

# LaTeX Workshop

主持人：林以凡 教授  
講者：資管四 陳瑾叡  
機械四 胡睿宸



# Self-Introduction

資管四 陳瑾叡  
機械四 胡睿宸



這堂課會涵蓋：  
LaTeX 的應用、概念、基礎語法、大量梗圖

這堂課不會涵蓋：  
詳細語法、每一種套件、選項的差別

Q Your Lecturer



# Q Today's Agenda

1 Introduction

2 Environment

3 Layouts

4 Formula, Figure, Table

5 List, Font, Citation

6 More Applications

# Introduction

開始摟

- 1 What's LaTeX
- 2 Why LaTeX

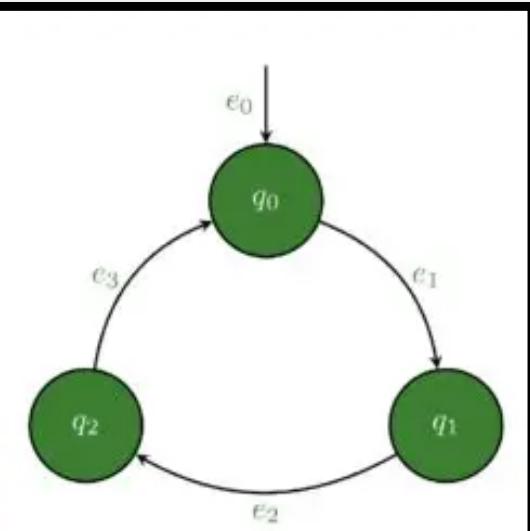
# What's LaTeX

LaTeX 是一種文件排版系統，常用於邊寫論文、書籍等文件，也可以用於製作投影片、履歷等制式內容。

1 用類似程式語言的方式寫文件，上手門檻較高

2 環境設置不容易，寫文件前就容易遇到許多問題

3 開源生態豐富，套件、模板眾多



Beautiful illustration made in **LaTeX**



```
% Required packages
\usepackage{tikz}

% Create style for node circles
\tikzstyle{state}=[
    circle,
    minimum size =1.25cm
    draw=black,
    thick,
    fill=OliveGreen,
    text=white
]

\begin{tikzpicture}[-stealth,thick,text=OliveGreen]
    % State q2
    \node[state] (A) at (0,0){$q_2$};

    % State q1
    \node[state] (B) at (4,0){$q_1$};

    % State q0
    \node[state] (C) at (2,2.5){$q_0$};

    % Transition q2 to q0
    \draw (A) to[bend left] node[left]{$e_0$}(C);

    % Transition q0 to q1
    \draw (C) to[bend left] node[right]{$e_1$}(B);

    ... Read More
\end{tikzpicture}
```

Graph in **LaTeX** be like:



Your professor be like:



You be like:

# Why LaTeX

我幹嘛不用Word？Notion？

- 1 杜絕手動排版，雙手解放。  
不用為了換行、縮排、行距、字體、圖片移位煩惱

- 2 數學式、圖表編號友善，特別適合  
理工科等較多數學文件的領域

- 3 完全免費，而且有很多酷炫的擴充  
功能可以探索，文書、美編無極限

# Environment

環境很重要！

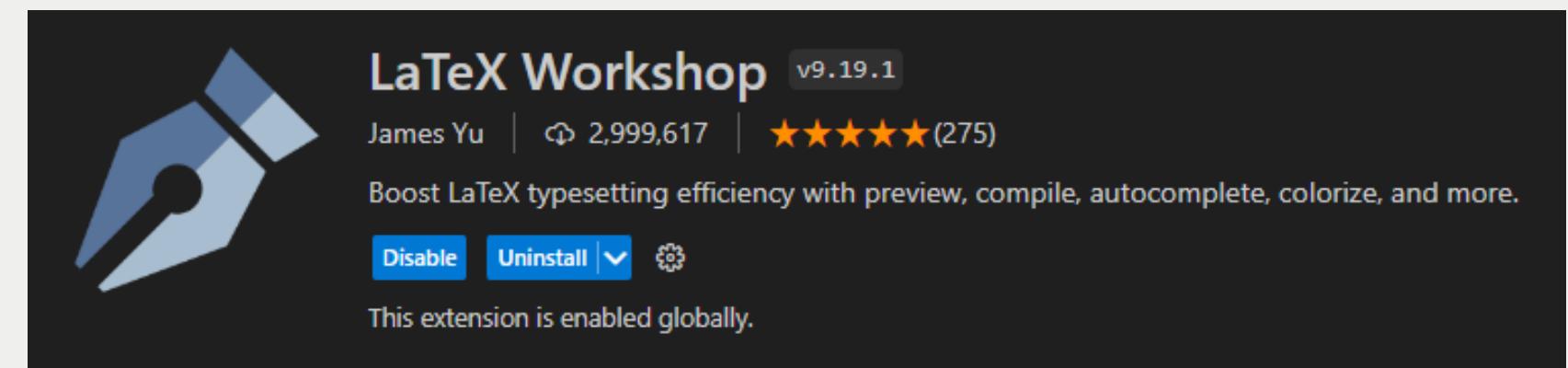
- ① LaTeX & VS Code
- ② Overleaf

# Latex & VS Code

要在自己的電腦寫 LaTeX 你需要

1. LaTeX 主程式
  - a. TexLive (Linux)
  - b. MacTex (MacOS)
  - c. MikTex (Windows)
2. LaTeX 的編譯器
  - a. TexMaker
  - b. TexStudio
  - c. TexWorks
  - d. VS Code?

VS Code Extension



Official LaTeX Website

## LaTeX - A document preparation system

LaTeX is a high-quality typesetting system; it includes features designed for the production of technical and scientific documentation.

 [latex-project.org](http://latex-project.org)

# Overleaf

線上寫 LaTeX 的網站

1. 可共編，教授在看著你
2. 雲端存檔，走到哪寫到哪
3. 環境簡易，不需複雜設定
4. 可和 Github 連動 (須付費)



Overleaf

# Layouts

排版令人抓狂 :)

1 Format

2 Section

3 Language Setting

# Format



```
\documentclass[10pt]{article}
% [ ]這邊可以用來選擇字體大小
% {}則是文件類別 Ex: report, article
% \usepackage{}
% 套件
% \title{tutorial}
% \author{Your Name}
% \date{March 2024}
\begin{document}
% \maketitle
% \section{Introduction}
% 可以開始打字
Hello World!
\end{document}
```

# Format



```
\usepackage{geometry}  
% \geometry{margin=1in}  
% \geometry{left=2cm,right=2cm,top=2cm,bottom=2cm}  
\linespread{1.5}% 行距
```

# Section



```
\section{Introduction}
  \subsection{Background}
    \subsubsection{History}

% \section*{Introduction}
```

# Language Setting

```
● ○ ●\usepackage{fontspec}\setmainfont{Times New Roman} % 設置英文字體\setmonofont{Courier New} % 設置等寬字體\usepackage{xecjk}\setCJKmainfont{Noto Sans CJK TC}\setCJKmonofont{Noto Serif CJK TC}\begin{document}這是一個中文範例\end{document}
```

# Formula, Figure, Table

強大的數學表達式

1 Formula

2 Figure

3 Table

# Formula



```
\usepackage{amsmath}% 數學排版功能  
\usepackage{amsfonts}% 額外數學字體  
\usepackage{array}% 數組與表格排版功能  
\usepackage{amssymb}% 額外的數學符號  
\usepackage{bm}% 加粗數學符號，ex:矩陣、向量
```

# Basics



```
\section{Basics}
let $a,b$ are real number, then $a^2 + b^2 = c^2$
% \[ your equation \]
% $ your equation $
% \begin{align} your equation \end{align}
% \begin{equation} your equation \end{equation}
```

# Polynomial



```
\section{Polynomial}
\begin{aligned}
P(x) &= 3x^3 + 2x^2 - 5x + 7 \\
&= x^2(3x + 2) - 5x + 7
\end{aligned}
```

# Summation



```
\section{Summation}
\begin{equation*}
    \sum_{i=1}^n i^2 = \frac{n(n + 1)(2n + 1)}{6}
\end{equation*}
```

# Differential



```
\section{Differential}
\begin{equation*}
    f(x)=ax^2+bx+c
\end{equation*} \\
\begin{equation*}
    f^{\prime}(x)=\frac{df(x)}{dx}=\frac{d(ax^2+bx+c)}{dx}=2ax+b
\end{equation*}
```

# Integral



```
\section{Integral}
\begin{equation*}
    \int_{a}^{x} f^{\prime}(t) dt = f(x)
\end{equation*}
```

# Matrix

```
\section{Matrix}
\begin{equation*}
\left[
\begin{array}{lcr}
1218 & 2213 & 398 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{array}
\right]
\end{equation*}
\begin{equation*}
\left[
\begin{matrix} % 默認都是居中對齊
a & b \\
c & d
\end{matrix}
\right]
\end{equation*}
```

# Vector



```
\section{Vector}
\begin{equation*}
    \text{\textbf{v}} = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}
\end{equation*}
\begin{equation*}
    \text{\textbf{v}} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}
\end{equation*}
```

# Figure



```
\usepackage{graphicx}
\begin{document}
\begin{figure}[b] % [htbp]
    \centering % 置中
    \includegraphics[width=0.5\linewidth]{cat.png} % 圖片路徑
    \caption{cat} % 圖片標題
    \label{cat} % 名稱自取
\end{figure}
As you can see in \ref{cat}
```

# Table

```
● ● ●  
  
\section*{Table}  
\begin{table}[h]  
  \centering  
  \begin{minipage}{0.6\textwidth}  
    \centering  
    \begin{equation}  
      \begin{array}{|c|c|}  
        \hline  
        x & f(x) \\  
        \hline  
        1 & 2 \\  
        2 & 3 \\  
        3 & 5 \\  
        4 & 7 \\  
        5 & 11 \\  
        \hline  
      \end{array}  
    \end{equation}  
  \end{minipage}  
  \caption{Math Table}  
  \label{math_table}  
\end{table}  
As you can see in Table \ref{math_table}
```

# List, Font, Citation

引用也是一門藝術

- 1 List
- 2 Font
- 3 Citation

# List



```
\begin{itemize}
  \item a
  \item b
  \item c
\end{itemize}
\begin{enumerate}
  \item a
  \item b
  \item c
\end{enumerate}
```

# Font



```
% \noindent  
\textbf{Hello World!}\  
% \\是換行  
  
\underline{Hello World!}\  
\textit{Hello World!}
```

# Citation



## Biblatex citation styles

An online LaTeX editor that's easy to use. No installation, real-time collaboration, version control, hundreds of LaTeX templates, and more.

 overleaf

```
● ● ●  
\bibliographystyle{ormsv080}  
\bibliography{intro}
```

# More Applications

不只能寫論文、還能做家事 (X)

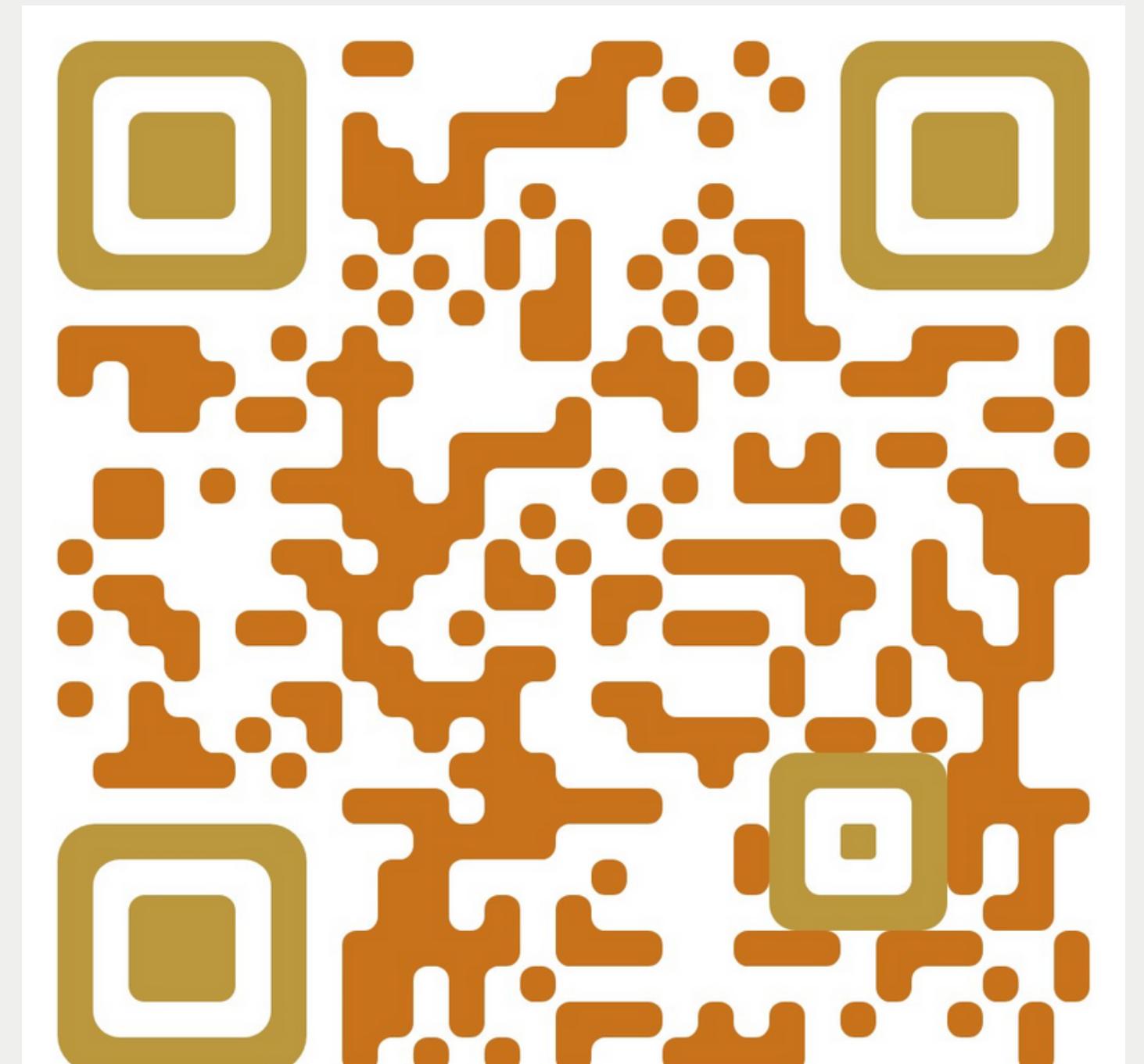
1 Resume

2 PPT

# More Applications

除了寫論文，LaTeX 還能做到很多事情

1. 做履歷
2. 投影片



# Thank you

Special  
Thanks: Abner