

Lecture 4: Typesetting Documents with \LaTeX

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Visual vs. Logical Document Design

- Visual design: WYSIWYG
 - ▶ Word etc.
 - ▶ Easy to learn
 - ▶ Immediate feedback
 - ▶ Distracts from contents
 - ▶ Professional typesetting hard to impossible
- Logical design (D. Knuth)
 - ▶ $\text{T}_{\text{E}}\text{X}$ and \LaTeX
 - ▶ Hard to learn
 - ▶ Can be unintuitive, compilation necessary
 - ▶ Helps writer focus on structure and content
 - ▶ Professional typesetting (especially equations, tables, diagrams)

L^AT_EX Document Classes

- L^AT_EX documents consist of
 - ▶ preamble (not printed): Define document class, load packages, change defaults, add definitions
 - ▶ main text (printed): Document content
(`\begin{\document}` ... `\end{\document}`)
- Most important classes:
 - ▶ article: Papers, lab reports, general purpose documents.
 - ▶ report: Longer papers and small books, theses.
 - ▶ book: Large books.
 - ▶ letter: (Formal) letters
 - ▶ beamer: Presentations
 - ▶ minimal: Plain class for standalone figures etc.

1. Paragraph mode (default): Words, separated by one or more spaces, paragraphs, separated by one or more blank lines
 - ▶ Automatically takes care of ligatures (e.g. ff vs. \ff), hyphenation, justification of paragraphs, pages
2. LR mode: Single line
 - ▶ Whenever complete control over line breaks is necessary, e.g. in tabular-type environments
3. Math mode: All letters are interpreted as symbols, spaces ignored
 - ▶ In-line math (\dots) is slightly different from math environments such as equation

Environments

- Paragraph formatting environments: `center` or `\centering` (single paragraph), `flushleft` or `\raggedright`, `flushright` or `\raggedleft`, `verbatim` or `\verb`, `quote`, `theorem`
- List type environments: `list`, `itemize`, `enumerate`, `description`, `thebibliography`
- Equation-type environments: `equation`, `eqnarray`, `multline` (AMS), `align` (AMS)
- Table type environments: `tabular`, `tabbing`
- Float type environments: `figure`, `table`, `float` (float package)
- Array type environments (math mode): `array`, `matrix` (AMS), `pmatrix` (AMS), `bmatrix` (AMS), `vmatrix` (AMS)
- Some other environments: `figure`, `minipage`, `titlepage`, `verse`

Typesetting your Lab Report in \LaTeX

1. Choose the `article` document class
2. Structure the document using `\section`, `\subsection` etc.
3. Insert tables and figures
4. Write methods section, followed by results, introduction, conclusions
5. Insert references using `\cite`
6. Write abstract
7. Proofread and re-write; spell-check
8. Address any remaining formatting issues (overfull hboxes, float positions) at the very end

Good Practices

- Version-control your \LaTeX documents (use `git-latexdiff` for word-like display of changes)
- Do not try to “micromanage” \LaTeX by controlling the exact location of figures, tables, lengths, and spaces
- Compile often while composing the document, but do not deal with formatting until the very end. Use `latexmk` to simplify compilation.
- Stick with basic packages and environments until you know what you are doing. Do not fiddle with fancy fonts, exotic packages etc.
- Do not blindly follow recommendations from the internet, use the \LaTeX companions or similar books instead
- If you are having trouble getting the result you want ask yourself whether you are on the right track