

## Skill Pill: L<sup>A</sup>T<sub>E</sub>X

### Session 1: The Basics of Typesetting

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- 1 Creating a Document
- 2 A First Example
- 3 Structure of  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  Documents
- 4 Structuring the Document
- 5 Punctuation and Special Characters

If you have not installed  $\text{\LaTeX}$  on your computer, you may use Overleaf, which is an online  $\text{\LaTeX}$  editor.

<https://www.overleaf.com>

For further reading and reference, see the  $\text{\LaTeX}$  wikibook:

<https://en.wikibooks.org/wiki/LaTeX>

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document.tex  $\rightarrow$  pdflatex document.tex  $\rightarrow$  document.pdf



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```
\documentclass{scrartcl}

\usepackage[ngerman,spanish,english]{babel}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}

\title{My First \LaTeX\ Document}
\author{Nico Fischer}
\date{\today}

\begin{document}

    \maketitle
    \section{How it Began}
    Hello world!

\end{document}
```

## My First $\text{\LaTeX}$ Document

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### 1 How it Began

Hello world!



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- Command:

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

If there is more than one optional argument, separate them by commas.

- Environments:

```
\begin{environment}  
...  
\end{environment}
```

- Comments are made using %.

```
\documentclass{scrartcl}
```

```
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```

- possible document classes:
  - scrartcl, scrreprt, scrbook (article, report, book...)
  - beamer
  - letter

```
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```

- possible document classes:
  - `scrartcl`, `scrreprt`, `scrbook` (article, report, book...)
  - `beamer`
  - `letter`
- possible preferences:
  - Font size (e. g. `11pt`)
  - Paper format (e. g. `a4paper`)
  - Number of columns (`onecolumn` or `twocolumn`)
  - One-sided/two-sided margins (`oneside` or `twoside`)

Example: `\documentclass[a4paper, 11pt, twocolumn]{scrartcl}`

```
\usepackage[ngerman,spanish,english]{babel}  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}
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Important packages:

- babel** Definition of language(s) – important for hyphenation
- inputenc** Input encoding – important to use special characters
- fontenc** Font encoding – important for diacritics

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There are many more packages, useful for formatting your document.



```
\title{My First \LaTeX\ Document}  
\author{Nico Fischer}  
\date{\today}
```

```
\title{My First \LaTeX\ Document}  
\author{Nico Fischer}  
\date{\today}
```

`\title{}`, `\author{}`, `\date{}` define title, author, and date of the document

`\today` includes today's date. The formatting of the date is determined by the defined language.

`\LaTeX` creates the  $\text{\LaTeX}$ -logo

```
\begin{document}

  \maketitle
  \section{How it Began}
  Hello world!

\end{document}
```

```
\begin{document}
```

```
    \maketitle
```

```
    \section{How it Began}
```

```
    Hello world!
```

```
\end{document}
```

`\begin{document} ... \end{document}` divides document and  
preamble

`\maketitle` creates the title (based on `\title`, `\author`, `\date` in the  
preamble)

`\section` creates a numbered section

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```
\section{A Section of the Document}
```

```
Text of a section.
```

```
\subsection{A Subsection}
```

```
Text of a subsection.
```

```
\subsubsection{A Subsubsection}
```

```
Further Text
```

```
\paragraph{A Paragraph}
```

```
More text
```

```
\subparagraph{A Subparagraph}
```

```
Text ad nauseam
```

## 1 A Section of the Document

Text of a section

### 1.1 A Subsection

Text of a subsection

#### 1.1.1 A Subsubsection

Further text

**A Paragraph** More text

**A Subparagraph** Text ad nauseam

```
\chapter{A Chapter}
```

```
    This is specific to books and reports.
```



# Chapter 1

## A Chapter

This is specific to books and reports (not articles etc.). Each chapter starts on a new page.

The option ‘openright’ in `\documentclass[twoside,openright]{report}` always starts a new chapter on a right-sided page.

To create appendices, use `\appendix` followed by sectioning commands as for slides 16/17.

The table of contents is created by `\tableofcontents`.

The table of contents is created by `\tableofcontents`.

## Contents

<b>1</b>	<b>A Section of the Document</b>	<b>1</b>
1.1	A Subsection . . . . .	1
1.1.1	A Subsubsection . . . . .	1

Label the section you want to reference using  
`\label{marker}`

Reference that section in text elsewhere using  
`\ref{marker}`

You can also reference the page that label was on using  
`\pageref{marker}`

[https://en.wikibooks.org/wiki/LaTeX/Labels\\_and\\_Cross-referencing](https://en.wikibooks.org/wiki/LaTeX/Labels_and_Cross-referencing)

Line breaks are created with `\newline` or short `\\`.

Paragraphs are created by empty lines or `\par`. To avoid the indentation, one may use `\noindent`.

Be aware of *widows* and *orphans* (*clubs*)!

**Widow** The last sentence of a paragraph that appears as first sentence of a new page or paragraph.

**Orphan** A paragraph opening that appears as the last sentence of a page or column.

This is suppressed by `\clubpenalty = 10000 \widowpenalty = 10000`

Paragraphs are created by empty lines or `\par`. To avoid the indentation, one may use `\noindent`.

To create default whitespace between paragraphs with no indents, copy these lines at the beginning of the document (after `\begin{document}`):

```
\setlength{\parindent}{0cm}  
\setlength{\parskip}{1cm plus4mm minus3mm}
```

In order to emphasize words/phrases one can use `\emph{}`. The emphasized text will be *cursive* if the rest of the text is upright/print, and the other way around.

Other possibilities for highlighting are:

- `\textbf{}` – **bold**
- `\textit{}` – *cursive* (as `\emph{}`)
- `\textsc{}` – SMALL CAPITALS
- `\underline{}` – underline



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

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

The listed examples are declarations (switches), which means they change the way the text to follow is printed. Another way to implement this is using it within an environment or braces. For example:

```
\begin{Large} ... \end{Large}
```

- There are three different listing environments:
  - `itemize` for unnumbered lists
  - `enumerate` for numbered lists
  - `description` for lists based on keywords (as it is in a dictionary)

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- There are three different listing environments:
  - `itemize` for unnumbered lists
  - `enumerate` for numbered lists
  - `description` for lists based on keywords (as it is in a dictionary)
- all three environments may be nested (even in combination)
- the structure of the environments is similar: a new item is created with `\item`.

```
\begin{itemize}
  \item first
  \item second
    \begin{itemize}
      \item three
      \item nested
      \item items
        \begin{itemize}
          \item further
          \item nesting
        \end{itemize}
      \end{itemize}
    \end{itemize}
  \item third
\end{itemize}
```

- first
- second
  - three
  - nested
  - items
    - \* further
    - \* nesting
- third

```
\begin{enumerate}
  \item first
  \item second
    \begin{enumerate}
      \item different
      \item level
      \item[x)] customized
      \item continued
      \item counting
    \end{enumerate}
  \item third
\end{enumerate}
```



1. first
2. second
  - a) different
  - b) level
  - x) customized
  - c) continued
  - d) counting
3. third

```
\begin{description}
  \item[First Term] Description of term.
  \item[Second Term] Description of term.
    \begin{description}
      \item[First Minor Term] Description
        of term.
      \item[Second Minor Term] Description
        of term.
      \item[Third Minor Term] Description
        of term.
    \end{description}
  \end{description}
\end{description}
```

**First Term** Description of term.

**Second Term** Description of term.

**First Minor Term** Description of term.

**Second Minor Term** Description of term.

**Third Minor Term** Description of term.

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Character	Code	Result
Single Quotation Marks	<code>'Example'</code>	'Example'
Quotation Marks	<code>"Example"</code>	"Example"
Apostrophe	<code>'</code>	'
Hyphen	<code>-</code>	-
En dash	<code>--</code>	—
Em dash	<code>---</code>	—
Ellipsis	<code>\dots</code>	...

Character	Code	Result
Enforced space	Mr.\ Smith	Mr. Smith
Non-breaking space	Fig.\~1	Fig. 1
Small non-breaking space	10\,%	10 %
Hyphenation	computa\-tional	computational

The *non-breaking space* prevents  $\text{\LaTeX}$  from breaking the text at this point.

For some characters a preceding `\` is necessary:

<b>Code</b>	<code>\%</code>	<code>\_</code>	<code>\\$</code>	<code>\&amp;</code>	<code>\#</code>	<code>\{</code>	<code>\}</code>
<b>Result</b>	<code>%</code>	<code>_</code>	<code>\$</code>	<code>&amp;</code>	<code>#</code>	<code>{</code>	<code>}</code>

Backslash is created with `\textbackslash`.