

ST 555:

Statistical Programming I



R Markdown

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Outline

- What is R Markdown?
- Why use R Markdown?
- Use R Markdown to generate report

What is R Markdown?




- R Markdown is a dynamic document for R
- It combines the core syntax of markdown (an easy-to-write plain text format) with embedded R code chunks that are run so their output can be included in the final document.

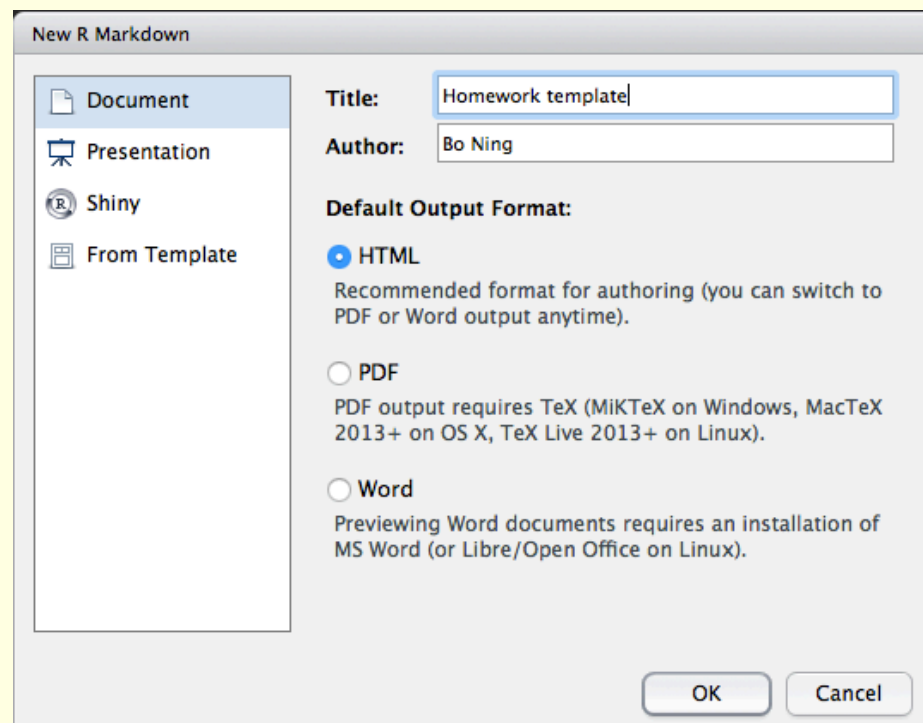
(from <http://rmarkdown.rstudio.com>)

Why use R Markdown?

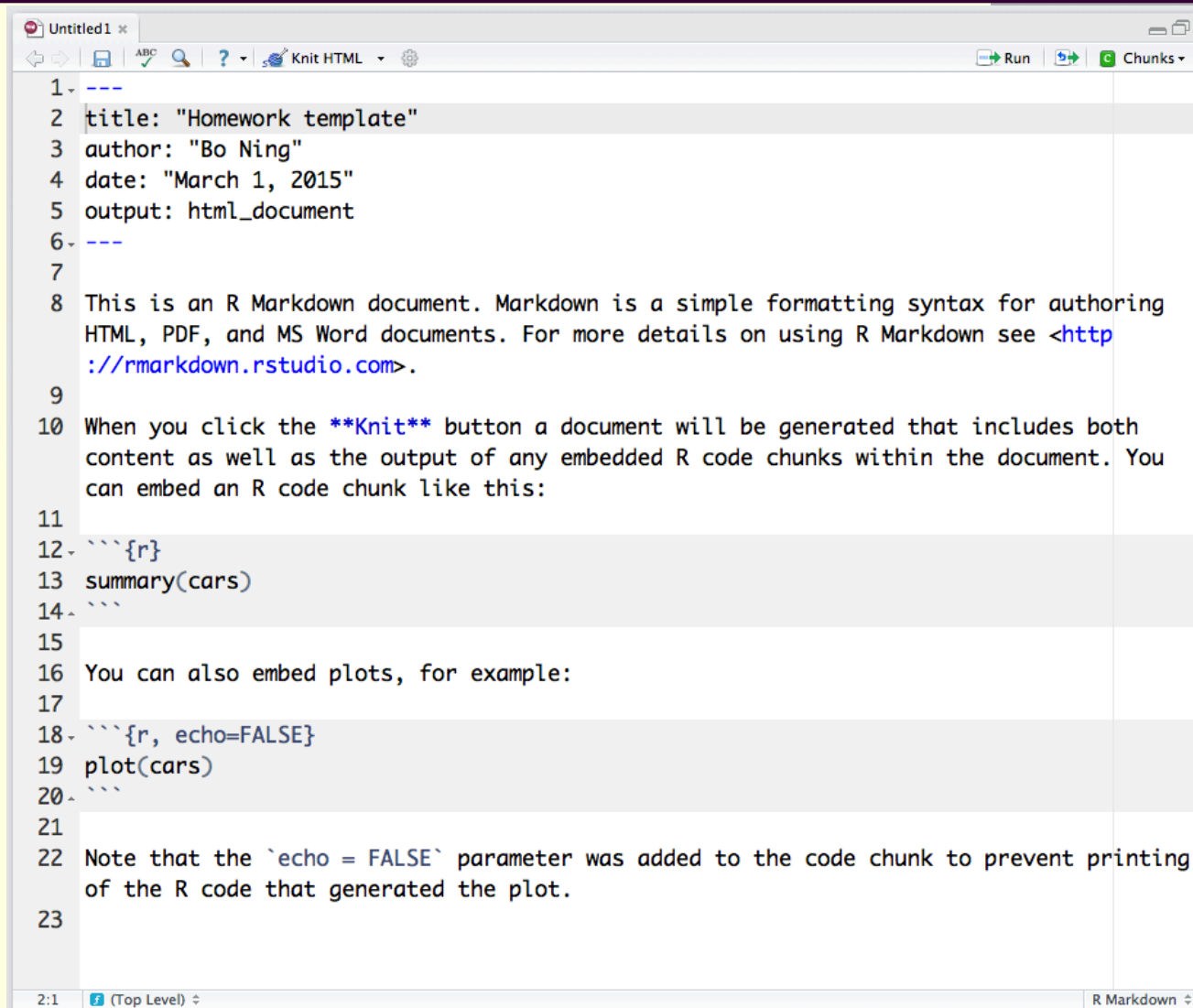
- New technology, widely used
- Integrate texts, R code and output together in one document in a nice looking way
- Automatically generate dynamic report for R programming
- Homework requires you to use R Markdown

Open R Markdown

- Find out  button in the left upper side of RStudio.
- Click , then click  R Markdown...
- Choose “Document”, enter “Title” with “Homework name”, enter your name, and choose format. Any format is fine. Then click “OK”.



Open R Markdown

A screenshot of an R Markdown document in a text editor. The document is titled "Untitled1" and contains a YAML header, a title, author, date, and output format. The main content is a paragraph explaining R Markdown, followed by two R code chunks. The first chunk contains the command `summary(cars)`. The second chunk contains the command `plot(cars)` with the parameter `echo=FALSE`. The document is displayed in a window with a toolbar at the top and a status bar at the bottom.

```
1 ---
2 title: "Homework template"
3 author: "Bo Ning"
4 date: "March 1, 2015"
5 output: html_document
6 ---
7
8 This is an R Markdown document. Markdown is a simple formatting syntax for authoring
9 HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
10
11 When you click the Knit button a document will be generated that includes both
12 content as well as the output of any embedded R code chunks within the document. You
13 can embed an R code chunk like this:
14
15 ```{r}
16 summary(cars)
17 ```
18
19 You can also embed plots, for example:
20
21 ```{r, echo=FALSE}
22 plot(cars)
23 ```
24
25 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing
26 of the R code that generated the plot.
```

Write code in R Markdown

- Let's start to write our first R Markdown file
- Includes title (question number) and “rm(list = ls())”

```
1 ---
2 title: "Homework template"
3 author: "Bo Ning"
4 date: "February 12, 2015"
5 output: html_document
6 ---
7
8 ```{r}
9 # clean dataset
10 rm(list = ls())
11 ```
12 ## Example 1
13 This is our Example 1 from Rstudio slide
14 ```{r}
15 # This is our first example in R
16 # We want to combine X and y
17 X <- 3 # Input X value
18 y <- 10 # Input y value
19 combineXy <- c(X, y) # combine X and y
20 combineXy # display the combined value
21 ```
```


To insert R code, add ```\${r}`` before the code and ``` after code, then the R code part is highlighted

Use “#”, “##”, “###” or “####” sign to make title

Coding part should meet R programming standard demonstrate in the RStudio module

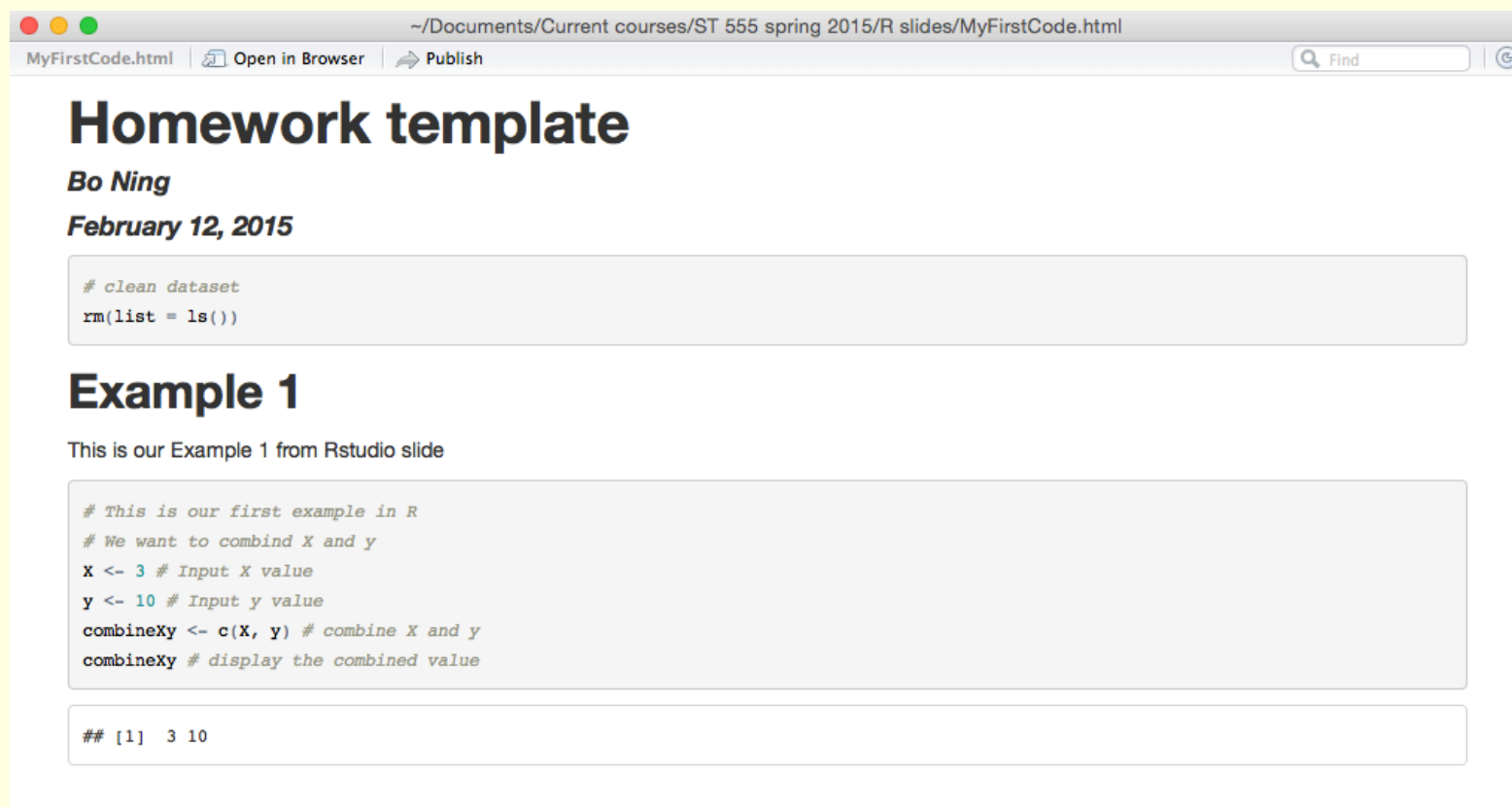
Type variables' name you want to print out in the output

Generate report

- To generate a report, in the editor window, find out  .
- There are three formats you could choose for your report. Knit HTML gives you a .html format report; Knit PDF, gives you a .pdf format report; Knit Word, gives you a .doc/.docx format report.
- Knit PDF may require you to install LaTeX, which you could download from the website: <http://latex-project.org>
- If you don't wish to install LaTeX, Knit HTML and Knit Word are the options for you. (In the homework, you are free to use any of the three forms)

Generate report

- Here is the report generated by “Knit HTML”. See what happened?



~/Documents/Current courses/ST 555 spring 2015/R slides/MyFirstCode.html

MyFirstCode.html Open in Browser Publish Find

Homework template

Bo Ning

February 12, 2015

```
# clean dataset
rm(list = ls())
```

Example 1

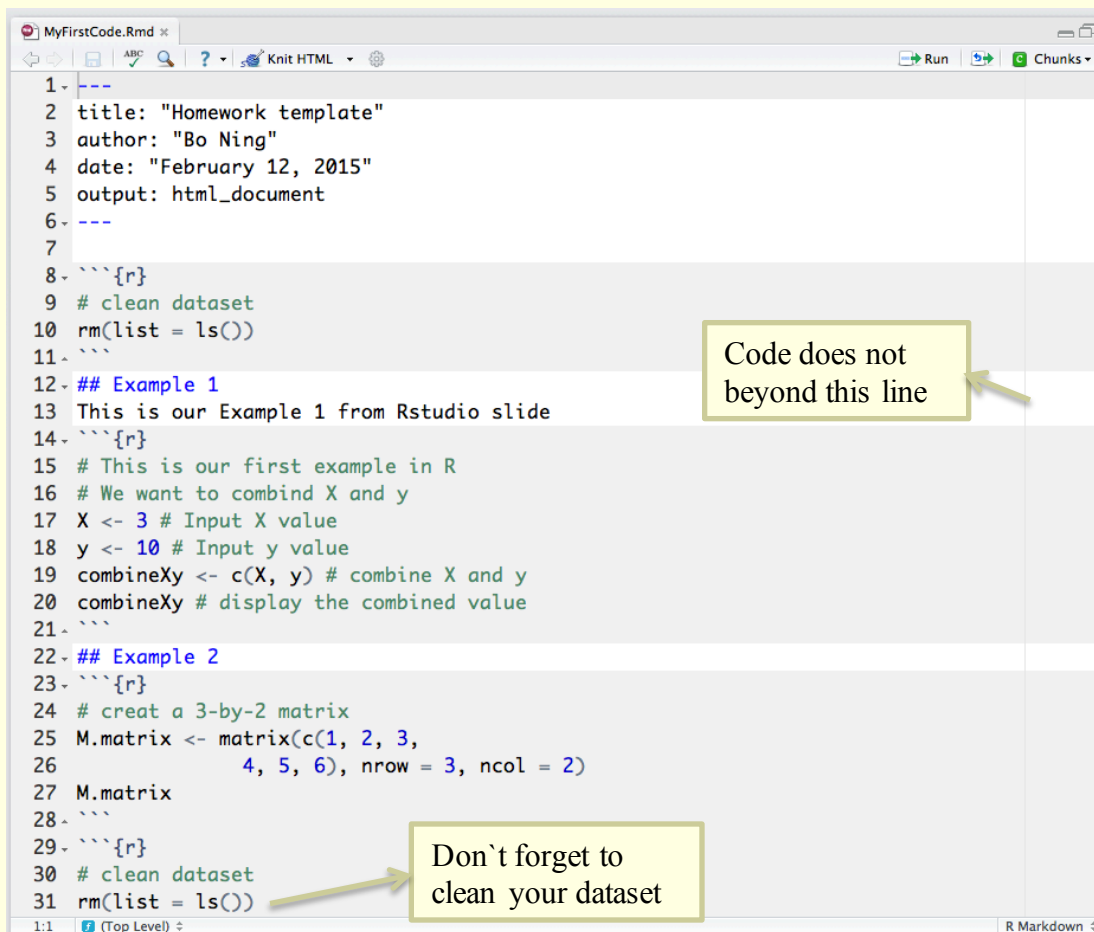
This is our Example 1 from Rstudio slide

```
# This is our first example in R
# We want to combine X and y
X <- 3 # Input X value
y <- 10 # Input y value
combineXy <- c(X, y) # combine X and y
combineXy # display the combined value
```

```
## [1] 3 10
```

Generate report

- Suppose our homework template has 2 examples, here is the final version of the code.



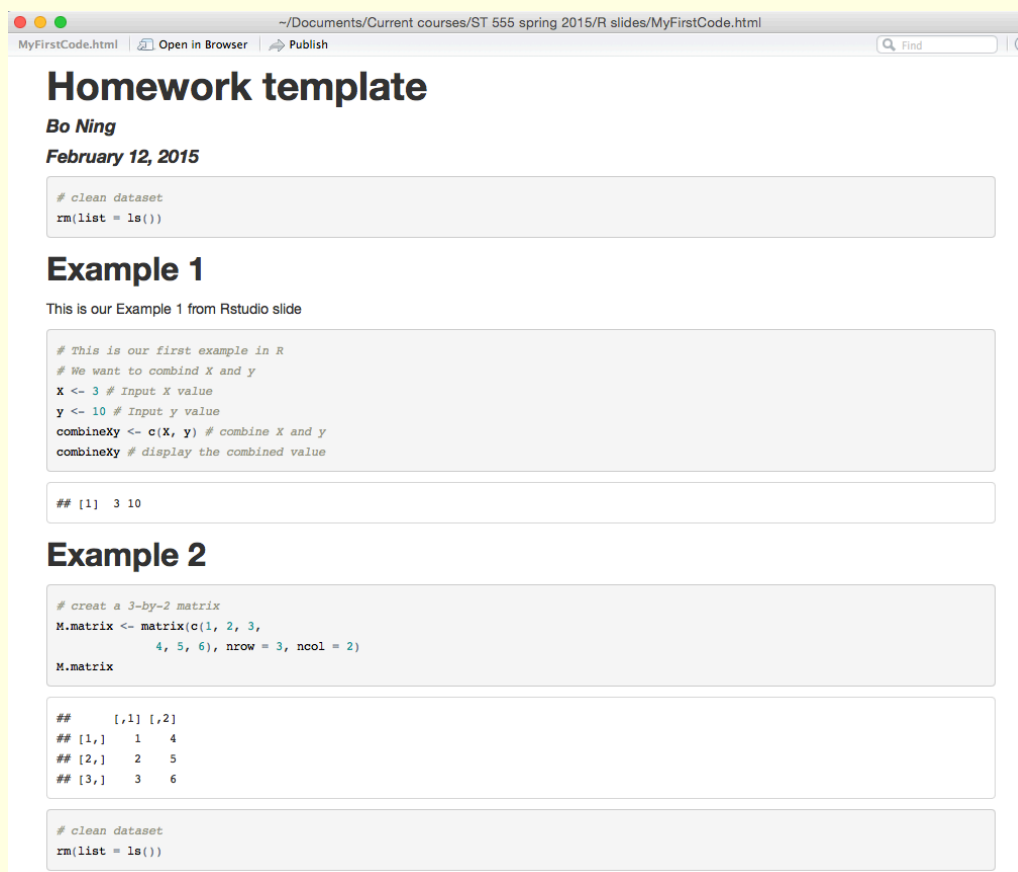
```
1 ---
2 title: "Homework template"
3 author: "Bo Ning"
4 date: "February 12, 2015"
5 output: html_document
6 ---
7
8 ```{r}
9 # clean dataset
10 rm(list = ls())
11 ```
12 ## Example 1
13 This is our Example 1 from Rstudio slide
14 ```{r}
15 # This is our first example in R
16 # We want to combine X and y
17 X <- 3 # Input X value
18 y <- 10 # Input y value
19 combineXy <- c(X, y) # combine X and y
20 combineXy # display the combined value
21 ```
22 ## Example 2
23 ```{r}
24 # create a 3-by-2 matrix
25 M.matrix <- matrix(c(1, 2, 3,
26                     4, 5, 6), nrow = 3, ncol = 2)
27 M.matrix
28 ```
29 ```{r}
30 # clean dataset
31 rm(list = ls())
```

Code does not go beyond this line

Don't forget to clean your dataset

Generate report

- Let's Knit HTML again.



The screenshot shows a web browser window displaying an RStudio HTML report. The title is "Homework template" by Bo Ning, dated February 12, 2015. The report contains three code blocks with R code and their outputs.

```
# clean dataset
rm(list = ls())
```

Example 1

This is our Example 1 from Rstudio slide

```
# This is our first example in R
# We want to combine X and y
x <- 3 # Input X value
y <- 10 # Input y value
combineXy <- c(x, y) # combine X and y
combineXy # display the combined value
```

```
## [1] 3 10
```

Example 2

```
# creat a 3-by-2 matrix
M.matrix <- matrix(c(1, 2, 3,
                    4, 5, 6), nrow = 3, ncol = 2)
M.matrix
```

```
##      [,1] [,2]
## [1,]    1    4
## [2,]    2    5
## [3,]    3    6
```

```
# clean dataset
rm(list = ls())
```

R Markdown supplements

- The advantage for R Markdown is that it incorporates LaTeX.
- If you want to know more about how to incorporate LaTeX code in R Markdown, please google it, or go to Yihui Xie's blog (<http://yihui.name>)
- For each homework, please submit a R Markdown file (.Rmd file) and the corresponding output file (.html file, .pdf file or a word file).