R Installation and Setup Guide.

R is an open source program available for Windows, Mac and Linux. It is fairly lightweight and will run on most computers, but if you cannot get it to work please email us (Joshuaac@usc.edu and aleavitt@usc.edu) or arrive at the workshop NO LATER THAN 8:30am.

In order to install R please follow these step by step instructions. Any code snippits and examples will be in the Courier New font, `like so`.

1. Head to the local download host for R (in this case the UCLA Statistics Dept.) by clicking here or copy and pasting the following link into your browser. http://cran.stat.ucla.edu/
2. Select the version of R appropriate for your operating system.
    a. For WINDOWS users select "base" and then Download R 3.0.2 for Windows.
    b. For MAC users select R-3.0.2.pkg.
    c. For LINUX users select the appropriate distro and download the required files.
3. Install the downloaded files
    a. Windows users, if your computer has more than 4gb of RAM then you only really need the 64 bit version of R.
4. Fire up R from your Program Files/Dock you should see something similar to this
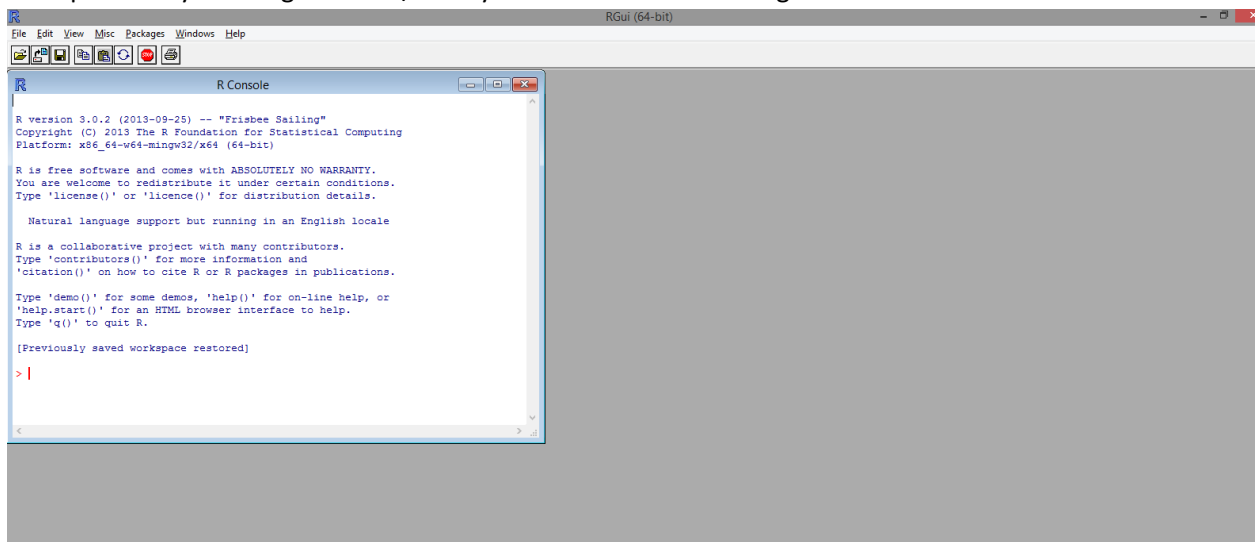
5. In keeping with a long tradition of programming, test R by typing `"hello world"` into the white text box (the console) and hitting enter, you should see this. Afterwards try some basic addition, subtraction and multiplication.
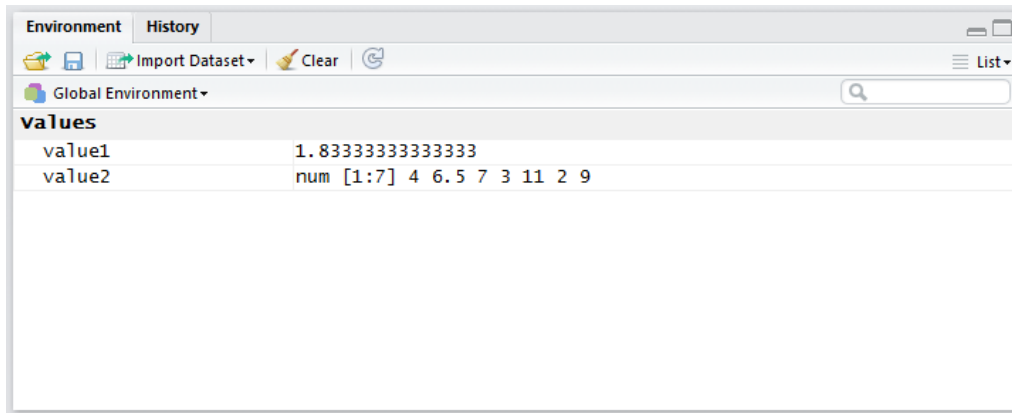
```
> "hello world"
[1] "hello world"
> |
```

6. As you've probably noticed R is not the prettiest piece of software. Lets download an IDE (Integrated Development Environment) which sits on top of the program and makes writing code easier. For this class I will be using Rstudio which is a popular IDE, you can chose your own

version if you'd like but some of the screenshots and instuctions in later labs might not make sense.

7. Head to http://www.rstudio.com/ hit "download now "and then select the desktop version. Use the link provided under the **Recommended For Your System** header

8. Install Rstudio and open it up. You should see four windows.

   a. Top left is the scripting window. Here you can type lines of code and run entire programs at one time. Rstudio will close brackets, highlight key words and perform other helpful features.
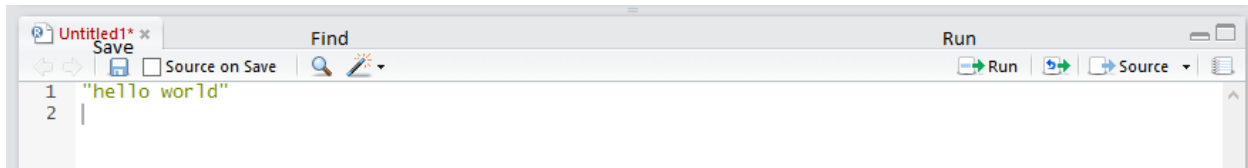
   i. Let's try the `"hello world"` program again. Type it in the scripting window and -hit the green "run" arrow or select the code and hit ctrl-enter (command-enter on a mac).

   ii. Now hit the blue disk button and save your code as HelloWorld.R

   iii. Finally hit the magnifying glass and type *hello* into the find box to highlight the text below.

9. When you ran your program you should have seen `"hello world"` pop up in the window immediately below the scripting window. This is the console. Any results and code from the scripting window will be run here. Additionally you can type code directly into the console, although the syntax editors is preferable due to the extra features described above. However, the console can be useful for doing one time calculations which don't need to be in your final code. Try typing `(4+7)/6` into the console and hit enter .

10. At the right hand top Rstudio is the Enviornment and History window. Enviornment shows all the assigned names for datasets or formulas which you have saved or created in your code. History has a running log of the various commands entered into the console.

   a. Lets assign a name to a number and put it in the enviornment. This is done with the `name<-content` command chain. If we wanted to assign the name `value1` to the earlier math we did in the console then enter `value1<-(4+7)/6`

   b. To see the contents of the variable simply type `value1` and run it.

   c. Multiple numbers can be assigned to a variable let's create a row of numbers and assign it to the name value2 with the following code: `value2<-c(4,6.5,7,3,11,2,9)`

Environment	History					
Import Dataset ▾	Clear					≡ List ▾
Global Environment ▾						
Values						
value1	1.83333333333333					
value2	num [1:7] 4 6.5 7 3 11 2 9					

      d.   Typing `value2` will display the contents, try some other commands such as:

          i.   `summary(value2)`

         ii.   `max(value2)`

       iii.   `mean(value2)`

       iv.   `value2/5`

      e.   You can store a wide variety of things in the enviornment such as formulas, tables, numbers, graphs and more.

      f.   Click the history tab and look at the log of your actions, double click an entry to transfer the code to the console.

11. Finally, the bottom righthand window is a multipurpose display area. You can see generated plots and graphs here, open up files from your harddrive, search the help files and manage packages (extensions of R's capabilities). Spend a few minutes clicking around to familiarize yourself.

Congratulations, you've set up R and run a basic script. Take some time and look through the help features and try different comands. R is very forgiving so don't worry about errors or mistyped commands. Under the Tools->Options menu at the pop of the window there numerous commands for customizing and changing how Rstudio appears and runs, so experiment and set up your enviornment in a way which is comfortable for you. Additionally bookmark these resources as they may come in handy.

UCLA Stats Help- http://www.ats.ucla.edu/stat/r/

R- Bloggers- http://www.r-bloggers.com/

Comprehensive R Archive Network- http://cran.r-project.org/