

# Basics of L<sup>A</sup>T<sub>E</sub>X

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# TOC

LaTeX & Overleaf

Basic Commands

Basic Environments

Practices

# LaTeX

- ▶ an open-source typesetting system invented by Donald Knuth.
- ▶ standard for the communication and publication of scientific documents, especially computer science.
- ▶ it makes beautiful documents, e.g. lecture notes, publications, slides
- ▶ you write documents in plain text with commands that describes its structure and meaning.

# Overleaf

- ▶ an online LaTeX and Rich Text collaborative writing and publishing tool.
- ▶ edited, saved, compiled online so no need to download TeX locally.
- ▶ Log in with SSO and enter your UCMerced email address at [www.overleaf.com](http://www.overleaf.com).

# Useful Links

- ▶ Overleaf tutorials, e.g. [Learn LaTeX in 30 min.](#)
- ▶ [Overleaf documentations.](#)
- ▶ AI tool (**FOR LATEX ONLY!**), e.g. OCR software for LaTeX, interfaces provided by Overleaf

# Math Symbols

- ▶ use `$COMMANDS$` for inline math and `$$COMMANDS$$` for centered math.
- ▶  $\wedge$  `$\wedge$`
- ▶  $\vee$  `$\vee$`
- ▶  $\neg$  `$\neg$`
- ▶  $\rightarrow$  `$\to`, `$\rightarrow`
- ▶  $\Leftarrow$  `$\impliedby`, `$\Leftarrow`
- ▶  $\iff$  `$\iff`, `$\Leftrightarrow`
- ▶  $\implies$  `$\implies`, `$\Rightarrow`

# Math Symbols

- ▶  $e^{\pi i} = -1$ : `$e^{\pi i}=-1$`
- ▶  $x_t = \sqrt{\alpha_t}x_0 + \sqrt{1 - \alpha_t}\epsilon$ :  
`$x_t=\sqrt{\alpha_t}x_0 + \sqrt{1-\alpha_t}\epsilon$`
- ▶ Greek letter = `$\GreekLetter$`, e.g.  $\alpha, \beta, \theta$
- ▶  $\frac{1}{2}$ : `$\frac{1}{2}$`

# More

- ▶ Fonts: [Math font in LaTeX](#)
- ▶ [List of symbols](#)
- ▶ [Matrices](#)
- ▶ Useful packages: physics, amsmath, amsthm, amsfont, hyperref ...



# Itemize and Enumerate

1. item 1

2. item 2

3. item 3

# Itemize and Enumerate

```
\begin{itemize}  
  \item item x  
  \item item x  
\end{itemize}
```

```
\begin{enumerate}  
  \item item 1  
  \item item 2  
  \item item 3  
\end{enumerate}
```

# Table

$q$	$p$	$\neg p$	$\neg p \vee q$
T	T	F	T
T	F	F	F
F	T	T	T
F	F	T	T

# Table

```
\begin{tabular}{ccccc}
    $q$ & $p$ & $\neg p$ & $\neg p \vee q$ & \\
    T & T & F & T & \\
    T & F & F & F & \\
    F & T & T & T & \\
    F & F & T & T & \\
\end{tabular}
```

# Figure

<b>TABLE 3</b> Truth Tables for $\neg(p \vee q)$ and $\neg p \wedge \neg q$ .						
$p$	$q$	$p \vee q$	$\neg(p \vee q)$	$\neg p$	$\neg q$	$\neg p \wedge \neg q$
T	T	T	F	F	F	F
T	F	T	F	F	T	F
F	T	T	F	T	F	F
F	F	F	T	T	T	T

Figure: 1.3.2 Example 2

# Figure

```
\begin{figure}[h]  
  \includegraphics[width=\linewidth]{Imgs/figure1}  
  \caption{1.3.2 Example 2}  
\end{figure}
```

# Exercise

Type this table in Overleaf

TABLE 3 Truth Tables for $\neg(p \vee q)$ and $\neg p \wedge \neg q$ .						
$p$	$q$	$p \vee q$	$\neg(p \vee q)$	$\neg p$	$\neg q$	$\neg p \wedge \neg q$
T	T	T	F	F	F	F
T	F	T	F	F	T	F
F	T	T	F	T	F	F
F	F	F	T	T	T	T

Figure: 1.3.2 Example 2