R Introduction

Overview

R is a programming language and software environment for statistical analysis, graphics representation and reporting

Evolution of R

- Creator : Ross Ihaka and Robert Gentleman
- Created at : Dept of Statistics, University of Auckland, New Zealand
- Year : 1993
- Current team : Since mid-1997 there has been a core group (the “R Core Team”) who can modify the R source code archive
- License : free under GNU General Public License
- R is free software distributed under a GNU-style copy left, and an official part of the GNU project called GNU S.
- Old Name of R : S programming
- S programming language : S is a statistical programming language developed primarily by John Chambers and Rick Becker and Allan Wilks of Bell Laboratories.
- S built year : 1976
- S now implemented as R
- Read more on

https://en.wikipedia.org/wiki/R_(programming_language) (https://en.wikipedia.org/wiki/R_(programming_language))

https://en.wikipedia.org/wiki/S_(programming_language) (https://en.wikipedia.org/wiki/S_(programming_language))

https://www.r-project.org/about.html (https://www.r-project.org/about.html)

Major Features

- core R is interpreted language
- allows use of functions , branching , looping, and input and output facilities.
- allows integration with the procedures written in the C, C++, .Net, Python or FORTRAN languages for efficiency.
- has an effective data handling and storage facility,

- provides a suite of operators for direct calculations on arrays, lists, vectors and matrices (a.k.a. vectorised operations).
- provides a large, coherent and integrated collection of tools for data analysis
- provides graphical facilities for data analysis and display either directly at the computer or printing at the papers.

Why R ? or Why to choose R programming ?

Strengths of R programming

- R has large number of packages for statistical analysis and data science
- R can be used for complex statistical modelling
- R Facilitates interaction with databases
- For statistical minded person, R is Simple and easy to understand

Limitations of R

- limited community support
- R can’t be used to create a complete end to end software

Major Libraries (Packages) in R

- R base
- tidy verse
- GGPlot2
- tidyr
- dplyr
- knitr
- caret

Installation of R

Windows Installation

- Install R base

You can download the latest Windows installer version of R from https://cran.r-project.org/bin/windows/base/ (https://cran.r-project.org/bin/windows/base/)

As it is a Windows installer (.exe) with a name “R-version-win.exe”. You can just double click and run the installer accepting the default settings. If your Windows is 32-bit version, it installs the 32-bit version. But if your windows is 64-bit, then it installs both the 32-bit and 64-bit versions. After installation you can run it After running you will get R console with basic GUI

- Install R studio

** NOTE: Install R Studio ONLY AFTER R base is installed and running

You can download R studio Desktop version from https://posit.co/products/open-source/rstudio/ (https://posit.co/products/open-source/rstudio/) and Install it.

This is a GUI tool for writing R scripts (.R) and R markmown (.Rmd) files.

R Command Prompt

Open R base (using shortcut on desktop)

It will give you command prompt to perform R operations

You can write R commands and execute them here

For example:

```
m = “Hello in R programing!”
print(m)
```

[1] “Hello in R programing!”

R Script File (.R)

Script file is collection of commands in R to run them together.

Script helps to save all the work at one place as .R file.

Comments in R Script

Single comment is written using # in the beginning of the statement

Example : # This is first comment

they are ignored by the interpreter while executing your actual script

R markdown File (.Rmd) or R notebook

This is latest type of file supported by R

R Markdown files are also known as notebook in R

It allows writing notes, explaintions along with the codes.

Markdown files have option to insert code snipets.

Output of code snipets is visible within the markdown file

Markdown file can be directly converted to HTML or PDF files

For example these notes are generated using markdown files ! :)

R Gui

When you open R base (using shortcut on desktop), R gui is launched

It gives you facility - to run the commands one by one - to run complete R script - to run part of R script - to save script - to print the script - to load/open “workspace” (workspace is any directory in your system)

R Studio

Specialised GUI to work with R scripts and Markdown files

Gives 4 panes : Source pane, Environment Pane, Console Pane and Files Pane

Read more at : https://rladiessydney.org/courses/ryouwithme/01-basicbasics-1/ (https://rladiessydney.org/courses/ryouwithme/01-basicbasics-1/)

Errors, Warnings and Messages

R reports errors, warnings, and messages in unique way.

R reports ALL a glaring red font, which makes it seem like it is scolding you.

However, seeing red text in the console is not always bad.

- Errors: Errors start with message “Error in …” When error comes script will stop running and will not complete the operation
- Warnings: Wornings start with message “Worning:” In this case script will continue running and complete the operation
- Messages: When red text is not having Error / Worning , then it is message from R There is no problem this is just a message