



# An Interactive Introduction to $\text{\LaTeX}$

## TLC Workshop

Haziq Jamil  
Mathematical Sciences, Faculty of Science, UBD  
<https://haziqj.ml>

Wednesday, 23 November 2022

# Overview

Hello World  
Getting started  
Mathematics

Figures and others  
Document structure  
Bibliography

# Why L<sup>A</sup>T<sub>E</sub>X?

- It makes beautiful documents
- Open source and active community. Lots of packages available.
- Extensible document types (articles, presentation slides, books, theses, exam papers, etc.)

# How does it work?

- You write your document in plain text with commands that describe its structure and meaning.
- The  $\text{\LaTeX}$  program then processes your text and commands to produce a beautifully formatted document.

The rain in Spain falls \emph{mainly} on the plain.

The rain in Spain falls *mainly* on the plain.

# More examples of commands and output...

```
\begin{itemize}
  \item Tea
  \item Milk
  \item Biscuits
\end{itemize}
```

- Tea
- Milk
- Biscuits

```
\begin{figure}
  \includegraphics{gerbil}
\end{figure}
```

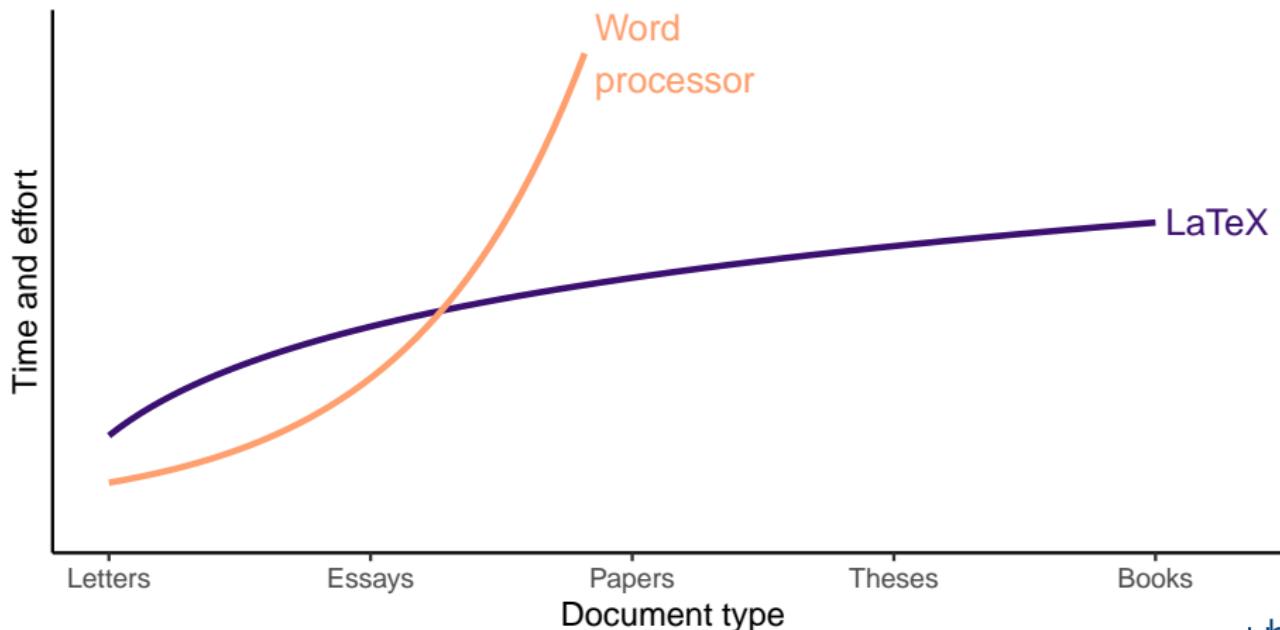


```
\begin{equation}
y = \alpha + \beta x
\end{equation}
```

$$y = \alpha + \beta x \quad (1)$$

# Attitude adjustment

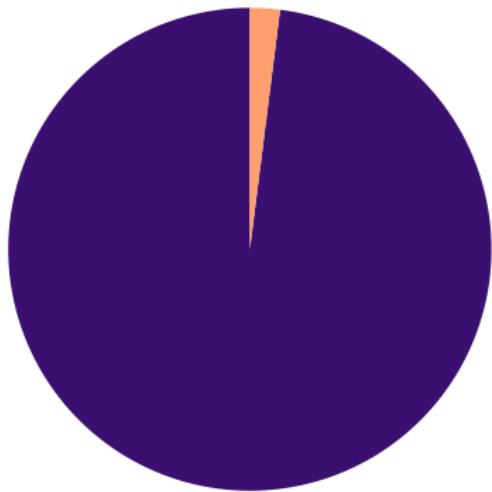
- Use commands to describe ‘what it is’ and not ‘how it looks’
- Focus on your content
- Let `LATEX` do its job



# Things that it solves: Picture alignment/placement

LATEX takes care of figure placements automatically.

Moving a picture in MS Word



- You mess up the whole document
- It actually does what you want



College Student  
@CollegeStudent

using microsoft word

\*moves an image 1 mm to the left\*

all text and images shift. 4 new pages appear. in the distance, sirens.

10:12 AM · Sep 24, 2017 · Twitter Web Client

52.3K Retweets 1,694 Quote Tweets 171.8K Likes

💬⤻❤️

# Things that it solves: References and bibliography

Sometimes, however, what others tell us is important as *corroboration* of what we have already found out (or think we have found out) for ourselves. The Scottish philosopher Thomas Reid makes this point in connection with mathematical research in the belief that, if it applies to the science ‘in which, of all sciences, authority is acknowledged to have least weight’ [2], it will be even more significant in other areas of thought and practice... Russell, as we shall see in a later chapter, considered this aspect of our reliance upon testimony essential to the understanding of what it is to be a physical thing and he criticized logical positivism for its failure to appreciate the implications of this point [4]. In the Analysis of Matter he says explicitly, ‘I mean here by “objective” not anything metaphysical but merely “agreeing with the testimony of others”’ [3].

Excerpt from *Testimony: A Philosophical Study* by C. A. J. Coady (1992)

# References

- [1] C. A. J. Coady. *Testimony: A philosophical study*. Clarendon Press, 1992.
- [2] T. Reid, D. Brookes, and K. Haakonssen. "Thomas Reid: Essays on the Intellectual Powers of Man." In: *Thomas Reid-Essays on the Intellectual Powers of Man*. Edinburgh University Press, 2002.
- [3] B. Russell. "Analysis of Matter (1927)." In: *Consciousness in the Physical World: Perspectives on Russellian Monism* (2015), p. 29.
- [4] B. Russell. *Logic and knowledge: Essays 1901-1950*. Spokesman Books, 2007.

# Things that it solves: Mathematical equations

Typesetting mathematics and equation referencing.

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## Theorem 1 (Central Limit Theorem)

Let  $X_1, \dots, X_n$  be an independent random sample from a distribution whose mean is  $\mu$  and variance is  $\sigma^2$ . Then  $\bar{X}_n := \frac{1}{n} \sum_{i=1}^n X_i$  converges in distribution to a random variable whose density function is

$$f(x) = \frac{1}{\sqrt{2\pi}} \exp \left[ -\frac{1}{2} \left( \frac{x - \mu}{\sigma/\sqrt{n}} \right)^2 \right] \quad (2)$$

The proof of Theorem 1 uses *characteristic functions*, whereby the standardised version of (2) is obtained in the limit.

# A chemistry example

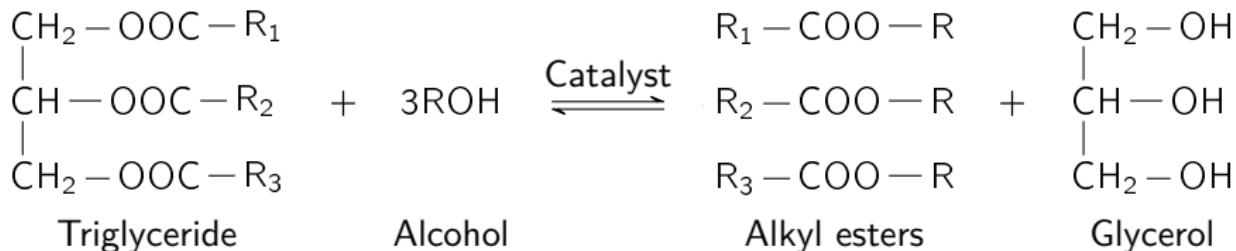
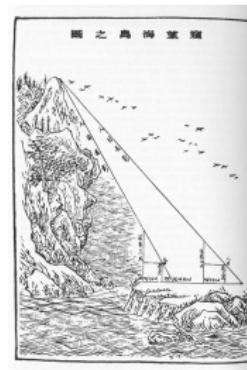


Figure 1: Transesterification of triglyceride with alcohol.

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Figure 1 obtained from <https://tex.stackexchange.com/a/472486>

# Languages



الْكِتَابُ الْمُخْتَصِّرُ فِي حِسَابِ الْجَبْرِ وَالْمُقَابَلَةِ  
(The Compendious Book on  
Calculation by Completion and  
Balancing), also known as  
الْجَبْرِ (Al-Jabr), written by  
مُحَمَّدْ بْنُ مُوسَى (Muhammad ibn Mūsā  
al-Khwārizmī) around 820 CE.

海岛算经 (Hǎidǎo suàn jīng—The Sea Island Mathematical Manual) was written by 刘徽 (Liú Huī) ca. 200 CE. The Chinese were aware of a good approximation of  $\pi \approx 355/113 = 3.1415929204$  very early on (祖冲之 Zǔ Chōng Zhī, 500 CE).

# For teaching

- Setting of question papers (assignments, tests, exams, etc.)
- Syllabus documents
- Presentations

Hello World

**Getting started**

Mathematics

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# Getting started

## A minimal $\text{\LaTeX}$ document

```
\documentclass{article}  
\begin{document}  
Hello, World! % your content goes here...  
\end{document}
```

- Commands start with a backslash \
- Every document starts with a \documentclass command
- The *argument* in curly braces { } tells  $\text{\LaTeX}$  what kind of document we are creating (in this case, an article)
- A percent sign % starts a *comment*— $\text{\LaTeX}$  will ignore the rest of the line

# Getting started

Overleaf



[https://www.  
overleaf.com/](https://www.overleaf.com/)

## Exercise 1

1

- Overleaf is a website for writing documents in  $\text{\LaTeX}$
- It ‘compiles’ your  $\text{\LaTeX}$  document online to show you the results
- As we go through the following slides, try out the examples by typing them into the example document on Overleaf!

Reminder

Sign up for Overleaf

# Exercises

Hello World

Getting started

## Mathematics

Figures and others

Document structure

Bibliography

Hello World

Getting started

Mathematics

## **Figures and others**

Document structure

Bibliography

Hello World

Getting started

Mathematics

Figures and others

**Document structure**

Bibliography

Hello World

Getting started

Mathematics

Figures and others

Document structure

Bibliography