

Introduction to R and RStudio

Part 1b: Introduction to R Studio

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What is RStudio?

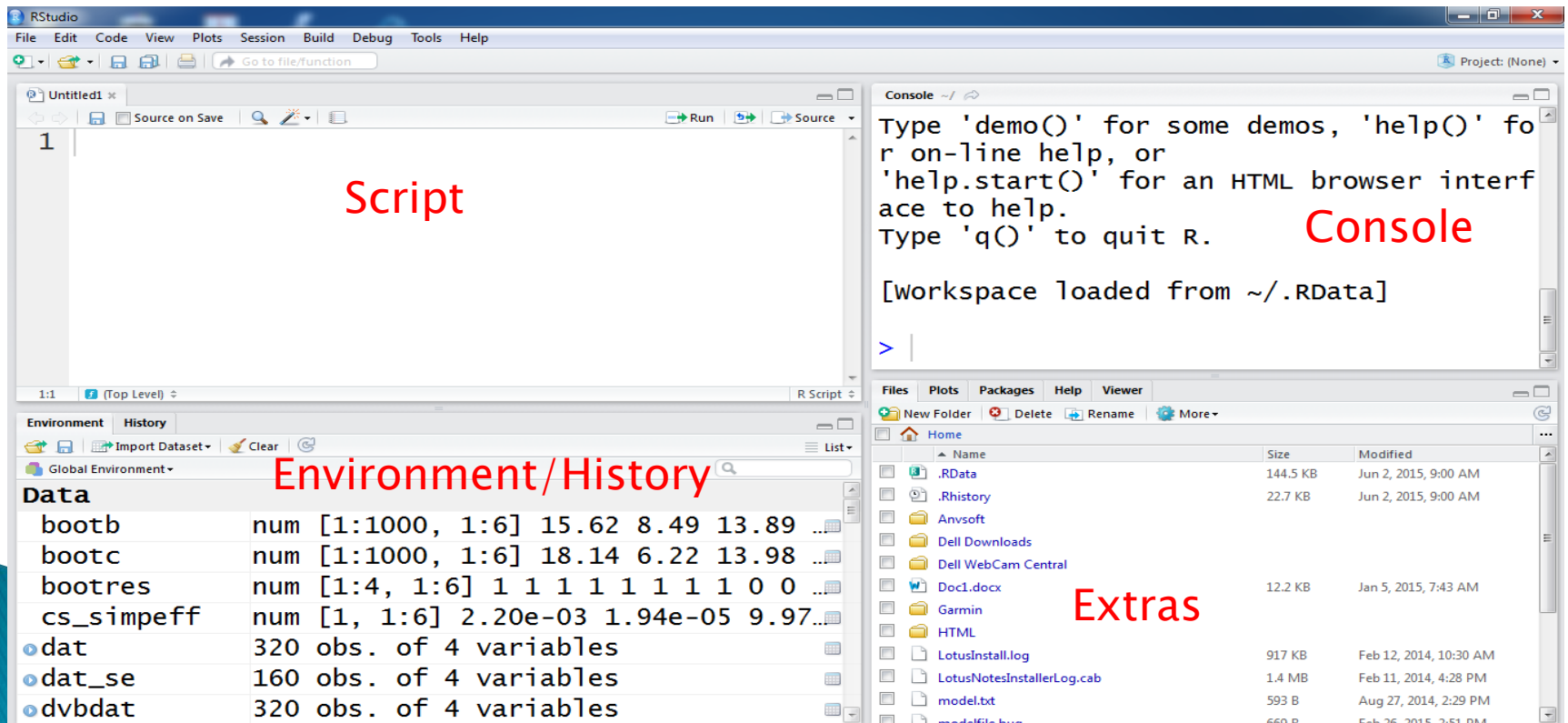
- ▶ RStudio is a free stand-alone program for handling all aspects of R including:
 - Submitting commands
 - Creating R scripts (bunches of code)
 - Managing graphics
 - Organizing information regarding functions, packages, help files, directories
- ▶ However, RStudio also has add-ons (e.g, R Markdown) for being able to create scripts with simultaneous input and output capabilities (great for teaching, demonstration, etc.), etc.

Where to get RStudio?

- ▶ You can get RStudio at:
 - <https://www.rstudio.com>
- ▶ Click on 'Download RStudio', then 'Desktop', then 'Download RStudio Desktop'
- ▶ Then, under installers, click on the appropriate operation system
 - E.g., [RStudio 0.99.467 – Windows Vista/7/8](#) for Windows

The Look of RStudio

- ▶ Rstudio is organized into four panels, that can be moved and organized based on the user's preferences



The Look of RStudio

- ▶ To change the layout of the panels in Rstudio, click on 'Tools' -> 'Global Options' -> 'Pane Layout'
- ▶ I find it helpful to have the Script Panel in the top-left and the Console Panel in the top-right, so you are submitting commands from left to right
 - This allows you to easily minimize the size of the Environment/History and Extras panels (which are used less often) and maximize the size of your more frequently used panels

The Four Panels of RStudio

- ▶ Rstudio is organized into:
 - 1) Console Panel
 - This is just the basic R window
 - If you want you can input all of your commands to this window, but it is not a great way to organize and save your code

```
Console C:/Users/cribbie/AppData/Local/Temp/ ↗
> 1+1
[1] 2
> var<-c(2,3,4,5)
> var
[1] 2 3 4 5
> mean(var)
[1] 3.5
> |
```

The Four Panels of RStudio

◦ 2) Script Panel

- This is where you write, store, save and organize your R scripts (programs)
 - There are actually many files types (e.g., R script, text) that can be worked on in this window, but we will be working only with R scripts for now
 - You can have many R scripts open at once, and they remain open even when you close the RStudio program (very handy)
 - To submit a line in your script to the console window hit ctrl-enter (or hit the 'run' button)
 - To submit all lines in your script to the console window hit ctrl-shift-enter (or highlight all lines and hit 'run')
- To see a list of keyboard shortcuts hit 'help' then 'keyboard shortcuts'

The Four Panels of RStudio

▶ Script Panel

File Name

The screenshot shows the RStudio interface. At the top is a menu bar with options: File, Edit, Code, View, Plots, Session, Build, Debug, Tools, Help. Below the menu bar is a toolbar with icons for file operations and a search bar labeled 'Go to file/function'. The main area is the Script Panel, which has a tab labeled 'Untitled1*'. Below the tab is another toolbar with icons for navigation, saving, and running. The code editor contains the following R code:

```
1 x<-c(2,5,4,2,6)
2 y<-c(4,5,2,5,6)
3 mean(x)
4 sd(y)
```

Red arrows point from the text 'File Name' to the 'Untitled1*' tab and from the text 'Run Button (but it is easier to hit ctrl-enter or ctrl-shift-enter)' to the 'Run' button in the toolbar.

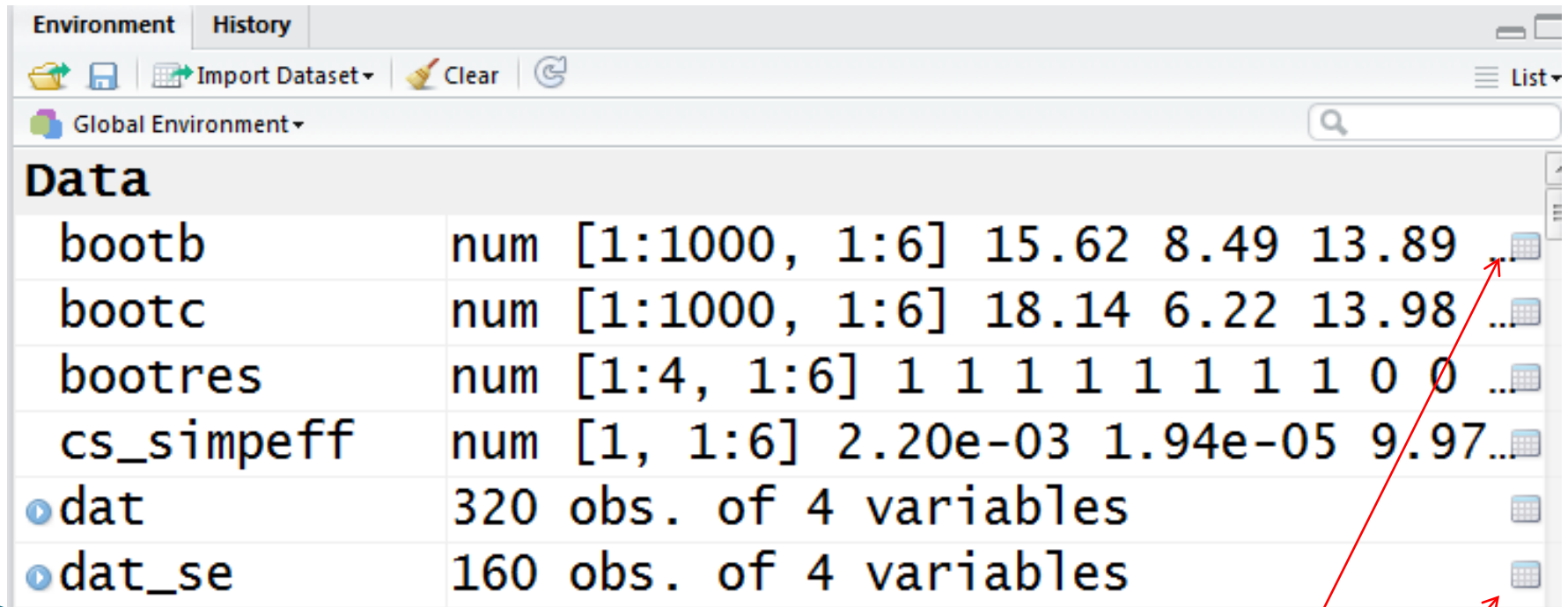
Run Button (but it is easier to hit ctrl-enter or ctrl-shift-enter)

The Four Panels of RStudio

- 3) Environment/History Panel
 - Environment Tab
 - This window allows you to view all available objects (vectors, datasets, etc.)
 - Clicking on the squares to the right of objects allows you to see that object
 - History Tab
 - This window allows you to view a history of all of your commands
 - These can be viewed, saved, copied to the script window, etc.
 - This is ordinarily not used very often (at least I don't use it)

The Four Panels of RStudio

- Environment/History Panel



The screenshot shows the Environment/History Panel in RStudio. The panel is titled "Environment" and "History" and contains a toolbar with "Import Dataset", "Clear", and "List" buttons. Below the toolbar is a search bar and a dropdown menu for "Global Environment". The main area displays a list of objects under the heading "Data".

Object	Type	Dimensions	Sample Values	Actions
bootb	num	[1:1000, 1:6]	15.62 8.49 13.89 ...	View
bootc	num	[1:1000, 1:6]	18.14 6.22 13.98 ...	View
bootres	num	[1:4, 1:6]	1 1 1 1 1 1 1 1 0 0 ...	View
cs_simpeff	num	[1, 1:6]	2.20e-03 1.94e-05 9.97...	View
dat		320 obs. of 4 variables		View
dat_se		160 obs. of 4 variables		View

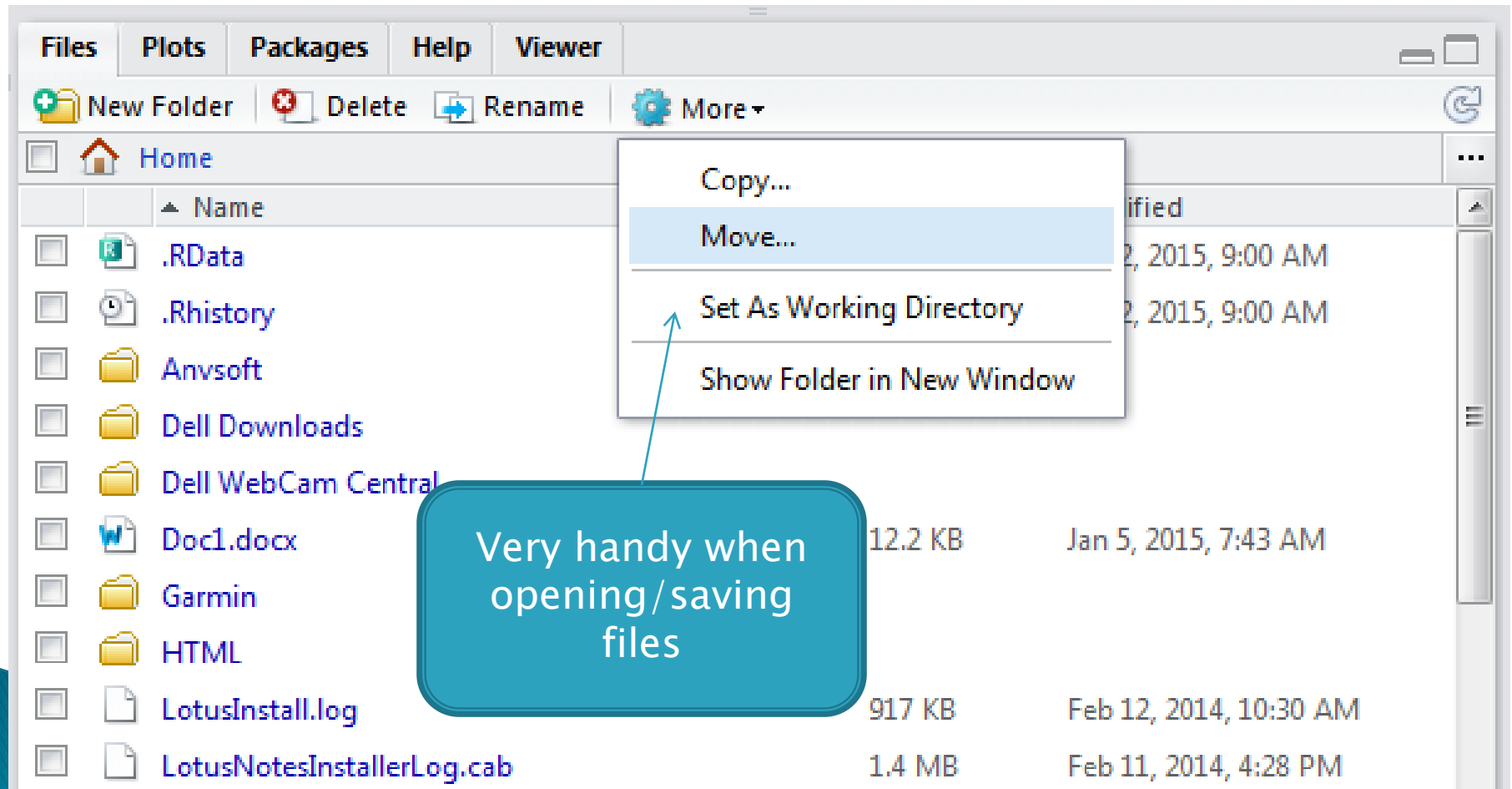
Click here to see the objects

The Four Panels of RStudio

- 4) Extras Panel
 - In the 'extras' panel there are five tabs
 - Files
 - Plots
 - Packages
 - Help
 - Viewer
 - Files Tab
 - The files tab can be used to view and organize files and folders from your computer, set a specific folder as your working directory, etc.

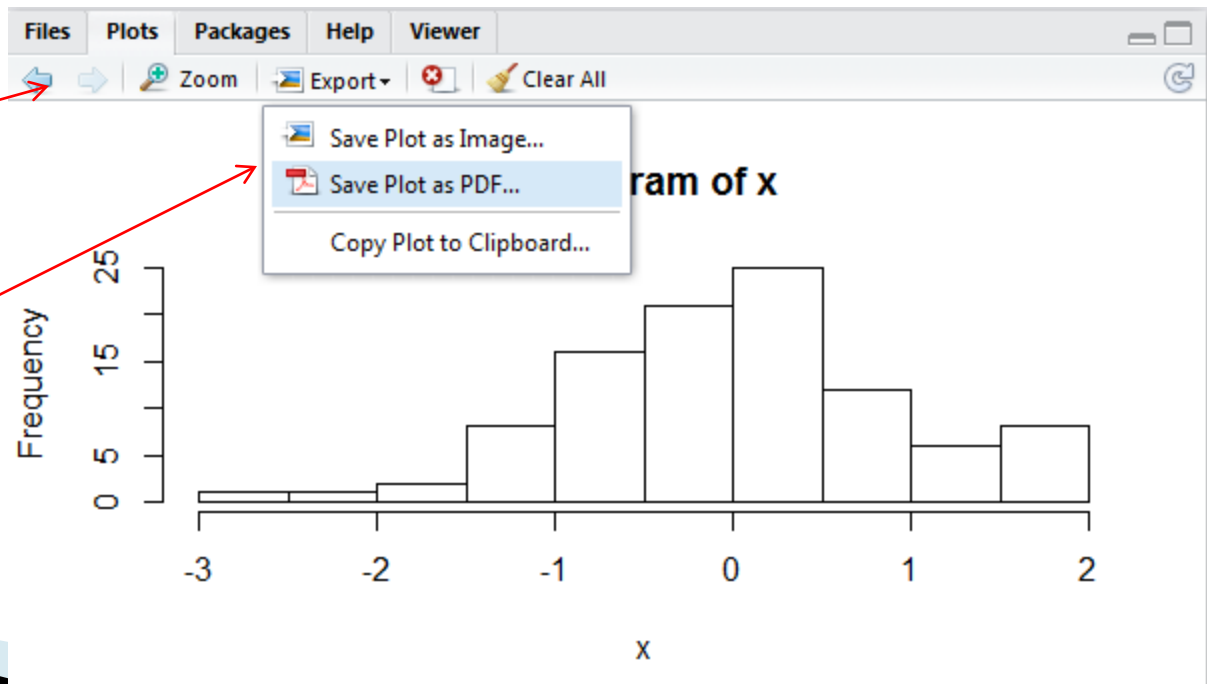
The Four Panels of RStudio

- Files Tab



The Four Panels of RStudio

- Plots Tab
 - The plots tab allows you to view the current plot or previously created plots, save plots as jpg, pdf, etc., copy plots to the clipboard, etc.
 - There are also capabilities for saving a plot in a large format (e.g., for a poster)



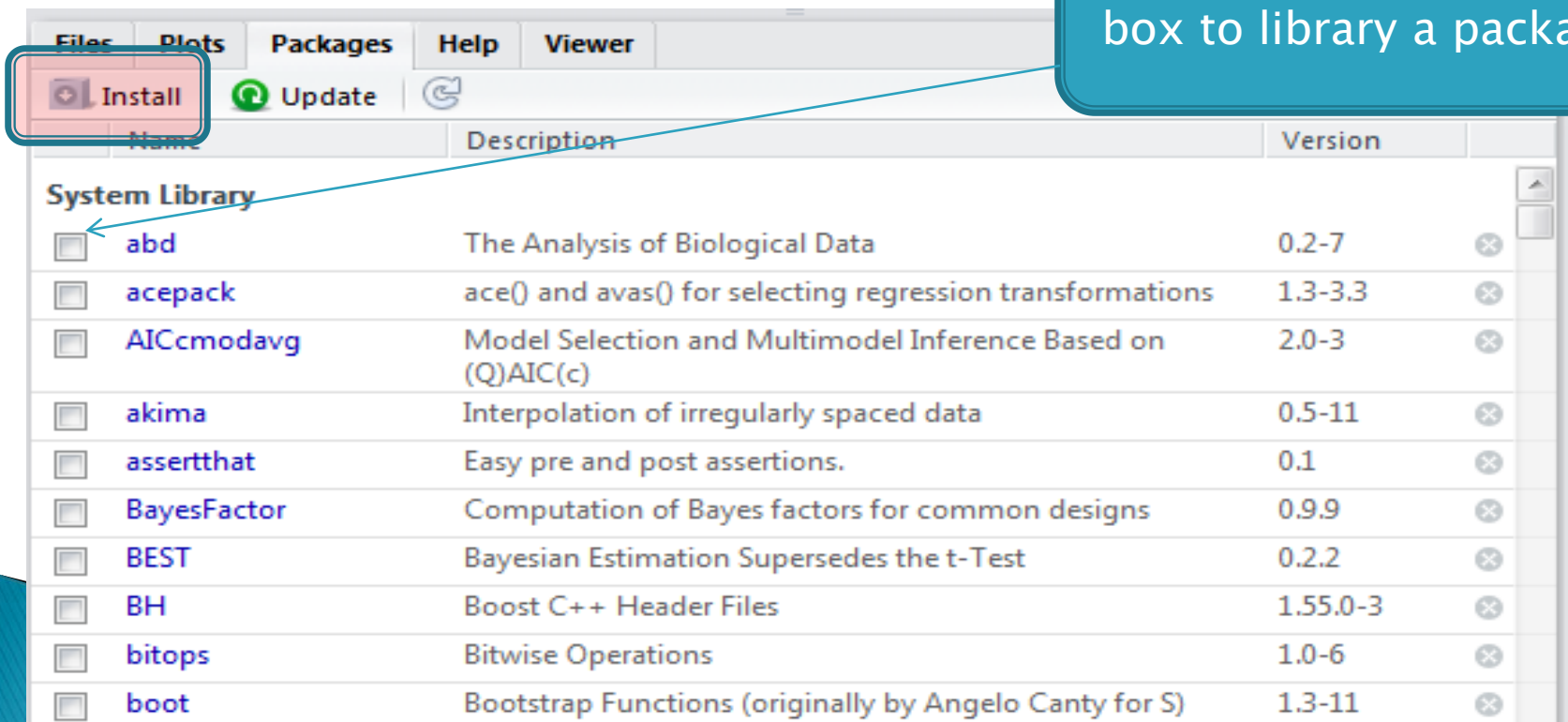
Move between available plots

Saving/copying options

The Four Panels of RStudio

- Packages Tab
 - The packages tab allows you to install packages, library/activate packages, deactivate packages, delete packages, update packages, etc.

Place a checkmark in the box to library a package



The screenshot shows the RStudio interface with the 'Packages' tab selected. The 'Install' button is highlighted with a red box. A blue callout box points to the 'abd' package row, indicating that a checkmark should be placed in the checkbox to library the package.

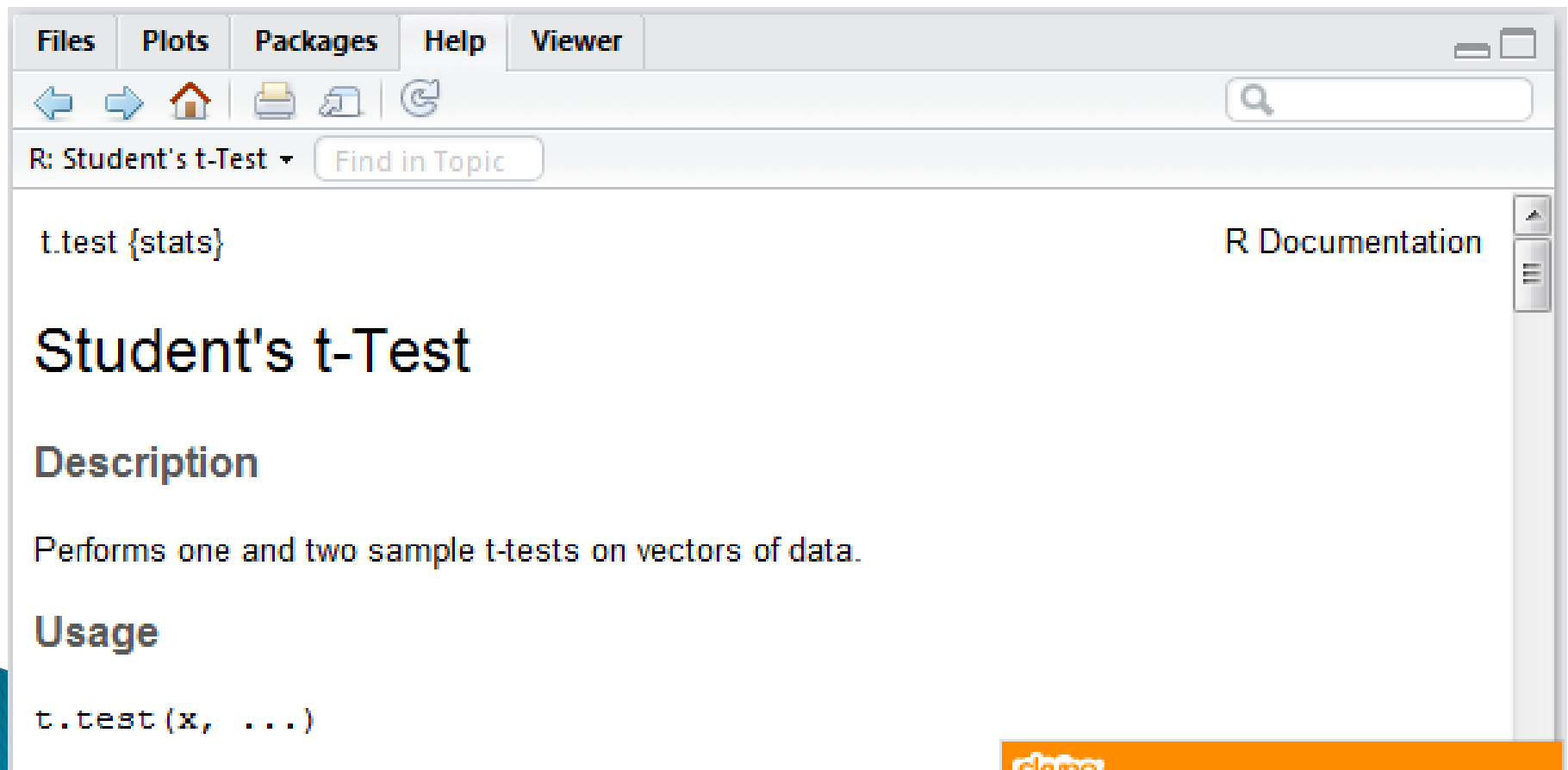
Name	Description	Version
System Library		
<input type="checkbox"/> abd	The Analysis of Biological Data	0.2-7
<input type="checkbox"/> acepack	ace() and avas() for selecting regression transformations	1.3-3.3
<input type="checkbox"/> AICcmodavg	Model Selection and Multimodel Inference Based on (Q)AIC(c)	2.0-3
<input type="checkbox"/> akima	Interpolation of irregularly spaced data	0.5-11
<input type="checkbox"/> assertthat	Easy pre and post assertions.	0.1
<input type="checkbox"/> BayesFactor	Computation of Bayes factors for common designs	0.9.9
<input type="checkbox"/> BEST	Bayesian Estimation Supersedes the t-Test	0.2.2
<input type="checkbox"/> BH	Boost C++ Header Files	1.55.0-3
<input type="checkbox"/> bitops	Bitwise Operations	1.0-6
<input type="checkbox"/> boot	Bootstrap Functions (originally by Angelo Canty for S)	1.3-11

The Four Panels of RStudio

- Help Tab
 - The help tab displays the help files for functions, packages, etc.
 - You can search for help files from within the tab, or you can activate help files from the console window by typing ‘?function’ (where ‘function’ is replaced with the actual name of the function)
 - E.g., ? t.test or ?t.test
 - You can also scroll back and forth between available help files

The Four Panels of RStudio

- Help Tab



The screenshot shows the RStudio interface with the Help tab selected. The top menu bar includes Files, Plots, Packages, Help, and Viewer. Below the menu bar is a toolbar with navigation icons and a search box. The main panel displays the documentation for the `t.test` function. The title is "Student's t-Test" and the description states: "Performs one and two sample t-tests on vectors of data." The usage is shown as `t.test(x, ...)`. The right side of the panel is labeled "R Documentation".

Files Plots Packages Help Viewer

← → Home Print Copy Refresh 🔍

R: Student's t-Test ▾ Find in Topic

t.test {stats} R Documentation

Student's t-Test

Description

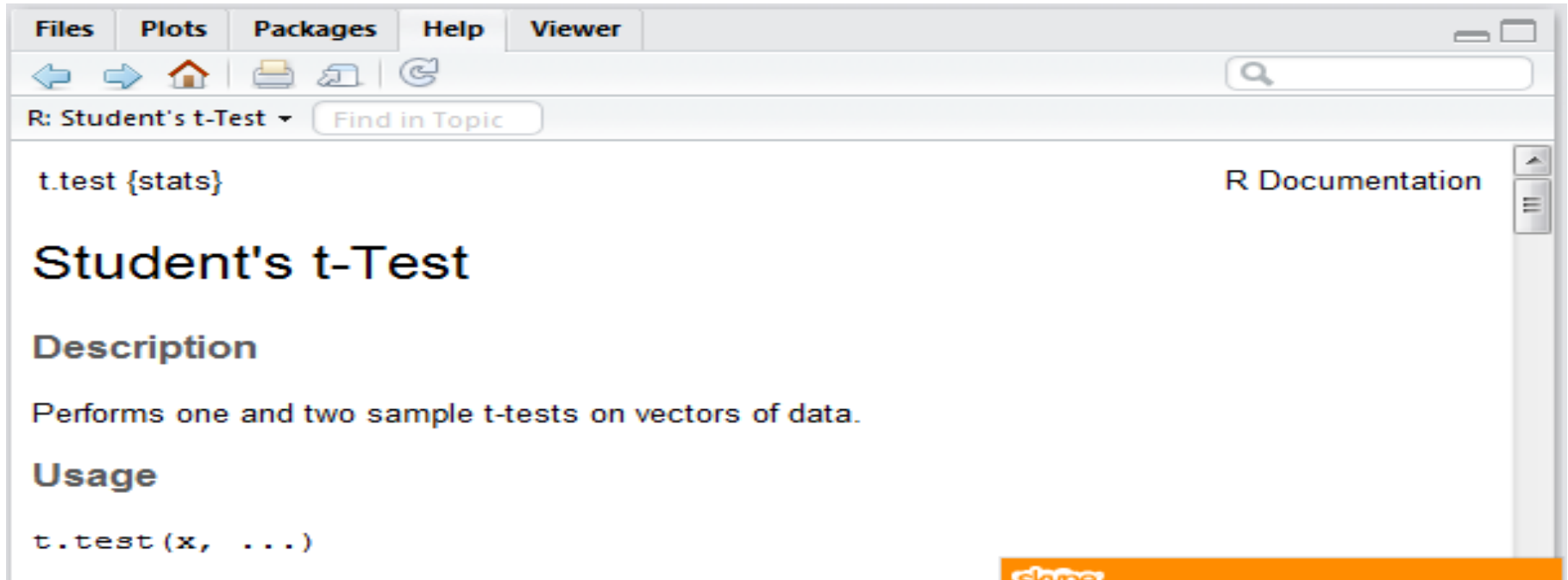
Performs one and two sample t-tests on vectors of data.

Usage

```
t.test(x, ...)
```


The Four Panels of RStudio

- Help Tab



- Viewer Tab
 - Used for displaying web content that is created within Rstudio (a more advanced topic that we will not cover)

Demonstration with RStudio

