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02_Basics

A UNIFIED APPROACH FOR WRITING AUTOMATIC REPORTS

Parameterization and Generalization of R-Markdown

Rmd: what is it?

Authoring framework for **data science**

Can be used to

- **Save** and **run** code
- Generate *high* **quality reports**

Both *computing code* and *description* in *same document*

Results are **automatically generated** from source code

Rmd: Why?

➜ Mix text and code chunks

➜ Customizable layout

➜ Personal website

➜ Personalized reports

➜ Interactive plots allowed

➜ Books

➜ Other languages friendly:

◆ Python

◆ SQL

◆ C++

◆ ...

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➜ Interactive plots allowed

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➜ Other languages friendly:

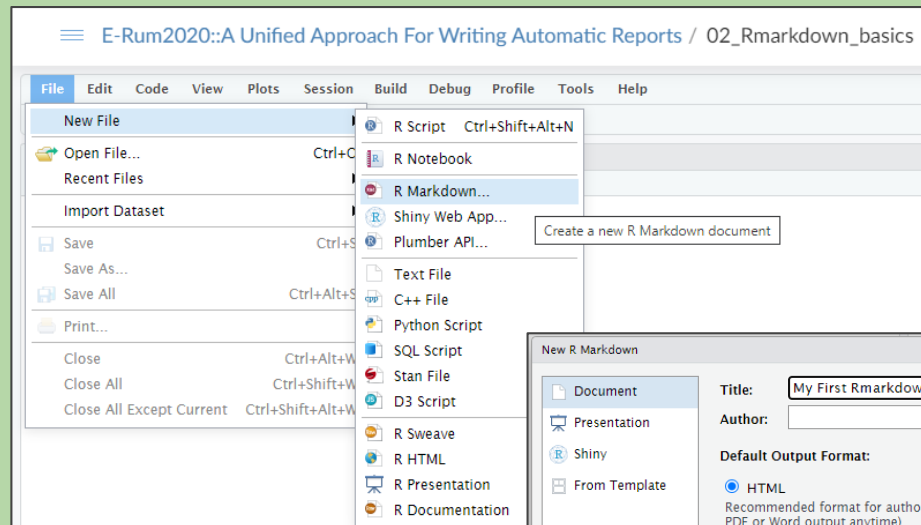   ◆ Python

    ◆ SQL

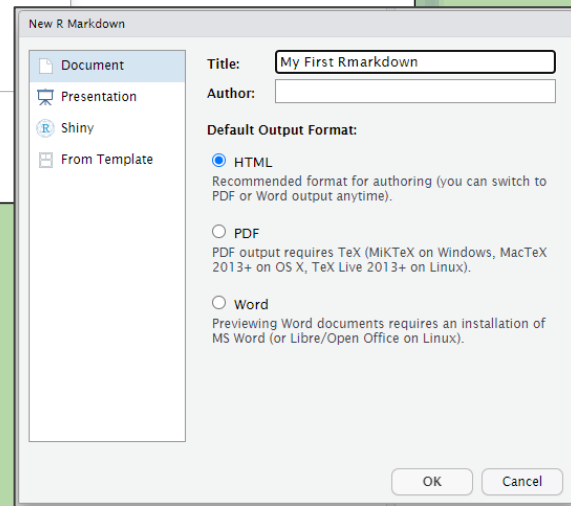   ◆ C++

    ◆ ...

...and much more..

Your turn: Exercise 1

Create your first R Markdown document

1. Select New File from the File Menu

2. Choose Document, select HTML as your output type and title the document "My First R Markdown"
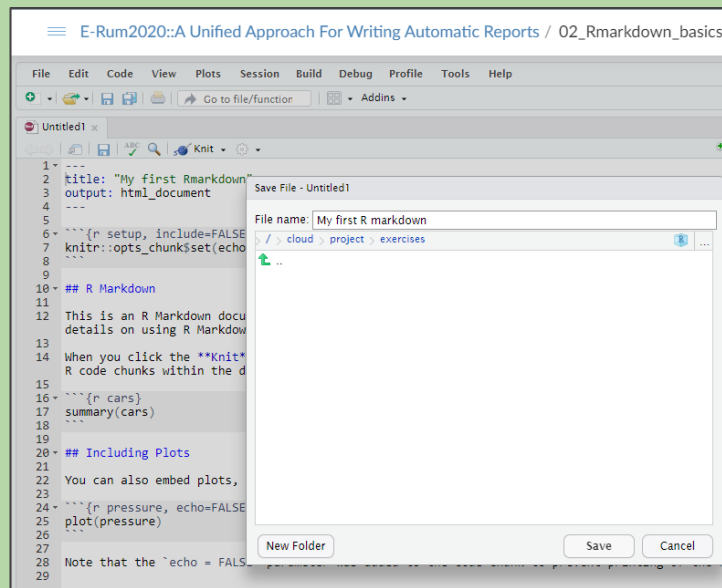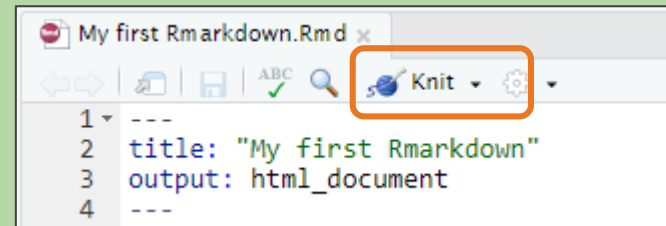
Time: 5 min

Your turn: Exercise 1

Create your first R Markdown document

3. Save File in "exercise" folder as "My First Markdown"
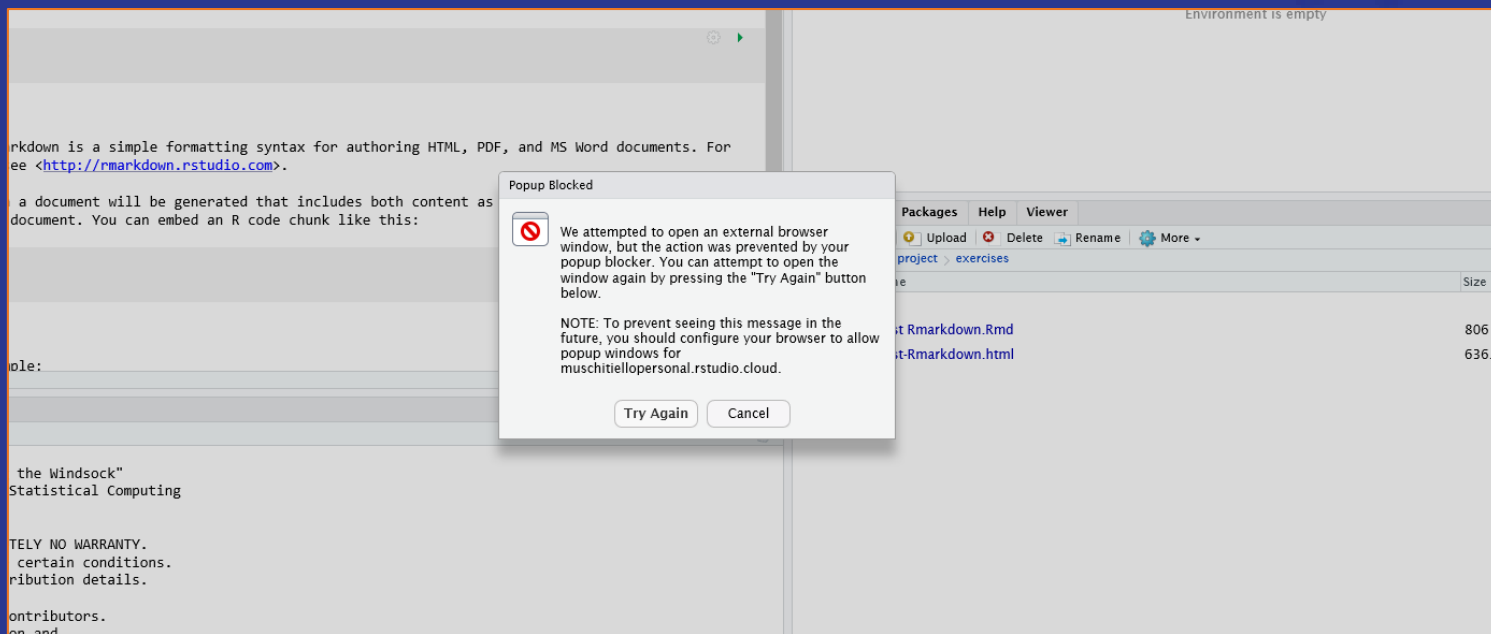

5:00

4. Knit the document

Time: 5 min

Your turn:

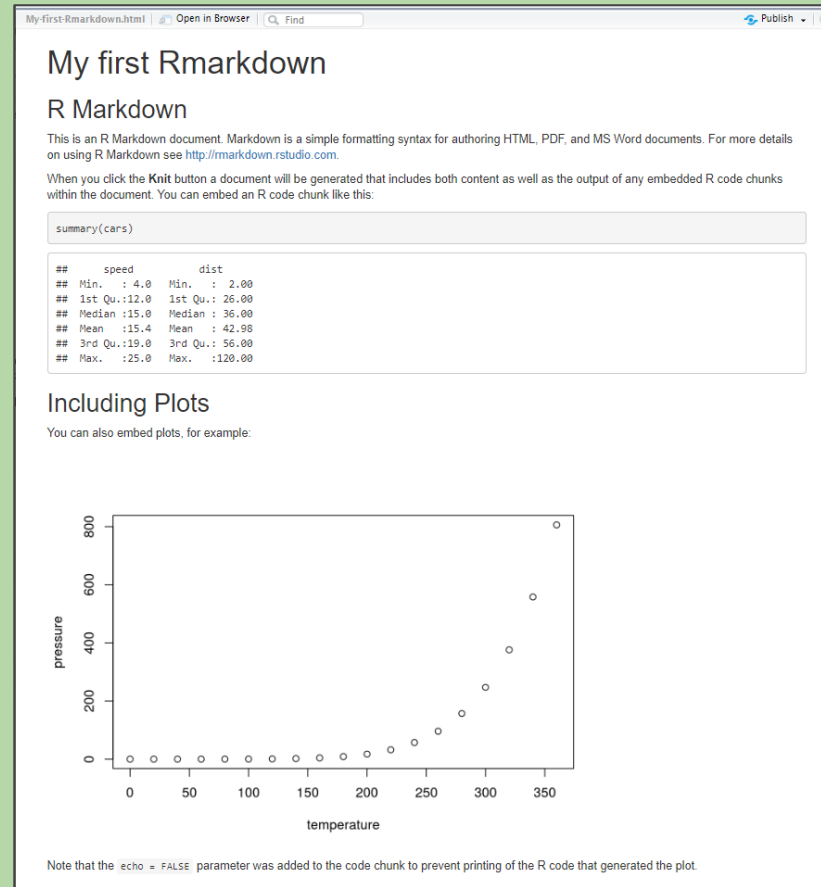## Create your first
R Markdown document

Don't Panic!!!! Click "Try Again" and it should be fine!

Your turn: Exercise 1

Create your first R Markdown document

Output

Time: 5 min

See what's underneath

Three main components in Rmd:

    1.Metadata

    2.Text

    3.Code

1.Metadata: the YAML header

```
1  ---
2  title: "My first Rmarkdown"
3  output: html_document
4  ---
```

Written between the three dashes

Written in YAML (YAML Aint Markup Language)*

1.Metadata: the YAML header

```
1  ---
2  title: "My First Markdown"
3  output: html_document
4  author: "Nick Stamboglis"
5  date: "`r format(Sys.time(), '%e %B %Y')`"
6  ---
```

➔ Safer to always quote

➔ Indentation matters

➔ Options available

➔ Logicals allowed

Source:
https://bookdown.org/yihui/bookdown/r-markdown.html
https://holtzy.github.io/Pimp-my-rmd/

2.Text

```
5
6 ▾ # Header 1
7
8 ▾ ## Header 2
9
10 ▾ ### Header 3
11
12   *italics* or _italics_
13
14   **bold** or __bold__
15
16   `inline code`
17
18   [links](https://github.com/muschitiello)
19
20   etc.
21
22   Lists:
23
24   * Item 1
25   * Item 2
26       + Item 2a
27       + Item 2b
28
29   1. Item 1
30   2. Item 2
31   3. Item 3
32
33   > Block Quotes
34
35   Horizontal rules:
36
37   ***
38
39 ▾ ---
40
41   superscript^2^
42
```

→

Header 1

Header 2

Header 3

italics or *italics*

bold or **bold**

`inline code`

links

etc.

Lists:

- Item 1
- Item 2
  - Item 2a
  - Item 2b

1. Item 1
2. Item 2
3. Item 3

> Block Quotes

Horizontal rules:

superscript[2]

2. Mathematics

```
5
6 ▾  # Inline math code
7
8    Inline LaTeX equations can be written in a pair of dollar signs
     using the LaTeX syntax, e.g., `$\lim_{x \to \infty} f(x)$` (actual
     output:$\lim_{x \to \infty} f(x)$)
9
10 ▾ # Centered math code
11
12   Math expressions of the display style can be written in a pair of
     double dollar signs, e.g., `$$x_{1} + x_{2} + \cdots + x_{n}$$`,
     and the output looks like this:
13
14   $$x_{1} + x_{2} + \cdots + x_{n}$$
```

LᴬTᴇX
Friendly
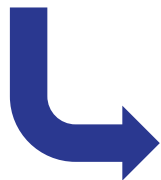
Inline math code

Inline LaTeX equations can be written in a pair of dollar signs using the LaTeX syntax, e.g., `$\lim_{x \to \infty} f(x)$` (actual output:$\lim_{x \to \infty} f(x)$)

Centered math code

Math expressions of the display style can be written in a pair of double dollar signs, e.g., `$$x_{1} + x_{2} + \cdots + x_{n}$$`, and the output looks like this:

$$x_1 + x_2 + \cdots + x_n$$

Click here for Suggestions for the use of mathematics in Rmarkdown

3.Code

```
5
6   # Inline code
7
8   Today is `r format(Sys.time(), '%e %B %Y')`.
9
10  # Code Chunks
11
12  You can easily add a code chunk by clicking **Ctrl + Alt + I**
13  ```{r, include = TRUE}
14
15  # Appearing Code
16  summary(cars)
17
18  ```
19
20  # Chunk Options
21
22  Chunk output can be customized with knitr options arguments set in
    the {} of a chunk header. The most common options are:
23
24   - `include = FALSE` prevents code and results from appearing in
    the finished file. R Markdown still runs the code in the chunk,
    and the results can be used by other chunks.
25   - `echo = FALSE` prevents code, but not the results from
    appearing in the finished file. This is a useful way to embed
    figures.
26
27  For a complete list see [R Markdown reference
    guide](https://rstudio.com/wp-content/uploads/2015/03/rmarkdown-re
    ference.pdf?_ga=2.116435842.520650959.1591111953-1268727786.157331
    1084)
28
29
```

Inline code

Today is 2 June 2020.

Code Chunks

You can easily add a code chunk by clicking **Ctrl + Alt + I**

```
# Appearing Code
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Chunk Options

Chunk output can be customized with knitr options arguments set in the {} of a chunk header. The most common options are:

- `include = FALSE` prevents code and results from appearing in the finished file. R Markdown still runs the code in the chunk, and the results can be used by other chunks.
- `echo = FALSE` prevents code, but not the results from appearing in the finished file. This is a useful way to embed figures.

For a complete list see R Markdown reference guide

R Markdown Reference Guide

3.Code (bonus tip)

```
4   ---
5
6 ▾ ```{r setup, include=FALSE}
7   knitr::opts_chunk$set(echo = TRUE)
8   ```
9
10 ▾ ## R Markdown
11
12   This is an R Markdown document. Markdown is a simple formatting syntax
    for authoring HTML, PDF, and MS Word documents. For more details on
    using R Markdown see <http://rmarkdown.rstudio.com>.
13
14   When you click the **Knit** button a document will be generated that
    includes both content as well as the output of any embedded R code
    chunks within the document. You can embed an R code chunk like this:
15
16 ▾ ```{r cars}
17   summary(cars)
18   ```

        speed          dist
    Min.   : 4.0   Min.   :  2.00
    1st Qu.:12.0   1st Qu.: 26.00
    Median :15.0   Median : 36.00
    Mean   :15.4   Mean   : 42.98
    3rd Qu.:19.0   3rd Qu.: 56.00
    Max.   :25.0   Max.   :120.00

19
20 ▾ ## Including Plots
21
```

Code chunks can be run before knitting to debug and preview

R Markdown Reference Guide

4. And more ....

- Images

- Bibliography

- Citations

- ...

Your turn: Exercise 2

02_Rmarkdown_components.Rmd

Add or change components in Rmarkdown

Add equation of the "mean" in exercise 2:

```
56
57  ### Equation of the *mean*
58
59  $$\bar{x} = \frac{1}{n} \sum_{i=1}^{n}x_{i}$$
```

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

```
60
```
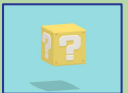
Time: 5 min

Output formats

Multiples formats

- HTML
- PDF
- Word
- Slides
- Latex document
- Dashboards
- Website

… and more!

Sources:
https://bookdown.org/yihui/bookdown/r-markdown.html
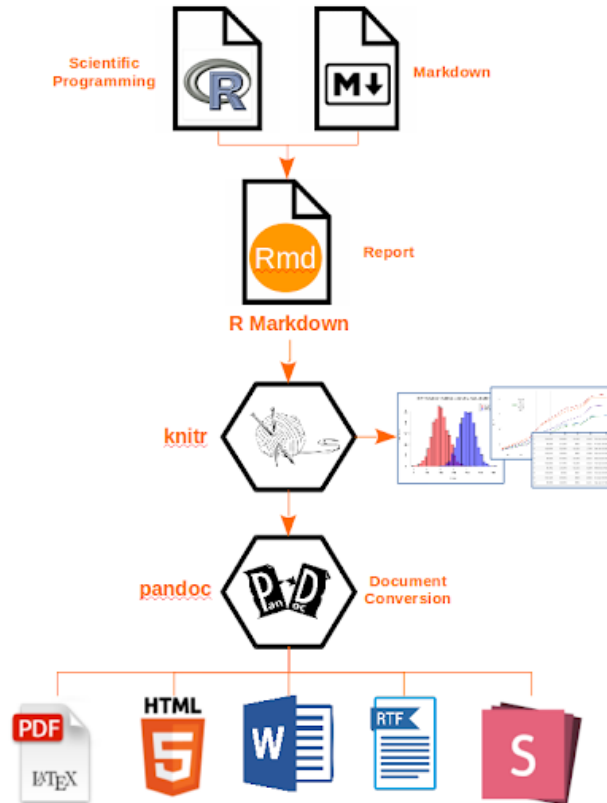
Your turn: Exercise 3

📄 03_Rmarkdown_output_formats.Rmd

Knit in different output formats

```
1  ---
2  title: "My First Markdown"
3  author: "Nick Stamboglis"
4  date: "`r format(Sys.time(), '%e %B %Y')`"
5  output: pdf_document
6  ---
```

```
1  ---
2  title: "My First Markdown"
3  author: "Nick Stamboglis"
4  date: "`r format(Sys.time(), '%e %B %Y')`"
5  output: word_document
6  ---
```

```
1  ---
2  title: "My First Markdown"
3  author: "Nick Stamboglis"
4  date: "`r format(Sys.time(), '%e %B %Y')`"
5  output: html_document
6  ---
```

03_Rmarkdown_output_formats.Rmd ×

Knit

- Knit to HTML
- Knit to PDF
- Knit to Word
- Knit with Parameters...
- Knit Directory
- Clear Knitr Cache...
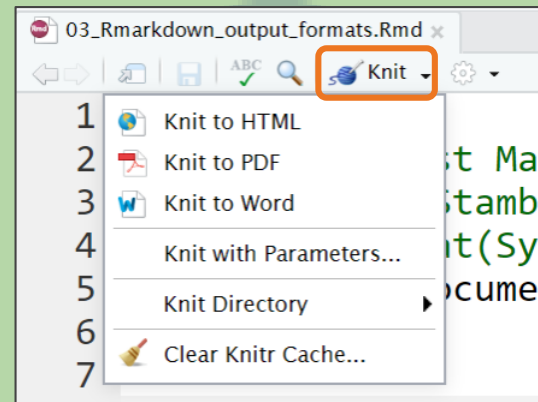
Time: 5 min

Resources:

R Markdown Cheat Sheet

R Markdown The Definitive Guide

R for Data Science

Questions

Next up: Parametrization

Source: giphy.com