

# The framework for a reproducible report

497 / 597 Reproducible Research



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# Software overview

 **R Studio** our interface to all the software



for combining your code, its results, and your prose



for data carpentry, analysis, and data graphics



for local version control

**GitHub**



for remote, asynchronous collaboration

# Today we'll set up directories and start an Rmd script



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# To start, set up a course directory

## 497 students

```
me497_reproducible_research
|-- practice_work/
|-- project_1/
`-- project_2/
```

- ▶ the top level is the course directory
- ▶ every subfolder is a separate R project directory

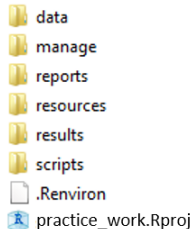
## 597 students

```
me597_reproducible_research
|-- practice_work/
|-- project_1/
|-- project_2/
`-- project_3/
```

```
practice_work/
project_1/
project_2/
project_3/
```

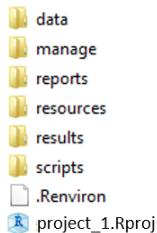
# Set up your project directories consistently

`practice_work/`



- ▶ create the same set of folders for every project
- ▶ an R Project directory is denoted by the `.Rproj` file
- ▶ copy the `.Renvirom` file to every project

`project_1/`



Instructions for creating an R Project and the `.Renvirom` file are on the course website

## To start a report

In RStudio, launch the project, for example, *practice\_work.Rproj*

*File > New File > R Markdown > OK*

*Save As* to your reports directory

Be deliberate in selecting file names, for example, *001\_first\_script.Rmd*

# The three important elements of an Rmd file

- ▶ YAML header, surrounded by ---

```
---  
title: "Sample report"  
author: "Richard Layton"  
date: "September 1, 2016"  
output: word_document  
---
```

- ▶ Chunks of R code surrounded by ```

```
```${r setup, include = FALSE}  
library(ggplot2)  
library(dplyr)  
smaller <- diamonds %>% filter(carat <= 2.5)  
```
```

- ▶ Text mixed with simple text formatting like # heading and *\*italics\**

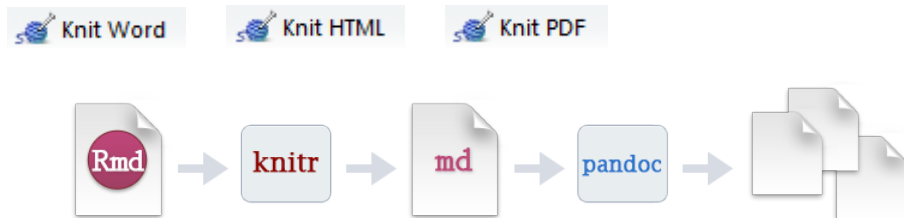
# Writing an R Markdown script

## R Markdown script

```
---  
title: "Sample report"  
author: "Richard Layton"  
date: "September 1, 2016"  
output: word_document  
---  
  
```${r setup, include=FALSE}  
knitr::opts_chunk$set(echo = TRUE)  
```${r  
  
## 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>.
```



# Knit the document any time



- ▶ R Markdown sends the .Rmd file to knitr
- ▶ knitr executes the code chunks and creates a markdown (.md) document that includes the code and its output
- ▶ pandoc process the .md file to create the output file

## Sample output when knitting to Word

# R Markdown script

```

---
title: "Sample report"
author: "Richard Layton"
date: "September 1, 2016"
output: word_document
---

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

## 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>.

## Output document

## Sample report

Richard Layton

September 1, 2016

## 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>.

# Add a code chunk

script

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:

```
```{r}  
summary(cars)  
```
```

# Add a code chunk

## script

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:

```
```{r}
summary(cars)
```
```

## output

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
```

# Add a graph

script

```
## Including Plots
```

You can also embed plots, for example:

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

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

# Add a graph

## script

```
## Including Plots
```

You can also embed plots, for example:

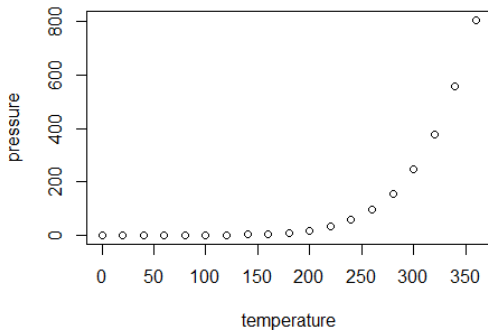
```
```{r echo=FALSE}  
plot(pressure)  
```
```

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

## output

### 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.

# Review the course website

Calendar for assignments and due dates

- ▶ projects
- ▶ practice work
- ▶ readings in the text
- ▶ articles for class discussion