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- Document markup language & document preparation system for $\TeX$
- Essentially a collection of macros for $\TeX$
- Awesome for scientific and mathematical papers
- “Lets authors focus on the content and not the visual presentation”

(http://en.wikipedia.org/wiki/LaTeX)
\LaTeX{}: Features

- Typesetting journal articles, technical reports, books, and slide presentations.
- Control over large documents containing sectioning, cross-references, tables and figures.
- Typesetting of complex mathematical formulas.
- Advanced typesetting of mathematics with AMS-LaTeX.
- Automatic generation of bibliographies and indexes.
- Multi-lingual typesetting.
- Inclusion of artwork, and process or spot color.
- Using Postscript or Metafont fonts.

(http://www.latex-project.org/intro.html)
**\TeX\ & \LaTeX: History**

**\TeX:**

- A computer program
- Created by Donald E. Knuth
- For typesetting text and mathematical formula
- Knuth started writing the \TeX\ typesetting engine in 1977

**\LaTeX:**

- Originally written by Leslie Lamport in the early 1980s
- Pronounced “Lah-tech” or “Lay-tech”

(The Not So Short Introduction to \LaTeX\ 2ε by Tobias Oetiker)
Writing a book . . .

- Author: Writes the contents
- Book Designer: Decides the layout
- Typesetter: Typesets the book
\LaTeX: Background

Writing a book . . .

\begin{itemize}
\item Author: Writes the contents
\item Book Designer: Decides the layout (\LaTeX)
\item Typesetter: Typesets the book
\end{itemize}
Writing a book . . .

- Author: Writes the contents
- Book Designer: Decides the layout (\LaTeX)
- Typesetter: Typesets the book (\TeX)
\texttt{\LaTeX: Simple Example}

simpleExample.tex:

```
\documentclass{article}
\begin{document}
Hello world!
\end{document}
```

Output:

```
Hello world!
```
\texttt{simpleExample2.tex:}

\begin{verbatim}
\documentclass{article}
\begin{document}
H'\{e\}llo \{\textbf{\texttt{world!}}\}
\\\nWe're \{\texttt{\textit{typesetting}}\}
\\\nwith \LaTeX!
\end{document}
\end{verbatim}

Notice:

- Whitespace
- Accent
- newlines with \texttt{\textbackslash\textbackslash}
\documentclass{article}
\title{Cartesian Closed Categories}
\author{Muhammad Smith}
\date{September 2011}
\begin{document}
  \maketitle
  Hello world!
\end{document}

Other options:
\begin{verbatim}
\author{Jane Doe \and John Doe}
\date{\today}  \% the default
\date{\{} \% no date
\end{verbatim}
LaTeX: documentclasses
\documentclass[options]{}

- article: for articles in scientific journals, presentations, short reports, program documentation, invitations, ...
- IEEEtran: for articles with the IEEE Transactions format.
- proc: a class for proceedings based on the article class.
- minimal: is as small as it can get. It only sets a page size and a base font. It is mainly used for debugging purposes.
- report: for longer reports containing several chapters, small books, thesis, ...
- book: for real books
- slides: for slides. The class uses big sans serif letters.
- memoir: for changing sensibly the output of the document. It is based on the book class, but you can create any kind of document with it
- letter: for writing letters.
- beamer: for writing presentations (see LaTeX/Presentations) (http://en.wikibooks.org/wiki/LaTeX/Basics)
\documentclass[options]{}
Most popular:

- book
- article
- report
- letter
\texttt{\LaTeX}: \texttt{documentclasses}

<table>
<thead>
<tr>
<th>Command</th>
<th>Level</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{\part{part}}</td>
<td>-1</td>
<td>not in letters</td>
</tr>
<tr>
<td>\texttt{\chapter{chapter}}</td>
<td>0</td>
<td>only books and reports</td>
</tr>
<tr>
<td>\texttt{\section{section}}</td>
<td>1</td>
<td>not in letters</td>
</tr>
<tr>
<td>\texttt{\subsection{subsection}}</td>
<td>2</td>
<td>not in letters</td>
</tr>
<tr>
<td>\texttt{\subsubsection{subsubsection}}</td>
<td>3</td>
<td>not in letters</td>
</tr>
<tr>
<td>\texttt{\paragraph{paragraph}}</td>
<td>4</td>
<td>not in letters</td>
</tr>
<tr>
<td>\texttt{\subparagraph{subparagraph}}</td>
<td>5</td>
<td>not in letters</td>
</tr>
</tbody>
</table>
LaTeX:

Simple structures:

- \begin{itemize}
  \item Item one
  \item Item two
\end{itemize}

- \begin{enumerate}
  \item Item one
  \item Item two
\end{enumerate}

- \begin{verbatim}
  code snippet
\end{verbatim}
\begin{center}
This text is centered! \\
As is this line.
\end{center}

Output:

This text is centered!
As is this line.
LaTeX: Equations

Equations

- One of the most popular reasons to use LaTeX
- Use \begin{equation} ... \end{equation} or $ ... $
\begin{equation}
M = P \times \frac{J}{1 - (1 + J)^{-N}}
\end{equation}

or

\begin{equation}
M = P \times \frac{J}{1 - (1 + J)^{-N}}
\end{equation}

(1)
\includegraphics[height=.7\texttheight]{fam}

Photo Credit: Ivan Syzonenko
\begin{figure}
\begin{center}
\includegraphics[height=.25\texttheight]{fam}
\end{center}
\caption{Family Photo: July 5, 2013; Credit: Ivan Syzonenko}
\end{figure}

**Figure**: Family Photo: July 5, 2013; Credit: Ivan Syzonenko
\begin{tabular}{lr}
  Student & Class \\
  \hline
  Student1 & 2 \\
  Student2 & 3 \\
  Student3 & 4 \\
  Student4 & 5 \\
\end{tabular}
Generating Output

- `latex lecture02.tex; dvips lecture02.dvi;`
- Produces `lecture02.dvi`, then `lecture02.ps`

or

- `pdflatex lecture02.tex`
- Produces `lecture02.pdf`

- Many advantages over postscript: bookmarks of the table of contents, hyperlinks to the figures, tables, bibliography references, or web site links
Good intro book:
The Not So Short Introduction to LaTeX 2ε:
Or LaTeX 2ε in 157 minutes
http://tobi.oetiker.ch/lshort/lshort.pdf