Intro to Markdown and RMarkdown

Markdown

Markdown was created by John Gruber and Aaron Swartz as a tool enabling people "to write using an easy-to-read, easy-to-write plain text format, and optionally convert it to structurally valid XHTML (or HTML)."

Part of the idea is that it's simple to write, but there is enough structure to allow for formatting many formats, such as html, Word, pdf, etc.

(Unfortunately there is not a universal standard for Markdown, so there are many different variants.)

The basic flow is that you
* write a text file with an ".md" extension
* run that through a markdown processor to render it as a webpage, Word document, slide, pdf file, etc.

We will include an additional step:
* write a text file with an ".Rmd" extension
* run it through R to generate a file with an ".md" extension
* run that through a markdown processor to render it as a webpage, Word document, slide, pdf file, etc.

(As we will see this can all be done with a single click in RStudio.)

RMarkdown

RMarkdown is an extension of Markdown that allows R commands to be run. Why would you want that?

Karl -- this is very interesting, however you used an old version of the data (n=143 rather than n=226).
I'm really sorry you did all that work on the incomplete dataset.
Bruce

(Example from Karl Broman)

Instead, you can type something like

The mean is `r mean(experiment.df[, "outcome"])`.

and get

The mean is 5.79.

If your data changes, just run the code again and get the new values. This is critically important for what is known as "reproducible research,", which we will discuss later in the semester.

Markdown syntax

- Type in plain text, with two returns to start a new paragraph
- Surround a word with * * or _ _ for italics; use ** ** or __ __ for bold; ^ ^ for superscript
  - Thus `*one* **two** three^3^`
  - will be turned into *one* **two** three^{3}
- Headers and sub-headers are indicated by **starting the line** with # or ## or ### …

Markdown syntax (cont)

- For an ordered list, just start the line with `1.` (you don't have to change the number with the items).
- For an unordered list, just start the line with `*`.
- For sub-items, indent and start the text with `+`.
- Depending on the flavor of Markdown, you can include math by surrounding it with `$ $` or `$$ $$`.

R Markdown syntax: "Inline" code

- Surround the code with back ticks and `r`
  - The observed mean of 10 normal random variables was `` `r mean(rnorm(n = 10))` ``.
  - will turn into: The observed mean of 10 normal random variables was 0.300966.
  - Any valid R code can go inside the ticks

R Markdown syntax: code "chunks"

» Start a chunk of code with a line with just ```{r} and end it with a line with just ```

» Use as many lines in between as needed.

````
```{r}
mean(rnorm(n = 10))
```
````

will produce

```
mean(rnorm(n = 10))
## [1] 0.01491161
```

R Markdown syntax: code "chunks" (cont)

- Plots can be included in a code chunk just by using regular plotting commands
- Later we will see there are many options that can be included inside the braces, such as
  - ```{r echo = FALSE} if you don't want your code to be shown
  - ```{r eval = FALSE} if you don't want your code to be evaluated
  - ```{r error = TRUE} if you want errors to be shown

Important Note!

When you knit a document in RStudio, it starts fresh---that is, you have to load packages, (re)define variables, and so on. I find it easiet to do that first in a code chunk at the top.