

The framework for a reproducible report

ME 497 / ME 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



Studio

our interface to all the software



for combining your code, its results, and your prose



for data carpentry, analysis, and data graphics



git

for local version control

GitHub



for remote, asynchronous collaboration

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

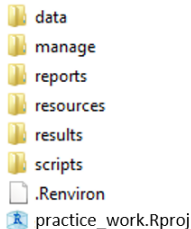
597 students

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

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

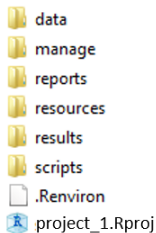
Set up your project directories consistently

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)
```
```

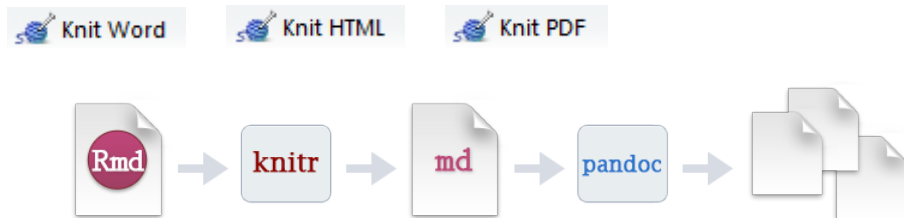
- ▶ Text mixed with simple text formatting like # heading and **italics**

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

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```
```{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:

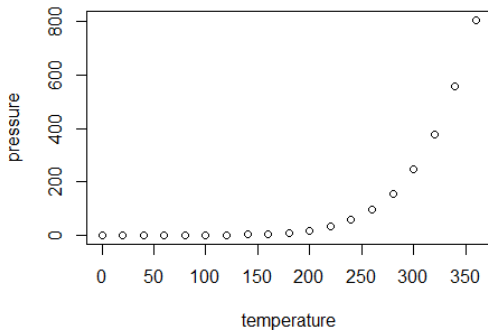
```
```{r echo=FALSE}  
plot(pressure)
```
```

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.

Reading

[Course calendar](#) regularly for assignments and due dates

[27.1](#) and [27.2](#) for more on R Markdown