

# The Future of Engineering

## Challenges and opportunities

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Get source of this slides and see further references from <https://github.com/mxochicale/itds2020>.



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2. Challenges and Opportunities in Engineering
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## Short-bio

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# Introduction

- $\text{\LaTeX}$  is a document preparation system and document markup language.
- It can be used to typeset articles, books, slides, posters, even graphics.
- **Pros:**
  - It separates presentation/format from contents.
  - Since the source codes are plaintext, it works well with version control system such as git.
  - Highly customizable through various of packages.
- **Cons:**
  - There is no graphic interface to support WYSIWYG style editing.
  - Not suitable to produce unstructured documents.

# Installation

- Windows/Linux

- TeXLive <https://www.tug.org/texlive/>
- Online installer:
  - Windows  
<http://mirror.ctan.org/systems/texlive/tlnet/install-tl-windows.exe>
  - Linux  
<http://mirror.ctan.org/systems/texlive/tlnet/install-tl-unx.tar.gz>
- Offline ISO file: <http://mirror.ctan.org/systems/texlive/Images/>

- Mac

- MacTeX <http://www.tug.org/mactex/>
- Or install through Homebrew (<https://brew.sh>)

```
# Install Homebrew
ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"
# Install MacTeX
brew cask install mactex
```

- TeXLive/MacTeX release major updates around May each year.  
It is recommended to uninstall the old version and install the new version annually.

- L<sup>A</sup>T<sub>E</sub>X source codes are plaintext. So you can use any editor you like.
- **Visual Studio Code** [Recommend]
  - <https://code.visualstudio.com>
  - LaTeX Workshop <https://github.com/James-Yu/LaTeX-Workshop>
  - Code Spell Checker <https://github.com/streetsidesoftware/vscode-spell-checker>
- **Vim/Neovim**
  - <https://www.vim.org> | <https://neovim.io>
  - Vimtex <https://github.com/lervag/vimtex>
- **Emacs**
  - <https://www.gnu.org/s/emacs>
  - AUCTeX <https://www.gnu.org/software/auctex>
- **TeXstudio**
  - <https://www.texstudio.org>

# Challenges and Opportunities in Engineering

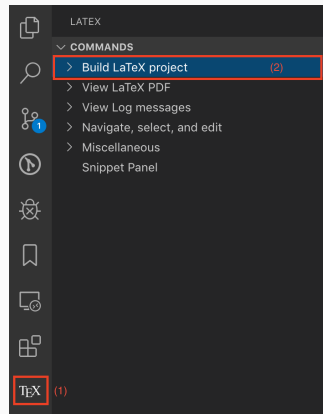
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# Hello, $\text{\LaTeX}$ !

- Create `hello.tex` file with following content.

```
% this is hello.tex
\documentclass{article}
\begin{document}
Hello,  $\text{\LaTeX}$ !
\end{document}
```

- Compile it
  - Click the build button in your  $\text{\LaTeX}$  editor/IDE
  - OR using command line: `latexmk -pdf hello`
- Open `hello.pdf` to preview the result



Compile  $\text{\LaTeX}$  Project in VSCode



## Example of A Complex Document

- Download the source code from <https://github.com/xu-cheng/latex-tutorial/archive/master.zip>
- The example document is located in the `example` folder. It contains:
  - `main.tex` The main tex source
  - `preamble.tex` A subfile to store format definitions
  - `tikz-example.tex` A figure drawn using tikz
  - `ref.bib` A database of references
- Use `latexmk -pdf main` to compile the document
- Access the same example in Overleaf:  
<https://www.overleaf.com/read/qsthqbjphhrz>

# Comment, Command and Environment

- `%` starts a comment. e.g. `% this is hello.tex`
- `\` starts a command.

```
\command % a command
\command{} % also a command
\command{arg} % a command with an argument
\command{arg1}{arg2} % a command with multiple arguments
\command[opt arg]{arg} % [] is for optional argument
```

- `\begin{} ... \end{}`  denotes an environment

```
\begin{envname}
  inside the environment
\end{envname}
% LaTeX environment can take arguments
\begin{envname}{arg} \end{envname}
\begin{envname}[opt arg]{arg} \end{envname}
```

# Source File Structure

- A document starts with `\documentclass{...}` command to specify the template
- Common templates include:
  - **article**
  - **book**
  - **report**
  - **letter**
  - **beamer** (slides)
  - **standalone** (graphics)
  - **acmart** (ACM template)
  - **IEEEtrans** (IEEE template)
- Template class can accept options, e.g. `\documentclass[a4paper,10pt]{article}`

## Class Options for **article**, **report**, **book**, **letter**

10pt, 11pt, 12pt	Set font size.
a4paper, letterpaper, ...	Defines the paper size.
fleqn	Typesets displayed formulae left-aligned instead of centred.
leqno	Places the numbering of formulae on the left hand side instead of the right.
titlepage, notitlepage	Specifies whether a new page should be started after the document title or not.
onecolumn, twocolumn	Typeset the document in one column or two columns.
twoside, oneside	Specifies whether double or single sided output should be generated.
landscape	Changes the layout of the document to print in landscape mode.
openright, openany	Makes chapters begin either only on right hand pages or on the next page available.

## Engineering as Multidisciplinary Field

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Thanks  
Questions?