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L^AT_EX Crash Course

Reports and Presentations with L^AT_EX

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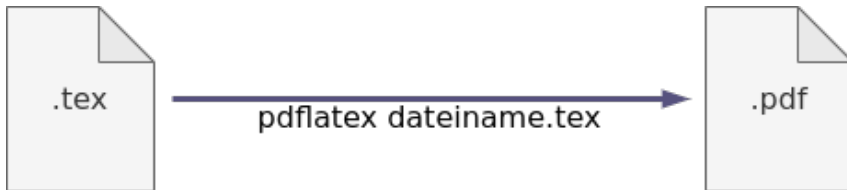
Definition

LaTeX is

- a document preparation system
- an extension of the **T_EX** Typesetting system
- written as plain text and compiled to a PDF
- widely used in academia (especially cs, physics, maths, chemistry)
- pronounced *Lah-tech* or *Lay-tech*
- completely Open source (initial release 1984)

Source: <https://www.latex-project.org/>

Compiling



- Terminal command: `pdflatex dateiname.tex`
- Requires a LaTeX installation

Installation

- Operating system independently available
- Install via **TeX Live** or **MiKTeX**
- Local edits via LaTeX editor such as **TeXstudio**
- Web App via **Overleaf** or **ShareLaTeX**
sharelatex.gwdg.de

Hello World in LaTeX

Tex

```
1 \documentclass[12pt]{article}
2 \begin{document}
3     \Huge
4     Hallo Welt!
5 \end{document}
```

Hallo Welt!

1

Basic Elements

Basisaufbau jedes Dokuments:

Tex

```
1 \documentclass{article}
2 % ... preamble
3 \begin{document}
4 % ... content
5 \end{document}
```

- Lots of classes:
article (Reports),
scrbook (Books),
beamer (Presentations),
...
- Content between
`\begin{document}` and
`\end{document}`
- Before that global settings

Commands

`command[...]{...}`

- `command` → Name of the command
- Empty braces can be dropped
- Required parameters are in `{...}`
- Optional parameters are in `[...]`

Options for `\documentclass[...]{article}`

- Font size: 10pt, 11pt, 12pt
- Paper format: a4paper, a5paper, a6paper
- Column number: onecolumn, twocolumn
- Example: `\documentclass[12pt, twocolumn]{article}`

Environments

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

- Environments are active between `\begin` and `\end`
- `document`: Environment with the printed content
- Example environments:
 - ▶ Maths formulas
 - ▶ Tables
 - ▶ Enumerations
 - ▶ Quotes

Enumerations

```
\begin{itemize}
  \item ...
  ...
\end{itemize}
```

- Simple not-numbered list
- For numbered lists use `enumerate`
- For bullet points on slides (like this)

Tip: Use your own enumeration symbol `\item[...]`
Here `\item[Tip:]`

Maths formulas

Many options for writing formulas:

```
1 Let \(\textcolor{blue}{3}+\textcolor{red}{2}=\textcolor{blue}{5}\).\n2 \[x*\textcolor{red}{x} = x^{\textcolor{blue}{2}}\]
```

Let $3 + 2 = 5$.

$$x * x = x^2$$

Equation system:

```
3\n4 \begin{align}\n5 \quad (x + y)^2 \&= (x+y)(x+y)\n6 \quad \&= x^2 + 2xy + y^2\n7 \end{align}\n8
```

Equation system:

$$\begin{aligned}(x + y)^2 &= (x + y)(x + y) \\ &= x^2 + 2xy + y^2\end{aligned}$$

`align` uses `&` to align multiple lines.

https://latex.wikia.org/wiki/List_of_LaTeX_environments

Example Formulas

- `\frac{}{}` : Fractions, e.g., $\frac{1}{3}$
- `\sqrt{}` : Roots, z.B. $\sqrt{2}$
- `\pi` : π
- `\leq` : Inequalities, e.g., $\leq$
- `\sum_{i=0}^n i + 1` : Sums, e.g., $\sum_{i=0}^n i + 1$
- `\int_0^1 x^2` : Integrals, e.g., $\int_0^1 x^2$

References

“Non-reproducible single occurrences are of no significance to science.”

— Karl Popper, *The Logic of Scientific Discovery*, 2002, p. 66

When to use LaTeX

- Seminar reports, thesis, paper
- Presentations
- Letters, CV
- Exercise Sheets
- Books
- Anything with formulas

We provide templates:

<https://hps.vi4io.org/teaching/ressources/start>

References

Popper, Karl Raimund and Gary James Jason. *The Logic of Scientific Discovery*. Psychology Press, 2002.
548 pp. ISBN: 978-0-415-27844-7.