Intro to Rmarkdown

Yawen Guan

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What is Rmarkdown?

- Think of the traditional way of creating a report...
  - write up -> analysis -> add results to report -> add figures to report -> conclude the study
  - sometimes we need to redo the analysis -> update results/figures in the report
  - hopefully done. If not, we will need to repeat the above vicious cycle.
- R Markdown is a file format for making dynamic documents with R.
  - This means, the analysis R code is embeded in the document.
  - The results and figures are added to the report as you modify your analysis.
  - Then, the above procedure simplifies to
    - write up -> analysis -> **Knit**

Why Rmarkdown?

- Develop your code and ideas side-by-side in a single document.
- Dynamic Documents: Knit together plots, tables, and results with narrative text. Render to a variety of formats like HTML, PDF, MS Word, or MS Powerpoint.
- Reproducible Research: Upload, link to, or attach your report to share. Anyone can read or run your code to reproduce your work.
    - The concepts of replication and reproducibility are central to science
- Good for creating report and tutorial, but for method development that involves series programing, Rmarkdown may not be the best

Get started

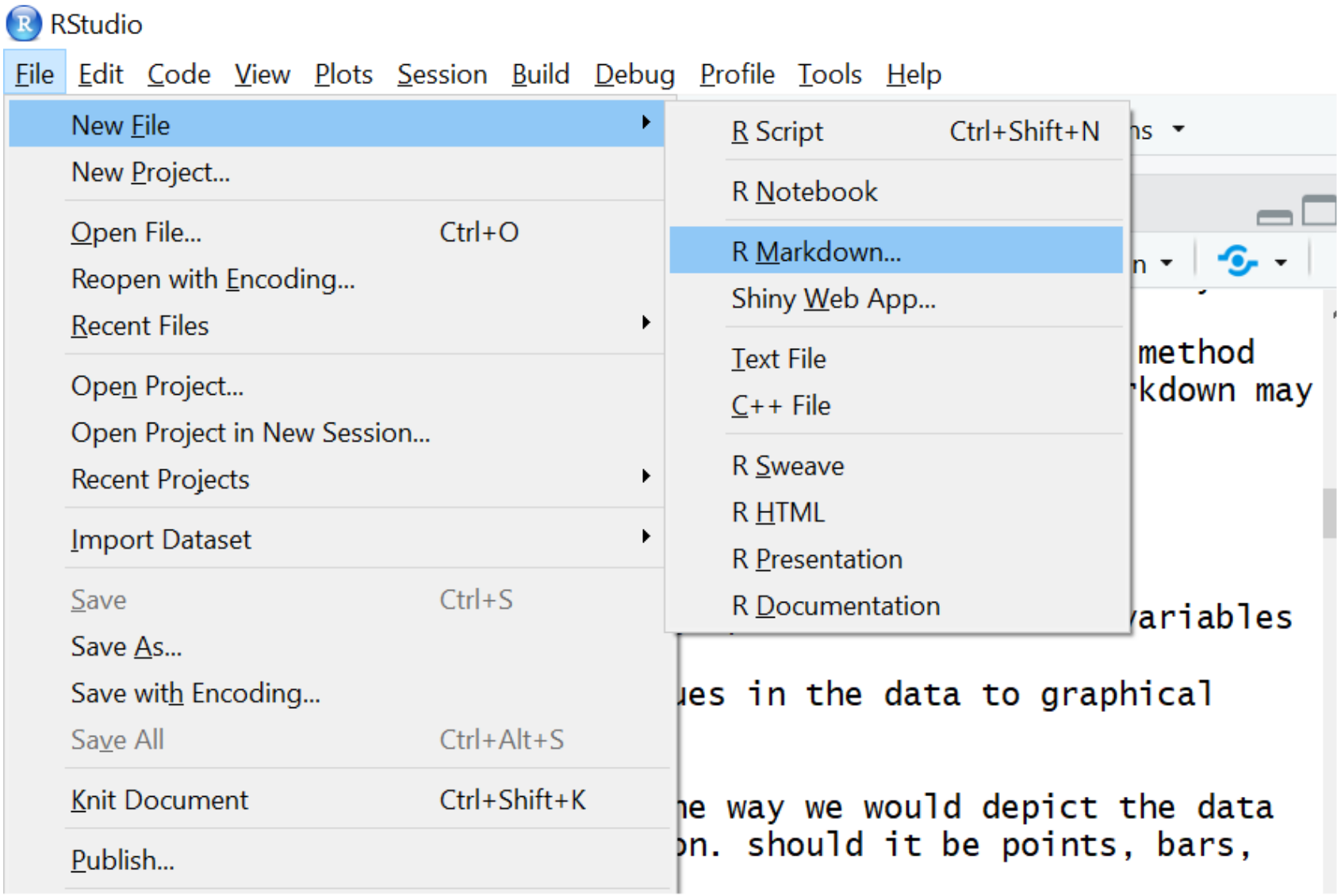

Figure 1: getstarted

Set format

We can change the output of the file format to slides, pdf, html or MS word by simply changing the *output:* to one of the followings

- `beamer_presentation`
- `html_document`
- `pdf_document`
- `word_document`

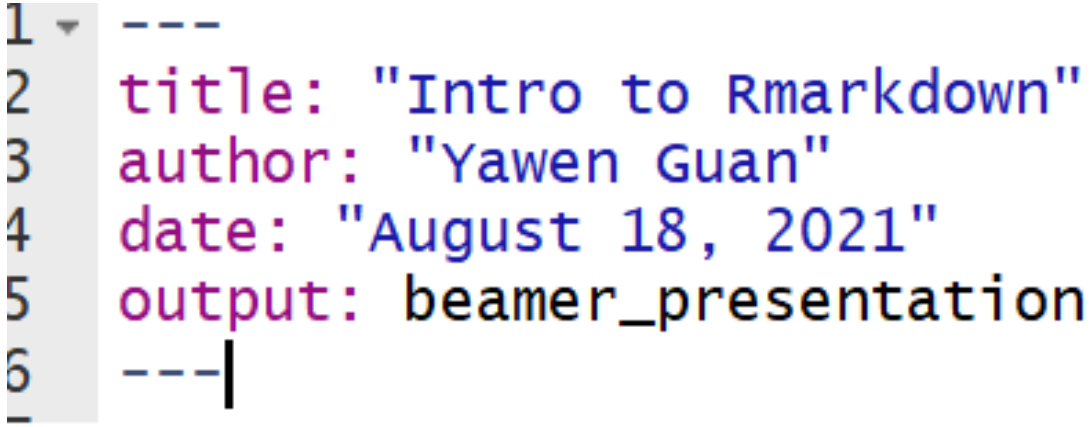

Figure 2:

Add text to describe the data

Toy Example: The mtcars dataset consists of data that was extracted from the 1974 Motor Trend US magazine, and depicts fuel consumption and 10 other attributes of automobile design and performance for 32 automobiles (1973-74 models).

Embed code chunks

We can add R code by typing R commands between ‘”{r} and ‘”

Several options can be added to {. . . } to determine how the code chunks show up in the document. For example,

- `echo = TRUE: command will appear in file`
- `echo = FALSE: command will not appear in file`
- `eval = TRUE:  R code will be evaluated`
- `echo = FALSE: R code in this session will be skipped`

Example:

````
```{r, message = F, warning = F}
library(tidyverse)
library(ggplot2)
head(mtcars)

```
````

This will print

```
library(tidyverse)
library(ggplot2)
head(mtcars)
```

```
##                    mpg cyl disp  hp drat    wt  qsec vs
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1
```

Embed code chunks for plots

We can add plots using ggplot in the code chunk

Several options can be added to $\{\ldots\}$ to determine how figures show up in the document. For example,

- fig.align = "left", "right", or "center"
- fig.width = 7
- fig.height = 7
- fig.cap ="Add caption"

Example:

````
```{r, echo=FALSE, fig.width=5, fig.height=4}
ggplot(mtcars,aes(wt, mpg)) +
          geom_point() +
          theme_bw()

```
````

This will print

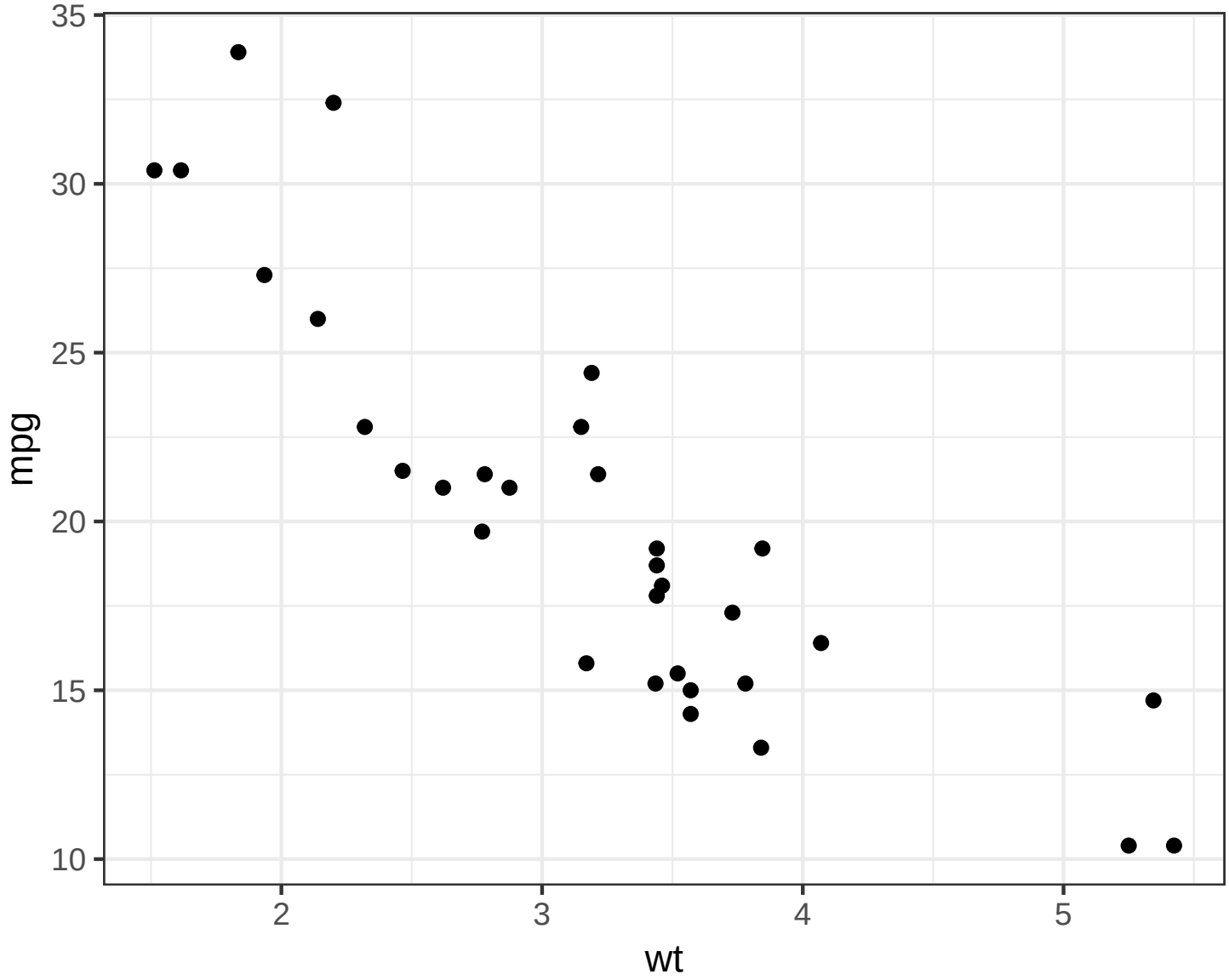

Figure 3: plot example

More on Rmarkdown cheatsheets

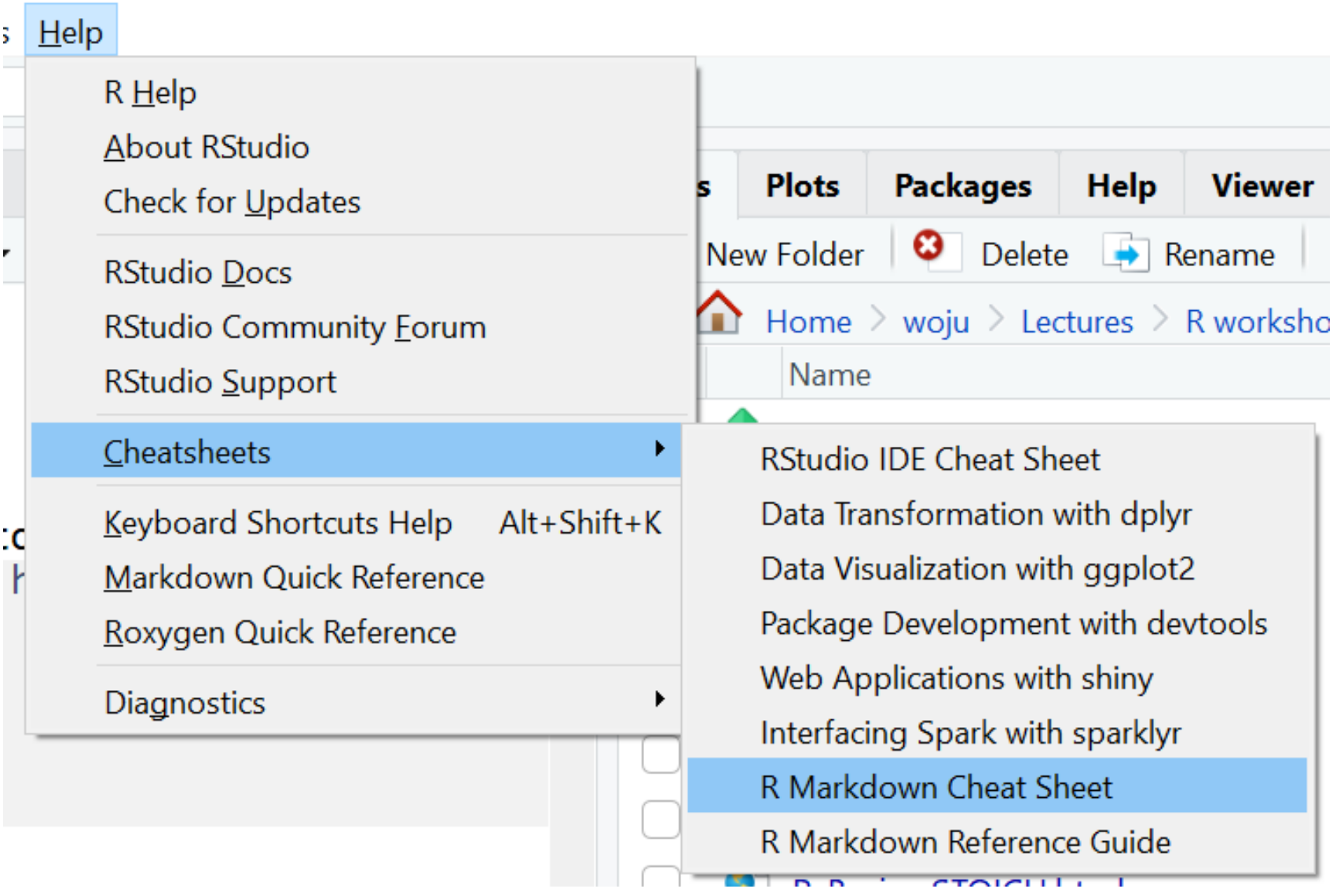

Figure 4: cheat sheets