

# Learning Support Weeks for International Students

## How to use Latex

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学習サポートデスク

Learning  
Support  
Desk



# Contents and 3W1H Latex

## Contents

Introduction

Structure of Latex

Images and table on Latex

Strong function of Latex (Hyper reference)

What

Typesetting software

When

Writing reports, papers etc...

Why

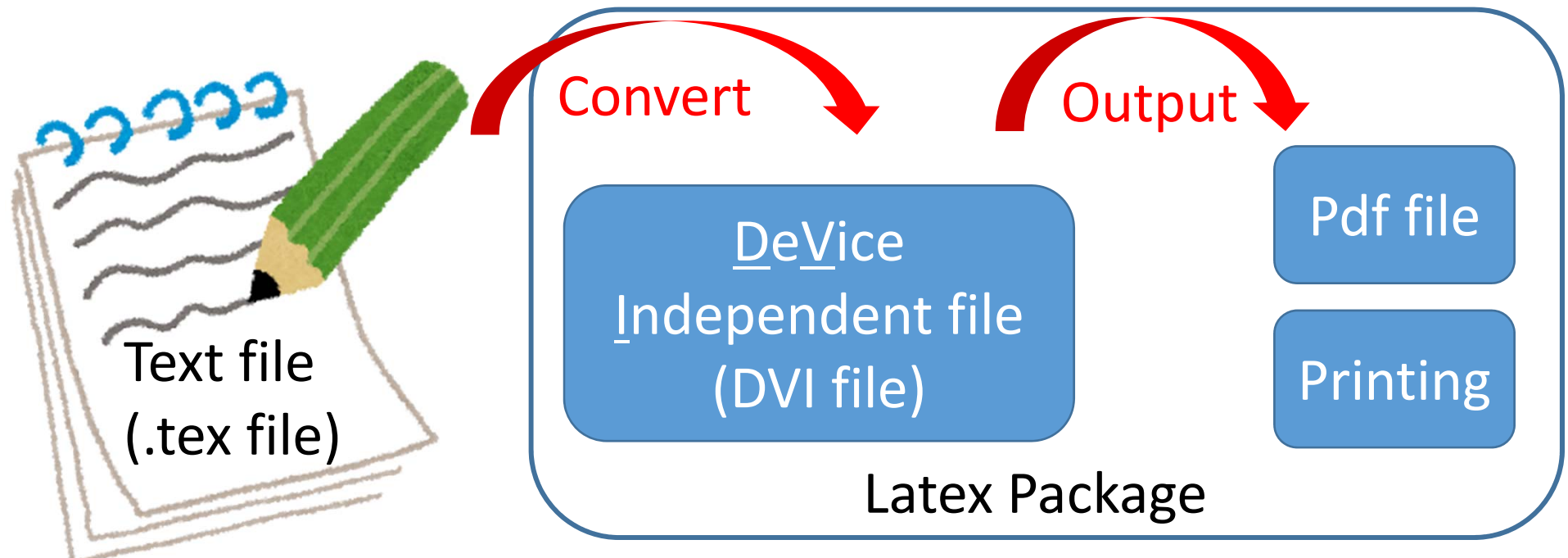
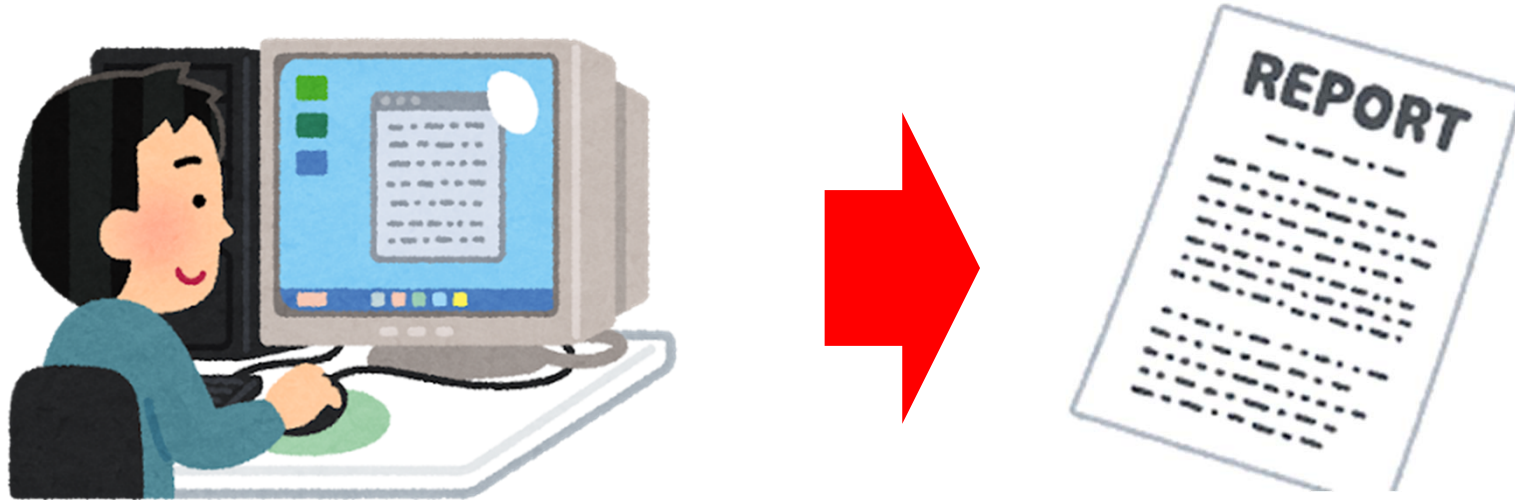
Many strong points

How

Online cloud service or offline application

# What is Latex ?

Typesetting software to make beautiful documents



# When is Latex used?

Suitable for document such as reports and papers.

Advantage

Make numerical formulas beautiful

Powerpoint output

$$\lim_{n \rightarrow \infty} x_n - \sum_{n=0}^{\infty} s_n = \int_0^1 g(t) dt$$

$\frac{x}{y}$

$e^x$

$\sqrt[n]{x}$

$\int_{-x}^x$

$\sum^n$

分数

上付き/下付き  
文字

べき乗根

積分

Click



Oh my God!

Latex Output

$$\lim_{n \rightarrow \infty} x_n - \sum_{n=0}^{\infty} s_n = \int_0^1 g(t) dt$$

```
$$\lim_{n \to \infty} x_n - \sum_{n=0}^{\infty} s_n = \int_0^1 g(t) dt$$
```



Type only

Oh yeah!

# Why is Latex used?

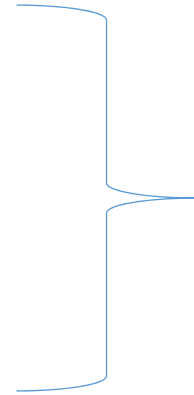
Because the format is defined and unified by Latex.



ARTICLE

**ARTICLE**

*ARTICLE*



ARTICLE

Beautiful!

Because the output of the Latex is independent of devices.



aaa.pptx



Linux

Layouts are a little different  
by each computer.

# How to use latex

Offline



Tex works



Advantage

Capability to expand  
Userpackage (Library)

Disadvantage

Presetting is needed and tough

Online



Online cloud service **for free**

Advantage

**Presetting is not needed**

Disadvantage

Online storage is limited

# Register for the Overleaf

Requirement : E-mail address, Password

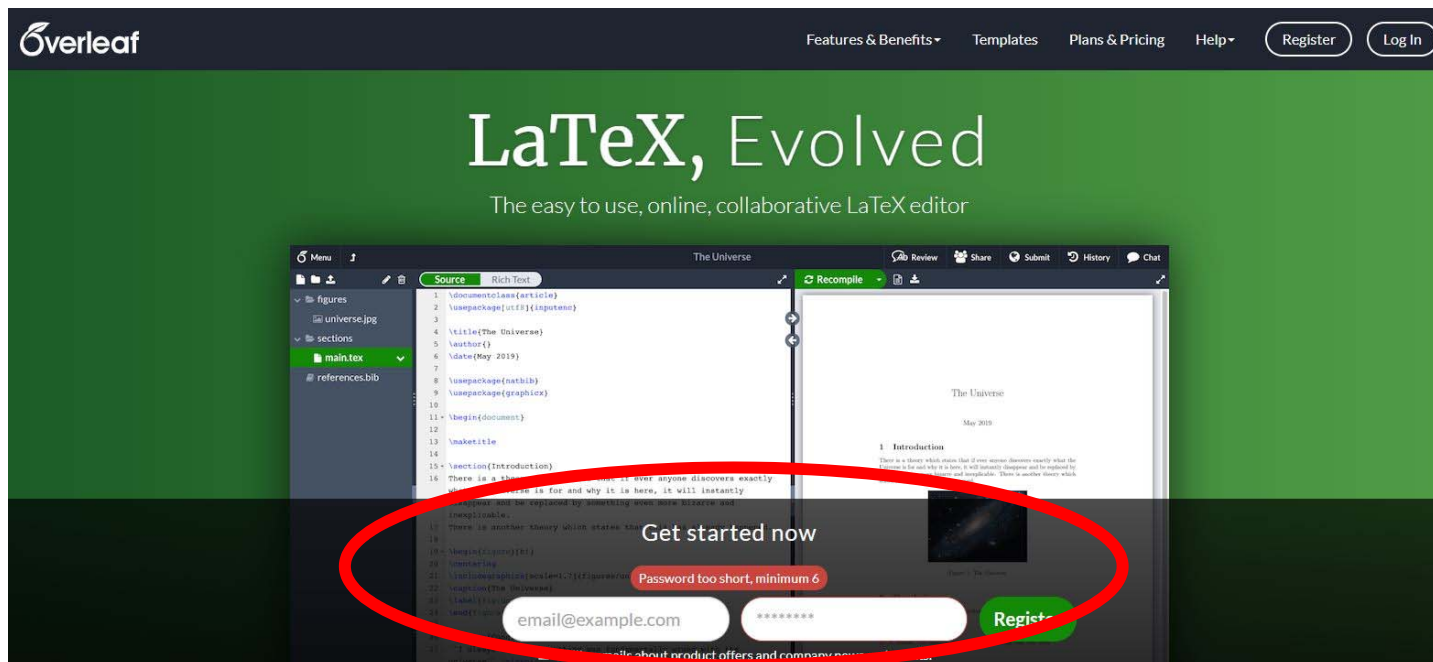
1. Search with “Overleaf”.



<https://www.overleaf.com/>



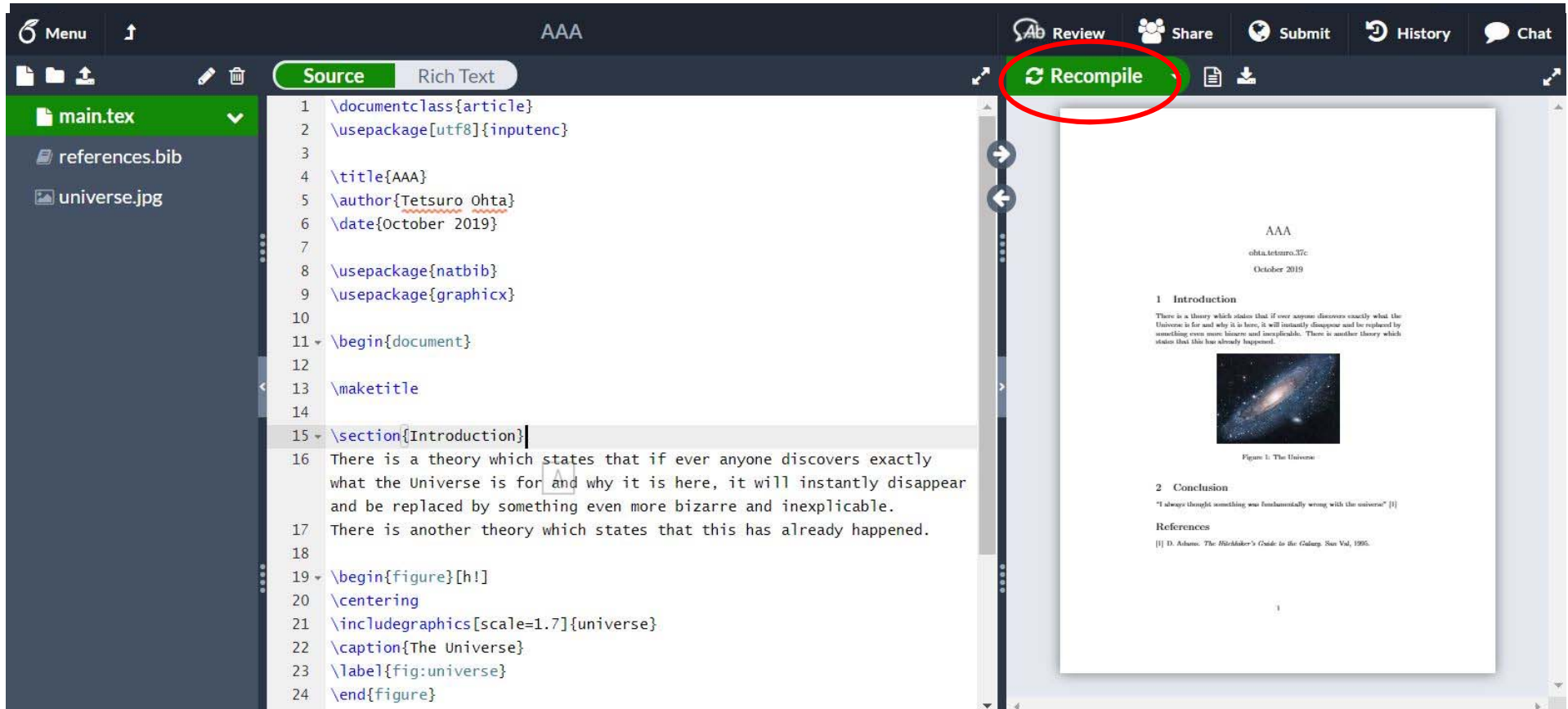
2. Register





# Let's start Latex

## Create a sample project



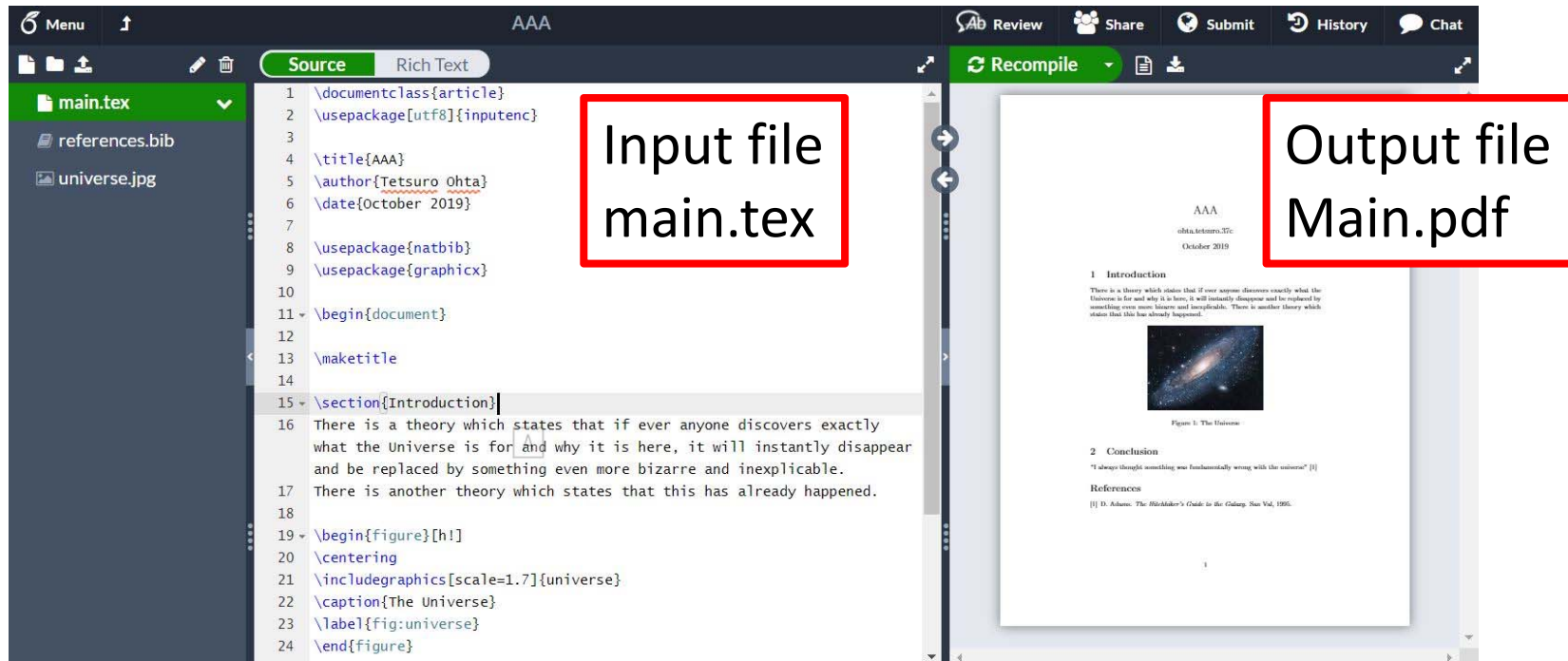
The screenshot shows a LaTeX editor interface. On the left, a file explorer lists 'main.tex', 'references.bib', and 'universe.jpg'. The main editor displays the source code for 'main.tex' with line numbers 1 through 24. The code includes document class settings, package loading, title and author information, and content sections for 'Introduction' and 'Conclusion'. A figure of a galaxy is included in the 'Introduction' section. On the right, a preview window shows the rendered PDF output, which includes the title 'AAA', author 'ohta.tetsuro.37c', date 'October 2019', and the content of the 'Introduction' and 'Conclusion' sections. The 'Recompile' button in the top right toolbar is circled in red.

```
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3
4 \title{AAA}
5 \author{Tetsuro Ohta}
6 \date{October 2019}
7
8 \usepackage{natbib}
9 \usepackage{graphicx}
10
11 \begin{document}
12
13 \maketitle
14
15 \section{Introduction}
16 There is a theory which states that if ever anyone discovers exactly
17 what the Universe is for and why it is here, it will instantly disappear
18 and be replaced by something even more bizarre and inexplicable.
19 There is another theory which states that this has already happened.
20
21 \begin{figure}[h!]
22 \centering
23 \includegraphics[scale=1.7]{universe}
24 \caption{The Universe}
25 \label{fig:universe}
26 \end{figure}
27
28 \section{Conclusion}
29 "I always thought something was fundamentally wrong with the universe" [1]
30
31 \begin{References}
32 [1] D. Adams. The Hubble's Guide to the Galaxy. San Va, 1995.
33 \end{References}
34
35 \end{document}
```

Recompile means to update pdf file according to tex file.



# Let's start Latex



Users edit .tex file with commands and usable characters to define the contents and format of your document.

Usable character

! ' ( ) \* + , - . / : ; = ? @ [ ] ~  
0 1 2 3 4 5 6 7 8 9  
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
a b c d e f g h i j k l m n o p q r s t u v w x y z

The commands are started with “Back”Slash (or¥)

# Structure of .tex file

```
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3
4 \title{AAA}
5 \author{Tetsuro Ohta}
6 \date{October 2019}
7
8 \usepackage{natbib}
9 \usepackage{graphicx}
10
11 \begin{document}
12
13 \maketitle
14
15 \section{Introduction}
16 There is a theory which states that if ever anyone discovers exactly ...
17
18 \begin{figure}[h!]
19 \centering
20 \includegraphics[scale=1.7]{universe}
21 \caption{The Universe}
22 \label{fig:universe}
23 \end{figure}
24
25 \section{Conclusion}
26 ``I always thought something was fundamentally wrong with
27
28 \bibliographystyle{plain}
29 \bibliography{references}
30 \end{document}
31
```

Preamble

The preamble is the part that builds a format of your document.

Body

# Edit your Preamble

```
1 \documentclass{article} ①  
2 \usepackage[utf8]{inputenc}  
3  
4 \title{AAA}  
5 \author{Tetsuro Ohta} ②  
6 \date{October 2019}  
7  
8 \usepackage{natbib} ③  
9 \usepackage{graphicx}
```

## ① Document class

Declare your document type

Article (Section)

Report (Chapter)

Book (Chapter)

Change the font size of body  
[12pt] (default 10pt)

¥documentclass[12pt]{report}

Variable within [] is defined by user

## ②. Overview

Define the title, author and date.

## ③ Userpackage

¥usepackage{} Browse the library of your Latex.  
If you install libraries, you can enhance function.

# Edit your Preamble

## Exercise

1. Create a blank project
2. Create your preamble and compile it

Format : Report

Font size: 10pt (12pt)

To display your preamble,  
¥maketitle must be written in the body.

# Put images on your document

```
9 \usepackage{graphicx}
10
11 \begin{document}
12     Declaration of figure start
13 \begin{figure}[h!] ①
14 \centering
15 \includegraphics[scale=1.7]{universe} ②
16 \caption{The Universe}
17 \label{fig:universe}
18 \end{figure}
19
20 \end{document}
```

① Image position  
t : top of page, b : bottom,  
p : picture only, h : here,  
H : absolutely here  
(escape trouble on compiling)

② Select and scale  
Select the image by {}  
( It is more reliable  
to specify the extension)  
[] is scaling factor

Sometimes, an image is displayed on an unpredicted place as your document is crowded.

Latex refers to an image file in the same folder as .tex file.

# Put tables on your document

Table is not required userpackage.

```
13 ▾ \begin{table}[]
14     \centering
15 ▾   \begin{tabular}{|c|c|c|}\hline ①
16     2 & 9 & 4 \\ \hline
17     7 & 5 & 3 \\ \hline
18     6 & 1 & 8 \\ \hline
19     \end{tabular}
20     \caption{Magic circle}
21     \label{Magic}
22 \end{table}
```

① Declaration of figure  
c : center, r : right, l : left  
| : ruled line,  
to define matrix dimension  
The number of separation is  
a dimension of columns

② Double back slash

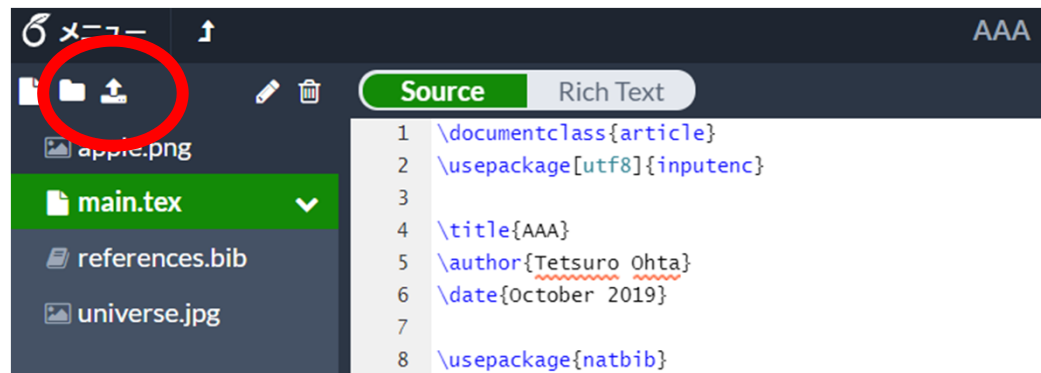
The number of double back slash is a dimension of rows.

& is partition of element of matrix.

# Put picture and table on your document

## Exercise

1. Download free picture from website.
2. Upload picture on your overleaf project.



3. Create a table with 3 rows and 2 columns.
4. Change ruled lines to double ruled lines.

| → | |

5. Compile picture and table



# Link between citation and reference

Hyper reference bookmark is strong function of Pdf output.

```
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3 \usepackage[dvipdfmx,bookmarks=true,bookmarksnumbered=true,bookmarkstype=toc]{hyperrref}
4 \title{AAA}
5 \author{Tetsuro Ohta}
6 \date{October 2019}
7
8 \begin{document}
9 J. A. Stockdale et.al(1975)\cite{Stockdale}
10 \newpage
11 \begin{thebibliography}{99}
12 \bibitem{Stockdale}J. \ A. \ Stockdale, \ V. \ E. \ Anderson, \ A. \ E. \ Carter \
and \ L. \ Deleanu, \textit{J. \ Chem. \ Phys.}\textbf{63}, \ 3886 (1975)
13 \end{thebibliography}
14 \end{document}
```

① Hyper reference userpackage  
[] variables are options of bookmarks.

② Flag of citation

Bookmark is inserted there.

③ Reference information

Bibitem is hyper ref destination. Variable is same as flag one.  
{99} means maximum ref. number.

# Try hyper reference

## Exercise

1. Write a sentence including citation command.
2. Write a newpage command on next line of the citation.
3. Write a bibliography including the same label bibitem.
4. Compile your .tex file.
5. Click your citation of your pdf file.

# Reference



Autor : 奥村 晴彦 黒木裕介

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