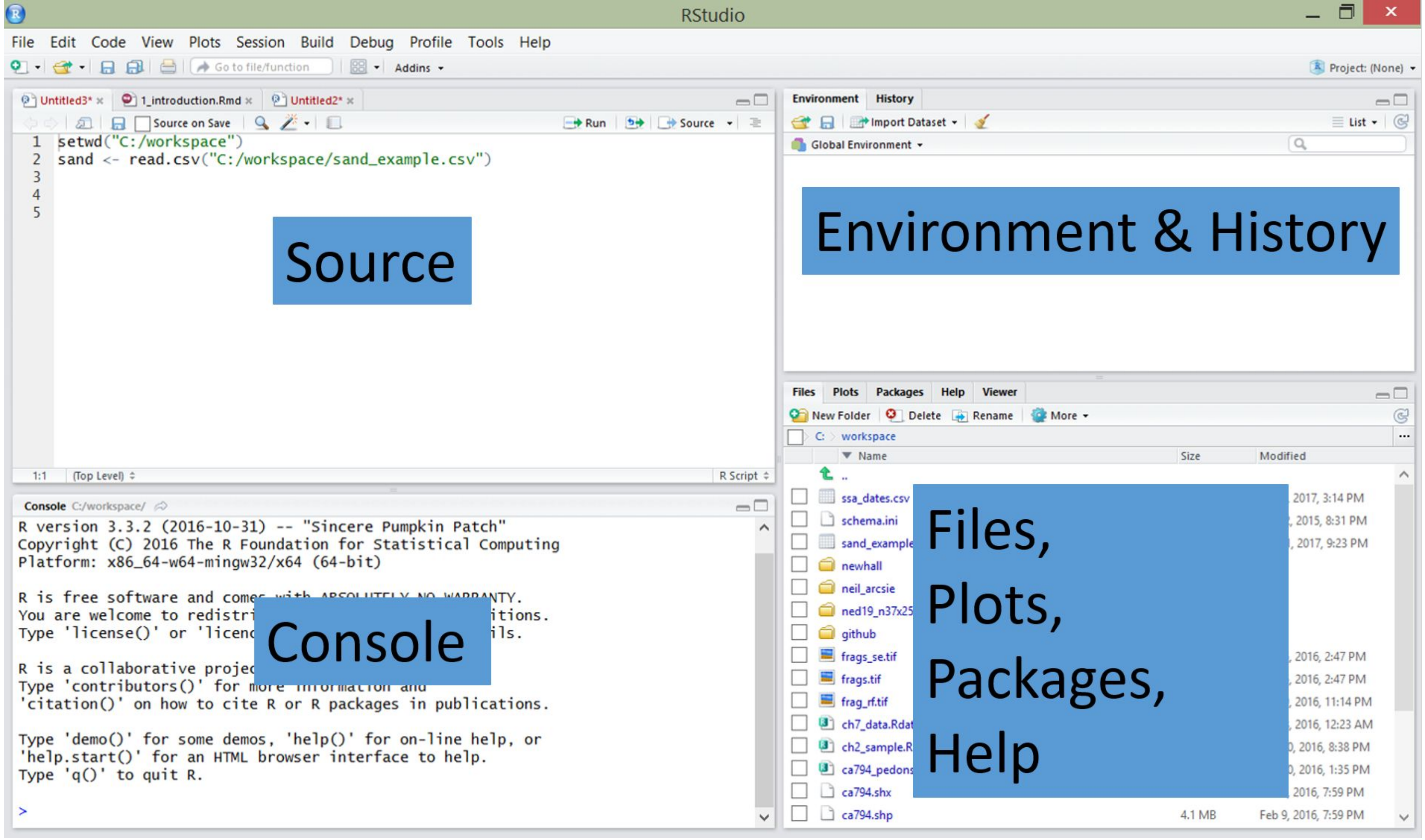
Introduction to R Studio



```r
setwd("C:/workspace")
sand <- read.csv("C:/workspace/sand_example.csv")
```

```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistri                       itions.
Type 'license()' or 'licenc                       ils.

R is a collaborative projec
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.

>
```

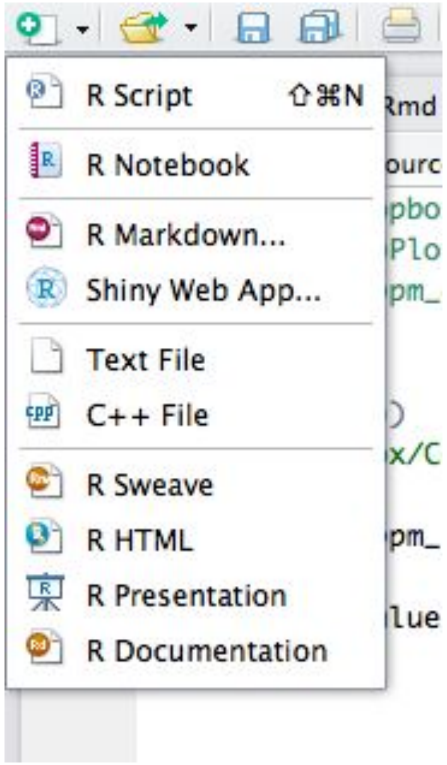
Name	Size	Modified
..		
ssa_dates.csv		2017, 3:14 PM
schema.ini		, 2015, 8:31 PM
sand_example		, 2017, 9:23 PM
newhall		
neil_arcsie		
ned19_n37x25		
github		
frags_se.tif		, 2016, 2:47 PM
frags.tif		, 2016, 2:47 PM
frag_rf.tif		, 2016, 11:14 PM
ch7_data.Rdat		, 2016, 12:23 AM
ch2_sample.R		0, 2016, 8:38 PM
ca794_pedons		0, 2016, 1:35 PM
ca794.shx		2016, 7:59 PM
ca794.shp	4.1 MB	Feb 9, 2016, 7:59 PM

https://ncss-tech.github.io/stats_for_soil_survey/chapters/1_introduction/1_introduction.html

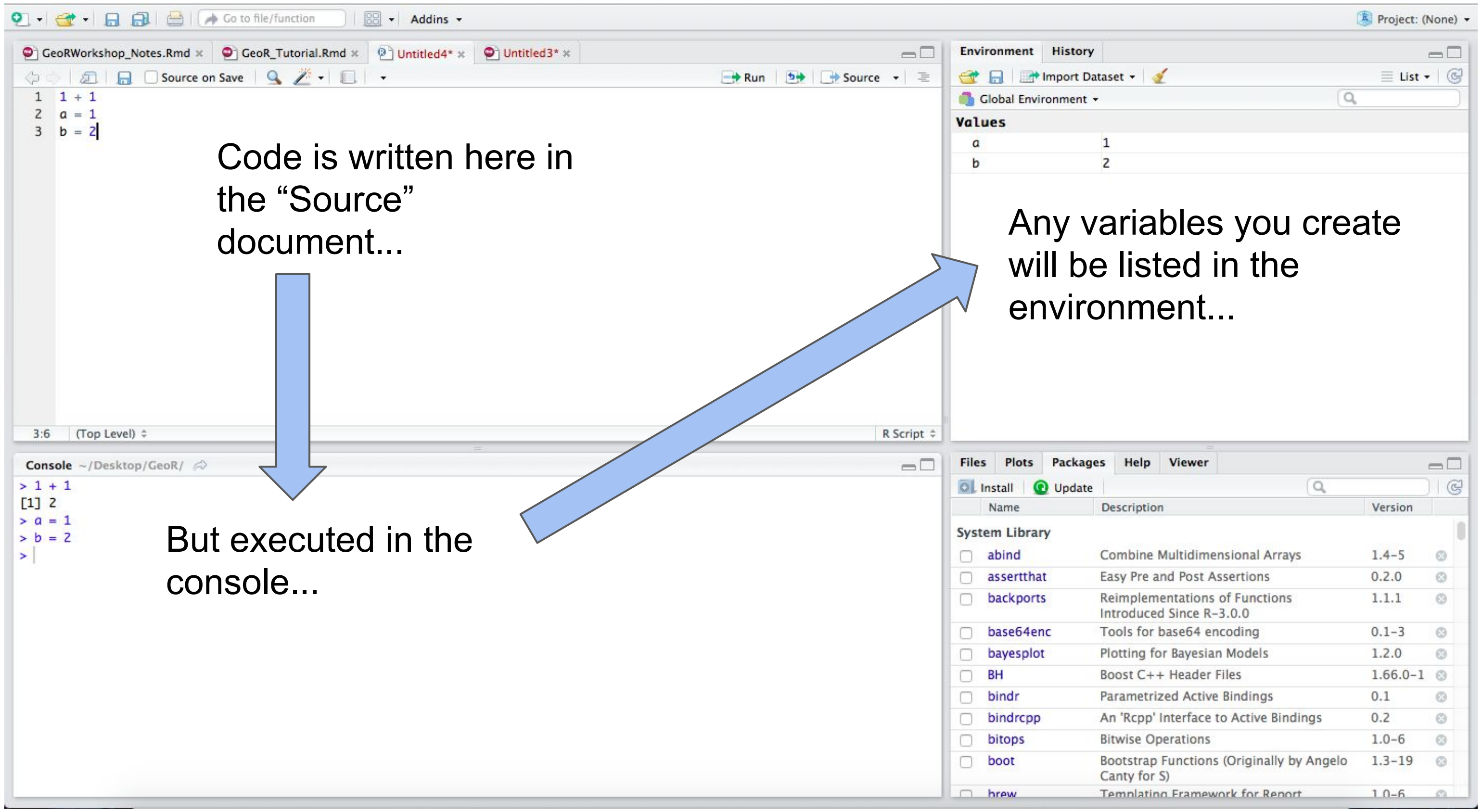
Writing Scripts in R Studio

R Studio Allows you to Create Scripts and other documents, most notably for this workshop are the **R Scripts** and **R Markdown** documents.

All Scripts and R Documents will show up in the Source Panel.



Executing Code



```
1 + 1
a = 1
b = 2
```

```
> 1 + 1
[1] 2
> a = 1
> b = 2
>
```

Values

a	1
b	2

Name	Description	Version
System Library		
abind	Combine Multidimensional Arrays	1.4-5
assertthat	Easy Pre and Post Assertions	0.2.0
backports	Reimplementations of Functions Introduced Since R-3.0.0	1.1.1
base64enc	Tools for base64 encoding	0.1-3
bayesplot	Plotting for Bayesian Models	1.2.0
BH	Boost C++ Header Files	1.66.0-1
bindr	Parametrized Active Bindings	0.1
bindrcpp	An 'Rcpp' Interface to Active Bindings	0.2
bitops	Bitwise Operations	1.0-6
boot	Bootstrap Functions (Originally by Angelo Canty for S)	1.3-19
brew	Templating Framework for Report	1.0-6

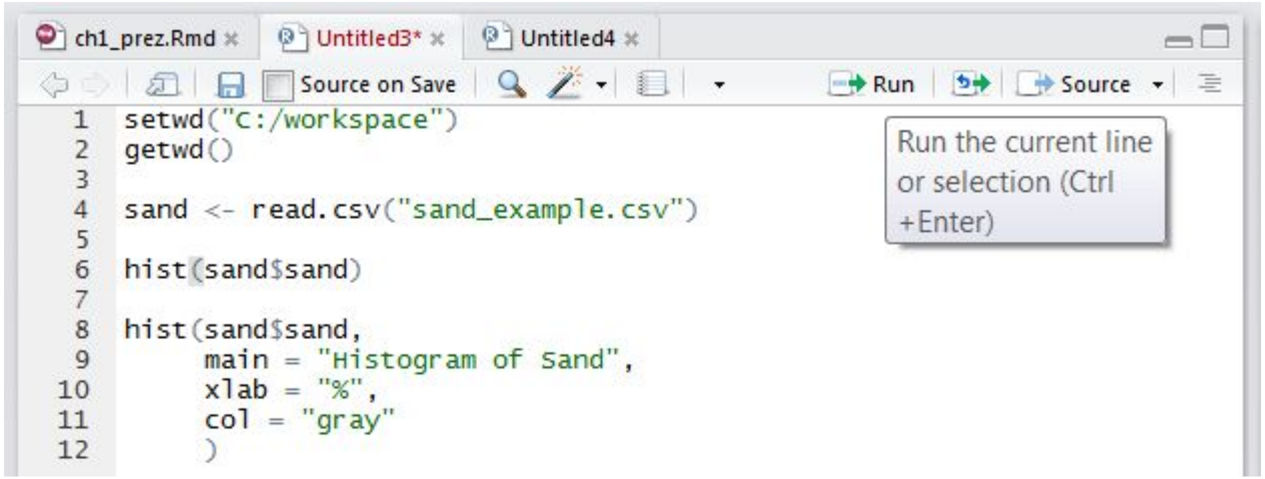
Code is written here in the “Source” document...

But executed in the console...

Any variables you create will be listed in the environment...

Running Code...

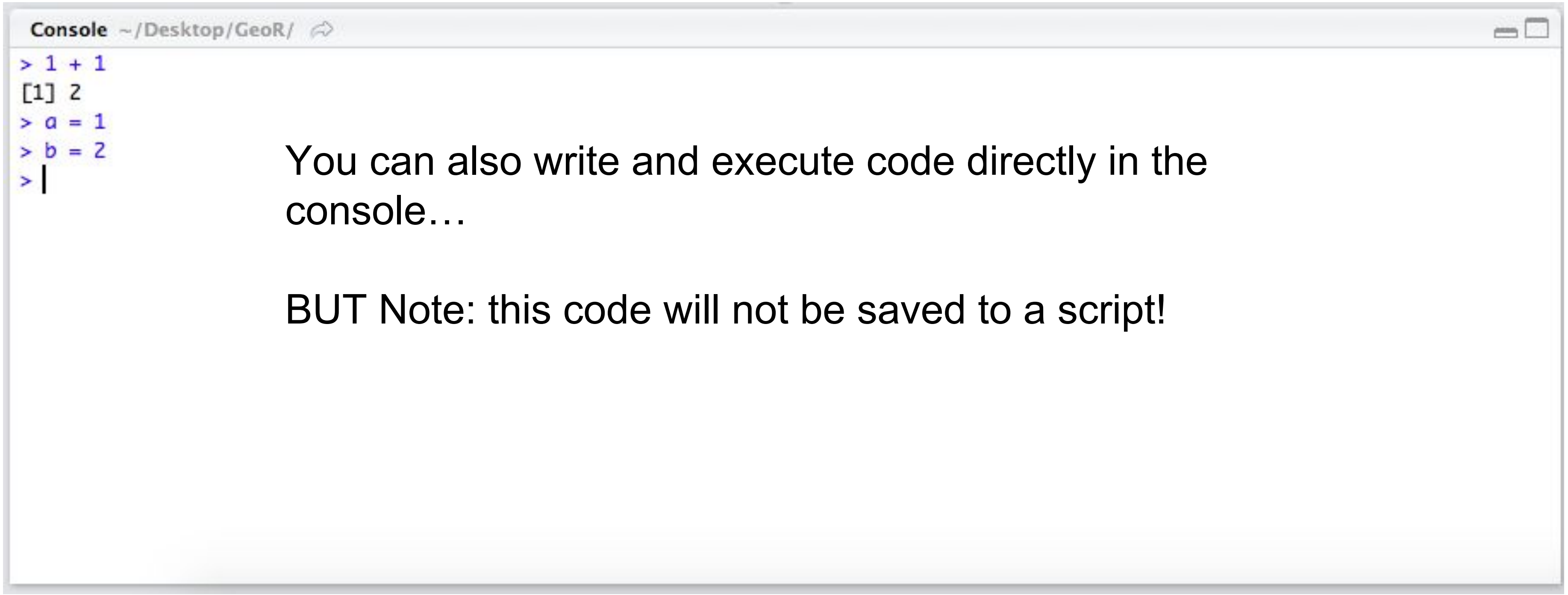
You can run code from a script with the “run” button or by clicking command Enter on your keyboard.



```r
setwd("C:/workspace")
getwd()

sand <- read.csv("sand_example.csv")

hist(sand$sand)

hist(sand$sand,
     main = "Histogram of Sand",
     xlab = "%",
     col = "gray"
     )
```

https://ncss-tech.github.io/stats_for_soil_survey/chapters/1_introduction/1_introduction.html

Executing Code



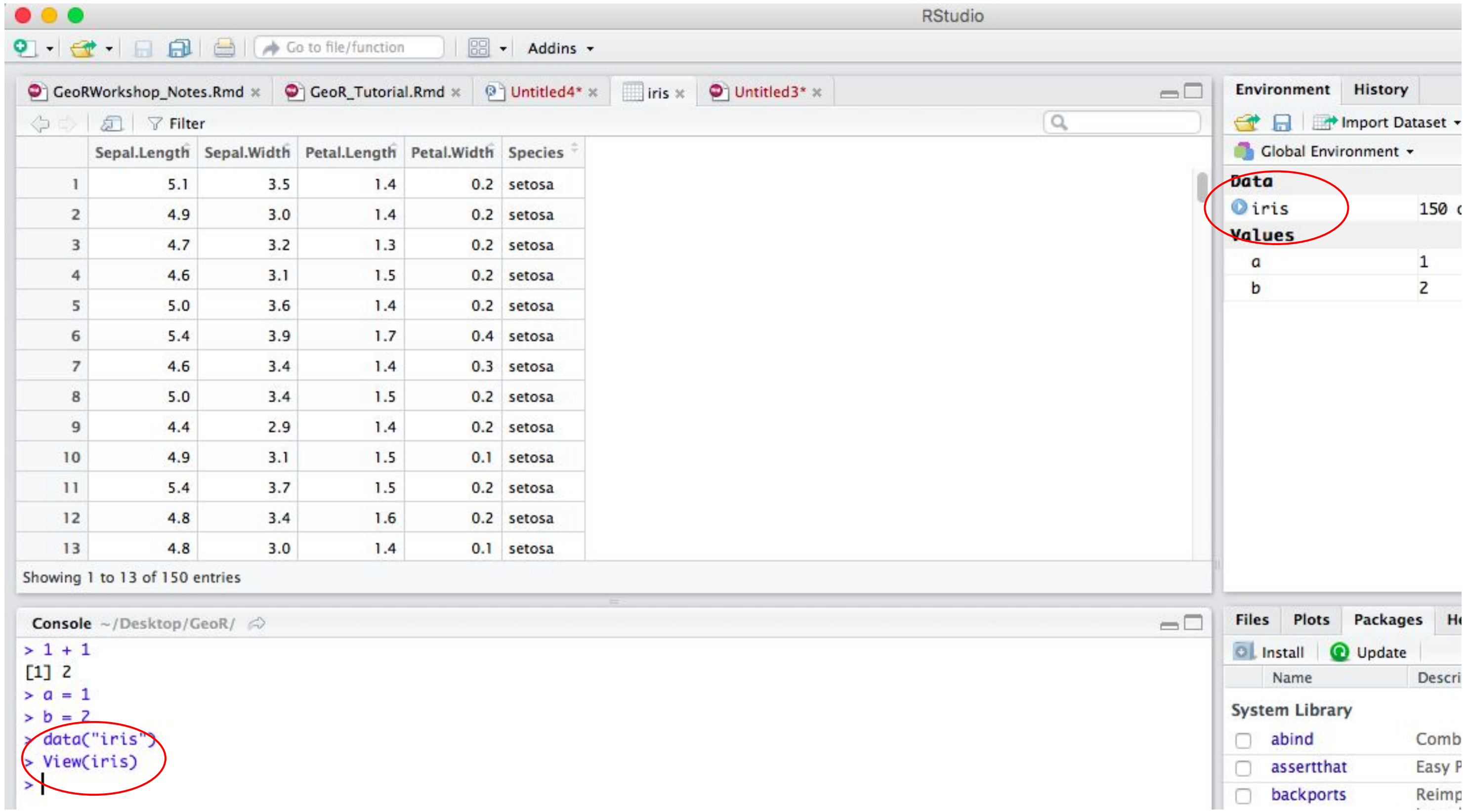
```
> 1 + 1
[1] 2
> a = 1
> b = 2
>
```

You can also write and execute code directly in the console…

BUT Note: this code will not be saved to a script!

Viewing Data

View data in R Studio using the “View()” function OR by simply clicking on the dataset in the Environment Panel...



	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5.0	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
11	5.4	3.7	1.5	0.2	setosa
12	4.8	3.4	1.6	0.2	setosa
13	4.8	3.0	1.4	0.1	setosa

Showing 1 to 13 of 150 entries

Data	
iris	150
Values	
a	1
b	2

Console ~/Desktop/GeoR/

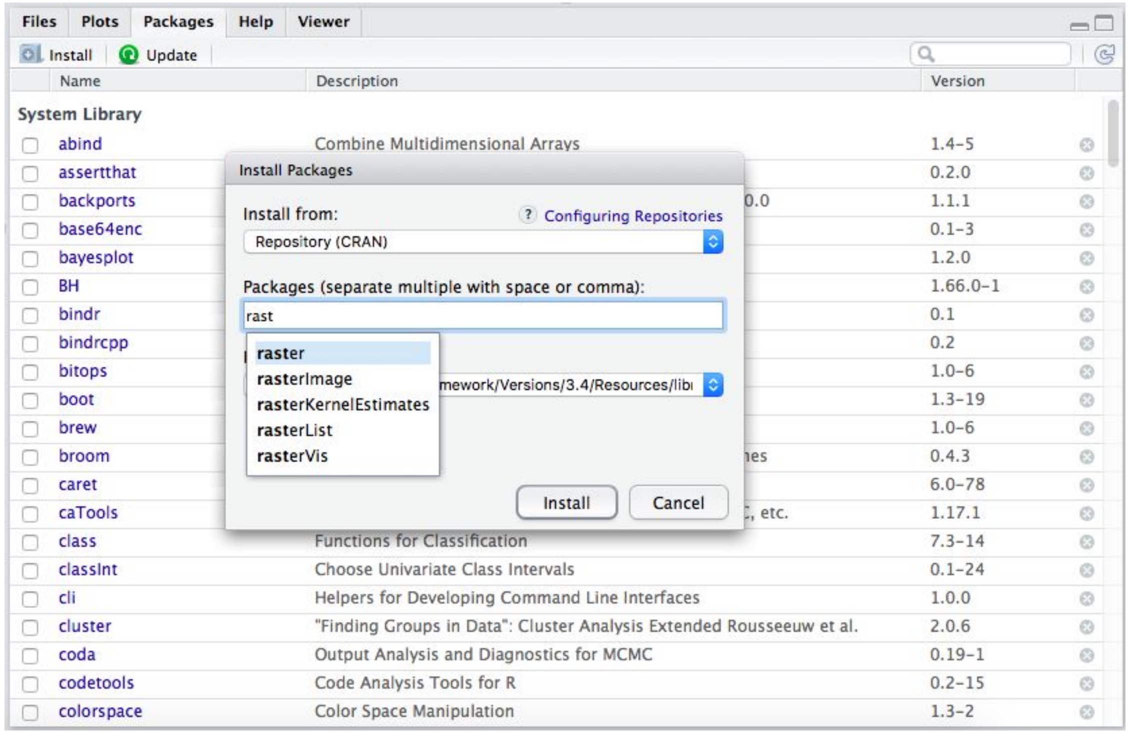
```
> 1 + 1
[1] 2
> a = 1
> b = 2
> data("iris")
> View(iris)
>
```

abind	Comb
assertthat	Easy F
backports	Reimp

Installing Packages

Packages can be installed easily in R Studio under the “Packages” tab.

You can also manually install a package with the install.packages() function.



	Name	Description	Version
System Library			
☐	abind	Combine Multidimensional Arrays	1.4-5
☐	assertthat		0.2.0
☐	backports	0.0	1.1.1
☐	base64enc		0.1-3
☐	bayesplot		1.2.0
☐	BH		1.66.0-1
☐	bindr		0.1
☐	bindrcpp		0.2
☐	bitops		1.0-6
☐	boot		1.3-19
☐	brew		1.0-6
☐	broom	ıes	0.4.3
☐	caret		6.0-78
☐	caTools	, etc.	1.17.1
☐	class	Functions for Classification	7.3-14
☐	classInt	Choose Univariate Class Intervals	0.1-24
☐	cli	Helpers for Developing Command Line Interfaces	1.0.0
☐	cluster	"Finding Groups in Data": Cluster Analysis Extended Rousseeuw et al.	2.0.6
☐	coda	Output Analysis and Diagnostics for MCMC	0.19-1
☐	codetools	Code Analysis Tools for R	0.2-15
☐	colorspace	Color Space Manipulation	1.3-2

Install Packages

Install from: Repository (CRAN)

? Configuring Repositories

Packages (separate multiple with space or comma): rast

raster
rasterImage
rasterKernelEstimates
rasterList
rasterVis

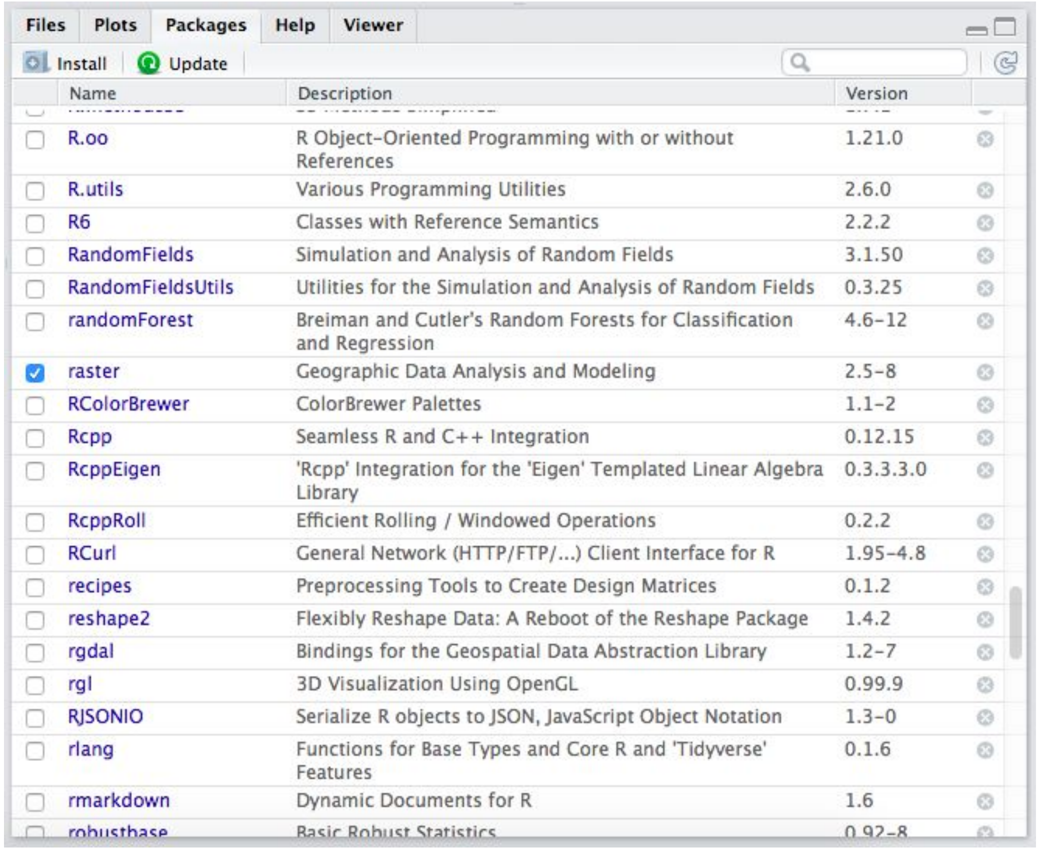
mework/Versions/3.4/Resources/libı

Install   Cancel

Loading Packages

Simply check the box for the package you want to load. This will automatically call the library() function to load in that package.

You can also simply use the library() or require() function in your script or directly in the console.

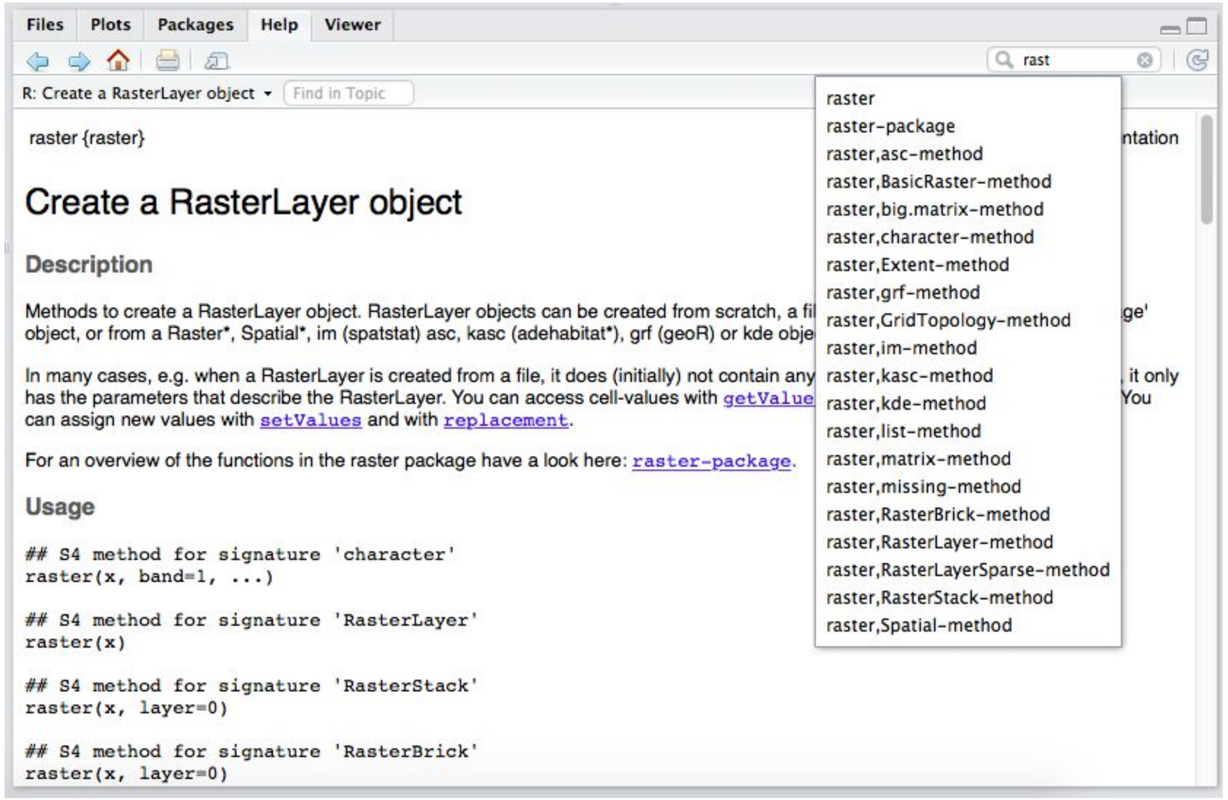


	Name	Description	Version
☐	R.oo	R Object-Oriented Programming with or without References	1.21.0
☐	R.utils	Various Programming Utilities	2.6.0
☐	R6	Classes with Reference Semantics	2.2.2
☐	RandomFields	Simulation and Analysis of Random Fields	3.1.50
☐	RandomFieldsUtils	Utilities for the Simulation and Analysis of Random Fields	0.3.25
☐	randomForest	Breiman and Cutler's Random Forests for Classification and Regression	4.6-12
☑	raster	Geographic Data Analysis and Modeling	2.5-8
☐	RColorBrewer	ColorBrewer Palettes	1.1-2
☐	Rcpp	Seamless R and C++ Integration	0.12.15
☐	RcppEigen	'Rcpp' Integration for the 'Eigen' Templated Linear Algebra Library	0.3.3.3.0
☐	RcppRoll	Efficient Rolling / Windowed Operations	0.2.2
☐	RCurl	General Network (HTTP/FTP/...) Client Interface for R	1.95-4.8
☐	recipes	Preprocessing Tools to Create Design Matrices	0.1.2
☐	reshape2	Flexibly Reshape Data: A Reboot of the Reshape Package	1.4.2
☐	rgdal	Bindings for the Geospatial Data Abstraction Library	1.2-7
☐	rgl	3D Visualization Using OpenGL	0.99.9
☐	RJSONIO	Serialize R objects to JSON, JavaScript Object Notation	1.3-0
☐	rlang	Functions for Base Types and Core R and 'Tidyverse' Features	0.1.6
☐	rmarkdown	Dynamic Documents for R	1.6
☐	robustbase	Basic Robust Statistics	0.92-8

Getting Help

Help is just a few clicks away in R Studio. You can either type the function or package into the search bar, or use the "?" function…

I.e. `?raster`



raster {raster}

Create a RasterLayer object

Description

Methods to create a RasterLayer object. RasterLayer objects can be created from scratch, a fil … ge'
object, or from a Raster*, Spatial*, im (spatstat) asc, kasc (adehabitat*), grf (geoR) or kde obje

In many cases, e.g. when a RasterLayer is created from a file, it does (initially) not contain any … it only
has the parameters that describe the RasterLayer. You can access cell-values with getValue … You
can assign new values with setValues and with replacement.

For an overview of the functions in the raster package have a look here: raster-package.

Usage

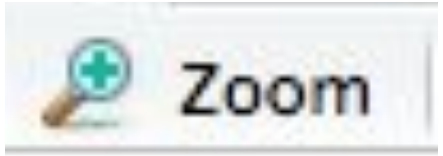
```
## S4 method for signature 'character'
raster(x, band=1, ...)

## S4 method for signature 'RasterLayer'
raster(x)

## S4 method for signature 'RasterStack'
raster(x, layer=0)

## S4 method for signature 'RasterBrick'
raster(x, layer=0)
```

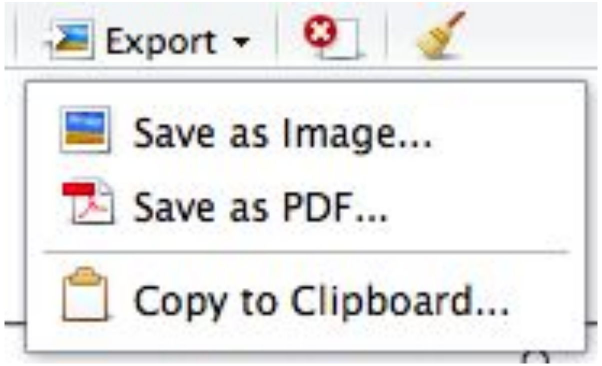
```
raster
raster-package
raster,asc-method
raster,BasicRaster-method
raster,big.matrix-method
raster,character-method
raster,Extent-method
raster,grf-method
raster,GridTopology-method
raster,im-method
raster,kasc-method
raster,kde-method
raster,list-method
raster,matrix-method
raster,missing-method
raster,RasterBrick-method
raster,RasterLayer-method
raster,RasterLayerSparse-method
raster,RasterStack-method
raster,Spatial-method
```

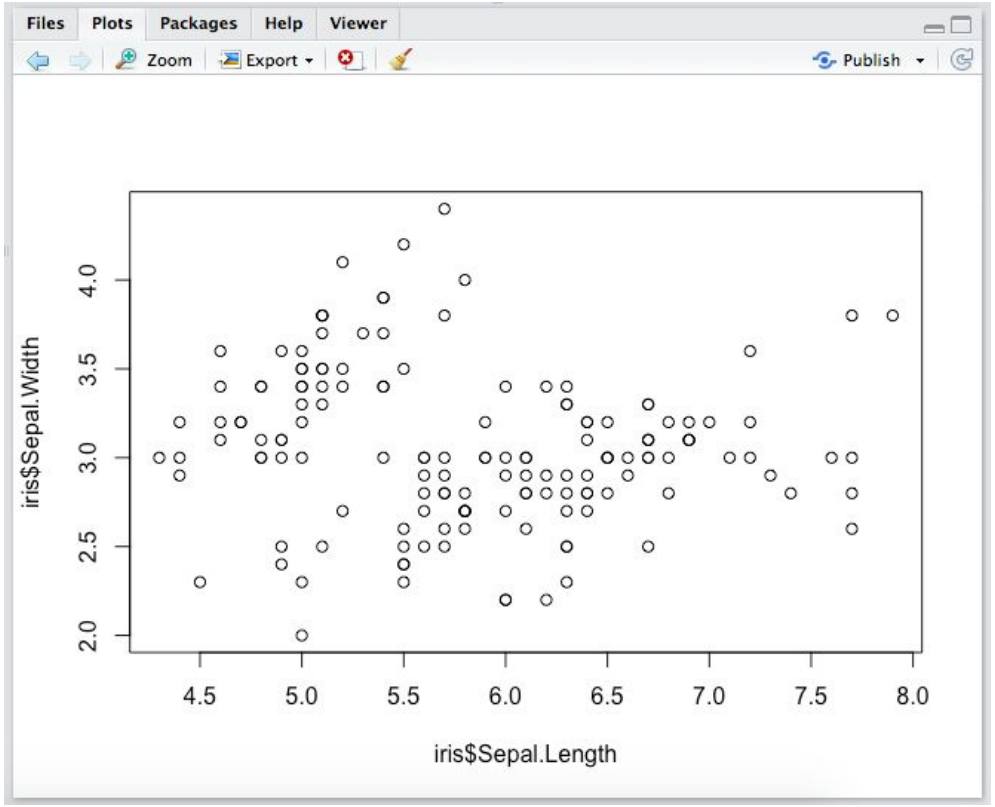
ntation

Viewing Plots in R Studio

Use the plot window to view and save plots in RStudio.







Demo Time!

Let’s play with some data.