MA2107:Programming Workshop

Department of Mathematics

Mahindra™ University
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ÉCOLE CENTRALE
SCHOOL OF ENGINEERING

About R

- R is an interpreted computer language. It is not a compiler.
- R provides a good environment for data manipulation and visualization, statistical computation and data analysis.
- R is open source.

Syllabus

Basics of R: Numeric, logical and character variables; vector, sequence, matrix and array; list, factors, and data frames; basic plotting; read and write files. Programming: Functions, loops and conditions.

Probability: Probability space, random variables, probability distributions (cdf, pdf, quantile, random sample).

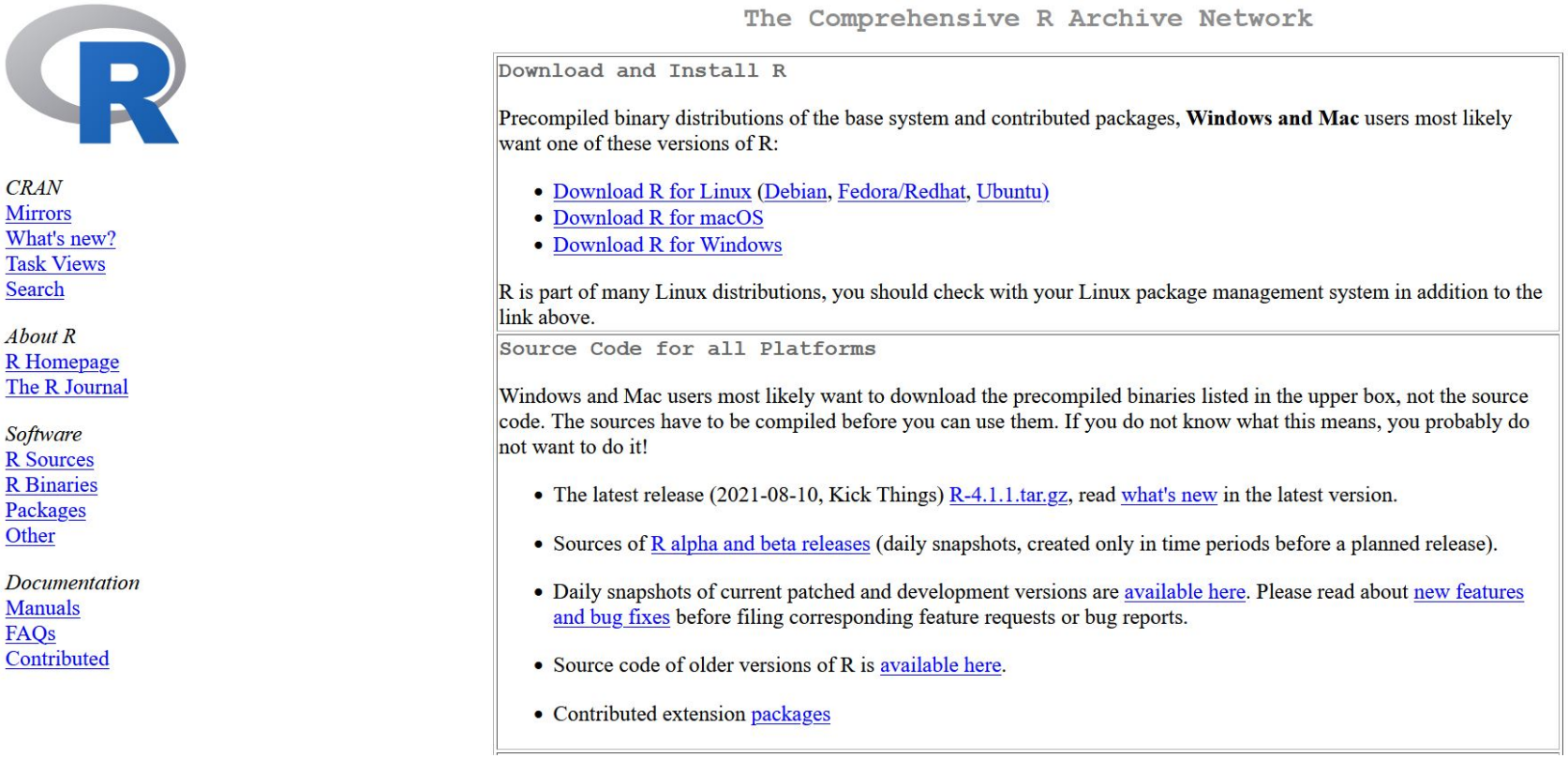
Statistics: Descriptive statistics, data visualization, sampling distribution, central limit theorem, MLE computations, confidence interval, testing of hypothesis.

Reference Books

1. Lander, J. P. (2017). R for Everyone: Advanced Analytics and Graphics. United States: Pearson Education.
2. Matloff, N. (2011). The Art of R Programming: A Tour of Statistical Software Design. Nigeria: No Starch Press.

How to install R?

- Go to: https://cran.r-project.org/



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Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- Download R for Linux (Debian, Fedora/Redhat, Ubuntu)
- Download R for macOS
- Download R for Windows

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

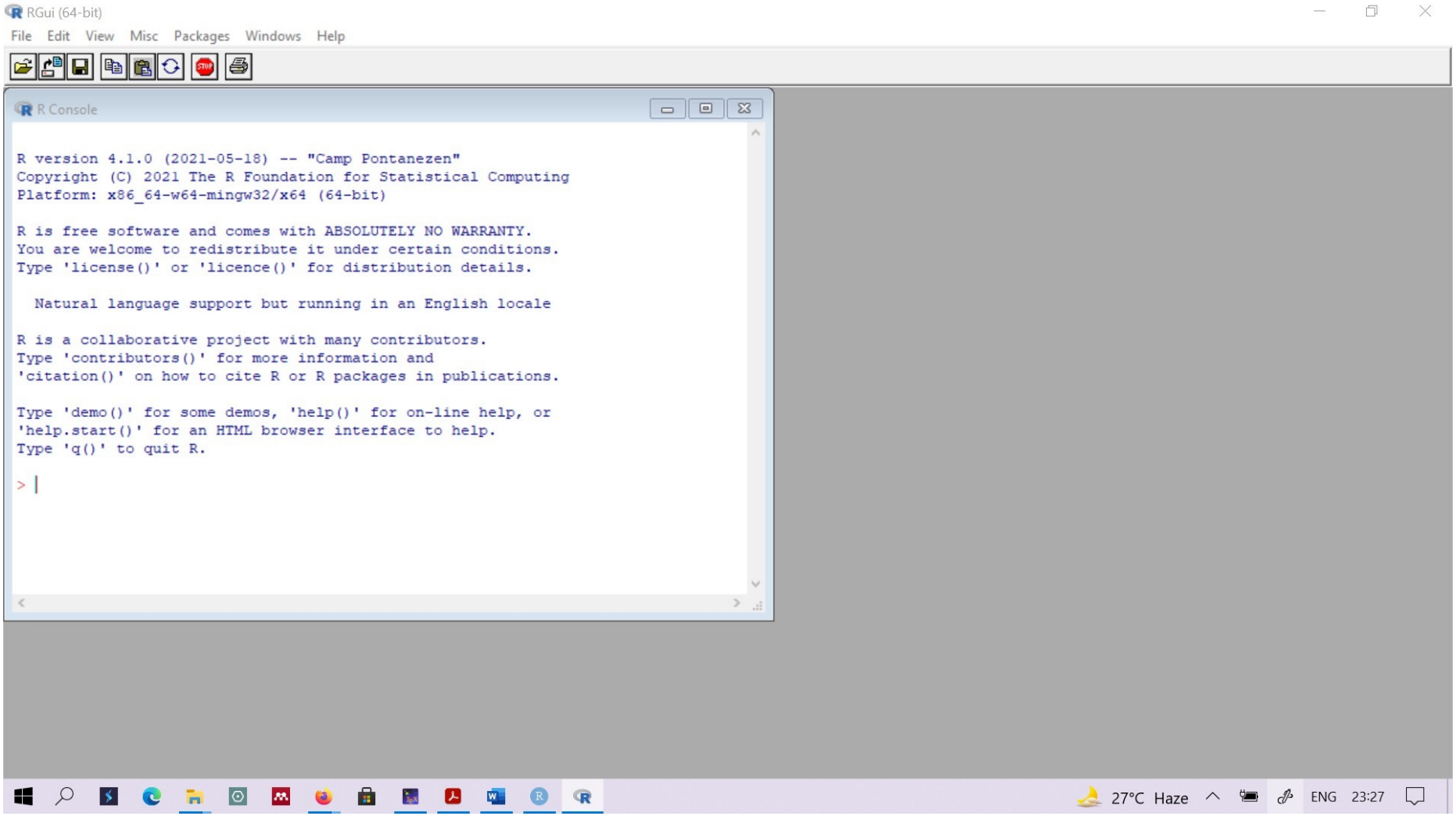
Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2021-08-10, Kick Things) R-4.1.1.tar.gz, read what's new in the latest version.
- Sources of R alpha and beta releases (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are available here. Please read about new features and bug fixes before filing corresponding feature requests or bug reports.
- Source code of older versions of R is available here.
- Contributed extension packages

- Download for your system and install.

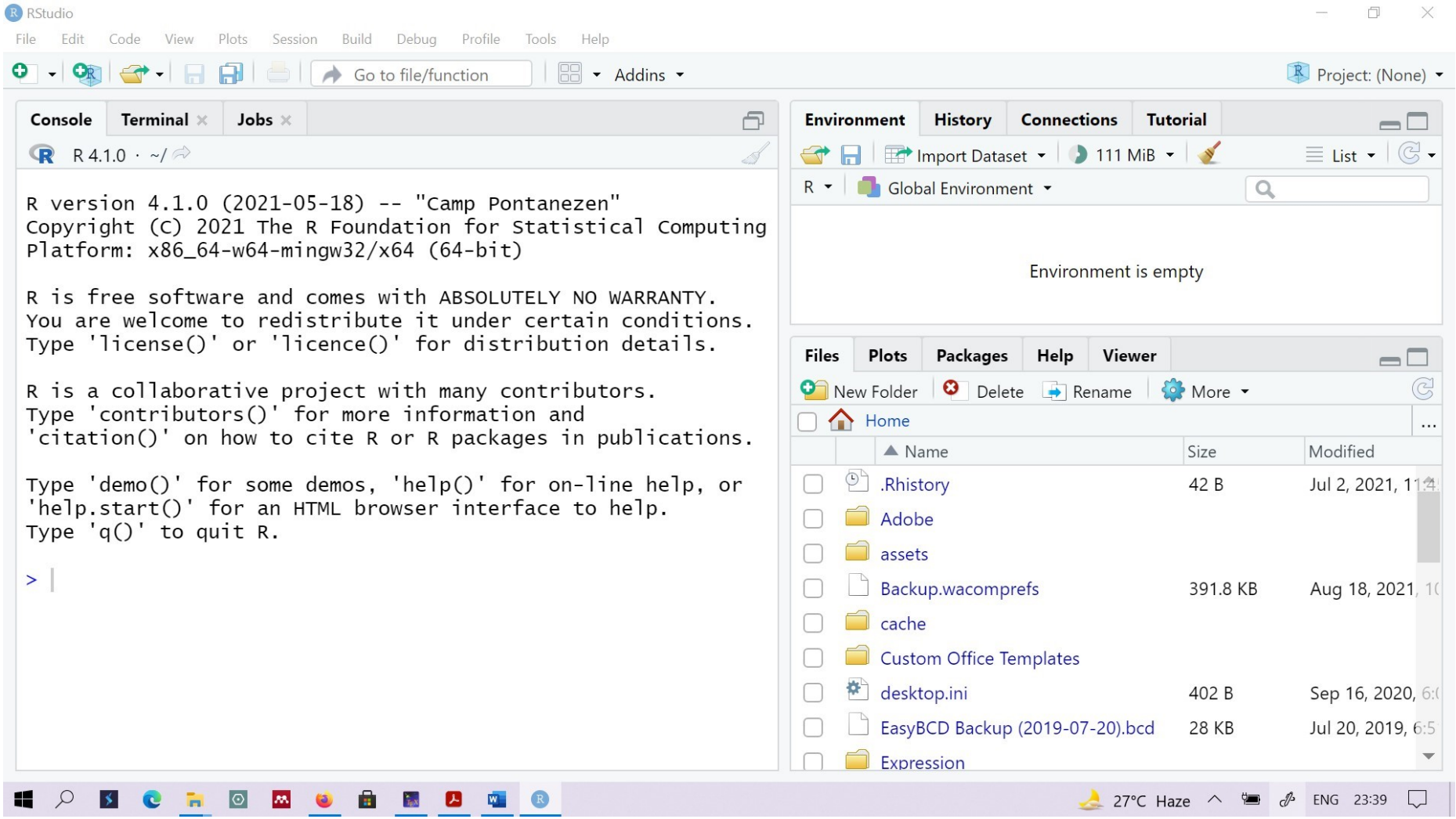
This is R


RGui (64-bit)
File Edit View Misc Packages Windows Help
R Console
R version 4.1.0 (2021-05-18) -- "Camp Pontanezen"
Copyright (C) 2021 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.
>
27°C Haze
ENG 23:27

RStudio

- RStudio is an integrated development environment (IDE) for R.
- It includes a console, syntax-highlighting editor that supports direct code execution.
- It also include tools for plotting, history, debugging and workspace management.
- Install the free version from here: https://www.rstudio.com/products/rstudio/download/

Screen of RStudio



Move to RStudio

- Now open RStudio and have fun!

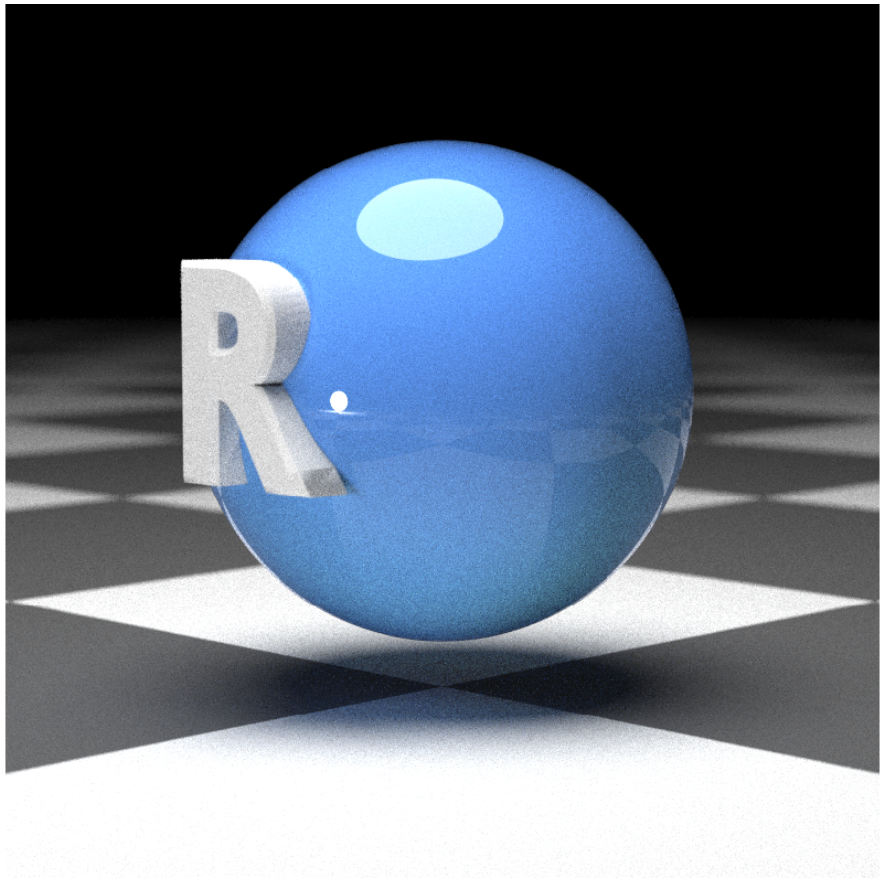


Figure: Image made using rayrender package written for R