

rmarkdown Introduction

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Announcements

- Homework 00 has been released
 - Be sure to read homework policies document!
 - Optional but **highly recommended**
- Begin Quiz review problems
 - Solutions **not** provided, be sure to take notes!
- Reading and Videos
 - Read! Watch! Review!

- **Markdown** allows you to write a file format independent document using an easy-to-read and easy-to-write plain text format.
- Instead of **marking up text** so that is easy for a computer to read...
 - e.g. HTML: `<html><body>Name</body></html>`
- The goal is to **mark down text** so that is human readable:
 - e.g. `**Name**`

Example Markdown Document

The image shows a side-by-side comparison of an R Markdown document in its source code and rendered HTML format.

Source Code (Left Pane):

```
1 # Header 1
2
3 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>.
4
5 Use an asterik mark, to provide emphasis such as italics and
  bold.
6
7 Create unordered lists with a dash or star:
8
9 - Item 1
10 - Item 2
11
12 Created ordered lists with a number followed by a period:
13 |
14 1. Item 1
15 2. Item 2
16
17 You can write `inline` code with a back-tick.
18
19 ```
20 Code blocks
21 for larger chunks
22 ```
23
24 > Blockquotes are great
```

Rendered HTML (Right Pane):

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 emphasis such as *italics* and **bold**.

Create unordered lists with a dash or star:

- Item 1
- Item 2
- Item 3

Created 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

Supported Output Files

As a result of Markdown being structured so loosely, any file format can be generated using pandoc.

That is to say, from one Markdown document you can generate any of the following:

- docx
- PDF
- **HTML**
- ODT
- RTF

The downside is that there is slightly less control over formatting, but it is well worth it.

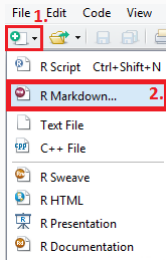
RMarkdown developed by RStudio takes what Markdown has established and extends it significantly by:

- Allowing *R* code and its results to be merged with Markdown;
- Ensuring that RMarkdown documents are fully reproducible;
- Enabling extra modifications to original markdown specification.

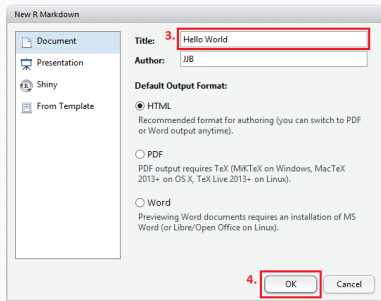
Creating an RMarkdown Document

To create an RMarkdown or .Rmd Document within RStudio:

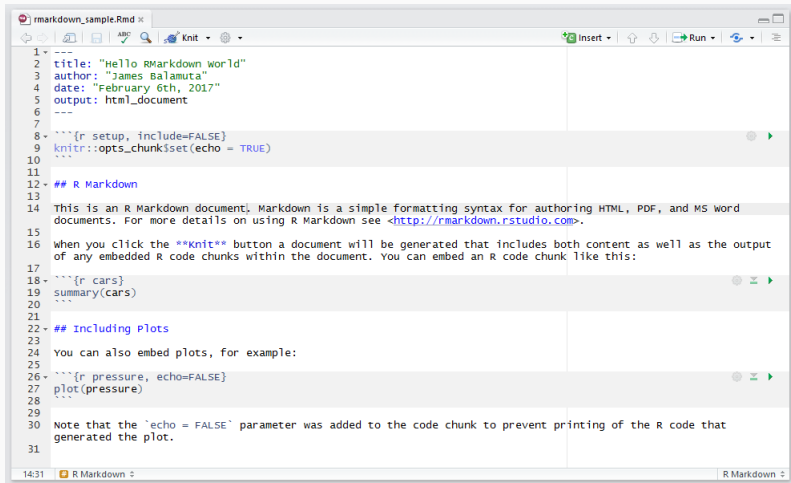
Click the
White Plus
Select R Markdown



Enter Document Title



Initial RMarkdown View



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


Compiling RMarkdown Document

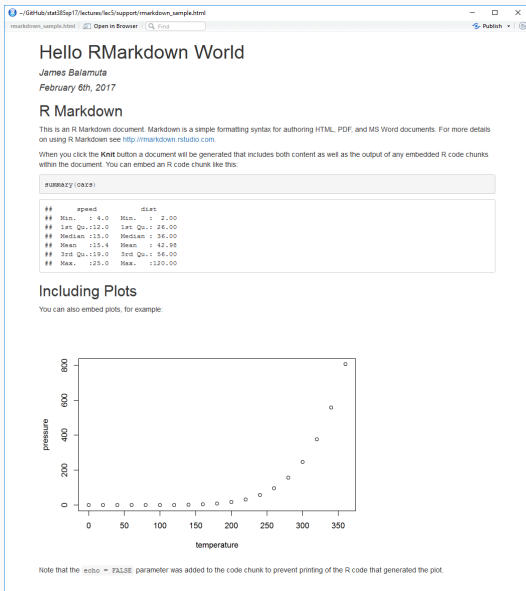
Use either:

- An RStudio shortcut
 - Windows: `Ctrl+Shift+K`
 - macOS: `Command+Shift+K`
- The “Knit ..” button on the source editor window



- Or, compile the document via `rmarkdown::render()`
 - more on this later...

Sample Render of Default RMarkdown View



~\GitHub\stat35\p17\lectures\lec5\support\rmarkdown_sample.html
rmarkdown_sample.html Open in Browser Find Publish

Hello RMarkdown World

James Balamuta
February 6th, 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>.

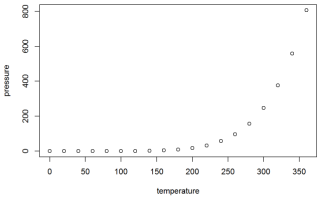
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(ozone)
```

```
##           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.   : 130.00
```

Including Plots

You can also embed plots, for example:



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

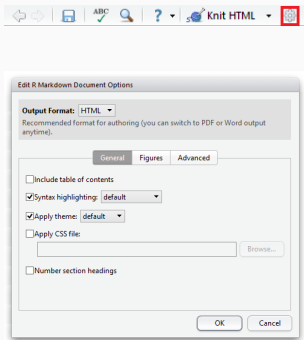
Sections of an RMarkdown Document

There are principally *three* sections to an RMarkdown document.

- YAML header
- Code chunks
- Copious amounts of text!

Options... Options... Options...

Some of RMarkdown's output options can be configured via a GUI in RStudio¹



¹To see all the options granted by RMarkdown, check out the package website at: <http://rmarkdown.rstudio.com/>.

Dynamic Code Chunks

To initiate a code chunk within RMarkdown, all one needs to do is use:

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

Example:

Here we will embed the output of obtaining 10 random numbers.

```
```{r chunk_demo}  
x = runif(10)
print(x)
```
```

Examples of Markdown syntax

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

Line breaks create a new paragraph.

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

Sample Image:

```
![Illinois](img/wordmark_vertical.png)
```

Rendered Example of Markdown syntax

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

Line breaks create a new paragraph.

Links can be hidden e.g. illinois or not `http://illinois.edu` .

Sample Image:



Examples of Markdown syntax (Con't)

```
> "Never gonna give you up, never gonna let you down..."
```

```
>
```

```
> --- Rick Astley
```

```
- generic
```

```
- bullet point
```

```
- listing
```

```
1. Ordered number list
```

```
1. is numbered
```

```
42. correctly
```

```
Inline math  $a^2 + b^2 = c^2$ 
```

```
Display math (centered math)  $1 - x = y$ 
```


Rendered Example of Markdown syntax (Con't)

“Never gonna give you up, never gonna let you down...”

— Rick Astley

- generic
 - bullet point
 - listing
1. Ordered number list
 2. is numbered
 3. correctly

Inline math $a^2 + b^2 = c^2$

Display math (centered math)

$$1 - x = y$$

Literate Programming

Reproducible Research

Let's try it!