

Introduction to Markdown and Modern Document Workflow

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Outline

1. Why Markdown?
2. Learn Markdown Syntax with Typora
3. Use R Markdown with RStudio

Material

Slides, notes and exercises are uploaded on GitHub: <https://github.com/iewaij/talkMarkdown>

Software

To follow the exercises, you need install Typora and RStudio.

Why Markdown?

Microsoft Word

- No separation of content and formatting;
- Bad code syntax highlighting, math equation and citation support;
- Hard to generate graphs and visualizations.

LaTeX

- Source code is way too bloated;
- Not really separate content from formats.

```
\documentclass[12pt, a4paper]{article}
\usepackage[utf8]{inputenc}

\title{A Simple Document}
\author{Jiawei Li}
\date{April 2021}
\begin{document}
\maketitle
Some of the \textbf{greatest}
discoveries in \textit{science}
were made by \textbf{\textit{accident}}}.
\end{document}
```

```
---  
title: A Simple Document  
author: Jiawei Li  
date: April 2021  
fontsize: 12pt  
papersize: a4  
---
```

Some of the **greatest**
discoveries in *science*
were made by **accident**.

Learn Markdown Syntax with Typora

The headers start with a hashtag (#). Using one hashtag means a level-one header. Two hashtags means a level-two header.

Introduction

Motivation

History

1910s

1920s

Main Texts

Conclusion

Wrap asterisks (*) around the word to emphasize. One asterisk puts the word in italic and two asterisks put it in boldface.

Some of the ****greatest****
discoveries in **science**
were made by *****accident*****.

Numbered List

Put a number, followed by a period, at the start of a line and write the list item after it.

1. This is a numbered list.
2. Where this is list item two.
3. And this is list item three.
 1. A numbered list inside a list.
 2. This is item 3.2.

To create a unnumbered list, you simply put a dash (-) or an asterisk (*) in the beginning of the line.

- This is a unnumbered list.
- * Asterisk is fine.
- And this is list item three.
 - You can also indent a list here.

Add a > before the quoted text.

```
> The idea is that a Markdown-formatted document should be publishable  
> as-is, as plain text, without looking like it's been marked up with  
> tags or formatting instructions.  
> If you want multiple lines where you include new lines,  
> you should add the `>` to each line.
```

Exercise 1: Countries' GDP

Open `exercises/1_gdp.md` with Typora and complete the following tasks:

1. Make a top level header “EU Countries Ordered by GDP”.
2. Quote the famous “in the long run we all die” sentence by Keynes.
3. Create a numbered list of countries below ordered by their GDP. Note that some nations of The UK should be indented.
4. Emphasize **Germany** by making it bold.

Bonus: Strike out UK and its nations since it has left EU.

Links can be created by using both `[]` and `()`, e.g.

```
[YouTube](https://youtube.com/)
```

The result will look like this:

YouTube

Syntax for inserting image is similar to links with ! in the beginning.

![FS Logo](figures/fslogo.png)

The result will look like this:



Figure 1: FS Logo

Inline code can be identified by backticks (`).

Variable can be assigned using ``a = 12``.

The result will look like this:

Variable can be assigned using `a = 12`.

Code block should be surrounded by three backticks.

```
```python  
print("Hello World!")
```
```

The result will look like this:

```
print("Hello World!")
```

Inline math follows the same logic of inline code. Inline math is wrapped by the dollar sign (\$).

Here we define `$m = ab$`.

The result will look like this:

Here we define $m = ab$.

Math Block

A math block is surrounded by two dollar signs (\$).

We know that

\$\$

$$e = mc^2$$

\$\$

The result will look like this:

We know that

$$e = mc^2$$

You may find Mathpix, an OCR tool for math equations, very helpful.

Exercise 2: Badges and Stuff

Shields.io is a website that generates badges. Open `exercises/2_badges.md` with Typora and complete the following tasks:

1. Create two YouTube channel badges which are linked to a YouTube Channel.
2. Create a thumbnail image stored in **figures** folder which is also linked to a YouTube video.
3. Finish off with a line of Python code and a math equation.

Bonus: Add another formula which is Euler's identity.

$$e^{i\pi} + 1 = 0$$

Use R Markdown with RStudio

The Markdown file can include metadata that describes the formats and detailed information, e.g. title and author.

```
---  
title: A Report Genrated by R Markdown  
author: Jiawei Li  
date: 21 April, 2021  
abstract: Here are some words.  
output: pdf_document  
---
```

Some texts.

```
---  
geometry:  
  - top=30mm  
  - left=30mm  
  - right=30mm  
  - bottom=30mm  
fontsize: 12  
documentclass: report  
output:  
  pdf_document:  
    toc: true  
    number_sections: true  
---
```


You can also create intentional page breaks.

```
---
```

```
toc: true
```

```
documentclass: article
```

```
---
```

```
\pagebreak
```

Some texts.

```
\pagebreak
```

```
# References
```

Citations can be inserted in the header as well, though you need generate a BibTex file from ZoteroBib and a specific citation style file from Zotero Style Repository.

bibliography: citation.bib

csl: harvard-cite-them-right.csl

Open `exercises/3_thesis.Rmd` with RStudio and complete the following tasks:

1. Generate a thesis with title, author, date, abstract and a table of contents.
2. The thesis should use “report” as documentclass.
3. Cite the book “Forecasting: Principles and Practice”.

Bonus: Number each section. For example, “Introduction” has a “Chapter 1” before it. You may not write these texts explicitly.

Tables

You can generate tables using Markdown syntax only.

| Country | GDP |
|----------------|-----------|
| ----- | ----- |
| Germany | 4,319,286 |
| United Kingdom | 3,124,650 |
| France | 2,938,271 |
| Italy | 2,106,287 |
| Spain | 1,461,552 |
| Netherlands | 1,012,598 |

Table Title: This is table caption

Run the code to generate a table. Simply add a `{r}` in your code fence, the code then become executable in RStudio.

```
```{r, include = FALSE, echo = FALSE}  
library(tidyverse)
library(knitr)
````  
  
```{r}  
kable(mpg[1:5,], caption = "A table")
```
```

You can also generate graphs for you the report.

```
```{r, caption = "A graph"}  
ggplot(data = mpg) +
 geom_point(mapping = aes(x = displ, y = hwy, color = class))
```
```

Templates

Install `stevetemplates` and `binb`, then you can start using the templates when create a new R Markdown document.

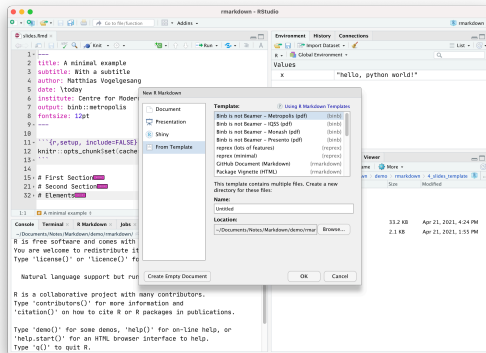


Figure 2: Start with a Template

How R Markdown Works



Figure 3: R Markdown Workflow

Internally, R Markdown runs the R code in the file and inserts the code's output into the text you wrote. The file will then be translated into a PDF or HTML using Pandoc.

If you are comfortable with the command line and do not need code execution, simply run like this:

```
pandoc --citeproc --pdf-engine=xelatex -o your_work.pdf your_work.md
```


We shape our tools and our tools shape us. – Marshall McLuhan