

Foundations of R Software

Lecture 1

Introduction

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Why R and Installation Procedure

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What is R?

R is an environment for data manipulation, statistical computing, graphics display and data analysis.

Effective data handling and storage of outputs is possible.

Simple as well as complicated calculations are possible.

What is R?

Graphical display on-screen and hardcopy are possible.

Programming language is effective which includes all possibilities just like any other good programming language.

The R language is very similar in appearance to "S" - language based on a software S-Plus.

The R Foundation

The R Foundation is a non-profit organization working in the public interest.

It has been founded by the members of the R Development Core Team in order to provide support for the R project and other innovations in statistical computing.

Hold and administer the copyright of R software and documentation.

The R Development

Professors Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand, began an alternative implementation of the basic S language, completely independent of S-PLUS in 1991.

It was named partly after the first names of the first two R authors and partly as a play on the name of S.



Ross Ihaka and Robert Gentleman

(Source: <https://snipcademy.com/r-introduction>)

The R Development

The first official release of R came in 1995.

The Comprehensive R Archive Network (CRAN) was officially announced 23 April 1997 with 3 mirrors and 12 contributed packages.

The first official "stable beta" version (v1.0) was released 29 February 2000.

As of November 2020, more than 16,000 packages are available.

Switching to R

Many people, research and design offices, analytical firms have started using R.

R is free.

Many statistical packages are freely available through the CRAN family of Internet sites covering a very wide range of modern statistics.

So you may also consider switching to R.

Switching to R

- R has a statistical computing environment.
- It is free (open source) software and therefore is not a black box.
- It has a computer language which is convenient to use for statistical and graphical applications.
- The commands can be saved, run and stored in script files.

Switching to R

- **R is available for Windows, Unix, Linux and Macintosh platforms.**
- **R was developed to compete with S-Plus.**
- **Built in and contributed packages are available, and users are provided tools to make packages. It is possible to contribute own packages.**

Switching to R

- This language provides the logical control of branching and looping, and modular programming using functions.
- Error messages are provided while executing a programme or a function which are helpful in finding the errors.

Switching to R

- R is an interpreted computer language (Not compiler).
- When we use the command line interface, each command or expression to be evaluated is typed at the command prompt, and immediately evaluated when the Enter key is pressed at the end of a syntactically complete statement.

Switching to R

- **Tips**

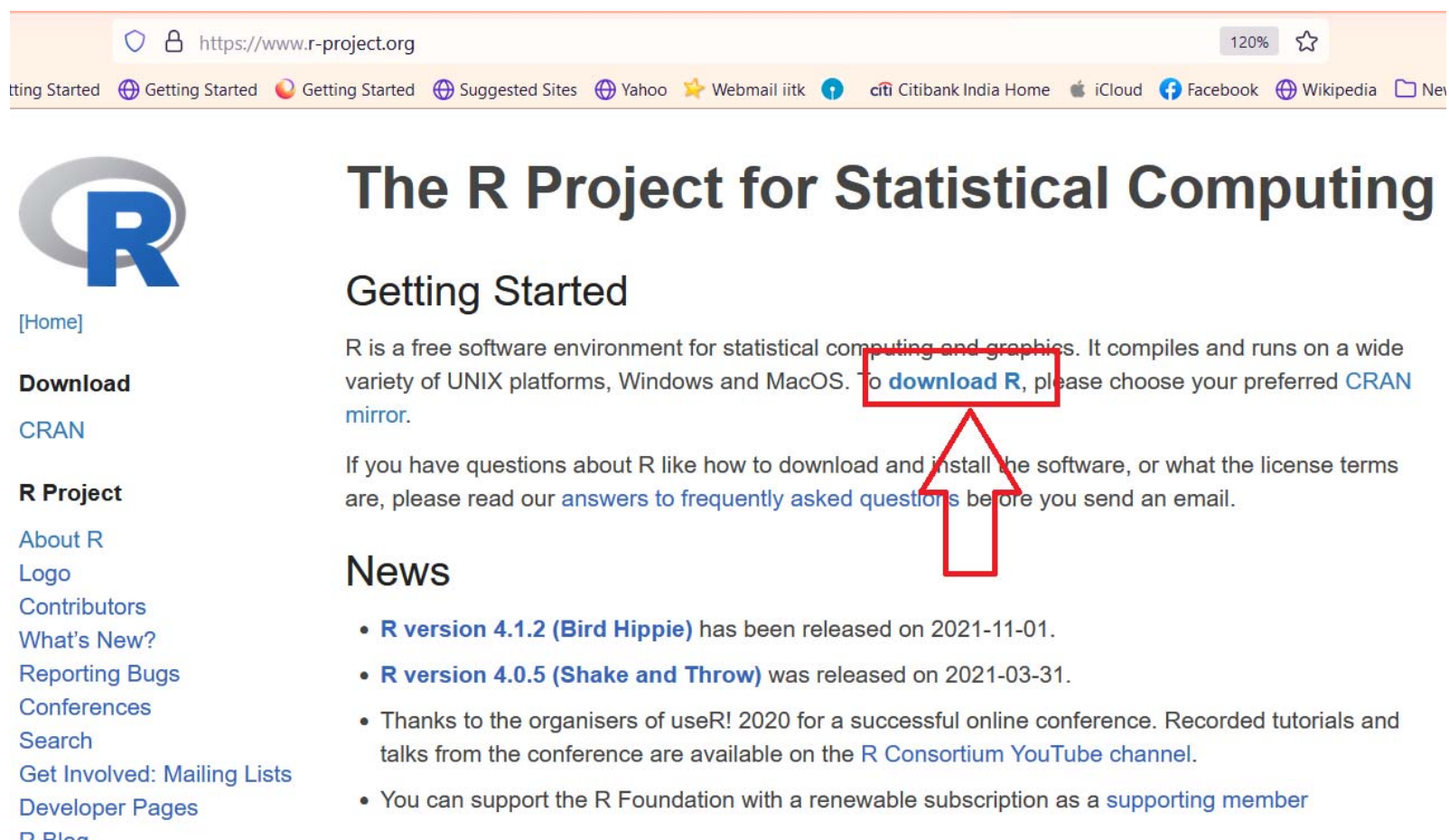
- ✓ **Press the up-arrow key to recall commands and edit them.**
- ✓ **Use the Esc (Escape) key to cancel a command.**

- **Graphics can be directly saved in a Postscript or PDF format.**

Installing R

You may install R in a windows or Apple computer by downloading from <https://www.r-project.org>

Click on [download R](#)



The screenshot shows the homepage of The R Project for Statistical Computing. The browser address bar displays 'https://www.r-project.org'. The page features the R logo on the left, a navigation menu with links like [Home], Download, CRAN, R Project, About R, Logo, Contributors, What's New?, Reporting Bugs, Conferences, Search, Get Involved: Mailing Lists, Developer Pages, and R Blog. The main heading is 'The R Project for Statistical Computing', followed by 'Getting Started'. The 'Getting Started' section contains text about R being a free software environment and a link to 'download R', which is highlighted by a red box and a red arrow. Below this is a 'News' section with a list of recent releases and events.

https://www.r-project.org

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The R Project for Statistical Computing

Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R**, please choose your preferred [CRAN mirror](#).

If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

News

- **R version 4.1.2 (Bird Hippie)** has been released on 2021-11-01.
- **R version 4.0.5 (Shake and Throw)** was released on 2021-03-31.
- Thanks to the organisers of useR! 2020 for a successful online conference. Recorded tutorials and talks from the conference are available on the [R Consortium YouTube channel](#).
- You can support the R Foundation with a renewable subscription as a [supporting member](#)

Installing R

Choose any mirror and click on the link

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:

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

Algeria

<https://cran.usthb.dz/>

University of Science and Technology Houari Boumediene

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.freeststatistics.org/cran/>

Patrick Wessa

<https://ftp.belnet.be/mirror/CRAN/>

Belnet, the Belgian research and education network

Brazil

<https://nbcgib.uesc.br/mirrors/cran/>

Computational Biology Center at Universidade Estadual de Santa Cruz

<https://cran-r.c3sl.ufpr.br/>

Universidade Federal do Parana

<https://cran.fiocruz.br/>

Oswaldo Cruz Foundation, Rio de Janeiro

<https://vps.fmvz.usp.br/CRAN/>

University of Sao Paulo, Sao Paulo

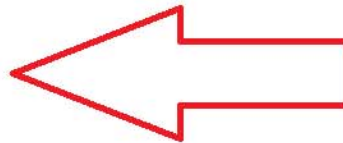
<https://brieger.esalq.usp.br/CRAN/>

University of Sao Paulo, Piracicaba

Bulgaria

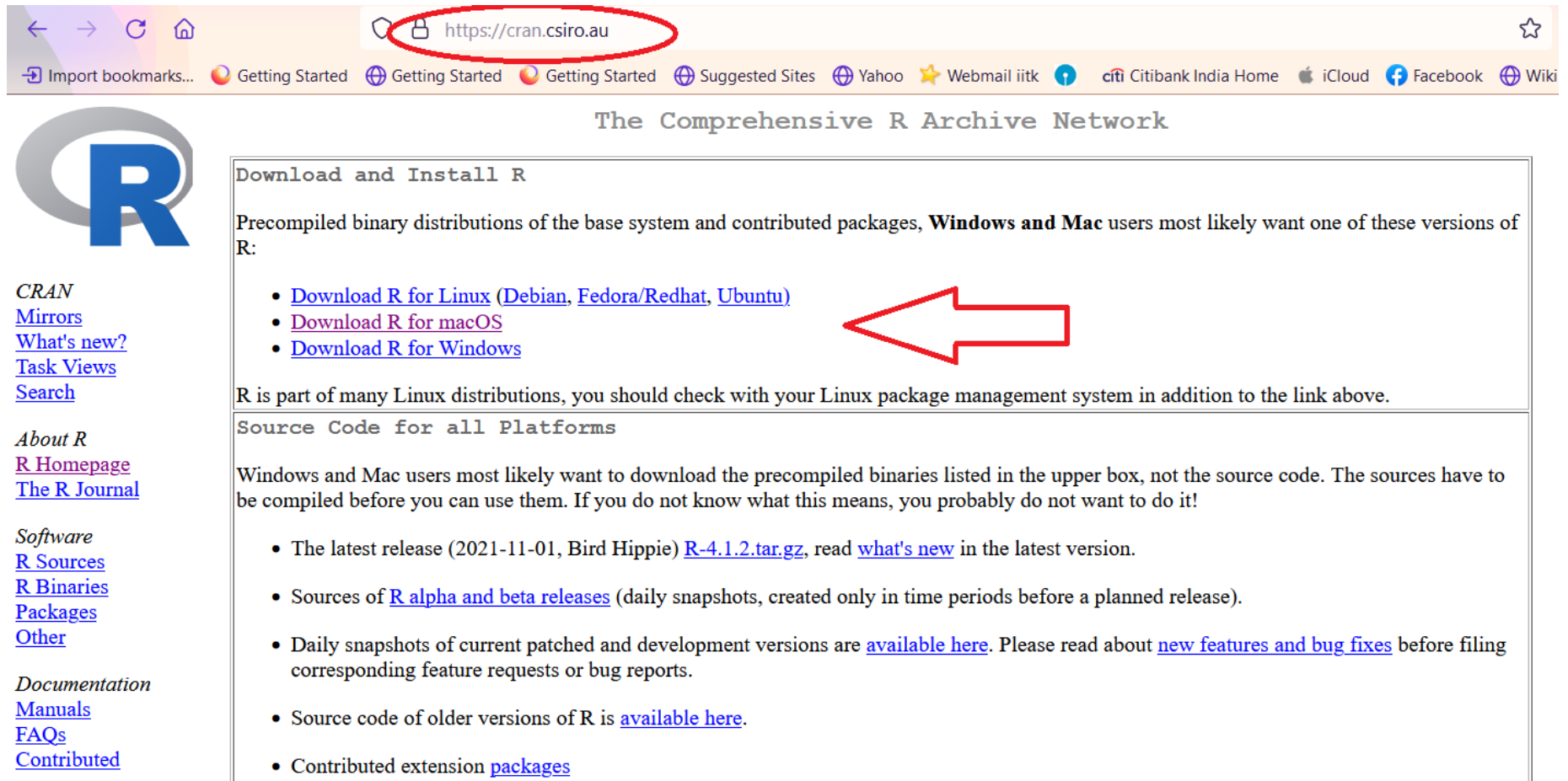
<https://ftp.uni-sofia.bg/CRAN/>

Sofia University



Installing R

Else, download it from the Comprehensive R Archive Network (CRAN) website: <http://cran.r-project.org/>



The screenshot shows the CRAN website with the URL <https://cran.csiro.au> in the browser's address bar. The page title is "The Comprehensive R Archive Network". The main content is titled "Download and Install R" and lists precompiled binary distributions for Windows and Mac users. A red arrow points to the "Download R for Linux" link. The page also includes a section for "Source Code for all Platforms" and a sidebar with links to CRAN Mirrors, What's new?, Task Views, Search, About R, R Homepage, The R Journal, Software, R Sources, R Binaries, Packages, Other, Documentation, Manuals, FAQs, and Contributed.

CRAN
[Mirrors](#)
[What's new?](#)
[Task Views](#)
[Search](#)

About R
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[The R Journal](#)

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[R Binaries](#)
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[FAQs](#)
[Contributed](#)

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 (2021-11-01, Bird Hippie) [R-4.1.2.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](#)