

# ECOM20001: Econometrics 1

## Tutorial 1: Introduction to R

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### Overview

This tutorial provides an introduction of the statistical program that we will use to **do** econometrics in ECOM20001. The program is called R. We go through (optional) installation of R, and basics in using R with your very first R file: [tute1.R](#).

What is R and R-Studio? R an open-source and free statistical program for doing econometrics. R-Studio is a companion program that makes working with R user friendly. Throughout ECOM20001, we will do tutorials and assignments in R Studio.

### Installing R and R Studio (Optional)

This section is optional since R and R Studio are available on the computer labs in The Spot where the ECOM20001 tutorials take place. You can also use these computers for doing your assignments, so installing R and R Studio on your Mac or Windows computer is not required for the subject. If you do not wish to download R and R Studio on your computer, you may skip the rest of this section and jump right to the next section on the **R Studio Environment** below.

However, since R and R Studio have \$0 cost, you may wish to install them on your laptop or home computer so that you can do your tutorials and assignments on your own computer. If you would rather work in the tutorials off of your laptop than at a University-provided computer, please feel free to do so. Most students do.

I also note that R is also used for ECOM30002: Econometrics 2, the subject which followed ECOM20001, so this might be useful to download R on your own computer and work on it from there from the very start. Check your computer's storage capacity and then requirements for R and R Studio before installing. To be safe, you need about 200 megabytes of space in total.

### *A. R Source Files*

To get started installing R, please visit the R homepage at the following url:

<https://www.r-project.org/>

At the top of the page you will see highlighted text **download R**, click on that link, and then choose any of the links ("CRAN Mirrors") under Australia. For example, you can click on <https://cran.csiro.au/> or any of the other links provided.

After clicking one of the CRAN mirror links, you will be brought to a new webpage, where at the top you will see three urls:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

Choose the link that is needed for your computer.

- If you choose (Mac) OS X, then choose the link at [R-3.5.2.pkg](#) which will begin downloading the R installation files. Wait for this file to download, and then install R on your Mac by clicking on the [R-3.5.2.pkg](#) and following the installation instructions. Note: this file is for the El-Capitan version of OS X, which was released in September 2015. If you have an older version of OS X on your Mac, choose the appropriate package (.pkg file) on the R installation webpage.
- If you choose Windows, click on the link under **install R for the first time**, which will bring you to a separate webpage. At the top of this page, you will see a link that says [Download R.3.5.2 for Windows](#), and follow the installation instructions after clicking on the [R-3.5.2-win.exe](#) file that downloads after clicking on this link.

## *B. R Studio*

Having completed the above installation instructions, you will now have the source files for R installed on your computer. The next step is to install R-Studio, which is a separate program. R-Studio is a user-interface that uses the R Source files to enable a user to do data work and econometrics.

To get started with installing R-Studio, please go to the following url:

<https://www.rstudio.com/products/rstudio/download/>

On this page, you will see various versions of R Studio downloads; click on the green **DOWNLOAD** button under the **FREE** RStudio Desktop Open Source License, which only offers Integrated Tools for R. This is all you need for ECOM20001.

After clicking on the download button, you are brought to the bottom of the webpage. Here you will see links listed under **Installers for Supported Platforms**.

- If you have (Mac) OS X, click on [RStudio 1.1.463 - Mac OS X 10.6+ \(64-bit\)](#). This will download the file [RStudio-1.1.463.dmg](#). Once this file is downloaded, click on it and follow the installation instructions.
- If you have Windows, click on [RStudio 1.1.463 - Windows Vista/7/8/10](#). This will download the file [RStudio-1.1.463.exe](#). Once this file is downloaded, click on it and follow the installation instructions.

### C. Online Installation Instructions

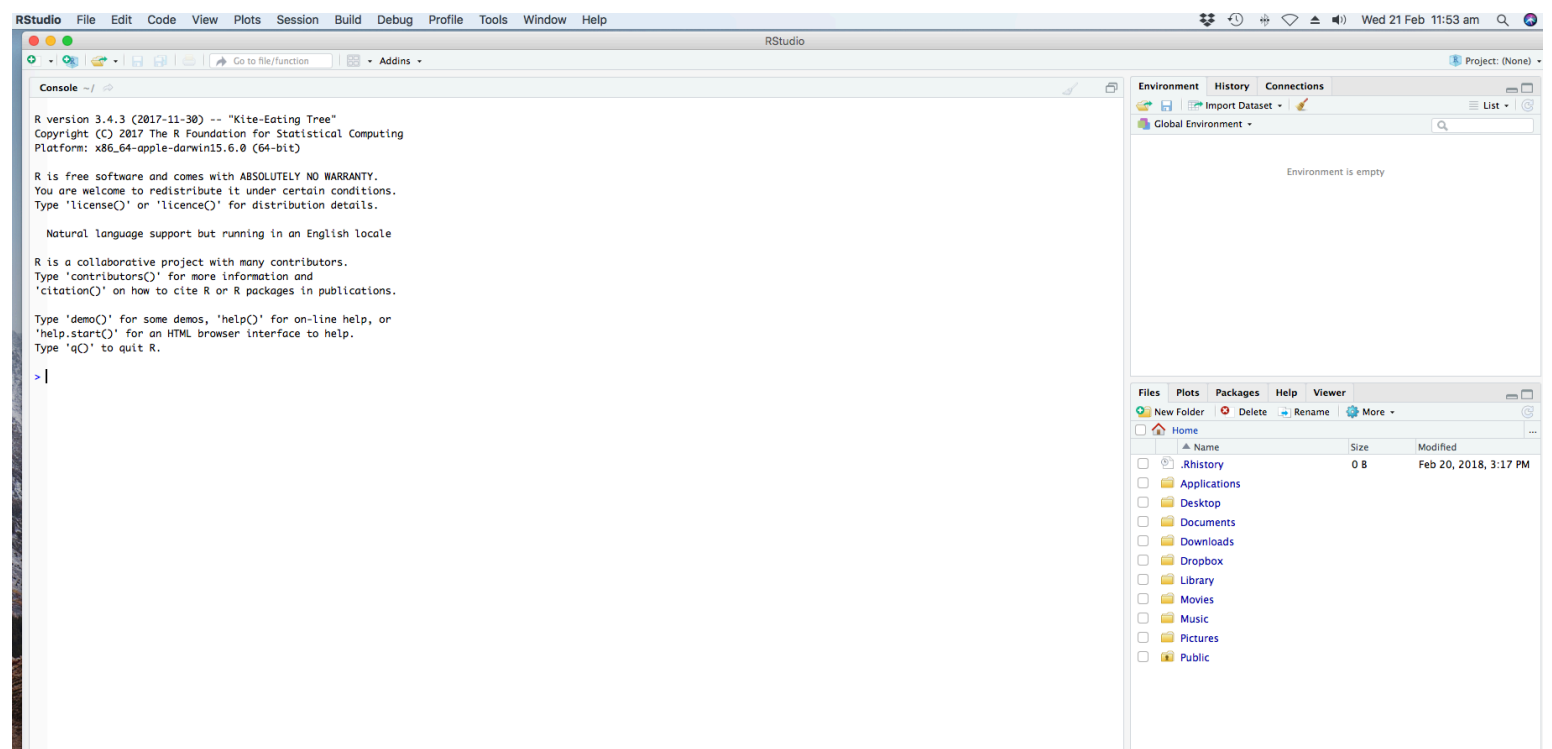
There are many tutorials online for how to install R and R Studio. See example videos at the following urls from Co (accessed 25 Feb 2019):

Mac: <https://www.coursera.org/lecture/r-programming/installing-r-on-a-mac-9Aepc>

Windows: <https://www.coursera.org/lecture/r-programming/installing-r-on-windows-3CIUX>

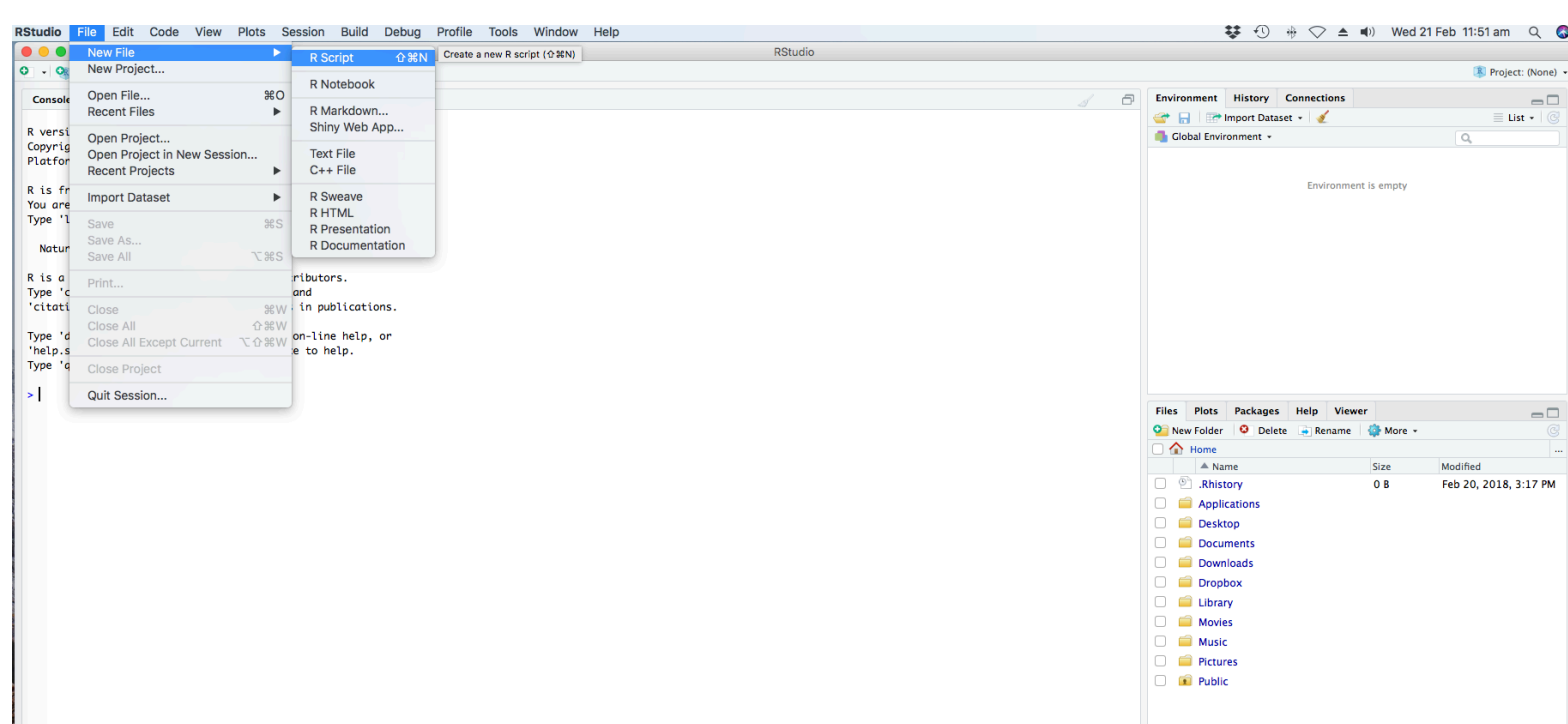
## R-Studio Environment

When you open R-Studio for the first time, it will look something like this:



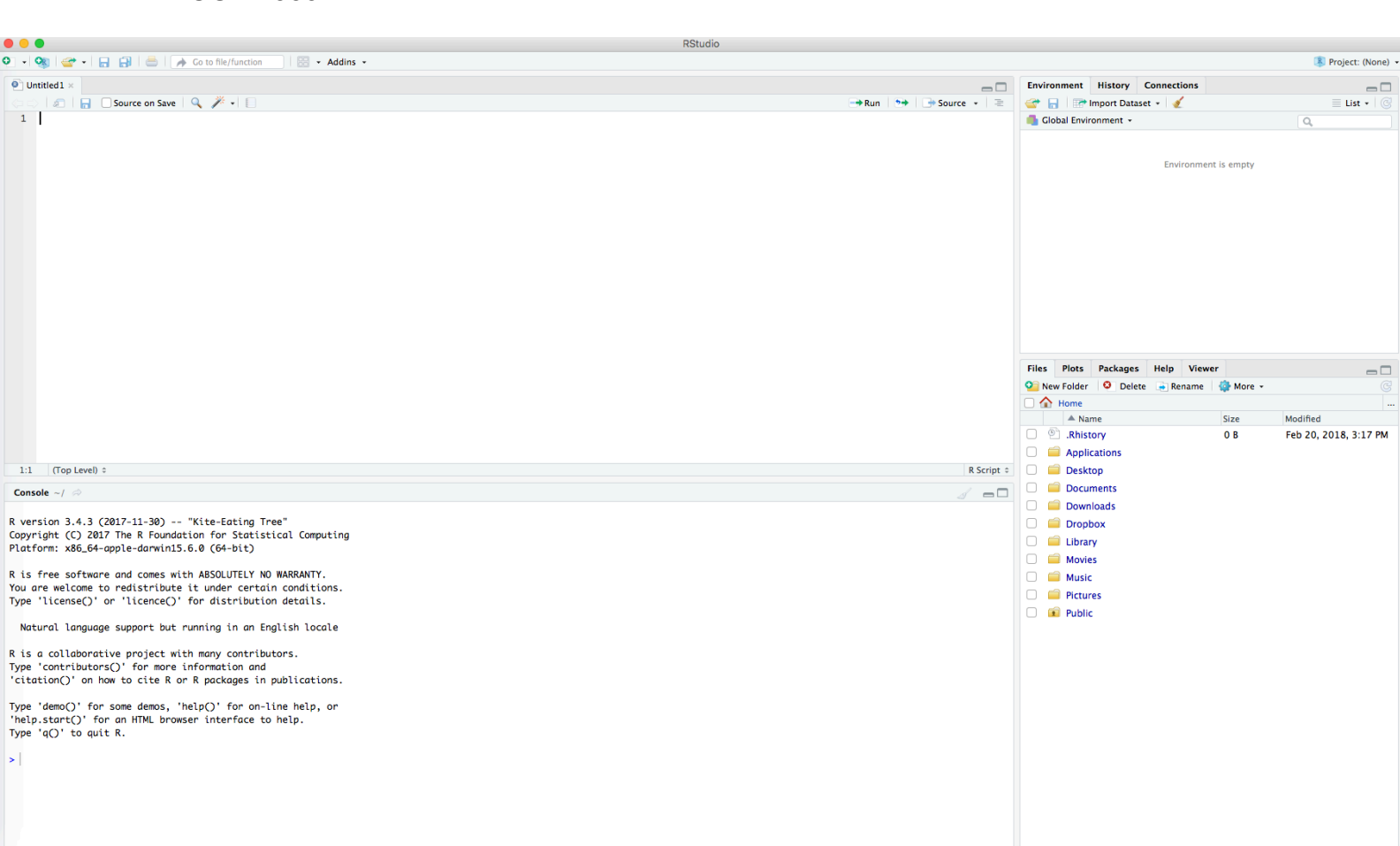
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If it does, in the top left corner of the screen, please click on “File” and then “New File” and then “R-Script”, as the figure below shows:

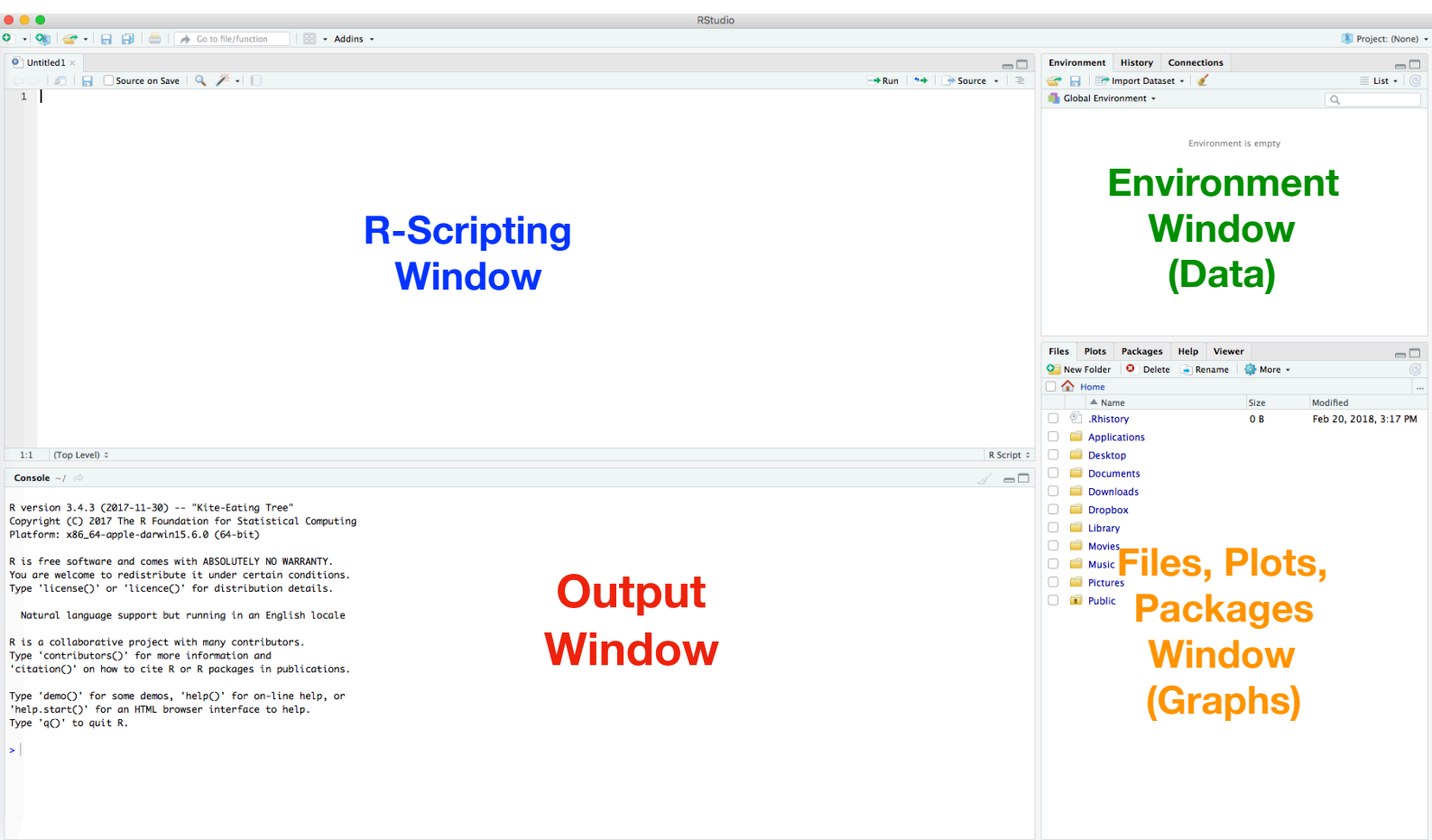


Your R-Studio window will now look like the picture below.

**This is the primary R-Studio working environment you will work in for ECOM20001.**



Let's label the four main frames in R-Studio, and describe what they are for.



**R-Scripting Window:** This is where you will do your data and econometric analyses by working with R files that are provided to you, and ones you will develop through the subject. Most of your time will be spent working in this window.

**Output Window:** This is where most of the output from your R-Scripting Window will be displayed

**Environment Window:** This window keeps track of the datasets and variables you will be working with, among other things including the history of commands. Most of the time this window will be used for looking at the **data and variables** for your analyses.

**Files, Plots, Packages Window:** This is a multi-function window that lists directories and files, presents graphs that you generate from your R-Scripting Window, allows you to install additional packages in R, and view help files. Most of the time this window will be used for viewing **graphs** generated from your R-Scripting Window. We will come back to this window in future tutorials.

## Working Through Your First R Code: tute1.R

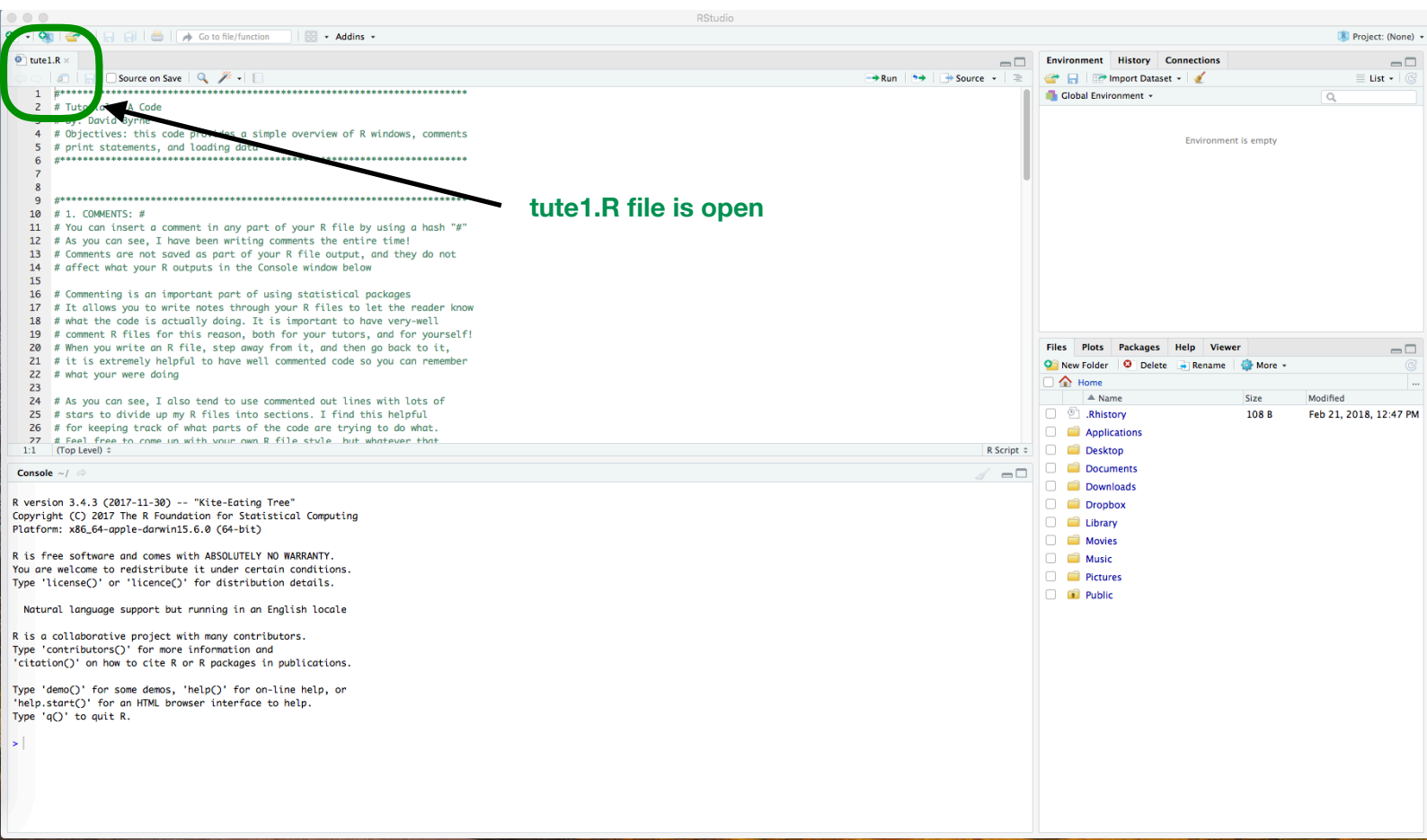
We are now set to open our first R file and work through it. This involves two steps.

- First, go to the LMS website for ECOM20001 and download the file [tute1.R](#) and the data file [tute1\\_tutors.csv](#). **We strongly encourage** you to save the two files in a separate folder named something like “Tute1” wherever on your computer you save files for ECOM20001, including lectures, tutorials, and assignments.
- Second, open the [tute1.R](#) in R-Studio by clicking “File” then “Open File” and then in the window that opens up, find where you downloaded [tute1.R](#) and click on the file to open it in R-Studio

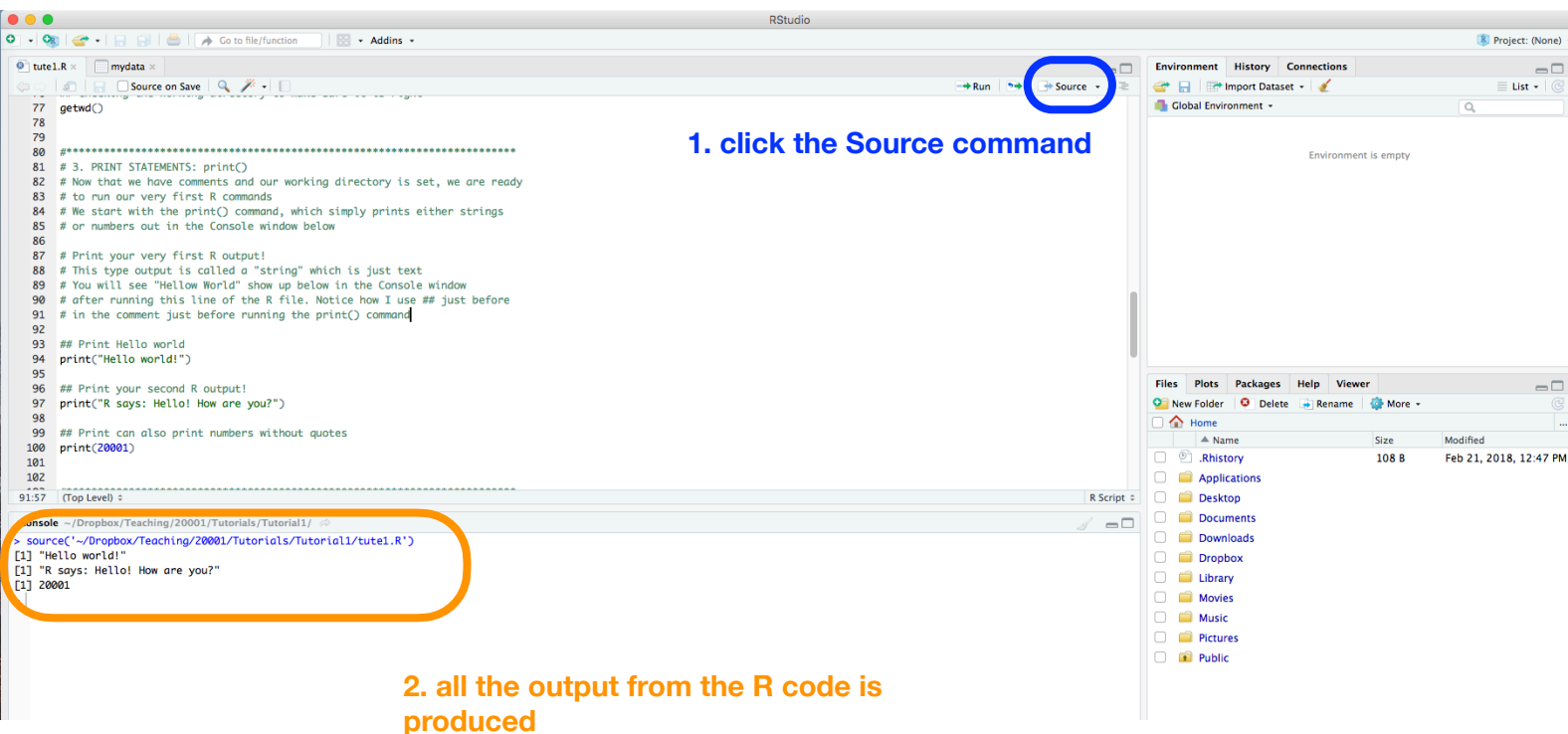
Having done this, your R-Studio window should now look something like the picture below, where your [R-Scripting Window](#) now has opened in it the file [tute1.R](#).

### A. Go to the Code

With the R file open, you are now ready to work with it. Please now go to the [tute1.R](#) file in R-Studio to continue with ECOM20001 Tutorial 1. In the file, we introduce four things: Comments, Directories, Print Statements, and Loading Data. When you have reached the bottom of Section 2. WORKING DIRECTORIES of the R file, before you reach the `setwd()` command, come back to this document and read the next 2 pages to see how to run R code.



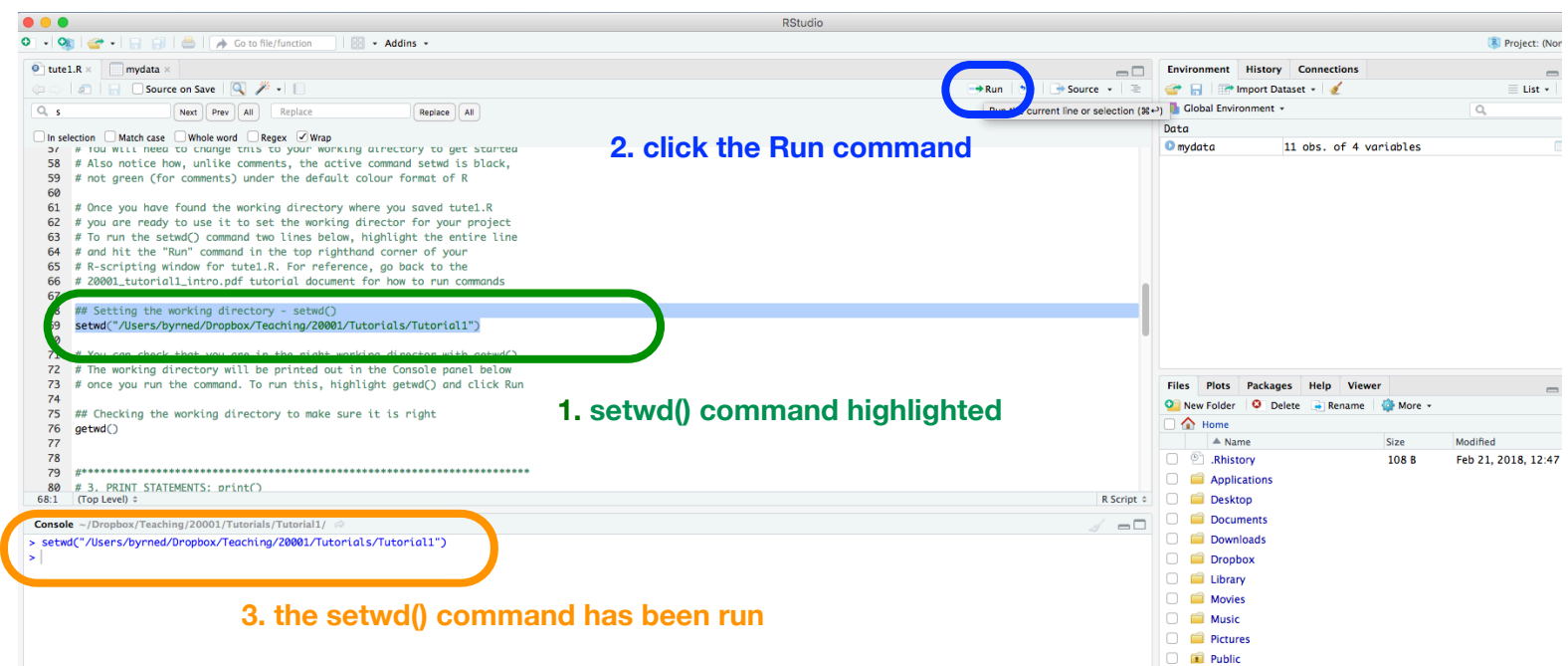
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## B. Running R-Code

How do you run R code in the **R-Scripting Window**? There are two usual ways in which you will run your R code.

- **Running Individual Lines:** you can run individual lines of code by highlighting them and clicking the **Run** command in the top right hand corner of the **R-Scripting Window**. The picture below shows how to highlight the `setwd()` command and run it, for example. If you highlight multiple R commands, then by clicking **Run** you will run all the commands that are highlighted.



- **Running The Entire Code:** you can alternatively run your entire R code instead of individual lines by clicking on the **Source** command in the top right hand corner of the **R-Scripting Window**. The picture on the next page shows how to run the entire R code using the source command.
- Note that to create the picture on the next page, we had to click back on the **tute1.R** tab in the **R-Scripting Window**. This because as part of hitting the Source button, other commands further down in the **tute1.R** code related to dataset viewing and uploading are also run, which switches you to another tab where you view your dataset called mydata.

