

Introduction to R

Anup Phayal

Political Science Department,
University of Kentucky

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Intro to R

What is R?

Installing R

Data structures in R

Resources

Hands-on practice using r script

What is R?

Based on S-language;

First written as a research project by Ross Ihaka and Robert Gentleman

Now undergoing active development under R core team:
www.r-project.org

Freely available

Forum/environment that allows development of different data analysis packages

More than 4400 add-on packages; 25 standard packages

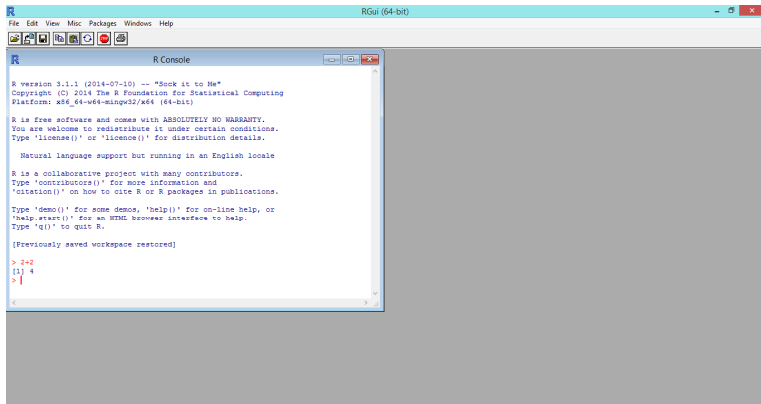
Simple syntax

Installing R

Complete installing instructions at [www.http://cran.r-project.org/](http://cran.r-project.org/)

Install latest version 3.1.1

This will install basic Graphical User Interface or GUI: R Console



```
RGui (64-bit)
File Edit View Misc Packages Windows Help
R Console
R version 3.1.1 (2014-07-10) -- "Sock it to Me"
Copyright (C) 2014 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 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.

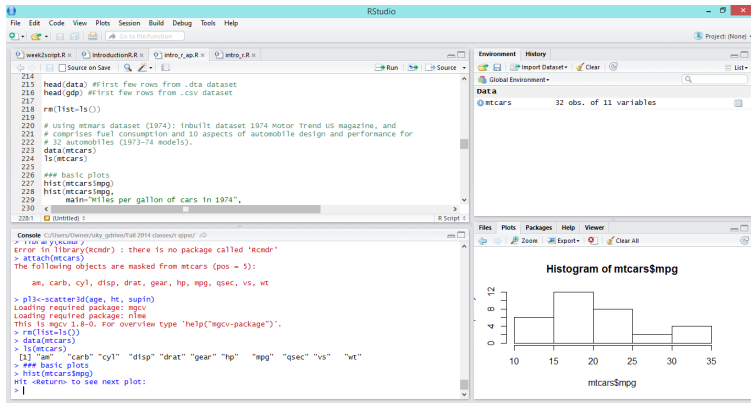
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Previously saved workspace restored]

> 2+2
[1] 4
> |
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Installing R

There are many such interfaces. I use R Studio



The screenshot displays the RStudio environment. The main editor window contains R code for loading data and creating a histogram. The console window shows the execution of these commands, including an error for a non-existent package 'rcnldr' and the successful loading of the 'mtcars' dataset. The Environment pane on the right shows the 'mtcars' dataset with 32 observations and 11 variables. The Plots pane at the bottom right displays a histogram titled 'Histogram of mtcars\$mpg'.

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215 head(data) #First few rows from .dta dataset
216 head(gdp) #First few rows from .csv dataset
217
218 rm(list=ls())
219
220 # using mtcars dataset (1974): Inbuilt dataset 1974 Motor Trend US magazine, and
221 # comprises fuel consumption and 10 aspects of automobile design and performance for
222 # 32 automobiles (1973-74 models).
223 data(mtcars)
224 ls(mtcars)
225
226 ### basic plots
227 hist(mtcars$mpg)
228 hist(mtcars$mpg,
229       main="Miles per gallon of cars in 1974",
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Console: C:\Users\Anup\OneDrive\My drive\Fall 2014 classes\apps\
> library(rcnldr)
Error in library(rcnldr) : there is no package called 'rcnldr'
> attach(mtcars)
The following objects are masked from mtcars (pos = 5):
  am, carb, cyl, disp, drat, gear, hp, mpg, qsec, vs, wt
> plot<-scatter3d(age, ht, supin)
Loading required package: mgcv
Loading required package: nlme
This is mgcv 1.8-0. For overview type 'help("mgcv-package")'.
> rm(list=ls())
> data(mtcars)
> ls(mtcars)
[1] "am" "carb" "cyl" "disp" "drat" "gear" "hp" "mpg" "qsec" "vs" "wt"
> ## basic plots
> hist(mtcars$mpg)
Hit <Return> to see next plot:
> |
```

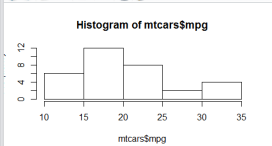
Environment History

Global Environment

Data

mtcars 32 obs. of 11 variables

Histogram of mtcars\$mpg



mpg bin	Frequency
10-12.5	4
12.5-15	7
15-17.5	10
17.5-20	4
20-22.5	1
22.5-25	2

Data Structure in R

Important to understand, as there are some features that are different than other statistical softwares like STATA

R uses RAM to store local files which has limited space. Therefore problematic when reading huge files

R objects: Vectors, arrays, character strings, functions, data frames and lists.

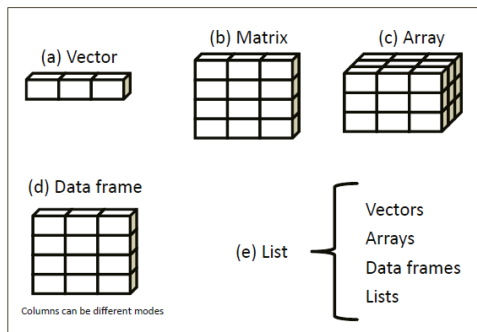
Most easy to understand: dataframes - rows and columns

R object that contains many dataframes of different sizes, vectors, functions etc is called list

A list can also contain another list

This feature of R makes it very flexible

Data structure in R



Source: Kabakoff(2012:23)

Figure 2.1 R data structures

Resources

Lots of resources in the web

Start with R-cran FAQ

websites:

- ▶ <http://cran.r-project.org/doc/manuals/R-intro.pdf>
- ▶ <http://data.princeton.edu/R/default.html>
- ▶ David Armstrong's ICPSR class handouts on R:
<http://www.quantoid.net/ICPSRR.html>

R-Project website has collection of R documents, journals and proceedings: <http://www.r-project.org/other-docs.html>

An excellent resource is: <http://www.twotorials.com/>. It has collections of 2 minute videos on using R.

I mostly google and find answers in STACK OVERFLOW: which is repository of Q and A from people using different programming languages including R

Resources

Books:

- ▶ R in Action: Data Analysis and Graphics with R (2014) by Robert Kabacoff
- ▶ R Cookbook (2011) by Paul Teeter
- ▶ Art of R programming: A Tour of Statistical Software Design (2011) by Norman Matloff
- ▶ Discovering Statistics Using R (2012) by Andy Field, Jeremy Miles, Zoe Field

For latest books on R, go to:

<http://www.r-project.org/doc/bib/R-books.html>

Let us now go to R for more hands-on learning?