

Lab 2: Starting with RMarkdown

Isabel Casas

RMarkdown Motivation

A [great tutorial](#).

Markdown is a mark-up language, like HTML or LaTeX, that produces text files using specific commands. First, we must install R packages *rmarkdown* and *tinytex* and type `tinytex::install_tinytex()` in your console.

RMarkdown is a mark-up language than together with RStudio allows us to:

- Create notebooks and compile them (knit) to create an output document in various formats: pdf, HTML, Powerpoint, etc.
- Write mathematical formula easily using the LaTeX syntaxis. For example,

$$y_i = \beta \sin(x_i) + \sqrt{4} + \epsilon_i \text{ for } i = 1, \dots, 50$$

- The notebooks can include inline R code, which we can run and print its output in the output file.
- It can be perfect for taking notes in class, doing homework and assignments, and creating periodic reports with different data.

Before starting with Lab 2, it is essential to understand the first lines on the top of every RMarkdown notebook, the YAML. Look at the top of Lab2.Rmd to find its YAML. It contains the settings of each notebook. Whenever we open a file and choose *RMarkdown*, we select its YAML implicitly. We can add more things to it. References:

- [RMarkdown cheatsheet](#)
- [RMarkdown reference guide](#)
- [RMarkdown website](#) for details.

Besides, text and code, Rmarkdown files contain metadata at the beginning. The first lines are called the YAML and have hte following format.

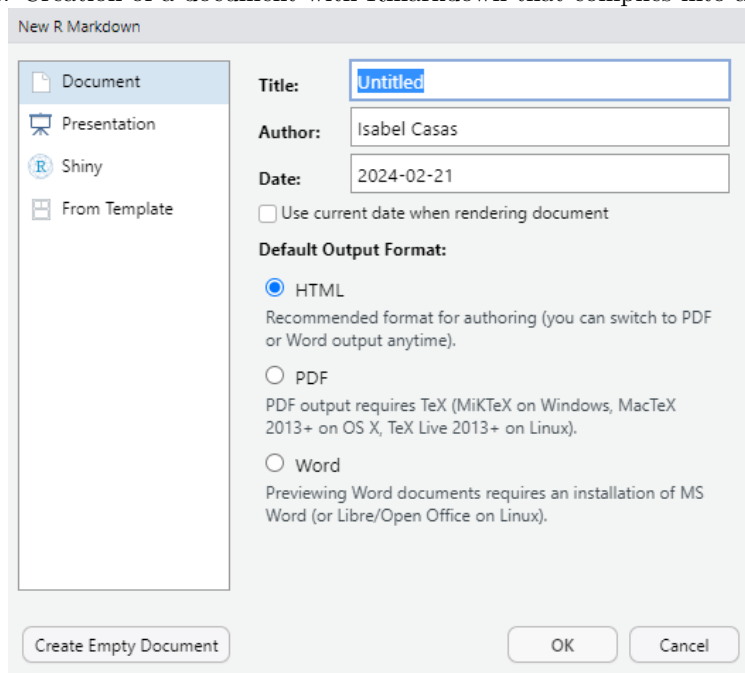
YAML (First lines that define the type of document and output)

Exercise 1

0. Install R package *rmarkdown* and *tinytext*.
1. In RStudio, open *Document* file of type *RMarkdown*, which will produce an HTML file when compiled (knit it). Check Figure 1 below.
2. Change the *Title* of your document and knit it again.
3. Now change the output type to *pdf_document* and knit it again.
4. Add your name as an author.

Hint: Change settings in the YAML.

Figure 1: Creation of a document with Rmarkdown that compiles into an HTML.



Exercise 2

There are many things that we can change in your RMarkdown document. Check the references above for details. For example, you can add a link to a website or a file using the command “`name`”. For example: “[Google Search](#)” creates the link to the Google search website.

1. Add a link to your RMarkdown file.
2. What is the colour of your link? Can you change it to make it more visible? Search on the Internet to change your link colour to red.

Hint: Add something to the YAML (you may google it!)

Exercise 3

We can also insert plots (like Figure 2 below), by plotting a function in R and letting it be part of the document.

One can change the settings of each R chunk. In the the R chunk for Figure 1 above, we used: `fig.show = TRUE`, `fig.align=“center”`, `fig.width=4.5`, `fig.cap = “My first figure in RMarkdown”` to get the caption and place the figure in the center of the page.

We also used “`echo = FALSE`”, so the code does not appear in the document and “`eval = TRUE`”, so the calculations are done.

Exercise:

1. Create a Figure that plots the following function:

$$z = x^3 \text{ for } x = -3, \dots, 3$$

Make sure that the figure with caption as well as the R code appear in the document when knitted.

This is a plot example

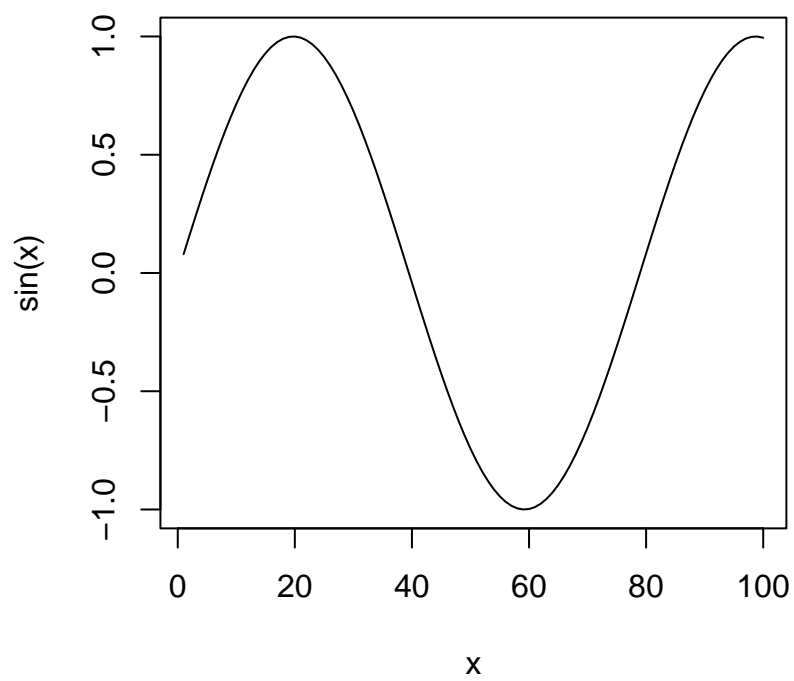


Figure 2: My first figure in RMarkdown

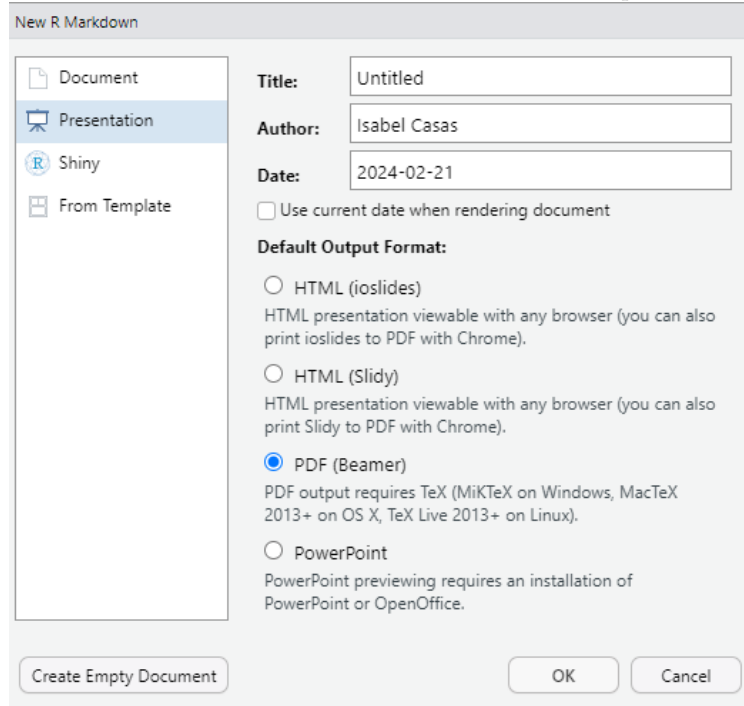
```
# Write you code here
```

2. Change the colour of the line in Figure 2 to *red*. **Hint:** type `?plot` in the R console and find the argument you have to change.

Exercise 4

1. Create a new Rmarkdown file different from this one called Lab2__2.Rmd. This file should be of type presentation. Check Figure 4 below.

Figure 3: Creation of a document with Rmarkdown that compiles into an HTML.



2. Reproduce the content of Lecture2.pdf using dataset MPG. Every slide starts with `## Title of slide.`
3. How does it work if you had chosen “Powerpoint presentation” in Step 1?

Homework

To continue learning about different features in RMarkdown, take the following [RMarkdown course](#) in Posit Cloud.

After this lab and homework you should have learned:

- The necessary R packages to create Rmarkdown files
- How to create and Rmarkdown file and produce PDF, HTML files and presentations.
- How to add different features to your file such as sections, lists, plots and R code
- How to use RMarkdown to write a report.

Annex

What to install in your computer to use R and RStudio locally

To have RStudio, R and RMarkdown on your personal computer, install this software in the order I write it down.

1. Download R from [Link](#) and install the **base** package. If you have an old version of R on your computer, please delete it before installing a new one.
2. Download RStudio Desktop from [Link] (<https://posit.co/download/rstudio-desktop/>) and install it.
3. Open RStudio and in the console type `install.packages(c("rmarkdown", "tinytex"))`
4. In the console type `tinytex::install_tinytex()`