

# Introduction to R and RStudio IDE

Wan Nor Arifin

Unit of Biostatistics and Research Methodology, Universiti Sains Malaysia.

Email: [wnarifin@usm.my](mailto:wnarifin@usm.my)



February 13, 2019

- 1 Why use R?
- 2 R and RStudio
- 3 R script
- 4 Function and Object
- 5 R packages
- 6 Working directory
- 7 Help

# 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

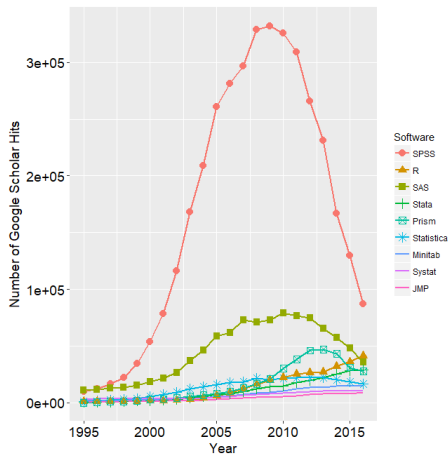
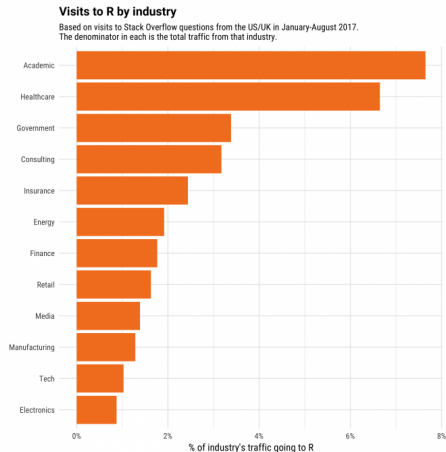


Figure 1: R popularity

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

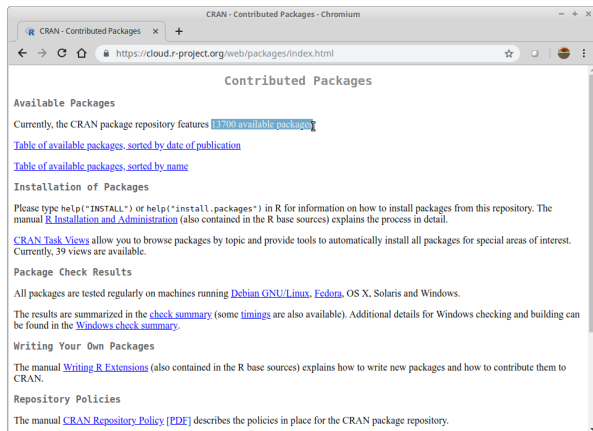
# R is getting more popular among academician



**Figure 2:** Impressive growth of R

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

# Availability of R packages



**Figure 3:** CRAN

Source: <https://cloud.r-project.org/web/packages/index.html>, as of 11/2/2019.

# R and RStudio



# R Installation

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

The screenshot shows the R Project for Statistical Computing website. The browser title is "R: The R Project for Statistical Computing - Chromium" and the address bar shows "https://www.r-project.org". The page features a navigation menu on the left with categories like Download, R Project, R Foundation, Help With R, Documentation, and Links. The main content area includes a "Getting Started" section with a brief introduction to R, a "News" section with several bullet points about version releases and proposals, and a "News via Twitter" section displaying two tweets from the R Foundation and user2019.

## 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 userR! 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 @gskqueiroz, @edroepbesma and @henkvangjosten, elected as ordinary members of the R Foundation in recognition of their services to the R community. Oct 27, 2018

**userR! 2019** (@userR2019\_Conf) 17-12-18 ; 01-19 ; 15-02-19 ; All the important dates are on our website! user2019.r-project.org/dates!

Figure 4: R Project

# RStudio Installation

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

Download RStudio - RStudio - Chromium

Products Resources Pricing About Us Blogs

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	85.6 MB	2018-10-29	58b3d796d8c1f96fb8588bc62746ab6404
RStudio 1.1.463 - Mac OS X 10.6+ (64-bit)	74.5 MB	2018-10-29	a79832ba4d7daaa86a8da91948278d994
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	89.3 MB	2018-10-29	8a6755fa9f9ae2ba1fce209df13358aaf63
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	97.4 MB	2018-10-29	bc50d6bd34926c1cc3ae4e209d670649
RStudio 1.1.463 - Ubuntu 16.04+/Debian 9+ (64-bit)	65 MB	2018-10-29	cf6599db18619cc78d15927efaa7c753
RStudio 1.1.463 - Fedora 19+/Red-Hat 7+/openSUSE 13.1+ (32-bit)	88.1 MB	2018-10-29	742f8ba956df1eaa32815716e14a06659e
RStudio 1.1.463 - Fedora 19+/Red-Hat 7+/openSUSE 13.1+ (64-bit)	90.6 MB	2018-10-29	c7383867a0ca990eea7e4278b56952d1

### Zip/Tarballs

Zip/tar archives	Size	Date	MD5
RStudio 1.1.463 - Windows Vista/7/8/10	122.9 MB	2018-10-29	1eb1d7758bd4b44b6864a7c3fe80894
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	90 MB	2018-10-29	e192428621d36c38de9e086b888840b41
RStudio 1.1.463 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	96.3 MB	2018-10-29	5944b3bd118c1ba46f2a6c4846768324
RStudio 1.1.463 - Fedora 19+/Red-Hat 7+/openSUSE 13.1+ (32-bit)	88.8 MB	2018-10-29	0bee446eeb4cc9e32967845e1f77fe2b
RStudio 1.1.463 - Fedora 19+/Red-Hat 7+/openSUSE 13.1+ (64-bit)	91.4 MB	2018-10-29	3f63725769b7b976fedb754eb2a19188

### Source Code

A tarball containing source code for RStudio v1.1.463 can be downloaded from here

Try RStudio Server Pro for free!

Figure 5: RStudio

# R to PDF Installation

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

Important for R-markdown session later.

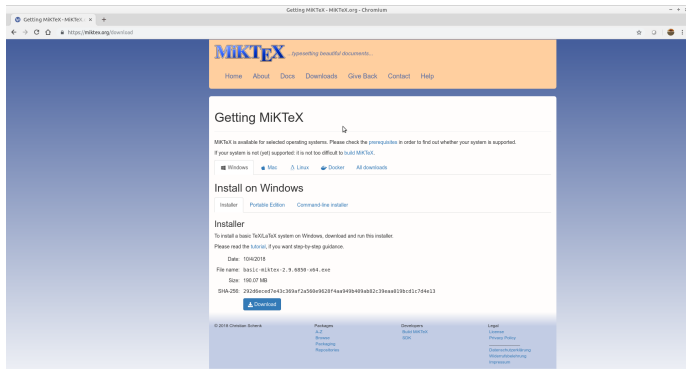
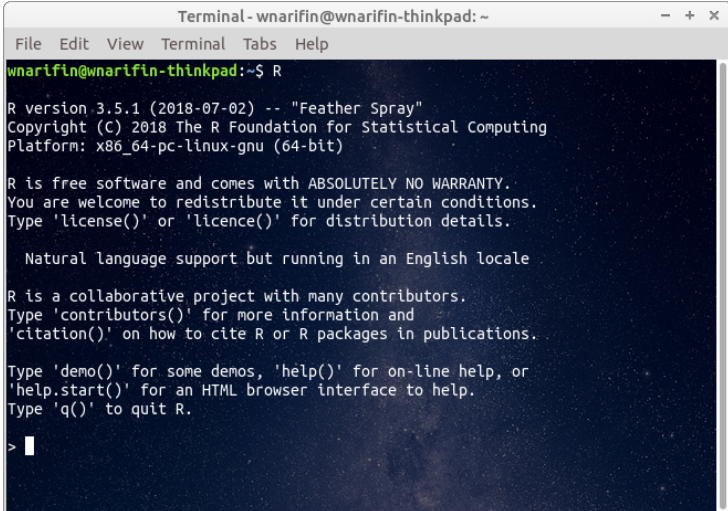


Figure 6: MikTeX

# R Interface

A terminal window titled "Terminal - wnarifin@wnarifin-thinkpad: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the command "R" being executed, followed by the R version information and license text. The prompt ">" is visible at the bottom.

```
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 7: Plain R

# RStudio Interface

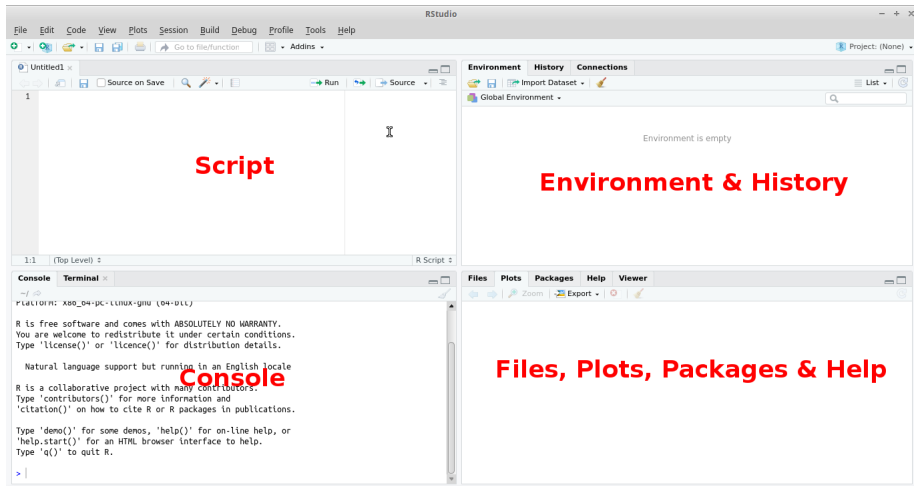


Figure 8: RStudio

# R script

## File > New file > R script

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

# Function and Object



- 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>