Typesetting with TEX / LATEX

Part VI: BIBTEX and MakeIndex

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Overview

- Part I: basic components and essential LaTeX
- Part II: formatting and layout
- Part III: figures and tables
- Part IV: basic mathematics and AMSLaTeX
- Part V: PDFLaTeX and slides
- Part VI: BIBTeX and MakeIndex
- Part VII: useful things...


BIBTEX

Bibliographies

- LaTeX 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
- BIBTeX is a tool to maintain bibliographies
  - References are kept in a database
  - BIBTeX automatically extracts and adds cited references
  - Formatting of references done automatically

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]

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)

BIBTEX

- BIBTEX generates `thebibliography` 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"
"John Christ {Smith Jones}"
"van de Klee, Mary-Jane"
"Smith, Jr, Fred Jhon"
"Maria {\uppercase{d}e La}
Cruz"
"Maria De La Cruz" (!)
```

A.T. von Neumann
J.C. Smith Jones
M.-J. van de Klee
F.J. Smith, Jr
M. 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 TEX 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}
```

BIBTEX Example

- In LATEX 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}
```

δ, 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 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)