Introduction to LaTeX

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Outline

What is LaTeX?

- LaTeX "is a software system for document preparation"[1]
- Uses markup tags "\tag{content}" to format
- Suitable for academics, esp. mathematics and computer science – technical journals often provide LaTeX templates
- Suitable for **thesis** writing (i.e. no headache about the thesis format later on)
- **Standard** format for everyone using the same document class – no need to adjust anything

[1] https://en.wikipedia.org/wiki/LaTeX

Resources

General:

- https://en.wikibooks.org/wiki/LaTeX
- https://www.overleaf.com/learn

Math:

- https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols
- https://en.wikipedia.org/wiki/Help:Displaying_a_formula#Formatting_using_TeX

Algorithm:

- https://www.overleaf.com/learn/latex/Algorithms

USM thesis format:

- https://github.com/wnarifin/usmthesis

LaTeX editors

Desktop:

- TeXmaker `http://www.xm1math.net/texmaker/`
- TeXstudio `https://www.texstudio.org/`
- TeXworks `https://www.tug.org/texworks/`

Online:

- Overleaf `https://www.overleaf.com/`

Structure

LaTeX

```
\documentclass{...}
...
\begin{document}
...
\end{document}
```

HTML

```
<html>
  <head>
  ...
  </head>
  <body>
  ...
  </body>
</html>
```

Preamble

```
\documentclass[options]{class}
\usepackage[options]{package}
```

```
\documentclass[11pt,a4paper]{article}
\usepackage{tabularx}
```

Preamble

```
\documentclass[options]{class}
\usepackage[options]{package}
\title{...}
\author{...}
\date{...}
```

```
\documentclass[11pt,a4paper]{article}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
```

Pramble + Document

```
\documentclass[options]{class}
\usepackage[options]{package}
\title{...}
\author{...}
\date{...}
\begin{document}
\maketitle
...content...
\end{document}
```

Pramble + Document

Let's copy + paste in LaTeX editor and compile

```
\documentclass[11pt,a4paper]{article}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
\begin{document}
\maketitle
...content...
\end{document}
```

Adding text

Let's copy + paste in LaTeX editor and compile

```
\documentclass[11pt,a4paper]{article}
\usepackage{tabularx}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
\begin{document}
\maketitle
In the world of document preparation and typesetting, LaTeX stands as a
timeless masterpiece, revered for its elegance, precision, and unmatched
capabilities. Developed by Leslie Lamport in the early 1980s, this
remarkable typesetting system has consistently proven itself as the
go-to choice for scholars, researchers, professionals, and creative
minds alike.
\end{document}
```

Adding section

Let's copy + paste in LaTeX editor and compile

```
\documentclass[11pt,a4paper]{article}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
\begin{document}
\maketitle
\section{First}
In the world of document preparation and typesetting, LaTeX stands as a
timeless masterpiece, revered for its elegance, precision, and unmatched
capabilities.
\subsection{Sub-First}
Developed by Leslie Lamport in the early 1980s, this remarkable
typesetting system has consistently proven itself as the go-to
choice for scholars, researchers, professionals, and creative
minds alike.
\end{document}
```

Adding bullet/number

Let's copy + paste in LaTeX editor and compile

```
\documentclass[11pt,a4paper]{article}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
\begin{document}
\maketitle
\begin{itemize}
\item First
\item Second
\begin{enumerate}
\item Second-First
\item Second-Second
\end{enumerate}
\end{itemize}
\end{document}
```

Adding mathematical formula

Let's copy + paste in LaTeX editor and compile

```
\documentclass[11pt,a4paper]{article}
\title{\LaTeX{} workshop}
\author{Arifin}
\date{July 23, 2023}
\begin{document}
\maketitle
This is an inline formula, $Y = \alpha + \beta X + \gamma Z^2$.
It views the mathematical expressions within the text.

Then this is a display formula,
\begin{equation}
\mu = \frac{\sum X_i}{n}
\end{equation}
It displays the mathematical expressions in a separate block.
\end{document}
```

Next on the `usmthesis` LaTeX template