

R Markdown basics

Richard Layton

2017-09-05

With R Markdown, prose and code are in the same script

Your portfolio is an R Markdown (.Rmd) script that includes

- ▶ the prose of your critiques
- ▶ the executable R code that creates your data graphics
- ▶ auto-generated tables, citations, and bibliographies

Quick introduction

- ▶ 1-minute video

Sample script

File > New File > R Markdown...

```
1 ---
2 title: "Untitled"
3 author: "Richard Layton"
4 date: "September 6, 2017"
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
15 a simple formatting syntax for authoring
16 HTML, PDF, and MS Word documents. For more
17 details on using R Markdown see
18 <http://rmarkdown.rstudio.com>.
19
20 When you click the Knit button a
21 document will be generated that includes
22 both content as well as the output of any
23 embedded R code chunks within the document.
24 You can embed an R code chunk like this:
25
26 ```{r cars}
27 summary(cars)
28 ```
29
30 ## Including Plots
31
32 You can also embed plots, for example:
33
34 ```{r pressure, echo=FALSE}
35 plot(pressure)
36 ```
37
38 Note that the `echo = FALSE` parameter was
39 added to the code chunk to prevent printing
40 of the R code that generated the plot.
```

Sample output document

The *knitr* package "knits" your prose and code results together.

Shown is the HTML output.

Untitled

Richard Layton

September 6, 2017

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>.

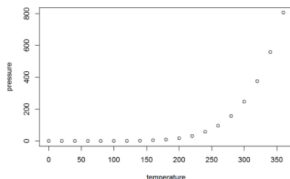
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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
```

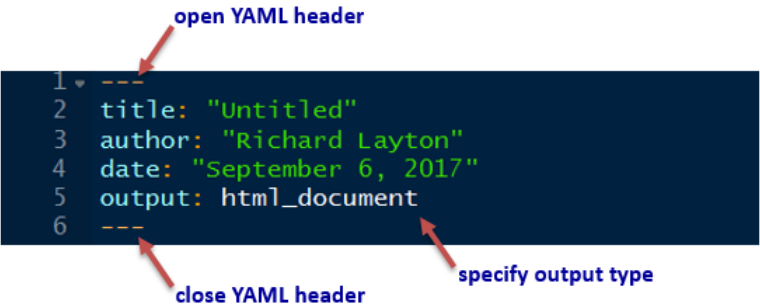
Including Plots

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.

The script starts with a YAML header



```
1 ---
2 title: "Untitled"
3 author: "Richard Layton"
4 date: "September 6, 2017"
5 output: html_document
6 ---
```

The diagram shows a code block with six lines of YAML. Red arrows point from text labels to specific parts of the code: 'open YAML header' points to the first '---' on line 1, 'close YAML header' points to the second '---' on line 6, and 'specify output type' points to 'html_document' on line 5.

close YAML header

specify output type

Untitled

Richard Layton

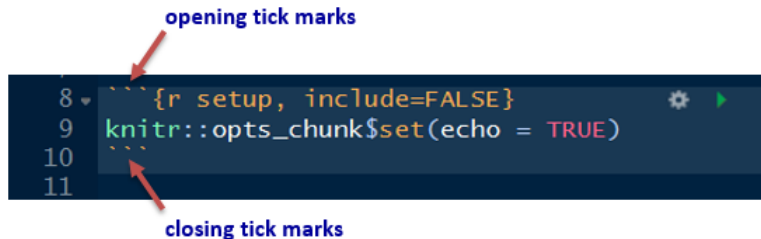
September 6, 2017

Code chunks open and close with 3 backticks

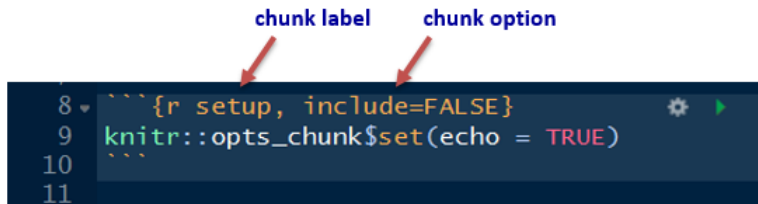
opening tick marks

```
8 {r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11
```

closing tick marks

A screenshot of a code editor with a dark blue background. The code is written in a light blue font. The code consists of two lines: line 8: {r setup, include=FALSE} and line 9: knitr::opts_chunk\$set(echo = TRUE). The code is enclosed in three backticks. A red arrow points from the text 'opening tick marks' to the first three backticks at the start of line 8. Another red arrow points from the text 'closing tick marks' to the last three backticks at the end of line 11. The line numbers 8, 9, 10, and 11 are visible on the left side of the code block. There is a gear icon and a green play button icon on the right side of the code block.

The code chunk header is {r}

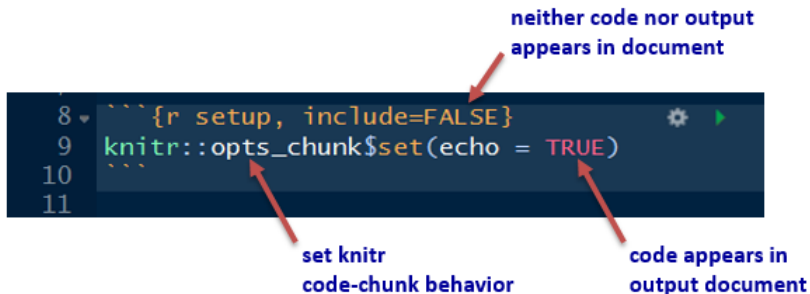


The diagram shows a code editor with a dark blue background. A code chunk header is highlighted with a lighter blue background. The header consists of two lines: the first line is `{r setup, include=FALSE}` and the second line is `knitr::opts_chunk$set(echo = TRUE)`. Above the first line, the text "chunk label" is written in blue, with a red arrow pointing to the `{r` part. Above the second line, the text "chunk option" is written in blue, with a red arrow pointing to the `knitr::opts_chunk$set` part. The code editor also shows line numbers 8, 9, 10, and 11 on the left side. On the right side of the code editor, there are icons for settings (a gear) and execution (a green play button).

```
8 {r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11
```

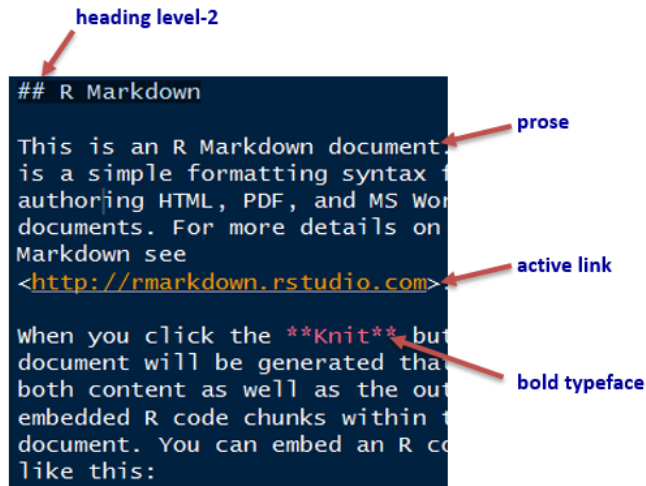
Header labels and arguments are optional.

Knitting options can be specified



The list of **knitr options** is extensive.

Use markup tags to format text



See the [R Markdown cheat sheet](#) for more detail.

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:

Incorporating R code and output in a document



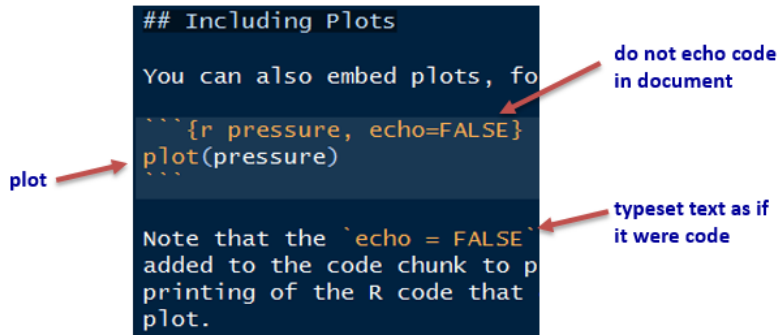
The output document will show

- ▶ The code echo
- ▶ The `summary(cars)` output table

```
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
```

Incorporating code output without listing the code



The diagram illustrates an R code chunk configuration for embedding plots without listing the code. It features a dark blue background with white and yellow text. A red arrow points from the word "plot" to the `plot(pressure)` line. Another red arrow points from the text "do not echo code in document" to the `echo=FALSE` line. A third red arrow points from the text "typeset text as if it were code" to the ``echo = FALSE`` line. The code chunk is enclosed in triple backticks.

```
## Including Plots

You can also embed plots, for example:

```{r pressure, echo=FALSE}
plot(pressure)
```

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

do not echo code in document

typeset text as if it were code

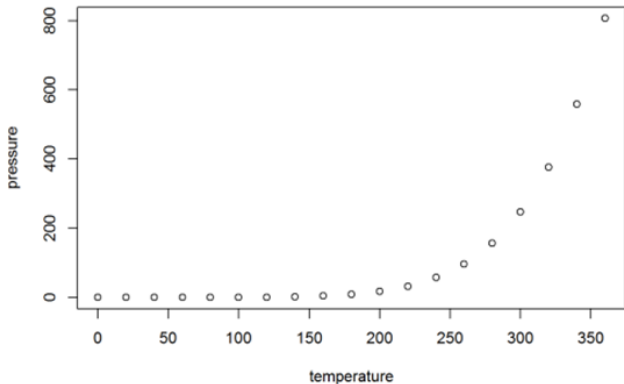
plot

The output document will show

- ▶ No code echo
- ▶ The `plot(pressure)` output graph

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.

Change output type

```
1 ---
2 title: "Untitled"
3 author: "Richard Layton"
4 date: "September 6, 2017"
5 output: word_document
6 ---
7
```

Untitled

Richard Layton

September 6, 2017

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>.

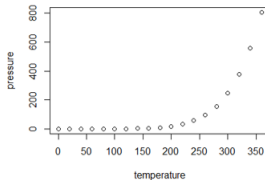
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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.

What the software is doing

markup We create the knittable *Rmd* file that includes both marked-up prose and executable code.



knit The *knitr* package executes the R code, converts the output to *markdown*, and creates a new *md* file.



compile The *md* file is compiled, creating a new HTML file.



File organization

- ▶ The resulting output file is placed in the same directory as your Rmd file.
- ▶ We will organize our files using the directories we've set up: *data*, *design*, *portfolio*, etc.
- ▶ More about that in a future session.