

## Discussion 1

*TA: Zach Quan, zkquan@ucdavis.edu**Office Hour: Thursday 5:00 pm - 7:00 pm**Zoom Link: <https://ucdavis.zoom.us/j/2478285521>*

## 1 Discussion

The discussion section will provide additional help on **data analysis (in R)**, **concept understanding**, and **homework assignments/quizzes**. Discussion notes will be uploaded to the Home page on Canvas weekly.

## 2 Setting Up R

### 2.1 Installing R

One of the wonderful things about *R* is that it is free. This way, you may work on your homework in the comfort of your home. To download and install R, complete the following steps:

1. Go to <http://cran.freestatistics.org/>
2. If you have Linux, click "Download R for Linux" and select the appropriate platform.
3. If you have a Mac, click "Download R for (Mac) OS X", and select the appropriate package based on your operating system.
4. Follow the instructions of the installer.

Congratulations, you have now (hopefully) installed R.

### 2.2 Installing RStudio

To install RStudio, complete the following steps:

1. Go to <http://rstudio.org/>
2. Click on the "Download RStudio" button.
3. Select the "Desktop" option.
4. Select the appropriate link (usually the recommended one for your system works just fine).

## 2.3 Installing R Markdown packages

- Install Markdown package by typing this command in R Console:

```
install.packages('rmarkdown')
```

- Install LaTeX (TinyTeX) for PDF reports by typing this command in R Console:

```
install.packages ('tinytex')
```

- Once the installation has been completed, type

```
tinytex::install_tinytex()
```

## 3 Brief introduction to Rstudio and R Markdown

### 3.1 Rstudio

- Click the RStudio icon to run this program, and R will open automatically in the background at the same time. You should have 4 panels. A brief description of the four windows follows:
  1. **Environment, History:** This window lists all Variables, Data, and Functions defined by us.
  2. **Files, Plots, Packages, Help:** We can use the help or ? command to get the documentation of any functions, and the relevant help document will be opened. Furthermore, if we plot a figure, it will be displayed in this panel as well.
  3. **Console:** The place we can type in commands and retrieve our output.
  4. **Source:** The place to store our commands.
- Ways of typing commands in R:
  1. Type code in Console
  2. **Recommended:** Create a new source file, type code in the file:  
click the green cross (+) in the top left corner, and choose "R script".
- Running R code:
  1. In R Console: hit \*Enter\* after the command line
  2. In R Source files:  
Place the cursor in the line or highlight the part you want to run and hit the "run" button on the menu, or apply the shortcut: **command + Return(MAC)** or **Ctrl + Enter(Windows)**
- Save R Source files (Script, notebook, markdown):
  1. click the blue square button in the source window.
  2. click File > Save/ Save as.

## 3.2 R Markdown

- Create an R markdown file:
  1. Click the green “+” in the top left in Rstudio > R markdown > write a title and choose output file format > OK
  2. Type text in the white space for your report
  3. Write R code in the grey R chunk, which can be created by typing ````\r{}```` at the beginning and ````` at the end.
  4. Click the **Knit** button to generate your pdf/html file by R Markdown file.
- More details about R Markdown: [https://rmarkdown.rstudio.com/authoring\\_basics.html](https://rmarkdown.rstudio.com/authoring_basics.html)
- An R Markdown Cookbook: <https://bookdown.org/yihui/rmarkdown-cookbook/>