

R Markdown

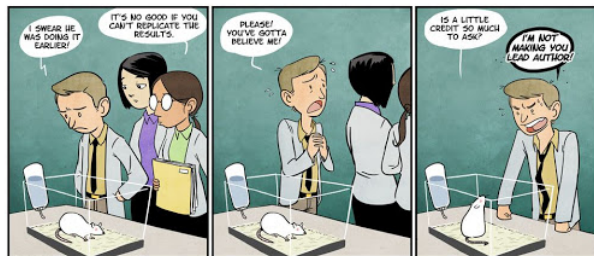
26 Apr 2020

- What is R Markdown?
- Summary of the advantages
- Approach
- Syntax for the main functions
- Specific examples
- Overview
- Exercices and closure
- Refernces

Before you start, make sure you have installed the R Markdown package

```
install.package("rmarkdown")
```

Introduction



POPSCL.COM/BLOG-NETWORK/BOXPLOT

What is R Markdown?

Markdown = Language for text formatting

- an easy to write plain text format for creating dynamic documents and reports
- contains “normal” text and code chunks (e.g. R, but Python, SQL, and more also possible)
- RMD -> MD -> html, Docx or PDF
- Formatting documents outside the analysis

Creating a document that can contain both text and code:

- When creating (“knitting”), the code is executed and displayed together with the description.
- Only a document without warnings/errors can be knitted!
- Possible to export a Word, HTML or PDF file.

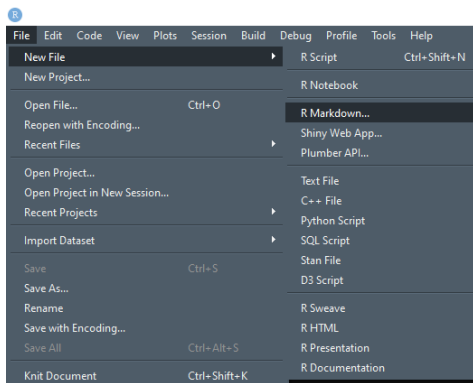
Why should you use R Markdown

- Research becomes reproducible
- Share your analysis (results and associated documentation)
- Consolidate your analysis and document into a single file
- Easy for version Control (e.g. Git/GitHub)
- Your output file will look great with hardly any effort on your part

Approach


- 1 Open RStudio -> File -> New File -> R Markdown
- 2 Enter a title for the document (optionally enter an author)
- 3 Choose an output format
- 4 YAML Headline: Final choice of your output format
- 5 Write the markdown
- 6 Embed Code
- 7 Rendering Output
 - RStudio: “Knit” (Ctrl+Shift+K)
 - Command line: `rmarkdown:: render(“input.Rmd”)`


Open new Markdown file





Give your file a title

New R Markdown

 Document

 Presentation

 Shiny

 From Template

Title:

Author:

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).

OK Cancel

Setting up your own R Markdown Document

You are going to present your work on the “Bike Rental” dataset.

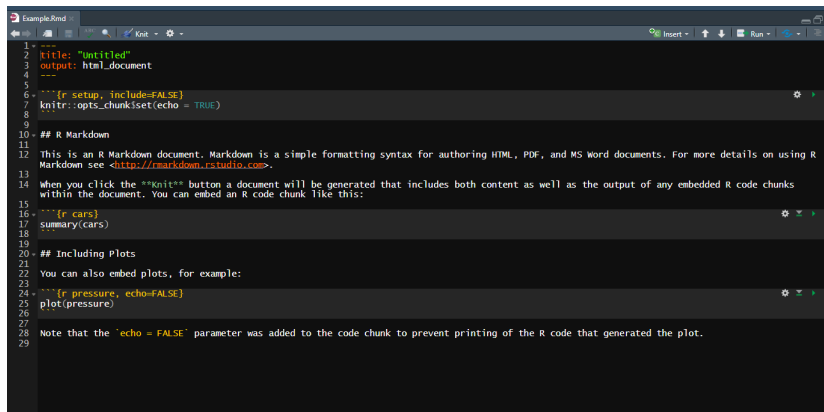
Exercise

- Title: “Analysis of the bike rental dataset”
- Subtitle: Your name

Choose the output format

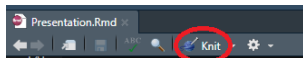
- You can choose between HTML, PDF and Docx(Word)
 - **HTML** is recommended, since everybody can read it
- You can always change your output format, in the YAML header

Starting Point

A screenshot of an R Markdown document titled 'Example.Rmd' in a text editor. The document contains a YAML header, R code chunks for setup and data summary, a paragraph about R Markdown, another R code chunk for a car summary, a section on including plots, a third R code chunk for a pressure plot, and a concluding note. The code is syntax-highlighted, and the interface includes a toolbar with icons for navigation and execution.

```
1- ----
2- |title: "Untitled"
3- |output: html_document
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
13- Markdown see <http://rmarkdown.rstudio.com>.
14-
15- 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
16- within the document. You can embed an R code chunk like this:
17-
18- ```{r cars}
19- summary(cars)
20-
21-
22- ## Including Plots
23-
24- You can also embed plots, for example:
25-
26- ```{r pressure, echo=FALSE}
27- plot(pressure)
28-
29-
30- Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.
```

Rendering output



- Press **“Knit”** in Rstudio
- Press **Ctrl+Shift+K** (Windows)
- Procedure¹



¹<https://d33wubrfki0l68.cloudfront.net/61d189fd9cdf955058415d3e1b28dd60e1bd7c9b/b739c/lesson-images/rmarkdownflow.png>

YAML Header

Example

```
1 ---
2 title: "R Markdown"
3 date: "`r format(Sys.Date(), '%d %b %Y')`"
4 output: beamer_presentation
5 urlcolor: blue
6 ---
7
```

Output types

Type	Format	Option in YAML Header
Website	HTML	output: html_document
Document	PDF	output: pdf_document
Document (Word)	DOCX	output: word_document
Presentation (beamer)	PDF	output: beamer_presentation
Presentation (ioslides)	HTML	output: ioslides_presentation

Additional YAML settings

- **toc**: table of content
- **bibliography**: bibliography.bib file with your references
- **csl**: custom citation style
- **abstract**: Space to write an abstract
- **css**: use custom css [HTML]
- **fig_width, fig_height, fig_caption**: figure options
- **include**: include other .tex files [PDF]

Your fancy Table of Content

Exercise

```
---  
title: "Analysis of the bike rental dataset"  
author: "Your name"  
date: "`r format(Sys.Date(), '%d %b %Y')`"  
output:  
  html_document:  
    toc: true  
    number_sections: true  
    toc_float:  
      collapsed: false  
      smooth_scroll: false  
bibliography: library.bib  
---
```


Text Formatting Examples

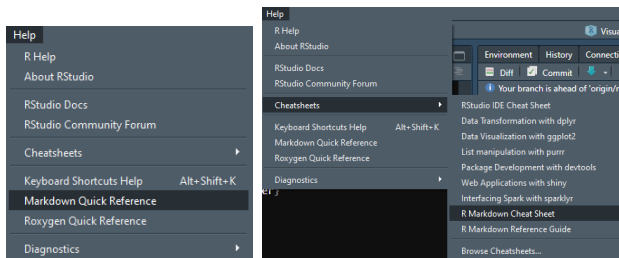
Text formatting

Text	Text
<code>*italic* or _italic_</code>	<i>italic</i>
<code>**bold** or __bold__</code>	bold
<code>[link] (www.sbg.ac.at)</code>	link

Write markdown

You can use the Quick Reference or the Cheatsheet

Both can be found by opening the **Help** dropdown menu which is positioned in the top bar



Expanding your R Markdown Document

Exercise

- 1 Set a header: “Part I: Summary statistics”
- 2 Write a plain text introduction using emphasis and lists according to Reference Guide and reproduce something like the following:

1. Set a Header: “Part I: Summary Statistics”

2. Using Emphasis and Lists

This is a plain text including *italic* formatting options in two ways as well as **bold** options in two ways.

Using ^ for ^{superscripts} and ~ for _{subscripts} and ~~strikethroughs~~.

We also learned how to use ordered lists:

1. This is the first bullet point
 - and its sub point
2. The second bullet point

Embed your code

Inline Code

```
The mean speed of cars is `r mean(cars$speed)`.
```

The mean speed of cars is 15.4.

Code Chunk

```
```${r cars_example, echo=TRUE}  
summary(cars)
```
```

```
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
```

How to get this " ' " symbol

Press Shift + ' (twice or followed by Space)



Embed your code

| Option | Description |
|---------------------------------|--|
| eval (logical, TRUE) | Evaluate chunk |
| echo (logical, TRUE) | Hides R-Code |
| results (char, "markup") | Formatting R output: e.g. "markup", "asis" |

Importing the dataset

Exercise

Now lets import our dataset while hiding our code.
To import the dataset you will want to use `read.csv()`

Hint

If you are using a project or set your working directory,
you can use `"./dataset/day.csv"`

Create a statistical overview

Exercise

Now let's use some basic statistical commands using the following commands on the count variable in the bike rental dataset:

Commands

```
summary()  
mean()  
sd()
```


Embed your code

You can also use other languages like Python, SQL, Javascript and more while using *R Markdown*

Example

```
x = 'hello, python world!'
print(x.split(' '))
## ['hello,', 'python', 'world!']
```

Creating a table

Create the following output:

| Command | Result |
|---------------------|--------|
| <code>mean()</code> | 15.4 |
| <code>sd()</code> | 5.29 |

Write Inline and Plotting

Exercise

- 1 Automatically write the Minimum in the output of the sentence
 - The smallest value of count is `[inline code]`.
- 2 Add a horizontal line
- 3 Set a header: "Part II: Visualization"
- 4 Use the command `plot()` to generate a scatterplot. Do not print the code!
- 5 Add some plain text, divided into two lines:
 - "Figure I:
 - Correlation of count and day"

Create Hyperlinks

Exercise

- 1 Write “*You can learn more about R Markdown here.*”, with here beeing the the following link:
 - <https://rmarkdown.rstudio.com/>
- 2 Add “*Stay Healthy*” as blockquote

How it should look

You can learn more about R Markdown [here](https://rmarkdown.rstudio.com/).
“*Stay Health!*”

- <https://rmarkdown.rstudio.com/lesson-1.html>
- https://www.is.uni-freiburg.de/resources/computational-economics/R_Markdown.pdf
- <https://www.youtube.com/watch?v=u4ZdvYXjslo>
- <https://bookdown.org/yihui/rmarkdown/>