A01

R / RStudio
軟體環境介紹

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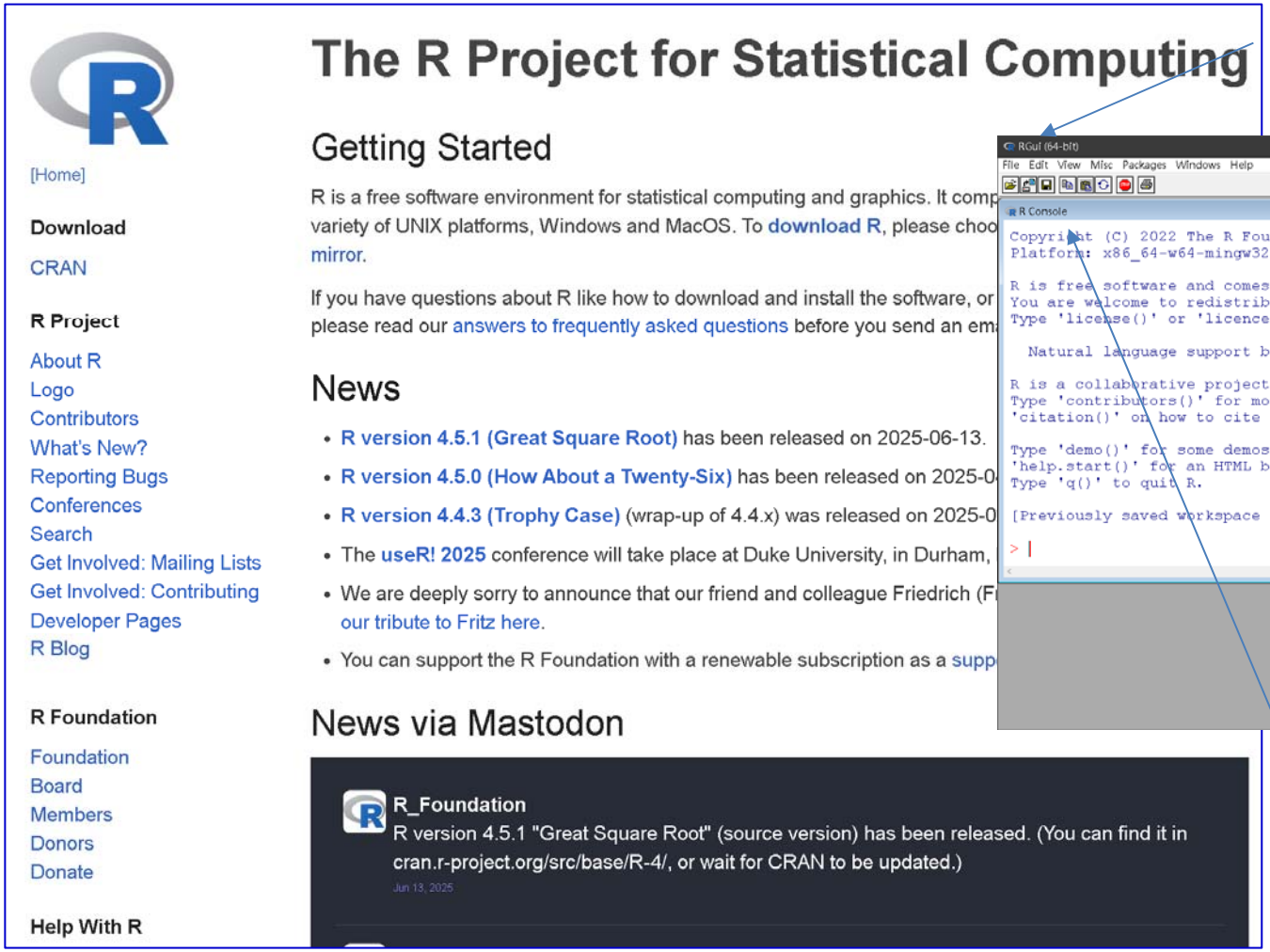
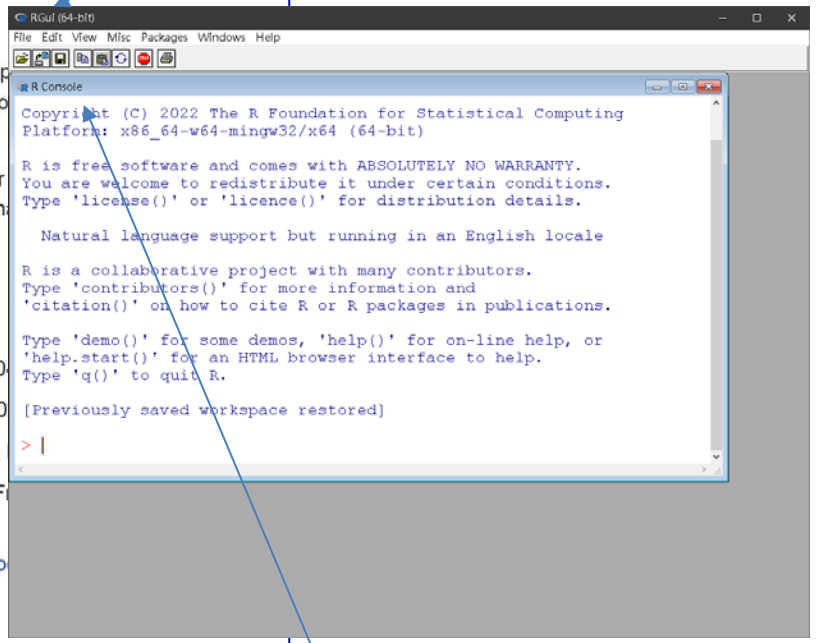
本章大綱&學習目標

- 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
- 常用查詢指令: sessionInfo, .libPaths, R.Version, RStudio.Version, packageVersion
- R的學習資源
- 安裝RStudio常見問題

The R Project for Statistical Computing

http://www.r-project.org





Rgui

R Console

R是什麼?

R is a language and environment for statistical computing and graphics.

- R 是一種程式語言與統計軟體環境，主要用於統計分析、資料探勘、機器學習與繪圖。
- 它最早(1985)由紐西蘭奧克蘭大學的 Ross Ihaka 和 Robert Gentleman 開發（名字 R 就來自他們的名字首字母）。
- R 有龐大的套件生態系（CRAN），研究人員、數據科學家和統計學家可以快速使用現成的套件做迴歸、分類、時間序列、文字探勘等分析。
- R 在學術界和產業界都非常普及，尤其是在需要大量統計建模和資料視覺化的領域。
- 簡單來說，R 就像是一個「專門為統計和資料分析打造的程式語言」，特別適合學術研究與數據處理。

R 語言應用地圖

- 統計分析：迴歸、ANOVA、時間序列、貝葉斯模型
- 資料視覺化：ggplot2、互動式圖表、儀表板
- 機器學習：分類、分群、神經網路、隨機森林
- 商業與經濟分析：行銷數據、財務風險、顧客分析
- 生物資訊與醫學研究：基因資料、臨床試驗數據、生存分析
- 文字探勘與自然語言處理：文字雲、情感分析、語料庫研究
- 大數據與資料處理：SparkR、資料清理與轉換、大規模運算
- 學術研究與教育：教學、教材開發、學術論文分析

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?

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

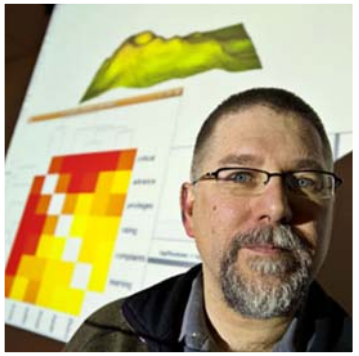
SEPTEMBER 2, 2019

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: Nilanjan 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

TIOBE
the software quality company

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

(共243種程式語言)

Aug 2025	Aug 2024	Change	Programming Language
1	1		Python
2	2		C++
3	3		C
4	4		Java
5	5		C#
6	6		JavaScript
7	8	↑	Visual Basic
8	9	↑	Go
9	25	⇈	Perl
10	12	↑	Delphi/Object Pascal
11	10	↓	Fortran
12	7	⇊	SQL
13	30	⇈	Ada
14	19	⇈	R
15	13	↓	PHP
16	11	⇊	MATLAB
17	20	↑	Scratch
18	14	⇊	Rust
19	18	↓	Kotlin
20	17	↓	Assembly language

Vibe Coding

https://www.bnext.com.tw/article/82704/how-to-vibe-coding-2025

Vibe Coding是什麼？

隨著生成式AI進入爆發生長時期，2025年初自美國矽谷颳起一股軟體開發新風潮，**透過AI工具協助，軟體工程師可以在「不寫程式碼」的前提下開發產品**，而這種近乎佛系、不用刻苦寫code的開發方式，被取了一個新穎的名字：**Vibe Coding**。

在Vibe Coding風潮中，其中Anthropic旗下的Claude系列模型被認為是擁有最強大寫程式能力的AI模型。近期外媒也訪問Anthropic高層，揭露其RLAIF學習技術、加強使用工具及記憶能力是勝出關鍵。

而除了Claude系列，好用的Vibe Coding工具有哪些？

https://www.youtube.com/watch?v=8me0juJCpWM&t=40s

軟體外觀 (Windows)

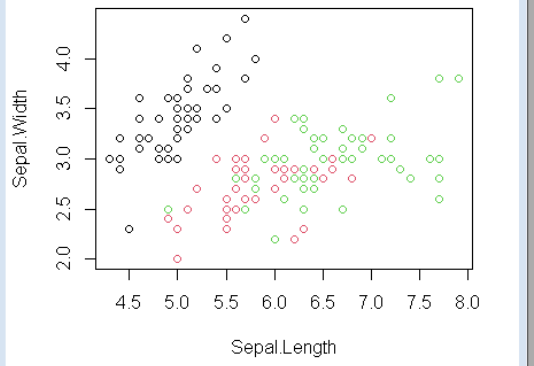
RGui (64-bit)

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)
>
```

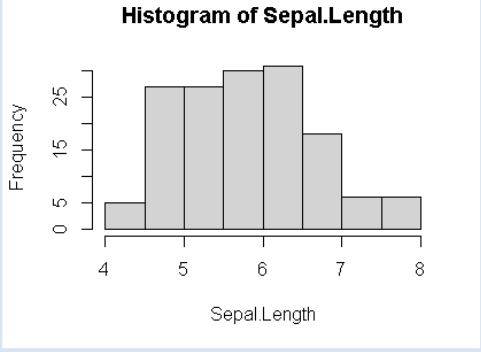
R Graphics: Device 2 (inactive)



Data: iris

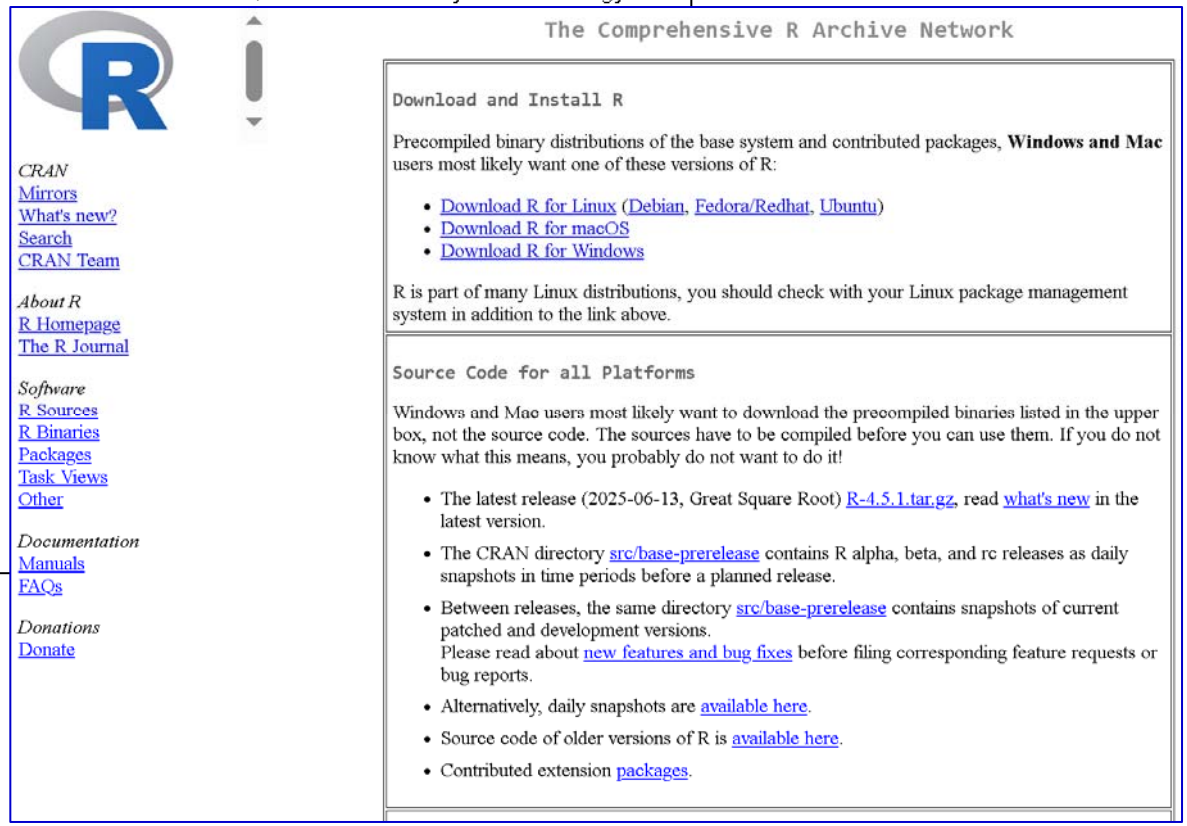
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
1	5.1	3.5	1.4	0.2
2	4.9	3.0	1.4	0.2
3	4.7	3.2	1.3	0.2
4	4.6	3.1	1.5	0.2
5	5.0	3.6	1.4	0.2
6	5.4	3.9	1.7	0.4
7	4.6	3.4	1.4	0.3
8	5.0	3.4	1.5	0.2
9	4.4	2.9	1.4	0.2
10	4.9	3.1	1.5	0.1
11	5.4	3.7	1.5	0.2
12	4.8	3.4	1.6	0.2
13	4.8	3.0	1.4	0.1

R Graphics: Device 3 (ACTIVE)



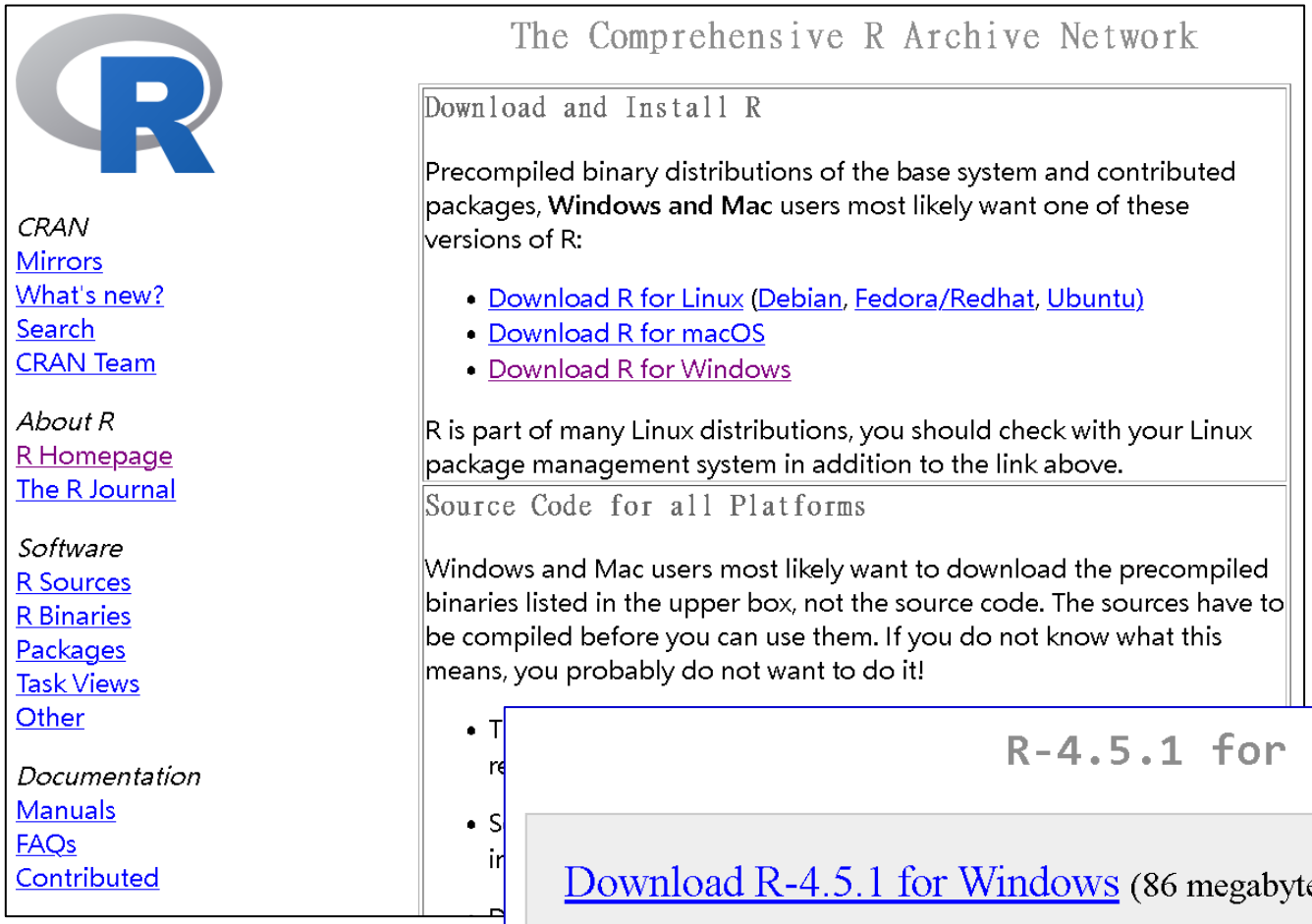
CRAN: The Comprehensive R Archive Network

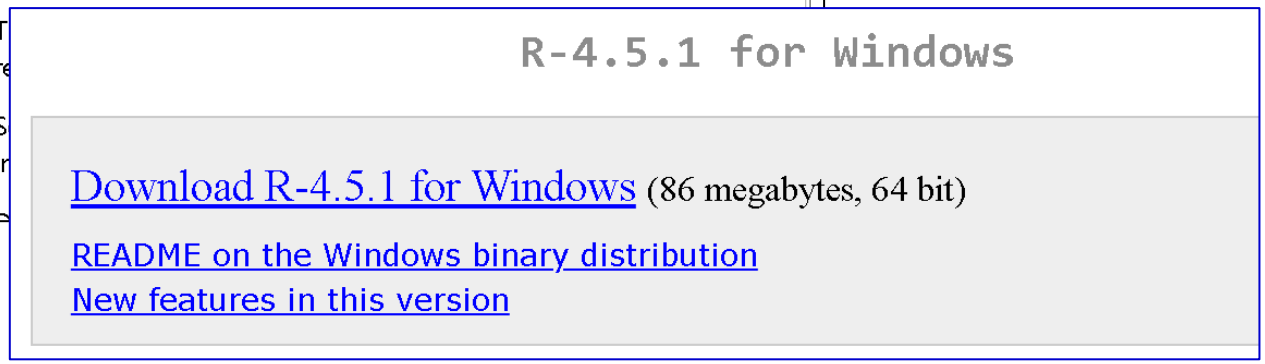
New Zealand	
https://cran.stat.auckland.ac.nz/	University of Auckland
Norway	
https://cran.uib.no/	University of Bergen
Philippines	
https://cran.stat.upd.edu.ph/	University of the Philippines and PREGINET
Poland	
https://cran.mi2.ai/	MI2.ai, Warsaw University of Technology
Portugal	
https://cran.radicaldevelop.com/	
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/	




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

R軟體下載

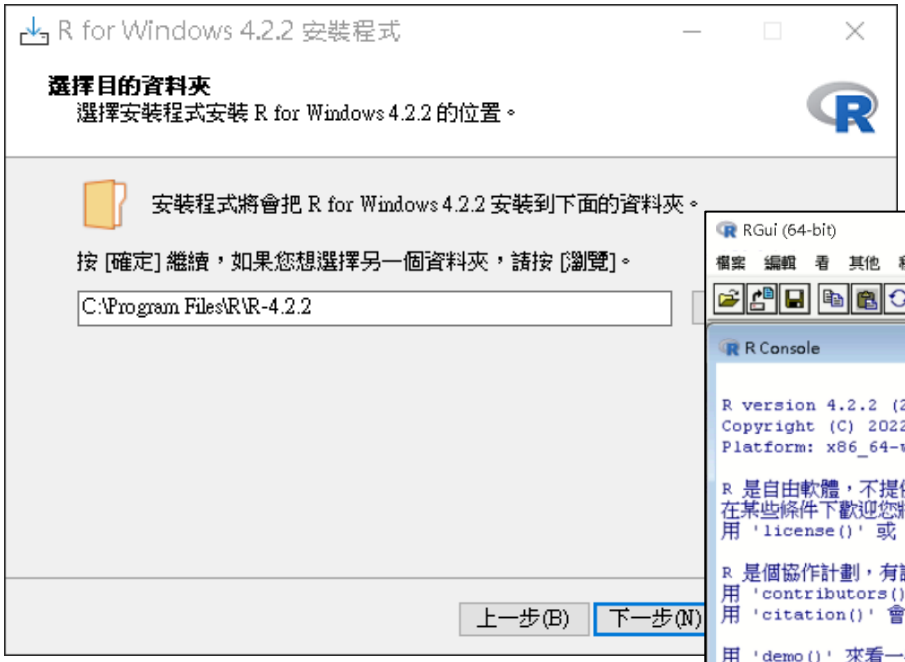


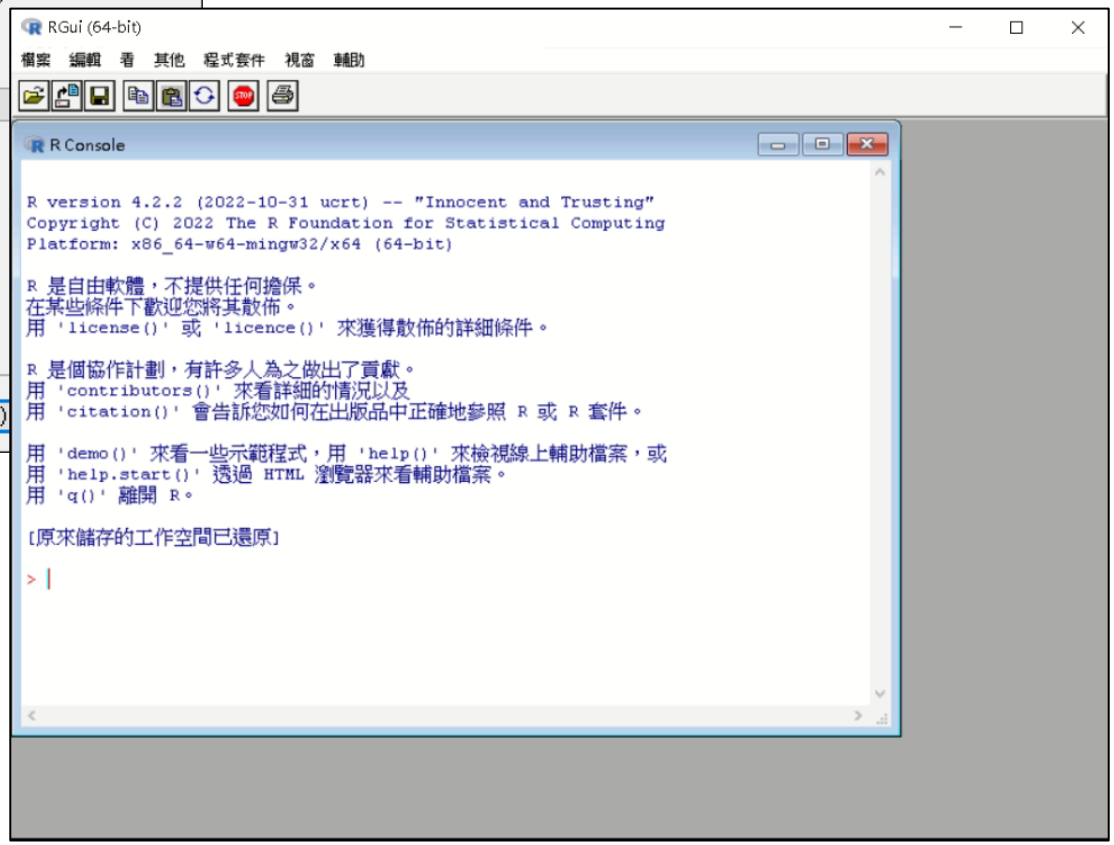


https://cran.csie.ntu.edu.tw/bin/windows/base/R-4.2.2-win.exe

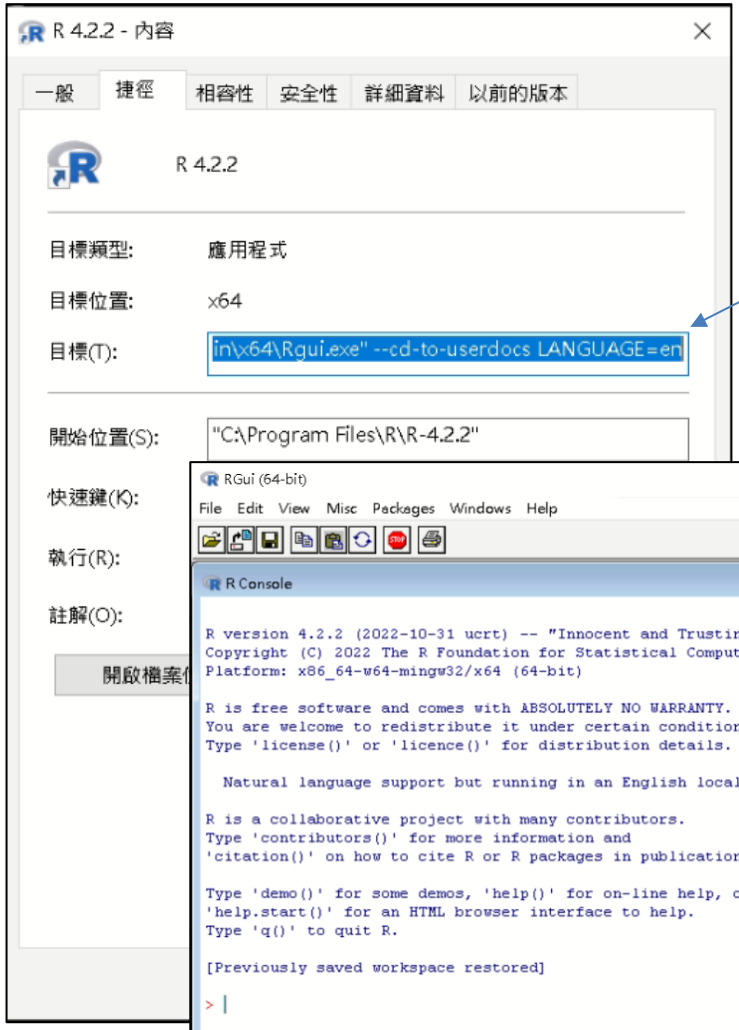
軟體安裝; 啟動R

注意: R軟體安裝目錄，使用者目錄、R套件安裝目錄的路徑

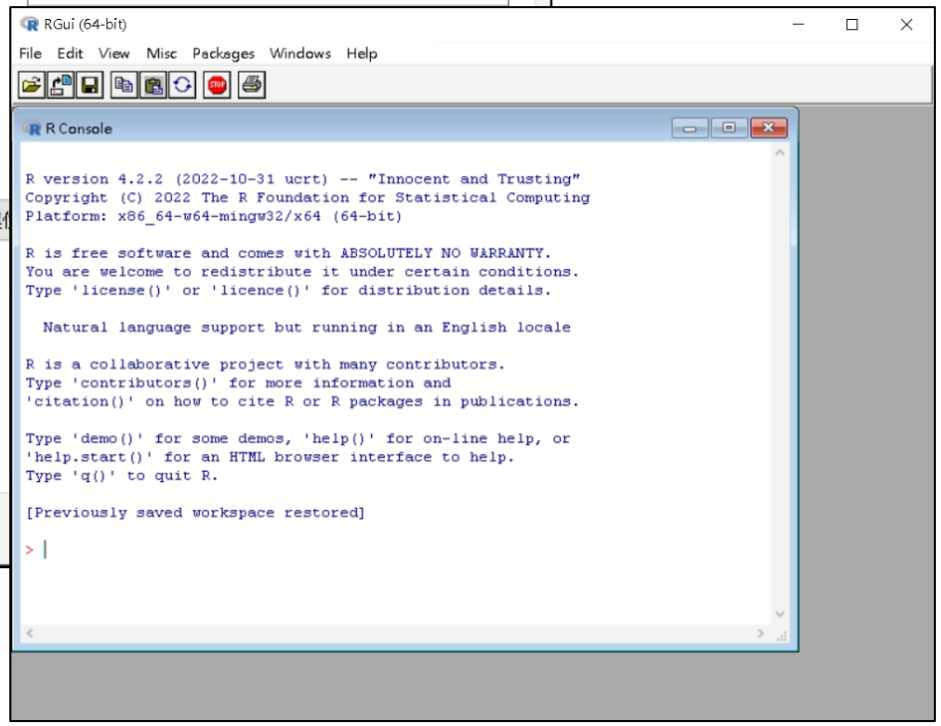




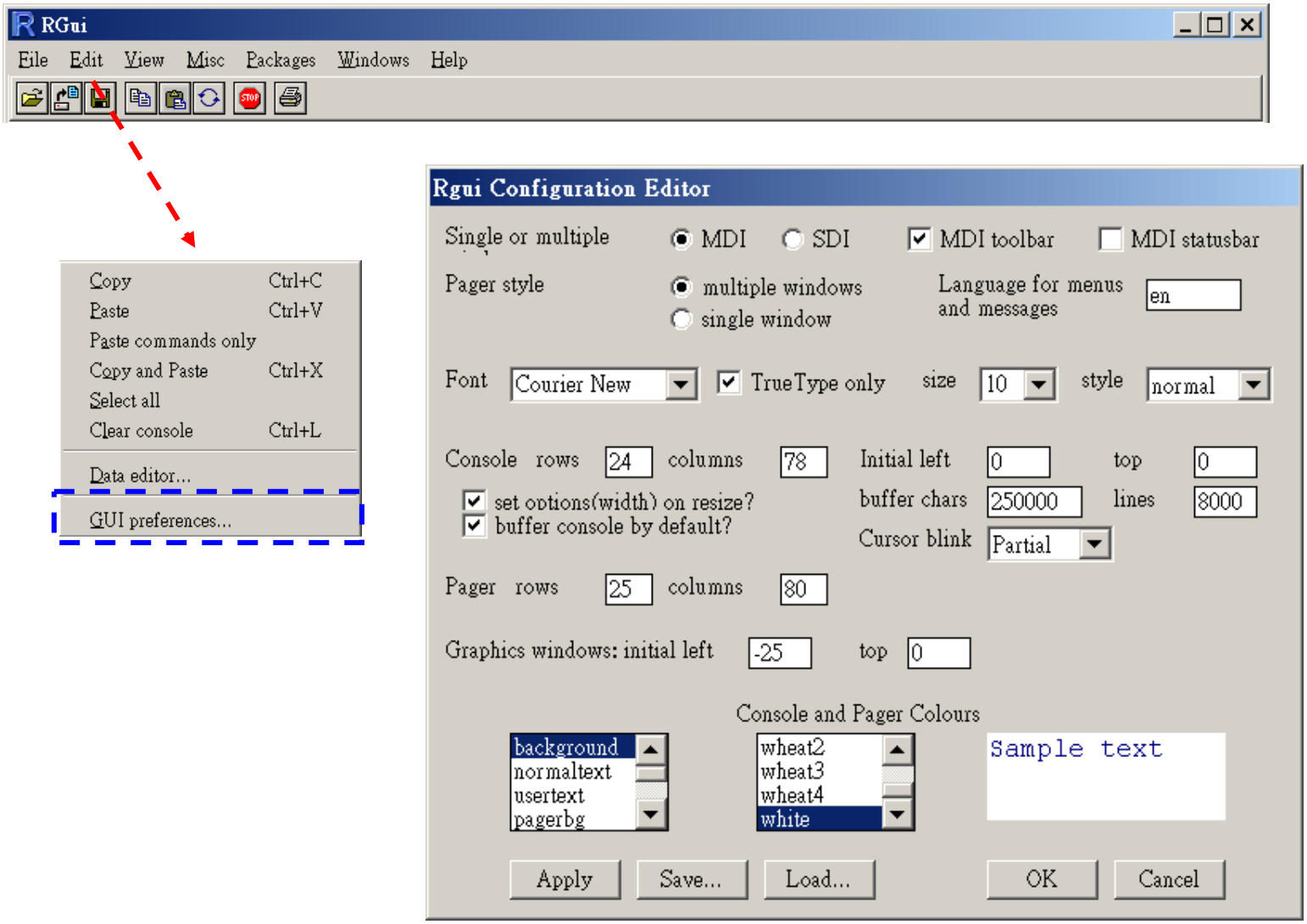
想把中文介面改成英文介面



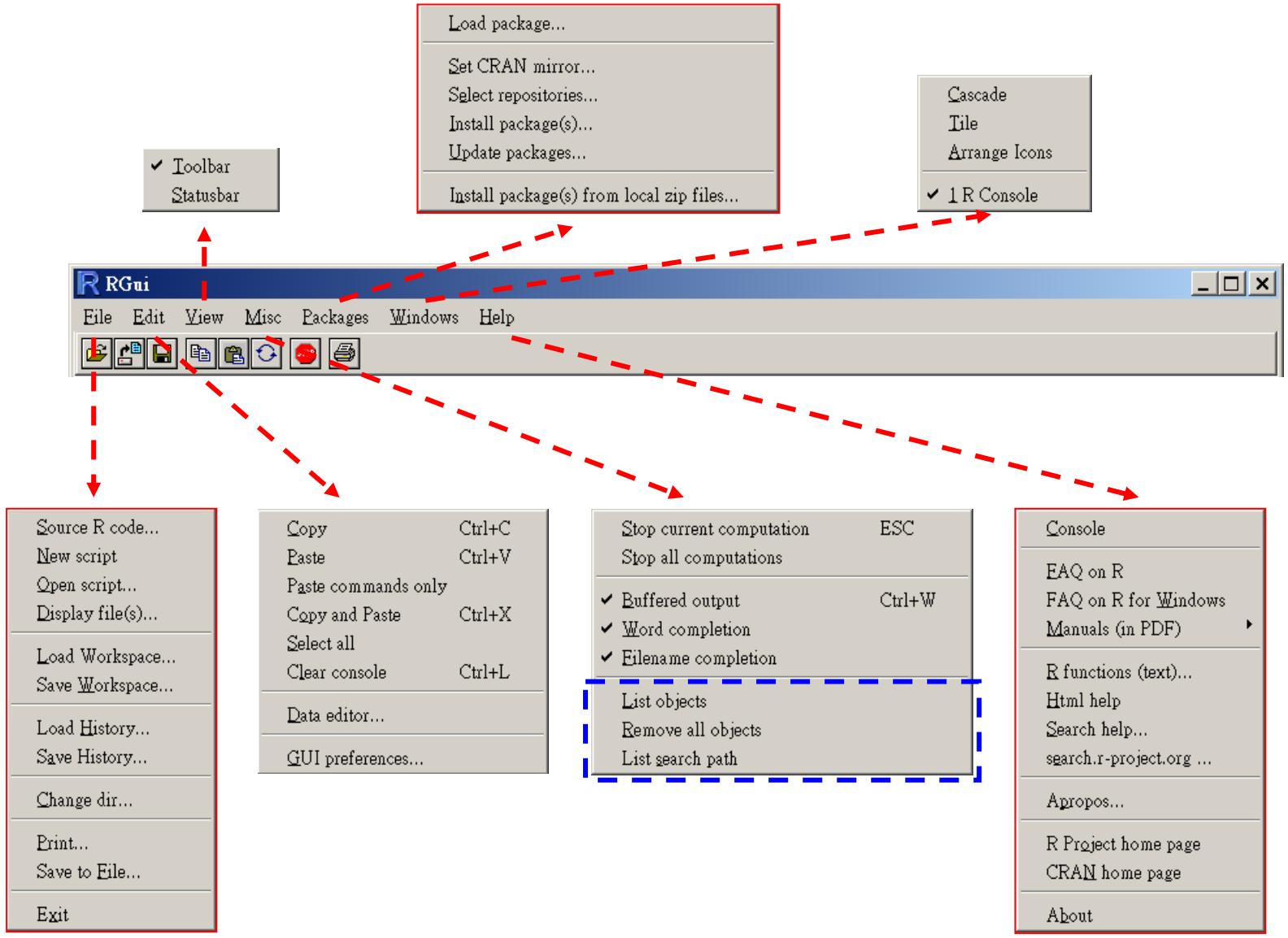
加入
LANGUAGE=en



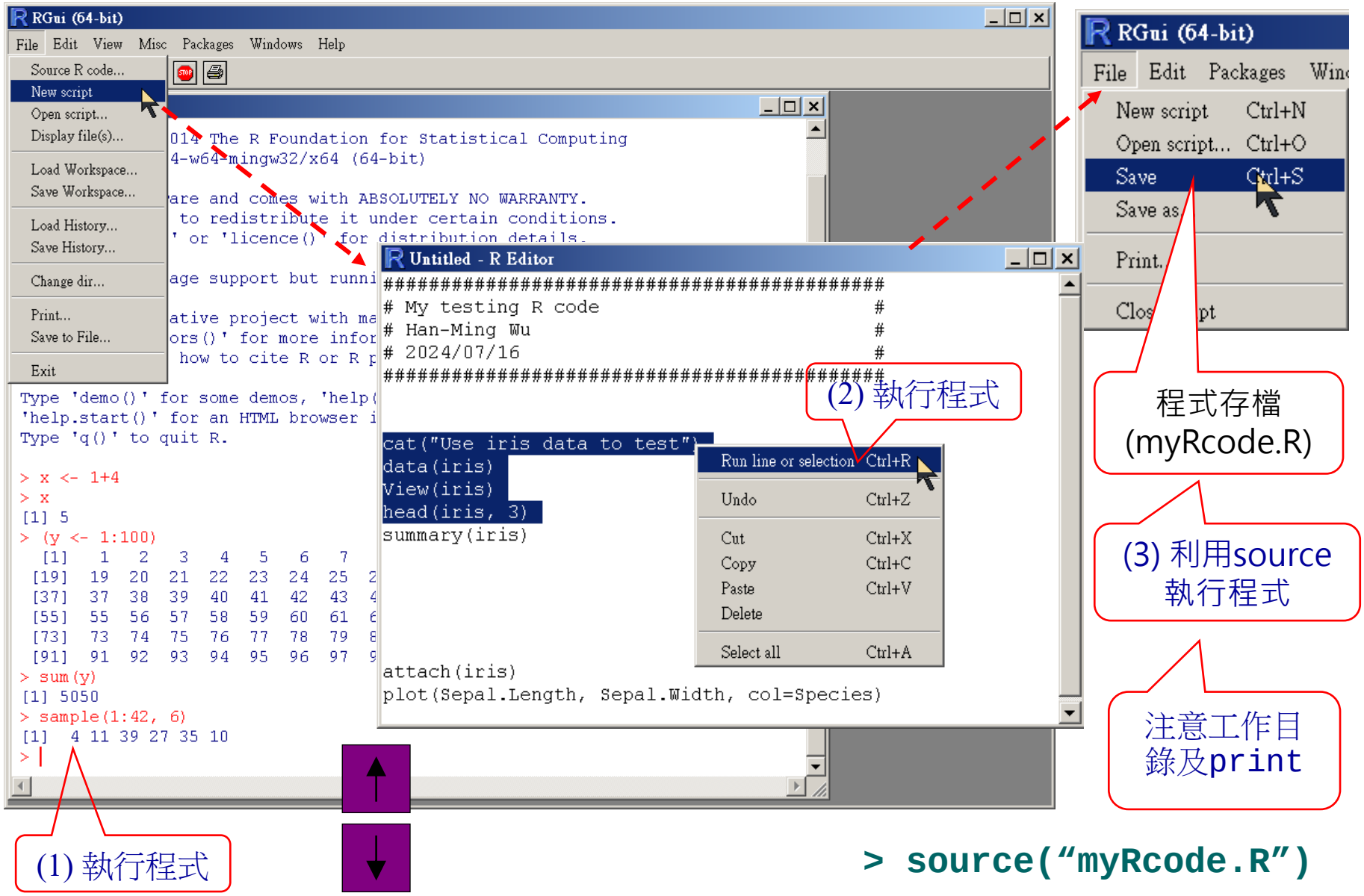
喜好設定


RGui
File Edit View Misc Packages Windows Help
Copy Ctrl+C
Paste Ctrl+V
Paste commands only
Copy and Paste Ctrl+X
Select all
Clear console Ctrl+L
Data editor...
GUI preferences...
Rgui Configuration Editor
Single or multiple
MDI
SDI
MDI toolbar
MDI statusbar
Pager style
multiple windows
single window
Language for menus and messages
en
Font
Courier New
TrueType only
size
10
style
normal
Console rows
24
columns
78
Initial left
0
top
0
set options(width) on resize?
buffer console by default?
buffer chars
250000
lines
8000
Cursor blink
Partial
Pager rows
25
columns
80
Graphics windows: initial left
-25
top
0
Console and Pager Colours
background
normaltext
usertext
pagerbg
wheat2
wheat3
wheat4
white
Sample text
Apply
Save...
Load...
OK
Cancel

R 選單


Load package...
Set CRAN mirror...
Select repositories...
Install package(s)...
Update packages...
Install package(s) from local zip files...
Toolbar
Statusbar
Cascade
Tile
Arrange Icons
1 R Console
RGui
File Edit View Misc Packages Windows Help
Source R code...
New script
Open script...
Display file(s)...
Load Workspace...
Save Workspace...
Load History...
Save History...
Change dir...
Print...
Save to File...
Exit
Copy Ctrl+C
Paste Ctrl+V
Paste commands only
Copy and Paste Ctrl+X
Select all
Clear console Ctrl+L
Data editor...
GUI preferences...
Stop current computation ESC
Stop all computations
Buffered output Ctrl+W
Word completion
Filename completion
List objects
Remove all objects
List search path
Console
FAQ on R
FAQ on R for Windows
Manuals (in PDF)
R functions (text)...
Html help
Search help...
search.r-project.org ...
Apropos...
R Project home page
CRAN home page
About

寫程式及執行

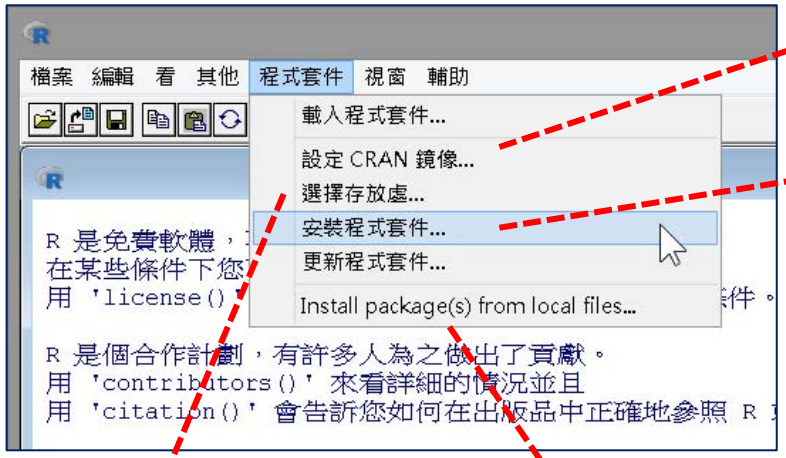

RGui (64-bit)
File Edit View Misc Packages Windows Help
Source R code...
New script
Open script...
Display file(s)...
Load Workspace...
Save Workspace...
Load History...
Save History...
Change dir...
Print...
Save to File...
Exit
Type 'demo()' for some demos, 'help()'
'help.start()' for an HTML browser i
Type 'q()' to quit R.
> x <- 1+4
> x
[1] 5
> (y <- 1:100)
> sum(y)
[1] 5050
> sample(1:42, 6)
[1] 4 11 39 27 35 10
Untitled - R Editor
# My testing R code
# Han-Ming Wu
# 2024/07/16
cat("Use iris data to test")
data(iris)
View(iris)
head(iris, 3)
summary(iris)
attach(iris)
plot(Sepal.Length, Sepal.Width, col=Species)
Run line or selection Ctrl+R
Undo Ctrl+Z
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Delete
Select all Ctrl+A
New script Ctrl+N
Open script... Ctrl+O
Save Ctrl+S
Save as...
Print...
(1) 執行程式
(2) 執行程式
程式存檔
(myRcode.R)
(3) 利用source
執行程式
注意工作目
錄及print
> source("myRcode.R")

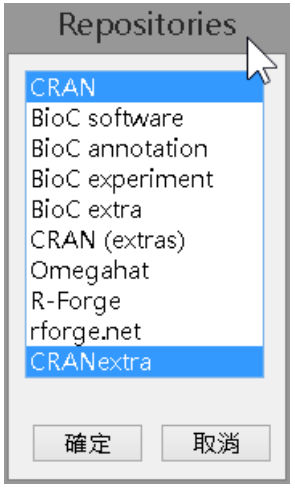
R相關檔案副檔名

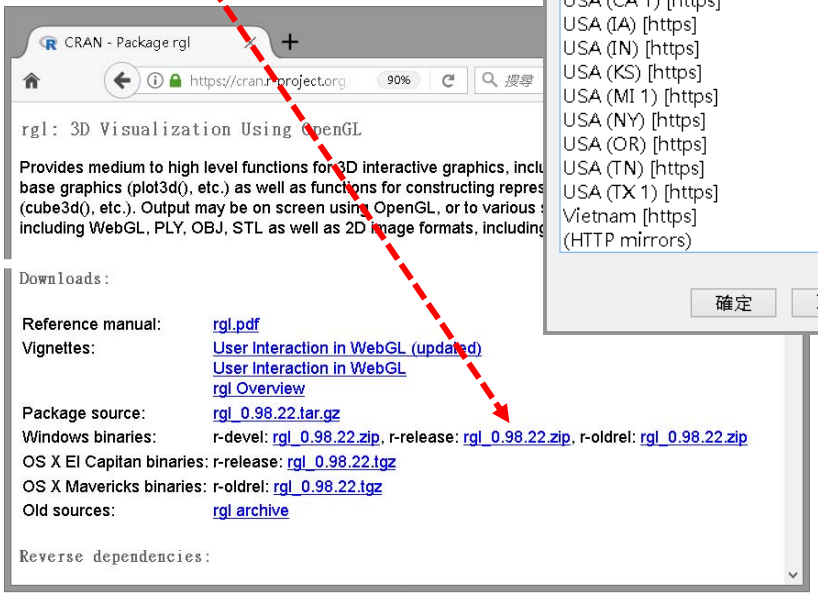
- **.R**：標準 R 程式碼檔案
- **.Rhistory**：指令操作紀錄檔
- **.Rprofile**：啟動時自動執行的設定檔
- **.RData**：整個工作環境（workspace）
- **.rda / .Rda**：多個 R 物件
- **.rds**：單一 R 物件（資料交換常用）
- **.tar.gz**：Linux/Unix R 套件壓縮檔
- **.zip**：Windows R 套件壓縮檔
- **.dll / .so**：編譯後的函式庫
- **.Rmd**：R Markdown 文件
- **.Rnw**：Sweave（R + LaTeX 文件）
- **.Renviron**：R 環境變數設定檔
- **.Rproj**：RStudio 專案檔
- **.Rd**：R 套件文件檔（help）

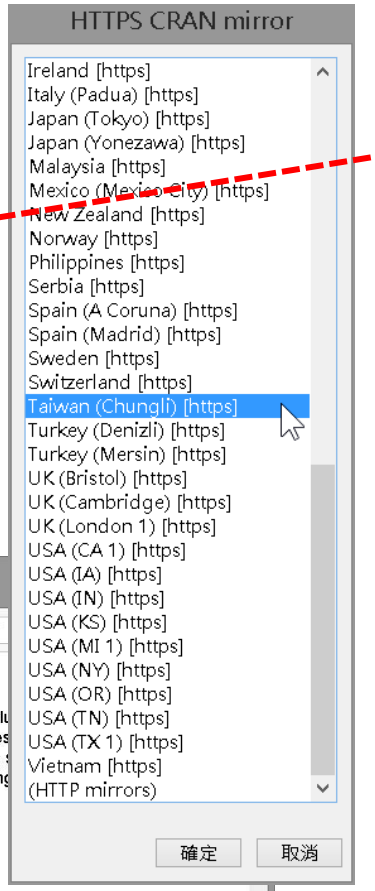
安裝R套件 (RGui選單)

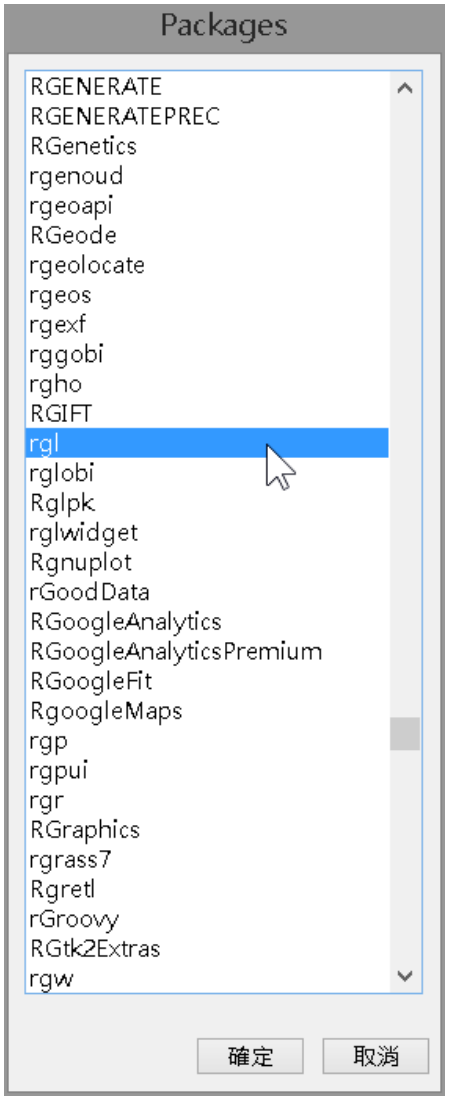
- Packages => Install package(s) => CRAN mirror => installr, rgl, scatterplot3d (按Ctrl可多重選取) => OK











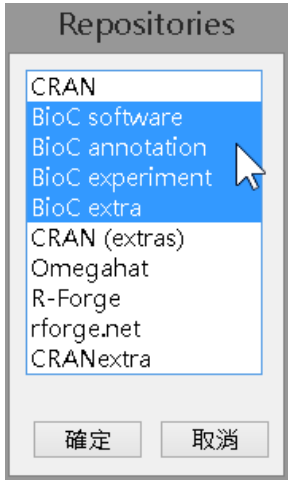
安裝R套件 (指令方式)

```
> 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
```

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

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

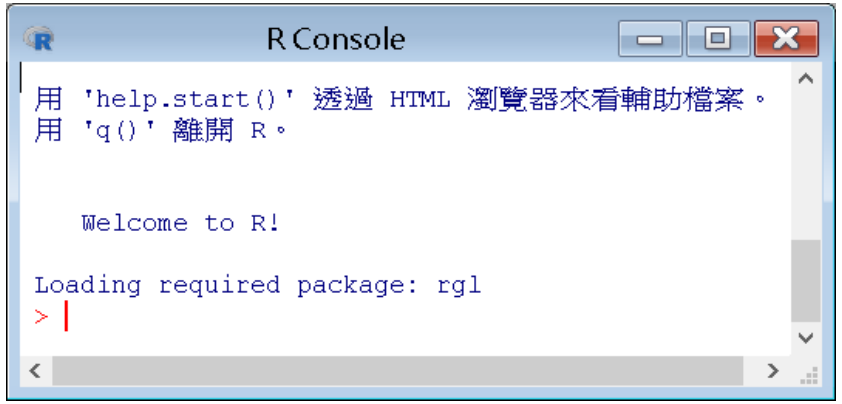
```
> options(repos="http://cran.csie.ntu.edu.tw")
> pks <- c("rgl", "ggplot2", "maps", "e1071")
> install.packages(pks)
> lapply(pks, library, character.only = TRUE)
```



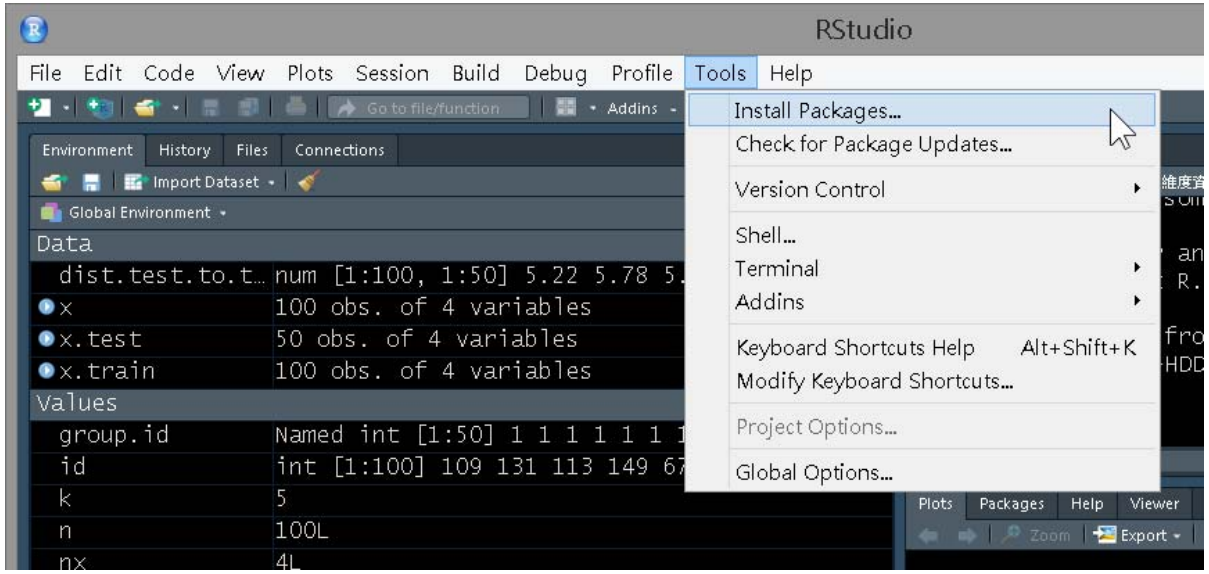
Automatically load packages in the Startup of R:

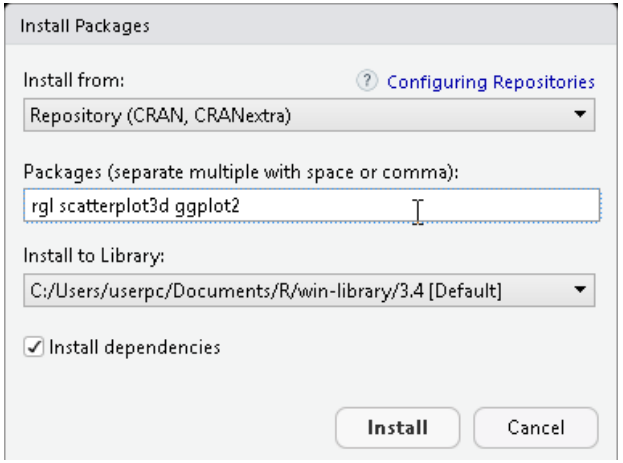
- call `.First()` in the **Rprofile** file.
- **編輯檔案**(Windows) C:\Program Files\R\R-3.3.1\library\base**Rprofile**

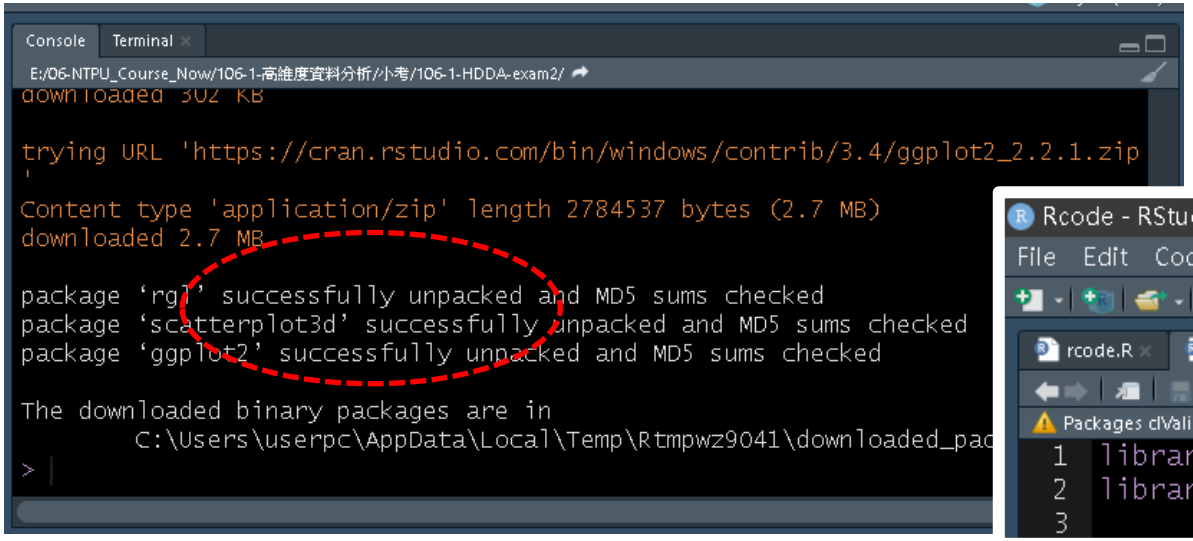
```
.First <- function(){
 cat("\n   Welcome to R!\n\n")
 require(rgl)
}
```

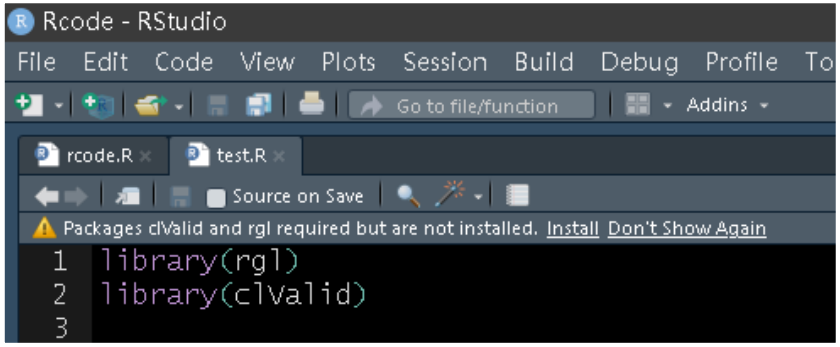


安裝R套件 (RStudio選單)

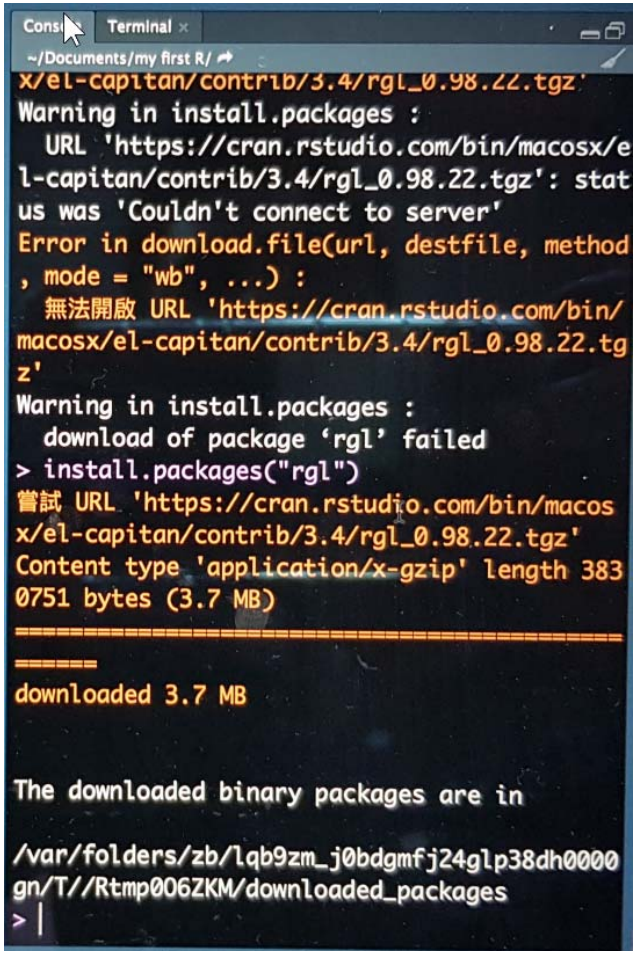


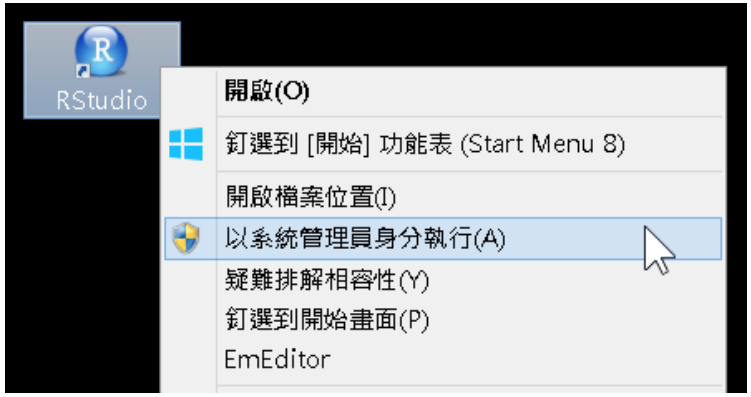






安裝R套件常見問題





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

- 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/

ActuarialScience	Actuarial Science
Agriculture	Agricultural Science
Bayesian	Bayesian Inference
CausalInference	Causal Inference
ChemPhys	Chemometrics and Computational Physics
ClinicalTrials	Clinical Trial Design, Monitoring, and Analysis
Cluster	Cluster Analysis & Finite Mixture Models
CompositionalData	Compositional Data Analysis
Databases	Databases with R
DifferentialEquations	Differential Equations
Distributions	Probability Distributions
DynamicVisualizations	Dynamic Visualizations and Interactive Graphics
Econometrics	Econometrics
Environmetrics	Analysis of Ecological and Environmental Data
Epidemiology	Epidemiology
ExperimentalDesign	Design of Experiments (DoE) & Analysis of Experimental Data
ExtremeValue	Extreme Value Analysis
Finance	Empirical Finance
FunctionalData	Functional Data Analysis
GraphicalModels	Graphical Models
HighPerformanceComputing	High-Performance and Parallel Computing with R
Hydrology	Hydrological Data and Modeling
MachineLearning	Machine Learning & Statistical Learning
MedicalImaging	Medical Image Analysis
MetaAnalysis	Meta-Analysis
MissingData	Missing Data
MixedModels	Mixed, Multilevel, and Hierarchical Models in R
ModelDeployment	Model Deployment with R
NaturalLanguageProcessing	Natural Language Processing
NetworkAnalysis	Network Analysis
NumericalMathematics	Numerical Mathematics
OfficialStatistics	Official Statistics & Survey Statistics
Omics	Genomics, Proteomics, Metabolomics, Transcriptomics, and Other Omics
Optimization	Optimization and Mathematical Programming
Paleontology	Paleontology
Pharmacokinetics	Analysis of Pharmacokinetic Data
Phylogenetics	Phylogenetics
Psychometrics	Psychometric Models and Methods
ReproducibleResearch	Reproducible Research
Robust	Robust Statistical Methods
Spatial	Analysis of Spatial Data
SpatioTemporal	Handling and Analyzing Spatio-Temporal Data
SportsAnalytics	Sports Analytics
Survival	Survival Analysis
TeachingStatistics	Teaching Statistics
TimeSeries	Time Series Analysis
Tracking	Processing and Analysis of Tracking Data
WebTechnologies	Web Technologies and Services

```
> 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 25 R Packages (You Need To Learn In 2024) | R-bloggers

https://www.r-bloggers.com/2024/08/top-25-r-packages-you-need-to-learn-in-2024/

- 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

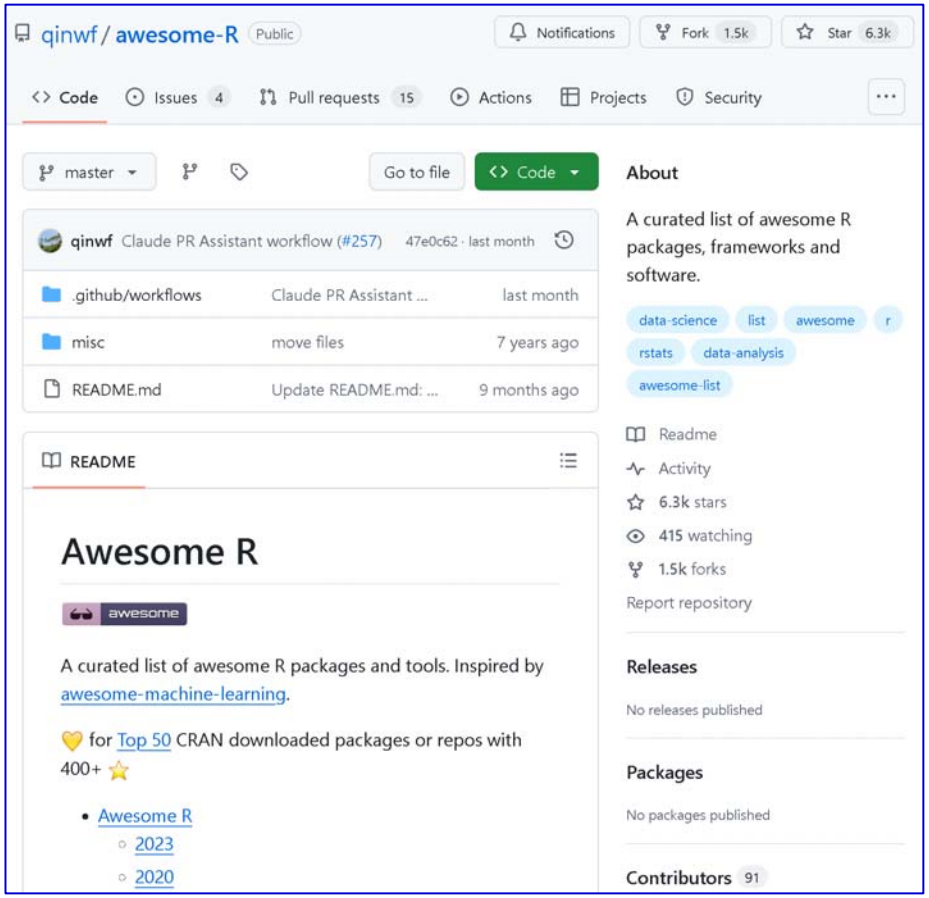
- Quick list of useful R packages

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

Categories: To Fload 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

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



Data Formats

Packages for reading and writing data of different formats.

- arrow - An interface to the Arrow C++ library.
- feather - Fast, interoperable binary data frame storage for Python, R, and more powered by Apache Arrow.
- fst - Lightning Fast Serialization of Data Frames for R.
- haven - Improved methods to import SPSS, Stata and SAS files in R.
- jsonlite - A robust and quick way to parse JSON files in R.
- qs - Quick serialization of R objects.
- readxl - Read excel files (.xls and .xlsx) into R.
- readr - A fast and friendly way to read tabular data into R.
- rio - A Swiss-Army Knife for Data I/O.
- readODS - Read OpenDocument Spreadsheets into R as data.frames.
- RcppTOML - Rcpp Bindings to C++ parser for TOML files.
- vroom - Fast reading of delimited files.
- writexl - Portable, light-weight data frame to xlsx exporter for R.
- yaml - R package for converting objects to and from YAML.

Graphic Displays

Packages for showing data.

- ggplot2 - An implementation of the Grammar of Graphics.
- ggfortify - A unified interface to ggplot2 popular statistical packages using one line of code.
- ggrepel - Repel overlapping text labels away from each other.
- ggalt - Extra Coordinate Systems, Geoms and Statistical Transformations for ggplot2.
- ggstatsplot - ggplot2 Based Plots with Statistical Details

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/

- ESS: Emacs speaks Statistics

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

- R for Mediawiki

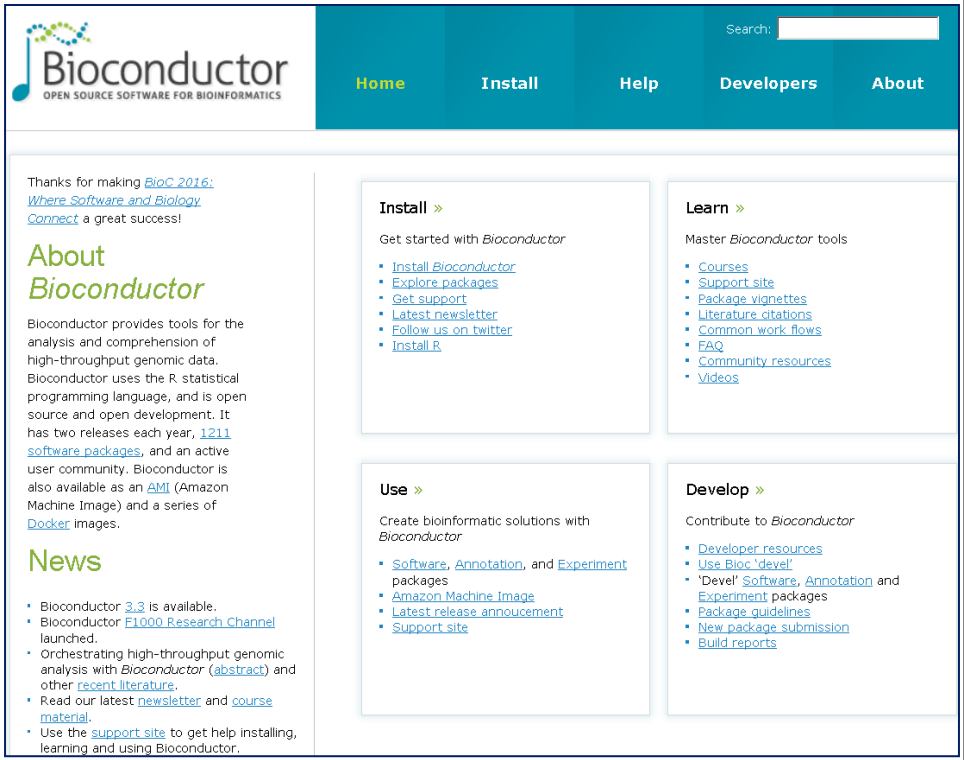
http://mars.wiwi.hu-berlin.de/mediawiki/sk/index.php/R_Extension_for_MediaWiki

- PowerShell R Interop Cmdlet

http://powershellrinterop.codeplex.com

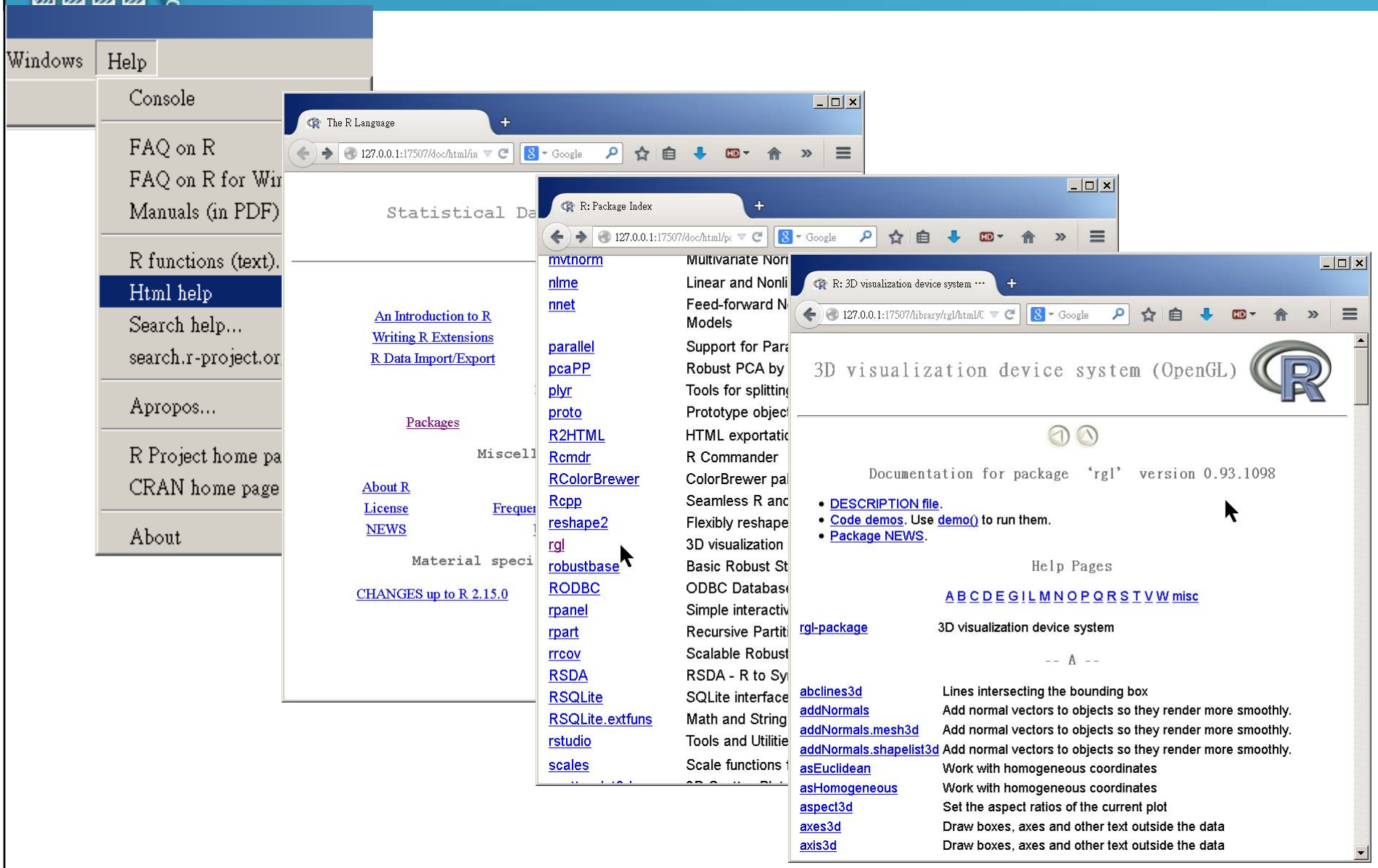
- TANGO/ALGENCAN

http://www.ime.usp.br/~egbirgin/tango/



http://www.bioconductor.org

說明手冊 (Help Manuals)



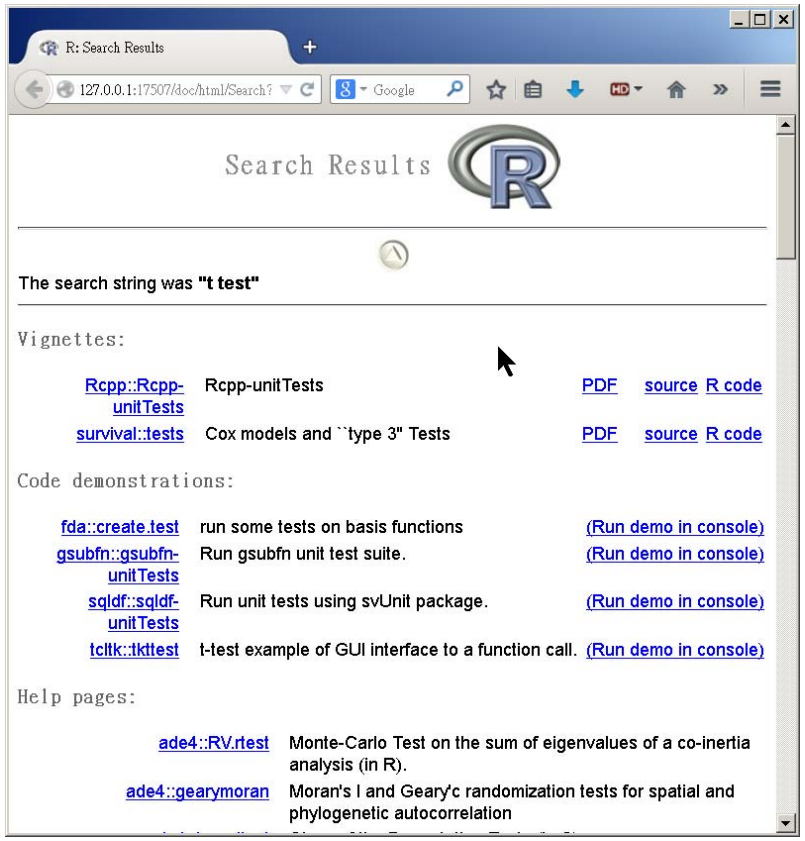
求助範例

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

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

NOTE:

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




```
?package.name
?package.name::function.name
apropos("norm")  #search all function names for the "norm" key
```

求助範例 (conti.)

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 bei 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

If paired is TRUE then both x and y must be specified and they must (in pairs if paired is TRUE). If var.equal is TRUE then the pooled estim FALSE then the variance is estimated separately for both groups and

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 alterna
estimate	the estimated mean or difference in means depending on whether it w
null.value	the specified hypothesized value of the mean or mean difference depe or a 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

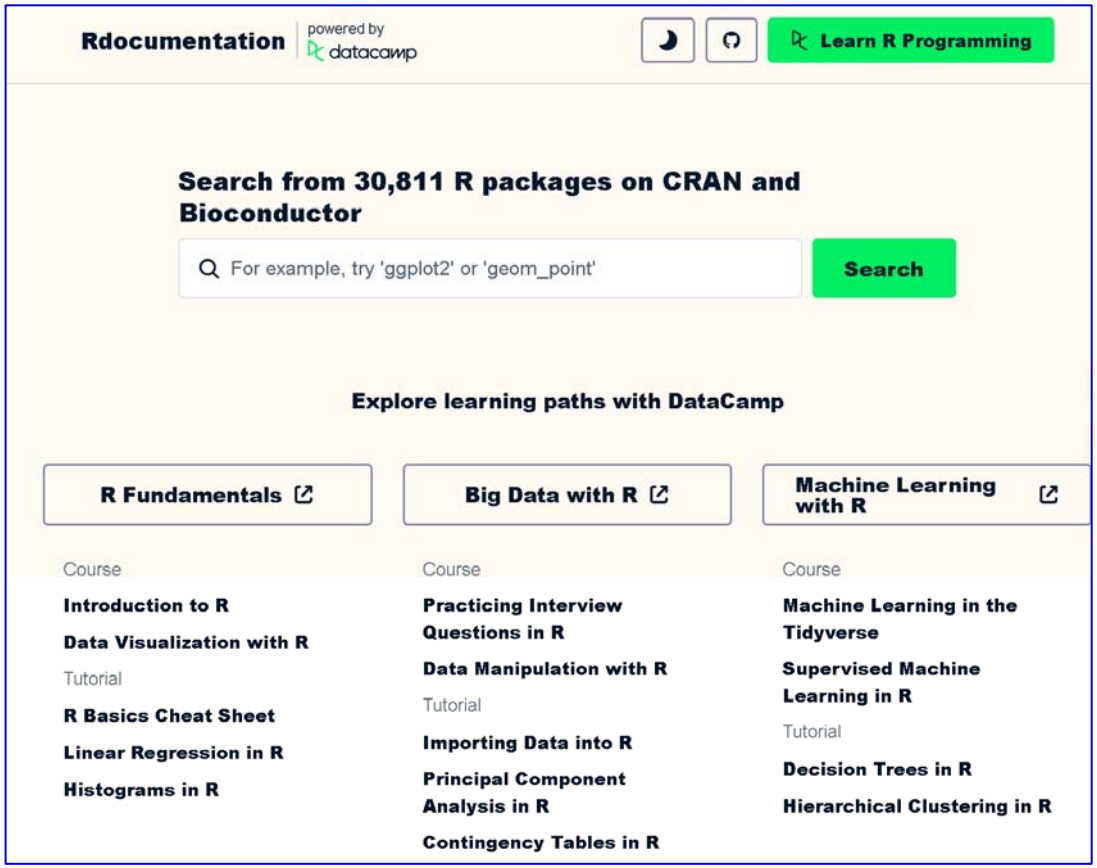
prop.test

Examples 範例

```
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/



RSeek:
https://rseek.org/

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")
```

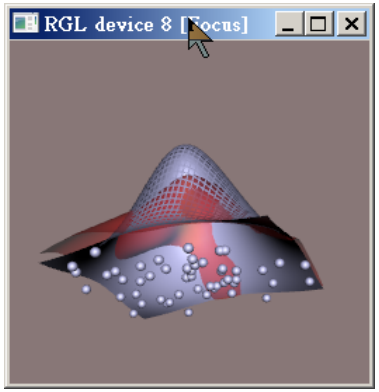
> demo()

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.
```

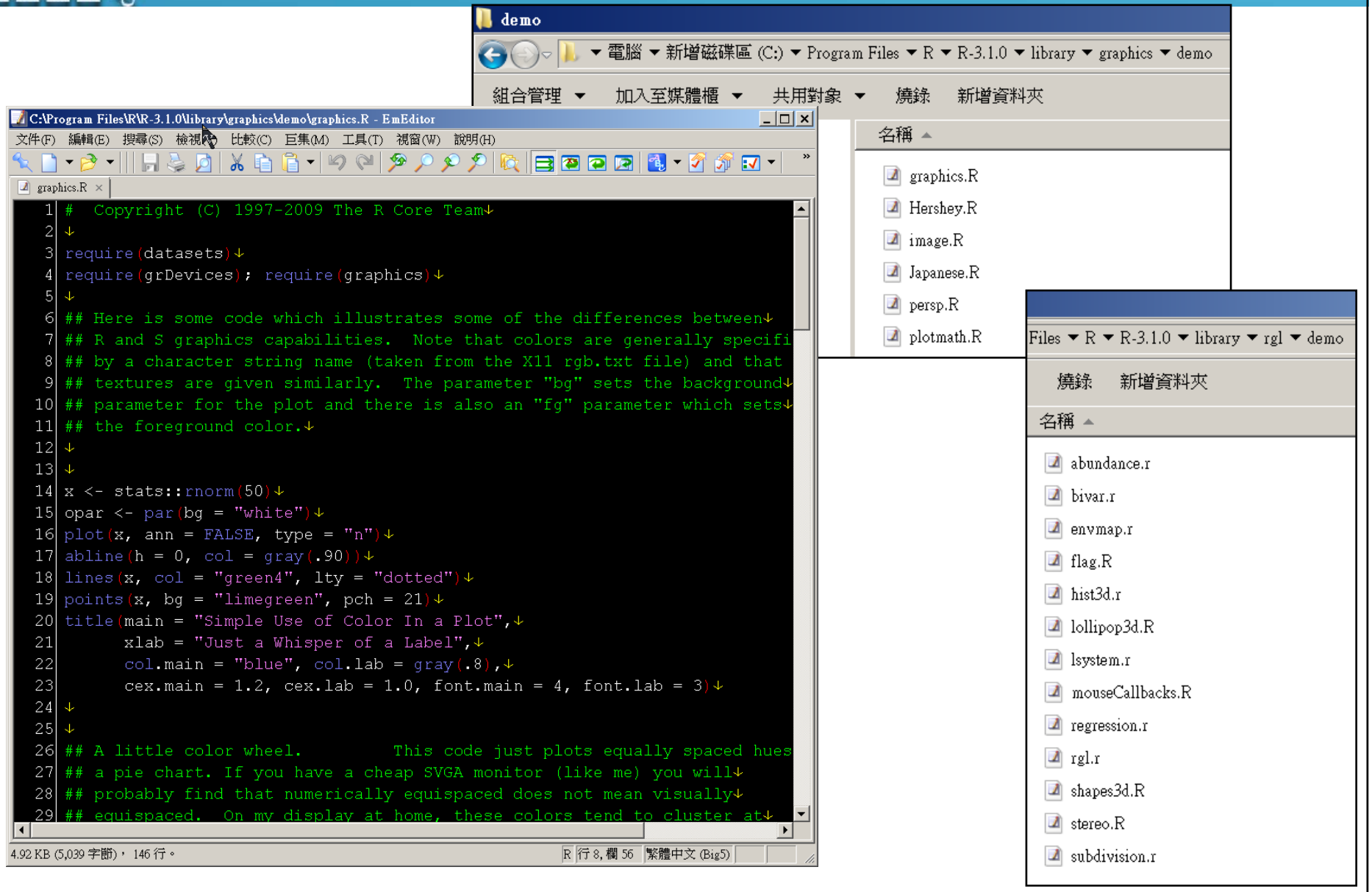
```
> demo(graphics)
```


```
> library(rgl)
> demo(rgl)
```




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

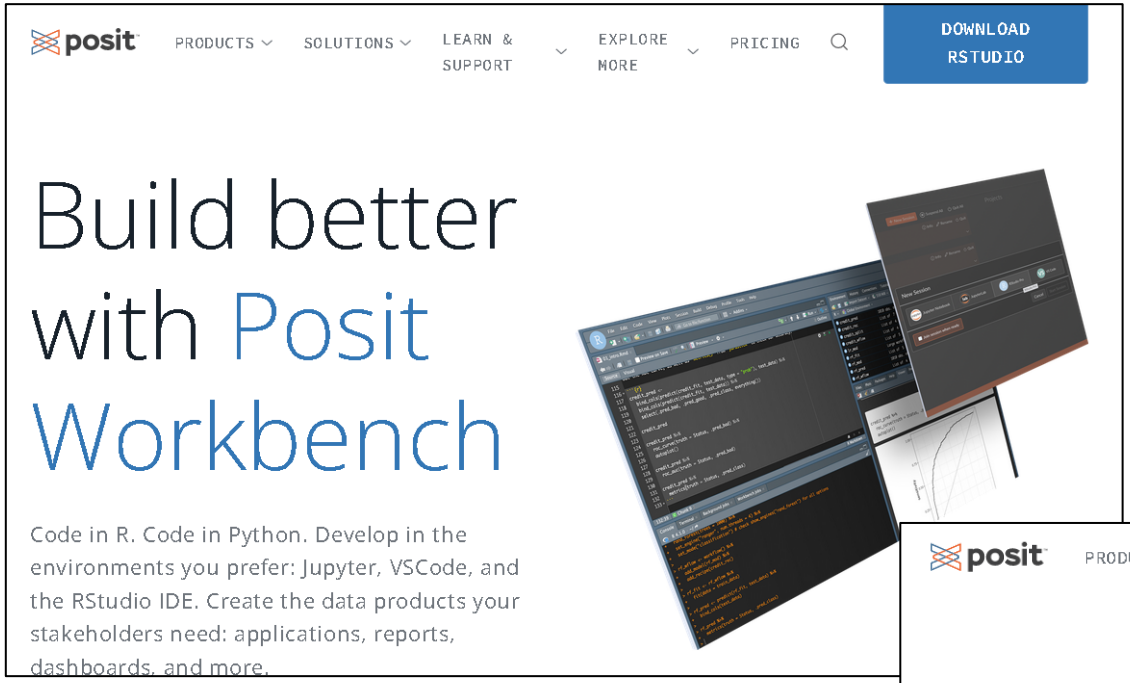
演示程式碼 (Demo Code)

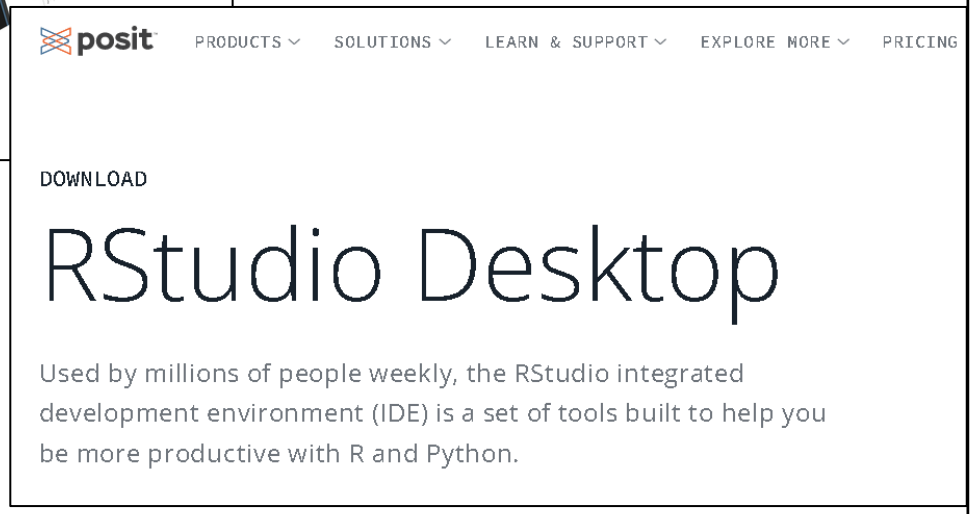


R程式IDE編輯器: RStudio

Download RStudio Desktop

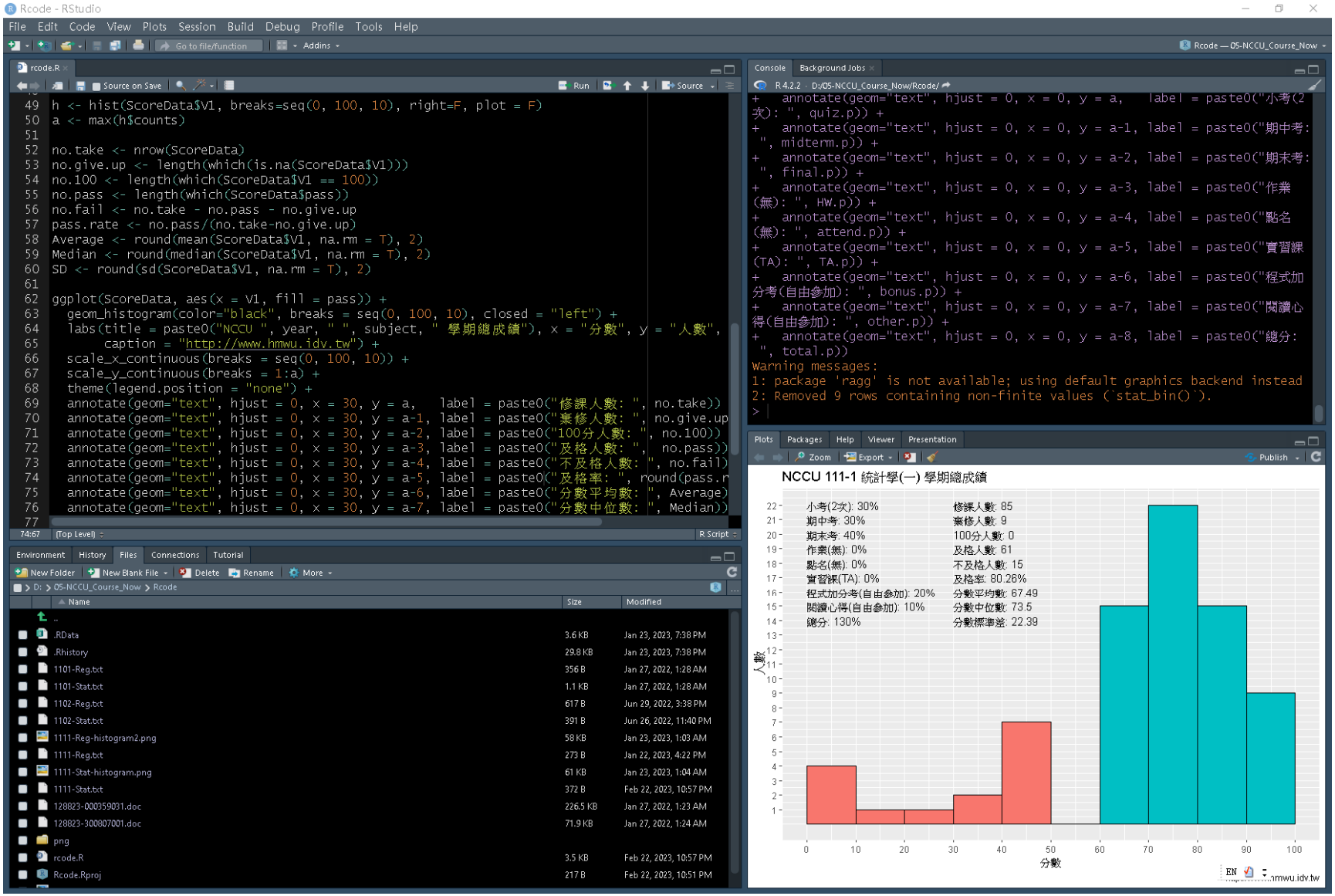
https://posit.co/



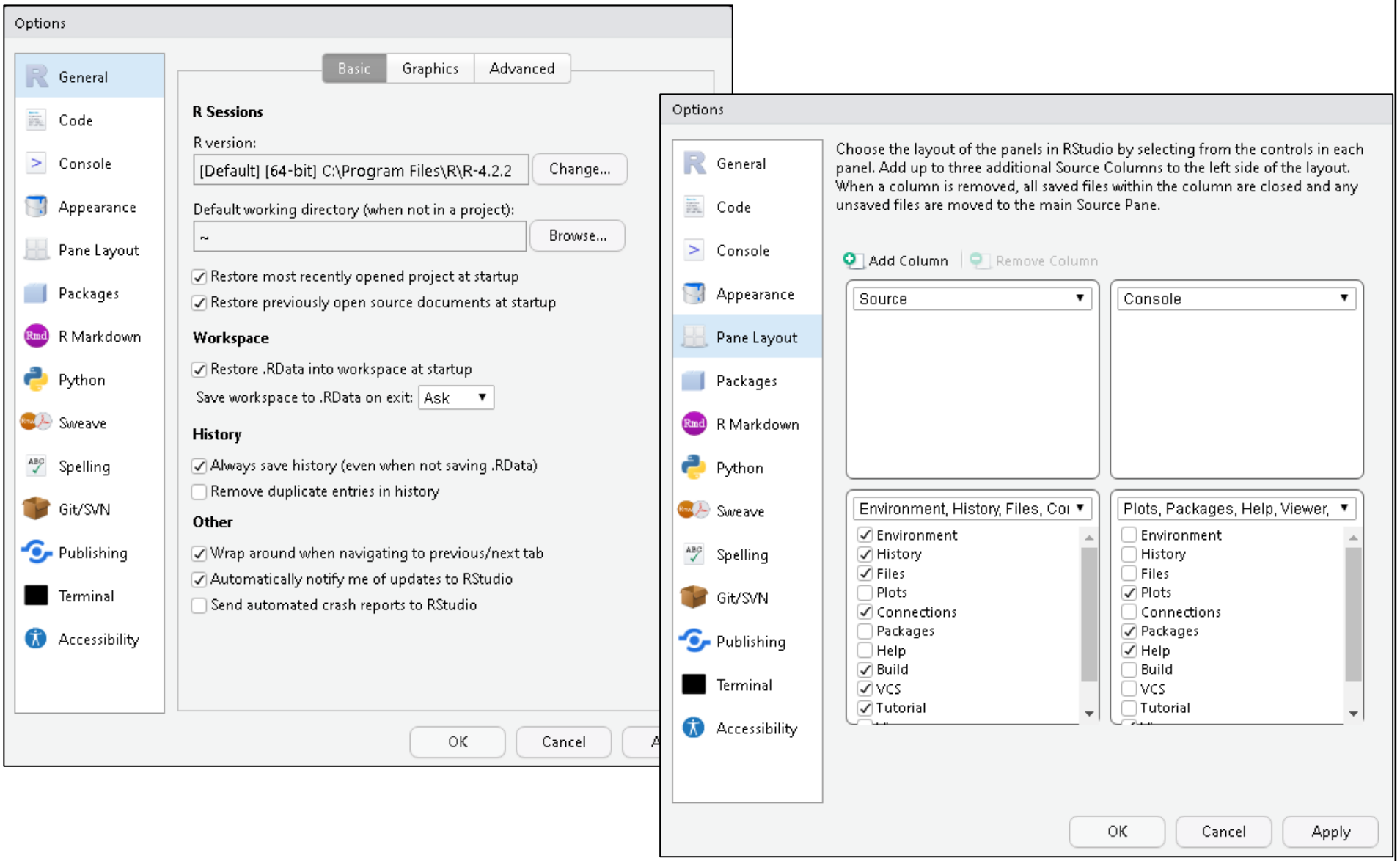


IDE: integrated development environment

客制化環境

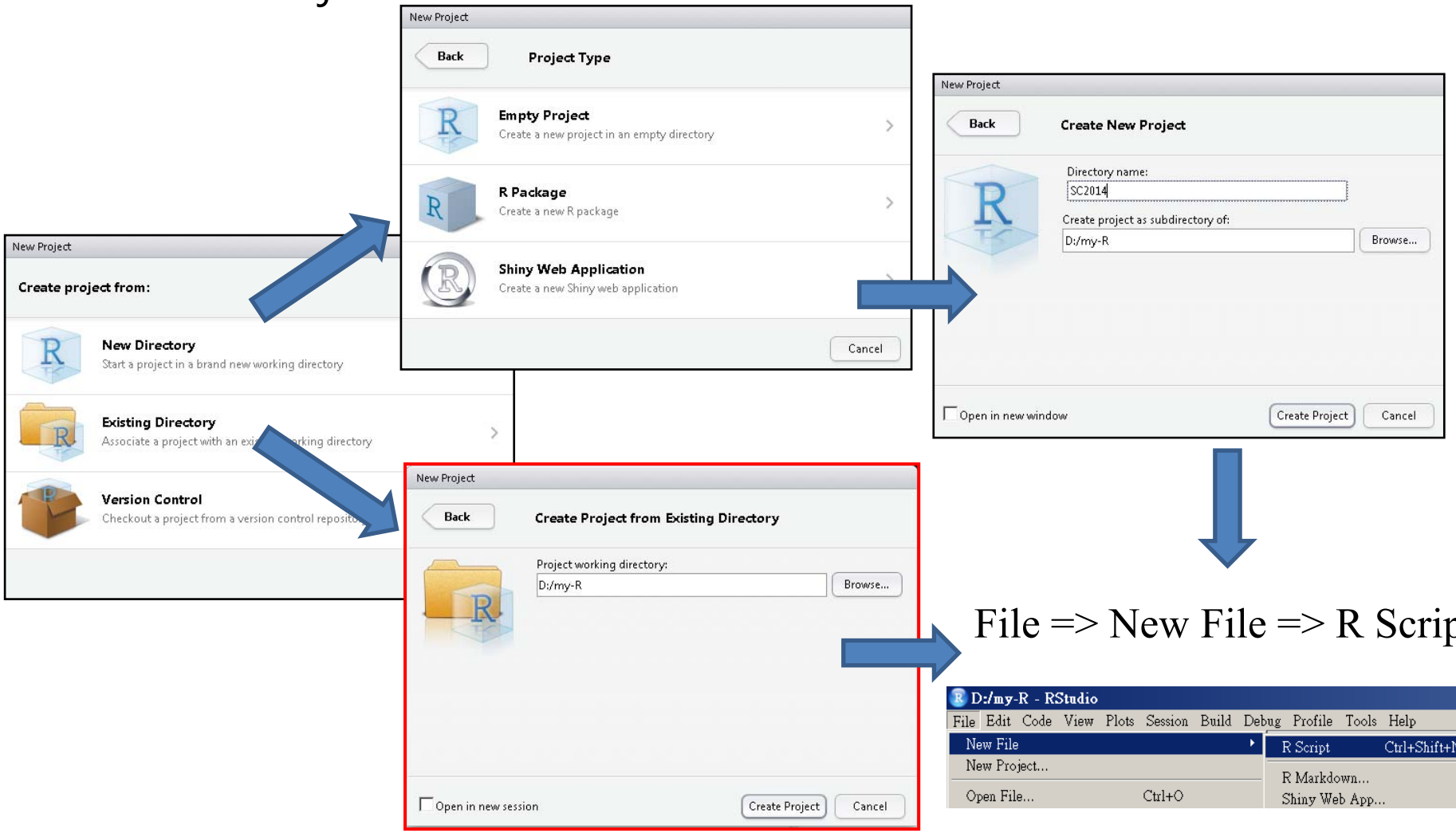

Rcode - RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
rcode.R
Source on Save
Run
Source
49 h <- hist(ScoreData$V1, breaks=seq(0, 100, 10), right=F, plot = F)
50 a <- max(h$counts)
51
52 no.take <- nrow(ScoreData)
53 no.give.up <- length(which(is.na(ScoreData$V1)))
54 no.100 <- length(which(ScoreData$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)) +
63 geom_histogram(color="black", breaks = seq(0, 100, 10), closed = "left") +
64 labs(title = paste0("NCCU ", year, " ", subject, " 學期總成績"), x = "分數", y = "人數",
65 caption = "http://www.hmwu.idv.tw") +
66 scale_x_continuous(breaks = seq(0, 100, 10)) +
67 scale_y_continuous(breaks = 1:a) +
68 theme(legend.position = "none") +
69 annotate(geom="text", hjust = 0, x = 30, y = a, label = paste0("修課人數: ", no.take))
70 annotate(geom="text", hjust = 0, x = 30, y = a-1, label = paste0("棄修人數: ", no.give.up
71 annotate(geom="text", hjust = 0, x = 30, y = a-2, label = paste0("100分人數: ", no.100))
72 annotate(geom="text", hjust = 0, x = 30, y = a-3, label = paste0("及格人數: ", no.pass))
73 annotate(geom="text", hjust = 0, x = 30, y = a-4, label = paste0("不及格人數: ", no.fail)
74 annotate(geom="text", hjust = 0, x = 30, y = a-5, label = paste0("及格率: ", round(pass.r
75 annotate(geom="text", hjust = 0, x = 30, y = a-6, label = paste0("分數平均數: ", Average)
76 annotate(geom="text", hjust = 0, x = 30, y = a-7, label = paste0("分數中位數: ", Median))
77
74:67 (Top Level) R Script
Console Background Jobs
R 4.2.2 · D:/05-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()`).
>
Environment History Files Connections Tutorial
New Folder New Blank File Delete Rename More
D: > 05-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, 3:38 PM
1102-Stat.txt 391 B Jun 26, 2022, 11:40 PM
1111-Reg-histogram2.png 58 KB Jan 23, 2023, 1:03 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
rcode.R 3.5 KB Feb 22, 2023, 10:57 PM
Rcode.Rproj 217 B Feb 22, 2023, 10:51 PM
Plots Packages Help Viewer Presentation
Zoom Export Publish
NCCU 111-1 統計學(一) 學期總成績
小考(2次): 30%
期中考: 30%
期末考: 40%
作業(無): 0%
點名(無): 0%
實習課(TA): 0%
程式加分考(自由參加): 20%
閱讀心得(自由參加): 10%
總分: 130%
修課人數: 85
棄修人數: 9
100分人數: 0
及格人數: 61
不及格人數: 15
及格率: 80.26%
分數平均數: 67.49
分數中位數: 73.5
分數標準差: 22.39
人數
分數
0 10 20 30 40 50 60 70 80 90 100
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
EN
.hmwu.idv.tw

Tools => Global Options...

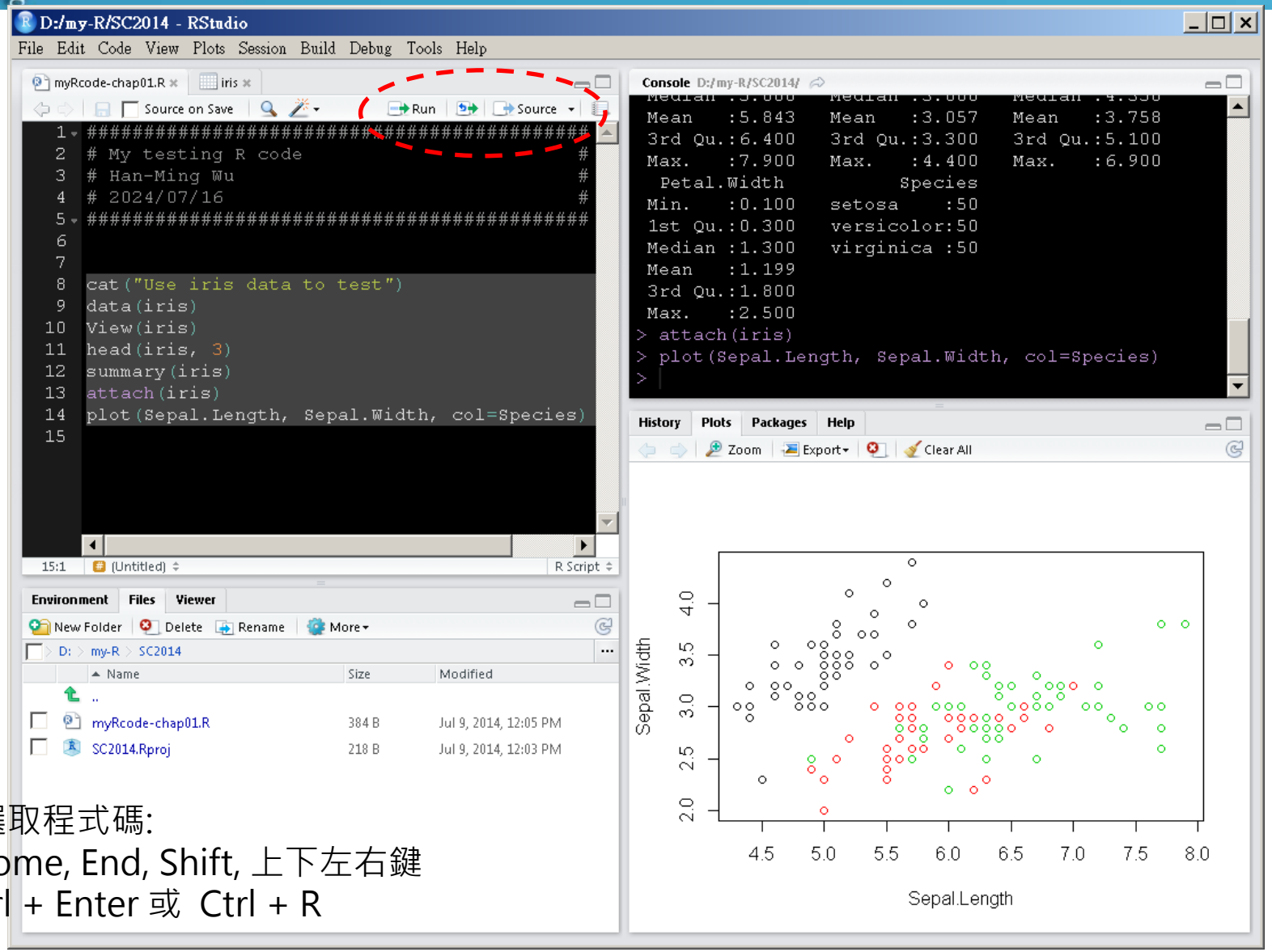


新增專案及R程式檔

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



執行程式

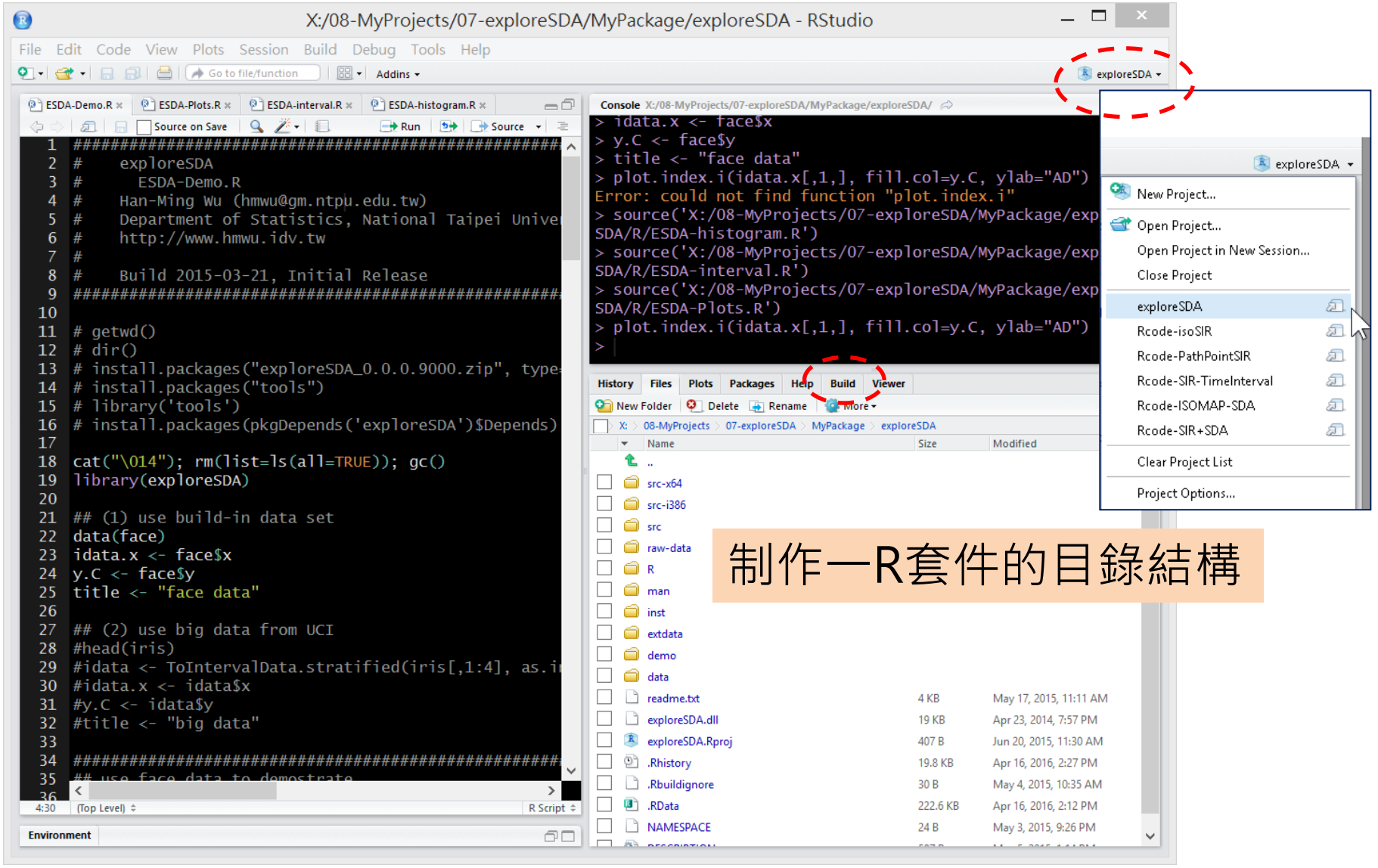


以鍵盤選取程式碼:

配合Home, End, Shift, 上下左右鍵

執行: Ctrl + Enter 或 Ctrl + R

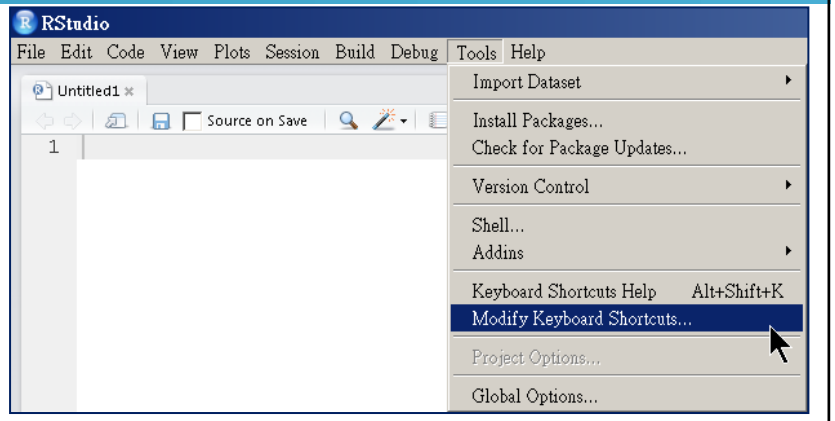
安排RStudio 專案目錄結構



RStudio 常用快速鍵 (Windows)

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

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

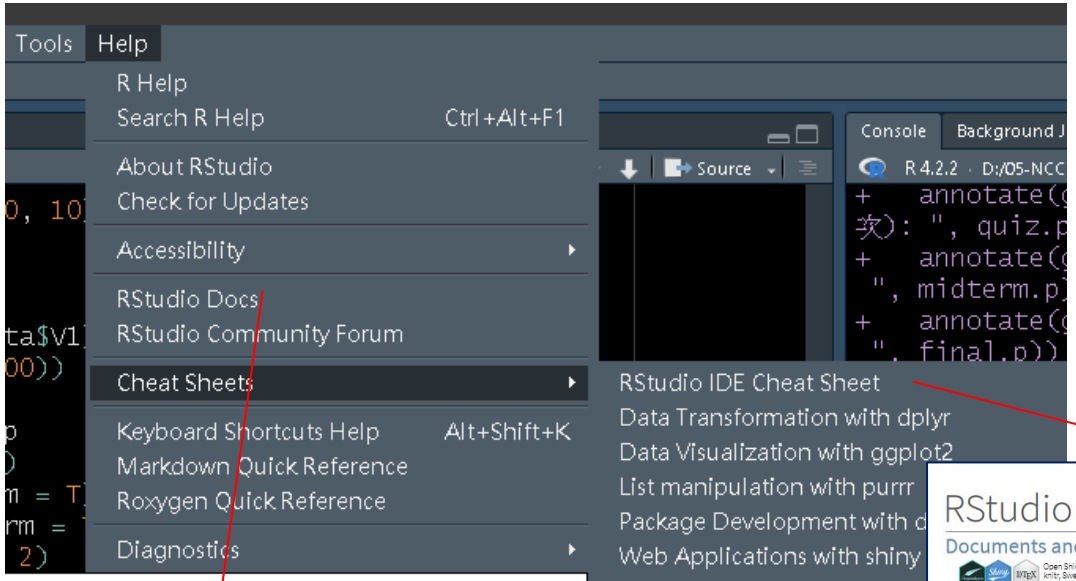
原始碼編輯區(Source)

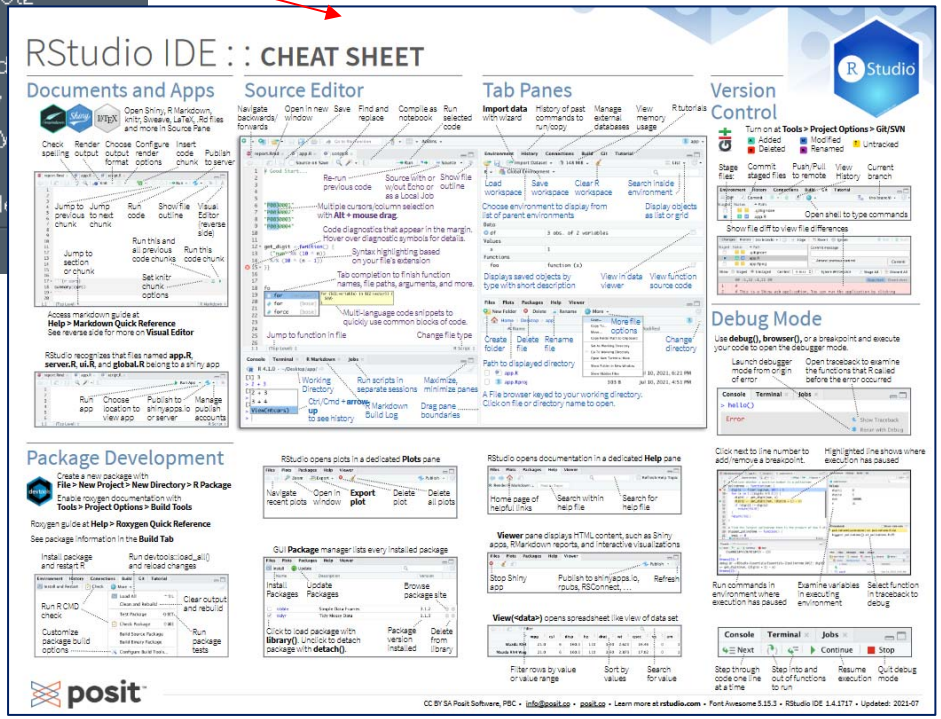
- 游標移動到原始檔編輯區 (Move cursor to Source Editor): **Ctrl+1**
- 存檔 (Save active document): **Ctrl+S**
- 關閉當前檔案 (Close active document): **Ctrl+W**
- 執行當前行或者選擇的行 (Run current line/selection): **Ctrl+Enter**
- 執行當前檔 (Run current document): **Ctrl+Alt+R**
- 從檔案開頭執行到該行 (Run from document beginning to current 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**

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



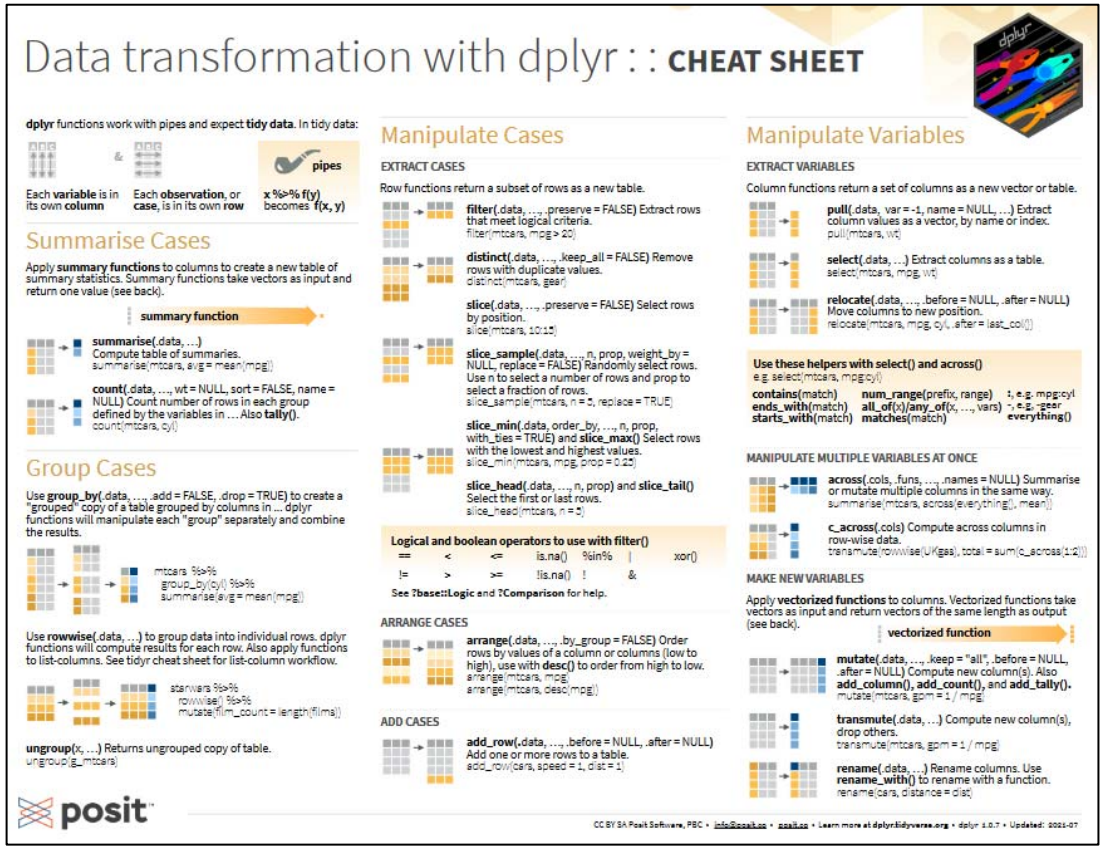


Posit Documentation

Posit Cheatsheets

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

Posit Cheatsheets



- 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

Communicate and interact

Analyze and explore

Model and predict

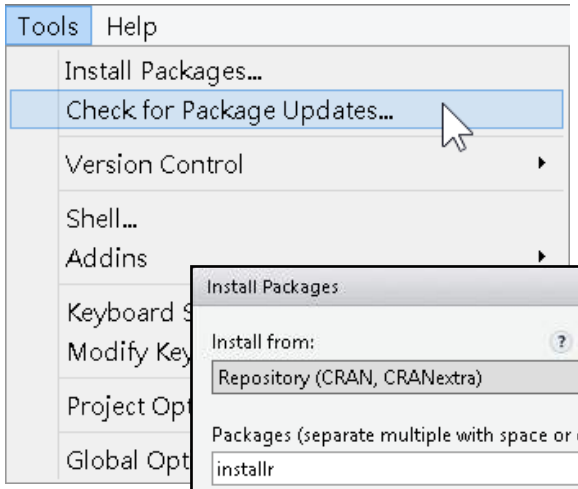
Connect and Integrate

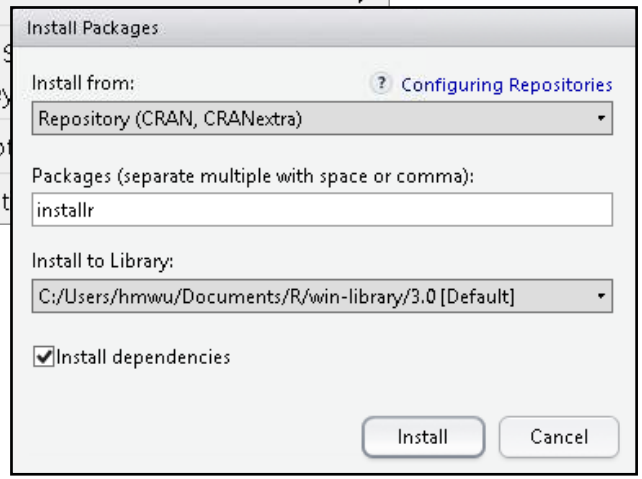
更新R軟體及R套件

- 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)
```

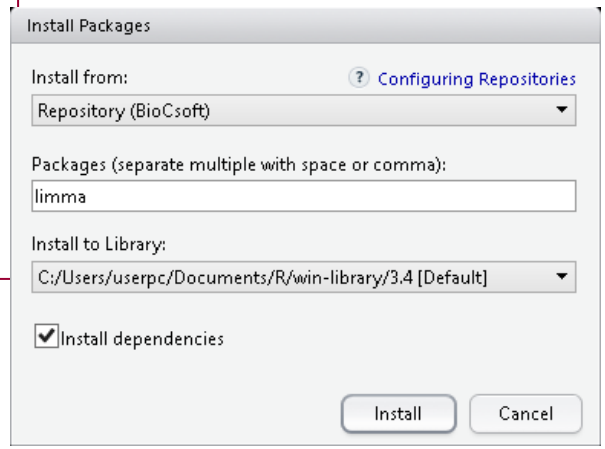
  - RGui => Packages => Update packages
  - RStudio => Tools => Check for Package Updates...





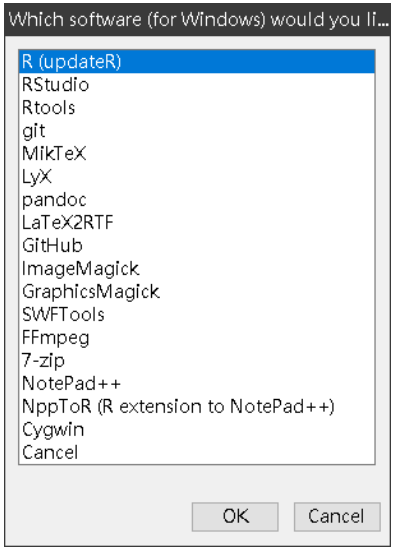

```
> setRepositories()
--- Please select repositories for use in this
session ---
1: + CRAN
2:   BioC software
3:   BioC annotation
4:   BioC experiment
5:   BioC extra
6:   CRAN (extras)
7:   Omegahat
8:   R-Forge
9:   rforge.net

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

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

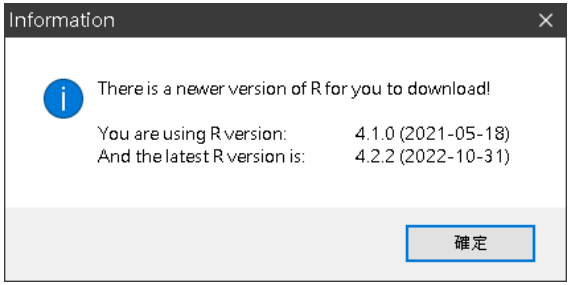


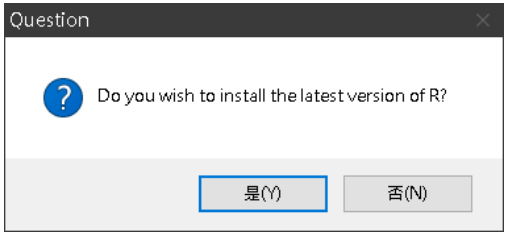
Note: 先暫時不移除舊版的R及套件!

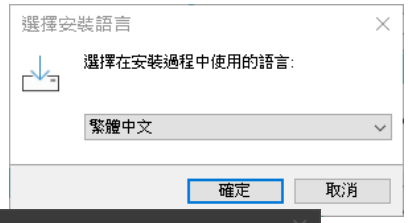
利用installr套件更新R軟體



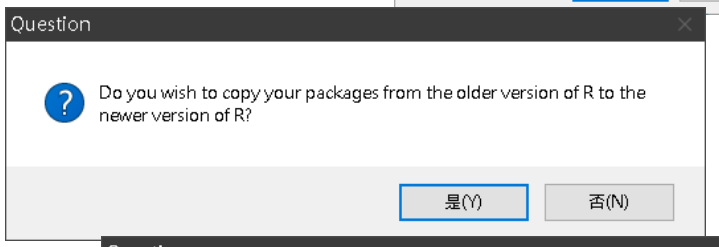

```
> library(installr)
> installr()
```

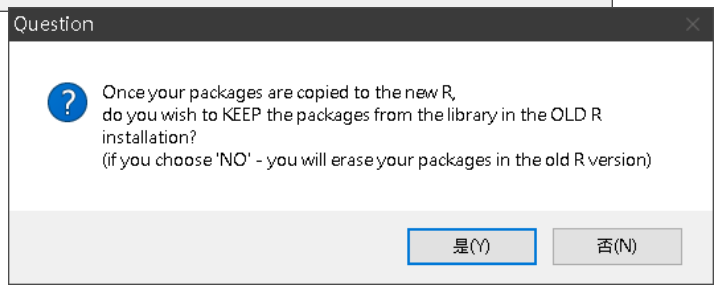


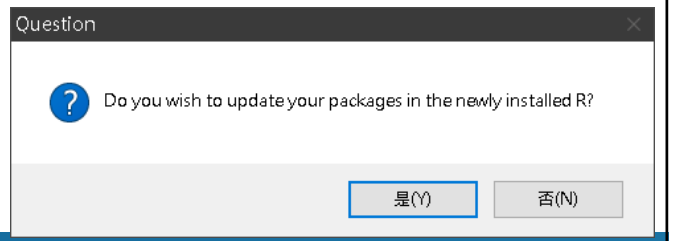





```
> sessionInfo()
```

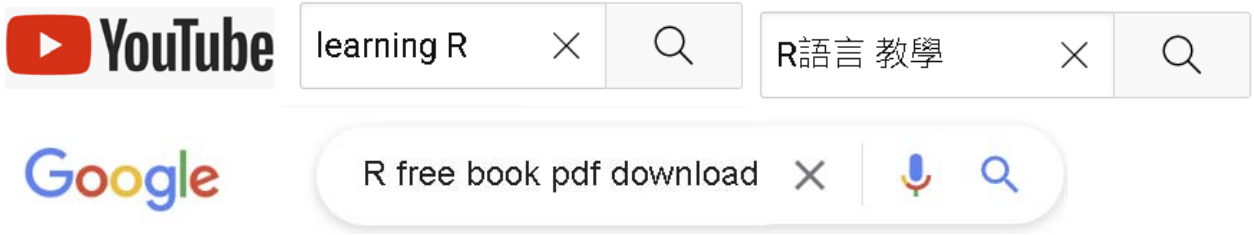


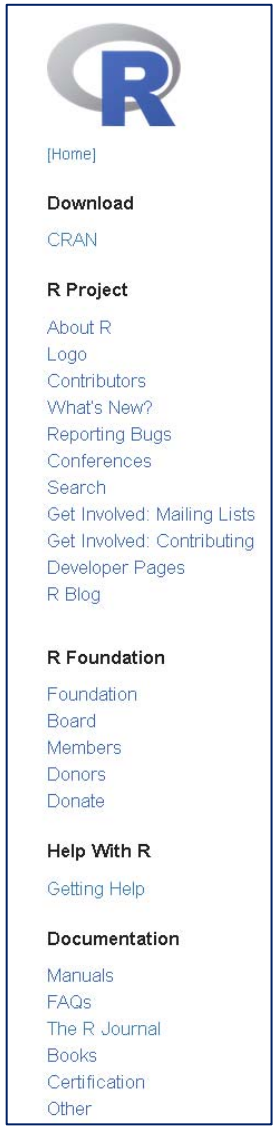





```
> version
                _
platform       x86_64-w64-mingw32
arch           x86_64
os             mingw32
crt            ucrt
system         x86_64, mingw32
status
major          4
minor          2.2
year           2022
month          10
day            31
svn rev        83211
language       R
version.string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

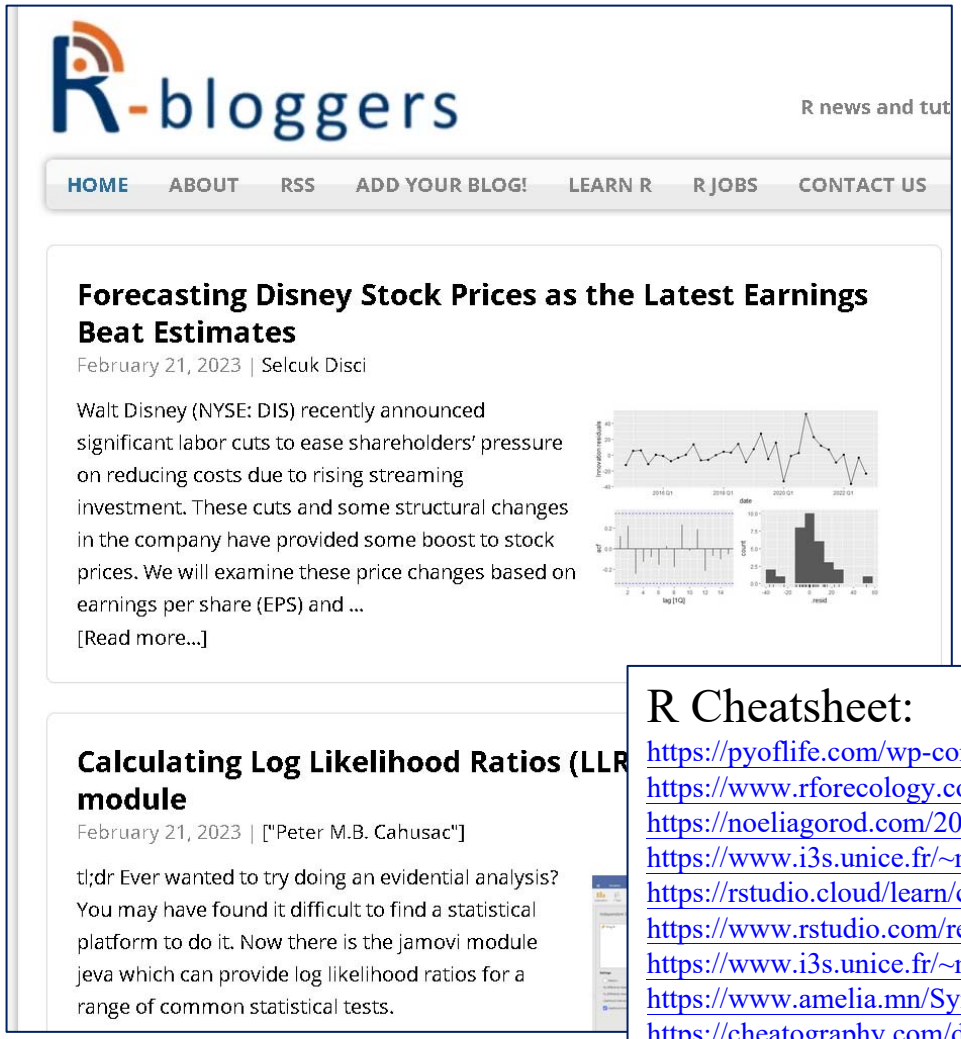
學習資源





- 博客來: https://www.books.com.tw
- Amazon
- Google
- Youtube
- https://stackoverflow.com/
- R-bloggers: https://www.r-bloggers.com/
- RDataMining.com: R and Data Mining: http://www.rdatamining.com/
- 中華R軟體學會?
  中華R軟體研發暨應用協會?

R-bloggers · R Cheatsheet



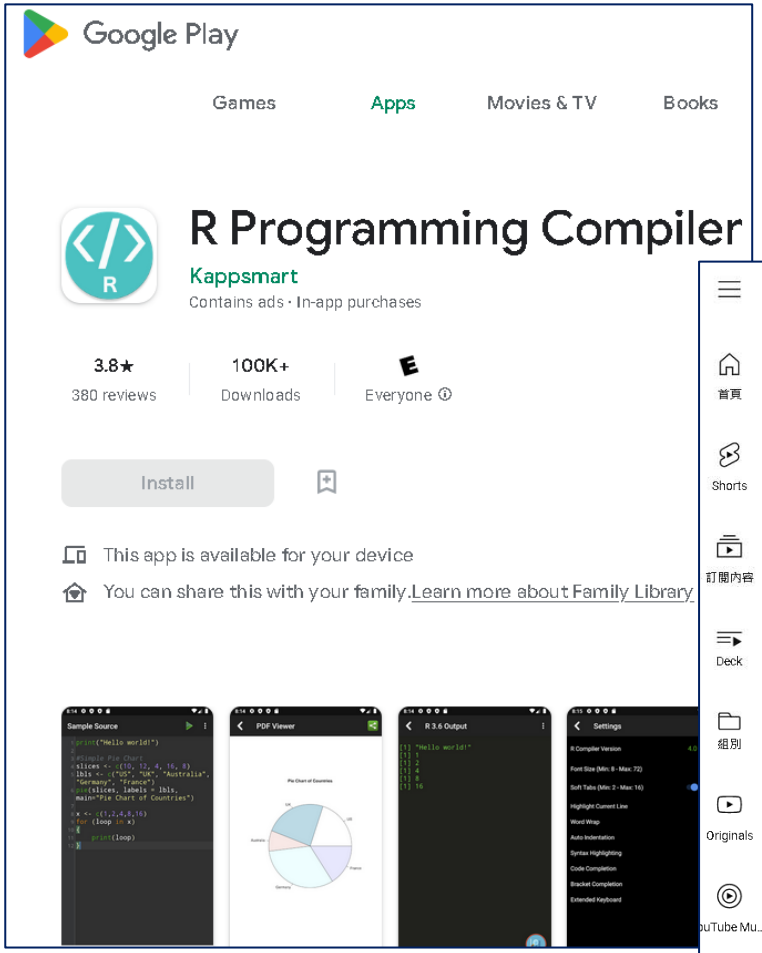
https://www.r-bloggers.com

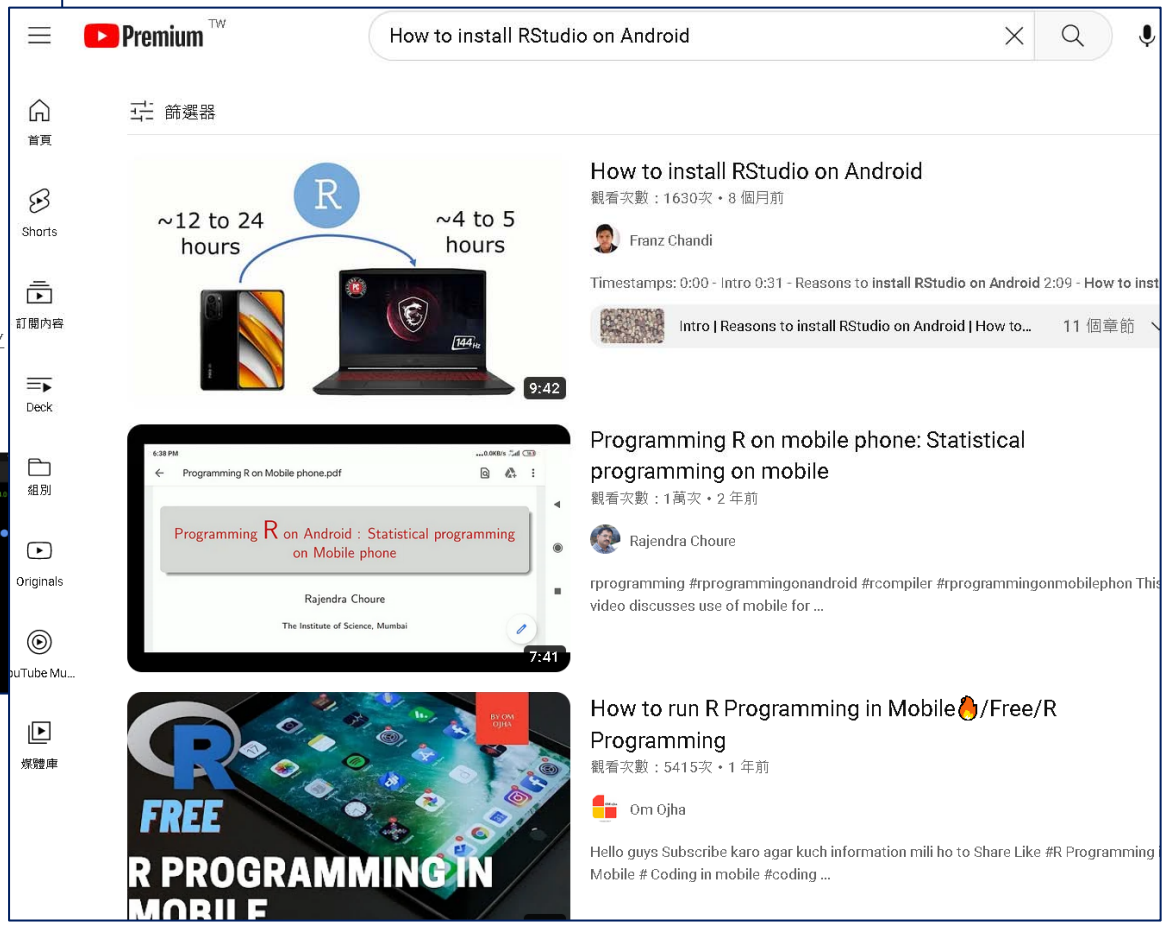
R Cheatsheet:

https://pyoflife.com/wp-content/uploads/2022/01/R-Cheatsheet-.pdf
https://www.rforecology.com/uploads/The_essential_R_Cheatsheet_v1_0.pdf
https://noeliagorod.com/2019/04/24/r-resources-free-courses-books-tutorials-cheat-sheets/
https://www.i3s.unice.fr/~malapert/R/pdf/base-r.pdf
https://rstudio.cloud/learn/cheat-sheets
https://www.rstudio.com/resources/cheatsheets/
https://www.i3s.unice.fr/~malapert/R/pdf/base-r.pdf
https://www.amelia.mn/Syntax-cheatsheet.pdf
https://cheatography.com/dipakk/cheat-sheets/r-basic/pdf/
https://cheatography.com/noella/cheat-sheets/introduction-to-package-r-sheet/pdf/
https://cheatography.com/bwaldo/cheat-sheets/r-subsetting/pdf/

相關中文書目/查詢相關中文書目

R/RStudio on the Phone





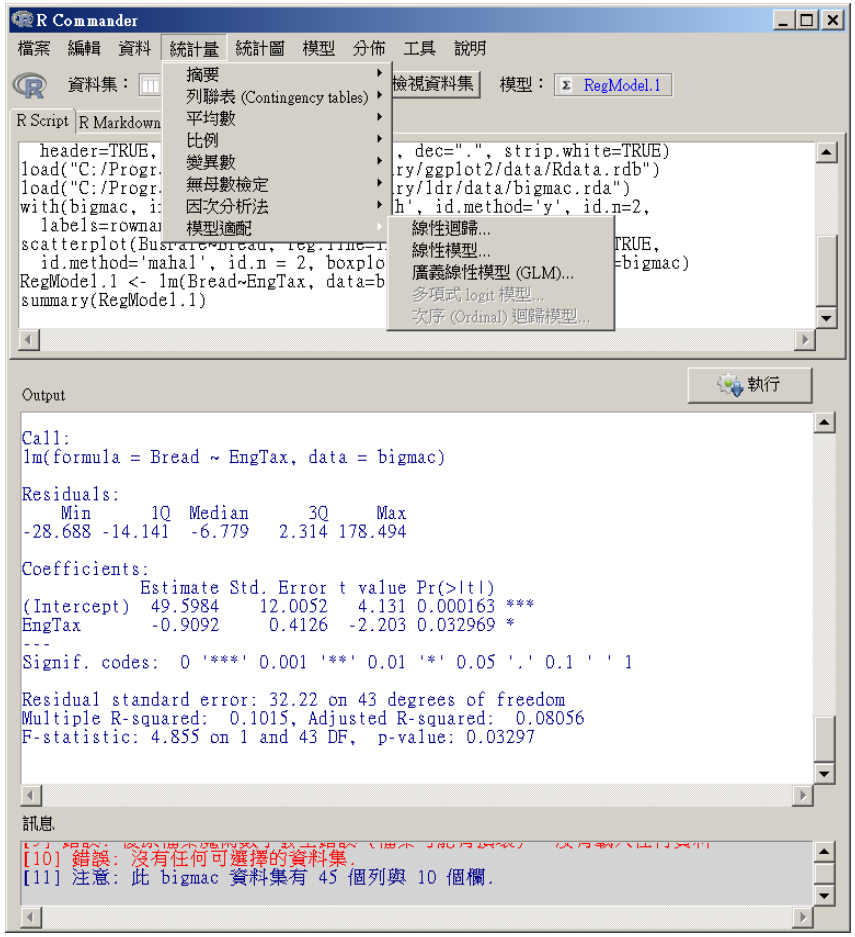
Rcmdr: R Commander

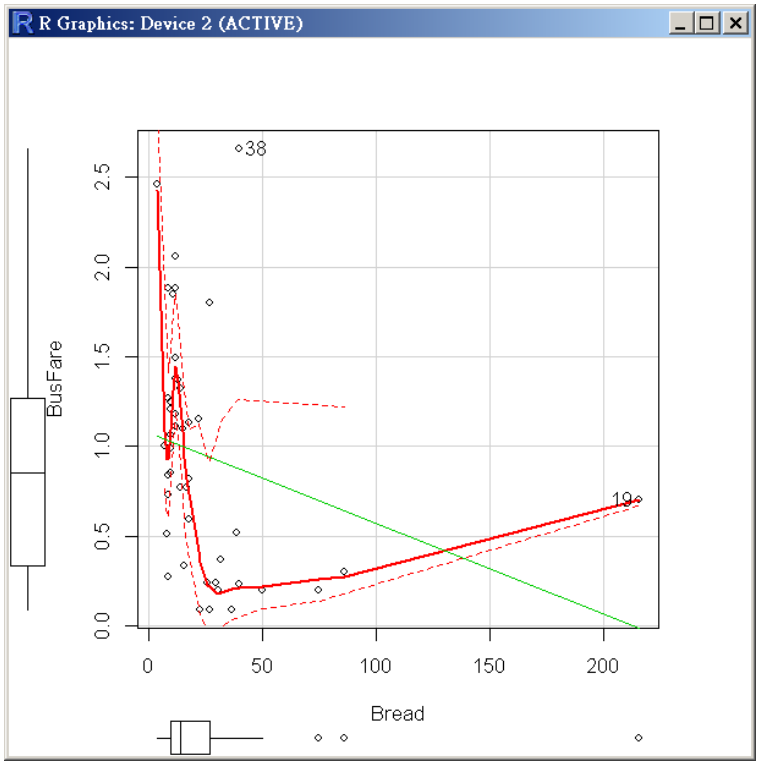
The R Commander: A Basic-Statistics GUI for R

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

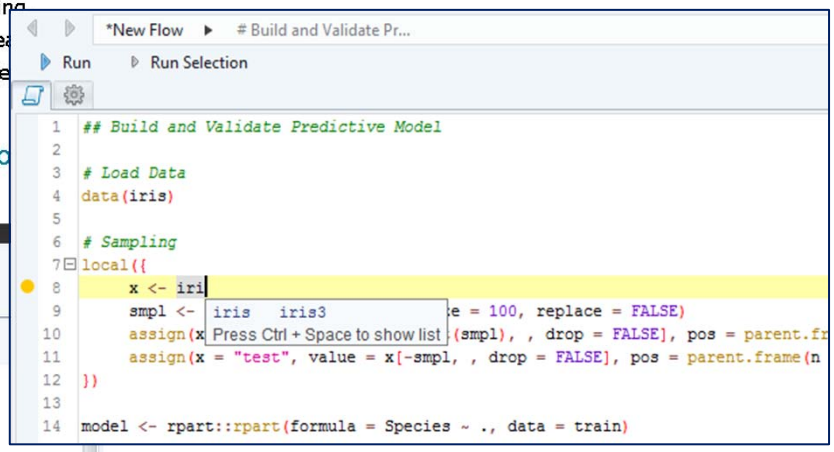
Overview Downloads Documents Help & Support

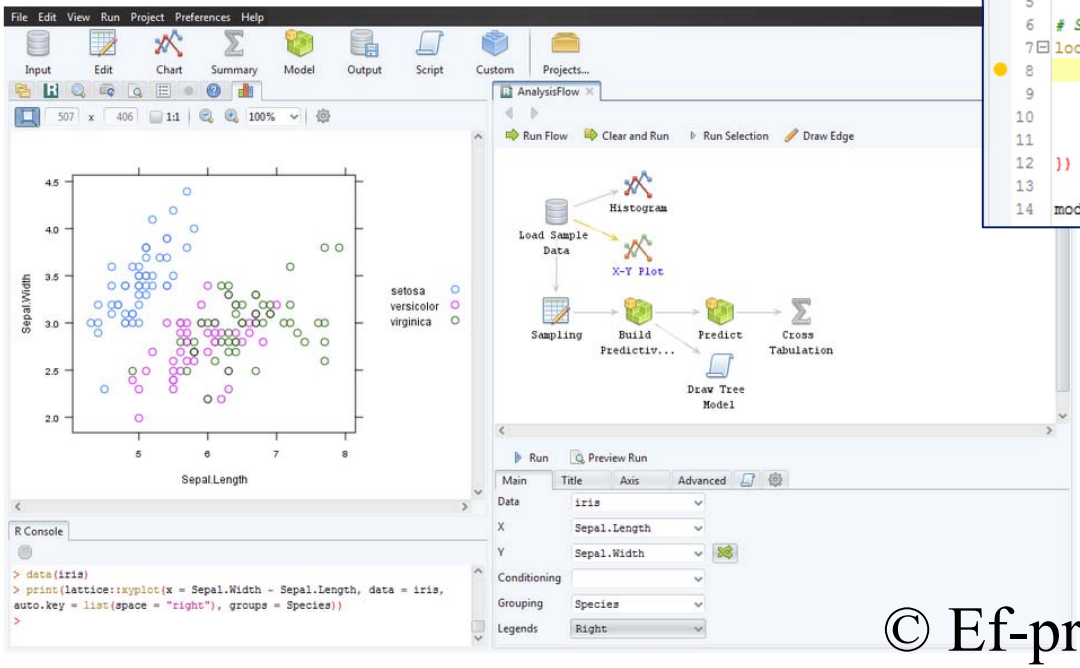
Designed for data analysis. Great for everyone.

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 fea
enable you to share the processes of data analysis between users with differing levels of proficie
AnalyticFlow works on Windows, Mac OS X, and Linux and is free for any use.

> Downloads > O

R Programming Support





系統資訊/參數

```
> # 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
```

ChatGPT for R, or in RStudio

8 ChatGPT packages for R

https://www.infoworld.com/article/2338386/8-chatgpt-tools-for-r-programming.html

`air`, `TheOpenAIR`, `RTutor`, `CodeLingo`, `askgpt`, `gptstudio`, `gpttools`, `gptchatteR`

https://cran.r-project.org/web/packages/chattr/index.html

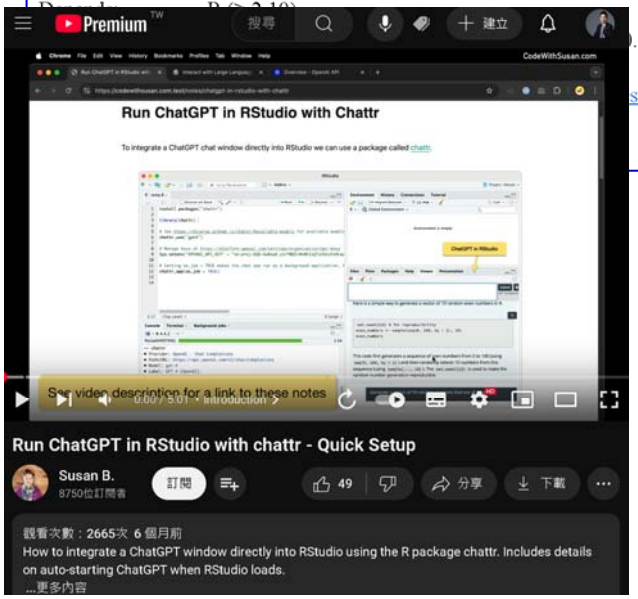
`chattr: Interact with Large Language Models in 'RStudio'`

Enables user interactivity with large-language models ('LLM') inside the 'RStudio' integrated development environment (IDE). The user can interact with the model using the 'shiny' app included in this package, or directly in the 'R' console. It comes with back-ends for 'OpenAI', 'GitHub' 'Copilot', and 'LlamaGPT'.

Version: 0.3.1

.3.0), purrr, rlang, bslib, shiny, clipr,

st2, withr



https://www.youtube.com/watch?v=AvRPsxnqzAM

`gptr: An R Interface with the ChatGPT API`

Author: Wanjun Gu

gptr is an R package that provides a convenient interface with the OpenAI ChatGPT API. It allows you to interact with ChatGPT, a powerful language model, for various natural language processing tasks.

The `gptr` R package makes talking to ChatGPT in R super easy. It helps researchers and data folks by simplifying the complicated stuff, like asking questions and getting answers. With `gptr`, you can use ChatGPT in R without any hassle, making it simpler for everyone to do cool things with language!

`Installation`

You can install gptr directly from CRAN:

```
install.packages("gptr")
```

https://cran.r-project.org/web/packages/gptr/readme/README.html

https://chatgpt.com/g/g-WUWF2eO0b-analysis-with-r

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 ba
[1] stats
datasets  r

loaded via
[1] compile
```

```
> RStudio.Version()
$citation
...

$version
[1] '2022.7.2.576'
```

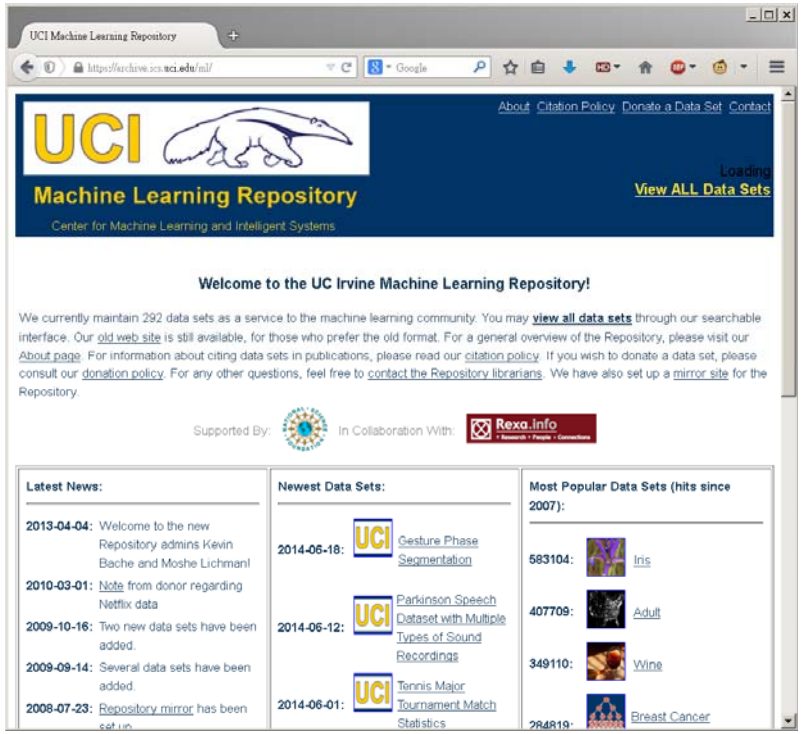
```
# 查詢套件版本
> packageVersion("rlang")
[1] ‘0.4.5’
```

```
> # 查詢所有套件安裝路徑:
> .libPaths()
[1] "C:/Users/hanmi/AppData/Local/R/win-library/4.5"
[2] "C:/Program Files/R/R-4.5.0/library"
>
> # 查詢特定套件的安裝目錄:
> system.file(package = "ggplot2")
[1] "C:/Users/hanmi/AppData/Local/R/win-library/4.5/ggplot2"
>
> # 查詢所有已安裝的套件清單與路徑:
> # installed.packages()
> installed.packages()[, c("Package", "LibPath")]
                Package          LibPath
abind           "abind"          "C:/Users/hanmi/AppData/Local/R/win-library/4.5"
admisc          "admisc"         "C:/Users/hanmi/AppData/Local/R/win-library/4.5"
arm             "arm"            "C:/Users/hanmi/AppData/Local/R/win-library/4.5"
...
```

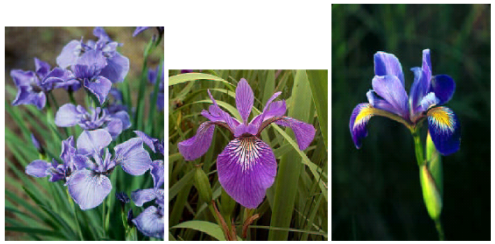
The Most Frequently Used Data Set

UCI Machine Learning Repository

https://archive.ics.uci.edu/ml/



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)



Iris Setosa *Iris Versicolor* *Iris Virginica*

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)

```
> install.packages("CVD")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate v
ersion 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_pac
kages'
>
```

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-C6EIgG1Gn-t3uJg

套件安裝問題，可能的解決方法:

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
```

- (1) 以「系統管理者員身份執行」開啟RStudio。
- (2) 改變R套件安裝資料夾「.libPaths」

https://www.twblogs.net/a/5cc0edfcbd9eee397113dede

- (3) 解決RStudio不支持Windows系统中文用户名問題

https://blog.csdn.net/qq_16146103/article/details/105445198

- (4) win10用户名為中文導致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

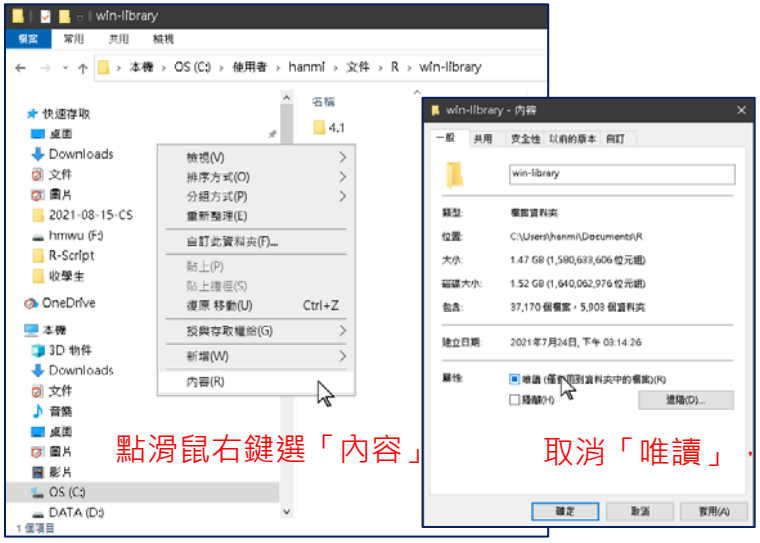
- (7) 如何更改R的預設語系

https://psmethods.postach.io/post/ru-he-geng-gai-rde-yu-she-yu-xi

```
# 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)

```
> 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。