Foundations in Data Science course

Week1 Lab Handout-1: Instructions for installing R and RStudio software

1. R is a system for statistical computation and graphics. It consists of a language plus a run-time environment with graphics, a debugger, access to certain system functions, and the ability to run programs stored in script files.

   (a) **R download and installation:** The webpage of The Comprehensive R Archive Network (CRAN) provides three links for downloading R. Depending on the Operating system running on your PC (Windows, Mac, or Linux) choose the appropriate link.

   CRAN Link: The Comprehensive R Archive Network (r-project.org)

   - To install R on Windows, click the "Download R for Windows" link.
   - Then click the "base" link. Next, click the first link at the top of the new page. This link should say something like "Download R 4.1.0 for Windows" (choose the most current version of R).
   - The link downloads an installer program, which installs the most up-to-date version of R for Windows.
   - Run this program and step through the installation wizard that appears. The wizard will install R into your program files folders and place a shortcut in your Start menu.
   - Note that you'll need to have all of the appropriate administration privileges to install new software on your machine.

   (b) **R FAQ:** If you have additional questions about R like how to download and install the software, you can refer to the following link providing answers to Frequently Answered Questions: R FAQ (r-project.org)

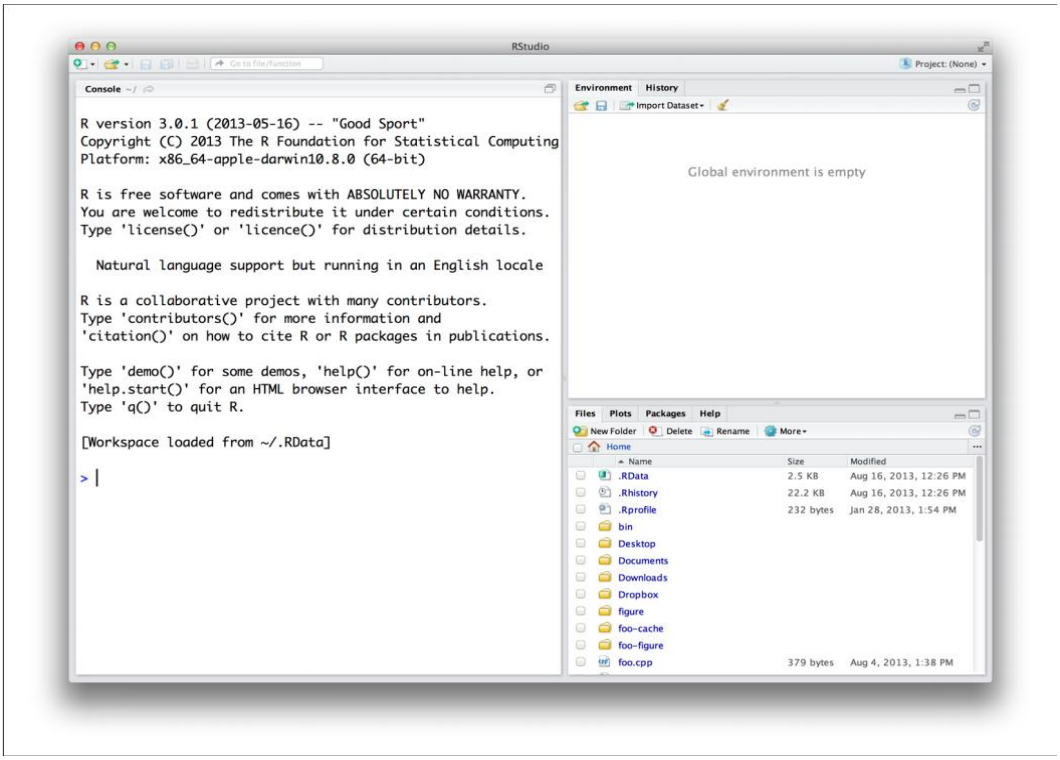
2. RStudio is an integrated development environment (IDE) for R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management.

   (a) **RStudio download and installation:** RStudio can be downloaded from the link: Download the RStudio IDE - RStudio

   Choose the **RStudio Desktop** Open Source License that can be downloaded for free.

   (b) Once you've installed RStudio, you can open it like any other program on your computer—usually by clicking an icon on your desktop.

When you open RStudio, a window appears with three panes in it, as in the figure below. The largest pane is a console window. This is where you'll run your R code and see results. Hidden in the other panes are a text editor, a graphics window, a debugger, a file manager, and more functionalities.



R Packages

Many of R's most useful functions do not come preloaded when you start R, but reside in packages that can be installed on top of R. R packages are similar to libraries in C, C ++, and Javascript, packages in Python, and gems in Ruby. An R package bundles together useful functions, help files, and data sets. You can use these functions within your own R code once you load the package they live in.

Base R

You may hear R users refer to "base R." What is base R? It is just the collection of R functions that gets loaded every time you start R. These functions provide the basics of the language, and you don't have to load a package before you can use them.

Installing Packages

To use an R package, you must first install it on your computer and then load it in your current R session. The easiest way to install an R package is with the install.packages R function. Open R and type the following into the command line:

```
install.packages("package name")
```

This will search for the specified package in the collection of packages hosted on the CRAN site. When R finds the package, it will download it into a libraries folder on your computer. R can access the package here in future R sessions without reinstalling it.

Loading Packages

Installing a package doesn't immediately place its functions at your fingertips. It just places them on your computer. To use an R package, you next have to load it in your R session with the command:

```
library(package name)
```