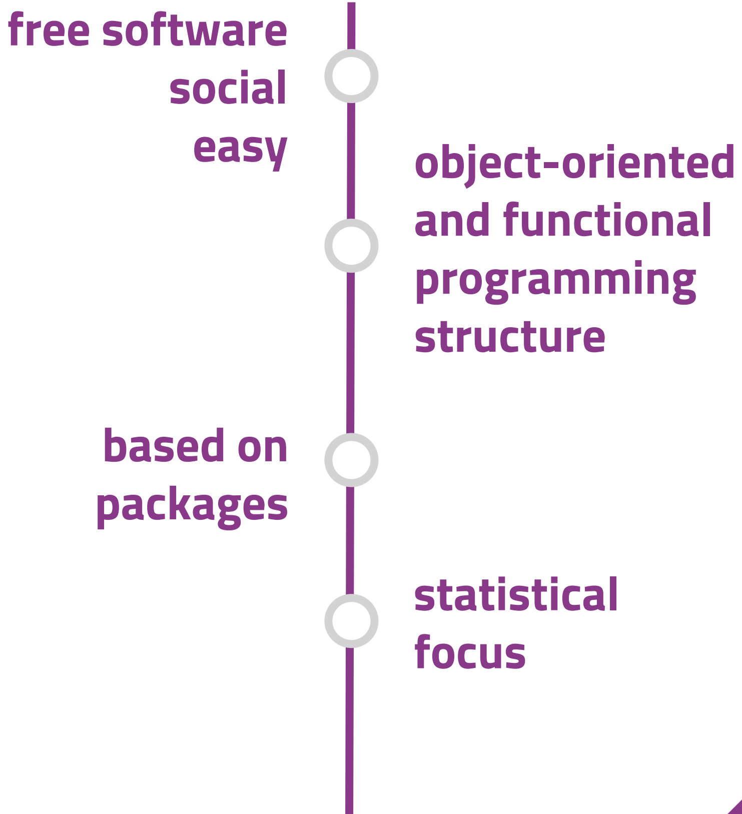
```r
library(dplyr)

rladies_global %>%
  filter(city == 'Bari')
```

PRIMI PASSI IN RStudio
R-Ladies Bari

29 Gennaio 2019

R(ecap)



free software
social
easy

object-oriented and functional programming structure

based on packages

statistical focus

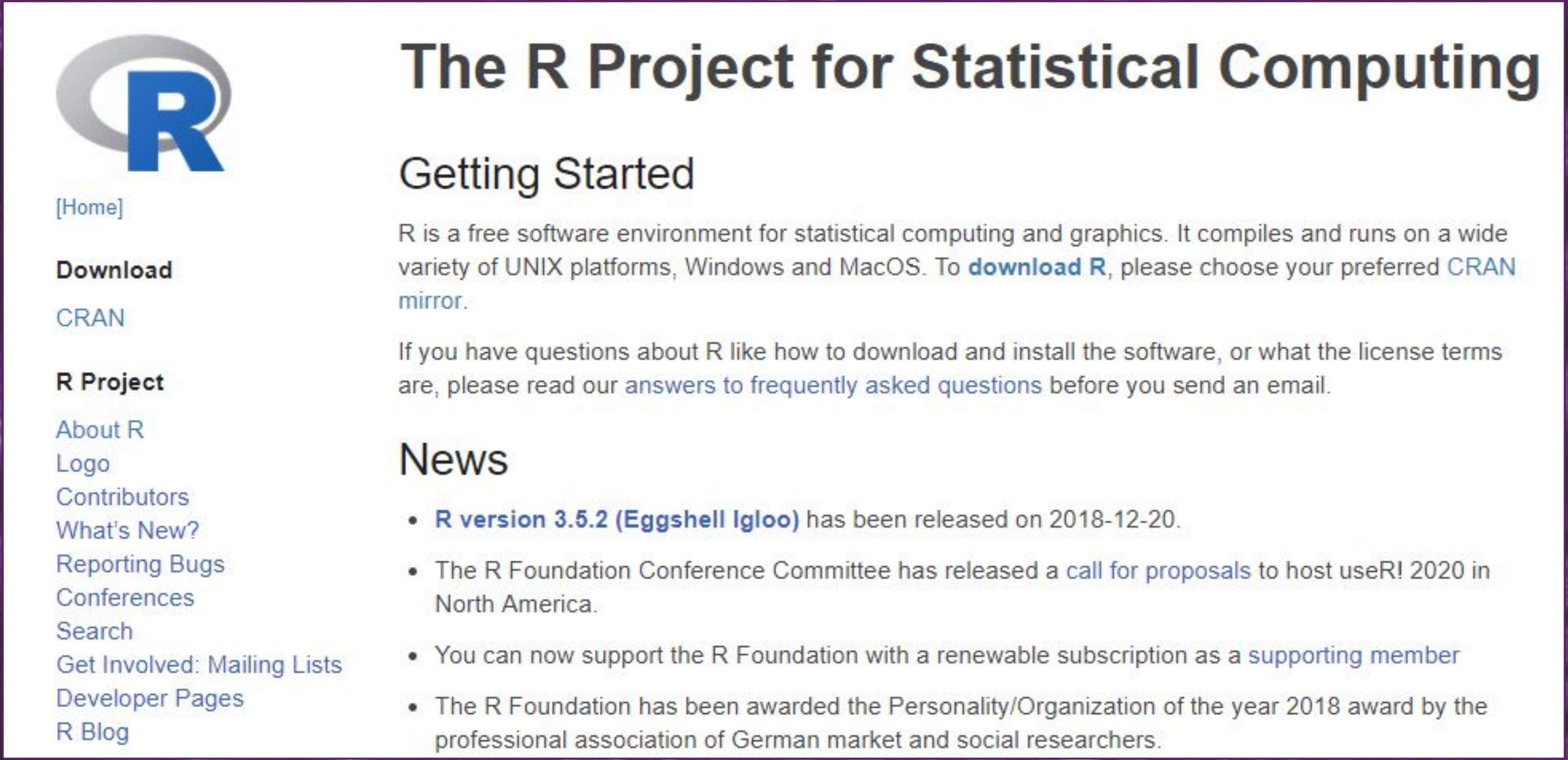
“Free software” is a matter of liberty, not price.

To understand the concept, you should think of “free” as in “free speech”, not as in “free beer”.

—from the GNU project site

https://www.gnu.org/philosophy/free-sw.en.html

Download R https://www.r-project.org/



The R Project for Statistical Computing

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Getting Started

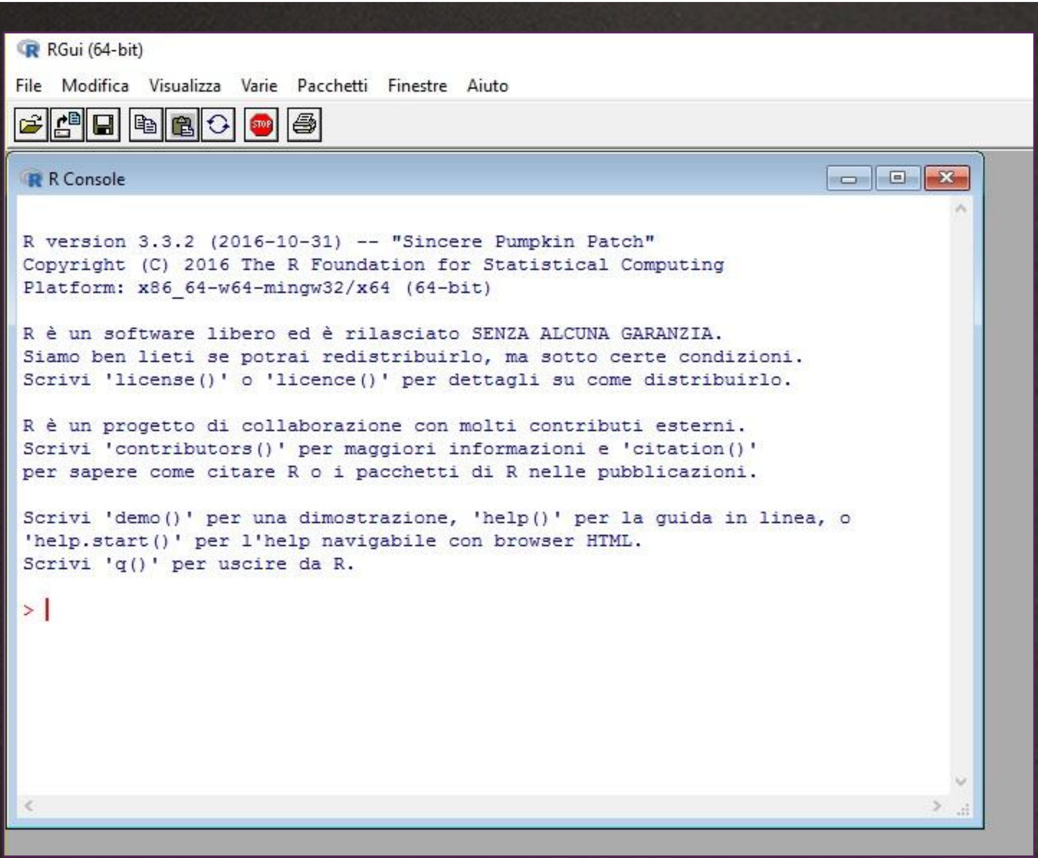
R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R**, please choose your preferred CRAN mirror.

If you have questions about R like how to download and install the software, or what the license terms are, please read our answers to frequently asked questions before you send an email.

News

- **R version 3.5.2 (Eggshell Igloo)** has been released on 2018-12-20.
- The R Foundation Conference Committee has released a call for proposals to host useR! 2020 in North America.
- You can now support the R Foundation with a renewable subscription as a supporting member
- The R Foundation has been awarded the Personality/Organization of the year 2018 award by the professional association of German market and social researchers.

What base-R offers



```
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)

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per sapere come citare R o i pacchetti di R nelle pubblicazioni.

Scrivi 'demo()' per una dimostrazione, 'help()' per la guida in linea, o
'help.start()' per l'help navigabile con browser HTML.
Scrivi 'q()' per uscire da R.

> |
```
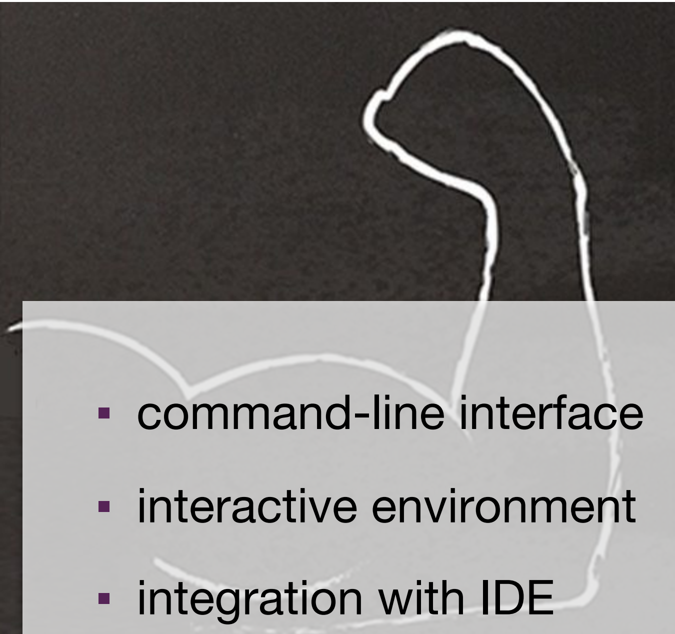
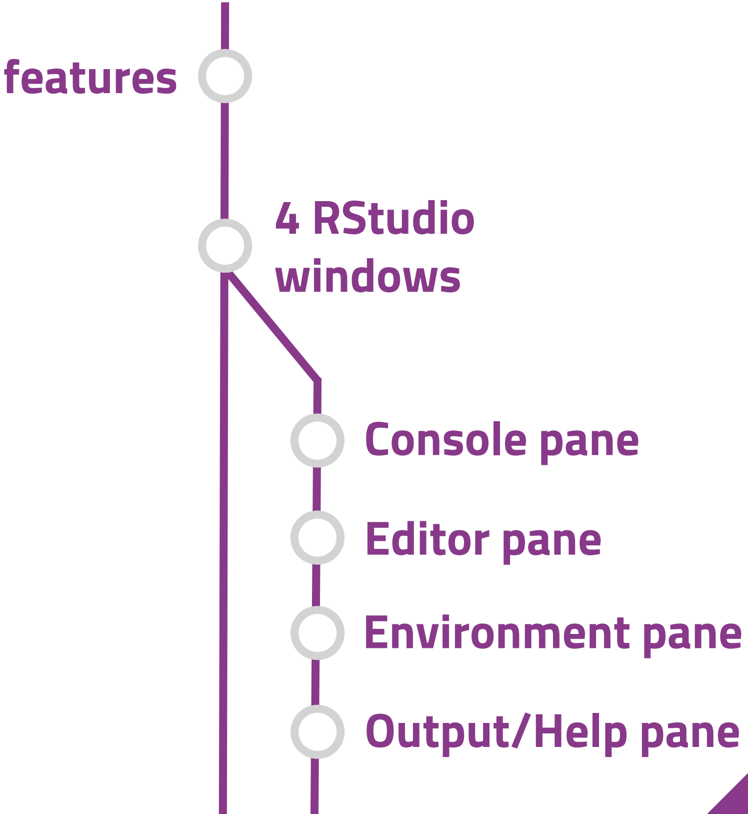



- command-line interface
- interactive environment
- integration with IDE

RStudio IDE



features

4 RStudio windows

Console pane

Editor pane

Environment pane

Output/Help pane

RStudio features

An IDE that was built just for R

- Syntax highlighting, code completion, and smart indentation
- Execute R code directly from the source editor
- Quickly jump to function definitions

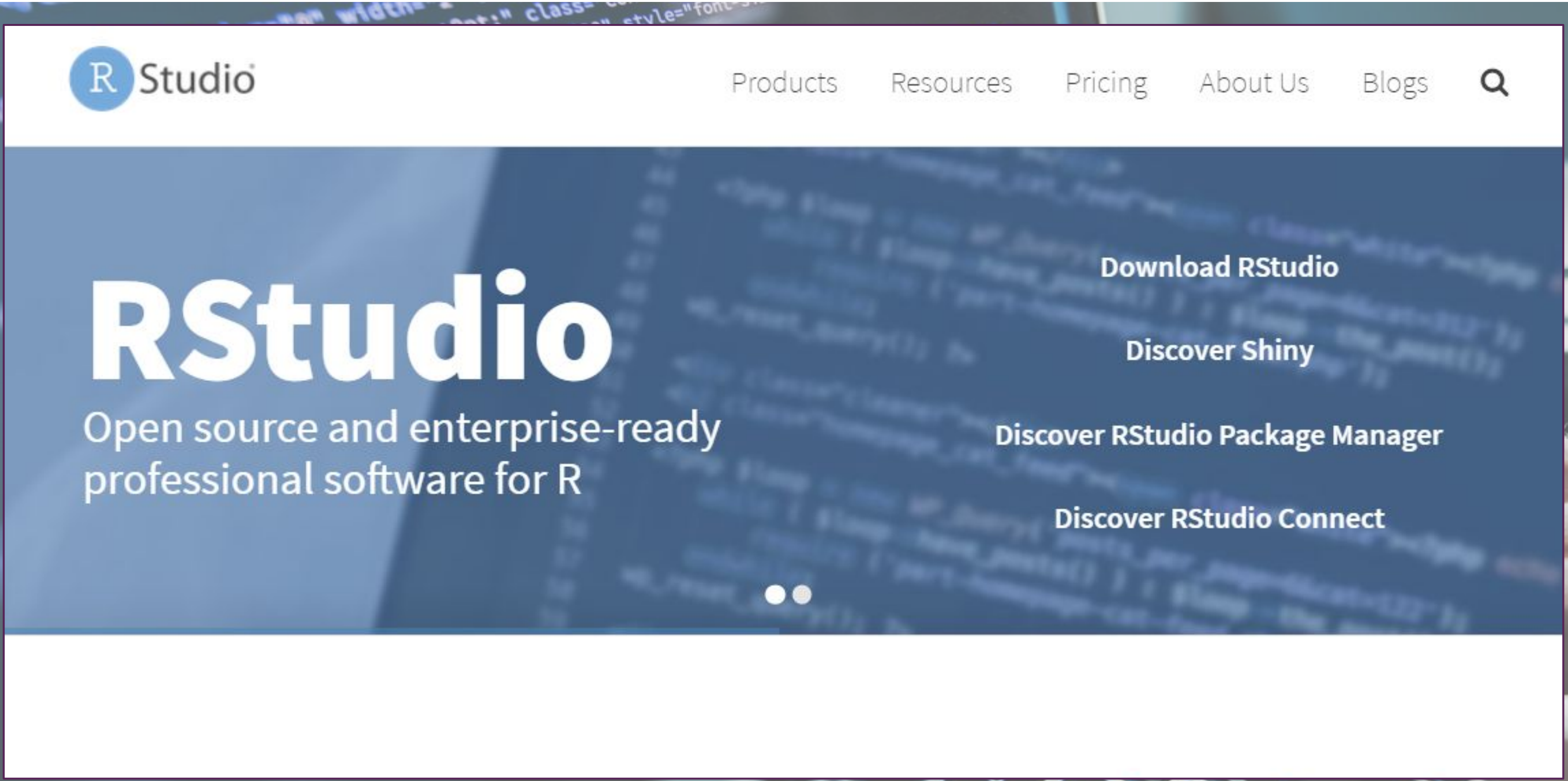
Bring your workflow together

- Integrated R help and documentation
- Easily manage multiple working directories using projects
- Workspace browser and data viewer

Powerful authoring & Debugging

- Interactive debugger to diagnose and fix errors quickly
- Extensive package development tools
- Authoring with Sweave and R Markdown

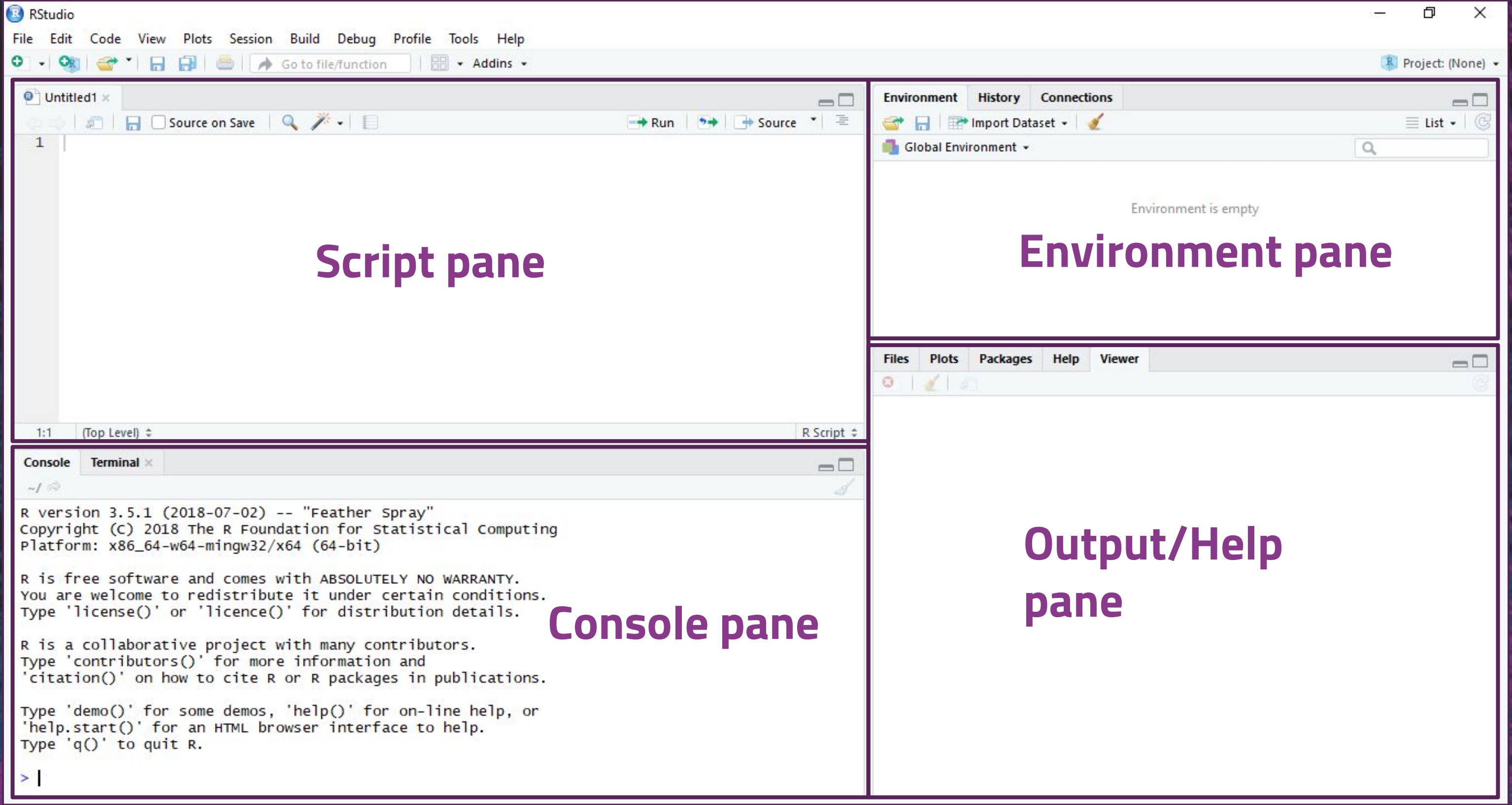
Download RStudio https://www.rstudio.com/



RStudio

Open source and enterprise-ready professional software for R

What RStudio IDE offers



```
R version 3.5.1 (2018-07-02) -- "Feather Spray"
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
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R is a collaborative project with many contributors.
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'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.

> |
```
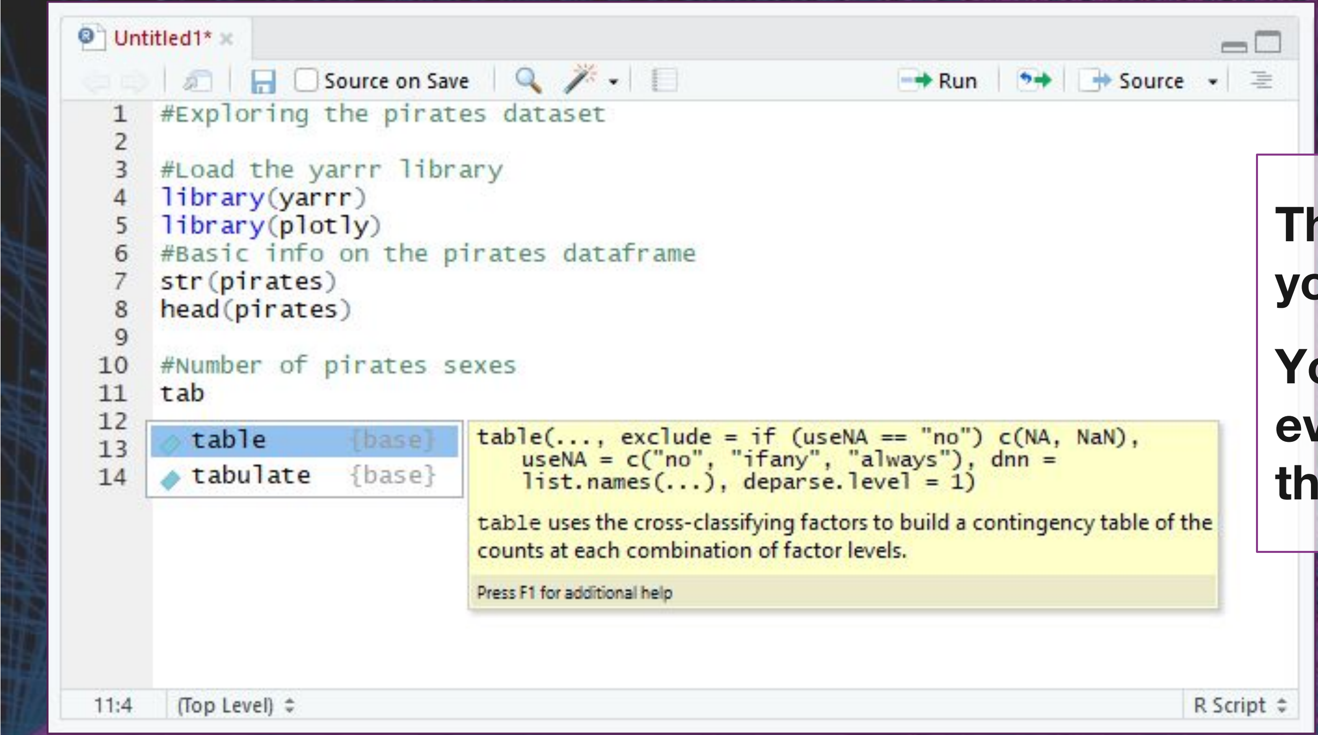

L’ambiente di programmazione RStudio

Script pane



```
#Exploring the pirates dataset

#Load the yarrr library
library(yarrr)
library(plotly)
#Basic info on the pirates dataframe
str(pirates)
head(pirates)

#Number of pirates sexes
tab
```

```
table(..., exclude = if (useNA == "no") c(NA, NaN),
    useNA = c("no", "ifany", "always"), dnn =
    list.names(...), deparse.level = 1)
```

table uses the cross-classifying factors to build a contingency table of the counts at each combination of factor levels.

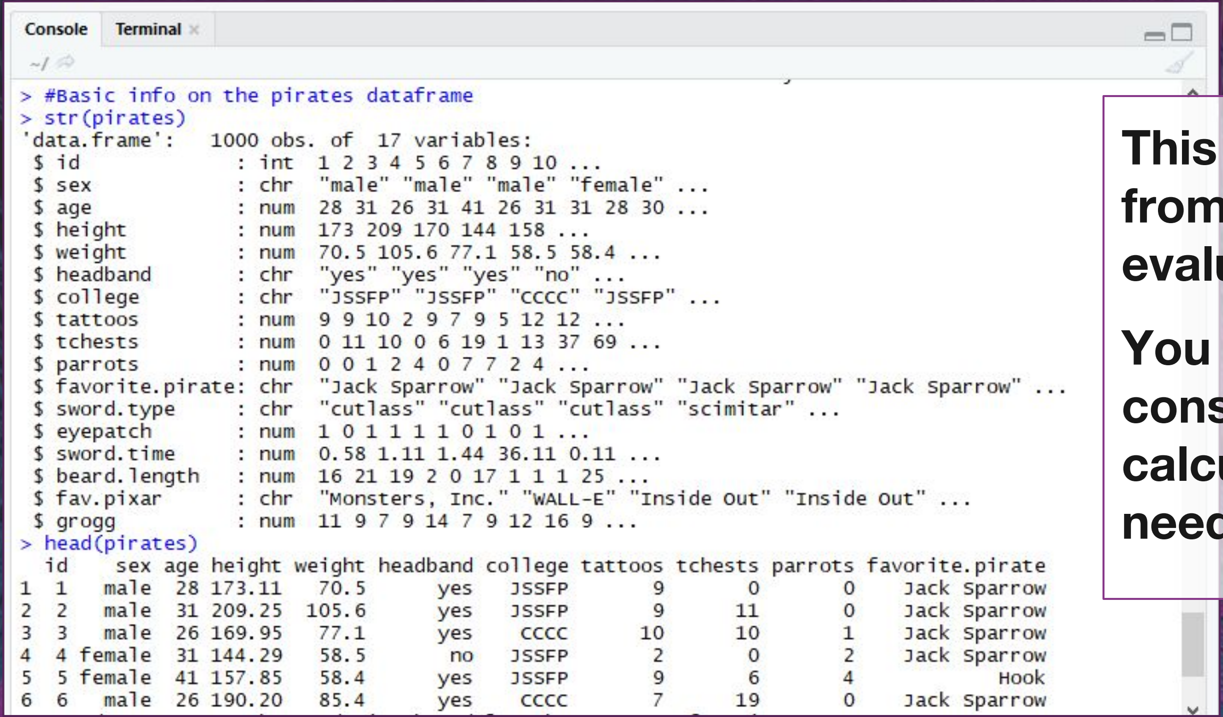
Press F1 for additional help

This is where you write your code!

Your code will not be evalueted until you “Run” them to the console.

L'ambiente di programmazione RStudio

Console pane



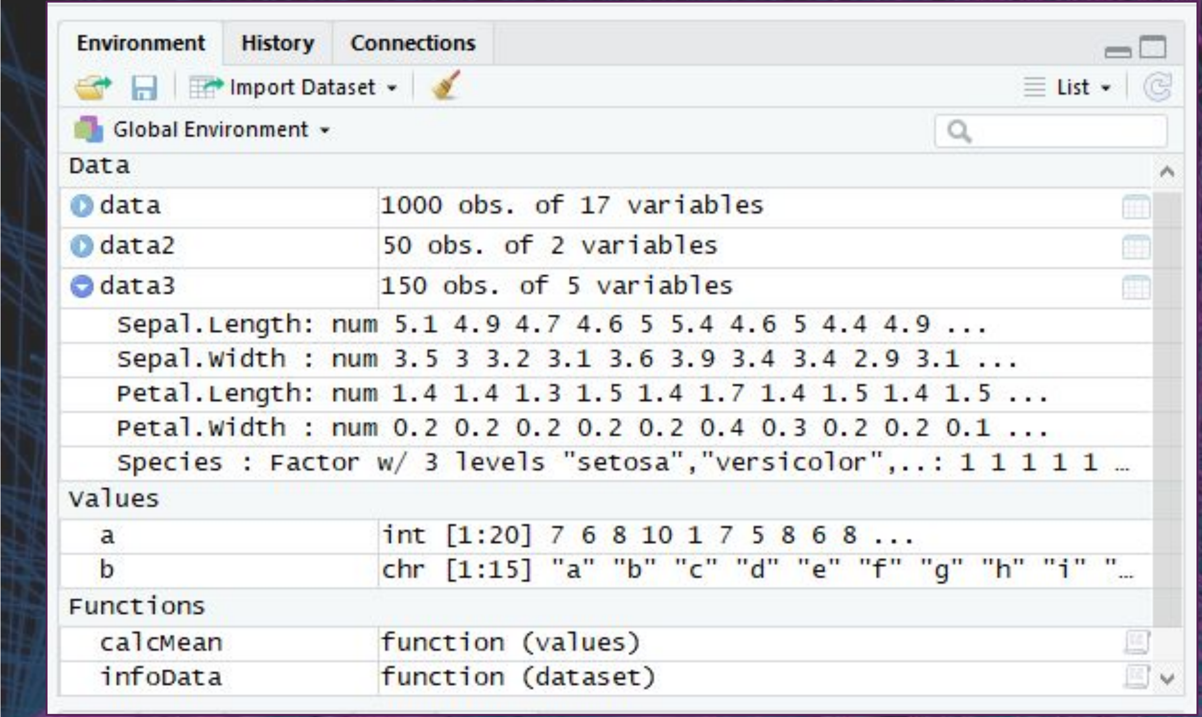
```
> #Basic info on the pirates dataframe
> str(pirates)
'data.frame':   1000 obs. of  17 variables:
 $ id             : int  1 2 3 4 5 6 7 8 9 10 ...
 $ sex            : chr  "male" "male" "male" "female" ...
 $ age            : num  28 31 26 31 41 26 31 31 28 30 ...
 $ height         : num  173 209 170 144 158 ...
 $ weight         : num  70.5 105.6 77.1 58.5 58.4 ...
 $ headband       : chr  "yes" "yes" "yes" "no" ...
 $ college        : chr  "JSSFP" "JSSFP" "CCCC" "JSSFP" ...
 $ tattoos        : num  9 9 10 2 9 7 9 5 12 12 ...
 $ tchests        : num  0 11 10 0 6 19 1 13 37 69 ...
 $ parrots        : num  0 0 1 2 4 0 7 7 2 4 ...
 $ favorite.pirate: chr  "Jack Sparrow" "Jack Sparrow" "Jack Sparrow" "Jack Sparrow" ...
 $ sword.type     : chr  "cutlass" "cutlass" "cutlass" "scimitar" ...
 $ eyepatch       : num  1 0 1 1 1 1 0 1 0 1 ...
 $ sword.time     : num  0.58 1.11 1.44 36.11 0.11 ...
 $ beard.length   : num  16 21 19 2 0 17 1 1 1 25 ...
 $ fav.pixar      : chr  "Monsters, Inc." "WALL-E" "Inside Out" "Inside Out" ...
 $ grogg          : num  11 9 7 9 14 7 9 12 16 9 ...
> head(pirates)
  id    sex age height weight headband college tattoos tchests parrots favorite.pirate
1  1   male  28 173.11   70.5      yes   JSSFP       9       0       0    Jack Sparrow
2  2   male  31 209.25  105.6      yes   JSSFP       9      11       0    Jack Sparrow
3  3   male  26 169.95   77.1      yes    CCCC      10      10       1    Jack Sparrow
4  4 female  31 144.29   58.5       no   JSSFP       2       0       2    Jack Sparrow
5  5 female  41 157.85   58.4      yes   JSSFP       9       6       4            Hook
6  6   male  26 190.20   85.4      yes    CCCC       7      19       0    Jack Sparrow
```

This is where your code from the Source pane is evalueted by R.

You can also use the console to perform quick calculations that you don't need to save.

L’ambiente di programmazione RStudio

Environment pane

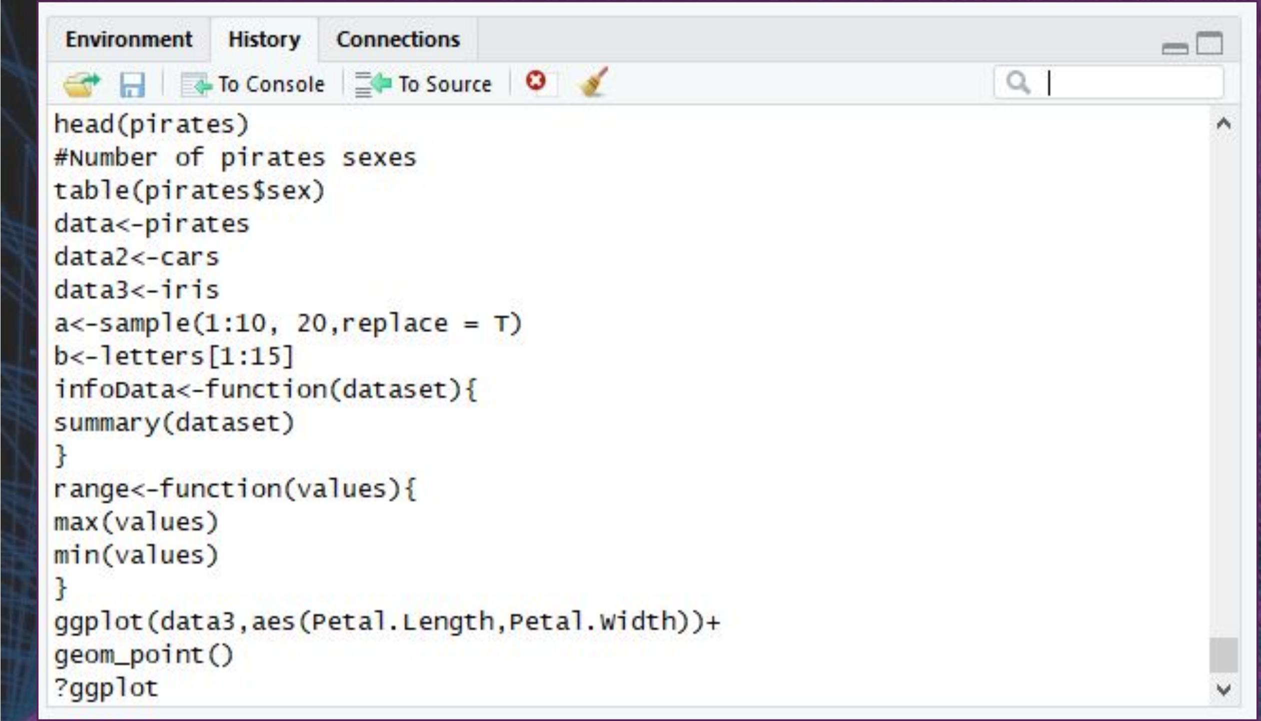


```
Data
data          1000 obs. of 17 variables
data2         50 obs. of 2 variables
data3         150 obs. of 5 variables
   Sepal.Length: num 5.1 4.9 4.7 4.6 5 5.4 4.6 5 4.4 4.9 ...
   Sepal.Width : num 3.5 3 3.2 3.1 3.6 3.9 3.4 3.4 2.9 3.1 ...
   Petal.Length: num 1.4 1.4 1.3 1.5 1.4 1.7 1.4 1.5 1.4 1.5 ...
   Petal.Width : num 0.2 0.2 0.2 0.2 0.2 0.4 0.3 0.2 0.2 0.1 ...
   Species : Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 ...
Values
  a           int [1:20] 7 6 8 10 1 7 5 8 6 8 ...
  b           chr [1:15] "a" "b" "c" "d" "e" "f" "g" "h" "i" "...
Functions
  calcMean    function (values)
  infoData    function (dataset)
```

Here you can see what objects are in your working space.

L’ambiente di programmazione RStudio

History pane

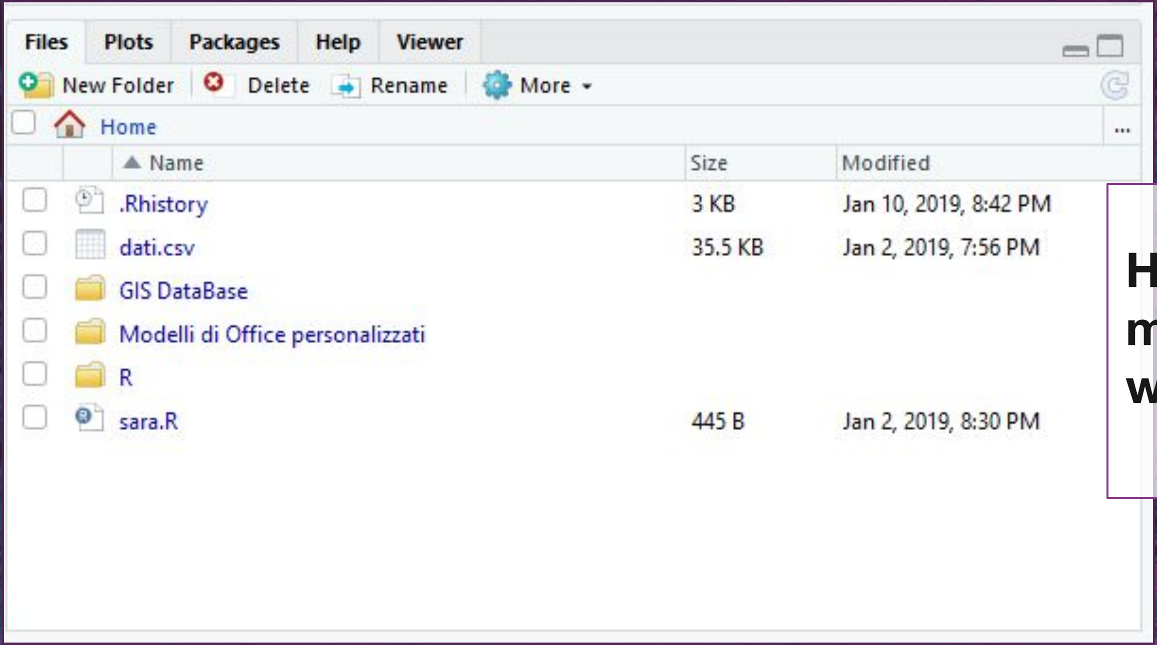


```
head(pirates)
#Number of pirates sexes
table(pirates$sex)
data<-pirates
data2<-cars
data3<-iris
a<-sample(1:10, 20,replace = T)
b<-letters[1:15]
infoData<-function(dataset){
summary(dataset)
}
range<-function(values){
max(values)
min(values)
}
ggplot(data3,aes(Petal.Length,Petal.Width))+
geom_point()
?ggplot
```

Here you can view your command history.

L’ambiente di programmazione RStudio

Files pane

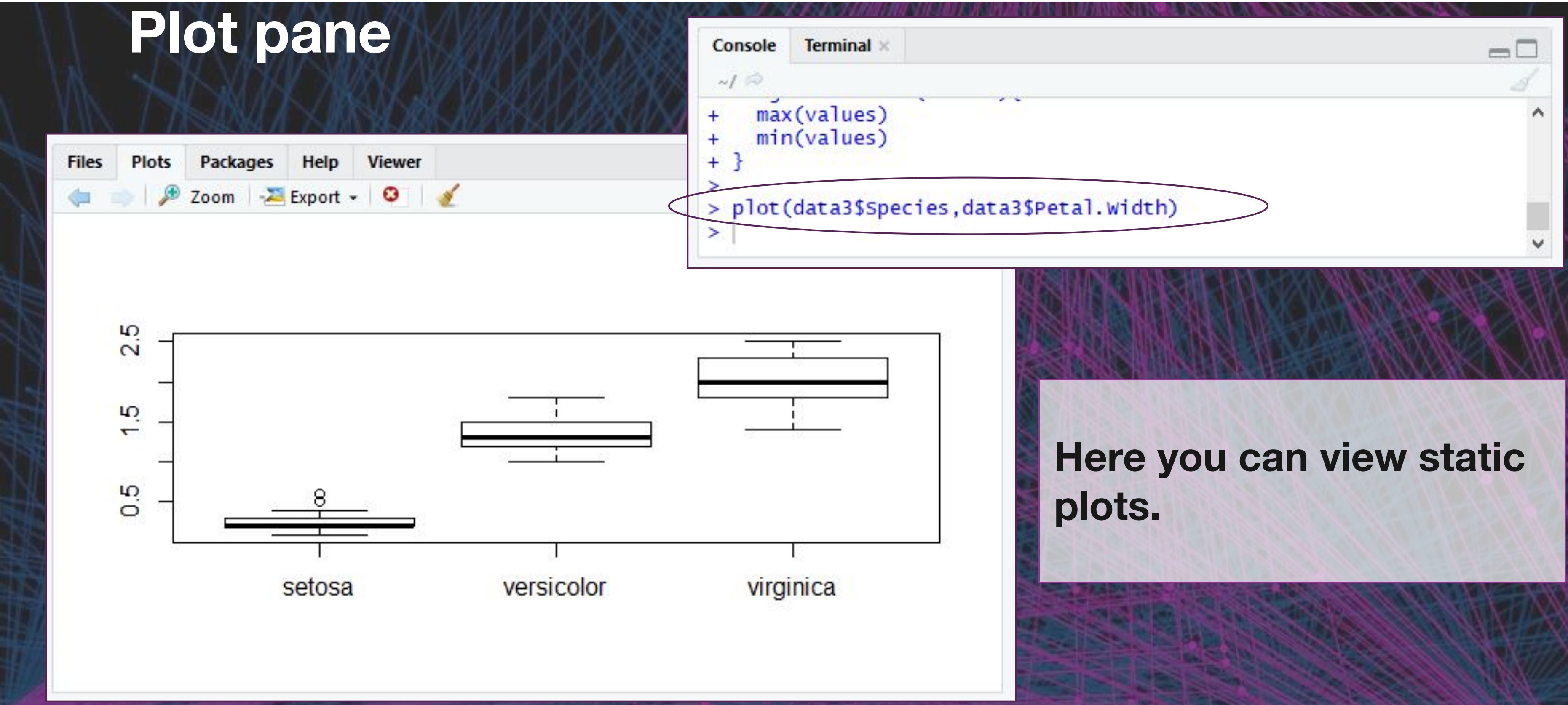


□	Name	Size	Modified
□	.Rhistory	3 KB	Jan 10, 2019, 8:42 PM
□	dati.csv	35.5 KB	Jan 2, 2019, 7:56 PM
□	GIS DataBase		
□	Modelli di Office personalizzati		
□	R		
□	sara.R	445 B	Jan 2, 2019, 8:30 PM

Here you can see and manage directories in your working space.

L’ambiente di programmazione RStudio

Plot pane

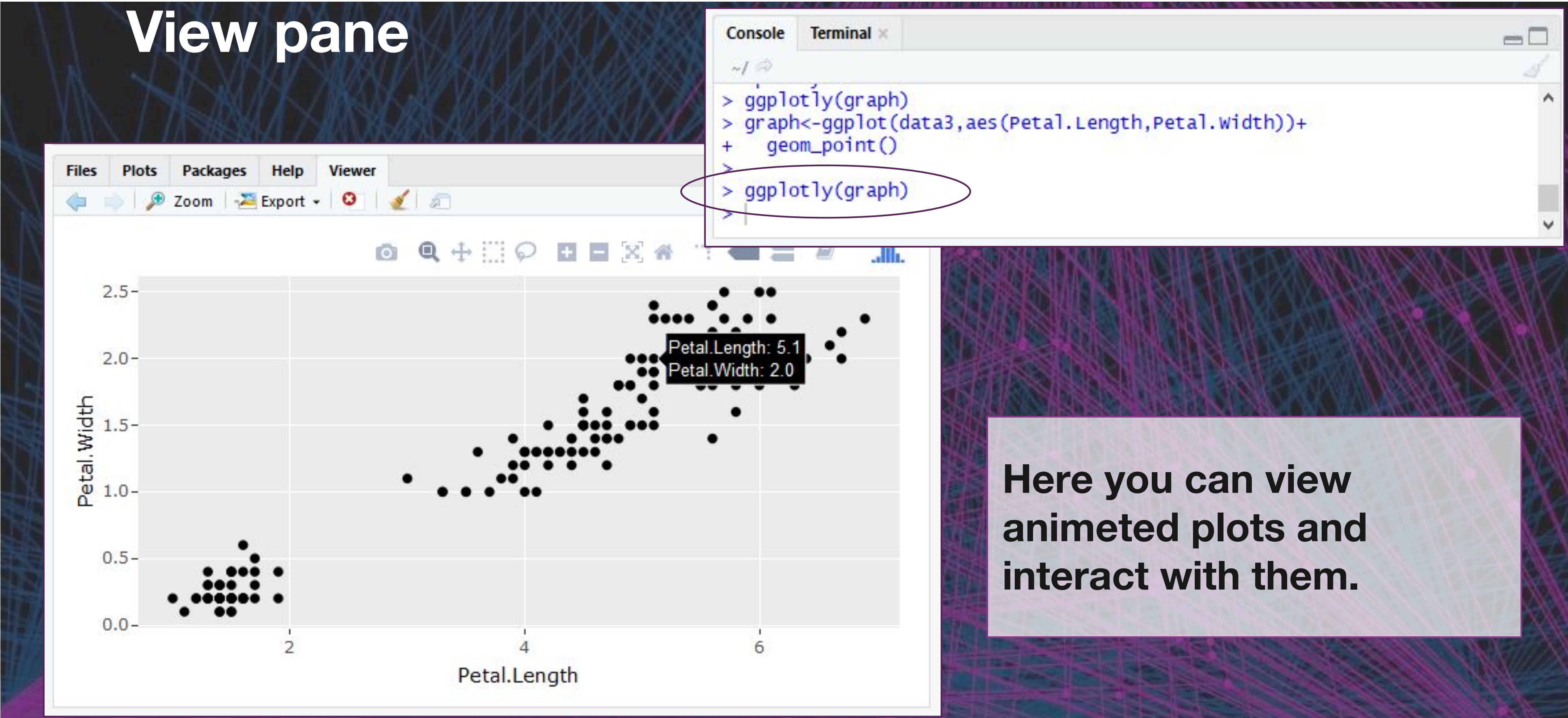


```
+   max(values)
+   min(values)
+ }
>
> plot(data3$Species,data3$Petal.width)
>
```

Here you can view static plots.

L’ambiente di programmazione RStudio

View pane

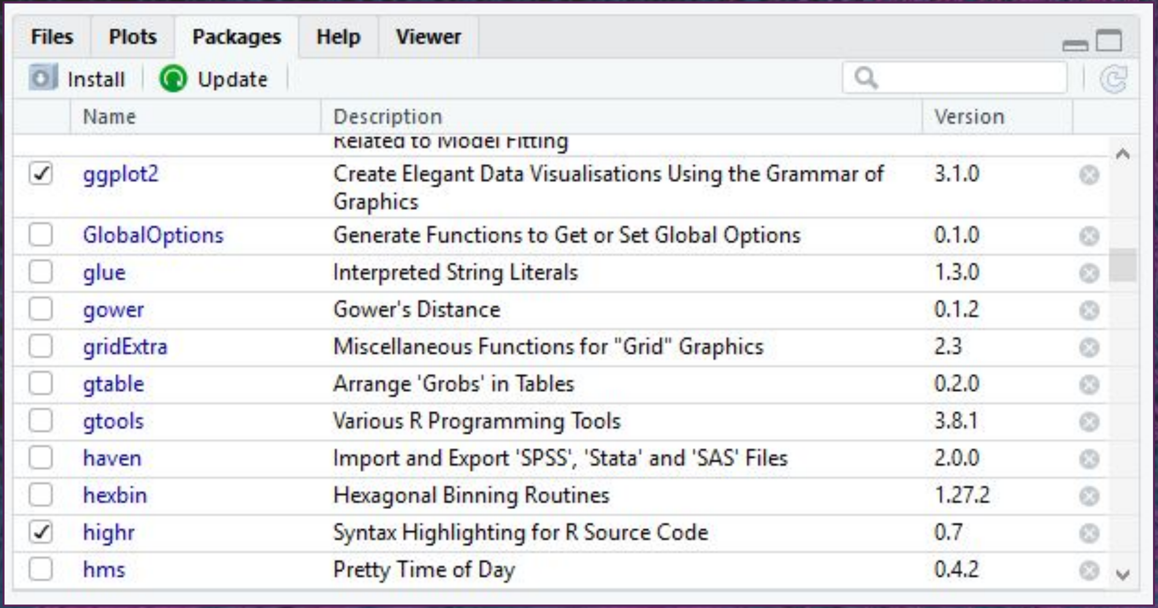


```
> ggplotly(graph)
> graph<-ggplot(data3,aes(Petal.Length,Petal.Width))+
+   geom_point()
>
> ggplotly(graph)
>
```

Here you can view animeted plots and interact with them.

L’ambiente di programmazione RStudio

Packages pane

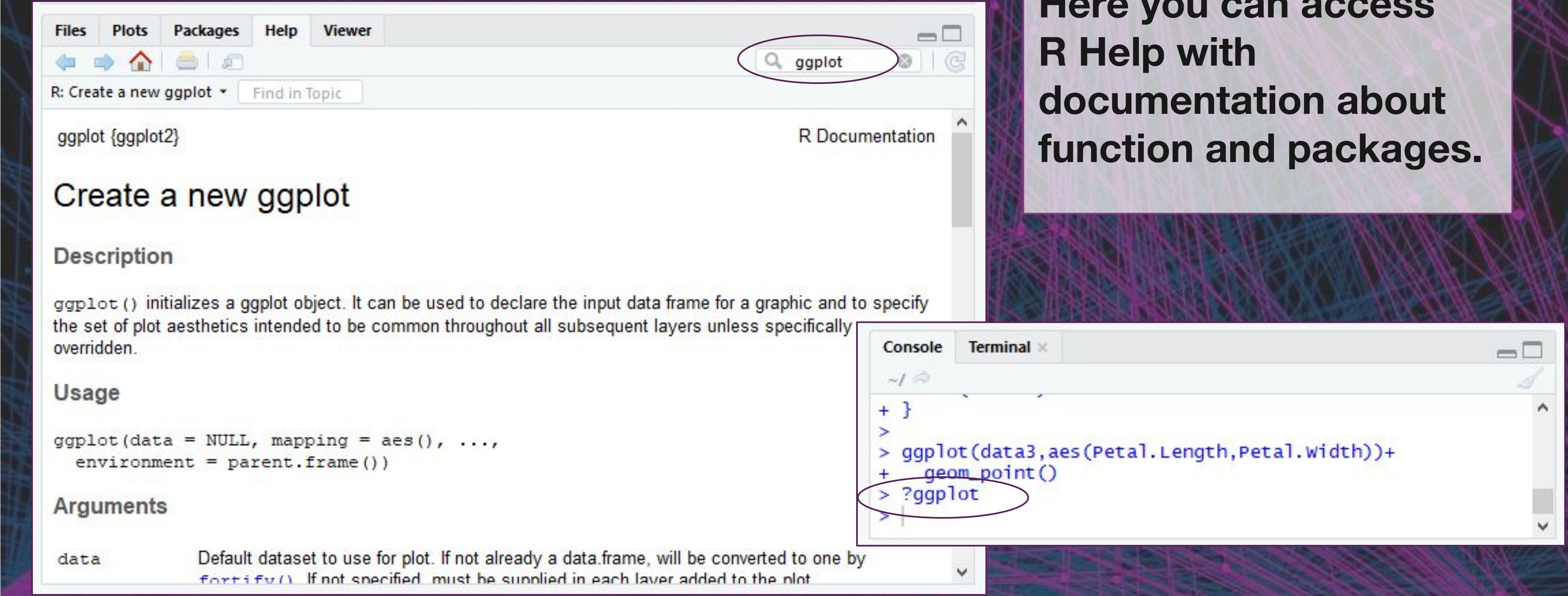


	Name	Description	Version
		Related to Model Fitting	
☑	ggplot2	Create Elegant Data Visualisations Using the Grammar of Graphics	3.1.0
□	GlobalOptions	Generate Functions to Get or Set Global Options	0.1.0
□	glue	Interpreted String Literals	1.3.0
□	gower	Gower's Distance	0.1.2
□	gridExtra	Miscellaneous Functions for "Grid" Graphics	2.3
□	gtable	Arrange 'Grobs' in Tables	0.2.0
□	gtools	Various R Programming Tools	3.8.1
□	haven	Import and Export 'SPSS', 'Stata' and 'SAS' Files	2.0.0
□	hexbin	Hexagonal Binning Routines	1.27.2
☑	highr	Syntax Highlighting for R Source Code	0.7
□	hms	Pretty Time of Day	0.4.2

Here you can see your packages and manage them.

L’ambiente di programmazione RStudio

Help pane



ggplot {ggplot2}   R Documentation

Create a new ggplot

Description

`ggplot()` initializes a ggplot object. It can be used to declare the input data frame for a graphic and to specify the set of plot aesthetics intended to be common throughout all subsequent layers unless specifically overridden.

Usage

```
ggplot(data = NULL, mapping = aes(), ...,
  environment = parent.frame())
```

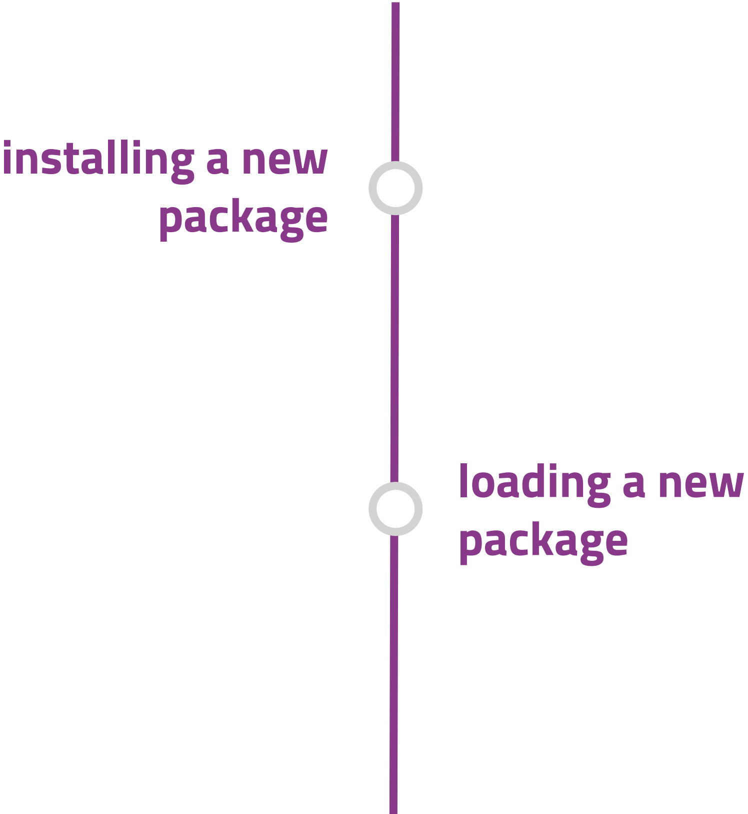
Arguments

`data`   Default dataset to use for plot. If not already a data.frame, will be converted to one by `fortify()`. If not specified, must be supplied in each layer added to the plot

```
+ }
>
> ggplot(data3,aes(Petal.Length,Petal.Width))+
+     geom_point()
> ?ggplot
>
```

Here you can access R Help with documentation about function and packages.

Packages



installing a new package

loading a new package

Installing a new package

Means downloading the package code onto your personal computer.

Main ways:

- **with code instruction:**

```
install.packages (“package name”)
```

- **through main menu:**

```
Tools > Install Packages…
```

- **through Packages pane:**

```
Install
```

Loading a new package

Means load the package in your R session in order to use it.

Main ways:

- **with code instruction:**

```
library(“package name”)
```

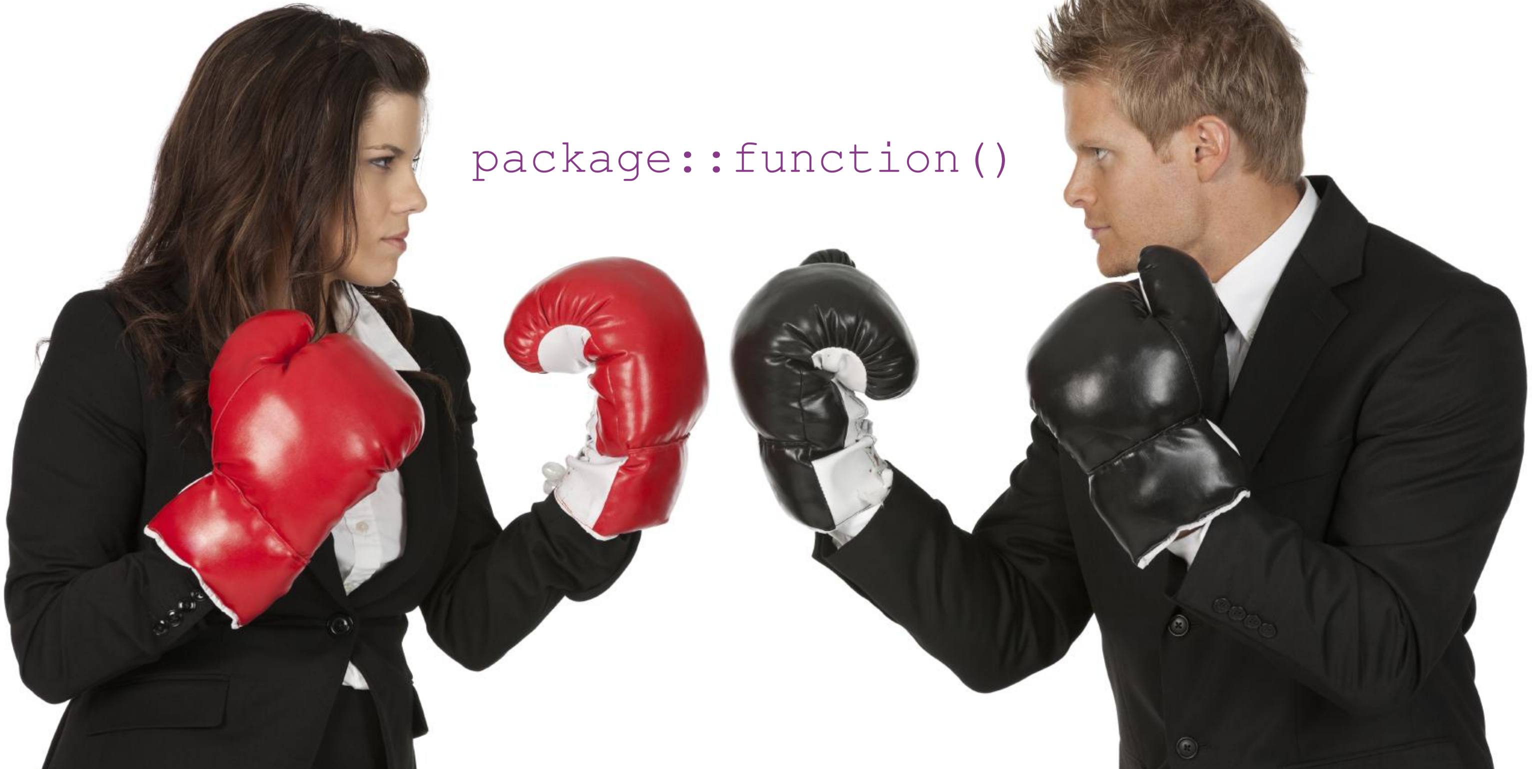
or

```
require(“package name”)
```

- **through Packages pane:**

```
Check the package in the list
```

Temporary load a package:
solve conflicts between packages



```
package::function()
```

Jump in!!!