

Lesson 0: Introduction to R Studio

Task 1: Getting R and R Studio

In this class we will be using R Studio Cloud.

Go to rstudio.cloud, click sign up. Then, choose the free version, and login with your school google account. R Studio Cloud works well with chromebooks.

- a. If you want to download R and R Studio on your computer, here is a link:

<https://youtu.be/TFGYIKvQE04>

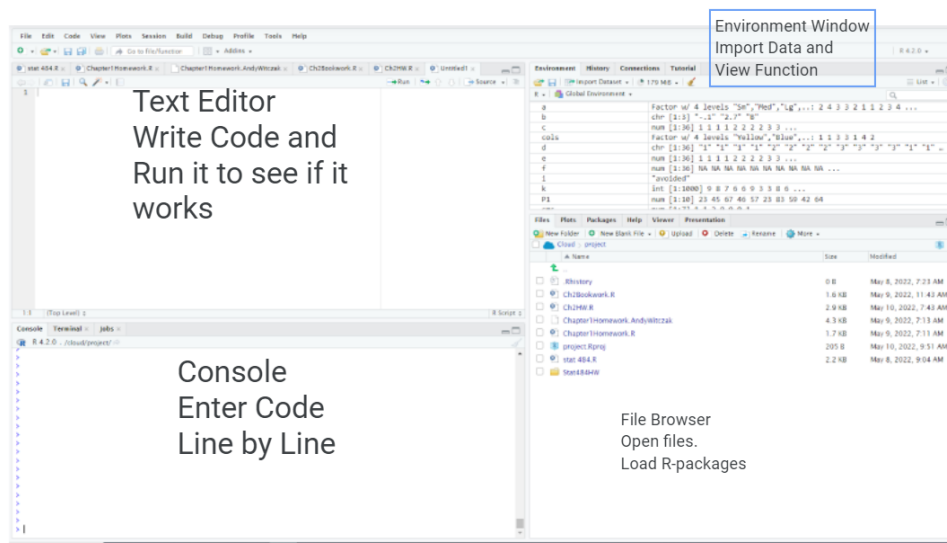
This link will help for downloading R to a computer:

<https://cran.r-project.org/bin/windows/base/>

Here is a link to download R Studio:

<https://www.rstudio.com/>.

- b. Here is a view of how R Studio works.



Task 2: Playing with R Studio

R can do math. We are going to look at the operations for adding (+), subtracting (-), multiplying (*), dividing (/), and finding powers (^)

- a. In the R Console type the following math problems. Make sure to use the Operations R recognizes.

$5+50$

$\frac{16}{9}$

20.1×17.8

3^5

$(5 - 2)(5 - 2)^6$

- b. Create some of your own math problems and place them in the Console. Check what R outputs with your calculator.

- c. Use the same math problems from Part a, type them into the text editor and then press run.

```
> #Task 2
> #a
> 5+50
[1] 55
> 16/9
[1] 1.777778
> 20.1*17.8
[1] 357.78
> 3^5
[1] 243
> (5-2)*(5-2)^6
[1] 2187
```

- d. Which coding area do you prefer to run code, the text editor or the console? Why?

Task 3: Putting Numeric Data into R Studio

The data R reads are called vectors. To put in the numbers 0, 1, 1, 1.5, 2, 7, 9 to R and save it, we use the following code:

```
falcon <- c(0, 1, 1, 1.5, 2, 7, 1, 0.5)
```

The object or vector containing the numbers is now called falcon. To assign a vector to a variable, falcon, you use the symbol `<-`. The `c()` portion of the code stands for concatenate which means to put the numbers together.

R can add, subtract, multiply, divide, and sort the data.

- a. Enter the following code into R.

```
falcon <- c(0, 1, 1, 1.5, 2, 7, 1, 0.5)
falcon + 5
falcon +      5
falcon - 2.5
falcon / 2
falcon ^ 2
sort(falcon)
```
- b. What did you notice about what happened to the vector falcon when you completed each step.
- c. Examine the structure of the data falcon using the code.

```
str(falcon)
```

Note, `num [1:8]` means a numeric vector with 8 elements.

Task 4: Putting Character Data into R Studio

R can also store character vectors. Enter the following vector into R.

```
thebest <- c("f", "a", "l", "c", "o", "n", "s", "a", "r", "e")
```

We will examine how R stores character vectors.

- a. Examine the structure of thebest using the following code.
`str(thebest)`

Note `chr [1:10]` means it is a character vector with 10 elements.

- b. Suppose we want to know the 8th letter or element in the vector thebest.
Type the following code.
`thebest[8]`
- c. Find the code to find the 4th letter in the vector.

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Practice Problems

Perform the following math operations in R. Record the R output.

1. $5 + 70.294$
2. $\frac{16}{10}$
3. -20.1×12.9
4. 23^3
5. $(5 - 12)(5 - 12)^2$

Enter the following numbers as a numeric vector. Save the vector as ekhs.

7, 4, 2.5, 7, -12, 35, 73

6. Multiply each element of ekhs by -2
7. Add 5.9 to each element
8. Find the third power of each element.
9. Sort the elements.
10. Use the function `summary()` on ekhs by typing `summary(ekhs)`. Record your results.

Tell what is wrong, or debug the following codes. Try putting them into R and read the error codes.

11. `falcon < c(0, 1, 1, 1.5, 2, 7, 1, 0.5)`
12. `falcon <- c(0, 1, 1, 1.5, 2, 7, 1 0.5)`
13. `a <- ("f", "r", "l", "e", "n", "d")`
14. `a <- c("f", "r", "l", "e", "n", "d")`

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Check for Understanding

1. Put the numbers 1, 3, 4.6, -1, 67, -76, 14, 16.2, 1.79 into R as a vector names xyz. Write the code and output needed.
 - a. Multiply each element of xyz by -3.
 - b. Sort xyz.
 - c. Find the summary statistics of xyz.