

Literate Programming

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STAT 385 @ UIUC



Homework Up Till Now .

STAT 385 Homework 1
James Balamuta

Problem 1a:

```
library(ggplot2)

weights = c(150, 163, 141, 155, 146, 152, 152, 158, 155, 156)

ggplot(data.frame(weights = weights), aes(weights)) +
  geom_bar() + theme_bw() + labs(
    y = "Count",
    x = "Bearing Weight",
    title = "Distribution of Bearing Weights"
  ) + theme(axis.text.x = element_text(size = 12),
            axis.text.y = element_text(size = 12),
            plot.title = element_text(size = 15))
```

Distribution of Bearing Weights

Bearing Weight	Count
140	1
145	1
150	1
152	2
154	2
156	1
158	1
163	1

The graph looks like it is centered at 154 and slightly skewed to the left due to an outlier. However, the sample size should be increased to verify this hypothesis.

Problem 1b:

Test $H_0 = 158$ vs. $H_1 < 158$

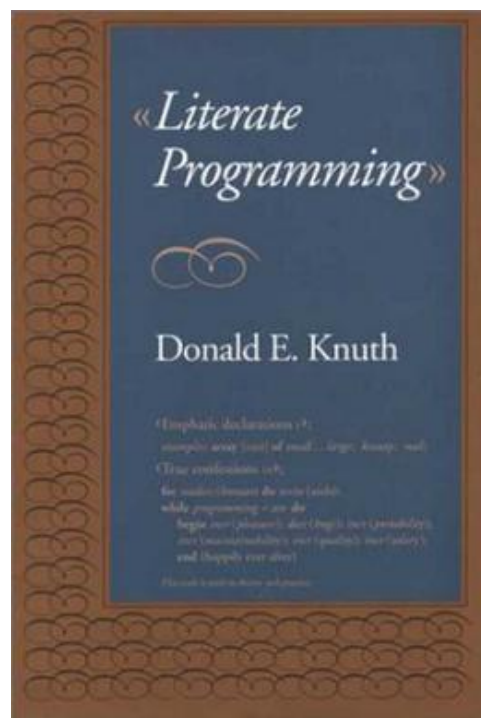
```
> t.test(weights, mu = 158, alternative = "less")
```

One Sample t-test

data: weights
t = -2.6364, df = 9, p-value = 0.01354
alternative hypothesis: true mean is less than 158
95 percent confidence interval:
-Inf 156.2328
sample estimates:
mean of x
152.2

After running a one-sided t-test on the bearing data, we conclude that there is evidence to suggest the null hypothesis should be rejected as the p-value < 0.05.

Page 1 of 1 165 Words Focus 115%

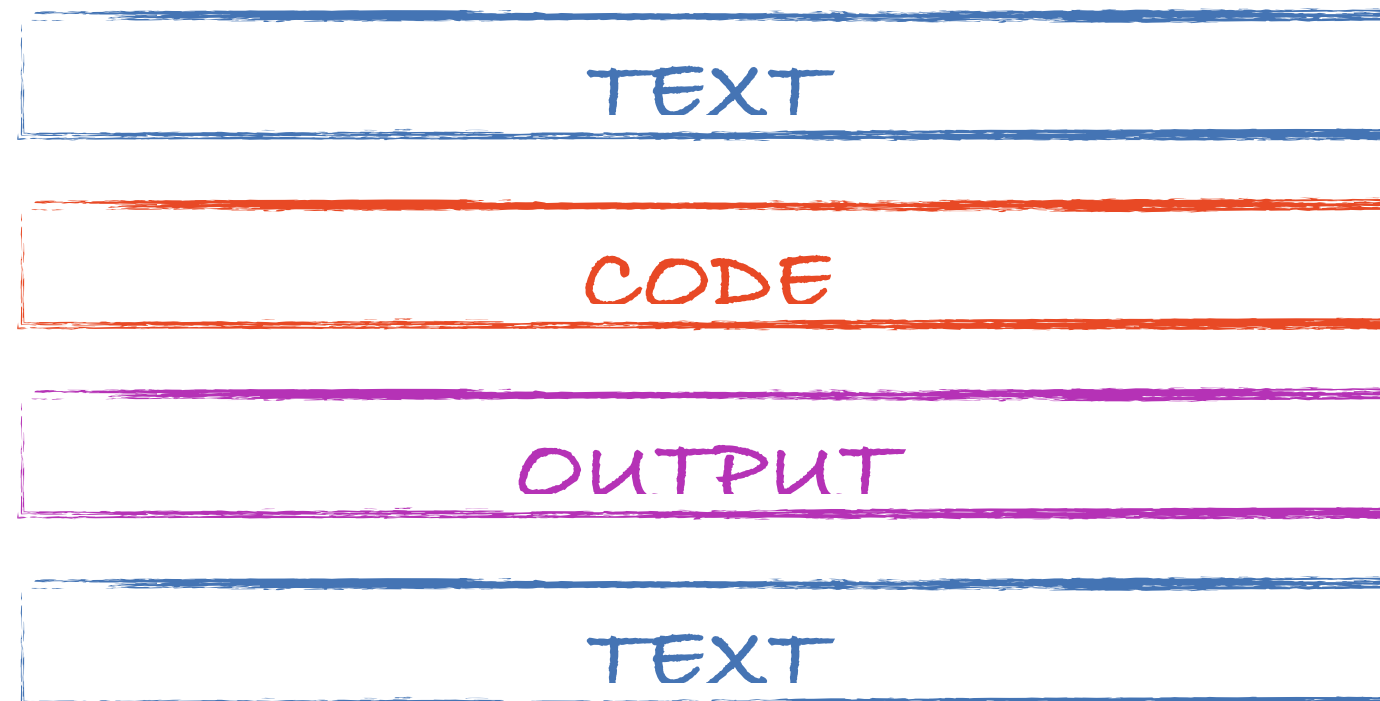


“Let us change our traditional attitude to the constructions of programs: Instead of imagining that our man task is to instruct a computer what to do, let us concentrate rather on explaining to human beings what we want a computer to do.”

–Donald Knuth in Literate Programming (1984) on pg. 1

Definition:

Literate Programming is the notion of encouraging programmers to interleaving code within narrative content that follows the natural logic and flow of human thought.



Markdown

file format independent documents



easy to read/write

****Name**** → **Name**

<https://daringfireball.net/projects/markdown/>

Example Markdown Document

The image shows a side-by-side comparison of a Markdown document in its source and rendered states. On the left is the RStudio Source Editor window, titled 'markdown-syntax.Rmd', showing the raw Markdown code. On the right is a web browser window, titled 'markdown-syntax.html', showing the rendered HTML output of the same document.

Source Editor (Left):

```
1 # Header 1
2
3 This is an R Markdown document. Markdown is a simple formatting syntax for
4 authoring HTML, PDF, and MS Word documents. For more details on using R
5 Markdown see <http://rmarkdown.rstudio.com>.
6
7 Use an asterik mark to provide mphasis such as *italics* and **bold**.
8
9 Create unordered lists with a dash or star:
10
11 - Item 1
12 - Item 2
13
14 Create ordered lists with a number followed by a period:
15
16 1. Item 1
17 1. Item 2
18 1. Item 3
19
20 You can write `inline` code with a back-tick.
21
22 Code blocks
23 for larger chunks
24
25 > Blockquotes are great
26
```

Rendered HTML (Right):

Header 1

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 Markdown see <http://rmarkdown.rstudio.com>.

Use an asterik mark to provide mphasis such as *italics* and **bold**.

Create unordered lists with a dash or star:

- Item 1
- Item 2

Create ordered lists with a number followed by a period:

1. Item 1
2. Item 2
3. Item 3

You can write `inline` code with a back-tick.

```
Code blocks
for larger chunks
```

Blockquotes are great

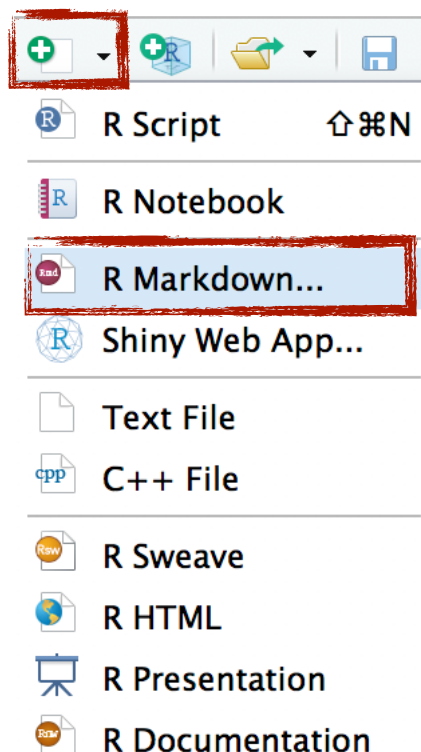


R + Markdown

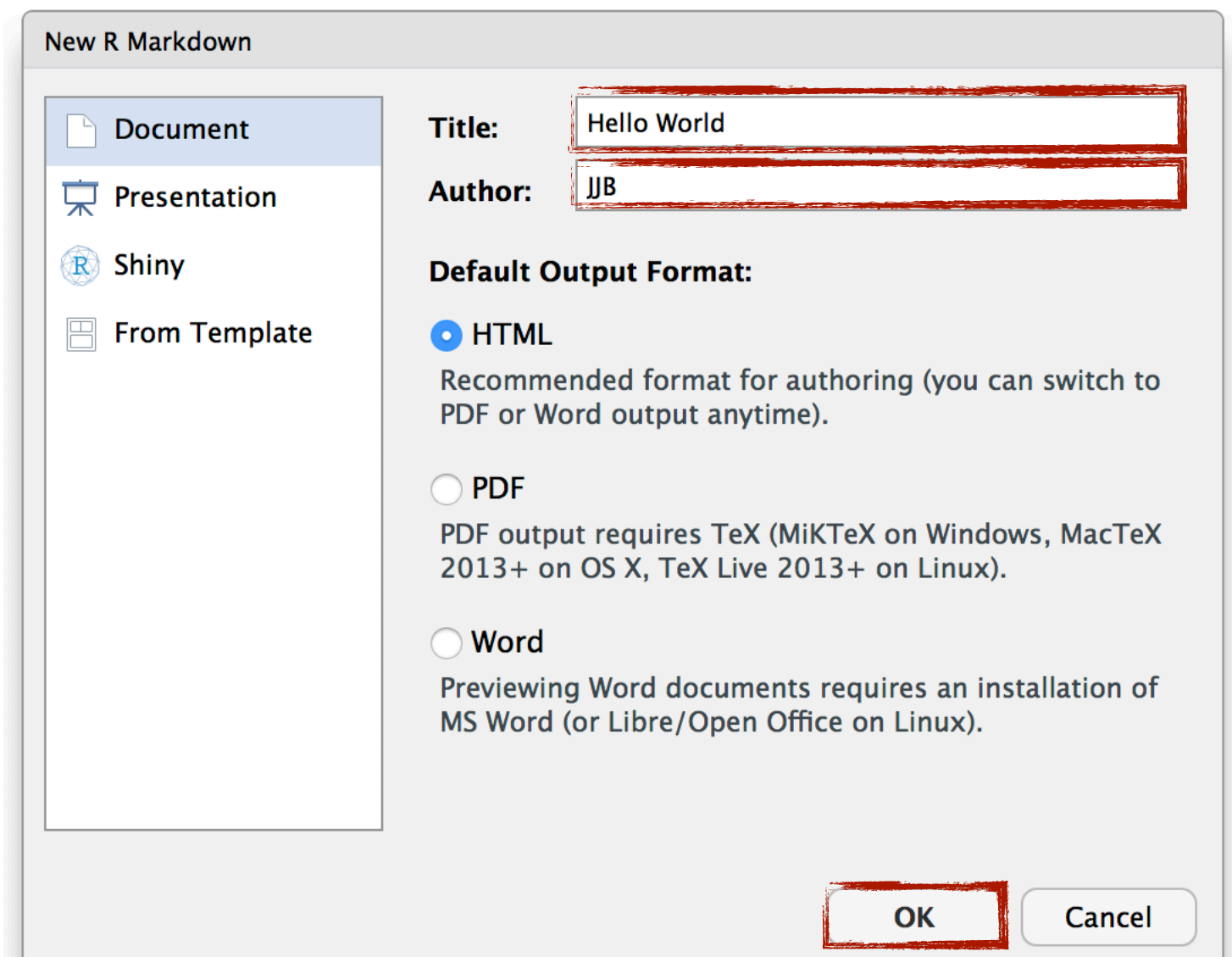
(more next)

Create an RMarkdown Document

Click the White Plus
Select **R Markdown...**



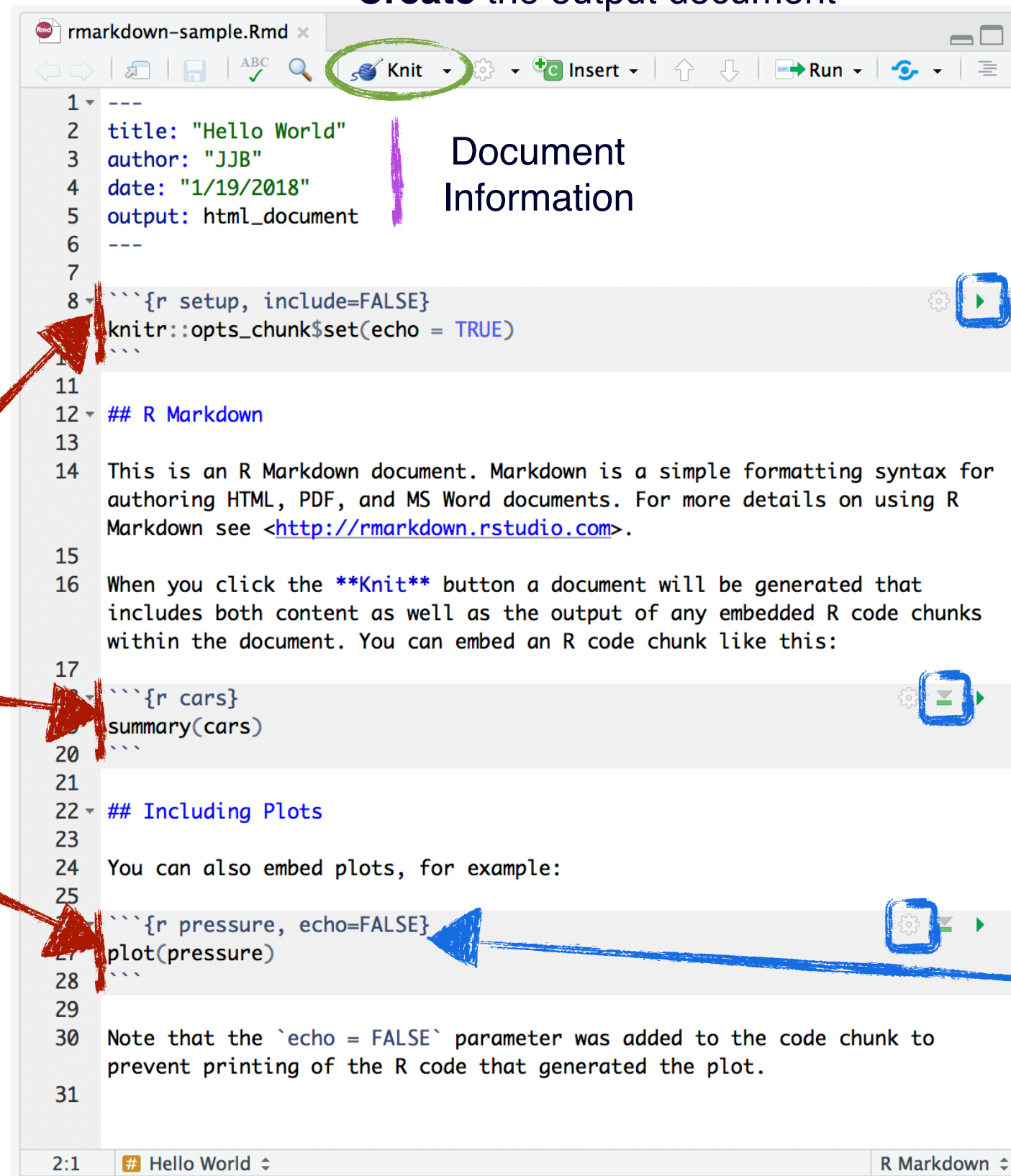
Enter Document Title and Author
Press **OK**



RMarkdown Document

Create the output document

Code
Chunks



The screenshot shows the RStudio interface with an RMarkdown document titled 'rmarkdown-sample.Rmd'. The editor contains the following content:

```
1 ---
2 title: "Hello World"
3 author: "JJB"
4 date: "1/19/2018"
5 output: html_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 This is an R Markdown document. Markdown is a simple formatting syntax for
15 authoring HTML, PDF, and MS Word documents. For more details on using R
16 Markdown see <http://rmarkdown.rstudio.com>.
17
18 When you click the Knit button a document will be generated that
19 includes both content as well as the output of any embedded R code chunks
20 within the document. You can embed an R code chunk like this:
21
22 ```{r cars}
23 summary(cars)
24 ```
25
26 ## Including Plots
27
28 You can also embed plots, for example:
29
30 ```{r pressure, echo=FALSE}
31 plot(pressure)
32 ```
33
34 Note that the `echo = FALSE` parameter was added to the code chunk to
35 prevent printing of the R code that generated the plot.
```

Annotations on the screenshot include:

- A green circle around the 'Knit' button in the top toolbar.
- A purple vertical line separating the document information from the code.
- Three red arrows pointing to the first, second, and third code chunks.
- A blue arrow pointing to the 'Change Code Chunk options' icon (gear) next to the third code chunk.

Document
Information

Run *this*
Code Chunk

Text with formatting
that describes what is
contained in the
document

Run Code Chunks
up to *here*

Change Code Chunk
options

RMarkdown Output

```
rmarkdown-sample.Rmd x
Knit Insert Run
1 ---
2 title: "Hello World"
3 author: "JJB"
4 date: "1/19/2018"
5 output: html_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
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12 ## R Markdown
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```



Hello World

JJB

1/19/2018

R Markdown

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 Markdown see <http://rmarkdown.rstudio.com>.

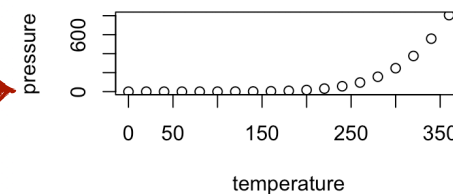
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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
```

Including Plots

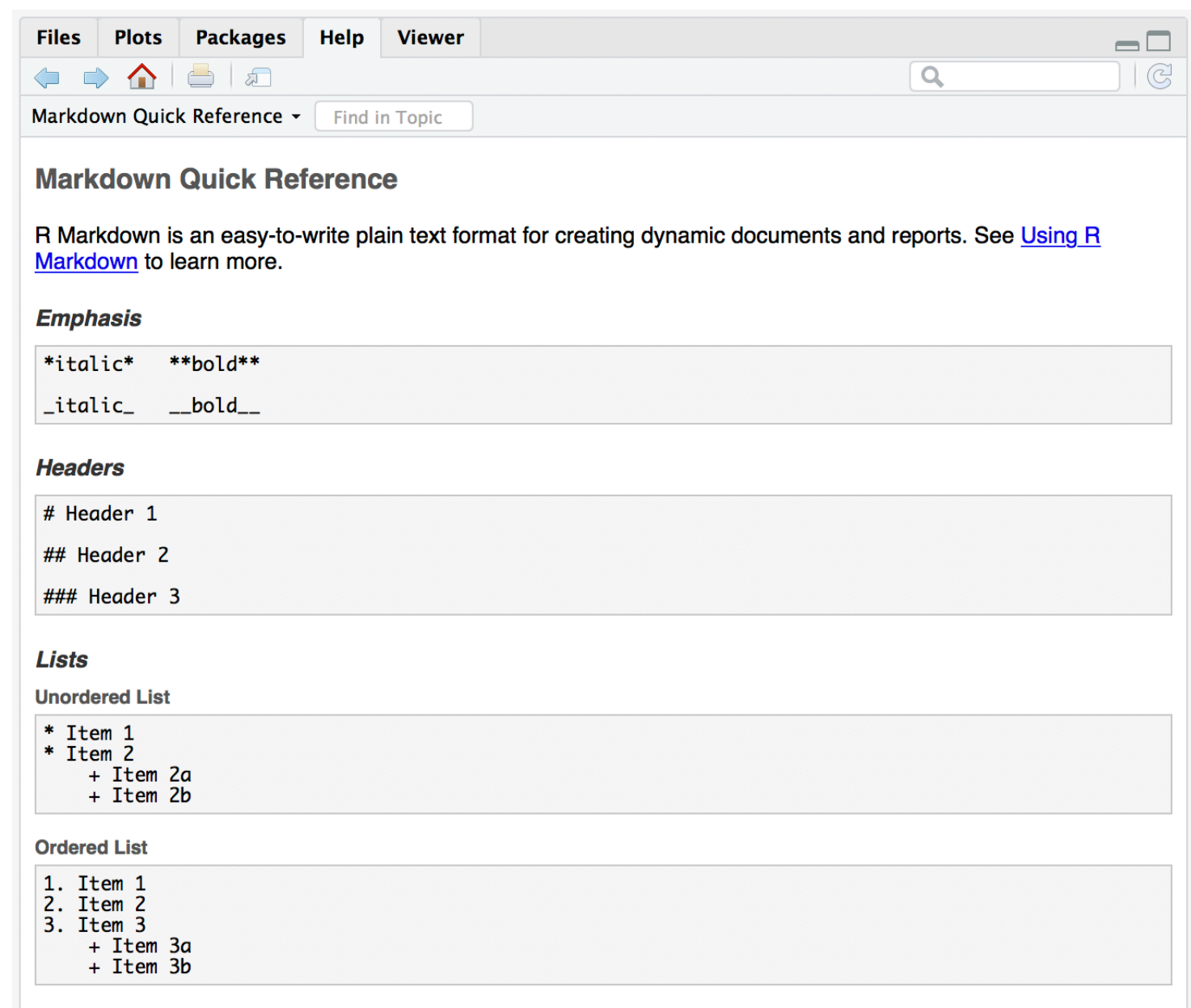
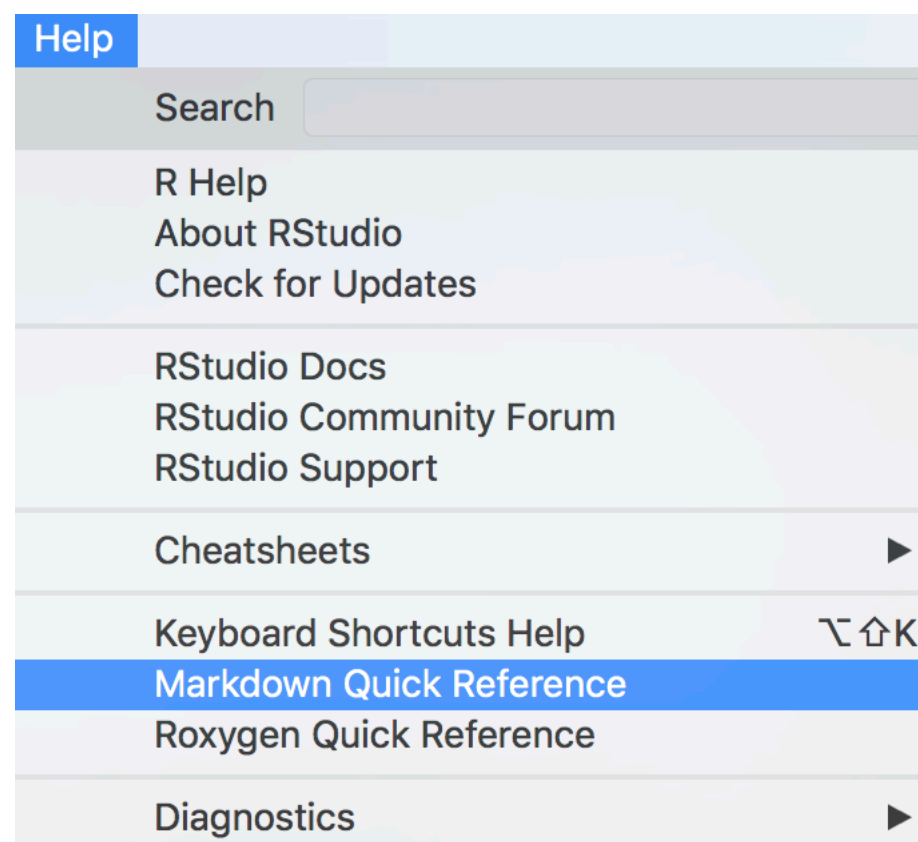
You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

Help Writing

syntax guide



Examples - Emphasis & Links

Writing text with emphasis in
`*italics*`, `**bold**` and ``code style``.



Writing text with emphasis in
italics, **bold** and code style.

Line breaks create a new paragraph.

Line breaks create a new paragraph.

Links can be hidden e.g.
[illinois](www.illinois.edu) or
not `<http://illinois.edu>` .



Links can be hidden e.g.
[illinois](#) or
not <http://illinois.edu>.

Example - Images

![Relative Path](img/block-i.png)



The Code Chunk

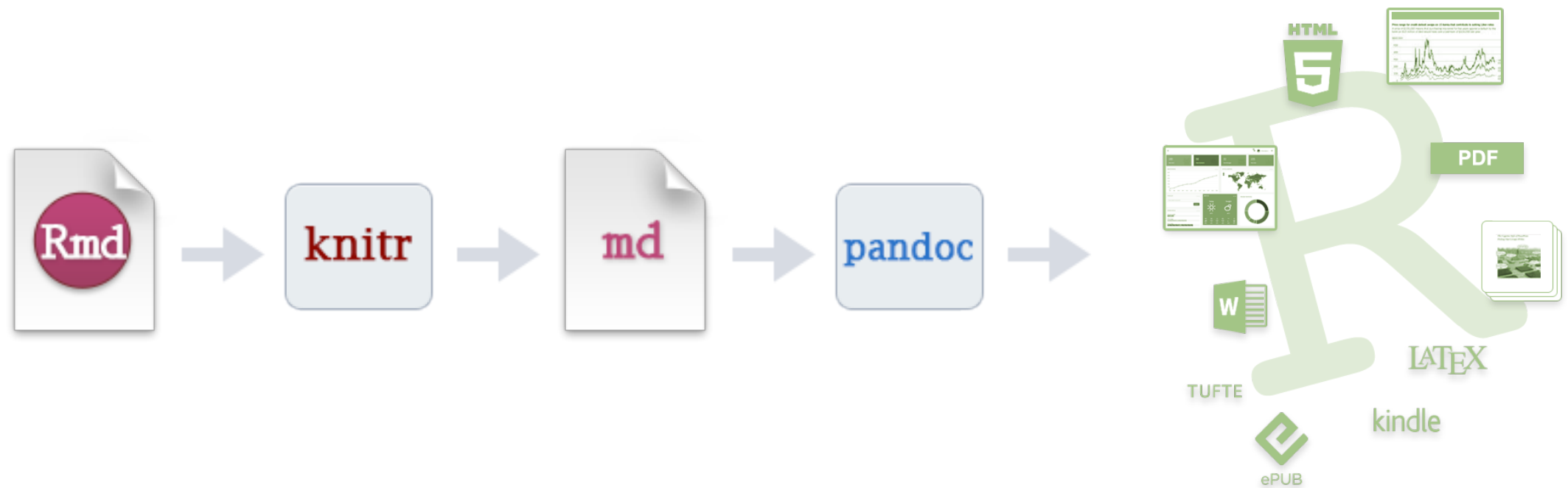
```
```{r chunk_label}  
Code here
```
```

Example: Adding two numbers

```
```{r add_nums}  
1 + 2
```
```

```
## [1] 3
```

How it Works



<http://rmarkdown.rstudio.com/>

<http://rmarkdown.rstudio.com/lesson-2.html#how-it-works>