

Introduction to R and RStudio IDE

Wan Nor Arifin

Unit of Biostatistics and Research Methodology, Universiti Sains Malaysia.

email: wnarifin@usm.my



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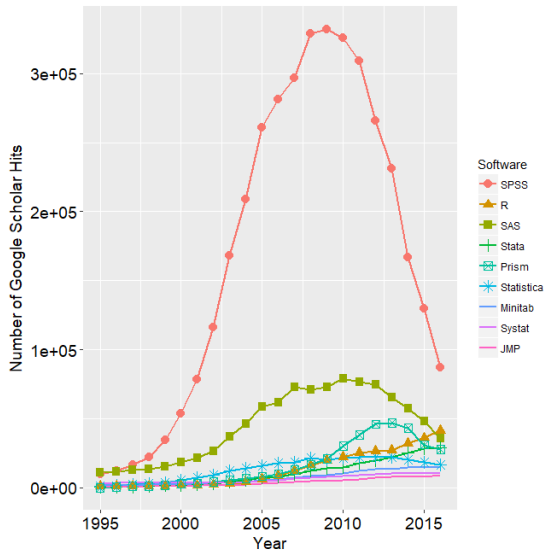
Why use R?

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.}

Source: <https://www.r-project.org/>

R outpaces other statistics software

Source: <http://r4stats.com/articles/popularity/>

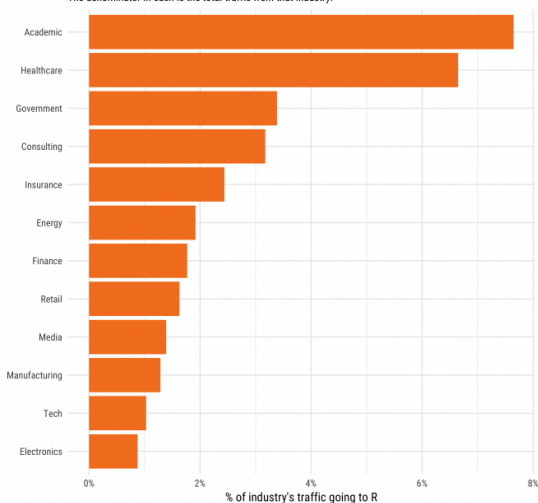


R is getting more popular among academician

Source: <https://stackoverflow.blog/2017/10/10/impressive-growth-r/>

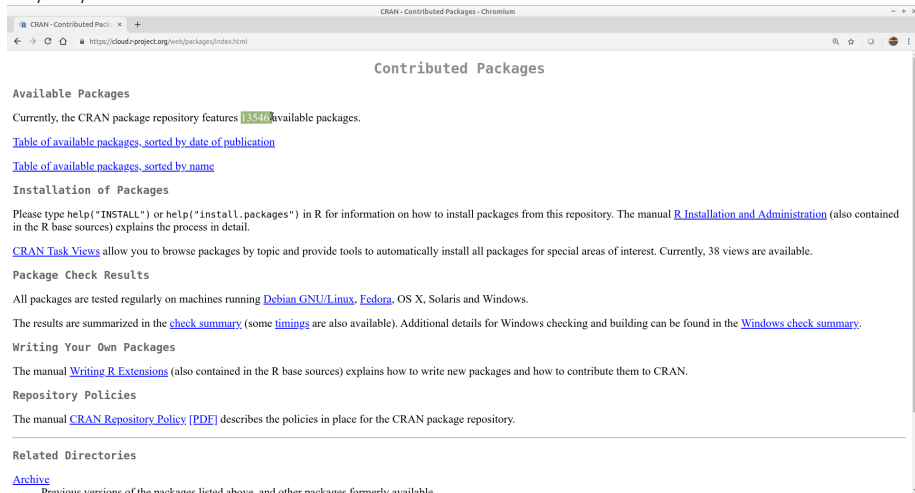
Visits to R by industry

Based on visits to Stack Overflow questions from the US/UK in January-August 2017.
The denominator in each is the total traffic from that industry.



Availability of R packages

Source: <https://cloud.r-project.org/web/packages/index.html>, as of 18/12/2018.

A screenshot of a web browser displaying the CRAN Contributed Packages page. The browser's address bar shows the URL 'https://cloud.r-project.org/web/packages/index.html'. The page title is 'Contributed Packages'. The main content area is titled 'Available Packages' and states that the CRAN package repository features 13546 available packages. It includes links to 'Table of available packages, sorted by date of publication' and 'Table of available packages, sorted by name'. Below this is the 'Installation of Packages' section, which explains how to install packages using 'install.packages()' and provides a link to the 'R Installation and Administration' manual. The 'CRAN Task Views' section mentions that 38 views are available for browsing packages by topic. The 'Package Check Results' section states that all packages are tested regularly on various operating systems and provides links to check summaries. The 'Writing Your Own Packages' section points to the 'Writing R Extensions' manual. The 'Repository Policies' section mentions the 'CRAN Repository Policy' PDF. Finally, the 'Related Directories' section includes a link to an 'Archive' of previous versions of packages.

CRAN - Contributed Packages - Chromium

Contributed Packages

Available Packages

Currently, the CRAN package repository features 13546 available packages.

[Table of available packages, sorted by date of publication](#)

[Table of available packages, sorted by name](#)

Installation of Packages

Please type `help("INSTALL")` or `help("install.packages")` in R for information on how to install packages from this repository. The manual [R Installation and Administration](#) (also contained in the R base sources) explains the process in detail.

[CRAN Task Views](#) allow you to browse packages by topic and provide tools to automatically install all packages for special areas of interest. Currently, 38 views are available.

Package Check Results

All packages are tested regularly on machines running [Debian GNU/Linux](#), [Fedora](#), OS X, Solaris and Windows.

The results are summarized in the [check summary](#) (some [timings](#) are also available). Additional details for Windows checking and building can be found in the [Windows check summary](#).

Writing Your Own Packages

The manual [Writing R Extensions](#) (also contained in the R base sources) explains how to write new packages and how to contribute them to CRAN.

Repository Policies

The manual [CRAN Repository Policy \[PDF\]](#) describes the policies in place for the CRAN package repository.

Related Directories

[Archive](#)
Previous versions of the packages listed above, and other packages formerly available

R and RStudio

R Installation

R @ <https://cran.r-project.org/>

The screenshot shows the R Project for Statistical Computing website in a Chrome browser. The browser's address bar displays <https://www.r-project.org>. The website's header features the R logo and the title "The R Project for Statistical Computing". Below the header, there is a "Getting Started" section with a brief introduction to R and links to download R from the CRAN mirror. A "News" section lists recent updates, including the release of R version 3.5.2 (Eggshell Igloo) and the R Foundation's 2018 award. A "News via Twitter" section displays tweets from the R Foundation and the useR! 2019 conference. The left sidebar contains a navigation menu with links to various sections of the website, including About R, Contributors, and Documentation.

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 3.5.2 (Eggshell Igloo) prerelease versions** will appear starting Monday 2018-12-10. Final release is scheduled for Thursday 2018-12-20.
- The R Foundation Conference Committee has released a [call for proposals](#) to host useR! 2020 in North America.
- You can now support the R Foundation with a renewable subscription as a [supporting member](#)
- **R version 3.5.1 (Feather Spray)** has been released on 2018-07-02.
- The R Foundation has been awarded the Personality/Organization of the year 2018 award by the professional association of German market and social researchers.

News via Twitter

The R Foundation
@_R_Foundation
We welcome @gdequeiroz, @edzerpebema and @henrikbengtsson, elected as ordinary members of the R Foundation in recognition of their services to the R community.
Oct 27, 2018

useR! 2019
@UseR2019_Conf
17-12-18 ;
01-19 ;
15-02-19 ;
All the important dates are on our website! user2019.r-project.org/dates/

Left Sidebar Navigation:

- Download**
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- Documentation**
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RStudio Installation

RStudio @ <http://www.rstudio.com/>

Download RStudio - RStudio x +

Download RStudio - RStudio - Chromium

← → ↻ 🏠 <https://www.rstudio.com/products/rstudio/download/#download> ☆ 🌐 🍪 ⓘ

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RStudio Desktop 1.1.463 — [Release Notes](#)

RStudio requires R 3.0.1+. If you don't already have R, download it [here](#).

Linux users may need to import RStudio's public code-signing key prior to installation, depending on the operating system's security policy.

Installers for Supported Platforms

Installers	Size	Date	MD5
RStudio 1.1.463 - Windows Vista/7/8/10	85.8 MB	2018-10-29	58b3d796d8cf96fb8580c62f46ab64d4
RStudio 1.1.463 - Mac OS X 10.6+ (64-bit)	74.5 MB	2018-10-29	a79832ba4d7daaa86a8da01948278d94
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	89.3 MB	2018-10-29	8a6755fa9fae2bafce289df3358aaf63
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	97.4 MB	2018-10-29	bc58d6bd34926c1cc3ae4a289d67d649
RStudio 1.1.463 - Ubuntu 16.04+/Debian 9+ (64-bit)	65 MB	2018-10-29	cf6d59db18619cc78d1592fefa7c753
RStudio 1.1.463 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	88.1 MB	2018-10-29	742f8bad60df8a3281576e14ad6699e
RStudio 1.1.463 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	90.6 MB	2018-10-29	c7383067a0ca99deea7e427b856952d1

Zip/Tarballs

Zip/tar archives	Size	Date	MD5
RStudio 1.1.463 - Windows Vista/7/8/10	122.9 MB	2018-10-29	1eb1d7758bd4bf44bb68d4a7c3fe8d894
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	90 MB	2018-10-29	ef9242b621d36c30de9d86b888840b41
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	98.3 MB	2018-10-29	5944b3dd118cfba46f2a6c484d768324
RStudio 1.1.463 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	88.8 MB	2018-10-29	6b0ee446eeb4cc8e32967845e17ffe2b
RStudio 1.1.463 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	91.4 MB	2018-10-29	3f63725769b79b76fedb754eb2a19108

Source Code

A tarball containing source code for RStudio v1.1.463 can be downloaded from [here](#)

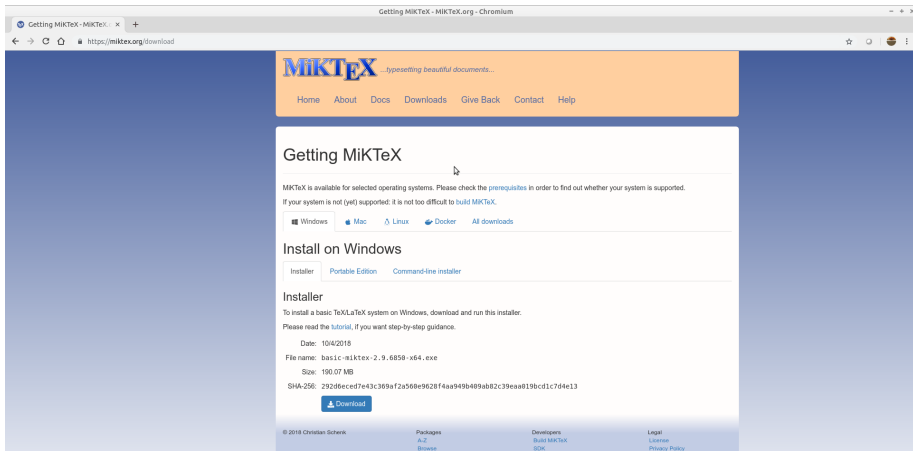
Try RStudio Server Pro for free!

🔊

R to PDF Installation

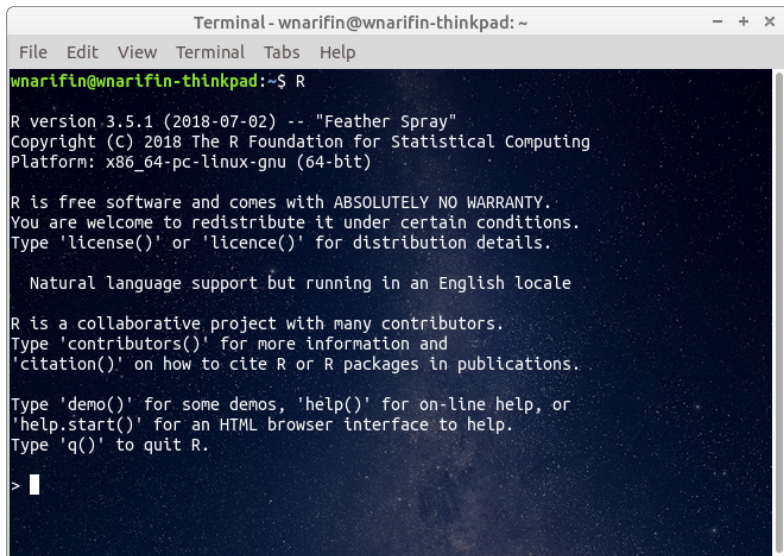
- Windows & MacOS – MikTeX @ <https://miktex.org/download>
- Linux – texlive.

Important for R-markdown session later.



The screenshot shows the MikTeX website in a Chromium browser. The page title is "Getting MikTeX - MikTeX.org - Chromium". The address bar shows "https://miktex.org/download". The website has a blue header with the MikTeX logo and the tagline ".typesetting beautiful documents...". Below the header is a navigation bar with links: Home, About, Docs, Downloads, Give Back, Contact, and Help. The main content area is titled "Getting MikTeX" and includes a mouse cursor icon. It states: "MikTeX is available for selected operating systems. Please check the [prerequisites](#) in order to find out whether your system is supported. If your system is not (yet) supported: it is not too difficult to [build MikTeX](#)." Below this is a section for "Windows" with a button labeled "Download". The "Windows" section is expanded, showing "Install on Windows" with sub-links for "Installer", "Portable Edition", and "Command-line installer". The "Installer" section is selected, showing details: "Date: 10/4/2018", "File name: basic-miktex-2.9.6859-x64.exe", "Size: 190.07 MB", and "SHA-256: 292d6eced7e43c369af2a568e9620f4aa949b409ab02c39eaa019bcd1c7d4e13". A "Download" button is visible. At the bottom, there is a footer with copyright information: "© 2018 Christian Schenk", "Packages A-Z Browse", "Developers Build MikTeX SDK", and "Legal License Privacy Policy".

R Interface

A screenshot of a terminal window titled "Terminal - wnarifin@wnarifin-thinkpad: ~". The window has a menu bar with "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the R version 3.5.1 (2018-07-02) startup screen, including copyright information, platform details (x86_64-pc-linux-gnu (64-bit)), and instructions on how to use R, including commands for license, contributors, demos, and help. The prompt is "wnarifin@wnarifin-thinkpad:~\$ R" and the output is the R startup text. The prompt is followed by a blank line and a cursor.

```
Terminal - wnarifin@wnarifin-thinkpad: ~
File Edit View Terminal Tabs Help
wnarifin@wnarifin-thinkpad:~$ R
R version 3.5.1 (2018-07-02) -- "Feather Spray"
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (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.

> 
```

Figure 2: Plain R

RStudio Interface

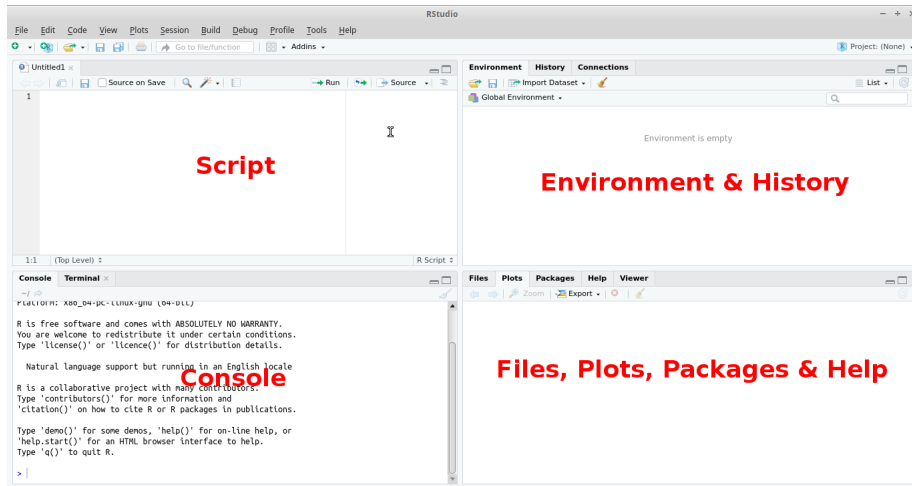


Figure 3: RStudio

R script

File > New file > R script

- type all commands/functions here
- comments, start with “#”
- run all commands by Ctrl+Enter

Function and Object

Function

- R function(), think of MS Excel function
- structure

```
function(argument1 = value, argument2 = value)
```

Object

- name assigned on left side of "<-" / "="
- variable, data (data frame, matrix, list)

```
x <- 1
y = 2
z = x + y
z  # type object name, you'll get the value
```

R packages

Install packages a.k.a libraries

- Graphically

Packages > Install

- Command

e.g. psych, car

```
install.packages("psych")  
install.packages("car")
```

Load libraries

e.g. load psych and car,

```
library(psych)  
library(car)
```

Working directory

Set working directory

- 1 Browse to target directory: **Files Tab** > ... > **Go To Folder**
- 2 **Files Tab** > **More** > **Set As Working Directory**

Help

If you know the name of packages/functions,

```
?psych  
?library
```

Search by keywords,

```
??mean  
??survey
```

Thank you

References

Fox, J., Weisberg, S., & Price, B. (2018). *Car: Companion to applied regression*. Retrieved from <https://CRAN.R-project.org/package=car>

R Core Team. (2018). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <https://www.R-project.org/>

Revelle, W. (2018). *Psych: Procedures for psychological, psychometric, and personality research*. Retrieved from <https://CRAN.R-project.org/package=psych>