

# Literate Programming

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## Literate programming with R Markdown

This is an R Markdown document. Markdown is a simple markup language for authoring reports, slide decks, websites, and more. Critically, it allows you to integrate code (`R`, `python`, `html`, etc) into the body text of your work. This combination of coding and typesetting is called “literate programming.”

### Markdown resources

There are a number of excellent, stand-alone resources on Markdown. Yihui Xie’s R Markdown: The Definitive Guide, for example, covers installation, documents, slide presentations, and much more.

### Workflow

When you’re ready to start communicating findings through a report or slide presentation, try the following:

1. Create a new `.Rmd` file and a new `.R` script in your project folder.
2. Use the `.R` script to test out and write initial code.
3. Outline the `.Rmd` document (all headers and sub headers).
4. Paste the final code chunks into the `.Rmd` doc, and test them.
5. Write the main body text.

### Markdown structure

Markdown documents (`.Rmd` files) have three parts:

- *YAML metadata* defining the document parameters
  - Specify author, title, date, etc
  - Set output type: HTML, PDF, MS Word, etc
- *R code chunks* to execute on `Knit`
- *Body text*

When you `Knit` your R markdown document, `knitr` and `pandoc` work together to generate a file that includes written content and the output of any code (e.g., figures and tables).

Table 1: Trash weight (tons) by wheel

wheel	Min	Mean	Max
Captain	0.6	1.2	3.2
Gwynnda	0.8	2.9	4.2
Mr. Trash	0.8	3.2	5.6
Professor	0.6	2.1	3.7

## Code chunks

You can embed code chunks like this:

Every code chunk begins and ends with the triple back tick, and you must specify that the code included in the chunk is `r` code. When you `knit`, or render, the document, `knitr` processes the code and displays the output (see Table 1 above).

You can also integrate code directly into the text. For example, the `trash_wheels` data includes records for 946 total bins with a maximum recorded weight of 5.62.

## Including Plots

Plots generated from code chunks are placed directly in the document. For example:

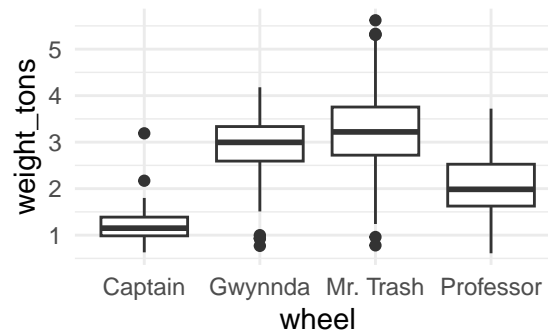


Figure 1: Weights by wheel

## Hard things (at first)

### Line breaks

Line breaks require two spaces. New paragraphs need two hard returns. When I `knit`, this line gets sucked into the one above. If I add two spaces and return at the end of the line, then I become a new line all to myself. If I want a whole new paragraph, I need two hard returns.

Now I'm a new paragraph.

### Knitting and errors

Knit often! Write a bit and `Knit`. Code a bit and `Knit`. Check every code chunk.