mindflow – write your ideas in a clear way

JINWEN Xu

2021/09/15

1. Introduction

The mindflow package provides you a way to write your ideas and annotations clearly. For example, with the options linenumber and rightmarker, you will get something like:

What to write next:
1 • usage: the initialization, options and configuration;
2 • an example;
3 • some word on the line numbering feature;
4 • some internal macros;
5 • the complete code.

This example only shows the default effect. You can customize it further according to the instructions in the next section.

2. The usage

2.1 How to load it?

Simply load the package with

\usepackage{mindflow}

By default, the environment has no line numbers or markers. You can use the following options (they can be specified directly, like off, or as a boolean optional, like off=false):

- linenumber: Same as leftlinenumber
- leftlinenumber: Enable left line numbers
- rightlinenumber: Enable right line numbers
- leftmarker: Enable left marker, by default it is a “*”
- rightmarker: Enable right marker, by default it is a “*”
- incolumn: The separation line would fit in the column (automatically applied in two-column documents)
- off, on: Turn the mindflow environments off or on

Additionally, there is an option nonbreakble, which enables the tcolorbox version, permits a background color, but is not breakable and doesn’t support line numbering quite well.

2.2 How to use it?

You can then use the mindflow environment as

\begin{mindflow}
{text}
\end{mindflow}

2.3 Further configuration

You can use \mindflowset{(configuration)} to configure the mindflow environment. The available keys are listed at the top of the next page.
Additionally, all the options mentioned in the previous section (except for `nonbreakble`) can be set with `\mindflowset`.*

### 3. An example

With the following settings:

```latex
\mindflowset{
  leftlinenumber, rightlinenumber, leftmarker, rightmarker,
  linecolor = green!50!black,
  textcolor = blue!50!cyan,
  numcolor = red!50!orange,
  markercolor = orange,
  textfont = \footnotesize\sffamily\itshape,
  numfont = \small\footnotesize\ttfamily,
  markerfont = \footnotesize\sffamily,
  left = \hspace{1em}\succ,
  right = \prec\hspace{1em},
  lineheight = 1pt
}
```

One will have something like this:

```latex
\text{Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look.}
```

### 4. About the line numbers

You can also add line numbers to the other part of your document in the usual way. For example, line numbers have been turned on for this paragraph with `\linenumbers`.

```
\PassOptionsToPackage{mathlines}{lineno}
```

The line numbering feature is provided by the package `lineno`. For more details, please refer to its documentation. Notice that, by default, displayed equations are not numbered. You can add the following line before `\usepackage{mindflow}:

```
\PassOptionsToPackage{mathlines}{lineno}
```

to enable the line numbers for displayed equations.

```
(a + b)^2 = a^2 + 2ab + b^2
```

```
(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3
```

*If the package option `nonbreakble` is enabled, then there is also a key `backgroundcolor`, similar to `textcolor`, for configuring the background color of the `mindflow` environments.
5. SOME \TeX\NICAL DETAILS

5.1 Internal macro for text elements

The font for text, line numbers and markers within the mindflow environments can be specified by redefining \mindflowTextFont, \mindflowNumFont and \mindflowMarkerFont. By default, they are defined as:

\newcommand{\mindflowTextFont}{\footnotesize}
\newcommand{\mindflowNumFont}{\scriptsize\ttfamily}
\newcommand{\mindflowMarkerFont}{\scriptsize\ttfamily}

\mindflowLeft and \mindflowRight are defined as: \( \succ \) and \( \prec \). Both have the default value “*”.

The height of the separation lines is a length macro named \mindflowLineHeight, with default value 0.4pt. You can change this with \setlength.

5.2 Internal name of the colors

And finally, the colors for the separation lines, text, line numbers and markers within the mindflow environments are called mindflowLine, mindflowText, mindflowNum and mindflowMarker, respectively. By default, they have the same color as the context, with opacity 40% for the separation lines and text, 20% for the markers, and 8% for line numbers. If the package option nonbreakable is enabled, then there is also the background color mindflowBackground, which by default is white.

6. THE SAME EXAMPLE

With option leftlinenumber, rightlinenumber, leftmarker, rightmarker and the following settings:

\colorlet{mindflowLine}{green!50!black}
\colorlet{mindflowText}{blue!50!cyan}
\colorlet{mindflowNum}{red!50!orange}
\colorlet{mindflowMarker}{orange}
\renewcommand{\mindflowTextFont}{\footnotesize\sffamily\itshape}
\renewcommand{\mindflowNumFont}{\scriptsize\ttfamily}
\renewcommand{\mindflowMarkerFont}{\footnotesize\ttfamily}
\renewcommand{\mindflowLeft}{\hspace{1em}\( \succ \)}
\renewcommand{\mindflowRight}{\( \prec \)\hspace{1em}}
\setlength{\mindflowLineHeight}{1pt}

One will get the same result as in the previous example.

7. KNOWN ISSUES

- There is no absolute guarantee that the separation lines will not fall alone at the top or bottom of the page, though great effort has been made to reduce the occurrence of such situation.
- The nonbreakable version doesn’t support line numbering quite well, especially for displayed equations. This is due to the usage of internallinenumbers.
8. Implementation

Below is the complete source code of this package.

\RequirePackage{kvoptions}
\SetupKeyvalOptions{%
  family = @mindflow,
  prefix = @mindflow@
}
\DeclareBoolOption[true]{on} % Turn on mindflow
\DeclareBoolOption[false]{off} % Turn off mindflow
\DeclareBoolOption[false]{leftmarker} % Left marker
\DeclareBoolOption[false]{rightmarker} % Right marker
\DeclareBoolOption[false]{linenumber} % Left line numbers
\DeclareBoolOption[false]{leftlinenumber} % Left line numbers
\DeclareBoolOption[false]{rightlinenumber} % Right line numbers
\DeclareBoolOption[false]{incolumn} % Separation line fits in column
\DeclareBoolOption[false]{nonbreakable} % Use the tcolorbox version

\ProcessKeyvalOptions*\relax
\if@mindflow@on
  \@mindflow@offfalse
\fi
\if@mindflow@linenumber
  \@mindflow@leftlinenumbertrue
\fi
%%================================
%% Initialization
%%================================
\RequirePackage{lineno}
\RequirePackage{xcolor}
\colorlet{mfSavedColor}{.}
\colorlet{mindflowLine}{mfSavedColor!40}
\colorlet{mindflowText}{mfSavedColor!40}
\colorlet{mindflowMarker}{mfSavedColor!20}
\colorlet{mindflowNum}{mfSavedColor!8}
\newcommand{\mindflowTextFont}{\footnotesize}
\newcommand{\mindflowNumFont}{\scriptsize	tfamily}
\newcommand{\mindflowMarkerFont}{\scriptsize	tfamily}
\newcommand{\mindflowLeft}{*}
\newcommand{\mindflowRight}{*}
\newlength{\mindflowLineHeight}
\setlength{\mindflowLineHeight}{0.4pt}
%%================================
%% The mindflow environment
%%================================
\PassOptionsToPackage{all}{nowidow}
\RequirePackage{nowidow}
\RequirePackage{verbatim}
\newif\ifLNturnsON
\def\LocallyStopLineNumbers{\LNturnsONfalse%
  \ifLineNumbers\LNturnsONtrue\fi\nolinenumbers}
\def\ResumeLineNumbers{\ifLNturnsON\linenumbers\fi}
\newif\ifICturnsON
\def\AutoIncolumn{\ICturnsONfalse%
  \if@mindflow@incolumn\ICturnsONtrue\fi%
  \if@twocolumn\@mindflow@incolumntrue\fi%
}
\def\ResumeIncolumn{\ifICturnsON\@mindflow@incolumntrue\fi}
\newcounter{recordLN}
\newcounter{mfLN}
\setcounter{mfLN}{1}
\newcommand*{\mfSepLine}{%
  \par
  \LocallyStopLineNumbers
  \vspace*{-.5\baselineskip}
  \noindent
  \if@mindflow@incolumn%
    \makebox[\linewidth]{\color{mindflowLine}\rule{\linewidth}{\mindflowLineHeight}}%
  \else%
    \makebox[\linewidth]{\color{mindflowLine}\rule{4\paperwidth}{\mindflowLineHeight}}%
  \fi%
  \par
  \ResumeLineNumbers%
}
\newcommand{\mindflow@makeLineNumber}{%
  \hss
  \if@mindflow@leftlinenumber%
    \normalfont\mindflowNumFont\color{mindflowNum}\LineNumber\hspace{1em}%
  \fi%
  \color{mindflowMarker}%
  \if@mindflow@leftmarker%
    \normalfont\mindflowMarkerFont\mindflowLeft\hspace{1em}%
  \fi%
  \rlap{\hskip\textwidth%
    \if@mindflow@rightlinenumber%
      \hspace{1em}\mindflowRight%
    \fi%
    \if@mindflow@rightmarker%
      \hspace{1em}\mindflowRight%.%
\define@key{mindflow}{textcolor}{\colorlet{mindflowText}{#1}}
\define@key{mindflow}{numcolor}{\colorlet{mindflowNum}{#1}}
\define@key{mindflow}{markerfont}{\renewcommand{\mindflowMarkerFont}{#1}}
\define@key{mindflow}{left}{\renewcommand{\mindflowLeft}{#1}}
\define@key{mindflow}{right}{\renewcommand{\mindflowRight}{#1}}
\define@key{mindflow}{lineheight}{\setlength{\mindflowLineHeight}{#1}}
\newcommand{\mindflowset}{\setkeys{mindflow}{#1}}

\if@mindflow@nonbreakable
\colorlet{mindflowBackground}{#1}
\else
\PackageWarning{mindflow}{The key 'backgroundcolor' is only available when the package option 'nonbreakable' is enabled.}
\fi
\define@key{mindflow}{textfont}{\renewcommand{\mindflowTextFont}{#1}}
\define@key{mindflow}{numfont}{\renewcommand{\mindflowNumFont}{#1}}
\define@key{mindflow}{left}{\renewcommand{\mindflowLeft}{#1}}
\define@key{mindflow}{right}{\renewcommand{\mindflowRight}{#1}}
\define@key{mindflow}{lineheight}{\setlength{\mindflowLineHeight}{#1}}
\newcommand{\mindflowset}{\setkeys{mindflow}{#1}}

\%------------------------------------------------------------------------
\% lineno patch
\%------------------------------------------------------------------------
\ifdefined{linenomathpatch}else
\RequirePackage{amsmath}
\RequirePackage{etoolbox}
\newcommand{\linenomathpatch}[1]{\cspreto{#1}{\linenomath}\
\cspreto{#1*}{\linenomath}\
\csappto{end#1}{\endlinenomath}\
\csappto{end#1*}{\endlinenomath}}
\newcommand{\linenomathpatchAMS}[1]{\cspreto{#1}{\linenomathAMS}\
\cspreto{#1*}{\linenomathAMS}\
\csappto{end#1}{\endlinenomathAMS}\
\csappto{end#1*}{\endlinenomathAMS}}
\expandafter\ifx\linenomath\linenomathWithnumbers
\let{\linenomathAMS}{\linenomathWithnumbers}
\patchcmd{\linenomathAMS}{\advance\postdisplaypenalty\linenopenalty}{\advance\postdisplaypenalty\linenopenalty}{1}{1}
\else
\let{\linenomathAMS}{\linenomathNonumbers}
\fi
\linenomathpatch{equation}
\linenomathpatchAMS{gather}
\linenomathpatchAMS{multline}
\linenomathpatchAMS{align}
\linenomathpatchAMS{alignat}
\linenomathpatchAMS{flalign}
\fi