

# Coding Hours

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**TeX Workshop**

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# What is $\text{\LaTeX}$ ?

- Tool used to create professional-looking documents
  - Research papers
  - Presentations
  - CV's
- Pronounced as *LAY-tek* or *LAH-tek*
- WYSIWYM: What You See Is What You Mean
  - Focus on contents of your document
  - Automatic formatting

# Why learn $\text{\LaTeX}$ ?

- Standard for scientific documents
- Quickly tackle the most complicated parts of typesetting
  - Mathematics
  - Tables of Contents
  - Referencing and creating bibliographies
- Consistent layout

# Why learn $\text{\LaTeX}$ ?

- Excellent package support
- Standardized documents
- Hundreds of **templates** available
- Great community support

# How to learn $\text{\LaTeX}$ ?

- Start with a **tutorial**
- Learn by doing
- Focus on learning what you need
- Google and **StackOverflow** are your best friends

## Creating your first working file

- Create an **Overleaf** account
- Under '*My Projects*' start a 'Blank project' and give it a name

**TIP:** Why do the work yourself? Use **templates**!

# Analyzing your first document

```
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3
4 \title{PROJECT_NAME}
5 \author{AUTHOR_NAME}
6 \date{MONTH_YEAR}
7
8 \begin{document}
9
10 \maketitle
11
12 \section{Introduction}
13
14 \end{document}
```

- The content, also known as the *body* of the document, is written in the *document environment*.
- Environments start with *begin{ENV\_NAME}* and end with *end{ENV\_NAME}*.
- Meta data, settings and information about the document, is written above the document environment.

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- The first line of code declares the type of document, known as the *class*.
- The class controls the overall appearance of the document.



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- The *usepackage* command is used to import external code.
- In this case, it imports *utf8* which is a collection of characters.
- Without including this, some characters such as Q and ß might not be supported.

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- The *maketitle* command prints the title to the document.
- The *title*, *author* and *date* command initialize the title, author and data used by the *maketitle* command, respectively.

**Exercise:** Try to change the title of the project and the name of the author and see what happens.

# Compiling your first document

- $\text{\LaTeX}$ code needs to be compiled to generate the output.
- To do this in Overleaf, simply hit '*Recompile*'.

**Exercise:** Recompile your file after having made some changes.

**TIP:** You can also set your project to automatically recompile when you edit your files, by clicking on the small arrow next to the '*Recompile*' button and set '*Auto Compile*' to '*On*'.

# Adding comments to your document

- It is often useful to include comments in your code.
- Comments are pieces of text you can include in the document which will not be printed.
- Comments start with a % symbol as is shown in the example on the right.

```
\begin{document}

\maketitle

We have now added a title, author and date to
our first \LaTeX{} document!

% This line here is a comment. It will not be
printed in the document.

\end{document}
```

My first LaTeX document

Hubert Farnsworth \*

January 2017

We have now added a title, author and date to our first  $\LaTeX$  document!

**Exercise:** Add two comments to the document; one in the preamble and one in the body of the document.

## Bold, italicised and underlined text

- **Bold:** Bold text is written with the `\textbf{...}` command.
- *Italics:* Italicised text is written with the `\textit{...}` command.
- Underline: Underlined text is written with the `\underline{...}` command.

**Exercise:** Add some text under `\section{Introduction}` and make a part of it bold, italicised and underlined. Next, try to make a part of the text both bold and italicised.

# Structuring your document

- LaTeX allows users to structure their documents with a variety of hierarchical constructs, including chapters, sections, subsections and paragraphs.

- The basic levels of depth are listed below:

0		<code>\chapter{CHAPTER_TITLE}</code>
1		<code>\section{SECTION_TITLE}</code>
2		<code>\subsection{SUBSECTION_TITLE}</code>
3		<code>\subsubsection{SUBSUBSECTION_TITLE}</code>
4		<code>\paragraph{PARAGRAPH_TITLE}</code>
5		<code>\subparagraph{SUBPARAGRAPH_TITLE}</code>

**Exercise:** Add more sections and subsections to your document and check how everything is formatted.

# Adding a Table of Contents

- To create the table of contents (ToC), use the `\tableofcontents` command.
- The ToC will be automatically updated when you make changes to your document.
- The depth of the ToC can be changed so that different levels of headings are listed.

**Exercise:** Add a table of contents at the top of your document.

## Time to practice!

- The best way to learn how to work with  $\text{\LaTeX}$  is by doing.
- In the remainder of this session, you can work on assignments that will get you familiar with the language.
- Before you start working on the assignments, please read through the following **tutorial**.



## Assignment 1 — Adding images

1. Read the **Adding images** and the **Captions, labels and references** sections in the linked tutorial.
2. Add an image to your document.
3. Resize the image to half the page width. (Note that you can use `0.5\pagewidth` to set the width)
4. Add a caption to your image.
5. Add a label to your image and add text in which you refer to the image below the image.

## Assignment 2 — Adding math

1. Read the **Adding math to L<sup>A</sup>T<sub>E</sub>X** section in the linked tutorial.
2. Add  $y = f(x)$  in your document in *inline* mode.
3. Now add the same, but do it in *display* mode.
4. Import the *amsmath* package and add the following mathematical expression to your document:

$$\mathbb{E}_X[X] = \int_{-\infty}^{\infty} x f_X(x) dx.$$

**TIP:** When you do not know the command for a symbol, draw it in **detexify** to find out!

## Assignment 3 — Adding tables

1. Read the **Creating tables** section in the linked tutorial.
2. Add the following table to your document:

1	2	3
4	5	6
7	8	9

**TIP:** The online **Tables Generator** can be a handy tool to create your tables.

## Assignment 3 — Adding tables (Cont'd)

4. Add the following table to your document:

Name	Score 1	Score 2	Score 3
Alan Turing	10	10	10
Steve Jobs	9	6	10

Table: Table of test scores.

Note that the first column is aligned to the left and the other columns are aligned in the center.

**TIP:** Most software packages and programming languages support generating  $\text{\LaTeX}$  tables. Examples are R, Stata, Python, Eviews, and Java.

## Assignment 4 — Adding references and citations

1. Read the **Bibliography management with natbib** article.
2. Add the '*The anatomy of a large-scale hypertextual Web search engine*' by Sergey Brin and Lawrence Page to your references and cite the paper in your document.

**TIP:** Overleaf can be linked to tools for references and citations such as **Mendeley** and **Zotero**.

## Assignment 5 — Working with templates

- Writing all documents from scratch is not very efficient.
- Fortunately, there are very elegant and well-structured templates available for you to use.
- Take a look at this [Masters/Doctoral Thesis](#) template and try to understand how it is structured.

## Recommended resources

- **Overleaf** offers the best documentation and tutorials for both beginners as well as more experienced  $\text{\LaTeX}$  users.
- Always work with templates! The **Overleaf templates repository** is a great place to start.
- Focus on learning what you need to write your documents.  $\text{\LaTeX}$  is huge and very complicated and therefore you will never fully understand it.

## Survey



<https://nl.surveymonkey.com/r/CSWEUR2019>

*Erasmus*