Slides and Course Notes*

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Abstract

We present a document class from which we can generate both course slides and course notes in a transparent way.

Contents

*Version ? (last revised ?)

1 Introduction

The `mikoslides` document class is derived from `beamer.cls` [Tana], it adds a "notes version" for course notes derived from the `omdoc` class [**Kohlhase:smomdl**] that is more suited to printing than the one supplied by `beamer.cls`.

2 The User Interface

The `mikoslides` class takes the notion of a slide frame from Till Tantau's excellent `beamer` class and adapts its notion of frames for use in the STEXand OMDoc. To support semantic course notes, it extends the notion of mixing frames and explanatory text, but rather than treating the frames as images (or integrating their contents into the flowing text), the `mikoslides` package displays the slides as such in the course notes to give students a visual anchor into the slide presentation in the course (and to distinguish the different writing styles in slides and course notes).

In practice we want to generate two documents from the same source: the slides for presentation in the lecture and the course notes as a narrative document for home study. To achieve this, the `mikoslides` class has two modes: *slides mode* and *notes mode* which are determined by the package option.

2.1 Package Options

EdN:1 The `mikoslides` class takes a variety of class options:[1]

`slides` `a`
- The options `slides`nd notes`notes` switch between slides mode and notes mode (see Section 2.2).

`sectocframes`
- If the option `sectocframes` is given, then special frames with section table of contents are produced headers [2]

EdN:2

`showmeta`
- `showmeta`. If this is set, then the metadata keys are shown (see [Koh16] for details and customization options).

`frameimages`
- If the option `frameimages` is set, then slide mode also shows the `\frameimage`-generated frames.

2.2 Notes and Slides

`frame` `note` Slides are represented with the `frame` just like in the `beamer` class, see [Tanb] for details. The `mikoslides` class adds the `note` environment for encapsulating the course note fragments.[1]

[1] EdNote: leaving out noproblems for the moment until we decide what to do with it.
[2] EdNote: document the functionality
[1] MK: it would be very nice, if we did not need this environment, and this should be possible in principle, but not without intensive LaTeX trickery. Hints to the author are welcome.

⚠ Note that it is essential to start and end the `notes` environment at the start of the line – in particular, there may not be leading blanks – else LaTeX becomes confused and throws error messages that are difficult to decipher.

```
\begin{note}
  We start this course with ...
\end{note}

\begin{frame}
  \frametitle{The first slide}
  ...
\end{frame}
\begin{note}
  ... and more explanatory text
\end{note}

\begin{frame}
  \frametitle{The second slide}
  ...
\end{frame}
...
```

Example 1: A typical Course Notes File

By interleaving the `frame` and `note` environments, we can build course notes as shown in Figure 1.

`\frameimage`

Sometimes, we want to integrate slides as images after all – e.g. because we already have a PowerPoint presentation, to which we want to add sTeXnotes. In this case we can use `\frameimage[`⟨*opt*⟩`]{`⟨*path*⟩`}`, where ⟨*opt*⟩ are the options of `\includegraphics` from the `graphicx` package [CR99] and ⟨*path*⟩ is the file path (extension can be left off like in `\includegraphics`).

2.3 Header and Footer Lines

2.4 Colors and Highlighting

`\textwarning`

The `\textwarning` macro generates a warning sign: ⚠

2.5 Front Matter, Titles, etc

2.6 Miscellaneous

3 Limitations

In this section we document known limitations. If you want to help alleviate them, please feel free to contact the package author. Some of them are currently discussed in the sTeXGitHub repository [sTeX].

1. when option `book` which uses `\pagestyle{headings}` is given and semantic macros are given in the `omgroup` titles, then they sometimes are not defined by the time the heading is formatted. Need to look into how the headings are made. This is a problem of the underlying `omdoc` package.

4 The Implementation

4.1 Class and Package Options

We define some Package Options and switches for the `mikoslides` class and activate them by passing them on to `beamer.cls` and `omdoc.cls` and the `mikoslides` package. We pass the `nontheorem` option to the `statements` package when we are not in notes mode, since the `beamer` package has its own (overlay-aware) theorem environments.

```
⟨*cls⟩
\newif\ifnotes\notesfalse
\DeclareOption{notes}{\notestrue\PassOptionsToPackage{\CurrentOption}{mikoslides}}
\DeclareOption{slides}{\notesfalse\PassOptionsToPackage{\CurrentOption}{mikoslides}}
\DeclareOption*{\PassOptionsToClass{\CurrentOption}{omdoc}
                            \PassOptionsToClass{\CurrentOption}{beamer}
                            \PassOptionsToPackage{\CurrentOption}{mikoslides}}
\ProcessOptions
⟨/cls⟩
```

now we do the same for the `mikoslides` package. Note that we also have to define the same switches[3], since we might use `mikoslides.sty` in a different class.

EdN:3

```
⟨*package⟩
\newif\if@mikoslides@mh@\@mikoslides@mh@false
\DeclareOption{mh}{\@mikoslides@mh@true
  \PassOptionsToPackage{\CurrentOption}{stex}
  \PassOptionsToPackage{\CurrentOption}{smglom}
  \PassOptionsToPackage{\CurrentOption}{tikzinput}}
\newif\ifnotes\notesfalse
\DeclareOption{notes}{\notestrue}
\DeclareOption{slides}{\notesfalse}
\ifnotes\else\PassOptionsToPackage{nontheorem}{statements}\fi
\newif\ifsectocframes\sectocframesfalse
\DeclareOption{sectocframes}{\sectocframestrue\PassOptionsToPackage{msection}{statements}}
\newif\iframeimages\frameimagesfalse
\DeclareOption{frameimages}{\frameimagestrue}
\newif\if@part\@partfalse
\DeclareOption{report}{\@parttrue\PassOptionsToPackage{\CurrentOption}{omdoc}}
\DeclareOption{book}{\@parttrue\PassOptionsToPackage{\CurrentOption}{omdoc}}
\DeclareOption{bookpart}{\@parttrue\PassOptionsToPackage{\CurrentOption}{omdoc}}
\newif\ifproblems\problemstrue
\DeclareOption{noproblems}{\problemsfalse}
```

[3] EdNote: MK: we may think about making all of them internal

```
\DeclareOption*{\PassOptionsToPackage{\CurrentOption}{stex}
                            \PassOptionsToPackage{\CurrentOption}{smglom}
                            \PassOptionsToPackage{\CurrentOption}{tikzinput}}
\ProcessOptions
⟨/package⟩
```

Depending on the options, we either load the `article`-based `omdoc` or the `beamer` class. In the first case, we also have to make the `beamer`-specific things available to `article` via the `beamerarticle` package. We use options to avoid loading theorem-like environments, since we want to use our own from the SᴛEX packages. On the LaTeXML side we just load the `omdoc` class.

```
⟨*cls⟩
\ifnotes
  \LoadClass{omdoc}
\else
  \LoadClass[10pt,notheorems]{beamer}
  \newcounter{Item}
  \newcounter{paragraph}
  \newcounter{subparagraph}
  \newcounter{Hfootnote}
\fi
```

now it only remains to load the `mikoslides` package that does all the rest.

```
\RequirePackage{mikoslides}
⟨/cls⟩
```

The first batch of packages we want are loaded on `mikoslides.sty`. These are the general ones, we will load the SᴛEX-specific ones after we have done some work (e.g. defined the counters `m*`). Only the `stex-logo` package is already needed now for the default theme.

```
⟨*package⟩
\ifnotes
\RequirePackage{a4wide}
\RequirePackage{marginnote}
\RequirePackage{xcolor}
\RequirePackage{mdframed}
\RequirePackage[noxcolor,noamsthm]{beamerarticle}
\fi
\if@mikoslides@mh@\RequirePackage{mikoslides-mh}\fi
\RequirePackage{etoolbox}
\RequirePackage{amssymb}
\RequirePackage{amsmath}
\RequirePackage{comment}
\RequirePackage{textcomp}
\RequirePackage{url}
\RequirePackage{graphicx}
\RequirePackage{stex-logo}
\RequirePackage{pgf}
\ifnotes
\RequirePackage[bookmarks,bookmarksopen,bookmarksnumbered,breaklinks,
```

```
linkcolor=black,citecolor=black,urlcolor=cyan,filecolor=cyan,colorlinks]{hyperref}
\fi
```

finally, we require the `metakeys` package from sTEX, so that we can use the `\addmetakey` mechanism.

```
\RequirePackage{metakeys}
```

4.2 Notes and Slides

For the lecture notes cases, we also provide the `\usetheme` macro that would otherwise from the the `beamer` class. While the latter loads `beamertheme`⟨*theme*⟩.sty, the notes version loads `beamernotestheme`⟨*theme*⟩`.sty`.[4]

EdN:4

```
\ifnotes
\renewcommand\usetheme[2][]{\usepackage[#1]{beamernotestheme#2}}
\fi
```

We define the sizes of slides in the notes. Somehow, we cannot get by with the same here.

```
\newcounter{slide}
\newlength{\slidewidth}\setlength{\slidewidth}{12.8cm}
\newlength{\slideheight}\setlength{\slideheight}{9cm}
```

`note` The `note` environment is used to leave out text in the `slides` mode. It does not have a counterpart in OMDoc. So for course notes, we define the `note` environment to be a no-operation otherwise we declare the `note` environment as a comment via the `comment` package.

```
\ifnotes%
  \renewenvironment{note}{\ignorespaces}{}%
\else%
  \excludecomment{note}%
\fi%
```

We start by giving the LaTeXML binding for the `frame` environment from the `beamer` class. We first set up the slide boxes in `article` mode. We set up sizes and provide a box register for the frames and a counter for the slides.

```
\ifnotes
  \newlength{\slideframewidth}
  \setlength{\slideframewidth}{1.5pt}
```

`frame` We first define the keys.

```
  \addmetakey{frame}{label}
  \addmetakey[yes]{frame}{allowframebreaks}
  \addmetakey{frame}{allowdisplaybreaks}
  \addmetakey[yes]{frame}{fragile}
  \addmetakey[yes]{frame}{shrink}
  \addmetakey[yes]{frame}{squeeze}
```

[4] EdNote: MK: This is not ideal, but I am not sure that I want to be able to provide the full theme functionality there.

We define the environment, read them, and construct the slide number and label.

```
\renewenvironment{frame}[1][]{%
  \metasetkeys{frame}{#1}%
  \stepcounter{slide}%
  \def\@currentlabel{\theslide}%
  \ifx\frame@label\@empty%
  \else%
    \label{\frame@label}%
  \fi%
```

We redefine the `itemize` environment so that it looks more like the one in `beamer`.

```
  \def\itemize@level{outer}%
  \def\itemize@outer{outer}%
  \def\itemize@inner{inner}%
  \renewcommand\newpage{}%
  \renewcommand\metakeys@show@keys[2]{\marginnote{{\scriptsize ##2}}}%
  \renewenvironment{itemize}{%
    \ifx\itemize@level\itemize@outer%
      \def\itemize@label{$\rhd$}%
    \fi%
    \ifx\itemize@level\itemize@inner%
      \def\itemize@label{$\scriptstyle\rhd$}%
    \fi%
    \begin{list}%
    {\itemize@label}%
    {\setlength{\labelsep}{.3em}%
     \setlength{\labelwidth}{.5em}%
     \setlength{\leftmargin}{1.5em}%
    }%
    \edef\itemize@level{\itemize@inner}%
  }{%
    \end{list}%
  }%
```

We create the box with the `mdframed` environment from the equinymous package.

```
    \begin{mdframed}[linewidth=\slideframewidth,skipabove=1ex,skipbelow=1ex,userdefinedwidth=\s
  }{%
    \medskip\miko@slidelabel\end{mdframed}%
  }%
```

Now, we need to redefine the frametitle (we are still in course notes mode).

`\frametitle`

```
  \renewcommand{\frametitle}[1]{{\Large\bf\sf\color{blue}{#1}}\medskip}%
\fi %ifnotes
```

`\frameimage` We have to make sure that the width is overwritten, for that we check the `\Gin@ewidth` macro from the `graphicx` package[5]

EdN:5

[5] EdNote: MK@DG; we need to do that in the LaTeXML binding as well!

```
\newrobustcmd\frameimage[2][]{%
  \stepcounter{slide}%
  \iframeimages%
    \def\Gin@ewidth{}\setkeys{Gin}{#1}%
    \ifnotes%
    \else%
      \vfill%
    \fi%
    \ifx\Gin@ewidth\@empty%
      \mycgraphics[width=\slidewidth,#1]{#2}\else\mycgraphics[#1]{#2}%
    \fi%
    \par\strut\hfill{\footnotesize Slide \arabic{slide}}%
    \ifnotes%
    \else%
      \vfill%
    \fi%
  \fi%
}% iframeimages
```

EdN:6 `\pause` [6]

```
\ifnotes\newcommand\pause{}\fi
```

4.3 Header and Footer Lines

Now, we set up the infrastructure for the footer line of the slides, we use boxes for the logos, so that they are only loaded once, that considerably speeds up processing.

`\setslidelogo` The default logo is the logo of Jacobs University. Customization can be done by `\setslidelogo{`⟨*logo name*⟩`}`.

```
\newlength{\slidelogoheight}
\ifnotes%
  \setlength{\slidelogoheight}{.4cm}%
\else%
  \setlength{\slidelogoheight}{1cm}%
\fi%
\newsavebox{\slidelogo}%
\sbox{\slidelogo}{\sTeX}%
\newrobustcmd{\setslidelogo}[1]{%
  \sbox{\slidelogo}{\includegraphics[height=\slidelogoheight]{#1}}%
}%
```

`\setsource` `\source` stores the writer's name. By default it is *Michael Kohlhase* since he is the main user and designer of this package. `\setsource{`⟨*name*⟩`}` can change the writer's name.

```
\def\source{Michael Kohlhase}% customize locally
\newrobustcmd{\setsource}[1]{\def\source{#1}}%
```

[6] EdNote: MK: fake it in notes mode for now

\setlicensing Now, we set up the copyright and licensing. By default we use the Creative Commons Attribuition-ShareAlike license to strengthen the public domain. If package `hyperref` is loaded, then we can attach a hyperlink to the license logo. `\setlicensing[`⟨*url*⟩`]{`⟨*logo name*⟩`}` is used for customization, where ⟨*url*⟩ is optional.

```
\def\copyrightnotice{\footnotesize\copyright:\hspace{.3ex}{\source}}%
\newsavebox{\cclogo}%
\sbox{\cclogo}{\includegraphics[height=\slidelogoheight]{cc_somerights}}%
\newif\ifcchref\cchreffalse%
\AtBeginDocument{%
  \@ifpackageloaded{hyperref}{\cchreftrue}{\cchreffalse}
}%
\def\licensing{%
  \ifcchref%
    \href{http://creativecommons.org/licenses/by-sa/2.5/}{\usebox{\cclogo}}%
  \else%
    {\usebox{\cclogo}}%
  \fi%
}%
\newrobustcmd{\setlicensing}[2][]{%
  \def\@url{#1}%
  \sbox{\cclogo}{\includegraphics[height=\slidelogoheight]{#2}}%
  \ifx\@url\@empty%
    \def\licensing{{\usebox{\cclogo}}}%
  \else%
    \def\licensing{%
      \ifcchref%
      \href{#1}{\usebox{\cclogo}}%
      \else%
      {\usebox{\cclogo}}%
      \fi%
    }%
  \fi%
}%
```

EdN:7 \slidelabel Now, we set up the slide label for the `article` mode.[7]

```
\newrobustcmd\miko@slidelabel{%
  \vbox to \slidelogoheight{%
    \vss\hbox to \slidewidth%
    {\licensing\hfill\copyrightnotice\hfill\arabic{slide}\hfill\usebox{\slidelogo}}%
  }%
}%
```

4.4 Colors and Highlighting

Now, we set up an infrastructure for highlighting phrases in slides. Note that we use content-oriented macros for highlighting rather than directly using color

[7] EdNote: see that we can use the themes for the slides some day. This is all fake.

markup. The first thing to to is to adapt the green so that it is dark enough for most beamers

```
\AtBeginDocument{%
\definecolor{green}{rgb}{0,.5,0}%
\definecolor{purple}{cmyk}{.3,1,0,.17}%
}%
```

We customize the `\defemph`, `\notemph`, and `\stDMemph` macros with colors for the use in the `statements` package. Furthermore we customize the `\@@lec` macro for the appearance of line end comments in `\lec`.

```
% \def\STpresent#1{\textcolor{blue}{#1}}
\def\defemph#1{{\textcolor{magenta}{#1}}}
\def\notemph#1{{\textcolor{magenta}{#1}}}
\def\stDMemph#1{{\textcolor{blue}{#1}}}
\def\@@lec#1{(\textcolor{green}{#1})}
```

I like to use the dangerous bend symbol for warnings, so we provide it here.

`\textwarning` as the macro can be used quite often we put it into a box register, so that it is only loaded once.

```
\pgfdeclareimage[width=.9em]{miko@small@dbend}{dangerous-bend}
\def\smalltextwarning{%
  \pgfuseimage{miko@small@dbend}%
  \xspace%
}%
\pgfdeclareimage[width=1.5em]{miko@dbend}{dangerous-bend}
\newrobustcmd\textwarning{%
  \raisebox{-.05cm}{\pgfuseimage{miko@dbend}}%
  \xspace%
}%
\pgfdeclareimage[width=2.5em]{miko@big@dbend}{dangerous-bend}%
\newrobustcmd\bigtextwarning{%
  \raisebox{-.05cm}{\pgfuseimage{miko@big@dbend}}%
  \xspace%
}%
```

4.5 Front Matter, Titles, etc

We need to redefine the frontmatter macros inherited from the `beamer` class for LaTeXML, since there they take an optional argument.

```
%      Must be first command on slide to make positioning work.
\newrobustcmd\putgraphicsat[3]{%
  \begin{picture}(0,0)\put(#1){\includegraphics[#2]{#3}}\end{picture}%
}%
\newrobustcmd\putat[2]{%
  \begin{picture}(0,0)\put(#1){#2}\end{picture}%
}%
```

4.6 Sectioning

If the `sectocframes` option is set, then we make section frames. We first define a set of counters[8]

EdN:8

```
\ifsectocframes%
\if@part%
    \newcounter{mpart}%
    \newcounter{mchapter}%
    \newcounter{msection}[mchapter]%
  \else%
    \newcounter{msection}%
  \fi%
  \newcounter{msubsection}[msection]%
  \newcounter{msubsubsection}[msubsection]%
  \newcounter{msubsubsubsection}[msubsubsection]%
\fi% ifsectocframes
```

Now that we have defined the counters, we can load the STEX-specific packages (in particular `statements` that needs these counters).

```
\RequirePackage{stex}
\RequirePackage{smglom}
\RequirePackage{tikzinput}
```

Now STEXis loaded, we redefine the `omgroup` environment to produce section toc frames (if the option `sectocframes` is specified.)[9]

EdN:9

```
\ifnotes\else% only in slides
  \renewenvironment{omgroup}[2][]{%
    \metasetkeys{omgroup}{#1}\sref@target%
    \advance\section@level by 1%
    \ifsectocframes%
    \begin{frame}[noframenumbering]%
    \vfill\Large\centering%
    \red{%
      \ifcase\section@level\or
      \stepcounter{mpart}
      \def\@@label{Part \Roman{mpart}}
      \def\currentsectionlevel{part}
      \or%
      \stepcounter{mchapter}
      \def\@@label{Chapter \arabic{mchapter}}
      \def\currentsectionlevel{chapter}
      \or
      \stepcounter{msection}
      \def\@@label{\if@part\arabic{mchapter}.\fi\arabic{msection}}
      \def\currentsectionlevel{section}
      \or
```

[8] EdNote: I forget: why not use the counters from beamer/article? –¿ document this.

[9] EdNote: MK: we should probably have a hook in the original code of omgroup so that we can add the sectocframes behavior here without having to copy the internals of omgroup, so that they do not get out of sync.

```
      \stepcounter{msubsection}
      \def\@@label{\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{msubsection}}
      \def\currentsectionlevel{subsection}
      \or
      \stepcounter{msubsubsection}
      \def\@@label{\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{msubsection}.\arabic{
      \def\currentsectionlevel{subsubsection}
      \or
      \stepcounter{msubsubsubsection}
      \def\@@label{\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{msubsection}.\arabic{
      \def\currentsectionlevel{subsubsubsection}
      \fi% end ifcase
      \@@label\sref@label@id\@@label
      \quad #2%
    }%
    \vfill%
    \end{frame}%
    \fi %ifsectocframes
  }
  {\advance\section@level by -1}%
\fi% ifnotes
```

4.7 Miscellaneous

We set up a `beamer` template for theorems like ams style, but without a block environment.

```
\def\inserttheorembodyfont{\normalfont}
\defbeamertemplate{theorem begin}{miko}
{\inserttheoremheadfont\inserttheoremname\inserttheoremnumber
  \ifx\inserttheoremaddition\@empty\else\ (\inserttheoremaddition)\fi%
  \inserttheorempunctuation\inserttheorembodyfont\xspace}
\defbeamertemplate{theorem end}{miko}{}
```

and we set it as the default one.

```
\setbeamertemplate{theorems}[miko]
```

The following fixes an error I do not understand, this has something to do with beamer compatibility, which has similar definitions but only up to 1.

```
\expandafter\def\csname Parent2\endcsname{}
```

We need to disregard the columns macros introduced by the `beamer` class in the notes.

```
\ifnotes%
  \renewenvironment{columns}{%
    \par\noindent%
    \begin{minipage}%
    \slidewidth\centering\leavevmode%
  }{%
    \end{minipage}\par\noindent%
  }%
```

```
  \newsavebox\columnbox%
  \renewenvironment{column}[1]{%
    \begin{lrbox}{\columnbox}\begin{minipage}{#1}%
  }{%
    \end{minipage}\end{lrbox}\usebox\columnbox%
  }%
\fi%

\ifproblems%
  \newenvironment{problems}{}{}%
\else%
  \excludecomment{problems}%
\fi%
⟨/package⟩
```

References

[CR99] David Carlisle and Sebastian Rathz. *The* graphicxl *package*. Part of the TEX distribution. The Comprehensive TEX Archive Network. 1999. URL: https://www.tug.org/texlive/devsrc/Master/texmf-dist/doc/latex/graphics/graphicx.pdf.

[Koh16] Michael Kohlhase. *metakeys.sty: A generic framework for extensible Metadata in LATEX*. Tech. rep. Comprehensive TEX Archive Network (CTAN), 2016. URL: http://mirror.ctan.org/macros/latex/contrib/stex/sty/metakeys/metakeys.pdf.

[sTeX] *KWARC/sTeX*. URL: https://github.com/KWARC/sTeX (visited on 05/15/2015).

[Tana] Till Tantau. *beamer – A LaTeX class for producing presentations and slides*. URL: http://ctan.org/pkg/beamer (visited on 01/07/2014).

[Tanb] Till Tantau. *User Guide to the Beamer Class*. URL: http://ctan.org/macros/latex/contrib/beamer/doc/beameruserguide.pdf.