Lesson 0: Introduction to R Studio

Lesson Plan

Learning Targets

Students will learn how to access and install R Studio on their computers.

Students will learn the 4 panels of R Studio.

Students will learn math computations in R Studio.

Students will learn how to input numeric and character vectors in R Studio.

Task 1: Getting R and R Studio

Here is a link for a video on R Studio basics.

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

[https://youtu.be/TFGYlKvQEQ4](about:blank)

This link will help for downloading R to a computer:

[https://cran.r-project.org/bin/windows/base/](about:blank)

Here is a link to download R Studio:

[https://www.rstudio.com/](about:blank).

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 (^)

1. Text

   Description automatically generatedIn the R Console type the following math problems. Make sure to use the Operations R recognizes.

5+50

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

Text

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1. Text

   Description automatically generatedUse the same math problems from Part a, type them into the text editor and then press run.
2. Which coding area do you prefer to run code, the text editor or the console? Why?

The text editor saves your work, but the console does not.

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.

1. Text

   Description automatically generatedEnter 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

falcons ^ 2

sort(falcon)

1. What did you notice about what happened to the vector falcon when you completed each step.

falcon + 5

Added 5 to each element of the vector.

falcon + 5

Added 5 to each element of the vector.

falcon – 2.5

Subtracted 2.5 from each element of the vector.

falcon / 2

Divided each element of the vector by 2.

falcons ^ 2

Created an error because the vector is named falcon not falcons.

sort(falcon)

Ordered each element of the vector from least to greatest.

1. 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.

1. Examine the structure of thebest using the following code.

str(thebest)

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

1. Suppose we want to know the 8th letter or element in the vector thebest.

Type the following code.

thebest[8]

1. Find the code to find the 4th letter in the vector.
2. thebest[4]

Task 4 Key

A picture containing graphical user interface

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Text

Description automatically generated with medium confidencePerform the following math operations in R. Record the R output.

1. 5+70.294

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

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

1. Multiply each element of ekhs by -2

A picture containing table

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1. Add 5.9 to each element
2. Find the third power of each element.
3. Sort the elements.
4. Use the function summary() on ekhs by typing summary(ekhs). Record your results.

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

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

The sign is wrong <- .

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

A comma is missing between the 1 and 0.5.

1. a <- (“f”, “r”, “I”, “e”, “n”, “d”)

Missing the c() in front of the vector.

1. a <- c(“f”, “r”, “I, “e”, “n”, “d”)

Check for Understanding

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.

1. Multiply each element of xyz by -3.

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1. Sort xyz.
2. Find the summary statistics of xyz.