

# Typesetting with T<sub>E</sub>X / L<sup>A</sup>T<sub>E</sub>X

## Part VI: BIB<sub>T</sub>E<sub>X</sub> and MakeIndex

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## Overview

- Part I: basic components and essential L<sup>A</sup>T<sub>E</sub>X
- Part II: formatting and layout
- Part III: figures and tables
- Part IV: basic mathematics and AMSL<sup>A</sup>T<sub>E</sub>X
- Part V: PDFL<sup>A</sup>T<sub>E</sub>X and slides
- **Part VI**: BIB<sub>T</sub>E<sub>X</sub> and MakeIndex
- Part VII: useful things...

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## BIB<sub>T</sub>E<sub>X</sub>

## Bibliographies

- L<sup>A</sup>T<sub>E</sub>X provides a mechanism for citations:
  - Symbolic citations to references in a bibliography
  - A special bibliography environment to keep the bibliography itself
  - Similar to label / reference system for counters
- BIB<sub>T</sub>E<sub>X</sub> is a tool to maintain bibliographies
  - References are kept in a database
  - BIB<sub>T</sub>E<sub>X</sub> automatically extracts and adds cited references
  - Formatting of references done automatically

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## Citations

- To cite a references in the bibliography:

```
\cite[text]{key}
```

  - **key** is label of reference
  - **text** is additional text printed with reference
  - More than one key can be listed, separated by commas
- For a \cite command to replace three or more references by ranges use package cite
  - Reference [3,4,5,8,7,6] becomes [3-5,8,7,6]
- To sort reference lists use package citesort
  - Reference [3,4,5,8,7,6] becomes [3-8]

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## thebibliography Environment

- Reference provided by thebibliography environment:

```
\begin{thebibliography}  
  \bibitem[label]{Key} M.~Goossens,  
  F.~Mittelbach. \emph{The \LaTeX\ companion}.  
  ...  
\end{thebibliography}
```

  - **key** is used for the \cite label
  - **label** provides printed label for reference
  - Without **label** references are numbered consecutively
- Format of references is free (works like a itemize environment)

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## BIB<sub>T</sub>EX

- BIB<sub>T</sub>EX generates the bibliography automatically
  - Can use large databases containing many references
  - Includes only those that are cited in the document
  - Entries are sorted
  - Entries are consistently formatted (provided the database is consistent)

## Bibliography Database

- Bibliography databases (.bib) entries:

```
@entry-type{key,
  field1 = "text",
  ...
  fieldn = "text"
}

@book{eijkhout91,
  author = "Victor Eijkhout",
  title = "\TeX\ by Topic, a \TeX{}nicians
Reference",
  publisher = "Addison-Wesley",
  year = "1991"
}
```

## Bibliography Entry Types

- Many different entry types in bibliography
  - Essentially defined by a bibliography style file
- Standard entries:
  - book, article, proceedings, inproceedings, incollection, inbook, booklet, phdthesis, mastersthesis, techreport, manual, unpublished, misc
  - See literature for details
- Many support programs available (e.g. emacs bibtex mode which knows about standard entries and fields)

## Author Format

- Authors should be entered in the following format:

- forenames von surname
- von surname, forenames
- von surname, jr, forenames

"Alex Thomas von Neumann"	A.T. von Neumann
"John Christ {Smith Jones}"	J.C. Smith Jones
"van de Klee, Mary-Jane"	M.-J. van de Klee
"Smith, Jr, Fred Jhon"	F.J. Smith, Jr
"Maria {\uppercase{d}}e La Cruz"	M. De La Cruz
"Maria De La Cruz" (!)	M.D.L. Cruz (!)

- Multiple authors should be split by and:

```
"Goossens, Michel and Rahtz, Sebastian"
```

## Database and Bibliography Style Declaration

- Bibliography Style declared in T<sub>E</sub>X source:

```
\bibliographystyle{style-name}
```
- Common Styles:
  - plain — sorted alphabetically with num. labels
  - unsrt — in order of citation with num. labels
  - alpha — sorted alphabetically with author/year labels
- Declare bibliography database (multiple separated by comma):

```
\bibliography{name}
```

## BIB<sub>T</sub>EX Example

- In L<sup>A</sup>T<sub>E</sub>X source filename.tex with database file database.bib:

```
This is the document\dots

\bibliographystyle{plain}
\bibliography{database}
```

- To generate the file:

```
> latex filename
> bibtex filename
> latex filename
> latex filename
```

## MakeIndex

## Indices...

- $\LaTeX$  provides special commands to maintain indices
- General procedure:
  - Mark entries in text
  - $\TeX$  generates unsorted index file
  - Use `makeindex` to sort indices
  - Run  $\TeX$  to include sorted index file

## Insert Index Markers

- Command to set indices:  
`\index{index text}`
  - Creates a index entry for `index text` to the page where `\index` appears (page itself it not changed)
- Sub-indices:  
`\index{index1!index0}`
  - Creates `index1` as sub-index of `index0` (more levels possible)

## Index Marker Examples

```
On page 3: \index{dimensions!rule!width!}  
On page 5: \index{box!parameters}  
On page 9: \index{dimensions!table}  
On page 12: \index{dimensions!rule!height}  
On page 21: \index{box}  
On page 33: \index{box!dimensions of!see{dimensions}}
```

```
box, 21  
  dimension of, see dimensions  
parameters, 5  
dimensions  
  rule  
    height, 12  
    width, 3  
table, 9
```

## Define Index Entry

- Default index entry is defined by argument of `\index`
- To change this provide alternative after `@`:

```
\index{key@label}
```

- Examples:

```
\index{flower@\textbf{flower}}  
\index{delta@$\delta$}  
\index{ninety@XC}
```

```
 $\delta$ , 14  
flower, 19  
XC, 28
```

- Note that sorting is done according to `key`

## Create Index

- To create the unsorted index file:
  - Include `makeidx` package
  - Insert `\makeindex` in preamble
  - Insert `\printindex` where index should appear in document
  - Run  $\LaTeX$  to get unsorted index file

## Format Index

- `makeindex` program can be used to generate a formatted index from unsorted index file:

```
> makeindex filename.idx
```

- Generates sorted index `filename.ind`
- Next run of  $\text{\LaTeX}$  will include `filename.ind`
- Index file contains a `theindex` environment similar to an `itemize` environment
  - Do not manually edit `filename.ind...`
- See `makeindex` man-page (`man makeindex`) for options, etc.
- There are many ways to adjust the index format (index styles), etc. (see literature)