Descriptive Statistics With R Software

Introduction to R Software

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R Software

Use of a software is desirable and moreover an essential part of any analysis.

Software – used in all sciences including mathematics and statistics.

Some popular statistical software are SPSS, SAS, Minitab, Stata, Matlab etc.

Another software is R.

Developers of R Software

Currently developed by the R Development Core Team.

Available at www.r-project.org

It is a free software.

It supports many free packages which helps the data scientist and analyst.

What is R?

R is an environment for data manipulation, statistical computing, graphics display and data analysis.

Effective data handling and storage of outputs is possible.

Simple as well as complicated calculations are possible.

Simulations are possible.

What is R?

Graphical display on-screen and hardcopy are possible.

Programming language is effective which includes all possibilities just like any other good programming language.

R has a statistical computing environment.

It has a computer language which is convenient to use for statistical and graphical applications.

Switching to R

R is free (open source) software and therefore is not a black box.

Built in and contributed packages are available, and users are provided tools to make packages.

It is possible to contribute own packages.

The commands can be saved, run and stored in script files.

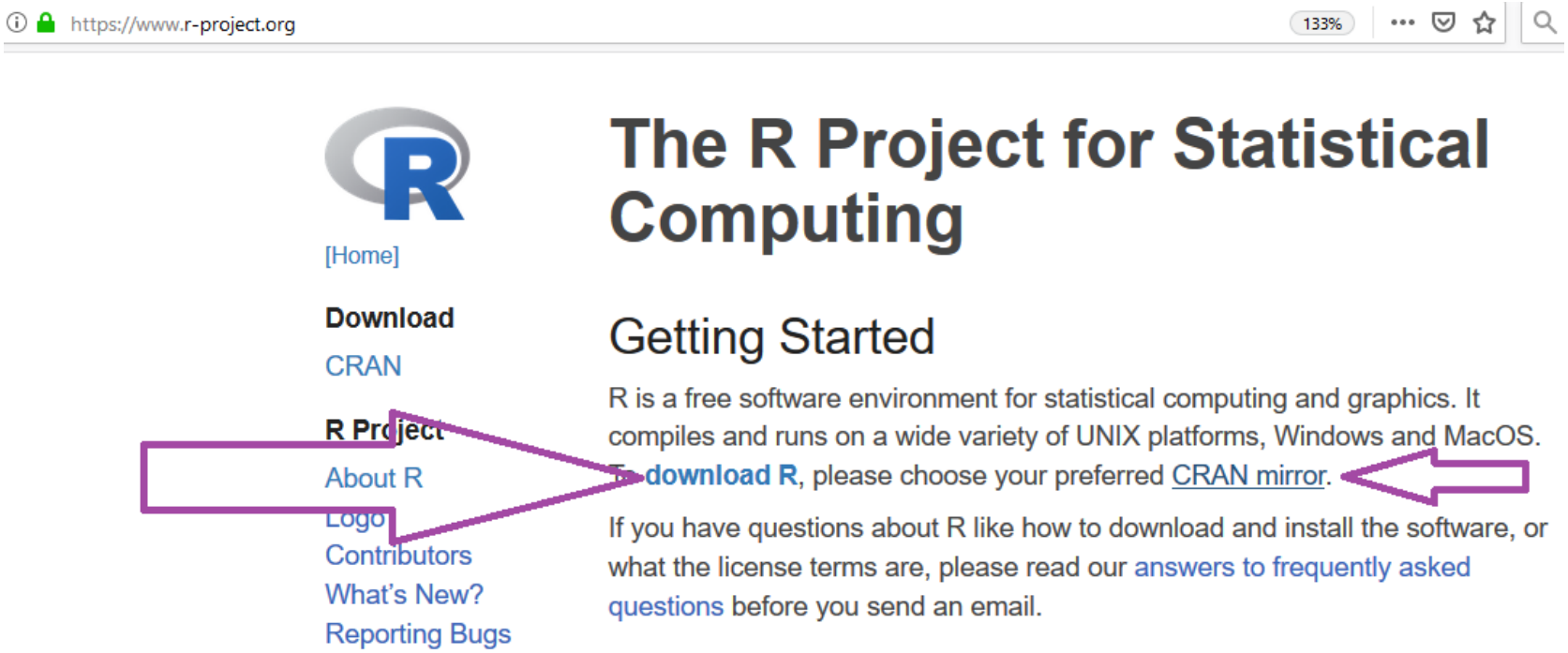
Switching to R

R is available for Windows, Unix, Linux and Macintosh platforms.

Graphics can be directly saved in a Postscript or PDF format.

Installing R

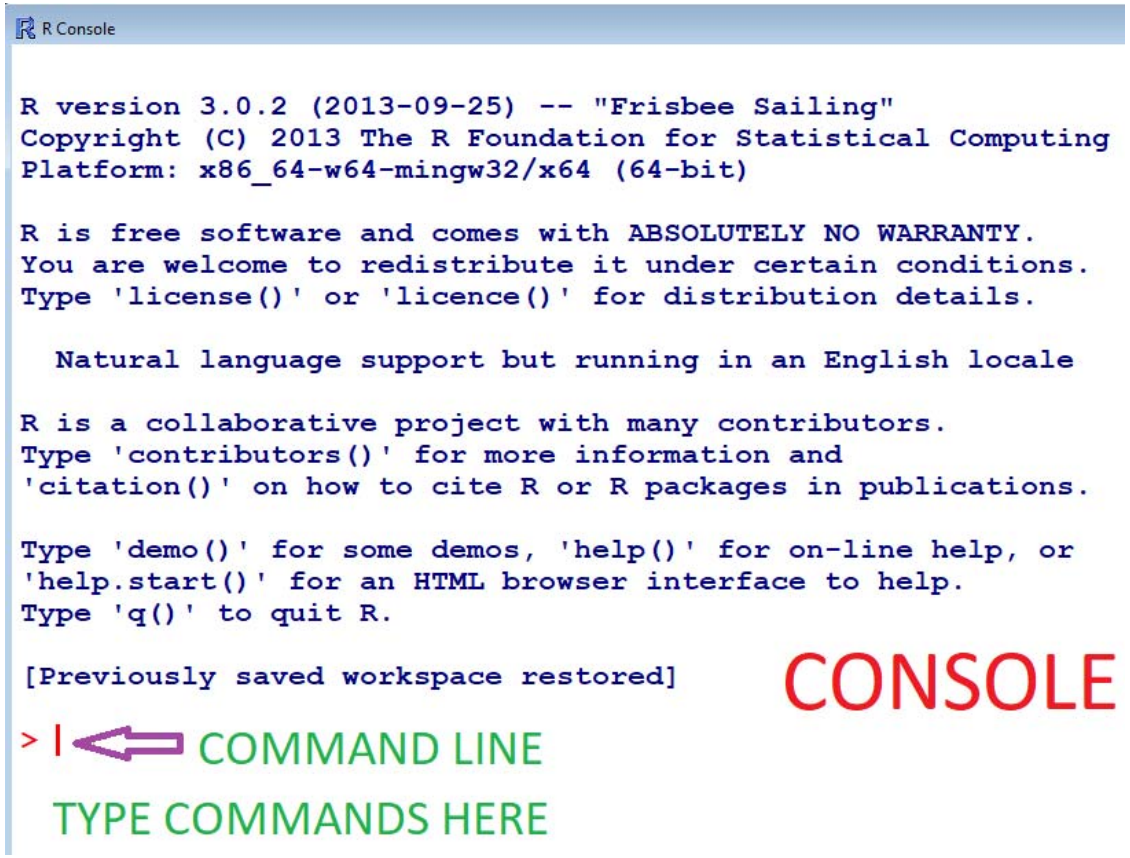
You may install R in a windows or Mac platform by downloading from the Comprehensive R Archive Network (CRAN) website: www.r-project.org or directly from http://cran.r-project.org/



Installing R

icon will appear.

Double click on this icon will start the software.



Working with R

Use command line to type and execute the commands.

Some free software like R Studio, Tinn R etc. are also available to work with R software. It is an interface between R and us.

Such software are more useful for beginners.

It makes coding and execution of programmes easier.

R Studio is available at https://www.rstudio.com/

Tinn R is available at https://sourceforge.net/projects/tinn-r/

Installing Packages and Libraries

The base R package contains some necessary libraries only.

Other libraries are required for advanced statistical work which are downloaded and installed.

Run the R program, then use the `install.packages` function to download the libraries.

Examples :

`install.packages("ggplot2")` : installs package `ggplot2`

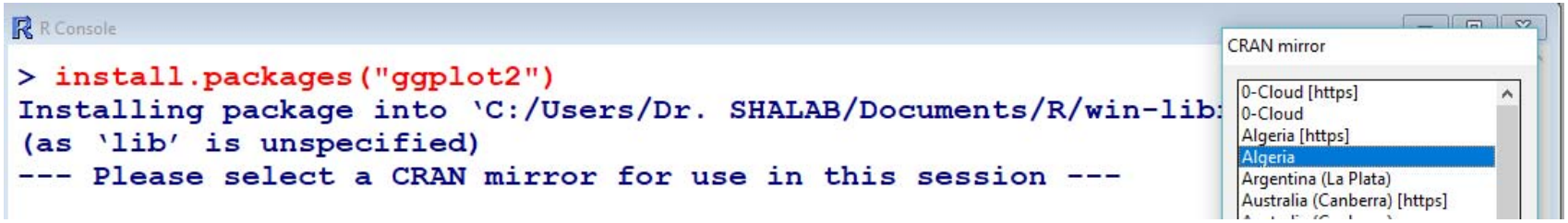
`install.packages("graphics")`: installs package `graphics`

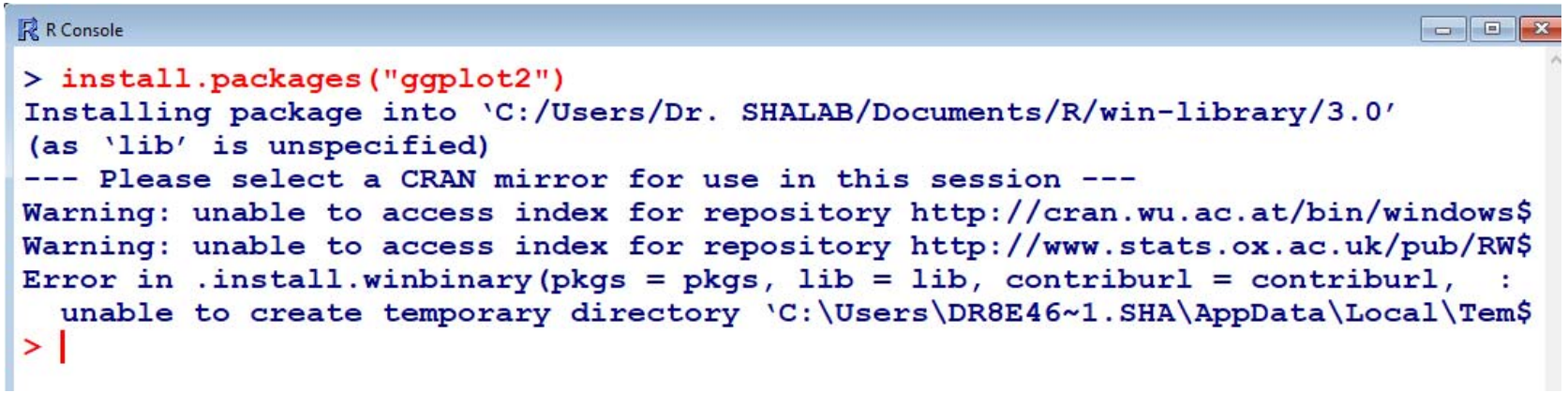
`install.packages("cluster")` : installs package `cluster`

Installing Packages and Libraries

Example

```
install.packages("ggplot2")
```





Libraries in R

To use a library, type the `library` function with the name of the library in brackets.

Thus to load the `cluster` library type:

```
library(cluster)
```

Similarly,

`library(ggplot2)` : loads package `ggplot2`

`library(graphics)`: loads package `graphics`

Libraries in R

Examples of libraries that come as a part of base package in R.

`MASS` : package associated with Venables and Ripley's book entitled *Modern Applied Statistics using S-Plus.*

`library(MASS)` : loads package `MASS`

`mgcv` : generalized additive models.

`library(mgcv)` : loads package `mgcv`

Contents of Libraries

Use `help` function to get the detailed contents of library packages.

Here is how we find out about the contents of the `cluster` library:
`library(help=cluster)` returns the following:

```
      Information on package 'cluster'
Description:

Package:              cluster
Version:              1.14.4
Date:                 2013-03-26
Priority:             recommended
Author:               Martin Maechler, based on S
                      original by Peter … …

… … …
```

followed by a list of all the functions and data sets.

Contents of Libraries

R Console

```
> library(help=cluster)
> |
```

Documentation for package 'cluster'

```
                Information on package 'cluster'

Description:

Package:              cluster
Version:              1.14.4
Date:                 2013-03-26
Priority:             recommended
Author:               Martin Maechler, based on S original by Peter
                      Rousseeuw <rousse@uia.ua.ac.be>,
                      Anja.Struyf@uia.ua.ac.be and
                      Mia.Hubert@uia.ua.ac.be, and initial R port by
                      Kurt.Hornik@R-project.org
Maintainer:           Martin Maechler <maechler@stat.math.ethz.ch>
```

Cleaning up the Windows

We assign names to variables when analyzing any data.

It is good practice to remove the variable names given to any data frame at the end each session in R.

`rm()` **command removes variable names**

For example,

`rm(x,y,z)` **removes the variables** `x`**,** `y` **and** `z`**.**

How to quit in R

Type `q()` to quit R.