Presentation in Beamer
Introduction to presentation in LaTeX

Jan Kohout

July 23, 2013 in Nové Hrady

Outline

What is LaTeX and Beamer?

What is LaTeX?

LaTeX

LaTeX is a **document markup language** and document preparation system for the **TeX** (typesetting program) - it creates final *pdf document*.
Uses ***.tex** file - created using some form of text editor or WYSIWYG.

Name origin

From capital Greek letters tau, epsilon, and chi, as the name of TeX derives from the Greek - means skill, art, technique)
Pronounced
$/'la : t\varepsilon x/, /'l : t\varepsilon k/ or /'leit\varepsilon k/$.

[en.wikipedia.org/wiki/LaTeX]]

Figure 1 : Latex.
[socaltrailriders.org]

Figure 2 : LaTeX logo.

What is Beamer?

Figure 3 : A beam.
[cdni.wired.co.uk]

Beamer

- ✗ a English boy name. The meaning of the name is 'trumpeter' Beamer, Bemeere.
- ✗ American slang for a BMW car.
- ✓ LaTeX class for creating slides for presentations.

Translation to czech

Beamer = *rychlý nadhoz, válové snovadlo* (?!).

Motivation

Why use Beamer and LaTeX?

Why use Beamer and LaTeX?

- **presentation under control**
  - not as PowerPoint, that do what he want (typically positioning)
- **easy changeable**
  - one line change look of the whole presentation
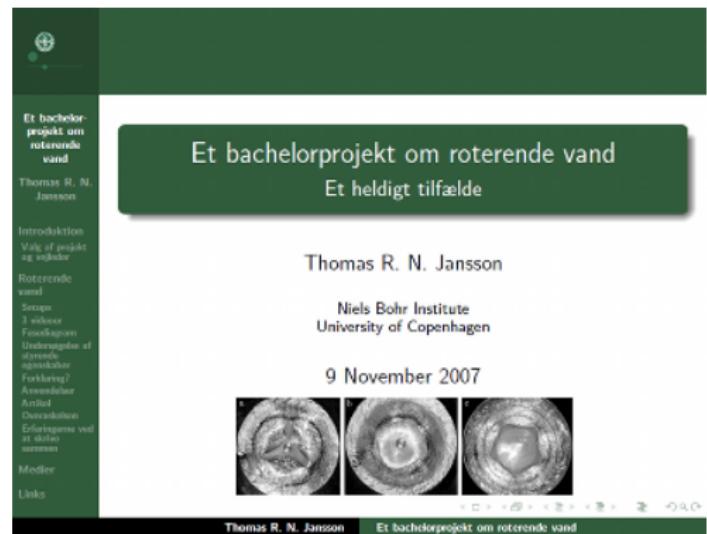
Figure 4 : Example of Beamer presentation.
[tjansson.dk/]

Advantages

Figure 5 : Beamer!
[chennaisocialmedia.com]

- **uniform** - format and positioning according to typographic rules
- **vector images** - able to insert
- **images** - easy to change image by changing source file
- **resizing image** - no problem
- **math, code, special chars** - easy to write math expression
- **source code** - highlighting source codes
- **outlines**, **navigation**, **reference**, **citation** - created automatically
- **professional looking, macros, templates**...

Disadvantages?

For effective work it is good to know some commands.
Sometimes is a problem to find where error is.
Compiling, compiling, compiling...

Figure 6 : Example of LaTeX code.

Figure 7 : Example of error console.

Disadvantages?

Figure 8 : Error finding…
[layoutsparks.com]

Disadvantages?

Figure 8 : Error finding...
[layoutsparks.com]

Figure 9 : Error found.
[parganews.com]

What you need?

Overview

MikTeX

Distribution of TeX - MikTeX,
http://miktex.org/.
Instalation about 400 *MB*.
Compile *.tex file into *.ps or
*.pdf.

Editors

Some text editor (*TexStudio,
TexMakerX...*) or WYSIWYG
editor (*Bakoma*) and pdf/ps
viewer (*SumatraPDF*).
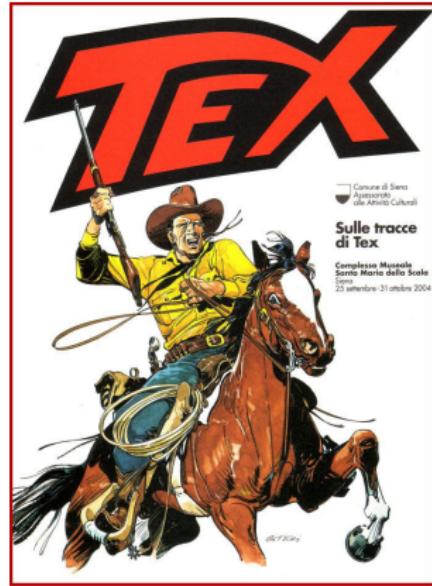
Figure 10 : TeX?
[comicbookdaily.com]

MiTeX instalation

MikTeX - instalation in czech with image wizard

http://latex.feec.vutbr.cz/cz/latex/lokalni-instalace/

http://latex.feec.vutbr.cz/cz/latex/diskuze/

or

http://support.dce.felk.cvut.cz/lab26/download/LaTeX/TeXinst.pdf

MiKTeX.3. Zvolte umístění instalace programu a další parametry instalace. Viz obrázky. Jako základní formát stránky nastavte **A4** a zvolte „**Ask me first**" u budoucí instalace chybějících balíčků. Spusťte samotnou instalaci. Trvá relativně dlouho, kopíruje se a rozbaluje totiž spousta malých souborů.

Figure 11 : http://latex.feec.vutbr.cz

TeXStudio
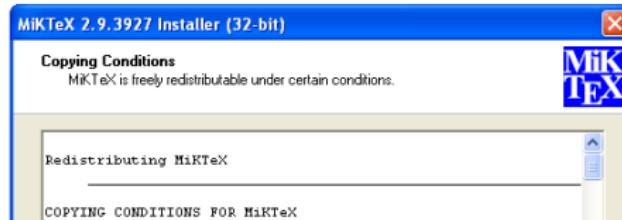
Instalation

http://texstudio.sourceforge.net/ - portable version. According me best LaTeX editor - macros, help, integration with SumatraPDF.
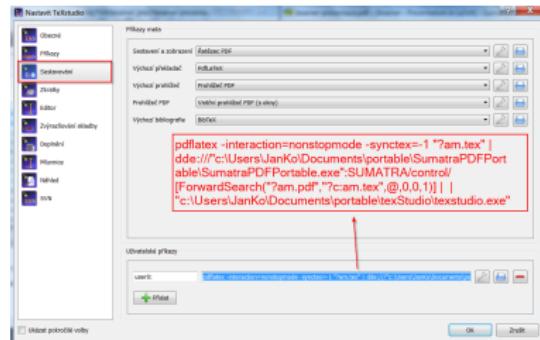
Figure 12 : Setting compilation.
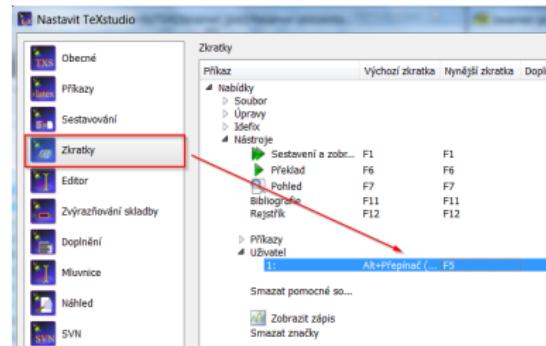
Figure 13 : Setting shortcut F5 for creating PDF.

SumatraPDF

Instalation

According me best LaTeX editor.
http://portableapps.com/apps/
office/sumatra_pdf_portable -
portable version.

Forward and inverse search

When compile TeX to see actual
page. When you click in the pdf
document to see related code.
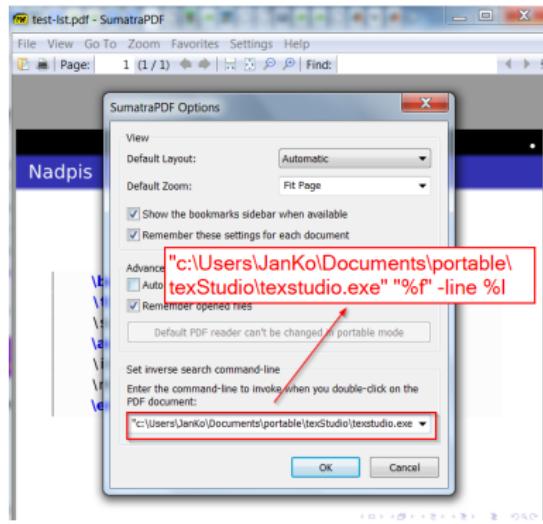
Figure 14 : SumatraPDF - setting
inverse search

Another editors

Figure 15 : TeXnicCenter editor.
http://www.texniccenter.org/
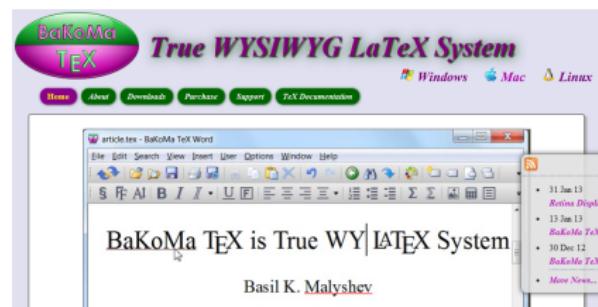
Figure 16 : BaKoMa - WYSIWYG editor.
http://www.bakoma-tex.com/

Philosophy

View output

Compilation

To view output pdf/ps you have to compile *.tex.
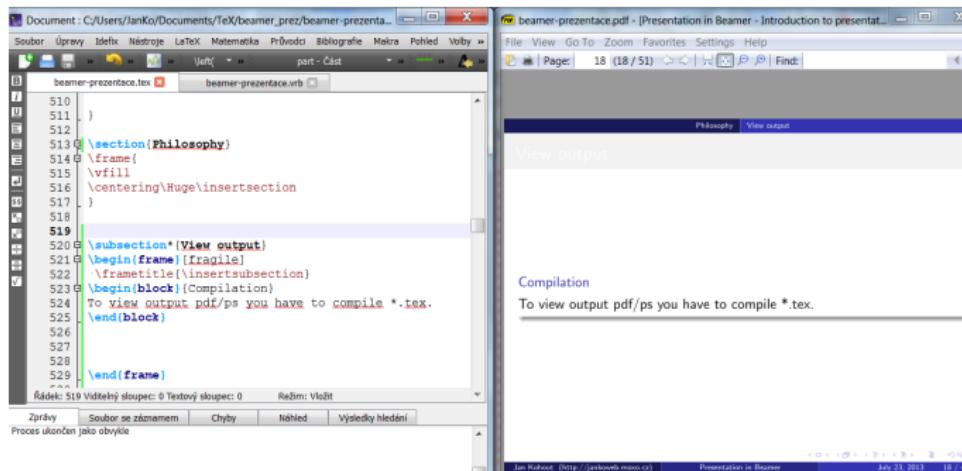
Figure 17 : TexStudio and SumatraPDF

Packages, commands

Packages

To use commands import packages.
$\backslash usepackage\{FILE\}$

Important commands

$\backslash$ (backslash) - control
char; escape char
$\{\}$ (brackets) - block
$\backslash$**command**
$\backslash$**command**{*parameters*}
$\{\backslash$**command** *text*$\}$
% comment

Examples

$\alpha, \phi, \Phi, \times, \neq, \spadesuit$
bold
small

```
\alpha, \phi, \Phi
\times, \neq, \spadesuit
\textbf{bold}, {\small small}
```

Syntax example

```latex
\documentclass{beamer}
\usepackage{NAME}
...
\begin{document}

\section{TITLE}
\frame{
 \frametitle{\insertsection}
  \begin{ENVIRONMENT}
   commands/text
  \end{ENVIRONMENT}
  % this is a comment
  Text...
}
...
\end{document}
```

Languages

In czech no problem, but beware of encoding

```
\usepackage[czech]{babel}
\usepackage[utf8]{inputenc}
```

http://jankoweb.moxo.cz/blog/skripty/
prevadec-rozhazene-diakritiky-pri-kopirovani-z-pdf-vytvoreneho-latexem/

In english - have to use special syntax - e.g. "Příliš"

```
\usepackage[english]{babel}
...
\begin{document}
P\v{r}\'{i}li\v{s} ...
\end{document}
```

Templates

```
\mode<presentation> {
\usetheme{CambridgeUS}\usecolortheme{whale}
}
```


Figure 18 : Beamer templates gallery, hartwork.org.

http://www.hartwork.org/beamer-theme-matrix/
http://jankoweb.moxo.cz/blog/odborny-sw/
beamer-sablony-a-materialy-k-tvorbe-profesionalnich-prezentaci/

Code examples

"Header"

Figure 19 : Header.

[webstory.my]

```
\documentclass{beamer}
\usepackage{epstopdf} % convert eps to pdf and using pdflatex
\usepackage[english]{babel}
\mode<presentation>{
\usetheme{CambridgeUS}\usecolortheme{whale}
}
\usepackage{url}
```

First slide (setting)

```
\title{Presentation in Beamer}
\subtitle[pod]{Introduction to presentation in LaTeX}
\author{Jan Kohout}
\institute[CTU]{http://jankoweb.moxo.cz}

\newcommand{\supervisor}{}
```

\newcommand

For defining custom commands.

First slide (code)

```
\defbeamertemplate*{my title page}{default}[1][] { %
   \vbox{}\vfill
   \begin{centering}\begin{beamercolorbox}[sep=8pt,center,#1]{tit
       \ifx\insertsubtitle\@empty%
       \else%
         \vskip0.25em%
         {\usebeamerfont{subtitle}\usebeamercolor[fg]{subtitle}\i
       \fi%
     \end{beamercolorbox}%
     \vskip1em\par\begin{beamercolorbox}[sep=4pt,center,#1]{autho
     \begin{beamercolorbox}[sep=4pt,center,#1]{institute}\usebeam
       \usebeamerfont{supervisor} Supervisor: \supervisor\end{bea
   }
   \frame{ % MAIN SLIDE
    \usebeamertemplate{my title page}
   }
```

Outline, slides

```latex
\section*{Outline}
\frame{
 \frametitle{\insertsection}
  \tableofcontents
}
.
.
.
\section{TITLE}
\frame{
 \frametitle{\insertsection}
Text...
}
```

\tableofcontents

Automatically generate outline from section, subsection...

Section, boxes, lists, fonts

Section, subsection

Appears in outline

```
\section{TITLE}
\subsection{TITLE}
\subsubsection{TITLE}
```

Not appears in outline - add star

```
\section*{TITLE}
\subsection*{TITLE}
\subsubsection*{TITLE}
```

Boxes

Block

```
\begin{block}{TITLE}
Text...
\end{block}
```

Alertblock

```
\begin{alertblock}{TITLE}
Text...
\end{alertblock}
```

Exampleblock

```
\begin{exampleblock}{TITLE}
Text...
\end{exampleblock}
```

List, columns

- text 1
- text 2

1. text 1
2. text 2

```
\begin{columns}

\column{5.5cm}
\begin{itemize}
\item text 1
\item text 2
\end{itemize}

\column{5.5cm}
\begin{enumerate}
\item text 1
\item text 2
\end{enumerate}

\end{columns}
```
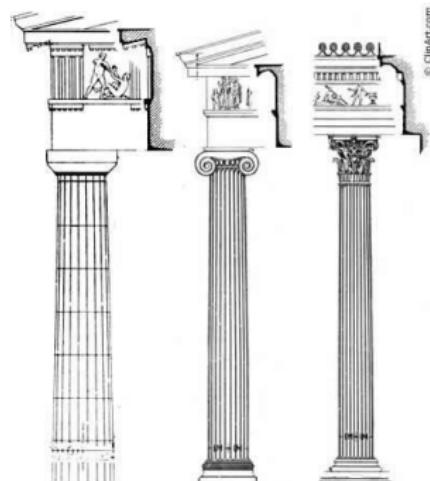

Comparison of Greek Columns: Doric, Ionic, and Corinthian

Figure 20 : Columns.

[0.tqn.com]

Font

tiny text small text large text Large text huge text Huge text

```
{\tiny tiny text}
{\small small text}
{\large large text}
{\Large Large text}
{\huge huge text}
{\Huge Huge text}
```

bold, *italic*,

red, green, blue

http://myweb.cz

```
\textbf{bold}, \textit{italic},
{\color{red} red}, {\color{green} green}, {\color{blue} blue}
\url{http://myweb.cz}
```

Images, tables, reference

Images
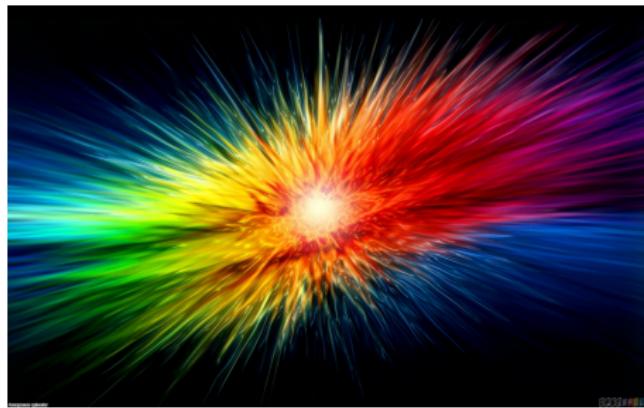
Simply

Setting width, changing image by changing source, auto positioning...

Figure 21 : Image example.

[openwalls.com]

```
\begin{figure}[h]
 \centering
 \includegraphics[width=6cm]{img/image.png}
 \caption{Image example}
 \label{fig:image.png}
\end{figure}
```

Tables

Table 1 : Caption

0	705	1,48	37,9
0,43	683	2,43	37,7
0,94	661	3,46	37,4
1,38	644	4,33	37,2

\label{tab : reference}

Reference to table. How to use below.

```latex
\begin{table}[H]
    \centering
    \caption{Caption}
    \vspace{0.2cm}
        \begin{tabular}{|c|l|r r|}
            \hline
0 & 705 & 1,48 & 37,9 \\
\hline\hline
0,43 & 683 & 2,43 & 37,7 \\
0,94 & 661 & 3,46 & 37,4 \\
1,38 & 644 & 4,33 & 37,2 \\
            \hline
        \end{tabular}
    \label{tab:reference}
\end{table}
```

Citation, reference

See [2]. According to equation (5).
You can see on figure 5.

```
See \cite{WWW}. According to equation \eqref{eq:example}.

You can see on image \ref{fig:advantages.png}.
```

📄 JOSEPH J.M. BRAAT, PETER DIRKSEN, SVEN VAN HAVER,
AUGUSTUS J.E.M. JANSSEN
Detailed description of the ENZ approach, 2005.

📄 JOSEPH J.M. BRAAT, PETER DIRKSEN, SVEN VAN HAVER,
AUGUSTUS J.E.M. JANSSEN
Extended Nijboer-Zernike (ENZ) Analysis and Aberration Retrieval
[online 2012-07-24], ⟨http://www.nijboerzernike.nl/⟩.

Reference (code)

```
\begin{thebibliography}{99}
    \bibitem{ENZ_math}
    \textsc{Joseph J.M. Braat, Peter Dirksen, Sven van Haver, Aug
    \newblock \emph{Detailed description of the ENZ approach}, 20
    \bibitem{WWW}
    \textsc{Joseph J.M. Braat, Peter Dirksen, Sven van Haver, Aug
    \newblock \emph{Extended Nijboer-Zernike (ENZ) Analysis and
    Aberration Retrieval} [online~\hbox{2012-07-24}],    $\langle
\end{thebibliography}
```

Pause


```
Some text
\pause
```

Figure 22 : Pause.

[genome.duke.edu]

Pause

Figure 22 : Pause.

[genome.duke.edu]

```
Some text
\pause

Some text
\pause
```

Pause

Figure 22 : Pause.

[genome.duke.edu]

```
Some text
\pause

Some text
\pause

Some text
\pause
```

Math, source code, Matlab

Math

Expand $(a + b)^n$:

$$(a + b)^n \tag{1}$$
$$(a \ + \ b)^n \tag{2}$$
$$(a \quad + \quad b)^n \tag{3}$$
$$(a \qquad + \qquad b)^n \tag{4}$$

```
Expand $(a+b)^n$:
\begin{eqnarray}
   (a + b)^n \\
   (a\ + \ b)^n \\
   (a\quad + \quad b)^n \\
   (a\qquad + \qquad b)^n
\end{eqnarray}
```

Equations

Math in text

$x = 7\,\alpha + 4\,\beta$

```
$x = 7 \, \alpha + 4 \, \beta$
```

Numbered equation

$$\frac{1}{2}, x_1, x^2, lim_{s\rightarrow\inf}s, \int_{min}^{max}x^2dx, \sum_{min}^{max}\beta = \pi \qquad (5)$$

```
\begin{equation}
\frac{1}{2}, x_1, x^2, lim_{s \rightarrow \inf} s, ...
\int_{min}^{max} x^2 dx, \sum_{min}^{max} \beta = \pi
\label{eq:example}
\end{equation}
```

Source code

```
\usepackage{color}
\lstset{language=[LaTeX]Tex}
```

Usage in slides - don't forget "fragile"

```
\begin{frame}[fragile]{Source code}
\begin{lstlisting}
code
\end{...}
```

Many languages supported

See http://en.wikibooks.org/wiki/LaTeX/Source_Code_Listings.

Matlab integration

latex()

Export output directly to LaTeX.
http://jankoweb.moxo.cz/blog/skripty/
matlab2latex-prevadec-ceskeho-retezce-matlabu-do-formatu-latexu/

File / Publish Configuration

Advanced export - directly to *.tex file. Example and more information
http:
//jankoweb.moxo.cz/blog/odborny-sw/matlab-publikovani-m-filu/.

Conclusion

Tips

Labels names

fig: for images, **eq:** for equations, **tab:** for tables.

Vector images (eps)

$\backslash usepackage\{eps2pdf\}$

Macros

Shortcuts, macros, symbol tables...
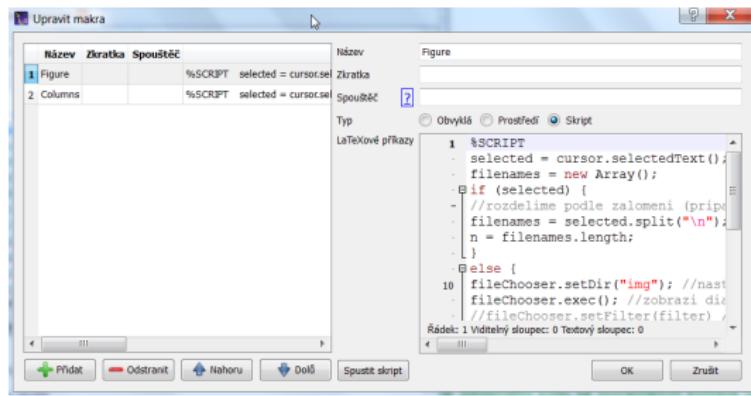
Figure 23 : Macros in TexStudio

Debugging

Frequent errors

- forgotten **usepackage**
- forgotten end of brackets }
- forgotten **end**{**environment**}
- using " _ " in text mode
- using special chars in text mode
- using math symbols in text mode

Code examples | I

Citation, reference

See [2]. According to equation (**??**).

Figure 24 : Bad reference or first compilation.

Tip

Often compiler report error at another place that occurs. You don't know nothing form error message? Google it.

Debugging II

Figure 25 : Forgotten usepackage.

Summary

Quick start

- MikTeX
- TeXStudio
- SumatraPDF

Steps for presentation in PDF

Editor $\rightarrow$ *.tex file $\rightarrow$ PDF

*.tex Beamer template

http://jankoweb.moxo.cz/blog/odborny-sw/
beamer-sablona-prezentace-pro-latex/

Thank you for attention!

Reference

For beginners

http://www.abclinuxu.cz/clanky/latex-pro-zacatecniky - course of LaTeX.

http://www.abclinuxu.cz/clanky/navody/beamer-latex-na-prezentace - course of Beamer.

http://www.it.cas.cz/manual/latex/ - huge course of LaTeX.

http://support.dce.felk.cvut.cz/pub/roubalj/teaching/latex.php - tex templates and something about typography.

Advanced

http://jankoweb.moxo.cz/blog/odborny-sw/ - my experiences.

http://tex.stackexchange.com/ - when you need a help.

http://stackoverflow.com/ - find "latex".

http://www.it.cas.cz/manual/latex/n.html - about macros.