

L^AT_EX

Introduction

Dr. Julian Huber - Translated from Malte Schmitz ¹

¹<https://github.com/malteschmitz/latex-talk>

Learning Goals

- ▶ get to know \LaTeX
- ▶ structure von \LaTeX -documents, -commands and -environments.
- ▶ application of \LaTeX for papers and theses.
- ▶ where to use and not to use \LaTeX .

Table of Content

What is \LaTeX ?

Context

\LaTeX -Documents

Installing \LaTeX

Toolbox

Using \LaTeX

Markups, Commands and Environments

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Structure of a Document

Dokument Classes

Loading Packages

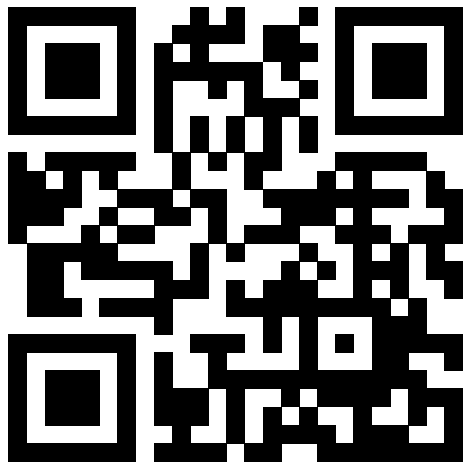
Theses

Modular Documents, and Sections

Sections, Math, Lists, Tables and Figures

Bibliographies with $\text{Bib}\TeX$

Website



mlte.de/latex

- ▶ German original of this presentation.
- ▶ script for this presentation.
- ▶ links to \LaTeX distributions, IDEs and further reading.

Dimensions of a Document

Content is the meaning of a document.

Dimensions of a Document

Content is the *meaning* of a document.

Structure is the *outline* of a document.

Dimensions of a Document

Content is the meaning of a document.

Structure is the outline of a document.

Form is the apperance of a document.

Structure vs. Form

Example (Structure)

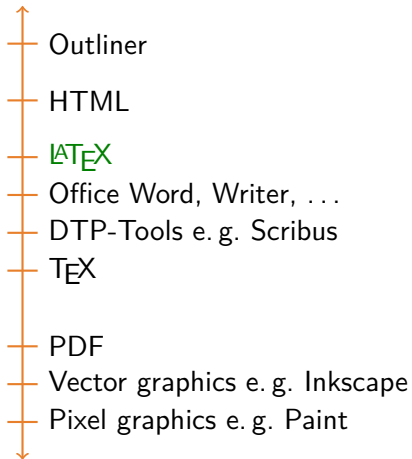
- ▶ heading
- ▶ grouping
- ▶ listing

Example (Form)

- ▶ 13,37 cm wide coloured box
- ▶ 0,6 cm indentation
- ▶ bullet ▶ at beginning of the column

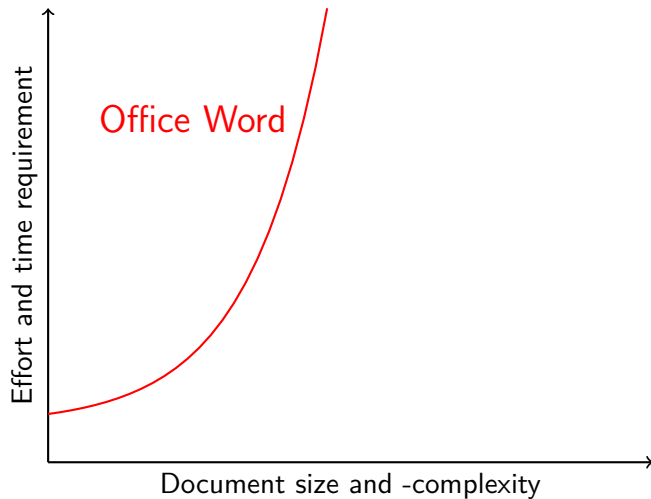
Markdown Languages

Struktur

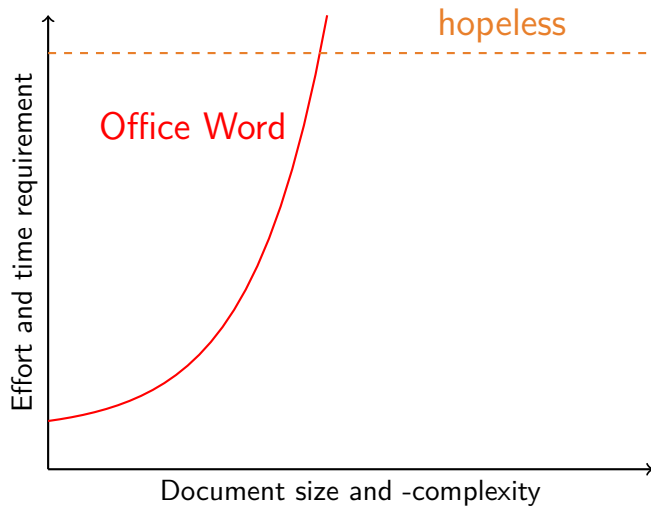


Form

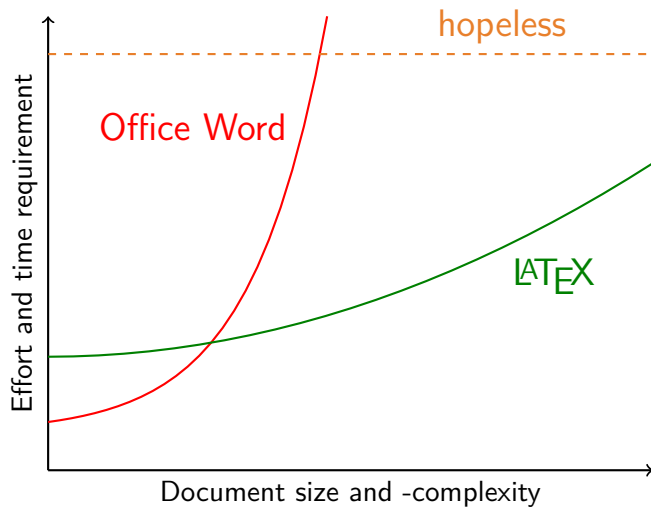
L^AT_EX vs. Office Word



\LaTeX vs. Office Word



\LaTeX vs. Office Word



A \LaTeX -Document

- ▶ are pure **text files** with **content**

```
Die Ermordung  
Iulius Caesars  
  
Marcus Iunius Brutus  
Iden des März  
  
Einleitung  
  
Vor dem Senatsgebäude stieß  
Caesar nochmals auf den Seher  
Spurinna und stellte  
abschätzig fest "Die Iden  
des März sind da!", worauf  
dieser entgegnete:  
"Da sind sie, aber noch  
nicht vorbei."
```

Content

A L^AT_EX-Document

- ▶ are pure text files with content
- ▶ also contains structure of the content

```
\documentclass{scrartcl}
\title{Die Ermordung
  Iulius Caesars}
\author{Marcus Iunius Brutus}
\date{Iden des März}
\begin{document}
  \maketitle
  \section{Einleitung}
  Vor dem Senatsgebäude stieß
  Caesar nochmals auf den Seher
  Spurinna und stellte
  abschätzig fest \enquote{Die
  Iden des März sind da!},
  worauf dieser entgegnete:
  \enquote{Da sind sie, aber
  noch nicht vorbei.}
\end{document}
```

Content &
Structure

A \LaTeX -Document

- ▶ are pure **text files** with **content**
- ▶ also contains **structure** of the content
- ▶ typesetting is done by \LaTeX **separately**

```
\documentclass{scrartcl}
\title{Die Ermordung
  Iulius Caesars}
\author{Marcus Iunius Brutus}
\date{Iden des März}
\begin{document}
  \maketitle
  \section{Einleitung}
  Vor dem Senatsgebäude stieß
  Caesar nochmals auf den Seher
  Spurinna und stellte
  abschätzig fest \enquote{Die
  Iden des März sind da!},
  worauf dieser entgegnete:
  \enquote{Da sind sie, aber
  noch nicht vorbei.}
\end{document}
```

Content &
Structure

→ \LaTeX →

Die Ermordung Iulius Caesars

Marcus Iunius Brutus

Iden des März

1 Einleitung

Vor dem Senatsgebäude stieß Caesar nochmals auf den Seher Spurinna und stellte abschätzig fest „Die Iden des März sind da!“, worauf dieser entgegnete: „Da sind sie, aber noch nicht vorbei.“

typeset
Document

What You need to start

- ▶ **Distribution** that compiles the text



e.g., TexLive
MikTex

What You need to start

- ▶ **Distribution** that compiles the text
- ▶ user friendly **Editor** to edit the \LaTeX -Document



e.g., TexLive
MikTeX



e.g., TexStudio
Texmaker

What You need to start

- ▶ **Distribution** that compiles the text
- ▶ user friendly **Editor** to edit the \LaTeX -Document
- ▶ **Literature tool** if You want to manage many citations



e.g., TexLive
MikTeX



e.g., TexStudio
Texmaker



e.g., JabRef
Citavi

What is \LaTeX



Using \LaTeX



Structure of a Document

```
\documentclass{scrartcl}

\usepackage[ngerman]{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}

\KOMAOptions{%
  parskip=full,%
  fontsize=12pt}

\begin{document}
  Franz jagt im komplett
  verwahrlosten Taxi quer
  durch Bayern.
\end{document}
```

Structure of a Document

```
\documentclass{scrartcl}
```

```
}Dokument class
```

```
\usepackage[ngerman]{babel}
```

```
\usepackage[utf8]{inputenc}
```

```
\usepackage[T1]{fontenc}
```

```
\KOMAoptions{%  
  parskip=full,%  
  fontsize=12pt}
```

```
\begin{document}
```

```
  Franz jagt im komplett  
  verwahrlosten Taxi quer  
  durch Bayern.
```

```
\end{document}
```

Structure of a Document

```
\documentclass{scrartcl}
```

}Dokument class

```
\usepackage[ngerman]{babel}
```

```
\usepackage[utf8]{inputenc}
```

```
\usepackage[T1]{fontenc}
```

} loading
packages

```
\KOMAoptions{%  
  parskip=full,%  
  fontsize=12pt}
```

```
\begin{document}
```

Franz jagt im komplett
verwahrlosten Taxi quer
durch Bayern.

```
\end{document}
```

Structure of a Document

`\documentclass{scrartcl}` }Dokument class

`\usepackage[ngerman]{babel}`
`\usepackage[utf8]{inputenc}`
`\usepackage[T1]{fontenc}` } loading
packages

`\KOMAoptions{%`
 `parskip=full,%`
 `fontsize=12pt}` }Settings

`\begin{document}`
 Franz jagt im komplett
 verwahrlosten Taxi quer
 durch Bayern.
`\end{document}`

Structure of a Document

<code>\documentclass{scrartcl}</code>	}Dokument class	
<code>\usepackage[ngerman]{babel}</code>	} loading packages	} Preamble
<code>\usepackage[utf8]{inputenc}</code>		
<code>\usepackage[T1]{fontenc}</code>		
<code>\KOMAOptions{% parskip=full,% fontsize=12pt}</code>	} Settings	
<code>\begin{document}</code> Franz jagt im komplett verwahrlosten Taxi quer durch Bayern. <code>\end{document}</code>		

Structure of a Document

<code>\documentclass{scrartcl}</code>	}Dokument class
<code>\usepackage[ngerman]{babel}</code> <code>\usepackage[utf8]{inputenc}</code> <code>\usepackage[T1]{fontenc}</code>	} loading packages }
<code>\KOMAOptions{% parskip=full,% fontsize=12pt}</code>	} Settings
<code>\begin{document}</code> Franz jagt im komplett verwahrlosten Taxi quer durch Bayern. <code>\end{document}</code>	} Document body

Preamble

Dokument classes

`\documentclass{scrartcl}`

short articles

`\documentclass{scrreprt}`

Reports with covering page and chapters

`\documentclass{scrbook}`

double-pages book with parts, chapters and headers

Preamble: Standard packages

```
\usepackage[utf8]{inputenc}
```

UTF-8 for text encoding

```
\usepackage[ngerman]{babel}
```

German hyphenation, date formats etc.

```
\usepackage[T1]{fontenc}
```

improves text encoding for western european languages

```
\usepackage{lmodern}
```

more modern fonts

Präambel: zusätzliche Pakete

`\usepackage{xcolor}`

adds command `\textcolor` for colour

`\usepackage{graphicx}`

adds command `\includegraphics` for figures

`\usepackage[german=guillemets]{csquotes}`

adds command `\enquote` for parentheses

`\usepackage{amsmath}`

adds environment `align` for aligned mathematical formulas

`\usepackage[breaklinks=true]{hyperref}`

improves pdf creation (e.g. hyperlinks)

Structure of a Document





UNIVERSITÄT ZUM BEISPIEL
INSTITUT FÜR BEISPIELE

Über Gummibärchen *On Gummy Bears*

Masterarbeit

im Rahmen des Studiengangs
Informatik
der Universität zum Beispiel

vorgelegt von
Max Mustermann

ausgegeben und betreut von
Prof. Dr. Erika Musterfrau

mit Unterstützung von
Lieschen Müller

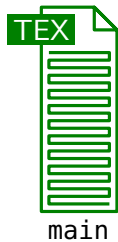
Die Arbeit ist im Rahmen einer Tätigkeit bei der Firma Muster GmbH entstanden.

Musterhausen, den 15. Juli 2017

Modular Documents



Modular Documents



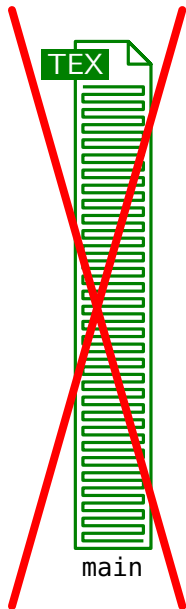
Modular Documents



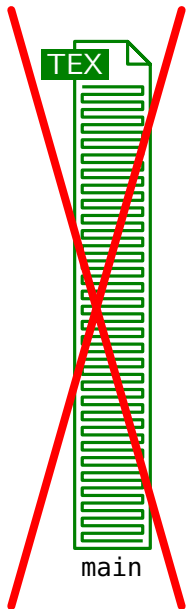
Modular Documents



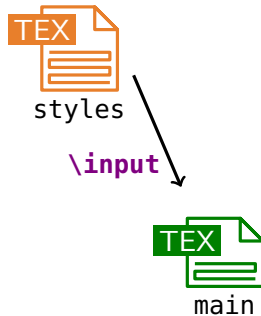
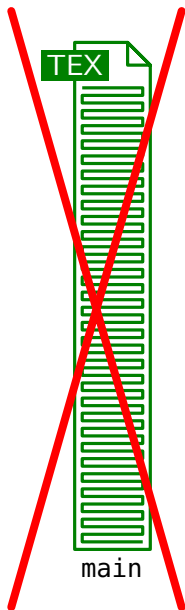
Modular Documents



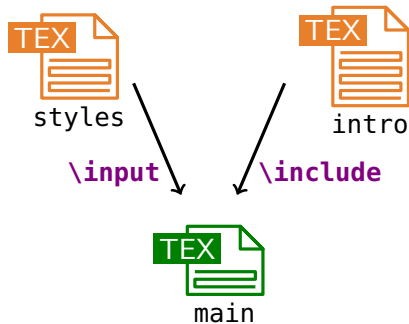
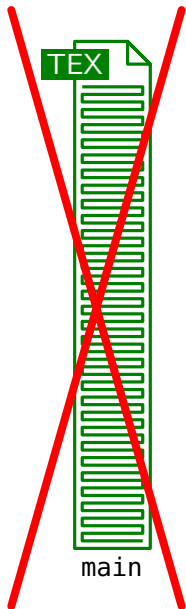
Modular Documents



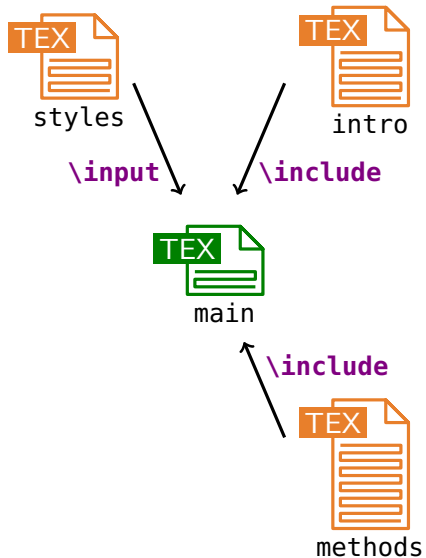
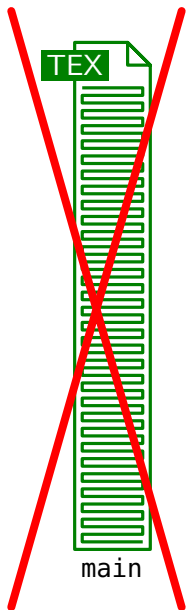
Modular Documents



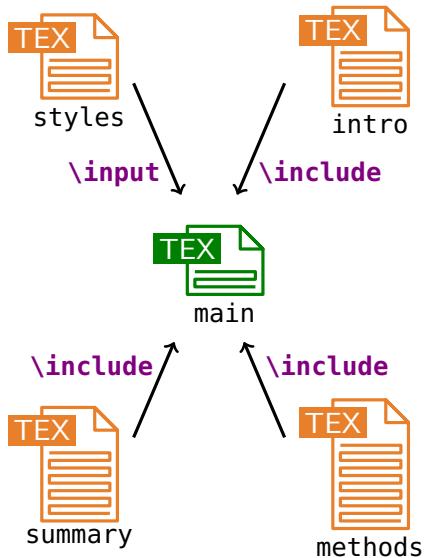
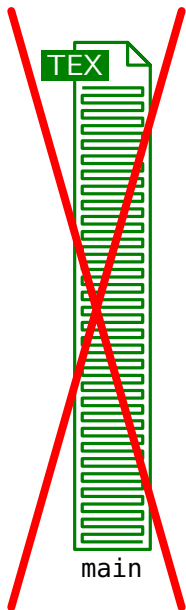
Modular Documents



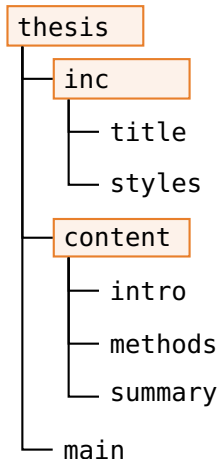
Modular Documents



Modular Documents



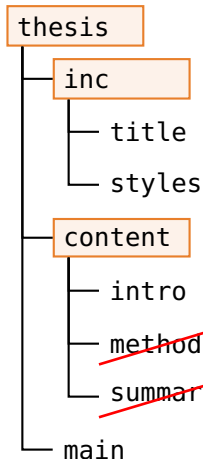
Modular Structure



```
\documentclass{scrbook}
\input{inc/styles}
% \includeonly
\begin{document}
  \frontmatter
  \input{inc/title}
  \tableofcontents

  \mainmatter
  \include{content/intro}
  \include{content/methods}
  \include{content/summary}
\end{document}
```

Modular Structure



```
\documentclass{scrbook}
\input{inc/styles}
\includeonly{content/intro}
\begin{document}
  \frontmatter
  \input{inc/title}
  \tableofcontents

  \mainmatter
  \include{content/intro}
  \include{content/methods}
  \include{content/summary}
\end{document}
```

Commands for a modular Structure

\input add content of the file.

\include add content of the file and
add pagebreaks before and behind.

\includeonly list of files regarded
by **\include** .

Segments of long Documents (scrbook)

```
\begin{document}
  \frontmatter % Titlepage, Table of Content, etc.
  \begin{titlepage} ... \end{titlepage}
  \tableofcontents
                % Has Roman page numbering (i, ii, ...)
  \mainmatter % Main content
  \chapter{Einleitung}
                % Has Arabic page numbering (1, 2, ...)
  \appendix % Appendix, Bibliography
  \chapter{Glossar}

  \backmatter % Ending
  \listoffigures
\end{document}
```

Layout of the Segments

\frontmatter Prefix

- chapters not numbered
- Roman page numbers

Abstract

– iv –

Layout of the Segments

`\frontmatter` Prefix

- chapters not numbered
- Roman page numbers

`\mainmatter` Main Content

- chapters numbered in Arabic
- `new` Arabic page numbers

Abstract

– iv –

3. Konzept

– 5 –

Layout of the Segments

`\frontmatter` Prefix

- chapters not numbered
- Roman page numbers

`\mainmatter` Main Content

- chapters numbered in Arabic
- **new** Arabic page numbers

`\appendix` Appendix

- **new** alphabetic chapter numbers
- Arabic page numbers

Abstract

– iv –

3. Konzept

– 5 –

A. Anhang

– 126 –

Layout of the Segments

\frontmatter Prefix

- chapters not numbered
- Roman page numbers

\mainmatter Main Content

- chapters numbered in Arabic
- **new** Arabic page numbers

\appendix Appendix

- **new** alphabetic chapter numbers
- Arabic page numbers

\backmatter Postamble

- chapters not numbered
- Arabic page numbers

Abstract

– iv –

3. Konzept

– 5 –

A. Anhang

– 126 –

Literatur

– 135 –

Special Environments \LaTeX



Bibliographies with BibT_EX

In^[Knu84] wird das Satzsystem T_EX vom Autor des Systems vorgestellt. Jedes Zeichen hat dabei einen Category Code (vergleiche dazu^[Eij92] S. 28 ff.).

Literatur

[Eij92] EIJKHOUT, Victor: *T_EX by Topic: A T_EXnician's Reference*. Addison-Wesley, 1992

[Knu84] KNUTH, Donald E.: *The*

Das L^AT_EX-Dokument arbeit.tex

```
\documentclass{scrartcl}
```

```
%...
```

```
package [super , square , sort&compress ]{natbib}
```

```
\begin{document}
```

In \cite{Knuth} wird das Satzsystem
\TeX{} vom Autor des Systems
vorgestellt. Jedes Zeichen hat dabei
einen Category Code (vergleiche dazu
\cite[S.~28~ff.]{Eijkhout}).

```
\bibliographystyle{alphadin}
```

```
\bibliography{datenbank}
```

```
\end{document}
```

The literature data base datenbank.bib

```
@book{Knuth,  
  author = {Donald E. Knuth},  
  title = {The \TeX book},  
  year = {1984},  
  publisher = {Addison-Wesley Professional},  
}
```

```
@book{Eijkhout,  
  author = {Victor Eijkhout},  
  title = {\TeX\ by Topic:  
    A \TeX nician's Reference},  
  year = {1992},  
  publisher = {Addison-Wesley},  
}
```

Compilation

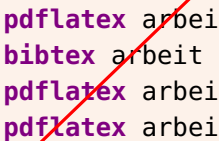
```
pdflatex arbeit
```

```
bibtex arbeit
```

```
pdflatex arbeit
```

```
pdflatex arbeit
```

Compilation



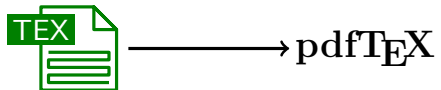
```
pdflatex arbeit  
bibtex arbeit  
pdflatex arbeit  
pdflatex arbeit
```

```
latexmk -pdf arbeit
```

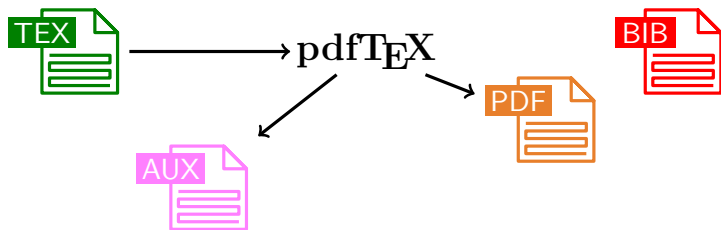
How does BIB_TEXwork?



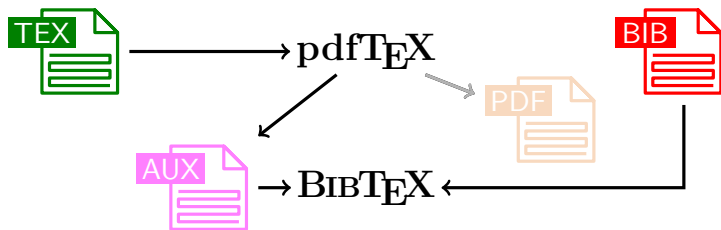
How does BIB_TEX work?



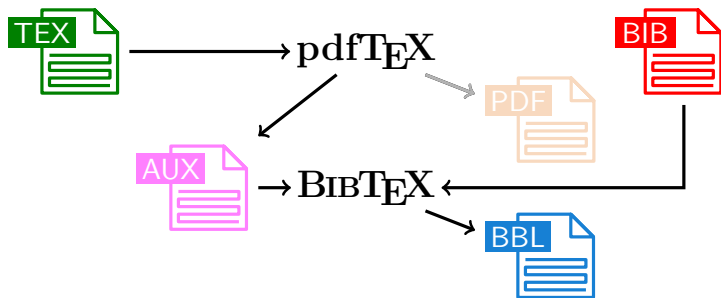
How does BIB_TE_X work?



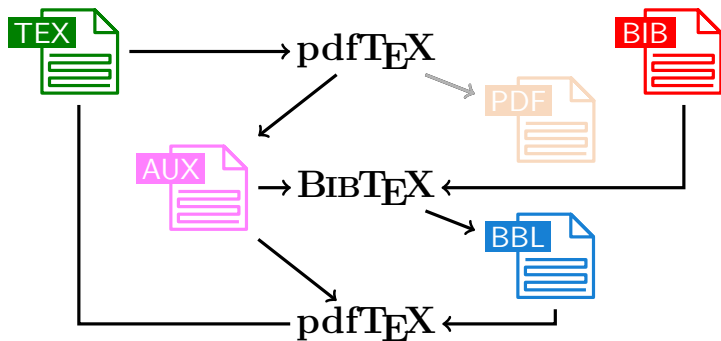
How does BIBTEX work?



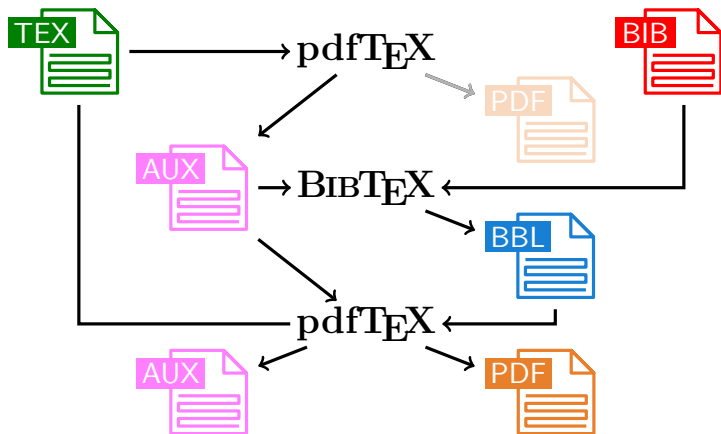
How does BIBTEX work?



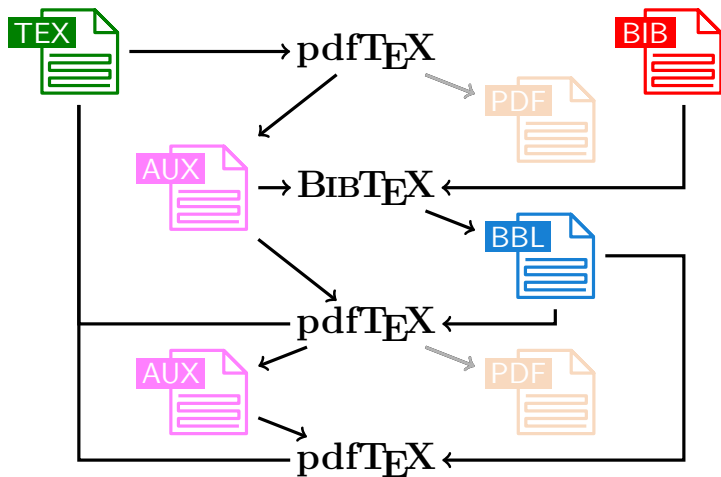
How does BIBTEX work?



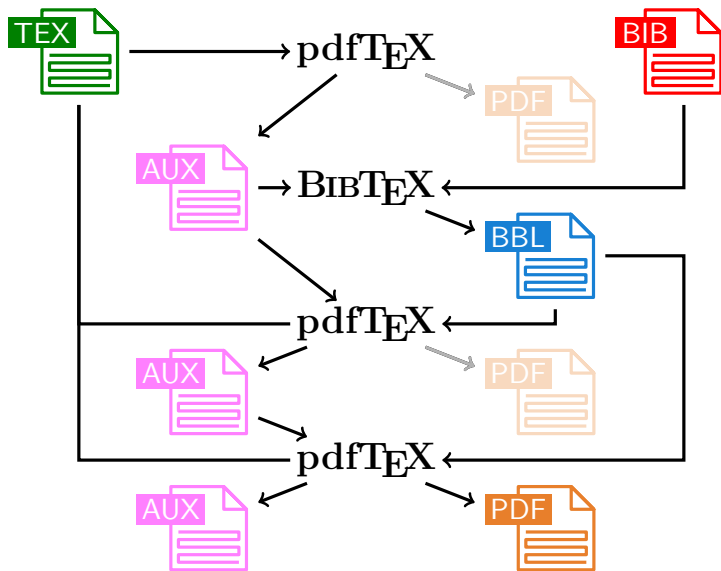
How does BIBTEX work?



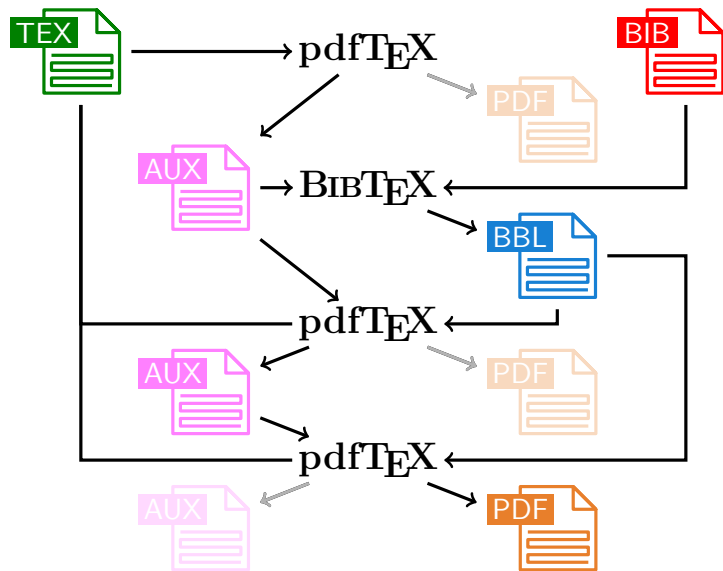
How does BIBTEX work?



How does BIBTEX work?



How does BIBTEX work?



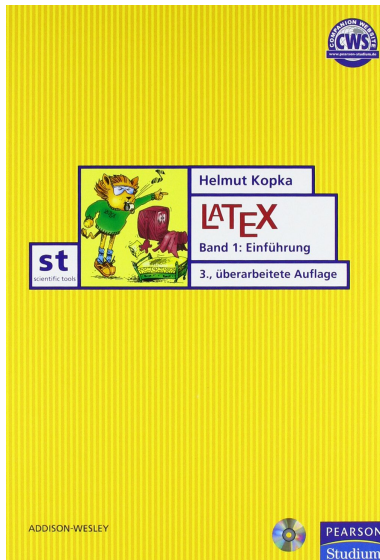
Bibliographies in L^AT_EX



Summary

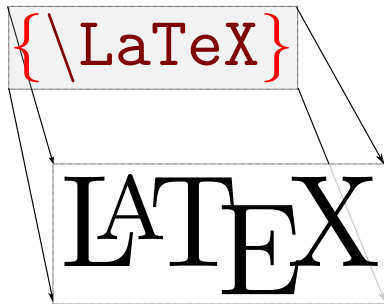
1. The \LaTeX -File contains content and structure.
2. \LaTeX typesets a PDF-document and ensures proper form.
3. Creating new Layouts is advanced.
4. A \LaTeX -document contains the document class, preamble und document body.
5. \LaTeX is very useful for longer Documents as it provides many possibilities for structuring and outlining. A document can be build from many source files.
6. \BibTeX generates a bibliography from a data base in a special format. There are many bibliography styles to choose from via the options of the `\natbib` package `\bibliographystyle`.

The L^AT_EX-Textbook



Modern L^AT_EX-Introduction





Wikibook