woRkshop 01 Exercise 01

Basic R Markdown

David Lovell

24/08/2020

This exercise gives you an opportunity to gain experience in

- Using `R` via the `Rstudio` interface
- Using `RMarkdown` , an authoring framework for data science (https://rmarkdown.rstudio.com/lesson-1.html), to combine commentary and analysis in a style known as literate programming (https://datacarpentry.org/rr-literate-programming/02-literate-programming/index.html)
- Using `Knit` to compile your commentary and execute your analysis into an HTML file
- Viewing that HTML file in your browser

Prelude to Exercise 01

Before making any changes to this file, check to see that you can knit this `Rmarkdown` file

- Type `Ctrl+Shift+K`
  OR
  click on the `Knit` button at the top of the code editing screen
  OR
  select the `Knit to HTML` option in the dropdown menu next to the `Knit` button at the top of the code editing screen

You *should* be rewarded by activity in the `RMarkdown` panel of `RStudio`

You *may* experience some kind of problem

- Don't panic. These things often happen because our computing environments are set up differently.
  - This can especially be the case if you have had `R` and `RStudio` installed for a while so `R` and its many packages are at different versions
  - You might see messages like
    `Error: package 'markdown' was installed before R 4.0.0: please re-install it`
  - The solution is to go to the `Packages` tab (in one of the four `RStudio` "panes"), click `Install` then type the name of the package that needs reinstallation
  - If you have a different issue, please consult your tutor and be happy that you are doing this in a Workshop and not 48 hours before your assignment is due

Exercise 01

This exercise involves using `RMarkdown` . To find out more about this way of combining `R` code and commentary please

- Open up the Markdown Quick Reference in `Rstudio` (under the `Help` menu)
- Take a look at the RMarkdown Cheat Sheet (under the `Help > Cheatsheets` menu)

Your exercise is to reproduce the output that appears between the two horizontal lines below as displayed in the file `./pdf/woRkshop 01 Exercise 01.pdf` .

- OK, you don't have to reproduce it exactly, but you do have to know how to achieve the various kinds of formatting demonstrated.

Key elements of `RMarkdown`

Text elements

`RMarkdown` lets us use plain text to indicate where to put things in **bold** or *italics* or in a `code font` .

List elements

Bulleted lists

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

Numbered lists

1. Item 1
2. Item 2
3. Item 3
    - Item 3a
    - Item 3b

Line Breaks and Blockquotes

Line breaks
are not so obvious.

> You can quote me on that

Hyperlinks

The following logo comes from https://i0.wp.com/static1.squarespace.com/static/51156277e4b0b8b2ffe11c00/t/583ccafcbebafbc5c11fa6ec/1480379239088/RStudio-Ball.png (https://i0.wp.com/static1.squarespace.com/static/51156277e4b0b8b2ffe11c00/t/583ccafcbebafbc5c11fa6ec/1480379239088/RStudio-Ball.png)

`R` Code

There are two main ways to include `R` Code so that it is executed. First, as a chunk of code. An empty block can be inserted by typing `Ctrl+Alt+I` or clicking on the `Insert` button at the top right of this editing pane

```
x <- 1:10
y <- 2^x
y
```

```
##  [1]    2    4    8   16   32   64  128  256  512 1024
```

The second way to insert `R` code is inline, e.g., the value of `x` is 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Mathematics

`RMarkdown` supports mathematics using $LaTeX$ typesetting conventions (written as `$\LaTeX$`).

You can produce beautiful equations like $e^{i\pi} + 1 = 0$ inline, or as a display equation:

$$e^{i\pi} + 1 = 0$$

Don't worry if you didn't make it through all that… the main thing is to have got a sense of what you can do with `RMarkdown` and understand the concept of literate programming (https://datacarpentry.org/rr-literate-programming/02-literate-programming/index.html)

For further reading

1. Grolemund, G., & Wickham, H. R for Data Science (https://r4ds.had.co.nz/) Chapter 27: RMarkdown