

Programming Workshop

R Programming and GPU Computing

Department of Mathematics



- 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.

- Basic commands of R: Numeric, logical and character variables; vector, sequence, matrix and array; list and data frames; plotting; read and write files.
- Programming: Functions, loops and conditions, progress timing and debugging.
- Probability and Statistics: Descriptive statistics, data visualization, probability distributions, sampling distribution and confidence, MLE Computations.

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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The Comprehensive R Archive Network

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.

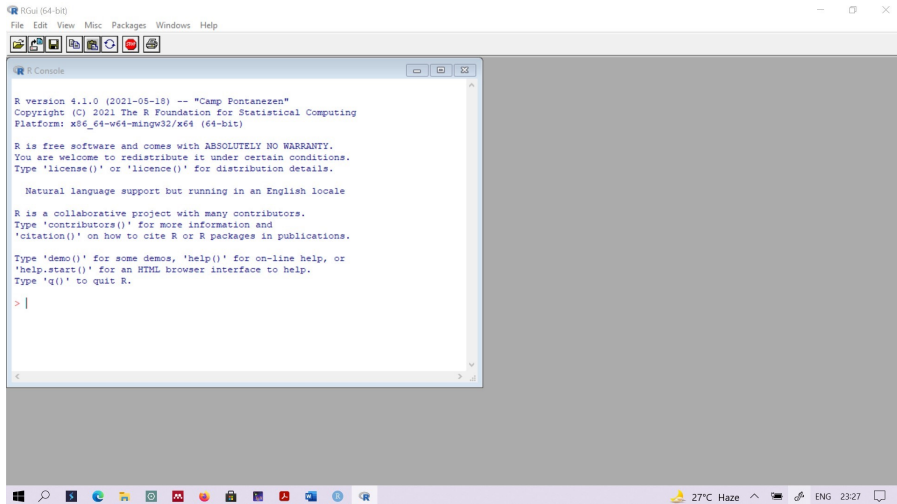
Source Code for all Platforms

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



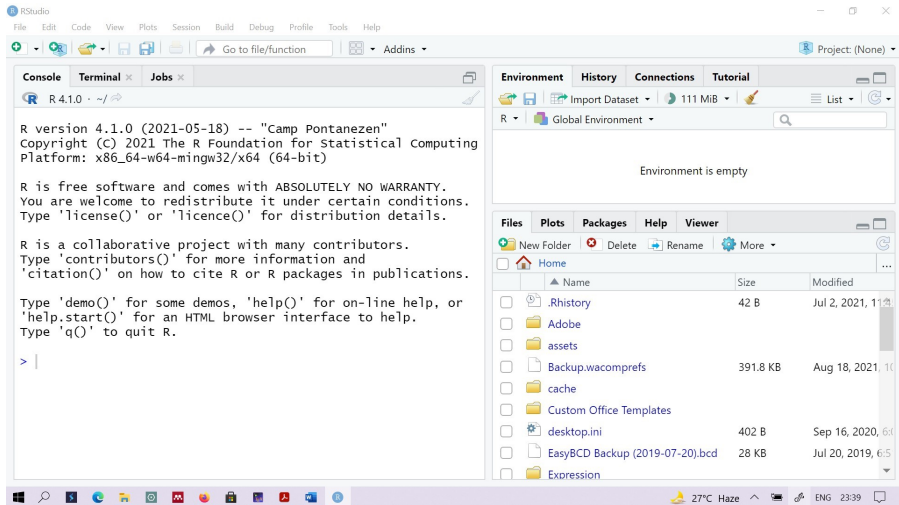
The screenshot shows the RGui (64-bit) application window. The title bar reads "RGui (64-bit)". The menu bar includes "File", "Edit", "View", "Misc", "Packages", "Windows", and "Help". Below the menu bar is a toolbar with icons for file operations and running code. The main window contains an "R Console" pane. The console displays the following text:

```
R version 4.1.0 (2021-05-18) -- "Camp Pontanzen"  
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.  
  
> |
```

The Windows taskbar is visible at the bottom, showing various application icons, the system clock (23:27), and the language (ENG).

- 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!