



Einführung in das wissenschaftliche Arbeiten

Notes on \LaTeX

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Installing \LaTeX

Don't install \LaTeX from original sources; it's a complicated beast. Use a pre-cooked system like [TeX Live](#), which is packaged by most Linux distributions and is available for Windows and MacOS as well.

L^AT_EX Processors

- `pdflatex`
 - the classical L^AT_EX-to-PDF processor
 - arcane, pre-Unicode handling of input encodings and fonts
- `xelatex` and `lualatex`
 - Unicode L^AT_EX engines; can use standard system fonts
 - `lualatex` features an embedded Lua interpreter
 - interchangeable for most simple use cases

Recommendation

Use `xelatex` or `lualatex` unless something forces you to use `pdflatex`.

Things to Avoid If Possible

- \LaTeX processors other than `xelatex` and `lualatex`
- `BibTeX` (prefer `BibLaTeX`)
- PostScript input (figures) or output (use PDF)
- `.dvi` intermediate files (`latex` legacy)
- messing with the placement of floats (`\begin{figure}[h]`)
- `\\` in regular text

Things to Do Where Appropriate

- `\usepackage{hyperref}` (late in the preamble)
- If you use non-English text anywhere in your document:
 - Always set the language using `polyglossia` (or `babel` for legacy \LaTeX ; see `lshort` Sec. 2.5).
 - Always use the correct quote characters (*ibid.*).
- Try to fix `Overfull \hbox` problems by `help\ing` \LaTeX hyphenation. If this does not suffice, place the offending paragraph inside a `sloppypar` environment.
- Always combine multiple references into a single command, like `\cite{ref1, ref2}`.
- Double-check your auto-generated bibliography:
 - Always use the correct entry type in your `.bib` files.
 - Make sure your references are complete. If you use the correct entry type, `biber` (or legacy `bibtex`) will warn about missing fields.
 - Always fix any such warnings or errors.
 - Prevent automatic lowercasing by protecting letters with braces, like `{MDP}`.

Code Listings

```
1 \usepackage{listings}           % in preamble
2 \lstset{                        % anywhere
3   basicstyle=\ttfamily,
4   keywordstyle=\color{purple},
5   identifierstyle=\color{blue},
6   stringstyle=\color{teal},
7   commentstyle=\color{lightgray}\slshape,
8   numbers=left,
9   numberstyle=\tiny
10 }
```

```
1 \lstinputlisting[language=Python,deletekeywords={print}]{%
2   code/python.py} % produces the following syntax highlighting:

1 #!/usr/bin/env python3
2 import sys
3
4 k = int(sys.argv[1])
5 f = 1
6 for n in range(1, k + 1):
7     f *= n
8 print(f"{k}! = {f}") # listings cannot handle f-strings
```

Algorithms in Pseudocode

Require: $a, b > 0$

Ensure: b is the greatest common divisor of a and b

1: **procedure** Euclid(a, b)

2: $r \leftarrow a \bmod b$

3: **while** $r \neq 0$ **do**

▷ We have the answer if r is 0

4: $a \leftarrow b$

5: $b \leftarrow r$

6: $r \leftarrow a \bmod b$

7: **end while**

8: **return** b

▷ The g.c.d. is b

9: **end procedure**

Source Code

To use the `algorithmicx` package: `\usepackage{algpseudocode}`

```
1 \begin{algorithmic}[1]
2   \Require $a, b > 0$
3   \Ensure $b$ is the greatest common divisor of $a$ and $b$
4   \Procedure{Euclid}{$a, b$}
5     \State $r$ \gets $a \bmod b$
6     \While{$r \neq 0$} \Comment{We have the answer if $r$ is 0}
7       \State $a$ \gets $b$
8       \State $b$ \gets $r$
9       \State $r$ \gets $a \bmod b$
10    \EndWhile
11    \State \textbf{return} $b$ \Comment{The g.c.d. is $b$}
12  \EndProcedure
13 \end{algorithmic}
```

`\usepackage{algorithm}` provides a corresponding floating environment of this name, `\listofalgorithms`, and more.

Presentations

If you use \LaTeX , use the beamer package. As a UIBK affiliate, use the official **UIBK beamer theme**:

```
1 \documentclass[11pt,t,usepdftitle=false,aspectratio=43,  
2   nosectiontitlepage]{beamer}  
3 \usetheme[foot,logo]{uibk}  
4  
5 \title{My Fancy Presentation}  
6 \footertext{My Fancy Presentation}  
7 \URL{https://iis.uibk.ac.at/}  
8 \author{Justus Piater}  
9 \headerimage{4}  
10  
11 \begin{document}  
12 %% Goes with nosectiontitlepage:  
13 \footerfalse\sfalse\maketitle\strue\footertrue  
14  
15 \begin{frame}  
16   \frametitle{My First Slide}  
17   Content.  
18 \end{frame}  
19 \end{document}
```

Further Resources

- Your primary reference on \LaTeX is *The Not So Short Introduction to $\LaTeX 2_{\epsilon}$* ([lshort.pdf](#)).
- Comprehensive documentation on \LaTeX , including many popular packages, is available on [Wikibooks](#).
- Citation support and bibliography management are discussed in the course notes on *Quoting and Citing* ([04-citing.pdf](#)).
- Graphics are discussed in the course notes on *Graphics, Tables and Floating Environments* ([08-graphics.pdf](#)).
- You find all documentation on the *Comprehensive $T_{\epsilon}X$ Archive Network* ([CTAN](#)).