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Module 5: L<sup>A</sup>T<sub>E</sub>X

Lecture 1: L<sup>A</sup>T<sub>E</sub>X Basics

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## Document structure

```
\% This is a comment
\% This is another comment

\%This is the document preamble
\documentclass[11pt,oneside,a4paper]{article}

\usepackage[english]{babel}
\usepackage{amsmath}

\%This is the document body
\begin{document}
  \title{This is my title}
  \author{My name}
  \maketitle      %this is the command to actually draw the title

  \section{Introduction}
  ...
  \begin{equation}
    \mathnormal{E = mc^2}
  \end{equation}
\end{document}
```

- ↪ Command: an instruction used for producing something new or to change the form of an existing item, e.g., producing the symbol  $\alpha$  or printing italic as *italic*.
- ↪ Environment: a logical structure established by a pair of commands `\begin{}`...`\end{}` to perform a particular task or render the output in a particular way.
- ↪ Package: additional code to extend core L<sup>A</sup>T<sub>E</sub>X functionalities.
- ↪ Class: general structure of the document.

## Common file extensions

- `.tex` L<sup>A</sup>T<sub>E</sub>X or T<sub>E</sub>X input file
- `.aux` Transport info from one compilation run to another (cross-references)
- `.log` Compilation run log
- `.toc` Stores section headers. Used to generate the table of contents
- `.lof` As `.toc` for the list of figures
- `.lot` As `.toc` for the list of tables
- `.bib` Bibliography database file
- `.bbl` Generated by BiB<sub>T</sub>E<sub>X</sub> to be used by L<sup>A</sup>T<sub>E</sub>X
- `.blg` BiB<sub>T</sub>E<sub>X</sub> log file
- `.bst` BiB<sub>T</sub>E<sub>X</sub> style file
- `.cls` Document class definition
- `.sty` Macro package
- `.pdf` The output document

## Syntax

### Commands

```
\command[options]{argument}
```

`\documentclass` command
$$\text{\documentclass}[\text{options}]\{\text{argument}\}$$

Argument		Options	
<code>book</code>	Default is two-sided.	<code>10pt/11pt/12pt</code>	Font size.
<code>report</code>	No <code>\part</code> divisions.	<code>letterpaper/a4paper</code>	Paper size.
<code>article</code>	No <code>\part</code> or <code>\chapter</code> divisions.	<code>twocolumn</code>	Use two columns.
<code>letter</code>	Letter.	<code>twoside</code>	Set margins for two-sided.
<code>slides</code>	Large sans-serif font.	<code>landscape</code>	Landscape orientation.
<code>beamer</code>	Presentations.	<code>draft</code>	Double-space lines.

## Syntax

`\usepackage command`

`\usepackage [options] {package_name}`

<b>Package</b>	<b>Use</b>	<b>Options</b>
babel	Internationalization	english, german
amsmath	Math writing	sumlimits, nosumlimits, leqno, reqno
hyperref	Hypertext links	draft, final, debug
graphicx	Graphics inclusion	draft, final, hiderotate

<https://www.ctan.org>

## Reserved and special characters

<code>&amp;</code>	<code>\&amp;</code>	<code>-</code>	<code>\_</code>	<code>...</code>	<code>\ldots</code>	<code>•</code>	<code>\textbullet</code>
<code>\$</code>	<code>\\$</code>	<code>^</code>	<code>\^{}</code>	<code> </code>	<code>\textbar</code>	<code>\</code>	<code>\textbackslash</code>
<code>%</code>	<code>\%</code>	<code>~</code>	<code>\~{}</code>	<code>#</code>	<code>\#</code>	<code>§</code>	<code>\S</code>

<code>ò</code>	<code>\'o</code>	<code>ó</code>	<code>\'o</code>	<code>ô</code>	<code>\^o</code>	<code>õ</code>	<code>\~o</code>	<code>ō</code>	<code>\=o</code>
<code>ó</code>	<code>\.o</code>	<code>ö</code>	<code>\"o</code>	<code>ø</code>	<code>\c o</code>	<code>ő</code>	<code>\v o</code>	<code>ő</code>	<code>\H o</code>
<code>ç</code>	<code>\c c</code>	<code>ø</code>	<code>\d o</code>	<code>ö</code>	<code>\b o</code>	<code>ö</code>	<code>\t oo</code>	<code>œ</code>	<code>\oe</code>
<code>Œ</code>	<code>\OE</code>	<code>æ</code>	<code>\ae</code>	<code>Æ</code>	<code>\AE</code>	<code>å</code>	<code>\aa</code>	<code>Å</code>	<code>\AA</code>
<code>ø</code>	<code>\o</code>	<code>Ø</code>	<code>\O</code>	<code>†</code>	<code>\l</code>	<code>‡</code>	<code>\L</code>	<code>ı</code>	<code>\i</code>
<code>ı</code>	<code>\j</code>	<code>ı</code>	<code>\~'</code>	<code>ı</code>	<code>\?'</code>				

<code>'</code>	<code>'</code>	<code>"</code>	<code>"</code>	<code>{</code>	<code>\{</code>	<code>[</code>	<code>[</code>	<code>(</code>	<code>(</code>	<code>&lt;</code>	<code>\textless</code>
<code>,</code>	<code>,</code>	<code>"</code>	<code>"</code>	<code>}</code>	<code>\}</code>	<code>]</code>	<code>]</code>	<code>)</code>	<code>)</code>	<code>&gt;</code>	<code>\textgreater</code>



## Reserved and special characters

hyphen	-	X-ray
en-dash	--	1–5
em-dash	---	Yes—or no?

\\		Begin new line without new paragraph.
\\*		Prohibit pagebreak after linebreak.
\pagebreak		Start new page.
\noindent		Do not indent current line.

\today		30th April 2019.
\$_sim\$		Prints ~ instead of $\sim\{}$ , which makes ~.
~		Space, disallow linebreak (W.J.~Clinton).

# Syntax

## Sectioning

```
\begin{document}
\title{Title}
\author{Author's name}
\maketitle      %this is the command to actually draw the title

\begin{abstract}
Your abstract goes here...
...
\end{abstract}

\part{title}
\chapter{title}
\section{title}
\subsection{title}
\subsubsection{title}
\paragraph{title}
\subparagraph{title}

\bibliographystyle{style}
\bibliography{source}
\tableofcontents
\end{document}
```

## Syntax

### Font size

<code>\tiny</code>	<code>tiny</code>	<code>\scriptsize</code>	<code>scriptsize</code>
<code>\footnotesize</code>	<code>footnotesize</code>	<code>\small</code>	<code>small</code>
<code>\normalsize</code>	<code>normalsize</code>	<code>\large</code>	<code>large</code>
<code>\Large</code>	<code>large</code>	<code>\LARGE</code>	<code>large</code>
<code>\huge</code>	<code>huge</code>	<code>\Huge</code>	<code>huge</code>

### Paragraph alignment

Alignment	Environment	Command
Left justified	<code>flushleft</code>	<code>\ruggedright</code>
Right justified	<code>flushright</code>	<code>\ruggedleft</code>
Center	<code>center</code>	<code>\centering</code>

## Syntax

### Font face

<i>Command</i>	<i>Declaration</i>	<i>Effect</i>
<code>\textrm{text}</code>	<code>{\rmfamily text}</code>	Roman family
<code>\textsf{text}</code>	<code>{\sffamily text}</code>	Sans serif family
<code>\texttt{text}</code>	<code>{\ttfamily text}</code>	Typewriter family
<code>\textmd{text}</code>	<code>{\mdseries text}</code>	Medium series
<code>\textbf{text}</code>	<code>{\bfseries text}</code>	<b>Bold series</b>
<code>\textup{text}</code>	<code>{\upshape text}</code>	Upright shape
<code>\textit{text}</code>	<code>{\itshape text}</code>	<i>Italic shape</i>
<code>\textsl{text}</code>	<code>{\slshape text}</code>	<i>Slanted shape</i>
<code>\textsc{text}</code>	<code>{\scshape text}</code>	SMALL CAPS SHAPE
<code>\emph{text}</code>	<code>{\em text}</code>	<i>Emphasized</i>
<code>\textnormal{text}</code>	<code>{\normalfont text}</code>	Document font
<code>\underline{text}</code>		<u>Underline</u>

<code>\begin{enumerate}</code>	Numbered list.
<code>\begin{itemize}</code>	Bulleted list.
<code>\begin{description}</code>	Description list.
<code>\item text</code>	Add an item.
<code>\item[x] text</code>	Use $x$ instead of normal bullet or number. Required for descriptions.

```
\begin{itemize}
  \item item 1
  \item item 2
\end{itemize}
```

```
\usepackage[language1, language2]{babel}
```

Place it soon after `\documentclass`

```
\selectlanguage{language1}
```

```
\foreignlanguage{language1}{Text in another language.}
```

*No spell checking!*

## Author's affiliation

```
\usepackage[options]{authblk}
```

```
\documentclass{article}
\usepackage{authblk}

\title{Multiple Affiliation for Multiple Author}
\date{\today}

\author[1, 2]{Author1}
\author[3, 5]{Author2}
\author[1, 2, 4]{Author3}
\author[1, 2, 4]{Author4}

\affil[1]{Affiliation1}
\affil[2]{Affiliation2}
\affil[3]{Affiliation3}
\affil[4]{Affiliation4}
\affil[5]{Affiliation5}














\begin{document}
\maketitle
\end{document}
```



## Create your command

```
\newcommand{\mycommand}{myoutput}
```

## Exercise

-  Open your TeX edition and create a document with document class type "article"
-  Create a title page (e.g., title, authors, date)
-  Create the sections and subsections of one of your papers or your next planned paper (incl. abstract)
-  Create a table of contents (use the command `\tableofcontents`)
-  Add some text between the sections (copy paste from a ready document you have - plain text only)
-  Add some keywords before the abstract, in the form of bullet points (For examples see here: [https://en.wikibooks.org/wiki/LaTeX/List\\_Structures](https://en.wikibooks.org/wiki/LaTeX/List_Structures))
-  Include a subscript in your text (e.g.,  $CO_2$ )
-  In one of your paragraphs refer to the first section (load the package *hyperref* and use the commands `\ref` and `\label`. For examples see here: [https://en.wikibooks.org/wiki/LaTeX/Labels\\_and\\_Cross-referencing](https://en.wikibooks.org/wiki/LaTeX/Labels_and_Cross-referencing))
-  Adjust the position of your text to center alignment
-  Install the babel language packet of your home country and write your name (or a typical name from your country that includes special characters)
-  Create your own command
-  Try different options and classes for the command `\documentclass` (For examples see here: [https://en.wikibooks.org/wiki/LaTeX/Document\\_Structure](https://en.wikibooks.org/wiki/LaTeX/Document_Structure))
-  Go to the CTAN website and search for packages useful to your research field