Using LaTeX

A Seminar

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Outline

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Software

- LaTeX compiler.
  - MikTex – free.
- Text editors
  - WinEdt – $40, 2-pass.
  - Texmaker – free, 1-pass.
  - TeXnicCenter – free, 1-pass.
- Vector graphics software
  - Mayura Draw – $39.
  - ipe – free and allows embedded LaTeX.
  - Inkscape – free.

Outline

Document Structure

Example (Hello, World!)

```
\documentclass{article}
\begin{document}
Hello, World!
\end{document}
```

Document Structure

- A LaTeX document consists of two main parts.
- Preamble
  - The document type
  - Any packages to include
  - Any special commands
  - Any user-defined definitions
- Body – contains the content of the document to be displayed.

The Basic Document

Practice Session 1

- Do Practice Session #1 (The basic document).

Outline

Document Classes

- The format of a document is determined primarily by the document class.
- Write `\documentclass{class}` to specify the document class.
  - article
  - book
  - report
  - beamer

Packages

- The capabilities of LaTeX can be extended by including packages.
- Write `\usepackage{class}` to specify the package.
  - amsmath
  - amssymb
  - graphicx
  - hyperref, etc.

Packages

Practice Session 2

- Do Practice Session #2 (Packages).

Outline

The Structure of the Body of a LaTeX Document

- The LaTeXdocument body is divided into
  - Parts
  - Chapters (book and report classes only)
  - Sections
  - Subsections
  - Subsubsections
  - Paragraphs
  - Subparagraphs
- These components may be numbered or not numbered.

Document Structure

Practice Session 3

- Do Practice Session #3 (Document Structure).

Table of Contents

- We can create a table of contents by using `\tableofcontents`.
- The table of contents includes all parts, chapters, sections, etc., along with their page numbers.
- How much is shown can be controlled with `\setcounter{tocdepth}{level}`.
- In a similar way, we can get a list of figures (`\listoffigures`) and a list of tables (`\listoftables`).

Table of Contents

Practice Session 4

- Do Practice Session #4 (Table of contents).

Formatting Text in LaTeX

- To start a new paragraph, leave a blank line.
- The face of the text may be modified.
  - Emphasis – *Hello, World!*
  - Boldface – **Hello, World!**
  - Italic – *Hello, World!*
  - Slanted – *Hello, World!*
  - Teletype – `Hello, World!`
  - Small caps – Hello, World!
  - Sans serif – Hello, World!
  - Roman – Hello, World!

Footnotes and Links

- Use `\footnote{`*content*`}` to enter a footnote.
- Use `\href{`*link*`}{`*text*`}` to create a link to another document.

Font Faces

Practice Session 5

- Do Practice Session #5 (Font faces).

Outline

Environments

- LaTeX provides several environments.
  - List environments
    - Bulleted lists.
    - Enumerated lists.
    - Descriptive lists.
  - Tabular environment.
  - Table environment.
  - Figure environment.
  - Quote and quotation environments.
- See the documents `Example4.tex` and `Example5.tex`.

Lists

Practice Session 6

- Do Practice Session #6 (List environments).

Tables and Figures

Practice Session 7

- Do Practice Session #7 (Tabular, table, and figure environments).

Outline

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Mathematical Expressions

- The `$` toggles between the text environment and the math environment.
- Inline math expressions are delimited by `$...$`.
- Displayed math expressions delimited by `$$...$$`.

Typesetting Mathematics

- Special tags are used to format a variety of mathematical notations.
  - Use `\frac` for fractions: $\frac{a}{b} = \frac{a}{b}$.
  - Use `\sum` for summations: $\sum_{k=0}^{n} k = \sum_{k=0}^{n} k = \frac{n(n+1)}{2}$.
  - Use `\lim` for limits: $\lim_{x \to \infty} \frac{1}{x} = \lim_{x \to \infty} \frac{1}{x} = 0$.
  - Use `\int` for integrals: $\int_0^1 x \, dx = \int_0^1 x \, dx = \frac{1}{2}$.
  - And so on.

Mathematical Expressions

Practice Session 8

- Do Practice Session #8 (Mathematical expressions).

Outline

Theorem Environment

- The theorem environment is used for. . . theorems!
- The theorem environment can be used to create many other similar environments, e.g., lemma, corollary, definition, and remark.
- Use the AMS package `amsthm`.

Theorem Environment

Practice Session 9

- Do Practice Session #9 (Theorems).