# CSC236 Tutorial 1
# Introduction to LaTeX

FALL 2022: SEPT 12-13

# Overview

## 01 About Us & Housekeeping

TA introductions & how to prep for your first lecture

## 02 LaTeX & Overleaf

What is it ?

## 03 LaTeX & Overleaf

How to use it?

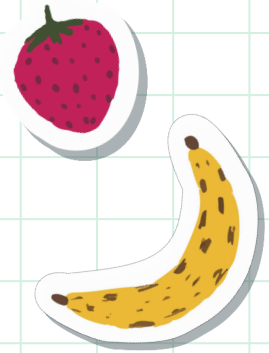
## 04 Activity

Tell us about yourself!

# 02

# LaTeX & Overleaf

What is it ?



## LaTeX

LaTeX is a tool used to create professional documents. Instead of writing your assignments by hand, you will be typing them on LaTeX.

## Overleaf

Overleaf is an online text editor for LaTeX. It is a great tool to type up your proofs and collaborate with your peers on CSC236 group assignments.

For example, the following statement was written in LaTeX:

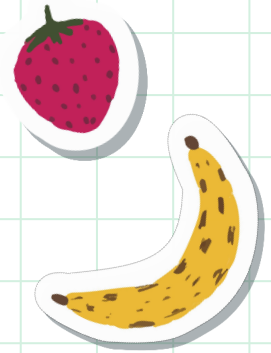
$$\textit{For all } n \in \mathbb{N}, \sum_{i=0}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$$

Overleaf

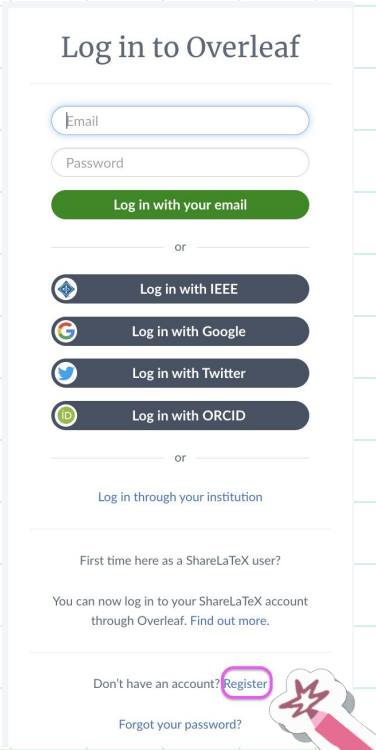
# 03

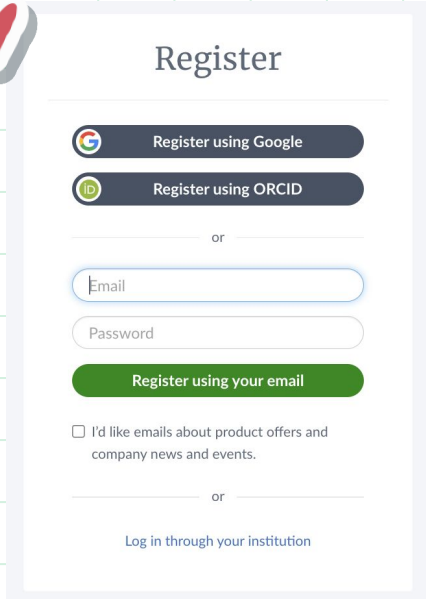
# LaTeX & Overleaf

How to use it?



# Creating an Overleaf account:

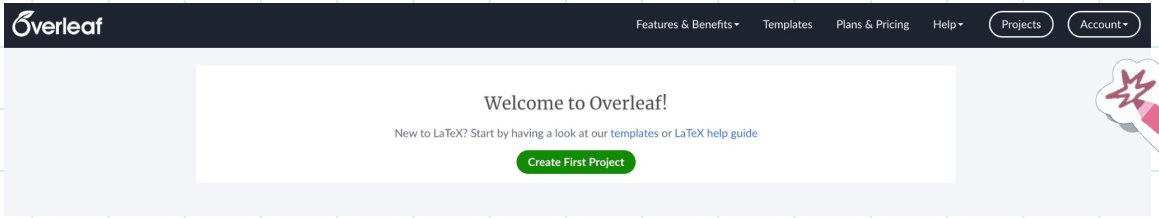


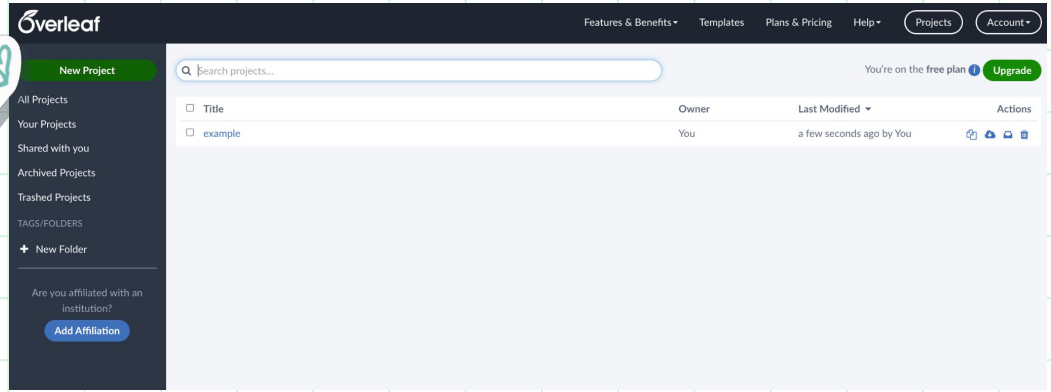

- **Optional**: You can register with your utoronto email

# Creating your first project:

- Follow the instructions on the screen after you register




- OR: If you only see the menu , use the **New Project** button



# LaTeX Basics: The Preamble

**Preamble:** The **text added before** the **start of a document** to define the type of document, language used, packages used etc...

```
1  \documentclass[12pt, letterpaper]{article}
2  \usepackage[utf8]{inputenc}
3
4  \title{My first LaTex project!!!}
5  \author{Ada Lovelace}
6  \date{September 12 2022}
7
8  \begin{document}
9
10 \maketitle
11 \end{document}
```

Defines the parameters of document. In this case **font size is 12pt**, paper size is defined by **letterpaper**, and the document is of **type article**

Encodes the document.

Defines the title of the document.

Defines the author of the document.

Defines the date of the document.

The **start of the document**

Refers to the title, author & date define in the preamble

The end of the document

# LaTeX Basics: The Preamble

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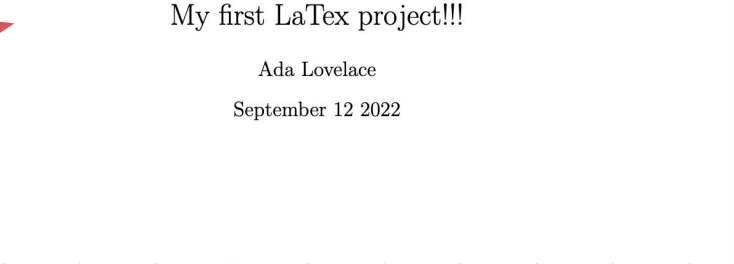
.tex




.pdf

# LaTeX Basics: Comments

**Comments:** In the case of LaTeX , just use **%**

```
% This is the preamble ------------------------------
\documentclass[12pt, letterpaper]{article}
\usepackage[utf8]{inputenc}

\title{My first LaTex project!!!}
\author{Ada Lovelace}
\date{September 12 2022}
% This is the end of the preamble ---------------------

\begin{document}
% Adding a comment within the document ...
% Hit the recompile button to see if this shows up!
\maketitle
\end{document}
```

My first LaTex project!!!

Ada Lovelace

September 12 2022

.tex

.pdf

# LaTeX Basics: bold, italics, & underlining

**Bold:** \textbf{the text to be bolded}
Underline: \underline{the text to be underlined}
*Italics:* \textit{the text to be Italicized}

***You can combine any of these properties!***

```
\begin{document}
We want \textbf{You} % bold
to \underline{succeed}  % underlined
in this \textit{course}!!! % italicized

We \textbf{\underline{have}} % bold and underlined
just combined these
\textbf{\textit{PROPERTIES}}. % bold and italicized
\end{document}
```

We want **You** to succeed in this *course*!!!
We **have** just combined these ***PROPERTIES***.

.tex

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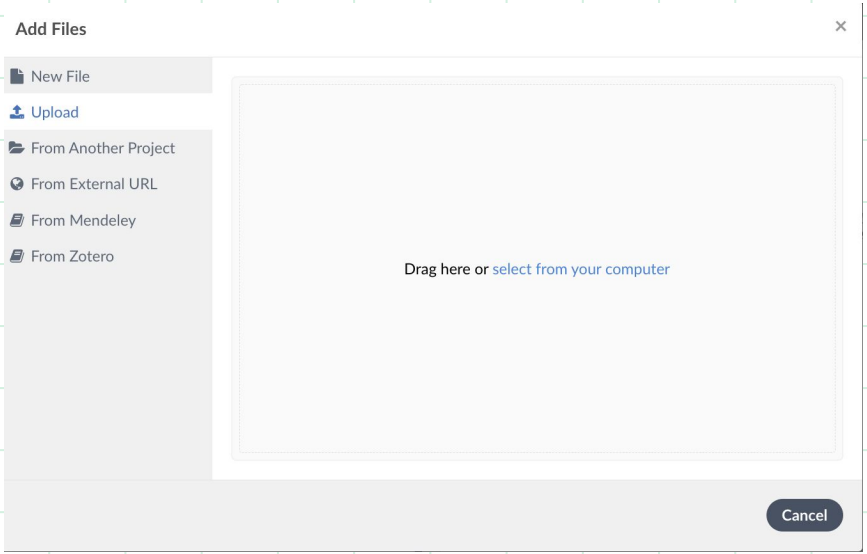
# LaTeX Basics: Adding images

**Step 1:** Upload the image onto overleaf

# LaTeX Basics: Adding images

**Step 2:** Add the graphix package in the preamble

```
1  \documentclass[12pt, letterpaper]{article}
2  \usepackage{graphicx}
3  \usepackage[utf8]{inputenc}
```

**Step 3:** Add the image into the document

```
5  \begin{document}
6  \begin{figure}
7    \includegraphics[width=\linewidth]{seal_of_approval.jpeg}
8    \caption{This is face of a happy seal}
9    \label{figure: When the code is perfect circa 2022}
10 \end{figure}
11 \end{document}
```

Name of image.

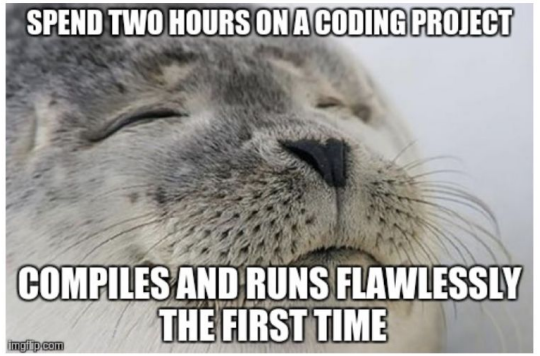



Figure 1: This is face of a happy seal

.tex

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# LaTeX Basics: Ordered Lists

**Ordered lists:** Produced using the itemize environment. Every entry is preceded with \item

```
5  \begin{document}
6  \begin{itemize}
7    \item This is the first item
8    \item This is the second item
9    \item This is the third item
10   \item This is the fourth item
11 \end{itemize}
12 \end{document}
```

- This is the first item
- This is the second item
- This is the third item
- This is the fourth item

.tex

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# LaTeX Basics: Ordered Lists

**Unordered lists:** Produced using the enumerate environment. Every entry is preceded with \item

```
5  \begin{document}
6      \begin{enumerate}
7        \item This is the first item
8        \item This is the second item
9        \item This is the third item
10       \item This is the fourth item
11     \end{enumerate}
12 \end{document}
```

.tex

1. This is the first item
2. This is the second item
3. This is the third item
4. This is the fourth item

.pdf

# LaTex Basics: Special characters

**How would you add these symbols on LaTex: %, &**

Note that % is used for comments and & is used in tables

```
\begin{document}
    % This is a comment
    and this is a percentage \%

    This is a random table \\

    \begin{tabular}{ |c|c|c| }
    \hline
     cell1 & cell2 & cell3 \\
     cell4 & cell5 & cell6 \\
     cell7 & cell8 & cell9 \\
     \hline
    \end{tabular} \\

    and this is how we use the special symbol in text \&
\end{document}
```

.tex

and this is a percentage %
This is a random table

| | | |
|---|---|---|
| cell1 | cell2 | cell3 |
| cell4 | cell5 | cell6 |
| cell7 | cell8 | cell9 |

and this is how we use the special symbol in text &

.pdf

# LaTeX Basics: Math

We will be doing a lot of proofs in CSC236!

To write these equations and expressions, we can wrap them in `$ ... $` or `\begin{math} ... \end{math}`. Here are some examples:

- `$x^2 + y^2 = z^2$` $x^2 + y^2 = z^2$
- `$x^{2 \alpha} - 1 = y_{ij} + y_{ij}$` $x^{2\alpha} - 1 = y_{ij} + y_{ij}$
- `$\sum_{i=1}^{\infty} \frac{1}{n^s} = \prod_p \frac{1}{1 - p^{-s}}$` $\sum_{i=1}^{\infty} \frac{1}{n^s} = \prod_p \frac{1}{1 - p^{-s}}$

# LaTeX Basics: Symbols

| Type | Code | Output |
| --- | --- | --- |
| Greek letters | \alpha \beta \gamma \rho \sigma \delta \epsilon | $\alpha\beta\gamma\rho\sigma\delta\epsilon$ |
| Binary Operators | \times \cup \cap | $\times \cup \cap$ |
| Relation Operators | < > \leq \geq \subset \supset \subseteq \supseteq | $< > \leq \geq \subset \supset \subseteq \supseteq$ |
| Number Types | \mathbb{R} \mathbb{Q} \mathbb{Z} \mathbb{N} | $\mathbb{R}\mathbb{Q}\mathbb{Z}\mathbb{N}$ |

# LaTeX Basics: Symbols

| Type | Code | Output |
| --- | --- | --- |
| Implications & Arrows | \implies \iff \leftarrow \rightarrow | $\Rightarrow \Leftrightarrow \leftarrow \rightarrow$ |
| Miscellaneous | \infty \forall \exists \neg \square | $\infty \forall \exists \neg \square$ |
| Summation & Product | \sum \prod | $\sum \prod$ |

# LaTeX Basics: Subscripts and Superscripts

Superscripts and subscripts are created using the characters ^ and _ respectively

| | |
|---|---|
| `Superscript: $x^2$` | $x^2$ |
| `Subscript: $x_1$` | $x_1$ |
| `Both: $x_1^2$` | $x_1^2$ |

# LaTeX Basics: Brackets and Parentheses

| Type | Code | Output |
| --- | --- | --- |
| Parentheses | (x+y) | (x+y) |
| Square brackets | [x+y] | [x+y] |
| Curly brackets | \{x+y\} | {x+y) |
| Angle brackets | \langle x+y \rangle | ⟨x+y⟩ |
| Pipes | \|x+y\| | \|x+y\| |

# LaTeX Basics: Fractions

For these commands to work, you will need to have \usepackage{amsmath}

Fractions can be written using \frac{numerator}{denominator}

For example \frac{1}{2} $\frac{1}{2}$

They can also be nested \frac{1}{\frac{1}{3}} $\frac{1}{\frac{1}{3}}$

Or even \frac{1+\frac{a}{b}}{1+\frac{1}{1+\frac{1}{a}}} $\frac{1+\frac{a}{b}}{1+\frac{1}{1+\frac{1}{a}}}$

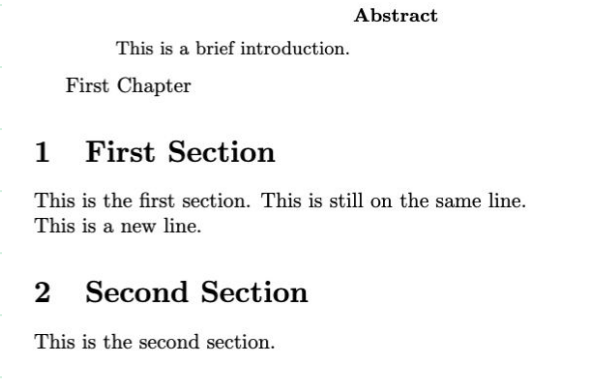
# LaTeX Basics: Formatting

- The **abstract** environment: a brief overview of the document
- Use \\ or \newline for a new line
- Press 'Enter' twice to start a new paragraph
- Use \chapter to denote a chapter and \section to break it down (or even \subsection)

```
\begin{abstract}
This is a brief introduction.
\end{abstract}

\chapter{First Chapter}

\section{First Section}
This is the first section.
This is still on the same line. \\
This is a new line.
\section{Second Section}
This is the second section.
```



**Abstract**

This is a brief introduction.

First Chapter

## 1 First Section

This is the first section. This is still on the same line.
This is a new line.

## 2 Second Section

This is the second section.

# LaTeX Basics: Tables

Creating a simple table:

- { |c|c|c| } specifies 3 columns with vertical borders around them.
- { c c c c } would specify 4 columns without vertical borders.
- \hline specifies a horizontal border
- You can use https://www.tablesgenerator.com/ to generate tables and export the code LaTeX.
- You can also add a \caption and a \label

```
\begin{center}
\begin{tabular}{ |c|c|c| }
 \hline
 Course Code & Course Name & Instructor \\
 \hline
 CSC236 & Introduction to the Theory of Computation & Michael Liut \\
 CSC207 & Software Design & Sonya Allin \\
 \hline
\end{tabular}
\end{center}
```

| Course Code | Course Name | Instructor |
|---|---|---|
| CSC236 | Introduction to the Theory of Computation | Michael Liut |
| CSC207 | Software Design | Sonya Allin |