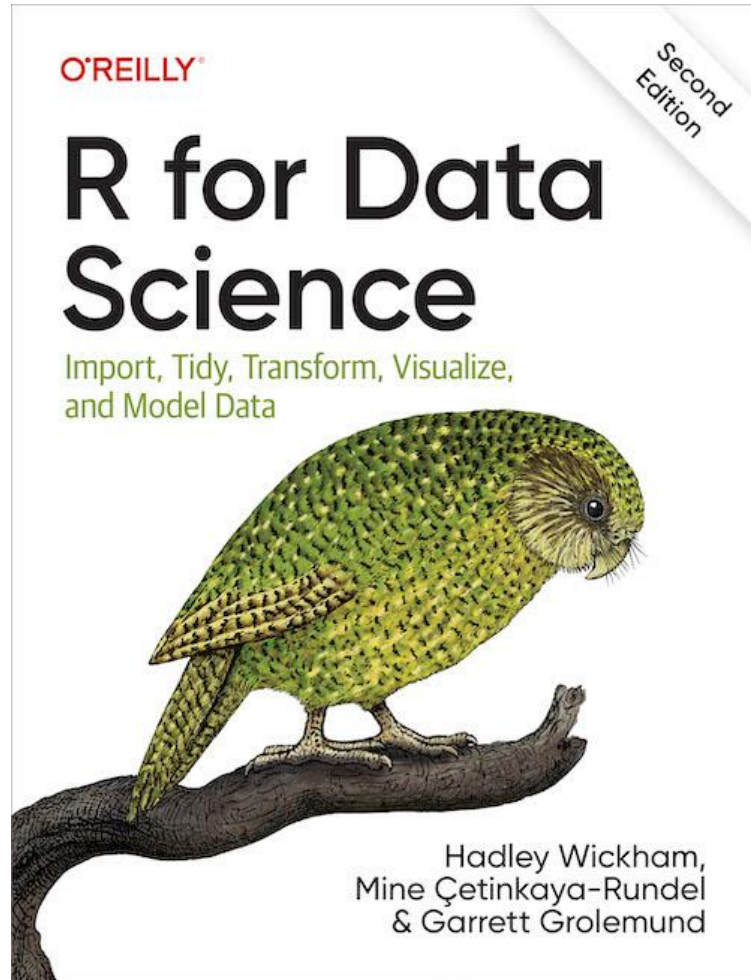


Introduction to R and Data Visualization Basics

REU Workshop
July 1st 2025

Recommended Resources



<https://r4ds.hadley.nz/>

You need two programs installed:



```
R Console

R version 3.4.0 (2017-04-21) -- "You Stupid Darkness"
Copyright (C) 2017 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin15.6.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

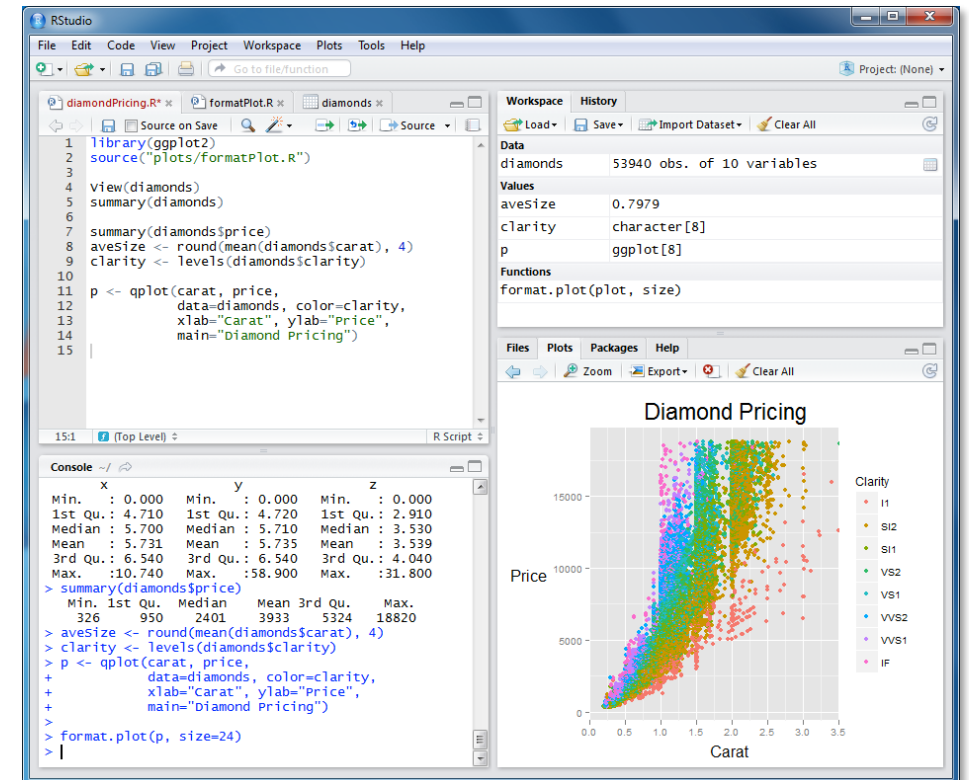
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.70 (7338) x86_64-apple-darwin15.6.0]

[History restored from /Users/Kelsey/.Rapp.history]

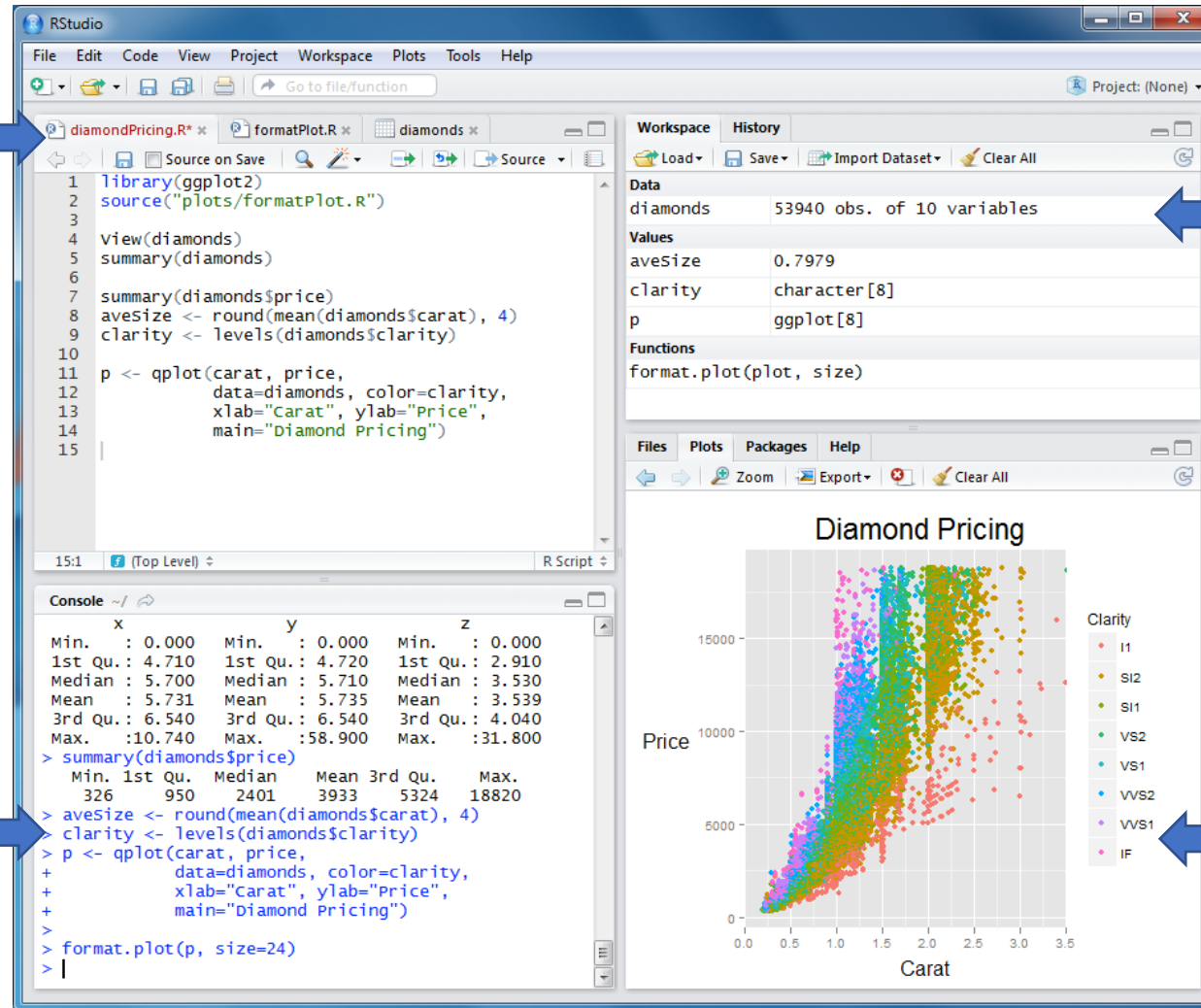
> |
```



The R Studio Workspace

Script editor (where you type and save your code)

Console (where you can see what happened to your code)



Workspace-

- view your data and objects

History

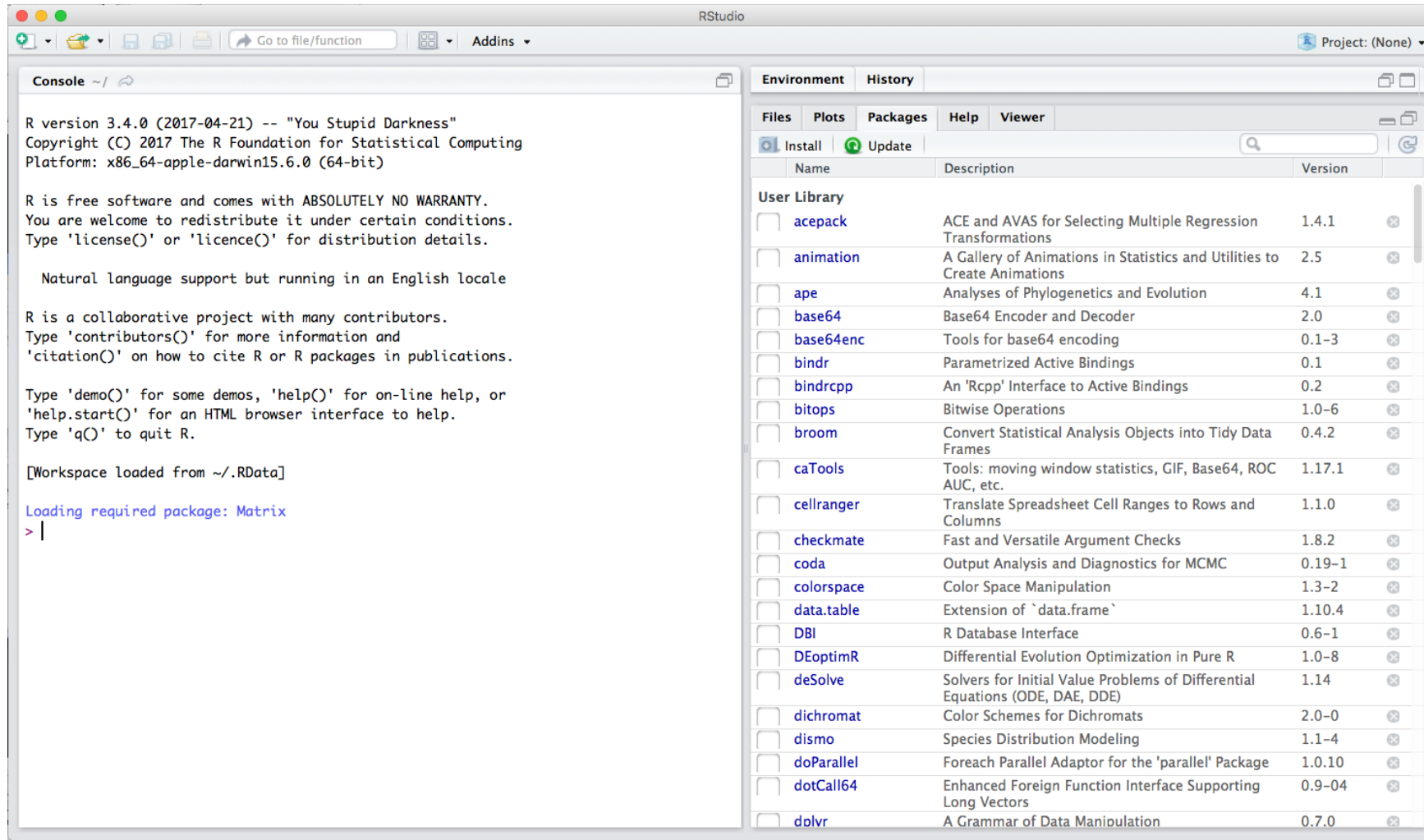
- View what has already happened in this session

View Plots, Load Packages, Ask for help

Setting up your workspace

- Open R Studio..

When you open R Studio, you may see this:



Click environment to show your current objects/ history

The screenshot shows the RStudio interface. The top toolbar includes icons for file operations and a search bar. The left pane is the Console, displaying the R startup message and the current workspace state. The right pane is the Environment pane, which is highlighted with a yellow circle and a blue arrow pointing to it from the text above. The Environment pane shows a list of installed packages under the 'User Library' tab. The packages are listed in a table with columns for Name, Description, and Version. The packages listed are: acepack, animation, ape, base64, base64enc, bindr, bindrcpp, bitops, broom, caTools, cellranger, checkmate, coda, colorspace, data.table, DBI, DEoptimR, deSolve, dichromat, dismo, doParallel, dotCall64, and dplyr.

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Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

Loading required package: Matrix
> |

Name	Description	Version
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
animation	A Gallery of Animations in Statistics and Utilities to Create Animations	2.5
ape	Analyses of Phylogenetics and Evolution	4.1
base64	Base64 Encoder and Decoder	2.0
base64enc	Tools for base64 encoding	0.1-3
bindr	Parametrized Active Bindings	0.1
bindrcpp	An 'Rcpp' Interface to Active Bindings	0.2
bitops	Bitwise Operations	1.0-6
broom	Convert Statistical Analysis Objects into Tidy Data Frames	0.4.2
caTools	Tools: moving window statistics, GIF, Base64, ROC AUC, etc.	1.17.1
cellranger	Translate Spreadsheet Cell Ranges to Rows and Columns	1.1.0
checkmate	Fast and Versatile Argument Checks	1.8.2
coda	Output Analysis and Diagnostics for MCMC	0.19-1
colorspace	Color Space Manipulation	1.3-2
data.table	Extension of `data.frame`	1.10.4
DBI	R Database Interface	0.6-1
DEoptimR	Differential Evolution Optimization in Pure R	1.0-8
deSolve	Solvers for Initial Value Problems of Differential Equations (ODE, DAE, DDE)	1.14
dichromat	Color Schemes for Dichromats	2.0-0
dismo	Species Distribution Modeling	1.1-4
doParallel	Foreach Parallel Adaptor for the 'parallel' Package	1.0.10
dotCall64	Enhanced Foreign Function Interface Supporting Long Vectors	0.9-04
dplyr	A Grammar of Data Manipulation	0.7.0

RStudio

Go to file/function Addins Project: (None)

Console ~/

```
R version 3.4.0 (2017-04-21) -- "You Stupid Darkness"
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Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

Loading required package: Matrix
> |
```

Environment History

Import Dataset

Global Environment

Data

b	num [1:126, 1:126]	0 0 0 0 0 0 0 0 0 0 ...
edges	875 obs. of 3 variables	
input1	126 obs. of 4 variables	
j5	127 obs. of 127 variables	
j6	chr [1:127, 1:127]	" " "Acaa Joyce" "Acayo Margret" "...
Ladwe.Aryo	1048248 obs. of 3 variables	
links	1048248 obs. of 3 variables	
Nodes	126 obs. of 4 variables	

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size	Modified
.RData	72.8 KB	Nov 9, 2016, 12:14 PM
.Rhistory	20.8 KB	Aug 13, 2017, 11:27 PM
adjacency.uganda.csv	33.4 KB	Oct 17, 2016, 12:09 PM
Applications		
Desktop		
Documents		
Downloads		
Dropbox		
Library		
Movies		
Music		
Pictures		
Public		
ugandamap.gfw	52 B	Jan 4, 2017, 4:53 PM

See the data frames and objects that you have used in this session

Open a fresh
R script



RStudio

Project: (None)

Go to file/function

Addins

R Script

R Notebook Create a new R script

R Markdown... 7-04-21) -- "You Stupid Darkness"

Shiny Web App... the R Foundation for Statistical Computing

Text File le-darwin15.6.0 (64-bit)

C++ File and comes with ABSOLUTELY NO WARRANTY.

R Sweave edistribute it under certain conditions.

R HTML 'licence()' for distribution details.

R Presentation support but running in an English locale

R Documentation project with many contributors.

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Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

Loading required package: Matrix

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Environment History

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b	num [1:126, 1:126]	0 0 0 0 0 0 0 0 0 0 ...
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Files Plots Packages Help Viewer

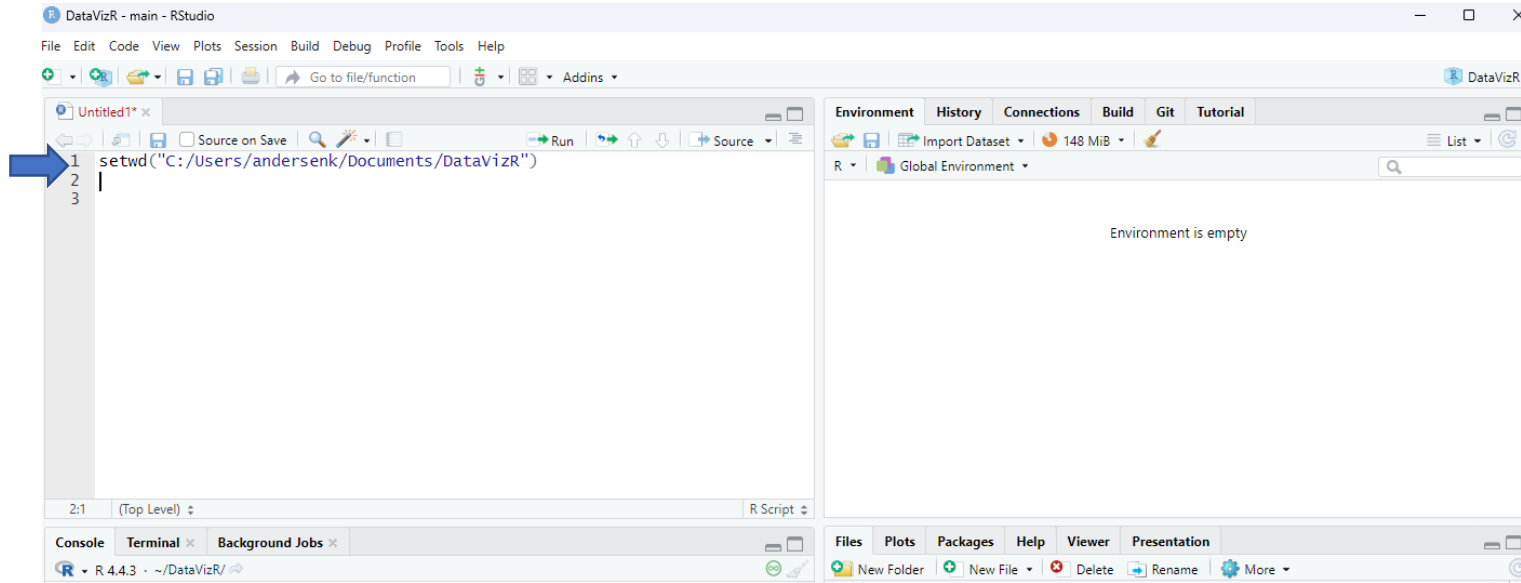
New Folder Delete Rename More

Home

Name	Size	Modified
.RData	72.8 KB	Nov 9, 2016, 12:14 PM
.Rhistory	20.8 KB	Aug 13, 2017, 11:27 PM
adjacency.uganda.csv	33.4 KB	Oct 17, 2016, 12:09 PM
Applications		
Desktop		
Documents		
Downloads		
Dropbox		
Library		
Movies		
Music		
Pictures		
Public		
ugandamap.gfw	52 B	Jan 4, 2017, 4:53 PM

Setting your working directory

Option 1



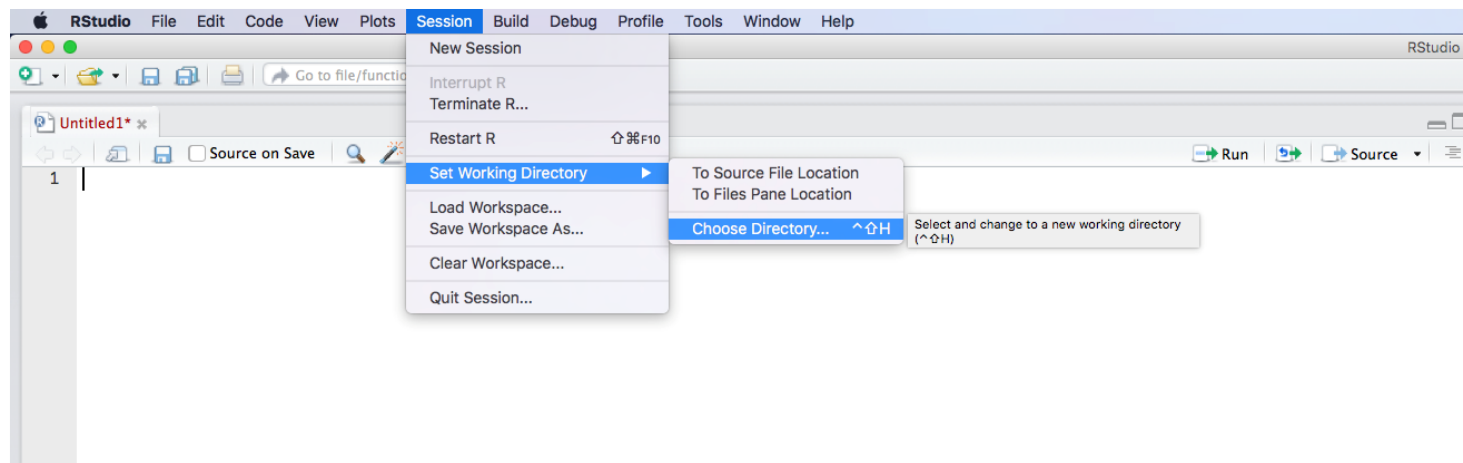
1. Your **working directory** is just a **folder** where:

- Your scripts will be stored
- You should place any data that needs to be imported into this session
- Any files or images will be saved

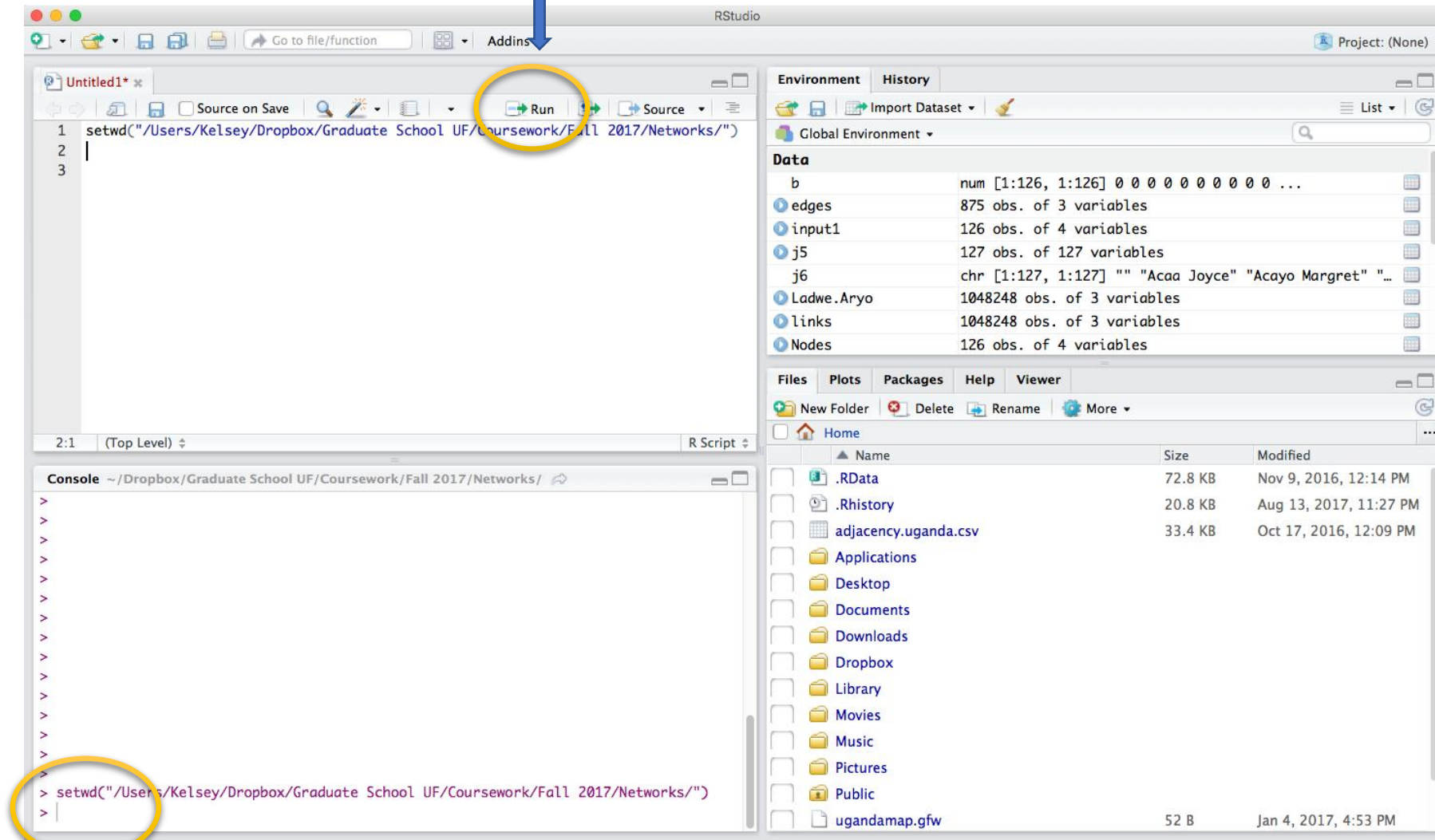
2. Use `setwd()` and copy the **path name** of the folder that you want to use and paste it in the script. Make sure you have quotes around your path name.

3. OR go to session > set working directory > choose directory. Select the folder that you would like to use.

Option 2

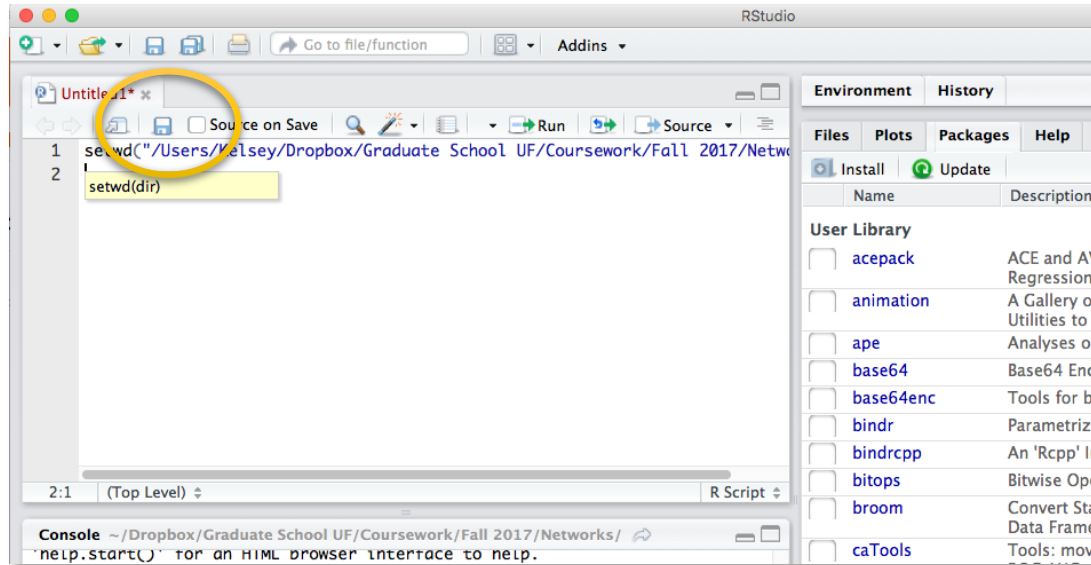


Place your cursor anywhere on the `setwd()` command and click “run”



Check your console to make sure the command has been completed by checking to see if there is a new “less than” sign under your line of code!

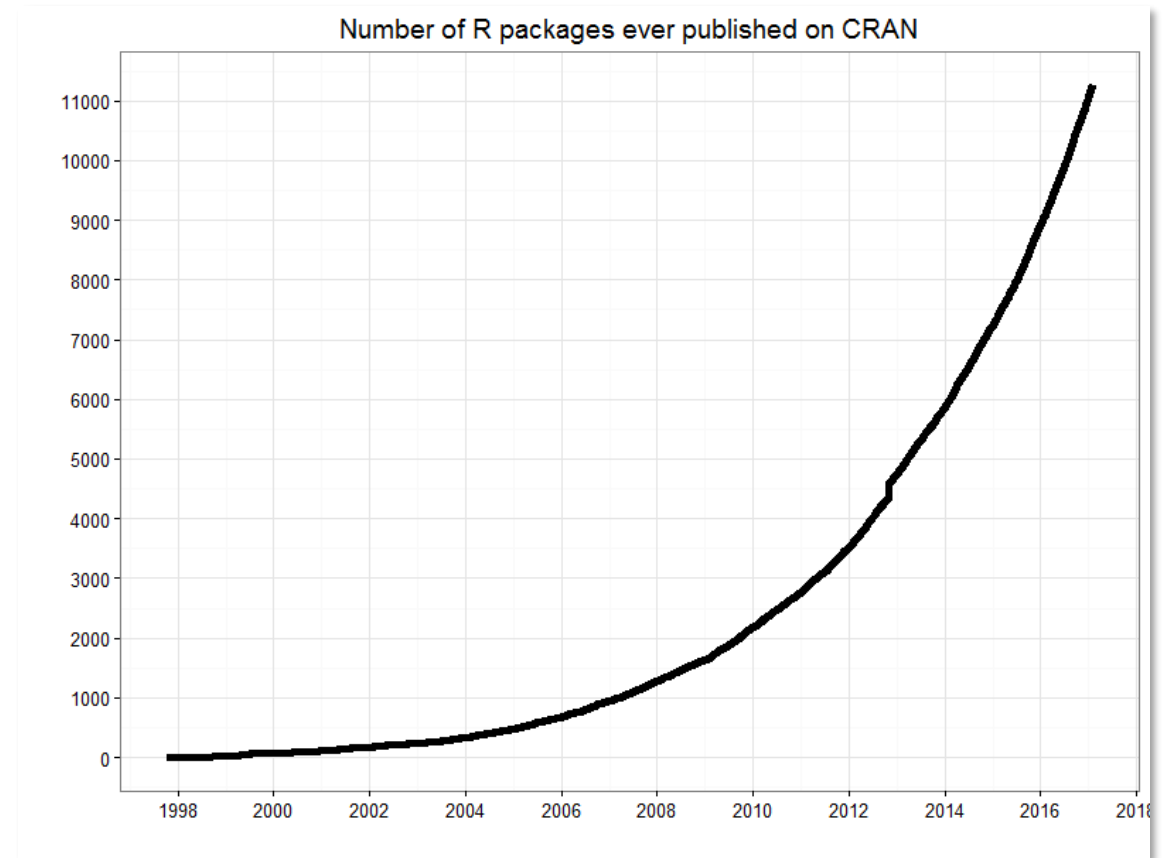
Next Steps:



1. Save R script by clicking “save” icon and name your script. You will notice that it is saving to your working directory.

R Packages

- You can do some basic calculations in base R but most things will be carried out in **functions** that are organized in **packages**.
- Packages are collections of r functions, data, and code that are usually developed to help with a specific task.
- There are over 10,000 packages on CRAN!
- Some are more organized, with better documentation than others



Some packages that you will use in this course:

- ggplot2
- igraph
- statnet
- matrix
- sna
- ergm
- tergm
- dplyr
- tidyverse