Efficient and reproducible research with R Markdown

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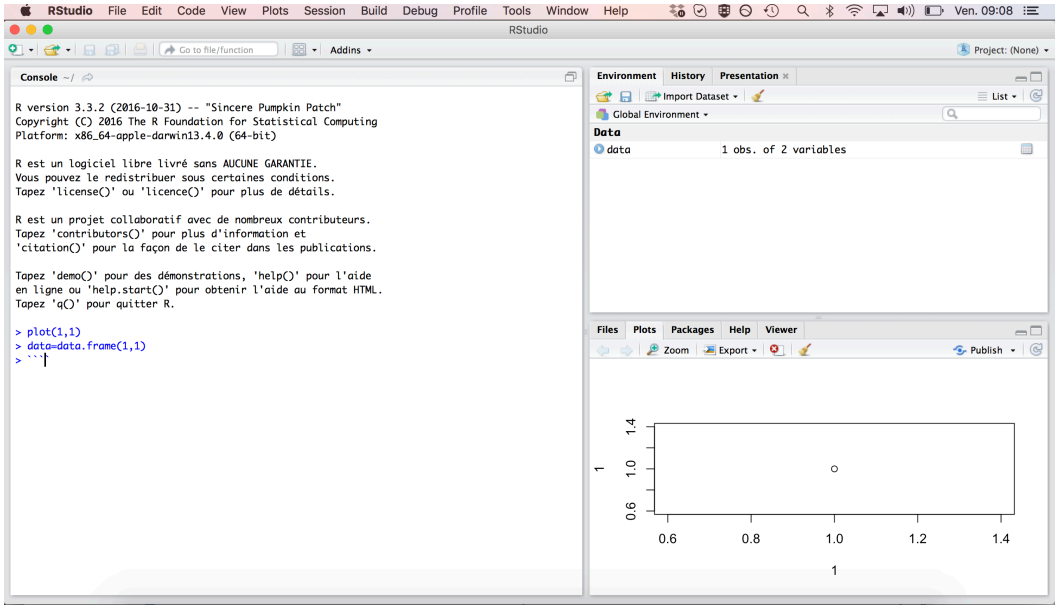
A few resources:

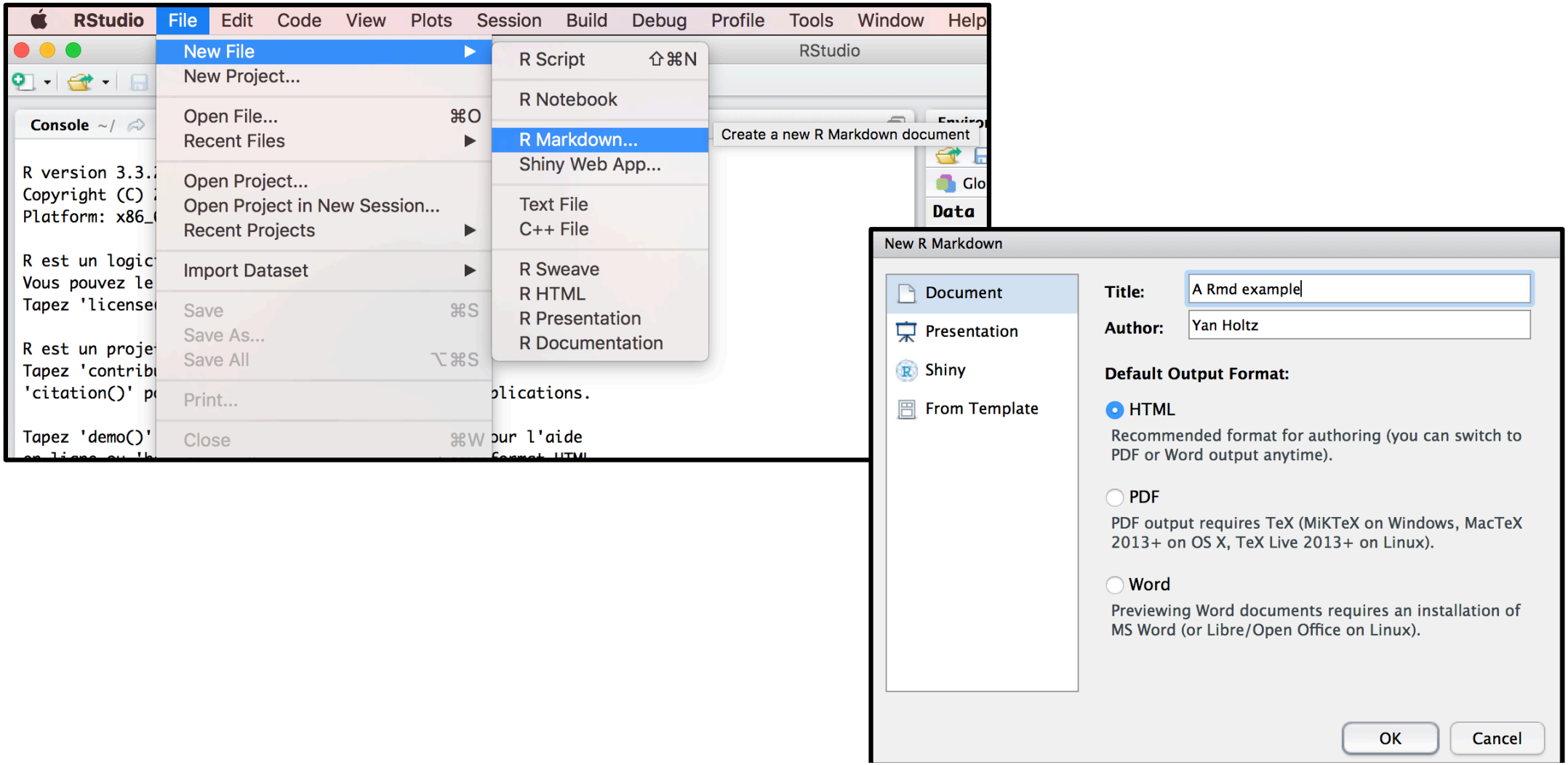
- The R Markdown website
- The R Markdown cheat sheet
- This presentation
- The PCTG template

Open R studio:

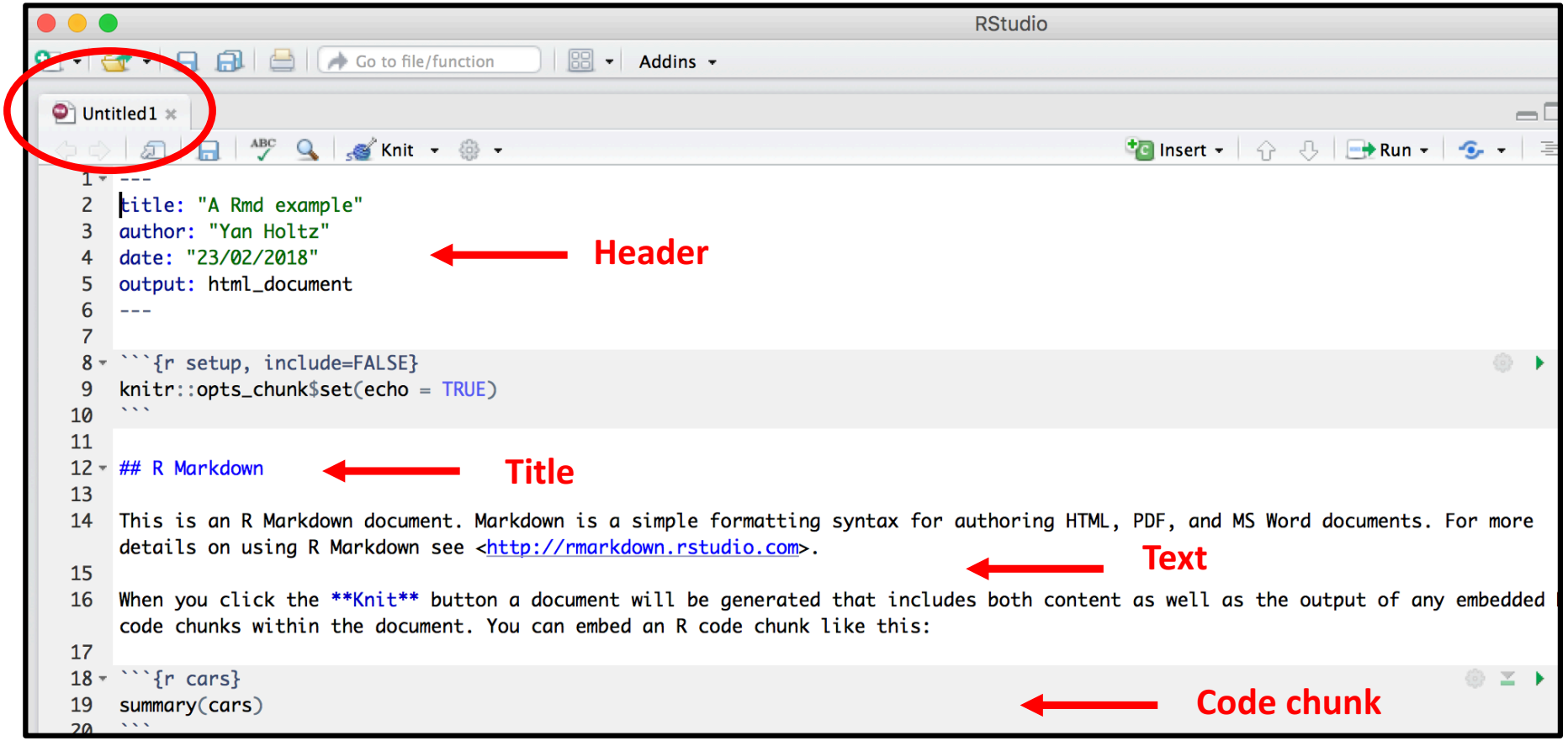
- User Friendly environment
- Auto completion
- Run a line of code with Cmd + Enter



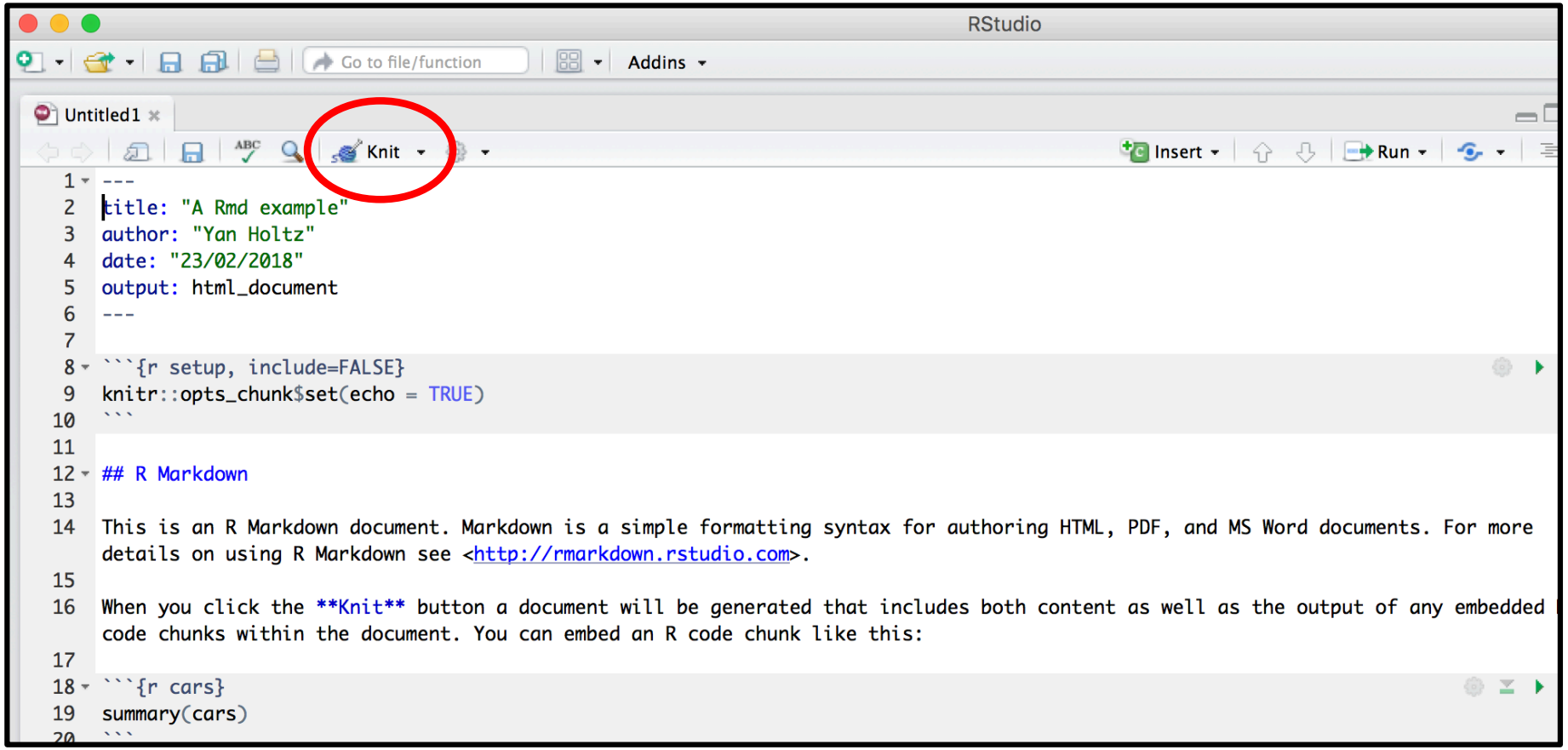
Open a .Rmd file:



Anatomy of a .Rmd file:

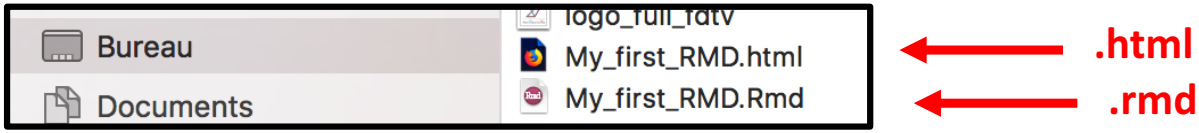


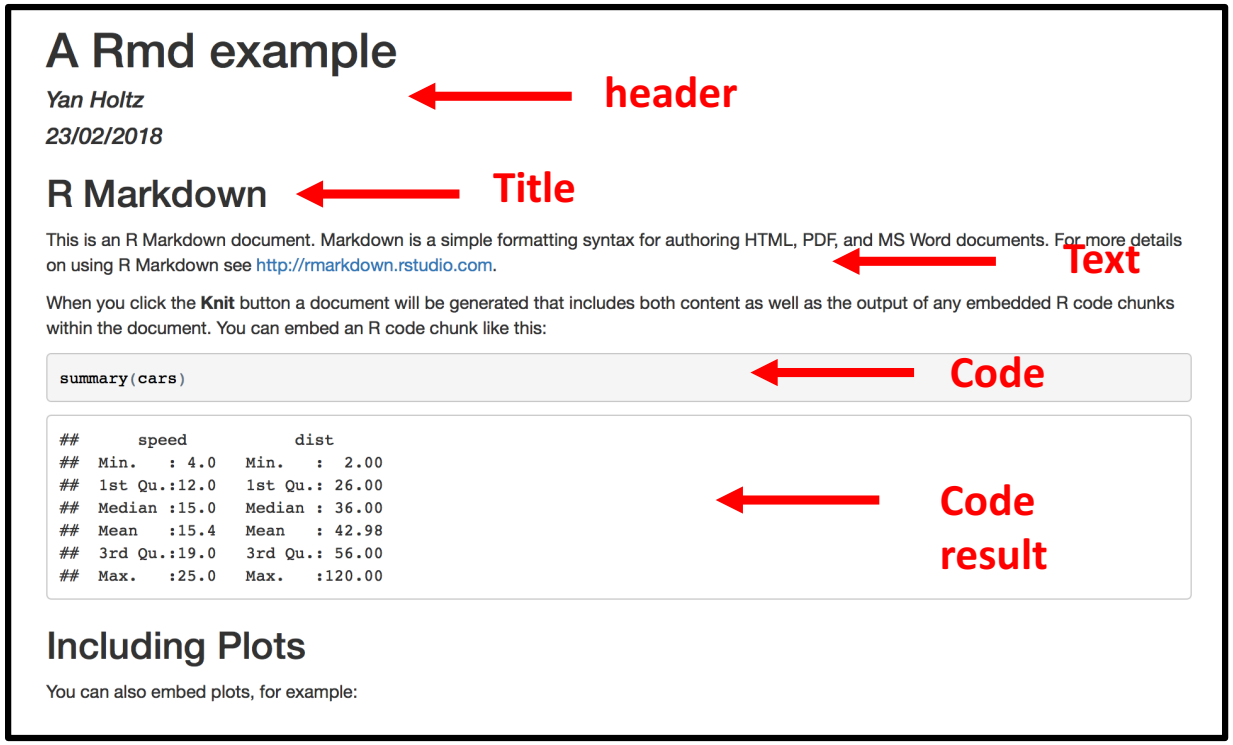
Knit the .Rmd file:



.HTML output is ready !

- Have a look to your current director
- Open the .html in a browser





Customize the text

[R Markdown cheat sheet]

syntax	becomes
Plain text End a line with two spaces to start a new paragraph. *italics* and _italics_ **bold** and __bold__ superscript^2^ ~~strikethrough~~ [link](www.rstudio.com)	Plain text End a line with two spaces to start a new paragraph. *italics* and *italics* **bold** and **bold** superscript^2 ~~strikethrough~~ link
# Header 1	**Header 1**
## Header 2	**Header 2**
### Header 3	**Header 3**
#### Header 4	**Header 4**
##### Header 5	**Header 5**
###### Header 6	**Header 6**
endash: -- emdash: --- ellipsis: ... inline equation: $A = \pi*r^{2}$ image: 	endash: – emdash: — ellipsis: … inline equation: $A = \pi * r^2$ image: 
horizontal rule (or slide break): ***	horizontal rule (or slide break):
> block quote	> block quote
* unordered list * item 2 + sub-item 1 + sub-item 2	• unordered list • item 2 ◦ sub-item 1 ◦ sub-item 2
1. ordered list 2. item 2 + sub-item 1 + sub-item 2	1. ordered list 2. item 2 ◦ sub-item 1 ◦ sub-item 2

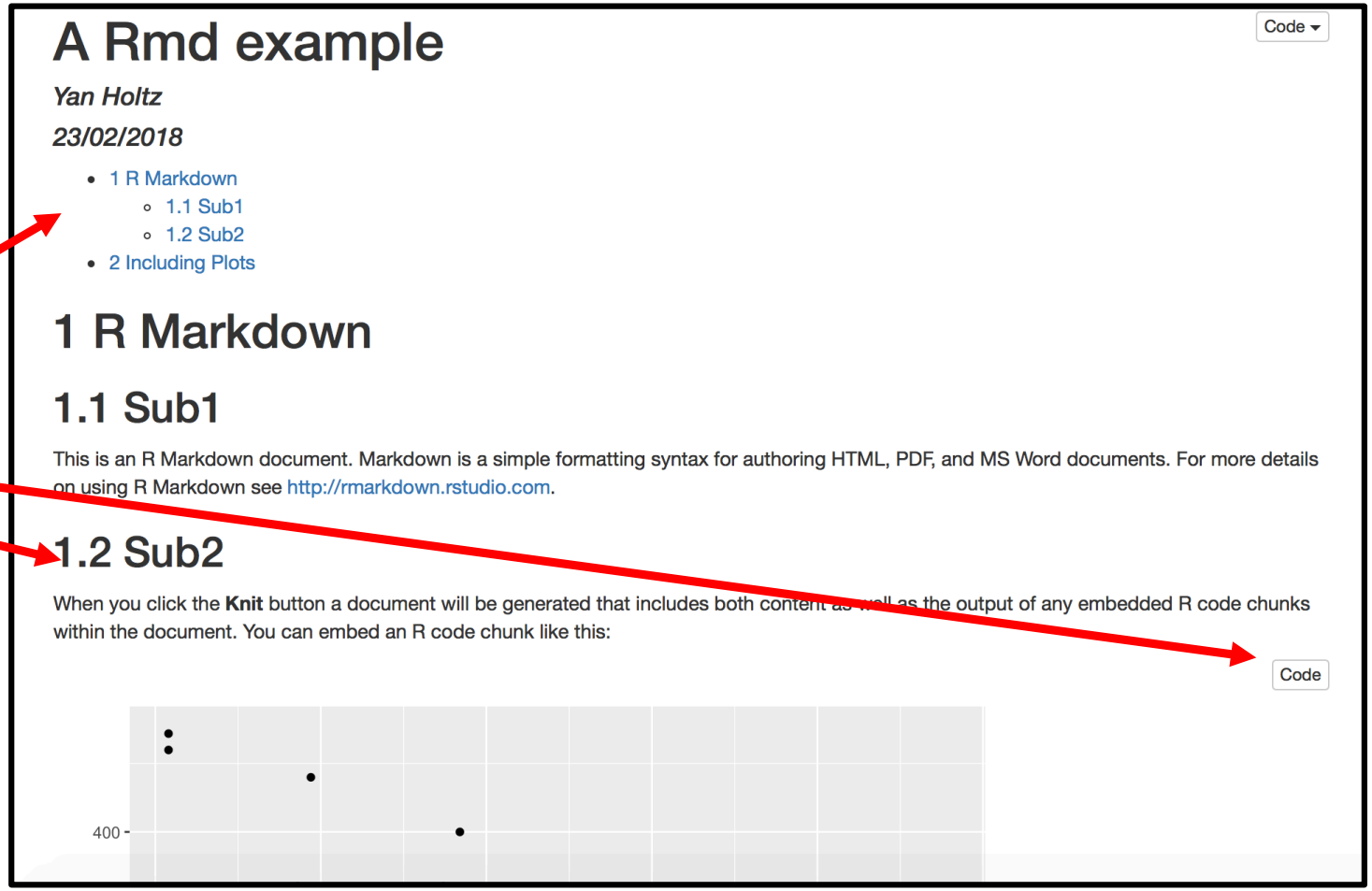
Anatomy of a Code chunk:

Code chunk options:

option	default	effect
`eval`	TRUE	Whether to evaluate the code and include its results
`echo`	TRUE	Whether to display code along with its results
`warning`	TRUE	Whether to display warnings
`error`	FALSE	Whether to display errors
`message`	TRUE	Whether to display messages
`tidy`	FALSE	Whether to reformat code in a tidy way when displaying it
`results`	"markup"	"markup", "asis", "hold", or "hide"
`cache`	FALSE	Whether to cache results for future renders
`comment`	"##"	Comment character to preface results with
`fig.width`	7	Width in inches for plots created in chunk
`fig.height`	7	Height in inches for plots created in chunk

Anatomy of the header:

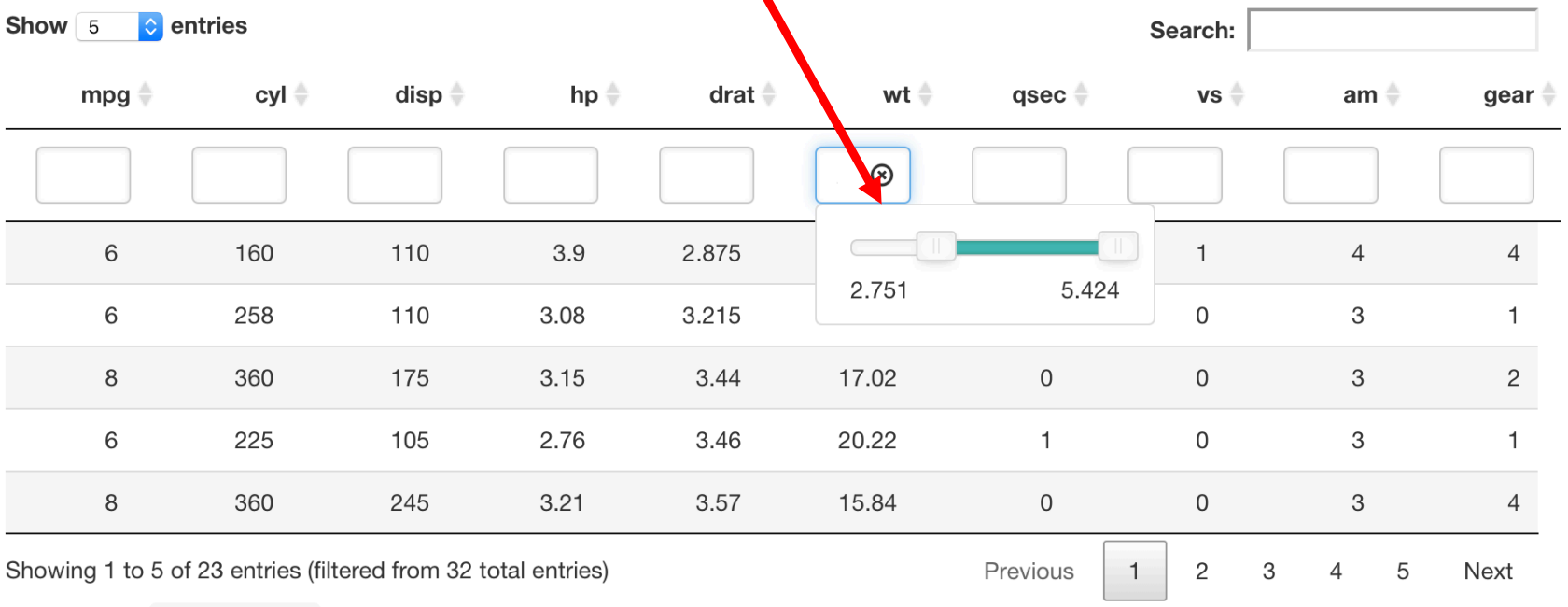
```
---
title: "A Rmd example"
author: "Yan Holtz"
date: "23/02/2018"
output:
  html_document:
    toc: TRUE
    code_folding: "hide"
    number_sections: TRUE
---
```



Insert a table: the DT library

```
```{r}
library(DT)
datatable(mtcars, rownames = FALSE, filter="top", options = list(pageLength = 5, scrollX=T) )
```
```

Data frame



Use Interactive graphics

```
```{r, warning=FALSE, message=FALSE}
# Load a library
library(ggplot2)
library(plotly)

# make a static plot with ggplot2
p <- mtcars %>%
  ggplot( aes(x=mpg, y=disp)) +
    geom_point()

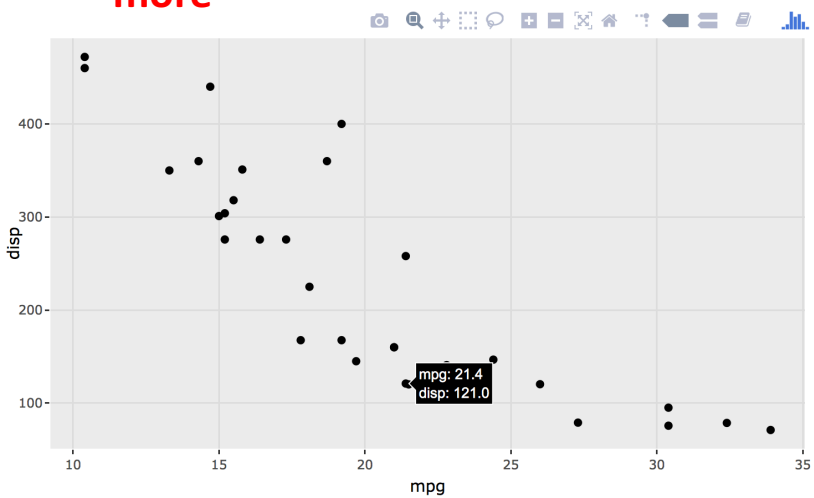
# turn it interactive with plotly
ggplotly(p)
```
```

Plotly library

Basic ggplot2 graphic

Ggplotly turn the plot interactive

Result: zoom / hover / export .. And more



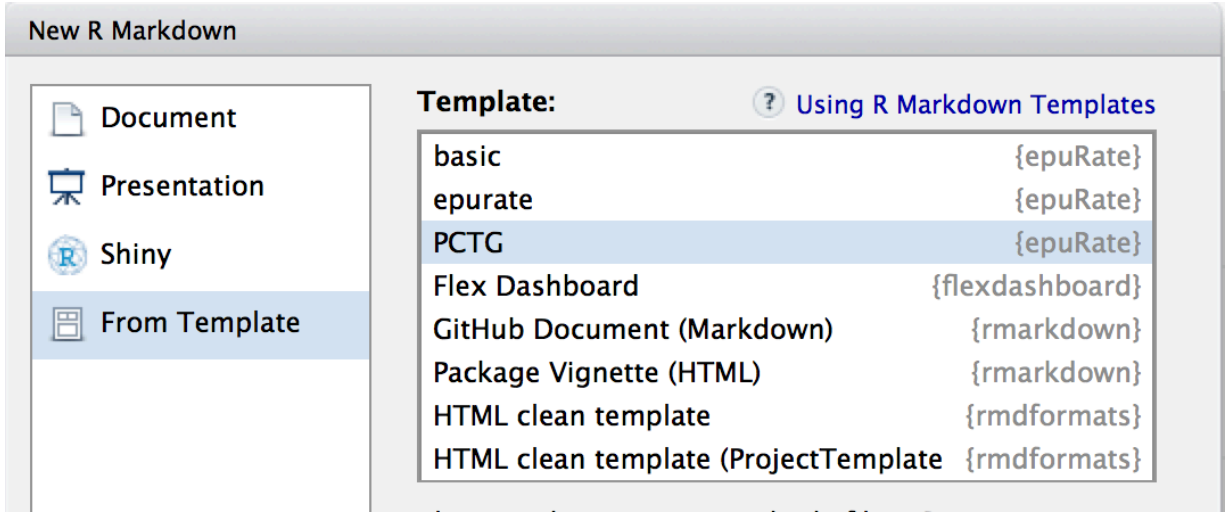
A note on interactivity

- Interactivity = javascript
- The HTML widgets wrap javascript in R function
- See http://www.htmlwidgets.org
- Large topic, needs **another tutorial (?)**

Use a template

- The PCTG template: www.github.com/holtzy/epuRate

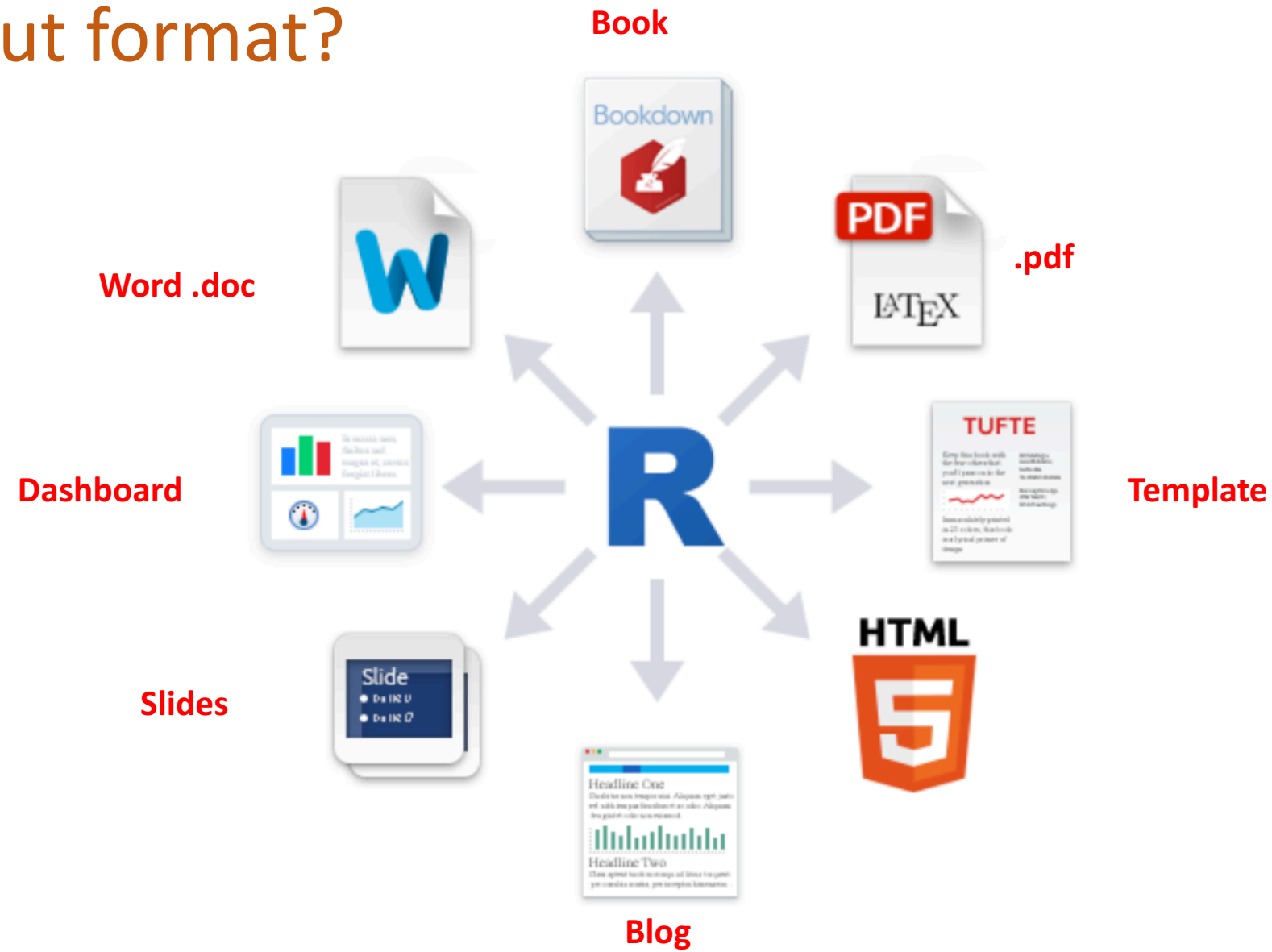
-
```
library(devtools)
install_github("holtzy/epuRate")
library(epuRate)
```

- 

Pimp my .Rmd

- holtzy.github.io/Pimp-my-rmd/
- Everything is possible
- Use CSS and HTML code
- Add header and footer
- More

Output format?



Share your analysis

- Mail with colleagues, supervisor
- Publication as a suplementary material
- Github: www.github.com
- Website

An example: my bioinfo pipeline:

- Interaction with clusters
- One unique folder
- Several .rmd wrapped in a website
- Shared online