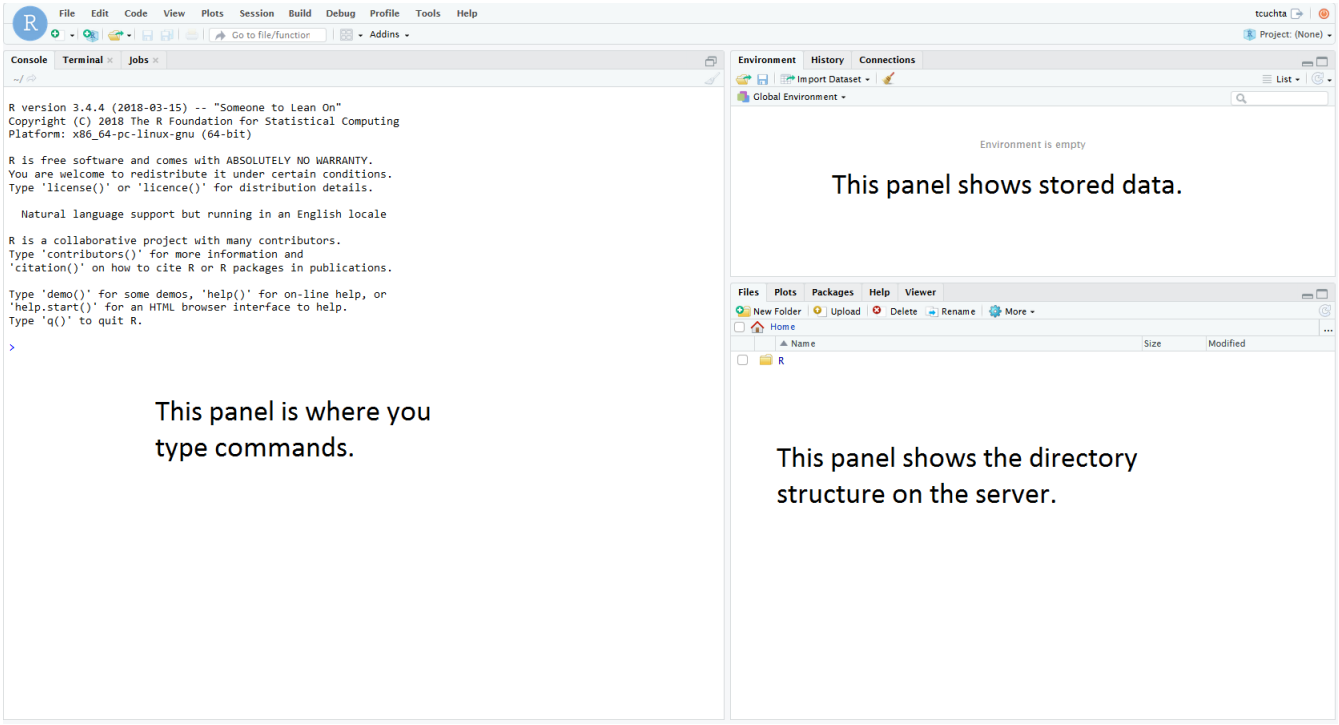
Math 1550, Lab 1:
RStudio Basic User's Guide

DUE: 4 September 2019

Commands needed for R:

(1) An RStudio server is being hosted by the department of computer science and math for use by students in MATH 1550. To access it, you should log into a **wired** campus computer and go to the URL `http://10.253.49.9:8787/`. To log in, use the credentials provided to you by your instructor.

(2) The window you get after opening RStudio or logging into the Fairmont State instance of RStudio is the following:



note: if you install RStudio on your personal computer, then it will look essentially the same

(3) A **list** is the simplest medium of storing data in RStudio. We can create a list using the function `c`. For example if we type the command

```
c(1,3,5,7,9)
```

then we observe the following response by the RStudio server:

```
> c(1,3,5,7,9)
[1] 1 3 5 7 9
>
```

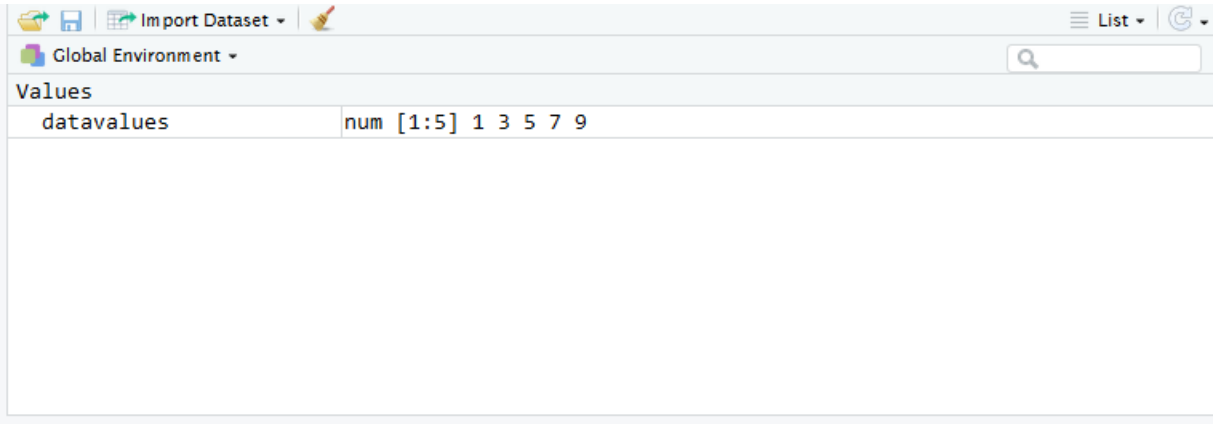
However we can't "access" that list anymore because it was not stored in a variable. Notice nothing appears in the "stored data" panel. If we would like to store data for future calculations, then we could do something like

```
datavalues=c(1,3,5,7,9)
```

then observe the following response, different from before:

```
> datavalues=c(1,3,5,7,9)
>
```

However now, we see in the "data storage" panel that this `datavalues` variable now has information in it:



The reason it says "`num`" is because the list consists of numbers. The reason it says `[1:5]` is that there are five entries in this list index as items 1, 2, 3, 4, and 5. Following `[1:5]` is the actual data we inserted into the list we named `datavalues`.

(4) To see what's located in the list variable `datavalues` at index value 1, we may type

```
datavalues[1]
```

and the response will be

```
> datavalues[1]
[1] 1
```

Similarly inserting `datavalues[X]` where X is actually is 1, 2, 3, 4, or 5 will yield the corresponding entry in the `datavalues` list:

```
> datavalues[1]
[1] 1
> datavalues[2]
[1] 3
> datavalues[3]
[1] 5
> datavalues[4]
[1] 7
> datavalues[5]
[1] 9
```

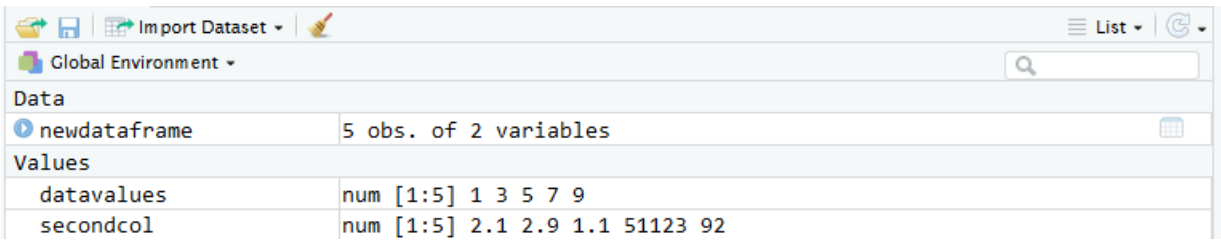
(5) The other most common data variable type we will see in this course will be a **data frame**. Think of data frames like Excel spreadsheets – it is a grid of values that can be used to make computations. Suppose we created another list named `secondcol`:

```
secondcol=c(2.1,2.9,1.1,51123,92)
```

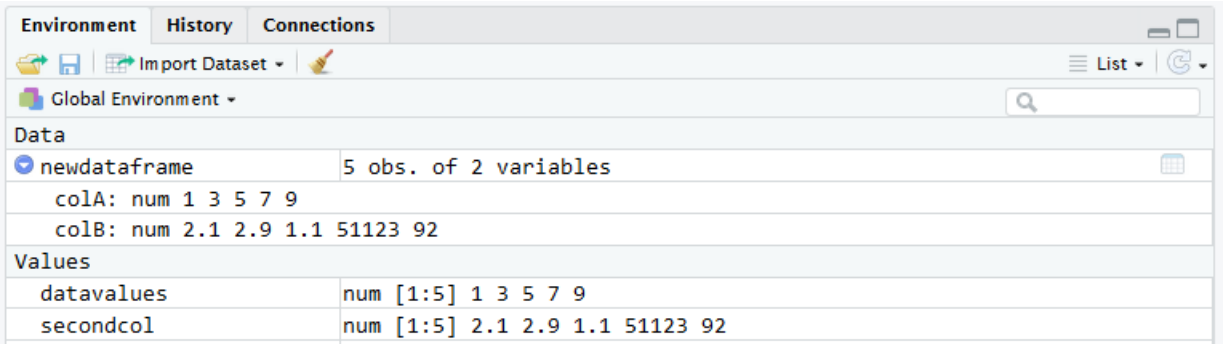
First notice that the new list appears in the "stored data" panel. We now have two separate lists that have nothing to do with each other: one named `datavalues` and one named `secondcol`. Sometimes it could be useful to combine these lists into a single data frame object named `newdataframe`. We can accomplish that in this case by the following complicated-seeming command:

```
newdataframe=do.call(rbind, Map(data.frame, colA=datavalues, colB=secondcol))
```

Running this command make the following appear in the "data storage" panel:



Clicking the blue button next to `newdataframe` expands it to show what the data frame contains:



To access the information in `newdataframe` we can reference the named columns `colA` and `colB`. Use the command

```
newdataframe$colA
```

and RStudio will spit out the contents of that column:

```
> newdataframe$colA
[1] 1 3 5 7 9
>
```

Similarly the command

```
newdataframe['colB']
```

will spit out the contents of `colB`:

```
> newdataframe$colB
[1]     2.1     2.9     1.1 51123.0    92.0
>
```

(6) We may do simple computations with columns in our data frame. For example we can compute the mean ("average") of `colB` of the dataframe `newdataframe` with the command

```
mean(newdataframe$colB)
```

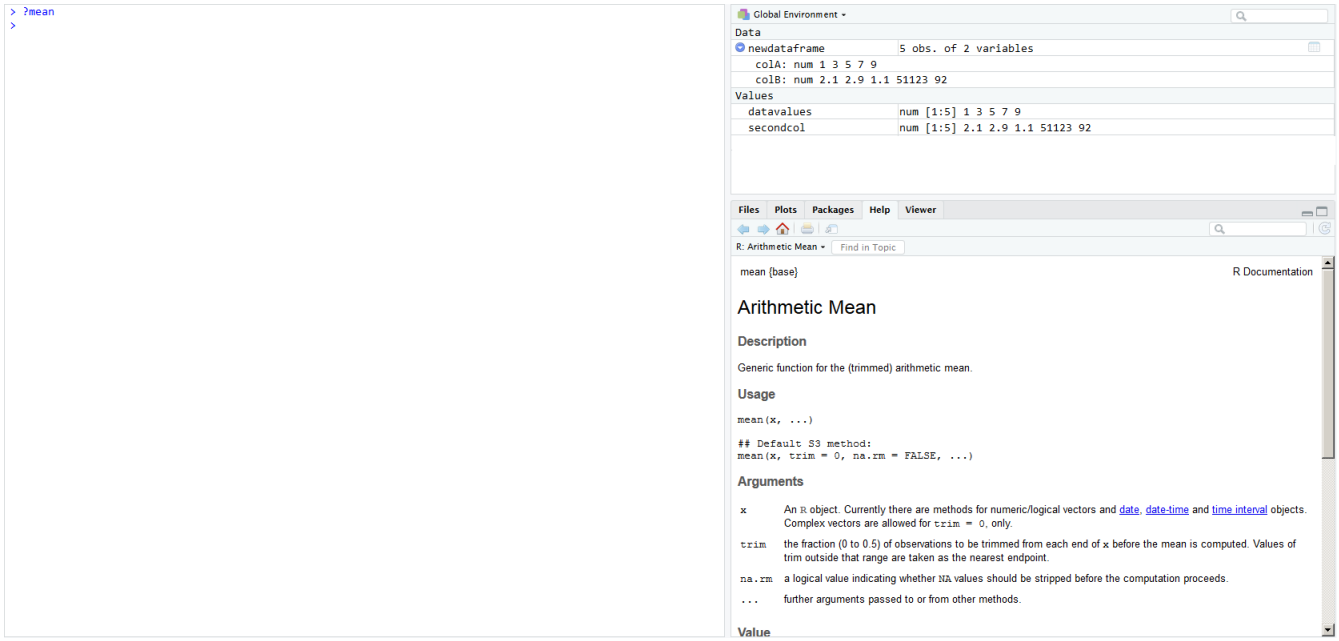
giving the response

```
> mean(newdataframe$colB)
[1] 10244.22
>
```

(7) You may always look up the documentation for a command using the `?` symbol followed by the command. For example, typing

```
?mean
```

will show the documentation for the `mean` funciton in the directory structure panel:



Problems:

(1) Make three lists of data:
   (a) The first list should be called "MyBD", and should consist of the three numbers that make up your birthday (month, day, year).
   (b) The other two lists should be the birthdays of two other people you know. Provide these lists with appropriate names

(2) Create a data frame called "BDays" that includes these three lists as columns. The first column should be MyBD.

(3) The command "`sum()` will give you the sum of the numbers in the list you feed it.
   (a) Search for the documentation for `sum()` using RStudio's query functionality
   (b) Find the sum of MyBD in two different ways:
      (i) By using sum with the original list
      (ii) By calling the appropriate column from the BDays data frame.

(4) Take a screenshot of your RStudio console, and paste it into the lab worksheet. Most PC keyboards have a "PrtScn" (Print Screen) button. This copies an image of your current screen onto your clipboard, which you can then paste into a Word document and submit by e-mail or with HW2.