tcolorbox

Manual for version 4.22
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Abstract

tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of \LaTeX{} examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.

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1 Introduction

The package originates from the first edition of my book «\textit{\LaTeX - Einführung in das Textsetsystem}» [21] in about 2006. For the \LaTeX{} examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [18–20] as well. With this package, you are invited to apply these boxes for similar projects.

Starting with version 2.00, for all internal calculations \varepsilon-\TeX{} [2] expressions are used in replacement of the package \texttt{calc}. The breaking news for version 2.00 is the support for breakable boxes. This new feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested ‘side by side’ mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX{} distribution and there is nothing special to do for a user.

If you intend to make a local installation \textit{by hand}, see the README file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [22], \texttt{verbatim} [17], \texttt{etoolbox} [7], and \texttt{environ} [16]. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{verbatim}
\usepackage{tcolorbox}
\end{verbatim}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\mbox{\textbackslash tcbuselibrary\textasciitilde{}P.\textdegree{9}}} (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[\mbox{\textbackslash listings}]{tcolorbox}
\end{verbatim}
1.3 Libraries

The base package \texttt{tcolorbox} is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\begin{verbatim}
\tcbuselibrary{⟨key list⟩}
\end{verbatim}

Loads the libraries given by the \texttt{⟨key list⟩}.

\begin{verbatim}
\tcbuselibrary{listings, theorems}
\end{verbatim}

The following keys are used inside \texttt{\tcbuselibrary} respectively \texttt{\usepackage} without the key tree path /tcb/library/.

\begin{itemize}
\item /tcb/library/skins
  \begin{verbatim}
  \tcbuselibrary{skins}
  \end{verbatim}
  Loads the package \texttt{tikz} \cite{tikz} and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 152.
\item /tcb/library/vignette
  \begin{verbatim}
  \tcbuselibrary{vignette}
  \end{verbatim}
  Provides code for more ornamental; see Section 14 from page 275.
\item /tcb/library/raster
  \begin{verbatim}
  \tcbuselibrary{raster}
  \end{verbatim}
  Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 15 from page 287.
\item /tcb/library/listings
  \begin{verbatim}
  \tcbuselibrary{listings}
  \end{verbatim}
  Loads the package \texttt{listings} \cite{listings} and provides additional macros for typesetting listings which are described in Section 16 from page 309.
\item /tcb/library/listingsutf8
  \begin{verbatim}
  \tcbuselibrary{listingsutf8}
  \end{verbatim}
  Loads the packages \texttt{listings} \cite{listings} and \texttt{listingsutf8} \cite{listingsutf8} for UTF-8 support. This is a variant of the library \texttt{listings} and is described in Section 16 from page 309.
\item /tcb/library/minted
  \begin{verbatim}
  \tcbuselibrary{minted}
  \end{verbatim}
  Loads the package \texttt{minted} \cite{minted} to typeset listings with the \texttt{Pygments} \cite{pygments} tool, also see Section 16 on page 309.
\item /tcb/library/theorems
  \begin{verbatim}
  \tcbuselibrary{theorems}
  \end{verbatim}
  Provides additional macros for typesetting theorems which are described in Section 17 from page 350.
\item /tcb/library/breakable
  \begin{verbatim}
  \tcbuselibrary{breakable}
  \end{verbatim}
  Provides support for automatic box breaking from one page to another; see Section 18 on page 374.
\item /tcb/library/magazine
  \begin{verbatim}
  \tcbuselibrary{magazine}
  \end{verbatim}
  Provides support for storing broken box parts to be used later or in interchanged order, Section 19 on page 399.
\item /tcb/library/poster
  \begin{verbatim}
  \tcbuselibrary{poster}
  \end{verbatim}
  Provides support for creating posters, Section 20 on page 409.
\item /tcb/library/fitting
  \begin{verbatim}
  \tcbuselibrary{fitting}
  \end{verbatim}
  Provides support for font size adaption of the box content to the box dimensions; see Section 21 from page 422.
\item /tcb/library/hooks
  \begin{verbatim}
  \tcbuselibrary{hooks}
  \end{verbatim}
  Extends several option keys to 'hookable' keys; see Section 22 from page 433.
\end{itemize}
/tcb/library/xparse

Provides document command production with \texttt{xparse} for \texttt{tcolorbox}; see Section 23 from page 444.

/tcb/library/external

Provides externalization support for stand-alone document snippets, see Section 24 on page 457.

/tcb/library/documentation

Provides additional macros for typesetting \LaTeX\ documentations which are described in Section 25 from page 469.

/tcb/library/many

Loads the libraries \texttt{skins}, \texttt{breakable}, \texttt{raster}, \texttt{hooks}, \texttt{theorems}, \texttt{fitting}, and \texttt{xparse}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of typesetting listings and using the specialized \texttt{documentation} library.

/tcb/library/most

Loads all libraries except \texttt{minted} and \texttt{documentation}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of using the \texttt{minted} package and using the specialized \texttt{documentation} library.

/tcb/library/all

Loads all libraries. Use this shortcut only, if you intend to use the \texttt{documentation} library.

## Package \texttt{tcolorbox}

### Basic Features

- Base package

### Advanced Features

- \texttt{breakable}
- \texttt{external}
- \texttt{fitting}
- \texttt{hooks}
- \texttt{magazine}
- \texttt{poster}
- \texttt{raster}
- \texttt{skins}
- \texttt{theorems}
- \texttt{vignette}
- \texttt{xparse}

### Advanced Listings

- \texttt{listings}
- \texttt{listingsutf8}

### Documentation

- \texttt{documentation}

3 Macros for Box Creation

\begin{tcolorbox}\[\langle options\rangle \]
\textbf{environment content} \\
\end{tcolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

This is a tcolorbox.

The text content of the box can be divided in an upper and a lower part by the command \texttt{\tcblower}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

This is another tcolorbox.

Here, you see the lower part of the box.

The \langle options\rangle control the appearance and several functions of the boxes, see Section 4 on page 18 for the complete list. A quick example is given here:

\begin{tcolorbox}\[colback=red!5!white,colframe=red!75!black,title=My nice heading\]
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

My nice heading

This is another tcolorbox.

Here, you see the lower part of the box.

\tcblower
Used inside tcolorbox to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{\tcbline} on page \pageref{p:tcbline}.
\texttt{\textbackslash tcbset\{\langle options\rangle\}}

Sets options for every following \texttt{tcolorbox} inside the current TEX group. By default, this does not apply to nested boxes, see Section 4.16 on page 94. For example, the colors of the boxes may be defined for the whole document by this:

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\end{verbatim}

\texttt{\textbackslash tcbsetforeverylayer\{\langle options\rangle\}}

Sets options for every following \texttt{tcolorbox} inside the current TEX group. In contrast to \texttt{\tcbset}, this does also apply to nested boxes, see Section 4.16 on page 94. Technically, the \langle \textit{options} \rangle are appended to the default values for every \texttt{tcolorbox} which are applied by \texttt{/tcb/reset}.

You should not use this macro, if you are not completely sure that you want to have the \langle \textit{options} \rangle also for boxes in boxes (in boxes in boxes ...).
\textbf{tcbbox[(options)]{(box content)}}

Creates a colored box which is fitted to the width of the given \textit{(box content)}. In principle, most \textit{(options)} for a \texttt{tcolorbox} \textsuperscript{P.12} can be used for \texttt{tcbbox} with some restrictions. A \texttt{tcbbox} cannot have a lower part and cannot be broken.

\begin{tcolorbox}[colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, nobeforeafter, center title]
Text \texttt{tcbbox[tcbbox raise base]{Hello World}}\hfill
% \texttt{tcbbox[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm, toptitle=0.5mm,bottomtitle=0.5mm,title=My table}{%}
\texttt{arrayrulecolor{blue!50!black}}\texttt{\renewcommand{\arraystretch}{1.2}}%\texttt{\begin{tabular}{r|c|l}\hline
One & Two & Three \\
Men & Mice & Lions \\
Upper & Middle & Lower
\end{tabular}}\hfill
% \texttt{tcbbox[colback=blue!85!black, left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt, title=My picture}{%}
\texttt{\includegraphics[width=5cm]{Basilica_5.png}}
\end{tcolorbox}

% \usepackage{tikz}
\texttt{tcbset}{colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, center title}

% \texttt{Fixed width box}
\begin{tcolorbox}Hello\ World!\end{tcolorbox}

% \texttt{Fitted width box (like hbox or makebox)}
\texttt{tcbbox}{Hello\ World!}

% \texttt{Fitted width box (using a \texttt{tikznode} node)}
\texttt{tcbbox[tikznode]{Hello\ World!}}
See Section 23.2 on page 446 and Section 23.3 on page 449 for more elaborate methods to create new environments and commands.

\newtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Creates a new environment \langle name \rangle based on \texttt{tcolorbox}. Basically, \newtcolorbox operates like \texttt{newenvironment}. This means, the new environment \langle name \rangle optionally takes \langle number \rangle arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \texttt{tcolorbox}. Note that /tcb/savedelimiter is set to the given \langle name \rangle automatically. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 111.

\begin{tcolorbox}[mybox]{colback=red!5!white, colframe=red!75!black}
This is my own box.
\end{tcolorbox}

\begin{tcolorbox}[mybox][1]{colback=red!5!white, colframe=red!75!black,fonttitle=bfseries, title=#1}
\begin{tcolorbox}[mybox]{Hello there}
This is my own box with a mandatory title.
\end{tcolorbox}

\begin{tcolorbox}[mybox][2]
\begin{tcolorbox}[mybox][colback=yellow]{Hello there}
This is my own box with a mandatory title and options.
\end{tcolorbox}

Definition in the preamble:

\begin{tcolorbox}[auto counter,number within=section]{pabox}[colback=red!5!white, colframe=red!75!black,fonttitle=bfseries, colbacktitle=red!85!black,enhanced, attach boxed title to top center={yshift=-2mm}, title=#2,#1}
\begin{pabox}{colback=yellow}{Hello there}
This is my own box with a mandatory numbered title and options.
\end{pabox}

\begin{pabox}{colback=red!5!white, colframe=red!75!black,fonttitle=bfseries, title=Examp.-#2,#1}
\begin{pabox}{colback=yellow}{Hello there}
This is my own box with a mandatory numbered title and options.
\end{pabox}

\renewtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Operates like \newtcolorbox, but based on \renewenvironment instead of \texttt{newenvironment}. An existing environment is redefined.
\newtcbox\{\langle init options \rangle\}\{\langle name \rangle\}\{\langle number \rangle\}\{\langle default \rangle\}\{\langle options \rangle\}

Creates a new macro \langle name \rangle based on \tcbox. Basically, \newtcbox operates like \newcommand. The new macro \langle name \rangle optionally takes \langle number \rangle+1 arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \tcbox. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 111.

\newtcbox\{\mybox\}\{colback=red!5!white, colframe=red!75!black\}
\mybox\{This is my own box.\}

\newtcbox\{\mybox\}[1]\{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\#1\}
\mybox\{Hello there\}\{This is my own box.\}

\newtcbox\{\mybox\}[2]\[\]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\#2,\#1\}
\mybox\{colback=yellow\}\{Hello there\}\%
\{This is my own box.\}

Definition in the preamble:

\%
\counter from previous example
\newtcbox\{\use counter from=pabox\}\{\pbbox\}\[2]\[\]{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=\{\thetcbcounter\} \#2,\#1\}

\pbbox\{colback=yellow\}\{Hello there\}\%
\{This is my own box.\}

\newtcbox\{\mybox\}\[1]\[red\]\{on line, arc=0pt,outer arc=0pt,colback=\#1!10!white,colframe=\#1!50!black, boxsep=0pt,left=ipt,right=ipt,top=2pt,bottom=2pt, boxrule=0pt,bottomrule=ipt,toprule=ipt\}
\newtcbox\{\xmybox\}\[1]\[red\]\{on line, arc=7pt,colback=\#1!10!white,colframe=\#1!50!black, before upper=\{\rule[-3pt]{0pt}{10pt}\},boxrule=ipt, boxsep=0pt,left=6pt,right=6pt,top=2pt,bottom=2pt\}

The \mybox\{green\}\{quick\} brown \mybox\{fox\} \mybox\{blue\}\{jumps\} over the \mybox\{green\}\{lazy\} \mybox\{dog\}. \par
The \mybox\{green\}\{quick\} brown \mybox\{fox\} \mybox\{blue\}\{jumps\} over the \mybox\{green\}\{lazy\} \mybox\{dog\}.

The quick brown fox jumps over the lazy dog.

\renewtcbox\{\langle init options \rangle\}\{\langle name \rangle\}\{\langle number \rangle\}\{\langle default \rangle\}\{\langle options \rangle\}

Operates like \newtcbox, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
An existing environment \textit{name} is redefined to be boxed inside a \texttt{tcolorbox} with the given \textit{options}.

\begin{alltt}
\% tcbuselibrary{skins}
\newenvironment{myitemize}{\begin{itemize}}{\end{itemize}}
\tcolorboxenvironment{myitemize}{blanker,
\begin{itemize}
\item Alpha
\item Beta
\item Gamma
\end{itemize}
More text.
\end{alltt}

See further examples in Section 17.4 on page 373.
4 Option Keys

For the \textit{\langle options\rangle} in \texttt{tcolorbox}\textsuperscript{P.12} respectively \texttt{\textbackslash tcbset}\textsuperscript{P.13} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see [21, 22] or the examples starting from page 337.

4.1 Title

\texttt{/tcb/title=\langle text\rangle} (no default, initially empty)

Creates a heading line with \langle text\rangle as content.

\begin{tcolorbox}[title=My heading line]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My heading line
This is a \textbf{tcolorbox}.

\texttt{/tcb/notitle} (no value, initially set)

Removes the title line if set before.

\texttt{/tcb/adjusted title=\langle text\rangle} (style, no default, initially unset)

Creates a heading line with \langle text\rangle as content. The minimal height of this line is adjusted to fit the text given by \texttt{/tcb/adjust text}. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

\tcbset{colback=White,arc=0mm,width=(\linewidth-4pt)/4,equal height group=AT,before=,after=\hfill,fonttitle=\bfseries}

The following titles are not adjusted:\\ 
\foreach \n in {xxx,ggg,AAA,\"Agypten}\n{\begin{tcolorbox}[title=\n,colframe=red!75!black] Some content. \end{tcolorbox}}

Now, we try again with adjusted titles:\\ 
\foreach \n in {xxx,ggg,AAA,\"Agypten}\n{\begin{tcolorbox}[adjusted title=\n,colframe=blue!75!black] Some content. \end{tcolorbox}}

The following titles are not adjusted:

<table>
<thead>
<tr>
<th>xxx</th>
<th>ggg</th>
<th>AAA</th>
<th>Ägypten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some content.</td>
<td>Some content.</td>
<td>Some content.</td>
<td>Some content.</td>
</tr>
</tbody>
</table>

Now, we try again with adjusted titles:

<table>
<thead>
<tr>
<th>xxx</th>
<th>ggg</th>
<th>AAA</th>
<th>Ägypten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some content.</td>
<td>Some content.</td>
<td>Some content.</td>
<td>Some content.</td>
</tr>
</tbody>
</table>

\texttt{/tcb/adjust text=\langle text\rangle} (no default, initially \texttt{`\textasciitilde Apgjy'})

This sets the reference text for \texttt{/tcb/adjusted title}. If your texts never exceed \texttt{`\textasciitilde Apgjy'} in depth and height you don’t need to care about this option.
/tcb/squeezed title=⟨text⟩ (style, no default, initially unset)

Creates a single heading line with ⟨text⟩ as content. If the ⟨text⟩ is longer than the available space, the text is squeezed to fit into the available space.

\begin{tcbitemize}
\raster
\squeezed title={Short title}
First box
\squeezed title={This is a very very long title}
Second box
\squeezed title={This title is clearly to long for this application}
Third box
\end{tcbitemize}

/tcb/squeezed title*=⟨text⟩ (style, no default, initially unset)

This is a combination of /tcb/adjusted title and /tcb/squeezed title.

\begin{tcbitemize}
\raster
\squeezed title*={Short title}
First box
\squeezed title*={This is a very very long title}
Second box
\squeezed title*={This title is clearly to long for this application}
Third box
\end{tcbitemize}

/tcb/titlebox=⟨mode⟩ (no default, initially visible)

Controls the treatment of the title part of the box. Feasible values for ⟨mode⟩ are:
- visible: usual type setting of the title box,
- invisible: empty space instead of the title contents.

\begin{tcolorbox}
\title=My invisible title,
titlebox=invisible
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.
/tcb/detach title  (no value)
Detaches the title from its normal position. The text of the title is stored into \tcbtitletext and the formatted title is available by \tcbtitle. The main application is to move the title from its usual place to another one.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,before upper={	cbtitle \quad}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,after upper={\par\hfill \tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\newtcolorbox{mybox}[2][]{colbacktitle=red!10!white, colback=blue!10!white,coltitle=red!70!black, title=#2,fonttitle=\bfseries,#1}

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,before upper={\tcbtit\quad}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,after upper={\par\hfill \tcbtit\quad}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title
This is a tcolorbox.

My title
This is a tcolorbox.

This is a tcolorbox.

My title
This is a tcolorbox.

/tcb/attach title (no value)
Attaches the title to its normal position. This option is used to reverse /tcb/detach title.

/tcb/attach title to upper=(text) (style, default empty, initially unset)
Attaches the title to the begin of the upper part of the box content. The optional \langle text \rangle is set between the formatted title and the box content.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper={\ ---\ }]\{My title
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper,after title={:\ }]\{My title
This is a \textbf{tcolorbox}.
\end{mybox}

\newtcolorbox{mybox}[2][]{colbacktitle=red!10!white, colback=blue!10!white,coltitle=red!70!black, title=#2,fonttitle=\bfseries,#1}

\begin{mybox}{attach title to upper={\ ---\ }}\{My title
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper,after title={:\ }]\{My title
This is a \textbf{tcolorbox}.
\end{mybox}

My title — This is a tcolorbox.

My title: This is a tcolorbox.

More title options are documented in Section 4.11 on page 64 and Section 10.2 on page 159.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further \textit{tcolorbox} which inherits some color and geometry options from the enclosing box. It may be customized just like any other \textit{tcolorbox}.

\begin{tcolorbox}[title=My title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries] This is a \textit{tcolorbox}. \tcbsubtitle% {My subtitle} Further text. \end{tcolorbox}

My title

This is a \textit{tcolorbox}.

My subtitle

Further text.

\begin{tcolorbox}[title=My title, colback=red!5!white, colframe=red!75!black, colbacktitle=yellow!50!red, coltitle=red!25!black, fonttitle=\bfseries] This is a \textit{tcolorbox}. \tcbsubtitle% {My subtitle} Further text. \end{tcolorbox}

My title

This is a \textit{tcolorbox}.

My subtitle

Further text.

N 2014-10-10/tcb/subtitle style=(no default, initially empty) Adds \textit{tcolorbox} \textit{(options)} to the settings for \textit{\tcbsubtitle}.
4.3 Upper Part

The text content of a \textcolor{red}{tcolorbox}\textsuperscript{P.12} may be parted into a mandatory upper part and an optional lower part. These parts are separated by \textcolor{red}{tcblower}\textsuperscript{P.12}. If there is no \textcolor{red}{tcblower}\textsuperscript{P.12} present, there is no lower part and the upper part forms the complete text content.

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\bigskip

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}
\begin{tcolorbox}[invisible,saveto={\jobname\_mysave1.tex},colback=white]
This is a \textbf{tcolorbox} which seems to be empty.
The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:\\
\input{\jobname\_mysave1.tex}

Now, we load the saved text:
This is a \textbf{tcolorbox}.
This is the lower part.
\begin{tcolorbox}[saveto={\jobname\_mysave2.tex}]
This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10, coltitle=black,colbacktitle=red!20,sidebyside, title=Here we see the saved content including the lower part]
\input{\jobname\_mysave2.tex}
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

Now, we load the saved text:
Here we see the saved content including the lower part
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is the lower part.
4.4 Lower Part

/\texttt{tcb/lowerbox}=\langle\texttt{mode}\rangle \quad \text{(no default, initially visible)}

Controls the treatment of the lower part of the box. Feasible values for \langle\texttt{mode}\rangle are:
- \texttt{visible}: usual type setting of the lower part,
- \texttt{invisible}: empty space instead of the lower part contents,
- \texttt{ignored}: the lower part is not used (here).

The last two values are usually applied in connection with \texttt{savelowerto}.

\begin{tcolorbox}[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but ignored).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex:
$$f(x) = \frac{1+x^2}{1-x^2}.$$\end{tcolorbox}

Now, we load the saved text:
\input{\jobname_bspsave.tex}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex: $f(x) = \frac{1+x^2}{1-x^2}$.
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex: $f(x) = \frac{1+x^2}{1-x^2}$.
\end{tcolorbox}
/tcb/lower separated=true|false (default true, initially true)

If set to true, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.
\newenvironment{mybox}[1][]{%
\begin{tcolorbox}[savedelimiter=mybox, 
  savelowerto=\jobname_bspsave2.tex,lowerbox=ignored, 
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, 
  title=#1]
\begin{mybox}{My Example}
Upper part.
\tcblower 
Saved lower part!
\end{mybox}
Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
\begin{mybox}{My Example}
Upper part.
\tcblower 
Saved lower part!
\end{mybox}
Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
4.5 Colors and Fonts

\begin{tcolorbox} \[colframe=\text{red!50!white}\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

\begin{tcolorbox} \[colback=\text{red!50!white}\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

\begin{tcolorbox} \[title=My title, title filled\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

\begin{tcolorbox} \[colbacktitle=\text{red!50!white},
   title=My title, coltitle=black,
   fonttitle=\bfseries\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.
/tcb/colupper=⟨color⟩
Sets the text ⟨color⟩ of the upper part.

```
\begin{tcolorbox}[colupper=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/collower=⟨color⟩
Sets the text ⟨color⟩ of the lower part.

```
\begin{tcolorbox}[collower=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/coltext=⟨color⟩
Sets the text ⟨color⟩ of the box. This is an abbreviation for setting colupper and collower to the same value.

```
\begin{tcolorbox}[coltext=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/coltitle=⟨color⟩
Sets the title text ⟨color⟩ of the box.

```
\begin{tcolorbox}[coltitle=red!75!black,
  colbacktitle=black!10!white,title=Test]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Test
This is a \textbf{tcolorbox}.
/tcb/fontupper=(text)  (no default, initially empty)
Sets \textit{text} before the content of the upper part (e.g. font settings).

\begin{tcolorbox}[fontupper=Hello! \sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello! This is a \textit{tcolorbox}.

/tcb/fontlower=(text)  (no default, initially empty)
Sets \textit{text} before the content of the lower part (e.g. font settings).

\begin{tcolorbox}[fontlower=\sffamily\bfseries]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textit{tcolorbox}.

This is the lower part.

/tcb/fonttitle=(text)  (no default, initially empty)
Sets \textit{text} before the content of the title text (e.g. font settings).

\begin{tcolorbox}[fonttitle=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{Hello}

This is a \textit{tcolorbox}.

More color options are provided by using skins documented in Section 10 from page 152.
4.6 Text Alignment

\texttt{/tcb/halign=(alignment)} (no default, initially \texttt{justify})

If there is no lower part, \texttt{halign} determines the horizontal \texttt{(alignment)} of the text content. Otherwise, \texttt{halign} determines the horizontal \texttt{(alignment)} of the upper part of the box only. The feasible values for \texttt{(alignment)} are more or less identical to the corresponding \texttt{/tikz/align} settings, even if the implementation differs.

- \texttt{justify}: usual left and right justified type setting.
- \texttt{left}: left border justification in analogy to plain \LaTeX{}.
- \texttt{flush left}: left border justification with \texttt{\raggedright} of \LaTeX{}.
- \texttt{right}: right border justification in analogy to plain \LaTeX{}.
- \texttt{flush right}: right border justification with \texttt{\raggedleft} of \LaTeX{}.
- \texttt{center}: centering in analogy to plain \LaTeX{}.
- \texttt{flush center}: centering with \texttt{\centering} of \LaTeX{}.

The differences between the flush and non-flush version are explained in detail in the \texttt{TikZ} manual [22]. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

```latex
\tcbset{colback=red!5!white,colframe=red!75!black,size=small, fonttitle=\bfseries,width=3.5cm,box align=top, nobeforeafter}

\begin{tcolorbox}[adjusted title=flush center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign upper=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
```

\texttt{flush center}

This is a demonstration text for showing how line breaking works.

\texttt{flush left}

This is a demonstration text for showing how line breaking works.

\texttt{flush right}

This is a demonstration text for showing how line breaking works.

\texttt{center}

This is a demonstration text for showing how line breaking works.

\texttt{left}

This is a demonstration text for showing how line breaking works.

\texttt{right}

This is a demonstration text for showing how line breaking works.

\texttt{/tcb/halign upper=(alignment)} (no default, initially \texttt{justify})

Alias for \texttt{/tcb/halign}.
\begin{tcbraster}
[raster columns=3,fonttitle=\bfseries,
colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign lower=center]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign lower=left]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign lower=right]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\end{tcbraster}

\begin{flushcenter}
Upper part.
\end{flushcenter}

\begin{flushleft}
Upper part.
\end{flushleft}

\begin{flushright}
Upper part.
\end{flushright}
halign lower determines the horizontal \(\langle\text{alignment}\rangle\) of the title of the box. The feasible values for \(\langle\text{alignment}\rangle\) are the same as for \(\text{/tcb/halign}\)\(^{P.30}\).

\[\begin{tcbraster}\text{flush center }\begin{tcolorbox}[adjusted title=flush center,halign title=flush center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\begin{tcbraster}\text{flush left }\begin{tcolorbox}[adjusted title=flush left,halign title=flush left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\begin{tcbraster}\text{flush right }\begin{tcolorbox}[adjusted title=flush right,halign title=flush right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\end{tcbraster}\]

\[\begin{tcbraster}\text{center }\begin{tcolorbox}[adjusted title=flush center,halign title=center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\begin{tcbraster}\text{left }\begin{tcolorbox}[adjusted title=flush center,halign title=left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\begin{tcbraster}\text{right }\begin{tcolorbox}[adjusted title=flush center,halign title=right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}\]
\[\end{tcbraster}\]
The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 53.

\tcbAlign{alignment}  \hspace{2cm} (no default, initially top)

If the height of a \texttt{tcolorbox} is not the natural height, \texttt{valign} determines the vertical \texttt{(alignment)} of the upper part. Feasible values are:

- \texttt{top}: Anchor text at top.
- \texttt{center}: Anchor text at center.
- \texttt{bottom}: Anchor text at bottom.
- \texttt{scale}: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 21 on page 422 alternatively.
- \texttt{scale*}: Like \texttt{scale}, but scaling is bounded by \texttt{/tcb/valign scale limit}.

For a box with natural height, these settings are meaningless.

\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/valign upper=alignment}  \hspace{2cm} (no default, initially top)

Alias for \texttt{/tcb/valign}.

\texttt{/tcb/valign lower=alignment}  \hspace{2cm} (no default, initially top)

This key has the same meaning for the lower part as \texttt{valign} for the upper part, i.e., it determines the vertical \texttt{(alignment)} of the lower part with feasible values \texttt{top}, \texttt{center}, \texttt{bottom}, \texttt{scale}, and \texttt{scale*}.

\texttt{/tcb/valign scale limit=real number}  \hspace{2cm} (no default, initially 1.1)

Sets an upper scale limit for the \texttt{scale*} setting in \texttt{/tcb/valign} and \texttt{/tcb/valign lower}. Note that this value is not reset by \texttt{/tcb/reset} \textsuperscript{P.109}. So, changes also apply to embedded boxes.

Also see \texttt{/tcb/sidebyside align} \textsuperscript{P.120} for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

\[ /tcb/width=(\text{length}) \]
(no default, initially $\backslash\text{linewidth}$)
Sets the total width of the colored box to $\text{(length)}$. See also \textit{/tcb/height} \textsuperscript{P.53}.

\begin{tcolorbox}{width=1cm}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}

See Section 4.10 on page 53 for setting fixed height values.
4.7.2 Rules

\texttt{/tcb/toprule=⟨length⟩} (no default, initially 0.5mm)
Sets the line width of the top rule to \(⟨\text{length}⟩\).

\begin{tcolorbox}[toprule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/bottomrule=⟨length⟩} (no default, initially 0.5mm)
Sets the line width of the bottom rule to \(⟨\text{length}⟩\).

\begin{tcolorbox}[bottomrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/leftrule=⟨length⟩} (no default, initially 0.5mm)
Sets the line width of the left rule to \(⟨\text{length}⟩\).

\begin{tcolorbox}[leftrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/rightrule=⟨length⟩} (no default, initially 0.5mm)
Sets the line width of the right rule to \(⟨\text{length}⟩\).

\begin{tcolorbox}[rightrule=3mm]
This is a \textbf{tcolorbox}.
/tcb/titlerule=(length)  (no default, initially 0.5mm)
Sets the line width of the rule below the title to ⟨length⟩.

\tcbset{enhanced,colback=red!5!white,colframe=red!75!black, colbacktitle=red!90!black}
\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/boxrule=(length)  (style, no default, initially 0.5mm)
Sets all rules of the frame to ⟨length⟩, i.e. /tcb/toprule\textsuperscript{P.35}, /tcb/bottomrule\textsuperscript{P.35}, /tcb/leftrule\textsuperscript{P.35}, /tcb/rightrule\textsuperscript{P.35}, and /tcb/titlerule.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

More options for drawing a /tcb/borderline\textsuperscript{P.181} are provided by using skins documented in Section 10 from page 152.

4.7.3 Arcs
/tcb/arc=(length)  (no default, initially 1mm)
Sets the inner radius of the four frame arcs to ⟨length⟩.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Sets `/tcb/circular arc` to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

If the height of the box is smaller than the width, the result will look quite ugly.

```
\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center, square,circular arc]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Sets `/tcb/bean arc` to match the smaller value of the half of the inner width and of the inner height of the colored box.

This only works for a fixed `/tcb/height`. Also, `/tcb/bean arc` must be used after width and height are set by option keys.

```
\tcbset{size=fbox,boxrule=0.5mm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center}
\begin{tcolorbox}[width=3cm,height=2cm, bean arc]
Box A
\end{tcolorbox}

\begin{tcolorbox}[width=2cm,height=3cm, bean arc]
Box B
\end{tcolorbox}
```

Sets `/tcb/octogon arc` to match $\frac{1}{2+\sqrt{2}}$ of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.

```
\begin{tcolorbox}[enhanced, size=minimal,auto outer arc, width=2.1cm,octogon arc, colback=red,colframe=white,colupper=white, fontupper={\fontsize{7mm}{7mm}\selectfont\bfseries\sffamily}, halign=center,valign=center, square,arc is angular, borderline={0.2mm}{-1mm}{red} ]
\end{tcolorbox}
```
Using this option applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option resets the patch from /tcb/arc is angular. The original TikZ code is activated.

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by /tcb/arc. 

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
4.7.4 Spacing

/\texttt{tcb/boxsep}=⟨\texttt{length}⟩  
(no default, initially 1mm)

Sets a common padding of ⟨length⟩ between the text content and the frame of the box. This value is added to the key values of left, right, top, bottom, and middle at the appropriate places.

\begin{tcolorbox} \texttt{\[boxsep=5mm\]}  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

\begin{tcolorbox} \texttt{\[boxsep=5mm,draft\]}  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

/tcb/\texttt{left}=⟨\texttt{length}⟩  
(style, no default, initially 4mm)

Sets the left space between all text parts and frame (additional to boxsep). This is an abbreviation for setting lefttitle, leftupper, and leftlower to the same value.

\begin{tcolorbox} \texttt{\[left=0mm\]}  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

\begin{tcolorbox} \texttt{\[grow to left by=5mm,left*=0mm, enhanced,show bounding box\]}  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

\textbf{N 2017-02-16} /\texttt{tcb/\texttt{left*=}}(\texttt{length})  
(style, no default)

Sets /tcb/left such that ⟨length⟩ is the distance between the left bounding box and the text parts.

\begin{tcolorbox} \texttt{\[\text{\texttt{left*=0mm}}\]}  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

\begin{tcolorbox} \texttt{\[\text{\texttt{grow to left by=5mm, left*=0mm, enhanced,show bounding box}}\]}  
This is some text.  
\end{tcolorbox}

\begin{tcolorbox} \texttt{\[\text{\texttt{grow to left by=5mm, left*=0mm, enhanced,show bounding box}}\]}  
This is some text.  
\end{tcolorbox}
**/tcb/lefttitle=(length)**  
(no default, initially 4mm)  
Sets the left space between title text and frame (additional to `boxsep`).

```latex
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[lefttitle=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.

**/tcb/leftupper=(length)**  
(no default, initially 4mm)  
Sets the left space between upper text and frame (additional to `boxsep`).

```latex
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftupper=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.

**/tcb/leftlower=(length)**  
(no default, initially 4mm)  
Sets the left space between lower text and frame (additional to `boxsep`).

```latex
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftlower=3cm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}.

**/tcb/right=(length)**  
(style, no default, initially 4mm)  
Sets the right space between all text parts and frame (additional to `boxsep`). This is an abbreviation for setting `righttitle`, `rightupper`, and `rightlower` to the same value.

```latex
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a \textbf{tcolorbox}. 
Sets /tcb/right such that \langle length \rangle is the distance between the right bounding box and the text parts.

\begin{tcolorbox}
  \flushright This is some text.
  \textbf{This is a tcolorbox.}
\end{tcolorbox}

Sets the right space between title text and frame (additional to boxsep).

\begin{tcolorbox}
  \textbf{My very long title text}
  \textbf{This is a tcolorbox with standard upper box dimensions.}
\end{tcolorbox}

Sets the right space between upper text and frame (additional to boxsep).

\begin{tcolorbox}
  \textbf{My very long title text}
  \textbf{This is a tcolorbox with compressed upper box dimensions.}
\end{tcolorbox}
/tcb/rightlower=⟨length⟩  
(no default, initially 4mm)  
Sets the right space between lower text and frame (additional to boxsep).

\begin{tcolorbox}[width=5cm,rightlower=2cm]  
This is a \textbf{tcolorbox} with standard upper box dimensions.  
\tcblower  
This is the lower part with large space at right.  
\end{tcolorbox}

This is a \textbf{tcolorbox} with standard upper box dimensions.  
This is the lower part with large space at right.

/tcb/top=⟨length⟩  
(no default, initially 2mm)  
Sets the top space between text and frame (additional to boxsep).

\begin{tcolorbox}[top=0mm]  
This is a \textbf{tcolorbox}.  
\tcblower  
This is the lower part.  
\end{tcolorbox}

This is a \textbf{tcolorbox}.  
This is the lower part.

/tcb/toptitle=⟨length⟩  
(no default, initially 0mm)  
Sets the top space between title and frame (additional to boxsep).

\begin{tcolorbox}[toptitle=3mm,title=My title]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

My title  
This is a \textbf{tcolorbox}.  

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/tcb/bottom={length}  (no default, initially 2mm)
Sets the bottom space between text and frame (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \texttt{tcolorbox}.
This is the lower part.

/tcb/bottomtitle={length}  (no default, initially 0mm)
Sets the bottom space between title and frame (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[bottomtitle=3mm, title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.

/tcb/middle={length}  (no default, initially 2mm)
Sets the space between upper and lower text to the separation line (additional to boxsep).

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[middle=0mm, boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \texttt{tcolorbox}.
This is the lower part.
4.7.5 Size Shortcuts

\texttt{/tcb/size=⟨name⟩} \hspace{1cm} \text{(no default, initially normal)}

Sets all geometry keys with exception of \texttt{/tcb/width} \textsuperscript{P.34} to predefined length values. For \langle name\rangle, the following values are feasible:

- \textbf{normal}: normal sized boxes e.g. of width $\texttt{\textbackslash linewidth}$.
- \textbf{title}: title line sized boxes.
- \textbf{small}: small boxes e.g. for keyword highlighting.
- \textbf{fbox}: identical to the standard \texttt{\textbackslash fbox}.
- \textbf{tight}: no padding space at all.
- \textbf{minimal}: no padding space, no box rules.

\tcbset{colback=red!5!white,colframe=red!75!black}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
\tcbox[size=\s,on line]{\s} }
\foreach \s in {normal,title,small,fbox,tight,minimal} {
\tcbox[size=\s,on line,title=Test]{\s} }
\foreach \s in {normal,title,small,fbox,tight,minimal} {
\begin{tcolorbox}[size=\s,on line,title=Test,width=2.2cm]
\s \tcblower lower\end{tcolorbox} }

\begin{table}
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textbf{Predefined values} & \textbf{normal} & \textbf{title} & \textbf{small} & \textbf{fbox} & \textbf{tight} & \textbf{minimal} \\
\hline
\textbf{boxrule} & 0.5mm & 0.4mm & 0.3mm & 0.4pt & 0.4pt & 0.0pt \\
\textbf{boxsep} & 1.0mm & 1.0mm & 1.0mm & 3.0pt & 0.0pt & 0.0pt \\
\textbf{left} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{right} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{top} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{bottom} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{toptitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{bottomtitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\textbf{middle} & 2.0mm & 0.75mm & 0.5mm & 1.0pt & 0.2pt & 0.0pt \\
\textbf{arc} & 1.0mm & 0.75mm & 0.5mm & 1.0pt & 0.0pt & 0.0pt \\
\textbf{outer arc} & auto & auto & auto & auto & 0.0pt & 0.0pt \\
\hline
\end{tabular}
\end{table}
Sets the text width of the upper part to the current line width plus an optional \langle length\rangle. This is achieved by changing the keys /tcb/width \textsuperscript{P.34} /tcb/enlarge left by \textsuperscript{P.86}, and /tcb/enlarge right by \textsuperscript{P.86} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given after all other geometry keys! Also see /tcb/grow sidewards by \textsuperscript{P.88} and /tcb/spread sidewards \textsuperscript{P.91}.

\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

Normal text for comparison:

Oversized box

Normal box
4.7.6 Toggle Left and Right

\begin{tcolorbox}[enhanced,breakable,toggle left and right,sharp corners,boxrule=0mm,top=0mm,bottom=0mm,left=1mm,right=1mm,rightrule=1cm,colupper=blue!25!black,interior style={fill overzoom image=lichtspiel.jpg,fill image opacity=0.25},frame style={pattern=crosshatch dots light steel blue},overlay={% \begin{tcbclipframe} \tcbifoddpage{\coordinate (X) at ([xshift=-5mm]frame.east);}{\coordinate (X) at ([xshift=5mm]frame.west);}\fill[shading=ball,ball color=blue!50!white,opacity=0.5](X) circle (4mm);\end{tcbclipframe}}\end{tcolorbox}

\lipsum[1-6]

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.


4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as /tcb/sharp corners or as /tcb/rounded corners \textsuperscript{P.49}. These settings are also reflected in the behavior of /tcb/borderline \textsuperscript{P.181} and /tcb/shadow \textsuperscript{P.192} as one would expect.

By default, all four corners are \textit{rounded}. So, only the /tcb/sharp corners option will be necessary for most use cases. The /tcb/rounded corners \textsuperscript{P.49} option can be used to revert a /tcb/sharp corners setting.

\texttt{/tcb/sharp corners=⟨position⟩} (default all, initially unset)

The \texttt{⟨position⟩} denotes one or more of the four box corners to be set as \textit{sharp} corners. The not assigned corners will retain their mode. Feasible values for \texttt{⟨position⟩} are:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,  
sharp corners=northwest ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,  
sharp corners ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.
/tcb/rounded corners=⟨position⟩
(default all, initially all)
The /tcb/rounded corners can be used to revert a /tcb/sharp corners setting.
The ⟨position⟩ denotes one or more of the four box corners to be set as rounded corners. The not assigned corners will retain their mode. Feasible values for ⟨position⟩ are²:

- northwest
- northeast
- southwest
- southeast
- north
- south
- east
- west
- downhill
- uphill
- all

²The graphical examples assume that the boxes where set to have sharp corners before.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners, rounded corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/sharpish corners
(style, no value)
Shortcut for setting /tcb/arc*P.36 and /tcb/outer arc*P.38 to 0pt. With this setting, rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Corners are still of type rounded with this option, but appear sharp. To switch back to rounded corners, one has to adapt /tcb/arc*P.36 and /tcb/outer arc*P.38.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The following examples will show the differences between \texttt{/tcb/rounded corners} \textsuperscript{P.49}, \texttt{/tcb/sharpish corners} \textsuperscript{P.49}, and \texttt{/tcb/sharp corners} \textsuperscript{P.48}. The later two give the same core box, but \texttt{/tcb/borderline} \textsuperscript{P.181} and \texttt{/tcb/shadow} \textsuperscript{P.192} settings are slightly different. The following examples use \texttt{/tcb/drop fuzzy shadow} \textsuperscript{P.186}.

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textbf{rounded corners}

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textbf{sharpish corners}

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textbf{sharp corners}
4.9 Transparency

Transparency effects are likely to be used in conjunction with \textit{jigsaw} skin variants, see Section 10.11 on page 205.

\begin{tcolorbox}[opacityframe=0.25, colframe=red] This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacityback=0.5] This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacitybacktitle=0.5, title filled, title=This is a title] This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title] This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/opacityupper=⟨fraction⟩  
(no default, initially 1.0)
Sets the text opacity of the upper box part to the given ⟨fraction⟩.

\begin{tcolorbox}
[enhanced,opacityupper=0.5,
  interior ]
  \(\langle\text{style}=\{\text{preaction}={\text{fill=white},\text{pattern=checkerboard},\text{color=gray!40}}\}\rangle\)
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitylower=⟨fraction⟩  
(no default, initially 1.0)
Sets the text opacity of the lower box part to the given ⟨fraction⟩.

\begin{tcolorbox}
[enhanced,opacitylower=0.5,
  interior ]
  \(\langle\text{style}=\{\text{preaction}={\text{fill=white},\text{pattern=checkerboard},\text{color=gray!40}}\}\rangle\)
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitytext=⟨fraction⟩  
(no default, initially 1.0)
Sets the text opacity of the upper and the lower box part to the given ⟨fraction⟩.

\begin{tcolorbox}
[enhanced,opacitytext=0.5,
  interior ]
  \(\langle\text{style}=\{\text{preaction}={\text{fill=white},\text{pattern=checkerboard},\text{color=gray!40}}\}\rangle\)
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitytitle=⟨fraction⟩  
(no default, initially 1.0)
Sets the text opacity of the box title to the given ⟨fraction⟩.

\begin{tcolorbox}
[enhanced,opacitytitle=0.7,
  coltitle=black,
  fonttitle=\textbf{bfseries},title=This is a title,
  title ]
  \(\langle\text{style}=\{\text{preaction}={\text{fill=white},\text{pattern=checkerboard},\text{color=gray!40}}\}\rangle\)
This is a \textbf{tcolorbox}.
\end{tcolorbox}

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4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable}, the height is always computed according to the \texttt{natural height}.

\texttt{/tcb/natural height} \hspace{1cm} (no value, initially set)

Sets the total height of the colored box to its natural height depending on the box content.

\texttt{/tcb/height=⟨length⟩} \hspace{1cm} (no default)

Sets the total height of the colored box to \texttt{⟨length⟩} independent of the box content. \texttt{⟨length⟩} is the minimum height of the box, if \texttt{/tcb/height plus} is larger than zero.

\begin{tcolorbox}[height=1cm,valign=center]
This box has a height of 1cm.
\end{tcolorbox}

\begin{tcolorbox}[height=2cm,valign=center]
This box has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}[height=3cm,split=0.5,valign=center,valign lower=center]
This box has a height of 3cm.
\end{tcolorbox}

\begin{tcolorbox}
\tcblower
Lower part.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/height plus=⟨length⟩} \hspace{1cm} (no default, initially \texttt{0pt})

The box may extend a given fixed \texttt{/tcb/height} up to the given \texttt{⟨length⟩}.
Sets the box height to a dimension between \(\langle \text{min} \rangle\) and \(\langle \text{max} \rangle\).

\% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter,
height from=2cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}

Sets the text height to \(\langle \text{length} \rangle\). This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width.\textsuperscript{P.34}

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}
This is a \textcolor{red}{tcolorbox} where the text area has a height of 2cm.
/tcb/add to height=⟨length⟩

(style, no default)

Adds ⟨length⟩ to the current height of the colored box. /tcb/height \textsuperscript{P.53} has to be set before this key is used! If this option is used several times, then the /tcb/height \textsuperscript{P.53} is also increased several times.

\begin{tcolorbox}
\text{This box has a height of 2cm.}
\end{tcolorbox}

\begin{tcolorbox}[add to height=1cm]
\text{This box has a height of 3cm.}
\end{tcolorbox}

/tcb/add to natural height=⟨length⟩

(style, no default)

The application of this option generates a box with natural height plus the given ⟨length⟩. If this option is used several times, then the last setting of ⟨length⟩ wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\begin{tcolorbox}
\text{This box has natural height.}
\end{tcolorbox}

\begin{tcolorbox}[add to natural height=1cm]
\text{This box has natural height plus 1 cm.}
\end{tcolorbox}
If set to `true`, the height of the `tcolorbox` is set to the rest of the available vertical space of the current page. If set to `maximum`, the page is compressed as much as possible. Note that the `tcolorbox` is always set as its own paragraph using this option. Also see `/tcb/text fill` on P.69.

Note that the library `breakable` has to be loaded to use this key!

This height control key is only applicable to unbreakable boxes, but it uses code from the library `breakable`. The counterpart for breakable boxes is `/tcb/height fixed` for P.381.

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a `tcbraster` on P.289.

If this option is used for a \texttt{tcolorbox} which is embedded inside another (outer) \texttt{tcolorbox} \textit{and} if this outer \texttt{tcolorbox} has a fixed height, then the given (\textit{fraction}) of the available text height of the outer \texttt{tcolorbox} is used as \texttt{/tcb/height $^{\text{P.53}}$} for the current \texttt{tcolorbox}. Otherwise, \texttt{/tcb/natural height $^{\text{P.53}}$} is applied for the current \texttt{tcolorbox}.
Sets `/tcb/height` \(^{53}\) to match the width of the colored box.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, square] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textit{tcolorbox}.

\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white,height=3cm}

\foreach \f in {0.2,0.4,0.7} {
\begin{tcolorbox}[space=\f]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}

This is the upper part.

This is the upper part.

This is the upper part.

This is the lower part.

This is the lower part.

This is the lower part.

This is the lower part.

/\tcb/\space=(\textit{fraction}) \quad \text{(no default, initially 0)}

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. \textit{\langle fraction \rangle} with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

\begin{tcolorbox}
\texttt{tcbset}\{width=(\texttt{\textbackslash linewidth}-2mm)/3,before=,after=\texttt{\textbackslash hfill}, colframe=blue!75!black,colback=white,height=3cm\}
\end{tcolorbox}

\foreach \f in {0.2,0.4,0.7} {
\begin{tcolorbox}[space=\f]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}

/\tcb/\space to upper \quad \text{(style)}

This is an abbreviation for \texttt{space}=1, i.e. all extra space is added to the upper part.

/\tcb/\space to lower \quad \text{(style, initially set)}

This is an abbreviation for \texttt{space}=0, i.e. all extra space is added to the lower part (if there is any).
/tcb/space to both

This is an abbreviation for \texttt{space=0.5}, i.e. the extra space equally distributed between the upper and the lower part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=3cm]
\foreach \myspace in \{space to upper,space to both,space to lower\}
{\begin{tcolorbox}[\myspace]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}}
\end{tcolorbox}

This is the upper part.

This is the upper part.

This is the upper part.

This is the lower part.

This is the lower part.

This is the lower part.

/tcb/space to\texttt{=}(macro)

(no default, initially unset)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is saved into the given local \texttt{=macro}. This \texttt{=macro} can and should be used inside the box content to add content which is vertically sized to match \texttt{=macro}.

- The actual length saved into \texttt{=macro} is adapted dynamically during several compilations – at least two, but maybe more.
- Due to the adaption algorithm, objects can be sized with \texttt{=macro} plus any offset length.
- Never ever use \texttt{=macro} multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to \texttt{=macro}.
- Never use this in combination with \texttt{/tcb/fit}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm,
space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:\\[2mm]\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\[1mm]
This is some other text.
\end{tcolorbox}

This is my box of height 3cm. The space is filled with a picture:

This is some other text.
/tcb/split=(fraction) \hspace{3cm} \text{(no default)}

If the height of a \texttt{tcolorbox} is not the natural height, the \texttt{(fraction)} with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \langle id \rangle serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

\begin{tcolorbox}[equal height group=A,adjusted title={One}]
My smallest box.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A,adjusted title={Two}]
This box is also small. But with a lower part.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A,adjusted title={Three}]
This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=B]
Now, we use another equal height group.
\end{tcolorbox}

\begin{equation*}
\int_{0}^{1} x^2 = \frac{1}{3}.
\end{equation*}

See Section 15 on page 287 for more equal height options.
/tcb/minimum for equal height group=⟨id⟩;⟨length⟩ (no default, initially unset)
Plants a ⟨length⟩ into the equal height group with the given ⟨id⟩. This ensures that the
height will not drop below ⟨length⟩. Note that you cannot reduce a computed height value
by using this key with a small value. The difference to applying /tcb/height\^{P.55} directly
is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm
if the content height is not too large.
\end{tcolorbox}
\begin{tcolorbox}
My second box.
\tcblower
This is the lower part.
\end{tcolorbox}
\begin{tcblisting}{raster equal height,colframe=blue!75!black,colback=white,raster every box/.style={minimum for current equal height group=2cm}}
A
\tcbitem B
\end{tcblisting}

\begin{tcolorbox}
\textbf{Mixed} with a listing.
\end{tcolorbox}

\textbf{Fourth box}
My final box.

/tcb/minimum for current equal height group=⟨length⟩ (no default, initially unset)
Sets /tcb/minimum for equal height group for the current equal height group. Appar-
ently, this only works for an already known equal height group, i.e. /tcb/equal height\^{P.61} has to be set before this option is used. This option is likely to be used in
combination with /tcb/raster equal height\^{P.298}

\begin{tcbitemize}
\tcbitem A
\tcbitem B
\end{tcbitemize}
Sets the current box to a fixed \texttt{/tcb/height} \textsuperscript{P.53} which is copied from an equal height group with the given \langle id \rangle. If this height is not available during the current compilation, no fixed height setting is used. If \langle id \rangle is omitted, the current equal height group is used which has to be set before by \texttt{/tcb/equal height group} \textsuperscript{P.61}. Note that the natural height of the current box is not considered for computation of the group height. The main application for \texttt{/tcb/use height from group} is that the height can be adapted further by \texttt{/tcb/add to height} \textsuperscript{P.55}.

\begin{tcolorbox}[use height from group=C,add to height=-2cm,\]
\texttt{colframe=blue!75!black,\textbackslash colback=white,} \]
\texttt{Height from group 'C' of the previous example, but reduced by 2cm.} \end{tcolorbox}

% \texttt{/tcbuselibrary{raster}}
\texttt{Every line is inside an equal height group:} \begin{tcbraster}\texttt{raster equal height=rows,} \begin{tcolorbox}First line\texttt{Second line}\end{tcolorbox} \begin{tcolorbox}[use height from group]Test\end{tcolorbox} \begin{tcolorbox}[use height from group]First line\texttt{Second line}\end{tcolorbox} \begin{tcolorbox}The height of this box rules.\end{tcolorbox} \end{tcbraster}

\texttt{\textbackslash tcbeheightfromgroup{\langle macro \rangle}{\langle id \rangle}}
\texttt{Saves the height from an equal height group with the given \langle id \rangle to a \langle macro \rangle. If this height is not available during the current compilation, \langle macro \rangle is set to 0pt.}
4.11 Box Content Additions

The following options introduce some arbitrary \textit{code} to the content of a \texttt{tcolorbox}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

\texttt{/tcb/before title}=\textit{code} \hspace{1cm} \text{(no default, initially unset)}

The given \textit{code} is placed \textit{after} the color and font settings and \textit{before} the content of the title.

\begin{verbatim}
\tcbset{before title={\textcolor{yellow}{\large Important:} ~},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
\textbf{Important:} My title
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/after title}=\textit{code} \hspace{1cm} \text{(no default, initially unset)}

The given \textit{code} is placed \textit{after} the content of the title.

\begin{verbatim}
\tcbset{after title={\hfill\colorbox{Navy}{approved}},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
My title \hspace{4cm} approved
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The given \texttt{code} is placed after the color and font settings and before the content of the upper part. The \texttt{code} is appended by a final \texttt{\ignorespaces}.

```
\tcbset{before upper={\textit{The story:}\par},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title

The story:
This is a \textbf{tcolorbox}.

The given \texttt{code} is placed after the color and font settings and before the content of the upper part. In contrast to \texttt{/tcb/before upper}, no \texttt{\ignorespaces} is appended. Use this for situations where \texttt{\ignorespaces} is not needed or causes harm.

```
\begin{tcolorbox}[size=small,tile,
colback=yellow!20,colbacktitle=yellow!70!black,
title=My table,hbox,center,center title,
before upper=\begin{tabular}{cc},
after upper=\end{tabular},]
\multicolumn{2}{c}{Title}\par
one & two  \\
three & four \\
\end{tcolorbox}
```

My table

<table>
<thead>
<tr>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
</tr>
<tr>
<td>two</td>
</tr>
<tr>
<td>three</td>
</tr>
<tr>
<td>four</td>
</tr>
</tbody>
</table>
The given \texttt{code} is placed after the content of the upper part. The \texttt{code} is prepended by a leading \unskip.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[before upper=\lqqq,after upper=\rrqq,
colback=red!5!white,colframe=red!75!black]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

From version 3.80 to 3.94, this option prepended an \unskip to the given \texttt{code}. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \unskip!).
\begin{tcolorbox}[size=small,bicolor,sidebyside,center lower,\noindent\begin{tabular}{cc}
|\textbf{Title}\hline
|one & two \\hline
|three & four \\hline
\end{tabular}]

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{\\begin{tabular}{cc}
|\textbf{Title}\hline
|one & two \\hline
|three & four \\hline
\end{tabular}}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
\begin{tabular}{cc}
|\textbf{Title}\hline
|one & two \\hline
|three & four \\hline
\end{tabular}
\end{tcolorbox}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
\begin{tabular}{cc}
|\textbf{Title}\hline
|one & two \\hline
|three & four \\hline
\end{tabular}
\end{tcolorbox}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
\begin{tabular}{cc}
|\textbf{Title}\hline
|one & two \\hline
|three & four \\hline
\end{tabular}
\end{tcolorbox}
The given \textit{⟨code⟩} is placed \textit{after} the content of the lower part. The \textit{⟨code⟩} is prepended by a leading \texttt{\unskip}.

\begin{tcolorbox}[after lower=\textit{This is the end.},
colback=red!5!white,colframe=red!75!black]
\textbf{This is a \textbf{tcolorbox}.}\\
\texttt{\tcblower} \\
This is the lower part. \\
\texttt{\end{tcolorbox}}

This is a \texttt{tcolorbox}.

This is the lower part. \textit{This is the end.}

\begin{tcolorbox}[before lower*=,after lower*=, 
colback=red!5!white,colframe=red!75!black]
\textbf{This is a \textbf{tcolorbox}.}\\
\texttt{\sin^2(x)+\cos^2(x)=1.}\\
\texttt{\end{tcolorbox}}

This is a \texttt{tcolorbox}.

\sin^2(x) + \cos^2(x) = 1.

From version 3.80 to 3.94, this option prepended an \texttt{\unskip} to the given \textit{⟨code⟩}. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \texttt{\unskip}!)
If `tcb/text fill` is used, one cannot have a lower part and the box is unbreakable.

This style sets `/tcb/before upper^P.65` and `/tcb/after upper^P.66` to embed the upper part with a minipage. If a fixed height was applied e.g. by `/tcb/height^P.53` or `/tcb/height fill^P.56`, this minipage gets a matching height. This allows to use vertical glue macros like \vfill to act like expected. If the box has no fixed height, setting `/tcb/text fill` has no other effect as making the box unbreakable.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, height=8cm, text fill, title={My filled box}]
This is a \textbf{tcolorbox}.
\par\vfill
\begin{center}
My middle text. \\
\end{center}
\par\vfill
This is the end of my box.
\end{tcolorbox}
This style sets /tcb/before upper^P.65 and /tcb/after upper^P.66 and several geometry keys to support a tabular* with the given \{preamble\}. The packages array and colortbl have to be loaded separately.

\begin{tcolorbox}
\[tabulars={@{\extracolsep{\fill}\hspace{5mm}}lrrrrr@{\hspace{5mm}}},
boxrule=0.5pt\]
title=My table
\hline
Group & One & Two & Three & Four & Sum\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00
\end{tcolorbox}

My table
\begin{tabular}{rrrrr}
  Group  & One & Two & Three & Four \\
  \hline
  Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
  \hline
  Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
  \hline
  Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
  \hline
  Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tabular}

This is a variant of /tcb/tabulars which adds some \{code\} before the table starts.

\begin{tcolorbox}
\[tabulars*=\{\extracolsep{\fill}\hspace{5mm}\},\{preamble\}\]
\begin{tabular}{rrrrr}
  One & Two & Three \\
  \hline
  1000.00 & 2000.00 & 3000.00 \\
  \hline
  2000.00 & 3000.00 & 4000.00
\end{tabular}
\end{tcolorbox}
If \texttt{/tcb/tabularx} or \texttt{/tcb/tabularx*} are used, one cannot have a lower part.

\texttt{/tcb/tabularx}=(\texttt{preamble}) \hfill (\textit{style})

This style sets \texttt{/tcb/before upper}^{\textup{P.65}} and \texttt{/tcb/after upper}^{\textup{P.66}} and several geometry keys to support a \texttt{tabularx} with the given \texttt{(preamble)}. The packages \texttt{tabularx} \citep{tabularx}, \texttt{array}, and \texttt{colortbl} have to be loaded separately.

\begin{tcolorbox}
\begin{tabular}{X||Y|Y|Y|Y||Y}
\hline
\textbf{Group} & One & Two & Three & Four & Sum \\
\hline
\textbf{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\textbf{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\textbf{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tabular}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tabular}{|X|X|X|}
\hline
\textbf{One} & Two & Three \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\hline
\end{tabular}
\end{tcolorbox}

\texttt{/tcb/tabularx*}=(\texttt{code})\{\texttt{preamble}\} \hfill (\textit{style})

This is a variant of \texttt{/tcb/tabularx} which adds some \texttt{(code)} before the table starts.

\begin{tcolorbox}
\begin{tabular}{|X/X/X|
\hline
\textbf{One} & Two & Three \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
/tcb/tikz upper={(options)} (style)
This style adds a centered \texttt{tikzpicture} environment to the start and end of the upper part. The \langle \text{options} \rangle may be given as TikZ picture options.

\begin{tcolorbox}[tikz upper,fonttitle=\bfseries,colback=white,colframe=black, title=\tikzname\ drawing]
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcolorbox}

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}

/tcb/tikz lower={(options)} (style)
This style adds a centered \texttt{tikzpicture} environment to the start and end of the lower part. The \langle \text{options} \rangle may be given as TikZ picture options.

\begin{tcblisting}{tikz lower,listing side text,fonttitle=\bfseries,bicolor,colback=LightBlue!50!white,colbacklower=white,colframe=black, righthand width=3cm,title=\tikzname\ drawing}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcblisting}

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
/tcb/tikznodetext{upper} \langle\text{options}\rangle \text{(style)}

This style places the upper part content into a centered Ti\kZ{} node. The \langle\text{options}\rangle may be given as Ti\kZ{} node options. This style is especially useful for boxes with multiline texts which are fitted to the text width.

% \usepackage{tikz}
\newtcbbox{headline}{\textbf{Important Headline}}[1\{\}]{enhanced,center,
  ignore nobreak,fontupper=\Large\bfseries,
  colframe=red!50!black,colback=red!10!white,
  drop fuzzy shadow=yellow,tikznodetext upper,#1}
\headline{Important
\\Headline}

/tcb/tikznodetext{lower} \langle\text{options}\rangle \text{(style)}

This style places the lower part content into a centered Ti\kZ{} node. The \langle\text{options}\rangle may be given as Ti\kZ{} node options.

% \usepackage{tikz}
\begin{tcolorbox}[bicolor,colback=LightBlue!50!white,colbacklower=white,
  colframe=black,tikznodetext lower={inner sep=2pt,draw=red,fill=yellow}]

Upper part.
\tcblower

Lower part.
\end{tcolorbox}

/tcb/tikznodetext \langle\text{options}\rangle \text{(style)}

Shortcut for setting /tcb/tikznodetext upper and /tcb/tikznodetext lower the same time.

/tcb/varwidth upper \langle\text{length}\rangle \text{(style, default /tcb/width \textsuperscript{P.34})}

This style places the upper part content into a \texttt{varwidth} environment. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. The resulting box has a maximal width of \langle\text{length}\rangle. This option is only senseful for a \texttt{tcbox} \textsuperscript{P.14}.

% \usepackage{varwidth}
\newtcbbox{varbox}{\texttt{Short text.}}[\texttt{This box contains is a longer text which is broken.}]
\varbox{Short text.}
\varbox{This box contains is a longer text which is broken.}
4.12 Overlays

With an overlay, arbitrary \textit{graphical code} can be added to a \texttt{tcolorbox}. This code is executed \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. Therefore, you can decorate the \texttt{tcolorbox} with your own extensions. Common special cases are \textit{watermarks} which are implemented using overlays. See Subsection 10.3 from page 169 if you want to add \textit{watermarks}.

If you use the core package only, the \textit{graphical code} has to be \texttt{pgf} code and there is not much assistance for positioning. Therefore, the usage of the \texttt{/tcb/enhanced} \textsuperscript{P.210} mode from the library \texttt{skins} is recommended which allows \texttt{tikz} code and gives access to \texttt{/tcb/geometry nodes} \textsuperscript{P.140} for positioning.

\texttt{/tcb/overlay=⟨graphical code⟩} \hspace{1em} (no default, initially unset)

Adds \textit{graphical code} to the box drawing process. This \textit{graphical code} is drawn \textit{after} the frame and interior \textit{before} the text content.

\begin{verbatim}
\% \tcbuselibrary{skins} \% preamble
\tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black,
enlarge top by=5.5mm,overlay={\foreach \x in {2cm,3.5cm} {
\begin{scope}[shift={([xshift=\x]frame.north west)}]
\path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
\path[fill=black] (-0.2,0) arc (0:180:1mm);
\end{scope}}}}}
\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\% \usetikzlibrary{patterns} \% preamble
\% \tcbuselibrary{skins} \% preamble
\tcbset{ribbonbox/.style={enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,overlay={\path[fill=blue!75!white,draw=blue,draw=blue,draw=white!85!blue,preaction={opacity=0.6,fill=blue!75!white},line width=0.1mm,double distance=0.2mm,pattern=fivepointed stars,pattern color=white!75!blue]
([xshift=-0.2mm,yshift=-1.02cm]frame.north east)
-- ++(-1,1) -- ++(-0.5,0) -- ++(1.5,-1.5) -- cycle;}}}
\begin{tcolorbox}[ribbonbox,title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}
This example demonstrates the application of break sequence specific overlay options. Here, we define an environment `myexample` based on `tcolorbox` where the visible drawing is done totally by overlay keys.

Here, the first application of `myexample` produces an unbroken `tcolorbox`. The frame is drawn by the code given with `/tcb/overlay unbroken`. The second application of `myexample` is broken into several parts which are drawn by the codes given with `/tcb/overlay first`, `/tcb/overlay middle`, and `/tcb/overlay last`.
Example 1

Example 2

euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus.
Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst.
Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean
placater. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar
elit purus eget enim. Nunc vitae tortor. Proin tempus nihb sit amet nisl. Vivamus quis tortor
vitaes risus porta vehicula.

Fusce mauris. Vestibulum luctus nihb at lectus. Sed bibendum, nulla a faucibus semper, leo
velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque,
augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Mae-
eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis
dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut
nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu.
Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel,
nisl. Ut lectus eros, malesuada at amet, fermentum eu, sodales cursus, magna. Donec eu
purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit
erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium,
ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas
vel, odio.

hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse
platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis
odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat
ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin
et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos
hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.
Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.
Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet
odio. Integer vitae justo. Aliquam vestibulum fringilla lorem. Sed neque lectus, consectetur
at, consectetur sed, eleifend ac, lectus. Nulla facilisi. Pellentesque eget lectus. Proin eu
mi, lacinia sit amet, placerat et, mollis vitae, dui. Sed ante tellus, tristique ut, iaculis eu,
malesuada ac, dui. Mauris nihb leo, facilisis non, adipiscing quis, ultrices a, dui.

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim
egat quam. Quisque libero justo, consectetur a, feugiat vitae, porttitor eu, libero. Sus-
pendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante.
Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio.
Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae;
Pellentesque sit amet pede ac sem eleifend consectetur. Nullam elementum, urna vel imperdiet
sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu
metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam
auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit
ipsum dolor sed augue. Nulla nec lacus.

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero.
Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in,


4.13 Floating Objects

\texttt{/tcb/floatplacement} = \langle values \rangle  
(no default, initially htb)
Sets \langle values \rangle as default values for the usage of \texttt{/tcb/float} and \texttt{/tcb/float*}. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}[floatplacement=t,float,
title=Floating box from |floatplacement|,
watermark text={I am floating}]
This floating box is placed at the top of a page.
\end{tcolorbox}

\texttt{/tcb/float} = \langle values \rangle  
(default from floatplacement)
Turns the box to a floating object where \langle values \rangle are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by floatplacement.

\begin{tcolorbox}[float, title=Floating box from |float|,
enhanced,watermark text={I'm also floating}]
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}

\texttt{/tcb/float*} = \langle values \rangle  
(default from floatplacement)
Identical to \texttt{/tcb/float}, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages \texttt{multicol} or \texttt{paracol}. Note that you have to set \texttt{width=\textwidth} additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}[float*=b, title=Floating box from |float*|,width=\textwidth,
enhanced,watermark text={I'm also floating}]
In this single column document, you will see no difference to |float|.
\end{tcolorbox}

\texttt{/tcb/nofloat}  
(style, initially set)
Turns the floating behavior off.

\begin{tcolorbox}[float*, title=In this single column document, you will see no difference to float.]
\end{tcolorbox}
For floating objects, the \texttt{/tcb/before} and \texttt{/tcb/after} settings are ignored. Instead, the given \texttt{⟨code⟩} is inserted before a floating box. If the box is \texttt{/tcb/breakable}, the given \texttt{⟨code⟩} is inserted before every part of the break sequence. The most common use case is \texttt{every float=\centering}.

\begin{tcbbox}[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white, coltitle=black,center title]{\includegraphics[height=6cm]{lichtspiel.jpg}}

Floating box
### 4.14 Embedding into the Surroundings

Typically, but not necessarily, a \texttt{tcolorbox} is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys \texttt{before} and \texttt{after}.

\begin{itemize}
  \item \texttt{/tcb/before}=(\texttt{code}) (no default, initially see \texttt{/tcb/autoparskip})
    Sets the \texttt{\{code\}} which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and \texttt{/tcb/ignore nobreak} \footnote{P.84} is set to \texttt{false}.
  \item \texttt{/tcb/after}=(\texttt{code}) (no default, initially see \texttt{/tcb/autoparskip})
    Sets the \texttt{\{code\}} which is executed after the colored box. It is not used for floating boxes.
\end{itemize}

\textbf{\texttt{/tcb/parskip}} \footnote{U 2017-02-01} (style, no value)

Sets the \texttt{\{code\}} which is executed before and after which are recommended, if the package \texttt{parskip} is used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt},
after={\par}}}
\end{verbatim}

\textbf{\texttt{/tcb/noparskip}} \footnote{U 2017-02-01} (style, no value)

Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is not used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt},
after={\par\smallskip}}}
\end{verbatim}

\textbf{\texttt{/tcb/autoparskip}} \footnote{style, no value, initially set}

Tries to detect the usage of the package \texttt{parskip} and sets the keys \texttt{before} and \texttt{after} accordingly. Actually, the following is done:

- If the length of \texttt{\parskip} is greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/parskip} is executed. Here, the usage of package \texttt{parskip} is assumed.
- Otherwise, if the length of \texttt{\parskip} is not greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/noparskip} is executed. Here, the absence of package \texttt{parskip} is assumed.

\texttt{autoparskip} is the default for the package \texttt{tcolorbox}, if \texttt{before} or \texttt{after} are not changed otherwise.

\textbf{\texttt{/tcb/nobeforeafter}} \footnote{style, no value}

Abbreviation for clearing the keys \texttt{before} and \texttt{after}. The colored box is not put into a paragraph and there is no space before or after the box.

\begin{verbatim}
\tcbset{myone/.style={colback=LightGreen,colframe=DarkGreen,equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}
\end{verbatim}

\textbf{\texttt{/tcb/forces nobeforeafter}} \footnote{style, no value}

Forces the setting of \texttt{/tcb/nobeforeafter} even if \texttt{/tcb/before} and \texttt{/tcb/after} are set to other values later. Do not use this option globally unless you really know what you do. Note that embedded boxes do not inherit this forced clearance.
/tcb/baseline=⟨length⟩  (no default, initially 0pt)
Used to set the \pgfsetbaseline value of the resulting tcolorbox.

Some text \dotfill
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\Second line.
\end{tcolorbox}

/tcb/box align=⟨alignment⟩  (style, no default, initially bottom)
Used to set the /tcb/baseline value of the resulting tcolorbox. Feasible values for ⟨alignment⟩ are:
• bottom: alignment with the box bottom,
• top: alignment with the box top,
• center: alignment with the box center,
• base: alignment with the box content base. This option is not applicable for a tcolorbox but for a \tcbox only. It is an alias for /tcb/tcbox raise base. 

Some text \dotfill
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\Second line.
\end{tcolorbox}
Some text
\begin{tcolorbox}[box align=center]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=center]
First line. Second line.
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcolorbox}[box align=base]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=base, size=fbox]
Another line
\end{tcolorbox}
\end{tcolorbox}

/tcb/before skip\(=\langle\text{glue}\rangle\) (style, no default)

Inserts some vertical space of the given \(\langle\text{glue}\rangle\) before the colored box. This style sets /tcb/before*\textsuperscript{P.81}.

\begin{tcolorbox}[before skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/after skip\(=\langle\text{glue}\rangle\) (style, no default)

Inserts some vertical space of the given \(\langle\text{glue}\rangle\) after the colored box. This style sets /tcb/after*\textsuperscript{P.81}.

\begin{tcolorbox}[after skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/beforeafter skip\(=\langle\text{glue}\rangle\) (style, no default)

Inserts some vertical space of the given \(\langle\text{glue}\rangle\) before and after the colored box. This style sets /tcb/before*\textsuperscript{P.81} and /tcb/after*\textsuperscript{P.81}.

\begin{tcolorbox}[beforeafter skip=0pt, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Second box.
/tcb/left skip=⟨length⟩  (style, no default, initially 0mm)

Inserts some horizontal space of the given ⟨length⟩ before the colored box. This style sets /tcb/grow to left by \(^{\text{P.87}}\) with the negated ⟨length⟩, i.e. the bounding box and box width are changed.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}
left skip=1cm, colframe=red!50!white
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

/tcb/right skip=⟨length⟩  (style, no default, initially 0mm)

Inserts some horizontal space of the given ⟨length⟩ after the colored box. This style sets /tcb/grow to right by \(^{\text{P.87}}\) with the negated ⟨length⟩, i.e. the bounding box and box width are changed.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}
right skip=1cm, colframe=red!50!white
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

/tcb/leftright skip=⟨length⟩  (style, no default)

Inserts some horizontal space of the given ⟨length⟩ before and after the colored box. This style changes the bounding box and the box width.

\noindent\rule{\linewidth}{2pt}
\begin{tcolorbox}
leftright skip=1cm, colframe=red!50!white
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

/tcb/ignore nobreak=true|false  (default true, initially false)

After a heading, \LaTeX{} tries to avoid a break by setting a nobreak boolean value. Starting from version 3.33, the \texttt{/tcb/before \textasciitilde P.81} respectively \texttt{/tcb/before skip \textasciitilde P.83} settings are not used after a heading if \texttt{/tcb/ignore nobreak} is set to \texttt{false}. For an unbreakable box, \texttt{/tcb/before nobreak} is used instead. Further, a \texttt{/tcb/breakable \textasciitilde P.376} box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set \texttt{/tcb/ignore nobreak to true}, if \texttt{nobreak} should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the \texttt{/tcb/before \textasciitilde P.81} setting.

/tcb/before nobreak=⟨code⟩  (no default, initially \texttt{\noindent})

Sets the ⟨code⟩ which is executed before the colored box if it is unbreakable, if \texttt{/tcb/ignore nobreak} is not set, and if the box follows a heading.

/tcb/parfillskip restore=true|false  (default true, initially true)

If this option is set to be \texttt{true}, the minimum value of \texttt{parfillskip} is tested at specific spots, if it is greater than 0pt. If so, \texttt{parfillskip} is restored to \texttt{@flushglue} which happens to be the default value.

These tests are executed for \texttt{/tcb/parskip \textasciitilde P.81}, \texttt{/tcb/noparskip \textasciitilde P.81}, \texttt{/tcb/after skip \textasciitilde P.83}, \texttt{/tcb/breakable \textasciitilde P.376}, and \texttt{tcbraster \textasciitilde P.289}.

This option was created to automatically avoid overfull box warnings with \texttt{parfillskip} changing packages.
4.15 Bounding Box

Normally, every \texttt{tcolorbox} has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX{} reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the \texttt{tcolorbox} will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the \texttt{tcolorbox} will overlap to other parts of the page. For example, the \texttt{tcolorbox} could be stretched into the page margin.

The following examples use \texttt{/tcb/show bounding box} \textsuperscript{P.183} to display the actual bounding box. For this, the library \texttt{skins} has to be included and \texttt{/tcb/enhanced} \textsuperscript{P.210} has to be set.

4.15.1 Shifting Bounding Box Borders

\texttt{/tcb/enlarge top initially by\texttt{=\langle length\rangle}} \hspace{1cm} \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the top of the box by \texttt{(length)}. If the box is breakable, only the first box of the break sequence gets enlarged. \texttt{/tcb/enlarge top by} \textsuperscript{P.86} overwrites this key.

\begin{Verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{Verbatim}

\begin{Verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=-5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{Verbatim}

\texttt{/tcb/enlarge bottom finally by\texttt{=\langle length\rangle}} \hspace{1cm} \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the bottom of the box by \texttt{(length)}. If the box is breakable, only the last box of the break sequence gets enlarged. \texttt{/tcb/enlarge bottom by} \textsuperscript{P.86} overwrites this key.

\begin{Verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{Verbatim}

\begin{Verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{Verbatim}
/tcb/enlarge top at break by=⟨length⟩

Enlarges the bounding box distance to the top of the box by ⟨length⟩, if the box is /tcb/breakable. In this case, it is applied to middle and last parts in a break sequence. /tcb/enlarge top by overwrites this key.

/tcb/enlarge bottom at break by=⟨length⟩

Enlarges the bounding box distance to the bottom of the box by ⟨length⟩, if the box is /tcb/breakable. In this case, it is applied to first and middle parts in a break sequence. /tcb/enlarge bottom by overwrites this key.

/tcb/enlarge top by=⟨length⟩

Enlarges the bounding box distance to the top of the box by ⟨length⟩. /tcb/enlarge top initially by (no default, initially 0mm) and /tcb/enlarge top at break by are set to ⟨length⟩.

/tcb/enlarge bottom by=⟨length⟩

Enlarges the bounding box distance to the bottom of the box by ⟨length⟩. /tcb/enlarge bottom finally by (no default, initially 0mm) and /tcb/enlarge bottom at break by are set to ⟨length⟩.

/tcb/enlarge left by=⟨length⟩

Enlarges the bounding box distance to the left side of the box by ⟨length⟩.

/tcb/enlarge right by=⟨length⟩

Enlarges the bounding box distance to the right side of the box by ⟨length⟩.
\texttt{/tcb/enlarge by}=(\texttt{length}) \hspace{1cm} (\texttt{no default, initially 0mm})
Enlarges the bounding box distance to all sides of the box by \texttt{(length)}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,width=5cm,nobeforeafter]
\begin{tcbox}[enlarge by=5mm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcbox}
\end{tcolorbox}

\texttt{/tcb/grow to left by}=\texttt{(length)} \hspace{1cm} (\texttt{no default, initially 0mm})
Enlarges the current box width by \texttt{(length)} and enlarges (shrinks) the bounding box
distance to the left side of the box by \texttt{−(length)}. Also see \texttt{/tcb/left skip} \texttt{P.84}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white]
\begin{tcbox}[width=5cm,grow to left by=2cm,enhanced,show bounding box]
This is a \texttt{tcolorbox} with a width of 7cm.
\end{tcbox}
\end{tcolorbox}

\texttt{/tcb/grow to right by}=\texttt{(length)} \hspace{1cm} (\texttt{no default, initially 0mm})
Enlarges the current box width by \texttt{(length)} and enlarges (shrinks) the bounding box distance
to the right side of the box by \texttt{−(length)}. Also see \texttt{/tcb/right skip} \texttt{P.84}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white]
\begin{tcbox}[grow to right by=2cm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcbox}
\begin{bigskip}
\begin{tcbox}[grow to right by=2cm,grow to left by=1cm, enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcbox}
\end{bigskip}

The \texttt{tcb/grow sidewards by} \texttt{= (length)} (no default, initially 0mm) shortcut for setting \texttt{/tcb/grow to left} by \texttt{P.87} and \texttt{/tcb/grow to right} by \texttt{P.87} to \texttt{(length)}. Also see \texttt{/tcb/oversize \texttt{P.45} and /tcb/spread sidewards \texttt{P.91}}.

\begin{tcolorbox}[grow sidewards by=2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\noindent This is a tcolorbox.

\section*{4.15.2 Box Alignment}

\texttt{/tcb/flush left} (style, no value)

Enlarges the bounding box to the right side to fill the line completely.

\begin{tcolorbox}[flush left,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\noindent This is a tcolorbox.

\texttt{/tcb/flush right} (style, no value)

Enlarges the bounding box to the left side to fill the line completely.

\begin{tcolorbox}[flush right,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\noindent This is a tcolorbox.

\texttt{/tcb/center} (style, no value)

Enlarges the bounding box equally to both sides to fill the line completely.

\begin{tcolorbox}[center,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\noindent This is a tcolorbox.
4.15.3 Toggle Enlargements

\texttt{/tcb/toggle enlargement=(toggle preset)} \hspace{1cm} (default \texttt{evenpage}, initially \texttt{none})

According to the \texttt{(toggle preset)}, the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. This value also sets \texttt{/tcb/check odd page=\texttt{true}}.

\textbf{See} \texttt{/tcb/toggle left and right} \textsuperscript{P.46} to toggle geometry settings.

\begin{tcolorbox}[toggle enlargement=none,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=forced]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=evenpage]
This page is an \texttt{tcbifoddpage}\{odd\}\{even\} page. Therefore, the left and right enlargements \texttt{tcbifoddpage}are not\{are\} toggled.
\end{tcolorbox}
4.15.4 Spread Box to Page Borders

The following border options are *not* applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options *may* work, but not necessarily. Also, boxes should be set with \noindent and full width.

\tcb/spread inwards={(length)}  (default 0pt, initially unset)
Enlarges the current box width to match the inner page border (left-handed side for one-sided documents). If the optional \(\text{(length)}\) is greater than 0pt, the box grows over the border, if \(\text{(length)}\) is lower than 0pt, there is a margin between box and page border. \tcb/toggle enlargement \(^{+}\text{P. 89}\) is set automatically.

This is a \textbf{tcolorbox}.

\tcb/spread outwards={(length)}  (default 0pt, initially unset)
Enlarges the current box width to match the outer page border (right-handed side for one-sided documents). If the optional \(\text{(length)}\) is greater than 0pt, the box grows over the border, if \(\text{(length)}\) is lower than 0pt, there is a margin between box and page border. \tcb/toggle enlargement \(^{+}\text{P. 89}\) is set automatically.

This is a \textbf{tcolorbox}.

\tcb/move upwards={(length)}  (default 0pt, initially unset)
Starts a new page with the box at the very top page border. If the optional \(\text{(length)}\) is greater than 0pt, the box moves over the border, if \(\text{(length)}\) is lower than 0pt, there is a margin between box and page border.

\tcb/move upwards*=\(\text{(length)}\)  (default 0pt, initially unset)
Identical to \texttt{\tcb/move upwards}, but without starting a new page.

\tcb/fill downwards={(length)}  (default 0pt, initially unset)
Enlarges the height of the box until the very bottom page border. The library \texttt{breakable} has to be loaded, and \texttt{\tcb/height fill} \(^{+}\text{P. 56}\) is set automatically. If the optional \(\text{(length)}\) is greater than 0pt, the box moves over the border, if \(\text{(length)}\) is lower than 0pt, there is a margin between box and page border.

This is a \textbf{tcolorbox}.
This is an example for 'spread upwards'.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm,
  colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
  This is an example for 'spread upwards'.
\end{tcolorbox}

Identical to /tcb/move upwards \note{P.90}, but without starting a new page.

\begin{tcolorbox}[enhanced,spread sidewards,
  colframe=blue!75!black,colback=white,show bounding box]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,
  colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
  This is an example for 'spread downwards'.
\end{tcolorbox}

This is an example for 'spread downwards'.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,
  colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
  This is an example for 'spread downwards'.
\end{tcolorbox}
4.15.5 Box Extrusion

The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight (style, no value, initially unset)

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the /tcb/boxsep to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

\tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt, nobeforeafter,tcbox raise base,shrink tight}
\begin{tcolorbox}
This is a tcolorbox.
\end{tcolorbox}
Lorem \tcbox{ipsum} dolor sit amet, consectetuer adipiscing elit.

This is a tcolorbox.
Lorem ipsum dolor sit amet, consectetuer adipiscing elit.

/tcb/extrude left by=(length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude left by=1cm]{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

/tcb/extrude right by=(length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude right by=1cm]{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\texttt{tcbset}\{enhanced,colframe=red,colbackground=yellow!25\text{white},}
\text{\hspace{1cm} frame style=\{opacity=0.25\},interior style=\{opacity=0.5\},}
\text{\hspace{1cm} nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm\}}
\]

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{tcb}[extrude top by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\texttt{tcbset}\{enhanced,colframe=red,colbackground=yellow!25\text{white},}
\text{\hspace{1cm} frame style=\{opacity=0.25\},interior style=\{opacity=0.5\},}
\text{\hspace{1cm} nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm\}}
\]

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{tcb}[extrude bottom by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{\texttt{tcbset}\{enhanced,colframe=red,colbackground=yellow!25\text{white},}
\text{\hspace{1cm} frame style=\{opacity=0.25\},interior style=\{opacity=0.5\},}
\text{\hspace{1cm} nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm\}}
\]

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{tcb}[Curabitur] dictum gravida mauris. \texttt{tcb}[colframe=Green,interior style=\{opacity=0.0\}]{Nam} arcu libero, nonummy eget, consectetuer id, \texttt{tcbbox} vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \texttt{tcbbox} Mauris ut leo.

4.16 Layered Boxes and Every Box Settings

A \texttt{tcolorbox} may contain another \texttt{tcolorbox} and so on. The package takes track of the nesting level using a counter \texttt{tcblayer}. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing \texttt{/tcb/every box on layer} \texttt{n} \textsuperscript{P.95}. If needed, the number of managed layers can be increased by setting \texttt{\tcbsetmanagedlayers} \textsuperscript{P.95} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a \texttt{/tcb/reset} \textsuperscript{P.109} by default. You can change this, but be prepared for surprises if you do.

If the defaults are \textit{not changed}, a \texttt{tcolorbox} gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every \texttt{\tcbset} \textsuperscript{P.13} command adds or changes options for the following boxes inside the current \TeX{} group.
3. While entering a \texttt{tcolorbox}, a \texttt{/tcb/every box on layer} \texttt{n} \textsuperscript{P.95} or \texttt{/tcb/every box on higher layers} \textsuperscript{P.95} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the \texttt{/tcb/every box} option list is applied. Not overwritten options given by a preceding \texttt{\tcbset} \textsuperscript{P.13} survive.
   - For layer 2 and above (nested boxes), a \texttt{/tcb/reset} \textsuperscript{P.109} followed by \texttt{/tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\tcbset} \textsuperscript{P.13} and by the surrounding box(es) are reset.
4. The \langle\textit{options}\rangle given to the \texttt{tcolorbox} are applied. Or, if the box was generated by \texttt{\newtcolorbox} \textsuperscript{P.15} or friends, the \langle\textit{options}\rangle given there are applied.
5. If the box was generated by \texttt{\newtcolorbox} \textsuperscript{P.15} or friends, some automated options are applied.

\texttt{/tcb/every box} \hspace{1cm} (style)

By default, this style is empty.

\begin{quote}
\% default setting:
\texttt{\tcbset\{every box/.style={}\}}
\end{quote}

It may be changed by redefining this style.

\begin{quote}
\% setting all boxes to be enhanced:
\texttt{\tcbset\{every box/.style={enhanced}\}}
\end{quote}

The alternative for setting something for every box (on every layer) is \texttt{\tcbsetforeverylayer} \textsuperscript{P.13}:

\begin{quote}
\% setting all boxes to be enhanced:
\texttt{\tcbsetforeverylayer\{enhanced\}}
\end{quote}
/tcb/every box on layer n

Here, n has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

\begin{tcbset}
    every box on layer 1/.style={every box},
    every box on layer 2/.style={reset,every box},
    every box on layer 3/.style={reset,every box},
    every box on layer 4/.style={reset,every box},
\end{tcbset}

Higher layers are layers above the highest managed layer number (4 by default).

\begin{tcbset}
    every box on higher layers/.style={reset,every box}
\end{tcbset}

\tcbsetmanagedlayers{⟨number⟩}

Replaces the highest managed layer number by ⟨number⟩ where 4 is the default. This macro can only be used inside the preamble. Using a ⟨number⟩ lower than 4 typically makes no sense, but is not forbidden.

\begin{tcbset}
    colframe=red!75!black,fonttitle=\bfseries,
    colback=red!5!white,
    every box/.style={enhanced,watermark text=\thetcblayer,
    before=\par\smallskip,after=\par\smallskip},
    every box on layer 2/.style={reset,every box,colback=yellow!10!white,
    drop fuzzy shadow}
\end{tcbset}

\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\lipsum[2]
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath{\sum_{n=1}^\infty \frac{1}{n}} = \infty.
\end{tcolorbox}
\begin{tcolorbox}[title=Yet Another Box]
\tcboxfit[height=2cm]{\lipsum[1]}
My text.
\begin{tcolorbox}
Another lipsum text\footnote{A lipsum text}. \lipsum[3]
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

Layer 1 Box

Here comes a footnote\footnote{Footnote from layer 1 box}. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisi hendrerit mollis. Suspendisse ut massa. Cras

Layer 2 Box

abc\(^a\)
\(^a\)The footnote of abc

Another Box

\[
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\]

(1)

Some text\(^b\).

Yet Another Box


My text.


Layer 4

Layer 4\(^a\)
\(^a\)Layer 4 footnote

The End\(^b\).
\(^a\)A ipsum text
\(^b\)Last footnote

Footnote from layer 1 box
Footnote from some text
4.17 Capture Mode

\[\texttt{/tcb/capture=\langle mode\rangle} \quad \text{(no default, initially minipage)}\]

The capture \(\langle mode\rangle\) defines how the box content is processed. Feasible values for \(\langle mode\rangle\) are:

- **minipage:**
  This is the default \(\langle mode\rangle\) for \texttt{tcolorbox} \(^{P.12}\). The content may have an upper and a lower part. Optionally, the box can be \texttt{/tcb/breakable} \(^{P.376}\). The box content is put into a minipage or into something similar to a minipage.

- **hbox:**
  This is the default \(\langle mode\rangle\) for \texttt{tcbox} \(^{P.14}\). The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \texttt{/tcb/hbox}.

- **fitbox:** (needs the fitting library)
  This is the default \(\langle mode\rangle\) for \texttt{tcboxfit} \(^{P.422}\). The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \texttt{/tcb/fit} \(^{P.424}\).

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=fitbox,height=9mm]\% needs the 'fitting' library
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
This is a tcolorbox.
This is a tcolorbox.
This is a tcolorbox.
\end{verbatim}

\[\texttt{/tcb/hbox} \quad \text{(style, no default)}\]

Shortcut for capture=hbox.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
This is a tcolorbox.
\end{verbatim}

\[\texttt{/tcb/minipage} \quad \text{(style, no default)}\]

Shortcut for capture=minipage.
4.18 Text Characteristics

/tcb/parbox=true|false  
(default true, initially true)

The text inside a \tcolorbox is formatted using a LaTeX minipage if the box is unbreakable. If breakable, the box tries a mimicry of a minipage. In a minipage or parbox, paragraphs are formatted slightly different as the main text. If the key value is set to false, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

\% \usepackage{lipsum} \% preamble
\% \tcbset\{width=(\linewidth-2mm)/2,nobeforeafter,arc=1mm,\n\% colframe=blue!75!black,colback=white,fonttitle=\bfseries,fontupper=\small,\n\% left=2mm,right=2mm,top=1mm,bottom=1mm,equal height group=parbox\}
\begin{tcolorbox}\[parbox,adjusted title={parbox=true (normal)}\]
\lipsum[1-2]
\end{tcolorbox}\%
\begin{tcolorbox}\[parbox=false,adjusted title={parbox=false}\]
\lipsum[1-2]
\end{tcolorbox}\%
/tcb/hyphenationfix=true|false

Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using \pdflatex. This problem is circumvented by applying the \texttt{hyphenationfix} option.

\begin{tcolorbox}
Rechnungsadjunktentochter.\par Statthaltbereikonzipist.
\end{tcolorbox}

\begin{tcolorbox}[hyphenationfix]
Rechnungsadjunktentochter.\par Statthaltbereikonzipist.
\end{tcolorbox}

parbox=false and \texttt{hyphenationfix} should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files
/tcb/tempfile=⟨file name⟩

Sets ⟨file name⟩ as name for the temporary file which is used inside \texttt{tcbwritetemp} \cite{P.129} and \texttt{tcbusetemp} \cite{P.129} implicitly.

4.20 \texttt{tcb} Specials

The following options are applicable for \texttt{tcb} \cite{P.14} and \texttt{tcbmath} \cite{P.352} only.
/tcb/tcbox raise=⟨length⟩

Raises the \texttt{tcb} \cite{P.14} by the given ⟨length⟩.

49
Controls how \texttt{tcbox}\texttt{width} respects a \texttt{tcb/width} setting. Feasible values for (mode) are:

- **auto** (initial setting): ignore \texttt{tcb/width} and set box width according to its content.
- **auto limited**: Set box width according to its content, if it is smaller than \texttt{tcb/width}. Otherwise, the content is set like in a \texttt{tcolorbox} with line breaks.
- **forced center**: Set box width according to \texttt{tcb/width}. The content is centered and may overlap the box borders.
- **forced left**: Set box width according to \texttt{tcb/width}. The content is left aligned and may overlap the box borders.
- **forced right**: Set box width according to \texttt{tcb/width}. The content is right aligned and may overlap the box borders.
- **minimum center**: Set box width according to \texttt{tcb/width}, if the content fits into. The content is centered and the box width may grow beyond \texttt{tcb/width}.
- **minimum left**: Set box width according to \texttt{tcb/width}, if the content fits into. The content is left aligned and the box width may grow beyond \texttt{tcb/width}.
- **minimum right**: Set box width according to \texttt{tcb/width}, if the content fits into. The content is right aligned and the box width may grow beyond \texttt{tcb/width}.

\begin{tcbset}{size=small, on line, before upper=\strut, colframe=blue!75!black, colback=blue!5!white, fontupper=\normalsize, width=4cm}
\begin{tabular}{llllll}
\texttt{tcbbox} & \texttt{tcbox width=auto}\{auto\} & \texttt{auto limited}\{auto limited\} & \texttt{auto limited with long text} & \texttt{forced center}\{forced center\} & \texttt{forced center with long text} \\
\texttt{tcbbox} & \texttt{tcbox width=auto limited}\{auto limited\} & \texttt{auto limited with long text}\{auto limited with long text\} & \texttt{forced left}\{forced left\} & \texttt{forced left with long text} & \texttt{forced left with long text}\{forced left with long text\} \\
\texttt{tcbbox} & \texttt{tcbox width=forced center}\{forced center\} & \texttt{forced center with long text}\{forced center with long text\} & \texttt{forced right}\{forced right\} & \texttt{forced right with long text} & \texttt{forced right with long text}\{forced right with long text\} \\
\texttt{tcbbox} & \texttt{tcbox width=minimum center}\{minimum center\} & \texttt{minimum center with long text}\{minimum center with long text\} & \texttt{minimum left}\{minimum left\} & \texttt{minimum left with long text} & \texttt{minimum left with long text}\{minimum left with long text\} \\
\texttt{tcbbox} & \texttt{tcbox width=minimum right}\{minimum right\} & \texttt{minimum right with long text}\{minimum right with long text\} & \texttt{minimum right}\{minimum right\} & \texttt{minimum right with long text} & \texttt{minimum right with long text}\{minimum right with long text\} \\
\end{tabular}
\end{tcbset}
4.21 Counters, Labels, and References

\tcb/phantom\{\langle code\rangle\} (no default, initially unset)

The \langle code\rangle is put in a box at the upper left corner of the \texttt{tcolorbox}. If the \texttt{tcolorbox} is breakable, the \langle code\rangle is executed for the first box of the break sequence only. If there already was some phantom code given, the new \langle code\rangle is appended.

The \langle code\rangle is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The \langle code\rangle is executed before the title and box content, i.e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The \langle code\rangle is executed only once even during fitting operations for title and box content.
- In combination with the \texttt{hyperref} package, the hyper anchor is set to the upper left corner of the \texttt{tcolorbox}, i.e. links inside the pdf document will jump to the box pleasantly.
- Since the \langle code\rangle is executed inside a \LaTeX group, only global operations can survive this group.

Examples for the \texttt{phantom} usage are given in Section 16.9 from page 344, e.g. Example 16.1 on page 345.

\tcb/nophantom (no value, initially set)

Removes the phantom code if set before.

\tcb/label\{\langle marker\rangle\} (no default, initially unset)

The \langle marker\rangle is set as label text for a reference with the $\backslash$\texttt{ref} macro. Typically, this option is used for numbered boxes, see Subsection 5.1 from page 111, e.g. \texttt{/tcb/new/auto\ counter\ \P.111}.

\tcb/phantomlabel\{\langle marker\rangle\} (no default, initially unset)

Equivalent to \texttt{/tcb/label} for an \texttt{unnumbered} box. A $\backslash$\texttt{phantomsection} from the package \texttt{hyperref} [15] is used to set a correct hyperlink target. This is not needed for a numbered box.

\tcb/label type\{\langle type\rangle\} (no default, initially unset)

This option key can be used only in conjunction with the \texttt{cleveref} package [5] which has to be loaded separately. \langle type\rangle has to be a cross-reference type known to \texttt{cleveref} like \texttt{theorem, algorithm, result}, etc. References made with \texttt{cleveref} will use this type. Note that using \texttt{label type} will result in compilation errors, if \texttt{cleveref} is not loaded. For an example, see Theorem 17.3.5 on page 370.

\tcb/no label type (no value, initially set)

Removes a \texttt{/tcb/label type}, if set before.

\tcb/step\{\langle counter\rangle\} (no default, initially unset)

Shortcut for \texttt{phantom=\{\texttt{\refstepcounter{#1}}\}}. The given \langle counter\rangle is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 111.

\tcb/step and label\{\langle counter\rangle\}\{\langle marker\rangle\} (no default, initially unset)

Shortcut for using \texttt{/tcb/step} and \texttt{/tcb/label}. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 111.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 118 is used, this key describes the \textit{text} for an entry into the generated list, e.g.

\begin{tcblist}{\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 16.9 from page 344 for a complete example.

See Section 16.9 from page 344 for a complete example.

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 118 is used, list entries are generated automatically. With this key, you can enforce an entry to the given (list) with the given (type). This issues:
\addcontentsline{(list)}{(type)}{(entry text)}

If the nameref package is loaded, the given \textit{text} is used for corresponding \texttt{\nameref} macros. Typically, the \textit{text} will be chosen to be identical or nearly identical to the one for /tcb/title.

Definition in the preamble:
\newtcolorbox[auto counter,number within=section]{pabox}[2]{
% colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp. \thetcbcounter: #2,#1}

\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}

This is a tcolorbox.
\end{pabox}

This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.

The box is titled '\texttt{\nameref{mynamelabel}}'.

Examp. 4.1: Title text

This is a tcolorbox.

This box is automatically numbered with 4.1 on page 102.
The box is titled 'Title or anything else'.

/tcb/nameref is used automatically inside \newtcbtheorem. P. 350.
A `\hypertarget` from the package `hyperref` [15] is used to create an internal link of an anchor `(marker)`. This `(marker)` can be referenced by `\hyperlink` or `/tcb/hyperlink` \footnote{P.203}.

Sets a PDF bookmark with the given `(text)`, if the package `bookmark` [10] is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

Identical to `/tcb/bookmark`, but additional `(options)` from the package `bookmark` [10] can be given.

Adds an index `(entry)` for the box. This is a shortcut for setting `\index{(entry)}` to `/tcb/phantom` \footnote{P.101}.

Adds an `(entry)` to an index with a specific `(name)`. This is a shortcut for setting `\index[(name)]{(entry)}` to `/tcb/phantom` \footnote{P.101}. An index extension package like `imakeidx` has to be loaded to use this option key.
4.22 Even and Odd Pages

Also see /tcb/toggle left and right \(^{P.46}\) and /tcb/toggle enlargement \(^{P.89}\) for further even/odd options.

\[
/tcb/check odd page=\text{true}|\text{false} \quad \text{(default true, initially false)}
\]

If set to \text{true}, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to \text{false}, even/odd page tests may give wrong results for the first box of a page.

/tcb/toggle left and right \(^{P.46}\), /tcb/toggle enlargement \(^{P.89}\), and /tcb/if odd page automatically set check odd page, but for \tcbifoddpage \(^{P.106}\) this option has to be set explicitly.

\[
/tcb/if odd page={\langle odd options\rangle}{\langle even options\rangle} \quad \text{(style, no default)}
\]

If the current box is on an odd page, the \langle odd options\rangle are applied. On an even page, the \langle even options\rangle are applied. /tcb/check odd page is automatically set for precise even/odd page testing.

\begin{tcolorbox}
\begin{tcolorbox}[if odd page={colback=yellow!50}{colback=red!50}]
This box is colored in yellow on an odd page and is colored in red on an even page.
\end{tcolorbox}
\end{tcolorbox}

This box is colored in yellow on an odd page and is colored in red on an even page.

\[
/tcb/if odd page or oneside={\langle odd options\rangle}{\langle even options\rangle} \quad \text{(style, no default)}
\]

For onesided documents, the \langle odd options\rangle are applied always. For twosided documents, this style is identical to /tcb/if odd page.
\texttt{/tcb/if odd page*={(odd options)}\{even options}\}} \quad \text{(style, no default)}

\begin{itemize}
    \item This option needs the \texttt{breakable} library, see Section 18 on page 374.
\end{itemize}

For breakable boxes, if the current partial box is on an odd page, the \texttt{(odd options)} are applied. On an even page, the \texttt{(even options)} are applied. \texttt{/tcb/check odd page}\textsuperscript{\textit{P.104}} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/if odd page}\textsuperscript{\textit{P.104}}, \texttt{/tcb/if odd page*} is used on \textit{every} partial box of a break sequences and not only on the \textit{first} box. Another difference is that \texttt{/tcb/if odd page*} is applied quite \textit{late} during option processing, while \texttt{/tcb/if odd page}\textsuperscript{\textit{P.104}} is applied immediately.

\texttt{/tcb/if odd page*} is implemented as \texttt{/tcb/if odd page}\textsuperscript{\textit{P.104}} packed into \texttt{/tcb/extras}\textsuperscript{\textit{P.382}}.

\begin{verbatim}
\% \tcbuselibrary{breakable}
\begin{tcolorbox}[breakable,if odd page*={colback=yellow!50}{colback=red!50}]
    This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{tcolorbox}
\end{verbatim}

\begin{itemize}
    \item This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{itemize}

\texttt{/tcb/if odd page or oneside*={(odd options)}\{even options}\}} \quad \text{(style, no default)}

For onesided documents, the \texttt{(odd options)} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page*}.
If the current box is on an odd page, the \textit{odd code} is executed. On an even page, the \textit{even code} is executed. For precise even/odd page testing, the \texttt{/tcb/check odd page} has to be set manually inside the box options.

The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will also work for boxes in a break sequence. The macro can also be used inside the box \texttt{content text}. For unbreakable boxes, the correct page test is applied. But for \texttt{/tcb/breakable} boxes, \texttt{tcbifoddpage} will always give the result for the page of the first box inside the box \texttt{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.

\begin{tcolorbox}[enhanced,check odd page, title={Example for a box on an \texttt{tcbifoddpage}\texttt{odd}\texttt{even} page}, watermark text={\texttt{tcbifoddpage}\texttt{Odd}\texttt{Even} page!}]
\lipsum[1]
\end{tcolorbox}

\textbf{Example for a box on an even page}


For onesided documents, the \textit{odd code} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,check odd page, title={Example for a box on an \texttt{tcbifoddpage}\texttt{odd}\texttt{even} page}, watermark text={\texttt{tcbifoddpage}\texttt{Odd}\texttt{Even} page!}]
\lipsum[1]
\end{tcolorbox}

\textbf{Example for a box on an even page}


For onesided documents, the \textit{odd code} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \thetcolorboxnumber]
This box is \thetcolorboxnumber.
\tcbox[on line,size=fbox]{This box is \thetcolorboxnumber} and
\tcbox[on line,size=fbox]{this box is \thetcolorboxnumber}.
This box is \thetcolorboxnumber.
\end{tcolorbox}

Box 1143

This box is 1143. This box is 1144 and this box is 1145. This box is 1143.

This macro contains the expanded arabic page number of the current tcolorbox. It is locally defined inside boxes and has no meaning outside. It is precise only, if /tcb/check odd page was set.

\begin{tcolorbox}[colback=yellow!5,check odd page, title=Box on page \thetcolorboxpage]  
This box is located on page \thetcolorboxpage.  
\end{tcolorbox}

Box on page 107

This box is located on page 107.
4.23 Externalization

See Section 24 on page 457 for the \texttt{external} library of \texttt{tcolorbox}.

If the \texttt{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment} \(^{\text{P.138}}\) is set to \texttt{tikzpicture}, a \texttt{tcolorbox} could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \texttt{\tikzexternaldisable} is set before a \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\tikzexternalenable some picture \tikzexternaldisable}, there is nothing to care about.

- If \texttt{externalization} is enabled globally, use \texttt{/tcb/shield externalize} to shield any \texttt{tcolorbox}. The preamble code could look like this:

```latex
\usetikzlibrary{external}
\tikzexternalize
\tcbset{shield externalize}
```

\texttt{/tcb/shield externalize=\texttt{true}|\texttt{false}} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikz upper} \(^{\text{P.72}}\) or alike are \textit{not} externalized.

If a \texttt{tcolorbox} is used inside a node of an encircling \texttt{tikzpicture} which is externalized, do \textit{not} use \texttt{\tikzexternaldisable} in front of the \texttt{tcolorbox}. \texttt{/tcb/shield externalize} is deactivated automatically inside a \texttt{tikzpicture}.

\texttt{/tcb/shield externalize} is applied for every following \texttt{tcolorbox} inside the current \TeX{} group and is not affected by \texttt{/tcb/reset} \(^{\text{P.109}}\).

\texttt{/tcb/external=\texttt{file name}} (no default, initially unset)

Convenience option which calls \texttt{\tikzsetnextfilename{\texttt{file name}}}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to set the externalization \texttt{(file name)} for the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} \(^{[22]}\) or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

\texttt{/tcb/remake=\texttt{true}|\texttt{false}} (default \texttt{true}, initially \texttt{false})

Convenience option which calls \texttt{/tikz/external/remake next}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to force the remake of the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} \(^{[22]}\) or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.
4.24 Miscellaneous

\texttt{\texttt{/tcb/reset}} \hspace{1em} (no value, initially set)
Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values \textit{plus} any settings given by \texttt{\tcbsetforeverylayer} \texttt{\texttt{P.13}}, \texttt{\tcb/savedelimiter} \texttt{\texttt{P.26}}, \texttt{\tcb/capture} \texttt{\texttt{P.97}}, and \texttt{\tcb/shield externalize} \texttt{\texttt{P.108}} keep their values. Also, all raster values (see Section 15 on page 287) are not resetted.
This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the \texttt{reset} is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 94.

\texttt{\texttt{/tcb/code=\langle\texttt{code}\rangle}} \hspace{1em} (no default, initially unset)
The given \texttt{\langle\texttt{code}\rangle} is executed immediately. This option is useful to place some arbitrary code into an option list.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,
  code={Useless at this spot but functional.},
  fonttitle=\bfseries}
\begin{tcolorbox}[code={\newcommand{\mycommand}{\textit{working}}},
  title=My \mycommand\ title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
Useless at this spot but functional.
\begin{tcolorbox}
\textbf{My working title}
\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}
Annihilates the current \texttt{tcolorbox} as far as possible. Basically, this comments out the whole \texttt{tcolorbox} by using a key. If the option list of the current \texttt{tcolorbox} contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of \texttt{/tcb/phantom}\textsuperscript{P.101}, \texttt{/tcb/step}\textsuperscript{P.101}, \texttt{/tcb/new/auto counter}\textsuperscript{P.111}, etc., are removed by \texttt{/tcb/void}.

\begin{tcolorbox}[title=This box is completely removed by the following key, void]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment \texttt{/tcb/void} cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment.

The contents of the current \texttt{tcolorbox} are processed including counter settings, but the box is just not drawn. Therefore, \texttt{/tcb/nirvana} is less radical than \texttt{/tcb/void} and several box environments can be nested without problems.

\begin{tcolorbox}[title=This box is completely removed by the following key, nirvana]
This is a \textbf{tcolorbox}.
\begin{tcolorbox}
Nested Box
\end{tcolorbox}
\end{tcolorbox}
5 Initialization Option Keys

The initialization options are only applicable for the generation of new environments and commands based on \texttt{tcolorbox} and friends. Particularly, they can be used for

- \texttt{\textbackslash newtcolorbox} \textsuperscript{P.15},
- \texttt{\textbackslash newtcb} \textsuperscript{P.16},
- \texttt{\textbackslash newtcbox} \textsuperscript{P.313},
- \texttt{\textbackslash newtcblisting} \textsuperscript{P.315},
- \texttt{\textbackslash newtcbinputlisting} \textsuperscript{P.315}, and
- \texttt{\textbackslash newtcbtheorem} \textsuperscript{P.350}, and
- \texttt{\textbackslash newtcbxfit} \textsuperscript{P.423}.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX{}'s \texttt{\textbackslash include} features.

5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by \texttt{\textbackslash thetcbcounter}, e.g. inside the title of the box. The real counter name is stored inside \texttt{\textbackslash tcbbcounter}.

\texttt{/tcb/new/auto counter} (no value, initially unset)

Creates a new counter automatically. With \texttt{/tcb/new/number format} \textsuperscript{P.113} and \texttt{/tcb/new/number within} \textsuperscript{P.113}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\textbackslash thetcbcounter}.

Definition in the preamble:

\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2][]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\textbackslash thetcbcounter: #2,#1}
\end{verbatim}

Examp. 5.1: Title with number

This box is automatically numbered with \texttt{\ref{myautocounter}} on page \texttt{\pageref{myautocounter}}. Inside the box, the \texttt{\textbackslash thetcbcounter} can also be referenced by \texttt{\textbackslash thetcbcounter}. The real counter name is \texttt{\textbackslash tcbbcounter}. The real counter name is \texttt{tcb\&cnt@pabox}.
Here, a counter from another \texttt{\tcolorbox} is reused. Note that the settings for \texttt{/tcb/new/number format =P.113} and \texttt{/tcb/new/number within =P.113} are inherited and cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter from=pabox]{mybox}
% \newtcolorbox[use counter from=pabox,]{mybox}{2}{\% 
\begin{mybox}{label={myusecounterfrom}}{Title with continued number}
This box is automatically numbered with \texttt{\ref{myusecounterfrom}} on page \pageref{myusecounterfrom}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.
\end{mybox}

Some Box 5.2: Title with continued number
This box is automatically numbered with 5.2 on page 112. Inside the box, the 5.2 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.

\end{tcolorbox}

Here, an ordinary existing \LaTeX \texttt{counter} is used for numbering. With \texttt{/tcb/new/number format =P.113} and \texttt{/tcb/new/number within =P.113}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter=counter]{mybox}
% \newtcolorbox{counter}{mybox}{2}{\% 
\begin{mybox}{label={myusecounter}}{Title with \LaTeX\ number}
This box is automatically numbered with \texttt{\ref{myusecounter}} on page \pageref{myusecounter}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.
\end{mybox}

Some Box A: Title with \LaTeX\ number
This box is automatically numbered with A on page 112. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.

\end{tcolorbox}

An existing \LaTeX \texttt{counter} is used for numbering. In contrast to \texttt{/tcb/new/use counter}, the options \texttt{/tcb/new/number format =P.113} and \texttt{/tcb/new/number within =P.113} are ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package, e.g. the standard \texttt{figure} counter.

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.

For \texttt{beamer} slides, this invokes the \texttt{\resetcounteronoverlays} command for the box counter. The counter is automatically reset on subsequent overlay slides of a frame. Thereby, the counter will be the same on all slides of every frame.
The automatic counter is set to zero, if \texttt{⟨counter⟩} is increased. Additionally, during output, the value of \texttt{⟨counter⟩} is prepended to the value of the automatic counter.

To preprend the automatic counter with the chapter number and to reset it with every new chapter, use:

\begin{verbatim}
number within=chapter
\end{verbatim}

See \texttt{/tcb/new/use\ counter}\textsuperscript{P.112} for a complete example.

\texttt{/tcb/new/number format=⟨format macro⟩} (no default, initially \texttt{\arabic})

Declares the format of the automatic counter. The \texttt{⟨format macro⟩} can be any valid \LaTeX\ number formatting macro like \texttt{\arabic}, \texttt{\roman}, etc.

To display the counter value in large roman numbers, use:

\begin{verbatim}
number format=\Roman
\end{verbatim}

See \texttt{/tcb/new/auto\ counter}\textsuperscript{P.111} for a complete example.

\texttt{/tcb/new/number freestyle=⟨code⟩} (no default, initially unset)

Allows advanced control over the complete number format. This option overrules the format given by \texttt{/tcb/new/number within} and \texttt{/tcb/new/number format}. Nevertheless, you can combine it with \texttt{/tcb/new/number within} to get the desired reset property.

The \texttt{⟨code⟩} is some formatting code which should contain \texttt{\tcbcounter} to reference the automated counter. Since this \texttt{⟨code⟩} is expanded, you have to secure each macro with \texttt{\noexpand} with exception of \texttt{\tcbcounter}.

\begin{verbatim}
\newtcolorbox[auto counter,number within=section, number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})}, ]{phbox}[]{
  colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Question~\thetcbcounter: #2,#1}
\end{verbatim}

\begin{verbatim}
\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with \ref{myfreestyle} on page \pageref{myfreestyle}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@phbox}.
\end{phbox}
\end{verbatim}

\begin{verbatim}
Question (Q/5/A): Title with freestyle number
This box is automatically numbered with (Q/5/A) on page 113. Inside the box, the (Q/5/A) can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@phbox}.
\end{verbatim}
The following options /tcb/new/crefname and /tcb/new/Crefname need to be set inside the preamble.

/tcb/new/crefname=\{\langle\text{singular}\rangle\}\{\langle\text{plural}\rangle\}\quad\text{(no default, initially unset)}

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the lowercase \langle\text{singular}\rangle and \langle\text{plural}\rangle forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type\textsuperscript{P.101} is set automatically. See /tcb/label type\textsuperscript{P.101} and [5] for more information.

/tcb/new/Crefname=\{\langle\text{singular}\rangle\}\{\langle\text{plural}\rangle\}\quad\text{(no default, initially unset)}

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the uppercase \langle\text{singular}\rangle and \langle\text{plural}\rangle forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type\textsuperscript{P.101} is set automatically. See /tcb/label type\textsuperscript{P.101} and [5] for more information.

\begin{definition}
\begin{center}
\begin{verbatim}
\% usepackage{cleveref}
\newtcolorbox[auto counter,number within=section, crefname=\{bluebox\}{blueboxes},]{mybluebox}[\{colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries, title=Bluebox \thetcbcounter: #2,#1}\]
\end{verbatim}
\end{center}
\end{definition}

\begin{definition}
\begin{center}
\begin{verbatim}
% usepackage{varioref}
% usepackage{cleveref}
\begin{mybluebox}[label=myreference]{My title}
This is an example.
\end{mybluebox}
\Cref{myreference}, \cref{myreference}.\\ 
\Cpageref{myreference}, \cpageref{myreference}.\\ 
\nameCref{myreference}, \namecref{myreference}.\\ 
\labelCref{myreference}, \labelcpageref{myreference}.\\ 
With \texttt{varioref}:\\ 
\Vref{myreference}, \vref{myreference}.\\ 
\Vref*{myreference}, \vref*{myreference}.
\end{verbatim}
\end{center}
\end{definition}

Bluebox 5.1: My title

This is an example.

Bluebox 5.1, bluebox 5.1.
Page 114, page 114.
Bluebox, bluebox.
5.1, 114.
With varioref:
Bluebox 5.1, bluebox 5.1.
Bluebox 5.1, bluebox 5.1.
Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a tcolorbox can be used to display and entitle an image pretending to be a standard figure environment. Here, \tcb/title^P.18 is used instead of the standard \caption and \tcb/list text^P.102 can be used instead of the optional parameter of the standard \caption.

Feasible values for \langle name \rangle are:

- \textbf{figures}: blend into the standard \texttt{figure} environment.
- \textbf{tables}: blend into the standard \texttt{table} environment.
- \textbf{listings}: blend into the standard \texttt{lstlisting} environment of the package \texttt{listings}[6].

Note that \texttt{blend into=listings} can only be used in the document content or, preferably, inside a \texttt{AtBeginDocument} clause! Using it without \texttt{AtBeginDocument} inside the preamble does not work since the \texttt{listings} packages initializes its counter also inside \texttt{AtBeginDocument}.

\begin{figure}[htb]
\centering\includegraphics[height=4cm]{lichtspiel.jpg}
\caption{A standard figure}
\end{figure}

\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox, title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=4cm]{lichtspiel.jpg}
\end{myfigure}

\textbf{Figure 1:} A standard figure

\textbf{Figure 2:} A tcolorbox figure
/tcb/blend before title=(value) (no default, initially colon)

This option formats the title output of /tcb/new/blend into \(^{P.115}\). Note that this is a common \texttt{tcolorbox} option which should be set globally or in the normal option part of \texttt{newtcolorbox} \(^{P.15}\).

Feasible values for \langle value \rangle are:

- \texttt{colon}: use name/number plus colon.
- \texttt{dash}: use name/number plus dash.
- \texttt{colon hang}: use name/number plus colon with hanging indent.
- \texttt{dash hang}: use name/number plus dash with hanging indent.

\begin{myfigure}{A tcolorbox figure with quite a long title}
\includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of \texttt{/tcb/new/blend into} \textsuperscript{P.115}. The \texttt{(code)} takes one parameter, the name/number. Use this, if \texttt{/tcb/blend before title} \textsuperscript{P.116} is not flexible enough.

\begin{tcolorbox}[blend into=figures\{myfigure\}[2]\{float=htb,capture=hbox, blend before title code={\fbox{##1}\ },title={#2},every float={\centering,#1}\}
\begin{myfigure}\{A tcolorbox figure\}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}

Figure 4 A tcolorbox figure
5.2 Lists of tcolorboxes

For figures and tables, \LaTeX{} provides the `\listoffigures` and `\listoftables` commands to create lists of these numbered entities. Also, a `tcolorbox` can be part of such a kind of list.

1. Assign a list \( \langle \text{name} \rangle \) by the `initialization` option `/tcb/new/list inside`.

2. Optionally, a new \( \langle \text{type} \rangle \) for list entries may be assigned by the `initialization` option `/tcb/new/list type`.

3. List entries are generated automatically within each new `tcolorbox` using the above initialization.
   - If `/tcb/list entry`\(^{\text{P.102}}\) is set, the entry is generated with it.
   - Otherwise, if `/tcb/title`\(^{\text{P.18}}\) is set, the entry is generated with it.
   - Otherwise, the entry is generated with the current number and the environment name.

4. The generated list is displayed by `\tcblistof`.

\[\text{/tcb/new/list inside}=(\text{name})\] (no default, initially unset)

Assigns a list or contents file to the generated `tcolorbox`es. Entries to this list are saved to a file which gets the \( \langle \text{name} \rangle \) as file name extension. The list is referenced by this name in `\tcblistof`. For example:

```
list inside=exam
```

See Section 16.9 from page 344 for a complete example.

\[\text{/tcb/new/list type}=(\text{type})\] (no default, initially `tcolorbox`)

Optionally, some \( \langle \text{type} \rangle \) can be assigned to the list entries. For a new \( \langle \text{type} \rangle \), a macro `\l@\langle \text{type} \rangle` has to exist which controls the format of the list entry. The default type is defined by

```
\newcommand*{\l@tcolorbox}{\dottedtocline{1}{1.5em}{2.3em}}
```

This is identical to the `\l@section` setting of \LaTeX{}. `\l@tcolorbox` can be redefined or a new \( \langle \text{type} \rangle \) can be assigned.

\[\text{\tcblistof}[\langle \text{macro} \rangle]{\langle \text{name} \rangle}{\langle \text{title text} \rangle}\]

Displays the generated list of `tcolorbox`es with the given \( \langle \text{name} \rangle \). The heading is generated by `\langle \text{macro} \rangle{\langle \text{title text} \rangle}` where `\section` is the default setting for `\langle \text{macro} \rangle`.

To display the list inside a subsection, use for example:

```
\tcblistof[\subsection]{exam}{List of Exercises}
```

The result of the example is found as Subsection 16.10 on page 347.

\[!\text{The core of the list is generated by } \@starttoc{\langle \text{name} \rangle} \text{ which can be wrapped into an own macro.}!\]
6 Side by Side

A side by side box is a special \texttt{tcolorbox} \footnote{P.12} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are \texttt{/tcb/listing side text} \footnote{P.326}, \texttt{/tcb/text side listing} \footnote{P.326}, \texttt{/tcb/listing outside text} \footnote{P.326}, \texttt{and /tcb/text outside listing} \footnote{P.326}.

6.1 Basic Settings

\texttt{/tcb/sidebyside=true|false} (default \texttt{true}, initially \texttt{false})

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to \texttt{true}, the upper part is drawn left-handed and the lower part is drawn right-handed. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{tcolorbox}
\begin{tcblower}
This is the upper (\textit{left-handed}) part.
\end{tcblower}
\begin{tcbtext}
This is the lower (\textit{right-handed}) part.
\end{tcbtext}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcblower}
My title
\end{tcblower}
\begin{tcblower}
This is the upper (\textit{left-handed}) part. This is the lower (\textit{right-handed}) part.
\end{tcblower}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcblower}
\texttt{\tcbset\{colback=red!5!white,colframe=red!75!black,fonttitle=\textbf\}}
\end{tcblower}
\begin{tcbtext}
% \usepackage{lipsum}
% \tcbuselibrary{skins}
% \begin{tcolorbox}[bicolor,sidebyside,righthand width=3cm,\
% \hspace{1cm}sharp corners,boxrule=.4pt,colback=green!5,colbacklower=green!50!black!50]
\lipsum[2]
\end{tcolorbox}
\end{tcbtext}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcblower}
% Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi.\n% Morbi auctor lorem non justo. Nam lacus libero, pretium at,\n% lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum,\n% erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa.\n% Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.
\end{tcblower}
\end{tcolorbox}
Sets the vertical ⟨alignment⟩ for the left-handed and right-handed part.

Feasible values for ⟨alignment⟩ are:

- **center**: identical to `minipage` option c.
- **top**: identical to `minipage` option t (aligns the top lines of the left-handed and right-handed side according to their baselines).
- **bottom**: identical to `minipage` option b (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- **center seam**: aligns the center of the left-handed and right-handed side.
- **top seam**: aligns the very top seam of the left-handed and right-handed side.
- **bottom seam**: aligns the very bottom seam of the left-handed and right-handed side.

```latex
\tcset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter, left=2mm,right=2mm,sidebyside,sidebyside gap=6mm,width=(\linewidth-2mm)/3}

\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

center, top, and bottom are identical to the known corresponding `minipage` options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.

For such content, one may use center seam, top seam, and bottom seam. For example, top seam aligns the very top seam of the left-handed and right-handed side.
<table>
<thead>
<tr>
<th>Seam Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center seam</td>
<td>This is my description text for the pictures displayed on the right-handed side.</td>
</tr>
<tr>
<td>Top seam</td>
<td>This is my description text for the pictures displayed on the right-handed side.</td>
</tr>
<tr>
<td>Bottom seam</td>
<td>This is my description text for the pictures displayed on the right-handed side.</td>
</tr>
</tbody>
</table>
/tcb/sidebyside gap=⟨length⟩
(no default, initially 10mm)
Sets the horizontal distance between the left-handed and right-handed part to ⟨length⟩.

/tcb/lefthand width=⟨length⟩
(no default, initially unset)
Sets the width of the left-handed part to the given ⟨length⟩.

/tcb/righthand width=⟨length⟩
(no default, initially unset)
Sets the width of the right-handed part to the given ⟨length⟩.
/tcb/lefthand ratio=(fraction)  (no default, initially 0.5)
Sets the width of the left-handed part to the given \langle fraction \rangle of the available space. \langle fraction \rangle is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper \textit{(left-handed)} part.
\tcblower
This is the lower \textit{(right-handed)} part.
\end{tcolorbox}

/tcb/righthand ratio=(fraction)  (no default, initially 0.5)
Sets the width of the right-handed part to the given \langle fraction \rangle of the available space. \langle fraction \rangle is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper \textit{(left-handed)} part.
\tcblower
This is the lower \textit{(right-handed)} part.
\end{tcolorbox}
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox `\mysavebox` to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 125.

```latex
\begin{Verbatim}
\% \tcbuselibrary{skins,mparsifl}
\% \usepackage{lipsum}
\% \newsavebox\mysavebox % preamble
\DeclareTotalTColorBox{\mysidebox}{ O{} +m +m }{
  bicolor, colback=white, colbacklower=yellow!10,
  fonttitle=\bfseries, center title,
  sidebyside,
  code={\sbox{\mysavebox}{#2}},
  lefthand width=\wd{\mysavebox},
  drop lifted shadow,
  #1
}
\usebox{\mysavebox}\tcblower
\mysidebox[title=The Triangle]{%}
\begin{tikzpicture}
  \path[fill=red!20,draw=red!50!black]
  (0,0) node[below]{A} -- (3,1) node[right]{B}
  -- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}%
\lipsum[1]
\end{Verbatim}
```

The Triangle

6.2 Advanced Settings from the \texttt{xparse} Library

All following macros and options need the \texttt{xparse} library to be loaded, see Section 23 on page 444.

\texttt{\tcbsidebyside[(options)]\{\langle left-handed content\rangle\}\{\langle right-handed content\rangle\}}

Creates a colored box using more or less arbitrary \langle options\rangle for a \texttt{tcolorbox}\textsuperscript{P.12}. The /tcb/sidebyside\textsuperscript{P.119} option is set to \texttt{true} and the \langle left-handed content\rangle and \langle right-handed content\rangle is filled into the box appropriately. The resulting box is unbreakable. \texttt{\tcbsidebyside} is not only a shortcut for using a normal \texttt{tcolorbox}\textsuperscript{P.12} with /tcb/sidebyside\textsuperscript{P.119}, but allows setting further options like /tcb/sidebyside adapt\textsuperscript{P.126} and /tcb/sidebyside switch\textsuperscript{P.128}.

\begin{verbatim}
% \tcbsuselibrary{skins,xparse}
% \usepackage{lipsum}
\tcbsidebyside[title=The Triangle,
sidebyside adapt=left,
bicolor,colback=white,colbacklower=yellow!10,
fonttitle=\bfseries,center title,drop lifted shadow,]
\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[right]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}\%
\{\%
\lipsum[1]
\}
\end{verbatim}

The Triangle

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside \tcb\sidebyside. Feasible values for \langle side(s) \rangle are:

- \textit{none}: no measurement of left-handed and right-handed side.
- \textit{left}: the actual width of the left-handed content is used to set \tcb\lefthandwidth. 
- \textit{right}: the actual width of the right-handed content is used to set \tcb\righthandwidth. 
- \textit{both}: the actual width of the left-handed and right-handed content is used to set \tcb\lefthandwidth, \tcb\righthandwidth, and the overall \tcb\width.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcb\sidebyside[sidebyside adapt=left, title=Very important table, beamer,colframe=blue!50!black,colback=blue!10, lower separated=false,sidebyside gap=5mm ]{
\begin{tabular}{|l|c|r|}
\hline
\left & \center & \right \\
\hline
A & B & C \\
\hline
D & E & F \\
\end{tabular}
\%
}
\{%
This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
}%
\textbf{Very important table}

\begin{tabular}{|l|c|r|}
\hline
\left & \center & \right \\
A & B & C \\
D & E & F \\
\end{tabular}
\end{verbatim}

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcb\sidebyside[sidebyside adapt=right, blanker,sidebyside gap=5mm ]{
\%
\lipsum[2]
\%
\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\%
}
\end{verbatim}

Both sides adapted

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>
If set to true, the (left-handed content) and (right-handed content) of \texttt{tcb\texttt{sidebyside}} are switched. Obviously, this option is only valid inside \texttt{tcb\texttt{sidebyside}}.

The side switching can be made even/odd page sensitive, if used inside \texttt{/tcb/if odd page}.

\begin{verbatim}
\% \tcbuselibrary{skins, xparse}
\tcbusepackage{Left}{Right}
\tcbusepackage{sidebyside switch}{Left}{Right}
\tcbusepackage{}{title=Very important table, if odd page={sidebyside switch, sidebyside adapt=right, flushright title}}%
% \begin{tabular}{|l|c|r|}
\hline
A & B & C \\
\hline
D & E & F \\
\hline
\end{tabular}
\% This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
\end{verbatim}
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages moreverb and verbatim. They are used implicitly inside of a tcolorbox environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. \TeX{} macros inside the environment are not expanded.

\begin{tcbverbatimwrite}{\jobname_verbexp.tex}
This text is saved \textit{as is}.
\end{tcbverbatimwrite}

Now, we are using the file:
\input{\jobname_verbexp.tex}

This environment may be used inside an own environment. Note, that inside the environment definition \tcbverbatimwrite has to be used instead of \begin{tcbverbatimwrite} and \end{tcbverbatimwrite} instead of \end{tcbverbatimwrite}.

\begin{tcbverbatimwrite}
This text is saved \textit{as is}.
\end{tcbverbatimwrite}

Now, we are using the file:
\input{\jobname_verbexp.tex}

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

Now, we are using the file:
\input{\jobname_myverb.tex}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as \tcbverbatimwrite, but uses the key value of \texttt{tempfile} for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

Now, we are using the file:
\tcbusetemp

This text is saved \textit{as is}.

\tcbusetemp

Loads the current temporary file which was saved by \tcbwritetemp.
If this option is set to be true, the percent sign % is silently ignored for `tcbverbatimwrite` \(^{P.129}\) and all macros and environments which are built using `tcbverbatimwrite` \(^{P.129}\), e.g. `tcbwritetemp` \(^{P.129}\), `tcblisting` \(^{P.310}\) or `dispExample` \(^{P.473}\).

This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by `/tcb/reset` \(^{P.109}\).

\begin{tcbwritetemp}
%\begin{center}\bfseries
This is my text.
%\end{center}
\end{tcbwritetemp}
\tcbusetemp
\tcbset{verbatim ignore percent}
\bigskip
\begin{tcbwritetemp}
%\begin{center}\bfseries
This is my text.
%\end{center}
\end{tcbwritetemp}
\tcbusetemp

\begin{tcblisting}{title=Normal}
%\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
%\end{center}
\end{tcblisting}
\begin{tcblisting}{title=Option applied, verbatim ignore percent}
\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}
\end{tcblisting}

Note that every percent sign is removed, also escaped ones.
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 135.

8.1 Macros

\texttt{\texttt{tcbstartrecording}}[(\texttt{file name})]

Opens a file denoted by \texttt{<file name>} for writing the records. The default file name is \texttt{\jobname.records}. See Section 8.3 on the next page for an example application.

In some situations, a not existing optional parameter may cause parsing problems. If this happens (or just for precaution), use

\texttt{\texttt{tcbstartrecording}}\texttt{\relax}

or

\texttt{\texttt{tcbstartrecording}}[	exttt{\jobname.records}]

\texttt{\texttt{tcbrecord}}\{\texttt{<content>}\}

Records any \texttt{<content>} to the record file. \texttt{tcbrecord} is implemented as \texttt{immediate\write}. \texttt{tcbstartrecording} has to be called before; otherwise, \texttt{tcbrecord} is silently ignored.

\texttt{\texttt{tcbrecord}}\{\texttt{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}\}

\texttt{\texttt{tcbstoprecording}}

Closes the current record file which was opened by \texttt{tcbstartrecording} before.

\texttt{\texttt{tcbinputrecords}}[(\texttt{file name})]

Opens a file denoted by \texttt{<file name>} for reading the records via \texttt{\input}. The default file name is the name of the last used record file for saving. \texttt{tcbstoprecording} has to be called before.

8.2 Options

\texttt{\texttt{/tcb/record=\langle content \rangle}} (style, no default)

Records any \texttt{<content>} to the record file, see \texttt{tcbrecord}. This key can be used several times to write several lines.

\texttt{record=\{\texttt{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}\}}

\texttt{\texttt{/tcb/no recording}}

Disables \texttt{tcbrecord} and \texttt{/tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single `tcolorbox` where the solution is given below. For every example, the solution part is saved by `/tcb/savelowerto` to a file. The saving is recorded using `/tcb/record` to a file. The saving is recorded using `/tcb/record` to a file. To enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 135.

```latex
\begin{exercise}
\begin{align*}
\text{Compute the derivative of the following function:} \\
\quad f(x) &= \sin((\sin x)^2) \\
\quad f'(x) &= \left( \sin((\sin x)^2) \right)' \\
\quad &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{exercise}
```

```
\input{#2}
\tcbset{no solution/.style={no recording,after upper=}}
\tcbstartrecording
\relax
\begin{example}
\text{Compute the derivative of the following function:} \\
\begin{equation*}
\quad f(x) = \sin((\sin x)^2) \\
\end{equation*}
\end{example}
```

```
\begin{solution}{\ref{exercise##1} on page \pageref{exercise##1}}
\phantom{\text{Solution of Exercise}}
\begin{align*}
\quad f'(x) &= \left( \sin((\sin x)^2) \right)' \\
\quad &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{solution}
```
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx}\left(\ln|x|\right) = \frac{1}{x}.
\end{equation*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)= (\sin(\sin x))^2
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left((\sin(\sin x))^2\right)' \\
&= 2\sin(\sin x)\cos(\sin x)\cos x.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)= \sqrt{x^3-6x^2+2x}
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left(\sqrt{x^3-6x^2+2x}\right)' \\
&= \frac{3x^2-12x+2}{2\sqrt{x^3-6x^2+2x}}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)= \left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left(\left(\frac{2+3x}{1-2x}\right)^3\right)' \\
&= 3 \left(\frac{2+3x}{1-2x}\right)^2 \frac{(1-2x)3-(2+3x)(-2)}{(1-2x)^2} \\
&= \frac{21(2+3x)^2}{(1-2x)^4}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)= \frac{\cos x}{(\tan 2x)^2}
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left(\frac{\cos x}{(\tan 2x)^2}\right)' \\
&= -\frac{\cos(2x) \left[\sin x \sin 2x \cos 2x + 4\cos x (\sin 2x)^2 \right]}{(\sin 2x)^3}.
\end{align*}
\end{exercise}
Exercise 8.1: Compute the derivative of the following function:
\[ f(x) = \sin((\sin x)^2) \]
Solution on page 135

Exercise 8.2: It holds:
\[ \frac{d}{dx} \ln x = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:
\[ f(x) = (\sin(\sin x))^2 \]
Solution on page 135

Exercise 8.4: Compute the derivative of the following function:
\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 \]

Solution on page 136

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 136

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 136

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 136

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 132. Now, the saved and recorded solutions are included.

\[ \text{Solution of Exercise 8.1 on page 134:} \]

The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2\sin x \cos x. \]

\[ \text{Solution of Exercise 8.3 on page 134:} \]

The derivative is:

\[ f'(x) = \left( (\sin(\sin x))^2 \right)' = 2\sin(\sin x) \cos(\sin x) \cos x. \]

\[ \text{Solution of Exercise 8.4 on page 134:} \]

The derivative is:

\[ f'(x) = \left( \sqrt{x^3 - 6x^2 + 2x} \right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}. \]
Solution of Exercise 8.5 on page 135:
The derivative is:

\[ f'(x) = \frac{2 + 3x}{1 - 2x} = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(+2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^2}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 135:
The derivative is:

\[
\begin{align*}
f''(x) &= \left( \frac{\cos x}{(\tan 2x)^2} \right)' = \left( \frac{\cos x(\cos 2x)^2}{(\sin 2x)^2} \right) \\
&= (\sin 2x)^2[\sin x(\cos 2x)^2 + (\cos x)4\cos 2x(-\sin 2x)] - \cos x(\cos 2x)^24\sin 2x\cos 2x \\
&= (\sin 2x)^2 \left[ \cos(2x)[\sin x \sin 2x \cos 2x + 4 \cos x (\sin 2x)^2 + 4 \cos x (\cos 2x)^2] \right] \\
&= \frac{-\cos(2x)[\sin x \sin 2x \cos 2x + 4 \cos x (\sin 2x)^2 + 4 \cos x (\cos 2x)^2]}{(\sin 2x)^3}.
\end{align*}
\]

Solution of Exercise 8.7 on page 135:
The derivative is:

\[
\begin{align*}
f'(x) &= \left( \cos((2x^2 + 3)^3) \right) = -\sin((2x^2 + 3)^3)3(2x^2 + 3)^22x \\
&= -12x(2x^2 + 3)^2\sin((2x^2 + 3)^3).
\end{align*}
\]

Solution of Exercise 8.8 on page 135:
The derivative is:

\[
\begin{align*}
f'(x) &= \left( (x^2 + 1)\sqrt{x^4 + 1} \right)' = 2x\sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}.
\end{align*}
\]
9 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 152 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{skins} library, see Section 10 on page 152.

9.1 Skins and Drawing Engines

From a technical point of view, a skin is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \textsuperscript{P.208} and \texttt{standard jigsaw} \textsuperscript{P.209}. The \texttt{skins} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
\texttt{/tcb/skin=(name)} \hspace{1cm} (style, no default, initially \texttt{standard})

Sets the current skin to \texttt{(name)}. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

\begin{verbatim}
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black,\linewid\textwidth-8mm}/2,\before=,\after=\hfill,\equal\height\group=ske}
\begin{tcolorbox}[\texttt{adjusted title=My title}]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{skin=beamer,beamer,adjusted title=My title}]
This is my content.
\end{tcolorbox}
\end{verbatim}

\end{verbatim}

\begin{verbatim}
\texttt{/tcb/skin\ first=(name)} \hspace{1cm} (style, no default, initially \texttt{standard})
If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.376} and is broken actually, then the skin for the first part of the break sequence is set to \texttt{(name)}, see Subsection 18.8 on page 389. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
\texttt{/tcb/skin\ middle=(name)} \hspace{1cm} (style, no default, initially \texttt{standard})
If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.376} and is broken actually, then the skin for the middle parts (if any) of the break sequence is set to \texttt{(name)}, see Subsection 18.8 on page 389. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
\texttt{/tcb/skin\ last=(name)} \hspace{1cm} (style, no default, initially \texttt{standard})
If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.376} and is broken actually, then the skin for the last part of the break sequence is set to \texttt{(name)}, see Subsection 18.8 on page 389. Typically, this key is set by a \texttt{/tcb/skin}.
\end{verbatim}
\end{verbatim}
/tcb/graphical environment={name} (no default, initially pgfpicture)
Sets the graphical environment for the tcolorbox to {name}. Feasible values are pgfpicture and tikzpicture or environments which inherit from one of these two. This key is set by a /tcb/skin \textsuperscript{P.137} and may seldom be used directly.

The skin of a tcolorbox is drawn by up to four engines. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The frame of the box, drawn by /tcb/frame engine.
2. The interior of the box. The interior of a box with title is drawn differently from a box without title. /tcb/interior titled engine or /tcb/interior engine \textsuperscript{P.139} is used to draw the interior.
3. The segmentation (line) of the box, if there is a lower part; drawn by /tcb/segmentation engine \textsuperscript{P.139}.
4. The title area of the box, if there is a title and /tcb/title filled \textsuperscript{P.27} is set to true; drawn by /tcb/title engine \textsuperscript{P.139}.

/tcb/frame engine={name} (no default, initially standard)
Sets the frame drawing engine for a box to {name}. Typically, this key is set by a /tcb/skin \textsuperscript{P.137}. Feasible values for {name} are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathfirst: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathfirstjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathmiddle: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathmiddlejigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathlast: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- pathlastjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.152},
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/interior engine={name} (no default, initially standard)
Sets the interior drawing engine for a titled box to {name}. Typically, this key is set by a /tcb/skin \textsuperscript{P.137}. Feasible values for {name} are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.153},
- pathfirst: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.153},
- pathmiddle: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.153},
- pathlast: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.153},
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.
/tcb/interior engine=(name) (no default, initially standard)
Sets the interior drawing engine for an untitled box to (name). Typically, this key is set by a /tcb/skin \textsuperscript{P.137}. Feasible values for (name) are:
- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by /tcb/interior style \textsuperscript{P.153},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by /tcb/interior style \textsuperscript{P.153},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by /tcb/interior style \textsuperscript{P.153},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by /tcb/interior style \textsuperscript{P.153},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

/tcb/segmentation engine=(name) (no default, initially standard)
Sets the segmentation (line) drawing engine for a box to (name). Typically, this key is set by a /tcb/skin \textsuperscript{P.137}. Feasible values for (name) are:
- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by /tcb/segmentation style \textsuperscript{P.155},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

/tcb/title engine=(name) (no default, initially standard)
Sets the title area drawing engine for a titled box to (name). Typically, this key is set by a /tcb/skin \textsuperscript{P.137}. Feasible values for (name) are:
- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by /tcb/title style \textsuperscript{P.155},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by /tcb/title style \textsuperscript{P.155},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by /tcb/title style \textsuperscript{P.155},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by /tcb/title style \textsuperscript{P.155},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 141.
/tcb/geometry nodes=true|false (default true, initially false)
If set to true, up to four tikz nodes are defined for a tcolorbox which are named frame, interior, segmentation, and title. These nodes describe the boundaries of the equally named parts of a tcolorbox. They are used by most engines based on TikZ. Typically, this key is set automatically by a /tcb/skin. *P.137*

\begin{tcolorbox}[adjusted title=The title]
The upper part. \tcblower The lower part.
\end{tcolorbox}
\begin{tcolorbox}[enhanced, adjusted title=The title, 
frame code={\path[draw=red,fill=red!25] (frame.south west) rectangle (frame.north east);}, 
interior titled code={\path[draw=blue,fill=blue!25] (interior.south west) rectangle (interior.north east);}, 
segmentation code={\path[draw=green,fill=green!25] (segmentation.south west) rectangle (segmentation.north east);}, 
title code={\path[draw=black,fill=brown!75!black] (title.south west) rectangle (title.north east);}]
The upper part. \tcblower The lower part.
\end{tcolorbox}
9.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{(graphical code)} can be any \texttt{pgf} code. For all skins with exception of \texttt{standard} \footnote{P.208} and \texttt{standard jigsaw} \footnote{P.209}, the \texttt{(graphical code)} can also be any \texttt{TikZ} code.

\texttt{/tcb/frame code=⟨graphical code⟩} \texttt{(code, default from standard)}

The given \texttt{(graphical code)} is used for drawing the \texttt{frame} of the box.

\begin{tcolorbox}
\begin{tcolorbox}[enhanced,frame code={
\foreach \n in {north east,north west,south east,south west}
{\path [fill=red!75!black] (interior.\n) circle (3mm); }
}]
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

\texttt{/tcb/frame empty} \texttt{(style, no value)}

This is a shortcut for setting \texttt{/tcb/frame code} to empty. This option removes the drawing of the frame. Alternatively, use \texttt{/tcb/frame hidden} \footnote{P.153}.

\texttt{/tcb/interior titled code=⟨graphical code⟩} \texttt{(code, default from standard)}

The given \texttt{(graphical code)} is used for drawing the \texttt{interior} of the box, if the box comes with a title.

\begin{tcolorbox}
\begin{tcolorbox}[enhanced,title=My title,interior titled code={
\path[draw=red!5!white,line width=5mm,line cap=round]
{([xshift=3mm,yshift=-3mm]interior.north west) -- ([xshift=-3mm,yshift=3mm]interior.south east) -- ([xshift=3mm,yshift=-3mm]interior.south west) -- ([xshift=-3mm,yshift=-3mm]interior.north east);}
}]
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

\texttt{/tcb/interior titled empty} \texttt{(style, no value)}

This is a shortcut for setting \texttt{/tcb/interior titled code} to empty. This option removes the drawing of the untitled interior. Alternatively, use \texttt{/tcb/interior hidden} \footnote{P.154}. 

\begin{tcolorbox}
\begin{tcolorbox}[enhanced,title=My title,interior titled code={
\path[draw=red!5!white,line width=5mm,line cap=round]
{([xshift=3mm,yshift=-3mm]interior.north west) -- ([xshift=-3mm,yshift=3mm]interior.south east) -- ([xshift=3mm,yshift=-3mm]interior.south west) -- ([xshift=-3mm,yshift=-3mm]interior.north east);}
}]
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.
/tcb/interior code=(graphical code)  
(code, default from standard)  
The given (graphical code) is used for drawing the interior of the box, if the box is without a title.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[enhanced,interior code={
\path[draw=red!5!white,line width=5mm,line cap=round] ([xshift=3mm,yshift=-3mm]interior.north west) --([xshift=-3mm,yshift=3mm]interior.south east) ([xshift=3mm,yshift=3mm]interior.south west) --([xshift=-3mm,yshift=-3mm]interior.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/interior empty
(style, no value)  
This is a shortcut for setting /tcb/interior code to empty. This option removes the drawing of the interior. Alternatively, use /tcb/interior hidden \textsuperscript{P.154}.

/tcb/segmentation code=(graphical code)  
(code, default from standard)  
The given (graphical code) is used for drawing the segmentation area of the box.

\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation code={
\path[top color=red!5!white,bottom color=red!5!white,middle color=blue] (segmentation.south west) rectangle (segmentation.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/segmentation empty
(style, no value)  
This is a shortcut for setting /tcb/segmentation code to empty. This option removes the drawing of the segmentation line. Alternatively, use /tcb/segmentation hidden \textsuperscript{P.155}.  

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The given ⟨graphical code⟩ is used for drawing the title area of the box.

/\texttt{tcb/title code}=(graphical code) (code, default from \texttt{standard})

This is a \textbf{tcolorbox}.

/\texttt{tcb/title empty} (style, no value)

This is a shortcut for setting /\texttt{tcb/title code} to empty. This option removes the drawing of the title area. Alternatively, use /\texttt{tcb/title hidden}^{\textcolor{red}{P.156}}.
9.3 Subskins

A subskin is a new `/tcb/skin` based on an existing skin which is extended or changed.

Never use geometry settings or bounding box options inside a subskin definition! If one skin is replaced by another skin, the overall bounding box should stay constant. Especially, if a skin is used for a breakable box, unpredictable and unpleasant results could arise otherwise. If you want to change the geometry also, use an additional style. See the skin `beamer` and the style `/tcb/beamer` as pattern.

```
\tcbsubskin{⟨name⟩}{⟨base skin⟩}{⟨options⟩}
```

Creates a new skin ⟨name⟩ which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. The new skin ⟨name⟩ can be used as value for the keys `/tcb/skin`, `/tcb/skin first`, `/tcb/skin middle`, and `/tcb/skin last`. As ⟨base skin⟩, one can take standard, empty, enhanced, or any skin from the `skins` library, see Section 10 on page 152.

```
\% \tcbuselibrary{skins}
\tcbsubskin{mycross}{empty}{frame code={
    \draw[red,line width=5pt] (frame.south west)--(frame.north east);
    \draw[red,line width=5pt] (frame.north west)--(frame.south east);},
    skin first=mycross,skin middle=mycross,skin last=mycross }
\begin{tcolorbox}[skin=mycross]
This is my content.
\end{tcolorbox}
```

This is my content.

```
\tcbsubskin{⟨base skin⟩}{⟨options⟩}   (no default, initially unset)
```

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as `/tcb/skin first`. See a detailed example on page 247.

```
\tcbsubskin{⟨base skin⟩}{⟨options⟩}   (no default, initially unset)
```

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as `/tcb/skin middle`. See a detailed example on page 247.

```
\tcbsubskin{⟨base skin⟩}{⟨options⟩}   (no default, initially unset)
```

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as `/tcb/skin last`. See a detailed example on page 247.
9.4 Drawing Scheme

Depending on the complexity of a \texttt{tcolorbox} definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

\begin{tcolorbox}[1]
\texttt{testbox}[1]
\{enhanced,title=Test Box, boxrule=1mm, titlerule=0.5mm, colframe=blue!50!black, interior style={top color=blue!20!green!50!white, bottom color=blue!20!yellow!50!white}, colbacktitle=blue!50!green!90!white, segmentation style={solid}, fonttitle=\textbf, drop fuzzy shadow, borderline={0.3mm}{0.35mm}{yellow!50!white}, underlay={\path[fill image opacity=0.15, fill image scale=0.9, fill stretch picture={\draw[blue,line width=2mm] circle (1);}](interior.south west) rectangle (interior.north east);}, watermark text={Watermark}, watermark color={green!20!white}, finish={\begin{tcbclipframe}
\path[bottom color=black!50!white, opacity=0.1] (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white, bottom color=black!50!white, opacity=0.1] (frame.south west) -- (frame.north west) -- cycle;
\end{tcbclipframe}},#1\}
\end{tcolorbox}

For this definition, we get the maximal number of drawing steps:

1. shadow

2. frame

- Section 10.6 on page 186.

- \texttt{/tcb/colframe} \textsuperscript{P.27}, \texttt{/tcb/opacityframe} \textsuperscript{P.51}
- \texttt{/tcb/frame code} \textsuperscript{P.141}
- \texttt{/tcb/frame style} \textsuperscript{P.152}

Lower part

- Section 10.9 on page 201

All together, the box is drawn:

```latex
\begin{testbox}
\lipsum[2]
\end{testbox}
```
9.5 Color Names

Color settings for a \texttt{tcolorbox} are saved into named colors which may be used inside a box, e.g. for an overlay. These color names are

- \texttt{tcbcolframe} set by \texttt{/tcb/colframe} (frame color)
- \texttt{tcbcolback} set by \texttt{/tcb/colback} (background color)
- \texttt{tcbcolbacktitle} set by \texttt{/tcb/colbacktitle} (background color of the title)
- \texttt{tcbcolbacklower} set by \texttt{/tcb/colbacklower} (skin dependend background color of the lower part; needs \texttt{skins} to be loaded)
- \texttt{tcbcolupper} set by \texttt{/tcb/colupper} (text color upper part)
- \texttt{tcbcollower} set by \texttt{/tcb/collower} (text color lower part)
- \texttt{tcbcoltitle} set by \texttt{/tcb/coltitle} (text color title)

\begin{tcolorbox}
\texttt{\% \tcblib{skins}}
\begin{tcolorbox}[
    title=Color names,
    colframe=blue!50!black,colback=blue!5,
    colbacktitle=blue!50,colupper=red!35!black
    ]
\foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower,tcbcolupper,tcbcollower,tcbcoltitle}
\{\texttt{\tikz\path[draw,fill=\name]}
\texttt{(0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);\par}\}
\end{tcolorbox}
\end{tcolorbox}
9.6 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 145. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\texttt{\tcbheightspace}

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is hold by \texttt{\tcbheightspace}. This macro is not usable inside the box content, but for skins or inside /tcb/underlay\textsuperscript{P.199}, /tcb/overlay\textsuperscript{P.74}, etc. If such a space information is needed inside the box content, see /tcb/space to\textsuperscript{P.59} instead.

\begin{verbatim}
\% \tcbselibrary{skins}
\newtcolorbox{testbox}[2]\{}{enhanced,size=fbox,
colframe=blue!75!black,colback=white,height=#2,
underlay={\node[above,inner sep=3pt] at (interior.south){%
  \includegraphics[width=\tcbtextwidth,height=\tcbheightspace-3pt]{goldshade.png}};
},
#1}
\begin{testbox}{3cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\begin{testbox}{2cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\end{verbatim}

\texttt{\tcbtextwidth}

This property describes the box content width.

- If there also is a lower part, it describes the width of the upper part.
- For /tcb/sidebyside\textsuperscript{P.119} boxes, it describes the combined text width plus segmentation.
- This property can be used inside the box content text with exception of /tcb/fit\textsuperscript{P.424} boxes.
- \texttt{\tcbtextwidth} can be used for all box types for skins or inside /tcb/underlay\textsuperscript{P.199}, /tcb/overlay\textsuperscript{P.74}, etc.

\begin{verbatim}
\begin{tcolorbox}[colframe=blue!75!black]
  Inside a box: \tcbtextwidth\ (=%the\linewidth).
\end{tcolorbox}
\end{verbatim}

\texttt{\texttt{tcbtextheigh}t}

This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than $\texttt{tcbtextheigh}t$.

- For boxes with a fixed /\texttt{tcb/height}$^\texttt{\textbullet}$, this property can be used inside the box content text. For other boxes, it denotes 0pt inside the box content.
- $\texttt{tcbtextheigh}t$ can be used for all box types for skins or inside /\texttt{tcb/underlay}$^\texttt{\textbullet}$, /\texttt{tcb/overlay}$^\texttt{\textbullet}$, etc.

\begin{tcolorbox}
\begin{tcbraster}
    \begin{tcolorbox}
        Upper part
    \end{tcolorbox}
    \begin{tcolorbox}
        Upper part
        \texttt{tclower} Lower part
    \end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}

\texttt{\texttt{tcbsegmentstate}}

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- 0: The current (partial) box contains only an upper part.
- 1: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- 2: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor}$^\texttt{\textbullet}$ use this property to paint the (partial) boxes.

\begin{tcolorbox}
\begin{tcolorbox}
    Upper part
\end{tcolorbox}
\begin{tcolorbox}
    Upper part
    \texttt{tclower} Lower part
\end{tcolorbox}
\end{tcolorbox}
The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{skins}
```

This also loads the package `tikz` [22]. Typically but not necessarily, the following skins use `tikz` instead of `pgf`.

### 10.1 Style Option Keys

The following style options are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `pathlast`. Especially, the skin `enhanced` [P.210] supports all of them and `standard` [P.208] none.

```
/tcb/frame style=(tikz keys) (style, no default)
```

The `(tikz keys)` are used inside the `tikz` path command for drawing the frame of the box. This option is available if the `/tcb/frame engine` [P.138] is set to `path`, `pathfirst`, `pathmiddle`, or `pathlast`. It is not available for `standard`.

```
\begin{tcolorbox}[enhanced,title=My title, frame style={left color=red!75!black, right color=blue!75!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title, frame style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title, frame style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title, frame style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```
/tcb/frame style tile={⟨graphics options⟩}{⟨file name⟩}  (no default, initially unset)
Fills the frame with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/frame style together with /tikz/fill tile image.\footnote{P.152}

\begin{tcolorbox}[enhanced,title=My title,
frame style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/frame hidden  (style, no value)
This is a shortcut for frame style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use /tcb/frame empty.\footnote{P.141}

\begin{tcolorbox}[enhanced,title=My title,
frame hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior style={⟨tikz keys⟩}  (style, no default)
The ⟨tikz keys⟩ are used inside the \tikz path command for drawing the interior of the box. They are used for the titled and for the untitled version as well. This option is available if the /tcb/interior titled engine\footnote{P.138} or /tcb/interior engine\footnote{P.139} is set to path, pathfirst, pathmiddle, or pathlast. It is \textit{not} available for standard.

\begin{tcolorbox}[enhanced,title=My title,
interior style={left color=red!20!white, right color=yellow!50!white}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.
/tcb/interior style image=⟨file name⟩ (no default, initially unset)
Fills the interior with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use /tcb/interior style together with /tikz/fill stretch image.

\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior style tile=⟨graphics options⟩⟨file name⟩ (no default, initially unset)
Fills the interior with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/interior style together with /tikz/fill tile image.

\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior hidden (style, no value)
This is a shortcut for interior style=draw=none,fill=none. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty and/or /tcb/interior titled empty.

\tcbset{frame style={top color=red!20!white, bottom color=red!20!white!75!black}, fonttitle=\bfseries,coltitle=black}
\begin{tcolorbox}[enhanced,title=My title, interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.
/tcb/segmentation style=(tikz keys)  (style, no default)
The ⟨tikz keys⟩ are used inside the tikz path command for drawing the segmentation line of the box. This option is available if the /tcb/segmentation engine \[P.139\] is set to path. It is not available for standard.

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation style={double=white,draw=blue,double distance=1pt,solid}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/segmentation hidden  (style, no value)
This is a shortcut for segmentation style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the segmentation line. See also /tcb/lower separated \[P.25\] which has the same effect for most skins. Alternatively, use /tcb/segmentation empty \[P.142\].

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[title=My title,enhanced,segmentation hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/title style=(tikz keys)  (style, no default)
The ⟨tikz keys⟩ are used inside the tikz path command for drawing the title area of the box. This option is available if the /tcb/title engine \[P.139\] is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black,coltitle=blue!50!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title,title style={left color=blue!15!yellow,right color=red!85!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.
/tcb/title style image=(file name) (no default, initially unset)
Fills the title area with an external image referenced by (file name). For advanced features like blending of a picture with the background, use /tcb/title style=\textit{P.155} together with /tikz/fill stretch image=\textit{P.261}.

```
\tcbset{colback=blue!5!white,colframe=blue!75!black,
        fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,
                 title style image=blueshade.png]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/title style tile={(graphics options)}{(file name)} (no default, initially unset)
Fills the title area with a tile pattern based on an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/title style=\textit{P.155} together with /tikz/fill tile image=\textit{P.265}.

```
\tcbset{colback=red!5!white,colframe=red!75!black, 
        coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,
                 title style tile={width=1cm}{pink_marble.png}]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/title hidden (style, no value)
This is a shortcut for title style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the title background. See also /tcb/title filled=\textit{P.27} for a similar effect. Alternatively, use /tcb/title empty=\textit{P.143}.

```
\tcbset{colback=red!5!white,colframe=red!75!black, 
        fonttitle=\bfseries}
\begin{tcolorbox}[title=My title, 
                 enhanced,title hidden]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.
The ⟨tikz keys⟩ are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by /tcb/titlerule P.36. It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an /tcb/underlay P.199. Thus, it is not available for standard P.208 and standard jigsaw P.209, but for all other skins, e.g. enhanced P.210. As an underlay, this option can be used multiple times and is removed by /tcb/no underlay P.199.

\begin{tcolorbox} [enhanced,  
    colback=red!5!white,colframe=red!75!black,  
    colbacktitle=red!50!yellow,fonttitle=\bfseries,  
    title=My title,  
    titlerule=1mm,  
    titlerule style=yellow ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox} [enhanced,  
    colback=red!5!white,colframe=red!75!black,  
    colbacktitle=red!50!yellow,fonttitle=\bfseries,  
    title=My title,  
    titlerule=1mm,  
    titlerule style={yellow,line width=0.5mm} ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox} [enhanced,  
    colback=red!10!white,colframe=red!75!black,  
    colbacktitle=red!50!yellow,fonttitle=\bfseries,  
    frame hidden,  
    title=My title,  
    boxrule=0pt,titlerule=1mm,  
    titlerule style=red!50!black ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox} [empty,  
    coltitle=red!75!black,fonttitle=\bfseries,  
    borderline horizontal={0.5mm}{0pt}{red!50!white},  
    title=My title,  
    titlerule style={red,  
    arrows = {Hooks[arc=270]-Hooks[arc=270]} } ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The combined Ti\kZ style applied to frame, interior, and title background can be used by authors in customizing code.

/tikz/tcb fill frame (style, no value)

This is a Ti\kZ style which is finally applied to the \textit{frame} of the box.

\begin{tcolorbox}[
\title=My title
\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill interior (style, no value)

This is a Ti\kZ style which is finally applied to the \textit{interior} of the box.

\begin{tcolorbox}[
\title=My title
\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill title (style, no value)

This is a Ti\kZ style which is finally applied to the \textit{title area} of the box.

\begin{tcolorbox}[
\title=My title
\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
## 10.2 Boxed Title Option Keys

### 10.2.1 Boxed Title Placement

The following options place the title text into an own \textbf{tcbox}. This boxed title can be customized independently from the main box using \texttt{/tcb/boxed title style}. The placement can be influenced by \texttt{(boxtitle options)}.

\begin{itemize}
  \item \texttt{/tcb/attach boxed title to top left}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the top left corner of the main box.
    \end{quote}
  \item \texttt{/tcb/attach boxed title to top center}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the top of the main box.
    \end{quote}
  \item \texttt{/tcb/attach boxed title to top right}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the top right corner of the main box.
    \end{quote}
  \item \texttt{/tcb/attach boxed title to bottom left}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the bottom left corner of the main box.
    \end{quote}
  \item \texttt{/tcb/attach boxed title to bottom center}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the bottom of the main box.
    \end{quote}
  \item \texttt{/tcb/attach boxed title to bottom right}={\langle boxtitle options\rangle} \hspace{1cm} (style, default empty)
    \begin{quote}
      The title is boxed with a \textbf{tcbox} and attached to the bottom right corner of the main box.
    \end{quote}
\end{itemize}
This is a convenient style to mimic a standard title. It uses /tcb/attach boxed title to top center *P.159, /tcb/minipage boxed title *P.167, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top*, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

This is a convenient style to produce a standard-like title at the bottom of the box. It uses /tcb/attach boxed title to bottom center *P.159, /tcb/minipage boxed title *P.167, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom*] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.

This style combines /tcb/attach boxed title to bottom* with /tcb/boxed title style *P.163. The \textit{(options)} are given to /tcb/boxed title style *P.163.

\begin{tcolorbox}[tile,flip title={sharp corners}, title=My title, colback=red!10, colbacktitle=red!75!black] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.
10.2.2 Options for the Boxed Title Placement

The \langle boxtitle options \rangle of the keys described above are shift values. The dimensions of the boxed title are stored into two macros $\texttt{tcboxedtitleheight}$ and $\texttt{tcboxedtitlewidth}$. These macros can be used inside the following \langle boxtitle options \rangle:

\begin{verbatim}
/\tcb/boxtitle/xshift=(length) (no default, initially \texttt{0pt})
  The boxed title is shifted by \langle length \rangle in the horizontal direction.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
  attach boxed title to top left={xshift=-2mm},
  boxed title style={size=small,colback=blue}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/\tcb/boxtitle/yshift=(length) (no default, initially \texttt{0pt})
  The boxed title is shifted by \langle length \rangle in the vertical direction.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
  attach boxed title to top center={yshift=-\texttt{tcboxedtitleheight}/2},
  boxed title style={size=small,colback=blue}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/\tcb/boxtitle/yshifttext=(length) (no default, initially \texttt{0pt})
  The text inside the main box is shifted by \langle length \rangle to give room for e.g. a sunken title.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
  attach boxed title to top center={yshift=-3mm,yshifttext=-1mm},
  boxed title style={size=small,colback=blue}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/\tcb/boxtitle/yshift*=(length) (no default, initially \texttt{0pt})
  Sets $/\tcb/boxtitle/yshift$ and $/\tcb/boxtitle/yshifttext$ the same time.
  $/\tcb/boxtitle/yshifttext$ is only set if necessary.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
  attach boxed title to top center={yshift*=-3mm},
  boxed title style={size=small,colback=blue}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

The bounding box of the resulting total \texttt{tcolorbox} is adapted automatically to the \textit{vertical} dimensions of the boxed title. Possible horizontal enlargements are not automatically computed.
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 199. Therefore, a boxed title is not drawn, if a skin does not support underlays like `standard` \( ^{P.208} \). Still, the room for the boxed titles gets reserved in these cases.

A TikZ node `title` is produced by a boxed title which can be used inside `/tcb/frame code \( ^{P.141} \), `/tcb/interior code \( ^{P.142} \), underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by `/tcb/underlay boxed title \( ^{P.200} \) which are drawn before. Additionally, underlays defined by `/tcb/underlay boxed title \( ^{P.200} \) are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\[ \text{/tcb/boxed title size=(size)} \] (no default, initially `title`)  
This setting defines the basic size for the title box. Further settings can be applied using `/tcb/boxed title style \( ^{P.163} \). Feasible values for `(size)` are:

- `title`: Sets the size according to `/tcb/size \( ^{P.44} \)`.  
- `standard`: No size setting. Typically, this is identical to `/tcb/size \( ^{P.44} \) = normal`.  
- `copy`: The size values for a title of the base box are copied for the title box.

\[
% \text{/tcbuselibrary{raster}}
\begin{tcbraster}[raster columns=3,enhanced,boxrule=0.4pt,  
title=My title,attach boxed title to top center]  
\begin{tcolorbox}[boxed title size=title]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}  
\begin{tcolorbox}[boxed title size=standard]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}  
\begin{tcolorbox}[boxed title size=copy]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}  
\end{tcbraster}
\]
By default, a boxed title is dimensioned with `/tcb/size` \(^\text{P.44}\)=title and inherits the `/tcb/skin` \(^\text{P.137}\) and `/tcb/colframe` \(^\text{P.27}\) of the main box. Also, the `/tcb/colback` \(^\text{P.27}\) is inherited from the main `/tcb/colbacktitle` \(^\text{P.27}\). Font and color of the title text are set as usual. All other \(\langle\text{options}\rangle\) are set by the `/tcboboxed title style` key. Since a boxed title is set by `\tcbox` \(^\text{P.14}\), all `tcolorbox` options are applicable here. If `/tcb/boxed title style` is used several times, the \(\langle\text{options}\rangle\) are is appended.

```
\begin{tcolorbox}[enhanced,title=My title,           
  fonttitle=\bfseries,coltitle=green!25!black,     
  attach boxed title to top center=             
  {yshift=-2mm,yshifttext=-1mm},               
  boxed title style={colframe=green!75!black,   
                      colback=yellow!50!green}]    
This is a \textbf{tcolorbox}.               
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title,            
  colframe=red!50!black,colback=red!10!white,   
  arc=1mm,colbacktitle=red!10!white,             
  fonttitle=\bfseries,coltitle=red!50!black,    
  attach boxed title to top left=               
  {xshift=3.2mm,yshift=-0.50mm},               
  boxed title style={skin=enhancedfirst jigsaw, 
                     size=small,arc=1mm,botomy=1mm,     
                     interior style={fill=none,       
                      top color=red!30!white,        
                      bottom color=red!20!white}}]     
This is a \textbf{tcolorbox}.               
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title,          
  colframe=blue!50!black,colback=blue!10!white,colbacktitle=blue!5!yellow!10!white, 
  fonttitle=\bfseries,coltitle=black,attach boxed title to top center=           
  {yshift=-0.25mm-\tcboxedtitleheight/2,yshifttext=2mm-\tcboxedtitleheight/2},  
  boxed title style={boxrule=0.5mm,         
                     frame code={\path[tcb fill frame] (xshift=-4mm)frame.west} 
                     -- (frame.north west) -- (frame.north east) -- ([xshift=4mm)frame.east} 
                     -- (frame.south east) -- (frame.south west) -- cycle; },     
  interior code={\path[tcb fill interior] ([xshift=-2mm]interior.west)  
                     -- (interior.north west) -- (interior.north east) 
                     -- ([xshift=2mm]interior.east) -- (interior.south east) -- (interior.south west)  
                     -- cycle; } ]       
\lipsum[2]                                            
\end{tcolorbox}
```

My title


\begin{mybox}[colbacktitle=green]{My title}
\lipsum[2]
\end{mybox}

\begin{mybox}[colbacktitle=red]{My title}
\lipsum[3]
\end{mybox}
The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

```
\newtcolorbox{mybox}[1]{hbox boxed title, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a minipage with a width of \(⟨\text{length}⟩\). By default, the resulting boxed title is somewhat smaller than the main box.

```
\newtcolorbox{mybox}[1]{minipage boxed title, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title, title={#1}}

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a minipage with a width of main box width plus \(⟨\text{length}⟩\). By default, the resulting boxed title is somewhat smaller than the main box.

```
\newtcolorbox{mybox}[1]{minipage boxed title=-2cm, enhanced, attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title, title={#1}}

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```
The title text content is captured with a TiKZ node with given TiKZ \texttt{(options)}. The text is centered by default.

\begin{tcolorbox}[mybox] % mybox{[1]}{tikznode boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}\end{tcolorbox}

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a \texttt{varwidth} environment with a width of \texttt{⟨length⟩}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{tcolorbox}[varwidth boxed title=\texttt{⟨length⟩}]
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\end{tcolorbox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a \texttt{varwidth} environment with a width of main box width plus \texttt{⟨length⟩}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{tcolorbox}[varwidth boxed title*=\texttt{⟨length⟩}]
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\end{tcolorbox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use tikzpicture as \( /tcb/graphical\ environment \). Therefore, the skin standard does not support these watermarks, but all other skins, e.g. enhanced.

The watermark options rely on the more general overlay options described in Section 4.12 from page 74. Therefore, watermarks and overlays cannot be used mixed. But a mixture is possible with the \( \texttt{hooks} \) library, see Section 22.

\( /tcb/watermark\text{ text} = \text{(text)} \)
(no default, initially unset)

Writes some \( (\text{text}) \) in the center of the interior region of a \( \texttt{tcolorbox} \). This \( (\text{text}) \) is written after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of \( /tcb/watermark\ zoom \) or \( /tcb/watermark\ stretch \).

\( \texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\textbf}} \)

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}

My Watermark

My title


\( /tcb/watermark\text{ text on} = (part) \text{ is} (text) \)
(no default, initially unset)

This option writes some \( (\text{text}) \) in the center of the interior region of a \( \texttt{tcolorbox} \) as described for \( /tcb/watermark\text{ text} \). But this is done only for boxes named \( (part) \) of a break sequence, see \( /tcb/breakable \).

Feasible values for \( (part) \) are:

- \textbf{broken}: all broken box parts,
- \textbf{unbroken}: unbroken boxes only,
- \textbf{first}: first parts of a break sequence,
- \textbf{middle}: middle parts of a break sequence,
- \textbf{last}: last parts of a break sequence,
- \textbf{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \textbf{middle and last}: middle and last parts of a break sequence,
- \textbf{first and middle}: first and middle parts of a break sequence.
/tcb/watermark graphics=(\textit{file name}) \hfill \text{(no default, initially unset)}
Draws an external picture referenced by \textit{(file name)} in the center of the interior region of a \texttt{tcolorbox}. The picture is drawn \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom \hfill \textsuperscript{P.172} or /tcb/watermark stretch \hfill \textsuperscript{P.174}.

\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\tcbloyer
\textbf{This example uses a public domain picture from}\
\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}

\begin{tcbset}{colback=red!5!white,colframe=red!75!black,fonttitle=\textbf{series}}
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\end{tcolorbox}
This example uses a public domain picture from http://commons.wikimedia.org/wiki/File:Basilica_5.png

\textbf{/tcb/watermark graphics on=(part) is (file name)} \hfill \text{(no default, initially unset)}
This option draws a picture referenced by \texttt{(file name)} in the center of the interior region of a \texttt{tcolorbox} as described for /tcb/watermark graphics. But this is done only for boxes named \texttt{(part)} of a break sequence, see /tcb/breakable \hfill \textsuperscript{P.376}.
Feasible values for \texttt{(part)} are:
\begin{itemize}
  \item \texttt{broken}: all broken box parts,
  \item \texttt{unbroken}: unbroken boxes only,
  \item \texttt{first}: first parts of a break sequence,
  \item \texttt{middle}: middle parts of a break sequence,
  \item \texttt{last}: last parts of a break sequence,
  \item \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
  \item \texttt{middle and last}: middle and last parts of a break sequence.
\end{itemize}
/tcb/watermark tikz=(graphical code)  (no default, initially unset)
Draws the given tikz (graphical code) in the center of the interior region of a tcolorbox. The code is executed after the frame and interior are drawn and before the text content is drawn. The result is zoomed or stretched according the values of /tcb/watermark zoom”P.172 or /tcb/watermark stretch”P.174.

\tcbset{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, watermk tikz=\draw [line width=2mm] circle (1cm) node\{fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont \};;\}]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}

My title


/tcb/watermark tikz on=(part) is (graphical code)  (no default, initially unset)
This option draws the given tikz (graphical code) in the center of the interior region of a tcolorbox as described for /tcb/watermark tikz. But this is done only for boxes named (part) of a break sequence, see /tcb/breakable”P.376.
Feasible values for (part) are:
• broken: all broken box parts,
• unbroken: unbroken boxes only,
• first: first parts of a break sequence,
• middle: middle parts of a break sequence,
• last: last parts of a break sequence,
• unbroken and first: unbroken boxes and first parts of a break sequence,
• middle and last: middle and last parts of a break sequence.

/tcb/no watermark  (style, no default, initially set)
Removes the watermark if set before. This is an alias for /tcb/no overlay”P.75.
Sets the opacity value $\in [0, 1]$ for a watermark.

\begin{tcolorbox}
[tcbset={enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,watermark text=Watermark,nobeforeafter,width=(\linewidth-2mm)/2}]
\begin{tcbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcbox}\hfill\
\begin{tcbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcbox}
\end{tcolorbox}

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

\begin{tcolorbox}
[tcbset={enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,watermark text=Watermark,nobeforeafter,width=(\linewidth-2mm)/2}]
\begin{tcbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcbox}\hfill\
\begin{tcbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcbox}
\end{tcolorbox}
/tcb/watermark shrink=$(fraction)$  
Identically to /tcb/watermark zoom $^{P.172}$, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom=$(fraction)$  
Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

```
\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries, 
    watermark opacity=0.5, 
    watermark graphics=lichtspiel.jpg,nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[1]
\end{tcolorbox}
\begin{tcolorbox}[title=Overzoom 1.0,watermark overzoom=1.0]
\lipsum[1]
\end{tcolorbox}
```

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than 0pt, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced $^{P.210}$ boxes. To avoid this optical glitch, just set /tcb/pad at break $^{P.380}$ to any desired value.
/tcb/watermark stretch=\(\text{fraction}\) (no default, initially unset)
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

\begin{tcolorbox}
[tcbset={enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries,watermark graphics=lichtspiel.jpg,watermark opacity=0.5,nobeforeafter,\textwidth=(\linewidth-2mm)/2}]
\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00]
\lipsum[2]
\end{tcolorbox}\hfill
\begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}
\end{tcolorbox}

Stretch 1.00

Stretch 0.50

/tcb/watermark color=(color) (no default, initially mixed background and frame color)
Sets the color for the watermark.

\begin{tcolorbox}
[tcbset={colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,watermark opacity=0.5,nobeforeafter,\textwidth=(\linewidth-2mm)/2}]
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark,watermark color=yellow!50!red]
\lipsum[1]
\end{tcolorbox}
\end{tcolorbox}

My title
Sets the watermark to be clipped to the interior area.

\begin{tcolorbox}[title=Clip (default),clip watermark]
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}[title=No clip,clip watermark=false]
\lipsum[1]
\end{tcolorbox}

Clip (default)


No clip

10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type path, pathfirst, pathmiddle, or pathlast. Especially, the skin enhanced supports all of them and standard none. The typical area of application is inside overlay code, see Section 4.12 from page 74.

\begin{tcbclipframe}
  (environment content)
\end{tcbclipframe}

Defines a Tikz scope which clips to the frame area path.

\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}
 Defines a Tikz scope which clips to the outside of the frame area path.

```
\begin{tcbset}{enhanced jigsaw,fonttitle=\bfseries,opacityback=0.35,colback=blue!5!white,
frame style={left color=red!75!black,right color=red!10!yellow}}
\begin{tikzpicture}
% draw two balls
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}
\begin{tcolorbox}
[title=A translucent box, overlay={\begin{tcbinvclipframe}
\draw[red,line width=1cm] ([xshift=-2mm,yshift=2mm]frame.north west)
--([xshift=2mm,yshift=-2mm]frame.south east);
\draw[red,line width=1cm] ([xshift=-2mm,yshift=-2mm]frame.south west)
--([xshift=2mm,yshift=2mm]frame.north east);
\end{tcbinvclipframe}}] \lipsum[2]
\end{tcolorbox}
```

A translucent box

\begin{tcbclipinterior}
\textit{environment content}
\end{tcbclipinterior}

Defines a Tikz scope which clips to the interior area path.

\begin{tcolorbox}[enhanced,title=My Title, overlap=\begin{tcbclipinterior}
\draw[red, line width=1cm] (interior.north west)--(interior.south east);
\draw[red, line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}]
\lipsum[1]
\end{tcolorbox}

My Title


\begin{tcbcliptitle}
\textit{environment content}
\end{tcbcliptitle}

Defines a Tikz scope which clips to the title area path.

\begin{tcolorbox}[enhanced,title=My Title, colframe=blue, colback=yellow!10!white, overlap=\begin{tcbcliptitle}node at (title)\includegraphics[width=\linewidth]{lichtspiel.jpg}\end{tcbcliptitle}]
\lipsum[1]
\end{tcolorbox}

My Title

/tcb/clip title=true|false (default true, initially false)
Sets the title to be clipped to the title area.

\tcbset{enhanced,width=5cm,colframe=red!50!white,coltitle=black,
    colbacktitle=yellow!50!white}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long},
    clip title]
This is a tcolorbox.
\end{tcolorbox}

This is a title which is unbreakable and far too long
This is a tcolorbox.
This is a title which is unbreakable and far too long
This is a tcolorbox.

/tcb/clip upper=true|false (default true, initially false)
Sets the upper part to be clipped to the interior area.

\newcommand{\mygraphics}[2][]{{%
    \tcbx{enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
        right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper,
        colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter,
        center title,fonttitle={\small\sffamily,title={\detokenize{#2}}}}
    {\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}}\mygraphics{lichtspiel.jpg}\hfill\mygraphics{Basilica_5.png}
The example for /tcb/clip upper\textsuperscript{.P.179} sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

\begin{tcblisting}{clip lower}
Donau\-dampf\-schiff\-fahrts\-ka\-pi\-t"ans\-m"ut\-zen\-fran\-sen
\end{tcblisting}

\begin{tcblisting}{clip lower}
Donau\-dampf\-schiff\-fahrts\-ka\-pi\-t"ans\-m"ut\-zen\-fran\-sen
\end{tcblisting}
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \textsuperscript{P.138}. Therefore, the skin \texttt{standard} \textsuperscript{P.208} does not support these borderline lines, but most other skins, e.g. \texttt{enhanced} \textsuperscript{P.210}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the \texttt{/tcb/segmentation engine} \textsuperscript{P.139}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn after the box frame and box interior and before overlays or watermarks.

\begin{tcolorbox}
[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,  
borderline={0.5pt}{0pt}{red},  
borderline={0.5pt}{5pt}{blue,dotted},  
borderline={0.5pt}{-5pt}{green} ]  
This is a tcolorbox.
\end{tcolorbox}

\bigskip

\begin{tcolorbox}
[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,sharp corners=downhill,  
borderline={0.5pt}{0pt}{red},  
borderline={0.5pt}{5pt}{blue,dotted},  
borderline={0.5pt}{-5pt}{green} ]  
This is a tcolorbox.
\end{tcolorbox}

Technically, the normal \texttt{tcolorbox} rules result from a TikZ \textit{filling} process. The border lines are created by a TikZ \textit{drawing} process. This can be used to apply different effects.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,  
borderline={0.5pt}{0pt}{red},  
borderline={0.5pt}{5pt}{blue,dotted},  
borderline={0.5pt}{-5pt}{green} ]  
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,sharp corners=downhill,  
borderline={0.5pt}{0pt}{red},  
borderline={0.5pt}{5pt}{blue,dotted},  
borderline={0.5pt}{-5pt}{green} ]  
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

Rounded corners

This is a tcolorbox.

Sharp corners

This is a tcolorbox.


My title


/tcb/no borderline

Removes all borderlines if set before.

/tcb/show bounding box=(color)

Displays the bounding box borderline of a \texttt{tcolorbox}. Its intended use is debugging and fine tuning. It should not be part of a final document. The optional \texttt{(color)} is the base color for the bounding box borderline.

\tcbset{enhanced,nobeforeafter,width=4cm,fonttitle=\bfseries}

\begin{tcolorbox}\texttt{show bounding box,title=Normal} This is a tcolorbox. \end{tcolorbox}

\begin{tcolorbox}\texttt{show bounding box=blue,title=Shadow,drop fuzzy shadow} This is a tcolorbox. \end{tcolorbox}

\begin{tcolorbox}\texttt{show bounding box=green,title=Enlarged,drop fuzzy shadow, enlarge by=2mm} This is a tcolorbox. \end{tcolorbox}
The following *partial* borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their ⟨offset⟩, they ignore skin settings but adapt to breakable boxes.

**/tcb/borderline north**={⟨width⟩}{⟨offset⟩}{⟨options⟩}  (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the north of the \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \textbf{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, 
borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline south**={⟨width⟩}{⟨offset⟩}{⟨options⟩}  (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the south of the \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \textbf{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, 
borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline east**={⟨width⟩}{⟨offset⟩}{⟨options⟩}  (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the east of the \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \textbf{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, 
borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline west**={⟨width⟩}{⟨offset⟩}{⟨options⟩}  (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the west of the \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \textbf{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, 
borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[blanker,top=3mm,bottom=3mm,\]
borderline horizontal={2pt}{0pt}{red}\]
This is a tcolorbox.\]
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}[blanker,left=3mm,right=3mm,\]
borderline vertical={2pt}{0pt}{red}\]
This is a tcolorbox.\\
My second line.\]
\end{tcolorbox}

My second line.

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \footnote{P.138}. Therefore, the skin \texttt{standard} \footnote{P.208} does not support these shadows, but most other skins, e.g. \texttt{enhanced} \footnote{P.210}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \textit{before} the box frame is drawn.

\texttt{/tcb/no shadow} \hfill (no default)

Removes all shadows if set before.

10.6.1 Common Shadows and Halos

\texttt{/tcb/drop shadow\equal{(color)} \hfill (style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/drop fuzzy shadow\equal{(color)} \hfill (style, default \texttt{black!50!white})}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/drop midday shadow\equal{(color)} \hfill (style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop midday shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}
/tcb/drop fuzzy midday shadow={color} (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the {color} for the shadow can be changed.

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop fuzzy midday shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop fuzzy midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

/tcb/ halo={size} with {color} (style, default 0.9mm with yellow)
Adds a new halo shadow with the given {color} which overlaps the colorbox an all sides by {size}.

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo,halo]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another halo, halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

/tcb/fuzzy halo={size} with {color} (style, default 0.9mm with yellow)
Adds a new fuzzy halo shadow with the given {color} which overlaps the colorbox an all sides by {size} plus 0.48mm.

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo,fuzzy halo]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[blank,enhanced jigsaw,boxsep=2pt,arc=2pt, fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white]
\lipsum[1]
\end{tcolorbox}
For all following shadows, the optionally given \langle color\rangle for the shadow can be changed equivalent to the preceding examples.

\texttt{/tcb/drop shadow southeast=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop shadow} \texttt{P.186}.

\begin{tcolorbox}[drop shadow southeast, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow south=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop midday shadow} \texttt{P.186}.

\begin{tcolorbox}[drop shadow south, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow southwest=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow southwest, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow west=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow west, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow northwest=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow northwest, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop shadow north=}\texttt{(color)} (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow north, enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
/tcb/drop shadow northeast \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow east \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow east, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southeast \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy shadow \textsuperscript{P.186}.

\begin{tcolorbox}[drop fuzzy shadow southeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow south \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy midday shadow \textsuperscript{P.187}.

\begin{tcolorbox}[drop fuzzy shadow south, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southwest \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow southwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow west \textit{(color)} \hspace{1em} \textit{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow west, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy shadow northwest\=(color) \hspace{1cm} \text{(style, default black!50!white)}
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow north\=(color) \hspace{1cm} \text{(style, default black!50!white)}
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow north, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow northeast\=(color) \hspace{1cm} \text{(style, default black!50!white)}
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow east\=(color) \hspace{1cm} \text{(style, default black!50!white)}
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow east, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
10.6.2 Lifted Shadows

\tcbset{enhanced,colback=red!5!white, 
boxrule=0.4pt,sharp corners, 
colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop lifted shadow]
This is a tcolorbox.
\end{tcolorbox}

Another shadow
This is a tcolorbox.

\begin{tcolorbox}[title=Another shadow, 
drop lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop small lifted shadow=(color) (style, default black!50!white)
Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}[drop small lifted shadow=size=fbox]
{This is a tcolorbox.}
\end{tcolorbox}

Another shadow
This is a tcolorbox.

\begin{tcolorbox}[title=Another shadow, 
drop small lifted shadow=black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop large lifted shadow=(color) (style, default black!50!white)
Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}[drop large lifted shadow]
This is a tcolorbox.
\end{tcolorbox}

Another shadow
This is a tcolorbox.

\begin{tcolorbox}[title=Another shadow, 
drop large lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
10.6.3 Generic Shadows

\texttt{/tcb/shadow={\langle xshift\rangle}{\langle yshift\rangle}{\langle offset\rangle}{\langle options\rangle}} (no default)

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \texttt{\langle xshift\rangle} and \texttt{\langle yshift\rangle}. The \texttt{\langle offset\rangle} value is a distance value from the frame outline. A positive \texttt{\langle offset\rangle} value shrinks the shadow and a negative \texttt{\langle offset\rangle} value enlarges the shadow. The shadow is filled along a \texttt{TikZ} path with the given \texttt{TikZ} \texttt{\langle options\rangle}.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrinked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But \texttt{/tcb/sharp corners}\textsuperscript{P.48} have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow, shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Double shadow, shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25},
shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Far shadow, shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Halo shadow, shadow={0mm}{0mm}{-1.5mm}{fill=yellow!75!red,opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
/tcb/fuzzy shadow={(xshift)\{(yshift)\{(offset)\{(step)\{(options)\}}}} (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the tcolorbox but is shifted by \langle xshift \rangle and \langle yshift \rangle. The \langle offset \rangle value is a distance value from the frame outline. A positive \langle offset \rangle value shrinks the shadow and a negative \langle offset \rangle value enlarges the shadow. The \{step\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a TikZ path with the given TikZ \langle options \rangle but any opacity value will be ignored.

\begin{tcolorbox}
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow, fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}
{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[title=Another shadow, fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}
{fill=blue}]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[title=Double shadow, fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}
{blue},
fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}
{red}]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[title=Far shadow, fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}
{black}]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[title=Glow shadow, fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}
{yellow!75!red}]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\newtcolorbox[mybox]{1}[]{enhanced, fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{blue!50!white},
fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{red!50!white},
fuzzy shadow={1.0mm}{1.0mm}{0.12mm}{0mm}{green!50!white},
fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{yellow!50!white},}
\begin{mybox}[title=A multi shadow box]
This is a tcolorbox.
\end{mybox}
If set to `true`, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

```
\tcbset{enhanced,nobeforeafter,colback=red!5!white, colframe=red!75!black,width=3cm,square,halign=center,valign=center}
\begin{tcolorbox}[drop shadow]
Smart shadow arc (arguably better than normal)
\end{tcolorbox}
\fill
\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
\fill
\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}
\fill
\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
```

```
\tcbset{enhanced,colback=red!5!white, boxrule=0.1pt, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow, lifted shadow={1mm}{-2mm}{3mm}{0.1mm}% {black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
```

```
\tcb/lifted shadow=\{⟨xshift⟩\}\{⟨yshift⟩\}\{⟨bend⟩\}\{⟨step⟩\}\{⟨options⟩\} (no default)
```

Adds a new lifted shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This lifted shadow follows the outline of the `tcolorbox` but is shifted by ⟨xshift⟩ and ⟨yshift⟩ on the lower left corner and by −⟨xshift⟩ and ⟨yshift⟩ on the lower right corner. Additionally, there is a ⟨bend⟩ in the middle. The ⟨⟨step⟩⟩ value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a TikZ path with the given TikZ ⟨options⟩ but any opacity value will be ignored.
10.6.4 TikZ Shadows

Alternatively to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using `/tcb/frame style` \textsuperscript{152}.

\begin{tcolorbox}
\begin{tcbitemize}
\item colback=red!5!white, colframe=red!75!black, \\
\item frame style={drop shadow}
\end{tcbitemize}
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}
\begin{tcbitemize}
\item colback=red!5!white, colframe=red!75!black, \\
\item halign=center, valign=center, \\
\item frame style={circular drop shadow}
\end{tcbitemize}
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}
\begin{tcbitemize}
\item square, circular arc, \\
\item colback=red!5!white, colframe=red!75!black, \\
\item frame style={circular glow={fill=red}}
\end{tcbitemize}
\end{tcolorbox}

tcolorbox
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as /tcb/graphical environment. Therefore, the skin standard does not support these options, but most other skins, e.g. enhanced.

\texttt{/tcb/tikz=⟨tikz option list⟩} (no default, initially empty)

Adds the given \texttt{(tikz option list)} to the main \texttt{tikzpicture} environment used to draw the color box, see [22]. If this option is applied a second time, the new \texttt{(tikz option list)} is appended to the current option list.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{enhanced,colback=red!5\!white,}
\texttt{colframe=red!75\!black,fonttitle=\textbackslash bfseries\}}
\begin{tcolorbox}[title=Transparent box, t\texttt{i}k\texttt{z}={opacity=0.5,transparency group}]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{enhanced,colback=red!5\!white,}
\texttt{colframe=red!75\!black,fonttitle=\textbackslash bfseries,}
\texttt{fontupper=\textbackslash bfseries\textbackslash huge,}
\texttt{halign title=center,halign=center\}}
\begin{tcolorbox}[title=Rotated box, t\texttt{i}k\texttt{z}={rotate=30}]
Sold!
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/tikz reset} (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=⟨tikz code⟩} (no default, initially empty)

The given \texttt{(tikz code)} is executed at the beginning of the \texttt{tikzpicture} environment after the TikZ option \texttt{execute at begin picture} was applied. If this option is applied a second time, the new \texttt{(tikz code)} is appended to the current code.

\texttt{/tcb/at begin tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=⟨tikz code⟩} (no default, initially empty)

The given \texttt{(tikz code)} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{(tikz code)} is appended to the current code.

\texttt{/tcb/at end tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.

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/tcb/rotate={angle}
(no default, initially unset)
Rotates the tcolorbox by the given \( \langle \text{angle} \rangle \). Note that this is a Ti\( \text{kZ} \) coordinate transformation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}
[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale={fraction}
(no default, initially unset)
Scales the tcolorbox by the given \( \langle \text{fraction} \rangle \). Note that this is a Ti\( \text{kZ} \) coordinate transformation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}
[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}
[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/remember
(style, initially unset)
Shortcut for \texttt{tikz=\{remember picture\}}. This allows one to reference nodes in other Ti\( \text{kZ} \) pictures.

\begin{tcolorbox}
[enhanced,remember, colback=red!5!white, colframe=red!75!black, fonttitle=\textbf{series}, title=The four corners of a paper, overlay={\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm]
(frame.north west) edge[->] (current page.north west)
(frame.north east) edge[->] (current page.north east)
(frame.south west) edge[->] (current page.south west)
(frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}
The \texttt{frame} node will be remembered by the given \texttt{(name)} to be referenced in other Ti\textit{k}Z pictures.

% \usepackage{lipsum}
\newtcolorbox{mybox}[1][\{enhanced, colframe=blue!75!black, colback=blue!10!white, fonttitle=\bfseries, #1\}]
\begin{mybox}[title=First Box, nobeforeafter, width=\linewidth/4, remember as=one]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Second Box, nobeforeafter, width=\linewidth/4, remember as=two]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Third Box, nobeforeafter, width=\linewidth/4, remember as=three]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Fourth Box, remember as=four]
This is a test.
\end{mybox}
\lipsum[2]
\begin{tikzpicture}
[overlay, remember picture, line width=1mm, draw=red!75!black]
\draw[->] (one.east) to[bend right] node[above] {A} (two.west);
\draw[->] (two.east) to[bend left] node[above] {B} (three.west);
\draw[->] (three.east) to[bend left=90] node[right] {C} (four.east);
\draw[->] (four.west) to[bend left=90] node[left] {D} (one.west);
\end{tikzpicture}

10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 74. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 145 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard\textsuperscript{P.208} and standard jigsaw\textsuperscript{P.209}, whereas overlays are applicable also for these skins. The skin spartan\textsuperscript{P.251} supports underlays but no overlays.

  If an underlay is used with the standard\textsuperscript{P.208} skin, it is silently ignored.

- Underlays are stackable, i.e. several different underlays can be used on the same \texttt{tcolorbox}. Overlays are not stackable by default (but with some help of the library \texttt{LIB hooks}).

- Boxed titles are implemented with underlays (Section 10.2 on page 159), watermarks are implemented with overlays (Section 10.3 on page 169).

\texttt{/tcb/underlay=⟨graphical code⟩} \hspace{1em} (no default, initially unset)

Adds \texttt{⟨graphical code⟩} to the box drawing process. This \texttt{⟨graphical code⟩} is drawn after the frame and interior and before the text content.

\texttt{\newtcolorbox{mybox}[1][1]{ enhanced, colback=red!5!white,}
\hspace{1em} colbacktitle=red!85!black!50!white,}
\hspace{1em} colframe=red!75!black,fonttitle=\bfseries,watermark color=yellow!50!white,}
\hspace{1em} underlay=\begin{tcbclipinterior}
\hspace{1em} \draw[red!40!white,line width=1cm] (interior.south west)--(interior.north east);
\hspace{1em} \end{tcbclipinterior},}
\hspace{1em} attach boxed title to top center={yshift=-2mm},#1}
\hspace{1em} \begin{mybox}[title=My box,watermark text=My Watermark]
\hspace{1em} \lipsum[2]
\hspace{1em} \end{mybox}

\texttt{/tcb/no underlay} \hspace{1em} (style, no default, initially set)

Removes the underlay if set before.
If the box is set to be `/tcb/breakable` and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. `/tcb/underlay` overwrites this key.

If the box is set to be `/tcb/unbreakable` but is not broken actually or if the box is set to be `/tcb/unbreakable`, then the ⟨graphical code⟩ is added to the box drawing process.

If the box has a boxed title, see Section 10.2 on page 159, then the ⟨graphical code⟩ is added to the box drawing process before the boxed title is drawn.

This is an abbreviation for setting `/tcb/underlay unbroken` and `/tcb/underlay first` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay middle` and `/tcb/underlay last` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay unbroken and last` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay first and middle` together. `/tcb/underlay` overwrites this key.

Removes the unbroken underlay if set before.

Removes the first underlay if set before.

Removes the middle underlay if set before.

Removes the last underlay if set before.

Removes the boxed title underlay if set before.

Removes the unbroken underlay and first together. `/tcb/underlay` overwrites this key.

Removes the middle underlay and last together. `/tcb/underlay` overwrites this key.

Removes the unbroken underlay and last together. `/tcb/underlay` overwrites this key.

Removes the first underlay and middle together. `/tcb/underlay` overwrites this key.
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 199 and overlays described in Section 4.12 on page 74. Finishes are drawn after the text content is drawn; see Section 9.4 on page 145 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content.

Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced[^P.210], empty[^P.241], freelance[^P.254], bicolor[^P.223], beamer[^P.232], and widget[^P.237].

  ![If a finish is used with the standard[^P.208] skin, it is silently ignored.]

- Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.

/\texttt{tcb/finish}=⟨\texttt{graphical code}⟩ (no default, initially unset)
Adds  \texttt{⟨\texttt{graphical code}⟩} to the box drawing process. This  \texttt{⟨\texttt{graphical code}⟩} is drawn after the text content.

\begin{tcolorbox}
{mybox}[1][]{enhanced,colback=red!5!white, 
colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\textbf, 
finish={\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
\end{tcbclipframe}},#1}
\end{tcolorbox}

\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}

My box

\begin{tcolorbox}
{mybox}[1][]{enhanced,colback=red!5!white, 
colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\textbf, 
finish={\node[draw,fill=white,fill opacity=0.85,inner sep=5mm, 
rounded corners] at (frame.center) \texttt{\Huge\textbf Finish!};},#1}
\end{tcolorbox}

\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}

My box
/tcb/no finish (style, no default, initially set)
Removes the finish if set before.

/tcb/finish broken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.376} and is broken actually, then the \textit{(graphical code)} is added to the box drawing process. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/finish unbroken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.376} but \textit{is not} broken actually or if the box is set to be /tcb/unbreakable \textsuperscript{P.377}, then the \textit{(graphical code)} is added to the box drawing process. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/no finish unbroken (style, no default, initially set)
Removes the unbroken finish if set before.

/tcb/finish first=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.376} and is broken actually, then the \textit{(graphical code)} is added to the box drawing process for the \textit{first} part of the break sequence. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/no finish first (style, no default, initially set)
Removes the first finish if set before.

/tcb/finish middle=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.376} and is broken actually, then the \textit{(graphical code)} is added to the box drawing process for the \textit{middle} parts (if any) of the break sequence. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/no finish middle (style, no default, initially set)
Removes the middle finish if set before.

/tcb/finish last=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.376} and is broken actually, then the \textit{(graphical code)} is added to the box drawing process for the \textit{last} part of the break sequence. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/no finish last (style, no default, initially set)
Removes the last finish if set before.

/tcb/finish unbroken and first=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/finish middle and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/finish unbroken and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \textsuperscript{P.201} overwrites this key.

/tcb/finish first and middle=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \textsuperscript{P.201} overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package \texttt{hyperref} \cite{hyperref} to be loaded separately. All these options are implemented as \texttt{/tcb/finish} \cite[p.201]{tcb} and can be disabled by \texttt{/tcb/no finish} \cite[p.202]{tcb}.

\begin{itemize}
  \item If the package \texttt{hyperref} \cite{hyperref} is not loaded or if the standard \cite[p.208]{tcb} skin is used, all hyper option are silently ignored.
\end{itemize}

\begin{itemize}
  \item \texttt{/tcb/hyperref}=(\texttt{marker}) \texttt{(no default, initially unset)}
    
    The whole frame of a \texttt{tcolorbox} is make an active hyperlink for a \texttt{\langle marker \rangle} which was given by \texttt{\label} or \texttt{/tcb/label} \cite[p.101]{tcb} or \texttt{/tcb/phantomlabel} \cite[p.101]{tcb}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).
  
  \begin{tcolorbox}[beamer, colback=red!50, hyperref=sec:skins]
    Jump to the heading of Section~\ref*{sec:skins}.
  \end{tcolorbox}

  \texttt{X} Jump to the heading of Section 10 (X marks the click point).

  \begin{itemize}
    \item \texttt{/tcb/hyperlink}=(\texttt{marker}) \texttt{(no default, initially unset)}
      
      The whole frame of a \texttt{tcolorbox} is make an active hyperlink for a \texttt{\langle marker \rangle} which was given by \texttt{\hypertarget} or \texttt{/tcb/hypertarget} \cite[p.103]{tcb}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).
  \end{itemize}

  \begin{itemize}
    \item \texttt{/tcb/hyperref\_interior}=(\texttt{marker}) \texttt{(no default, initially unset)}
      
      Identical to \texttt{/tcb/hyperref}, but only the \texttt{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).
  \end{itemize}

  \begin{itemize}
    \item \texttt{/tcb/hyperref\_title}=(\texttt{marker}) \texttt{(no default, initially unset)}
      
      Identical to \texttt{/tcb/hyperref}, but only the \texttt{title} of a \texttt{tcolorbox} is made a hyperlink.
  \end{itemize}

  \begin{itemize}
    \item \texttt{/tcb/hyperref\_node}=(\texttt{marker})\{\texttt{\langle node \rangle}\} \texttt{(no default, initially unset)}
      
      Identical to \texttt{/tcb/hyperref}, but only the \texttt{\langle node \rangle} of a \texttt{tcolorbox} is made a hyperlink. This \texttt{\langle node \rangle} may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \texttt{\langle node \rangle} may be defined inside \texttt{/tcb/underlay} \cite[p.199]{tcb}, \texttt{/tcb/overlay} \cite[p.74]{tcb} or \texttt{/tcb/finish} \cite[p.201]{tcb}. If the later is used, define the node before \texttt{/tcb/hyperref\_node} is applied.
  \end{itemize}

  \begin{itemize}
    \item \texttt{/tcb/hyperlink}=(\texttt{marker}) \texttt{(no default, initially unset)}
      
      The whole frame of a \texttt{tcolorbox} is make an active hyperlink for a \texttt{\langle marker \rangle} which was given by \texttt{\hypertarget} or \texttt{/tcb/hypertarget} \cite[p.103]{tcb}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).
  \end{itemize}

  \begin{itemize}
    \item \texttt{/usepackage\{hyperref\}}
      
      \begin{tcolorbox}[enhanced, colback=blue!10, colframe=blue!50!black, hypertarget=hypertwinB, hyperlink=hypertwinA, title=Box B]
        Click me to jump to Box A.
      \end{tcolorbox}

      Box B
      
      Click me to jump to Box A.
  \end{itemize}
Identical to /tcb/hyperlink \(^{P.203}\), but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperlink \(^{P.203}\), but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperlink \(^{P.203}\), but only the given TikZ \langle node\rangle is made a hyperlink. This \langle node\rangle may be frame, interior, title, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node\rangle may be defined inside /tcb/underlay \(^{P.199}\), /tcb/overlay \(^{P.74}\) or /tcb/finish \(^{P.201}\). If the later is used, define the node before /tcb/hyperlink node is applied.

The whole frame of a \texttt{tcolorbox} is make an active hyperlink for an \langle url\rangle in the same manner as using \texttt{\href} or \texttt{\url}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).

\begin{tcolorbox}[enhanced,colback=red!50, hyperurl=http://www.ctan.org/pkg/tcolorbox]
\href{http://www.ctan.org/pkg/tcolorbox}{View CTAN with a browser.}
\end{tcolorbox}

Identical to /tcb/hyperurl, but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperurl, but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperurl, but only the given TikZ \langle node\rangle is made a hyperlink. This \langle node\rangle may be frame, interior, title, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node\rangle may be defined inside /tcb/underlay \(^{P.199}\), /tcb/overlay \(^{P.74}\) or /tcb/finish \(^{P.201}\). If the later is used, define the node before /tcb/hyperurl node is applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref} \(^{[15]}\) \langle options\rangle are applied.

\begin{tcolorbox}[enhanced,colback=green!50, hyperurl*={page=3,pdfnewwindow=true}]
\href{page=3, pdfnewwindow=true}{tcolorbox-example.pdf}
\end{tcolorbox}

Identical to /tcb/hyperurl\* interior, but additional \texttt{hyperref} \(^{[15]}\) \langle options\rangle are applied.

Identical to /tcb/hyperurl\* title, but additional \texttt{hyperref} \(^{[15]}\) \langle options\rangle are applied.

Identical to /tcb/hyperurl\* node, but additional \texttt{hyperref} \(^{[15]}\) \langle options\rangle are applied.
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 137, a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called \textit{jigsaw} skins. For standard \texttt{\footnotesize{\texttt{!P.208}}} and enhanced \texttt{\footnotesize{\texttt{!P.210}}}, there are variants called \textit{standard jigsaw} \texttt{\footnotesize{\texttt{!P.209}}} and \textit{enhanced jigsaw} \texttt{\footnotesize{\texttt{!P.217}}}.

\begin{verbatim}
\newcommand{\ballexample}{\begin{tikzpicture}
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}}
\tcbset{enhanced,colback=blue!5!white,
frame style={left color=red!75!black,right color=red!10!yellow},
fonttitle=\bfseries }

\ballexample
\begin{tcolorbox}[title=A normal box]
\lipsum[2]
\end{tcolorbox}
\ballexample
\begin{tcolorbox}[title=A translucent jigsaw box, enhanced jigsaw,opacityback=0.35]
\lipsum[2]
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}[title=A normal box]
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accum-
san bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl
penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla
ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.
\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box]
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accum-
san bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl
penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla
ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.
\end{tcolorbox}
A normal box with hidden interior and title
This is a tcolorbox.

A jigsaw box with hidden interior and title
This is a tcolorbox.

\newtcolorbox{mybox}{skin=enhancedmiddle jigsaw,leftrule=5mm,rightrule=5mm,boxsep=0mm,top=0mm,bottom=0mm,frame style={top color=blue,bottom color=red},interior hidden}

\begin{mybox}
\lipsum[2]
\end{mybox}

10.12 Draft Mode

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan \textsuperscript{P.251} and sets the \texttt{/tcb/fit} algorithm \textsuperscript{P.430} to \texttt{squeeze}. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is not used for the final document. Use spartan \textsuperscript{P.251} directly, if you want to stay with it. The draft mode implementation may change in future.

Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, \texttt{/tcb/remember as} \textsuperscript{P.198} will not have any effect. You may exclude critical code with \texttt{\texttt{/tcbinterruptdraftmode} / \texttt{tcbcontinuedraftmode}} from converting to draft mode.

\texttt{\texttt{/tcbstartdraftmode}}

Any following \texttt{tcolorbox} code is put into draft mode. All skin settings are overruled with spartan \textsuperscript{P.251}. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all \texttt{tcolorbox} layers.

\texttt{\texttt{/tcbstopdraftmode}}

The draft mode is deactivated for the following code.

\texttt{\texttt{/tcbinterruptdraftmode}}

If the compilation is in draft mode, the draft mode is deactivated until a following \texttt{\texttt{/tcbcontinuedraftmode}} is detected.

If the compilation is not in draft mode, nothing happens and a following \texttt{\texttt{/tcbcontinuedraftmode}} will not start the draft mode.

The pair \texttt{\texttt{/tcbinterruptdraftmode}} and \texttt{\texttt{/tcbcontinuedraftmode}} cannot be used nested.

\texttt{\texttt{/tcbcontinuedraftmode}}

Continues the draft mode which was suspended by a preceding \texttt{\texttt{/tcbinterruptdraftmode}}. Nothing happens, if there was no draft mode before \texttt{\texttt{/tcbinterruptdraftmode}}.

Code, which is place between \texttt{\texttt{/tcbinterruptdraftmode}} and \texttt{\texttt{/tcbcontinuedraftmode}} is shielded from draft mode.

\texttt{/tcb/draftmode=true|false} (default true, initially false)

If set to \texttt{true}, the draft mode is started. If set to \texttt{false}, the draft mode is stopped.
10.13 Skin Family ’standard’

Note that the option keys /tcb/frame style $^{P.152}$, /tcb/interior style $^{P.153}$, /tcb/segmentation style $^{P.155}$, and /tcb/title style $^{P.155}$ are not applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

/tcb/skin=standard

This is the standard skin from the core package. All drawing engines are set to type standard. The drawing is based on pgf commands and does not need the tikz package.

Environment and engines for the skin ’standard’

/tcb/graphical environment $^{P.138}$: pgfpicture
/tcb/frame engine $^{P.138}$: standard
/tcb/interior titled engine $^{P.138}$: standard
/tcb/interior engine $^{P.139}$: standard
/tcb/segmentation engine $^{P.139}$: standard
/tcb/title engine $^{P.139}$: standard

/tcb/standard

This is an abbreviation for setting skin=standard.

\begin{tcbraster}
standard,raster equal height,raster columns=4, 
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, 
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is the standard jigsaw skin from the core package. It differs from the skin `standard`\(^{P.208}\) by its frame engine, see Section 10.11 on page 205.

Environment and engines for the skin `standard jigsaw`

- `/tcb/graphical environment`\(^{P.138}\): `pgfpicture`
- `/tcb/frame engine`\(^{P.138}\): `standardjigsaw`
- `/tcb/interior titled engine`\(^{P.138}\): `standard`
- `/tcb/interior engine`\(^{P.139}\): `standard`
- `/tcb/segmentation engine`\(^{P.139}\): `standard`
- `/tcb/title engine`\(^{P.139}\): `standard`

This is an abbreviation for setting `skin=standard jigsaw`.

```
\begin{tcbraster}[standard jigsaw, raster equal height, raster columns=4,
  colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen,
  opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5,
  left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
More content.
\end{tcolorbox}
\end{tcbraster}
```
If you like the standard appearance of a `tcolorbox` but you want to have some 'enhanced' features, the `enhanced` skin is what you are looking for.

```
\begin{tcbraster}
[enhanced,raster equal height,raster columns=4, 
  colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, 
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```

This is my content.

This is my content.

My title

My title

More content.

More content.
With the 'enhanced' skin, it is quite easy to produce fancy looking effects.

Note that this is still a \texttt{tcolorbox}.

\begin{tcolorbox}[title=A listing box with shadow and some specials]
Of course, skins can be used for listings also.
\begin{equation}
\int_{1}^{2} \frac{1}{x} \, dx = \ln(2).
\end{equation}
\end{tcolorbox}
For unbreakable boxes, this is identical to using `/tcb/enhanced`\(^{210}\). But, for breakable boxes, the break sequence is identical to the standard\(^{208}\) skin, see Section 18.8 from page 389.

This style relies on the skin enhanced\(^^{210}\). All drawing operations are hidden and all margins are set to 0pt. See `/tcb/blanker`\(^{242}\) for switching off the drawing engines.

\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}
\texttt{\textbackslash tcbline}

Sometimes, a line is only a line. With \texttt{\textbackslash tcblower} \footnote{P.12} you separate the box content into two functional units. \texttt{\textbackslash tcbline} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{\textbackslash tcbline} more than just once. \texttt{\textbackslash tcbline} always uses the \path{} drawing engine. Therefore, the /tcb/segmentation style \footnote{P.155} can be applied.

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\tcbline
\lipsum[2]
\tcbline
\lipsum[3]
\tcbline
\lipsum[4]
\end{tcolorbox}

\texttt{\textbackslash tcbset{enhanced,colframe=blue!50!black,colback=white}}

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\tcbline
\lipsum[2]
\tcbline
\lipsum[3]
\tcbline
\lipsum[4]
\end{tcolorbox}

\texttt{\textbackslash tcbline*}

Equivalent to \texttt{\textbackslash tcbline}, but in a breakable box, \texttt{\textbackslash tcbline*} is removed if at a page/box break. Also, it is removed at the end of a box.


This is a flavor of enhanced\textsuperscript{P.210} which is used as a first part in a break sequence for enhanced\textsuperscript{P.210}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'enhancedfirst'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathfirst</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>pathfirst</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>pathfirst</td>
<td>P.139</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>path</td>
<td>P.139</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathfirst</td>
<td>P.139</td>
</tr>
</tbody>
</table>

\begin{tcbbraster}[skin=enhancedfirst, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm] \begin{tcolorbox} This is my content. \end{tcolorbox} \begin{tcolorbox} This is my content. \tcblower More content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \tcblower More content. \end{tcolorbox} \end{tcbbraster}
This is a flavor of enhanced which is used as a middle part in a break sequence for enhanced. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'enhancedmiddle'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>path</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

\begin{tcbbraster}[skin=enhancedmiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbbraster}
This is a flavor of enhanced which is used as a last part in a break sequence for enhanced. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'enhancedlast'

- `/tcb/graphical environment`: `tikzpicture`
- `/tcb/frame engine`: `pathlast`
- `/tcb/interior titled engine`: `pathlast`
- `/tcb/interior engine`: `pathlast`
- `/tcb/segmentation engine`: `path`
- `/tcb/title engine`: `pathlast`

```latex
\begin{tcbraster}[skin=enhancedlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content. \tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content. \tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content. \tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```
/tcb/skin=enhanced jigsaw

This is the jigsaw variant of skin enhanced\textsuperscript{P.210}. It differs by its frame engine, see Section 10.11 on page 205.

**Environment and engines for the skin 'enhanced jigsaw'**

- /tcb/graphical environment\textsuperscript{P.138}: \texttt{tikzpicture}
- /tcb/frame engine\textsuperscript{P.138}: \texttt{pathjigsaw}
- /tcb/interior titled engine\textsuperscript{P.138}: \texttt{path}
- /tcb/interior engine\textsuperscript{P.139}: \texttt{path}
- /tcb/segmentation engine\textsuperscript{P.139}: \texttt{path}
- /tcb/title engine\textsuperscript{P.139}: \texttt{path}

/tcb/enhanced jigsaw

This is an abbreviation for setting \texttt{skin=enhanced\_jigsaw}.

```
\begin{tcbraster}
\begin{tcbbox}
This is my content.
\end{tcbbox}
\begin{tcbbox}
This is my content.
\tcblower
More content.
\end{tcbbox}
\begin{tcbbox}[adjusted title=My title]
This is my content.
\end{tcbbox}
\begin{tcbbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcbbox}
\begin{tcbbox}
This is my content.
\tcblower
More content.
\end{tcbbox}
\end{tcbraster}
```

/tcb/enhanced standard jigsaw

For unbreakable boxes, this is identical to using \texttt{/tcb/enhanced jigsaw}. But, for breakable boxes, the \textit{break sequence} is identical to the \texttt{standard\_jigsaw}\textsuperscript{P.209} skin, see Section 18.8 from page 389.
This is the jigsaw variant of skin \texttt{enhancedfirst\ P.214}. It differs by its frame engine, see Section 10.11 on page 205.

Environment and engines for the skin ’enhancedfirst\ jigsaw’

\begin{Verbatim}
\texttt{\tcb/graphical\ environment\ P.138: tikzpicture}
\texttt{\tcb/frame\ engine\ P.138: pathfirstjigsaw}
\texttt{\tcb/interior\ titled\ engine\ P.138: pathfirst}
\texttt{\tcb/interior\ engine\ P.139: pathfirst}
\texttt{\tcb/segmentation\ engine\ P.139: path}
\texttt{\tcb/title\ engine\ P.139: pathfirst}
\end{Verbatim}
This is the jigsaw variant of skin `enhancedmiddle`. It differs by its frame engine, see Section 10.11 on page 205.

Environment and engines for the skin `enhancedmiddle jigsaw`

<table>
<thead>
<tr>
<th>/tcb/graphical environment</th>
<th>P.138: tikzpicture</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/frame engine</td>
<td>P.138: pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>P.138: pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>P.139: pathmiddle</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>P.139: path</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>P.139: pathmiddle</td>
</tr>
</tbody>
</table>

This styles relies on the skin `enhancedmiddle jigsaw`. It is intended to be used as an optical marker like a highlighter pen.

\begin{tcbraster}[skin=enhancedmiddle jigsaw, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}

\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}


219
This examples demonstrates the creation of several text marker environments based on \texttt{enhancedmiddle}. 

\begin{tcolorbox}[textmarker/.style={
  skin=enhancedmiddle jigsaw, breakable, parbox=false,
  boxrule=0mm, leftrule=5mm, rightrule=5mm, boxsep=0mm, arc=0mm, outside arc=0mm,
  left=3mm, right=3mm, top=1mm, bottom=1mm, toptitle=1mm, bottomtitle=1mm, oversize}]
\begin{yellow}
\lipsum[1-3]
\end{yellow}
\begin{orange}
\lipsum[4]
\end{orange}
\begin{red}
\lipsum[5]
\end{red}
\begin{green}
\lipsum[6]
\end{green}
\begin{blue}
\lipsum[7]
\end{blue}
\begin{rainbow}
\lipsum[8]
\end{rainbow}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,colback=yellow!5!white,colframe=yellow]
\begin{yellow}
\lipsum[1-3]
\end{yellow}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,colback=DarkOrange!5!white,colframe=DarkOrange!75!yellow]
\begin{orange}
\lipsum[4]
\end{orange}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,colback=red!5!white,colframe=red]
\begin{red}
\lipsum[5]
\end{red}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,colback=DeepSkyBlue!5!white,colframe=DeepSkyBlue]
\begin{blue}
\lipsum[6]
\end{blue}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,colback=Chartreuse!5!white,colframe=Chartreuse]
\begin{green}
\lipsum[7]
\end{green}
\end{tcolorbox}

\begin{tcolorbox}[textmarker,interior hidden, frame style={top color=blue,bottom color=red,middle color=green}]
\begin{rainbow}
\lipsum[8]
\end{rainbow}
\end{tcolorbox}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,


This is the jigsaw variant of skin `enhancedlast`\(^\text{P.216}\). It differs by its frame engine, see Section 10.11 on page 205.

**Environment and engines for the skin 'enhancedlast'**

- `/tcb/graphical environment`\(^\text{P.138}\): `tikzpicture`
- `/tcb/frame engine`\(^\text{P.138}\): `pathlastjigsaw`
- `/tcb/interior titled engine`\(^\text{P.138}\): `pathlast`
- `/tcb/interior engine`\(^\text{P.139}\): `pathlast`
- `/tcb/segmentation engine`\(^\text{P.139}\): `path`
- `/tcb/title engine`\(^\text{P.139}\): `pathlast`

```latex
\begin{tcbraster}
[skin=enhancedlast jigsaw,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
```
10.15 Skin Family ’bicolor’

This skin is quite similar to the standard and enhanced skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

<table>
<thead>
<tr>
<th>Environment and engines for the skin ’bicolor’</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment \textsuperscript{P.138}: tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine \textsuperscript{P.138}: path</td>
</tr>
<tr>
<td>/tcb/interior titled engine \textsuperscript{P.138}: special</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{P.139}: special</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{P.139}: special</td>
</tr>
<tr>
<td>/tcb/segmentation engine \textsuperscript{P.139}: special</td>
</tr>
<tr>
<td>/tcb/title engine \textsuperscript{P.139}: path</td>
</tr>
</tbody>
</table>

- The most basic usage of this skin is to set the background color of the lower part by /tcb/colbacklower \textsuperscript{P.224} and all other options like for the standard skin.

\begin{tcolorbox}[skin=bicolor,title=The title, \texttt{\color{FireBrick!75!black}}, \texttt{\colback=Salmon!50!white}, \texttt{colbacklower=Salmon}]
\begin{tcolorbox}[title=The title, \texttt{\colframe=FireBrick!15!white}, \texttt{\colback=Salmon!50!white}, \texttt{colbacklower=Salmon}]
\end{tcolorbox}

\begin{tcolorbox}[frame style={top color=FireBrick, bottom color=FireBrick!15!white, draw=black}, interior style={left color=Salmon, right color=Salmon!50!white}, segmentation style={right color=Salmon, left color=Salmon!50!white}]
\begin{tcolorbox}[title=The title, \texttt{\frame style={top color=FireBrick}}, \texttt{\colframe=FireBrick!15!white, draw=black}]
\end{tcolorbox}

- The more advanced usage of this skin is to apply the /tcb/frame style \textsuperscript{P.152} and the /tcb/interior style \textsuperscript{P.153} like for the enhanced skin. Also, the /tcb/segmentation style \textsuperscript{P.155} can be used, but it is applied to the whole lower part.

\begin{tcolorbox}[skin=bicolor,title=The title, \texttt{\colframe=FireBrick!15!white}, \texttt{\colback=Salmon!50!white}, \texttt{colbacklower=Salmon}]
\begin{tcolorbox}[frame style={top color=FireBrick, bottom color=FireBrick!15!white, draw=black}, interior style={left color=Salmon, right color=Salmon!50!white}, segmentation style={right color=Salmon, left color=Salmon!50!white}]
\end{tcolorbox}

/tcb/bicolor \textsuperscript{(style, no value)}

This is an abbreviation for setting skin=bicolor.
This is my content.

This is my content.

More content.

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.

This is my content.

This is my content.

My title

This is my content.

More content.

My title

This is my content.

More content.

This is my content.

This is my content.

My title

This is my content.

More content.

My title

This is my content.

More content.

This is my content.

This is my content.

My title

This is my content.

More content.

My title

This is my content.

More content.

/tcb/colbacklower=(color) (no default, initially black!15!white)
Sets the background (color) of the lower part. It depends on the skin, if this value is used.

\begin{tcblisting}{title={Snapshot of the staging area},
  gitexample={The option `-a' automatically stages all tracked and modified
  files before the commit.\par
  This can be combined with the message option `-m'
  as seen in the third line.}}

  git commit
  git commit -a
  git commit -am 'changes to my example'
\end{tcblisting}

SNAPSHOT OF THE STAGING AREA

/gitexample/ The option `-a' automatically stages all tracked and modified
files before the commit.

This can be combined with the message option `-m'
as seen in the third line.
This is a flavor of \texttt{bicolor} \cite[p.223]{P.223} which is used as a \textit{first} part in a break sequence for \texttt{bicolor} \cite[p.223]{P.223}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin \texttt{\textquotesingle bicolorfirst\textquoteright}:

- /tcb/graphical environment \texttt{\textquotesingle P.138\textquoteright}: \texttt{tikzpicture}
- /tcb/frame engine \texttt{\textquotesingle P.138\textquoteright}: \texttt{pathfirst}
- /tcb/interior titled engine \texttt{\textquotesingle P.138\textquoteright}: \texttt{special}
- /tcb/interior engine \texttt{\textquotesingle P.139\textquoteright}: \texttt{special}
- /tcb/segmentation engine \texttt{\textquotesingle P.139\textquoteright}: \texttt{special}
- /tcb/title engine \texttt{\textquotesingle P.139\textquoteright}: \texttt{pathfirst}

\begin{tcbraster}[
skin=bicolorfirst,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of bicolor\textsuperscript{P.223} which is used as a middle part in a break sequence for bicolor\textsuperscript{P.223}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'bicolormiddle'**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=bicolormiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of bicolor\(^{\text{P.223}}\) which is used as a last part in a break sequence for bicolor\(^{\text{P.223}}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'bicolorlast'

| `/tcb/graphical environment` \(^{\text{P.138}}\) | `tikzpicture` |
| `/tcb/frame engine` \(^{\text{P.138}}\) | `pathlast` |
| `/tcb/interior titled engine` \(^{\text{P.138}}\) | `special` |
| `/tcb/interior engine` \(^{\text{P.139}}\) | `special` |
| `/tcb/segmentation engine` \(^{\text{P.139}}\) | `special` |
| `/tcb/title engine` \(^{\text{P.139}}\) | `pathlast` |

\begin{tcbraster}[skin=bicolorlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,colbacktitle=LimeGreen!75!DarkGreen,left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
10.16 Skin Family ‘tile’

This skin is a variant of skin bicolor\footnote{P.223}. Especially, the optional lower part of the box is colored by /tcb/colbacklower\footnote{P.224}. The main difference to bicolor\footnote{P.223} is that tile has no frame.

Environment and engines for the skin ‘tile’

- /tcb/graphical environment\footnote{P.138}: tikzpicture
- /tcb/frame engine\footnote{P.138}: empty
- /tcb/interior titled engine\footnote{P.139}: special
- /tcb/interior engine\footnote{P.139}: special
- /tcb/segmentation engine\footnote{P.139}: special
- /tcb/title engine\footnote{P.139}: path

This skin is an abbreviation for setting skin=tile.

It also changes the geometry and some style options.

```latex
\begin{tcbraster}[tile,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```

This is my content.
This is my content.
My title
My title
More content.
This is my content.
This is my content.
More content.
This is a flavor of tile\footnote{P.~228} which is used as a first part in a break sequence for tile\footnote{P.~228}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin `tilefirst`

\begin{tabular}{|l|}
\hline
\texttt{/tcb/graphical environment}\footnote{P.~138} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine}\footnote{P.~138} & \texttt{empty} \\
\texttt{/tcb/interior titled engine}\footnote{P.~138} & \texttt{special} \\
\texttt{/tcb/interior engine}\footnote{P.~138} & \texttt{special} \\
\texttt{/tcb/segmentation engine}\footnote{P.~139} & \texttt{special} \\
\texttt{/tcb/title engine}\footnote{P.~139} & \texttt{pathfirst} \\
\hline
\end{tabular}

\begin{tcbaster}[skin=tilefirst,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of tile\textsuperscript{P.228} which is used as a \textit{middle} part in a break sequence for tile\textsuperscript{P.228}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'tilemiddle'**

\begin{tcbraster} [skin=tilemiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{tile} which is used as a last part in a break sequence for \texttt{tile}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin `tilelast`

- \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}: \texttt{empty}
- \texttt{/tcb/interior titled engine}: \texttt{special}
- \texttt{/tcb/interior engine}: \texttt{special}
- \texttt{/tcb/segmentation engine}: \texttt{special}
- \texttt{/tcb/title engine}: \texttt{pathlast}

\begin{tcbraster}
\[\text{This is my content.}\]
\[\text{This is my content.}\]
\[\text{More content.}\]
\[\text{My title}\]
\[\text{This is my content.}\]
\[\text{My title}\]
\[\text{This is my content.}\]
\[\text{More content.}\]
\end{tcbraster}
10.17 Skin Family 'beamer'

\texttt{/tcb/skin=beamer} (skin)

This skin resembles boxes known from the \texttt{beamer} class and therefore is called 'beamer'. It uses the normal colors from the core package but shades them a little bit. To use this skin, the \texttt{tikz} library \texttt{shadings} has to be included in the preamble by:

\begin{verbatim}
\usetikzlibrary{shadings}
\end{verbatim}

<table>
<thead>
<tr>
<th>Environment and engines for the skin 'beamer'</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment \textsuperscript{\textbullet}P.138: \texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine \textsuperscript{\textbullet}P.138: \texttt{path}</td>
</tr>
<tr>
<td>/tcb/interior titled engine \textsuperscript{\textbullet}P.138: \texttt{special}</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{\textbullet}P.139: \texttt{special}</td>
</tr>
<tr>
<td>/tcb/segmentation engine \textsuperscript{\textbullet}P.139: \texttt{special}</td>
</tr>
<tr>
<td>/tcb/title engine \textsuperscript{\textbullet}P.139: \texttt{path}</td>
</tr>
</tbody>
</table>

\texttt{/tcb/beamer} (style, no value)

This is an abbreviation for setting \texttt{skin=beamer}.

\begin{itemize}
  \item It also changes the geometry and some style options.
\end{itemize}

\begin{verbatim}
\begin{tcbraster}
\begin{tcolorbox}[beamer,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

This is my content.
This is my content.
My title
My title

This is my content.
More content.
This is my content.
This is my content.

More content.
A colored box with the 'beamer' skin

This box looks like a box provided by the beamer class.

Beamer Box with background picture


Beamerish block: myblock

This is a flavor of beamer \(^{P.232}\) which is used as a first part in a break sequence for beamer \(^{P.232}\). Nevertheless, this skin can be applied independently.

Environment and engines for the skin `beamerfirst`

\begin{tcbraster}
\[beamer, skin=beamerfirst, raster equal height, raster columns=4, \]
\[colback=LightGreen, colframe=DarkGreen, \]
\[left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of `beamer`\textsuperscript{P.232} which is used as a \textit{middle} part in a break sequence for `beamer`\textsuperscript{P.232}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `beamermiddle`

\begin{tcbraster}[beamer,skin=beamermiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of `beamer` which is used as a last part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'beamerlast'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>frame engine</td>
<td>pathlast</td>
</tr>
<tr>
<td>interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>interior engine</td>
<td>special</td>
</tr>
<tr>
<td>segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>title engine</td>
<td>pathlast</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[beamer,skin=beamerlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm] \begin{tcolorbox} This is my content. \end{tcolorbox} \begin{tcolorbox} This is my content. \tcblower More content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \tcblower More content. \end{tcolorbox} \end{tcbraster}
10.18 Skin Family ‘widget’

/tcb/skin=widget

This skin uses the normal colors from the core package but shades them a little bit. To use this skin, the \texttt{tikz} library \texttt{shadings} has to be included in the preamble by:

\begin{verbatim}
\usetikzlibrary{shadings}
\end{verbatim}

The appearance of the skin can be controlled by \texttt{/tcb/frame style} \cite{P.152}, \texttt{/tcb/interior style} \cite{P.153}, and \texttt{/tcb/segmentation style} \cite{P.155}, if needed.

Environment and engines for the skin ‘widget’

\begin{verbatim}
/tcb/graphical environment \cite{P.138}: tikzpicture
/tcb/frame engine \cite{P.138}: path
/tcb/interior titled engine \cite{P.138}: path
/tcb/interior engine \cite{P.139}: path
/tcb/segmentation engine \cite{P.139}: special
/tcb/title engine \cite{P.139}: special
\end{verbatim}

\begin{verbatim}
/tcb(widget
This is an abbreviation for setting \texttt{skin=widget}.

\begin{Verbatim}
\begin{tcbraster}[raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
\end{Verbatim}

\begin{Verbatim}
This is my content.
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\end{Verbatim}

\begin{Verbatim}
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
\end{Verbatim}

\begin{Verbatim}
This is my content.
\end{Verbatim}

\begin{Verbatim}
My title
This is my content.
\tcblower
More content.
A colored box with the 'widget' skin
This is my content.

\begin{tcolorbox}[widget,skin=widgetfirst]
This is my content.
\end{tcolorbox}

\texttt{/tcb/skin=widgetfirst}

This is a flavor of \texttt{widget} \textsuperscript{P.237} which is used as a \textit{first} part in a break sequence for \texttt{widget} \textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'widgetfirst'

\begin{itemize}
\item \texttt{/tcb/graphical environment} \textsuperscript{P.138}: \texttt{tikzpicture}
\item \texttt{/tcb/frame engine} \textsuperscript{P.138}: \texttt{pathfirst}
\item \texttt{/tcb/interior titled engine} \textsuperscript{P.138}: \texttt{pathfirst}
\item \texttt{/tcb/interior engine} \textsuperscript{P.139}: \texttt{pathfirst}
\item \texttt{/tcb/segmentation engine} \textsuperscript{P.139}: \texttt{special}
\item \texttt{/tcb/title engine} \textsuperscript{P.139}: \texttt{special}
\end{itemize}

\begin{tcbaster}[widget,skin=widgetfirst,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbaster}

This is my content.
This is my content.
My title
This is my content.
My title
This is my content.

238
This is a flavor of widget\textsuperscript{P.237} which is used as a \textit{middle} part in a break sequence for widget\textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `widgetmiddle`

<table>
<thead>
<tr>
<th>Engine/Environment</th>
<th>Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment\textsuperscript{P.138}</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine\textsuperscript{P.138}</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior titled engine\textsuperscript{P.138}</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior engine\textsuperscript{P.139}</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/segmentation engine\textsuperscript{P.139}</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine\textsuperscript{P.139}</td>
<td>special</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[widget,skin=widgetmiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{widget}\textsuperscript{P.237} which is used as a \textit{last} part in a break sequence for \texttt{widget}\textsuperscript{P.237}. Nevertheless, this skin can be applied independently.

\textbf{Environment and engines for the skin ‘widgetlast’}

\begin{itemize}
\item [/tcb/\texttt{graphical\ environment}\textsuperscript{P.138}: \texttt{tikzpicture}]
\item [/tcb/\texttt{frame\ engine}\textsuperscript{P.138}: \texttt{pathlast}]
\item [/tcb/\texttt{interior\ titled\ engine}\textsuperscript{P.138}: \texttt{pathlast}]
\item [/tcb/\texttt{interior\ engine}\textsuperscript{P.139}: \texttt{pathlast}]
\item [/tcb/\texttt{segmentation\ engine}\textsuperscript{P.139}: \texttt{special}]
\item [/tcb/\texttt{title\ engine}\textsuperscript{P.139}: \texttt{special}]
\end{itemize}

This is my content.

\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{tcbraster}
10.19 Skin Family 'empty'

\texttt{/tcb/skin=empty} (skin)

This skin sets all engines to \texttt{empty}, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

<table>
<thead>
<tr>
<th>Environment and engines for the skin 'empty'</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment ^{P.138}: \texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine ^{P.138}: \texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior titled engine ^{P.138}: \texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior engine ^{P.139}: \texttt{empty}</td>
</tr>
<tr>
<td>/tcb/segmentation engine ^{P.139}: \texttt{empty}</td>
</tr>
<tr>
<td>/tcb/title engine ^{P.139}: \texttt{empty}</td>
</tr>
</tbody>
</table>

\texttt{/tcb/empty} (style, no value)

This is an abbreviation for setting \texttt{skin=empty}.

\begin{tcbraster}[empty,raster equal height,raster columns=4, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This style relies on the skin empty \cite{P.212}. All engines are set to empty and all margins are set to 0 pt. In contrast to \cite{P.212}, the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}


% \tcbuselibrary{fitting}
\newtcbfit{\mybox[1]}{\textwidth=4cm,height=7cm,top=0pt,watermark text=#1}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline
\mybox{A}{\lipsum[1]} & \mybox{B}{\lipsum[2]} & \mybox{C}{\lipsum[3]} \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline


242
This style extends \texttt{/tcb/blankest} \(^{P.242}\). All engines are set to empty and all margins are set to 0pt. In contrast to \texttt{/tcb/blanker} \(^{P.242}\), also title, shadow, underlay, overlay, finish and borderline are removed.

% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster equal height,
title=Box \texttt{\thetcbrasternum},
enhanced,size=small,colframe=red!50!black,colback=red!10!white,
coltitle=yellow!85!black,
drop fuzzy shadow,watermark text={Box \texttt{\thetcbrasternum}},
borderline={.25mm}{-0.5mm}{green!40!black},
finish={\begin{tcbclipframe}\draw[blue,opacity=0.1,line width=1cm](frame.south west) -- (frame.north east);\end{tcbclipframe}},]
\begin{tcolorbox}\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox}
\end{tcbraster}

\begin{tcolorbox}
\begin{tcolorbox}
\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox}
\end{tcolorbox}


This is a flavor of empty\textsuperscript{P.241} which is used as a first part in a break sequence for empty\textsuperscript{P.241}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘emptyfirst’

<table>
<thead>
<tr>
<th>Environment</th>
<th>Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>empty</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[empty,skin=emptyfirst,raster equal height,raster columns=4, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of empty\textsuperscript{P.241} which is used as a \textit{middle} part in a break sequence for empty\textsuperscript{P.241}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'emptymiddle'**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{empty}</td>
</tr>
</tbody>
</table>

\begin{tcbbraster}[empty,skin=emptymiddle,raster equal height,raster columns=4,\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbbraster}
This is a flavor of empty\textsuperscript{P.241} which is used as a last part in a break sequence for empty\textsuperscript{P.241}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}
\begin{tcolorbox}[empty,skin=emptylast,raster equal height,raster columns=4,
  coltitle=Navy,borderline={2pt}{0pt}{black!10!white},
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
\end{tcbraster}
This example demonstrates a breakable customized box. Here, we define an environment `freebox`. The first application of `freebox` produces an unbroken `tcolorbox`. The box is drawn by the code given by `/tcb/frame code` \cite{P.141} and `/tcb/interior code` \cite{P.142}. The second application of `freebox` is broken into several parts which are drawn by the codes given by `/tcb/skin first is subskin of` \cite{P.144}, `/tcb/skin middle is subskin of` \cite{P.144}, and `/tcb/skin last is subskin of` \cite{P.144}.

% Preamble:
\usepackage{tikz,lipsum}
\tcbuselibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}
\newtcolorbox{freebox}[1][{}]{empty,breakable,leftrule=5mm,left=2mm,
  frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red},
  colback=yellow!50!white,
  watermark color=red!50!yellow!75!white,
  watermark text on=unbroken is unbroken box,
  watermark text on=first is first part,
  watermark text on=middle is middle part,
  watermark text on=last is last part,
  \% code for unbroken boxes:
  frame code={
    \path[tcb fill frame] (frame.south west)--(frame.north west)
    --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east)
    --((yshift=5mm)frame.south east)--((xshift=5mm)frame.south east)--cycle; },
  interior code={
    \path[tcb fill interior] (interior.south west)--(interior.north west)
    --((xshift=-4.8mm)interior.north east)--((yshift=4.8mm)interior.south east)
    --((yshift=4.8mm)interior.north east)--((xshift=-4.8mm)interior.south east)--cycle; },
  \% code for the first part of a break sequence:
  skin first is subskin of={emptyfirst}{
    \path[tcb fill frame] (frame.south west)--(frame.north west)
    --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east)
    --((yshift=5mm)frame.south east)--((xshift=5mm)frame.south east)--cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm)
    -- +(60:2mm) -- cycle; },
  \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm)
  -- +300:2mm) -- cycle; },
  \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm)
  -- +(60:2mm) -- cycle; },
  interior code={
    \path[tcb fill interior] (interior.south west)--(interior.north west)
    --((xshift=-4.8mm)interior.north east)--((yshift=4.8mm)interior.south east)
    --(xshift=-4.8mm)interior.north east)--(interior.south east|--frame.south)
    --cycle; },
  \% code for the middle part of a break sequence:
  skin middle is subskin of={emptymiddle}{
    \path[tcb fill frame] (frame.south west)--(frame.north west)
    --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east)
    --((yshift=5mm)frame.south east)--((xshift=5mm)frame.south east)--cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(120:2mm)
    -- +(60:2mm) -- cycle; },
  \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm)
  -- +(60:2mm) -- cycle; },
  interior code={
    \path[tcb fill interior] (interior.south west)--(interior.north west)
    --(xshift=-4.8mm)interior.north east)--(interior.south east|--frame.south)
    --cycle; },
  \% code for the last part of a break sequence:
  skin last is subskin of={emptylast}{
    \path[tcb fill frame] (frame.south west)--(frame.north west)
    --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east)
    --((yshift=5mm)frame.south east)--((xshift=5mm)frame.south east)--cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(120:2mm)
    -- +(60:2mm) -- cycle; },
  interior code={
    \path[tcb fill interior] (interior.south west)


10.20 Skin 'spartan'

This skin is quite... spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the spartan skin is used for the draft mode, see Section 10.12 on page 207. Nevertheless, it can be used as a normal skin.

Environment and engines for the skin 'spartan'

This is an abbreviation for setting \texttt{skin=spartan}.

\begin{tcbraster}
\tcb{spartan,raster equal height,raster columns=4,\
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,\
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
10.21 Skin 'draft'

/tcb/skin=draft

This skin is intended to be used while drafting new geometric settings for a tcolorbox.

<table>
<thead>
<tr>
<th>Environment and engines for the skin 'draft'</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment [P.138]</td>
</tr>
<tr>
<td>/tcb/frame engine [P.138]</td>
</tr>
<tr>
<td>/tcb/interior titled engine [P.138]</td>
</tr>
<tr>
<td>/tcb/interior engine [P.139]</td>
</tr>
<tr>
<td>/tcb/segmentation engine [P.139]</td>
</tr>
<tr>
<td>/tcb/title engine [P.139]</td>
</tr>
</tbody>
</table>

/tcb/draft

This is an abbreviation for setting skin=draft.

\begin{tcbraster}
\[draft, raster equal height, raster columns=4,\]
\[colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen,\]
\[left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content. \tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content. \tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
A colored box with the 'draft' skin


This skin family 'freelance' is deprecated with \texttt{tcolorbox} 3.00. It is not longer needed, because \texttt{/tcb/frame code} \texttt{tcolorbox}\texttt{frame code} \texttt{\texttt{P.141}}, \texttt{/tcb/interior code} \texttt{tcolorbox}\texttt{interior code} \texttt{\texttt{P.142}}, \texttt{/tcb/interior titled code} \texttt{tcolorbox}\texttt{interior titled code} \texttt{\texttt{P.141}}, and \texttt{/tcb/title code} \texttt{tcolorbox}\texttt{title code} \texttt{\texttt{P.143}} can be applied to every skin now. In this sense, everything has become \textit{freelance} now.

For users of \texttt{/tcb/freelance}: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \texttt{/tcb/empty} \texttt{\texttt{P.241}} or \texttt{/tcb/enhanced} \texttt{\texttt{P.210}} where you would have used \texttt{/tcb/freelance} before.

\verb|\tcb/skin=freelance| (skin)

This skin gives full freedom for the appearance of the \texttt{tcolorbox}. All drawing engines are set to type \textit{freelance}; they use the \texttt{tikz} package and compute the \texttt{/tcb/geometry nodes} \texttt{\texttt{P.140}}.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment} & \texttt{\texttt{tikzpicture}} \\
\texttt{/tcb/frame engine} & \texttt{\texttt{freelance}} \\
\texttt{/tcb/interior titled engine} & \texttt{\texttt{freelance}} \\
\texttt{/tcb/interior engine} & \texttt{\texttt{freelance}} \\
\texttt{/tcb/segmentation engine} & \texttt{\texttt{freelance}} \\
\texttt{/tcb/title engine} & \texttt{\texttt{freelance}} \\
\hline
\end{tabular}
\end{table}

\texttt{/tcb/freelance} (style, no value)

This is an abbreviation for setting \texttt{skin=freelance}.

\texttt{/tcb/skin=freelancefirst} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 18.8 on page 389.

\texttt{/tcb/skin=freelancemiddle} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 18.8 on page 389.

\texttt{/tcb/skin=freelancelast} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 18.8 on page 389.

\texttt{/tcb/extend freelance=\langle options\rangle} (no default, initially empty)

The \texttt{\langle options\rangle} are added to the skin definition of \textit{freelance}.

\texttt{/tcb/extend freelancefirst=\langle options\rangle} (no default, initially empty)

The \texttt{\langle options\rangle} are added to the skin definition of \textit{freelance first} which is used as first part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin first is subskin of \texttt{\texttt{P.144}}} for a substitute of this key.

\texttt{/tcb/extend freelancemiddle=\langle options\rangle} (no default, initially empty)

The \texttt{\langle options\rangle} are added to the skin definition of \textit{freelance middle} which is used as middle part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin middle is subskin of \texttt{\texttt{P.144}}} for a substitute of this key.

\texttt{/tcb/extend freelancelast=\langle options\rangle} (no default, initially empty)

The \texttt{\langle options\rangle} are added to the skin definition of \textit{freelance last} which is used as last part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin last is subskin of \texttt{\texttt{P.144}}} for a substitute of this key.
11 Inclusion of Boxed Image Files

The \texttt{skins} library adds some commands to conveniently include boxed image files. For the following macros and options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{Verbatim}
\tcbuselibrary{skins}
\end{Verbatim}

See Section 10 on page 152 for the documentation of all other options of the \texttt{skins} library.

11.1 Macros

\begin{Verbatim}
\tcbincludegraphics[(options)]{(file name)}
\end{Verbatim}

In principle, this macro includes an image file denoted by \texttt{(file name)} using the standard \texttt{includegraphics} and puts it into a \texttt{tcolorbox}. The \texttt{(options)} are \texttt{tcolorbox} keys to set up the colored box. Use \texttt{/tcb/graphics options} to specify options for the underlying \texttt{includegraphics}. Some \texttt{tcolorbox} option keys are automatically set, namely \texttt{/tcb/enhanced} and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a \texttt{/tcb/width} is specified, but no fixed \texttt{/tcb/height}, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed \texttt{/tcb/height} is specified, the image is sized to fill the fixed inner area of the box.
- If the \texttt{/tcb/capture} mode \texttt{/tcb/hbox} is specified, the image is sized according to given \texttt{includegraphics} options only. The box adapts to the image.

\begin{Verbatim}
\% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster force size=false,size=fbox, colframe=red!50!black,colback=red!20!black, fonttitle=\bfseries,center title,drop fuzzy shadow] \tcbincludegraphics[(title=Normal)]{goldshade.png} \tcbincludegraphics[(title=Fixed height,height=3cm)]{goldshade.png} \tcbincludegraphics[(title=hbox mode,hbox,graphics options={width=3cm})]{goldshade.png} \end{tcbraster}
\end{Verbatim}
The auxiliary macro \texttt{\texttt{imagename}} may be used inside \texttt{\texttt{tcincludegraphics}} to display the name of the file. \texttt{\texttt{imagename}} is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

\begin{tcbincludegraphics}[title={\texttt{imagename}}]{goldshade.png}
\tcbincludegraphics[finish={\node[fill=white,fill opacity=0.5,text opacity=1] at (frame.center) {\texttt{imagename}};}]{blueshade.png}
\end{tcbincludegraphics}
This is a generalized version of \texttt{tcbincludegraphics}\textsuperscript{P.255} which allows to include a complete PDF file denoted by \texttt{(file name)}. Every page is boxed into an own tcolorbox\textsuperscript{P.12} customized by the given \texttt{options}. It is reasonable to put such a series of boxes inside a tcbraster\textsuperscript{P.280} for alignment. Use \texttt{/tcb/graphics\_pages}\textsuperscript{P.258} to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{imagepage} may be used inside \texttt{tcbincludepdf} to display the current page number.

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}

\begin{tcbbraster}[raster]{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\texttt{small}\texttt{\textbf{series}}\texttt{\textsf{ttfamily}}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,botontitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbf{\textsl{imagename}}} [\texttt{\textbf{\textsl{imagepage}}}]}}
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}
11.2 Option Keys

\texttt{/tcb/graphics options}=\langle\textit{options}\rangle \quad \text{(no default, initially empty)}

\begin{itemize}
  \item Used for \texttt{\tcbincludegraphics} \textsuperscript{P.255} and \texttt{\tcbincludepdf} \textsuperscript{P.257} to specify \texttt{\includegraphics}\langle\textit{options}\rangle.
\end{itemize}

\begin{verbatim}
\% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,size=fbox,raster equal height,
    colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
\tcbincludegraphics{goldshade.png}
\newcommand{\myangle}{angle=20}\%
\tcbincludegraphics[graphics options=\myangle]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbraster}
\end{verbatim}

\texttt{/tcb/graphics directory}=\langle\textit{directory}\rangle \quad \text{(no default, initially empty)}

\begin{itemize}
  \item Used for \texttt{\tcbincludegraphics} \textsuperscript{P.255} and \texttt{\tcbincludepdf} \textsuperscript{P.257} to specify a file system \langle\textit{directory}\rangle where the image files are located.
\end{itemize}

\begin{verbatim}
\begin{verbatim}
\tcbset{
    graphics directory=\{.\},
    graphics directory=\{examples\},
    graphics directory=\{../../pictures\},
}
\end{verbatim}
\end{verbatim}

\begin{itemize}
  \item The \texttt{\graphicspath} macro from the \texttt{graphics} package is superior to this option. \texttt{/tcb/graphics directory} may be used especially for \texttt{\tcbincludepdf} \textsuperscript{P.257}.
\end{itemize}

\texttt{/tcb/graphics pages}=\langle\textit{selection}\rangle \quad \text{(no default, initially \texttt{1,\ldots,\pdfpages})}

\begin{itemize}
  \item Used for \texttt{\tcbincludepdf} \textsuperscript{P.257} to specify a \langle\textit{selection}\rangle of pages to be included. The largest page number is accessible by \texttt{\pdfpages}. The \langle\textit{selection}\rangle has to be given using the \texttt{\foreach} syntax of \texttt{TikZ}.
\end{itemize}

\begin{verbatim}
\begin{verbatim}
\tcbset{
    graphics pages=\{1,3,7\},
    graphics pages=\{1,\ldots,10\},
    graphics pages=\{1,3,\ldots,18\},
    graphics pages=\{100,\ldots,\pdfpages\},
}\
\end{verbatim}
\end{verbatim}
/\texttt{tcbgraphics orientation=⟨orientation⟩} (no default, initially \texttt{as-is})

Used for \texttt{\textbackslash tcbincludegraphics}^{\textit{P.255}} and \texttt{\textbackslash tcbincludepdf}^{\textit{P.257}} to guarantee a certain \texttt{⟨orientation⟩} of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for \texttt{⟨orientation⟩} are:

- \texttt{as-is}: no rotation of the processed image.
- \texttt{landscape}: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{landscape*}: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{portrait}: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- \texttt{portrait*}: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.

\begin{tcbraster}[raster columns=6,size=fbox,raster equal height, colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
\tcbincludegraphics\{Basilica_5.png\}
\tcbincludegraphics[graphics orientation=landscape]\{Basilica_5.png\}
\tcbincludegraphics[graphics orientation=portrait]\{Basilica_5.png\}
\tcbincludegraphics[graphics orientation=portrait*]\{Basilica_5.png\}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm,clip}]\{goldshade.png\}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm,clip}, graphics orientation=landscape]\{goldshade.png\}
\end{tcbraster}
12 TikZ Image and Picture Fill Extensions; Auxiliary Macros

The `skins` library adds some image and picture fill options to the vast option set of TikZ [22]. These options can be used in any `tikzpicture`. For the following options, the `skins` library has to be loaded by a package option or inside the preamble by:

\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

See Section 10 on page 152 for the documentation of all other options of the `skins` library.

12.1 Fill Plain

\texttt{/tikz/fill plain image\textasciitilde (file name)}

(no default, initially unset)

Fills the current path with an external image referenced by \texttt{(file name)}. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{tikzpicture}
\path[draw,fill plain image\textasciitilde={width=2.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill plain image*= (file name)}

(no default, initially unset)

Fills the current path with an external image referenced by \texttt{(file name)}. The image is put in the center of the path, but it is not resized to fit into the path area. The \texttt{(graphics options)} are given to the underlying `\includegraphics` command.

\begin{tikzpicture}
\path[draw,fill plain image*=\texttt{image}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill plain picture\textasciitilde (graphical code)}

(no default, initially unset)

Fills the current path with the given \texttt{(graphical code)}. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard \texttt{path picture} option.

\begin{tikzpicture}
\path[draw,fill plain picture=\texttt{\%}]
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
\draw[red,line width=5mm] (0,0) circle (1cm);
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.2 Fill Stretch

/\texttt{tikz/fill stretch image}=⟨\texttt{file name}⟩

(no default, initially unset)

Fills the current path with an external image referenced by ⟨\texttt{file name}⟩. The image is stretched to fill the path area.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/\texttt{tikz/fill stretch image*}={⟨\texttt{graphics options}⟩}{⟨\texttt{file name}⟩}

(no default, initially unset)

Fills the current path with an external image referenced by ⟨\texttt{file name}⟩. The ⟨\texttt{graphics options}⟩ are given to the underlying \includegraphics command. The image is stretched to fill the path area.

\begin{tikzpicture}
\path[fill stretch image*={angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/\texttt{tikz/fill stretch picture}=⟨\texttt{graphical code}⟩

(no default, initially unset)

Fills the current path with the given ⟨\texttt{graphical code}⟩. The result is stretched to fill the path area.

\begin{tikzpicture}
\path[draw,fill stretch picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}%]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.3 Fill Overzoom

/tikz/fill overzoom image=(file name) (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom image*=(⟨graphics options⟩){(file name)} (no default, initially unset)
Fills the current path with an external image referenced by (file name). The ⟨graphics options⟩ are given to the underlying \includegraphics command. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image*={angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom picture=(⟨graphical code⟩) (no default, initially unset)
Fills the current path with the given ⟨graphical code⟩. The result is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[draw,fill overzoom picture={%}
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.4 Fill Zoom

\texttt{/tikz/fill zoom image\{file name\}} \hspace{1cm} \text{(no default, initially unset)}

Fills the current path with an external image referenced by \texttt{(file name)}. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill zoom image*=\{graphics options\}\{file name\}} \hspace{1cm} \text{(no default, initially unset)}

Fills the current path with an external image referenced by \texttt{(file name)}. The \texttt{(graphics options)} are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image*=\{angle=90,origin=c\}goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill zoom picture\{graphical code\}} \hspace{1cm} \text{(no default, initially unset)}

Fills the current path with the given \texttt{(graphical code)}. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom picture=\%]
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
\]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.5 Fill Shrink

\texttt{/tikz/fill shrink image\equal{\textit{file name}}} (no default, initially unset)

Fills the current path with an external image referenced by \textit{(file name)}. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

```latex
\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

\texttt{/tikz/fill shrink image**\equal{\textit{file name}}} (no default, initially unset)

Fills the current path with an external image referenced by \textit{(file name)}. The \texttt{\graphics options} are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

```latex
\begin{tikzpicture}
\path[draw,fill shrink image*=\textit{width=1.5cm}
goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

\texttt{/tikz/fill shrink picture\equal{\textit{graphical code}}} (no default, initially unset)

Fills the current path with the given \textit{graphical code}. The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

```latex
\begin{tikzpicture}
\path[draw,fill shrink picture=%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```
12.6 Fill Tile

\texttt{/tikz/fill tile image=\langle file name \rangle} (no default, initially unset)

Fills the current path with a tile pattern using an external image referenced by \langle file name \rangle.

\begin{tikzpicture}
\path [fill tile image=pink_marble.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315} 
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill tile image*=\langle graphics options \rangle\{\langle file name \rangle\}} (no default, initially unset)

Fills the current path with a tile pattern using an external image referenced by \langle file name \rangle. The \langle graphics options \rangle are given to the underlying \texttt{\includegraphics} command.

\begin{tikzpicture}
\path [fill tile image*=\{width=1cm\}{pink_marble.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315} 
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill tile picture=\langle graphical code \rangle} (no default, initially unset)

Fills the current path with a tile pattern using the given \langle graphical code \rangle.

\begin{tikzpicture}
\path [draw,fill tile picture=\%]
\draw [red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw [red,line width=5mm] (-1,-1) -- (1,1);
\draw [red,line width=5mm] (-1,1) -- (1,-1);
\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315} 
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill tile picture*=\langle fraction \rangle\{\langle graphical code \rangle\}} (no default, initially unset)

Fills the current path with a tile pattern using the given \langle graphical code \rangle. The graphic is resized by \langle fraction \rangle.

\begin{tikzpicture}
\path [draw,fill tile picture*=0.25\%]
\draw [red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw [red,line width=5mm] (-1,-1) -- (1,1);
\draw [red,line width=5mm] (-1,1) -- (1,-1);
\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315} 
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.7 Filling Options

\textbf{/tikz/fill image opacity=⟨fraction⟩} \hspace{1.5cm} (no default, initially 1.0)
Sets the fill opacity for the image or picture fill options to the given ⟨fraction⟩.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

\textbf{/tikz/fill image scale=⟨fraction⟩} \hspace{1.5cm} (no default, initially 1.0)
Stretches, zooms, overzooms or shrinks the image or picture to the given ⟨fraction⟩ of the
width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

\textbf{/tikz/fill image options=⟨graphics options⟩} \hspace{1.5cm} (no default, initially empty)
The ⟨graphics options⟩ are given to the underlying \texttt{includegraphics} command for the
image fill options. This can be just together with /tikz/fill stretch image \textsuperscript{P.261},
/tikz/fill overzoom image \textsuperscript{P.262}, /tikz/fill zoom image \textsuperscript{P.263}, and /tikz/fill
tile image \textsuperscript{P.265}.

\begin{tikzpicture}
\path[fill image options={width=1cm},
fill tile image=pink_marble.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

\texttt{\textbackslash tcbpatcharcangular}

The TikZ package provides a nice rounded corners option to replace all corners by little arcs. \texttt{\textbackslash tcbpatcharcangular} is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

\begin{tikzpicture}
  \draw[thick,rounded corners=8pt]
  (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0) -- (0,2) -- (2,2) -- (0,0) -- (2,0);
  \texttt{\textbackslash tcbpatcharcangular}
  \draw[thick,rounded corners=8pt,xshift=2.5cm]
  (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0) -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}

\texttt{\textbackslash tcbpatcharcround}

This macro reverts \texttt{\textbackslash tcbpatcharcangular}, i.e., the patch from \texttt{\textbackslash tcbpatcharcangular} is replaced by the original code.
12.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \texttt{skins} library. They allow to determine the width and height of an arbitrary \LaTeX{} node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{tikzpicture}
\node[align=center,draw=red,fill=yellow] (A) {This is my\ example node};
\tcbsetmacrotowidthofnode\mywidth{A}
\tcbsetmacrotoheightofnode\myheight{A}
\path[fill=blue!25!white] % rectangle widthout border
(xshift=2mm) A.south east rectangle node{Copy} +(\mywidth,\myheight);
\node[draw=blue,fill=blue!25!white, % standard border width 0.4pt
minimum width=\mywidth-0.4pt, % minus width of border
minimum height=\myheight-0.4pt % minus height of border
] at ([xshift=5cm]A) {Copy 2};
\end{tikzpicture}

12.10 Hyper Nodes

The following auxiliary macro is defined by the \texttt{skins} library.

\begin{tikzpicture}
\node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section~\ref*{sec:tikzimagefilling}};
\tcbhypernode\hyperref[sec:tikzimagefilling]{mybutton}
\end{tikzpicture}

\% \usepackage{hyperref}
\begin{tikzpicture}
\node[align=center,draw=red,fill=red!5] (mybutton) {
\{Click me to jump to Section-\ref{sec:tikzimagefilling}\};
\tcbhypernode\hyperref[sec:tikzimagefilling]{mybutton}
\end{tikzpicture}
The \texttt{skins} library adds some supporting options for the \texttt{beamer} package [23]. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 152 for the documentation of all other options of the \texttt{skins} library.

\begin{verbatim}
/tcb/only=<\langle overlay specification \rangle>{\langle options \rangle}  \hspace{1cm} \text{(style, no default, initially unset)}
\end{verbatim}

Sets the given \texttt{tcolorbox} \texttt{(options)} in dependency of a \texttt{beamer} \texttt{(overlay specification)}. Note that this needs the \texttt{beamer} class [23]. The \texttt{(options)} will only be used on the specified \texttt{beamer} frames.

\begin{verbatim}
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\textbf{series},
  enhanced,colframe=red!50!black,colback=red!10,colbacktitle=red,
  sidebyside,righthand width=3cm,
  lowerbox=invisible,lower separated=false,
  drop lifted shadow,
  only=<1>{colbacktitle=yellow,coltitle=red!50!black,colframe=red},
  only=<3>{colback=yellow!50,watermark text={Attention!}},
  only=<3>{lowerbox=visible} ]
This is a test.
\begin{itemize}[<+->]
\item One
\item Two
\item \alert<3>{Three}
\item Four
\end{itemize}
\tcblower
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\end{tcolorbox}
\end{frame}
\end{document}
\end{verbatim}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}[fragile]
\begin{tcblisting}{beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, title=Example, only=<1>{lowerbox=invisible},only=<2>{}
This is an \textbf{example listing}
\end{tcblisting}
\end{frame}
\end{document}
/tcb/alert=<\{overlay specification\}> (style, no default, initially unset)
Sets the /tcb/beamer alerted\textsuperscript{P.271} style in dependency of a \texttt{beamer} (overlay specification). /tcb/beamer alerted\textsuperscript{P.271} can be redefined for customization.

/tcb/beamer alerted (style, no options, initially fuzzy halo)
This style is not intended to be used directly, but in concealed way by applying /tcb/alert. The style can be redefined.

\begin{itemize}
\item[	cbitem] \texttt{beamer alerted/.style={colframe=red!50!gray},}
\end{itemize}

The following examples use \texttt{tcbitemize}\textsuperscript{P.290} from \texttt{raster} for convenient use of a list of boxes which are uncovered one by one.

\begin{verbatim}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,]
\item[tcbitem] title=One,alert=<1> First Statement
\item[tcbitem] title=Two,hide=<-1>,alert=<2> Second Statement
\item[tcbitem] title=Three,hide=<-2>,alert=<3> Test
\item[tcbitem] title=Four,hide=<-3>,alert=<4> \begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x). \end{equation*}
\item[tcbitem] title=Five,hide=<-4>,alert=<5> \includegraphics[width=1cm]{goldshade.png}
\item[tcbitem] title=Six,hide=<-5>,alert=<6> Test
\end{tcbitemize}
\end{frame}
\end{document}
\end{verbatim}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, beamer hidden/.style={invisible,interior hidden,colframe=blue!20!gray!15}, beamer alerted/.style={colframe=red!50!gray},]
\tcbitem\[title=One,alert=<1>\]
First Statement
\tcbitem\[title=Two,hide=<-1>,alert=<2>\]
Second Statement
\tcbitem\[title=Three,hide=<-2>,alert=<3>\]
Test
\tcbitem\[title=Four,hide=<-3>,alert=<4>\]
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\tcbitem\[title=Five,hide=<-4>,alert=<5]\]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem\[title=Six,hide=<-5>,alert=<6>\]
Test
\end{tcbitemize}
\end{frame}
\end{document}
One
First Statement

Two
Second Statement

Three
Test

\[ \int_{1}^{x} \frac{1}{t} \, dt = \ln(x). \]
\[
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\]
The library is loaded by a package option or inside the preamble by:

```latex
\tcbuselibrary{vignette}
```

This also loads the \texttt{skins} library, see Section 10 on page 152, and the \texttt{fadings} library of \texttt{tikz} [22].

14.1 Vignette Drawing

```latex
\tcbvignette{⟨options⟩}
```

In this context, a \texttt{vignette} is a four part rectangular frame. It is constructed as several Ti\texttt{kZ} paths and, therefore, can only be used inside a \texttt{tikzpicture} environment or inside \texttt{tcolorbox}\hspace{1.5em}P.12 options.

The \{\texttt{options}\} control position, size and style settings of the vignette. These options have the common key path \texttt{/tcb/vig/} and are described in the following.

The next examples show direct \texttt{tcbvignette} usage without a \texttt{tcolorbox}\hspace{1.5em}P.12.

```latex
\begin{tikzpicture}
\tcbvignette
\end{tikzpicture}
```

```latex
\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcbvignette{outside node=A,raised color=blue}
\end{tikzpicture}
```

```latex
\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcbvignette{size=3mm,outside node=A,north style=red,east style=yellow,south style=blue,west style=green}
\end{tikzpicture}
```

```latex
\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcbvignette{over node=A,fade in}
\end{tikzpicture}
```

\texttt{tcbvignette} can be used directly inside appropriate options keys for \texttt{tcolorbox}\hspace{1.5em}P.12. Note that options like \texttt{/tcb/underlay}\hspace{1.5em}P.199 need \texttt{/tcb/enhanced}\hspace{1.5em}P.210 or similar settings.
Mostly, convenient short cuts like \texttt{/tcb/underlay vignette} can be used to add a vignette to a tcolorbox. Here, \texttt{tcbvignette} is used internally.

\begin{tcolorbox}[enhanced,size=small,sharp corners,
colback=green!10,colframe=green!50!black,
boxrule=1mm,titlerule=0mm,
title=My title,center title,fonttitle=\textbf{series},
underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

\subsection{Generic Geometry Settings}

\begin{itemize}
  \item \texttt{/tcb/vig/xmin=\{length\}} (no default, initially 0pt)
    \begin{itemize}
      \item Sets the lower horizontal limit of a \texttt{tcbvignette}.
    \end{itemize}
  \item \texttt{/tcb/vig/xmax=\{length\}} (no default, initially 1cm)
    \begin{itemize}
      \item Sets the upper horizontal limit of a \texttt{tcbvignette}.
    \end{itemize}
  \item \texttt{/tcb/vig/ymin=\{length\}} (no default, initially 0pt)
    \begin{itemize}
      \item Sets the lower vertical limit of a \texttt{tcbvignette}.
    \end{itemize}
  \item \texttt{/tcb/vig/ymax=\{length\}} (no default, initially 1cm)
    \begin{itemize}
      \item Sets the upper vertical limit of a \texttt{tcbvignette}.
    \end{itemize}
  \item \texttt{/tcb/vig/lower left corner=\{coordinates\}} (style, initially 0,0)
    \begin{itemize}
      \item Sets the lower left corner of a \texttt{tcbvignette}. This style sets \texttt{/tcb/vig/xmin} and \texttt{/tcb/vig/ymin}.
    \end{itemize}
  \item \texttt{/tcb/vig/upper right corner=\{coordinates\}} (style, initially 1,1)
    \begin{itemize}
      \item Sets the upper right corner of a \texttt{tcbvignette}. This style sets \texttt{/tcb/vig/xmax} and \texttt{/tcb/vig/ymax}.
    \end{itemize}
  \item \texttt{/tcb/vig/inside node=\{name\}} (style, initially unset)
    \begin{itemize}
      \item Places the \texttt{tcbvignette} inside the node with the given \{name\}. The outer limits of the vignette are adapted to the node geometry.
    \end{itemize}
\end{itemize}
\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette\{outside node=A\}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette\{over node offset=1mm, over node=A\}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{north size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{south size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{east size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{west size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{vertical size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette\{outside node=A\}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette\{over node offset=1mm, over node=A\}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{north size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{south size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{east size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{west size=4mm\}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette\{vertical size=4mm\}
\end{tikzpicture}
Sets \texttt{/tcb/vig/east size} \textsuperscript{P.277} and \texttt{/tcb/vig/west size} \textsuperscript{P.277}, to the given \texttt{⟨length⟩}.

\begin{tikzpicture}
  \tcbvignette{east size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{west size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{north size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{north style=blue}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south style=blue}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{draw=blue,fill=yellow}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{north style=blue}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south style={draw=blue,fill=yellow}}
\end{tikzpicture}

14.3 Generic Color and Style Settings

\texttt{/tcb/vig/north style=} \texttt{⟨style⟩} (no default, initially \texttt{red!50!white})

Sets Ti\texttt{kZ} \texttt{⟨style⟩} options for the north \texttt{vignette} part.

\begin{tikzpicture}
  \tcbvignette{north style=blue}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south style=draw=blue,fill=yellow}
\end{tikzpicture}

\texttt{/tcb/vig/south style=} \texttt{⟨style⟩} (no default, initially \texttt{red!50!black})

Sets Ti\texttt{kZ} \texttt{⟨style⟩} options for the south \texttt{vignette} part.

\begin{tikzpicture}
  \tcbvignette{south style=blue}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south style={draw=blue,fill=yellow}}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south style=draw=blue,fill=yellow}
\end{tikzpicture}
Sets TikZ \texttt{⟨style⟩} options for the east \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{east style={left color=yellow!75!black, right color=blue!75!black}}
\end{tikzpicture}

Sets TikZ \texttt{⟨style⟩} options for the west \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{west style={preaction={fill=black!20}, pattern=checkerboard, pattern color=black!30}}
\end{tikzpicture}

The four \texttt{vignette} parts are drawn inside a TikZ \texttt{scope} environment which takes the given \texttt{⟨style⟩} as option.

\begin{tikzpicture}
\tcbvignette{scope={transparency group,opacity=0.25}}
\end{tikzpicture}

Creates a raised frame impression by setting the four style options \texttt{/tcb/vig/north style} \textsuperscript{P.278}, \texttt{/tcb/vig/south style} \textsuperscript{P.278}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{⟨color⟩}.

\begin{tikzpicture}
\tcbvignette{raised color=blue}
\end{tikzpicture}

Creates a lowered frame impression by setting the four style options \texttt{/tcb/vig/north style} \textsuperscript{P.278}, \texttt{/tcb/vig/south style} \textsuperscript{P.278}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{⟨color⟩}.

\begin{tikzpicture}
\tcbvignette{lowered color=green!75!black}
\end{tikzpicture}

Sets the four style options \texttt{/tcb/vig/north style} \textsuperscript{P.278}, \texttt{/tcb/vig/south style} \textsuperscript{P.278}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} such that the color shades from the \texttt{⟨inner⟩} color to the \texttt{⟨outer⟩} color.

\begin{tikzpicture}
\tcbvignette{color from=red to blue!50}
\end{tikzpicture}

Sets the base color for \texttt{/tcb/vig/raised color}, \texttt{/tcb/vig/lowered color}, \texttt{/tcb/finish fading vignette} \textsuperscript{P.285}. Typically, this value has not to be set directly.
Especially, if shadings or fadings are used, the drawn vignette graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The \texttt{/tcb/vig/draw method} intends to give a choice of alternative drawing methods.

- \texttt{direct}: The vignette parts are drawn/filled by using a single Ti\textit{k}Z graph. This is the preferred (and default) method for solid color graphs.
- \texttt{clipped}: The vignette parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

\begin{tikzpicture}
\tcbvignette[color from=red to yellow]
\end{tikzpicture}

\begin{tikzpicture}
\tcbvignette[color from=red to yellow,draw method=clipped]
\end{tikzpicture}

\textbf{Warning:} This option is a stopgap and may be changed or preferably removed in future.

### 14.4 Generic Fading Settings

The \texttt{fadings} library of \textit{tikz} \cite{tikz-fadings} is loaded automatically by the \texttt{vignette} library. Amongst others, the fadings \texttt{west}, \texttt{east}, \texttt{north}, and \texttt{south} are defined inside the \texttt{fadings} library.

The \texttt{vignette} library adds some more fadings called \texttt{semi west}, \texttt{semi east}, \texttt{semi north}, and \texttt{semi south}. These fadings are much \textit{weaker} than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30] (0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}

\textbf{Comparison of the Fadings}

<table>
<thead>
<tr>
<th>west</th>
<th>east</th>
</tr>
</thead>
<tbody>
<tr>
<td>north</td>
<td>south</td>
</tr>
<tr>
<td>semi west</td>
<td>semi east</td>
</tr>
<tr>
<td>semi north</td>
<td>semi south</td>
</tr>
</tbody>
</table>

\texttt{/tcb/vig/fade in}={\textit{(style)}}

Sets the four style options \texttt{/tcb/vig/north style} \cite{tcb/vig/north style}, \texttt{/tcb/vig/south style} \cite{tcb/vig/south style}, \texttt{/tcb/vig/east style} \cite{tcb/vig/east style}, and \texttt{/tcb/vig/west style} \cite{tcb/vig/west style} such that the paths fade from outside to inside.
\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade in=blue}
\end{tikzpicture}

\texttt{\textbackslash tcb/vig/fade out\{\textit{style}\}}

(style, default white)

Sets the four style options \texttt{/tcb/vig/north style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/south style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/east style \textsuperscript{P.\,279}}, and \texttt{/tcb/vig/west style \textsuperscript{P.\,279}} such that the paths fade from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}

\texttt{\textbackslash tcb/vig/semi fade in\{\textit{style}\}}

(style, default white)

Sets the four style options \texttt{/tcb/vig/north style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/south style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/east style \textsuperscript{P.\,279}}, and \texttt{/tcb/vig/west style \textsuperscript{P.\,279}} such that the paths fade weak from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade out=blue}
\end{tikzpicture}

\texttt{\textbackslash tcb/vig/semi fade out\{\textit{style}\}}

(style, default white)

Sets the four style options \texttt{/tcb/vig/north style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/south style \textsuperscript{P.\,278}}, \texttt{/tcb/vig/east style \textsuperscript{P.\,279}}, and \texttt{/tcb/vig/west style \textsuperscript{P.\,279}} such that the paths fade weak from inside to outside.
14.5 Vignette as Underlay

This puts a \texttt{tcbvignette} with the given \texttt{⟨options⟩} as /tcb/underlay to a \texttt{tcolorbox}. The dimensions of the \textit{vignette} are matched to the dimensions of the \texttt{tcolorbox}. For example, /tcb/leftrule is used as /tcb/vig/west size. Also, /tcb/colframe is used as /tcb/vig/raised color. For a \texttt{/tcb/breakable} \texttt{tcolorbox}, the \textit{vignette} is also been broken. Alternatively, \texttt{tcbvignette} could be used directly inside an \texttt{/tcb/underlay} with appropriate settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners,  
colback=green!10,colframe=green!50!black,  
boxrule=2mm,titlerule=0mm,  
title=My title,center title,fonttitle=\bfseries,  
underlay vignette]  
This is a tcolorbox.  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt,  
colback=blue!10,colframe=blue,boxrule=2mm,  
underlay vignette={size=1.5mm}]  
This is a tcolorbox.  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners,  
colframe=red,interior hidden,boxrule=2mm,  
colupper=white,center upper,fontupper=\bfseries,  
underlay vignette]  
This is a tcolorbox.  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners,  
colback=red!50!yellow,frame hidden,boxrule=2mm,  
underlay vignette={color from=red!50!yellow to white,  
draw method=clipped,size=2.1mm}]  
This is a tcolorbox.  
\end{tcolorbox}

\tcbox[enhanced,sharp corners,colback=red!10,colframe=red]  
{Test}

\tcbox[enhanced,sharp corners,colback=red!10,colframe=red,  
underlay vignette]{Test}
This is a special style derived from \texttt{/tcb/underlay vignette} \cite{tcb282}, where the frame color is shaded to create a soft raised frame impression.

\begin{tcolorbox}[enhanced,sharp corners, colback=green!10, colframe=green!50!black, size=small,boxrule=2mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, underlay raised shading vignette] This is a tcolorbox. \end{tcolorbox}

This style gives a similar effect as \texttt{/tcb/underlay raised shading vignette}, but a path fading is used here. Different optical impression are very previewer-dependent.

\begin{tcolorbox}[enhanced,sharp corners, colback=green!10, colframe=green!50!black, size=small,boxrule=2mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, underlay raised fading vignette] This is a tcolorbox. \end{tcolorbox}

This is a special style derived from \texttt{/tcb/underlay vignette} \cite{tcb282}, where the frame color is shaded into the interior color.

\begin{tcolorbox}[enhanced,sharp corners,frame hidden, colback=green!10, colframe=green!50!black, size=small,boxrule=2mm,titlerule=0mm, underlay shade in vignette] This is a tcolorbox. \end{tcolorbox}
14.6 Vignette as Finish

\begin{tcolorbox}[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,
finish vignette={size=3mm}]{pink_marble.png}

\begin{tcolorbox}[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,
finish raised fading vignette={size=3mm}]{pink_marble.png}
This puts a `\texttt{tcbvignette}` \textsuperscript{P.275} with the given \texttt{(options)} as `\texttt{/tcb/finish}` \textsuperscript{P.201} to a `\texttt{tcolorbox}` \textsuperscript{P.12}. The default style settings fade the box into white from inside to outside. Note that `\texttt{/tcb/vig/over node}` \textsuperscript{P.277} is used here. `\texttt{/tcb/vig/over node offset}` \textsuperscript{P.277} can be adapted to overlap the box more or less. The fade color can be set using `\texttt{/tcb/vig/base color}` \textsuperscript{P.279}.

```
\begin{tcolorbox}[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\textbf{series},
finish fading vignette={size=2mm}]
This is a tcolorbox.
\end{tcolorbox}
```

```
\begin{tcolorbox}[colback=blue!50!black,size=small,
title=Example]
\tcbincludegraphics[blankest,width=3cm,
finish fading vignette={size=3mm}]{pink_marble.png}
\end{tcolorbox}
```
\begin{tcbitemize}
\raster columns=3,bicolor,
\raster equal height,sharp corners,boxrule=2mm,
\colframe=red,colback=yellow!5,colbacklower=yellow!25!red!20
\tcbitem A
\tcbitem[underlay vignette] B
\tcbitem[underlay=\tcbvignette\{inside node=interior, \lowered color=red,\size=1mm\}] C
\tcbitem[underlay vignette, \underlay=\tcbvignette\{inside node=interior, \lowered color=red,\size=1mm\}] D
\tcbitem[boxrule=3mm,underlay vignette=\{size=2mm\}, \underlay=\tcbvignette\{inside node=interior, \lowered color=red,\size=1mm\}] E
\tcbitem[underlay raised shading vignette] F
\tcbitem[underlay raised shading vignette, \underlay=\tcbvignette\{inside node=interior, \lowered color=red,\size=1mm\}] G
\tcbitem[title=H1,underlay=\tcbvignette\{inside node=interior, \lowered color=red,\size=1mm\},finish vignette] H2
\tcbitem[boxrule=0.25mm,colback=red!30,finish vignette] I1 \tcblower I2
\tcbitem[title,colback=red!30,finish raised fading vignette] J1 \tcblower J2
\tcbitem[boxrule=1mm,underlay=\tcbvignette\{inside node=interior, \raised color=red,\size=1mm\}] K
\tcbitem[boxrule=1mm,title=L1,underlay=\tcbvignette\{inside node=title, \lowered color=red,\size=0.5mm\}] L2
\end{tcbitemize}
15 Library \texttt{raster}

The library is loaded by a package option or inside the preamble by:

\begin{tcbelement}
\cbuselibrary{raster}
\end{tcbelement}

15.1 Concept of Rasters

A \textit{raster} is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the \texttt{matrix} construct of \LaTeX, but it differs in many aspects.

In principle, \texttt{tcolorbox}s are arranged in rows and columns when put inside a \texttt{tcbraster} environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a \textit{raster} is not restricted to a single page but may break into an arbitrary series of pages.


Nine Boxes.


15.2 Macros of the Library

\begin{tcbraster}[(options)]
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}[raster columns=2, raster equal height=rows,
  size=small, colframe=red!50!black, colback=red!10!white, colbacktitle=red!50!white,
  title={Box \thetcbrasternum}]
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcbraster}

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \emph{options} are used to control the raster parameters and to set the properties for the enclosed boxes.

- The \emph{raster} is only allowed to contain a series of \texttt{tcolorbox} environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit} can also be added. Boxes created with \texttt{tcbox} are not reasonable here, but may be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of whitespace. Especially, do not use \texttt{\\;} or \texttt{\par} to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\thetcbrasternum} may be used inside a box to access this number.
This is a special case of a `tcbraster` \cite{P.289} with the given \textit{(options)}.

- Here, the enclosed boxes are created using \textit{\texttt{\textbackslash tcbitem}}.
- There has to be at least one \textit{\texttt{\textbackslash tcbitem}}.
- One cannot use anything else than \textit{\texttt{\textbackslash tcbitem}} to add something to the \textit{raster}.

This leads to a very compact syntax.

\begin{tcbitemize}[raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# \texttt{\textbackslash thetcbrasternum}}]
\textit{\texttt{\textbackslash tcbitem}} First box
\textit{\texttt{\textbackslash tcbitem}} Second box
\textit{\texttt{\textbackslash tcbitem}} This is a box with a second line
\textit{\texttt{\textbackslash tcbitem}}[colback=yellow,colbacktitle=yellow!50!black] Another box
\textit{\texttt{\textbackslash tcbitem}} A box again
\end{tcbitemize}

\begin{center}
\begin{tabular}{|c|c|}
\hline
Box \# 1 & Box \# 2 \\
First box & Second box \\
\hline
Box \# 3 & Box \# 4 \\
This is a box with a second line & Another box \\
\hline
Box \# 5 & \\
A box again & \\
\hline
\end{tabular}
\end{center}

\texttt{tcbitemize} has more restrictions than \texttt{tcbraster} \cite{P.289}. Especially, the \texttt{/tcb/capture} \cite{P.97} mode has to be \texttt{minipage}. For example, \texttt{/tcb/fit} \cite{P.424} cannot be used safely. If \texttt{/tcb/fit} \cite{P.424} should be used, turn over to \texttt{tcbraster} \cite{P.289}.

\begin{tcbitemize}[\textit{(options)}]
\item Used inside \textit{\texttt{tcbitemize}} to create a new \texttt{tcolorbox} \cite{P.12} with the given \textit{(options)}.
\end{tcbitemize}
This is a convenience environment which combines a `tcolorbox` with an embedded `tcbraster`. The `box options` are given to the outer `tcolorbox`, while the `raster options` are given to the embedded `tcbraster`. This environment is especially useful for rasters inside rasters.

\begin{tcboxedraster}
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcboxedraster}

\begin{tcbraster}
\begin{tcolorbox}One\end{tcolorbox}
\begin{tcolorbox}Two\end{tcolorbox}
\begin{tcolorbox}Three\end{tcolorbox}
\begin{tcolorbox}Four\end{tcolorbox}
\begin{tcolorbox}Five\end{tcolorbox}
\begin{tcolorbox}Six\end{tcolorbox}
\begin{tcolorbox}Seven\end{tcolorbox}
\end{tcbraster}
This is a convenience environment which combines a \texttt{tcolorbox} with an embedded \texttt{tcbitemize}. The \texttt{(box options)} are given to the outer \texttt{tcolorbox}, while the \texttt{(raster options)} are given to the embedded \texttt{tcbitemize}. This environment is especially useful for rasters inside rasters.

\begin{tcboxeditemize}
\begin{tcbraster}[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# \texttt{\thetcbrasternum}}]
\tcbrasteritem[colback=yellow!10,fonttitle=\textbf, title=Boxed Itemize]
First box
\tcbrasteritem\textbf{This is a box\textbackslash{} with a second line}
\tcbrasteritem\textbf{Another box}
\tcbrasteritem\textbf{A box again}
\end{tcbraster}
\end{tcboxeditemize}
15.3 Option Keys of the Library

\texttt{/tcb/raster columns=\langle number \rangle}

(no default, initially 2)

Sets the \langle number \rangle of columns for a \emph{raster}.

\begin{tcbitemize}[raster columns=3, size=small,colframe=red!50!black, colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster columns=4, size=small,colframe=blue!50!black, colback=blue!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

\texttt{/tcb/raster rows=\langle number \rangle}

(no default, initially 2)

Sets the \langle number \rangle of rows for a \emph{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} \textsuperscript{P.295} to a value greater than \texttt{0pt}. Then, it defines the number of rows per given height.

\texttt{/tcb/raster width=\langle length \rangle}

(no default, initially \texttt{\linewidth})

Sets the total raster width to the given \langle length \rangle. \texttt{/tcb/raster left skip} \textsuperscript{P.296} and \texttt{/tcb/raster right skip} \textsuperscript{P.296} are part of the total width. Note that both skip values are not changed by this option.

\begin{tcbitemize}[raster width=\texttt{\linewidth}/2, size=small,colframe=red!50!black, colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
\texttt{/tcb/raster width flush left=(length)} \hspace{1cm} (style, no default)

Sets the total \texttt{/tcb/raster width} \footnote{P.293} to \texttt{\linewidth} and adapts \texttt{/tcb/raster left skip} \footnote{P.296} and \texttt{/tcb/raster right skip} \footnote{P.296} to place the raster on the left hand side with a visual width of the given \texttt{(length)}.

\begin{tcbitemize}
\item[raster width flush left=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

Note that the results of \texttt{/tcb/raster width} \footnote{P.293} and \texttt{/tcb/raster width flush left} look identical, but differ on technical side since the later always fills the available \texttt{\linewidth}.

\texttt{/tcb/raster width center=(length)} \hspace{1cm} (style, no default)

Sets the total \texttt{/tcb/raster width} \footnote{P.293} to \texttt{\linewidth} and adapts \texttt{/tcb/raster left skip} \footnote{P.296} and \texttt{/tcb/raster right skip} \footnote{P.296} to center the raster with a visual width of the given \texttt{(length)}.

\begin{tcbitemize}
\item[raster width center=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster width flush right=(length)} \hspace{1cm} (style, no default)

Sets the total \texttt{/tcb/raster width} \footnote{P.293} to \texttt{\linewidth} and adapts \texttt{/tcb/raster left skip} \footnote{P.296} and \texttt{/tcb/raster right skip} \footnote{P.296} to place the raster on the right hand side with a visual width of the given \texttt{(length)}.

\begin{tcbitemize}
\item[raster width flush right=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
/tcb/raster height=⟨length⟩  (no default, initially 0pt)
Sets the raster height per /tcb/raster rows\textsuperscript{P.293} to the given \langle length\rangle. This forces an appropriate height for the enclosed boxes. /tcb/raster before skip and /tcb/raster after skip are not part of this calculation. If the \langle length\rangle is set to 0pt, this feature is deactivated.

\begin{tcbitemize}
  \begin{tcbitemize}
    \item \texttt{raster height=4cm, raster rows=2,}
    \item \texttt{size=small, colframe=red!50!black, colback=red!10!white}
  \end{tcbitemize}
  \item One
  \item Two
  \item [enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }]
  \item Three
  \item Four
  \item Five
\end{tcbitemize}

/tcb/raster before skip=⟨glue⟩  (no default, initially 2mm)
Space of the given \langle glue\rangle is inserted vertically before the raster. This space is discardable.

/tcb/raster after skip=⟨glue⟩  (no default, initially 2mm)
Space of the given \langle glue\rangle is inserted vertically after the raster. This space is discardable.

/tcb/raster equal skip=⟨length⟩  (style, no default)
Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip\textsuperscript{P.296}, and /tcb/raster row skip\textsuperscript{P.296} to the same \langle length\rangle value.

\begin{tcbitemize}
  \begin{tcbitemize}
    \item \texttt{raster equal skip=4mm,}
    \item \texttt{size=small, colframe=red!50!black, colback=red!10!white}
  \end{tcbitemize}
  \item One
  \item Two
  \item Three
  \item Four
\end{tcbitemize}
\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster row skip=0pt, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted horizontally left of the raster.

Space of the given \langle length \rangle is inserted horizontally right of the raster.

Space of the given \langle length \rangle is inserted horizontally between the columns.

Space of the given \langle length \rangle is inserted vertically between the rows.
\begin{tcbitemize}[raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

One \hspace{2cm} Two \hspace{2cm} Three

\begin{tcbitemize}[raster valign=top, raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=center, raster columns=3, size=small,colframe=blue!50!black,colback=blue!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=bottom, raster columns=3, size=small,colframe=green!50!black,colback=green!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

One \hspace{2cm} Two \hspace{2cm} Three

One \hspace{2cm} Two \hspace{2cm} Three

One \hspace{2cm} Two \hspace{2cm} Three
\texttt{/tcb/raster equal height=\langle type \rangle} (default \texttt{all}, initially \texttt{none})

Puts the enclosed boxes into a common /tcb/equal height group \( ^{[61]} \). The \( \langle \text{id} \rangle \) of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group \( ^{[62]} \).

Feasible values for \( \langle \text{type} \rangle \) are:

- \texttt{none}: no equal height setting,
- \texttt{rows}: all boxes in a row are set to equal height,
- \texttt{all}: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One
\Huge Two
Three
Four

\begin{tcbitemize}[raster equal height, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One
\Huge Two
Three
Four

\texttt{/tcb/raster equal height group=\langle id \rangle} (no default)

Overwrites the automatically chosen id with the given \( \langle \text{id} \rangle \). If this is used to share a common height between the raster and another raster or box, the /tcb/raster equal height option should be set to \texttt{all}.

\tcbset\{size=small,colframe=red!50!black,colback=red!10!white\}
\begin{tcolorbox}[equal height group=raster-manual-id]
A single box
\end{tcolorbox}
\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
\tcbitem One
\tcbitem \Huge Two
\end{tcbitemize}

A single box
One
\Huge Two
Enforces the raster size computations onto the enclosed boxes. If set to \texttt{false}, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem[add to width=-3cm] Three
\tcbitem[add to width=-3cm] Four
\tcbitem[add to width=-3cm] Five
\tcbitem[add to width=3cm] Six
\end{tcbitemize}

\begin{tcbitemize}
\item One
\item Two
\item Three
\item Four
\item Five
\item Six
\end{tcbitemize}

Sets all raster settings back to their default values. Note that \texttt{/tcb/reset} \textsuperscript{P.109} does not execute this option. Style settings like \texttt{/tcb/raster odd column} etc. are not touched by \texttt{/tcb/raster reset}.

15.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a \textit{raster}. Note that such style definitions are not removed by \texttt{/tcb/reset} \textsuperscript{P.109} or \texttt{/tcb/raster reset}. The style definitions are used in the order given below.

\texttt{/tcb/raster every box} (style)

This style is used for every box.

\texttt{/tcb/raster odd column} (style)

This style is used for every box in an odd column.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster odd column/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster even column} (style)

This style is used for every box in an even column.

\texttt{/tcb/raster column n} (style)

This style is used for every box in the \textit{n}-th column. \textit{n} has to be replaced by a number.

\texttt{/tcb/raster odd row} (style)

This style is used for every box in an odd row.
This style is used for every box in an even row.

This style is used for every box in the $m$-th row. $m$ has to be replaced by a number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster row 2/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

This style is used for every box with an odd number.

This style is used for every box with an even number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster even number/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\tcitem Five
\tcitem Six
\end{tcbitemize}

This style is used for the box in the $m$-th row and $n$-th column. $m$ and $n$ have to be replaced by numbers.

This style is used for the box with number $n$. $n$ has to be replaced by a number.
15.5 Combining Columns or Rows

\texttt{/tcb/raster multicolumn=(number)} (no default, initially unset)

This option has to be set inside the option list of a \texttt{tcolorbox} \(^{\text{P.12}}\) inside a \texttt{tcb raster} \(^{\text{P.289}}\) or inside \texttt{\tcbitem} \(^{\text{P.290}}\) inside \texttt{tcbitemize} \(^{\text{P.290}}\). It merges the given \texttt{(number)} of boxes into one single box on the same line. The resulting box gets the \texttt{\thetcbrasternum} of the first box. If there are not enough boxes available on the current line, this option is ignored and a warning is given.

\begin{verbatim}
\begin{tcbitemize}
[raster equal height=rows, raster columns=3, title=\thetcbrasternum, colframe=red!50!black, colback=red!10!white]
  \tcbitem [colframe=blue!50!black, colback=blue!10!white, raster multicolumn=1] multicolumn=1
  \tcbitem
  \tcbitem [colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2] multicolumn=2
  \tcbitem
  \tcbitem [colframe=blue!50!black, colback=blue!10!white, raster multicolumn=3] multicolumn=3
  \tcbitem
  \tcbitem [colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2] multicolumn=2
\end{tcbitemize}
\end{verbatim}

\begin{table}
\centering
\begin{tabular}{|c|c|c|}
\hline
1 & 2 & 3 \\
\hline
multicolumn=1 & & \\
\hline
4 & 6 & \\
\hline
multicolumn=2 & & \\
\hline
7 & \\
\hline
multicolumn=3 & & \\
\hline
10 & 11 & \\
\hline
multicolumn=2 & \\
\hline
\end{tabular}
\end{table}

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This option has to be set inside the option list of \texttt{tcolorbox} \textsuperscript{P.12} inside a \texttt{tcbiraster} \textsuperscript{P.289} or inside \texttt{tcbitem} \textsuperscript{P.290} inside \texttt{tcbitemize} \textsuperscript{P.290}. This option not really merges boxes, but simply sizes the current box to fit the space of \langle \textit{number} \rangle rows.

\begin{tcbitemize}[raster rows=3, raster columns=3, raster height=6cm, raster every box/.style={colframe=red!50!black, colback=red!10!white}]
\tcbitem \\
\tcbitem \\
\tcbitem [colframe=blue!50!black, colback=blue!10!white, raster multirow=2]  \\
\begin{tcbitemize}[raster multicolumn=2, raster multirow=2, blankest]
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\tcbitem  \\
\end{tcbitemize}
\end{tcbitemize}

\texttt{/tcb/raster multirow=\textit{number}} (no default, initially unset)
For rasters without fixed \texttt{tcb/raster height} \textsuperscript{P.295}, \texttt{tcb/raster multirow} \textsuperscript{P.302} cannot be used. Note that \texttt{tcb/textheight} \textsuperscript{P.151} also cannot be used like in the previous example.

But, with combination of \texttt{tcb/raster equal height} \textsuperscript{P.298} and \texttt{tcb/space to} \textsuperscript{P.59}, a similar effect can be created:

\begin{tcbitemize}[raster columns=3,raster equal height=rows,\raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem[colframe=blue!50!black,colback=blue!10!white]
\lipsum[2]
\tcbitem[raster multicolumn=2,blankest,space to=\myspace]
\begin{tcbitemize}[raster columns=2]
\tcbitem
This is a box of the inner raster.
\tcbitem
\tcbitem[height=\myspace]
\tcbitem[height=\myspace]
\end{tcbitemize}
\end{tcbitemize}

15.6 Rasters inside Rasters

A raster inside a raster cannot be used directly, because a raster can only contain a tcolorbox or something derived from a tcolorbox. So, a raster can be put inside a tcolorbox inside a raster.

Some examples for such constructions can be found at tcboxedraster \(^\text{P.291}\), /tcb/raster multicolumn \(^\text{P.301}\), /tcb/raster multirow \(^\text{P.302}\).

15.6.1 Raster Setup

The intermediating tcolorbox \(^\text{P.12}\) can be made invisible by using /tcb/blankest \(^\text{P.243}\).

\begin{tcbraster}[raster equal height=rows, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\begin{tcolorbox}[blankest]
\begin{tcbraster}[raster columns=1]
\begin{tcolorbox}One\end{tcolorbox}
\begin{tcolorbox}Two\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}
\begin{tcolorbox}raster+tcolorbox+raster\end{tcolorbox}
\end{tcbraster}
\begin{tcbraster}[raster equal height=rows, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\begin{tcboxedraster}[raster columns=1]{blankest}
\begin{tcolorbox}One\end{tcolorbox}
\begin{tcolorbox}Two\end{tcolorbox}
\end{tcbitemize+tcbitem+tcbitemize
\end{tcbraster}
15.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height` \( \rightarrow \) \textit{P.295}, the height of boxes is available by `/tcbtextheight` \( \rightarrow \) \textit{P.151}. This can be used to size deeper layered boxes/rasters.

- For boxes/rasters layed out using `/tcb/raster equal height` \( \rightarrow \) \textit{P.298}, space can be distributed by `/tcb/space to` \( \rightarrow \) \textit{P.59}. It can take several compilations until all spaces are distributed correctly.

\begin{tcbitemize}
  \[\text{raster rows=2, raster height=6cm,}
  \text{raster every box/.style={colframe=red!50!black, colback=red!10!white}}\]
  \begin{tcbitemize}
    \[\text{raster columns=1, raster rows=2, raster height=}`tcbtextheight\]
    \item One
    \item Two
  \end{tcbitemize}
  \item This is a fixed height box.
  \item Three
  \item Four
\end{tcbitemize}
\begin{tcbitemize}[raster columns=4,raster rows=4,raster height=0.8\linewidth, rasterevery box/.style={size=small,beamer, colframe=blue!75!yellow,colback=red!75!yellow!20, center title,title=Box}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\tcbitem[raster multirow=2,blankest]
\begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
\tcbitem Twelve
\tcbitem Eleven
\end{tcbitemize}
\tcbitem[raster multirow=2,raster multicolumn=2, colframe=red!75!yellow,colback=blue!75!yellow!20]
This is an example with fixed height boxes.
\tcbitem[raster multirow=2,blankest]
\begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
\tcbitem Five
\tcbitem Six
\end{tcbitemize}
\tcbitem Ten
\tcbitem Nine
\tcbitem Eight
\tcbitem Seven
\end{tcbitemize}
One

This box will adapt its height.


This is a flexible height box.

One

This box will adapt its height.
16 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

16.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in \LaTeX parallel. The difference is the underlying \LaTeX package which does the core job for displaying a listing. So, typically, you need just one of these libraries. If you do not have a clue which one of them you should use and you are using \texttt{pdflatex}, you should take \texttt{listingsutf8}. If you are using \texttt{xelatex} or \texttt{lualatex}, you should take \texttt{listings} as \texttt{xelatex} and \texttt{lualatex} are not compatible with \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the /tcb/reset behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

16.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} \cite{listings} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{listings}
\end{verbatim}

This also loads the package \texttt{listings} \cite{listings}.

The /tcb/listing engine \cite{listings} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

16.1.2 Loading \texttt{listingsutf8}

This library is not needed (and troublesome) when using Xe\LaTeX or Lua\LaTeX.

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} \cite{listingsutf8} by loading the library variant \texttt{listingsutf8}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1}\% optional; ‘latin1’ is the default.
\end{verbatim}

This also loads the library \texttt{listings} and the packages \texttt{listings} \cite{listings} and \texttt{listingsutf8} \cite{listingsutf8}.

The /tcb/listing engine \cite{listings} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
16.1.3 Loading \texttt{minted}

This library uses the package \texttt{minted} \cite{12} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{quote}
\verb|\tcbuselibrary{minted}|
\end{quote}

This also loads the package \texttt{minted} \cite{12}.

\begin{quote}
The \texttt{minted} package uses the external tool \texttt{Pygments} \cite{14} to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \cite{12} and \cite{14}. The \texttt{tcolorbox} library \texttt{\textcolor[rgb]{0.5,0.5,0.5}{minted}} does not work, if the package \texttt{minted} \cite{12} does not work.
\end{quote}

The /tcb/listing engine \textsuperscript{P.321} is set to \texttt{minted} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{quote}
\verb|\tcbset{listing engine=minted}|
\end{quote}

16.2 Common Macros of the Libraries

\begin{verbatim}
\begin{tcblisting}{⟨options⟩}
⟨environment content⟩
\end{tcblisting}
\end{verbatim}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. Controlled by the given \texttt{⟨options⟩}, the environment content is typeset normally and/or as a listing. Furthermore, the \texttt{⟨options⟩} control appearance and functions of the \texttt{tcolorbox}. By default, the listing is interpreted as a \texttt{LaTeX} listing.

\begin{verbatim}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \texttt{LaTeX} example which displays the text as source code
and in compiled form.
\end{tcblisting}
\end{verbatim}

This is a \texttt{LaTeX} example which displays the text as source code
and in compiled form.
This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

This box is as wide as needed (listing only !!)

```latex
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcblisting}
```
Saves the environment content to a file which is named by the key value of `listing file`. Later, this file can be loaded by `\tcbinputlisting` or `\tcbuselistingtext` or `\tcbuselistinglisting`.

\begin{tcboutputlisting}
\begin{environment content}
\end{environment content}
\end{tcboutputlisting}

\tcbinputlisting{⟨options⟩}
Creates a colored boxed based on a `tcolorbox`. The text content is read from a file named by the key value of `listing file`. Apart from that, the function is equal to that of `tcblisting` \cite{P.310}.

\begin{tcbinputlisting}
This \textbf{text} is written to a standardized file for later usage.
\end{tcbinputlisting}

\tcbinputlisting{colback=red!5!white,colframe=red!75!black,text only}
\tcbinputlisting{colback=green!5,colframe=green!75!black,listing only}

\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}

\tcbuselistingtext
Loads text from a file named by the key value of `listing file`.

\begin{tcbuselistingtext}
\end{tcbuselistingtext}

\tcbuselistinglisting
Typesets text as listing from a file named by the key value of `listing file`.

\begin{tcbuselistinglisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbuselistinglisting}

\tcbusetemplisting
Typesets text as listing from a temporary file which was written by `tcbwritetemp` \cite{P.129}. 

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See Section 23.4 on page 452 and Section 23.5 on page 454 for more elaborate methods to create new environments and commands.

If a new sort of \texttt{tcblisting} environments should be created with one optional argument only, one is highly recommended to use \texttt{\textbackslash DeclareTCBListing} or \texttt{\textbackslash NewTCBListing} instead of \texttt{\textbackslash newtcblisting} to avoid content scanning problems.

\texttt{\textbackslash newtcblisting}((\textit{init options})\{\textit{name}\}\{\textit{number}\}\{\textit{default}\}\{\textit{options}\})

Creates a new environment \textit{name} based on \texttt{tcblisting}. Basically, \texttt{\textbackslash newtcblisting} operates like \texttt{\textbackslash newenvironment}. This means, the new environment \textit{name} optionally takes \textit{number} arguments, where \textit{default} is the default value for the optional first argument. The \{\textit{options}\} are given to the underlying \texttt{tcblisting}. Note that \texttt{/tcb/savedelimiter} is set to the given \textit{name} automatically. The \{\textit{init options}\} allow setting up automatic numbering, see Section 5 from page 111.

\begin{Verbatim}
\texttt{\textbackslash newtcblisting}\{mybox\}\{\%
\begin{verbatim}
colback=red!5!white, 
colframe=red!75!black
\end{verbatim}
\texttt{\textbackslash begin}\{mybox\}
This is my \LaTeX\ box.
\texttt{\textbackslash end}\{mybox\}
\end{Verbatim}

\texttt{This is my \LaTeX\ box.}

\begin{Verbatim}
\texttt{\textbackslash newtcblisting}\{mybox\}[1]\{\%
\begin{verbatim}
colback=red!5!white, 
colframe=red!75!black, 
fonttitle=\bfseries, 
title=#1
\end{verbatim}
\texttt{\textbackslash begin}\{mybox\}\{\textit{Listing Box}\}
This is my \LaTeX\ box.
\texttt{\textbackslash end}\{mybox\}
\end{Verbatim}

\texttt{Listing Box}

\begin{Verbatim}
\texttt{\textbackslash newtcblisting}\{mybox\}[2]\{\%
\begin{verbatim}
colback=red!5!white, 
colframe=red!75!black, 
fonttitle=\bfseries, 
title=#2,#1
\end{verbatim}
\texttt{\textbackslash begin}\{mybox\}\{\textit{listing only}\}
{\textit{Listing Box}}
This is my \LaTeX\ box.
\texttt{\textbackslash end}\{mybox\}
\texttt{\textbackslash bigskip}
\texttt{\textbackslash begin}\{mybox\}\{\textit{listing side text}\}
{\textit{Listing Box}}
This is my \LaTeX\ box.
\texttt{\textbackslash end}\{mybox\}
\end{Verbatim}

\texttt{Listing Box}

\texttt{Listing Box}

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Definition in the preamble:

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}

\renewtcblisting[init options]{(name)}{(number)}{(default)}{(options)}

Operates like \newtcblisting \textsuperscript{P.313}, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.
\newtcbinputlisting[(init options)]\{\langle name\rangle}\{\langle number\rangle}\{\langle default\rangle}\{\langle options\rangle\}

Creates a new macro \langle name\rangle based on \tcbinputlisting. Basically, \newtcbinputlisting operates like \newcommand. The new macro \langle name\rangle optionally takes \langle number\rangle arguments, where \langle default\rangle is the default value for the optional first argument. The \langle options\rangle are given to the underlying tcbinputlisting. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 111.

\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][%
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1]

\mylisting[before upper=\textit{This is the included file content:)\}
\{\jobname.tcbtemp\}

\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1]

\mylisting[before upper=\textit{This is the included file content:)\}
\{\jobname.tcbtemp\}

\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1]

\mylisting[before upper=\textit{This is the included file content:)\}
\{\jobname.tcbtemp\}

\renewtcbinputlisting[(init options)]\{\langle name\rangle}\{\langle number\rangle}\{\langle default\rangle}\{\langle options\rangle\}

Operates like \newtcbinputlisting, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
16.3 Option Keys of the \textcolor{cyan}{listings} Library

\texttt{/tcb/listing\_options=(key list)} \hspace{1cm} (no default, initially \texttt{style=tcblatex})

Sets the options from the package \texttt{listings [6]} which are used during typesetting of the listing. For \LaTeX\ listings, there is a predefined \texttt{listings} style named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm, listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}} This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here. \end{tcblisting}

All \textit{listings} options removed.

\begin{tcblisting}{no listing options} All \textit{listings} options removed. \end{tcblisting}

\texttt{/tcb/listing\_style=(style)} \hspace{1cm} (no default, initially \texttt{tcblatex})

Abbreviation for \texttt{listing\_options={style=...}}. This key sets a \texttt{(style)} for the \texttt{listings} package, see [6]. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex} Here, we use the predefined style. \end{tcblisting}

Here, we use the predefined style.
/tcb/listing inputencoding=(encoding) \[no default, initially \texttt{\inputencodingname}\]
Sets the input encoding value for the predefined listing style \texttt{tcblatex} and \texttt{tcbdocumentation} from the library \texttt{documentation}. The initial value is derived from the package \texttt{inputenc} if used.

/tcb/listing remove caption=true|false \[default true, initially true\]
If set to true, some part of the caption building code of the \texttt{listings} package is silenced to prevent some unwanted interaction with the \texttt{hyperref} package resulting in additional vertical space. If set to false, the \texttt{listings} package code is kept unchanged. Note that listings outside \texttt{tcblisting \[P.310\]} and \texttt{\tcbinputlisting \[P.312\]} are always processed normally. Typically, a user is not expected to use this key at all.

/tcb/every listing line=(text) \[no default, initially unset/empty\]
Inserts some \texttt{(text)} to the begin of every line of a listing. Note that this is a hack of the \texttt{listings} package code. This may become unusable or superfluous in the future.

\begin{commandshell}
\textcolor{red}{\small\texttt{\bfseries root \$>}}
ls -al
cd /usr/lib
\end{commandshell}

\texttt{root \$> ls -al}
\texttt{root \$> cd /usr/lib}

See further options in Section 16.6 on page 321.

\begin{commandshell}
\textcolor{red}{\small\texttt{\bfseries root \$>}}
ls -al
cd /usr/lib
\end{commandshell}

\texttt{root \$> ls -al}
\texttt{root \$> cd /usr/lib}

For an combined example of using \texttt{\lstinline} inside a \texttt{tcolorbox}, see \texttt{\DeclaFIGTotalTBox \[P.450\].
16.4 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is not needed (and troublesome) when using Xe\LaTeX{} or Lua\LaTeX{}.

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 16.3 on page 316 are applicable.

\texttt{/tcb/listing utf8=⟨one-byte-encoding⟩} \hspace{1em} (style, no default, initially \texttt{latin1})

Abbreviation for using \texttt{/tcb/listing inputencoding} \cite{page 317} together with UTF-8 support from the package \texttt{listingsutf8} \cite{11}. This option is available only for the library variant \texttt{listingsutf8}. The \texttt{⟨one-byte-encoding⟩} is one of the applicable encodings from \cite{11}, e.g. \texttt{latin1} which is the default.

Be aware that this means restriction to this specific \texttt{⟨one-byte-encoding⟩}; e.g. \texttt{latin1} comprises umlauts and other accented characters, but not the Euro sign. If you want to use the \texttt{listings} package and «real» UTF-8 source code, then do not use \texttt{listingsutf8} but \texttt{listings} with \texttt{/tcb/listing inputencoding=\texttt{utf8}} and with specific manual hacks for specific UTF-8-encoded characters.

See further options in Section 16.6 on page 321.
16.5 Option Keys of the \texttt{minted} Library

Sets a \texttt{(programming language)} known to \texttt{Pygments} \cite{14}.

\begin{tcblisting}[listing engine=minted,minted style=trac,\
minted language=java,\
\begin{verbatim}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{verbatim}
\end{tcblisting}

Sets the options from the package \texttt{minted} \cite{12} which are used during typesetting of the listing.

\begin{verbatim}
\begin{tcblisting}[listing engine=minted,\
minted style=colorful,\
minted language=java,\
\begin{verbatim}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{verbatim}
\end{tcblisting}
\end{verbatim}

\begin{verbatim}
\begin{tcblisting}[listing engine=minted,\
minted style=colorful,\
minted language=java,\
\begin{verbatim}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{verbatim}
\end{tcblisting}
\end{verbatim}
Sets a \textit{style} known to \texttt{Pygments} \cite{Pygments}. This is independent from \texttt{/tcb/minted options} \cite{P.319}. Note that styles are always applied globally; all following examples will be set in the given \textit{style} until a new style is set. Also note that setting \texttt{\usemintedstyle{\textit{style}}} only once per document is more economic, if all styles in a document are the same. For examples of different styles, see \texttt{/tcb/minted language} \cite{P.319} and \texttt{/tcb/minted options} \cite{P.319}.

See further options in Section 16.6 on the next page.
16.6 Common Option Keys of all Libraries

For the ⟨options⟩ in \texttt{tcblisting} \textsuperscript{\textit{P.310}} respectively \texttt{tcbinputlisting} \textsuperscript{\textit{P.312}} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

\texttt{/tcb/listing engine=⟨engine⟩} (no default)
Sets the ⟨engine⟩ which typesets the listings. Feasible values are
- \texttt{listings}, if library \texttt{listings} or \texttt{listingsutf8} is loaded.
- \texttt{minted}, if library \texttt{minted} is loaded.

\texttt{/tcb/listing file=⟨file name⟩} (no default, initially \texttt{jobname.listing})
Sets the ⟨file name⟩ of the file which is used to save listings.

\texttt{/tcb/listing and text} (no value, initially set)
Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
This is a \LaTeX\ example.

\texttt{/tcb/text and listing} (no value)
Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
This is a \LaTeX\ example.

\texttt{/tcb/listing only} (no value)
Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text only
Typesets the environment content as compiled text.

\begin{tcblisting}{colback=red!5!white, colframe=red!75!black, text only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment=⟨text⟩
Records a comment with ⟨text⟩ as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment \cite{P.325} and /tcb/comment and listing \cite{P.325}.

\begin{tcblisting}{comment={This comment is really only a comment},
colback=red!5!white, colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a \textbf{tcolorbox}.

/tcb/comment only
Typesets only the environment content with the comment text.

\begin{tcblisting}{comment only,
comment={This is a comment.},
colback=red!5!white, colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a comment.

/tcb/image comment={⟨options⟩}{⟨filename⟩}
Uses an image denoted by ⟨filename⟩ as comment for the listing. The image is included by the standard \includegraphics macro with given ⟨options⟩.

\begin{tcblisting}{colback=red!5!white, colframe=red!75!black, listing side comment,
image comment={width=2.5cm}{example-image-a.pdf}, center lower}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/tcbimage comment=⟨filename⟩ (style, no default, initially unset)

Uses an image denoted by ⟨filename⟩ as comment for the listing. The image is included by the \tcbincludegraphics\textsuperscript{P.255} macro. The inclusion can be customized by /tcb/comment style\textsuperscript{P.325}.

! The library \texttt{skins} is needed to apply this option.

\begin{tcblisting}
\begin{verbatim}
\texttt{This is a \LaTeX\ example.}
\end{verbatim}
\end{tcblisting}

\% \tcbuset-library{skins}
\begin{tcblisting}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcblisting}

\tcbPdfComment{⟨filename⟩} (style, default listing file, initially unset)

Uses a PDF file denoted by ⟨filename⟩ as comment for the listing. The image is included by \tcbincludepdf\textsuperscript{P.257} inside a tcbraster\textsuperscript{P.289}. The inclusion can be customized by /tcb/comment style\textsuperscript{P.325}.

! The libraries \texttt{skins} and \texttt{raster} are needed to apply this option.
This is a \LaTeX\ example.
Sets the PDF file name extension for \texttt{/tcb/pdf comment} \textsuperscript{\textit{P.323}} to \texttt{\langle extension\rangle}. Note that \texttt{\langle extension\rangle} always overwrites any actual extension given inside \texttt{/tcb/pdf comment} \textsuperscript{\textit{P.323}}.

Sets the \texttt{\langle options\rangle} for \texttt{/tcb/tcbimage comment} \textsuperscript{\textit{P.323}} and \texttt{/tcb/pdf comment} \textsuperscript{\textit{P.323}}. These are \texttt{tcolorbox} options to customize the colored box drawn around the image(s), also image options encapsulated by \texttt{/tcb/graphics options} \textsuperscript{\textit{P.258}}, and \texttt{tcbraster} \textsuperscript{\textit{P.289}} options for \texttt{/tcb/pdf comment} \textsuperscript{\textit{P.323}}.

Typesets the environment content as listing in the upper part and a given comment in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing, \texttt{\langle This is my comment. It may contain line breaks.\par It can even use the environment content «This is a \LaTeX\ example.»}}
This is a \LaTeX\ example.
\end{tcblisting}

Typesets a given comment in the upper part and the environment content as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing, \texttt{\langle This is my comment.\}}
This is a \LaTeX\ example.
\end{tcblisting}
/tcb/listing side text (style, no value)

Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part. This is a shortcut for setting /tcb/listing and text \textsuperscript{P.321} and /tcb/sidebyside \textsuperscript{P.119}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \TeX\ example.

Note that sidebyside=false has to be added, if the setting of /tcb/listing side text is to be annihilated.

/tcb/text side listing (style, no value)

Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/text and listing \textsuperscript{P.321} and /tcb/sidebyside \textsuperscript{P.119}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \TeX\ example. This is a \LaTeX\ example.

/tcb/listing outside text (no value)

Typesets the environment content side by side as listing in a \texttt{tcolorbox} and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 119.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \TeX\ example.

/tcb/text outside listing (no value)

Typesets the environment content side by side as listing in a \texttt{tcolorbox} and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 119.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \TeX\ example. This is a \LaTeX\ example.
/tcb/listing side comment (style, no value)
Typesets the environment content side by side as listing in the left (upper) part and a
given comment in the right (lower) part. This is a shortcut for setting /tcb/listing and
comment \textsuperscript{P.325} and /tcb/sidebyside \textsuperscript{P.119}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

A

/tcb/comment side listing (style, no value)
Typesets the environment content side by side with a given comment in the left (upper)
part and as listing in the right (lower) part. This is a shortcut for setting /tcb/comment
and listing \textsuperscript{P.325} and /tcb/sidebyside \textsuperscript{P.119}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing,
lefhand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing outside comment (no value)
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given com-
ment outside the box in the right part of the page. Nevertheless, the outside text is treated
as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space
partitioning is done with the side by side options from Section 6 on page 119.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside comment,
righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment outside listing (no value)
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given com-
ment outside the box in the left part of the page. Nevertheless, the outside text is treated
as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space
partitioning is done with the side by side options from Section 6 on page 119.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing,
lefhand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and below the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle}.\footnote{P.43}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/listing above comment

Typesets the environment content as listing in a tcolorbox and a given comment outside and below the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle.\(^{+P.43}\)

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing above* comment

Widely equal to /tcb/listing above comment, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/after.\(^{+P.81}\)

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing above listing

Typesets the environment content as listing in a tcolorbox and a given comment outside and above the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle.\(^{+P.43}\)

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment above listing

Widely equal to /tcb/comment above listing, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/before.\(^{+P.81}\)

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
16.7 Option Keys for Processing and Full Document Examples

A complete \LaTeX{} document including \texttt{\documentclass}, \texttt{\begin{document}} and \texttt{\end{document}} cannot be processed directly by \texttt{tcolorbox}. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a \texttt{/tcb/pdf comment} \textsuperscript{P.323}.

The following example shows how to apply the first method. There already is a file \texttt{tcolorbox-example.tex} and a PDF file \texttt{tcolorbox-example.pdf}. Both of them are input partly by the following:

\begin{verbatim}
\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}

\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
Upper part of my box.
\tcblower
Lower part of my box.
\end{tcolorbox}
\end{document}
\end{verbatim}
I can do this also with a title.
\tcblower
Lower part of my box.
\end{tcolorbox}

Now, we play hide and seek. Where is the lower part?
\tcblower
I'm invisible until you find me.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,lowerbox=invisible, savelowerto=\jobname_ex.tex]
\input{\jobname_ex.tex}
\end{tcolorbox}

Funny settings.
\end{tcolorbox}

This box is filled with an external image.\par
Title and interior are made partly transparent to show the image.
\end{tcolorbox}

This box uses a \textit{boxed title}. The box of the title can be formatted independently from the main box.
\end{tcolorbox}
3.2 Theorem (Summation of Numbers): For all natural number \( n \) it holds:
\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}
\]
(4)

3.3 Theorem (Summation of Numbers): For all natural number \( n \) it holds:
\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}
\]
(4)
/tcb/no process

Removes all processing commands if set before.

/tcb/process code=⟨code⟩

(no default, initially empty)

Adds ⟨code⟩ which is executed during \texttt{\textbackslash cbinputlisting} \textsuperscript{P.312} and \texttt{\textbackslash tcblisting} \textsuperscript{P.310}. At the time of executing the given ⟨code⟩, the listing is already written to \texttt{/tcb/listing} \textsuperscript{P.321}, but the colored box is not constructed yet. Its intended use is to process the listing somehow before displaying. The processing result can be used inside a \texttt{/tcb/comment} \textsuperscript{P.322}. Several /tcb/process code options can be given which are processed in the given order. Typically, ⟨code⟩ is added by using the following styles /tcb/run system command, /tcb/run pdflatex, etc.

To use the further options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.

Anyway, it’s more economic to compile examples independent from the main document and to include them as shown in the previous pages.

/tcb/run system command=⟨system command⟩

(style, no default, initially unset)

Runs a ⟨system command⟩, if the document is compiled with the \texttt{-shell-escape} permission. The current listing file can be accessed as \texttt{//filename@area//filename@base//filename@ext}. This ⟨system command⟩ is added to /tcb/process code.

/tcb/compilable listing

(style, no default)

Sets \texttt{/tcb/listing file} \textsuperscript{P.321} to \texttt{\jobname-listing-⟨counter⟩}.

The default \texttt{/tcb/listing file} \textsuperscript{P.321} setting cannot be used to compile a listing, since the base name equals the \texttt{\jobname} and the included PDF files should be unique. Therefore, to use \texttt{/tcb/run pdflatex} etc., the \texttt{/tcb/listing file} \textsuperscript{P.321} has to be set to a unique value. One may use \texttt{/tcb/compilable listing} for this purpose.

/tcb/run pdflatex=⟨arguments⟩

(style, no default, initially unset)

Issues a \texttt{pdflatex} compilation of the listing with the given ⟨arguments⟩.

- The main document has to be compiled with the \texttt{-shell-escape} permission.
- The /tcb/listing file \textsuperscript{P.321} has to be unique for the listing.
- If the listing has to be compiled twice, add \texttt{run pdflatex} two times to the option list.
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\begin{alertblock}{Integral}
\begin{equation}
\int_1^x \frac{1}{t} \, dt = \ln(x). \tag{1}
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\begin{tcblisting}{enhanced jigsaw, title={PSTricks with pdflatex},fonttitle=bfseries, colframe=red!50!black,colback=yellow!10!white, listing options={style=tcblatex, texcsstyle={\color{red!70!black}}, lower separated=false,middle=0pt, listing side comment,righthand width=4cm, compilable listing, run latex,run dvips,run ps2pdf, pdf comment,freeze pdf, comment style={raster columns=1, graphics options={viewport=0.5in 7.7in 3.5in 10.5in,clip}}}, }
\documentclass{article}
\usepackage{pstricks,multido}
\begin{document}
\psset{unit=3}
\multido{\nHue=0.01+0.01}{100}{
\definecolor{MyColor}{hsb}{\nHue,1,1}
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}
\end{document}
\end{tcblisting}

PSTricks with pdflatex

\documentclass{article}
\usepackage{pstricks,multido}
\begin{document}
\psset{unit=3}
\multido{\nHue=0.01+0.01}{100}{
\definecolor{MyColor}{hsb}{\nHue,1,1}
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}
\end{document}
For most applications, you will like to add /tcb/freeze pdf as option, since the included pdf file is only refreshed, if the source for this file has changed.

/tcb/freeze file=(<file>)
(no default, initially unset)

Observes some <file>, usually the final file produced by /tcb/process code\footnote{P. 333}, /tcb/run system command\footnote{P. 333}, /tcb/run pdflatex\footnote{P. 333}, etc. If the MD5 checksum of the current /tcb/listing file\footnote{P. 321} is unchanged and <file> exists, the processing is skipped and the <file> is kept (frozen). Typically, the style /tcb/freeze pdf can be used for convenience.

/tcb/freeze none
(no default, initially set)

Freeze no file and always execute the given process commands.

/tcb/freeze extension=(<text>)
(style, no default)

Calls /tcb/freeze file with the current /tcb/listing file\footnote{P. 321} stripped with its extension plus <text> as new extension.

/listing file=myfile.tex,
freeze extension=-modified.pdf, \% \rightarrow myfile-modified.pdf is observed

/tcb/freeze pdf
(no value)

Calls /tcb/freeze file with the current /tcb/listing file\footnote{P. 321} stripped with its extension plus .pdf as new extension.

/tcb/freeze png
(no value)

Calls /tcb/freeze file with the current /tcb/listing file\footnote{P. 321} stripped with its extension plus .png as new extension. See the examples for /tcb/run pdflatex\footnote{P. 333} and /tcb/run ps2pdf\footnote{P. 335}.

/tcb/freeze jpg
(no value)

Calls /tcb/freeze file with the current /tcb/listing file\footnote{P. 321} stripped with its extension plus .jpg as new extension.
16.8 Creation of \LaTeX\ Tutorials

The following source code gives a guideline for the creation of \LaTeX\ tutorials. In the next section, a framework for \LaTeX\ exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}

\begin{example}
Here, we use Example 16.1 with a title line.
\end{example}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code only.

Example 16.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

This is a \LaTeX\ example with a numbered heading line which can be referred to.

Here, we see Example 16.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Example 16.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Example 16.3:

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Example 16.3: Another Example with a Heading

Here, we see Example 

Example 16.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

Example 16.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on \pageref{heading3}.

The floating box of the last example is seen as Example 16.4 on page 339.

Example 16.5: Special application

Some \LaTeX\ source code.

Example 16.5: Special application

Some \LaTeX\ source code.

For special cases, the environment \texttt{tcolorbox} with style example can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of \texttt{tcolorbox} options for diversification.
Example 16.6: How to use options (1):
The basic example

\begin{tikzpicture}
  \path[fill=yellow!50!white] (0,0) circle (11mm);
  \path[fill=white] (0,0) circle (9mm);
  \foreach \w/\c in {90/red,210/green,330/blue}
  {\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 16.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

\begin{tikzpicture}
  \path[fill=yellow!50!white] (0,0) circle (11mm);
  \path[fill=white] (0,0) circle (9mm);
  \foreach \w/\c in {90/red,210/green,330/blue}
  {\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 16.8: How to use options (3):
Here, the `tikzpicture` is totally hidden. The `bicolor` skin highlights the output.

\begin{texexptitled}[tikz lower,bicolor,colbacklower=white]
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texexptitled}

Example 16.9: How to use options (4):
The `bicolor` skin also works with side by side mode

\begin{texexptitled}[center lower,listing side text,righthand width=3.5cm,bi
color,colbacklower=white]
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texexptitled}
Example 16.10: How to use options (5):
Putting our picture outside is just a matter of one word.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 16.11: How to use options (6):
The picture may also be put above the listing box.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 16.12: How to use options (7): Our style is easily transformed into a beamerish one.

```latex
begin{tikzpicture}
    \path[fill=yellow!50!white] (0,0) circle (11mm);
    \path[fill=white] (0,0) circle (9mm);
    \foreach \w/\c in {90/red,210/green,330/blue}
        {\path[shading=ball,ball color=\c]
            (\w:1cm) circle (7mm);}
\end{tikzpicture}
```

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16.9 Creation of \LaTeX Exercises

In the following, a guideline is given for the creation of \LaTeX exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file `jobname.records` for automatic processing. The solution contents themselves are saved to a subdirectory named `solutions`. Also see Section 8 on page 131.

- Before the first exercise is given, `\tcbstartrecording` has to be called to start recording.
- The solution is given as content of a `tcboutputlisting` environment. Note, that you can use this content also inside the exercise with `\tcbuselistingtext` in compiled form.
- After the last exercise is given (and before using the solutions), `\tcbstoprecording` has to be called to stop recording.
- The solutions are loaded by `\tcbinputrecords`.

Inside the exercise text, there may be text parts which are needed as \LaTeX source code and as compiled text as well. These parts can be saved by `\tcbwritetemp` and used in compiled form by `\tcbusetemp` or as source code by `\tcbusetemplisting`.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label `⟨marker⟩`. Automatically, the label `exe:⟨marker⟩` is used to mark the exercise and the label `sol:⟨marker⟩` is used to mark the solution.

\begin{tcolorbox}[arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\textbf\sffamily, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle*=\color{red!40!black}}]
\begin{Verbatim}
\tcbset{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\textbf\sffamily, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle*=\color{red!40!black}}},
\end{Verbatim}
\end{tcolorbox}

With these preparations, the kernel environment `texercise` for our exercises is created quickly:

\begin{tcolorbox}[arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\textbf\sffamily, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle*=\color{red!40!black}}]
\begin{Verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{%
texercisestyle, listing file={solutions/texercise/\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise/\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter hfill mdseries Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}}, #1}
\end{Verbatim}
\end{tcolorbox}
The following examples demonstrate the application.

\begin{exe}
\begin{tcboutputlisting}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries Das alte Italien}\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter}\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten}\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.\hline
\end{tabular}
\end{tcboutputlisting}
\end{exe}

Exercise 16.1

Create the following table:

<table>
<thead>
<tr>
<th>Antike</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
</tr>
<tr>
<td>In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren.</td>
<td>Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert.</td>
</tr>
<tr>
<td>In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft.</td>
<td>Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.</td>
</tr>
</tbody>
</table>


\newcommand{\headingline}[1]{{
\begin{center}
\Large\bfseries #1
\end{center}}}

Create a new macro \verb+\headingline+ which produces the following output:
\begin{tcbwritetemp}
\headingline{Very important heading}
\end{tcbwritetemp}
\tcbusetemplisting\tcbusetemp

Exercise 16.2  Solution on page 348

Create a new macro \headingline which produces the following output:
\headingline{Very important heading}

\begin{tcbwritetemp}
\headingline{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}
\end{tcbwritetemp}
\tcbusetemplisting\par\smallskip\tcbusetemp

Exercise 16.3  Solution on page 348

Create a new macro \verb+\minitable+ which produces the following output:
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}

\begin{tcbwritetemp}
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}
\end{tcbwritetemp}
\tcbusetemplisting\par\smallskip\tcbusetemp

My heading

In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.

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Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\begin{tcbwritetemp}
\synop{Neil Armstrong}

{That's one small step for a man, one giant leap for mankind.}

{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}
\end{tcbwritetemp}

Now, we give a list of all exercises with:

\section{List of Exercises}

16.1 Exercise with solution on page 348 . . . . . . . . . . . . . . . . . . . . . . . . . . 345
16.2 Exercise with solution on page 348 . . . . . . . . . . . . . . . . . . . . . . . . . . 346
16.3 Exercise with solution on page 348 . . . . . . . . . . . . . . . . . . . . . . . . . . 346
16.4 Exercise with solution on page 349 . . . . . . . . . . . . . . . . . . . . . . . . . . 347
16.11 Solutions for the given \LaTeX\ Exercises

For all solutions, a macro `\processsol` was written to the file `\jobname.records`. Now, we need a definition for this macro to use the solutions.

```latex
% \usepackage{hyperref} \% for phantomlabel
\newtcbinputlisting{\processsol}[2]{%
  texercisestyle, listing only, listing file={#1}, phantomlabel={sol:#2},%
  title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},}
```

The loading of all solutions is done by:

`\tcbinputrecords`

With this, we get:

**Solution for Exercise 16.1 on page 345**

```latex
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries\itshape Antike} & \multicolumn{2}{c|}{\bfseries\itshape Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. \\
\end{tabular}
```

**Solution for Exercise 16.2 on page 346**

```latex
\newcommand{\headingline}{1}{% 
  \begin{center}\Large\bfseries #1\end{center}}
```

**Solution for Exercise 16.3 on page 346**

```latex
\newcommand{\minitable}{2}{% 
  \begin{center}\begin{tabular}{p{10cm}}\hline
  \multicolumn{1}{c}{\bfseries#1} \\
  #2\\\n  \end{tabular}\end{center}}
```
\newcommand{\synop}[3]{% 
\begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2|}%
p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2\}
\hline
\multicolumn{2}{c}{\bfseries #1}\midrule
\multicolumn{1}{c|}{\itshape English}& 
\multicolumn{1}{c}{\itshape German}\midrule
#2 & #3
\end{tabular}}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{theorems}

This also loads the package amsmath.

## 17.1 Macros of the Library

\newtcbtheorem[(init options)]{(name)}{(display name)}{(options)}{(prefix)}

Creates new environments (name) and (name)* based on tcolorbox to frame a (mathematical) theorem. The (display name) is used in the title line with a number, e.g. «Theorem 5.1». The (options) are given to the underlying tcolorbox to control the appearance. The (init options) allow setting up automatic numbering, see Section 5 on page 111.

The new environment (name) takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as /tcb/nameref \textsuperscript{P.102} identifier. The second mandatory parameter is a (marker). The theorem is automatically labeled with (prefix)(separator)(marker) where (separator) is predefined as ‘:’, see /tcb/label separator \textsuperscript{P.357}.

The new environment (name)* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment (name). This variant is not labeled and not listed in lists of theorems.

### Definition in the preamble:

\begin{mytheo}{This is my title}{theoexample}
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \ref{th:theoexample}, it is given on page \pageref{th:theoexample}, and it is titled «This is my title».
\end{mytheo}

\begin{mytheo}{label=myownlabel}{This is my title}{}
The label parameter can be left empty without \LaTeX\ error. Or you may use an own label to reference Theorem \ref{myownlabel}.
\end{mytheo}

\begin{mytheo}{label=myownlabel}{This is my title}{}
The label parameter can be left empty without \LaTeX\ error. Or you may use an own label to reference Theorem \ref{myownlabel}.
\end{mytheo}
\begin{mytheo}{}
  The title can also be left empty without problem. Note that the '::' vanished magically.
\end{mytheo}

My Theorem 17.3
The title can also be left empty without problem. Note that the '::' vanished magically.

\begin{mytheo*}{Unnumbered Theorem}
  This theorem is not numbered.
\end{mytheo*}

My Theorem: Unnumbered Theorem
This theorem is not numbered.

\begin{mytheo*}{}
  This theorem has no number and no title.
\end{mytheo*}

My Theorem
This theorem has no number and no title.

To switch off the nameref feature permanently, add nameref/.style={} inside the \langle options \rangle list.

\renewtcbtheorem[\langle init options \rangle]{\langle name \rangle}{\langle display name \rangle}{\langle options \rangle}{\langle prefix \rangle}

Operates like \newtcbtheorem \cite{P.350}, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

\tcbmaketheorem{\langle name \rangle}{\langle display name \rangle}{\langle options \rangle}{\langle counter \rangle}{\langle prefix \rangle}

\newtcbtheorem \cite{P.350} supersedes this macro.

Creates a new environment \langle name \rangle based on tcolorbox to frame a (mathematical) theorem. The \langle display name \rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle options \rangle are given to the underlying tcolorbox to control the appearance. The \langle counter \rangle is used for automatic numbering. The new environment \langle name \rangle takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and the second mandatory parameter is a \langle marker \rangle. The theorem is automatically labeled with \langle prefix \rangle\langle separator \rangle\langle marker \rangle where \langle separator \rangle is predefined as '::', see \texttt{/tcb/label separator} \cite{P.357}. 

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\texttt{tcboxmath\{options\}\{(mathematical box content)\}

Creates a \texttt{tcolorbox} \textsuperscript{P.12} which is fitted to the width of the given \texttt{(mathematical box content)}. This box is intended to be applied as part of a larger formula and may be used as replacement for the \texttt{boxed} macro of \texttt{amsmath}.

\begin{equation}
\begin{tcbset}
{fonttitle=\scriptsize}
\tcboxmath
[\textcolor{LightBlue}{colback=LightBlue!25!white},colframe=\textcolor{blue}{blue}]
\{ \texttt{a^2 = 16} \}
\quad \Rightarrow \quad
\text{Implication}
\text{Implication}
\begin{tcbset}
{colback=\textcolor{Salmon}{Salmon!25!white},colframe=\textcolor{red}{red},title=Implication}
\{ a = 4 \lor a = -4. \}
\end{equation}

\begin{tcbhighmath\{options\}\{(mathematical box content)\}

This is a special case of the \texttt{tcboxmath} macro which uses the style \texttt{/tcb/highlight math} \textsuperscript{P.360}. It is intended to provide context sensitive highlighting of formula parts. The color settings via \texttt{/tcb/highlight math style} \textsuperscript{P.360} may be different inside theorems or other colored areas and outside.

\begin{align}
\begin{tcbhighmath}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}

\begin{tcolorbox}\texttt{\texttt{tcset}}\{\texttt{myformula/.style=}}\{\texttt{colback=yellow!10!white,colframe=red!50!black,}
\texttt{every box/.style=}{\texttt{highlight math style=}}\{\texttt{colback=LightBlue!50!white,colframe=Navy}}\}
\end{tcolorbox}

\begin{align}
\begin{tcbhighmath}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}

\begin{tcolorbox}\texttt{\texttt{tcset}}\{\texttt{myformula/.style=}}\{\texttt{colback=yellow!10!white,colframe=red!50!black,}
\texttt{every box/.style=}{\texttt{highlight math style=}}\{\texttt{colback=LightBlue!50!white,colframe=Navy}}\}
\end{tcolorbox}

\begin{align}
\begin{tcbhighmath}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}

\begin{tcolorbox}\texttt{\texttt{tcset}}\{\texttt{myformula/.style=}}\{\texttt{colback=yellow!10!white,colframe=red!50!black,}
\texttt{every box/.style=}{\texttt{highlight math style=}}\{\texttt{colback=LightBlue!50!white,colframe=Navy}}\}
\end{tcolorbox}
\texttt{\textbackslash tcbhighmath}  \textsuperscript{P.352} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}{align}
a&=\sin(z) \\
E &= mc^2 + \int_a^b x \, dx 
\end{empheq}
\[ E = mc^2 \] \label{eq:12}

Besides \texttt{\textbackslash tcbhighmath} \textsuperscript{P.352}, one can easily define an independent new box based on \texttt{\textbackslash tcbox} \textsuperscript{P.14} which acts like \texttt{\textbackslash tcbhighmath} \textsuperscript{P.352}:

\begin{empheq}{align}
a&=\sin(z) \\
E &= mc^2 + \int_a^b x \, dx 
\end{empheq}
\begin{equation}
\texttt{\textbackslash tcbhighmath}{E} = \texttt{\textbackslash otherbox}{mc^2} 
\end{equation}
17.2 Option Keys of the Library

/\texttt{tcb/separatortext}=(\textit{sign})

(no default, initially :) The given \textit{\langle sign \rangle} is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

\begin{verbatim}
\usepackage{amssymb}
\newtcbtheorem{use counter from=any theor}{sometheorem}{Theorem}{\%
colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign=\$\blacktriangleright\$}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 17.4} \textit{My example}

My theorem text.

/tcb/separatortext colon (style, no value, initially set)

Sets \texttt{tcb/separatortext} to the default colon : sign.

/tcb/separatortext dash (style, no value)

Sets \texttt{tcb/separatortext} to an en-dash sign.

\begin{verbatim}
\newtcbtheorem{use counter from=any theor}{sometheorem}{Theorem}{\%
colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign dash}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 17.5} – \textit{My example}

My theorem text.

/tcb/separatortext none (style, no value)

Sets \texttt{tcb/separatortext} to empty.

\begin{verbatim}
\newtcbtheorem{use counter from=any theor}{sometheorem}{Theorem}{\%
colback=white,colframe=red!50!black,fonttitle=\bfseries,
    separator sign none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 17.6} \textit{My example}

My theorem text.
The given ⟨left⟩ and ⟨right⟩ delimiter signs are used to frame the descriptive title text of a theorem.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters={\flqq}{\frqq}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 17.7: «My example»
My theorem text.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters parenthesis}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 17.8: (My example)
My theorem text.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 17.9: My example
My theorem text.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description color=red!25!yellow}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 17.9: My example
My theorem text.
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{\begin{sometheorem}{My example}{}{My theorem text.}}

Theorem 17.10: „My example“
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{\begin{sometheorem}{My example}{}{My theorem text.}}

Theorem 17.11: My example
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{\begin{sometheorem}{My example}{}{My theorem text.}}

Theorem 17.12: My example.
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

\textbf{Theorem 17.13 – My example:}
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

\textbf{Theorem 17.14: My example –}
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
\begin{sometheorem}{My example}{myex}
My theorem text.
\end{sometheorem}

See Example~\ref{theo*myex}.

\textbf{Theorem 17.15: My example}
My theorem text.

\textbf{See Example 17.15.}
/tcb/theorem full label supplement={\langle style\rangle} \hspace{1cm} (no default, initially empty)

The given \langle style\rangle is used in connection with labels created with environments which are defined themselves by \newtcbtheorem{P.350}. This \langle style\rangle uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of \langle prefix\rangle (defined by \newtcbtheorem{P.350}), /tcb/label separator{P.357}, and \langle marker\rangle (defined by an actual theorem environment).

\begin{verbatim}
% The following adds a hyper target to all environments
% created with \newtcbtheorem
\tcbset{theorem full label supplement={hypertarget={#1}}}

\newtcbtheorems[use counter from=mytheo]{sometheorem}{Theorem}
% \{colback=white,colframe=red!50!black,fonttitle=\bfseries\}
\begin{sometheorem}{My example}{myex2}
My theorem text.
\end{sometheorem}

This automated \hyperlink{theo:myex2}{hyper target can be linked to with a hyper link}.
\end{verbatim}

Theorem 17.16: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.

A second usage of /tcb/theorem full label supplement overwrites the first setting.

/tcb/theorem label supplement={\langle style\rangle} \hspace{1cm} (no default, initially empty)

The given \langle style\rangle is used in connection with labels created with environments which are defined themselves by \newtcbtheorem{P.350}. This \langle style\rangle uses one argument which is automatically set to the label \langle marker\rangle defined by an actual theorem environment.

A second usage of /tcb/theorem label supplement overwrites the first setting, but /tcb/theorem full label supplement and /tcb/theorem label supplement can be used independently.

\begin{verbatim}
% 'marginnote' has to be loaded
\newtcbtheorems[use counter from=mytheo]{sometheorem}{Theorem}
% \{colback=white,colframe=red!50!black,fonttitle=\bfseries,\}
% \{theorem label supplement={hypertarget={XYZ-##1}},\}
% \{theorem full label supplement={code={\marginnote{##1}}}\}
\begin{sometheorem}{My example}{myex3}
My theorem text.
\end{sometheorem}

This automated \hyperlink{XYZ-myex3}{hyper target can be linked to with a hyper link}.
\end{verbatim}

theo:myex3

Theorem 17.17: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

\textbf{Theorem 17.18}: My example
My theorem text.

\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

\textbf{17.19 Theorem}: My example
My theorem text.

\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

\textbf{Theorem}: My example
My theorem text. 17.20
This key is internally used by \texttt{tcbmaketheorem} \textsuperscript{P.351}, but can be used directly in a \texttt{tcolorbox} for a more flexible approach. The \texttt{display name} is used together with the increased \texttt{counter} value and the \texttt{title} for the title line of the box. Additionally, a \texttt{label} with the given \texttt{marker} is created.

\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm, theorem={Test}{texercise}{Direct usage}{myMarker}]
Here, we see the test \ref{myMarker}.
\end{tcolorbox}

For a common appearance inside the document, the key \texttt{theorem} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{tcbmaketheorem} \textsuperscript{P.351} or using its successor \texttt{newtcbtheoremp} \textsuperscript{P.350}.

\begin{align*}
\tcbhighmath[remember as=fx]{f(x)} &= \int\limits_{1}^{x} \frac{1}{t^2}~dt \\
&= \left[ -\frac{1}{t} \right]_{1}^{x} \\
&= -\frac{1}{x} + \frac{1}{1} \\
&= 1 - \frac{1}{x}.
\end{align*}
/tcb/math upper
Sets the upper part to mathematical mode with font \textit{\texttt{\textbackslash displaystyle}}.

/tcb/math lower
Sets the lower part to mathematical mode with font \textit{\texttt{\textbackslash displaystyle}}.

/tcb/math
Sets the upper part \textit{and} lower part to mathematical mode with font \textit{\texttt{\textbackslash displaystyle}}.

\begin{tcolorbox}
\[\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\]
\end{tcolorbox}

The following styles are only tested to work with the original amsmath environments. If e.g. the \texttt{equation} environment is redefined as gather, then /tcb/ams equation could not be used. Obviously, you are encouraged to use /tcb/ams gather in this case.

/tcb/ams equation upper
Adds an \texttt{amsmath equation} environment to the start and end of the upper part.

/tcb/ams equation lower
Adds an \texttt{amsmath equation} environment to the start and end of the lower part.

/tcb/ams equation
Adds an \texttt{amsmath equation} environment to the start and end of the upper \textit{and} lower part.

\begin{tcolorbox}
\[\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\] (15)
\end{tcolorbox}

/tcb/ams equation* upper
Adds an \texttt{amsmath equation*} environment to the start and end of the upper part.

/tcb/ams equation* lower
Adds an \texttt{amsmath equation*} environment to the start and end of the lower part.

/tcb/ams equation*
Adds an \texttt{amsmath equation*} environment to the start and end of the upper \textit{and} lower part.

\begin{tcolorbox}
\[\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\]
\end{tcolorbox}
/tcb/ams align upper
(\text{style, no value})
Adds an \texttt{amsmath align} environment to the start and end of the upper part.

/tcb/ams align lower
(\text{style, no value})
Adds an \texttt{amsmath align} environment to the start and end of the lower part.

/tcb/ams align
(\text{style, no value})
Adds an \texttt{amsmath align} environment to the start and end of the upper and lower part.

\begin{tcolorbox}[\texttt{ams align},colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, \text{d}x &= \frac{1}{3} x^3 + c.
\end{tcolorbox}

∞ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (16)
\int x^2 \, \text{d}x = \frac{1}{3} x^3 + c. \quad (17)

/tcb/ams align* upper
(\text{style, no value})
Adds an \texttt{amsmath align*} environment to the start and end of the upper part.

/tcb/ams align* lower
(\text{style, no value})
Adds an \texttt{amsmath align*} environment to the start and end of the lower part.

/tcb/ams align*
(\text{style, no value})
Adds an \texttt{amsmath align*} environment to the start and end of the upper and lower part.

\begin{tcolorbox}[\texttt{ams align*},colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, \text{d}x &= \frac{1}{3} x^3 + c.
\end{tcolorbox}

\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\int x^2 \, \text{d}x = \frac{1}{3} x^3 + c.
/tcb/ams gather upper
(-----, no value)
Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower
(-----, no value)
Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather
(-----, no value)
Adds an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\quad (18)
\int x^2 ~\text{d}x = \frac{1}{3} x^3 + c. \quad (19)
\end{tcolorbox}

/tcb/ams gather* upper
(-----, no value)
Adds an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower
(-----, no value)
Adds an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather*
(-----, no value)
Adds an amsmath gather* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\int x^2 ~\text{d}x = \frac{1}{3} x^3 + c.
\end{tcolorbox}
Neutralizes the \texttt{abovedisplayskip} of a following \texttt{align} or \texttt{gather} environment for the upper part. Note that the text content has to start with such a formula. 

Neutralizes the \texttt{abovedisplayskip} of a following \texttt{align} or \texttt{gather} environment for the lower part. Note that the text content has to start with such a formula. 

Neutralizes the \texttt{abovedisplayskip} of a following \texttt{align} or \texttt{gather} environment for the upper part \textit{and} lower part. Note that the text content has to start with such a formula.
\texttt{/tcb\_theorem\_style=(name)} (no default, initially \texttt{standard})

Applies a predefined style \texttt{(name)} to the theorem environment. Some of the feasible \texttt{(name)} values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter \texttt{/tcb/separator sign} \texttt{\textasciitilde P.354}, \texttt{/tcb/description delimiters} \texttt{\textasciitilde P.355}, \texttt{/tcb/terminator sign} \texttt{\textasciitilde P.356}, and more. Therefore, one should apply such keys \textit{after} a theorem style.

For the following examples, we use:

\texttt{\textcolor{green}{Definition in the preamble:}}

\begin{verbatim}
define\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{
  \% \texttt{fonttitle=\texttt{bfseries\upshape},fontupper=\texttt{\itshape},}
  \texttt{colframe=green!50!black,colback=green!10!white,}
  \texttt{colbacktitle=green!20!white, coltitle=blue!75!black}\{theo}\end{verbatim}

The predefined styles are:

- \texttt{standard}: This is the initial value.

\begin{verbatim}
\texttt{\begin{theorem}[theorem style=standard]\{standard\}\{\}
This is my theorem. \texttt{\begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}}
\end{verbatim}

\texttt{Theorem 17.21: standard}

\begin{quote}
\textit{This is my theorem.}
\end{quote}

\begin{quote}
\texttt{a^2 + b^2 = c^2.}
\end{quote}

- \texttt{change standard}

\begin{verbatim}
\texttt{\begin{theorem}[theorem style=change standard]\{change standard\}\{\}
This is my theorem. \texttt{\begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}}
\end{verbatim}

\begin{quote}
\texttt{17.22 Theorem: change standard}
\end{quote}

\begin{quote}
\textit{This is my theorem.}
\end{quote}

\begin{quote}
\texttt{a^2 + b^2 = c^2.}
\end{quote}

- \texttt{plain}

\begin{verbatim}
\texttt{\begin{theorem}[theorem style=plain]\{plain\}\{\}
This is my theorem. \texttt{\begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}}
\end{verbatim}

\texttt{Theorem 17.23 (plain): This is my theorem.}

\begin{quote}
\texttt{a^2 + b^2 = c^2.}
\end{quote}
• break

\begin{theorem}[theorem style=break]\end{theorem}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} 
\end{theorem}

Theorem 17.24 (break):
This is my theorem. 

\begin{align*}
a^2 + b^2 &= c^2.
\end{align*}

• plain apart

\begin{theorem}[theorem style=plain apart]\end{theorem}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} 
\end{theorem}

Theorem 17.25 (plain apart)
This is my theorem. 

\begin{align*}
a^2 + b^2 &= c^2.
\end{align*}

• change

\begin{theorem}[theorem style=change]\end{theorem}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} 
\end{theorem}

17.26 Theorem (change): This is my theorem. 

\begin{align*}
a^2 + b^2 &= c^2.
\end{align*}

• change break

\begin{theorem}[theorem style=change break]\end{theorem}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} 
\end{theorem}

17.27 Theorem (change break):
This is my theorem. 

\begin{align*}
a^2 + b^2 &= c^2.
\end{align*}

• change apart

\begin{theorem}[theorem style=change apart]\end{theorem}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} 
\end{theorem}

17.28 Theorem (change apart)
This is my theorem. 

\begin{align*}
a^2 + b^2 &= c^2.
\end{align*}
\begin{theorem}[theorem style=margin, left=10mm]{margin}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

17.29 Theorem (margin): This is my theorem. 
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

\begin{theorem}[theorem style=margin,break, left=10mm]{margin break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

17.31 Theorem (margin break):
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

\begin{theorem}[theorem style=margin apart, left=10mm]{margin apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

17.33 Theorem (margin apart)
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
17.3 Examples for Definitions and Theorems

In the following, the application of \texttt{tcbmaketheorem}\textsuperscript{P.351} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package [5] is used for clever references.

\begin{definitioninthe preamble:}
\% \usepackage{cleveref}
\tcbset{
  defstyle/.style={fonttitle=\bfseries, fontupper=\slshape, arc=0mm, colback=blue!5!white, colframe=blue!75!black},
  theostyle/.style={fonttitle=\bfseries, fontupper=\slshape, colback=red!10!white, colframe=red!75!black},
}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{Corollary}{Corollary}{theostyle}{cor}
\end{definitioninthe preamble:}

By \texttt{tcbclaimtheorem}\textsuperscript{P.350}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

The following theorem is numbered as \Cref{theo:diffbarstetig} and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}

The following theorem is numbered as Theorem 17.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}
Der folgende Definition ist nummeriert als \texttt{def:diffbarkeit} und referenziert mit dem Marker \texttt{def:diffbarkeit}.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion $f: \mathbb{I} \to \mathbb{R}$ auf einem Intervall $\mathbb{I}$ heißt in $x_0 \in \mathbb{I}$ differenzierbar oder linear approximierbar, wenn der Grenzwert
\begin{equation*}
\lim_{x \to x_0} \frac{f(x) - f(x_0)}{x - x_0} = \lim_{h \to 0} \frac{f(x_0 + h) - f(x_0)}{h}
\end{equation*}
existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von $f$ in $x_0$ und man schreibt für ihn
\begin{equation*}
f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).
\end{equation*}
\end{Definition}

The following definition is numbered as Definition 17.3.2 and referenced with the marker def:diffbarkeit.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a, b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b) < 0$, so besitzt $f$ eine Nullstelle $x_0 \in (a, b]$.
\end{Corollary}

The following corollary is numbered as Corollary 17.3.3 and referenced with the marker cor:nullstellen.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a, b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b) < 0$, so besitzt $f$ eine Nullstelle $x_0 \in [a, b]$, also $f(x_0) = 0$.
\end{Corollary}
Hinreichende Bedingung f"{u}r Wendepunkte

$f$ sei eine auf einem Intervall $]a,b[$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0)=0$ in $x_0\in]a,b[$ und $f'''(x_0)\neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.

Theorem 17.3.4: Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $]a,b[$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0)=0$ in $x_0\in]a,b[$ und $f'''(x_0)\neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.

Theorem 17.3.5 (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $x_0 \in [x_0,x]$, so dass gilt

\[ f(x) - f(x_0) = \text{grad } f(x_0)^\top (x-x_0) \]

Here, \texttt{cleveref} support is used to reference \Cref{theo:meanvaluetheorem} on \Cpageref{theo:meanvaluetheorem}. This \texttt{nameref} can also be referenced by \texttt{\Vref} resulting in \texttt{\Vref{theo:meanvaluetheorem}}.

Note that \texttt{/tcb/label type} \texttt{P.101} was used in the example above to feed \texttt{cleveref} \texttt{[5]} with the needed name information.
Theorem 17.3.5: Mittelwertsatz für $n$ Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \text{grad } f(\xi)^\top (x - x_0)$$
You need more attention for your theorems? Here, you are ...

\begin{Theorem}[enhanced, fuzzy halo=3mm with yellow, fuzzy halo=2mm with red, fuzzy halo=1mm with yellow, watermark color=red!35!white, watermark text={Overacting\Fundamental Theorem}]
\lipsum[1-2]
\end{Theorem}

Theorem 17.3.8: Fundamental Theorem of Theorems


Let’s try a more conservative approach:

\begin{YetAnotherTheorem}{Mittelwertsatz f"{u}r $n$ Variable}{mittelwertsatz_n4}
Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$ eine offene Menge und $f([x_0, x] \subseteq \mathbb{R}$ einem Punkt $\xi \in [x_0, x]$, so dass gilt
\begin{equation*}
\begin{align*}
f(x) - f(x_0) &= \operatorname{operatorname{grad}} f(\xi) \cdot (x-x_0)
\end{align*}
\end{equation*}
\end{YetAnotherTheorem}

Theorem 17.3.9 (Mittelwertsatz für $n$ Variable): Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subseteq D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)$$
17.4 Using other theorem environments with tcolorbox

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a `tcolorbox`.

Environments may be created e.g. by methods from the `theorem` package or the `amsthm` package. `\tcolorboxenvironment` \textsuperscript{17} can be used to put a box around these environments.

**Definition in the preamble:**

```
\usepackage{amsthm}
\theoremstyle{plain}\% from `amsthm'
newtheorem{lem}{Lemma}\% from `amsthm'
\tcolorboxenvironment{lem}{}
\text{\% enhanced jigsaw, colframe=cyan, interior hidden, breakable, before\skip=10pt, after\skip=10pt}
\tcolorboxenvironment{proof}\% `proof` from `amsthm'
\text{\textbackslash{}blanker, breakable, left=5mm, before\skip=10pt, after\skip=10pt, borderline west={1mm}{0pt}{red}}
```

```
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]

\begin{proof}
\lipsum*[4]
\end{proof}
```


The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{breakable}
```

### 18.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by \texttt{/tcb/breakable} \textsuperscript{P.376} and disabled by \texttt{/tcb/unbreakable} \textsuperscript{P.377}.

If a \texttt{tcolorbox} is set to be \texttt{/tcb/breakable} \textsuperscript{P.376}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

   **Unbroken Box**

<table>
<thead>
<tr>
<th>The box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>unbroken</td>
</tr>
</tbody>
</table>

3. Otherwise, it is checked if at least \texttt{/tcb/lines before break} \textsuperscript{P.377} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.
4. Now, the \textit{break sequence} starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{first part} of the \textit{break sequence} and shipped out.

   **Broken Box**

<table>
<thead>
<tr>
<th>The box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>first</td>
</tr>
</tbody>
</table>

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.
6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{middle part} of the \textit{break sequence} and shipped out. Then, the algorithm goes back to Step 5.

<table>
<thead>
<tr>
<th>The box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>middle</td>
</tr>
</tbody>
</table>

7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

<table>
<thead>
<tr>
<th>The box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>last</td>
</tr>
</tbody>
</table>

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least \texttt{/tcb/lines before break} \textsuperscript{P.377}. 

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In principle, all boxes of the \textit{break sequence} share the same geometric parameters. The differences are:

- The given \texttt{/tcb/before} \cite{P.81} and \texttt{/tcb/after} \cite{P.81} values are used only before the \textit{first} and after the \textit{last} part of the \textit{break sequence}.

- A special behavior between the parts of the \textit{break sequence} can be given by \texttt{/tcb/toprule at break} \cite{P.380}, \texttt{/tcb/bottomrule at break} \cite{P.380}, \texttt{/tcb/enlarge top at break} \cite{P.86}, and \texttt{/tcb/enlarge bottom at break} \cite{P.86}.

- The \texttt{/tcb/skin} \cite{P.137} decides how the \textit{first}, \textit{middle}, and \textit{last} part look like. Actually, every part type has its own skin given by the options \texttt{/tcb/skin first} \cite{P.137}, \texttt{/tcb/skin middle} \cite{P.137}, and \texttt{/tcb/skin last} \cite{P.137}. Typically, these options are set automatically by the main skin, see Subsection 18.8 from page 389.

### 18.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable \texttt{tcolorbox} is about 65536pt (ca. 2300cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the \texttt{unlimited} value for \texttt{/tcb/breakable} \cite{P.376}. With the \texttt{unlimited} setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use \texttt{unlimited} for critical large boxes only.

- You can nest an unbreakable \texttt{tcolorbox} inside another \texttt{tcolorbox}, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The \texttt{/tcb/breakable} \cite{P.376} key for a nested box is ignored automatically\footnote{Until \texttt{tcolorbox} 3.04, the \texttt{/tcb/breakable} \cite{P.376} key was not ignored for nested boxes.}, i.e. inner boxes are always unbreakable.

After all, in the unlikely case you really want to have the nested box to be breakable, use \texttt{/tcb/enforce breakable} \cite{P.377} for the nested box\footnote{\texttt{/tcb/enforce breakable} \cite{P.377} acts like \texttt{/tcb/breakable} \cite{P.376} until \texttt{tcolorbox} 3.04.}. But, a breakable box inside a breakable box will usually give a mess.

- If your text content contains some text color changing commands, your color will not survive the break to the next box. But, with the \texttt{fontspec} package and \texttt{xelatex} or \texttt{lualatex}, you can use \texttt{\addfontfeatures{Color=mycolor}} to add a font color which survives the break.

- The \texttt{perpage} option of the \texttt{footmisc} package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box \texttt{/tcb/breakable} \cite{P.376} which actually is not broken creates a box which acts \textit{almost} like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain \texttt{/tcb/before} \cite{P.81} and \texttt{/tcb/after} \cite{P.81} settings, especially, if there is an automatic page break before the box.

- \texttt{LuaT\TeX} version 0.95 changes the behaviour of the basic \texttt{\vsplit} (a bug?!) resulting in badly broken boxes. Thanks to Jeremy Engel, the \texttt{breakable} library contains a patch for this which also loads the the \texttt{ifluatex} package.
18.3 Main Option Keys

/tcb/breakable=true|false|unlimited  (default true, initially false)

Allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use \texttt{/tcb/enhanced} for breaking a box. The parts of the \texttt{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

\begin{tcolorbox}
\begin{small}
\lipsum[1-6]
\end{small}
\end{tcolorbox}

My breakable box


Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea


/tcb/unbreakable  
Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable  
A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable on such an inner box has no effect. If one really wants the inner box to be breakable, use /tcb/enforce breakable. This will usually give a mess of shattered boxes. You are advised to not use this option.

Note that /tcb/enforce breakable has the functionality that /tcb/breakable had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=⟨text⟩  
The /tcb/title is used only for the first part of a break sequence. Use title after break to create a heading line with ⟨text⟩ as content for all following parts. Also see /tcb/extras title after break for formatting the title text.

/tcb/notitle after break  
Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=⟨text⟩  
Works like /tcb/adjusted title but applied to /tcb/title after break.

/tcb/lines before break=⟨number⟩  
Assures that the given ⟨number⟩ of lines of the upper box part or the lower box part are placed before a break happens.
\texttt{tcb/break at=⟨length⟩/⟨length⟩/\ldots/⟨length⟩} (no default, initially \texttt{Opt})

Defines break points at the given \texttt{⟨length⟩} values. The first \texttt{⟨length⟩} defines the (maximal) height of the first partial box, the second \texttt{⟨length⟩} defines the (maximal) height of the second partial box, and so on. The last \texttt{⟨length⟩} value is applied to all following partial boxes if any.

- Setting a \texttt{⟨length⟩} to \texttt{Opt} means that the naturally available space is used for breaking.
- Setting a \texttt{⟨length⟩} to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). That is before version 4.10 negative values were treated like \texttt{Opt}.

\begin{tcolorbox}
\[enhanced jigsaw, size=small, vfill before first, colframe=red, colback=yellow!10!white, before title=\raggedright, title=\texttt{Broken box inside a \texttt{multicols} environment}, fonttitle=\texttt{bfseries}, enforce breakable, \texttt{x use only breakable in the real world!} \]
\lipsum[1]
\end{tcolorbox}

\texttt{refKey{/tcb/height fixed for} may also be considered for \texttt{multicols} environments.
\end{multicols}

Breakable boxes inside a \texttt{multicols} environment need special attendance. They are broken by default at \texttt{\textheight}. The \texttt{break at} option can be used to insert better break points by hand.

\begin{tcolorbox}
\[\texttt{breakable, enlargepage=0mm/\baselineskip/2\baselineskip/0mm,\ldots} \]
\end{tcolorbox}

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

\texttt{/tcb/enlargepage=⟨length⟩/⟨length⟩/\ldots/⟨length⟩} (no default, initially \texttt{Opt})

Inserts a \texttt{\enlargethispage{⟨length⟩}} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first \texttt{⟨length⟩} is applied to the first partial box, the second \texttt{⟨length⟩} is applied to the second partial box, and so on. The last \texttt{⟨length⟩} value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\begin{tcolorbox}
\lipsum[1]
\end{tcolorbox}

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

\texttt{/tcb/height fixed for} \texttt{-P.381} may also be considered for \texttt{multicols} environments.

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box \textit{and} again to the page of the first partial box. Insert a manual break to prevent this.

In general, \texttt{enlargepage} should be used at the final stage of a document for fine-tuning only.
/tcb/enlargepage flexible=⟨length⟩  
(no default, initially 0pt)
This allows an automated page enlargement for up to ⟨length⟩. The algorithm can use this to avoid breaking a box, if there is enough room after enlargement. Also, the last partial box of a break sequence may be enlarged to avoid further breaking.
Note that this potential enlargement is additive to settings of /tcb/enlargepage→P.378. But /tcb/enlargepage flexible overwrites settings of /tcb/pad before break→P.380 or /tcb/pad at break→P.380.

% The following setting hinders orphan lines for the last partial box
\tcbset{enlargepage flexible=\baselineskip}

/tcb/compress page=⟨option⟩  
(default all, initially baselineskip)
This option controls the space management on the page which contains the unbroken box or the first part of a break sequence. Feasible ⟨option⟩ values are:
• all (default value): All shrinkable glue on the page is potentially used for the unbroken box or the first part of a break sequence. Thus, all vertical spaces on the page will potentially be reduced to their minimal values.
• baselineskip (initial value): Shrinkable glue up to one \baselineskip on the page is potentially used for the unbroken box or the first part of a break sequence.
• none: The break algorithm respects the target size of the given glue values on the page. This was the initial value before version 3.34.

Note that the box content is not influenced by this option.

/tcb/shrink break goal=⟨length⟩  
(no default, initially 0pt)
This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by ⟨length⟩ which may result in smaller boxes. Never use negative values. Usually, this option will never be needed at all.
18.4 Option Keys for the Break Appearance

/tcb/toprule at break=⟨length⟩ (no default, initially 0.5mm)
Sets the line width of the top rule to ⟨length⟩ if the box is /tcb/breakable \textsuperscript{P.376}.
In this case, it is applied to middle and last parts in a break sequence. Note that /tcb/toprule \textsuperscript{P.35} overwrites this value if used afterwards.

/tcb/bottomrule at break=⟨length⟩ (no default, initially 0.5mm)
Sets the line width of the bottom rule to ⟨length⟩ if the box is /tcb/breakable \textsuperscript{P.376}.
In this case, it is applied to first and middle parts in a break sequence. Note that /tcb/bottomrule \textsuperscript{P.35} overwrites this value if used afterwards.

/tcb/topsep at break=⟨length⟩ (no default, initially 0mm)
Additional vertical space of ⟨length⟩ which is added at the top of middle and last parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

/tcb/bottomsep at break=⟨length⟩ (no default, initially 0mm)
Additional vertical space of ⟨length⟩ which is added at the bottom of first and middle parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

/tcb/pad before break=⟨length⟩ (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the text content and before the break point to ⟨length⟩. This style sets /tcb/toprule at break to 0pt and changes /tcb/topsep at break as required. In general, it is not advisable to change this value if the middle and last parts in a break sequence start with a rule or a title.

/tcb/pad before break*=⟨length⟩ (style, no default)
Sets /tcb/pad before break to ⟨length⟩ and /tcb/enlargepage flexible \textsuperscript{P.379} to an appropriate value such that empty closing frames are avoided.

/tcb/pad after break=⟨length⟩ (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the break point and before the text content to ⟨length⟩. This style sets /tcb/bottomrule at break to 0pt and changes /tcb/bottomsep at break as required. In general, it is not advisable to change this value if the first and middle parts in a break sequence end with a rule.

/tcb/pad at break=⟨length⟩ (style, no default, initially 3.5mm)
Abbreviation for setting ⟨length⟩ to /tcb/pad before break and /tcb/pad after break.

/tcb/pad at break*=⟨length⟩ (style, no default)
Sets /tcb/pad at break to ⟨length⟩ and /tcb/enlargepage flexible \textsuperscript{P.379} to an appropriate value such that empty closing frames are avoided.

\begin{tcolorbox}[enhanced jigsaw,breakable,pad at break*=0mm, title={For this box, the pad space at the break point is set to 0mm}]
\lipsum[1-2]
\end{tcolorbox}

For this box, the pad space at the break point is set to 0mm


/tcb/pad at break=P.380 or /tcb/pad at break*=P.380 should be used as very last option in an option list, because they adapt other settings.

Also see /tcb/enlarge top at break by=P.86 and /tcb/enlarge bottom at break by=P.86.

/tcb/height fixed for=(part) (no default, initially none)

When certain amount of space is available for a partial box of a break sequence, the partial box typically is smaller than this space (depending on the box content). For given (part)(s), the height can be set to all available space.

- none: Every partial tcolorbox is set with its natural height.
- first: The first partial box is set to a height which matches the available space.
- middle: All middle partial boxes are set to a height which matches the available space.
- last: The last partial box is set to a height which matches the available space.
- first and middle: The first and all middle partial boxes are set to a height which matches the available space.
- middle and last: All middle partial boxes and the last partial box are set to a height which matches the available space.
- all: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See /tcb/height=P.53 for setting a fixed height for unbroken boxes. See /tcb/height fill=P.56 for giving unbroken boxes maximum height.

/tcb/vfill before first=true|false (default true, initially false)

Inserts a \vfill at the begin of the first partial box to move this partial box to the end of the current page. This may be used as an alternative to /tcb/height fixed for=first to get justified columns or pages. The \vfill is not inserted, if the box gets not actually broken.

/tcb/segmentation at break=true|false (default true, initially true)

If a breakable box contains an upper part and a lower part and the break happens at the segmentation between both parts, then

- the segmentation line (or similar) is drawn as first element of the partial box containing the lower part, if /tcb/segmentation at break is set to be true.
- the segmentation line (or similar) is not drawn at all, if /tcb/segmentation at break is set to be false. This may be preferable for skins like bicolor=P.223, tile=P.228, or beamer=P.232.
18.5 Extra Options for Partial Boxes

\texttt{/tcb/extras=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

Adds \texttt{tcolorbox} \langle options\rangle to every box of a break sequence after skin settings are done. This is quite late in box processing. Geometry and break settings should \textit{not be used} here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly. Usually, \texttt{/tcb/extras first}, \texttt{/tcb/extras middle}, etc. are sensible to apply.

\texttt{/tcb/no extras} \hspace{1cm} (style, no default, initially set)

Removes all extras if set before.

\texttt{/tcb/extras broken=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textit{P.376} and \textit{is} broken actually, then the \langle options\rangle are added to every box of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/extras unbroken=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textit{P.376} but \textit{is not} broken actually or if the box is set to be \texttt{/tcb/unbreakable} \textit{P.377}, then the \langle options\rangle are added to the box. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras unbroken} \hspace{1cm} (style, no default, initially set)

Removes the unbroken extras if set before.

\texttt{/tcb/extras first=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textit{P.376} and \textit{is} broken actually, then the \langle options\rangle are added to the \textit{first} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras first} \hspace{1cm} (style, no default, initially set)

Removes the first extras if set before.

\texttt{/tcb/extras middle=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textit{P.376} and \textit{is} broken actually, then the \langle options\rangle are added to every middle box (if any) of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras middle} \hspace{1cm} (style, no default, initially set)

Removes the middle extras if set before.

\texttt{/tcb/extras last=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textit{P.376} and \textit{is} broken actually, then the \langle options\rangle are added to the \textit{last} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras last} \hspace{1cm} (style, no default, initially set)

Removes the last extras if set before.

\texttt{/tcb/extras unbroken and first=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras first} together. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/extras middle and last=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras middle} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/extras unbroken and last=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/extras first and middle=\{\langle options\rangle\}} \hspace{1cm} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras first} and \texttt{/tcb/extras middle} together. \texttt{/tcb/extras} overwrites this key.
If the box has a \texttt{/tcb/title after break} \cite{P.377}, then the \texttt{(options)} are added for all titles after the first break, i.e. all middle and last. The color, font, and alignment of titles after break can be adapted choosing \texttt{(options)}, e.g. by \texttt{/tcb/coltitle} \cite{P.28}, \texttt{/tcb/fonttitle} \cite{P.29}, \texttt{/tcb/halign title} \cite{P.32}. Note that \texttt{/tcb/colbacktitle} \cite{P.27} has to be placed into \texttt{/tcb/extras middle and last} \cite{P.382}.

Removes the title after break extras if set before.
My unbroken box

My broken box
18.6 Breakable boxes and the multicol package

With version 4.10, the algorithm for detecting the available height for a \texttt{tcolorbox} inside a multicol environment was improved with help of Frank Mittelbach. This change may impact existing user code which may have to be adapted.

Unbreakable \texttt{tcolorbox}es can be used without special care inside a multicol environment from the multicol package [9]. Since version 3.10, a breakable \texttt{tcolorbox} detects, if it is used inside a multicol environment. But choosing break points for a breakable box cannot be done by the balancing routine of \texttt{multicols}. By default, boxes will break at maximum column height. To get pleasant results, use the \texttt{/tcb/break at} \texttt{P.378} and \texttt{/tcb/height fixed for} \texttt{P.381} options.

\begin{verbatim}
% \usepackage{lipsum,multicol} % preamble
\footnotesize
\begin{multicols}{2}
  \lipsum[1]
  \begin{tcolorbox}[enhanced jigsaw,breakable,size=title,  
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
  title=My breakable box,\textbf{pad at break}=1mm, break at=-\baselineskip/0pt ]  
  \lipsum[2-4]
  \end{tcolorbox}
  \lipsum[4]
\end{multicols}
\end{verbatim}


\begin{mybreakablebox}
\end{mybreakablebox}

This example is already set inside a `multicol` environment. This time, a `middle` part has full column height (here `\textheight`). `/tcb/height fixed for ^P\textsuperscript{381}` is used to spread this box part over the full height to align with neighboring columns.

```
% \usepackage{lipsum,multicol}
\begin{tcolorbox}
\lipsum[1]
\begin{colorbox}[enhanced jigsaw, breakable, size=title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=My breakable box, pad at break=2mm, break at=-\baselineskip/0pt, height fixed for=middle ]
\lipsum[2-7]
\end{colorbox}
\lipsum[8]
\end{tcolorbox}
```


My breakable box


quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Praon et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a \texttt{tcolorbox} which fills the \texttt{multicols} environment completely. Here, \texttt{/tcb/height fixed for} \texttt{P.381} is used to give all three columns the full height. Note that the appropriate \texttt{/tcb/break at} \texttt{P.378} value is not computed automatically but set manually.

```latex
\begin{tcolorbox}[enhanced jigsaw,breakable,size=small,
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=My breakable box,pad at break=2mm,drop fuzzy shadow,
  height fixed for=all, break at=11.4cm ]
\lipsum[1-3]
\end{tcolorbox}
```

My breakable box


A *breakable* box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with \texttt{\break}, \texttt{\pagebreak}, \texttt{\columnbreak}, ... may only work as expected, if the box is broken at least into two parts *without* inserting the penalties.

To *force* a page or column break, \texttt{\tcbbreak} starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use \texttt{\pagebreak}.

For an *unbreakable box*, \texttt{\tcbbreak} is identical to insert \texttt{\par}, i.e. it just starts a new paragraph.

Also see /tcb/break at \texttt{\textasciitilde P.378} for defining height dependend breaks.

```latex
\begin{multicols}{3}
\begin{tcolorbox}
[breakable,enhanced jigsaw,size=small,
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Break into parts]
\end{tcolorbox}
\end{multicols}
\begin{multicols}{3}
\begin{tcolorbox}
[enhanced jigsaw,size=small,
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=You shall not break]
\end{tcolorbox}
\end{multicols}
```

<table>
<thead>
<tr>
<th>Break into parts</th>
<th>Second part</th>
<th>Third part</th>
</tr>
</thead>
<tbody>
<tr>
<td>First part</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| You shall not break    |             |            |
| First part             | Second part | Third part |
| First part             | Second part | Third part |
18.8 Break Sequence for the Skins

The following diagrams document the break sequence for different skins. Depending on the main skin of a tcolorbox, the actual skins of the break sequence parts are displayed.

Unbroken Box

| skin=standard |

Broken Boxes

| skin=standard |
| skin=standard |
| skin=standard |

Unbroken Box

| skin=standard jigsaw |

Broken Boxes

| skin=standard jigsaw |
| skin=standard jigsaw |
| skin=standard jigsaw |

Unbroken Box

| skin=spartan |

Broken Boxes

<p>| skin=spartan |
| skin=spartan |
| skin=spartan |</p>
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhanced</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhancedfirst</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhancedmiddle</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhancedlast</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedfirst jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedmiddle jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedlast jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>skin=empty</td>
<td>skin=emptyfirst</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>unbroken</td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin=emptyfirst</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin=emptymiddle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin=emptymiddle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin=emptymiddle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Skin: bicolor</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Broken Boxes</td>
<td>Skin: bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolorlast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin: bicolorfirst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin: bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin: bicolormiddle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin: bicolorlast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin: bicolorlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>skin=tile</td>
<td>skin=tilefirst</td>
</tr>
<tr>
<td></td>
<td>skin=tilemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=tilelast</td>
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<tr>
<td>Unbroken Box</td>
<td>Unbroken Box</td>
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<tr>
<td>skin=tilefirst</td>
<td>skin=tilefirst</td>
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<tr>
<td></td>
<td>skin=tilemiddle</td>
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<td></td>
<td>skin=tilemiddle</td>
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<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<td>skin=tilemiddle</td>
<td>skin=tilemiddle</td>
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<td>skin=tilemiddle</td>
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<td>Unbroken Box</td>
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<td>skin=tilemiddle</td>
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<td>skin=tilemiddle</td>
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<td></td>
<td>skin=tilelast</td>
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<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<tr>
<td>skin=beamer</td>
<td>skin=beamermiddle</td>
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<td>skin=beamermiddle</td>
<td>skin=beamermiddle</td>
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<td>skin=beamerlast</td>
<td>skin=beamermiddle</td>
</tr>
<tr>
<td>skin=beamerlast</td>
<td>skin=beamermiddle</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=widget</td>
<td>skin=widgetfirst</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=widgetlast</td>
</tr>
</tbody>
</table>

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<tr>
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<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=widgetfirst</td>
<td>skin=widgetfirst</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
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</tbody>
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<th>Broken Boxes</th>
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</thead>
<tbody>
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<td>skin=widgetmiddle</td>
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<tr>
<td></td>
<td>skin=widgetmiddle</td>
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<tr>
<td></td>
<td>skin=widgetmiddle</td>
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</tbody>
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<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=widgetlast</td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
</tr>
</tbody>
</table>
18.9 Break by Hand (Faked Break)

See Section 18.6 on page 385 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to ‘fake a break’. For this, you actually don’t need the \texttt{breakable} library at all.

\begin{tcolorbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}
\begin{tcolorbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your
\end{tcolorbox}
\begin{tcolorbox}[skin=enhancedlast]
own purposes.
\end{tcolorbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage.

If the \texttt{tcolorbox} is not breakable, there is not much add-on compared to usual \TeX/\LaTeX{} box storage and usage (and you do not really need this library for that use case).

For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is \textit{continued on page} \textit{x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{breakable}, see Section 18 on page 374.

The box register operations of this library are global. \TeX{} grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \TeX{}‘s available memory and registers.

\\textbf{19.1 Creation and Resetting of Box Arrays}

\begin{verbatim}
\newboxarray\{\textit{name}\}
\end{verbatim}\hspace{1cm}This creates a new box array called \textit{name}. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray\{myarray\}
\end{verbatim}

\begin{verbatim}
\newboxarray\{myarray\}
\end{verbatim}

\begin{verbatim}
\boxarrayreset\{\textit{name}\}
\end{verbatim}\hspace{1cm}Resets the size counter of a box array \textit{name} to zero. If \textit{name} is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\boxarrayreset
\boxarrayreset\{myarray\}
\end{verbatim}

\begin{verbatim}
/tcb/reset box array=(\textit{name})
\end{verbatim}\hspace{1cm}(default \texttt{default}, initially unset)

Resets the size counter of a box array \textit{name} to zero. Use this or \texttt{\boxarrayreset} (which does the same) before you apply \texttt{/tcb/store to box array}. 

\begin{verbatim}
/tcb/reset box array=(\textit{name})
\end{verbatim}

\begin{verbatim}
\tcbset{reset box array, % resets ‘default’
reset box array=myarray, % resets ‘myarray’}
\end{verbatim}
\boxarrayclear[(name)]

Works like \boxarrayreset to reset the size counter of a box array \langle name \rangle to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \consumeboxarray or \consumetcboxarray was used to apply the stored boxes, there is no advantage in using \boxarrayclear.

\boxarrayclear \ % clears ‘default’
\boxarrayclear{myarray} \ % clears ‘myarray’

19.2 Storing Content

/tcb/store to box array=(name) (default default, initially unset)

Stores a \textcolorbox or all parts of a break sequence of a \tcolorbox into a box array \langle name \rangle. If no \langle name \rangle is given, the already existing default box array is used. Otherwise, the box array has to be created beforehand with \newboxarray. Note that the box has to be /tcb/breakable, if the box shall break into several parts. Typically, manual break points are additionally defined by /tcb/break at. Otherwise, the box parts will have a length of about \textwidth. For most use cases, a /tcb/reset box array should be applied to reset the box array counter.

\begin{tcolorbox}
\[enhanced jigsaw, size=fbox, width=4cm, 
colback=yellow!10, colframe=yellow!10!black, 
enforce breakable, use only breakable in the real world! 
break at=7cm/4cm, 
height fixed for=all, 
watermark text=\arabic{tcbbreakpart}, 
reset box array, 
store to box array]
\end{tcolorbox}

\useboxarray{1}\hfill \useboxarray{2} & \useboxarray{3}
\begin{tabular}{cc}
\multicolumn{2}{c}{\includegraphics[width=7cm]{Basilica_5.png}}
\end{tabular}

If the first box part should fill the rest of the available space of the current page, you can use `\pagegoal`\- `\pagetotal` minus some distance for the first element of `/tcb/break at`\- P.378. You may want to have some additional distance to the preceding text.

```latex
% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,breakable, reset box array, store to box array, break at=\pagegoal-\pagetotal-5\textwidth/0pt, height fixed for=first and middle]
  \lipsum[1-15]
\end{tcolorbox}
% 
% \consumetcboxarray\{1\}{blanker,before=\par\vfill\noindent}

\begin{tcolorbox}[blanker,width=4cm, fontupper=\footnotesize, enforce breakable, % use only breakable in the real world! break at=4cm, height fixed for=all, watermark text=\arabic{tcbbreakpart}, reset box array, store to box array]
  \includegraphics[width=\linewidth]{Basilica_5.png}
  \lipsum[1-2]
\end{tcolorbox}

\begin{tcbitemize}[raster columns=3,raster equal height, size=small,halign=center,sharp corners,colback=blue!5]
  \tcbitem\consumeboxarray{5}
  \tcbitem\consumeboxarray{6}
  \tcbitem\consumeboxarray{1}
  \tcbitem\consumeboxarray{2}
  \tcbitem\consumeboxarray{3}
  \tcbitem\consumeboxarray{4}
\end{tcbitemize}

Combination of /tcb/reset box array \(^\text{P.399}\) and /tcb/store to box array \(^\text{P.400}\).

Disables the /tcb/store to box array \(^\text{P.400}\) option, if set before.

Stores the environment content into a box array \(\langle \text{name} \rangle\). This corresponds to the standard \LaTeX{} environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{\boxarrayreset} \(^\text{P.399}\) is not used, every new \texttt{boxarraystore} adds a further box to the array.

Stores the current size of a box array \(\langle \text{name} \rangle\) into a given \(\langle \text{macro} \rangle\). If no \(\langle \text{name} \rangle\) is given, the already existing \texttt{default} box array is used.

Typesets the box with the given \(\langle \text{index} \rangle\) number from the box array \(\langle \text{name} \rangle\). If no \(\langle \text{name} \rangle\) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \(\langle \text{name} \rangle\) is used. It is silently ignored, if the \(\langle \text{index} \rangle\) is out of range. Note that \texttt{\useboxarray} corresponds to the standard \texttt{\usebox} macro, respectively, \texttt{\copy}.
\usetcboxarray\{\textit{name}\}\{\textit{index}\}\{\textit{options}\}

Typesets the box with the given \textit{index} number from the box array \textit{name} using \useboxarray \textsuperscript{P.402} as content of a \tcbox \textsuperscript{P.14}. If no \textit{name} is given, the already existing default box array is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. The \tcbox \textsuperscript{P.14} can be customized by \tcolorbox \textit{options}.

\begin{verbatim}
\foreach \n in {1,...,\mysize} { \usetcboxarray\{\n\}{on line,colframe=yellow, colback=yellow!10} }
\end{verbatim}

\begin{tabular}{c|c|c|c|c|c}
Mary & Had & a & Little & Lamb \\
\end{tabular}

\consumeboxarray\{\textit{name}\}\{\textit{index}\}

Typesets the box with the given \textit{index} number from the box array \textit{name}. If no \textit{name} is given, the already existing default box array is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. In contrast to \useboxarray \textsuperscript{P.402}, \consumeboxarray corresponds to the standard \texttt{box} macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in {1,...,\mysize} { \consumeboxarray\{\n\} }
\par
\foreach \n in {1,...,\mysize} { \consumeboxarray\{\n\} }
\end{verbatim}

First run: \begin{tabular}{c|c|c|c|c|c}
Mary & Had & a & Little & Lamb \\
\end{tabular}

Second run: Mary Had a Little Lamb

\consumeetcboxarray\{\textit{name}\}\{\textit{index}\}\{\textit{options}\}

Typesets the box with the given \textit{index} number from the box array \textit{name} using \consumeboxarray as content of a \tcbox \textsuperscript{P.14}. If no \textit{name} is given, the already existing default box array \textit{name} is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. The \tcbox \textsuperscript{P.14} can be customized by \tcolorbox \textit{options}. After typesetting the box register is cleared and cannot be used again.

--- continued from page 402 ---

The linking texts like \textit{continued on page x} are created by \tcb/finish \textsuperscript{P.201} commands for the embedding \texttt{tcbox} \textsuperscript{P.14}. To label the box parts, \tcb/phantomlabel \textsuperscript{P.101} is used. These quite small partial boxes are

--- continued on page 406 ---


\textbf{boxarraygetbox}[$\langle$\texttt{name}$\rangle$]{$\langle$\texttt{macro}$\rangle$}{$\langle$\texttt{index}$\rangle$}

Assigns the box with the given \texttt{index} number from the box array \texttt{name} to a \texttt{macro}. If no \texttt{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \texttt{name} is used. If the \texttt{index} is out of range, the \texttt{macro} will be undefined.

\textbf{ifboxarrayempty}[$\langle$\texttt{name}$\rangle$]{$\langle$\texttt{index}$\rangle$}{$\langle$\texttt{true}$\rangle$}{$\langle$\texttt{false}$\rangle$}

Tests the box with the given \texttt{index} number from the box array \texttt{name} for emptiness be empty and executes \texttt{true} if it is empty, and \texttt{false} otherwise. If no \texttt{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \texttt{name} is used.
19.4 Box Dimensions

 Assigns the width of the box with the given \( \langle \text{index} \rangle \) number from the box array \( \langle \text{name} \rangle \) to a \( \langle \text{macro} \rangle \). If no \( \langle \text{name} \rangle \) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \( \langle \text{name} \rangle \) is used. If the \( \langle \text{index} \rangle \) is out of range, the \( \langle \text{macro} \rangle \) will be set to \texttt{0pt}.

\[
\texttt{\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}}
\]
\[
\begin{tabular}{ll}
\useboxarray{1} & width of box 1: \texttt{\boxarraygetwidth{\mylen}{1} \mylen} \\
\useboxarray{2} & width of box 2: \texttt{\boxarraygetwidth{\mylen}{2} \mylen} \\
\end{tabular}
\]

Test \hspace{1cm} width of box 1: 30.35799pt
width of box 2: 0pt

Assigns the height of the box with the given \( \langle \text{index} \rangle \) number from the box array \( \langle \text{name} \rangle \) to a \( \langle \text{macro} \rangle \). If no \( \langle \text{name} \rangle \) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \( \langle \text{name} \rangle \) is used. If the \( \langle \text{index} \rangle \) is out of range, the \( \langle \text{macro} \rangle \) will be set to \texttt{0pt}.

\[
\texttt{\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}}
\]
\[
\begin{tabular}{ll}
\useboxarray{1} & height of box 1: \texttt{\boxarraygetheight{\mylen}{1} \mylen} \\
\useboxarray{2} & height of box 2: \texttt{\boxarraygetheight{\mylen}{2} \mylen} \\
\end{tabular}
\]

Test \hspace{1cm} height of box 1: 9.89883pt
height of box 2: 0pt

Assigns the depth of the box with the given \( \langle \text{index} \rangle \) number from the box array \( \langle \text{name} \rangle \) to a \( \langle \text{macro} \rangle \). If no \( \langle \text{name} \rangle \) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \( \langle \text{name} \rangle \) is used. If the \( \langle \text{index} \rangle \) is out of range, the \( \langle \text{macro} \rangle \) will be set to \texttt{0pt}.

\[
\texttt{\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}}
\]
\[
\begin{tabular}{ll}
\useboxarray{1} & depth of box 1: \texttt{\boxarraygetdepth{\mylen}{1} \mylen} \\
\useboxarray{2} & depth of box 2: \texttt{\boxarraygetdepth{\mylen}{2} \mylen} \\
\end{tabular}
\]

Test \hspace{1cm} depth of box 1: 3.69884pt
depth of box 2: 0pt
Assigns the total height of the box with the given \( \langle index \rangle \) number from the box array \( \langle name \rangle \) to a \( \langle macro \rangle \). If no \( \langle name \rangle \) is given, the already existing default box array is used. It is considered an error, if a not existing box array \( \langle name \rangle \) is used. If the \( \langle index \rangle \) is out of range, the \( \langle macro \rangle \) will be set to 0pt.

\begin{tabular}{ll}
\useboxarray{1} & total height of box 1: \boxarraygettotalheight{\mylen}{1} \mylen \\
\useboxarray{2} & total height of box 2: \boxarraygettotalheight{\mylen}{2} \mylen
\end{tabular}

Test total height of box 1: 13.59767pt
total height of box 2: 0pt
19.5 Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

```latex
\documentclass[a4paper,landscape]{article}
\usepackage[noheadfoot,margin=0pt]{geometry}
\usepackage[skins,raster,magazine]{tcolorbox}
\usepackage{lipsum}
\newenvironment{leaflet}[1][{}]{%
  \begin{tcolorbox}[nobeforeafter,empty,colback=white,sharpcorners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm,width=\textwidth/3,breakable,break at=\textwidth,height fixed for=all,reset box array,store to box array,#1]}
  \begin{tcbitemize}[raster columns=3,raster equal skip=0pt,blankest]
    \tcbitem\consumeboxarray{5}
    \tcbitem\consumeboxarray{6}
    \tcbitem\consumeboxarray{1}
    \tcbitem\consumeboxarray{2}
    \tcbitem\consumeboxarray{3}
    \tcbitem\consumeboxarray{4}
  \end{tcbitemize}
}\end{tcolorbox}%
\pagestyle{empty}
\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize]at (frame.south) {- \arabic{tcbbreakpart} -};}]
  \includegraphics[width=\linewidth]{Basilica_5.png}
  \begin{center}
    \bfseries\LARGE Example
  \end{center}
  \section{Introduction}
  \lipsum[1]
  \section{Main Part A}
  \lipsum[2-8]
  \section{Main Part B}
  \lipsum[9-15]
  \section{Conclusion}
  \lipsum[16-18]
\end{leaflet}
\end{document}
```

3 Main Part B


4 Conclusion

The main purpose of this library is to support creation of single page posters with \texttt{tcolorboxes}. A \texttt{tcbposter} \cite{tcbposter} is a \texttt{tikzpicture} where \texttt{tcolorboxes} can be placed in a column oriented manner using \texttt{\posterbox} \cite{posterbox} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{raster} library, see Section 15 on page 287, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.

- The \texttt{tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like \texttt{nodes} are placed inside a \texttt{tikzpicture}. In contrast to \texttt{raster}, this is a \textit{single} page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

\textbf{Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpictures}.} This rule is violated by the \texttt{poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorboxes}.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{poster}
\end{verbatim}

This also loads the libraries \texttt{skins}, see Section 10 on page 152, \texttt{breakable}, see Section 18 on page 374, \texttt{magazine}, see Section 19 on page 399, and \texttt{fitting}, see Section 21 on page 422.

\section{Overview}

\begin{verbatim}
Click me to see the tutorial
\end{verbatim}

You get the best overview of the \texttt{poster} library and its facilities, if you look at the \textbf{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:

\texttt{tcolorbox-tutorial-poster.pdf}
This creates a \texttt{tikzpicture} environment with suitable additional settings defined by the given \texttt{(options)}. Basically, \texttt{posterbox} \textsuperscript{\texttt{P.415}} and \texttt{posterboxenv} \textsuperscript{\texttt{P.415}} are used to place \texttt{tcolorboxes} as nodes into the environment, but additional Ti\texttt{k}Z code can also be used. As \texttt{(options)} all \texttt{/tcb/posterset/} keys may be applied, namely:

- \texttt{/tcb/posterset/poster} \textsuperscript{\texttt{P.412}}: poster settings like columns, rows, sizes...
- \texttt{/tcb/posterset/coverage} \textsuperscript{\texttt{P.413}} and \texttt{/tcb/posterset/no coverage} \textsuperscript{\texttt{P.413}}: settings for a surrounding \texttt{tcolorbox} for background and margins.
- \texttt{/tcb/posterset/boxes} \textsuperscript{\texttt{P.414}}: style of the \texttt{tcolorboxes} used for the poster.
- \texttt{/tcb/posterset/fontsize} \textsuperscript{\texttt{P.414}}: scaling of used fonts.
Inside `\tcbposter`\textsuperscript{P.410}, there are several predefined TikZ nodes. These nodes share a common `/tcb/poster/prefix`\textsuperscript{P.412} which is `TCBPOSTER`\textsuperscript{P.410} by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded `tikzpicture` environment. You will never need this prefix using `\posterbox`\textsuperscript{P.415} and its placement options, but if you want to refer to a predefined node using pure TikZ code. The predefined nodes (shown without prefix) are:

- `poster`: defines the bounding box of the poster (without the coverage).
- `top`: top position plus row spacing
- `bottom`: bottom position minus row spacing
- `middle`: vertical middle position
- `col1, col2, ...`: bounding box of column 1, column 2, ...
- `row1, row2, ...`: bounding box of row 1, row 2, ...

Further nodes are defined using the `/tcb/posterloc/name`\textsuperscript{P.416} option.

\[\text{Never use a } \tcbposter \text{ inside a } \tcbposter. \text{ But, if you do anyway, use a different } /tcb/poster/prefix \text{ for the embedded poster or you surely get a total mess.}\]

There are several properties inside a `\tcbposter`\textsuperscript{P.410} which may be useful for advanced code (skip the following on first reading):

- `\tcbposterwidth`: Width of the poster (without margins).
- `\tcbposterheight`: Height of the poster (without margins).
- `\tcbpostercolspacing`: Column distance.
- `\tcbposterrowspacing`: Row distance.
- `\tcbpostercolumns`: Column quantity.
- `\tcbposterrows`: Row quantity.
- `\tcbpostercolwidth`: Width of a column.
- `\tcbposterrowheight`: Height of a row.

\texttt{\tcbposterset\{⟨options⟩\}}

Sets options for every following `\tcbposter`\textsuperscript{P.410} inside the current TeX group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{verbatim}
\tcbposterset{poster={columns=2,rows=3}}
\end{verbatim}

See `\tcbposter`\textsuperscript{P.410} for all feasible options.
20.3 Poster Settings

\[\texttt{/tcb/posterset/poster} = \lbrace \text{option list} \rbrace \] (style, no default)

This option can be applied inside \texttt{tcbposter} \footnote{P.410} and \texttt{tcbposterset} \footnote{P.411} to set the given poster \langle option list \rangle, e.g.

\[
\texttt{tcbposterset} \lbrace \text{poster} = \{ \text{width} = 20\text{cm}, \text{height} = 15\text{cm} \} \rbrace
\]

For the \langle option list \rangle, see the following keys.

\[\texttt{/tcb/poster/columns} = \langle \text{number} \rangle \] (no default, initially 3)

Sets the \langle number \rangle of columns for a \texttt{tcbposter}.

\[
\begin{tcbposter}[
  \text{poster} = \{ \text{showframe}, \text{columns} = 5, \text{rows} = 2, \text{spacing} = 1\text{mm}, \text{height} = 4\text{cm} \},
]\end{tcbposter}
\]

\[\texttt{/tcb/poster/rows} = \langle \text{number} \rangle \] (no default, initially 4)

Sets the \langle number \rangle of rows for a \texttt{tcbposter}.

\[\texttt{/tcb/poster/colspacing} = \langle \text{length} \rangle \] (no default, initially 4\text{mm})

Sets \langle length \rangle as distance between columns.

\[\texttt{/tcb/poster/rowspacing} = \langle \text{length} \rangle \] (no default, initially 4\text{mm})

Sets \langle length \rangle as distance between rows.

\[\texttt{/tcb/poster/spacing} = \langle \text{length} \rangle \] (style, no default, initially 4\text{mm})

Sets \langle length \rangle as distance between columns and rows.

\[\texttt{/tcb/poster/showframe} = \text{true} | \text{false} \] (default \text{true}, initially \text{false})

Displays a red auxiliary mesh as optical support during poster creation. Also, every \texttt{/tcb/posterloc/name} \footnote{P.416} is displayed.

\[\texttt{/tcb/poster/width} = \langle \text{length} \rangle \] (no default, initially \texttt{\linewidth})

Sets \langle length \rangle as width of the poster. For a typical poster, this has not to be set manually.

\[\texttt{/tcb/poster/height} = \langle \text{length} \rangle \] (no default, initially unset)

Sets \langle length \rangle as height of the poster. For a typical poster, this has not to be set manually, but is set automatically to an appropriate value.

\[\texttt{/tcb/poster/prefix} = \langle \text{name} \rangle \] (no default, initially \texttt{TCBPOSTER@})

\langle name \rangle is set as prefix for any \texttt{TikZ} node which is generated automatically by the \texttt{\texttt{\texttt{poster}}} library. This encompasses predefined nodes like \texttt{top}, \texttt{bottom}, \ldots, and nodes defined by using \texttt{/tcb/posterloc/name} \footnote{P.416}. Also, see Section 20.2 on page 410. For a typical poster, this value can stay as it is.

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20.4 Coverage

\texttt{\texttt{/tcb/posterset/coverage}={<\texttt{option list}>(style, no default)}}

This option can be applied inside \texttt{tcbposter} P.410 and \texttt{\textbackslash\texttt{tcbposterset}} P.411 and it adds an optional coverage for the poster which is a surrounding \texttt{tcolorbox} with the given \texttt{(option list)}. Here, margins and background settings for the poster can be given. The \texttt{coverage} has several default \texttt{tcolorbox} settings suitable for the purpose:

\begin{itemize}
  \item enhanced, frame hidden, sharp corners, boxsep=0pt, boxrule=0pt,
  \item top=4mm, bottom=4mm, left=4mm, right=4mm,
  \item toptitle=2mm, bottomtitle=2mm, colback=white
\end{itemize}

The \texttt{(option list)} can contain any \texttt{tcolorbox} option.

\begin{tcbposter}
\[ \texttt{poster = \{showframe,spacing=1mm\},}
\texttt{coverage = \{height=5cm,}
\texttt{\quad \texttt{interior style}={top color=yellow,bottom color=yellow!50!red},}
\texttt{\quad \texttt{watermark text}={My Poster},\texttt{watermark color}=white,}
\texttt{\}},
\]
\end{tcbposter}

- For a typical poster, the option \texttt{/tcb/spread} P.91 will use the whole page for the poster coverage.
- Poster margins can be adapted by \texttt{/tcb/left} P.39, \texttt{/tcb/right} P.40, \texttt{/tcb/top} P.42, \texttt{/tcb/bottom} P.43.
- Poster background can be changed by \texttt{/tcb/colback} P.27, \texttt{/tcb/interior style} P.153, \texttt{/tcb/interior style image} P.154, etc.

\texttt{\texttt{/tcb/posterset/no\ coverage}(style, no value, initially set)}

Removes the surrounding \texttt{tcolorbox} completely.
20.5 Common Box Settings

\texttt{/tcb/posterset/boxes} = \{\texttt{(option list)}\} \hspace{0.5cm} \text{(style, no default)}

This option can be applied inside \texttt{tcbposter} \(^{P.410}\) and \texttt{tcbposterset} \(^{P.411}\) and it is used to set up the style of the \texttt{tcolorbox}es inside the poster. The \texttt{(option list)} can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{tcbposter}
  \[ \begin{array}{l}
  \text{poster} = \{ \text{spacing}=2mm, \text{columns}=3, \text{rows}=2, \\
  \text{coverage} = \{ \text{height}=5cm, \\
  \hspace{1cm} \text{interior style} = \{ \text{top color}=yellow, \text{bottom color}=yellow!50!red \}, \\
  \}, \\
  \text{boxes} = \{ \text{sharp corners}=downhill, \text{arc}=3mm, \text{boxrule}=1mm, \\
  \hspace{1cm} \text{colback}=white, \text{colframe}=cyan, \\
  \hspace{1cm} \text{title style} = \{ \text{left color}=black, \text{right color}=cyan \}, \\
  \hspace{1cm} \text{fonttitle}=\textbf{\scshape}\}
  \end{array} \]
\end{tcbposter}

20.6 Font Scaling

\texttt{/tcb/posterset/fontsize} = \{\texttt{length}\} \hspace{0.5cm} \text{(style, no default, initially unset)}

This option can be applied inside \texttt{tcbposter} \(^{P.410}\) and \texttt{tcbposterset} \(^{P.411}\). It uses \texttt{/tcb/fit basedim} \(^{P.425}\) and \texttt{/tcb/fit fontsize} macros \(^{P.426}\) to redefine \texttt{\normalsize} to \texttt{\{length\}} and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly. This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{tcbposter}
  \begin{array}{l}
  \text{poster} = \{ \text{spacing}=2mm, \text{columns}=3, \text{rows}=2, \\
  \text{coverage} = \{ \text{height}=5cm, \\
  \hspace{1cm} \text{interior style} = \{ \text{top color}=yellow, \text{bottom color}=yellow!50!red \}, \\
  \}, \\
  \text{fontsize} = 15pt, \hspace{0.5cm} \% \texttt{\normalsize} \text{is now 15pt}
  \end{array}
\end{tcbposter}
20.7 Box Placement

Inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{(options)} and the given \texttt{(box content)} at a place determined by \texttt{(placement)}. All \texttt{(placement)} options are described in the following. Note that \texttt{(box content)} cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{tcbposter}[\begin{tcbverbatim}{width=\textwidth}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbverbatim}]
\posterbox[title=My title]{name=A,column=2,row=2}{My first box}
\end{tcbposter}

This is the environment version of \texttt{posterbox}, i.e. inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{(options)} and the given \texttt{(environment content)} at a place determined by \texttt{(placement)}. In contrast to \texttt{posterbox}, the \texttt{(environment content)} is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{tcbposter}[\begin{tcbverbatim}{width=\textwidth}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {size=small,beamer,
        colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbverbatim}]
\begin{posterboxenv}[title=My title]{name=A,column=2,between=top and bottom}
My first box.
\begin{tcblisting}{size=small,colback=yellow!10}
My \textbf{first}
poster listing.
\end{tcblisting}
\end{posterboxenv}
\end{tcbposter}
\begin{tcbposter}
  \begin{align*}
  \text{poster} & = \{\text{showframe, height=2.5cm, spacing=2mm, rows=2}, \\
  \text{boxes} & = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \\
  \end{align*}
  \end{tcbposter}

\begin{tcbposter}
  \begin{align*}
  \text{poster} & = \{\text{showframe, height=2.5cm, spacing=2mm, rows=2}, \\
  \text{boxes} & = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \\
  \end{align*}
  \end{tcbposter}

\begin{tcbposter}
  \begin{align*}
  \text{poster} & = \{\text{showframe, height=2.5cm, spacing=2mm, rows=2}, \\
  \text{boxes} & = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \\
  \end{align*}
  \end{tcbposter}
\begin{tcbposter}[
    poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
    boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
]
\posterbox{row=1,column=1}{First box}
\posterbox{row=1,column=2,rowspan=2}{Second box}
\posterbox[natural height]{row=1,column=3}{Third box}
\end{tcbposter}

\begin{tcbposter}[
    poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
    boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
]
\posterbox{row=1,column=1,rowspan=0.9}{First box}
\posterbox{row=1,column=2,rowspan=1.5}{Second box}
\posterbox{row=1,column=3,rowspan=2}{Third box}
\end{tcbposter}

\begin{tcbposter}[
    poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
    boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
]
\posterbox[\textcolor{red}{\scriptsize fixed height}]{row=1,column=1,rowspan=0.9}{First box}
\posterbox{row=1,column=2,rowspan=1.5}{Second box}
\posterbox{row=1,column=3,rowspan=2}{Third box}
\end{tcbposter}
The box is placed below another box with the given \( \langle \text{name} \rangle \). Also, \( \langle \text{name} \rangle \) can be a predefined node, see Section 20.2 on page 410.

\begin{tcbposter}
\begin{verbatim}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\posterbox{name=A,column=1,below=top}{First box}
\posterbox{name=B,column=1,below=A}{Second box}
\posterbox{name=C,column=2,below=B}{Third box}
\posterbox{name=D,column=3,below=row1}{Fourth box}
\end{tcbposter}

```
<table>
<thead>
<tr>
<th>col1</th>
<th>col2</th>
<th>col3</th>
</tr>
</thead>
<tbody>
<tr>
<td>row1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First box A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>row2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second box B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

The box is placed above another box with the given \( \langle \text{name} \rangle \). Also, \( \langle \text{name} \rangle \) can be a predefined node, see Section 20.2 on page 410.

\begin{tcbposter}
\begin{verbatim}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\posterbox{name=A,column=1,above=bottom}{First box}
\posterbox{name=B,column=1,above=A}{Second box}
\posterbox{name=C,column=2,above=B}{Third box}
\posterbox{name=D,column=3,above=row2}{Fourth box}
\end{tcbposter}

```
<table>
<thead>
<tr>
<th>col1</th>
<th>col2</th>
<th>col3</th>
</tr>
</thead>
<tbody>
<tr>
<td>row1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second box B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>row2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First box A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

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The box is placed at the position with the given \textit{name}. This is quite likely a predefined node, see Section 20.2 on page 410.

\begin{tcbposter}
\[\text{poster} = \{\text{showframe, height=3cm, spacing=2mm, rows=2}\},\]
boxes = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\},
\]
\begin{tcbox}{name=A, column=1, at=middle}\{\text{First box}\}
\begin{tcbox}{name=B, column=2, at=row1}\{\text{Second box}\}
\end{tcbposter}

\begin{tcbposter}
\[\text{poster} = \{\text{showframe, height=3cm, spacing=2mm, rows=2}\},\]
boxes = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\},
\]
\begin{tcbox}{name=A, column=1, below=top}\{\text{First box}\}
\begin{tcbox}{name=B, column=1, between=A and bottom}\{\text{Second box}\}
\begin{tcbox}{name=C, column=2, above=bottom}\{\text{Third box}\}
\begin{tcbox}{name=D, column=2, between=top and C, span=2}\{\text{Fourth box}\}
\begin{tcbox}{name=E, column=3, between=D and bottom}\{\text{Fifth box}\}
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given \langle sequence \rangle of placements. The feasible syntax for the \langle sequence \rangle is:

\begin{align*}
\langle \text{column a} \rangle & \text{ between } \langle \text{name a1} \rangle \text{ and } \langle \text{name a2} \rangle \text{ then} \\
\langle \text{column b} \rangle & \text{ between } \langle \text{name b1} \rangle \text{ and } \langle \text{name b2} \rangle \text{ then} \\
\langle \text{column c} \rangle & \text{ between } \langle \text{name c1} \rangle \text{ and } \langle \text{name c2} \rangle \text{ then} \ldots
\end{align*}

Obviously, this places the first part box at \langle column a \rangle between \langle name a2 \rangle and \langle name a2 \rangle. The second box part is placed at \langle column b \rangle between \langle name b2 \rangle and \langle name b2 \rangle, and so on.

If the box content of a /tcb/posterloc/sequence is too short to fill all reserved box parts, the empty boxes are drawn with the /tcb/plac eholder style. This style can be redefined, e.g. to /tcb/blankest \textsuperscript{P.243}, if nothing should be drawn for empty boxes.
Horizontal shift of a box by \texttt{\langle length \rangle}.

\begin{tcbposter}[ poster = \{showframe,height=3cm,spacing=2mm,rows=2\}, boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\}, ] \posterbox\texttt{name=A,column=1,row=1,xshift=6mm}\{First box\} \posterbox\texttt{name=B,column=2,row=2,xshift=-6mm}\{Second box\} \end{tcbposter}

Vertical shift of a box by \texttt{\langle length \rangle}.

\begin{tcbposter}[ poster = \{showframe,height=3cm,spacing=2mm,rows=2\}, boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\}, ] \posterbox\texttt{name=A,column=1,row=1,yshift=-4mm}\{First box\} \posterbox\texttt{name=B,column=2,row=2,yshift=4mm}\{Second box\} \end{tcbposter}
The library is loaded by a package option or inside the preamble by:
\tcbuselibrary{fitting}

### 21.1 Macros of the Library

\tcboxfit\{\textlangle options\textrangle}{\textlangle box content\textrangle}\}

Creates a colored box where the given \textlangle box content\textrangle is fitted to the width and height of the box. A \tcboxfit has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \textlangle options\textrangle for a tcolorbox \textsuperscript{P.12} can be used for \tcboxfit with some restrictions. A \tcboxfit cannot have a lower part and cannot be broken.

\begin{tcbarray}{colback=green!10!white,boxsep=1mm}
\begin{tcbarray}{raster columns=3,raster valign=bottom}
\tcbset\% \usepackage{lipsum} \tcbuselibrary{raster}
\begin{tcbarray}{height=4cm,title=With a title}{\lipsum[2]}
\end{tcbarray}
\begin{tcbarray}{height=4cm}{\lipsum[1]}
\end{tcbarray}
\begin{tcbarray}{height=4cm}{\lipsum[1]}
\end{tcbarray}
\end{tcbarray}
\end{tcbarray}
\begin{tcbarray}{colback=green!10!white,boxsep=1mm}
\begin{tcbarray}{height=4cm}{\lipsum[2]}
\end{tcbarray}
\begin{tcbarray}{height=4cm,title=With a title}{\lipsum[2]}
\end{tcbarray}
\end{tcbarray}


With a title

See Section 23.6 on page 455 for more elaborate methods to create new commands.

\newtcbboxfit{⟨init options⟩}{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}

Creates a new macro \(⟨name⟩\) based on \tcbboxfit\textsuperscript{-P.422}. Basically, \newtcbboxfit operates like \newcommand. The new macro \(⟨name⟩\) optionally takes \(⟨number⟩+1\) arguments, where \(⟨default⟩\) is the default value for the optional first argument. The \(⟨options⟩\) are given to the underlying tcbboxfit. The \(⟨init options⟩\) allow setting up automatic numbering, see Section 5 from page 111.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, width=4cm, height=1.5cm, halign=center]  \mybox\par  \mybox{This is my own box.}\par  \mybox{This is my own box with more text to be written.}\end{tcolorbox}

% %usepackage{lipsum}  \newtcbboxfit{⟨mybox⟩}{colback=red!5!white, colframe=red!75!black, fontsize=\textbf{series}, boxsep=1mm, left=0mm, right=0mm, top=0mm, bottom=0mm, halign=center, valign=center, nobeforeafter, width=#1, height=#2}  \mybox{2.5cm}{1cm}{First box}  \mybox{2.5cm}{1cm}{Second box with more text}\par  \mybox{5cm}{2cm}{Third box with text}\par  \mybox{5cm}{3cm}{\lipsum[1]}  

% %usepackage{lipsum}  \newtcbboxfit{⟨mybox⟩}{colback=yellow}{\lipsum[2]}  

\renewtcbboxfit{⟨init options⟩}{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}

Operates like \newtcbboxfit, but based on \renewcommand instead of \newcommand. An existing macro is redefined.

\tcbfontsize{⟨factor⟩}

Selects a font size inside a tcolorbox which is scaled with the given \(⟨factor⟩\) relative to \tcbfitdim.

\begin{tcolorbox}[fit basedim=10pt]  \mybox{colback=red!5!white, colframe=red!75!black}  \begin{tcolorbox}[fit basedim=10pt]  \tcbfontsize{0.25} Very tiny,\par  \tcbfontsize{0.5} Small,\par  \tcbfontsize{1} Normal,\par  \tcbfontsize{2} Large,\par  \tcbfontsize{4} Huge.  \end{tcolorbox}  \end{tcolorbox}
21.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the **fitbox capture mode**. Note that the fit control algorithm constructs a series of versions for the box and selects the 'best'. Therefore, the compilation time is quite longer than for a normal box. The algorithm will fail, if a different selected font size does not change the overall size of the box content. The \texttt{tcbfit} macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

\texttt{/tcb/fit} \hspace{1cm} \texttt{(style, initially unset)}

Sets the \texttt{/tcb/capture} mode to fitbox, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} acts like \texttt{tcbfit} where the given \texttt{⟨box content⟩} is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \texttt{tcbfitdim} can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \texttt{tcbfitsteps} for analysis.

```latex
\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}

\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}

\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
```


\texttt{/tcb/fit to=(width) and (height)} \textit{(style, initially unset)}
Shortcut for using \texttt{/tcb/fit to=P.424} and setting the \texttt{(width)} and \texttt{(height)} values separately.

\begin{tcolorbox}
\begin{tcboxed}{colback=red!5!white,colframe=red!75!black}
\texttt{\begin{tcboxed}[fit to=3cm and 2cm]
This box content is fitted to the given dimensions.
\end{tcboxed}
}\end{tcboxed}
\end{tcolorbox}

This box content is fitted to the given dimensions.

\texttt{/tcb/fit to height=(height)} \textit{(style, initially unset)}
Shortcut for using \texttt{/tcb/fit to=P.424} and setting the \texttt{(height)} value separately.

\begin{tcolorbox}
\begin{tcboxed}{colback=red!5!white,colframe=red!75!black}
\texttt{\begin{tcboxed}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcboxed}
}\end{tcboxed}
\end{tcolorbox}

This box content is fitted to the given height.

\texttt{/tcb/fit basedim=(length)} \textit{(no default, initially 10pt)}
Sets the starting font dimension for the font size adjustment algorithm to \texttt{(length)}. The algorithm never enlarges this dimension.

\begin{tcolorbox}
\begin{tcboxed}{colback=red!5!white,colframe=red!75!black}
\texttt{\begin{tcboxed}[fit to=4cm and 2cm]
Too few words for the box.
\end{tcboxed}
}\end{tcboxed}
\end{tcolorbox}

Too few words for the box.

\begin{tcolorbox}
\begin{tcboxed}{colback=red!5!white,colframe=red!75!black}
\texttt{\begin{tcboxed}[fit to=4cm and 2cm, fit basedim=50pt]
Enough words for the box.
\end{tcboxed}
}\end{tcboxed}
\end{tcolorbox}

Enough words for the box.

\texttt{/tcb/fit skip=(real value)} \textit{(no default, initially 1.2)}
Sets the skip value of the selected font to \texttt{(real value)} times \texttt{\tcbfitdim}.

\begin{tcolorbox}
\begin{tcboxed}{colback=red!5!white, colframe=red!75!black,left=1mm, right=1mm,boxsep=0mm}
\texttt{\begin{tcboxed}[fit to=5cm and 4cm, fit skip=1.0 ]
\lipsum[1] \end{tcboxed}}
\end{tcboxed}
\end{tcolorbox}

/tcb/fit fontsize macros
Redefines the standard \LaTeX font size macros \texttt{\tiny}, \texttt{\scriptsize}, \texttt{\footnotesize}, \texttt{\small}, \texttt{\normalsize}, \texttt{\large}, \texttt{\Large}, \texttt{\LARGE}, and \texttt{\huge}, to set font sizes relative to the current \texttt{tcbfitdim}. Note that the display skip values for mathematical formulas are respected by the redefined macros.

This text is not adapted:
\begin{tcolorbox}[fit to height=4cm]
\begin{lipsum}[2]
\end{tcolorbox}

This text is adapted:
\begin{tcolorbox}[fit to height=4cm, fit fontsize macros ]
\begin{lipsum}[2]
\end{tcolorbox}

The relative relative font size macros are also usable without the \texttt{fit} algorithm.
\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, fit fontsize macros]
The relative relative font size macros are also usable without the \texttt{fit} algorithm.\par
\end{tcolorbox}

Adapted title
\begin{tcolorbox}[height=5cm, fit fontsize macros, fonttitle=\normalsize\bseries, title=\adaptedtitle]
\end{tcolorbox}

\begin{tcolorbox}
% \usepackage{lipsum}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}

\begin{tcolorbox}[fit to height=4cm]\
\begin{Large}\bfseries This text is not adapted:\par\end{Large}\lipsum[2]\end{tcolorbox}

\begin{tcolorbox}[fit to height=4cm, fit fontsize macros ]\
\begin{Large}\bfseries This text is adapted:\par\end{Large}\lipsum[2]\end{tcolorbox}

\let\realHuge=\Huge

\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, fit fontsize macros]\
The relative relative font size macros are also usable without the \texttt{fit} algorithm.\par\end{tcolorbox}

\begin{tcolorbox}[height=5cm, fit fontsize macros, fonttitle=\normalsize\bseries, title=\adaptedtitle]\
\end{tcolorbox}

\tcbset{size=fbox, colback=red!5!white, colframe=red!75!black}
\tcbx{height=5cm, fit fontsize macros, fonttitle=\normalsize\bseries, title=\adaptedtitle}\
\lipsum[2]
The box is allowed to enlarge the fixed height up to the given (dimension), before a font size fit is applied. An optional /tcb/fit width plus is tried after the height adaptation.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

The box is allowed to enlarge the fixed width up to the given (dimension), before a font size fit is applied. An optional /tcb/fit height plus is tried before the width adaptation.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
Typically but not necessarily, the optional title of a \texttt{tcolorbox} is not part of the fit operation. If a /tcb/fit width plus is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use /tcb/phantom \textsuperscript{P.101} or /tcb/step and label \textsuperscript{P.101} to set counters or use automatic numbering, see Subsection 5.1 from page 111.

\texttt{tcb/fit width from}=(\textit{min}) \text{ to } (\textit{max})  \text{(style, no default)}

Sets the box width to (\textit{min}) and allows the width to grow up to (\textit{max}).

\begin{verbatim}
\% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
  right=1mm,boxsep=0mm,height=4cm}

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
\end{verbatim}


/tcb/fit height from=(min) to (max) (style, no default)
Sets the box height to (min) and allows the height to grow up to (max).

% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
bottom=1mm,right=1mm,boxsep=0mm,width=4cm,nobeforeafter,
fit height from=1cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\lipsum[2]
\texttt{/tcb/fit algorithm=⟨name⟩} (no default, initially \texttt{fontsize})

Sets the algorithm for the fitting process after optionally width and height are adapted. Feasible values for \texttt{⟨name⟩} are:

- \texttt{fontsize} (initial): The algorithm is a bisection method that adapts the font size until certain stop conditions are fulfilled. This is the most time-consuming method but it is robust and gives pleasant results.

  ! The used font has to be freely scalable for this method! Other content than text is not scaled down. The aspect ratio is fully guaranteed.

- \texttt{fontsize*}: First, the \texttt{fontsize} algorithm is applied. If the font was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- \texttt{areasize}: The algorithm calculates the area size for the text without scaling the font. The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is scaled down with a standard \texttt{\resizebox} macro.

  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- \texttt{areasize*}: The \texttt{areasize} algorithm is applied, but if the content was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- \texttt{hybrid}: First, this algorithm estimates the needed font size in one or two steps. Then an \texttt{areasize} fitting as above is applied.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- \texttt{hybrid*}: First, this algorithm estimates the needed font size in one or two steps. Then an \texttt{areasize*} fitting as above is applied.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- \texttt{squeeze}: The text box is brutally scaled down to fit.

  ! The aspect ratio is very likely to be horrible. You should not use this method for final documents.
Quality . . . . . . . . . . . . . . . . . . . . . . . . . . . . . versus . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Speed

Quality . . . . . . . . . . . . . . . . . . . . . . . . . . . . . versus . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Speed
The following options set control parameters for the fit algorithm. Mainly, they apply to the \texttt{fontsize} variant, see \texttt{/tcb/fit algorithm} \textsuperscript{p.430}. The options should be seen as experimental and are likely to change in future versions, if necessary.

\texttt{/tcb/fit maxstep=⟨number⟩} \hspace{0.5cm} (no default, initially \texttt{20})

Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the initial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

\texttt{/tcb/fit maxfontdiff=⟨dimension⟩} \hspace{0.5cm} (no default, initially \texttt{0.1pt})

The algorithm stops, if the font size is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxfontdiffgap=⟨dimension⟩} \hspace{0.5cm} (no default, initially \texttt{1pt})

The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxwidthdiff=⟨dimension⟩} \hspace{0.5cm} (no default, initially \texttt{1pt})

The algorithm stops, if the (optionally) flexible box width is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxwidthdiffgap=⟨dimension⟩} \hspace{0.5cm} (no default, initially \texttt{10pt})

The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit warning=⟨value⟩} \hspace{0.5cm} (no default, initially \texttt{off})

Typically, the fit control algorithm constructs several auxiliary boxes to determine the optimal one. If not switched off, the construction of the auxiliary boxes may produce many \texttt{hbox} warnings. This option key changes the \texttt{\hbadness} value.

- \texttt{off}: Most of \texttt{‘Underfull \hbox’} and \texttt{‘Overfull \hbox’} warnings are switched off (including the ones for the finally used box).
- \texttt{on}: All warnings for all auxiliary boxes are displayed.
- \texttt{final}: Only warnings for the finally used box are displayed. Note that an additional box has to be constructed for theses messages.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{hooks}

For the skin related options, the library \skins has to be loaded separately.

22.1 Concept of Hooks

A hook is a placeholder in some \LaTeX code where additional code can be added. For example, the \LaTeX macro \AtBeginDocument adds code to a hook which is placed at the beginning of every document.

Several option keys of \tcolorbox allow providing some code which is added to specific places of a colored box. For example, /tcb/before upper \footnote{P.65} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \hooks extends /tcb/before upper \footnote{P.65} and several more existing keys to 'hookable' versions, e.g. /tcb/before upper app \footnote{P.434} and /tcb/before upper pre \footnote{P.434}. The 'hookable' keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- \langle option key \rangle app: works like \langle option key \rangle but appends its code to the existing code.
- \langle option key \rangle pre: works like \langle option key \rangle but prepends its code to the existing code.

If the original \langle option key \rangle is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.

\begin{tcolorbox}
\begin{tabular}{|c|c|c|c|c|c|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
22.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 64.

\( /tcb/before\ title\ app=(code) \) (no default)

Appends the given (code) to /tcb/before title\(^{P.64}\) after the color and font settings and before the content of the title.

\( /tcb/before\ title\ pre=(code) \) (no default)

Prepends the given (code) to /tcb/before title\(^{P.64}\) after the color and font settings and before the content of the title.

\( /tcb/after\ title\ app=(code) \) (no default)

Appends the given (code) to /tcb/after title\(^{P.64}\) after the content of the title.

\( /tcb/after\ title\ pre=(code) \) (no default)

Prepends the given (code) to /tcb/after title\(^{P.64}\) after the content of the title.

\( /tcb/before\ upper\ app=(code) \) (no default)

Appends the given (code) to /tcb/before upper\(^{P.65}\) or /tcb/before upper*\(^{P.65}\) after the color and font settings and before the content of the upper part.

\( /tcb/before\ upper\ pre=(code) \) (no default)

Prepends the given (code) to /tcb/before upper\(^{P.65}\) or /tcb/before upper*\(^{P.65}\) after the color and font settings and before the content of the upper part.

\( /tcb/after\ upper\ app=(code) \) (no default)

Appends the given (code) to /tcb/after upper\(^{P.66}\) or /tcb/after upper*\(^{P.66}\) after the content of the upper part.

\( /tcb/after\ upper\ pre=(code) \) (no default)

Prepends the given (code) to /tcb/after upper\(^{P.66}\) or /tcb/after upper*\(^{P.66}\) after the content of the upper part.

\% \tcbuselibrary{theorems}
\begin{tcolorbox}[
ams align,\% this sets 'before upper*' and 'after upper*'\ncolback=yellow!10!white,colframe=red!50!black,\nbefore upper app=\{frac\{2\}\{sqrt\{2\}\}\}&\{sqrt\{2\}\}.\},
\text{after upper pre=\{sin\left(\{frac\{\pi\}{2}\}\right)\}&\{1\}.},\]
\sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\ (23)\n\int x^2 \text{d}x &= \frac13 x^3 + c. \ (24)\nsin \left(\frac{\pi}{2}\right) &= 1. \ (25)\end{tcolorbox}
### 22.3 Embedding into the Surroundings

The following option keys extend the options given in Subsection 4.14 from page 81.

- `/tcb/before lower app=(code)` (no default)
  Appends the given `(code)` to `/tcb/before lower` or `/tcb/before lower*` after the color and font settings and before the content of the lower part.

- `/tcb/before lower pre=(code)` (no default)
  Prepends the given `(code)` to `/tcb/before lower` or `/tcb/before lower*` after the color and font settings and before the content of the lower part.

- `/tcb/after lower app=(code)` (no default)
  Appends the given `(code)` to `/tcb/after lower` or `/tcb/after lower*` after the content of the lower part.

- `/tcb/after lower pre=(code)` (no default)
  Prepends the given `(code)` to `/tcb/after lower` or `/tcb/after lower*` after the content of the lower part.

---

```latex
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,before app={The box follows:\[4pt\]},
  after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The box follows:

<table>
<thead>
<tr>
<th>My title</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a <code>tcolorbox</code>.</td>
</tr>
</tbody>
</table>

This is the end.
22.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 74.

/tcb/overlay app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay."³⁷⁴.

/tcb/overlay pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay."³⁷⁴.

/tcb/overlay unbroken app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken."³⁷⁵.

/tcb/overlay unbroken pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken."³⁷⁵.

/tcb/overlay first app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay first."³⁷⁵.

/tcb/overlay first pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay first."³⁷⁵.
/tcb/overlay middle app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay middle
/tcb/overlay middle pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay middle
/tcb/overlay last app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay last
/tcb/overlay last pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay last
/tcb/overlay broken app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay broken
/tcb/overlay broken pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay broken
/tcb/overlay unbroken and first app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first
/tcb/overlay unbroken and first pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first
/tcb/overlay middle and last app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay middle and last
/tcb/overlay middle and last pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay middle and last
/tcb/overlay unbroken and last app={graphical code}
    Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last
/tcb/overlay unbroken and last pre={graphical code}
    Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last
22.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 169.

Watermarks are special overlays. The \texttt{\ac{hook}} library allows the combination of several watermarks and overlays.

\texttt{/tcb/watermark text app=\{text\}} \quad \text{(no default)}

Appends a /tcb/watermark text on P.169 to the colored box.

\begin{tcolorbox}
\begin{tcbset}{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}
\begin{tcbset}{enhanced,title=My title,watermark graphics=Basilica_5.png,watermark opacity=0.25,watermark text app=Basilica,watermark color=Navy}
\lipsum[1-2]
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

This example uses a public domain picture from \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

\texttt{/tcb/watermark text pre=\{text\}} \quad \text{(no default)}

Prepends a /tcb/watermark text on P.169 to the colored box.

\texttt{/tcb/watermark text app on=\{part\} is \{text\}} \quad \text{(no default)}

Appends a /tcb/watermark text on on P.169 the named \{part\} of a break sequence.

\texttt{/tcb/watermark text pre on=\{part\} is \{text\}} \quad \text{(no default)}

Prepends a /tcb/watermark text on on P.169 the named \{part\} of a break sequence.
/tcb/watermark graphics app = (file name)  
( no default)  
Appends a /tcb/watermark graphics\textsuperscript{P.170} referenced by (file name) to the colored box.

/tcb/watermark graphics pre = (file name)  
( no default)  
Prepends a /tcb/watermark graphics\textsuperscript{P.170} referenced by (file name) to the colored box.

/tcb/watermark graphics app on = (part) is (file name)  
( no default)  
Appends a /tcb/watermark graphics on\textsuperscript{P.170} the named (part) of a break sequence. The picture is referenced by (file name).

/tcb/watermark graphics pre on = (part) is (file name)  
( no default)  
Prepends a /tcb/watermark graphics on\textsuperscript{P.170} the named (part) of a break sequence. The picture is referenced by (file name).

/tcb/watermark tikz app = (graphical code)  
( no default)  
Appends a /tcb/watermark tikz\textsuperscript{P.171} with the given tikz (graphical code) to the colored box.

/tcb/watermark tikz pre = (graphical code)  
( no default)  
Prepends a /tcb/watermark tikz\textsuperscript{P.171} with the given tikz (graphical code) to the colored box.

\% \usepackage{tikz}  
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
watermark color=Navy,watermark opacity=0.25,  
smiley/.style={watermark tikz pre={  
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);  
\fill[red] (45:5mm) circle (1mm);  
\fill[red] (135:5mm) circle (1mm);  
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);}}}

\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark,  
smiley]  
\lipsum[1-2]  
\end{tcolorbox}

My title


/tcb/watermark tikz app on = (part) is (graphical code)  
( no default)  
Appends a /tcb/watermark tikz on\textsuperscript{P.171} the named (part) of a break sequence.

/tcb/watermark tikz pre on = (part) is (graphical code)  
( no default)  
Prepends a /tcb/watermark tikz on\textsuperscript{P.171} the named (part) of a break sequence.
## 22.6 Underlays

The following option keys extend the options given in Section 10.8 on page 199. There are no app type keys since underlays are stackable by default.

<table>
<thead>
<tr>
<th>Option Key</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/underlay pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay P.199</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay unbroken P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay first pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay first P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay middle pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay middle P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay last pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay last P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay boxed title pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay boxed title P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay broken pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay broken P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken and first pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay unbroken and first P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay middle and last pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay middle and last P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken and last pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay unbroken and last P.200</code>.</td>
</tr>
<tr>
<td><code>/tcb/underlay first and middle pre=(graphical code)</code></td>
<td>(no default)</td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/underlay first and middle P.200</code>.</td>
</tr>
</tbody>
</table>
22.7 Finishes

The following option keys extend the options given in Section 10.9 on page 201. There are no app type keys since finishes are stackable by default.

\[ /tcb/finish \textit{pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \)

\[ /tcb/finish \textit{unbroken pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{unbroken} \)

\[ /tcb/finish \textit{first pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{first} \)

\[ /tcb/finish \textit{middle pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{middle} \)

\[ /tcb/finish \textit{last pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{last} \)

\[ /tcb/finish \textit{broken pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{broken} \)

\[ /tcb/finish \textit{unbroken and first pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{unbroken and first} \)

\[ /tcb/finish \textit{middle and last pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{middle and last} \)

\[ /tcb/finish \textit{unbroken and last pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{unbroken and last} \)

\[ /tcb/finish \textit{first and middle pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/finish \textit{first and middle} \)

22.8 Skin Code

The following option keys extend the options given in Subsection 9.2 from page 141.

\[ /tcb/frame \textit{code app} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Appends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/frame \textit{code} \)

\[ /tcb/frame \textit{code pre} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Prepends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/frame \textit{code} \)

\[ /tcb/interior\textit{ titled code app} = \langle \textit{graphical code} \rangle \quad (\text{no default}) \]

Appends the given \( \langle \textit{graphical code} \rangle \) to \( /tcb/interior\textit{ titled code} \)
### 22.9 Extras

The following option keys extend the options given in Section 18.5 on page 382. There are no app type keys since extras are stackable by default.

- \texttt{/tcb/extras pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras.\footnote{382}

- \texttt{/tcb/extras unbroken pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras unbroken.\footnote{382}

- \texttt{/tcb/extras first pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras first.\footnote{382}

- \texttt{/tcb/extras middle pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras middle.\footnote{382}

- \texttt{/tcb/extras last pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras last.\footnote{382}

- \texttt{/tcb/extras broken pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras broken.\footnote{382}

- \texttt{/tcb/extras unbroken and first pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras unbroken and first.\footnote{382}

- \texttt{/tcb/extras middle and last pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras middle and last.\footnote{382}

- \texttt{/tcb/extras unbroken and last pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras unbroken and last.\footnote{382}

- \texttt{/tcb/extras first and middle pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/extras first and middle.\footnote{382}

### 22.10 Listings

The following option keys extend the options given in Section 16 from page 309.

- \texttt{/tcb/listing options app=\{\textit{options}\}}  
  (no default)
  Appends the given \textit{\langle options \rangle} to /tcb/listing options.\footnote{316}

- \texttt{/tcb/listing options pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/listing options.\footnote{316}

- \texttt{/tcb/minted options app=\{\textit{options}\}}  
  (no default)
  Appends the given \textit{\langle options \rangle} to /tcb/minted options.\footnote{319}

- \texttt{/tcb/minted options pre=\{\textit{options}\}}  
  (no default)
  Prepends the given \textit{\langle options \rangle} to /tcb/minted options.\footnote{319}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{xparse}

This also loads the package xparse [13].

The purpose of this library is to give comfortable access to the powerful document command production with xparse for tcolorbox. See the xparse package documentation [13] for details about the argument (\textit{specification}) used in this section.

### 23.1 Option Keys

\textbf{/tcb/verbatim} (style, no value)

Sets options for a \textit{verbatim} style \texttt{tcb} \textsuperscript{P.14}. Since the indented boxes may contain only very few words, the dimensions are made smaller and \texttt{/tcb/nobeforeafter} \textsuperscript{P.81} and \texttt{/tcb/tcbox raise base} \textsuperscript{P.99} are set.

\small
\begin{Verbatim}
\DeclareTotalTCBox{\myverb}{v}{verbatim, colframe=red!75!black, colupper=blue}{#1}
\end{Verbatim}
\small
\myverb{\textbf} is a \texttt{\LaTeX} command.

\textbf{/tcb/IfNoValueTF}={}\langle\textit{argument}\rangle\{\langle\textit{true options}\rangle\}\{\langle\textit{false options}\rangle\} (no default)

Wraps the \texttt{\textbackslash IfNoValueTF} command of \texttt{xparse} for option setting. If the \textit{argument} has no value, the \textit{true options} are set. Otherwise, the \textit{false options} are set.

\small
\begin{Verbatim}
\DeclareTColorBox{mybox}{o}{colframe=red!75!black, IfNoValueTF=#1}{colback=red!5!white}{enhanced,interior style image=#1}
\end{Verbatim}
\small
\begin{Verbatim}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[goldshade.png]
This is a tcolorbox.
\end{mybox}
\end{Verbatim}
\small
This is a tcolorbox.

This is a tcolorbox.
/tcb/IfValueTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩} (no default)
Wraps the \IfValueTF command of xparse for option setting. If the ⟨argument⟩ has a value, the ⟨true options⟩ are set. Otherwise, the ⟨false options⟩ are set.

\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[My title]
This is a tcolorbox.
\end{mybox}

/tcb/IfBooleanTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩} (no default)
Wraps the \IfBooleanTF command of xparse for option setting. If the ⟨argument⟩ is \BooleanTrue, the ⟨true options⟩ are set. If the ⟨argument⟩ is \BooleanFalse, the ⟨false options⟩ are set.

\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}*
This is a tcolorbox.
\end{mybox}
23.2 Producing tcolorbox Environments and Commands

\DeclareTColorBox{\langle init options\rangle}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Creates a new environment \langle name\rangle based on tcolorbox \textsuperscript{P.12}. Basically, \DeclareTColorBox operates like \DeclareDocumentEnvironment. This means, the new environment \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying tcolorbox \textsuperscript{P.12}. Note that /tcb/savedelimiter \textsuperscript{P.26} is set to the given \langle name\rangle automatically. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 111. The new environment is always created, irrespective of an already existing environment with the same name.

% counter from previous example
\DeclareTColorBox[use counter from=pabox]{mybox}{0\{red\} m d"" !0\{}{enlargelimits=false,formatextra=\textbf{}\{\thetcbcounter\},\IfValueTF{#3}{watermark text={#3}}{}}
\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[blue]{My title}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[green]{My title} "My Watermark"
This is a tcolorbox.
\end{mybox}
\begin{mybox}[yellow]{My title} [colbacktitle=yellow!50!white, coltitle=black]
This is a tcolorbox.
\end{mybox}
\begin{mybox}[purple]{My title} "All together" [coltitle=yellow]
This is a tcolorbox.
\end{mybox}
\NewTColorBox[(init options)]{(name)}{(specification)}{(options)}

Operates like \DeclareTColorBox\textsuperscript{P. 446}, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if \textit{name} has already been defined.

\RenewTColorBox[(init options)]{(name)}{(specification)}{(options)}

Operates like \DeclareTColorBox\textsuperscript{P. 446}, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox[(init options)]{(name)}{(specification)}{(options)}

Operates like \DeclareTColorBox\textsuperscript{P. 446}, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment \textit{name} is only created if it is not already defined.
\DeclareTotalTColorBox{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Creates a new command \langle name⟩ based on tcolorbox\textsuperscript{P.12}. In contrast to \DeclareTColorBox\textsuperscript{P.446}, also the \langle content⟩ of the tcolorbox is specified.

Basically, \DeclareTotalTColorBox operates like \DeclareDocumentCommand. This means, the new command \langle name⟩ is constructed with the given argument \langle specification⟩. The \langle options⟩ are given to the underlying tcolorbox\textsuperscript{P.12} which is filled with the specified \langle content⟩.

Note that /tcb/savedelimiter\textsuperscript{P.26} is set to the given \langle name⟩ automatically. The \langle init options⟩ allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTColorBox{\diabox}{O{} v m}
{ bicolor,nobeforeafter,equal height group=diabox,width=5.7cm,
  fonttitle=\bfseries\ttfamily,adjusted title={#2},center title,
  colframe=blue!20!black,leftupper=0mm,rightupper=0mm,colback=black!75!white,#1}
{ \tikz\path[fill zoom image={#2}] (0,0) rectangle (\linewidth,4cm);
  \tcblower #3}
\end{verbatim}

\begin{itemize}
  \item \diabox{blueshade.png} \{Created with GIMP. \url{http://www.gimp.org}\}
  \item \diabox{goldshade.png} \{Created with GIMP. \url{http://www.gimp.org}\}
\end{itemize}

\NewTotalTColorBox{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name⟩ has already been defined.

\RenewTotalTColorBox{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTColorBox{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name⟩ is only created if it is not already defined.
23.3 Producing \texttt{tcbox} Commands

\texttt{\DeclareTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}

Creates a new command \texttt{⟨name⟩} based on \texttt{tcbox}.\footnote{P.14}. Basically, \texttt{\DeclareTCBox} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{⟨name⟩} is constructed with the given argument \texttt{⟨specification⟩}. The \texttt{⟨options⟩} are given to the underlying \texttt{tcbox}.\footnote{P.14}. Note that /tcb/savedelimiter\footnote{P.26} is set to the given \texttt{⟨name⟩} automatically.

The \texttt{⟨init options⟩} allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTCBox[use counter from=pabox]{\mybox}{ s m s }{ nobeforeafter,colback=red!5!white,colframe=red!75!black, title={#2 (Box \thetcbcounter)},fonttitle=\bfseries, IfBooleanTF={#1}{enhanced,drop shadow}{}, IfBooleanTF={#3}{colbacktitle=red!50!white}{} }
\mybox{Bird}{This is my first box.}
\hfill
\mybox*{Tree}{This is my second box.}
\par\bigskip
\mybox{Bike}*{This is my third box.}
\hfill
\mybox*{City}*{This is my fourth box.}
\end{verbatim}

\NewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{⟨name⟩} has already been defined.

\RenewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{⟨name⟩} is only created if it is not already defined.
\DeclareTotalTCBox\[\langle \text{init options} \rangle \{ \langle \text{name} \rangle \}\{ \langle \text{specification} \rangle \}\{ \langle \text{options} \rangle \}\{ \langle \text{content} \rangle \}\]

Creates a new command \(\langle \text{name} \rangle\) based on \texttt{\tcbox^\textsuperscript{P.14}}. In contrast to \texttt{\DeclareTCBox^\textsuperscript{P.449}}, also the \(\langle \text{content} \rangle\) of the \tcbox is specified.

Basically, \texttt{\DeclareTotalTCBox} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \(\langle \text{name} \rangle\) is constructed with the given argument \(\langle \text{specification} \rangle\). The \(\langle \text{options} \rangle\) are given to the underlying \texttt{\tcbox^\textsuperscript{P.14}} which is filled with the specified \(\langle \text{content} \rangle\).

Note that /tcb/savedelimiter^\textsuperscript{P.26} is set to the given \(\langle \text{name} \rangle\) automatically.

The \(\langle \text{init options} \rangle\) allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTCBox{myverb}{ O{red} v !O{} }
{ fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt,
top=0pt,bottom=0pt,left=0mm,right=0mm,
leftrule=0pt,rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm,
colback=#1!10!white,colframe=#1!50!black,#3}{#2}
\end{verbatim}

To set a word \texttt{\textbf{bold}} in \texttt{myverb\{LaTeX\}}, use \texttt{myverb[green]{\textbf{bold}}}. Alternatively, write \texttt{myverb[yellow]{\bfseries bold}}.

In \texttt{myverb\{blue\}\{\LaTeX\}\{enhanced,fuzzy halo\}}, other font settings are done in the same way, e.g. \texttt{myverb\{\textit\}, myverb\{\itshape\}}\texttt{\} or \texttt{myverb\{brown\}\{\texttt\}, myverb\{brown\}\{\ttfamily\}}.

The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.

\begin{verbatim}
% \usepackage{listings} or \tcbuselibrary{listings}
\DeclareTotalTCBox{commandbox}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}
% \lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]\^#2^}
\end{verbatim}

\texttt{\lstinline{cd "My Documents"}} changes to directory \texttt{\commandbox{My Documents}}.

\texttt{\commandbox{dir /A}} lists the directory content.

\texttt{\commandbox{copy example.txt d:\target}} copies \texttt{\commandbox{example.txt}} to \texttt{\commandbox{d:\target}}.

\begin{itemize}
  \item \texttt{\textasciitilde cd "My Documents"} changes to directory \texttt{My Documents}.
  \item \texttt{\textasciitilde dir /A} lists the directory content.
  \item \texttt{\textasciitilde copy example.txt d:\target} copies \texttt{example.txt} to \texttt{d:\target}.
\end{itemize}
\NewTotalTCBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTCBox\textsuperscript{P.450}, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name \rangle has already been defined.

\RenewTotalTCBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTCBox\textsuperscript{P.450}, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTCBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTCBox\textsuperscript{P.450}, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name \rangle is only created if it is not already defined.

\tcboxverb[(options)]{⟨verbatim box content⟩}

Creates a colored box based on \tcbox\textsuperscript{P.14} which is fitted to the width of the given \langle verbatim box content \rangle. The underlying \tcbox\textsuperscript{P.14} is styled with /tcb/verbatim\textsuperscript{P.444} plus the given \langle options \rangle. The difference to \tcbox\textsuperscript{P.14} is that the \langle verbatim box content \rangle is interpreted verbatim. Therefore, \tcboxverb acts similar to \verb.

\tcboxverb{\LaTeX}, \tcboxverb[colback=blue!10!white,colupper=blue]{\LaTeX},
\tcboxverb[blank,fuzzy halo]{\LaTeX}, \tcboxverb[beamer]{\LaTeX},
\tcboxverb[enhanced,skin=enhancedmiddle jigsaw,colframe=red]{\LaTeX}.
23.4 Producing \texttt{tcblisting} Environments

Besides \texttt{xparse}, the following commands also need the \texttt{listings} library to be included.

\texttt{\DeclareTCBListing}\[\texttt{\[\langle init options\rangle\]}\{\texttt{\langle name\rangle}\}\{\texttt{\langle specification\rangle}\}\{\texttt{\langle options\rangle}\}]

Creates a new environment \texttt{\langle name\rangle} based on \texttt{tcblisting}\footnote{P.310}. Basically, \texttt{\DeclareTCBListing} operates like \texttt{\DeclareDocumentEnvironment}. This means, the new environment \texttt{\langle name\rangle} is constructed with the given argument \texttt{\langle specification\rangle}. The \texttt{\langle options\rangle} are given to the underlying \texttt{tcblisting}\footnote{P.310}. Note that \texttt{/tcb/savedelimiter}\footnote{P.26} is set to the given \texttt{\langle name\rangle} automatically.

The \texttt{\langle init options\rangle} allow setting up automatic numbering, see Section 5 from page 111. The new environment is always created, irrespective of an already existing environment with the same name.

\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}
\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}
\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\begin{mybox}\[colback=yellow\}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\begin{mybox}\{Listing Box\}}
\texttt{This is my \LaTeX\ box.\end{mybox}}

\texttt{\DeclareTCBListing} operates like \texttt{\DeclareDocumentEnvironment}, but based on \texttt{\NewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An error is issued if \texttt{\langle name\rangle} has already been defined.

\texttt{\RenewTCBListing} operates like \texttt{\DeclareTCBListing}, but based on \texttt{\RenewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An existing environment is redefined.

\texttt{\ProvideTCBListing} operates like \texttt{\DeclareTCBListing}, but based on \texttt{\ProvideDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. The environment \texttt{\langle name\rangle} is only created if it is not already defined.
With date of 2018-05-12, the \texttt{xparse} \cite{13} package changed the argument collection process. Now, spaces are ignored which leads to a serious change for listing environments ending with an optional argument like \texttt{0{}}. The former behaviour of respecting spaces can be preserved by adding a «!». Note that the following code uses \texttt{!0{}} now.

- For older \texttt{xparse} versions, the following code is correct when using \texttt{0{}}.
- For \texttt{xparse} of 2018-05-12, only the first two examples of the following code using \texttt{0{}} are really «good» – all others do not work.
- For \texttt{xparse} of 2018-05-12 and later, the following code is correct when using \texttt{!0{}}.

\begin{verbatim}
\DeclareTCBListing{mybox}{ !O{} }{listing only,#1}
\begin{mybox}[colframe=red]
\good
\end{mybox}
\begin{mybox}[colframe=red]\good\end{mybox}
\begin{mybox} \good\end{mybox}
\begin{mybox}\bad!\end{mybox}
\begin{mybox} \[\good\]\end{mybox}
\begin{mybox} \[\good\]\end{mybox}
\begin{mybox}\[\bad!\]\end{mybox}
\end{verbatim}
23.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Creates a new command ~\langle name\rangle~ based on \texttt{tcbinputlisting}\cite{tcbinputlisting}. Basically, \texttt{DeclareTCBInputListing} operates like \texttt{DeclareDocumentCommand}. This means, the new command ~\langle name\rangle~ is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying \texttt{tcbinputlisting}\cite{tcbinputlisting}.

The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{ 0}{0[red] m }{%
  listing file={#3},title=Listing~\thetcbcounter,
  colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
  fonttitle=\bfseries,listing only,#1}
\mylisting[before upper=\textit{This is the included file content:}] {blue}{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\NewTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{DeclareTCBInputListing}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \langle name\rangle has already been defined.

\begin{verbatim}
\RenewTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{DeclareTCBInputListing}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{DeclareTCBInputListing}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \langle name\rangle is only created if it is not already defined.
23.6 Producing \texttt{tboxfit} Commands

The following commands need the \texttt{fitting} library to be included.

\begin{verbatim}
\DeclareTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Creates a new command \texttt{\langle name \rangle} based on \texttt{tcboxfit} \textsuperscript{P.422}. Basically, \texttt{\DeclareTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{\langle name \rangle} is constructed with the given argument \texttt{\langle specification \rangle}. The \texttt{\langle options \rangle} are given to the underlying \texttt{tcboxfit} \textsuperscript{P.422}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \texttt{\langle name \rangle} automatically. The \texttt{\langle init options \rangle} allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTCBoxFit{mybox}{O{} m !o}
{colback=red!5!white,
 colframe=red!75!black,
 width=#2,height=#2/3*2,
 IfValueTF={#3}{height=#3}{},
 #1}
\mybox[colback=yellow]{5cm}
{\lipsum[2]}
\mybox[colback=yellow]{5cm}[4cm]{\lipsum[2]}
\end{verbatim}

\begin{verbatim}
\NewTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{\langle name \rangle} has already been defined.

\begin{verbatim}
\RenewTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{\langle name \rangle} is only created if it is not already defined.
\DeclareTotalTCBoxFit[(init\ options)]{(name)\{(specification)\}\{options\}\{content\}}

Creates a new command \(\text{name}\) based on \texttt{tcbfit}. In contrast to \texttt{DeclareTCBoxFit} \(^{P.455}\), also the \{content\} of the \texttt{tcbfit} is specified. Basically, \texttt{DeclareTotalTCBoxFit} operates like \texttt{DeclareDocumentCommand}. This means, the new command \texttt{name} is constructed with the given argument \{specification\}. The \{options\} are given to the underlying \texttt{tcbfit} \(^{P.422}\) which is filled with the specified \{content\}.

Note that \texttt{/tcb/savedelimiter} \(^{P.26}\) is set to the given \{name\} automatically. The \{init\ options\} allow setting up automatic numbering, see Section 5 from page 111. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTotalTCBoxFit{\multibox}{ O{} m O{10} m }
{nobebeforeafter, colback=red!5!white, colframe=red!75!black, width=#2, height=#2/3*2, valign=center, #1}
\{ \foreach \n in {1,...,#3} { #4} \}
\multibox{5cm}[I shall not repeat.]
\multibox[colframe=blue!75!white]{5cm}[20]{I shall not repeat.}\\
\multibox{5cm}[I shall not repeat.]
\end{verbatim}

\NewTotalTCBoxFit[(init\ options)]{(name)\{(specification)\}\{options\}\{content\}}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \texttt{name} has already been defined.

\RenewTotalTCBoxFit[(init\ options)]{(name)\{(specification)\}\{options\}\{content\}}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\ProvideTotalTCBoxFit[(init\ options)]{(name)\{(specification)\}\{options\}\{content\}}

Operates like \texttt{DeclareTotalTCBoxFit}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \texttt{name} is only created if it is not already defined.

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The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{external}
```

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The `external` library is something in between and can be seen as poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and `external` are:

- TikZ `external` compiles the whole original document in a sophisticated way while `external` uses only the preamble or a part of the preamble of the original document.
- TikZ `external` can automatically externalize all `tikzpicture` environments while `external` externalizes marked snippets only.
- Code snippets to be externalized by `external` are not restricted to `tikzpicture` environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use `external` instead of the more powerful TikZ `external`? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ `external` tends to choke on complicated documents where the sophisticated mechanism stumbles. Since `external` does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed.

Use `/tcb/external/force remake` to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the `--shell-escape` permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
### 24.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the `/tcb\EXTERNALIZE` command. Without this command, no externalization operation will be executed.

```
\documentclass[a4paper]{book}
% for example
\usepackage{...}
% ... typically, all or the very most settings for the document.
\tcb\EXTERNALIZE% Typically, just before \begin{document}

% Additional settings which are ABSOLUTELY irrelevant for the
% stand-alone snippets.
% 
\begin{document}
  % The document.
  % This also contains the marked snippets for externalization.
\end{document}
```

During compilation, a `/tcb/external/runner` file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

```
/tcb/external/runner=(file name)  % no default, initially \jobname_run.tex
```

Sets the `(file name)` for dynamically created `runner` file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

```
/tcbset{external/runner=myrunner.tex}
```

```
/tcb/external/prefix=(text)  % no default, initially external/
```

The `(text)` is prefixed to any `/tcb/external/name` for an externalization snippet. The initial setting implies saving all snippets into an `external/` subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

```
% Use a 'real' prefix instead of writing into a subdirectory:
/tcbset{external/prefix=ext_}
```

```
/tcb/external/externalize=true|false  % default true, initially true
```

If set to `true`, the marked snippets are compiled if necessary. If set to `false`, the marked snippets are not compiled but included as text. `/tcb/external/externalize` can only be used after `/tcb\EXTERNALIZE`.

```
/tcb/external/force remake=true|false  % default true, initially false
```

If set to `true`, the marked snippets are always compiled. If set to `true`, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the md5 checksum of the source snippet has changed.

```
/tcb/external/!
```

Shortcut for setting `/tcb/external/force remake` to `true`.

```
/tcb/external/-
```

Shortcut for setting `/tcb/external/externalize` to `false`.
24.2 Marking Externalization Snippets

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
  \path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);\end{tikzpicture}
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The \langle \texttt{name} \rangle is automatically prefixed with /tcb/external/prefix. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \langle \texttt{options} \rangle are keys from the /tcb/external/ key tree.

If a \texttt{tcolorbox}\textsuperscript{\texttt{P.\texttt{12}}} is externalized, one should use /tcb/nobeforeafter\textsuperscript{\texttt{P.\texttt{81}}} for the box. Indention and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}{minipage}{example_tcolorbox}
\begin{tcolorbox}[nobeforeafter,enhanced,fonttitle=\bfseries,title=Externalized Box,colframe=red!50!black,drop fuzzy shadow,interior style={fill overzoom image=goldshade.png}]
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.\end{tcolorbox}
\end{tcbexternal}

\begin{tcbexternal}{minipage}{example_tcolorbox}
\begin{tcolorbox}[enhanced,fonttitle=\bfseries,title=Externalized Box,colframe=red!50!black,drop fuzzy shadow,interior style={fill overzoom image=goldshade.png}]
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.\end{tcolorbox}
\end{tcbexternal}
The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.

\begin{tabular}{|l||r|r|r|r|r|}
\hline
Group & One  & Two  & Three & Four & Sum  \\
\hline
Red    & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00  \\
Green  & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00  \\
Blue   & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00  \\
\hline
Sum    & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00   \\
\hline
\end{tabular}

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00   \\
\hline
\end{tabularx}
\end{tcbexternal}

\begin{tcbexternal}[minipage]{example_tcolorbox2}
\color{white}
\% The interior of the tcolorbox is externalized.
\begin{tcbexternal}
\\begin{table}
\centering
\begin{tabular}{|l||r|r|r|r|r|}
\hline
\textbf{Group} & \textbf{One}  & \textbf{Two}  & \textbf{Three} & \textbf{Four} & \textbf{Sum}  \\
\hline
Red    & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00  \\
Green  & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00  \\
Blue   & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00  \\
\hline
Sum    & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00   \\
\hline
\end{tabular}
\caption{}
\end{table}
\end{tcbexternal}
\end{tcbexternal}

\texttt{/tcb/external/name=\langle name\rangle}

(no default, initially \texttt{unnamed})

The \langle name\rangle is automatically prefixed with \texttt{/tcb/external/prefix}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal}.

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
\textbf{Group} & \textbf{One}  & \textbf{Two}  & \textbf{Three} & \textbf{Four} & \textbf{Sum}  \\
\hline
Red    & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00  \\
Green  & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00  \\
Blue   & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00  \\
\hline
Sum    & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00   \\
\hline
\end{tabularx}
\end{tcbexternal}

This is an externalized version of \texttt{tcolorbox} \textsuperscript{P.12} created using \texttt{\textbackslash{newtcbexternalizetcolorbox}} \textsuperscript{P.466}:

\begin{extcolorbox}
\[\text{example_extcolorbox}\]
\[\text{enhanced,colframe=red!50!black,colback=yellow!10,}
\text{fonttitle=\textbf{bfseries},drop fuzzy shadow,}
\text{title=My external box}\]

This box is completely externalized.
\end{extcolorbox}

\begin{tcolorbox}
\[\text{colframe=blue,colback=blue!5,before skip=6pt}\]
Inner box.
\end{tcolorbox}

\end{extcolorbox}

\begin{itemize}
\item \textbf{Never} externalize numbered boxes.
\item \textbf{Never} externalize boxes which contain references to other things, e.g. using \texttt{\textbackslash ref} or \texttt{\textbackslash cite}.
\item \textbf{Never} externalize breakable boxes.
\end{itemize}
This is an externalized version of `tikzpicture` created using \texttt{newtcbexternalizeenvironment} \cite{p.466}:

\begin{center}
\begin{extikzpicture}
\begin{example_pgfplots}
\input{example_pgfplots}
\pgfplotsset{width=12cm}
\begin{axis}[
3d box=background,grid=major,
xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40,
mesh/interior colormap name=hot, colormap/blackwhite, z buffer=sort,domain=0:90,y domain=0:60, zmin=0,zmax=2,z post scale=1.2,]
\addplot3[surf,mesh/interior colormap name=blackwhite, colormap/hot,] ( {cos(x)},{sin(x)}, {2*sin(y)} );
\addplot3[surf] ( {2*cos(x)*cos(y)},{2*sin(x)*cos(y)}, {2*sin(y)} );
\end{axis}
\end{example_pgfplots}
\end{extikzpicture}
\end{center}
The text content of a `tcblisting` is externalized with the given \( \text{name} \). Note that the listing part is not externalized.

\begin{tcblisting}[externalize listing=example_listing,\
bicolor,colback=yellow!10,colframe=yellow!50!black,\
colbacklower=white,center lower]
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
\{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);\}
\end{tikzpicture}
\end{tcblisting}

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
\{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);\}
\end{tikzpicture}

A combination of '/tcb/externalize listing' and '/tcb/external/force remake' is externalized.

The text content of a `dispExample*` is externalized with the given \( \text{name} \). Note that the listing part is not externalized.

\begin{dispExample*}[sidebyside,externalize example=example_example]
\tikz\path[shading=ball,\
bball color=red] circle (7mm);
\end{dispExample*}

\tikz\path[shading=ball,\
bball color=red] circle (7mm);

A combination of '/tcb/externalize example' and '/tcb/external/force remake' is externalized.

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### 24.3 Customization

**/tcb/external/safety=(length)**  
(no default, initially 2mm)

The snippet box is surrounded with a safety border with a thickness of \( \langle \text{length} \rangle \). This border is automatically trimmed during picture inclusion. The reason for this mechanism is to catch box content which extrudes over the bounding box. For example, shadows of a tcolorbox are painted outside the bounding box and would be lost otherwise.

**/tcb/external/environment=(env)**  
(no default, initially unset)

Surrounds the exported snippet text with an environment \( \langle \text{env} \rangle \) without parameters. Note that this option is ignored for /tcb/externalize listing \(^{\text{P.463}}\).

**/tcb/external/environment with percent=true|false**  
(default true, initially true)

If set to true, the \texttt{\begin} and \texttt{\end} code of /tcb/external/environment is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

**/tcb/external/minipage=(length)**  
(default \texttt{\linewidth}, initially unset)

Surrounds the exported snippet text with a minipage. The optional \( \langle \text{length} \rangle \) parameter sets the width of the minipage. Note that the default width is the current line width of the main document. See tcbexternal \(^{\text{P.459}}\) for examples. Note that this option is ignored for /tcb/externalize listing \(^{\text{P.463}}\).

**/tcb/external/plain**  
(no value, initially set)

Removes any text which was set to surround the snippet. This removes the setting of /tcb/external/minipage, but is independent of /tcb/external/safety.

**/tcb/external/compiler=(text)**  
(no default, initially pdflatex)

Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{\pdfmdfivesum} primitive e.g. using the pdftexcmds package. This should work for xelatex and lualatex.

**/tcb/external/runs=(number)**  
(no default, initially 1)

Sets the number of compiler runs for the snippet.

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}[raster equal height,size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

One  
\Huge Two  
Three  
Four

**/tcb/external/input source on error=true|false**  
(default true, initially true)

If set to true, the source code of the snippet is loaded instead of the failed pdf picture. Typically, this will lead to an error stop at the faulty place of the source and such helps detecting the cause. If the source input compiles without error, the document setup may be incorrect, see Section 24.1 on page 458. Maybe, the external/ subdirectory has to be created manually in this case, see /tcb/external/prefix \(^{\text{P.458}}\).

If the option is set to false, the compilation stops immediately on an error. The log file of the external snippet has to be consulted for error messages in this case.
The given \texttt{⟨code⟩} is added before the snippet document. Typically, this means before \texttt{\documentclass}. This is not used for compilation of the main document.

The given \texttt{⟨options⟩} are passed to the given \texttt{⟨package⟩} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToPackage}. This not used for compilation of the main document.

The given \texttt{⟨options⟩} are passed to the given \texttt{⟨class⟩} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToClass}. This not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preclass} settings.

The given \texttt{⟨code⟩} is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \texttt{⟨options⟩} are added as parameter for \texttt{\tcbset} to the preamble of the snippet document. This are not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preamble} settings.

Expands to \texttt{⟨true⟩}, if executed during snippet compilation, and to \texttt{⟨false⟩}, if executed during main document compilation. This can be used before \texttt{\tcbEXTERNALIZE} to give different setting to snippet and main document.

\begin{verbatim}
\tcbifexternal{
    \usepackage{onlyforexternal}
  }{
    \usepackage{onlyformain}
}
\end{verbatim}
\newtcbexternalizeenvironment{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin⟩}{⟨end⟩}

Creates a new environment ⟨newenv⟩ which is based on tcbexternal \textsuperscript{P.459}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to tcbexternal \textsuperscript{P.459}. Further, the given ⟨options⟩ are always added to the option list of tcbexternal \textsuperscript{P.459}.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. The included image is prepended by ⟨begin⟩ and appended by ⟨end⟩.

extikzpicture \textsuperscript{P.462} is an example application for \newtcbexternalizeenvironment.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C \\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b \\
\hline
\end{extabular}

\renewtcbexternalizeenvironment{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin⟩}{⟨end⟩}

Identical to \newtcbexternalizeenvironment, but the environment ⟨newenv⟩ is created by \renewenvironment instead of \newenvironment.

\newtcbexternalizetcolorbox{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin⟩}{⟨end⟩}{⟨begin end options⟩}

Creates a new environment ⟨newenv⟩ which is based on tcbexternal \textsuperscript{P.459}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to tcbexternal \textsuperscript{P.459}. Further, the given ⟨options⟩ are always added to the option list of tcbexternal \textsuperscript{P.459}.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. In contrast to \newtcbexternalizeenvironment, the environment ⟨env⟩ is intended to be based on tcolorbox \textsuperscript{P.12} or tcblisting \textsuperscript{P.310}.

The ⟨begin end options⟩ are options for settings the space before and after the included image using /tcb/before \textsuperscript{P.81}, /tcb/before skip \textsuperscript{P.83}, /tcb/after \textsuperscript{P.81}, or /tcb/after skip \textsuperscript{P.83}.

Use the exact identical values for /tcb/before \textsuperscript{P.81} and /tcb/after \textsuperscript{P.81} inside ⟨begin end options⟩ as they where used for definition of ⟨env⟩! Otherwise, externalized and non-externalized version will have different spacings.

extcolorbox \textsuperscript{P.461} is an example application for \newtcbexternalizetcolorbox.

\newtcblisting{myownlisting}{2}[]{
  enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,
  title={#2}#{1}
}

\newtcbexternalizetcolorbox{exmyownlisting}{myownlisting}{minipage}%
{before skip=6pt,after skip=6pt}% same values as for mylisting
This is my \LaTeX\ box.

This is my \LATEX\ box.

\renewtcbexternalizetcolorbox\{⟨newenv⟩\}{⟨env⟩}\{⟨options⟩\}\{⟨begin\ end\ options⟩\}

Identical to \newtcbexternalizetcolorbox \footnote{p. 466}, but the environment ⟨newenv⟩ is created by \renewenvironment instead of \newenvironment.

\tcbiffileprocess\{⟨condition⟩\}{⟨source⟩}\{⟨md5-file⟩\}{⟨target⟩}\{⟨true⟩\}{⟨false⟩}\n
This is a low-level macro which is internally used. The MD5 digest of a ⟨source⟩ file is compared with a stored MD5 digest from an auxiliary ⟨md5-file⟩. If they are not equal, the auxiliary ⟨md5-file⟩ is updated to store the current MD5 digest. Further,

• if ⟨condition⟩ equals 0, ⟨true⟩ is executed.
• if ⟨condition⟩ equals 1:
  If the current and stored MD5 digests were different, ⟨true⟩ is executed. Otherwise, if the ⟨target⟩ file is not existing, ⟨true⟩ is executed. Otherwise, if the ⟨target⟩ file is older than the ⟨md5-file⟩, ⟨true⟩ is executed. Otherwise, ⟨false⟩ is executed.
• if ⟨condition⟩ equals 2, ⟨false⟩ is executed.

The intended processing purpose of the ⟨true⟩ code is to produce a ⟨target⟩ file from the given ⟨source⟩ file.
24.4 Troubleshooting and FAQ

- I use the default settings, but the external subdirectory is not created. Depending on operating system and compiler, an external subdirectory is automatically created or not. If not, create such a directory manually or add the following to your document:

\ShellEscape{mkdir external}

or

\ShellEscape{mkdir -p external}

If the combination of /tcb/external/prefix \(^{\text{P.458}}\) and chosen snippet name points to another subdirectory than external, this has to be adapted.

- I use the minted package and I get a cache directory for every externalized snippet.
To avoid this problem, there are several ways.

  – If you do not need minted inside the snippet code, you may use \usepackage[minted] after \tcbEXTERNALIZE \(^{\text{P.458}}\) or use \tcbifexternal \(^{\text{P.465}}\) to switch minted off for the external code. If minted is already included by another package, add the following to your preamble:

    \tcbset{external/PassOptionsToPackage={draft}{minted}}

  – If minted is needed for the snippet code, caching can be switched off by adding the following to your preamble:

    \tcbset{external/PassOptionsToPackage={cache=false}{minted}}

Alternatively, the cachedir option of minted may be used to redirect the cache.

\(^5\) The shellesc package is loaded automatically by the library.
This library has the single purpose to support \LaTeX{} package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s pgf \cite{pgf} documentation. Typically, this library is assumed to be used in conjunction with the class \texttt{ltxdoc} or alike.

The library is loaded by a package option or inside the preamble by:

\begin{quote}
\texttt{\tcbuselibrary{documentation}}
\end{quote}

This also loads the library \texttt{listings}, see Section 16 on page 309, the library \texttt{skins}, see Section 10 on page 152, the library \texttt{xparse}, see Section 23 on page 444, and a bunch of packages, namely \texttt{pifont}, \texttt{marvosym}, \texttt{makeidx}, \texttt{marginnote}, \texttt{recount}, and \texttt{hyperref}.

The package \texttt{makeidx} is loaded only, if \texttt{\textbackslash printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{\textbackslash imakeidx before} the library \texttt{documentation} is used.

The package \texttt{marginnote} is loaded only, if \texttt{\textbackslash marginnote} is not already defined.

In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{\textcolor{documentation}} are typically not getting reset by /\texttt{tcb/\textbackslash reset} \textsuperscript{P.109}, i.e. they keep their values for embedded boxes.

In combination with DocStrip, /\texttt{tcb/\textbackslash verbatim ignore percent} \textsuperscript{P.130} may be helpful.

For UTF-8 support load (ignore this when using Xe\LaTeX{}):

\begin{quote}
\texttt{\tcbuselibrary{listingsutf8,documentation}}
\end{quote}

For \texttt{minted} \cite{minted} support, load:

\begin{quote}
\texttt{\tcbuselibrary{documentation,minted}}
\texttt{\tcbset{listing engine=minted}}
\end{quote}

\section{Macros of the Library}

\begin{quote}
\begin{verbatim}
\begin{docCommand}\langle options\rangle\{\langle name\rangle\}{\langle parameters\rangle}
\end{docCommand}
\end{verbatim}
\end{quote}

Documents a \LaTeX{} macro with given \langle name\rangle where \langle name\rangle is written without backslash. The given \langle options\rangle are set with \texttt{\tcbset} \textsuperscript{P.13}. This macro takes mandatory or optional \langle parameters\rangle. It is automatically indexed and can be referenced with \texttt{\textcolor{documentation}} \textsuperscript{P.476}\langle name\rangle.

\begin{quote}
\begin{verbatim}
\begin{docCommand}\foomakedocSubKey\{\langle name\rangle\}{\langle key path\rangle}
\end{docCommand}
\end{verbatim}
\end{quote}

Creates a new environment \texttt{\textcolor{name}} based on \texttt{\textcolor{docKey} for the documentation of keys with the given \texttt{\textcolor{key path} \texttt{/docCommand}}.

\begin{quote}
\begin{verbatim}
\foomakedocSubKey\{\langle name\rangle\}{\langle key path\rangle}
\end{verbatim}
\end{quote}

Creates a new environment \langle name\rangle based on \texttt{\textcolor{docKey} \textsuperscript{P.471} for the documentation of keys with the given \langle key path\rangle.
\begin{docCommand}[color definition=blue]{foomakedocSubKey*}\
\marg{name}\marg{key path}
Creates a new environment \meta{name} based on \refEnv{docKey} for the documentation of keys with the given \meta{key path}.
\end{docCommand}\

\begin{foomakedocSubKey*}{⟨\marg{name}\rangle}{⟨\marg{key path}\rangle}
Creates a new environment ⟨name⟩ based on \texttt{docKey} \textsuperscript{P.471} for the documentation of keys with the given ⟨key path⟩.
\end{foomakedocSubKey*}\

\begin{docCommand*}[⟨\marg{options}\rangle]{⟨\marg{name}\rangle}{⟨\marg{parameters}\rangle}
\(\text{(command description)}\)
\end{docCommand*}\

Identical to \texttt{docCommand} \textsuperscript{P.469}, but without index entry.

\begin{docEnvironment*}[⟨\marg{options}\rangle]{⟨\marg{name}\rangle}{⟨\marg{parameters}\rangle}
\(\text{(environment description)}\)
\end{docEnvironment*}\

Documents a \LaTeX{} environment with given ⟨name⟩. The given ⟨options⟩ are set with \texttt{\tcbset} \textsuperscript{P.13}. This environment takes mandatory or optional ⟨parameters⟩. It is automatically indexed and can be referenced with \texttt{\refEnv} \textsuperscript{P.476}{⟨\name⟩}.

\begin{docEnvironment}{foocolorbox}{⟨\marg{options}\rangle}\
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}\

\begin{foocolorbox}{⟨\marg{options}\rangle}\
\(\text{(environment description)}\)
\end{foocolorbox}\

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment}\
\[\text{[doclang/environment content=My content text]}\]
\marg{foocolorbox}\marg{options}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}\

\begin{foocolorbox}{⟨\marg{options}\rangle}\
\(\text{(My content text)}\)
\end{foocolorbox}\

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}[⟨\marg{options}\rangle]{⟨\marg{name}\rangle}{⟨\marg{parameters}\rangle}
\(\text{(environment description)}\)
\end{docEnvironment*}\

Identical to \texttt{docEnvironment}, but without index entry.
\begin{docKey}[(key path)] [(options)]{(name)}{(parameters)}{(description)}
\end{docKey}

Documents a key with given \langle name \rangle and an optional \langle key path \rangle. The given \langle options \rangle are set with \texttt{\textbackslash tcset} \texttt{\textasciitilde P.13}. This key takes mandatory or optional \langle parameters \rangle as value with a short \langle description \rangle. It is automatically indexed and can be referenced with \texttt{\textbackslash refKey \textasciitilde P.477\{\langle name\}\}}.

\begin{docKey}[foo]{footitle}{=\texttt{\textbackslash meta\{text\}}}{no default, initially empty}
Creates a heading line with \texttt{\textbackslash meta\{text\}} as content.
\end{docKey}

\begin{docPathOperation}[(options)]{(name)}{(parameters)}
\end{docPathOperation}

Documents a Ti\textsc{k}Z path operation with given \langle name \rangle. The given \langle options \rangle are set with \texttt{\textbackslash tcset} \texttt{\textasciitilde P.13}. This Ti\textsc{k}Z path operation takes mandatory or optional \langle parameters \rangle. It is automatically indexed and can be referenced with \texttt{\textbackslash refPathOperation \textasciitilde P.477\{\langle name\}\}}.

\begin{docValue}{(name)}
Documents a value with given \langle name \rangle. Typically, this is a value for a key. This value is automatically indexed.
\end{docValue}

\begin{docPathOperation*}[(options)]{(name)}{(parameters)}
\end{docPathOperation*}

Identical to \texttt{docPathOperation}, but without index entry.

\begin{docValue*}{(name)}
Identical to \texttt{docValue}, but without index entry.
\end{docValue*}
\docAuxCommand\{(name)\}
Documents an auxiliary or minor \LaTeX\ macro with given \(\langle name\rangle\) where \(\langle name\rangle\) is written without backslash. This macro is automatically indexed.

The macro \docAuxCommand\{fooaux\} holds some interesting data.

The macro \fooaux holds some interesting data.

\docAuxCommand*\{(name)\}
Identical to \docAuxCommand, but without index entry.

\docAuxEnvironment\{(name)\}
Documents an auxiliary or minor \LaTeX\ environment with given \(\langle name\rangle\). This macro is automatically indexed.

The environment \docAuxEnvironment\{fooauxenv\} holds some interesting data.

The environment \fooauxenv holds some interesting data.

\docAuxEnvironment*[\{(key path)\}\{\langle name\rangle\}]
Identical to \docAuxEnvironment, but without index entry.

\docAuxKey\{(key path)\}\{\langle name\rangle\}
Documents an auxiliary key with given \(\langle name\rangle\) and an optional \(\langle key path\rangle\). It is automatically indexed.

The key \docAuxKey[foo]{fooaux} holds some interesting data.

The key /foo/fooaux holds some interesting data.

\docAuxKey*[\{(key path)\}\{\langle name\rangle\}]
Identical to \docAuxKey, but without index entry.

\docCounter\{(name)\}
Documents a counter with given \(\langle name\rangle\). The counter is automatically indexed.

The counter \docCounter\{foocounter\} can be used for computation.

The counter \foocounter can be used for computation.

\docCounter*[\{(name)\}]
Identical to \docCounter, but without index entry.

\docLength\{(name)\}
Documents a counter with given \(\langle name\rangle\). The counter is automatically indexed.

The length \docLength\{foolength\} can be used for computation.

The length \foolength can be used for computation.

\docLength*[\{(name)\}]
Identical to \docLength, but without index entry.
\docColor{(name)}
Documents a color with given <i>(name)</i>. The color is automatically indexed.

<table>
<thead>
<tr>
<th>The color \docColor{foocolor} is available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The color foocolor is available.</td>
</tr>
</tbody>
</table>

\docColor*{(name)}
Identical to \docColor, but without index entry.

\cs{(name)}
Macro from ltxdoc [3] to typeset a command word <i>(name)</i> where the backslash is prefixed. The library overwrites the original macro.

<table>
<thead>
<tr>
<th>This is a \cs{foocommand}.</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a \foocommand.</td>
</tr>
</tbody>
</table>

\meta{<text>}
Macro from doc [8] to typeset a \meta <i>(text)</i>. The library overwrites the original macro.

<table>
<thead>
<tr>
<th>This is a \meta{text}.</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a &lt;text&gt;.</td>
</tr>
</tbody>
</table>

\marg{<text>}
Macro from ltxdoc [3] to typeset a \marg <i>(text)</i> with curly brackets as a mandatory argument. The library overwrites the original macro.

<table>
<thead>
<tr>
<th>This is a mandatory \marg{argument}.</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a mandatory {&lt;argument&gt;}.</td>
</tr>
</tbody>
</table>

\oarg{<text>}
Macro from ltxdoc [3] to typeset a \oarg <i>(text)</i> with square brackets as an optional argument. The library overwrites the original macro.

<table>
<thead>
<tr>
<th>This is an optional \oarg{argument}.</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is an optional [(&lt;argument&gt;)].</td>
</tr>
</tbody>
</table>

\brackets{<text>}
Sets the given \brackets <i>(text)</i> with curly brackets.

<table>
<thead>
<tr>
<th>Here we use \brackets{some text}.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Here we use {some text}.</td>
</tr>
</tbody>
</table>
\begin{dispExample}
\begin{tcolorbox}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcolorbox}
\end{dispExample}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\begin{dispExample*}{sidebyside}
\begin{tcolorbox}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcolorbox}
\begin{tcolorbox}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcolorbox}
\end{dispExample*}

The starred version of \texttt{dispExample} takes \texttt{tcolorbox} as parameter. These \texttt{options} are executed after \texttt{/tcb/docexample}. It may be changed by redefining this style.

\begin{dispExample*}{sidebyside}
\begin{tcolorbox}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcolorbox}
\begin{tcolorbox}
\begin{verbatim}
This is a \LaTeX\ example.
\end{verbatim}
\end{tcolorbox}
\end{dispExample*}
\begin{dispListing}
(environment content)
\end{dispListing}

Creates a colored box based on a \texttt{tcolorbox} \(^{\text{P.12}}\). It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style} \(^{\text{P.479}}\) and the style \texttt{/tcb/docexample} \(^{\text{P.479}}\). It may be changed by redefining this style.

\begin{dispListing}
This is a \LaTeX\ example.
\end{dispListing}

\begin{dispListing*}{(options)}
(environment content)
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox} \(^{\text{P.12}}\) \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \(^{\text{P.479}}\).

\begin{dispListing*}{title=My listing}
This is a \LaTeX\ example.
\end{dispListing*}

\begin{absquote}
⟨environment content⟩
\end{absquote}

Used to typeset an abstract as quoted and small text.

\begin{absquote}
\texttt{tcolorbox} provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.\end{absquote}

\texttt{tcolorbox} provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\texttt{tcbmakedocSubKey\{⟨name⟩\}{⟨key path⟩}}

Creates a new environment \texttt{⟨name⟩} based on \texttt{docKey} for the documentation of keys with the given \texttt{⟨key path⟩} as default. The new environment \texttt{⟨name⟩} takes the same parameters as \texttt{docKey} itself. A second starred environment \texttt{⟨name⟩} is also created, which is identical to \texttt{⟨name⟩} but without index entry.

\begin{verbatim}
\tcbmakedocSubKey{docFooKey}{foo}
\begin{docFooKey}{foodummy}{=\texttt{\meta}\{nothing\}}{no default, initially empty}
Some key.
\end{docFooKey}
\begin{docFooKey*}{foo another dummy}{=\texttt{\meta}\{nothing\}}{no default, initially empty}
Some key (not indexed).
\end{docFooKey*}
\end{verbatim}

\texttt{/foo/foodummy={nothing}} (no default, initially empty)
Some key.
\texttt{/foo/foo another dummy={nothing}} (no default, initially empty)
Some key (not indexed).

\texttt{\refCom\{⟨name⟩\}}

References a documented \LaTeX macro with given \texttt{⟨name⟩} where \texttt{⟨name⟩} is written without backslash. The page reference is suppressed if it links to the same page.

\begin{verbatim}
We have created \refCom{foomakedocSubKey} as an example.
We have created \foomakedocSubKey as an example.
\end{verbatim}

\texttt{\refCom*\{⟨name⟩\}}

References a documented \LaTeX macro with given \texttt{⟨name⟩} where \texttt{⟨name⟩} is written without backslash. There is no page reference.

\begin{verbatim}
We have created \refCom*{foomakedocSubKey} as an example.
We have created foomakedocSubKey as an example.
\end{verbatim}

\texttt{\refEnv\{⟨name⟩\}}

References a documented \LaTeX environment with given \texttt{⟨name⟩}. The page reference is suppressed if it links to the same page.

\begin{verbatim}
We have created \refEnv{foocolorbox} as an example.
We have created foocolorbox as an example.
\end{verbatim}

\texttt{\refEnv*\{⟨name⟩\}}

References a documented \LaTeX environment with given \texttt{⟨name⟩}. There is no page reference.

\begin{verbatim}
We have created \refEnv*{foocolorbox} as an example.
We have created foocolorbox as an example.
\end{verbatim}
\refKey\{(name)\}
References a documented key with given \textit{name} where \textit{name} is the full path name of the
key. The page reference is suppressed if it links to the same page.

We have created \refKey{/foo/footitle} as an example.

We have created /foo/footitle \textsuperscript{P. 471} as an example.

\refKey*\{(name)\}
References a documented key with given \textit{name} where \textit{name} is the full path name of the
key. There is no page reference.

We have created \refKey*{/foo/footitle} as an example.

We have created /foo/footitle as an example.

\refPathOperation\{(name)\}
References a documented TikZ path operation with given \textit{name}. The page reference is
suppressed if it links to the same page.

We have created \refPathOperation{fooop} as an example.

We have created fooop \textsuperscript{P. 471} as an example.

\refPathOperation*\{(name)\}
References a documented TikZ path operation with given \textit{name}. There is no page refer-
ence.

We have created \refPathOperation*{fooop} as an example.

We have created fooop as an example.

\refAux\{(name)\}
References some auxiliary environment, key, value, or color. The hyperlink color is used,
but there is no real link.

Some pages back, one can see \refAux{/foo/footitle} as an example.

Some pages back, one can see /foo/footitle as an example.

\refAuxcs\{(name)\}
References some auxiliary macro \textit{name} where \textit{name} is written without backslash. The
hyperlink color is used, but there is no real link.

Some pages back, one can see \refAuxcs{fooaux} as an example.

Some pages back, one can see \texttt{fooaux} as an example.
\textbf{Sets} \langle text \rangle \textbf{with the command color}, see \textit{/tcb/color command} \textsuperscript{\textit{P.481}}.

This is my \textbf{\textcolor{red}{\colDef{text}}}. This is my \textbf{\textcolor{blue}{\colDef{text}}}.

\textbf{Sets} \langle text \rangle \textbf{with the option color}, see \textit{/tcb/color option} \textsuperscript{\textit{P.481}}.

This is my \textbf{\textcolor{red}{\colOpt{text}}}.

\textbf{Sets} \langle text \rangle \textbf{with the fade color}, see \textit{/tcb/color fade} \textsuperscript{\textit{P.481}}.

This is my \textbf{\textcolor{red}{\colFade{text}}}.

\begin{tcbdocmarginnote}[options]{\textit{\langle text \rangle}}
\textbf{Creates a tcolorbox note} with the given \langle text \rangle \textbf{inside the margin} using the \textit{marginnote} package. The style of the tcolorbox is predefined and can be altered by \textit{/tcb/doc marginnote} \textsuperscript{\textit{P.487}} and the given \langle options \rangle.
\end{tcbdocmarginnote}

\begin{tcbdocmarginnote}[colframe=blue!50!white,colback=blue!5!white]{Note B}
\textbf{Note B} \textbf{with another note.}
\end{tcbdocmarginnote}

\begin{tcbdocmarginnote}{Note A}
\textbf{Note A} \textbf{which is commented by a note inside the margin. Alternatively to \textbf{\textcolor{red}{\tcbdocmarginnote}}}, you can always use \textbf{\textcolor{red}{\texttt{\marginnote}}} with a \textbf{\textcolor{red}{\texttt{\tcolorbox}}} directly. \textbf{\texttt{\par}}
\end{tcbdocmarginnote}

This is further text\textbf{\texttt{\par}}
\begin{tcbdocmarginnote}{Note B}
\textbf{Note B} \textbf{with another note.}
\end{tcbdocmarginnote}

\begin{tcbdocnew}{\langle date \rangle}}
\textbf{Auxiliary macro which typesets} the \textit{/tcb/doclang/new} \textsuperscript{\textit{P.482}} \textbf{text} with the given \langle date \rangle. \textbf{It may be redefined for customization.}
\end{tcbdocnew}

\begin{tcbdocnew}{1981-10-29}.
\% Next one is displayed in the margin: \textbf{\textcolor{red}{\tcbdocnew{1978-02-09}}} \textbf{New: 1981-10-29.}
\end{tcbdocnew}

\begin{tcbdocupdated}{\langle date \rangle}}
\textbf{Auxiliary macro which typesets} the \textit{/tcb/doclang/updated} \textsuperscript{\textit{P.482}} \textbf{text} with the given \langle date \rangle. \textbf{It may be redefined for customization.}
\end{tcbdocupdated}

25.2 Option Keys of the Library

/tcb/docexample (style, no value)

Sets the style for dispExample \(^{P.474}\) and dispListing \(^{P.475}\) with the colors ExampleBack and ExampleFrame. To change the appearance of the examples, this style can be redefined.

\[
\begin{align*}
\text{\% Predefined style:} \\
\text{\texttt{\texttt{\texttt{\texttt{tcbset}}} \\
\texttt{docexample/.style={colframe=ExampleFrame, colback=ExampleBack, \\
before skip=\texttt{\texttt{\medskipamount}}, after skip=\texttt{\texttt{\medskipamount}}, \\
fontlower=\texttt{\texttt{\footnotesize}}}}}
\end{align*}
\]

/tcb/documentation listing options=(\textit{key list}) (no default, initially style=tcbdocumentation)

Sets the options from the package listings [6]. They are used inside dispExample \(^{P.474}\) and dispListing \(^{P.475}\) to typeset the listings. Note that this is not identical to the key /tcb/listing options \(^{P.316}\) which is used for 'normal' listings.

Used for /tcb/listing engine \(^{P.321}\)=listings only.

/tcb/documentation listing style=(\textit{listing style}) (no default, initially tcbdocumentation)

Abbreviation for documentation listing options\{style=...\}. This key sets a (style) for the listings package, see [6]. Note that this is not identical to the key /tcb/listing style \(^{P.316}\) which is used for 'normal' listings.

Used for /tcb/listing engine \(^{P.321}\)=listings only.

/tcb/documentation minted options=(\textit{minted style}) (no default, initially \texttt{\texttt{tabsize=2,fontsize=\texttt{\small}}})

Sets the options from the package minted [12] which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options \(^{P.319}\) which is used for 'normal' listings.

Used for /tcb/listing engine \(^{P.321}\)=minted only.

/tcb/documentation minted style=(\textit{key list}) (no default, initially unset)

Sets a (style) known to Pygments [14] for the package minted [12], if used. Note that this is not identical to the key /tcb/minted style \(^{P.320}\) which is used for 'normal' listings.

Used for /tcb/listing engine \(^{P.321}\)=minted only.

/tcb/documentation minted language=(\textit{programming language}) (no default, initially \texttt{latex})

Sets a (programming language) known to Pygments [14] for the package minted [12], if used. Note that this is not identical to the key /tcb/minted language \(^{P.319}\) which is used for 'normal' listings.

Used for /tcb/listing engine \(^{P.321}\)=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before \(^{P.81}\) and /tcb/after \(^{P.81}\) with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=(\textit{macros}) (no default, initially empty)

Sets the (macros) which are executed before dispExample \(^{P.474}\) and dispListing \(^{P.475}\) additional to /tcb/before \(^{P.81}\).

/tcb/after example=(\textit{macros}) (no default, initially empty)

Sets the (macros) which are executed after dispExample \(^{P.474}\) and dispListing \(^{P.475}\) additional to /tcb/after \(^{P.81}\).
Keyword used in `docEnvironment` \( P.470 \), `docCommand` \( P.469 \), etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

```
\LARGE
\docAuxCommand{fooaux}, \refCom{tcbset}
\tcbset{keywords bold=false}
\docAuxCommand{fooaux}, \refCom{tcbset}
```

```
\tcbset{index command=\myindexcommand}
```

```
\tcbset{index command name=mydoc}
```

Determines the basic \( \langle \text{format} \rangle \) of the generated index. Feasible values are:

- \texttt{pgfsection}: The index is formatted like in the \texttt{pgf} documentation (as a section).
- \texttt{pgfchapter}: The index is formatted like in the \texttt{pgf} documentation (as a chapter).
- \texttt{pgf}: Alias for \texttt{pgfsection}.
- \texttt{doc}: The index is assumed to be formatted by \texttt{doc} or \texttt{ltxdoc}. The usage of \texttt{makeindex} with \texttt{-s gind.ist} is assumed. The package \texttt{hypdoc} has to be loaded \texttt{before} \texttt{tcolorbox}.
- \texttt{off}: The index is not formatted by \texttt{tcolorbox}. Use this, if the index is formatted by other package like \texttt{imakeidx}.

```
\tcbset{index actual=\@,index quote=!},\tcbset{index level=}\}
```

Sets the character for 'actual' in automatic indexing.

```
\tcbset{index quote=!}
\tcbset{index level=!}
```

Sets the character for 'quote' in automatic indexing.

Sets the `makeindex` default values for `/tcb/index actual`, `/tcb/index quote`, and `/tcb/index level`.

Sets the `makeindex` values recommended for German language texts. This is identical to setting the following:

```
\tcbset{index actual=\@},\tcbset{index quote=!},\tcbset{index level=}\}
```
If set to `true`, the index entries are annotated with short descriptions given by `/tcb/doclang/environment`^P.482, `/tcb/doclang/key`^P.482, and others.

If set to `true`, the index entries colorized according to the color settings given by `/tcb/color environment`, `/tcb/color key`, and others.

Sets the highlight color used by macro definitions.

Sets the highlight color used by environment definitions.

Sets the highlight color used by key definitions.

Sets the highlight color used by value definitions.

Sets the highlight color used by counter definitions.

Sets the highlight color used by length definitions.

Sets the highlight color for `/tcb/color command`, `/tcb/color environment`, `/tcb/color key`, `/tcb/color path`, `/tcb/color value`, `/tcb/color counter`, `/tcb/color length`, and `/tcb/color color`.

Sets the color used for optional arguments.

Sets the color used for faded text like \path in docPathOperation^P.471.

Sets the color for all hyper-links, i.e. all internal and external links.
The following keys are provided for language specific settings. The English language is prede-
defined.

<table>
<thead>
<tr>
<th>Key</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcb/English language</td>
<td>(style, no value)</td>
</tr>
<tr>
<td></td>
<td>Sets all language specific settings to English.</td>
</tr>
<tr>
<td>tcb/doclang/color</td>
<td>(no default, initially color)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for colors.</td>
</tr>
<tr>
<td>tcb/doclang/colors</td>
<td>(no default, initially Colors)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for colors.</td>
</tr>
<tr>
<td>tcb/doclang/counter</td>
<td>(no default, initially counter)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for counters.</td>
</tr>
<tr>
<td>tcb/doclang/counters</td>
<td>(no default, initially Counters)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for counters.</td>
</tr>
<tr>
<td>tcb/doclang/environment</td>
<td>(no default, initially environment)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for environments.</td>
</tr>
<tr>
<td>tcb/doclang/environments</td>
<td>(no default, initially Environments)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for environments.</td>
</tr>
<tr>
<td>tcb/doclang/environment content</td>
<td>(no default, initially environment content)</td>
</tr>
<tr>
<td></td>
<td>Text used in docEnvironment P.470.</td>
</tr>
<tr>
<td>tcb/doclang/index</td>
<td>(no default, initially Index)</td>
</tr>
<tr>
<td></td>
<td>Heading text for the index.</td>
</tr>
<tr>
<td>tcb/doclang/key</td>
<td>(no default, initially key)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for keys.</td>
</tr>
<tr>
<td>tcb/doclang/keys</td>
<td>(no default, initially Keys)</td>
</tr>
<tr>
<td></td>
<td>Heading text used in the index for keys.</td>
</tr>
<tr>
<td>tcb/doclang/length</td>
<td>(no default, initially length)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for lengths.</td>
</tr>
<tr>
<td>tcb/doclang/lengths</td>
<td>(no default, initially Lengths)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for lengths.</td>
</tr>
<tr>
<td>tcb/doclang/new</td>
<td>(no default, initially New)</td>
</tr>
<tr>
<td></td>
<td>Announcement text for new content.</td>
</tr>
<tr>
<td>tcb/doclang/path</td>
<td>(no default, initially path operation)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for path operations.</td>
</tr>
<tr>
<td>tcb/doclang/paths</td>
<td>(no default, initially Path operations)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for path operations.</td>
</tr>
<tr>
<td>tcb/doclang/pageshort</td>
<td>(no default, initially P.)</td>
</tr>
<tr>
<td></td>
<td>Short text for page references.</td>
</tr>
<tr>
<td>tcb/doclang/updated</td>
<td>(no default, initially Updated)</td>
</tr>
<tr>
<td></td>
<td>Announcement text for updated content.</td>
</tr>
<tr>
<td>tcb/doclang/value</td>
<td>(no default, initially value)</td>
</tr>
<tr>
<td></td>
<td>Text used in the index for values.</td>
</tr>
<tr>
<td>tcb/doclang/values</td>
<td>(no default, initially Values)</td>
</tr>
<tr>
<td></td>
<td>Heading text in the index for values.</td>
</tr>
</tbody>
</table>
/tcb/doc left=⟨length⟩ (no default, initially 2em)
Sets the left hand offset of the documentation texts from docCommand \textsuperscript{P.469},
docEnvironment \textsuperscript{P.470}, docKey \textsuperscript{P.471}, etc, to ⟨length⟩.

\begin{docCommand*}[doc left=2cm,doc left indent=-2cm]{myCommandA}{⟨argument⟩}
This is the documentation of \refCom{myCommandA} which takes one \meta{argument}.
\refCom{myCommandA} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandA{⟨argument⟩} (no default, initially 2em)
This is the documentation of \myCommandA which takes one \meta{argument}.
\myCommandA does some funny things with its \meta{argument}.

/tcb/doc right=⟨length⟩ (no default, initially 0em)
Sets the right hand offset of the documentation texts from docCommand \textsuperscript{P.469},
docEnvironment \textsuperscript{P.470}, docKey \textsuperscript{P.471}, etc, to ⟨length⟩.

\begin{docCommand*}[doc right=2cm]{myCommandB}{⟨argument⟩}
This is the documentation of \refCom{myCommandB} which takes one \meta{argument}.
\refCom{myCommandB} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandB{⟨argument⟩} (no default, initially 0em)
This is the documentation of \myCommandB which takes one \meta{argument}.
\myCommandB does some funny things with its \meta{argument}.

/tcb/doc left indent=⟨length⟩ (no default, initially -2em)
Sets the left hand indent of documentation heads from docCommand \textsuperscript{P.469},
docEnvironment \textsuperscript{P.470}, docKey \textsuperscript{P.471}, etc, to ⟨length⟩.

\begin{docCommand*}[doc left indent=2cm]{myCommandC}{⟨argument⟩}
This is the documentation of \refCom{myCommandC} which takes one \meta{argument}.
\refCom{myCommandC} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandC{⟨argument⟩} (no default, initially -2em)
This is the documentation of \myCommandC which takes one \meta{argument}.
\myCommandC does some funny things with its \meta{argument}.

/tcb/doc right indent=⟨length⟩ (no default, initially 0pt)
Sets the right hand indent of documentation heads from docCommand \textsuperscript{P.469},
docEnvironment \textsuperscript{P.470}, docKey \textsuperscript{P.471}, etc, to ⟨length⟩.

\begin{docCommand*}[doc right indent=-10mm,doc right=10mm, doc description=test value]{myCommandD}{⟨argument⟩}
This is the documentation of \refCom{myCommandD} which takes one \meta{argument}.
\refCom{myCommandD} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandD{⟨argument⟩} (test value)
This is the documentation of \myCommandD which takes one \meta{argument}.
\myCommandD does some funny things with its \meta{argument}.
The head lines of the main documentation environments \texttt{docCommand \textsuperscript{P.469}}, \texttt{docEnvironment \textsuperscript{P.470}}, \texttt{docKey \textsuperscript{P.471}}, etc, are set inside \texttt{tcolorbox}es. Options to these \texttt{tcolorbox}es can be given using the following keys.

\begin{itemize}
\item \texttt{/tcb/doc head command=\langle options\rangle} (no default, initially empty)
\item \texttt{/tcb/doc head environment=\langle options\rangle} (no default, initially empty)
\item \texttt{/tcb/doc head key=\langle options\rangle} (no default, initially empty)
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docCommand \textsuperscript{P.469}} and \texttt{docCommand* \textsuperscript{P.470}}.

\begin{itemize}
\item \texttt{\tcbset{doc head command={interior style={fill,left color=red!20!white, right color=blue!20!white}}}}
\item \texttt{\begin{docCommand*}{myCommandE}{\marg{argument}} \refCom{myCommandE} which takes one \meta{argument}. \end{docCommand*}}
\item \texttt{\begin{myCommandE}{\langle argument\rangle}} (no default, initially empty)
\item \texttt{\tcbset{doc head environment={beamer,boxsep=2pt,arc=2pt,colback=green!20!white, after=\par\smallskip}}}
\item \texttt{\begin{docEnvironment*}{myEnvironment}{\marg{argument}} \refEnv{myEnvironment} which takes one \meta{argument}. \end{docEnvironment*}}
\item \texttt{\begin{myEnvironment}{\langle argument\rangle}} (no default, initially empty)
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}} \texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docEnvironment \textsuperscript{P.470}} and \texttt{docEnvironment* \textsuperscript{P.470}}.

\begin{itemize}
\item \texttt{\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt, frame style=fill,interior style=fill,colframe=green!50!black}}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docKey \textsuperscript{P.471}} and \texttt{docKey* \textsuperscript{P.471}}.

\begin{itemize}
\item \texttt{\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt, frame style=fill,interior style=fill,colframe=green!50!black}}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docKey \textsuperscript{P.471}} and \texttt{docKey* \textsuperscript{P.471}}.

\begin{itemize}
\item \texttt{\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt, frame style=fill,interior style=fill,colframe=green!50!black}}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docKey \textsuperscript{P.471}} and \texttt{docKey* \textsuperscript{P.471}}.

\begin{itemize}
\item \texttt{\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt, frame style=fill,interior style=fill,colframe=green!50!black}}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docKey \textsuperscript{P.471}} and \texttt{docKey* \textsuperscript{P.471}}.

\begin{itemize}
\item \texttt{\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt, frame style=fill,interior style=fill,colframe=green!50!black}}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\item \texttt{\begin{docKey*}{/foo/myKey}{}{no value}}
\item \texttt{\begin{myEnvironment}}\texttt{\langle environment content\rangle} \end{myEnvironment}}
\end{itemize}

Sets \langle options\rangle for the head line of \texttt{docKey \textsuperscript{P.471}} and \texttt{docKey* \textsuperscript{P.471}}.
Sets ⟨options⟩ for the headline of docPathOperation • P.471 and docPathOperation* • P.471.

\begin{docPathOperation*}{-{}-}{\meta{coordinate or cycle}}
This is the documentation of \refPathOperation{-{}-}.
\end{docPathOperation*}

\path ... --\langle coordinate or cycle \rangle ...;
This is the documentation of --.

Shortcut for setting the same ⟨options⟩ for /tcb/doc head command • P.484, /tcb/doc head environment • P.484, /tcb/doc head key • P.484, and /tcb/doc head path.

The description texts of the main documentation environments docCommand • P.469, docEnvironment • P.470, docKey • P.471, etc, are set in a compact form without indentation and \parskip=0pt. This settings can overruled by using the following keys to insert code before (or after) the description texts.

\begin{docCommand*}{myCommandG}{\marg{argument}}
This is the documentation of \refCom{myCommandG} which takes one \meta{argument}. \myCommandG does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandG\langle{argument}\rangle
This is the documentation of \myCommandG which takes one \langle argument\rangle. \myCommandG does some funny things with its \langle argument\rangle.

\begin{docCommand*}{myCommandH}{\marg{argument}}
This is the documentation of \refCom{myCommandH} which takes one \meta{argument}. \myCommandH does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandH\langle{argument}\rangle
This is the documentation of \myCommandH which takes one \langle argument\rangle. \myCommandH does some funny things with its \langle argument\rangle.
Executes \( \langle \text{code} \rangle \) before the description texts of \( \text{docEnvironment} \) and \( \text{docEnvironment}^* \).

Executes \( \langle \text{code} \rangle \) after the description texts of \( \text{docEnvironment} \) and \( \text{docEnvironment}^* \).

Executes \( \langle \text{code} \rangle \) before the description texts of \( \text{docKey} \) and \( \text{docKey}^* \).

Executes \( \langle \text{code} \rangle \) after the description texts of \( \text{docKey} \) and \( \text{docKey}^* \).

Executes \( \langle \text{code} \rangle \) before the description texts of \( \text{docPathOperation} \) and \( \text{docPathOperation}^* \).

Executes \( \langle \text{code} \rangle \) after the description texts of \( \text{docPathOperation} \) and \( \text{docPathOperation}^* \).

Shortcut for setting the same \( \langle \text{options} \rangle \) for \( /\text{tcb}/\text{before doc body} \) command, \( /\text{tcb}/\text{before doc body environment} \), \( /\text{tcb}/\text{before doc body key} \), and \( /\text{tcb}/\text{before doc body path} \).

Shortcut for setting the same \( \langle \text{options} \rangle \) for \( /\text{tcb}/\text{after doc body} \) command, \( /\text{tcb}/\text{after doc body environment} \), \( /\text{tcb}/\text{after doc body key} \), and \( /\text{tcb}/\text{after doc body path} \).

Sets a (short!) additional description \( \langle \text{text} \rangle \) for \( \text{docCommand} \), \( \text{docEnvironment} \), or \( \text{docPathOperation} \). Such a description is mandatory for \( \text{docKey} \).

\begin{docCommand*}[doc description=my description]{myCommandF}{\marg{argument}}
This is the documentation of \refCom{myCommandF} which takes one \meta{argument}. \refCom{myCommandF} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandF{⟨argument⟩} (my description)
This is the documentation of \myCommandF which takes one ⟨argument⟩. \myCommandF does some funny things with its ⟨argument⟩.

Note that the description ⟨text⟩ may overlap with the text on the left hand side if too long. Linebreaks can be used inside the ⟨text⟩.
/tcb/doc label=⟨text⟩ (no default, initially unset)

If used inside the option list of docCommand \(\text{P.469}\), docEnvironment \(\text{P.470}\), docKey \(\text{P.471}\), or docPathOperation \(\text{P.471}\), then ⟨text⟩ is used for labeling instead of the name of the definition.

\begin{docPathOperation*}\{doc label=pathline\}\{-\}-\{\meta\{coordinate or cycle\}\}
This is the documentation of \refPathOperation{pathline}.
\end{docPathOperation*}

/\text{tcb/doc into index}=true|false (default true, initially true)

If set to false, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. docCommand* \(\text{P.470}\) instead of docCommand \(\text{P.469}\).

/tcb/doc marginnote=⟨options⟩ (no default, initially empty)

Sets style ⟨options⟩ for the displayed box of the \tcbdocmarginnote \(\text{P.478}\) command.

\tcbset\{doc marginnote={colframe=blue!50!white,colback=blue!5!white}\}%
This is some text \tcbdocmarginnote{Note A}
which is commented by a note inside the margin.

Note A

This is some text which is commented by a note inside the margin.

/tcb/doc new=⟨date⟩ (style, no default)

Adds a marginnote with a 'New: ⟨data⟩' message at the beginning of the upper box part. The intended use is inside the option list of docCommand \(\text{P.469}\), docEnvironment \(\text{P.470}\), etc.

```
\begin{docCommand}\{doc new=2000-01-01\}\{foosomething\}\{marg\{text\}\}
Some command for something.
\end{docCommand}
```

New:
2000-01-01

/\text{tcb/doc updated}=⟨date⟩ (style, no default)

Adds a marginnote with a 'Updated: ⟨data⟩' message at the beginning of the upper box part. See /\text{tcb/doc new}.

/tcb/doc new and updated=⟨new date⟩\{⟨update date⟩\} (style, no default)

Adds a marginnote with 'New: ⟨new date⟩' and 'Updated: ⟨update data⟩' messages at the beginning of the upper box part. See /\text{tcb/doc new}.

25.3 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

Option □, Definition □, ExampleFrame □, ExampleBack □, Hyperlink □, Fade □.
The following pictures were used inside this documentation.

- **Basilica_5.png**
  - Taken from [commons.wikimedia.org/wiki/File:Basilica_5.png](http://commons.wikimedia.org/wiki/File:Basilica_5.png)
  - Photograph taken by Thomas F. Sturm.

- **lichtspiel.jpg**
  - Created with GIMP.
  - [http://www.gimp.org](http://www.gimp.org)

- **crinklepaper.png**
  - Created with GIMP.
  - [http://www.gimp.org](http://www.gimp.org)

- **pink_marble.png**
  - Created with GIMP.
  - [http://www.gimp.org](http://www.gimp.org)

- **blueshade.png**
  - Created with GIMP.
  - [http://www.gimp.org](http://www.gimp.org)

- **goldshade.png**
  - Created with GIMP.
  - [http://www.gimp.org](http://www.gimp.org)
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