LaTeX SUPPORT AT DTU

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Download slides from:
http://www.latex.dtu.dk/downloads/courses/introduction/latex_introduction_slides.pdf

Download the exercises from:
http://www.latex.dtu.dk/downloads/courses/introduction/latex_introduction_exercises.pdf

INTRODUCTION TO LaTeX

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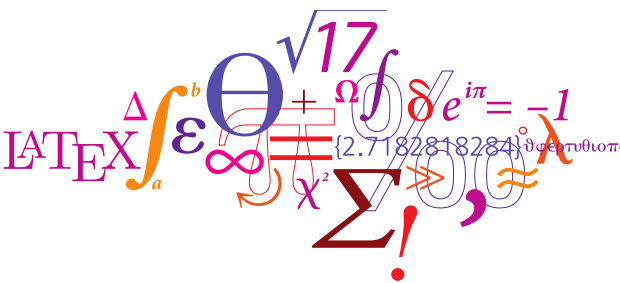


CONTENT

Exercises and hands-on experience.

ABOUT THIS COURSE

AGENDA

- What is LaTeX?
- The structure of a LaTeX-document
- How to compile (typeset) a LaTeX-document.
- How to find and correct errors.
- How to learn more about LaTeX.

THE FORM OF THIS COURSE

- Approximately $\frac{1}{3}$ lectures.
- Approximately $\frac{2}{3}$ exercises.

WHAT IS LaTeX?

LaTeX FACTS

- Extension to the typesetting system TeX.
- Macro-based mark-up of text documents.
- Available on all the operating systems. Free and open source.

WHEN SHOULD YOU USE LaTeX?

- If your document contains math.
- If elegant typography is of importance.
- If your text is structured.

DRAWBACKS

- Steep learning curve.

WHAT IS LaTeX NOT?

WYSIWYG VS. WYSIWYM

- LaTeX is What You See Is What You Mean and not What You See Is What You Get.
- MS Word and alike encourages you to produce inconsistent layout.
- It can be difficult to make cross references, bibliography etc. in MS-Word and alike.

WHEN SHOULD YOU NOT USE LaTeX?

- If your text isn't structured.
- For documents with fancy text and graphics (invitations, posters etc.).
- If your supervisor insists that you use MS-Word.

TOOLS YOU NEED TO BEGIN USING LaTeX

LaTeX-DISTRIBUTION

TeX Live TeX distribution for Unix/Linux/Windows.
http://www.tug.org/texlive/

MiKTeX TeX distribution for Windows only. Easy to install and maintain.
http://www.miktex.org/

MacTeX TeX distribution for Mac OS X. http://www.tug.org/mactex/

TEXT EDITOR -- FREE CHOICE

Texmaker Free/open source for Windows, Linux and OS X.

TeXStudio Free/open source for Windows, Linux and OS X (Texmaker fork).

Emacs Very powerful editor.

ONLINE ALTERNATIVES

ShareLaTeX www.sharelatex.com

Overleaf www.overleaf.com

THE STRUCTURE OF A LaTeX-DOCUMENT

CODE

```
\documentclass{article}
% Preamble
\begin{document}
Hello world!
\end{document}
```

OUTPUT

Hello world!

DOCUMENTCLASSES

article	Articles, papers etc. We will use this class today.
report	For larger documents.
book	For books.
letter	For letters.
beamer	For presentations.
…	and many more…

Æ, Ø, Å, ETC. AND ACCENTS

```
\usepackage[T1]{fontenc}     % Enables æ, ø, å `glyphs' output
\usepackage[utf8]{inputenc} % Allows æ, ø, å input
\usepackage{lmodern}         % Latin Modern font
```

DANISH HYPHENATION (ENGLISH)

```
\usepackage[danish]{babel}
\usepackage[english]{babel}
```

EUROPEAN DECIMAL SIGN

```
\usepackage{icomma}
$\pi\approx 3,14$
```

becomes $\pi \approx 3{,}14$ and not $\pi \approx 3, 14.$

TEXT SIZES

INPUT

```
{\tiny This text is tiny}\\
{\scriptsize This text is
 ↪  scriptsize}\\
{\footnotesize This text is
 ↪  footnotesize}\\
{\small This text is small}\\
{\normalsize This text is
 ↪  normalsize}\\
{\large This text is large}\\
{\Large This text is Large}\\
{\LARGE This text is LARGE}\\
{\huge This text is huge}\\
{\Huge This text is Huge}
```

OUTPUT

This text is tiny

This text is scriptsize

This text is footnotesize

This text is small

This text is normalsize

This text is large

This text is Large

This text is LARGE

This text is huge

This text is Huge

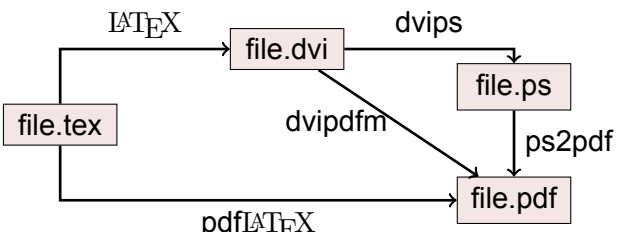
FILE FORMATS

.tex Input file. The file you are writing.

.dvi Output file. View this in a dvi viewer (xdvi).

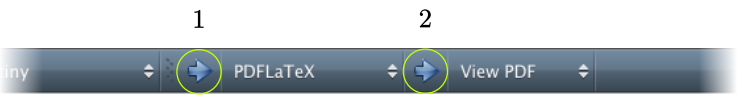
.ps PostScript file. View this with GhostView (gv).

.pdf Can be opened using Acrobat Reader (acroread).



HOW TO USE TEXMAKER

- You can start Texmaker from a terminal with the command: `texmaker &` or find it in the start menu.
- Files can be typeset and viewed using Texmaker's arrow buttons shown below.
- The typeset engine and the viewer are selected using the drop menus.



- It is also possible to use the shortcuts:

Quick Build	pdfLaTeX	View PDF	View Log	Bibliography
F1	F6	F7	F10	F11

Exercises

Solve exercises 1 and 2

Experiment and ask questions!

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THE STRUCTURE OF THE DOCUMENT

Level	Article	Report/Book
Part		`\part{}`
Chapter		`\chapter{}`
Section	`\section{}`	`\section{}`
Subsection	`\subsection{}`	`\subsection{}`
Subsubsection	`\subsubsection{}`	`\subsubsection{}`
Paragraph	`\paragraph{}`	`\paragraph{}`

The above commands have a *-version and using these results in no number and no entry in the table of contents:
e.g. `\section*{A heading}`
Print the table of contents with the command `\tableofcontents`

INLINE MATH

INPUT

```
Lorem ipsum
\begin{math}
  c^2 = a^2 + b^2 - 2ab\cos(C)
\end{math}
dolor sit amet
```

OUTPUT

Lorem ipsum $c^2 = a^2 + b^2 - 2ab\cos(C)$ dolor sit amet

`\begin{math}` and `\end{math}` can be replaced by `\(<math>\)` or simply `$<math>$`.

INPUT

```
Lorem ipsum $c^2 = a^2 + b^2 - 2ab\cos(C)$ dolor sit amet
```

DISPLAYED MATH

INPUT

```
Lorem ipsum
\begin{displaymath}
  c^2 = a^2 + b^2 - 2ab\cos(C)
\end{displaymath}
dolor sit amet
```

OUTPUT

Lorem ipsum

$$c^2 = a^2 + b^2 - 2ab\cos(C)$$

dolor sit amet

Shortcuts: `\[<math>\]` or `$$<math>$$`.

NUMBERED EQUATIONS

INPUT

```
Lorem ipsum
\begin{equation}
  c^2 = a^2 + b^2 - 2ab\cos(C)
\end{equation}
dolor sit amet
```

OUTPUT

Lorem ipsum

$$c^2 = a^2 + b^2 - 2ab\cos(C) \tag{1}$$

dolor sit amet

LaTeX handles the numbering automatically.

SYSTEM OF EQUATIONS

DTU

INPUT

```
Lorem ipsum
\begin{subequations}
  \begin{align}
    \bm{F} &= m\bm{a}\\
    \bm{a} &= \dot{\bm{v}}\\
    \bm{v} &= \dot{\bm{p}}
  \end{align}
\end{subequations}
dolor sit amet
```

OUTPUT

Lorem ipsum

$$\boldsymbol{F} = m\boldsymbol{a} \tag{2a}$$
$$\boldsymbol{a} = \dot{\boldsymbol{v}} \tag{2b}$$
$$\boldsymbol{v} = \dot{\boldsymbol{p}} \tag{2c}$$

dolor sit amet

- The equations are aligned at the & characters
- `\usepackage{mathtools}` For subequations
- `\usepackage{bm}` For bold math (bm)

Exercises

Solve exercises 3 to 5

Experiment and ask questions!

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LIST ENVIRONMENTS

description Descriptions.

enumerate Numbered lists.

itemize Bullet lists.

INPUT

```
\begin{enumerate}
\item One item.
\item Another item.
\end{enumerate}
```

Optional tickmark in itemize.

```
\item[a] One item.
```

ITEMIZE

- One item.
- Another item.

ITEMIZE WITH OPTIONAL ARGUMENT

a One item.

b Another item.

ENUMERATE

1. One item.
2. Another item.

REFER TO...

Labels are placed by the command `\label{<name>}`.

References are made by the commands:

- `\ref{<name>}` refers to a number.
- `\pageref{<name>}` refers to a page number.
- `\eqref{<name>}` refers to a equation number.
- `\cref{<name>}` or `\cpageref{<name>}` refers to any label (or page number) (requires the 'cleveref' package. Recommended!).

EXAMPLE

```
This is an equation with a
 ↪  number:
\begin{equation}
  a^2 + b^2 = c^2
  \label{eq:pythagoras}
\end{equation}
The equation has the number
 ↪  \eqref{eq:pythagoras}.
```

OUTPUT

This is an equation with a number:

$$a^2 + b^2 = c^2. \tag{3}$$

The equation has the number (3).

GRAPHICS

Load the `graphicx` package and use the command `\includegraphics[options]{filename}` to insert graphics in LaTeX.

INSERT AN IMAGE

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}
\includegraphics{image}
\end{document}
```

SUPPORTED GRAPHICS FORMATS

pdfLaTeX	pdf, png & jpg
dvips	eps
dvipdfm	eps, pdf, png & jpg

OPTIONAL ARGUMENTS

- width=<width><unit>
- height=<height><unit>
- scale=<scaling factor>
- angle=<angle>

TABLES

Tables are made with the `tabular` environment.

INPUT

```
\begin{tabular}{|l|c|r|}
  \hline
  Left & Center & Right \\
  \hline
  1    & 2      & 3 \\
  \hline
  \multicolumn{3}{|c|}{Long text} \\
  \hline
\end{tabular}
```

OUTPUT

Left	Center	Right
1	2	3
Long text		

- l left
- c center
- r right
- | vertical line

FIGURES

INPUT

```
\begin{figure}[htbp]
  \centering
  \includegraphics[width=.5\textwidth]{filename}
  \caption[Description for list of figures.]{Description.}
  \label{fig:my_figure}
\end{figure}
```

t the top of the page.

b the bottom of the page.

p on a page containing only floats.

h here if possible.

! try harder – even if it ruins the layout.

H put it here (requires the ‘float’ package)!

TABLES

INPUT

```
\begin{table}[htbp]
  \centering
  \begin{tabular}{lcr}
    ...
  \end{tabular}
  \caption[Short description for list of tables.]{Text.}
  \label{tab:my_table}
\end{table}
```

Print the list of figures with the command `\listoffigures`.
Print the list of tables with the command `\listoftables`.

Exercises

Solve exercises 6 to 10

Experiment and ask questions!

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BibTEX is used to generate the bibliography.

```
@book{companion,
  author    = {Michel Goossens and Frank Mittelbach},
  title     = {The \LaTeX\ Companion},
  publisher = {Addison-Wesley Publishing Company},
  year      = {2004},
  edition   = {2}
}
```

You can refer to the book using the command
`\cite[p.~56]{companion}`.

Michel Goossens and Frank Mittelbach.
The LaTeX Companion.
Addison-Wesley Publishing Company, 2 edition, 2004.

The package 'biblatex' is recommended. It supplies many different citation/bibliography styles.

ERRORS WHEN TYPESETTING

WHY ARE THERE ERRORS?

- LaTeX cannot guess what you want!
- Often when you forget to end ‘something’
  — like an environment (begin...end).

HOW DO YOU FIND AND CORRECT THE ERRORS?

- Read the error messages in the log file!
- In Texmaker click on the ‘View log’ to show the log.

Compile the document often and correct the errors when they occur. Always correct the first error first, latter errors can be caused by the first one.
Tip: comment parts of your code to easier find the culprit.

HELP AND SUPPORT

If you want to learn more about LaTeX then you can start by:

- Visiting our webpage `www.latex.dtu.dk`
- Read “The not so short introduction to LaTeX”
- Just start writing LaTeX documents

Please don’t hesitate in writing to our email address latex-support@student.dtu.dk.

Question and Answer at: http://tex.stackexchange.com.

OTHER SOURCES OF HELP

- With the terminal/command prompt command `texdoc` you can find the documentation for most packages
- Comprehensive TEX Archive Network (CTAN) http://ctan.org/
- The not so short guide to LATEX
  http://www.ctan.org/tex-archive/info/lshort/
- Lars Madsens Danish LATEX-book
  http://www.imf.au.dk/system/latex/bog/
- The LATEX Companion 2nd edition [Mittelbach and Goossens]

Exercises

Solve exercise 11

Experiment and ask questions!

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