**An Introduction to R**

**Introduction**

The statistical package R is a potentially very handy tool for analyzing and visualizing statistical data. It was designed by the dynamic duo of Ross Ihaka and Robert Gentleman in the year of 1993 first as a “testbed which could be used to trial some ideas on how a statistical environment might be built”. Fast-forwarding to today, R has become more than just a simple testbed; it has become a collaborative effort to create a piece of free, yet approachable software for statistical modeling and data analyzing.

The R programming language is based off of the S programming language (a statistical language based around functions and the concept of objects). R is an interpreted language, which means that it interprets plain text and numerical values inputed by the user. For example, if a user were to type in “1+2”, the R command prompt would reply with “4”. The fact that R is an interpreted language makes coding in its command prompt very approachable, in that it removes some of the hassle that traditional coding languages maintain, such as having to initially set up variables to store a value before utilizing said value. Users can utilize R in a multitude of ways from classical statistical tests to data cleansing and analyzing. In layman’s terms, if you have some data and want to do something with it, R more than likely has a solution for you.

**Purpose**

The purpose of this exercise is to get R installed on your computer, set your working directory, overview some basic concepts with a ‘Hello World!’ function, and practice loading in a library. By the end of this exercise, we hope you will have gained a basic understanding of R and its potential.

**Before We Begin…**

Please, if you all run into any trouble during the course of this exercise, do not hesitate to seek help from me. I want to make sure you all get off on the right foot. I’m here for you!!! ☺

**Procedure**

**Part 1: Instillation**

In order to begin messing around with R, we first have to download it from the web.

1. Navigate to the website <http://www.r-project.org/>. Here you will find the home base for everything R, including manuals, FAQs, screenshots, etc.
2. On the left-hand side of your screen, click on CRAN. This will take you to a page titled CRAN Mirrors.
3. On the page CRAN MIRRORS, scroll down until you see the heading “USA”. Underneath this heading you will find a multitude of hyperlinks. Each hyperlink allows you to download R, so no matter which one you press; it will take you to the R download page. Click on one of the hyperlinks. This will take you to a page called The Comprehensive R Archive Network.
4. On the page titled The Comprehensive R Archive Network, click the hyperlink that matches your operating system. This will take you to a page titled R for (your operating system).
5. On the page titled R for (your operating system), do one of the following:
   * For Mac OS: click on Download R for Mac OS. After that, select the hyperlink that ends in the file format “.pkg”.

* Note: If your browser informs you that this file may harm your computer, select keep.
* For Windows: click on Download R for Windows. After that, click on the hyperlink titled base. Then, click on Download R for Windows.
* Note: If your browser informs you that this file may harm your computer, select keep.

1. Once your package/file has downloaded, navigate to your operating system’s downloads folder. From here, double click on the file/package and follow the on screen instructions to install R. A shortcut for R should be created on your desktop if you are running windows or your applications folder if you are running Mac OS.

**Part 2: Setting Your Working Directory**

Now that you have R installed on your computer, we can set your working directory. This allows you to potentially import data into R as well as have a place for all of your R related materials.

1. Open up R by clicking on the Icon that was created for you in Step 6 of Part 1. An R coding environment should pop up.
2. The first thing we want to do is find out where the working directory is set. You want to set it to the place where it is convenient for you (for example, I like to set it to my Desktop for easy access). To get your current directory, type getwd() and press enter.
3. Your working directory will display below getwd(). I recommend creating a folder titled R in your working directory for convenience sake and navigating into it by simply typing setwd(“your/directory/goes/here/R”). If you wish to change your working directory entirely, find a directory that suits you (example: Documents), create an R folder in it, and type setwd(“your/directory/goes/here/R”).
4. If all is successful with the step above and you type getwd() once again, you should see the directory you just inputted. Your working directory has now been set.

**Part 3: A Simple Hello World! Exercise**

Now that your working directory is set, let’s do a simple Hello World! Exercise to become familiar with R syntax.

1. In your R terminal, type the following and press enter: x <- (“Hello”)
2. Type x and you should see [1] “Hello”. In the step above, we assigned the word Hello to a variable x by using the assignment operator (<-). Note that any String, a series of characters containing non-numeric values, must be contained in quotes.
3. Once again in your terminal, type the following and press enter: y <- (“World!”)
4. Type y and you should see [1] “World!”. This time, we assigned the word World! to a variable y.
5. Now lets combine these two words. Type the following and press enter: paste(x,y)
6. You should see [1] “Hello World!” appear after pressing enter.

**Part 4: Installing Packages**

One of the awesome things about R is that it is a highly multi-versatile package. It allows you to download libraries that allow you do awesome stuff such as create awesome graphs/tables and, for our purposes, mine and analyze data. To demonstrate how to download and load a library, we are going to use “Rfacebook” as an example.

1. While in your R terminal, navigate to a dropdown menu titled Packages (Windows) or Packages & Data (Mac). Click on Install Package(s)… (Windows) or Package Installer (Mac).
2. A window should appear that says something along the lines of “Please select a country”. Select USA (MD).
3. After selecting your country, you should see a long list of libraries. For Mac users, you may need to click on Get List to see the list (make sure CRAN (binaries) is selected from the dropdown menu above before clicking Get List).
4. Navigate down until you see Rfacebook. Highlight it, and click OK (Windows) or Install Selected (Mac) \*\*For Mac users, make sure to check the Install Dependencies box. It will save you A LOT of hassle.
5. Completing the step above will download your selected library. Note that you can download more than one library at once.
6. To load the library that you just downloaded (in this case Rfacebook), type library(“Rfacebook”) into your R terminal. Doing so will load in the selected library. As with downloading libraries, you can load multiple libraries as well (we recommend one at a time).

**Wrap-Up**

Congratulations! You have just downloaded the major key tool to this class!!! Over the course of time, we feel that you will see how multi-versatile and just overall cool R is as well as how it empowers you as data miners/analyzers.