Installation Instructions: R and RStudio

Erasmus Q-Intelligence

Overview

This document walks you through preparing your laptop for the first lecture. We will use the statistical programming environment R, together with the independent development environment (IDE) RStudio, in this course. Both of these are available for free from their respective websites. You are expected to bring a laptop to class with a working installation of both R and RStudio.

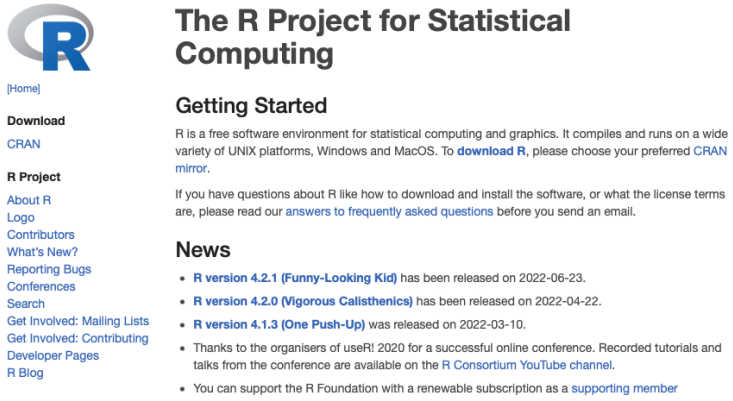
It is preferable to have the latest versions of these installed, but note that if you are already working with R, upgrading to the latest major version may require you to reinstall your packages (that is, when upgrading from R 3.6.3 to R 4.0.0, not when upgrading from R 4.0.2 to R 4.1.0). At the time of writing, the latest versions are R version 4.4.1 (2024-06-14) (nickname "Race for Your Life") and version 2024.04.2+764 of the RStudio Desktop IDE.

Below you will find instructions on installing R and RStudio. Please make sure you go through these steps before attending the first class.

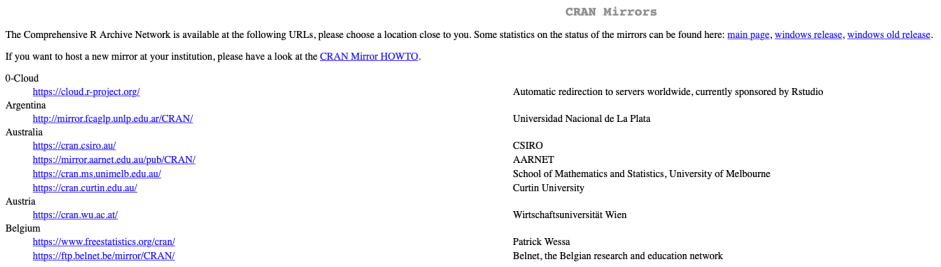
Note that the images below may not exactly match the latest versions of the web pages. Make sure you install the latest fully released R version 4.4.1 (2024-06-14) and RStudio (2024.04.2+764).

Installing R

R is distributed freely on the Comprehensive R Archive Network (CRAN), which is accessible through the R Project's homepage https://www.r-project.org/. Below is an excerpt of the R homepage.



To install R, we first have to select a CRAN mirror. These are identical copies (i.e., mirrors) of CRAN hosted in various places around the world. To select a mirror, click on the CRAN link. You will see something like the following:



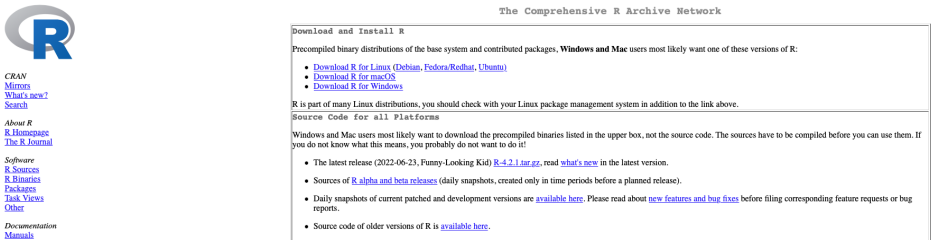
CRAN Mirrors

The Comprehensive R Archive Network is available at the following URLs, please choose a location close to you. Some statistics on the status of the mirrors can be found here: main page, windows release, windows old release.

If you want to host a new mirror at your institution, please have a look at the CRAN Mirror HOWTO.

0-Cloud	
https://cloud.r-project.org/	Automatic redirection to servers worldwide, currently sponsored by Rstudio
Argentina	
http://mirror.fcaglp.unlp.edu.ar/CRAN/	Universidad Nacional de La Plata
Australia	
https://cran.csiro.au/	CSIRO
https://mirror.aarnet.edu.au/pub/CRAN/	AARNET
https://cran.ms.unimelb.edu.au/	School of Mathematics and Statistics, University of Melbourne
https://cran.curtin.edu.au/	Curtin University
Austria	
https://cran.wu.ac.at/	Wirtschaftsuniversität Wien
Belgium	
https://www.freestatistics.org/cran/	Patrick Wessa
https://ftp.belnet.be/mirror/CRAN/	Belnet, the Belgian research and education network

Click on the top left link to be redirected to a cloud-based version of CRAN. You will land on a page looking as follows:



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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

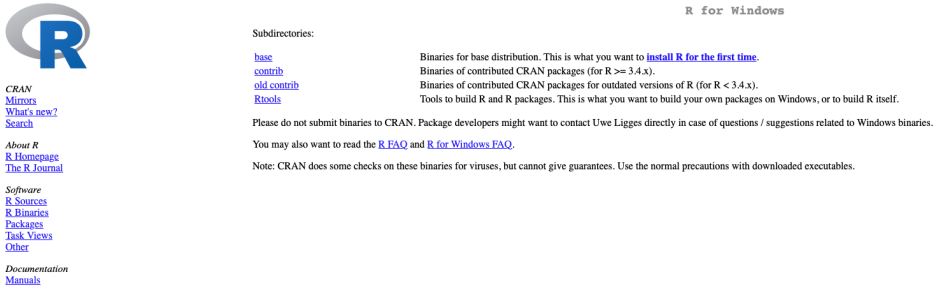
Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2022-06-23, Funny-Looking Kid) R-4.2.1.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.

Here, you should choose the download link for your respective platform (either Linux, Mac OS X or Windows). Separate instructions follow below.

Windows

After clicking on the 'Download R for Windows' link, you will see the page below.



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R for Windows

Subdirectories:

base	Binaries for base distribution. This is what you want to **install R for the first time**.
contrib	Binaries of contributed CRAN packages (for R >= 3.4.x).
old contrib	Binaries of contributed CRAN packages for outdated versions of R (for R < 3.4.x).
Rtools	Tools to build R and R packages. This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

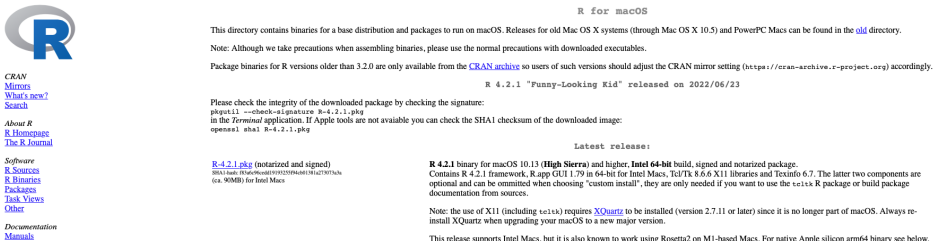
You may also want to read the R FAQ and R for Windows FAQ.

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.

Click on the 'base' link, download the Windows installer and install as you would normally install a Windows program (the installation defaults will suffice). Once you are successful, proceed to installing RStudio (see below).

Mac OS X

On Mac OS X, follow the link 'Download R for (Mac) OS X'. You will land on the page listed below. Download the R-4.2.1.pkg file of the latest version and install it by double-clicking on it and working through the prompts. For our purposes, it should not be necessary to install XQuartz, as mentioned on this page (and in the screenshot).



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R for macOS

This directory contains binaries for a base distribution and packages to run on macOS. Releases for old Mac OS X systems (through Mac OS X 10.5) and PowerPC Macs can be found in the old directory.

Note: Although we take precautions when assembling binaries, please use the normal precautions with downloaded executables.

Package binaries for R versions older than 3.2.0 are only available from the CRAN archive so users of such versions should adjust the CRAN mirror setting (`https://cran-archive.r-project.org`) accordingly.

R 4.2.1 "Funny-Looking Kid" released on 2022/06/23

Please check the integrity of the downloaded package by checking the signature:
`pkgutil --check-signature R-4.2.1.pkg`
in the *Terminal* application. If Apple tools are not avaiable you can check the SHA1 checksum of the downloaded image:
`openssl sha1 R-4.2.1.pkg`

Latest release:

R-4.2.1.pkg (notarized and signed)
f8fd13adc353a699ed4f19592f39ab6015f1a2750f3a3a
(ca. 90MB) for Intel Macs

R 4.2.1 binary for macOS 10.13 (**High Sierra**) and higher, **Intel 64-bit** build, signed and notarized package.
Contains R 4.2.1 framework, R.app GUI 1.79 in 64-bit for Intel Macs, Tcl/Tk 8.6.6 X11 libraries and Texinfo 6.7. The latter two components are optional and can be ommitted when choosing "custom install", they are only needed if you want to use the `tcltk` R package or build package documentation from sources.

Note: the use of X11 (including `tcltk`) requires XQuartz to be installed (version 2.7.11 or later) since it is no longer part of macOS. Always re-install XQuartz when upgrading your macOS to a new major version.

This release supports Intel Macs, but it is also known to work using Rosetta2 on M1-based Macs. For native Apple silicon arm64 binary see below.

Linux

If you are running Linux, click on the 'Download R for Linux' link. You should be able to proceed on your own from here (instructions are provided on the respective web pages). Below is a screenshot of the different flavours of Linux being supported (you can also compile R from source).

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Index of /bin/linux

Name	Last modified	Size
Parent Directory		-
debian/	2022-06-24 07:33	-
fedora/	2022-06-15 07:55	-
redhat/	2022-06-15 07:55	-
suse/	2012-02-16 14:09	-
ubuntu/	2022-05-24 02:25	-

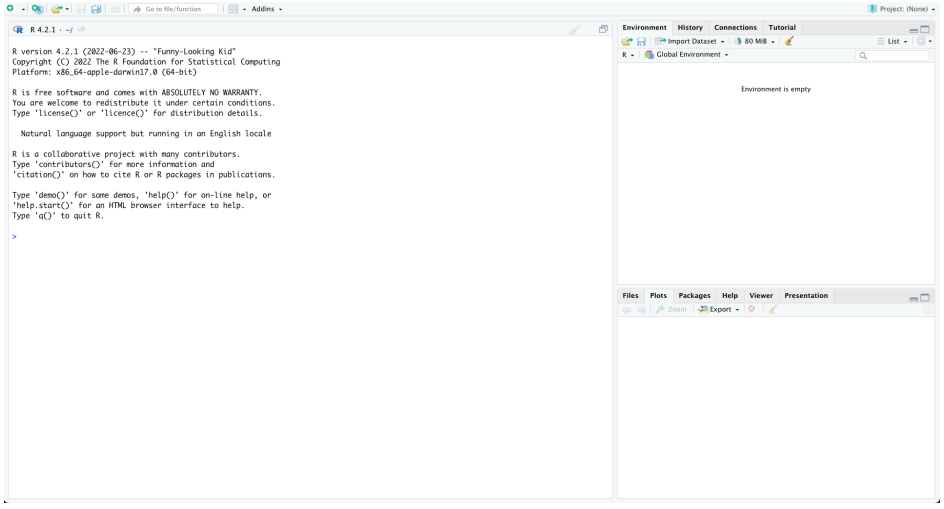
Apache/2.4.39 (Unix) Server at cloud.r-project.org Port 80

Installing RStudio Desktop

RStudio is an IDE that integrates with R to provide a more user-friendly interface and additional functionality. We will be using RStudio extensively in this course, as it makes navigating the R environment easier. Note that, on Windows and Mac OS, R also comes with a more spartan default R graphical user interface (GUI) – you can do everything and much more with RStudio.

To install RStudio Desktop on your laptop for free, visit https://posit.co/download/rstudio-desktop/ and download the correct version of the installer. Open this installer and follow the prompts to complete the installation.\

Once your installation has finished, you can open RStudio as you would any other application. Your view should look something like this (there will be small unimportant differences depending on your platform).



In the console pane, next to the '>' (shown here but not typed), type the following and press enter to see that everything works.

```
> cat("Hello, world!")
```

You just executed your first R command! See you in class.

References

R Core Team (2016). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

RStudio Team (2015). *RStudio: Integrated Development for R*. RStudio, Inc., Boston, MA URL http://www.rstudio.com/.