



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

TLC Workshop

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# Overview

Hello World

Getting started

# 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 `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}
```

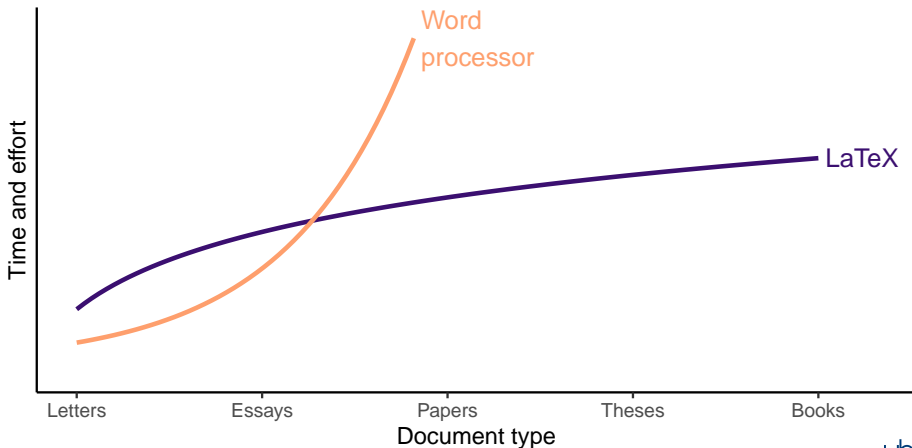


```
\begin{equation}
y = \alpha + \beta x
\end{equation}
```

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

# Attitude adjustment

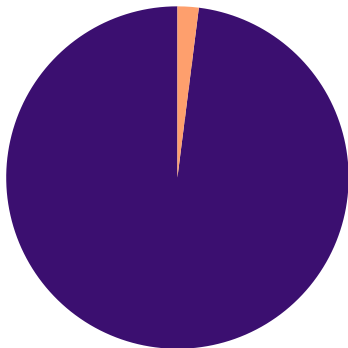
- Use commands to describe ‘what it is’ and not ‘how it looks’
- Focus on your content
- Let  $\text{\LaTeX}$  do its job





# Things that it solves: Picture alignment/placement

L<sup>A</sup>T<sub>E</sub>X takes care of figure placements automatically.

Moving a picture in MS Word



 You mess up  
the whole  
document

 It actually  
does what  
you want



# 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

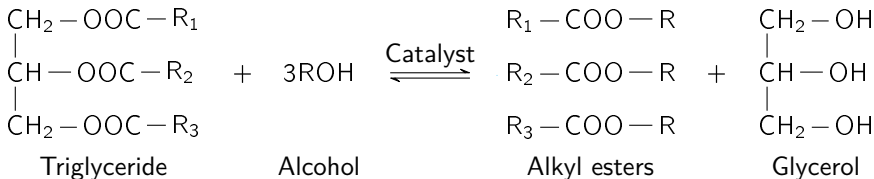


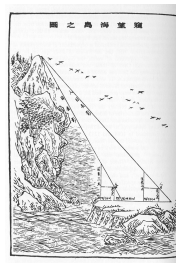
Figure 1: Transesterification of triglyceride with alcohol.

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

# Languages



الْكِتَابُ الْمُخْتَصَرُ فِي حِسَابِ الْجَبْرِ وَالْمُقَابَلَةِ  
(The Compendious Book on  
Calculation by Completion and  
Balancing), also known as الجبر  
(Al-Jabr), written by محمد بن موسى  
الخوارزمي (Muḥammad 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

# Getting started

## A minimal L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X what kind of document we are creating (in this case, an article)
- A percent sign % starts a *comment*—L<sup>A</sup>T<sub>E</sub>X will ignore the rest of the line

# Getting started

## Overleaf

- Overleaf is a website for writing documents in  $\text{\LaTeX}$
- It 'compiles' your  $\text{\LaTeX}$  document automatically 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!



# Exercises

1. Familiarising
2. Article
3. Mathematics
4. Figures
5. Referencing