Introduction to Overleaf

Learning how to use Overleaf and LaTeX

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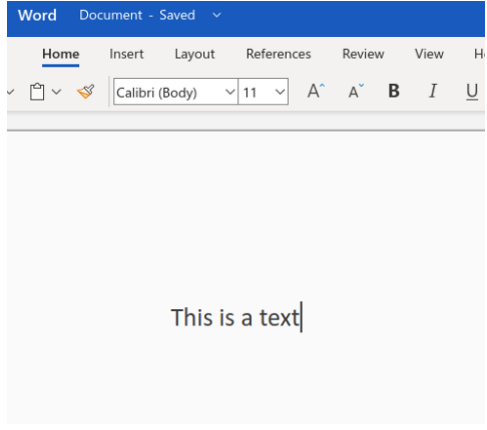
KAUST Library

Overleaf and LaTeX

Overleaf in their own words: "Overleaf is a startup and social enterprise that builds modern collaborative authoring tools for scientists — like *Google Docs for Science*. Our primary product is an online, real time collaborative editor for papers, theses, technical reports and other documents written in the *LaTeX markup language*."
Sounds good, but what is *LaTeX markup language*?

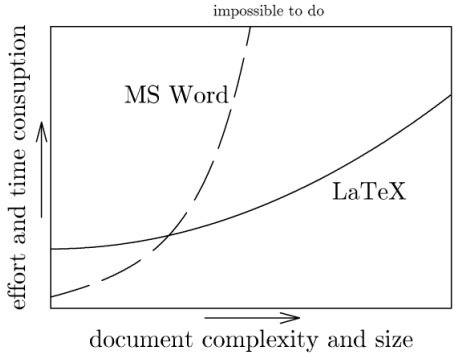
Text Processor vs Text Editor

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>

<h1>This is a Heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```



LaTeX and MS-Word

Why to consider LaTeX over Word?



Origins of LaTeX

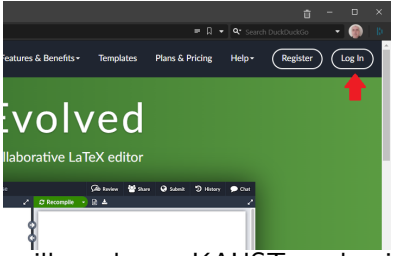
Donald E. Knuth created $\tau\varepsilon\chi$ (Tau Epsilon Chi) between 1977 and 1979.

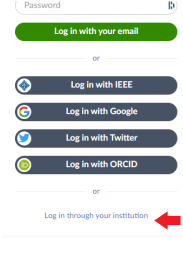
- Unhappy how his book looked after publisher changed from hot metal typesetting (19th century tech) to phototypesetting in 1960s.
- Greek word "Tekne" means "art, skill, craft in work," and it's the root for the word "technology."

Leslie Lamport extended TeX

- While using TeX he noticed could expand with macros
- Released his LaTeX macros between 1984 and 1985. He handed the control of LaTeX in 1989.

Logging in Overleaf

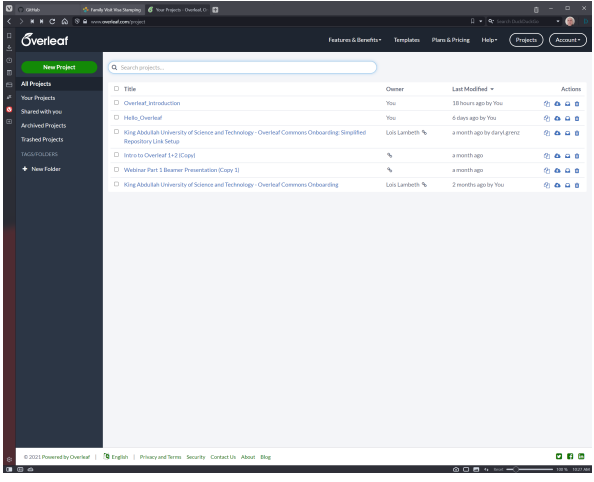




You will need your KAUST credentials for the login.

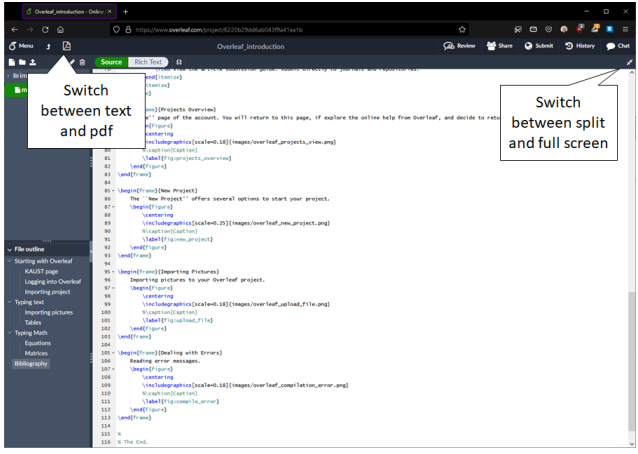
Projects Overview

"Home" page of the account. You will return to this page, if explore the online help from Overleaf, and decide to return to your projects. It's a shortcut.



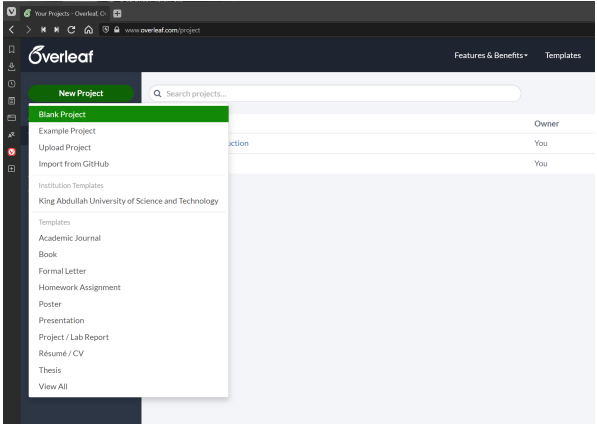
Split or Full Screen

Switching between split and full screen.



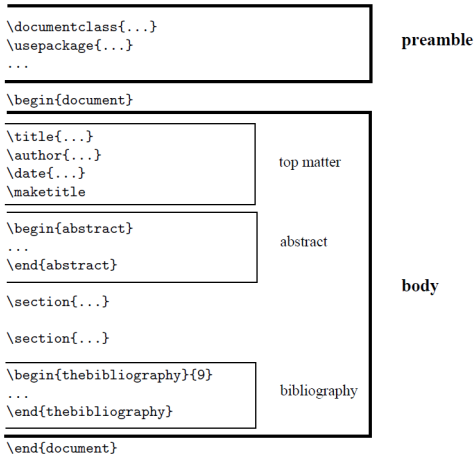
New Project

The “New Project” offers several options to start your project.



Document Structure

Structure of a LaTeX document.



The Preamble and Top Matter

The preamble and top matter of the document

- The `\documentclass[parameter]{class}` command marks the beginning of the document.
  - Parameter (optional): font and paper size, like `10pt` or `a4paper`
  - Class: the class of the document *book, report, article, letter*, etc.
  - For example, the KAUST template document class

```
\documentclass[onecolumn, 12 pt, doublespace, fullpage, a4paper]{report}
```

- To combine more then one author use `\and`, like `\author{John \and Mary}`.
- You can control the date that is displayed by giving an explicit date, like `\date{1st January 1970}`, or `\date{\today}`, or `\date{}` for no date.

Working with Text

- Several levels of sectioning: section, subsection, subsubsection, etc.
- Several font families

Specifier	Switches To
`\textnormal{}`	normal document text
`\emph{}`	*emphasis*
`\texttt{}`	`Typewriter style font family`
`\textit{}`	*italic text*
`\textbf{}`	**bold text**
`\textrm{}`	Roman font family
`\textsf{}`	Sans-serif font family

Example of Lists

```
\begin{itemize}
    \item We have the bullet list
    \begin{itemize}
        \item A nested list
    \end{itemize}
\end{itemize}
\begin{enumerate}
    \item We have numbered list
    \begin{enumerate}
        \item Another nested list
    \end{enumerate}
\end{enumerate}
\begin{description}
    \item[itemize:] is an unordered list
    \item[enumerate:] is an ordered list
\end{description}
```

- We have the bullet list
  - A nested list

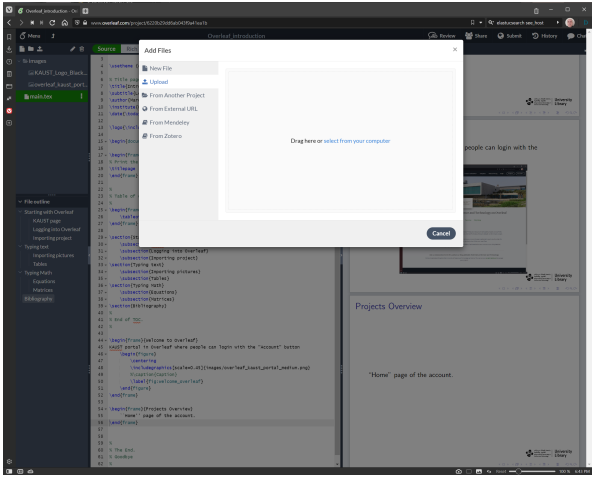
1. We have numbered list
   1.1 Another nested list

itemize: is an unordered list

enumerate: is an ordered list

Importing Pictures

Importing pictures to your Overleaf project.



Working with Pictures

Adding caption and setting the size of pictures

- Import the package `graphicx` to enable pictures in the document.
- You can specify the size of the pictures by scaling the pictures, like 10% of the original size, or by explicitly setting dimension.
- Give "hints" of the picture placement, with *h* for *here* or *t* for *top*.
- Use the caption to explain the picture
- By labeling the picture, you can reference it later in the document.

Example of Picture

```
\begin{figure}[ht]
    \centering
    \includegraphics[width=0.5\textwidth] <break>
       {bombetoka_aster_23aug00_lrg}
    \caption{An Otherworldly-Looking Bombetoka Bay,
      Madagascar}
    \label{fig:Bombetoka_Bay}
\end{figure}
```

Figure: An Otherworldly-Looking Bombetoka Bay, Madagascar

Working with Equations

Here is where LaTeX really shines! This is a huge topic, and we will cover only the basics.

- Load the packages `amssymb` and `latexsym`
- Inline math can type between the `$...$`, like `$\sqrt{5}$` will produce $\sqrt{5}$.
- Equations will be in the equation environment

```
\begin{equation}
   x = \sqrt{5}
\end{equation}
```

- Big and complex formulas require some planning

Examples of Equations

```
\begin{equation}\label{E:firstInt}
\int_{0}^{\pi} \sin x \, dx = 2
\end{equation}
```

$$\int_{O}^{\pi} \sin x \, dx = 2 \tag{1}$$

```
\begin{align}
r^{2}  &= s^{2} + t^{2},                \label{E:Pyth}\\
2u + 1 &= v + w^{\alpha},               \label{E:alpha}\\
x      &= \frac{y + z}{\sqrt{s + 2u}}; \label{E:frac}
\end{align}
```

$$r^2 = s^2 + t^2, \tag{2}$$

$$2u + 1 = v + w^{\alpha}, \tag{3}$$

$$x = \frac{y + z}{\sqrt{s + 2u}}; \tag{4}$$

```
\[
f(x)=
\begin{cases}
-x^{2},      &\text{if $x < 0$;}\\
\alpha + x, &\text{if $0 \leq x \leq 1$;}\\
x-{2},       &\text{otherwise.}
\end{cases}
\]
```

$$f(x) = \begin{cases} -x^2, & \text{if } x < O; \\ \alpha + x, & \text{if } 0 \leq x \leq 1; \\ x - 2, & \text{otherwise.} \end{cases}$$

```
\[
\overbrace{a + b + \cdots + z}^{n}
\]
```

$$\overbrace{a + b + \cdots + z}^{n}$$

Working with Tables

Creating tables in LaTeX

- Start simple with the `tabular` environment
- Define the alignment of columns, left (`l`), center (`c`) or right (`r`).
- Then add borders with `\hline` for horizontal lines and for vertical lines, define together with the header, like

  `{||c c c c||}`
- Add the `table` environment
- Finally finish the table environment by defining the adding caption and label.

Example Table

```
\begin{table}[h!]
    \centering
    \begin{tabular}{||c c c c||}
     \hline
     Col1 & Col2 & Col2 & Col3 \\ [0.5ex]
     \hline\hline
     1 & 6 & 87837 & 787 \\
     2 & 7 & 78 & 5415 \\
     3 & 545 & 778 & 7507 \\
     4 & 545 & 18744 & 7560 \\
     5 & 88 & 788 & 6344 \\ [1ex]
     \hline
    \end{tabular}
    \caption{Table to test captions and labels}
    \label{table:data}
\end{table}
```

Col1	Col2	Col2	Col3
1	6	87837	787
2	7	78	5415
3	545	778	7507
4	545	18744	7560
5	88	788	6344

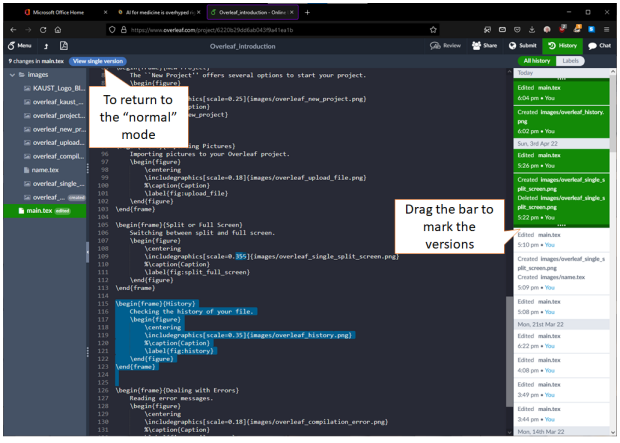
Table: Table to test captions and labels

Bibliography

- Add the package `biblatex`
- Specify the file with the bibliography entries
- You reference the citation with `\cite{...}`
- Several supported entries: books, articles, patents, proceedings, conference, etc
- Several styles of bibliography are supported: numeric, alphabetic authoryear, etc
- Specific bibliography style for some magazines like Nature, IEEE, Science, and others.
- Where do you want the bibliography list to appear, add the command `\printbibliography`.

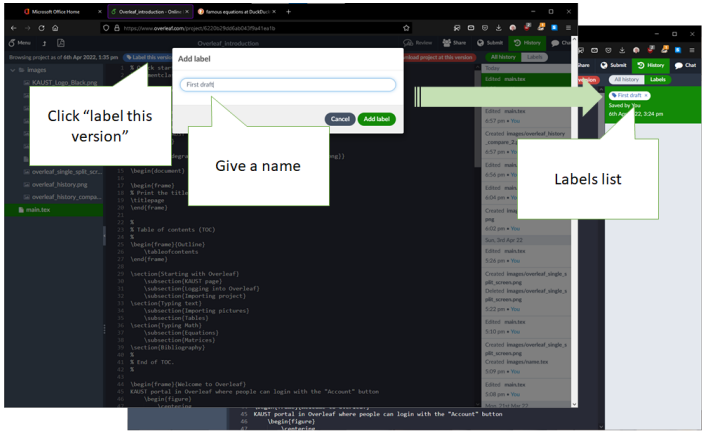
Comparing Versions

You can compare different versions of the document using the “History”.



Using Tags

Tag your versions to mark special versions.



Working Offline

- Working offline or with a collaborator that doesn't have Overleaf.
- Options for Dropbox, Git and Github.
- Using Github as example
  1. Create the project in Github
  2. Import into Overleaf as new project
  3. Remember to synchronize the two projects!! (Not automatic)

Dealing with Errors

Reading error messages.