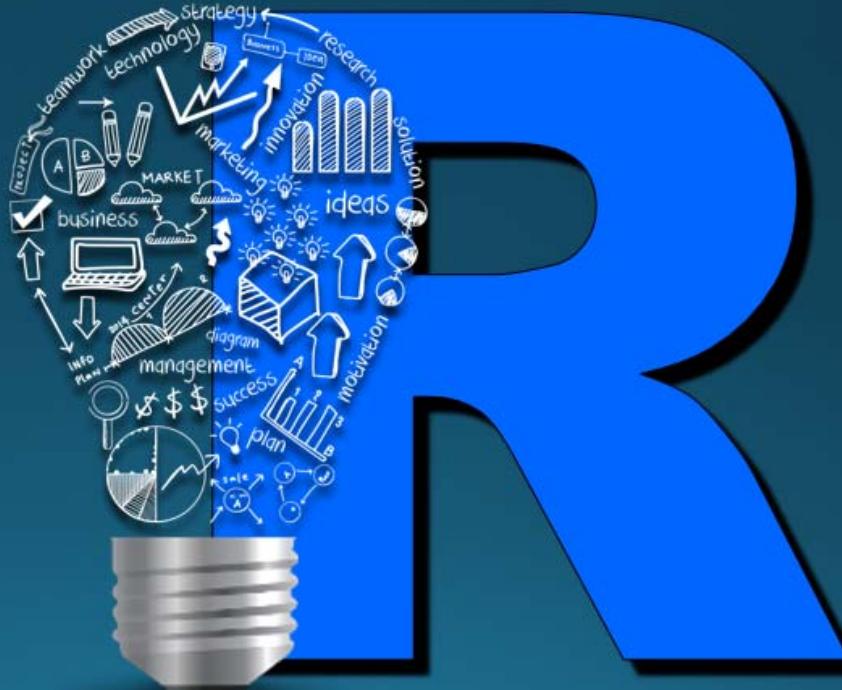


A01

# R / RStudio 軟體環境介紹

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<http://www.hmwu.idv.tw>



# 本章大綱&學習目標

2/55

## ■ R軟體環境簡介

- R軟體安裝，R程式執行及套件(Package)
- R相關檔案其副檔名的意義
- 求助說明 `help()`、內訂Demo程式

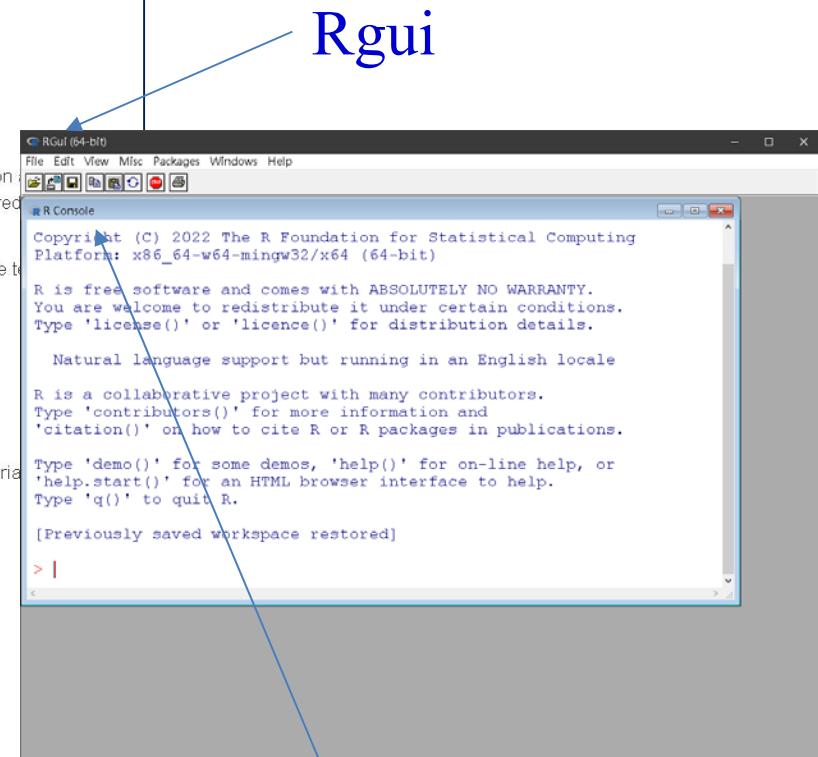
## ■ R程式IDE編輯器: RStudio

- 建立專案、HELP、常用快速鍵
- 更新R軟體及R套件
- 安裝RStudio常見問題
- R的學習資源

# The R Project for Statistical Computing

<http://www.r-project.org>

The screenshot shows the official website for The R Project for Statistical Computing. At the top left is the R logo. The main title "The R Project for Statistical Computing" is centered above a "Getting Started" section. Below this are sections for "News" and "News via Twitter". On the left sidebar, there are links for "Home", "Download", "CRAN", "R Project", "About R", "Logo", "Contributors", "What's New?", "Reporting Bugs", "Conferences", "Search", "Get Involved: Mailing Lists", "Get Involved: Contributing", "Developer Pages", "R Blog", "R Foundation", "Foundation", "Board", "Members", "Donors", "Donate", "Help With R", "Getting Help", and "Documentation". At the bottom is a footer with the URL "http://www.hmwu.idv.tw".



R Console

# R是什麼？



- R is a language and environment for **statistical computing and graphics**.
  - 1985, University of Auckland, **Robert Gentleman** and **Ross Ihaka**.
  - R is an official part of the Free Software Foundation's GNU project, and the R Foundation has similar goals to other open source software foundations like the Apache Foundation or the GNOME Foundation.
  - Similar to the S language (AT&T) and environment.
  - S-plus (<http://www.tibco.com>)
- R provides a wide variety of **statistical** (*linear and nonlinear modelling, classical statistical tests, time-series analysis, classification, clustering, ...*) and **graphical** techniques, and is highly **extensible**.
- One of R's strengths is the ease with which well-designed **publication-quality plots** can be produced, including mathematical symbols and formulae where needed.
- For computationally-intensive tasks, **C**, **C++** and **Fortran** code can be linked and called at run time. Advanced users can write C code to manipulate R objects directly.
- R is a high-quality, cross-platform, flexible, widely used open source, free language for statistics, graphics, mathematics, and data science.
- R contains more than 5,000 algorithms (>25,000 packages) and millions of users with domain knowledge worldwide.

## 優點：

- 免費統計分析軟體' 完整的說明文件與討論區' 高品質的學術繪圖' 程式易根據需求修改

## 缺點：

- 不親切的使用者介面(Rgui)' 需詳知套件、函式名稱與程式編寫邏輯' 大量計算效能低。(已有改進方法)' its lack of security over the Web



# 我為什麼要使用R做為資料分析工具？

5/55

<http://www.r-project.org>

<https://posit.co/>

寫程式是資料分析的必要技能

<https://medium.com/datainpoint/9ee15b58cc>

Python or R, what should you learn first?

<https://read01.com/0ePnyD.html#.Wu66C3--kZY>

Why I use R for Data Science – An Ode to R

<https://www.r-bloggers.com/why-i-use-r-for-data-science-an-ode-to-r-2/>

選擇R開發數據分析平台的 4 個不錯的理由

<https://read01.com/660M4g.html>

做數據分析必須學R語言的4個理由

<https://read01.com/yyREB2.html>

Hadley Wickham : 一個改變了R的人

<https://read01.com/Mmy64J.html>

Hadley Wickham: "R is ... tailored to  
the problems of data science"



COPSS Presidents' Award: Hadley Wickham

SEPTEMBER 2, 2019

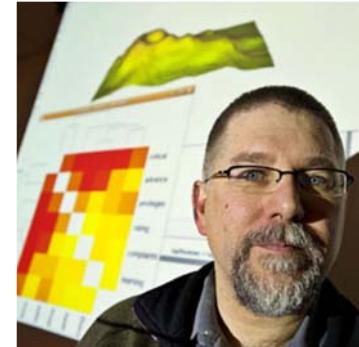
**Hadley Wickham wins the prestigious 2019 COPSS Presidents' Award**

Winners of the COPSS Presidents' Award [ edit ]

- 1981: Peter J. Bickel, University of California, Berkeley
- 1982: Stephen Fienberg, Carnegie Mellon University
- 1983: Tze Leung Lai, Stanford University
- 1984: David V. Hinkley, University of California, Santa Barbara
- 1985: James O. Berger, Duke University
- 1986: Ross L. Prentice, Fred Hutchinson Cancer Research Center
- 1987: C.F. Jeff Wu, Georgia Institute of Technology
- 1988: Raymond J. Carroll, Texas A&M University
- 1989: Peter Hall, Australian National University
- 1990: Peter McCullagh, University of Chicago
- 1991: Bernard Silverman, University of Oxford
- 1992: Nancy Reid, University of Toronto
- 1993: Wing Hung Wong, Stanford University
- 1994: David L. Donoho, Stanford University
- 1995: Iain M. Johnstone, Stanford University
- 1996: Robert J. Tibshirani, Stanford University
- 1997: Kathryn Roeder, Carnegie Mellon University
- 1998: Pascal Massart, Université de Paris-Sud
- 1999: Larry A. Wasserman, Carnegie Mellon University
- 2000: Jianqing Fan, Princeton University
- 2001: Xiao-Li Meng, Harvard University
- 2002: Jun Liu, Harvard University
- 2003: Andrew Gelman, Columbia University
- 2004: Michael A. Newton, University of Wisconsin
- 2005: Mark J. van der Laan, University of California, Berkeley
- 2006: Xihong Lin, Harvard University
- 2007: Jeff Rosenthal, University of Toronto
- 2008: T. Tony Cai, University of Pennsylvania
- 2009: Rafael Irizarry, Harvard University
- 2010: David Dunson, Duke University
- 2011: Nilanjana Chatterjee, Johns Hopkins University
- 2012: Samuel Kou, Harvard University
- 2013: Marc A. Suchard, UCLA
- 2014: Martin J. Wainwright, University of California, Berkeley
- 2015: John D. Storey, Princeton University
- 2016: Nicolai Meinshausen, ETH Zürich
- 2017: Tyler J. VanderWeele, Harvard University
- 2018: Richard J. Samworth, University of Cambridge
- 2019: Hadley Wickham, RStudio, Inc.
- 2020: Rina Foygel Barber, University of Chicago
- 2021: Jeffrey T. Leek, Johns Hopkins University
- 2022: Daniela Witten, University of Washington

Robert C. Gentleman

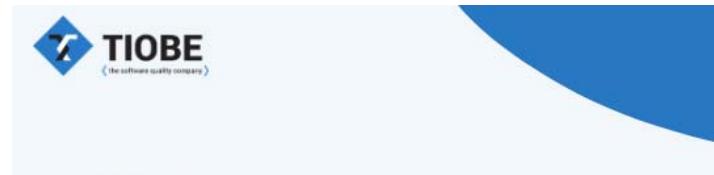
Department of Biostatistical Sciences,  
Dana Farber Cancer Institute



Ross Ihaka,

University of Auckland, 2017

# TIOBE 全球程式語言排名



Home » TIOBE Index

## TIOBE Index for February 2024

February Headline: The Go programming language enters the top 10

<http://www.tiobe.com/tiobe-index/>

281種程式語言:

[http://www.tiobe.com/tiobe-index/programminglanguages\\_definition](http://www.tiobe.com/tiobe-index/programminglanguages_definition)

Position	Programming Language
21	R
22	SAS

Feb 2024	Feb 2023	Change	Programming Language	Ratings	Change
1	1		Python	15.16%	-0.32%
2	2		C	10.97%	-4.41%
3	3		C++	10.53%	-3.40%
4	4		Java	8.88%	-4.33%
5	5		C#	7.53%	+1.15%
6	7	▲	JavaScript	3.17%	+0.64%
7	8	▲	SQL	1.82%	-0.30%
8	11	▲	Go	1.73%	+0.61%
9	6	▼	Visual Basic	1.52%	-2.62%
10	10		PHP	1.51%	+0.21%
11	24	▲	Fortran	1.40%	+0.82%
12	14	▲	Delphi/Object Pascal	1.40%	+0.45%
13	13		MATLAB	1.26%	+0.27%
14	9	▼	Assembly language	1.19%	-0.19%
15	18	▲	Scratch	1.18%	+0.42%
16	15	▼	Swift	1.16%	+0.23%
17	33	▲	Kotlin	1.07%	+0.76%
18	20	▲	Rust	1.05%	+0.35%
19	30	▲	COBOL	1.01%	+0.60%
20	16	▼	Ruby	0.99%	+0.17%

# 其它調查



<http://www.kdnuggets.com/2013/08/languages-for-analytics-data-mining-data-science.html>

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## Top Languages for analytics, data mining, data science

[◀ Previous post](#)

[Next post ▶](#)



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Tweet

The most popular languages continue to be R (used by 61% of KDnuggets readers), Python (39%), and SQL (37%). SAS is stable at around 20%. The highest growth was for Pig/Hive/Hadoop-based languages, R, and SQL, while Perl, C/C++, and Unix tools declined. We also find a small affinity between R and Python users.

By Gregory Piatetsky, Aug 27, 2013.

[comments](#)

Previous KDnuggets polls looked at [high-level Analytics and Data mining software](#), but sometimes a full-power programming language is needed. That was the focus of the latest KDnuggets Poll, which asked:

[What programming/statistics languages you used for an analytics / data mining / data science work in 2013?](#)

Based on a very high response of over 700 voters, the most popular languages continue to be R (now used by 61% of responders), Python (39%), and SQL (37%). On average, there were 2.3 languages used.

For trends, we compared the 2013 results with similar

- [2012 Poll: languages used for analytics / data mining](#) and
- [2011 Poll: languages used for data mining / data analysis?](#)



## IEEE

<http://spectrum.ieee.org/computing/software/the-2016-top-programming-languages>

IEEE.org | IEEE Xplore Digital Library | IEEE

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Feature | Computing | Software

## The 2016 Top Programming Languages

C is No. 1, but big dat

By Stephen Cass  
Posted 26Jul 2016 | 16:00 GMT

Welcome to *IEEE Spectrum* programming languages. As a programmer, *Spectrum* uses a lot of a language. Working online sources we've chosen a different axis of popularity ranking.

### Language Types (click to hide)

Web Mobile Enterprise Embedded

Language Rank	Types	Spectrum Ranking
1. C		100.0
2. Java		98.1
3. Python		97.9
4. C++		95.8
5. R		87.7
6. C#		86.4
7. PHP		82.4
8. JavaScript		81.9
9. Ruby		74.0
39. SAS		21.7



# 軟體外觀 (Windows)

8/55

RGui (64-bit)

File History Resize Windows

R Console

Type 'q()' to quit R.

[Previously saved workspace restored]

```
> names(iris)
[1] "Sepal.Length" "Sepal.Width"  "Petal.Length"
[4] "Petal.Width"   "Species"
> View(iris)
> attach(iris)
> plot(Sepal.Length, Sepal.Width, col = Species)
> x11()
> hist(Sepal.Length)
>
```

Data:iris

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
1	5.1	3.5	1.4	0.2
2	4.9	3.0	1.4	0.2
3	4.7	3.2	1.3	0.2
4	4.6	3.1	1.5	0.2
5	5.0	3.6	1.4	0.2
6	5.4	3.9	1.7	0.4
7	4.6	3.4	1.4	0.3
8	5.0	3.4	1.5	0.2
9	4.4	2.9	1.4	0.2
10	4.9	3.1	1.5	0.1
11	5.4	3.7	1.5	0.2
12	4.8	3.4	1.6	0.2
13	4.8	3.0	1.4	0.1

R Graphics: Device 2 (inactive)

R Graphics: Device 3 (ACTIVE)

Histogram of Sepal.Length

# CRAN: The Comprehensive R Archive Network



New Zealand

<https://cran.stat.auckland.ac.nz/>

Norway

<https://cran.uib.no/>

Philippines

<https://cran.stat.upd.edu.ph/>

Poland

<https://cran.mi2.ai/>

Portugal

<https://cran.radicaldevelop.com/>

Russia

<https://mirror.truenetwork.ru/CRAN/>

South Africa

<https://cran.mirror.ac.za/>

Spain

<https://ftp.cixug.es/CRAN/>

<https://cran.rediris.es/>

Sweden

<https://ftp.acc.umu.se/mirror/CRAN/>

Switzerland

<https://stat.ethz.ch/CRAN/>

<https://mirror.metanet.ch/cran/>

Taiwan

<https://cran.csie.ntu.edu.tw/>

University of Auckland

University of Bergen

University of the Philippines and PREGINET



CRAN

Mirrors

[What's new?](#)

Search

CRAN Team

About R

[R Homepage](#)

[The R Journal](#)

Software

[R Sources](#)

[R Binaries](#)

[Packages](#)

[Task Views](#)

[Other](#)

Documentation

[Manuals](#)

[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 (2022-10-31, Innocent and Trusting) [R-4.2.2.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.

```
repos="https://cran.csie.ntu.edu.tw/"
```



# R軟體下載

10/55

## 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 CRAN mirrors. You can also download R from the Source Code mirror.

**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](#)

Please do not use the contributed or old contributed packages in case of questions about them.

You may also want to look at the [Windows Task View](#).

Note: CRAN mirrors are located in different parts of the world. Please take into account network latency when choosing a mirror.

### R-4.2.2 for Windows

[Download R-4.2.2 for Windows \(76 megabytes, 64 bit\)](#)

[README on the Windows binary distribution](#)

[New features in this version](#)

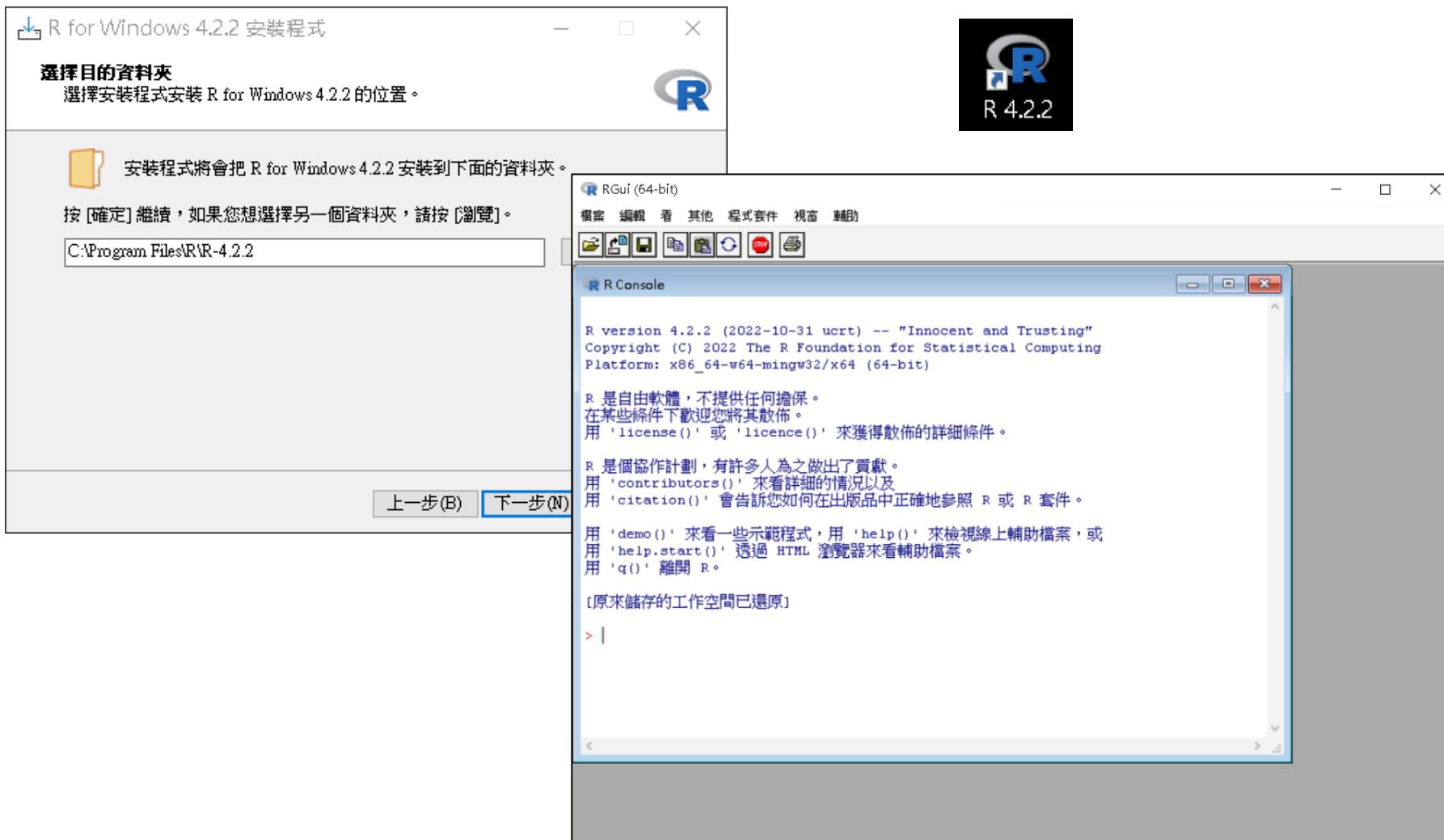
<https://cran.csie.ntu.edu.tw/bin/windows/base/R-4.2.2-win.exe>



# 軟體安裝；啟動R

11/55

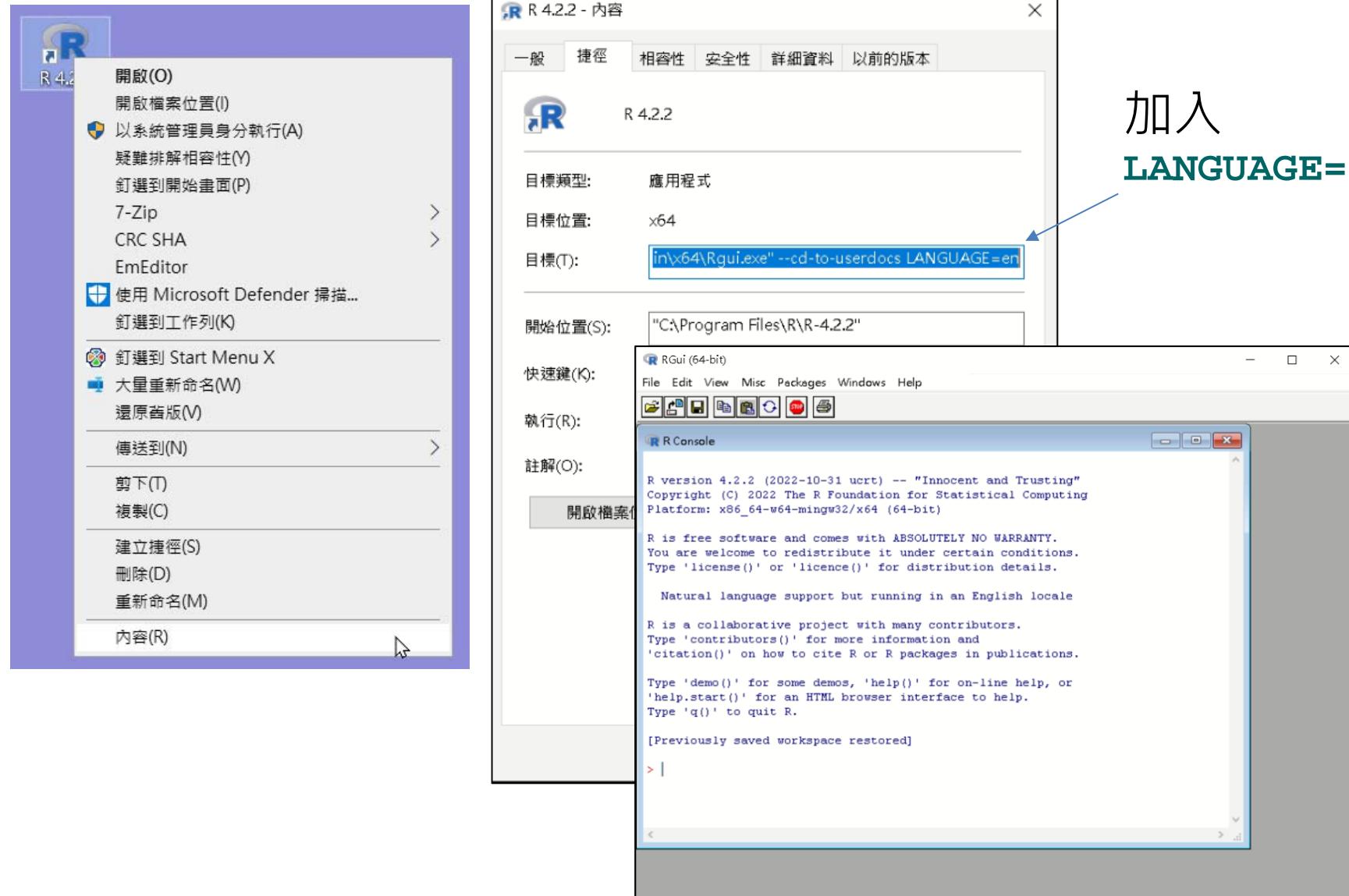
注意: R軟體安裝目錄，使用者目錄、R套件安裝目錄的路徑





# 想把中文介面改成英文介面

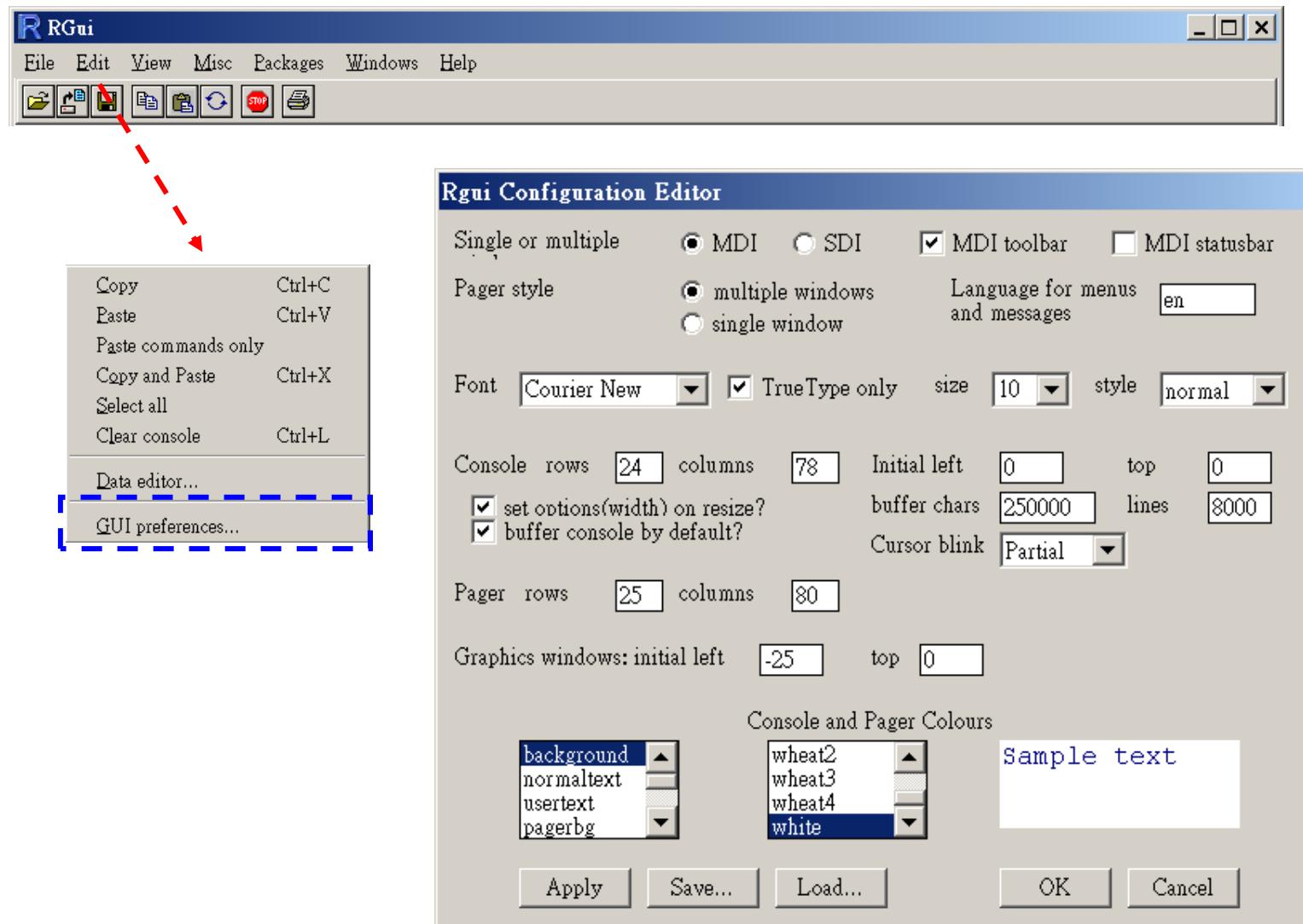
12/55



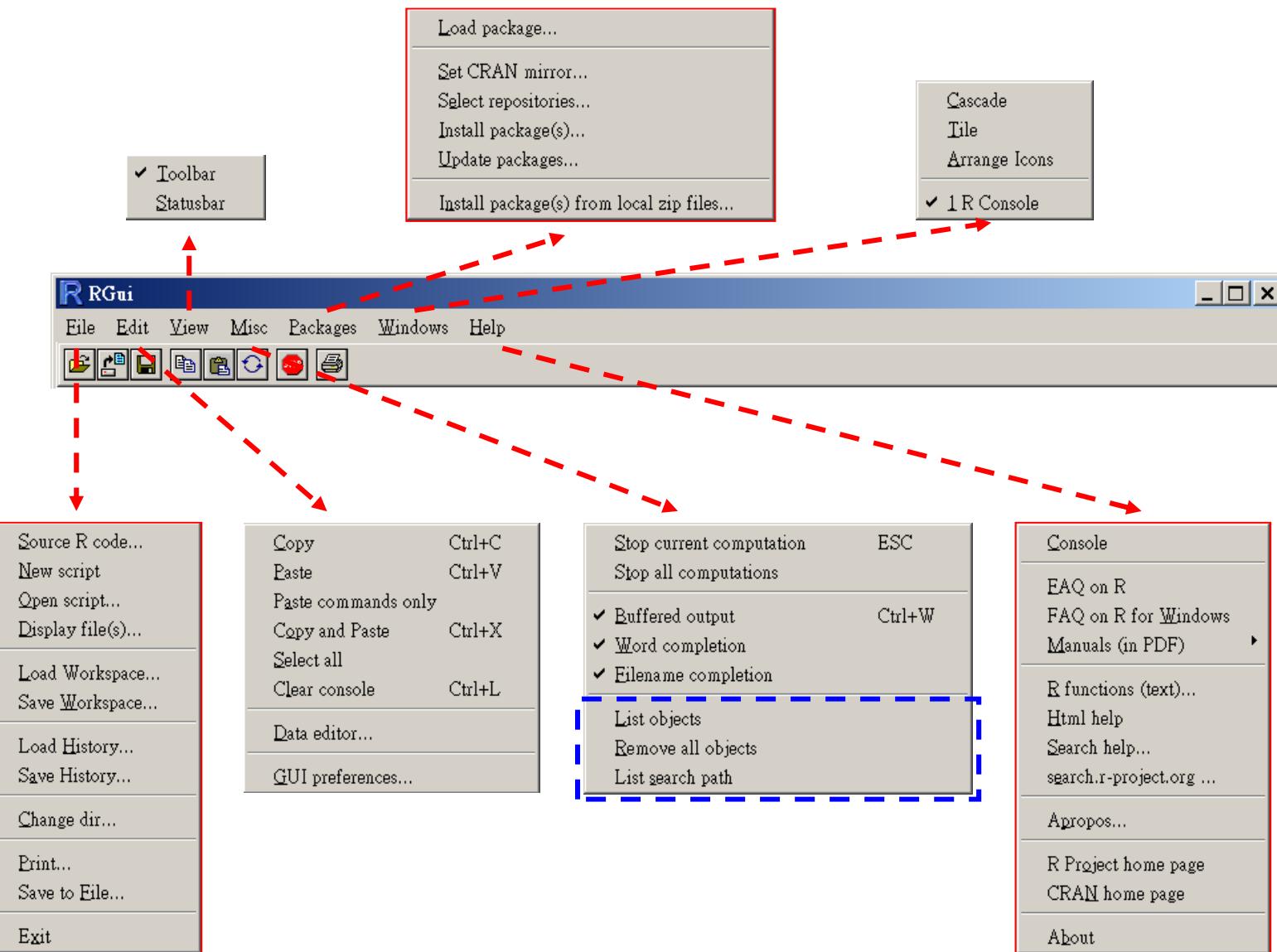


# 喜好設定

13/55



# R 選單



# 寫程式及執行

The screenshot shows the RGui (64-bit) interface. On the left, the R console window displays a session with the Iris dataset. On the right, the R Editor window shows a script named "Untitled - R Editor". A context menu is open over the script code, with the option "Run line or selection Ctrl+R" highlighted.

**(1) 執行程式**

**(2) 執行程式**

**(3) 利用source 執行程式**

**注意工作目錄及print**

**程式存檔 (myRcode.R)**

**> source("myRcode.R")**

<http://www.hmwu.idv.tw>



# R相關檔案副檔名

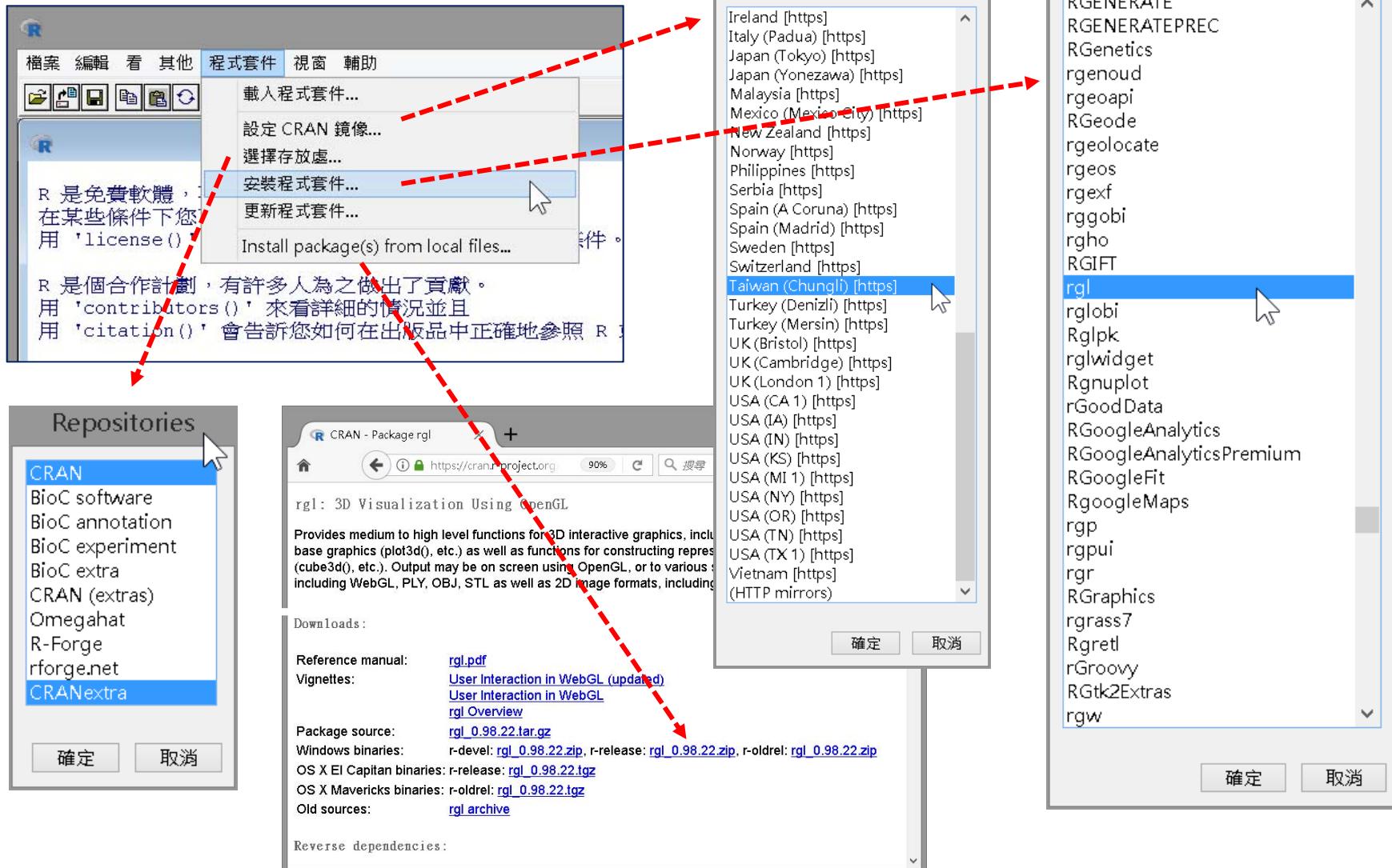
16/55

- 工作區存檔 File => Workspace (**.RData**)
- 歷史指令存檔File => History (. **Rhistory**)
- 改變工作目錄 File => Change dir...

```
> getwd  
> setwd("D:\\my-R")  
> dir() #查看目前目錄下的檔案
```
- **Rnw** stands for R NoWeb files. The RNW file type is primarily associated with 'Sweave'. Sweave is a tool that allows you to embed the R code for complete data analyses in latex documents.
- **name.rdb**: a concatenation of serialized objects.
- **name.rdx**: file contains an index.
- **name.rds** the serialized R objects written by saveRDS
- **name.rda**: 二進位R資料檔。(用load(name)載入)

# 安裝R套件 (RGui選單)

- Packages => Install package(s) => CRAN mirror => installr, rgl, scatterplot3d (按Ctrl可多重選取) => OK





# 安裝R套件 (指令方式)

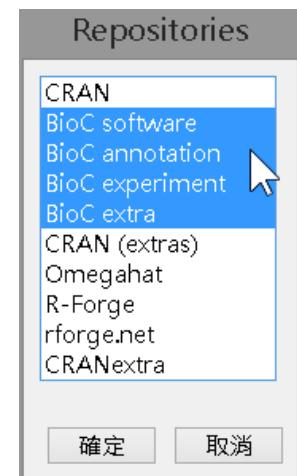
18/55

```
> setRepositories()  
> chooseCRANmirror()  
> install.packages("rgl") # 安裝套件  
> library(rgl) # 載入套件  
> # same as > library("rgl")  
> detach("package:rgl", unload=TRUE) # 卸載套件  
> remove.packages("rgl") # 移除套件  
> .libPaths() # 列出library安裝目錄
```

```
> # 指定repositories  
> install.packages("rgl", repos = "http://cran.csie.ntu.edu.tw")
```

```
> options(repos="http://cran.csie.ntu.edu.tw")  
> pks <- c("rgl", "ggplot2", "maps", "e1071")  
> install.packages(pks)  
> lapply(pks, library, character.only = TRUE)
```

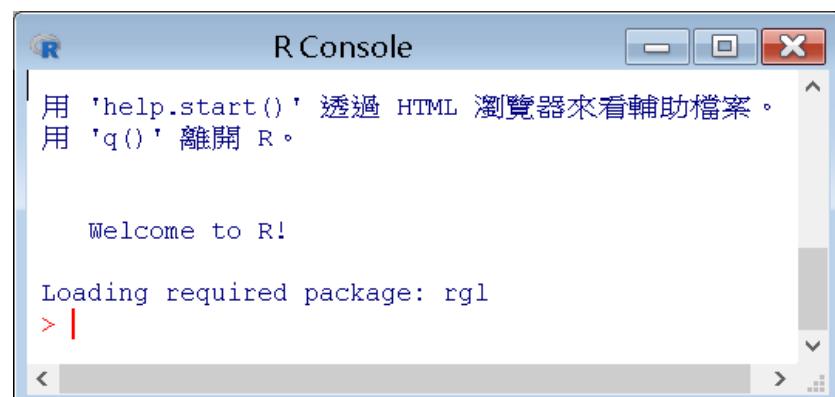
```
> # 安裝 BioC 的套件  
> # setRepositories(graphics = F, ind = 2)  
> # options("repos")  
> source("https://bioconductor.org/biocLite.R")  
> biocLite("EBIImage")
```



## Automatically load packages in the Startup of R:

- call `.First()` in the `Rprofile` file.
- 編輯檔案(Windows) C:\Program Files\R\R-3.3.1\library\base\Rprofile

```
.First <- function(){  
  cat("\n  Welcome to R!\n\n")  
  require(rgl)  
}
```





# 安裝R套件 (RStudio選單)

19/55

The screenshot shows the RStudio interface. The 'Tools' menu is open, with 'Install Packages...' highlighted. A modal dialog titled 'Install Packages' is displayed, containing fields for 'Install from:' (set to 'Repository (CRAN, CRANextra)'), 'Packages' (containing 'rgl scatterplot3d ggplot2'), 'Install to Library:' (set to 'C:/Users/userpc/Documents/R/win-library/3.4 [Default]'), and a checked 'Install dependencies' option. At the bottom are 'Install' and 'Cancel' buttons.

```
E:\06-NTPU_Course_Now\106-1-高維度資料分析\小考\106-1-HDDA-exam2/ →
downloaded 302 KB

trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.4/ggplot2_2.2.1.zip'
Content type 'application/zip' length 2784537 bytes (2.7 MB)
downloaded 2.7 MB

package 'rgl' successfully unpacked and MD5 sums checked
package 'scatterplot3d' successfully unpacked and MD5 sums checked
package 'ggplot2' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\userpc\AppData\Local\Temp\Rtmpwz9041\downloaded_packages
```

```
Rcode - RStudio
File Edit Code View Plots Session Build Debug Profile Tools
+ - + Go to file/function Addins
rcode.R x test.R x
Source on Save
! Packages c1Valid and rgl required but are not installed. Install Don't Show Again
1 library(rgl)
2 library(c1Valid)
3
```



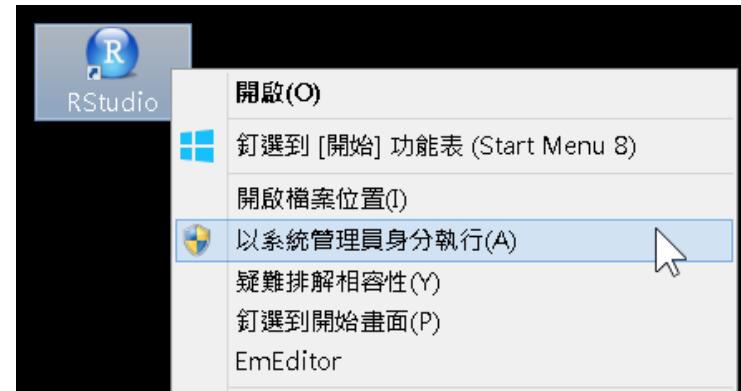
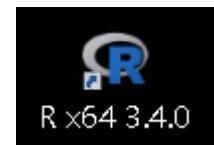
# 安裝R套件常見問題

20/55

```
Console Terminal x
~/Documents/my first R/ ↵
x/el-capitan/contrib/3.4/rgl_0.98.22.tgz'
Warning in install.packages :
  URL 'https://cran.rstudio.com/bin/macosx/e
l-capitan/contrib/3.4/rgl_0.98.22.tgz': stat
us was 'Couldn't connect to server'
Error in download.file(url, destfile, method
, mode = "wb", ...):
  無法開啟 URL 'https://cran.rstudio.com/bin/
macosx/el-capitan/contrib/3.4/rgl_0.98.22.tg
z'
Warning in install.packages :
  download of package 'rgl' failed
> install.packages("rgl")
嘗試 URL 'https://cran.rstudio.com/bin/macos
x/el-capitan/contrib/3.4/rgl_0.98.22.tgz'
Content type 'application/x-gzip' length 383
0751 bytes (3.7 MB)
=====
=====

downloaded 3.7 MB

The downloaded binary packages are in
/var/folders/zb/lqb9zm_j0bdgmfj24glp38dh0000
gn/T//Rtmp006ZKM/downloaded_packages
> |
```



Installing R on OS X

<https://www.r-bloggers.com/installing-r-on-os-x/>

Why mac OS failed to install rgl: rgl package needs X11 to show its 3D plots.

- (1) Download/install XQuartz <https://www.xquartz.org>
- (2) Check the library /usr/X11/lib/libGLU.1.dylib is loaded
- (3) install.packages("rgl")



# library 和 require 的差別

21/55

- 狀況(1): 載入已安裝的套件，且 using the command outside of a function definition，則：
  - "require" or "library" 相同。
- 狀況(2): 載入未安裝的套件，則：
  - **library(foo)**: 程式停止with the message "**Error in library(foo): there is no package called 'foo'.**"
  - **require(foo)**: get a warning, but not an error. Your program will continue to run, only to crash later when you try to use a function from the library "**foo**"
- **require(package)** returns (invisibly) TRUE if the package is available

```
> # install "package" if it doesn't exist, and then load it.  
> if (!require(package)) install.packages("package")  
> library(package)
```



# CRAN Task Views

<https://cran.r-project.org/web/views/>

## CRAN Task Views

<a href="#">Bayesian</a>	Bayesian Inference
<a href="#">ChemPhys</a>	Chemometrics and Computational Physics
<a href="#">ClinicalTrials</a>	Clinical Trial Design, Monitoring, and Analysis
<a href="#">Cluster</a>	Cluster Analysis & Finite Mixture Models
<a href="#">DifferentialEquations</a>	Differential Equations
<a href="#">Distributions</a>	Probability Distributions
<a href="#">Econometrics</a>	Econometrics
<a href="#">Environmetrics</a>	Analysis of Ecological and Environmental Data
<a href="#">ExperimentalDesign</a>	Design of Experiments (DoE) & Analysis of Experimental Data
<a href="#">Finance</a>	Empirical Finance
<a href="#">Genetics</a>	Statistical Genetics
<a href="#">Graphics</a>	Graphic Displays & Dynamic Graphics & Graphic Devices & Visualization
<a href="#">HighPerformanceComputing</a>	High-Performance and Parallel Computing with R
<a href="#">MachineLearning</a>	Machine Learning & Statistical Learning
<a href="#">MedicalImaging</a>	Medical Image Analysis
<a href="#">MetaAnalysis</a>	Meta-Analysis
<a href="#">Multivariate</a>	Multivariate Statistics
<a href="#">NaturalLanguageProcessing</a>	Natural Language Processing
<a href="#">NumericalMathematics</a>	Numerical Mathematics
<a href="#">OfficialStatistics</a>	Official Statistics & Survey Methodology
<a href="#">Optimization</a>	Optimization and Mathematical Programming
<a href="#">Pharmacokinetics</a>	Analysis of Pharmacokinetic Data
<a href="#">Phylogenetics</a>	Phylogenetics, Especially Comparative Methods
<a href="#">Psychometrics</a>	Psychometric Models and Methods
<a href="#">ReproducibleResearch</a>	Reproducible Research
<a href="#">Robust</a>	Robust Statistical Methods
<a href="#">SocialSciences</a>	Statistics for the Social Sciences
<a href="#">Spatial</a>	Analysis of Spatial Data
<a href="#">SpatioTemporal</a>	Handling and Analyzing Spatio-Temporal Data
<a href="#">Survival</a>	Survival Analysis
<a href="#">TimeSeries</a>	Time Series Analysis
<a href="#">WebTechnologies</a>	Web Technologies and Services
<a href="#">gR</a>	gRaphical Models in R

```
> install.packages("ctv")
> library(ctv)
>
> available.views()
```

## CRAN Task Views

---

Name: Bayesian  
Topic: Bayesian Inference  
Maintainer: Jong Hee Park  
Repository: <https://cran.fhcrc.org>

```
...
> ## install MachineLearning view
> install.views("MachineLearning")
> ## only with core packages
> install.views("MachineLearning",
coreOnly = TRUE)
> ## update MachineLearning view
> update.views("MachineLearning")
```

What is the difference between **require()** and **library()**? Not much difference in everyday work. **require** is used inside functions, as it outputs a warning and continues if the package is not found, whereas **library** will throw an error.



# Popular Packages

- Top 15 R Libraries for Data Science in 2023

<https://www.knowledgehut.com/blog/data-science/top-r-libraries-for-data-science>

dplyr, tidyr, readr, stringr, lubridate, jsonlite, Shiny, tseries, Prophet, RColorBrewer, githubinstall, ggmap, sqldf, caret

- Quick list of useful R packages

<https://support.posit.co/hc/en-us/articles/201057987-Quick-list-of-useful-R-packages>

Categories: To Flood data, To manipulate data, To visualize data, To model data, To report results, For Spatial data, For Time Series and Financial data, To write high performance R code, To work with the web, To write your own R packages



<https://github.com/qinwf/awesome-R>

## Awesome R



A curated list of awesome R packages and tools. Inspired by [awesom](#)

⭐ for Top 50 CRAN downloaded packages or repos with 400+ ⭐

- [Awesome R](#)
  - [2020](#)
  - [2019](#)
  - [2018](#)
  - [Integrated Development Environments](#)
  - [Syntax](#)
  - [Data Manipulation](#)
  - [Graphic Displays](#)
  - [Html Widgets](#)
  - [Reproducible Research](#)
  - [Web Technologies and Services](#)
  - [Parallel Computing](#)
  - [High Performance](#)
  - [Language API](#)
  - [Database Management](#)

- [Machine Learning](#)
- [Natural Language Processing](#)
- [Bayesian](#)
- [Optimization](#)
- [Finance](#)
- [Bioinformatics and Biostatistics](#)
- [Network Analysis](#)
- [Spatial](#)
- [R Development](#)
- [Logging](#)
- [Data Packages](#)
- [Other Tools](#)
- [Other Interpreters](#)
- [Learning R](#)
- [Resources](#)
  - [Websites](#)
  - [Books](#)
  - [Podcasts](#)
  - [Reference Cards](#)
  - [MOOCs](#)
  - [Lists](#)
- [Other Awesome Lists](#)

# R Related Project



## Related Projects

<https://www.r-project.org/other-projects.html>

### • Bioconductor: Bioinformatics with R

<http://www.bioconductor.org>

- Rgeo: Spatial Statistics with R

<https://geodacenter.asu.edu/projects/rsp>

- Robust Statistics with R

<http://www.statistik.tuwien.ac.at/rsr/>

- Rmetrics: Financial Market Analysis with R

<http://www.rmetrics.org>

- Omegahat: Distributed Statistical Computing

<http://www.omegahat.org>

- Graphical User Interfaces for R

[http://www.sciviews.org/\\_rgui/](http://www.sciviews.org/_rgui/)

- ESS: Emacs speaks Statistics

<http://ess.R-project.org/>

- R for Mediawiki

[http://mars.wiwi.hu-berlin.de/mediawiki/sk/index.php/R\\_Extension\\_for\\_MediaWiki](http://mars.wiwi.hu-berlin.de/mediawiki/sk/index.php/R_Extension_for_MediaWiki)

- PowerShell R Interop Cmdlet

<http://powershellinterop.codeplex.com>

- TANGO/ALGENCAN

<http://www.ime.usp.br/~ebirgin/tango/>

Thanks for making [BioC 2016: Where Software and Biology Connect](#) a great success!

## About Bioconductor

Bioconductor provides tools for the analysis and comprehension of high-throughput genomic data. Bioconductor uses the R statistical programming language, and is open source and open development. It has two releases each year, [1.211 software packages](#), and an active user community. Bioconductor is also available as an [AMI](#) (Amazon Machine Image) and a series of [Docker](#) images.

## News

- Bioconductor 3.3 is available.
- Bioconductor [F1000 Research Channel](#) launched.
- Orchestrating high-throughput genomic analysis with [Bioconductor](#) ([abstract](#)) and other [recent literature](#).
- Read our latest [newsletter](#) and [course material](#).
- Use the [support site](#) to get help installing, learning and using Bioconductor.

## Install »

Get started with Bioconductor

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- [Explore packages](#)
- [Get support](#)
- [Latest newsletter](#)
- [Follow us on twitter](#)
- [Install R](#)

## Learn »

Master Bioconductor tools

- [Courses](#)
- [Support site](#)
- [Package vignettes](#)
- [Literature citations](#)
- [Common work flows](#)
- [FAQ](#)
- [Community resources](#)
- [Videos](#)

## Use »

Create bioinformatic solutions with Bioconductor

- [Software](#), [Annotation](#), and [Experiment](#) packages
- [Amazon Machine Image](#)
- [Latest release announcement](#)
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## Develop »

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- [Developer resources](#)
- [Use BioC 'devtools'](#)
- 'Devel' [Software](#), [Annotation](#) and [Experiment](#) packages
- [Package guidelines](#)
- [New package submission](#)
- [Build reports](#)

<http://www.bioconductor.org>

# 說明手冊 (Help Manuals)

The screenshot shows the R Help system interface with three windows:

- The R Language**: A browser window showing general R documentation.
- R: Package Index**: A browser window showing a list of R packages and their descriptions.
- R: 3D visualization device system (OpenGL)**: A browser window showing the documentation for the rgl package.

The left sidebar of the main window contains the following links:

- Windows
- Help
- Console
- FAQ on R
- FAQ on R for Win
- Manuals (in PDF)
- R functions (text)
- Html help**
- Search help...
- search.r-project.org
- Apropos...
- R Project home page
- CRAN home page
- About

The central area displays the R: Package Index window, which lists various R packages. The 'rgl' package is highlighted with a cursor. The right side of the R: Package Index window shows the documentation for the rgl package, including its version (0.93.1098) and a list of help pages (A, B, C, D, E, G, I, L, M, N, O, P, Q, R, S, T, V, W, misc).

# 求助範例

```
> help.search("t test")
> ?t.test
```

```
> help(solve)
> ?solve
> help("[[")
> help.start()
> ?help
```

**NOTE:**

```
> ?'if'
> ?Control
> ?'while'
> ?'%'
```

R: Search Results

The search string was "t test"

Vignettes:

- [Rcpp::Rcpp-unitTests](#) Rcpp-unitTests
- [survival::tests](#) Cox models and ``type 3'' Tests

Code demonstrations:

- [fda::create.test](#) run some tests on basis functions
- [gsubfn::gsubfn-unitTests](#) Run gsubfn unit test suite.
- [sqldf::sqldf-unitTests](#) Run unit tests using svUnit package.
- [tcltk::tkttest](#) t-test example of GUI interface to a function call.

Help pages:

- [ade4::RV.rtest](#) Monte-Carlo Test on the sum of eigenvalues of a co-inertia analysis (in R).
- [ade4::gearymoran](#) Moran's I and Gearyc randomization tests for spatial and phylogenetic autocorrelation

R: Search Results

stats::fisher.test FISHER'S EXACT TEST FOR COUNT DATA

stats::fligner.test Fligner-Killeen Test of Homogeneity of Variances

stats::friedman.test Friedman Rank Sum Test

stats::kruskal.test Kruskal-Wallis Rank Sum Test

stats::ks.test Kolmogorov-Smirnov Tests

stats::mantelhaen.test Cochran-Mantel-Haenszel Chi-Squared Test for Count Data

stats::mauchly.test Mauchly's Test of Sphericity

stats::mcnemar.test McNemar's Chi-squared Test for Count Data

stats::mood.test Mood Two-Sample Test of Scale

stats::pairwise.t.test Pairwise t tests

stats::pairwise.wilcox.test Pairwise Wilcoxon Rank Sum Tests

stats::poisson.test Exact Poisson tests

stats::power.anova.test Power Calculations for Balanced One-Way Analysis of Variance Tests

stats::power.prop.test Power Calculations for Two-Sample Test for Proportions

stats::power.t.test Power calculations for one and two sample t tests

stats::PP.test Phillips-Perron Test for Unit Roots

stats::quade.test Quade Test

stats::shapiro.test Shapiro-Wilk Normality Test

stats::t.test Student's t-Test

stats::var.test F Test to Compare Two Variances

stats::wilcox.test Wilcoxon Rank Sum and Signed Rank Tests

survival::plot.cox.zph Graphical Test of Proportional Hazards

survival::survobrien O'Brien's Test for Association of a Single Variable with Survival

tools::RdTextFilter Select text in an Rd file.

utils::file\_test Shell-style Tests on Files

?package.name

?package.name::function.name

apropos("norm") #search all function names for the "norm" key



# 求助範例 (cont.)

28/55

t.test {stats}

Student's t-Test

Description

Performs one and two sample t-tests on vectors of data.

Usage 語法

t.test(x, ...)

## Default S3 method:

```
t.test(x, y = NULL,  
       alternative = c("two.sided", "less", "greater"),  
       mu = 0, paired = FALSE, var.equal = FALSE,  
       conf.level = 0.95, ...)
```

## S3 method for class 'formula'

```
t.test(formula, data, subset, na.action, ...)
```

Arguments 參數

x a (non-empty) numeric vector of data values.

y an optional (non-empty) numeric vector of data values.

alternative a character string specifying the alternative hypothesis, must be one "less". You can specify just the initial letter.

mu a number indicating the true value of the mean (or difference in mean).

paired a logical indicating whether you want a paired t-test.

var.equal a logical variable indicating whether to treat the two variances as being used to estimate the variance otherwise the Welch (or Satterthwaite) used.

Details

## 說明

The formula interface is only applicable for the 2-sample tests.

alternative = "greater" is the alternative that x has a larger mean than y.

If paired is TRUE then both x and y must be specified and they must be length 1 or length equal. If var.equal is TRUE then the pooled estimate of the variance is used; if FALSE then the variance is estimated separately for both groups and weighted averages are used to compute the estimate of the mean difference.

Value 回傳值

A list with class "htest" containing the following components:

statistic the value of the t-statistic.

parameter the degrees of freedom for the t-statistic.

p.value the p-value for the test.

conf.int a confidence interval for the mean appropriate to the specified alternative.

estimate the estimated mean or difference in means depending on whether it was a one-sample or two-sample test.

null.value the specified hypothesized value of the mean or mean difference depending on whether it was a one-sample or two-sample test.

alternative a character string describing the alternative hypothesis.

method a character string indicating what type of t-test was performed.

data.name a character string giving the name(s) of the data.

See Also

[prop.test](#)

## 範例

Examples

```
require(graphics)
```

```
t.test(1:10, y = c(7:20)) # P = .00001855
```

```
t.test(1:10, y = c(7:20, 200)) # P = .1245 -- NOT significant anymore
```

```
## Classical example: Student's sleep data
```

```
plot(extra ~ group, data = sleep)
```

```
## Traditional interface
```

```
with(sleep, t.test(extra[group == 1], extra[group == 2]))
```

```
## Formula interface
```

```
t.test(extra ~ group, data = sleep)
```



# Search R

<http://www.rdocumentation.org/>

Search all 25,990 R packages on CRAN and Bioconductor

For example, try 'ggplot2' or 'geom\_point'

<https://cran.r-project.org/web/packages/sos/index.html>

**sos**: Search Contributed R Packages,

Sort by Package

RSeek:

<https://rseek.org/>

The screenshot shows the RSeek search interface. It features a large R logo with the word "SEEK" below it. A search bar is centered above a blue search button. Below the search bar, there is some small text: "Created and maintained by [Sasha Goodman](#). Serving the R community since 2007. Version 2.0." There are also links for "Privacy Policy" and "Download and Install R".

**pkgsearch**: Search and Query CRAN R

Packages

<https://cran.r-project.org/web/packages/pkgsearch/index.html>

```
# ps() is an alias to pkg_search()  
> install.packages("pkgsearch")  
> library(pkgsearch)  
> ps("survival")  
> ps("networks")  
> ps("visualization")
```



## &gt; demo( )

```
R demos

Demos in package 'base':

error.catching      More examples on catching and handling errors
is.things            Explore some properties of R objects and
                     is.FOO() functions. Not for newbies!
recursion            Using recursion for adaptive integration
scoping              An illustration of lexical scoping.

Demos in package 'graphics':

Hershey               Tables of the characters in the Hershey
                      vector fonts
Japanese              Tables of the Japanese characters in the
                      Hershey vector fonts
graphics              A show of some of R's graphics capabilities
image                 The image-like graphics builtins of R
persp                 Extended persp() examples
plotmath              Examples of the use of mathematics annotation

Demos in package 'grDevices':

colors                A show of R's predefined colors()
hclColors             Exploration of hcl() space

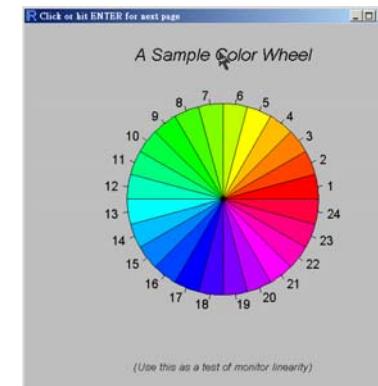
Demos in package 'stats':

glm.vr                Some glm() examples from V&R with several
                      predictors
lm.glm                Some linear and generalized linear modelling
                      examples from 'An Introduction to Statistical
                      Modelling' by Annette Dobson
nlm                  Nonlinear least-squares using nlm()
smooth               'Visualize' steps in Tukey's smoothers

Use 'demo(package = .packages(all.available = TRUE))'
to list the demos in all *available* packages.
```

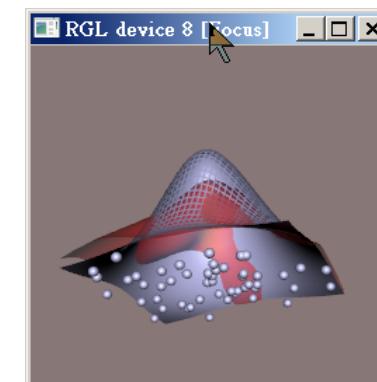
```
demo(package = .packages(all.available = TRUE))
```

```
> demo(graphics)
```



```
> library(rgl)
```

```
> demo(rgl)
```





# 演示程式碼 (Demo Code)

31/55

The screenshot shows the EmEditor application open with the file `graphics.R`. The code in the editor window is as follows:

```
1 # Copyright (C) 1997-2009 The R Core Team
2 #
3 require(datasets)
4 require(grDevices); require(graphics)
5 #
6 ## Here is some code which illustrates some of the differences between
7 ## R and S graphics capabilities. Note that colors are generally specified
8 ## by a character string name (taken from the X11 rgb.txt file) and that
9 ## textures are given similarly. The parameter "bg" sets the background
10 ## parameter for the plot and there is also an "fg" parameter which sets
11 ## the foreground color.
12 #
13 #
14 x <- stats::rnorm(50)
15 opar <- par(bg = "white")
16 plot(x, ann = FALSE, type = "n")
17 abline(h = 0, col = gray(.90))
18 lines(x, col = "green4", lty = "dotted")
19 points(x, bg = "limegreen", pch = 21)
20 title(main = "Simple Use of Color In a Plot",
21       xlab = "Just a Whisper of a Label",
22       col.main = "blue", col.lab = gray(.8),
23       cex.main = 1.2, cex.lab = 1.0, font.main = 4, font.lab = 3)
24 #
25 #
26 ## A little color wheel. This code just plots equally spaced hues
27 ## a pie chart. If you have a cheap SVGA monitor (like me) you will
28 ## probably find that numerically equispaced does not mean visually
29 ## equispaced. On my display at home, these colors tend to cluster at
```

The status bar at the bottom left indicates "4.92 KB (5,039 字節), 146 行。". The status bar at the bottom right shows "R 行 8, 欄 56 繁體中文 (Big5)".

To the right of the editor, a file browser window titled "demo" is open, showing the directory structure:

- Files ▾ R ▾ R-3.1.0 ▾ library ▾ rgl ▾ demo
- 名稱

  - graphics.R
  - Hershey.R
  - image.R
  - Japanese.R
  - persp.R
  - plotmath.R

- 燒錄 新增資料夾
- 名稱

  - abundance.r
  - bivar.r
  - envmap.r
  - flag.R
  - hist3d.r
  - lollipop3d.R
  - lsystem.r
  - mouseCallbacks.R
  - regression.r
  - rgl.r
  - shapes3d.R
  - stereo.R
  - subdivision.r

# R程式IDE編輯器: RStudio



Download RStudio Desktop  
<https://posit.co/>

The screenshot shows the Posit website's main navigation bar with links for PRODUCTS, SOLUTIONS, LEARN & SUPPORT, EXPLORE MORE, PRICING, and a search icon. A prominent blue button labeled 'DOWNLOAD RSTUDIO' is visible. Below the navigation, the text 'Build better with Posit Workbench' is displayed in large blue font. To the right of the text are three overlapping images: a code editor window showing R code, a 'New Session' dialog box, and a scatter plot.

Code in R. Code in Python. Develop in the environments you prefer: Jupyter, VSCode, and the RStudio IDE. Create the data products your stakeholders need: applications, reports, dashboards, and more.

IDE: integrated development environment

The screenshot shows the RStudio Desktop landing page with the heading 'RStudio Desktop'. Below the heading is a paragraph describing the product: 'Used by millions of people weekly, the RStudio integrated development environment (IDE) is a set of tools built to help you be more productive with R and Python.' The page also features a 'DOWNLOAD' button and links for 'PRODUCTS', 'SOLUTIONS', 'LEARN & SUPPORT', 'EXPLORE MORE', and 'PRICING'.

# 客制化環境



R code - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

rcode.R x Source on Save Go to file/function Run Source

```

49 h <- hist(ScoreData$V1, breaks=seq(0, 100, 10), right=F, plot = F)
50 a <- max(h$counts)
51
52 no.take <- nrow(ScoreData)
53 no.give.up <- length(which(is.na(ScoreData$V1)))
54 no.100 <- length(which(ScoreData$V1 == 100))
55 no.pass <- length(which(ScoreData$pass))
56 no.fail <- no.take - no.pass - no.give.up
57 pass.rate <- no.pass/(no.take-no.give.up)
58 Average <- round(mean(ScoreData$V1, na.rm = T), 2)
59 Median <- round(median(ScoreData$V1, na.rm = T), 2)
60 SD <- round(sd(ScoreData$V1, na.rm = T), 2)
61
62 ggplot(ScoreData, aes(x = V1, fill = pass)) +
  geom_histogram(color="black", breaks = seq(0, 100, 10), closed = "left") +
  labs(title = paste0("NCCU ", year, " ", subject, " 學期總成績"), x = "分數", y = "人數",
       caption = "http://www.hmwu.idv.tw") +
  scale_x_continuous(breaks = seq(0, 100, 10)) +
  scale_y_continuous(breaks = 1:a) +
  theme(legend.position = "none") +
  annotate(geom="text", hjust = 0, x = 30, y = a, label = paste0("修課人數: ", no.take))
  annotate(geom="text", hjust = 0, x = 30, y = a-1, label = paste0("棄修人數: ", no.give.up))
  annotate(geom="text", hjust = 0, x = 30, y = a-2, label = paste0("100分人數: ", no.100))
  annotate(geom="text", hjust = 0, x = 30, y = a-3, label = paste0("及格人數: ", no.pass))
  annotate(geom="text", hjust = 0, x = 30, y = a-4, label = paste0("不及格人數: ", no.fail))
  annotate(geom="text", hjust = 0, x = 30, y = a-5, label = paste0("及格率: ", round(pass.r)))
  annotate(geom="text", hjust = 0, x = 30, y = a-6, label = paste0("分數平均數: ", Average))
  annotate(geom="text", hjust = 0, x = 30, y = a-7, label = paste0("分數中位數: ", Median))

```

74:67 (Top Level) - R Script

Environment History Files Connections Tutorial

D: \OS-NCCU\_Course\_Now\ Rcode

Name Size Modified

- ..
- .RData 3.6 KB Jan 23, 2023, 7:38 PM
- .Rhistory 29.8 KB Jan 23, 2023, 7:38 PM
- 1101-Reg.txt 356 B Jan 27, 2022, 1:28 AM
- 1101-Stat.txt 1.1 KB Jan 27, 2022, 1:28 AM
- 1102-Reg.txt 617 B Jun 29, 2022, 3:39 PM
- 1102-Stat.txt 391 B Jun 26, 2022, 11:40 PM
- 1111-Reg-histogram2.png 58 KB Jan 23, 2023, 1:09 AM
- 1111-Reg.txt 273 B Jan 22, 2023, 4:22 PM
- 1111-Stat-histogram.png 61 KB Jan 23, 2023, 1:04 AM
- 1111-Stat.txt 372 B Feb 22, 2023, 10:57 PM
- 128823-000359031.doc 226.5 KB Jan 27, 2022, 1:23 AM
- 128823-300807001.doc 71.9 KB Jan 27, 2022, 1:24 AM
- png 3.5 KB Feb 22, 2023, 10:57 PM
- rcode.R 217 B Feb 22, 2023, 10:51 PM

Console Background Jobs

R 4.2.2 D:\OS-NCCU.Course\_Now\rCode\

```

+ annotate(geom="text", hjust = 0, x = 0, y = a, label = paste0("小考(2次): ", quiz.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-1, label = paste0("期中考: ", midterm.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-2, label = paste0("期末考: ", final.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-3, label = paste0("作業(無): ", HW.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-4, label = paste0("點名(無): ", attend.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-5, label = paste0("實習課(TA): ", TA.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-6, label = paste0("程式加分考(自由參加): ", bonus.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-7, label = paste0("閱讀心得(自由參加): ", other.p)) +
+ annotate(geom="text", hjust = 0, x = 0, y = a-8, label = paste0("總分: ", total.p))
Warning messages:
1: package 'ragg' is not available; using default graphics backend instead
2: Removed 9 rows containing non-finite values (stat_bin()).
> |
```

Plots Packages Help Viewer Presentation

NCCU 111-1 統計學(一) 學期總成績

22-	小考(2次): 30%	修課人數: 85
21-	期中考: 30%	棄修人數: 9
20-	期末考: 40%	100分人數: 0
19-	作業(無): 0%	及格人數: 61
18-	點名(無): 0%	不及格人數: 15
17-	實習課(TA): 0%	及格率: 80.26%
16-	程式加分考(自由參加): 20%	分數平均數: 67.49
15-	閱讀心得(自由參加): 10%	分數中位數: 73.5
14-	總分: 130%	分數標準差: 22.39
13-		
12-		
11-		
10-		
9-		
8-		
7-		
6-		
5-		
4-		
3-		
2-		
1-		
0-		

EN [www.hmwu.idv.tw](http://www.hmwu.idv.tw)

# Tools => Global Options...

The screenshot shows two overlapping RStudio 'Options' dialog boxes.

**Left Dialog (General Tab):**

- R Sessions:**
  - R version: [Default] [64-bit] C:\Program Files\R\R-4.2.2 (Change...)
  - Default working directory (when not in a project): ~ (Browse...)
  - Restore most recently opened project at startup
  - Restore previously open source documents at startup
- Workspace:**
  - Restore .RData into workspace at startup
  - Save workspace to .RData on exit: Ask
- History:**
  - Always save history (even when not saving .RData)
  - Remove duplicate entries in history
- Other:**
  - Wrap around when navigating to previous/next tab
  - Automatically notify me of updates to RStudio
  - Send automated crash reports to RStudio

**Buttons at the bottom:** OK, Cancel, Apply

**Right Dialog (Pane Layout Tab):**

Choose the layout of the panels in RStudio by selecting from the controls in each panel. Add up to three additional Source Columns to the left side of the layout. When a column is removed, all saved files within the column are closed and any unsaved files are moved to the main Source Pane.

**Add Column** (+) Remove Column (-)

Source	Console
Source	Console

**Environment, History, Files, Colors:**

- Environment
- History
- Files
- Plots
- Connections
- Packages
- Help
- Build
- VCS
- Tutorial

**Plots, Packages, Help, Viewer, etc.:**

- Environment
- History
- Files
- Plots
- Connections
- Packages
- Help
- Build
- VCS
- Tutorial

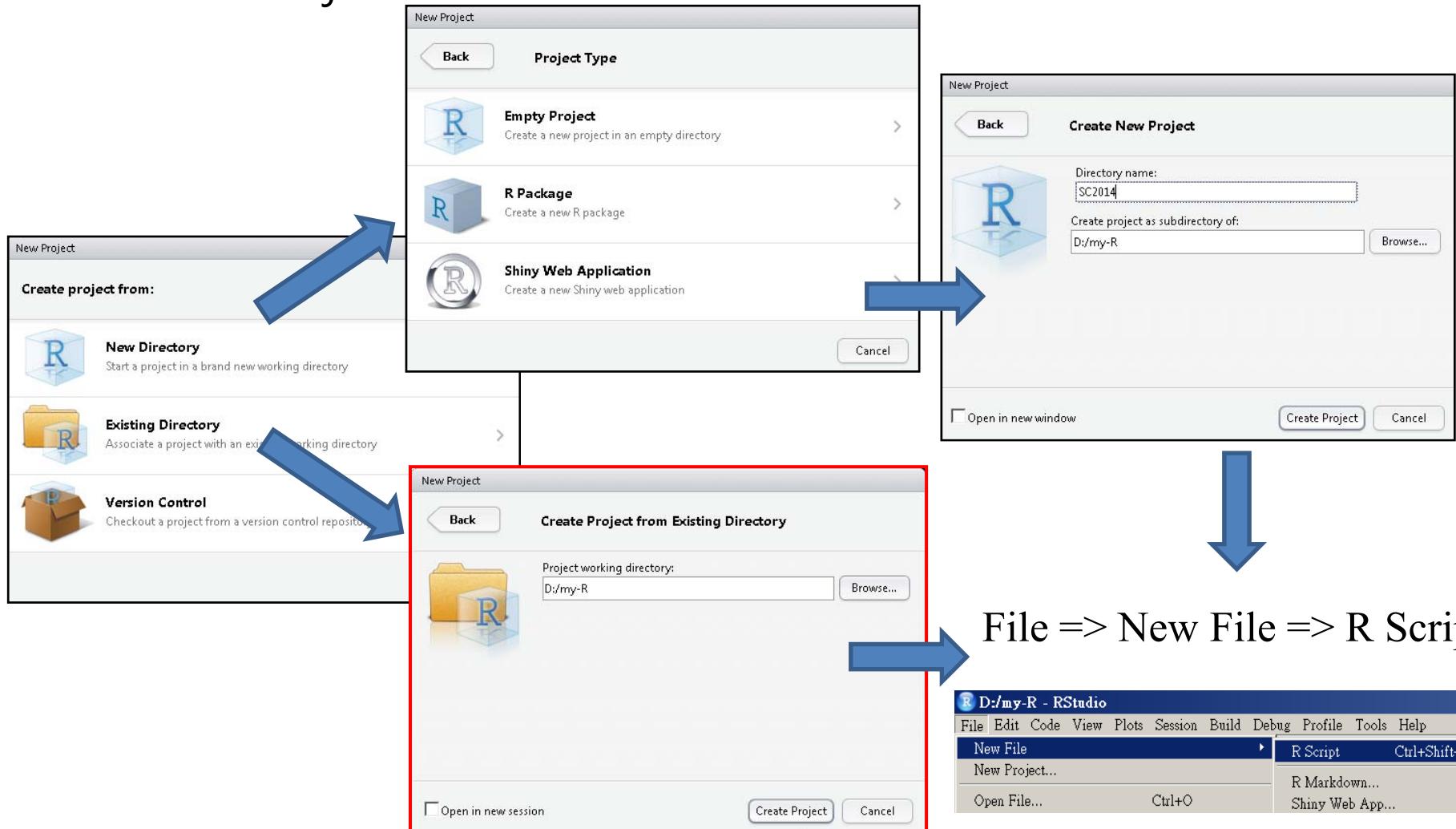
**Buttons at the bottom:** OK, Cancel, Apply



# 新增專案及R程式檔

35/55

- File => New Project... => New Directory => Empty Project => Create Project



# 執行程式

The screenshot shows the RStudio interface with the following components:

- Script Editor (myRcode-chap01.R):**

```

1 #####
2 # My testing R code
3 # Han-Ming Wu
4 # 2024/07/16
5 #####
6
7
8 cat ("Use iris data to test")
9 data(iris)
10 View(iris)
11 head(iris, 3)
12 summary(iris)
13 attach(iris)
14 plot(Sepal.Length, Sepal.Width, col=Species)
15

```
- Console:**

```

Median :5.000 Median :5.000 Median :4.350
Mean   :5.843 Mean   :3.057 Mean   :3.758
3rd Qu.:6.400 3rd Qu.:3.300 3rd Qu.:5.100
Max.   :7.900 Max.   :4.400 Max.   :6.900
Petal.Width Species
Min.   :0.100 setosa  :50
1st Qu.:0.300 versicolor:50
Median :1.300 virginica:50
Mean   :1.199
3rd Qu.:1.800
Max.   :2.500
> attach(iris)
> plot(Sepal.Length, Sepal.Width, col=Species)
>

```
- Environment Browser:**
  - Disk: D: > my-R > SC2014
  - File: myRcode-chap01.R (384 B, Jul 9, 2014, 12:05 PM)
  - File: SC2014.Rproj (218 B, Jul 9, 2014, 12:03 PM)
- Plots:**

A scatter plot showing Sepal.Length on the x-axis (ranging from 4.5 to 8.0) and Sepal.Width on the y-axis (ranging from 2.0 to 4.0). The data points are colored by species: setosa (light blue), versicolor (orange), and virginica (green).

以鍵盤選取程式碼:

配合Home, End, Shift, 上下左右鍵  
執行: Ctrl + Enter 或 Ctrl + R

# 安排RStudio 專案目錄結構

The screenshot shows the RStudio interface with the following components:

- Top Bar:** File, Edit, Code, View, Plots, Session, Build, Debug, Tools, Help.
- Toolbar:** Source on Save, Run, Source.
- Code Editor:** X:/08-MyProjects/07-exploreSDA/MyPackage/exploreSDA - RStudio. It contains R code for the exploreSDA package, including data loading, plotting, and function sourcing.
- Console:** X:/08-MyProjects/07-exploreSDA/MyPackage/exploreSDA/. It shows the execution of R code and an error message about the 'plot.index.i' function.
- Project Explorer:** Shows the project structure under X:/08-MyProjects/07-exploreSDA/MyPackage/exploreSDA. It includes folders like src-x64, src-i386, src, raw-data, R, man, inst, extdata, demo, data, and files like README.txt, exploreSDA.dll, and .Rhistory.
- Project Menu:** A dropdown menu for the current project 'exploreSDA' with options: New Project..., Open Project..., Open Project in New Session..., Close Project, exploreSDA (selected), Rcode-isoSIR, Rcode-PathPointSIR, Rcode-SIR-TimeInterval, Rcode-ISOMAP-SDA, Rcode-SIR+SDA, Clear Project List, and Project Options... A red dashed circle highlights the 'exploreSDA' option in the menu.

制作一R套件的目錄結構

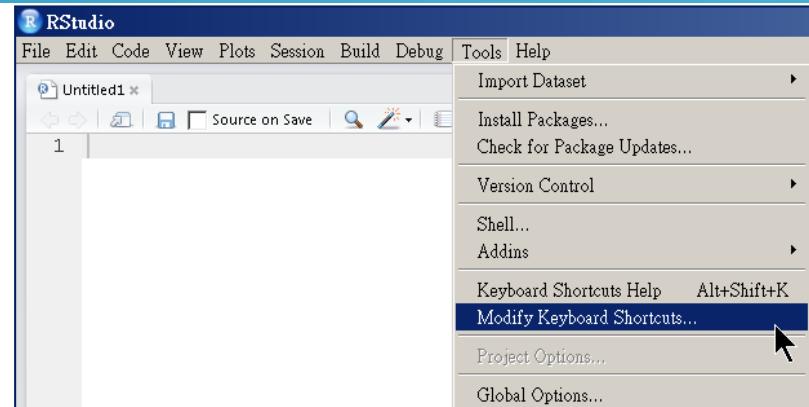


# RStudio 常用快速鍵 (Windows)

38/55

## 控制台(Console)

- 游標移動到控制台 (Move cursor to Console): **Ctrl+2**
- 清除控制台 (Clear console): **Ctrl+L**
- 移動游標到行首 (Move cursor to beginning of line): **Home**
- 移動游標到行尾 (Move cursor to end of line): **End**
- 調出歷史指令 (Navigate command history): **上箭頭/下箭頭**
- 彈出歷史指令 (Popup command history): **Ctrl+上箭頭**
- 中斷正在執行的指令 (Interrupt currently executing command): **Esc**



RStudio 0.99.893

<C:\Program Files\RStudio\www\docs\keyboard.htm>

## 原始碼編輯區(Source)

- 游標移動到原始檔編輯區 (Move cursor to Source Editor): **Ctrl+1**
- 存檔 (Save active document): **Ctrl+S**
- 關閉當前檔案 (Close active document): **Ctrl+W**
- 執行當前行或者選擇的行 (Run current line/selection): **Ctrl+Enter**
- 執行當前檔 (Run current document): **Ctrl+Alt+R**
- 從檔案開頭執行到該行 (Run from document beginning to current line): **Ctrl+Alt+B**
- 行縮排 (Reindent lines) : **Ctrl+I**
- 註解(或消除)當前行或者所選程式碼 (Comment/uncomment current line/selection): **Ctrl+Shift+C**
- 跳轉到配對的括弧 (Jump to Matching Brace/Parentheses): **Ctrl+P**
- 刪除行 (Delete Line): **Ctrl+D**
- 選擇 (Select): **Shift+箭頭**

RStudio , 重新載入R:  
選單: Session => Restart R  
快速鍵: ctrl + shift + F10  
指令: > **.rs.restartR()**

## 一般

- 尋找和替換 (Find and Replace): **Ctrl+F**; 尋找上一個 (Find Previous): **Shift+F3**; 尋找下一個(Find Next): **F3**
- 上一步 (Undo ): **Ctrl+Z**; 剪下 (Cut): **Ctrl+X**; 複制 (Copy): **Ctrl+C**; 貼上 (Paste): **Ctrl+V**; 全選 (Select All): **Ctrl+A**

# RStudio Help

The screenshot shows the RStudio IDE interface with the 'Help' menu open. The 'Cheat Sheets' option is highlighted with a red arrow pointing to the 'RStudio IDE : CHEAT SHEET' documentation page below.

**RStudio IDE : CHEAT SHEET**

This page provides a comprehensive overview of various features and tools available in the RStudio IDE:

- Documents and Apps**: Includes sections for R Help, Search R Help, About RStudio, Check for Updates, Accessibility, RStudio Docs, RStudio Community Forum, Cheat Sheets, Keyboard Shortcuts Help, Markdown Quick Reference, Roxygen Quick Reference, and Diagnostics.
- Source Editor**: Details on navigating code, using the Source Editor, and working with multiple files.
- Tab Panes**: Information on managing tabs, workspace, databases, memory usage, and environments.
- Version Control**: Instructions for committing changes, pushing to a remote repository, and viewing history.
- Debug Mode**: Guidance on setting breakpoints, launching debuggers, and examining variables.
- Package Development**: Steps for creating new packages, enabling documentation, and using the GUI Package manager.
- Plots**: Details on creating and managing plots in the Plots pane.
- Help**: Information on opening documentation in the Help pane.
- Viewer**: Descriptions of the Viewer pane's capabilities.
- Console**: Instructions for running commands in the console.
- Terminal**: Guidance on using the terminal for executing commands.
- Jobs**: Information on managing jobs and processes.

The bottom of the page includes a copyright notice: "CC BY SA Posit Software, PBC - info@posit.org • posit.org • Learn more at rstudio.com • Font Awesome 5.15.3 • RStudio IDE 1.4.717 • Updated: 2023-07".

## Posit Documentation



# Posit Cheatsheets

<https://posit.co/resources/cheatsheets/>

# Posit Cheatsheets

Data transformation with dplyr :: CHEAT SHEET

dplyr functions work with pipes and expect tidy data. In tidy data:

- Each variable is in its own column
- Each observation, or case, is in its own row
- x %>% f(y) becomes f(x, y)

**Manipulate Cases**

**EXTRACT CASES**

Row functions return a subset of rows as a new table.

- filter(data, ..., preserve = FALSE) Extract rows that meet logical criteria.  
filter(mtcars, mpg > 20)
- distinct(data, ..., keep\_all = FALSE) Remove rows with duplicate values.  
distinct(mtcars, gear)
- slice(data, ..., preserve = FALSE) Select rows by position.  
slice(mtcars, 1:15)
- slice\_sample(data, ..., n, prop, weight\_by = NULL, replace = FALSE) Randomly select rows. Use n to select a number of rows and prop to select a fraction of rows.  
slice\_sample(mtcars, n = 5, replace = TRUE)
- slice\_min(data, order\_by, ..., n, prop, with\_ties = TRUE) and slice\_max() Select rows with the lowest and highest values.  
slice\_min(mtcars, mpg = 25)
- slice\_head(data, ..., n, prop) and slice\_tail() Select the first or last rows.  
slice\_head(mtcars, n = 5)

**Logical and boolean operators to use with filter()**

- == < >= is.na() %in% | xor()
- != > >= !is.na() ! &

See ?base::Logic and ?Comparison for help.

**ARRANGE CASES**

Order rows by values of a column or columns (low to high), use with desc() to order from high to low.

- arrange(data, ..., by\_group = FALSE)
- arrange(data, ..., by\_group = TRUE)
- arrange(mtcars, mpg)
- arrange(mtcars, desc(mpg))

**ADD CASES**

Add one or more rows to a table.

- add\_row(data, ..., before = NULL, after = NULL)
- add\_col(data, ..., before = 1, after = 1)

**ungroup(x, ...)** Returns ungrouped copy of table.  
ungroup(g\_mtcars)

**Manipulate Variables**

**EXTRACT VARIABLES**

Column functions return a set of columns as a new vector or table.

- pull(data, var = -1, name = NULL, ...) Extract column values as a vector, by name or index.  
pull(mtcars, wt)
- select(data, ...) Extract columns as a table.  
select(mtcars, mpg:wt)
- relocate(data, ..., before = NULL, after = NULL) Move columns to new position.  
relocate(mtcars, mpg, cyl, after = last\_col())

**Use these helpers with select() and across()**

e.g. select(mtcars, mpg:cyl)

- contains(match) num\_range(prefix, range) e.g. mpg:cyl
- ends\_with(match) all\_of(...) any\_of(..., vars) e.g. gear
- starts\_with(match) matches(match) everything()

**MANIPULATE MULTIPLE VARIABLES AT ONCE**

**across(cols, funs, ..., names = NULL)** Summarise or mutate multiple columns in the same way.  
summarise(mtcars, across(everything(), mean))

**c\_across(cols)** Compute across columns in row-wise data.  
transmute(rownames(mtcars), total = sum(c\_across(1:2)))

**MAKE NEW VARIABLES**

Apply **vectorized functions** to columns. Vectorized functions take vectors as input and return vectors of the same length as output (see back).

**vectorized function**

- mutate(data, ..., keep = "all", before = NULL, after = NULL) Compute new column(s). Also add\_column(), add\_count(), and add\_tally().  
mutate(mtcars, gpm = 1 / mpg)
- transmute(data, ...) Compute new column(s), drop others.  
transmute(mtcars, gpm = 1 / mpg)
- rename(data, ...) Rename columns. Use rename\_with() to rename with a function.  
rename(mtcars, distance = dist)

CC BY SA Posit Software, PBC • [info@posit.co](mailto:info@posit.co) • [posit.co](#) • Learn more at [dplyr.tidyverse.org](https://dplyr.tidyverse.org) • dplyr 1.0.7 • Updated: 2021-07

**posit**

- Sparklyr Cheat Sheet
- R Markdown Cheat Sheet
- RStudio IDE Cheat Sheet
- Shiny Cheat Sheet
- Data Visualization Cheat Sheet
- Package Development Cheat Sheet
- Data Wrangling Cheat Sheet
- R Markdown Reference Guide
- Contributed Cheatsheets
- Base R
- Advanced R
- Regular Expressions
- How big is your graph? (base R graphics)



# R Packages Developed by RStudio

<https://posit.co/products/open-source/rpackages/>

R PACKAGES

Inspired by R and our community

Analyze and explore



Connect and Integrate



Communicate and interact



Model and predict



# 更新R軟體及R套件



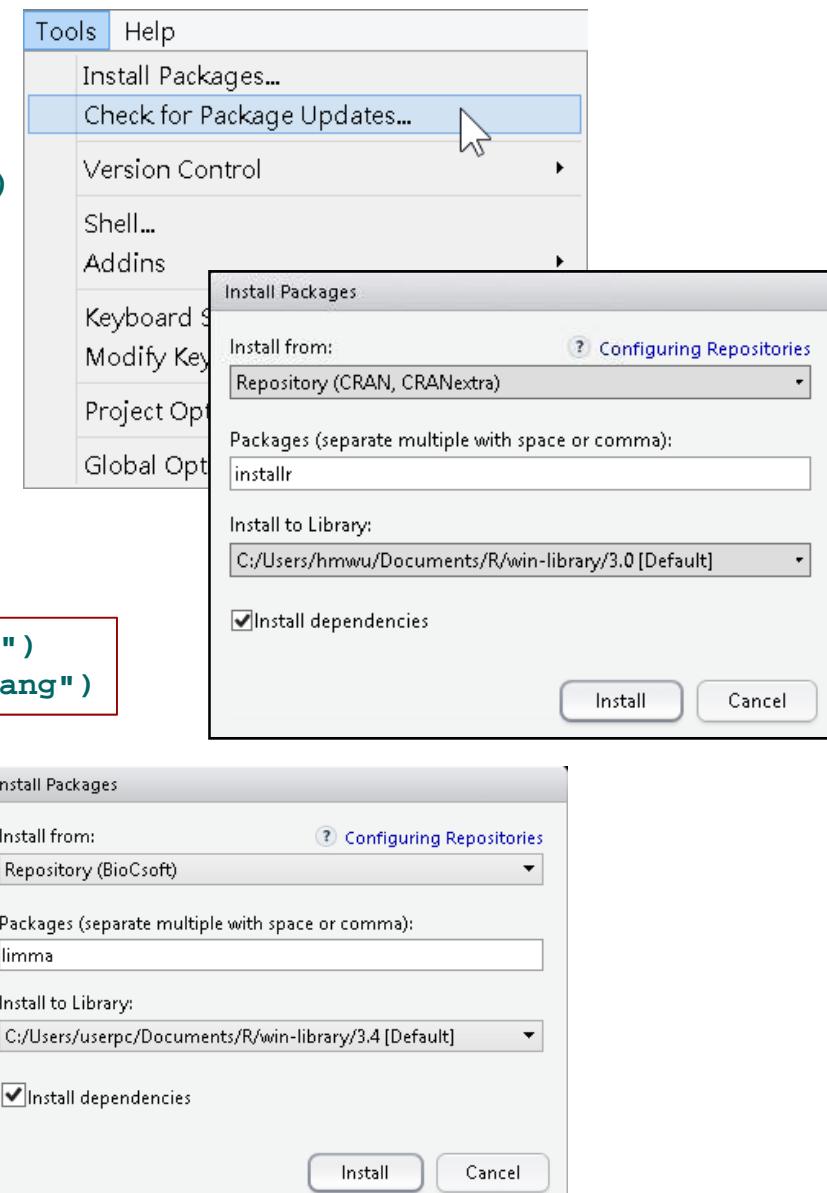
- 安裝R套件
- 利用installr套件更新R軟體及R套件

```
> update.packages(checkBuilt=TRUE, ask=FALSE)
  ■ RGui => Packages => Update packages
  ■ RStudio => Tools => Check for Package Updates...
```

```
> setRepositories()
--- Please select repositories for use in this
session ---
1: + CRAN
2: BioC software
3: BioC annotation
4: BioC experiment
5: BioC extra
6: CRAN (extras)
7: Omegahat
8: R-Forge
9: rforge.net

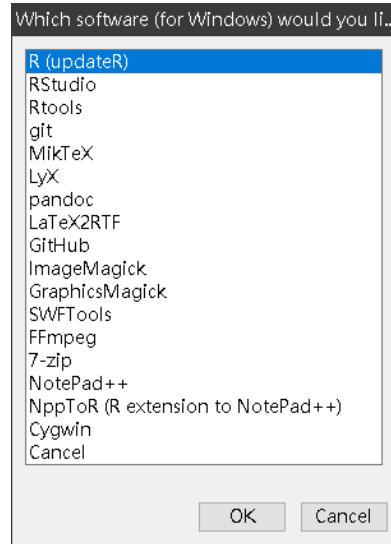
Enter one or more numbers separated by
spaces, or an empty line to cancel
1: 2

> update.packages("rlang")
> uninstall.packages("rlang")
```

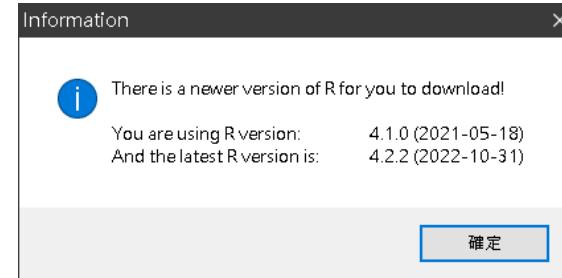


Note: 先暫時不移除舊版的R及套件!

# 利用installr套件更新R軟體



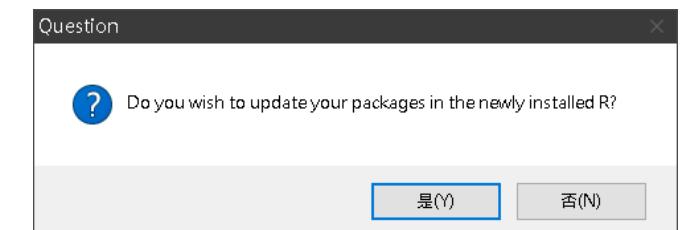
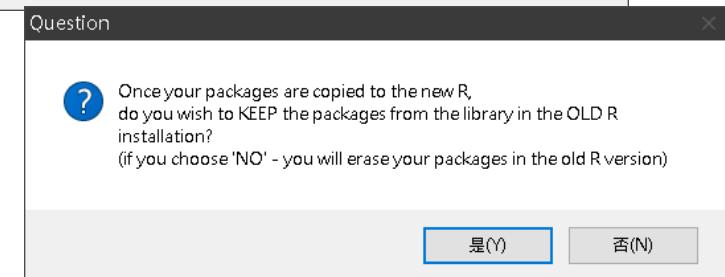
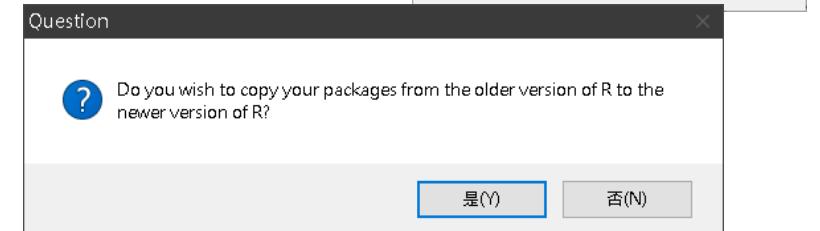
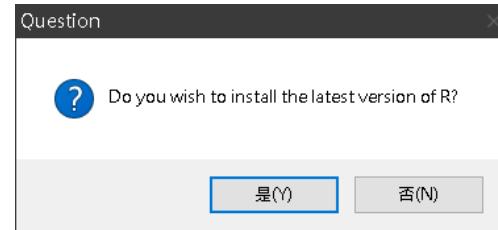
```
> library(installr)
> installr()
```



```
> sessionInfo()
```

```
> version

platform      x86_64-w64-mingw32
arch          x86_64
os            mingw32
crt           ucrt
system        x86_64, mingw32
status
major         4
minor         2.2
year          2022
month         10
day           31
svn rev       83211
language      R
version.string R version 4.2.2 (2022-10-31 ucrt)
nickname      Innocent and Trusting
```





# 學習資源

44/55

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R and Data Mining

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datacamp Learn R by doing Start For Free

This website presents documents, examples, tutorials and resources on R and data mining.

Documents on Data Mining with R



# R-bloggers • R Cheatsheet

**R-bloggers** R news and tut

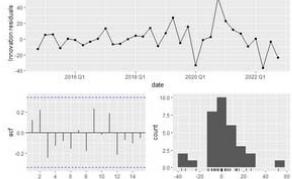
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## Forecasting Disney Stock Prices as the Latest Earnings Beat Estimates

February 21, 2023 | Selcuk Disci

Walt Disney (NYSE: DIS) recently announced significant labor cuts to ease shareholders' pressure on reducing costs due to rising streaming investment. These cuts and some structural changes in the company have provided some boost to stock prices. We will examine these price changes based on earnings per share (EPS) and ...

[Read more...]



## Calculating Log Likelihood Ratios (LLR module)

February 21, 2023 | ["Peter M.B. Cahusac"]

tl;dr Ever wanted to try doing an evidential analysis? You may have found it difficult to find a statistical platform to do it. Now there is the jamovi module jeva which can provide log likelihood ratios for a range of common statistical tests.



<https://www.r-bloggers.com>

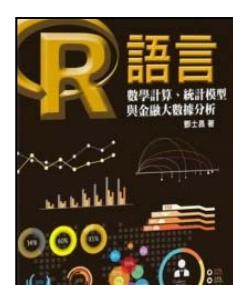
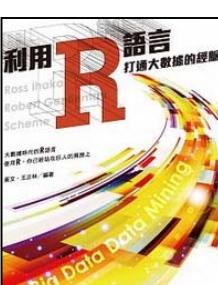
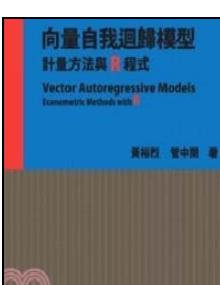
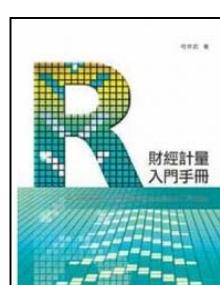
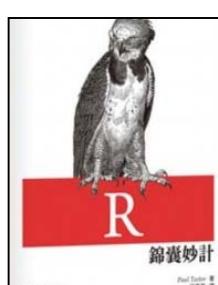
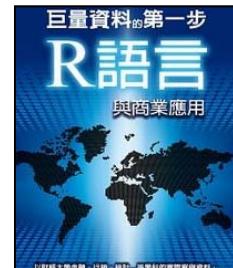
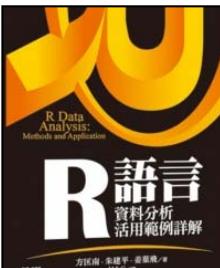
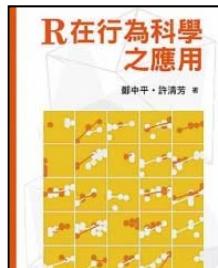
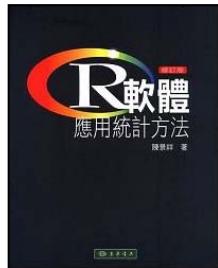
## R Cheatsheet:

- <https://pyoflife.com/wp-content/uploads/2022/01/R-Cheatsheet-.pdf>
- [https://www.rforecology.com/uploads/The\\_essential\\_R\\_Cheatsheet\\_v1\\_0.pdf](https://www.rforecology.com/uploads/The_essential_R_Cheatsheet_v1_0.pdf)
- <https://noeliagorod.com/2019/04/24/r-resources-free-courses-books-tutorials-cheat-sheets/>
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- <https://www.amelia.mn/Syntax-cheatsheet.pdf>
- <https://cheatography.com/dipakk/cheat-sheets/r-basic/pdf/>
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- <https://cheatography.com/bwaldo/cheat-sheets/r-subsetting/pdf/>



# 相關中文書目 (1)

46/55



# 查詢相關中文書目



博客來

全部

HOT 暢銷書56折 教科書7折起 貓咪節送贈品 飛利浦54折

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您輸入的關鍵字: R軟體

分類 (單選)  所有商品(1108)  圖書(341)  影音(26)  雜誌(15)  百貨(696)  電子書(30)

顯示所有篩選 清除篩選 確認

搜尋結果共 1108 筆, 頁數 1 / 47

排序依 準確度 | 呈現: 列表 小圖

應用機器學習  
R軟體實務演練

R軟體：應用統計方法(二版)(附光碟1片)

R軟體統計應用分析實務

R軟體在決策樹的實務應用

R軟體統計進階分析實務

心理測驗  
理論與應用  
含RT與R軟體分析

應用機器學習 : R軟體實務 | R軟體 : 應用統計方法(二版)(附光碟1片) | R軟體統計應用分析實務 | R軟體在決策樹的實務應用 | R軟體統計進階分析實務 | 心理測驗理論與應用 : 含RT與R軟體分析



# R/RStudio on the Phone

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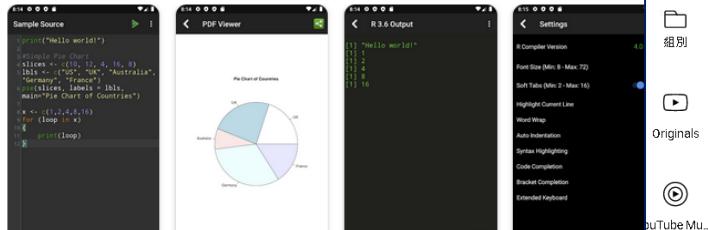
## R Programming Compiler

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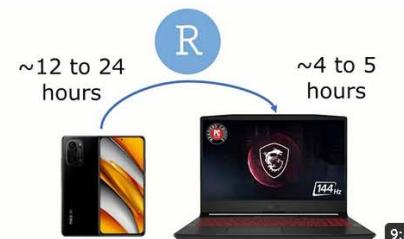
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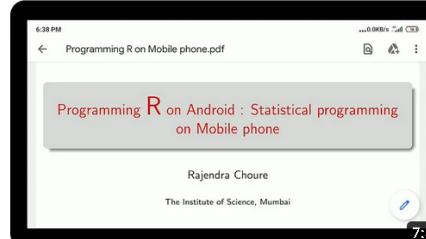


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### How to install RStudio on Android



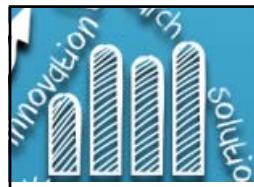
How to install RStudio on Android  
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# Rcmdr: R Commander

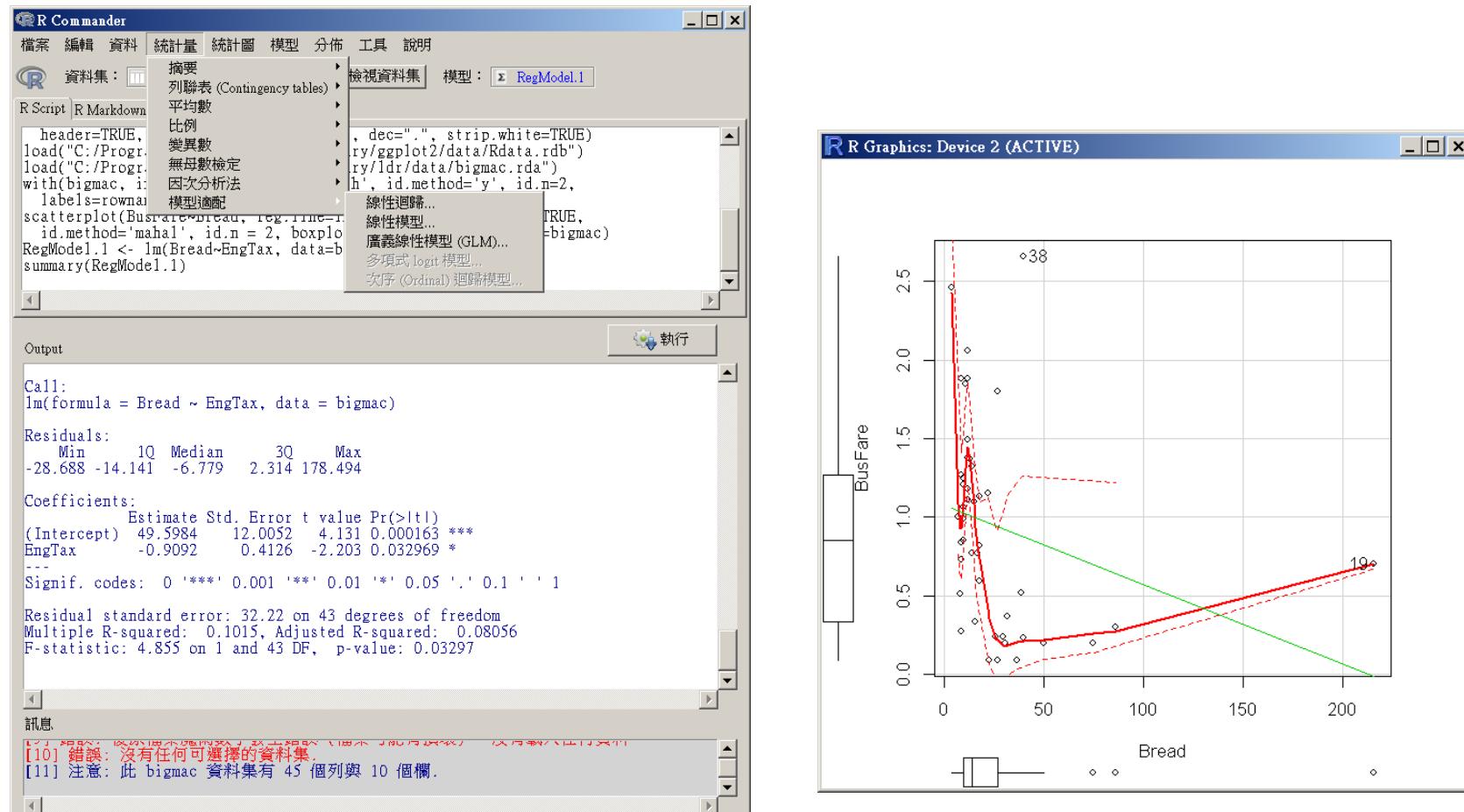
## The R Commander: A Basic-Statistics GUI for R

Current Version: 2.7-x

John Fox

<https://cran.r-project.org/web/packages/Rcmdr/index.html>

<https://socialsciences.mcmaster.ca/jfox/Misc/Rcmdr/>





**R** AnalyticFlow

EN JP

## Overview

## Downloads

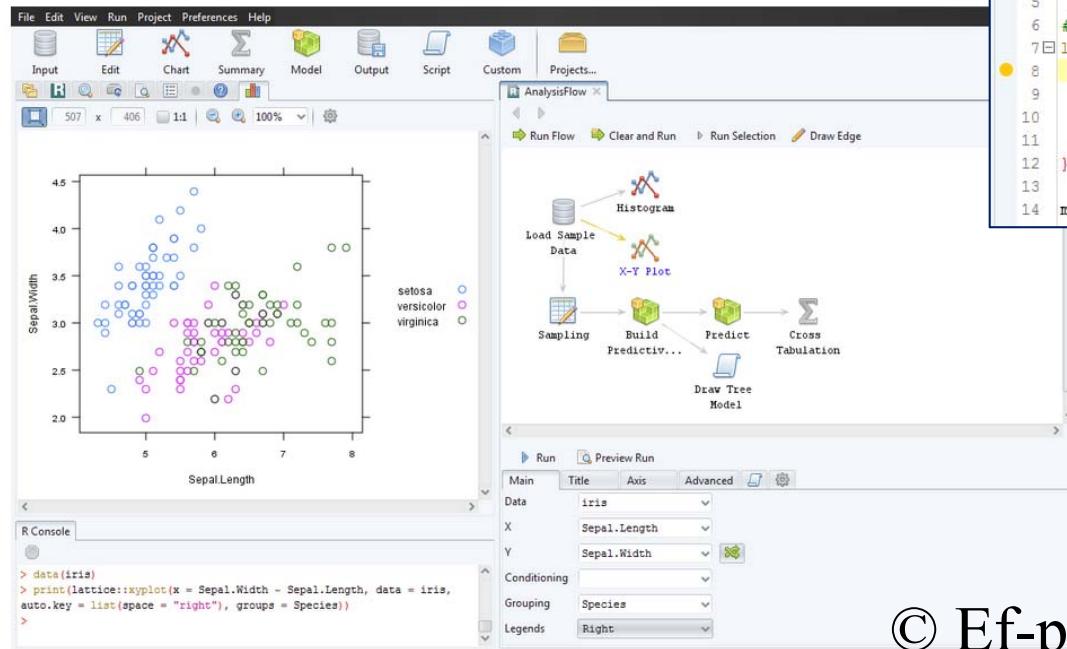
## Documents

[Help & Support](#)

Designed for data analysis. Great for everyone.

R AnalyticFlow is a data analysis software that utilizes the R environment for statistical computing. In addition to intuitive user interface, it also provides advanced features for R experts. These features enable you to share the processes of data analysis between users with differing levels of proficiency. AnalyticFlow works on Windows, Mac OS X, and Linux and is free for any use.

## R Programming Support



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# 系統資訊/參數

51/55

```
> # R.Version: Version Information
> as.data.frame(R.Version())
  platform    arch     os      system status major minor year month day svn.rev
1 x86_64-w64-mingw32 x86_64 mingw32 x86_64, mingw32            3   3.1 2016   06  21 70800
  language      version.string      nickname
1          R R version 3.3.1 (2016-06-21) Bug in Your Hair
>
> # Sys.info: Extract System and User Information
> Sys.info()
  sysname   release   version   nodename   machine   login   user   effective_user
"Windows" "8.1 x64" "build 9600" "HMWU-HOME" "x86-64" "userpc" "userpc" "userpc"
>
> # .Platform: Platform Specific Variables
> as.data.frame(.Platform)
  OS.type file.sep dynlib.ext   GUI endian   pkgType path.sep r_arch
1 windows        /       .dll Rgui little win.binary ;      x64
>
> # .Machine {base}: Numerical Characteristics of the Machine
> as.data.frame(.Machine)
  double.eps double.neg.eps  double.xmin  double.xmax double.base double.digits
1 2.220446e-16 1.110223e-16 2.225074e-308 1.797693e+308      2           53
  double.rounding double.guard double.ulp.digits double.neg.ulp.digits double.exponent
1             5              0            -52            -53           11
  double.min.exp double.max.exp integer.max sizeof.long sizeof.longlong sizeof.longdouble
1         -1022          1024  2147483647            4              8           16
  sizeof.pointer
1             8
```



# sessionInfo( )

```
> sessionInfo()
R version 4.2.2 (2022-10-31 ucrt)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows 10 x64 (build 19044)

Matrix products: default

locale:
[1] LC_COLLATE=Chinese (Traditional)_Taiwan.utf8
[2] LC_CTYPE=Chinese (Traditional)_Taiwan.utf8
[3] LC_MONETARY=Chinese (Traditional)_Taiwan.utf8
[4] LC_NUMERIC=C
[5] LC_TIME=Chinese (Traditional)_Taiwan.utf8

attached base packages:
[1] stats      graphics   grDevices utils
datasets  methods   base

loaded via a namespace (and not attached):
[1] compiler_4.2.2 tools_4.2.2
```

```
> RStudio.Version()
$citation
...
$version
[1] '2022.7.2.576'
```

# 檢查詢套件版本

```
> packageVersion("rlang")
[1] '0.4.5'
```

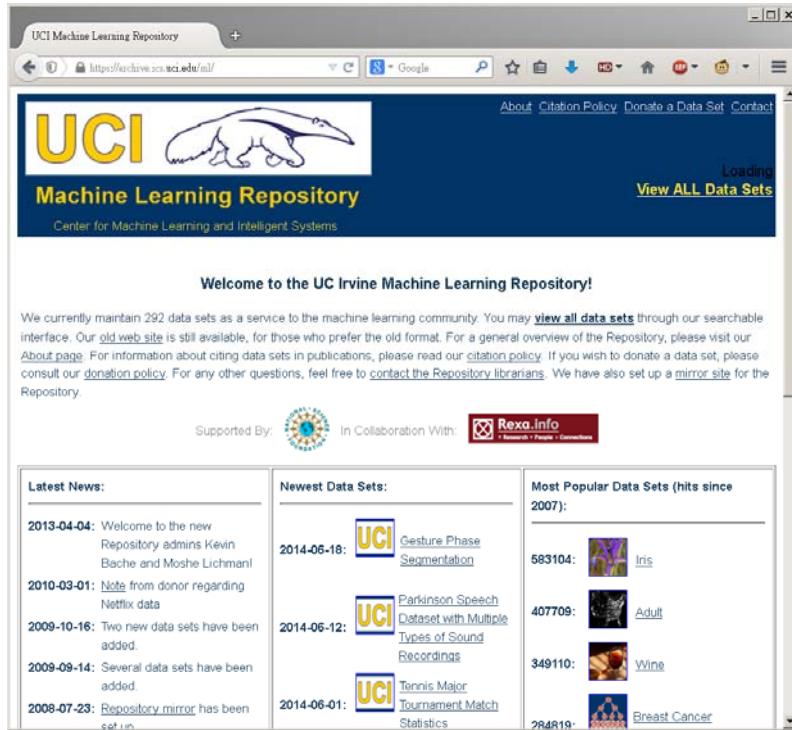


&gt; iris

53/55

## The Most Frequently Used Data Set

### UCI Machine Learning Repository <https://archive.ics.uci.edu/ml/>



Welcome to the UC Irvine Machine Learning Repository!

We currently maintain 292 data sets as a service to the machine learning community. You may [view all data sets](#) through our searchable interface. Our [old web site](#) is still available, for those who prefer the old format. For a general overview of the Repository, please visit our [About page](#). For information about citing data sets in publications, please read our [citation policy](#). If you wish to donate a data set, please consult our [donation policy](#). For any other questions, feel free to [contact the Repository librarians](#). We have also set up a [mirror site](#) for the Repository.

Supported By:  In Collaboration With: 

Latest News:	Newest Data Sets:	Most Popular Data Sets (hits since 2007):
2013-04-04: Welcome to the new Repository admins Kevin Bache and Moshe Lichman!	2014-06-18:  Gesture Phase Segmentation	583104:  Iris
2010-03-01: Note from donor regarding Netflix data	2014-06-12:  Parkinson Speech Dataset with Multiple Types of Sound Recordings	407709:  Adult
2009-10-16: Two new data sets have been added.	2014-06-01:  Tennis Major Tournament Match Statistics	349110:  Wine
2009-09-14: Several data sets have been added.		294819:  Breast Cancer
2008-07-23: Repository mirror has been set up		

The sepal length, sepal width, petal length, and petal width are measured in centimeters on 50 iris specimens from each of three species, *Iris setosa*, *I. versicolor*, and *I. virginica*. Fisher (1936)



資料編輯器					
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
11	5.4	3.7	1.5	0.2	setosa
12	4.8	3.4	1.6	0.2	setosa
13	4.8	3	1.4	0.1	setosa
14	4.3	3	1.1	0.1	setosa
15	5.8	4	1.2	0.2	setosa
16	5.7	4.4	1.5	0.4	setosa
17	5.4	3.9	1.3	0.4	setosa
18	5.1	3.5	1.4	0.3	setosa
19	5.7	3.8	1.7	0.3	setosa
20	5.1	3.8	1.5	0.3	setosa
21	5.4	3.4	1.7	0.2	setosa

2014 IASC Data Analysis Competition: <http://www.iasc-isi.org/node/227>

- World Bank - <http://data.worldbank.org>
- United Nations - <http://www.un.org/en/databases/#stats>
- World Health Organization - <http://www.who.int/research/en/>

- StatLib: <http://lib.stat.cmu.edu/>
- 政府資料開放平台 <http://data.gov.tw/>
- 開放資料Open Data <http://www.opendata.tw/>



# RStudio 套件安裝問題 (1)

54/55

```
> install.packages("CVD")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:

https://cran.rstudio.com/bin/windows/Rtools/
warning in install.packages :
  cannot create dir 'C:\Users\xáñçò\AppData\Local\Temp\Rtmpw9xEQw\downloaded_packages', reason 'No such file or directory'
Error in install.packages : unable to create temporary directory 'C:\Users\xáñçò\AppData\Local\Temp\Rtmpw9xEQw\downloaded_packages'
> |
```

## 中文帳戶名問題

### ■ My favorite RStudio tips and tricks

[http://datacornering.com/my-favorite-rstudio-tips-and-tricks/?fbclid=IwAR2ZK9Fu3Q5j\\_wUQVo-tFuX0lxP4Zp2TwcfWKXHyV2R-C6ElgG1Gn-t3uJg](http://datacornering.com/my-favorite-rstudio-tips-and-tricks/?fbclid=IwAR2ZK9Fu3Q5j_wUQVo-tFuX0lxP4Zp2TwcfWKXHyV2R-C6ElgG1Gn-t3uJg)

## 套件安裝問題，可能的解決方法：

- (1) 以「系統管理員身份執行」開啟RStudio。
- (2) 改變R套件安裝資料夾「.libPaths」  
<https://www.twblogs.net/a/5cc0edfc9eee397113dede>
- (3) 解決RStudio不支持Windows系統中文用戶名問題  
[https://blog.csdn.net/qq\\_16146103/article/details/105445198](https://blog.csdn.net/qq_16146103/article/details/105445198)
- (4) win10用戶名為中文導致RStudio繪圖錯誤的解決方法  
<https://www.cnblogs.com/yanjiamin/p/12064048.html>

- (5) Windows中文使用者與RStudio的環境變數調校

<http://shorturl.at/AMNQ9>

- (6) 解決RStudio中的亂碼  
<https://itw01.com/5XYZENB.html>

- (7) 如何更改R的預設語系  
<https://psmethods.postach.io/post/ru-he-geng-gai-rde-yu-she-yu-xi>

## 中文路徑名問題

```
Error in utils::shortPathName(path[i]) : 無效的多位元組字串於 '<e6><88><91>?□~1/DOCUME~1/R/WIN-LI~1/4.0/RMARKD~1/rmd/h/DEFAUL~1.HTM'
Calls: <Anonymous> ... do.call -> <Anonymous> ->
  pandoc_path_arg -> <Anonymous>
停止執行
```

```
# 列出已安裝套件 ? installed.packages
mypks <- as.data.frame(installed.packages()[, 1:3])
mypks
```



# RStudio 套件安裝問題 (2)

55/55

```
> install.packages("gridExtra")
```

將程式套件安載入 'C:/Users/User/Documents/R/win-library/4.1'  
(因為 'lib' 沒有被指定)

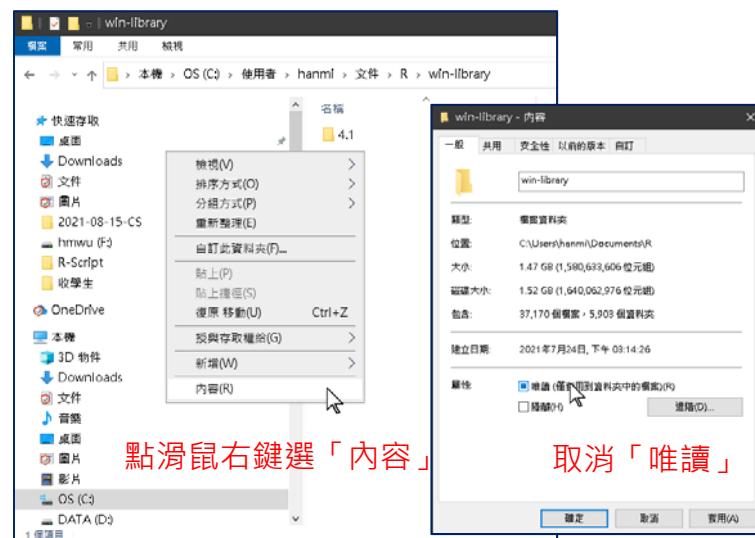
Warning in install.packages :

'lib = "C:/Users/User/Documents/R/win-library/4.1"' is not writable  
嘗試 URL 'https://cran.rstudio.com/bin/windows/contrib/4.1/gridExtra\_2.3.zip'  
Content type 'application/zip' length 1109407 bytes (1.1 MB)  
downloaded 1.1 MB

Warning in install.packages :

無法建立目錄 'C:\Users\User\Documents\R\win-library\4.1\file2b905b04620'，原因是 'No such file or directory'

Error in install.packages : unable to create temporary directory  
'C:\Users\User\Documents\R\win-library\4.1\file2b905b04620'



點滑鼠右鍵選「內容」

取消「唯讀」，按確定。

