Section 1: Basic Information of This Template Class

Despite this \texttt{SEU-ML-Assign} class is dedicated to Southeast University as the Machine Learning assignment \LaTeX template both for teachers and students, it can also be used for other schools. In the near future, it will eventually become an elegant template for all assignment requirements.

<table>
<thead>
<tr>
<th>Package Class Name</th>
<th>\texttt{seu-ml-assign}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>1.0 (2022/03/20)</td>
</tr>
<tr>
<td>Description</td>
<td>\LaTeX Template for Southeast University Machine Learning Assignment</td>
</tr>
<tr>
<td>Author</td>
<td>Teddy van Jerry (Wuqiong Zhao)</td>
</tr>
<tr>
<td>Maintainer</td>
<td>Teddy van Jerry (Wuqiong Zhao)</td>
</tr>
<tr>
<td>GitHub Repository</td>
<td>\url{<a href="https://tvj.one/ml-tex%7D">https://tvj.one/ml-tex}</a></td>
</tr>
<tr>
<td>Issues</td>
<td>\url{<a href="https://tvj.one/ml-tex/issues%7D">https://tvj.one/ml-tex/issues}</a></td>
</tr>
<tr>
<td>Open Source License</td>
<td>MIT License (\url{<a href="https://tvj.one/ml-tex/blob/master/LICENSE%7D">https://tvj.one/ml-tex/blob/master/LICENSE}</a>)</td>
</tr>
</tbody>
</table>

You can contact me at me@tvj.one for support.

Section 2: Class Options

To use this template, put \texttt{seu-ml-assign.cls} file under the same directory with your main \texttt{tex} file.

\begin{verbatim}
documentclass{seu-ml-assign} \% SEU Machine Learning Assignment Template
\end{verbatim}

There are 6 supported options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>solution</td>
<td>Write solutions (for students). [Default]</td>
</tr>
<tr>
<td>problem</td>
<td>Write problem sets (for instructors).</td>
</tr>
<tr>
<td>9pt</td>
<td>Set font size as 9 points.</td>
</tr>
<tr>
<td>10pt</td>
<td>Set font size as 10 points. [Default]</td>
</tr>
<tr>
<td>11pt</td>
<td>Set font size as 11 points.</td>
</tr>
<tr>
<td>12pt</td>
<td>Set font size as 12 points.</td>
</tr>
</tbody>
</table>

For example, a 10pt document for instructors to create an assignment consisting of problem sets should use

\begin{verbatim}
documentclass[10pt,problem]{seu-ml-assign} \% The 10pt option can be omitted.
\end{verbatim}

There are several differences between the \texttt{solution} mode and \texttt{problem} mode, including the preset texts on the document (for example the student name is not shown in the \texttt{problem} mode) and some properties can only be used with the \texttt{problem} mode which will be elaborated on in \S 3.2.
Section 3: Document Properties

(1) Fields
There are several fields to set. Consider the following example used in the sample file:

```
\title{Assignment} % Document Type: assignment, quiz, etc.
\author{Teddy van Jerry} % Your Name
\studentID{61520522} % Your Student ID
\instructor{TeX - LaTeX Stack Exchange} % The Name of Your Instructor
\date{\today} % The Submission or Release Date
\duedate{20:00 March 21, 2022} % The Time the Assignment is Due
\assignno{1} % Assignment Number
\semester{SEU --- 2022 Spring} % Semester
```

With these fields set, you can use the command \maketitle to print the title. At the same time, the metadata for the PDF document is automatically set.

(2) Problem Mode Only Properties
One of the fields \author{} and \instructor{} can be omitted or set as empty provided that they are the same.

Section 4: Section Title (Problem) Settings

(1) Normal Title
The title of a problem can be set as \section{This is a Section Title} or uses a higher level command \problem{This is a Section Title}.

(2) Problem with Points
The points of a problem can be set using command \problempts{xxx} before calling the \section{} command. These two commands can be simplified to \problem[xxx]{}. For example, using the command \problem[15]{This is a Problem Worth 15 Points} will have:

Problem 1: This is a Problem Worth 15 Points (15 points)

Note that if the point is an empty string, the point information will not be shown.

(3) Long Title Compatibility
There is also no problem if the section title is too long.

Problem 2: I Don’t Think that Anyone Will Enjoy Themselves Seeing a Very Very Long Problem That is Worth Twenty Points in this Machine Learning Course (20 points)

(4) Section Title Name
The name of the section (default name as problem) can be changed by using \renewcommand{\sectionheadname}{Name}.

(5) Section Number
The number of the section can be changed, for example \texttt{\setproblem{4}} will make the next section number be 5. For experienced \LaTeX{} users to understand, this command actually change the section counter.

(6) Solution Declaration
You can use \startsolution to declare you start writing the solution. This will reset the section number and it is especially useful when your document contains problems and solutions as two separate parts. There is an option print and if you use \startsolution[print] you will get:

\textbf{Solution}

and the word \textbf{SOLUTION} can be changed using command \renewcommand{\solutionname}{Other Name}. 

Section 5: Subsection Title (Sub Problem) Settings

(1) **Normal Title**  This is a normal title using command `\subproblem{Normal Title}` or its equivalent command `\subsection{Normal Title}`.

(2) Use `\subproblem{}` or `\subsection{}` if only the sub problem number is required (like this line).

(3) **Subsection Number**  Similar to `\setproblem{}`, there is also `\setsubproblem{}`.

Section 6: Other Tools

(1) **Equation Numbering**  The equation number is within the section (problem), for example

\[
det(A) = 1 \times \begin{vmatrix} -5 & 3 \\ -6 & 4 \end{vmatrix} - (-3) \times \begin{vmatrix} 3 & 3 \\ 6 & 4 \end{vmatrix} + 3 \times \begin{vmatrix} 3 & -5 \\ 6 & -6 \end{vmatrix} = 1 \times (-2) + 3 \times (-6) + 3 \times 12 = 16. \quad (6.1)
\]

(2) **Maths Packages**  Maths Package `mathtools`, `amssymb`, `amsthm`, `bm` and `nicematrix` are automatically loaded. The `nicematrix` package is especially powerful in terms of writing a matrix. You can find its documentation at [https://ctan.org/pkg/nicematrix](https://ctan.org/pkg/nicematrix).

(3) **Fancy Box**  A fancy box has been defined.

You can use the following code to generate it.

\begin{fancybox}{This is a Title}
\end{fancybox}

Appendix A: Known Issues

- `\section{}` still shows the section number except for it does not increment the section counter by one;
- The section title background height may not be accurate;
- The style of the footnote line has not been adapted to the current colorful theme.

Appendix B: Source Code

The source code of `SEU-ML-Assign.cls` is listed below.

```
\NeedsTeXFormat{LaTeX2e}
\ProvidesClass{seu-ml-assign}[2022/02/20 SEU Machine Learning Assignment Template]
```
\documentclass[a4paper, onecolumn, \@ptsize]{article}

\begin{document}

\section*{Class and Options}

\begin{verbatim}
% \def\@ptsize{10 pt} % font size
\DeclareOption{9 pt}{\def\@ptsize{9 pt}}
\DeclareOption{10 pt}{\def\@ptsize{10 pt}}
\DeclareOption{11 pt}{\def\@ptsize{11 pt}}
\DeclareOption{12 pt}{\def\@ptsize{12 pt}}
\def\@solutionmode{1} % default as the solution mode
\DeclareOption{solution}{\def\@solutionmode{1}} % solution mode
\DeclareOption{problem}{\def\@solutionmode{0}} % problem mode
\ProcessOptions\relax
\LoadClass[a4paper, onecolumn, \@ptsize]{article}
\end{verbatim}

\section*{Page Settings}

\begin{verbatim}
% \requirepackage[inner=2.0 cm, outer=2.0 cm, top=1.2 cm, bottom=3.5 cm]{geometry}
\newcommand{\firstfooteradditionalheight}{2 em} % additional height for footer on the first page
hfuzz=.5 em % disable false positive of overfull \hbox
\end{verbatim}

\section*{Document Properties}

\begin{verbatim}
\global\let\@assignno\@empty
\global\let\@semester\@empty
\global\let\@studentID\@empty
\global\let\@instructor\@empty
\global\let\@duedate\@empty
\newcommand{\assignno}[1]{\gdef\@assignno{#1}} % Assignment Number
\newcommand{\semester}[1]{\gdef\@semester{#1}} % Semester
\newcommand{\studentID}[1]{\gdef\@studentID{#1}} % Student ID
\newcommand{\instructor}[1]{\gdef\@instructor{#1}} % Instructor
\newcommand{\duedate}[1]{\gdef\@duedate{#1}} % Due Date of the Assignment
\end{verbatim}

\section*{Fonts and Colors}

\begin{verbatim}
% \requirepackage[T1]{fontenc}
\requirepackage[usenames, dvipsnames]{xcolor}
\end{verbatim}

\section*{TikZ Rule}

\begin{verbatim}
\usetikzlibrary{fadings, calc}
\newcommand{\tikzrule}[3][blue!20]{\begin{tikzpicture}[inner sep=0pt, inner ysep=0.3 ex]
\node[anchor=base west] at (0,0) (counter) {#2};
\path let \p1=(counter.base east) in node[anchor=base west, text width=($textwidth-\x1-0.33em$)] (content) at ($\counter.base east+(0.33em,0)$) {#3};
\begin{pgfonlayer}{background}
shade[left color=\@solutionmode?white:1, right color=white] let \p1=(counter.north), \p2=(content.north) in (0,\max(\y1,\y2)) rectangle (content.south east);
\end{pgfonlayer}
\end{tikzpicture}}
\end{verbatim}

\section*{Sections Settings}

\begin{verbatim}
% \requirepackage[explicit]{titlesec} % explained in \url{https://tex.stackexchange.com/a/292307/234654}
% http://mirrors.ctan.org/macroslatex/contrib/titlesec/titlesec.pdf
\pgfdeclarelayer{background}
\pgfsetlayers{background, main}
\newcommand{\boxedsection}[3][blue!20]{\begin{tikzpicture}[inner sep=0pt, inner ysep=0.3 ex]
\node[anchor=base west] at (0,0) (counter) {#2};
\path let \p1=(counter.base east) in node[anchor=base west, text width=($textwidth-\x1-0.33em$)] (content) at ($\counter.base east+(0.33em,0)$) {#3};
\begin{pgfonlayer}{background}
shade[left color=\@solutionmode?white:1, right color=white] let \p1=(counter.north), \p2=(content.north) in (0,\max(\y1,\y2)) rectangle (content.south east);
\end{pgfonlayer}
\end{tikzpicture}}
\end{verbatim}

\end{document}
```latex
\titleformat{\section}
  {{Large \bfseries}}
  {}% %
  {0 pt}
  {boxedsection{\sectionheadname} \thesection:}{#1}\%
\titleformat{\subsection}
  {{ large \bfseries}}
  {}{0 pt}{(\arabic{subsection}. #1)}
\newcommand{\setproblem}[1]{\ifx #1\@empty \else setcounter{section}{#1}\fi \% force the number of problem}
\newcommand{\setsubproblem}[1]{\ifx #1\@empty \else setcounter{subsection}{#1}\fi \% force the number of subproblem}
\newcommand{\problem}[2]{\problempts{#1} section {#2}}
\newcommand{\solutionname}{Solution}\newcommand{\startsolution}[1][ print]{\setproblem{0} \% reset the section counter
\setproblemprintoption{print}\setsubproblemprintuseroption{#1}\% \ifx \setproblemprintuseroption \setproblemprintoption {\% \fontfamily{LinuxLibertineT-OsF}\selectfont \% select font as Linux \rightarrow Libertine \centering LARGE \scshape \% \solutionname{}}\vspace{-0.2 em}\% \noindent \tikzrule[WildStrawberry, path fading=west]{.5\textwidth}{.2 em} \% \tikzrule[WildStrawberry, path fading=east]{.5\textwidth}{.2 em}\% \fi}
\titlespacing{\section}{0 em}{2.5\baselineskip}{1\baselineskip}
\titleformat{\subsection}[runin]{\large \bfseries}{\solutionname{}}{0 pt}{(\arabic{subsection}. #1)}
\newcommand{\subproblem}[2]{\subsection[#1]{#2}}
\titleformat{\subsubsection}[runin]{\large \bfseries}{\solutionname{}}{0 pt}{(\arabic{subsubsection}. #1)}

%% Maths Settings
\RequirePackage{mathtools}
\RequirePackage{amssymb}
\RequirePackage{amsthm} % proof environment and others\RequirePackage{bm} \% bm command\RequirePackage{nicematrix}\numberwithin{equation}{section}

%% Code Block Settings\RequirePackage{listings}\definecolor{dkgreen}{rgb}{0,0.5,0}\definecolor{gray}{rgb}{0.5,0.5,0.5}\definecolor{mauve}{rgb}{0.58,0,0.82}\lstset{
numbers=left, frame=tb, aboveskip=3mm, belowskip=3mm, showstringspaces=false, columns=fixed, framerule=1pt, rulecolor=\color{gray!35}, backgroundcolor=\color{gray!5}, basicstyle=\ttfamily\small, numberstyle=\footnotesize\color{gray},
}
```
keywordstyle={\bfseries\color{blue}},
commentstyle={\color{dkgreen}},
stringstyle={\color{mauve}},
breaklines=true,
breakatwhitespace=true,
tabsize=2,
extendedchars=false,
postbreak={\mbox{\hspace{-1.4 em}\textcolor{purple}{$\hookrightarrow$}\space}}

%% Captions Settings
\RequirePackage[font=footnotesize,labelfont=bf]{caption}

%% Color Boxes
\RequirePackage{tcolorbox}
\RequirePackage{varwidth}
\newtcolorbox{fancybox}[2]{
    enhanced,skin=enhancedlast jigsaw,
    fonttitle=\bfseries\sffamily,varwidth boxed title=0.7\linewidth,
    colbacktitle=blue!45!white,colframe=red!50!black,
    interior style={top color=blue!10!white,bottom color=red!10!white},
    boxed title style={empty,arc=0pt,outer arc=0pt,boxrule=0 pt},
    underlay boxed title={
      \fill[blue!45!white] (title.north west) -- (title.north east)
      -- +(-tcboxedtitleheight-1 mm,-tcboxedtitleheight+1mm)
      -- ([xshift=4 mm,yshift=0.5 mm]frame.north east) -- +(0 mm,-1 mm)
      -- (title.south west) -- cycle;
      \fill[blue!45!white!50!black] ([yshift=0.5 mm]frame.north west)
      -- +(-0.4,0) -- +(0,-0.3) -- cycle;
      \fill[blue!45!white!50!black] ([yshift=-0.5 mm]frame.north east)
      -- +(0,-0.3) -- +(0.4,0) -- cycle; },
    title={#2},#1
}
\newtcolorbox{notice}[2]{
    enhanced,
    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=0.25 mm,-tcboxedtitleheight/2,yshifttext=2 mm-\tcboxedtitleheight/2},
    boxed title style={boxrule=0.5 mm,
      frame code={\path[tcb fill frame] ([xshift=-4 mm]frame.west)
      -- (frame.north west) -- (frame.north east) -- ([xshift=4 mm]frame.east)
      -- (frame.south east) -- (frame.south west) -- cycle; },
    interior code={\path[tcb fill interior] ([xshift=-2 mm]interior.west)
      -- (interior.north west) -- (interior.north east)
      -- ([xshift=2 mm]interior.east) -- (interior.south east) -- (interior.south west)
      -- cycle; },
    title={#2},#1
}

%% Header and Footer
\RequirePackage{fancyhdr}
\RequirePackage[colorlinks=true, urlcolor=blue, linkcolor=purple, citecolor=red]{hyperref}
\setlength{\headheight}{52 pt}
\setlength{\marginparwidth}{2 cm}
\pagestyle{fancy}
\head{
  \fontfamily{Linux Libertine \- OSF}\selectfont
  \if\@solutionmodel
    \textsc{\@title\@assignno} -- \@studentID\@author
  \else
    \textsc{Machine Learning \@title\@assignno}
  \fi
}
\rhead{\thepage}
\renewcommand{\headrule}{\vspace{-0.7em}\tikzrule[BrickRed, path fading=east]{.5\textwidth}{0.3mm}}
\cfoot{}
% header and footer style for the first page
\fancypagestyle{firstpage}{
  \renewcommand{\headrule}{}
  \lhead{}
  \rhead{}
  \cfoot{
    \fontfamily{LinuxLibertineT-OSF}\selectfont
    \vspace*{-firstfooteradditionalheight}
    \vspace{-1.5em}
    \tikzrule[purple, path fading=west]{.5\textwidth}{.15em}% Do not remove this
    \tikzrule[purple, path fading=east]{.5\textwidth}{.15em}
  }
  \footnotesize\centering
  \if\@solutionmodel
    This \MakeLowercase{\@title} is due \@duedate{} and the date of submission is \@date.
  \else
    This \MakeLowercase{\@title} is due \textbf{\@duedate}{} and the version of the problem set is \@date.
  \fi
}
% LaTeX template information
\LaTeX{} template for this \MakeLowercase{\@title} is \textit{SEU-ML-Assign}
open source at \url{https://tvj.one/ml-tex} under the MIT License.
E-mail \href{mailto:me@tvj.one}{me@tvj.one} for support.

%% Title Settings
\RequirePackage{tabularx}
\RequirePackage{afterpage}
\newcommand{\pdftitleadditionalname}{Solution}
\makeatletter
\renewcommand{\maketitle}{
  \if\@solutionmodel
    \ifx\@instructor\@empty
      \let\@instructor\@author % author is the instructor (if not specified)
    \else
      \ifx\@author\@empty
        \let\@author\@instructor % instructor is the author (if not specified)
      \fi
    \fi
  \fi

  \thispagestyle{firstpage}
  \fontfamily{LinuxLibertineT-OSF}\selectfont % set font as Linux Libertine
  \enlargethispage{-firstfooteradditionalheight} % make room for the footer
  \begin{minipage}{10.5cm}
    \centering
    {
      \textsize{36}{48}\selectfont
      \textcolor{Plum}{\textsc{Machine Learning}}\textcolor{White}{\[.5em\]}
    }
    \\
  \end{minipage}
  \begin{minipage}{10.5cm}
    \centering
    {
      \if\@solutionmodel
        \@studentID~\@author
    \end{minipage}
\textit{Instructor:~@instructor}

\begin{minipage}{5 cm}
\vspace{0.7 em}
\centering
{\large
\textcolor{BrickRed}{\sffamily \@semester}
\vspace{2 mm}}
\LARGE \@title ~\{\fontfamily{bch}\selectfont \@assignno\}
\end{minipage}

\vspace{.3 em}
\tikzrule[cyan, path fading=east]{\textwidth}{.4 em}
\vspace{2 mm}
\fontfamily{cmr}\selectfont % Computer Modern

\% Set up document meta data
\% Note that it should be placed here because
\% by now \@author and \@title have been set.
\hypersetup{
 pdfauthor={\@author},
 pdftitle={\%
 \@title~\@assignno~}
 \if\@@solutionmode
 \pdftitleadditionalname{}
 \fi
 -- Machine Learning
 pdfsubject={Machine Learning},
 pdftitle={Machine Learning, \@title},
 pdfcreator={LaTeX with SEU-ML-Assgn class},
 pdfproducer={LaTeX}
}
\makeatother