Introduction

2020

Course Info

Components

- Lectures
- Exercises
- Lab Exercises

Lab Exercises Program

- Monday
  - 18-20 /Online/
  - 20-22 /Online/
- Saturday
  - 9-11 /FMI 306/
  - 11-13 /FMI 306/
  - 13-15 /FMI 306/

How to pass

You have to successfully pass all the 3 components !

For the Lab exercises you will have:

- **Test** in week 8
- **Exam** in the session

Syllabus

5.Oct	**Introduction to R**
12.Oct	**Univariate data**
19.Oct	**Bivariate data**
26.Oct	**Multivariate data**
2.Nov	**Discrete random data**
9.Nov	**Continuous random data**
16.Nov	**Law of large numbers (LLM) and central limit theorem (CLT)**
23.Nov	
30.Nov	**Confidence interval estimation**
7.Dec	**Hypothesis testing**
14.Dec	**Two-sample tests**
21.Dec	**Chi square tests**
04.Jan	**Regression analysis**
11.Jan	**Multiple linear regression**
18.Jan	**Analysis of variance**

Materials

- **Book: Verzani,** John Simple R
- **Course Web Site:** moodle
- **Software:** R
- **IDE:** R Studio

Why we learn statistics with R?

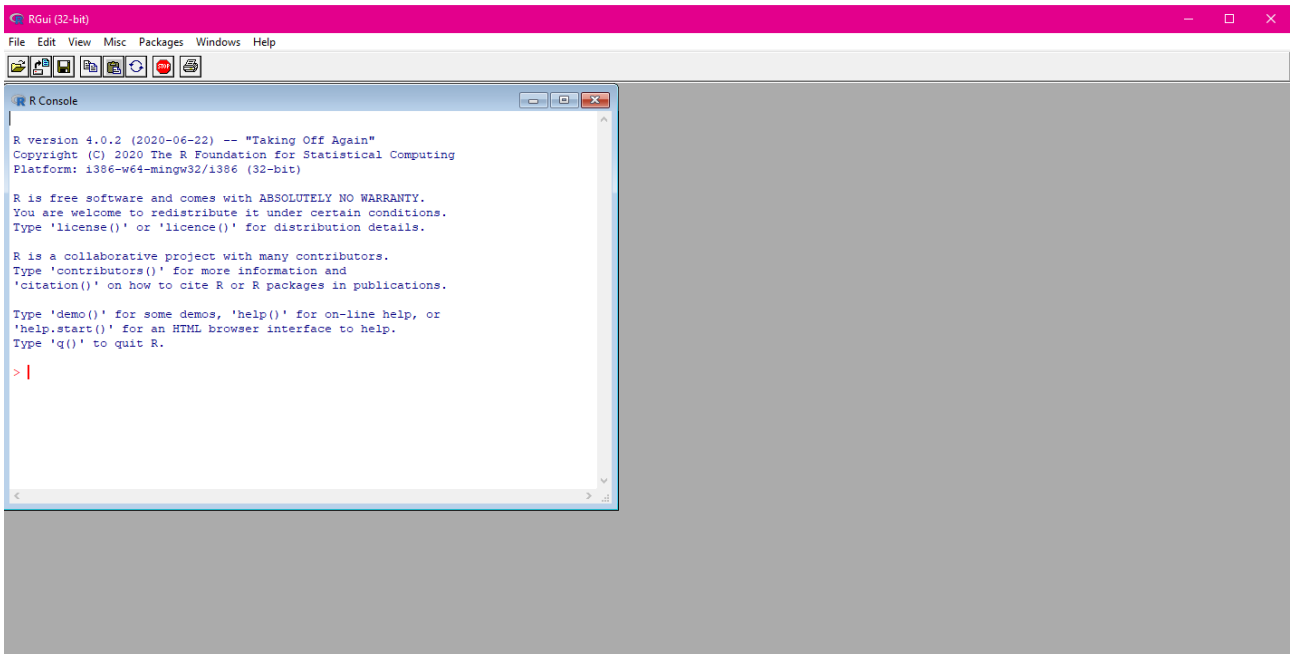
R:
- is free and open-source programming language
- runs on UNIX, Windows and Macintosh
- is widely used in academia
- is interactive /results can be seen one command at a time/
- has an excellent built-in help system
- is powerful and easy to learn
- has many built in statistical functions

Why is it called R?

- Created in Aug 1993 by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand
- There was a language called S created by John Chambers in 1976, at Bell Labs
- So the name R came from the first letters of the names of the creators of the language and as a play with the name of S

R Console

You can download and install R from here.
If you have any problem with the installation you can refer to: for the Windows users, for the Ubuntu users, for the Mac users.
After the installation you must see something similar to this:

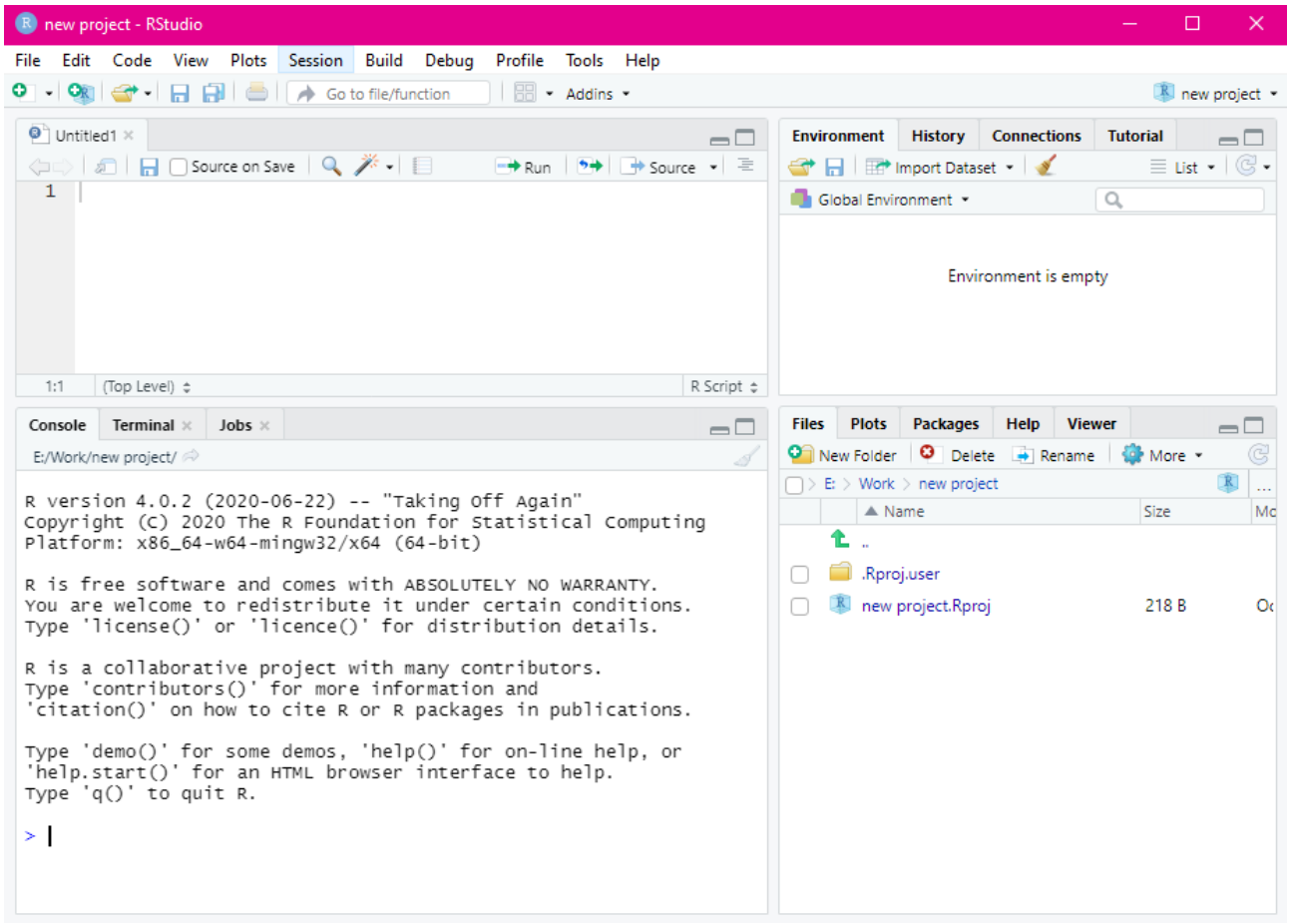


Commands are written after the prompt “>”.
Shortcuts:

- Enter – run a command
- Up Arrow – give the previous written command
- Esc – interrupt a command

R Studio

After installing R, you can install the free version of R Studio IDE from here.
If you have any problems with the installation you can refer to : for the Windows users, for the Ubuntu users, for the Mac users.
After the installation you must see something similar to this:



R Studio is customizable, but in the begging the interface is separated in 4 panels in which we have:

- Upper Left panel
  - **Text editor** – here you write your code
- Lower Left panel
  - **Console** – the commands are executed here and the output is printed
- Upper Right panel
  - **Environment** – contains interactive list of loaded R objects
  - **History** – containing the executed commands
- Lower Right panel
  - **Files** – shows the files in your working directory
  - **Plots** – output location for plots
  - **Packages** – list of installed packages

    - **Help** – output location for help commands and help search window

Shortcuts

- Ctrl + Enter – Run current line
- Ctrl + Shift + S – Run an entire file of code
- Ctrl + Z – Undo
- Ctrl + Shift + Z – Redo
- Ctrl + D – Delete Line
- Ctrl + 1 – Moves the cursor to the text editor area
- Ctrl + 2 – Moves the cursor to the console area
- Alt + Shift + K – Shows keyboard shortcut reference

Sources

[1] Monika Petkova's notes on R programming language @ FMI, Sofia University