

Introduction to **R Markdown**

Vincent Guillemot



Cheatsheet

rmarkdown.pdf

Set Output Formats and their Options in YAML

Use the document's YAML header to set an **output format** and customize it with **output options**.

```
---
title: "My Document"
author: "Author Name"
output:
  html_document:
    toc: TRUE
---
```

Indent format 2 characters,
indent options 4 characters

OUTPUT FORMAT	CREATES
html_document	.html
pdf_document*	.pdf
word_document	Microsoft Word (.docx)
powerpoint_presentation	Microsoft Powerpoint (.pptx)
odt_document	OpenDocument Text
rtf_document	Rich Text Format
md_document	Markdown
github_document	Markdown for Github
ioslides_presentation	ioslides HTML slides
slidy_presentation	Slidy HTML slides
beamer_presentation*	Beamer slides
* Requires LaTeX, use <code>tinytex::install_tinytex()</code>	
Also see flexdashboard , bookdown , distill , and blogdown .	

IMPORTANT OPTIONS	DESCRIPTION	HTML	PDF	MS Word	MS PPT
anchor_sections	Show section anchors on mouse hover (TRUE or FALSE)	X			
citation_package	The LaTeX package to process citations ("default", "natbib", "biblatex")		X		
code_download	Give readers an option to download the .Rmd source code (TRUE or FALSE)	X			
code_folding	Let readers to toggle the display of R code ("none", "hide", or "show")	X			
css	CSS or SCSS file to use to style document (e.g. "style.css")	X			
dev	Graphics device to use for figure output (e.g. "png", "pdf")	X	X		
df_print	Method for printing data frames ("default", "kable", "tibble", "paged")	X	X	X	X
fig_caption	Should figures be rendered with captions (TRUE or FALSE)	X	X	X	X
highlight	Syntax highlighting ("tango", "pygments", "kate", "zenburn", "textmate")	X	X	X	
includes	File of content to place in doc ("in_header", "before_body", "after_body")	X	X		
keep_md	Keep the Markdown .md file generated by knitting (TRUE or FALSE)	X	X	X	X
keep_tex	Keep the intermediate TEX file used to convert to PDF (TRUE or FALSE)		X		
latex_engine	LaTeX engine for producing PDF output ("pdflatex", "xelatex", or "lualatex")		X		
reference_docx/_doc	docx/pptx file containing styles to copy in the output (e.g. "file.docx", "file.pptx")		X	X	
theme	Theme options (see Bootswatch and Custom Themes below)	X			
toc	Add a table of contents at start of document (TRUE or FALSE)	X	X	X	X
toc_depth	The lowest level of headings to add to table of contents (e.g. 2, 3)	X	X	X	X
toc_float	Float the table of contents to the left of the main document content (TRUE or FALSE)	X			

Use `?output format` to see all of a format's options, e.g. `?html_document`

Render

When you render a document, **rmarkdown**:

1. Runs the code and embeds results and text into an .md file with **knitr**.
2. Converts the .md file into the output format with **Pandoc**.



Save, then **Knit** to preview the document output. The resulting HTML/PDF/MS Word/etc. document will be created and saved in the same directory as the .Rmd file.

Use **rmarkdown::render()** to render/knit in the R console. See `?render` for available options.

Share

Publish on Posit Connect

to share R Markdown documents securely, schedule automatic updates, and interact with parameters in real-time. posit.co/products/enterprise/connect.



More Header Options

PARAMETERS

Parameterize your documents to reuse with new inputs (e.g., data, values, etc.).

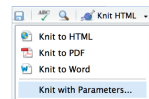
1. **Add parameters** in the header as sub-values of `params`.

```
params:
  state: "hawaii"
```

2. **Call parameters** in code using `params$<name>`.

```
{r}
data <- df[, params$state]
summary(data)
```

3. **Set parameters** with Knit with Parameters or the `params` argument of `render()`.



REUSABLE TEMPLATES

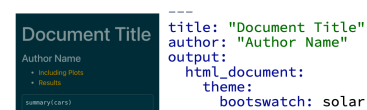
1. **Create a new package** with an `inst/rmarkdown/` templates directory.
2. **Add a folder** containing **template.yaml** (below) and **skeleton.Rmd** (template contents).
3. **Install** the package to access template by going to **File > New R Markdown > From Template**.

```
name: "My Template"
```

BOOTSWATCH THEMES

Customize HTML documents with Bootswatch themes from the **bslib** package using the theme output option.

Use `bslib::bootswatch_themes()` to list available themes.



CUSTOM THEMES

Customize individual HTML elements using `bslib` variables. Use `?bs_theme` to see more variables.

```
output:
  html_document:
    theme:
      bg: "#121212"
      fg: "#E4E4E4"
      base_font:
        google: "Prompt"
---
```

More on `bslib` at pkgs.rstudio.com/bslib/.

STYLING WITH CSS AND SCSS

Add CSS and SCSS to your document by adding a path to a file with the `css` option in the YAML header.

```
title: "My Document"
author: "Author Name"
output:
  html_document:
    css: "style.css"
---
```

Apply CSS styling by writing HTML tags directly or:

- Use markdown to apply style attributes inline.

Bracketed Span
A `[green][.my-color]` word. A green word.

Fenced Div
`::: [.my-color]`
All of these words are green.
`:::` All of these words are green.

- Use the Visual Editor. Go to **Format > Div/Span** and add CSS styling directly with Edit Attributes.

This is a div with some text in it.

INTERACTIVITY

Turn your report into an interactive Shiny document in 4 steps:

1. Add `runtime: shiny` to the YAML header.
2. Call Shiny input functions to embed input objects.
3. Call Shiny render functions to embed reactive output.
4. Render with `rmarkdown::run()` or click **Run Document** in RStudio IDE.

```
output: html_document
runtime: shiny
```

```
{r, echo = FALSE}
numericInput("n",
  "How many cars?", 5)

renderTable({
  head(cars, input$n)
})
```

How many cars?		
5		
speed	dist	
1 4.00	2.00	
2 4.00	10.00	
3 7.00	4.00	
4 7.00	22.00	
5 8.00	16.00	

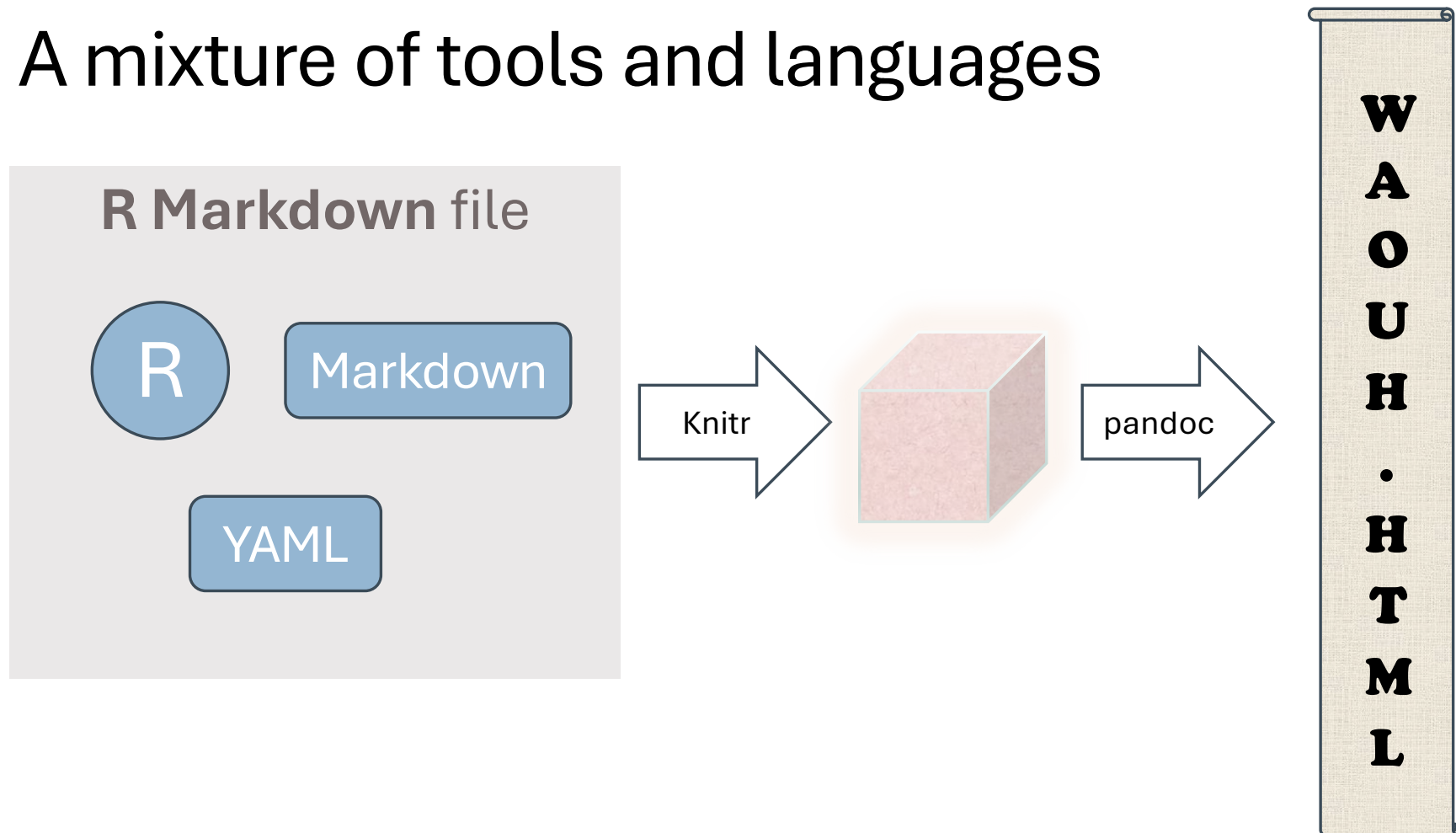
Also see Shiny Prerendered for better performance.

rmarkdown.rstudio.com/authoring_shiny_prerendered.

Embed a complete app into your document with `shiny::shinyAppDir()`. More at bookdown.org/yihui/rmarkdown/shiny-embedded.html.



A mixture of tools and languages



Other features

- PDF: LaTeX
- Maths: LaTeX
- Customized HTML documents: CSS (ou SCSS)
- Diagrams: mermaid or GraphViz
- Other high-level programming languages: Python, Julia, SQL
- Other: bash, Rcpp (C++), Stan (statistiques bayésiennes),

The default document

File > New File > R Markdown...

Procedure:

- create a document,
- change the default values,
- change
 - headers,
 - text,
 - R code,
- save document as an Rmd file.
- Click on “**Knit**”



New R Markdown

☒ Document
☐ Presentation
☐ Shiny
☐ From Template

Title:

Author:

Date:

☐ Use current date when rendering document

Default Output Format:

☒ **HTML**
Recommended format for authoring (you can switch to PDF or Word output anytime).

☐ **PDF**
PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+ on OS X, TeX Live 2013+ on Linux).

☐ **Word**
Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux).

Exercise: modify the default document

1. Select « HTML » output format
2. Change title to “Document 1: title and text”
3. Change author
4. Change text:
 1. Header to “Header”
 2. Text to “I’m learning R Markdown!”
5. Save this file as “document1-simple.Rmd”
6. Compile by clicking on “Knit”

The structure of an R Markdown file

- YAML header: title, author, date, etc.

```
---  
title: "Untitled"  
author: "Vincent Guillemot"  
date: "2025-05-23"  
output: html_document  
---
```

The structure of an R Markdown file

- Text in Markdown

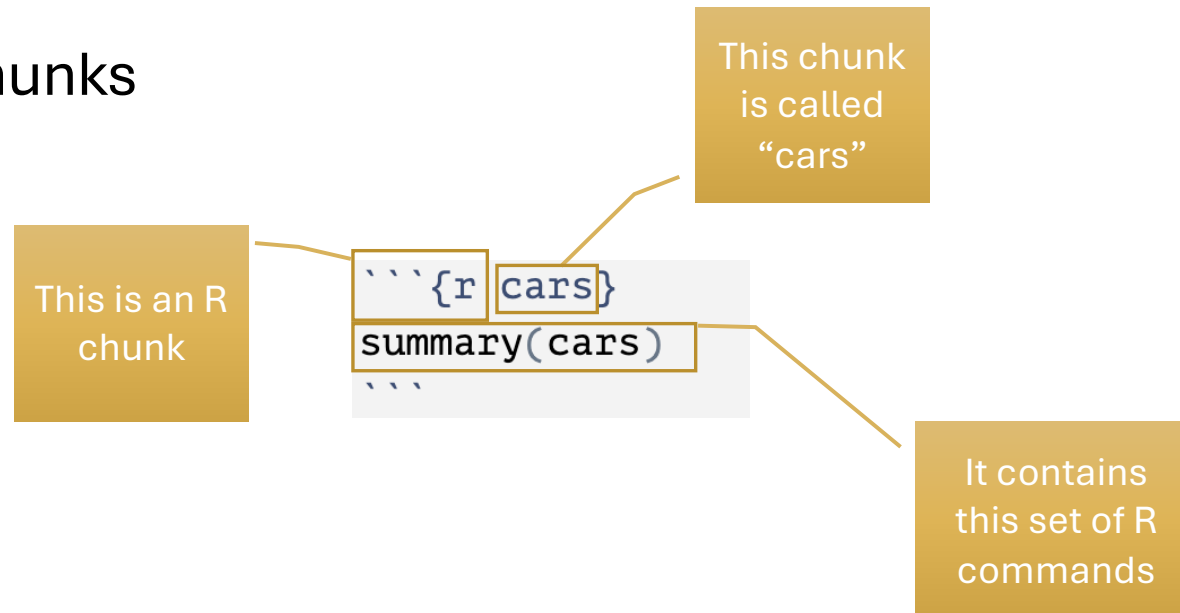
```
## R Markdown
```

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>.

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:

The structure of an R Markdown file

- R code in chunks



The structure of an R Markdown file

- Setup chunk

This R chunk is called “setup”

```
```${r setup, include=FALSE}  
knitr::opts_chunk$set(echo = TRUE)
```
```

Its code is executed but nothing is shown on the output file

It sets the values of chunk options for all the other chunks

All chunks have these little buttons, they are here to help you!



Exercise

- Create an R Markdown document called « document2-justeAtitle.Rmd »
- Compile it by clicking « Knit »
- The result should look like this

```
---  
title: "Untitled"  
author: "Vincent Guillemot"  
date: "2025-05-23"  
output: html_document  
---
```



Le document avec juste un titre

Jean-Edmond Synthétique

1er avril 1956

The “text” part is written in **Markdown**

It’s another language entirely... but intuitive!

Markdown Quick Reference

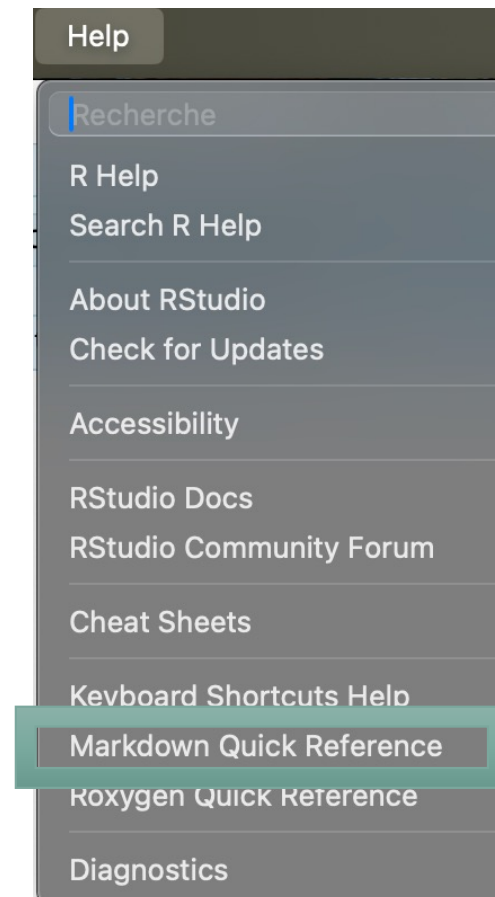
(...)

Emphasis

italic ****bold****
italic __bold__

Headers

Header 1 ## Header 2 ### Header 3



Exercise

Create an R Markdown called “document3-just_blabla.Rmd” that will look like this:

- Les chaussettes de l’archiduchesse sont-elles sèches ?
- **ARCHI**-sèches ?

Chunks

```
```${r moins3a3aucarré, echo=FALSE}  
plot((-3:3)^2)
```
```



Chunk Name: moins3a3aucarré

Output: Show output only

☐ Show warnings

☐ Show messages

☐ Use paged tables

☐ Use custom figure size

[? Chunk options](#)

Revert

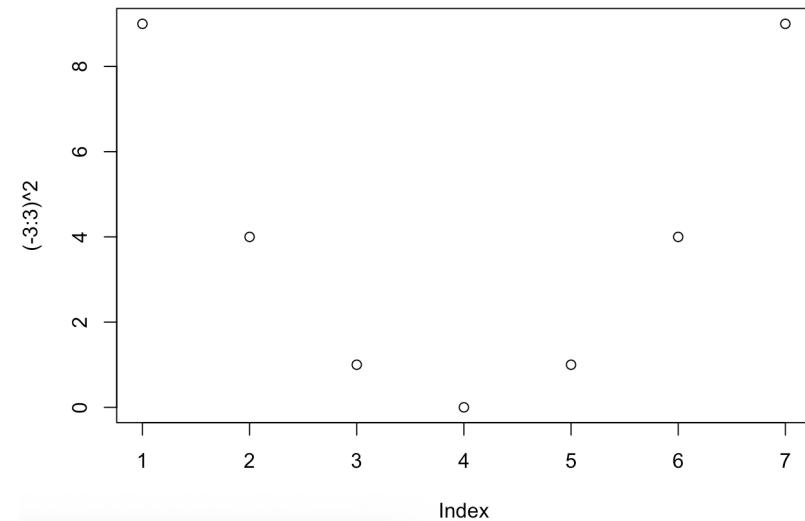
Apply



Run all the previous chunks



Run the code inside this chunk



Exercise

- Create an R Markdown document called « document4-complete.Rmd », with
 - a **YAML** header
 - **Markdown** text
 - Two **R chunks**
- That will compile into the following HTML document ->

Un diagramme en bâtons

Vincent Guillemot

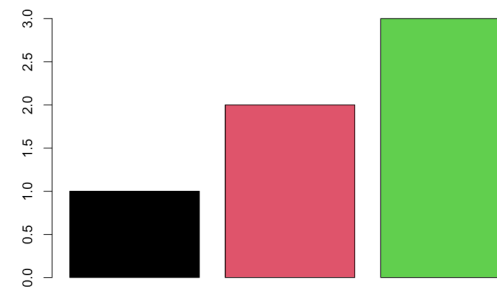
2025-05-25

Génération des données

```
x <- 1:3
```

Diagramme en bâtons

```
barplot(x, col = 1:3)
```



Final exercise: the first useful R Markdown document

Create an R Markdown document that will contain:

1. An R chunk to load the COVID dataset
2. An R chunk to show the expression of CD4 for all cases
3. A title, your name and the date
4. Some text

Work in groups

