Introductory LaTeX course

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Benefits of LaTeX

- Separation of content and style
- Absolute control over the document
- Style set up for entire document in one place (i.e. CSS in HTML)
- Automatic equation, table, figure numbering
- Automatic bibliography set up
- Flexibility (if you know how :))
- Free license (except few editors)

Main idea

Write and develop high-end scientific documents with little formatting effort

Basic Concept

1. Set up your TEX document
2. Write document
3. Compile document
4. View and enjoy your work

TEX Commands

```
\command[optional arguments]{mandatory arguments}

\begin{environment}
.
\end{environment}
```

Compilation

TexWorks

Structure of TEX file

- Declare document class
- Include packages
- Document content

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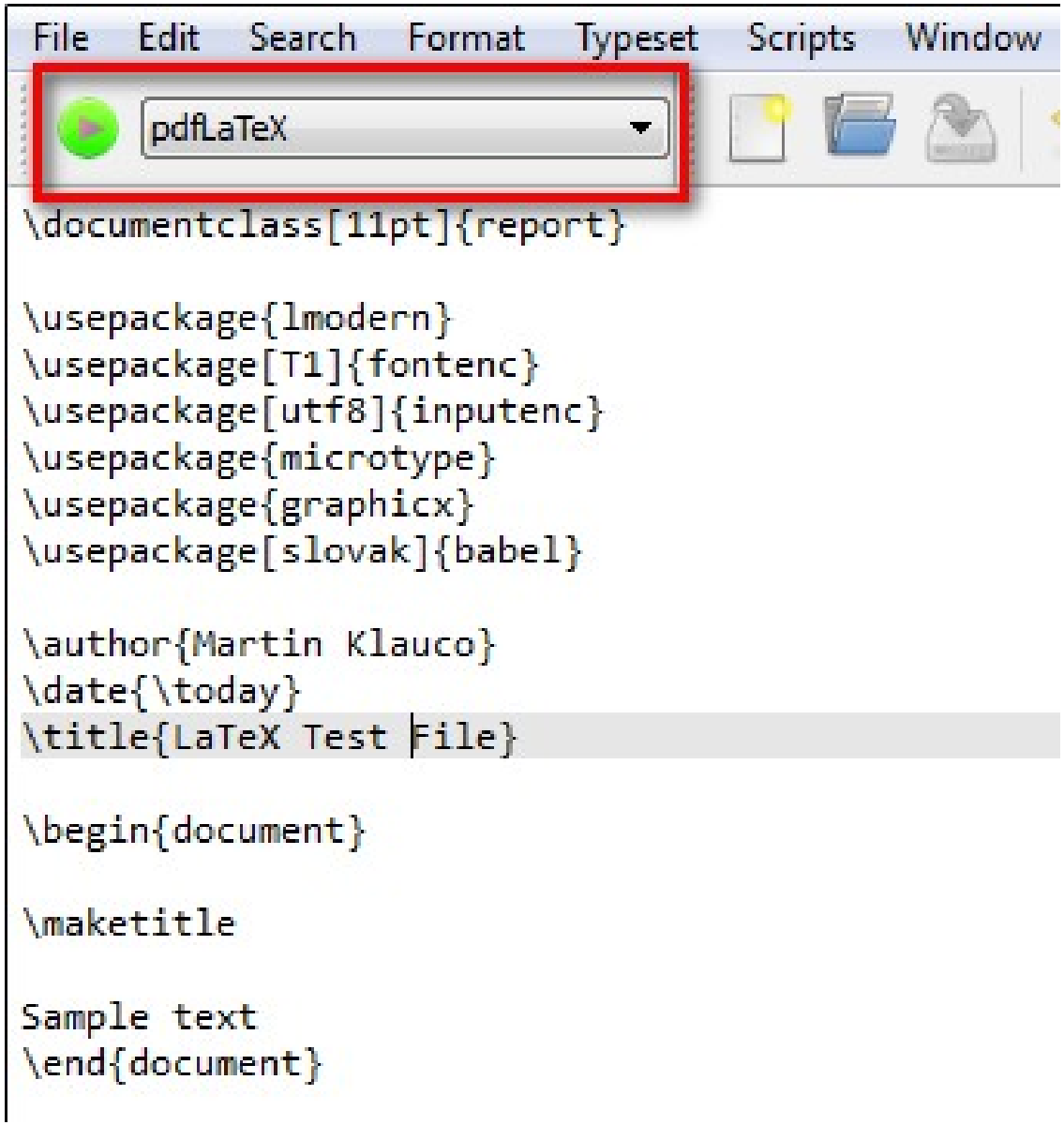
```
\documentclass[11pt]{report}
\usepackage{lmodern}
\usepackage[T1]{fontenc}
\usepackage[utf8]{inputenc}
\usepackage{microtype}
\usepackage{graphicx}
\usepackage[slovak]{babel}

\author{Name}
\date{\today}
\title{LaTeX Test File}

\begin{document}
\maketitle
Sample text
\end{document}
```

Compilation



Most needed commands

- Text in TEX file is text in document
- Document structuring - headings
- Write equations
- Include graphs
- Build tables

Text in TEX file is text in document

```
This is simple text.
Check how it looks on right
side of the slide.
```

This is simple text. Check how it looks on right side of the slide.

Text in TEX file is text in document

```
\section{Heading}
\subsection{Heading}
```

1 Heading

1.1 Heading

Write equations

```
Formula \ref{roots} is
used for calculating roots
of second order polynomial
function \ref{function}

\begin{equation}
    \label{function}
    ax^2 + bx + c = 0
\end{equation}

\begin{equation}
    \label{roots}
    x_{1, 2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\end{equation}
```

Formula 2 is used for calculating roots of second order polynomial function 1

$$ax^2 + bx + c = 0 \tag{1}$$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{2}$$

Include graphs

```
\begin{figure}
\includegraphics[width = 0.5\textwidth]{spy}
\caption{Figure produced
         by Matlab command "spy"
         Figures must be stored as
         \alert{pdf} or
         \alert{eps} files}
\label{spy}
\end{figure}
```

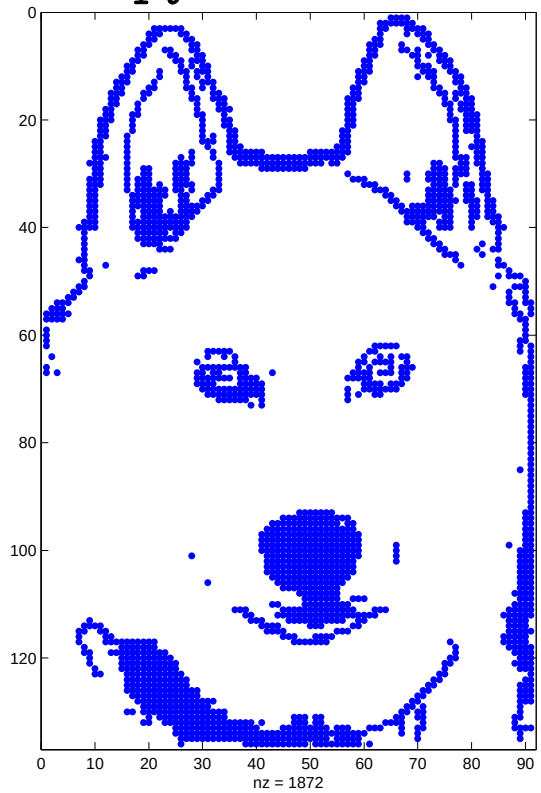


Figure : Figure produced by Matlab command "spy". Figures must be stored as pdf or eps files

Build tables

```
\begin{table}
    \caption{Physical data}
    \label{table}
    \begin{tabular}{r|cl}
          & value & unit  \\ \hline
    $V^s$ & 6     & $m^3$ \\
    $F_g$ & 12    & $N$   \\
    \end{tabular}
\end{table}
```

Table : Physical data

	value	unit
V^s	6	m^3
F_g	12	N

Math packages

```
\usepackage{amssymb}
\usepackage{amsmath}
\usepackage{amsfonts}
\usepackage{bm}
\usepackage{mathtools}
```

Matrices, Greek Letters other symbols

```
\begin{equation*}
 \begin{bmatrix}
  \alpha & \beta & \vartheta \\
  \Gamma & \Omega _2& \pi \\
 \end{bmatrix}
\end{equation*}
```

$$\begin{bmatrix} \alpha & \beta & \vartheta \\ \Gamma & \Omega_2 & \pi \end{bmatrix}$$

```
\begin{equation*}
    \frac{\partial f(x, y)}{\partial x} =
    \left( x^2 - \log(x) \right) \geq e^{2x-5}
\end{equation*}
```

$$\frac{\partial f(x, y)}{\partial x} = \left(x^2 - \log(x) \right) \geq e^{2x-5}$$

Wrap up #1

- Learning LaTeX is painful, but the result is worth it
- If you don't know how to do something:
  1. Ask GOOGLE
  2. Email me
  3. Come visit me
- Don't spent time by formatting the document, let LaTeX do it

Wrap up #2

What is being done in LaTeX

- Diploma thesis
- Scientific papers
- Books
- Dictionaries
- Presentations
- Posters

Wrap up #3

- Návod v čestine
- All possible symbols

Next session?

- Set up bibliography
- MATLAB and LaTeX
- More details in connection with figures, tables and equations