LaTeX tutorial

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Main sources of information

Strong inspiration from Amandine Decker's classes (2022-2023), with her consent.

https://fr.overleaf.com/learn

Just the basics in this session, but feel free to explore!

Before we start

- Who has heard about LaTeX?
- Who already knows how to create documents with LaTeX?

This session (3h): theory, small break, then practice

What is LaTeX?

Document structure

Essential commands – to fill in your documents

Bibliography and citations

Some useful packages

Hands-on: fill in this document to make it look like the PDF!

LaTeX

- Pronounced LAY-tek or LAH-tek
- A markup **language** (like HTML or Markdown)
- And a typesetting **system**
- With a set of ready-made commands
- With a separation between form and content (two parallel "tabs")

Why use LaTeX?

To **easily** create documents that are:

- pretty
- clean
- with a very practical **bibliography** management system!
- and many, already made, available templates (for articles, theses, slides, ...) in .zip

You will deal with: `.tex`, `.bib` that are compiled into a **PDF**.

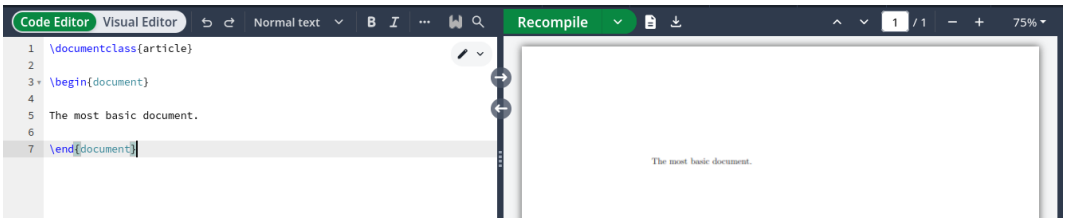
Note: you will need to make your Supervised project report and your M2 thesis in Latex.

Where/how to use LaTeX?

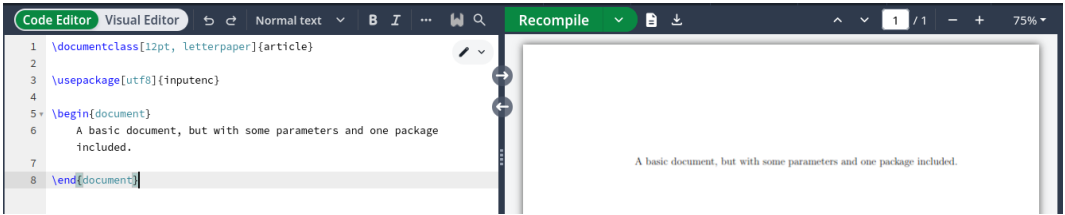
- On Overleaf (online, collaborative, compiles for you)
- On `https://plmlatex.math.cnrs.fr/` ("copy" of Overleaf but fully free, by the CNRS, for universities/research)
- Locally (with VSCode, TeXStudio, ...)

Let's make a document from scratch, `main.tex`

You can either start from scratch (blank document), or from a .zip template.



Let's make a document from scratch, `main.tex`



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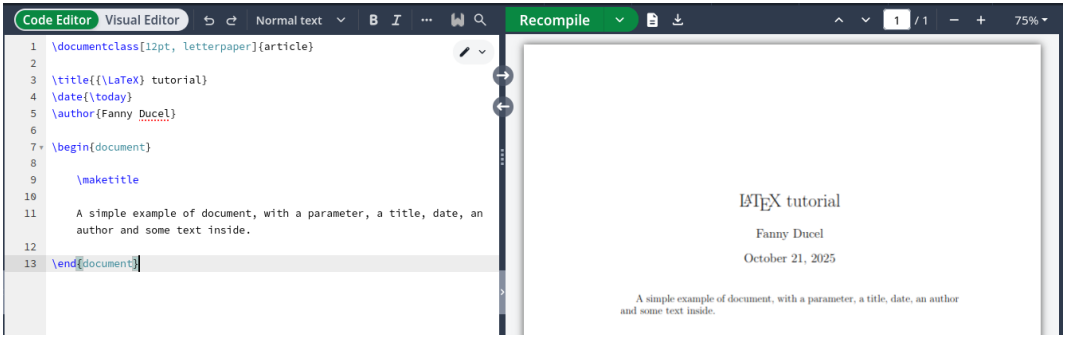

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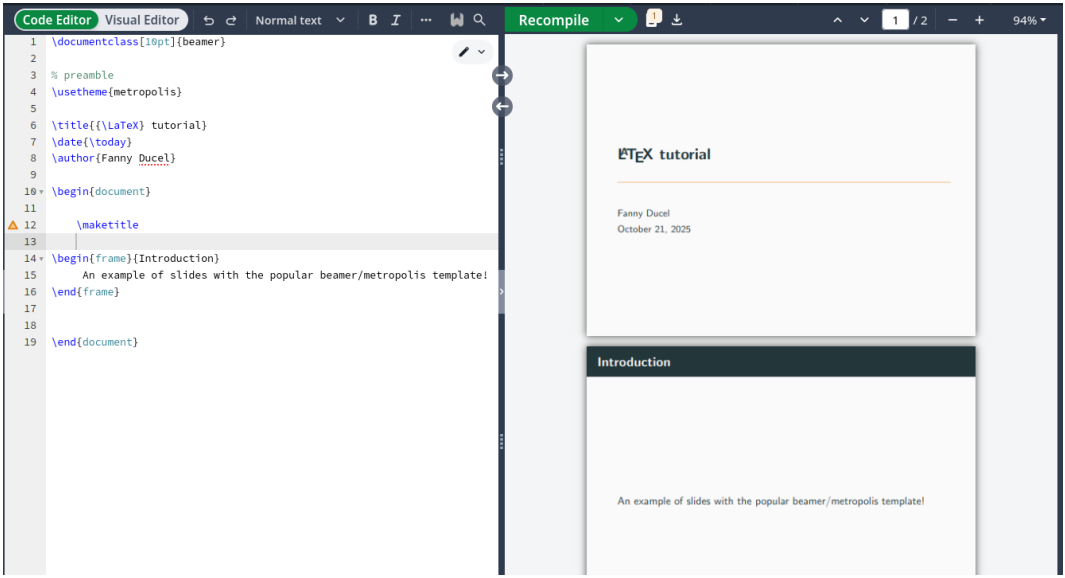

Preamble

In previous examples, we added more and more elements before the `\begin{document}`. It is called the **preamble**. It contains:

- the `\documentclass[]{}`: *article, book, report, beamer*, ... (+ optional parameters, for example about font, in [ ])
- the imported packages: with `\usepackage{}`
- the title of the document
- its authors (and their institutions)
- the date

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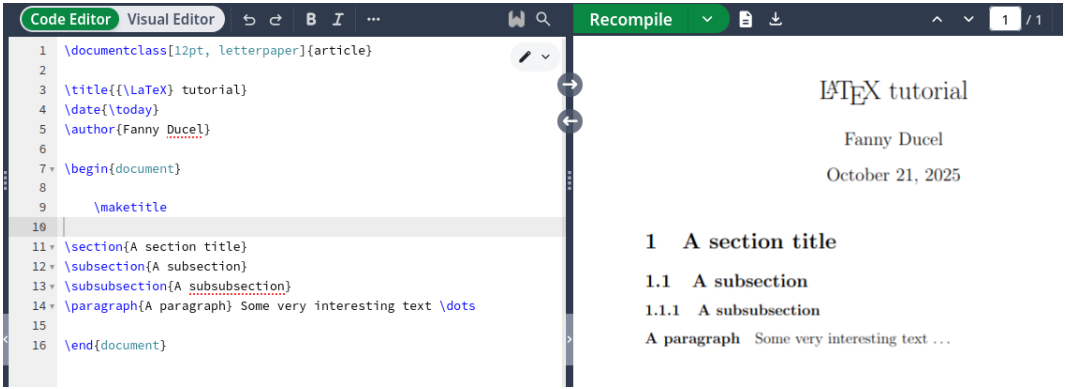
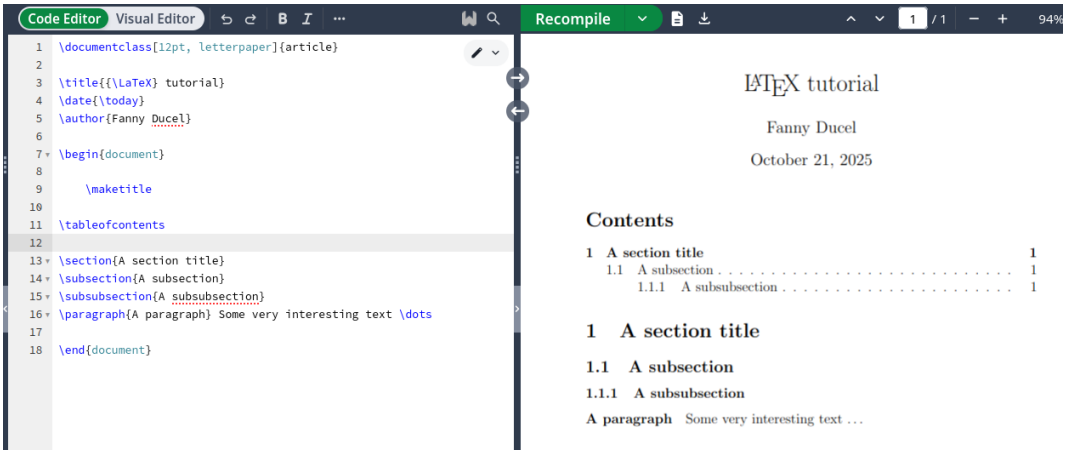
Document structure



Document structure and automatic table of contents



Text formatting

`\textbf{Bold text}` → **Bold text**

`\textit{Italics}` → *Italics*

`\textsc{Small caps}` → SMALL CAPS

`\underline{Underlined}` → Underlined

`\texttt{Teletype/typewriter font}` → `Teletype/typewriter font`

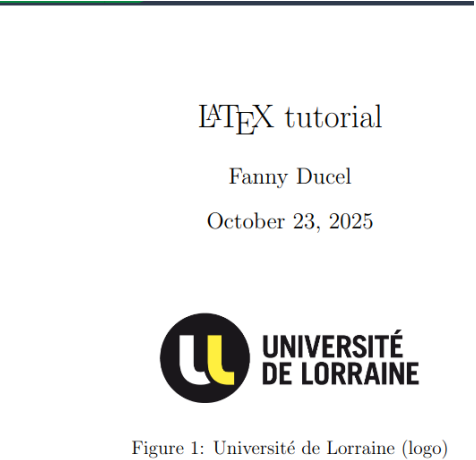
`\textcolor{red}{Some colored text}` → Some colored text

Text size – https://www.overleaf.com/learn/latex/Font_sizes%2C_families%2C_and_styles

\tiny	Lorem ipsum
\scriptsize	Lorem ipsum
\footnotesize	Lorem ipsum
\small	Lorem ipsum
\normalsize	Lorem ipsum
\large	Lorem ipsum
\Large	Lorem ipsum
\LARGE	Lorem ipsum
\huge	Lorem ipsum
\Huge	Lorem ipsum

Images – figure environment

```latex
\documentclass[12pt, letterpaper]{article}
\usepackage{graphicx}

\title{{\LaTeX} tutorial}
\date{\today}
\author{Fanny Ducel}

\begin{document}

    \maketitle

\begin{figure}[h]
    \centering
    \includegraphics[width=0.5\linewidth]{img/univ_lorraine.png}
    \caption{Université de Lorraine (logo)}
    \label{fig:logo_ul}
\end{figure}

The university's logo is presented in Figure~\ref{fig:logo_ul}.

\end{document}
```



Images – figure environment (step by step)

1. import the graphicx package: `\usepackage{graphicx}`

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2. `\begin{figure}[h]` with the desired figure's location in [ ]

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3. you can add `\centering`

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4. `\includegraphics[]{}` with size between [ ] and path to file between { } (`png`, `pdf`, `jpeg`, `eps`)

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5. a caption `\caption{Description...}`

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7. `\end{figure}`

Tables – tabular

```latex
\begin{table}[h]
    \centering
    \begin{tabular}{|c|c|}
    \hline
    \textbf{Col 1}     & \textbf{Col 2} \\
    \hline
    Cell 1    & Cell 2 \\
    \hline
    \end{tabular}
    \caption{A simple table.}
    \label{tab:example}
\end{table}
```

Col 1	**Col 2**
Cell 1	Cell 2

Table 1: A simple table.

Tables – `tabular` (step by step)

1. `\begin{table}[h]` environment, with location in [ ] (// figures)

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   - each "|" symbol represents a vertical line

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   - each letter represents a column and its alignment: `c` (center), `r` (right), or `l` (left)

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4. We fill the table line by line, separating values with a `&`, and indicating the end of the line with `\\`

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4. We fill the table line by line, separating values with a `&`, and indicating the end of the line with `\\`
5. Then we `\end{tabular}`
6. We can add a caption and a label (// figures)

Tables – `tabular` (step by step)

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2. `\begin{tabular}{|c|c|}` where:
   - each "`|`" symbol represents a vertical line
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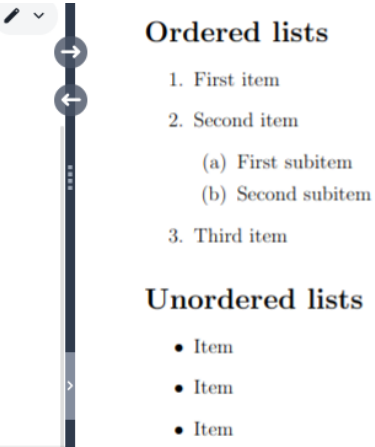
3. `\hline` is used to add a horizontal line
4. We fill the table line by line, separating values with a `&`, and indicating the end of the line with `\\`
5. Then we `\end{tabular}`
6. We can add a caption and a label (// figures)
7. We close the table: `\end{table}`

Lists – enumerate and itemize

```latex
\section*{Ordered lists}
\begin{enumerate}
    \item First item
    \item Second item
    \begin{enumerate}
        \item First subitem
        \item Second subitem
    \end{enumerate}
    \item Third item
\end{enumerate}

\section*{Unordered lists}
\begin{itemize}
    \item Item
    \item Item
    \item Item
\end{itemize}
```



Ordered lists

1. First item
2. Second item
   (a) First subitem
   (b) Second subitem
3. Third item

Unordered lists

- Item
- Item
- Item

Equations and formulas

Inline: `$a^2 + b^2 = c^2$` → $a^2 + b^2 = c$

Display: `\begin{equation} a^2 + b^2 = c^2 \end{equation}`

$$a^2 + b^2 = c \tag{1}$$

Table of contents, glossaries, index, footnotes . . .

Earlier, we saw: `\tableofcontents`

You can also have `\listoftables`, `\listoffigures`

You can also make glossaries, index, ... with the corresponding packages (see https://www.overleaf.com/learn/latex/Glossaries, https://www.overleaf.com/learn/latex/Indices)

And use `\footnote{This is a footnote.}` [1]

[1] This is a footnote.

Misc: comments, hyperlinks, linebreaks, symbols

Comments: with **%**, everything that follows it on the line won't be displayed.

Hyperlinks: `\url{www.overleaf.com}` → www.overleaf.com or
`\href{www.overleaf.com}{Overleaf}` → Overleaf[2]

Linebreaks: Double line break ("Enter"), or `\\` (no indent though)

Pagebreaks: `\newpage`, everything that follows will be on... a new page

Spaces: `\hfill`, `\vspace{1cm}`, `\hspace{1cm}`

Symbols (arrows, operators, greek letters, ...):
`$\alpha, \Rightarrow, \cap, \neq, \infty$` → $\alpha, \Rightarrow, \cap, \neq, \infty$

[2] You will need the href package.

Bibliography management – `biblio.bib`

You will need to create `.bib` files that contain `bibtex` entries like this:

Key (used for citations commands)

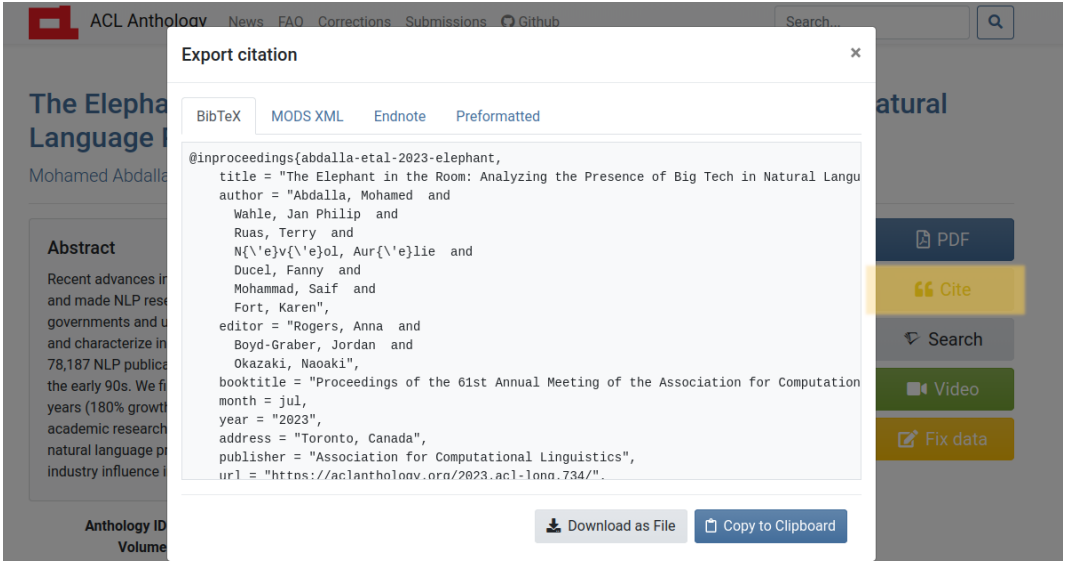
Type of document:

- *inproceedings*: articles in conferences with proceedings
- *article*: journal article
- *book*
- *online*
- *thesis*
- *misc*

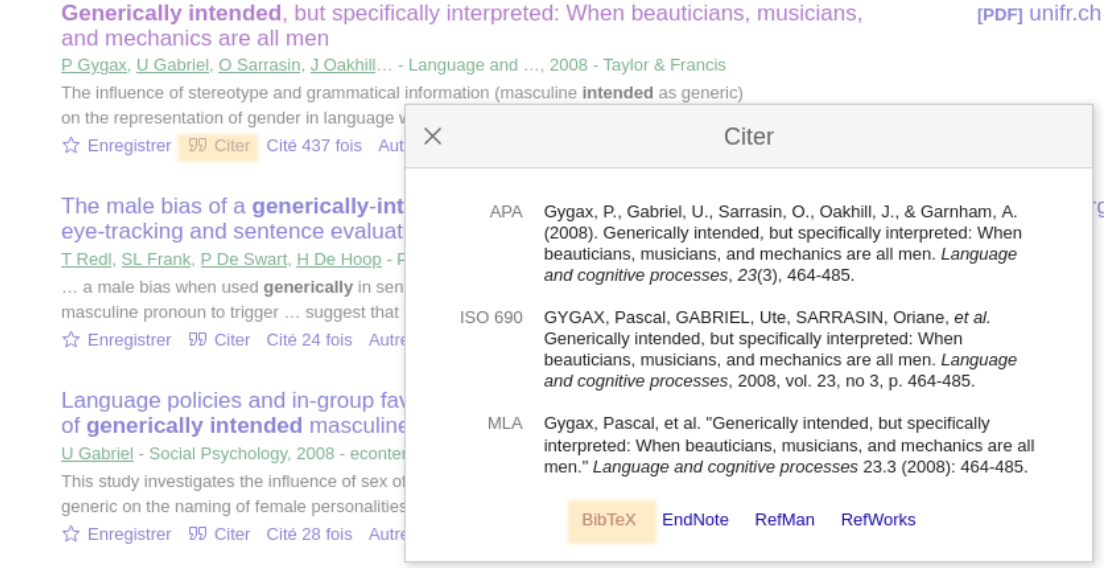
...

```
@inproceedings{bannour-etal-2021-evaluating,
    title = "Evaluating the carbon footprint of {NLP} methods: a survey and
    analysis of existing tools",
    author = "Bannour, Nesrine  and
      Ghannay, Sahar  and
      N{\'e}v{\'e}ol, Aur{\'e}lie  and
      Ligozat, Anne-Laure",
    booktitle = "Proceedings of the Second Workshop on Simple and Efficient
    Natural Language Processing",
    month = nov,
    year = "2021",
    address = "Virtual",
    publisher = "Association for Computational Linguistics",
    url = "https://aclanthology.org/2021.sustainlp-1.2",
    doi = "10.18653/v1/2021.sustainlp-1.2",
    pages = "11--21"
}
```

Bibliography management – how to find `bibtex` entries? ACL Anthology



Bibliography management – how to find `bibtex` entries? Google Scholar



Bibliography management – bib commands

Commands depend on the used template/package:

`\usepackage{natbib}` in the preamble
`\bibliographystyle{apalike}` with the desired bibliography style[3], at the end of the document
`\bibliography{biblio}` with the name of the `bib` file between { }, at the end of the document

OR: (in the Supervised Project template)
`\addbibresource{example.bib}` in the preamble (along with the package import)
`\printbibliography[heading=bibintoc]` at the end of the document

[3] See https://www.overleaf.com/learn/latex/Bibtex_bibliography_styles.

Bibliography management – output

```
\bibliography{biblio}
\bibliographystyle{apalike}
\end{document}
```

References

Bannour, N., Ghannay, S., Névéol, A., and Ligozat, A.-L. (2021). Evaluating the carbon footprint of NLP methods: a survey and analysis of existing tools. In *Proceedings of the Second Workshop on Simple and Efficient Natural Language Processing*, pages 11–21, Virtual. Association for Computational Linguistics.

Bender, E. M., Gebru, T., McMillan-Major, A., and Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, FAccT '21, page 610–623, New York, NY, USA. Association for Computing Machinery.

Strubell, E., Ganesh, A., and McCallum, A. (2019). Energy and policy considerations for deep learning in NLP. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, pages 3645–3650, Florence, Italy. Association for Computational Linguistics.

Citations – knowing when to use which command

`\cite{bender-stochastic}` → Bender et al. (2021)
⇒ For textual citations, when the authors' name(s) are part of the text: "As mentioned in Bender et al. (2021), . . . "

`\citet{bender-stochastic}` → Bender et al. (2021)
⇒ Same as `\cite{}`, can sometimes render slightly differently depending on the template/package.

`\citep{bender-stochastic}` → (Bender et al., 2021)
⇒ For parenthetical, more indirect citations: "The image of stochastic parrots (Bender et al., 2021) is used...", "Previous research efforts show that ethics is important (Bender et al., 2021)."

Some useful packages

- `graphicx`: seen earlier, for figures
- `xcolor`: to add colors to documents
- `babel`: to choose the language(s) of the document and automatically translate automatic titles (table of content, ...), change date format, ...
- `geometry`: for page layout control
- `subcaption`: for subfigures
- `multirow`: for advanced tables
- ...

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Small break?

10 minutes

Copy the Overleaf project

We will work on the template that you should use for the Supervised project report (cf. Arche): https://www.latextemplates.com/template/masters-doctoral-thesis.

1. Create an account on Overleaf (or PLM Latex).
2. Download the .zip on my website
3. Create a new project, select "upload project" and select the .zip file that you just downloaded.
4. Start filling in the `.tex` files, so that it looks like `result.pdf`
5. Note: Don't write text yourself, paste directly from the `.md` file (but add the formatting)

Note/tip: to keep a long document clean, we usually work on different `.tex` file (one per chapter for example), and put them together in the `main.tex` with `\include{chapter1}`

Collaborative correction?

Join the project: https://tinyurl.com/ycxj4sjj
The correction will also be made available on my website after the class.

Bender, E. M., Gebru, T., McMillan-Major, A., and Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? In Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency, FAccT '21, page 610–623, New York, NY, USA. Association for Computing Machinery.