

# Introduction to $\text{\LaTeX}$

## Lecture 2: Text in $\text{\LaTeX}$

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February 6, 2018

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# Use UTF-8 encoding in $\text{\LaTeX}$

UTF-8 encoding is widely used in modern computer applications, so it's useful to include the `inputenc` package and use UTF-8 encoding.

## Command

```
\usepackage[utf-8]{inputenc}
```

## Example

café

However, different operating systems and compiling engines have different support on UTF-8 encoding, some UTF-8 codes that work on your computer may not work on others (though rarely), so it is recommended to use commands (will be introduced later) instead of directly copy and paste the UTF-8 codes from the Internet.

# Special symbols

Some special symbols can't be directly used since they are reserved by  $\text{\LaTeX}$

$\backslash\#$	$\#$	$\backslash\$$	$\$$	$\backslash\%$	$\%$	$\backslash\&$	$\&$	$\backslash\sim$	$\sim$	$\backslash`$	$`$
$\backslash\{$	$\{$	$\backslash\}$	$\}$	$\backslash-$	$-$	$\backslash\text{textbackslash}$	$\backslash$				

Many  $\text{\LaTeX}$  starters are confused with how to correctly print quotes, hyphens and dots.

$\backslash$  prints a left single quote,  $'$  prints a right single quote.

$\backslash\backslash$  prints a left double quote,  $\backslash\backslash$  prints a right double quote.

one hyphen (-) print like -

two hyphens (--) print like --

three hyphens (---) print like ---

$\backslash\text{dots}$  prints the dots with a correct format ( $\dots$ ) instead of directly use three dots (...)

# Accent on letters

Sometimes you may need an accent form of a letter, here is an example of letter o

<code>\`{o}</code>	ò	<code>\'{o}</code>	ó	<code>\^{o}</code>	ô	<code>\\"{o}</code>	ö	<code>\~{o}</code>	õ
<code>\={o}</code>	ō	<code>\.{o}</code>	ô	<code>\u{o}</code>	ů	<code>\v{o}</code>	ǒ	<code>\H{o}</code>	Ǫ
<code>\t{oo}</code>	ôo	<code>\r{o}</code>	ø	<code>\c{o}</code>	ç	<code>\d{o}</code>	ø	<code>\b{o}</code>	⓪


## Something interesting

You may be curious about how to print words like  $\text{\LaTeX}$ , actually it's defined as a command.

- `\TeX` -  $\text{\TeX}$
- `\LaTeX` -  $\text{\LaTeX}$
- `\LaTeXe` -  $\text{\LaTeX} 2_{\epsilon}$

# Spaces may be confusing

There are defined command of spaces in different width and usages.

-  - the basic space in  $\text{\LaTeX}$  (printed in yellow since it's transparent). Note that any number of spaces or tabs is equal to one space, and the space after a command is ignored. If you want to add an extra space, use `\img alt="yellow square" data-bbox="228 378 258 408"/>` which makes a 1/3 em space (1 em is approximately the width of an M in the current font)
- `~` - If two words can't be separated on two lines, you can tell  $\text{\LaTeX}$  about it using a tie (`~`), such as Prof.`~`Hamade (Prof. Hamade).
- `\,` - makes a 1/6 em space, commonly used before units (notice the space before em on this page)
- `\;` - makes a 2/7 em space
- `\quad` - makes a 1 em space
- `\qquad` - makes a 2 em space
- `\phantom{text}` - makes actually the space of `text`, but `text` will be invisible.

# Separate contents into lines and pages

Here are some basic commands about lines and pages in  $\text{\LaTeX}$ , you will use them everywhere.

- `\newline` - begin a new line
- `\\` - begin a new line
- `\\[offset]` - begin a new line with an offset
- `\linebreak` - begin a new line with the words discrete
- `\newpage` - begin a new page
- `%` - begin a line comment

# Basic commands about fonts

First, let's start with some commands that transform font types

- `\bf` - **Sample Text**
- `\it` - *Sample Text*
- `\rm` - Sample Text
- `\sc` - SAMPLE TEXT
- `\sf` - Sample Text
- `\sl` - *Sample Text*
- `\tt` - Sample Text

Note that the commands that transform font types influence the text in the whole scope (`{...}`) until another font type is specified. For example, how to use the first command `\bf` is shown below

```
{\bf Sample Text}
```



Sometimes we don't want to transform the font types, instead, we can only change the font type of some specified text, then the following commands are used (you can similarly use all font types on the previous page)

- `\textbf` - **Sample Text**
- `\textit` - *Sample Text*
- `\textsc` - SAMPLE TEXT

However, in a math environment (will be introduced later), some other commands should be used

- `\mathbf` - **Sample Text**
- `\mathit` - *Sample Text*
- `\mathsf` - Sample Text

Note that the math environment doesn't include all of the font types on the previous page. More information about font types can be found [here](#).

Font size can also be easily modified

- `\tiny` - Sample Text
- `\scriptsize` - Sample Text
- `\footnotesize` - Sample Text
- `\small` - Sample Text
- `\normalsize` - Sample Text
- `\large` - Sample Text
- `\Large` - Sample Text
- `\LARGE` - Sample Text
- `\huge` - Sample Text
- `\Huge` - Sample Text

# Build a colorful document

Changing the color is similar to changing font types.

If you want to transform to a color (like `\bf`), you can use `\color{name}`  
 Similarly, you can use `\textcolor{name}` like `\textbf`

The background color of the whole page can be set using  
`\pagecolor{name}`

There are some defined color `name` in the `xcolor` package.

 black	 gray	 olive	 teal	 blue
 green	 orange	 violet	 brown	 lightgray
 pink	 white	 cyan	 lime	 purple
 yellow	 darkgray	 magenta	 red	

You can find more information in the documentation of `xcolor` (`\texdoc{xcolor}`)

# Ulem package

If you want to add some lines on the text, use the `ulem` package.

## Command

```
\usepackage{ulem}
\uline{Sample Text}
```

There are different kinds of lines supported:

- `\uline` - Sample Text
- `\uuline` - Sample Text
- `\uwave` - Sample Text
- `\sout` - ~~Sample Text~~
- `\xout` - ~~Sample Text~~
- `\dashuline` - Sample Text
- `\dotuline` - Sample Text

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# Enumerate and Item

When you need to enumerate some items as a list, you may use the `enumerate` package.

## Command

```
\usepackage{enumerate}  
\begin{enumerate}[style]  
  \item ...  
  \item ...  
  \item ...  
\end{enumerate}
```

This will generate a normal list with the serial numbers in the specified `style`, which could be the following (as example)

- 1 - 1, 2, 3, 4, ...
- (i) - (i), (ii), (iii), (iv), ...
- [1.] - [1.], [2.], [3.], [4.], ...

If you want to generate an unordered list, use `itemize` instead of `enumerate`.

### Command

```
\usepackage{enumerate}  
\begin{itemize}  
  \item[style] ...  
  \item[style] ...  
  \item[style] ...  
\end{itemize}
```

In this case, the position of `style` is different from that in `enumerate`, and the symbol displayed in the beginning of each item will be exactly same as the `style`. If `style` is not added, a default style will be used.

# Text align

If you want to align a paragraph of text, use these three environments for left/center/right align.

## Command

```
\begin{flushleft/center/flushright}  
...  
\end{flushleft/center/flushright}
```

However, if only a single line needs to be aligned, use these three commands.

## Command

```
\leftline  
\centerline  
\rightline
```



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  - Multi Languages
  - Scope

# Spelling languages

If you want to use a language with characters similar to English, package `babel` can be used (exactly the same name as `babel`).

## Command

```
\usepackage[languages]{babel}
```

- `languages` - a list of languages, the last one to be the default language

## Example

```
\usepackage[greek,english]{babel}  
\textgreek{abcdefgABCDEFG}
```

Then  $\LaTeX$  will print  $\alpha\beta\zeta\delta\epsilon\varphi\gamma AB^{\Delta}E\Phi\Gamma$

Of course, you can use some simple commands to print these greek letters directly, such as `\alpha`, `\beta` and etc, which is more convenient only when few of them are needed.

# Usage of scope in $\text{\LaTeX}$

First, you should realize the meaning of “scope” in programming. Let's start with a simple example in C/C++ (assuming you know that):

```
1  int main()  
2  { // The scope "main" of function main  
3    int a = 1; // int a is defined in scope "main"  
4    for (int i = 0; i < 10; i++)  
5    { // The scope "for" of the for loop  
6      int b = i; // int b and i are both defined in scope "for"  
7      a += b; // int a can be visited here!  
8    }  
9    { // The scope "other", we can directly define a scope like this  
10     int c; // int c is defined in scope "other"  
11     c = a; // int a can be visited here!  
12   }  
13   a -= c // error: c is not in scope "main", can't be visited!  
14 }
```

In the example of C/C++, we use brackets `{}` to define a scope, which is just the same in  $\text{\LaTeX}$ . In addition, notice that an environment or a command also defines a scope.

## Example

1	<code>black (default) text \</code>	black (default) text
2	<code>\color{blue}</code>	blue text
3	<code>blue text \</code>	brown text
4	<code>{ \color{brown} brown text }</code>	
5	<code>\begin{center}</code>	
6	<code>\color{red}</code>	centered red text
7	<code>centered red text</code>	
8	<code>\end{center}</code>	
9	<code>\textbf{ \color{brown}</code>	bold brown text
10	<code>bold brown text } \</code>	blue text
11	<code>blue text</code>	

With the usage of scopes, you can flexibly change the color, font or anything else you wish in a self-defined range of the document.