

**HPS**

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## L<sup>A</sup>T<sub>E</sub>X Crash Course

Reports and Presentations with L<sup>A</sup>T<sub>E</sub>X

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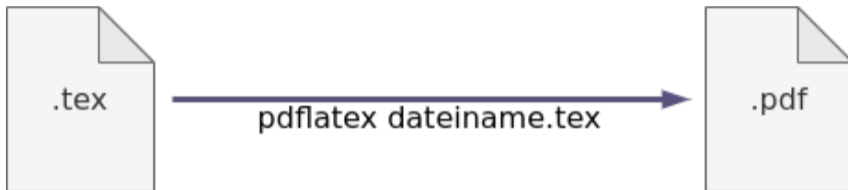
# Definition

## LaTeX is

- a document preparation system
- an extension of the **T<sub>E</sub>X** 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](http://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 `\(3+2=5\)`.`\`

Let  $3 + 2 = 5$ .

2 `\[x*x = x^2\]`

$$x * x = x^2$$

3  
4 Equation system:

Equation system:

5 `\begin{align}`

6 `(x + y)^2 &= (x+y)(x+y)\`

$$(x + y)^2 = (x + y)(x + y)$$

7 `&= x^2 + 2xy + y^2`

$$= x^2 + 2xy + y^2$$

8 `\end{align}`

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

[https://latex.wikia.org/wiki/List\\_of\\_LaTeX\\_environments](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` :  $\pi$
- `\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.