



# The R Project for Statistical Computing



# R Language quick start

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<https://ce.nctu.edu.tw/member/teachers/23>

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# 選擇R的理由?

統計軟體:

- SAS (Statistical Analysis System), 1976創立，適合**專業人員**，支援作業系統Windows、Linux **(\\$)**
- SPSS (Statistical Package for the Social Science), 1975年創立，用FORTRAN語言編寫，支援作業系統Windows、macOS **(\\$)**
- Minitab, 1972創立，支援作業系統Windows、macOS, 2001 **(\\$)**
- EXCEL **(\\$)**
- S-PLUS, 商用軟體 **(\\$)**

# 選擇R的理由? 免錢、容易安裝、繪圖功能

- 主要語法與S語言相同，為簡化版的S統計軟體
- 1995年由Auckland大學統計系的Robert Gentleman & Ross Ihaka兩位學者發展建立，  
支援Windows、macOS、Linux
- 開放原始碼，可以加以修改或擴充其功能
- 可以以矩陣或是向量的形式處理**數字**、字串及  
時間等資料，並且俱有強大的**繪圖能力**

# 選擇R的理由? 可外部呼叫

R並非為封閉的程式環境。可以呼叫C、Fortran、Python & JAVA程式所寫的外部程式庫來輔助運算

# 已知缺點

- 不親切的使用者介面

Rstudio- 整合開發環境

(Integrated Development Environment, IDE)

- 須完全瞭解套件、函式名稱與程式撰寫邏輯
- 大量計算效能低

# TIOBE全球程式語言排名



HOME COMPANY TICS PRODUCTS MARKETS TQI DOCUMENTATION

Sep 2021	Sep 2020	Change	Programming Language	Ratings	Change
1	1		C	11.83%	-4.12%
2	3	▲	Python	11.67%	+1.20%
3	2	▼	Java	11.12%	-2.37%
4	4		C++	7.13%	+0.01%
5	5		C#	5.78%	+1.20%
16	16		MATLAB	1.02%	-0.07%
17	37	▲	Fortran	1.01%	+0.65%
18	9	▼	R	0.98%	-1.40%
19	13	▼	Perl	0.78%	-0.53%
20	29	▲	NYCU Colab Copyright Delphi Object Pascal	0.77%	+0.24%

# TIOBE 全球程式語言排名

## The R Programming Language

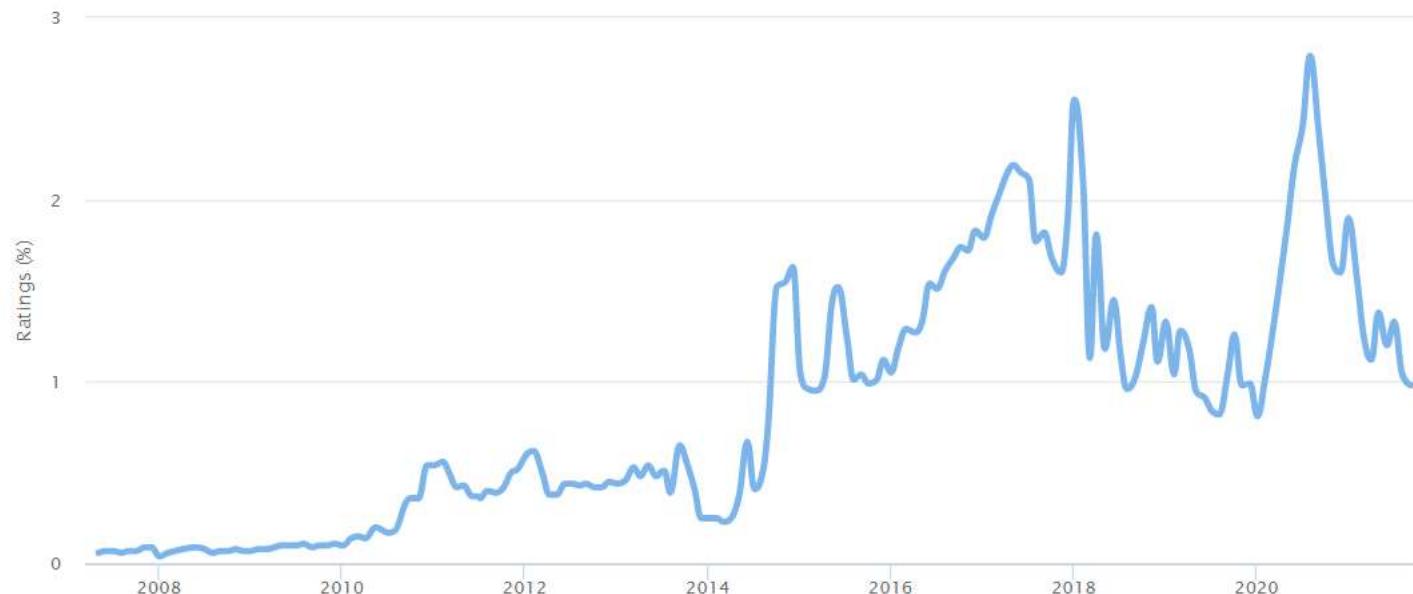
Some information about R:

▲ Highest Position (since 2007): #8 in Aug 2020

▼ Lowest Position (since 2007): #73 in Dec 2008

TIOBE Index for R

Source: [www.tiobe.com](http://www.tiobe.com)





# 安裝前須知

Windows不要設定中文使用者名稱，若原先為中文使用者名稱者，請另外創立一個英文帳號名稱，後續將R安裝於英文帳號中。

先安裝R再安裝Rstudio

不要安裝在Windows的OneDrive資料夾



The R Project for Statistical Computing

# 下載及安裝R軟體

下載軟體

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





[Home]

## Download

CRAN

1

## R Project

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R Blog

## R Foundation

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# The R Project for Statistical Computing

## Getting Started

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

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

## News

- [R version 3.6.1 \(Action of the Toes\)](#) has been released on 2019-07-05.
- useR! 2020 will take place in St. Louis, Missouri, USA.
- [R version 3.5.3 \(Great Truth\)](#) has been released on 2019-03-11.
- The R Foundation Conference Committee has released a [call for proposals](#) to host useR! 2020 in North America.
- You can now support the R Foundation with a renewable subscription as a [supporting member](#)
- The R Foundation has been awarded the Personality/Organization of the year 2018 award by the professional association of German market and social researchers.

## News via Twitter

# 下載及安裝R軟體

## CRAN Mirrors

The Comprehensive R Archive Network is available at the following URLs, please choose a location close to you. Some statistics on the status of the mirrors can be found here: [main page](#), [windows release](#), [windows old release](#).

If you want to host a new mirror at your institution, please have a look at the [CRAN Mirror HOWTO](#).

0-Cloud  
2

<https://cloud.r-project.org/>

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

Argentina  
<http://mirror.fcaglp.unlp.edu.ar/CRAN/>

Australia  
<https://cran.csiro.au/>  
<https://mirror.aarnet.edu.au/pub/CRAN/>  
<https://cran.ms.unimelb.edu.au/>  
<https://cran.curtin.edu.au/>

Austria  
<https://cran.wu.ac.at/>

Belgium  
<https://www.freestatistics.org/cran/>  
<https://lib.ugent.be/CRAN/>

Brazil  
<https://cran-r.c3sl.ufpr.br/>  
<https://cran.fiocruz.br/>  
<https://vps.fmvz.usp.br/CRAN/>  
<https://brieger.esalq.usp.br/CRAN/>

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

Canada

Automatic redirection to servers worldwide, currently sponsored by Rstudio

University of Science and Technology Houari Boumediene

Universidad Nacional de La Plata

CSIRO  
AARNET  
School of Mathematics and Statistics, University of Melbourne  
Curtin University of Technology

Wirtschaftsuniversität Wien

Patrick Wessa  
Ghent University Library

Universidade Federal do Parana  
Oswaldo Cruz Foundation, Rio de Janeiro  
University of Sao Paulo, Sao Paulo  
University of Sao Paulo, Piracicaba

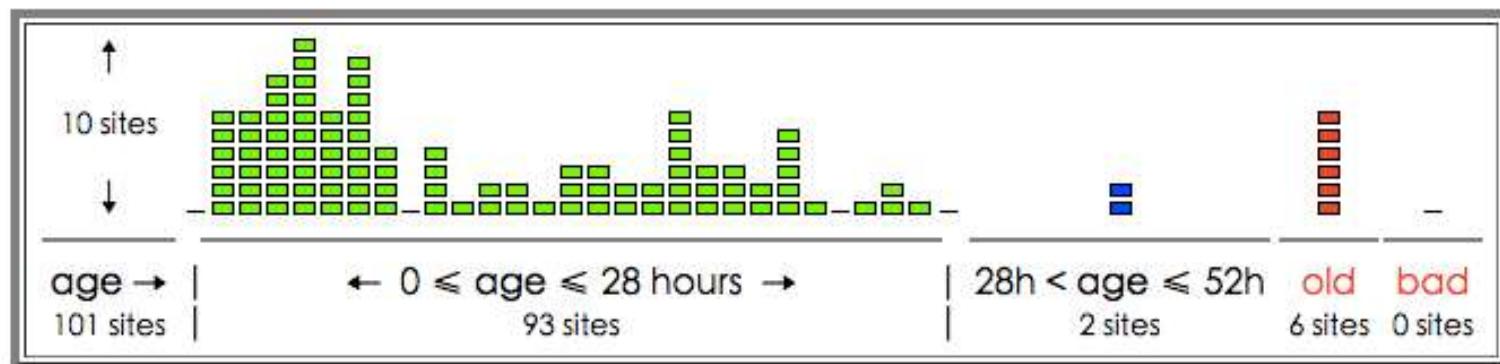
Sofia University

# 下載及安裝R軟體

the status of [CRAN](#) mirrors

date : Sat Sep 19 22:06:01 2020 (UTC)  
last check : Sat Sep 19 22:06:01 2020 (UTC)

age histogram



units ■ ■ ■ represent one mirror site.

regions

[ar](#) [asia](#) [at](#) [au](#) [be](#) [bg](#) [br](#) [ca](#) [ch](#) [cl](#) [cn](#) [co](#) [cr](#) [cz](#) [de](#) [dk](#) [dz](#) [ec](#) [ee](#) [es](#) [fr](#) [gr](#) [hu](#) [id](#)  
[ie](#) [in](#) [ir](#) [is](#) [it](#) [jp](#) [kr](#) [ma](#) [mx](#) [my](#) [nl](#) [no](#) [nz](#) [ph](#) [pt](#) [ru](#) [se](#) [sv](#) [th](#) [tr](#) [tw](#) [uk](#) [us](#) [uy](#) [za](#)

report

3

4

Taiwan					
<a href="#">cran.csie.ntu.edu.tw</a> @	https	3.3 days		2.8 days	no time
Thailand					
<a href="#">mirrors.psu.ac.th</a> @	http	23 hours		2 hours	ok
Turkey					
<a href="#">cran.gedik.edu.tr</a> @	https	4 hours		2 hours	ok
<a href="#">cran.ncc.metu.edu.tr</a> @	https	6 hours		renewed	ok
<a href="#">cran.pau.edu.tr</a> @	https	1 hour		renewed	ok
United Kingdom					
<a href="#">www.stats.bris.ac.uk</a> @	https	2 hours		renewed	ok
<a href="#">cran.ma.imperial.ac.uk</a> @	https	9 hours		1 hour	ok
United States - 13 sites					
<a href="#">cran.mirrors.hoobly.com</a> @	http	5 hours		renewed	ok
<a href="#">cran.revolutionanalytics.com</a> @	https	22 hours		3 hours	ok
<a href="#">cran.case.edu</a> @	https	18 hours		renewed	ok
<a href="#">lib.stat.cmu.edu</a> @	http	4 hours		3 hours	ok
<a href="#">archive.llinux.duke.edu</a> @	http	16 hours		2 hours	ok
<a href="#">mirror.las.iastate.edu</a> @	https	11 hours		renewed	ok
<a href="#">ftp.ussg.iu.edu</a> @	http	15 hours		2 hours	ok
<a href="#">rweb.crmda.ku.edu</a> @	https	18 hours		3 hours	ok

## 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](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

5

## 選擇作業系統相容的安裝檔

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 (2019-07-05, Action of the Toes) [R-3.6.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

## Questions About R

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

The Comprehensive R Archive | +

cran.csie.ntu.edu.tw

R for Windows

Subdirectories:

- [base](#) 6 Binaries for base distribution. This is what you want to [install R for the first time](#).
- [contrib](#) Binaries of contributed CRAN packages (for R >= 2.13.x; managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.
- [old contrib](#) Binaries of contributed CRAN packages for outdated versions of R (for R < 2.13.x; managed by Uwe Ligges).
- [Rtools](#) Tools to build R and R packages. This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.



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[FAQs](#)  
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7

## R-4.1.1 for Windows (32/64 bit)

[Download R 4.1.1 for Windows](#) (86 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can compare the [md5sum](#) of the .exe to the [fingerprint](#) on the master server. You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

### Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

### Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

查看過去版本

Note to webmasters: A stable link which will redirect to the current Windows binary release is  
<CRAN MIRROR>/bin/windows/base/release.html.

Last change: 2021-08-10

# 下載及安裝R軟體



[CRAN](#)  
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[Search](#)

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[R Binaries](#)  
[Packages](#)  
[Other](#)

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[Manuals](#)  
[FAQs](#)  
[Contributed](#)

## Previous Releases of R for Windows

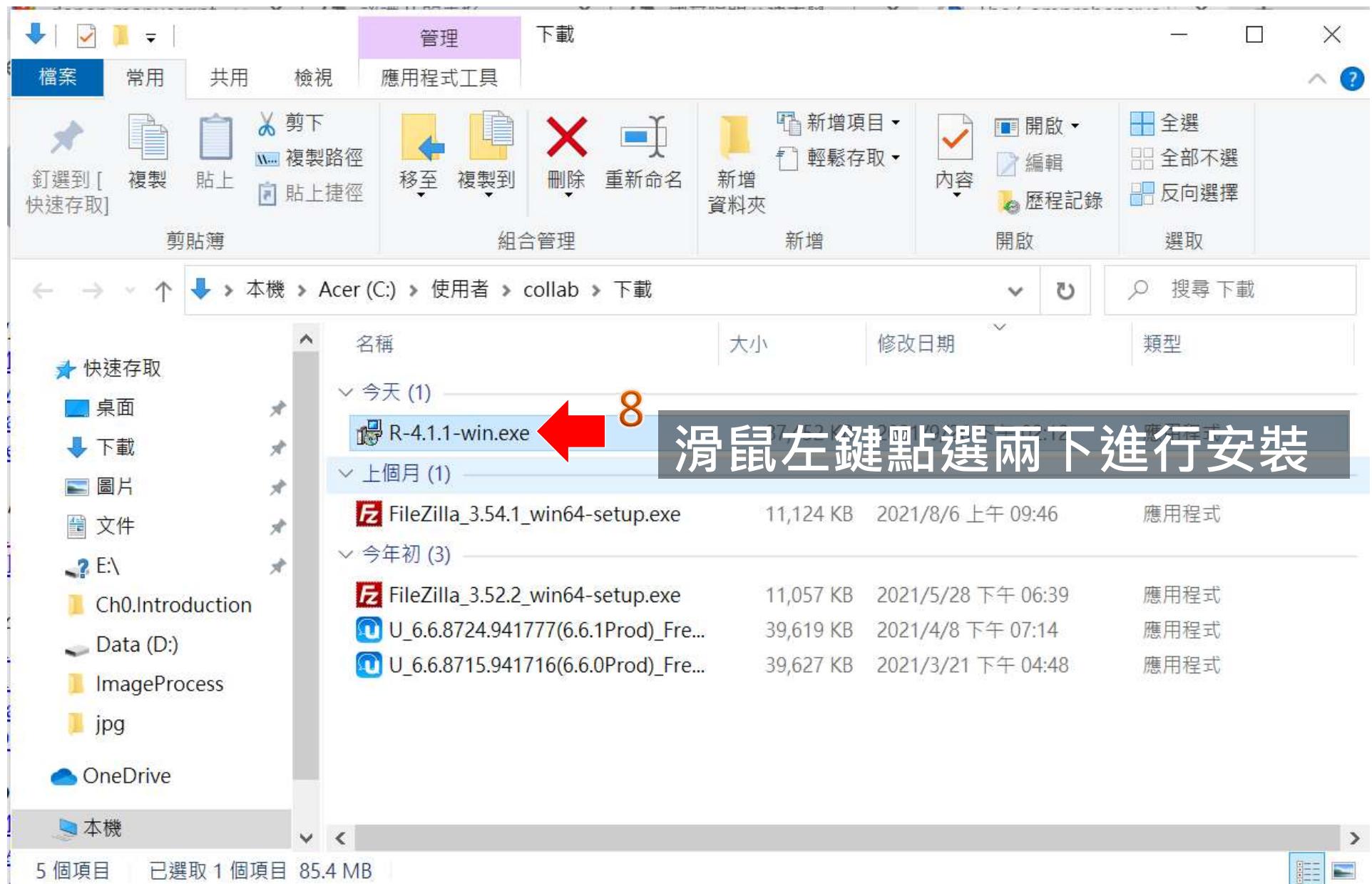
This directory contains previous binary releases of R for Windows.

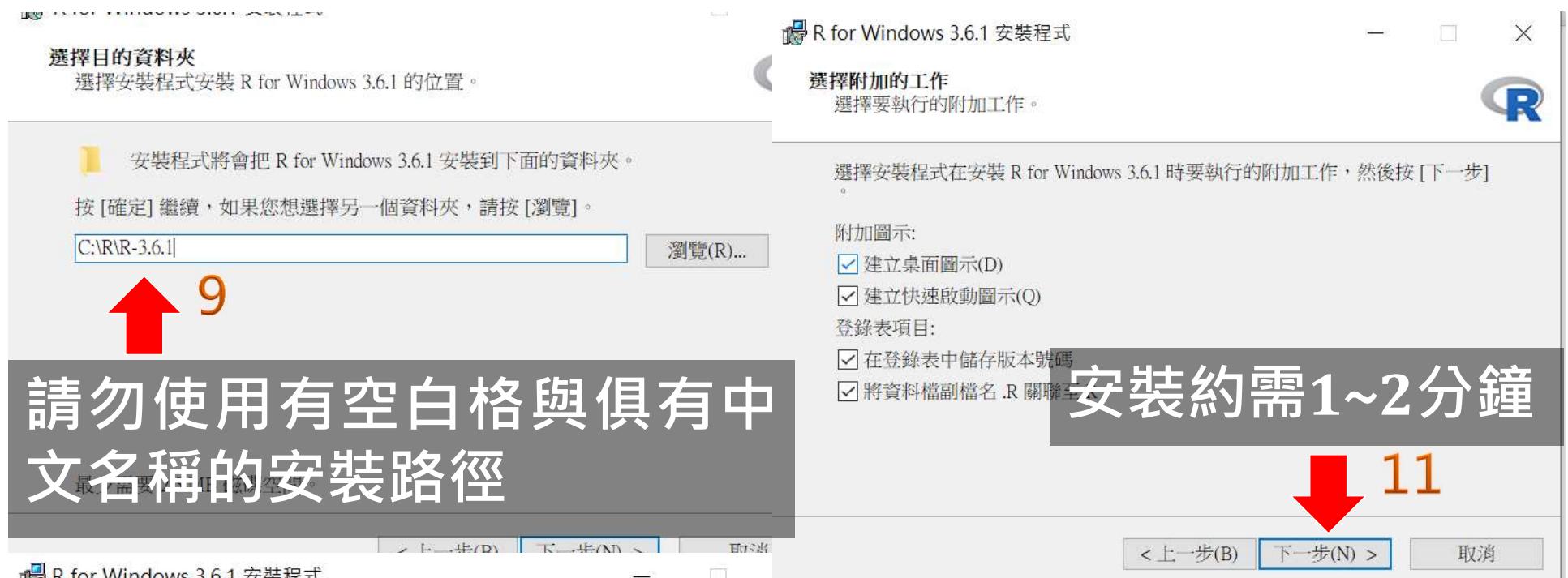
The current release, and links to development snapshots, are available [here](#). Source code for these releases and others is available through [the main CRAN page](#).

In this directory:

[R 4.0.2](#) (June, 2020)  
[R 4.0.1](#) (June, 2020)  
[R 4.0.0](#) (April, 2020)  
[R 3.6.3](#) (February, 2020)  
[R 3.6.2](#) (December, 2019)  
[R 3.6.1](#) (July, 2019)  
[R 3.6.0](#) (April, 2019)  
[R 3.5.3](#) (March, 2019)  
[R 3.5.2](#) (December, 2018)  
[R 3.5.1](#) (July, 2018)  
[R 3.5.0](#) (April, 2018)  
[R 3.4.4](#) (March, 2018)  
[R 3.4.3](#) (November, 2017)  
[R 3.4.2](#) (September, 2017)  
[R 3.4.1](#) (June, 2017)  
[R 3.4.0](#) (April, 2017)  
[R 3.3.3](#) (March, 2017)  
[R 3.3.2](#) (October, 2016)  
[R 3.3.1](#) (June, 2016)  
[R 3.3.0](#) (April, 2016)  
[R 3.2.5](#) (April, 2016)  
[R 3.2.4](#) (March, 2016)  
[R 3.2.3](#) (December, 2015)  
[R 3.2.2](#) (August, 2015)  
[R 3.2.1](#) (June, 2015)  
[R 3.2.0](#) (April, 2015)  
[R 3.1.3](#) (March, 2015)  
[R 3.1.2](#) (October, 2014)  
[R 3.1.1](#) (July, 2014)  
[R 3.1.0](#) (April, 2014)  
[R 3.0.3](#) (March, 2014)  
[R 3.0.2](#) (September, 2013)

注意:版本選擇與相關套件的  
相容性有極大關係





選擇元件  
選擇將會被安裝的元件。

選擇您想要安裝的元件；清除您不想安裝的元件。然後按 [下一步] 繼續安裝。

自訂安裝

元件	大小
<input checked="" type="checkbox"/> Core Files	86.0 MB
<input type="checkbox"/> 32-bit Files	48.6 MB
<input checked="" type="checkbox"/> 64-bit Files	50.3 MB
<input checked="" type="checkbox"/> Message translations	7.3 MB

目前的選擇需要至少 145.9 MB 磁碟空間。

< 上一步(B) | 下一步(N) > 取消

↑ 10

勾選電腦相容的位元

選擇附加的工作  
選擇要執行的附加工作。

選擇安裝程式在安裝 R for Windows 3.6.1 時要執行的附加工作，然後按 [下一步]

附加圖示:  
 建立桌面圖示(D)  
 建立快速啟動圖示(Q)

登錄表項目:  
 在登錄表中儲存版本號碼  
 將資料檔副檔名.R 關聯至

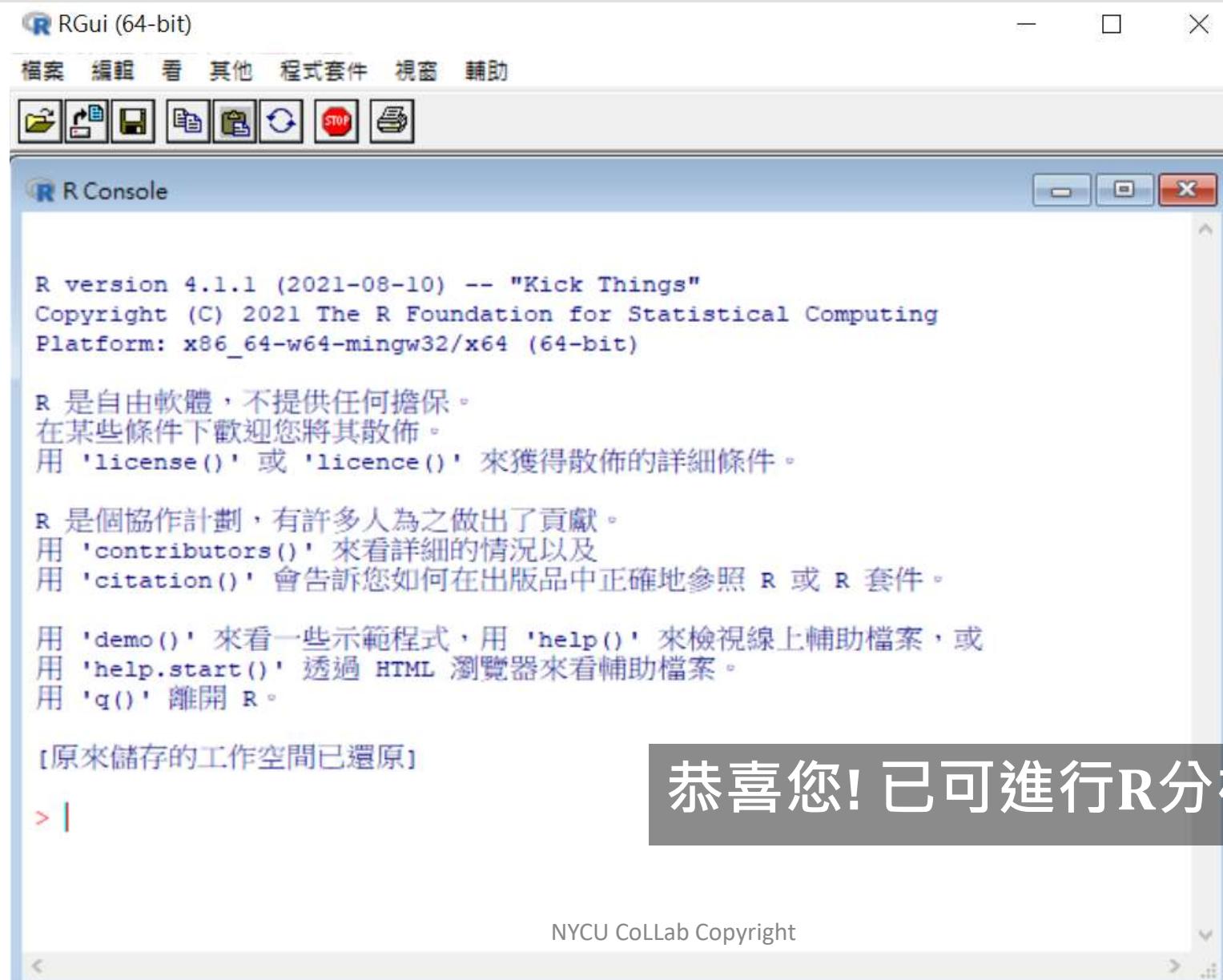
< 上一步(B) | 下一步(N) > 取消

↓ 11

確認桌面的icon  
點選開啓

12 →

# R 執行程序環境



# 下載及安裝RStudio軟體



僅支援R版本R 3.0.1以上

下載軟體

<https://www.rstudio.com/products/rstudio/download/>

是為R語言設計的一種跨平台**整合開發環境**，並分為在本地電腦上執行的桌面版和與伺服器上執行而可由瀏覽器連接後使用的伺服器版

# 下載及安裝RStudio軟體

R Studio Your Version of RStudio

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RStudio is a set of integrated tools designed to help you be more productive with R. It includes a console, syntax-highlighting editor that supports direct code execution, and a variety of robust tools for plotting, viewing history, debugging and managing your workspace. Learn More about RStudio features.

RStudio's new solution for every professional data science team. RStudio Team includes RStudio Server Pro, RStudio Connect and RStudio Package Manager. [LEARN MORE](#)

RStudio Desktop	RStudio Desktop	RStudio Server	RStudio Server Pro
Open Source License	Commercial License	Open Source License	Commercial License
18  FREE	\$995 per year	FREE	\$4,975 per year (5 Named Users)
<a href="#">DOWNLOAD</a>	<a href="#">BUY</a>	<a href="#">DOWNLOAD</a>	<a href="#">BUY</a>
<a href="#">Learn More</a>	<a href="#">Learn More</a>	<a href="#">Learn More</a>	<a href="#">Evaluation</a>   <a href="#">Learn More</a>



# 下載及安裝RStudio軟體

All Installers

選擇作業系統相容的安裝檔

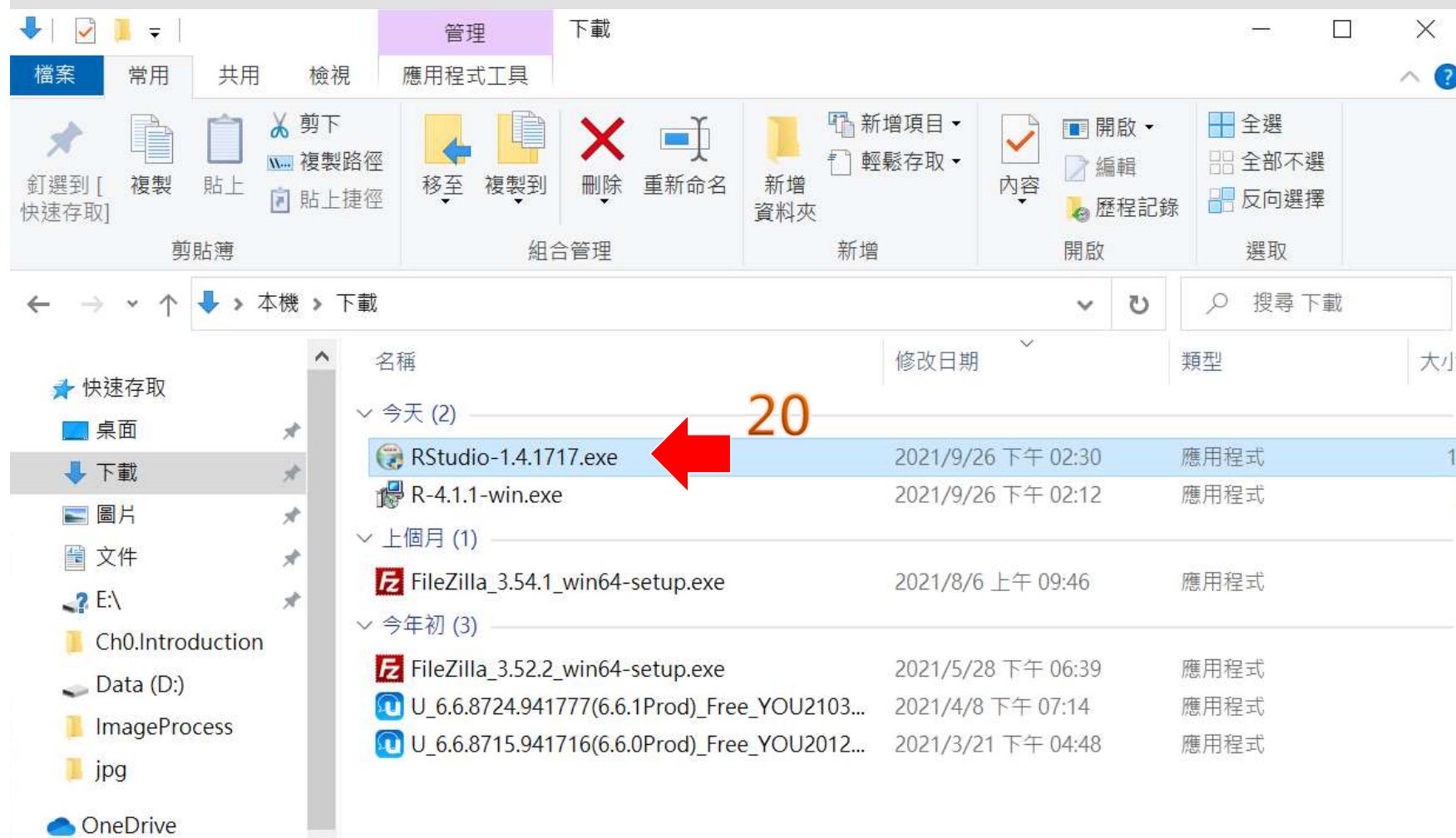
Linux users may need to [import RStudio's public code-signing key](#) prior to installation, depending on the operating system's security policy.

RStudio requires a 64-bit operating system. If you are on a 32 bit system, you can use an [older version of RStudio](#).

OS	Download	Size	SHA-256
Windows 10	<a href="#"> RStudio-1.4.1717.exe</a> <span style="color: orange;">19</span> ←	156.18 MB	71b36e64
macOS 10.14+	<a href="#"> RStudio-1.4.1717.dmg</a>	203.06 MB	2cf2549d
Ubuntu 18/Debian 10	<a href="#"> rstudio-1.4.1717-amd64.deb</a>	122.51 MB	e27b2645
Fedora 19/Red Hat 7	<a href="#"> rstudio-1.4.1717-x86_64.rpm</a>	138.42 MB	648e2be0
Fedora 28/Red Hat 8	<a href="#"> rstudio-1.4.1717-x86_64.rpm</a>	138.39 MB	c76f620a
	<a href="#"> rstudio-1.4.1717-amd64.deb</a>	123.29 MB	e4ea3a60
	<a href="#"> rstudio-1.4.1717-x86_64.rpm</a> NYCU_CoLLab_Copyright	123.15 MB	e69d55db <sup>23</sup>



# 下載及安裝RStudio軟體



# 下載及安裝RStudio軟體



請勿使用有空白格與俱有中  
文名稱的安裝路徑

21

所需空間: 719.2MB

可用空間: 64.2GB

Nullsoft Install System v2.50

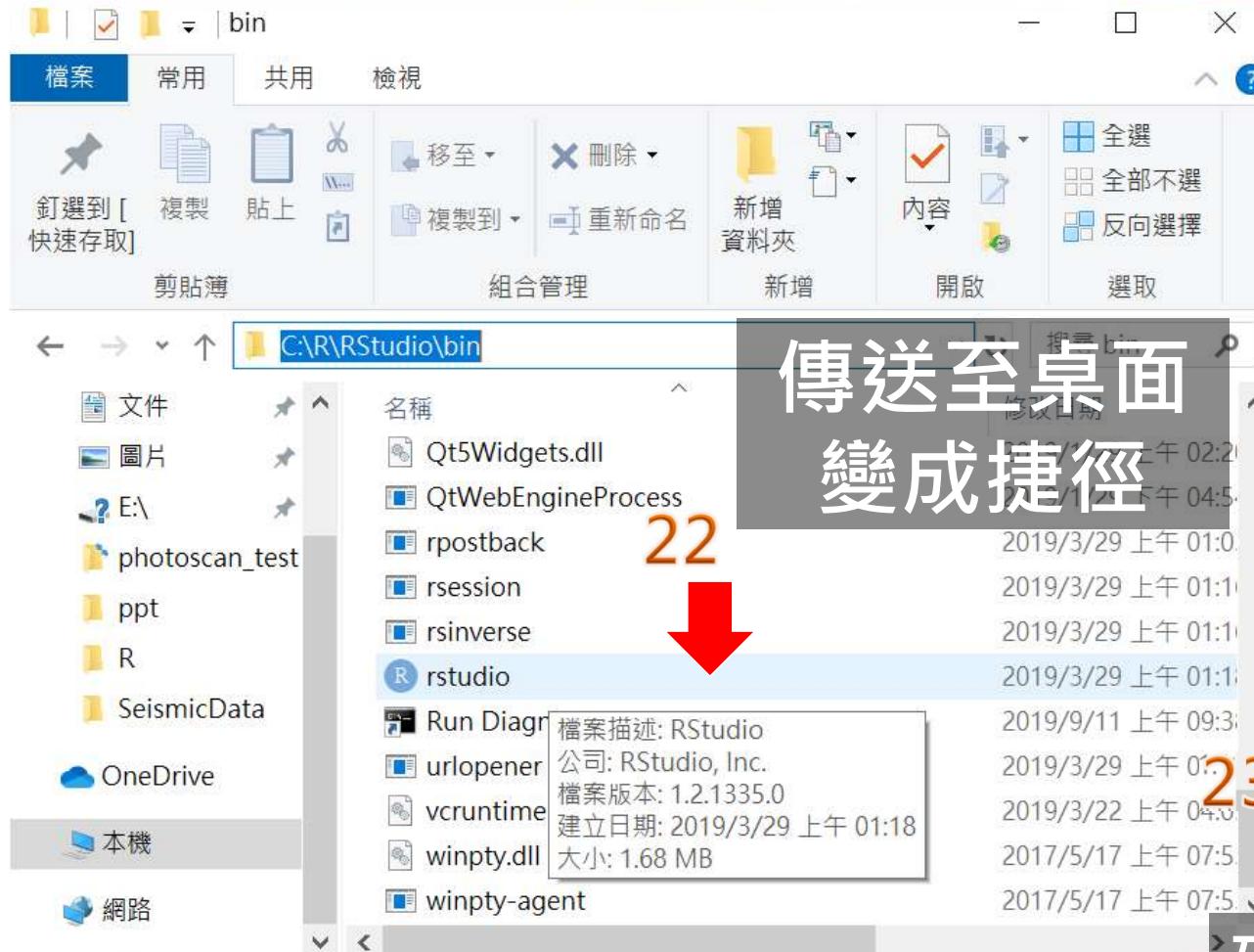
< 上一步(F) 下一步(N) > 取消(C)



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25

# 建立RStudio桌面路徑



傳送至桌面  
變成捷徑



確認桌面的icon  
點選開啓



# RStudio界面

The screenshot displays the RStudio IDE interface. The top navigation bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. The title bar shows "RStudio". The main window features several panes:

- Console** pane: Shows the R startup message and workspace loading information.
- Environment** pane: Displays the Global Environment, which is currently empty.
- Plots** pane: Not visible in the screenshot.
- Packages** pane: Not visible in the screenshot.

The bottom taskbar shows the RStudio logo and various system icons. The system tray indicates the date as 2019/9/10 and the time as 11:51 PM.

```
R version 3.6.1 (2019-07-05) -- "Action of the Toes"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

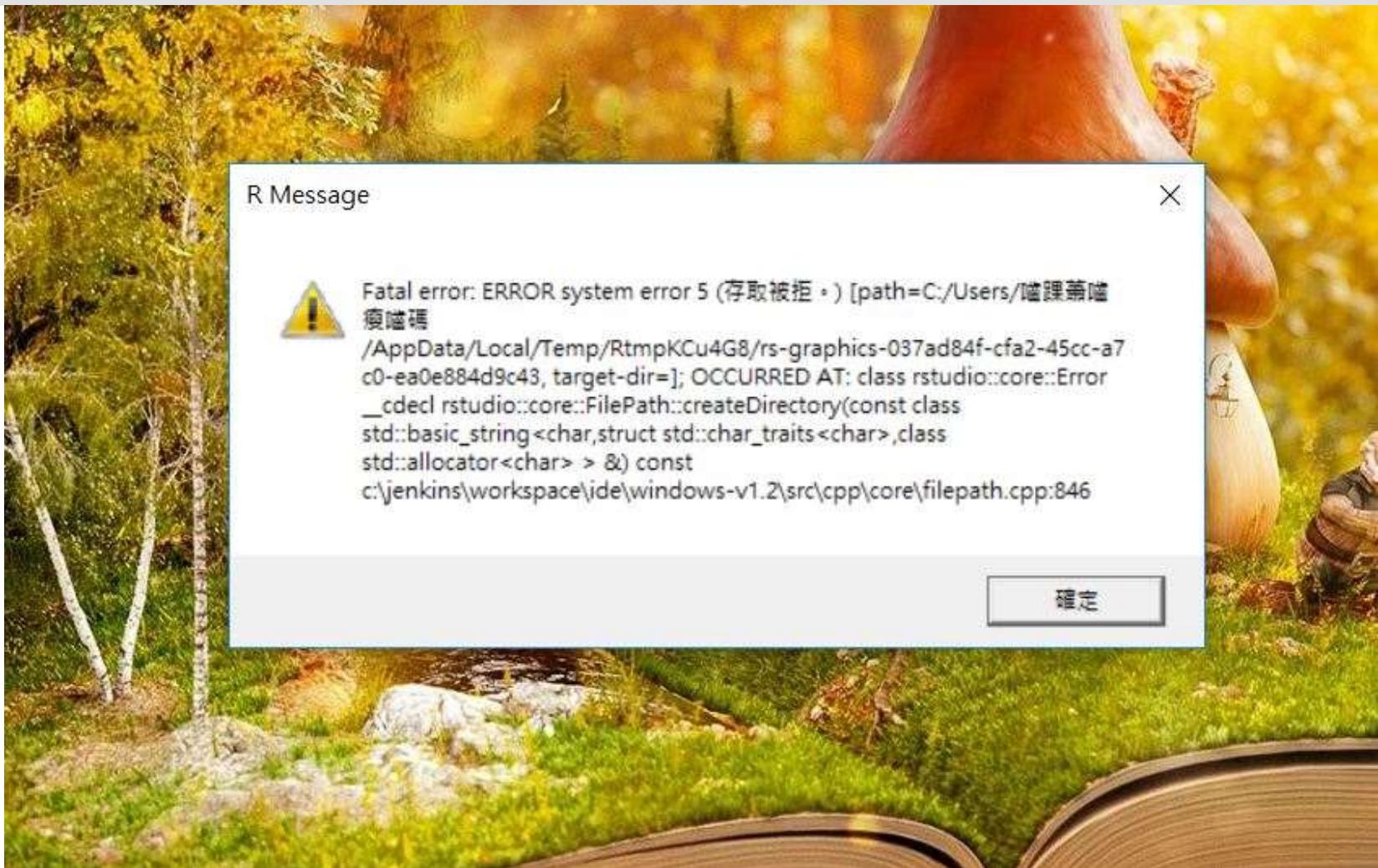
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[workspace loaded from ~/.RData]

> |
```

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# RStudio無法開啟問題



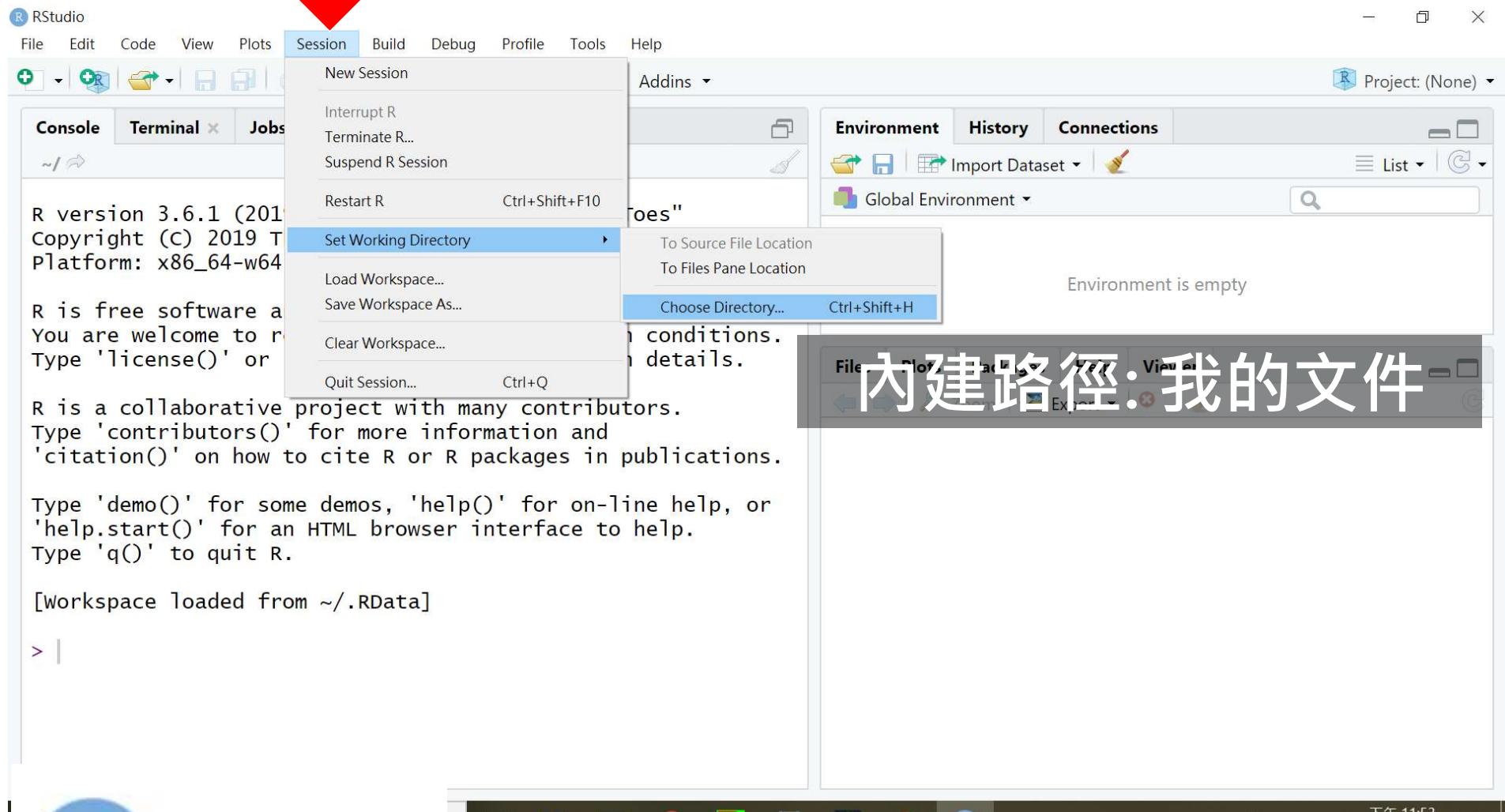
# RStudio無法開啟問題

右鍵點選Rstudio  
選擇  
以系統管理員身分



# 設定本機工作目錄路徑

24



內建路徑: 我的文件



# 設定本機工作目錄路徑

R version 3.6.1 (2019-07-05) -- "Action of the Toes"  
Copyright (C) 2019 The R Foundation for Statistical Computing  
Platform: x86\_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

```
> setwd("D:/R") ←
```

以指令方式設定工作路徑  
注意!! 路徑中斜線是右上左下

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31

# 手動更新套件(Library)方法

The screenshot shows the RStudio interface. The top bar includes the RStudio logo, File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help menus. Below the menu bar are tabs for Console, Terminal, and Jobs, with 'D:/R' selected. The main area displays the R startup message and workspace details. A red arrow points to the 'Plots' tab in the Environment pane, which shows the number 24 and an 'Environment is empty' message.

R version 3.6.1 (2019-07-05) -- "Action of the Toes"  
Copyright (c) 2019 The R Foundation for Statistical Computing  
Platform: x86\_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

```
> setwd("D:/R")
>
```

Environment pane:

24

Environment is empty

Plots

System Library

base	The R Base Package	3.6.1
boot	Bootstrap Functions (Originally by Angelo Canty for S)	1.3-22
class	Functions for Classification	7.3-15
cluster	"Finding Groups in Data": Cluster Analysis Extended Rousseeuw et al.	2.1.0
codetools	Code Analysis Tools for R	0.2-16
compiler	The R Compiler Package	3.6.1
datasets	The R Datasets Package	3.6.1
foreign	Read Data Stored by 'Minitab', 'S',	0.8-71

# 範例: 更新套件-XML

The screenshot shows the RStudio interface with the following details:

- Console Tab:** Displays R code and its output. The user has run `install.packages("XML")` and is prompted to download the XML package from CRAN.
- Install Packages Dialog:** A modal window titled "Install Packages" is open. It shows the "Install from:" dropdown set to "Repository (CRAN)". The "Packages" input field contains "XML". Below it, a list shows "xml2" and "XML2R" under "xml" dependencies. At the bottom are "Install" and "Cancel" buttons.
- Environment Tab:** Shows the global environment, which is currently empty.
- Session View:** Shows the session history with the XML package update command.
- Taskbar:** At the bottom, there are icons for various applications like File Explorer, Task Manager, and a system tray with date/time information.



# 範例: 更新套件-XML

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

+ Go to file/function Addins Project: (None)

Console Terminal Jobs

D:/R/ type `demo()` for some demos, `help()` for on-line help, or 'help.start()' for an HTML browser interface to help. Type 'q()' to quit R.

[workspace loaded from ~/.RData]

```
> setwd("D:/R")
> install.packages("XML")
```

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/
trying URL 'https://ftp.yzu.edu.tw/CRAN/bin/windows/contrib/3.6/XML\_3.98-1.20.zip'
Content type 'application/zip' length 4610084 bytes (4.4 MB)
downloaded 4.4 MB

package 'XML' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
 C:\Users\collab\AppData\Local\Temp\RtmpQNekeyd\downloaded\_packages
>

以指令方式安裝套件  
注意: 須上雙引號

Environment History Connections

Import Dataset Global Environment

Environment is empty

Files Plots Packages Help Viewer

Install Update Name Description Version

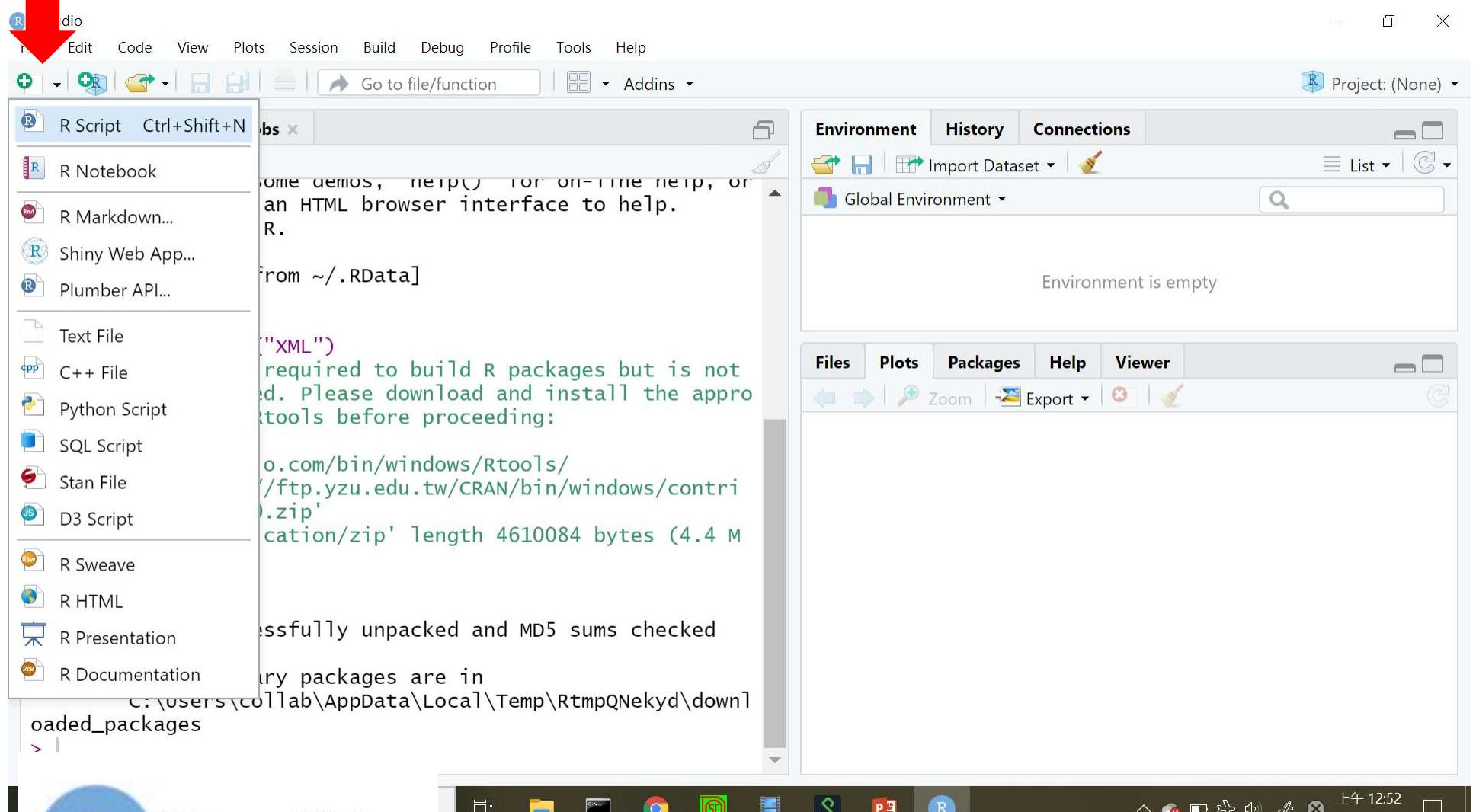
System Library

Name	Description	Version
base	The R Base Package	3.6.1
boot	Bootstrap Functions (Originally by Angelo Canty for S)	1.3-22
class	Functions for Classification	7.3-15
cluster	"Finding Groups in Data": Cluster Analysis Extended Rousseeuw et al.	2.1.0
codetools	Code Analysis Tools for R	0.2-16
compiler	The R Compiler Package	3.6.1
datasets	The R Datasets Package	3.6.1
foreign	Read Data Stored by 'Minitab', 'S', ...	0.8-71

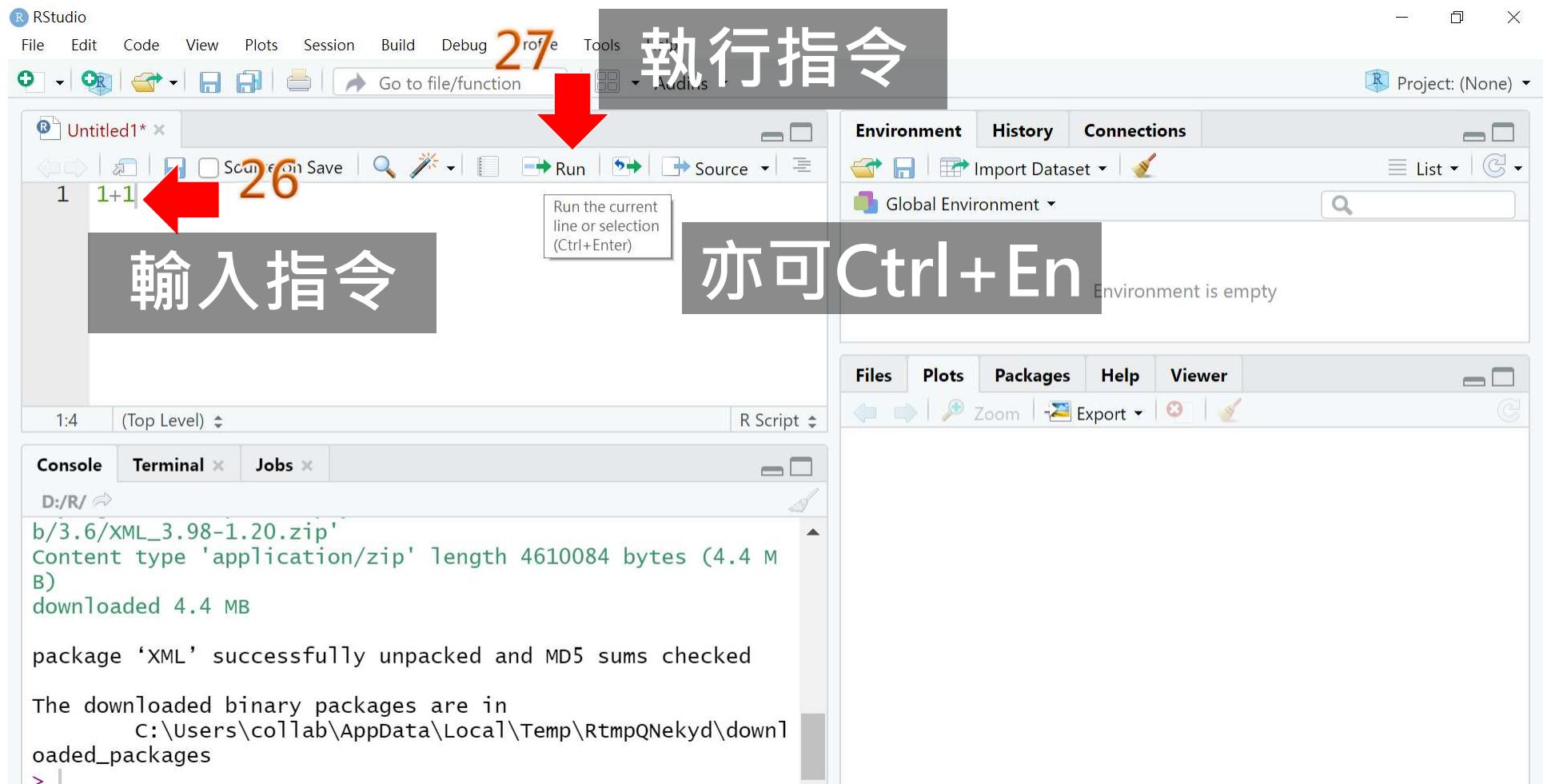
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# 新增R程式編輯介面

25



# 簡易R程式編輯 + 執行



# 簡易R程式編輯 + 執行

The screenshot shows the RStudio interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. The main window has several panes:

- Script Editor:** Untitled1.R contains the code `1+1`.
- Environment:** Global Environment pane shows "Environment is empty".
- Console:** Displays package installation logs and a command prompt:

```
B)
downloaded 4.4 MB

package 'XML' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\collab\AppData\Local\Temp\RtmpQNekeyd\downl
oaded_packages
> 1+1
[1] 2
```

A large red arrow points from the number 28 in the title to the console output.
- Taskbar:** Shows the Windows Start button, a search bar, and pinned application icons for File Explorer, Chrome, FileZilla, and Microsoft Office.

**R程序執行 + 顯示結果** (R Program Execution + Display Result) is overlaid on the bottom left of the console area.

# 快捷鍵一覽



The screenshot shows the RStudio application window. The top menu bar has 'Tools' highlighted in blue. A red arrow points down to the 'Tools' menu. The 'Keyboard Shortcuts Help' option under 'Tools' is also highlighted in blue, with its keyboard shortcut 'Alt+Shift+K' displayed to its right. The main workspace shows R code being run, including package installation and file extraction logs.

```
RStudio
File Edit Code View Plots Session Build Debug Profile
+ - Go to file/function
Console Terminal Jobs
D:/R/
type demo() for some demos, help() for
'help.start()' for an HTML browser interface
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> setwd("D:/R")
> install.packages("XML")
WARNING: Rtools is required to build R packages
currently installed. Please download and
appropriate version of Rtools before proceeding:

https://cran.rstudio.com/bin/windows/Rtools/
trying URL 'https://ftp.yzu.edu.tw/CRAN/bin/windows/contrib/3.6/XML_3.98-1.20.zip'
Content type 'application/zip' length 4610084 bytes (4.4 MB)
downloaded 4.4 MB

package 'XML' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\collab\AppData\Local\Temp\RtmpQNekeyd\down
loaded_packages
>
```



# 快捷鍵一覽

The screenshot shows the RStudio interface with a modal dialog titled "Keyboard Shortcut Quick Reference". The dialog is divided into several sections: "Tabs", "Source Navigation", "Source Editor", "Source Control", "Build", and "Panes". Each section lists keyboard shortcuts with their corresponding descriptions. The "Source Editor" section is currently active, showing various navigation and code manipulation keys. The background shows the RStudio environment with tabs like "Console", "Terminal", and "Jobs". The status bar at the bottom indicates it's 12:44 AM on 2019/9/11.

Section	Shortcut	Description
Tabs	<b>Ctrl+Shift+F9</b>	Switch to Tab...
	<b>Ctrl+Tab</b>	Next Tab
	<b>Ctrl+Shift+Tab</b>	Previous Tab
<b>F11</b>	First Tab	
<b>Ctrl+Shift+F12</b>	Last Tab	
Source Navigation	<b>Ctrl+F3</b>	Find Usages
	<b>Ctrl+Alt+U</b>	Use Selection for Find
	<b>Ctrl+F3</b>	Find...
<b>F3</b>	Find Next	
<b>Shift+F3</b>	Find Previous	
<b>Ctrl+Shift+J</b>	Replace and	
<b>Ctrl+Shift+A</b>	Reformat Code	
<b>Ctrl+Shift+Alt+D</b>	Show Diagnostics (Project)	
<b>Alt+L</b>	Collapse Fold	
<b>Shift+Alt+L</b>	Expand Fold	
<b>Alt+O</b>	Collapse All Folds	
<b>Shift+Alt+O</b>	Expand All Folds	
<b>Alt+Up</b>	Move Lines Up	
<b>Alt+Down</b>	Move Lines Down	
Source Editor	<b>Ctrl+Alt+I</b>	Insert Chunk
	<b>Ctrl+Shift+R</b>	Insert Section...
	<b>Ctrl+Alt+X</b>	Extract Function
<b>Ctrl+Alt+V</b>	Extract Variable	
<b>Ctrl+Shift+C</b>	Comment/Uncomment Lines	
<b>Ctrl+I</b>	Reindent Lines	
<b>Ctrl+Shift+/</b>	Reflow Comment	
<b>Ctrl+Shift+D</b>	Show Diagnostics (Project)	
<b>Ctrl+Shift+L</b>	Load	
<b>Ctrl+Shift+E</b>	Check Package	
<b>Ctrl+Shift+T</b>	Test Project	
<b>Ctrl+Shift+D</b>	Document	
Source Control	<b>Ctrl+Alt+D</b>	Diff Files
	<b>Ctrl+Alt+M</b>	Commit
	<b>Ctrl+Shift+K</b>	Preview
<b>Ctrl+Shift+K</b>	Knit Document	
<b>Ctrl+Shift+B</b>	Install RStudio	
<b>Ctrl+Shift+R</b>	Restart	
<b>Ctrl+Shift+L</b>	Load	
<b>Ctrl+Shift+E</b>	Check Package	
<b>Ctrl+Shift+T</b>	Test Project	
<b>Ctrl+Shift+D</b>	Document	
Build	<b>Ctrl+Shift+K</b>	Compile
	<b>Ctrl+Shift+K</b>	Preview
	<b>Ctrl+Shift+K</b>	Knit Document
<b>Ctrl+Shift+B</b>	Install RStudio	
<b>Ctrl+Shift+R</b>	Restart	
<b>Ctrl+Shift+L</b>	Load	
<b>Ctrl+Shift+E</b>	Check Package	
<b>Ctrl+Shift+T</b>	Test Project	
<b>Ctrl+Shift+D</b>	Document	
Panes	<b>F3</b>	Find Next
	<b>Shift+F3</b>	Find Previous
	<b>Ctrl+Shift+J</b>	Replace and
<b>Ctrl+Shift+A</b>	Reformat Code	
<b>Ctrl+Shift+Alt+D</b>	Show Diagnostics (Project)	
<b>Alt+L</b>	Collapse Fold	
<b>Shift+Alt+L</b>	Expand Fold	
<b>Alt+O</b>	Collapse All Folds	
<b>Shift+Alt+O</b>	Expand All Folds	
<b>Alt+Up</b>	Move Lines Up	
<b>Alt+Down</b>	Move Lines Down	

# 重要環境參數設定

29

The screenshot shows the RStudio interface. The 'Tools' menu is open, and the 'Global Options...' item is highlighted with a blue selection bar. A red arrow points from the number 29 down to this menu item. The 'Console' tab is active, displaying R command history and output. The 'Plots', 'Packages', 'Help', and 'Viewer' tabs are also visible in the bottom navigation bar.

```
B)
downloaded 4.4 MB

package 'XML' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\collab\AppData\Local\Temp\RtmpQNekeyd\downl
oaded_packages
> 1+1
[1] 2
>
```



在這裡輸入文字來搜尋



上午 01:00  
2019/9/11



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40

# 環境參數設定

The screenshot shows the RStudio interface with the 'Options' dialog box open. The 'General' tab is selected. In the 'R Sessions' section, there is a dropdown menu for 'R version' set to '[Default] [64-bit] C:\R\R-3.6.1'. A large red arrow points to the 'Change...' button next to this dropdown. The text '切換不同版本的R' (Switch between different versions of R) is overlaid on the dialog box. The background shows the RStudio workspace with a code editor containing R code and a terminal window showing package installation logs.

切換不同版本的R  
macOS無此項目

macOS無此項目



# macOS切換R版本

開啓終端機模式  
-Terminal



# macOS切換R版本

30

Command line:

進到安裝路徑、查看現在版本

```
cd /Library/Frameworks/R.framework/Versions
```

```
ls -al
```

total 8

drwxrwxr-x 5 root admin 170 8 10 17:02 .

drwxrwxr-x 8 root admin 272 8 10 17:02 ..

drwxrwxr-x 6 root admin 204 8 11 22:08 3.0

drwxrwxr-x 6 root admin 204 8 11 22:04 3.1

lrwxr-xr-x 1 root admin 3 8 10 17:02 Current -> 3.1

31

列出目錄下所有檔案

電腦中已存在3.0, 3.1版本  
現階段使用版本為3.1



# macOS切換R版本

32

## 刪除目前的Current

```
rm -rf Current
```

```
ls -al
```

```
total 0
drwxrwxr-x  4 root  admin  136  8 11 22:26 .
drwxrwxr-x  8 root  admin  272  8 10 17:02 ..
drwxrwxr-x  6 root  admin  204  8 11 22:08 3.0
drwxrwxr-x  6 root  admin  204  8 11 22:04 3.1
```



# macOS切換R版本

33

重新建立Current，並指向3.0版本

```
ln -s 3.0 Current
```

```
ls -al
```

```
total 8  
drwxrwxr-x  5 root  admin  170  8 11 22:26 .  
drwxrwxr-x  8 root  admin  272  8 10 17:02 ..  
drwxrwxr-x  6 root  admin  204  8 11 22:08 3.0  
drwxrwxr-x  6 root  admin  204  8 11 22:04 3.1  
lrwxr-xr-x  1 joe   admin     3  8 11 22:26 Current -> 3.0
```



# 環境參數設定

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Options

General

Code Appearance Pane Layout Packages R Markdown Sweave Spelling Git/SVN Publishing Terminal

Editing Display Saving Completion Diagnostics

**General**

Ensure that source files end with newline  
 Strip trailing horizontal whitespace when saving  
 Restore last cursor position when opening file

**Serialization**

Line ending conversion: Platform Native

Default text encoding: **UTF-8** **Change...**

**編碼**

34

UTF-8可以支援中文編碼

Project: (None)



# 環境參數設定-面板樣式

The screenshot shows the RStudio interface with the 'Code' tab selected in the 'Options' panel. The 'Editor theme:' dropdown is open, displaying a list of themes. The 'Chaos' theme is highlighted with a blue selection bar. The main workspace shows some R code for plotting objects.

RStudio theme: Modern  
Editor font: Lucida Console  
Editor font size: 10  
Editor theme: Ambiance  
Chaos

```
# plotting of R objects
plot <- function (x, y, ...)
{
  if (is.function(x) &&
      is.null(attr(x, "class")))
  {
    if (missing(y))
      y <- NULL

    # check for ylab argument
    hasylab <- function(...)
      !all(is.na(
        pmatch(names(list(...)),
              "ylab")))

    if (hasylab(...))
      plot.function(x, y, ...)

    else
      plot.function(
        x, y,
        ylab = paste(
          deparse(substitute(x)),
          "(x)"),
        ...)
```

Project: (None)

Console Terminal Jobs

B) downloaded 4.4 MB

package 'XML' success

The downloaded binary C:\Users\coll loaded\_packages

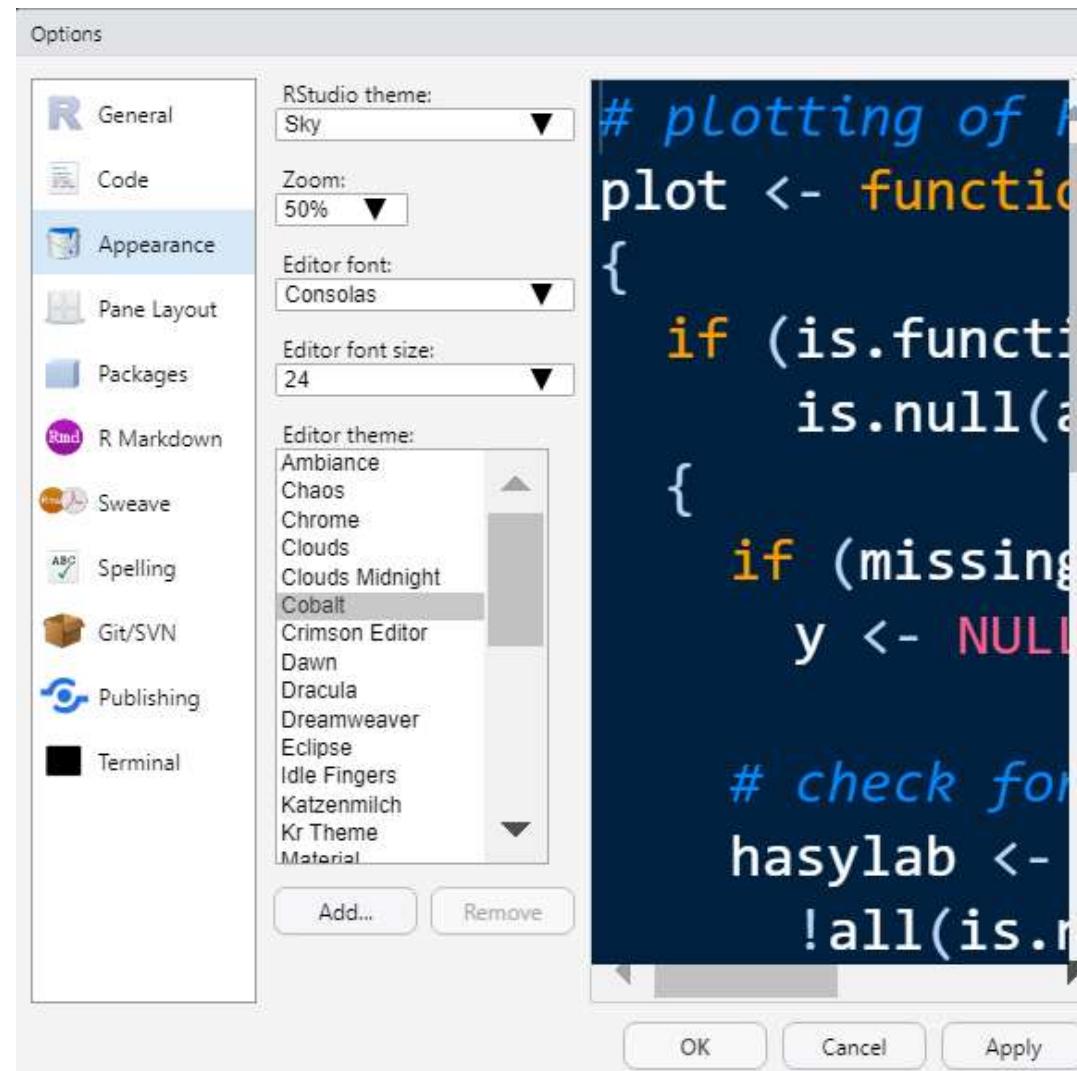
> 1+1  
[1] 2

在這裡輸入文字來搜尋

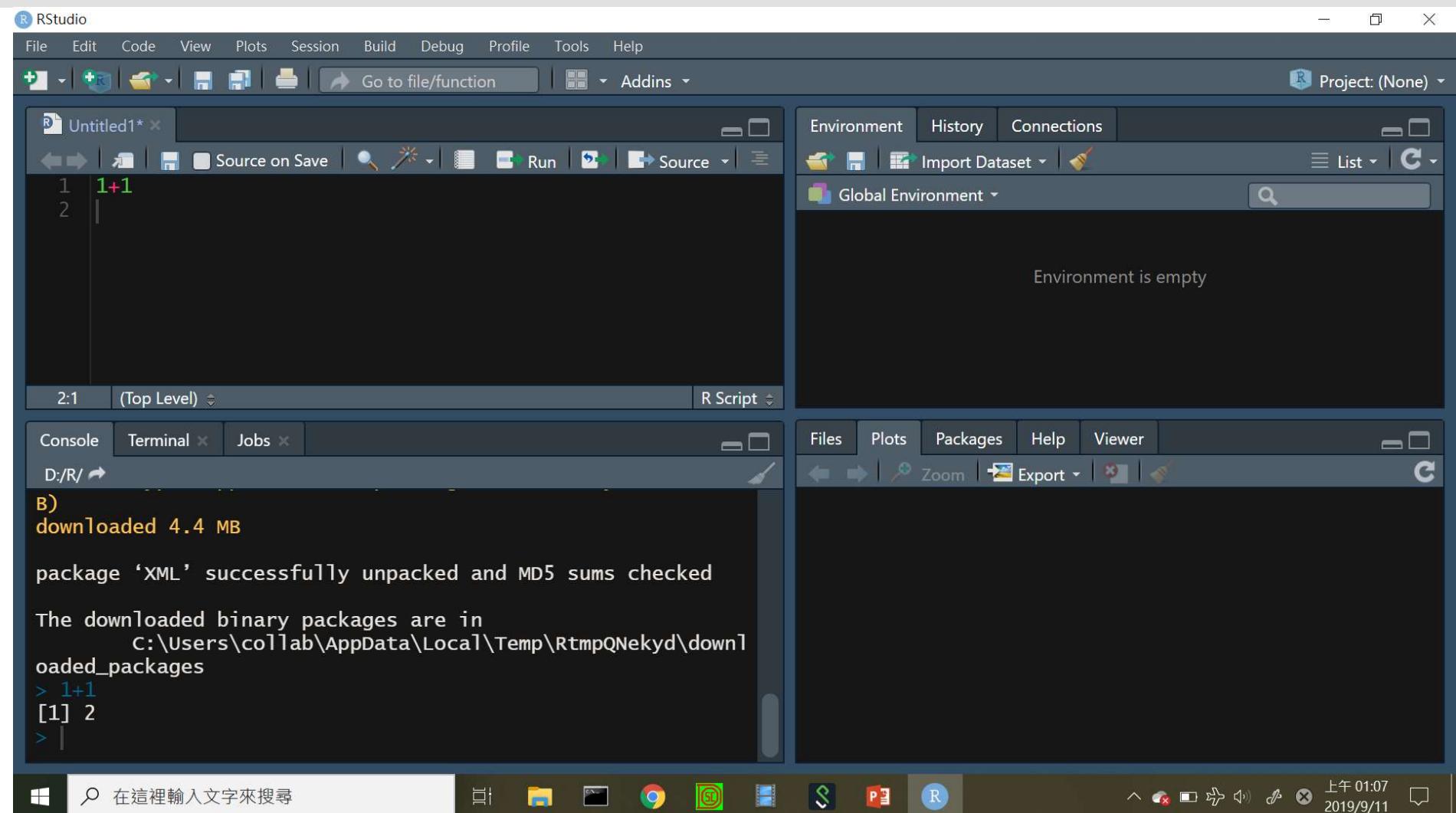
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47

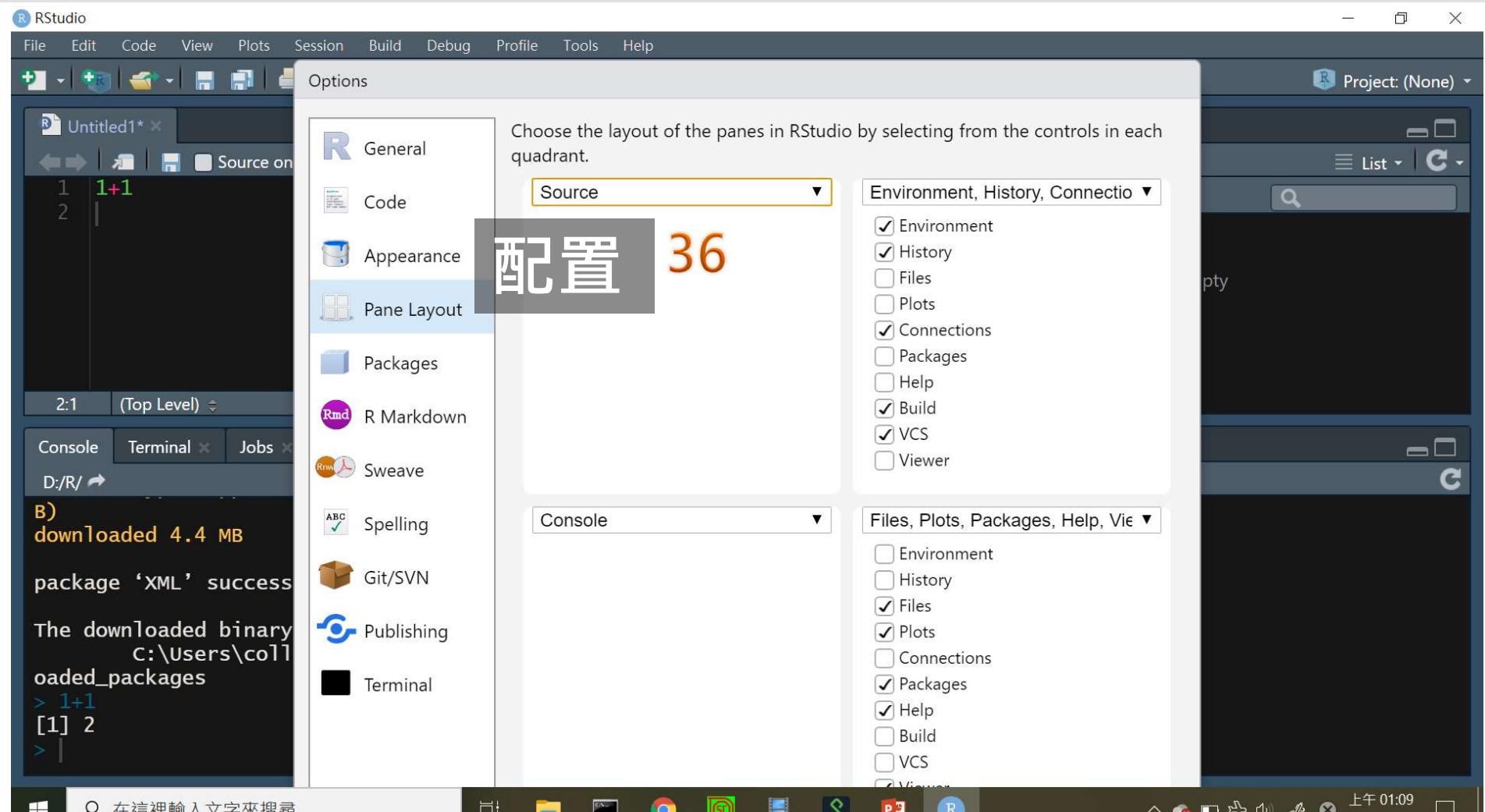
# 環境參數設定-面板樣式



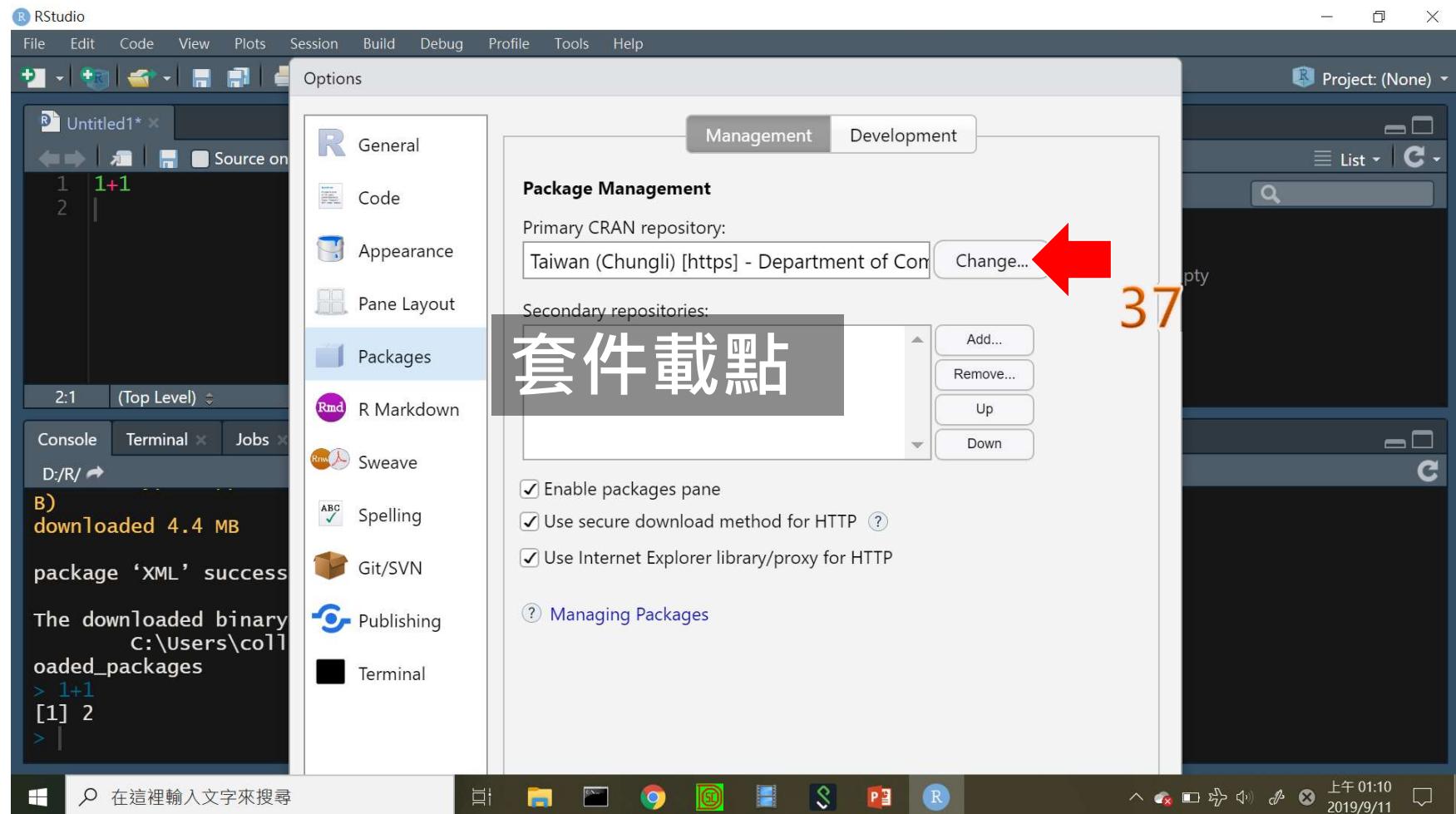
# 環境參數設定-面板樣式



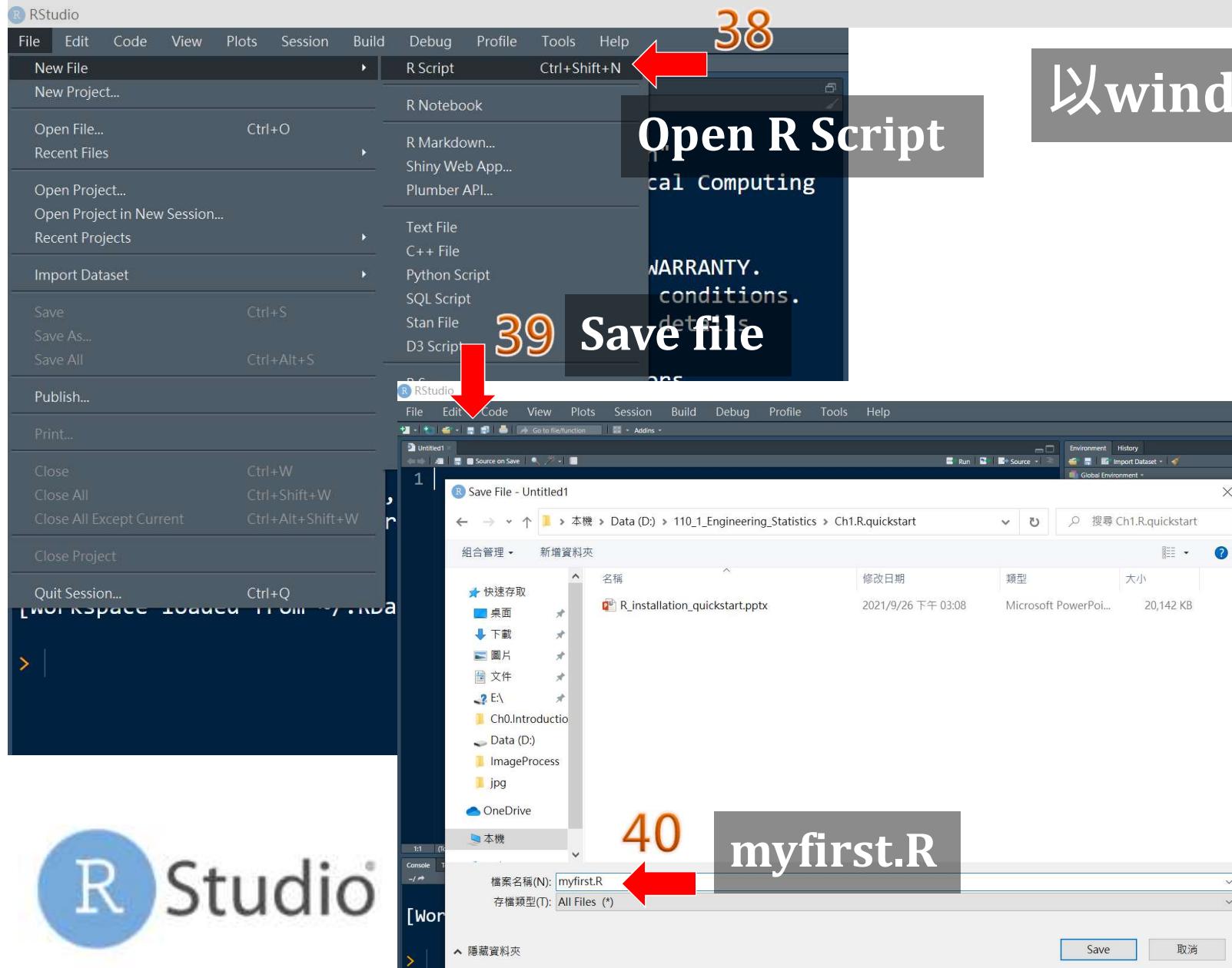
# 環境參數設定-面板配置



# 環境參數設定-套件載點



# 第一個R語言撰寫-儲存R檔



以windows為例

# 第一個R語言撰寫-隨機亂數

The screenshot shows the RStudio interface with the following components:

- Top Bar:** RStudio, File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Code Editor:** myfirst.R, containing the R code:

```
1 # create 100 random repeatable number
2 x <- sample(x = 1:100, size = 100, replace = TRUE)
3
```
- Environment Tab:** Shows the variable **x** as an integer vector [1:100] with values 80, 36, 30, 93, 92, ...
- Text Overlay:** A dark blue box contains the text "可以重複的1至100整數中隨機選取100次".
- Text Overlay:** A dark blue box contains the text "環境變數，可以直接查看".
- Console Tab:** Displays the executed command: `sample(x = 1:100, size = 100, replace = TRUE)`.
- Bottom Left Logo:** R Studio logo.
- Bottom Right Footer:** NYCU CoLLab Copyright, page 53.

# 第一個R語言撰寫-隨機亂數

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

myfirst.R\* Go to file/function Addins

```
1 # create 100 random repeatable number
2 x <- sample(x = 1:100, size = 100, replace = TRUE)
3 x
```

可以直接輸出x變數內容

Console Terminal

```
> # create 100 random repeatable number
> x <- sample(x = 1:100, size = 100, replace = TRUE)
> x
```

[1] 80 36 30 93 92 13 48 7 82 61 1 68  
[13] 69 62 36 98 63 26 97 19 81 13 50 39  
[25] 100 71 86 73 96 52 97 49 28 12 94 61  
[37] 56 35 26 3 79 39 87 89 1 92 9 14  
[49] 95 80 85 44 76 94 86 48 65 12 92 12  
[61] 25 50 89 8 54 31 69 12 30 9 66 9  
[73] 41 43 22 27 42 60 87 98 67 60 1 66  
[85] 83 29 69 98 12 82 34 47 62 13 39 4  
[97] 70 50 48 87

# 第一個R語言撰寫-隨機亂數

RStudio

```
File Edit Code View Plots Session Build Debug Profile Tools Help
myfirst.R* Go to file/function Addins
2 x <- sample(x = 1:100, size = 100, replace = TRUE)
3 x
4 # compute mean, variance, standard deviation
5 mean(x)
6 var(x)
7 sd(x)
8
[49] 95 80 85 44 76 94 86 48 65 12 92 12
[61] 25 50 89 8 54 31 69 12 30 9 66 9
[73] 41 43 22 27 42 60 87 98 67 60 1 66
[85] 83 29 69 98 12 82 34 47 62 13 39 4
[97] 70 50 48 87
> # compute mean, variance, standard deviation
> mean(x)
[1] 52.95
> var(x)
[1] 926.1086
> sd(x)
[1] 30.43203
```

簡單統計量計算

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# 第一個R語言撰寫-隨機亂數

The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project: (None)
- Code Editor:** myfirstR.R containing R code to generate random numbers and replace some of them with NaN.
- Console Output:** Shows the first 10 elements of the vector y, which contains 20 NaN values interspersed with other integers.
- Environment Tab:** Shows the global environment with variables x and y. Variable y is a numeric vector of length 100, with several entries replaced by NaN.
- Annotations:**
  - A callout box points to the code from line 4 to 10 with the text: "y變數中隨機選取20個位置 將其數值取代為NaN".
  - A callout box points to the Environment tab with the text: "環境變數，可以直接查看 新增的y變數".
  - A callout box points to the Console output with the text: "可以直接輸出y變數內容".



# 第一個R語言撰寫-NAN處理

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

myfirst.R\* Addins Go to file/function Run Source

```
1 # create 100 random repeatable number
2 x <- sample(x = 1:100, size = 100, replace = TRUE)
3 x
4 # compute mean, variance, standard deviation
5 mean(x)
6 var(x)
7 sd(x)
8 # replace 20 number by not a number (NaN)
9 y <- x
10 y[sample(x = 1:100, size = 20, replace = FALSE)] <- NaN
11 y
12 mean(y) ← 平均算出來會等於NaN
13 mean(y,na.rm = TRUE) ← 先移除NaN再計算平均
14 |
```

14:1 (Top Level)

Console Terminal R Script

```
[1:7] 87 NaN 87 88 NaN 88 NaN 23 83 30 NaN 62 54
[92] 47 62 NaN 39 4 70 50 48 87
> mean(y)
[1] NaN
> mean(y,na.rm = TRUE)
[1] 54.8875
>
```

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# 使用CMD或Terminal執行R檔

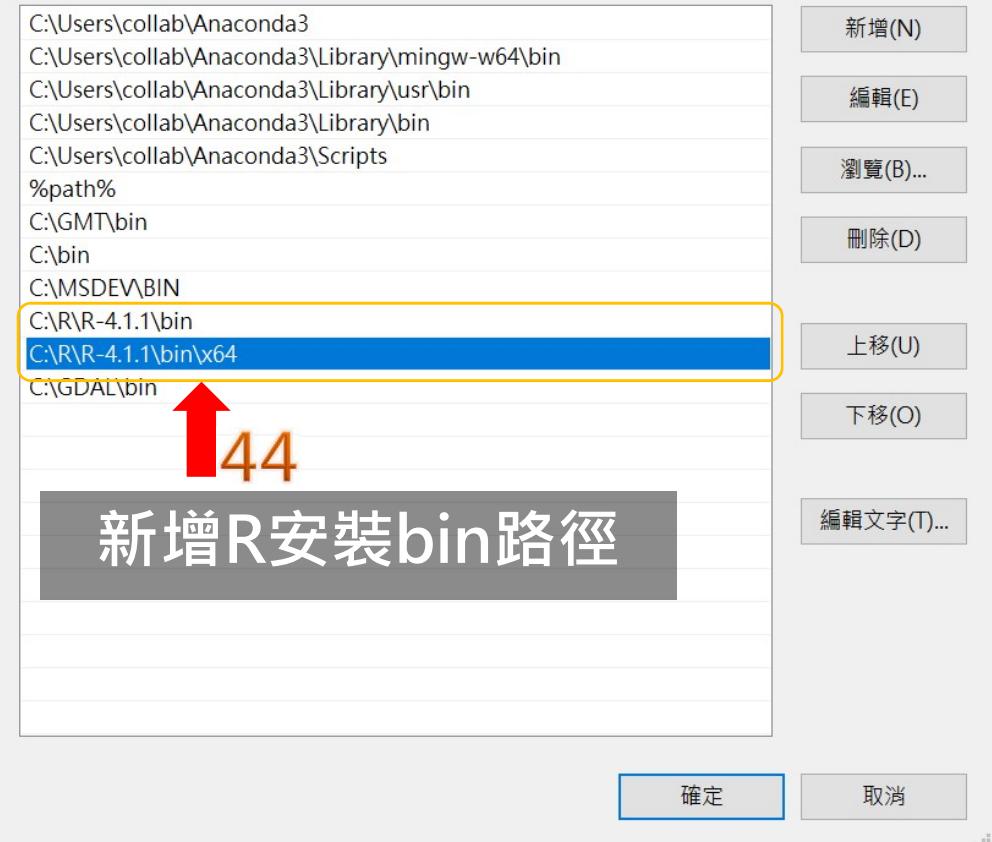
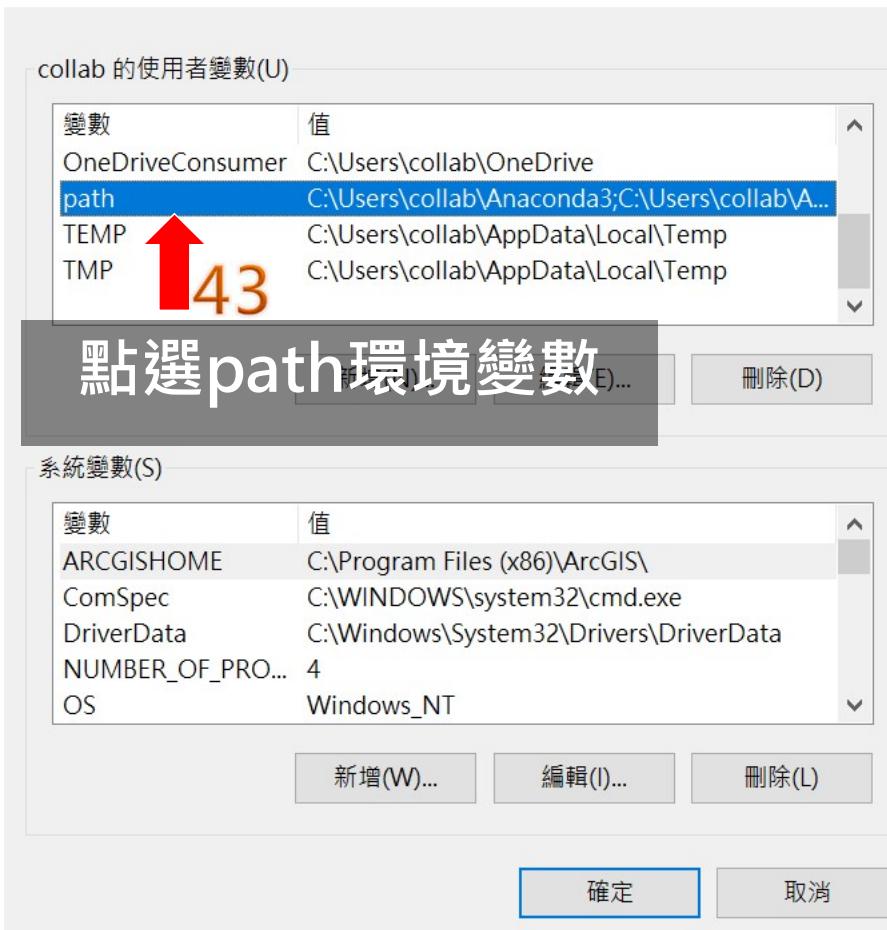


# 使用CMD或Terminal執行R檔

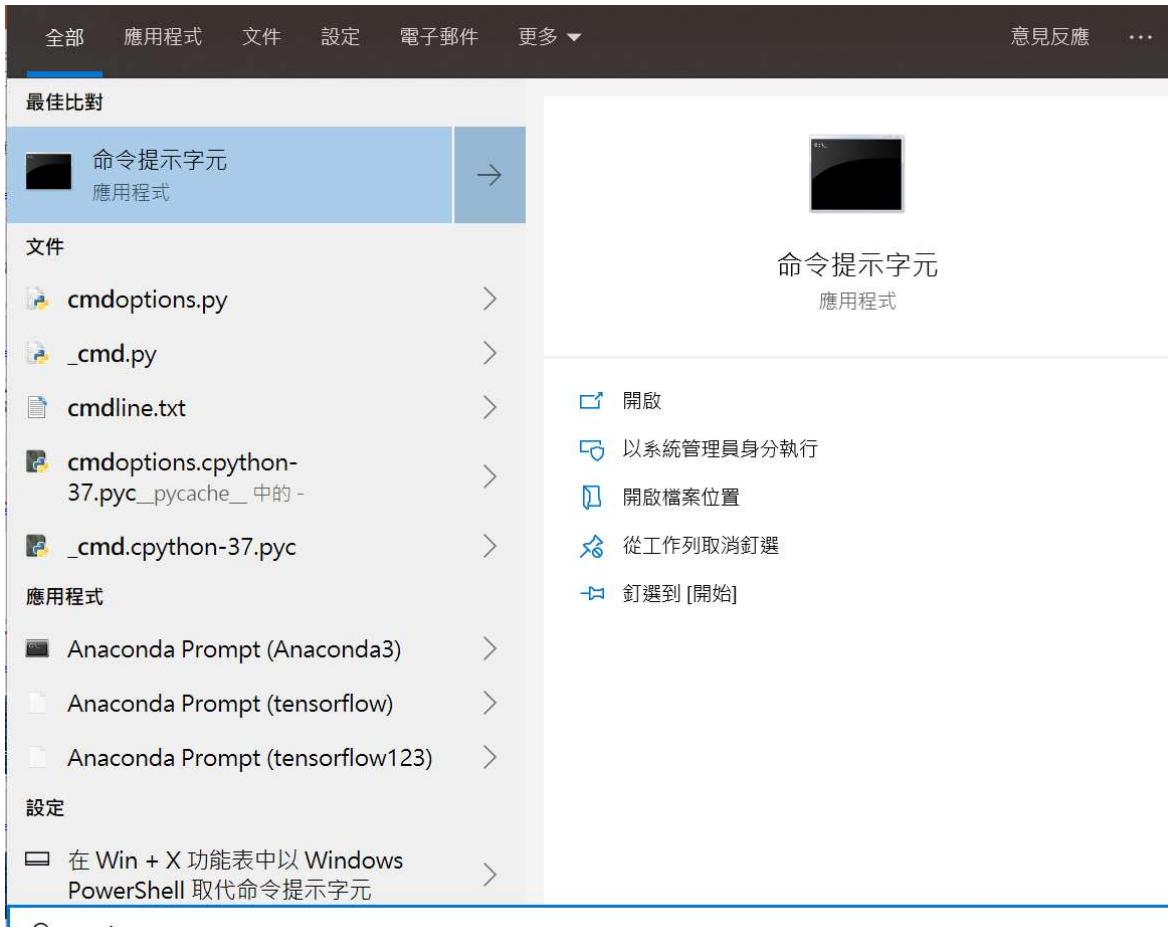
環境變數

編輯環境變數

X



# 使用CMD或Terminal執行R檔 (Windows)



# 使用CMD或Terminal執行R檔 (Windows)

命令提示字元

到本機R code的位置

Microsoft Windows [版本 10.0.18363.1556]

(c) 2019 Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\collab>cd D:\110\_1\_Engineering\_Statistics\Ch1. R.quickstart

C:\Users\collab>D: ← 46 若硬碟標籤不同，需切換

D:\110\_1\_Engineering\_Statistics\Ch1. R.quickstart>dir

磁碟區 D 中的磁碟是 Data

磁碟區序號： D414-B6BA

D:\110\_1\_Engineering\_Statistics\Ch1. R.quickstart>↑ 47 確認myfirst.R是否存在

2021/09/26	下午 03:53	<DIR>	.
2021/09/26	下午 03:53	<DIR>	..
2021/09/26	下午 03:51		306 myfirst.R
2021/09/26	下午 03:53		20,068,078 R_installation_quickstart.pptx
		2 個檔案	20,068,384 位元組
		2 個目錄	140,982,456,320 位元組可用

D:\110\_1\_Engineering\_Statistics\Ch1. R.quickstart>S



# 使用CMD或Terminal執行R檔 (Windows)-Rscript

命令提示字元

- □ ×

```
D:\110_1_Engineering_Statistics\Ch1.R.quickstart>Rscript
'Rscript' 不是內部或外部命令、可執行的程式或批次檔。

D:\110_1_Engineering_Statistics\Ch1.R.quickstart>Rscript
Usage: /path/to/Rscript [--options] [-e expr [-e expr2 ...]] | file] [args]

--options accepted are
--help                  Print usage and exit
--version                Print version and exit
--verbose                Print information on progress
--default-packages=list
                        Where 'list' is a comma-separated set
                        of package names, or 'NULL'
or options to R, in addition to --no-echo --no-restore, such as
--save                  Do save workspace at the end of the session
--no-environ              Don't read the site and user environment files
--no-site-file            Don't read the site-wide Rprofile
--no-init-file            Don't read the user R profile
--restore                Do restore previously saved objects at startup
--vanilla                Combine --no-save, --no-restore, --no-site-file
                        --no-init-file and --no-environ

'file' may contain spaces but not shell metacharacters
Expressions (one or more '-e <expr>') may be used *instead* of 'file'
See also ?Rscript from within R
```

# 使用CMD或Terminal執行R檔 (Windows)-Rscript



48 Command line: Rscript myfirst.R

```
D:\110_1_Engineering_Statistics\Ch1. R. quickstart>Rscript myfirst.R
[1] 92 17 62 59 49 49 35 64 34 48 47 63 90 63 77 39 91 3
[19] 23 53 34 24 73 39 7 2 58 73 73 19 94 21 16 91 69 62
[37] 4 53 16 2 33 53 12 24 59 22 65 82 73 19 24 19 49 74
[55] 38 3 13 44 62 100 38 97 75 33 89 49 39 11 20 83 38 75
[73] 23 62 45 19 34 4 26 23 60 41 88 95 80 28 46 85 5 8
[91] 1 53 85 70 70 70 86 3 80 49
[1] 47.42
[1] 795.0541
[1] 28.1967
[1] 92 NaN 62 59 49 49 35 64 34 48 47 63 90 63 77 39 91 3
[19] NaN 53 34 NaN 73 39 NaN 2 NaN 73 73 19 94 21 NaN NaN 69 62
[37] 4 53 16 2 33 53 12 24 59 NaN NaN 73 NaN 24 19 49 NaN
[55] 38 3 13 44 62 100 38 NaN 75 NaN 89 NaN NaN 11 20 83 38 75
[73] NaN 62 45 NaN 34 4 26 NaN 60 41 88 95 80 28 46 85 5 8
[91] 1 53 NaN 70 70 70 86 3 80 49
[1] NaN
[1] 48.45
```

D:\110\_1\_Engineering\_Statistics\Ch1. R. quickstart>



# 使用CMD或Terminal執行R檔 (Windows)-Rscript

↓49

Rscript myfirst.R > output.txt

The screenshot shows the RStudio environment. On the left, the R console window displays the command "Rscript myfirst.R > output.txt" followed by the output of the script. On the right, a Crimson Editor window titled "output.txt" shows the contents of the generated text file.

```
[1] 48.45
D:\110_1_Engineering_Statistics\Ch1.R.quickstart>Rscript myfirst.R > output.txt
D:\110_1_Engineering_Statistics\Ch1.R.quickstart>
Crimson Editor - [D:\110_1_Engineering_Statistics\Ch1.R.quickstart\output.txt]
File Edit Search View Document Project Tools Macros Window Help
output.txt | W ABC 1 E . . . ? 
1 [1] 40 19 84 52 48 8 29 68 92 60 81 29 73 79 54 42 13 48
2 [19] 71 59 57 25 12 63 79 82 4 90 58 95 97 20 12 36 1 93
3 [37] 11 41 2 4 40 85 71 13 18 88 74 37 95 67 41 54 26 79
4 [55] 25 2 91 90 93 60 36 10 24 38 5 45 58 65 63 98 68 31
5 [73] 65 88 100 24 82 44 36 30 55 3 82 73 21 1 51 9 17 87
6 [91] 65 72 25 59 13 93 36 88 74 46
7 [1] 50.6
8 [1] 881.7172
9 [1] 29.69372
10 [1] 40 19 84 52 NaN 8 29 68 92 60 81 29 73 79 54 42 NaN 48
11 [19] 71 59 57 25 12 63 79 82 4 90 58 NaN 97 20 12 NaN 1 93
12 [37] 11 41 2 4 NaN NaN 71 NaN NaN 88 74 37 95 67 41 54 26 79
13 [55] 25 NaN 91 90 93 60 36 10 24 38 5 45 58 65 NaN 98 NaN NaN
14 [73] 65 88 NaN NaN 82 44 NaN NaN 55 3 82 73 NaN NaN 51 9 17 87
15 [91] 65 72 25 NaN 13 93 36 88 NaN 46
16 [1] NaN
17 [1] 52.5375
18
```



# 使用CMD或Terminal執行R檔 (Windows)-R CMD BATCH

↓ 50

R CMD BATCH myfirst.R

```
命令提示字元
D:\110_1_Engineering_Statistics\Ch1. R.quickstart>R CMD BATCH myfirst.R
D:\110_1_Engineering_Statistics\Ch1. R.quickstart>dir
磁碟區 D 中的磁碟是 Data
磁碟區序號： D414-B6BA

D:\110_1_Engineering_Statistics\Ch1. R.quickstart 的目錄
2021/09/26 下午 07:47 <DIR> .
2021/09/26 下午 07:47 <DIR> ..
2021/09/26 下午 07:47 3,079 .RData
2021/09/26 下午 03:51 306 myfirst.R
2021/09/26 下午 07:47 1,785 myfirst.Rout
2021/09/26 下午 07:43 944 output.txt
2021/09/26 下午 07:47 20,221,596 R_installation_quickstart.pptx
      5 個檔案    20,227,710 位元組
      2 個目錄   140,981,764,096 位元組可用
```

51

自動輸出檔案



# 使用CMD或Terminal執行R檔 (Windows)-R CMD BATCH

Crimson Editor - [D:\110\_1\_Engineering\_Statistics\Ch1.R.quickstart\myfirst.Rout]

File Edit Search View Document Project Tools Macros Window Help

myfirst.Rout

1  
2 R version 4.1.1 (2021-08-10) -- "Kick Things"  
3 Copyright (C) 2021 The R Foundation for Statistical Computing  
4 Platform: x86\_64-w64-mingw32/x64 (64-bit)  
5  
6 R 是自由軟體，不提供任何擔保。  
7 在某些條件下歡迎您將其散佈。  
8 用 'license()' 或 'licence()' 來獲得散佈的詳細條件。  
9  
10 R 是個協作計劃，有許多人為之做出了貢獻。  
11 用 'contributors()' 來看詳細的情況以及  
12 用 'citation()' 會告訴您如何在出版品中正確地參照 R 或 R 套件。  
13  
14 用 'demo()' 來看一些示範程式，用 'help()' 來檢視線上輔助檔案，或  
15 用 'help.start()' 透過 HTML 瀏覽器來看輔助檔案。  
16 用 'q()' 離開 R。  
17  
18 > # create 100 random repeatable number  
19 > x <- sample(x = 1:100, size = 100, replace = TRUE)  
20 > x  
21 [1] 45 50 90 79 47 5 90 74 63 9 64 75 18 88 92 17 36 4 74 91 27 73 6 55 57  
22 [26] 52 76 6 15 39 26 73 17 41 85 43 53 33 10 26 96 49 42 90 92 76 78 62 38 65  
23 [51] 79 22 89 17 23 4 24 6 34 44 14 67 35 67 40 73 80 76 35 33 74 63 40 75 58  
24 [76] 52 74 61 58 58 83 76 65 64 40 88 28 34 60 1 61 49 36 19 65 53 84 25 99 3  
25 > # compute mean, variance, standard deviation  
26 > mean(x)  
27 [1] 51.2  
28 > var(x)  
29 [1] 724.2828  
30 > sd(x)  
31 [1] 26.9125  
32 > # replace 20 number by not a number (NAN)  
33 > y <- x



# 使用CMD或Terminal執行R檔 (Windows)-R CMD BATCH

```
34 > y[sample(x = 1:100, size = 20, replace = FALSE)] <- NaN
35 > y
36 [1] 45 NaN 90 79 47 NaN 90 74 63 9 NaN 75 18 NaN 92 17 36 4
37 [19] 74 NaN 27 73 NaN NaN 57 52 NaN 6 15 39 26 NaN 17 NaN 85 43
38 [37] 53 NaN NaN 26 NaN 49 42 90 NaN 76 78 62 38 65 79 22 89 17
39 [55] 23 4 24 6 34 44 14 67 35 67 NaN 73 80 76 35 33 74 NaN
40 [73] 40 75 58 NaN 74 61 58 NaN 83 76 NaN 64 40 88 28 34 60 1
41 [91] 61 49 36 19 65 53 NaN 25 99 3
42 > mean(y)
43 [1] NaN
44 > mean(y,na.rm = TRUE)
45 [1] 49.725
46 >
47 > proc.time()
48 使用者 系統 流逝
49 0.14 0.09 0.21
50
```

使用者時間與CPU時間



# CMD直接切換R執行程序環境- (Windows)- Rterm

```
Rterm (64-bit) ━ ─ ×
D:\110_1_Engineering_Statistics\Ch1. R.quickstart>Rterm
R version 4.1.1 (2021-08-10) -- "Kick Things"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R 是自由軟體，不提供任何擔保。
在某些條件下歡迎您將其散佈。
用 'license()' 或 'licence()' 來獲得散佈的詳細條件。

R 是個協作計劃，有許多人為之做出了貢獻。
用 'contributors()' 來看詳細的情況以及
用 'citation()' 會告訴您如何在出版品中正確地參照 R 或 R 套件。

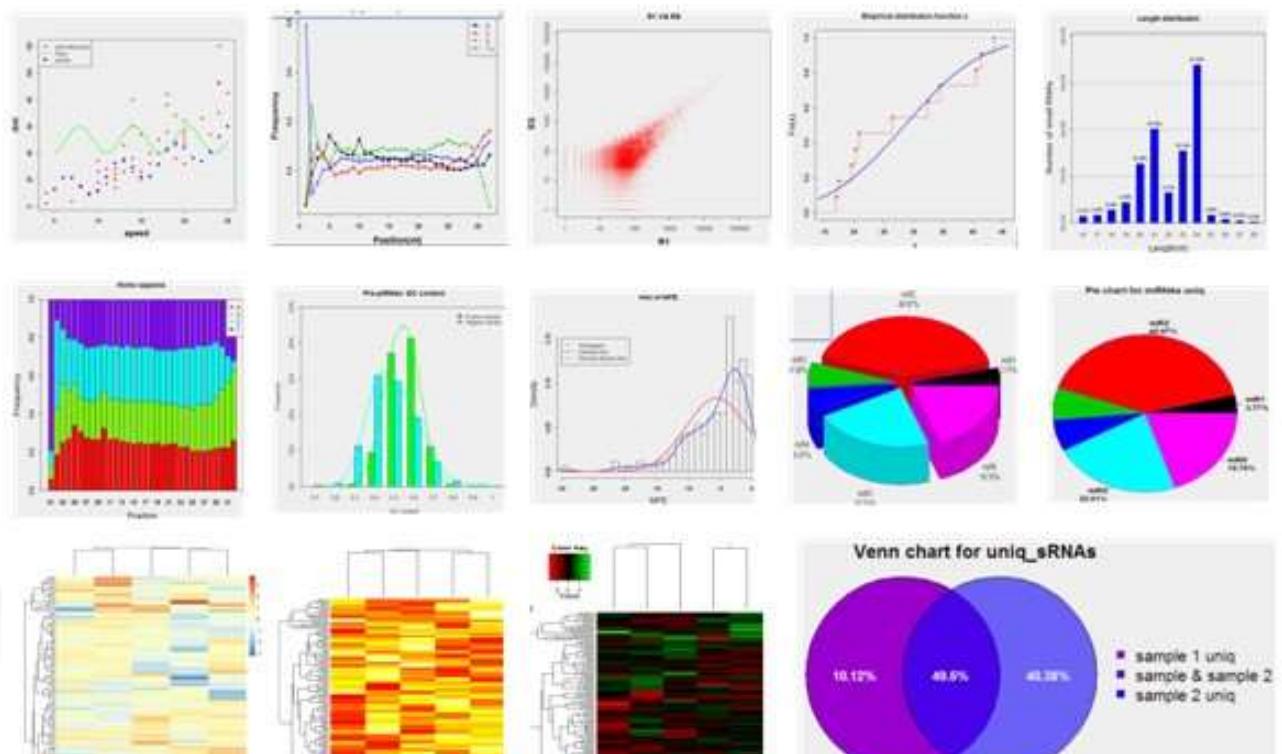
[原來儲存的工作空間已還原]
>
```





The R Project for Statistical Computing

# 歡迎加入R語言世界



# 使用CMD或Terminal執行R檔 (Windows)-R CMD BATCH

Crimson Editor - [D:\110\_1\_Engineering\_Statistics\Ch1.R.quickstart\myfirst.Rout]

File Edit Search View Document Project Tools Macros Window Help

myfirst.Rout

1  
2 R version 4.1.1 (2021-08-10) -- "Kick Things"  
3 Copyright (C) 2021 The R Foundation for Statistical Computing  
4 Platform: x86\_64-w64-mingw32/x64 (64-bit)  
5  
6 R 是自由軟體，不提供任何擔保。  
7 在某些條件下歡迎您將其散佈。  
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10 R 是個協作計劃，有許多人為之做出了貢獻。  
11 用 'contributors()' 來看詳細的情況以及  
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13  
14 用 'demo()' 來看一些示範程式，用 'help()' 來檢視線上輔助檔案，或  
15 用 'help.start()' 透過 HTML 瀏覽器來看輔助檔案。  
16 用 'q()' 離開 R。  
17  
18 > # create 100 random repeatable number  
19 > x <- sample(x = 1:100, size = 100, replace = TRUE)  
20 > x  
21 [1] 45 50 90 79 47 5 90 74 63 9 64 75 18 88 92 17 36 4 74 91 27 73 6 55 57  
22 [26] 52 76 6 15 39 26 73 17 41 85 43 53 33 10 26 96 49 42 90 92 76 78 62 38 65  
23 [51] 79 22 89 17 23 4 24 6 34 44 14 67 35 67 40 73 80 76 35 33 74 63 40 75 58  
24 [76] 52 74 61 58 58 83 76 65 64 40 88 28 34 60 1 61 49 36 19 65 53 84 25 99 3  
25 > # compute mean, variance, standard deviation  
26 > mean(x)  
27 [1] 51.2  
28 > var(x)  
29 [1] 724.2828  
30 > sd(x)  
31 [1] 26.9125  
32 > # replace 20 number by not a number (NAN)  
33 > y <- x



# Quick Demo R – dplyr + Linear regression + ggplot2

dplyr is a **grammar of data manipulation**, providing a consistent set of verbs that help you solve the most common **data manipulation** challenges.

**dplyr()**  
**gapminder()**

<https://www.youtube.com/watch?v=jbkSRLYSoho>

Hans Rosling's 200 Countries, 200 Years, 4 Minutes - The Joy of Stats - BBC Four

<https://dplyr.tidyverse.org/>



## Overview

dplyr is a grammar of data manipulation, providing a consistent set of verbs that help you solve the most common data manipulation challenges:

- `mutate()` adds new variables that are functions of existing variables
- `select()` picks variables based on their names.
- `filter()` picks cases based on their values.
- `summarise()` reduces multiple values down to a single summary.
- `arrange()` changes the ordering of the rows.

These all combine naturally with `group_by()` which allows you to perform any operation “by group”. You can learn more about them in `vignette("dplyr")`. As well as these single-table verbs, dplyr also provides a variety of two-table verbs, which you can learn about in `vignette("two-table")`.

If you are new to dplyr, the best place to start is the [data transformation chapter](#) in R for data science.

## Links

Download from CRAN at  
[https://cloud.r-project.org/  
package=dplyr](https://cloud.r-project.org/package=dplyr)

Browse source code at  
[https://github.com/tidyverse/  
dplyr/](https://github.com/tidyverse/dplyr/)

Report a bug at  
[https://github.com/tidyverse/  
dplyr/issues](https://github.com/tidyverse/dplyr/issues)

Learn more at  
[http://r4ds.had.co.nz/  
transform.html](http://r4ds.had.co.nz/transform.html)

# Quick Demo R – dplyr + Linear regression + ggplot2

<https://www.rdocumentation.org/packages/gapminder/versions/0.3.0>

dplyr()

gapminder()

## gapminder

Excerpt from the [Gapminder](#) data. The main object in this package is the `gapminder` data frame or "tibble".

There are other goodies, such as the data in tab delimited form, a larger unfiltered dataset, premade color schemes for the countries and continents, and ISO 3166-1 country codes.

The `gapminder` data frames include six variables, ([Gapminder.org documentation page](#)):

variable	meaning
country	
continent	
year	
lifeExp	life expectancy at birth
pop	total population
gdpPercap	per-capita GDP

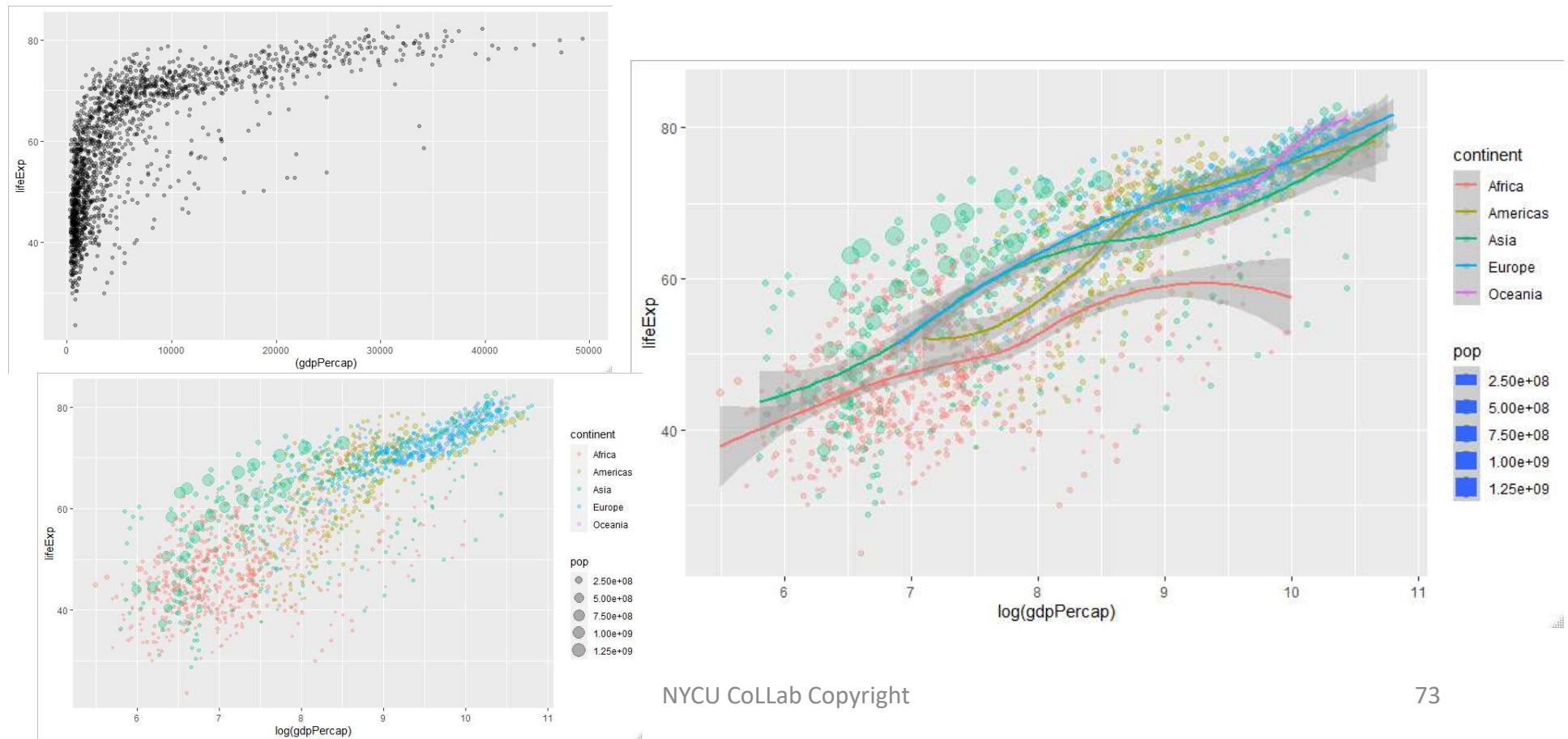
# Quick Demo R – dplyr + Linear regression + ggplot2

dplyr is a **grammar of data manipulation**, providing a consistent set of verbs that help you solve the most common **data manipulation** challenges.

**dplyr()**  
**gapminder()**

<https://www.youtube.com/watch?v=jbkSRLYSoho>

Hans Rosling's 200 Countries, 200 Years, 4 Minutes - The Joy of Stats - BBC Four



# 常見數據資料庫



<https://archive.ics.uci.edu/ml/index.php>

## Forest Fires Data Set

*Download:* [Data Folder](#), [Data Set](#)

[Description](#)

**Abstract:** This is a difficult regression task, where the aim is to predict the burned area of forest fires, in the northeast region of Portugal, by using meteorological and other data (see details at: [\[Web Link\]](#)).



Data Set Characteristics:	Multivariate	Number of Instances:	517	Area:	Physical
Attribute Characteristics:	Real	Number of Attributes:	13	Date Donated	2008-02-29
Associated Tasks:	Regression	Missing Values?	N/A	Number of Web Hits:	916095

# 常見數據資料庫



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Attribute Characteristics:	Real	Number of Attributes:	13	Date Donated	2008-02-29
Associated Tasks:	Regression	Missing Values?	N/A	Number of Web Hits:	916095

# 常見數據資料庫

<https://www.un.org/en/databases/index.html>

Welcome to the United Nations

العربية 中文 English Français Русский Español



## United Nations

Peace, dignity and equality  
on a healthy planet

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Where We Work

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Documents

Observances

Resources for:

Coronavirus (COVID-19)

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## Databases

### Official Documents and Bibliographic Databases

#### Official Document System (ODS)

UN documentation, daily journal and daily list of documents.

#### UN Digital Library

Explore documents, votes, speeches, public domain publications and more!

#### UNBIS Thesaurus

Terminology used in subject analysis of documents and other materials relevant to UN programmes and activities.

### Databases

#### Official Documents

#### Treaties

#### UN Members

#### Terminology

#### Multimedia

#### Civil Society

#### Human Rights Issues

# 常見數據資料庫

<https://www.who.int/health-topics/>

The screenshot shows the official website of the World Health Organization (WHO). At the top, there is a navigation bar with links for "Global", "Regions", "العربية" (Arabic), "中文" (Chinese), "English", "Français", "Русский" (Russian), "Español", and a search icon. Below the navigation bar is the WHO logo and name. The main menu includes "Health Topics", "Countries", "Newsroom", "Emergencies", "Data", and "About Us". The background features a photograph of a female healthcare worker in a white coat interacting with an elderly man. A blue banner across the photo reads "Health topics". In the bottom right corner of the image, there is a small copyright notice: "WHO COLLECTIVE Copyright © WHO 2023".

# 常見數據資料庫

<https://data.gov.tw/>

The screenshot shows the homepage of the Government Data Open Platform (政府資料開放平臺) at DATA.GOV.TW. The top navigation bar includes links for '全部資料集' (All Data Sets), '網站導覽' (Website Navigation), '互動專區' (Interactive Zone), '資料故事館' (Data Storytelling), '最新消息' (Latest News), '諮詢小組' (Consultation Groups), '關於平臺' (About the Platform), and language options 'EN' and '智能客服 | 線上客服 | 登入/註冊' (Smart Customer Service | Online Customer Service | Login/Register). A search bar at the top allows users to search for specific datasets. Below the search bar, there is a link to '進階搜尋器 | 進階搜尋請參考這裡' (Advanced Search | Advanced search please refer here). The main content area features a section titled '資料集服務分類' (Dataset Service Categories) with eight categories: '生育保健(507)', '出生及收養(89)', '求學及進修(761)', '服兵役(275)', '求職及就業(570)', '開創事業(736)', '婚姻(35)', and '投資理財(1716)'. Each category is accompanied by a representative icon.

## 資料集服務分類



生育保健(507)



出生及收養(89)



求學及進修(761)



服兵役(275)



求職及就業(570)



開創事業(736)



婚姻(35)



投資理財(1716)

# 課堂練習1: 上傳myfirst.R螢幕執行結果

透過Rstudio撰寫myfirst.R程式，  
執行程式後將螢幕執行結果畫面截圖後，  
儲存檔案名稱為  
**學號-姓名-quickstart-1.jpg**



# 課堂練習1: 上傳myfirst.R 螢幕執行結果

```
Console Terminal ~ / 
> # create 100 random repeatable number
> x <- sample(x = 1:100, size = 100, replace = TRUE)
> x
[1] 89 80 22 26 40 48 14 6 54 72 85 24 67
[14] 37 14 27 77 83 3 29 61 69 89 95 78 59
[27] 100 84 31 77 3 40 24 93 10 77 62 42 70
[40] 74 19 82 55 85 46 23 90 79 93 42 29 69
[53] 86 65 86 13 22 58 70 41 97 24 22 33 74
[66] 83 8 12 75 16 43 21 6 88 90 72 21 7
[79] 99 42 33 94 5 5 4 11 2 10 34 2 76
[92] 6 58 73 83 5 81 73 54 54
> # compute mean, variance, standard deviation
> mean(x)
[1] 49.84
> var(x)
[1] 962.0347
> sd(x)
[1] 31.01668
> # replace 20 number by not a number (NaN)
> y <- x
> y[sample(x = 1:100, size = 20, replace = FALSE)] <- NaN
```

```
> y
[1] 89 NaN 22 26 NaN 48 NaN NaN 54 72 85 NaN NaN
[14] 37 14 27 77 83 3 29 61 69 89 95 78 59
[27] 100 84 31 77 3 40 24 93 NaN 77 62 42 NaN
[40] 74 19 82 55 NaN 46 23 90 NaN 93 42 29 NaN
[53] 86 65 NaN 13 22 NaN 70 41 97 NaN 22 33 74
[66] 83 8 12 75 16 NaN 21 NaN 88 90 72 21 7
[79] 99 42 33 94 5 5 4 11 2 10 NaN NaN 76
[92] 6 NaN 73 NaN 5 81 73 54 54
> mean(y)
[1] NaN
> mean(y,na.rm = TRUE)
[1] 50.575
> |
```



# 課堂練習2: 上傳dplyr\_demo.R 繪圖成果

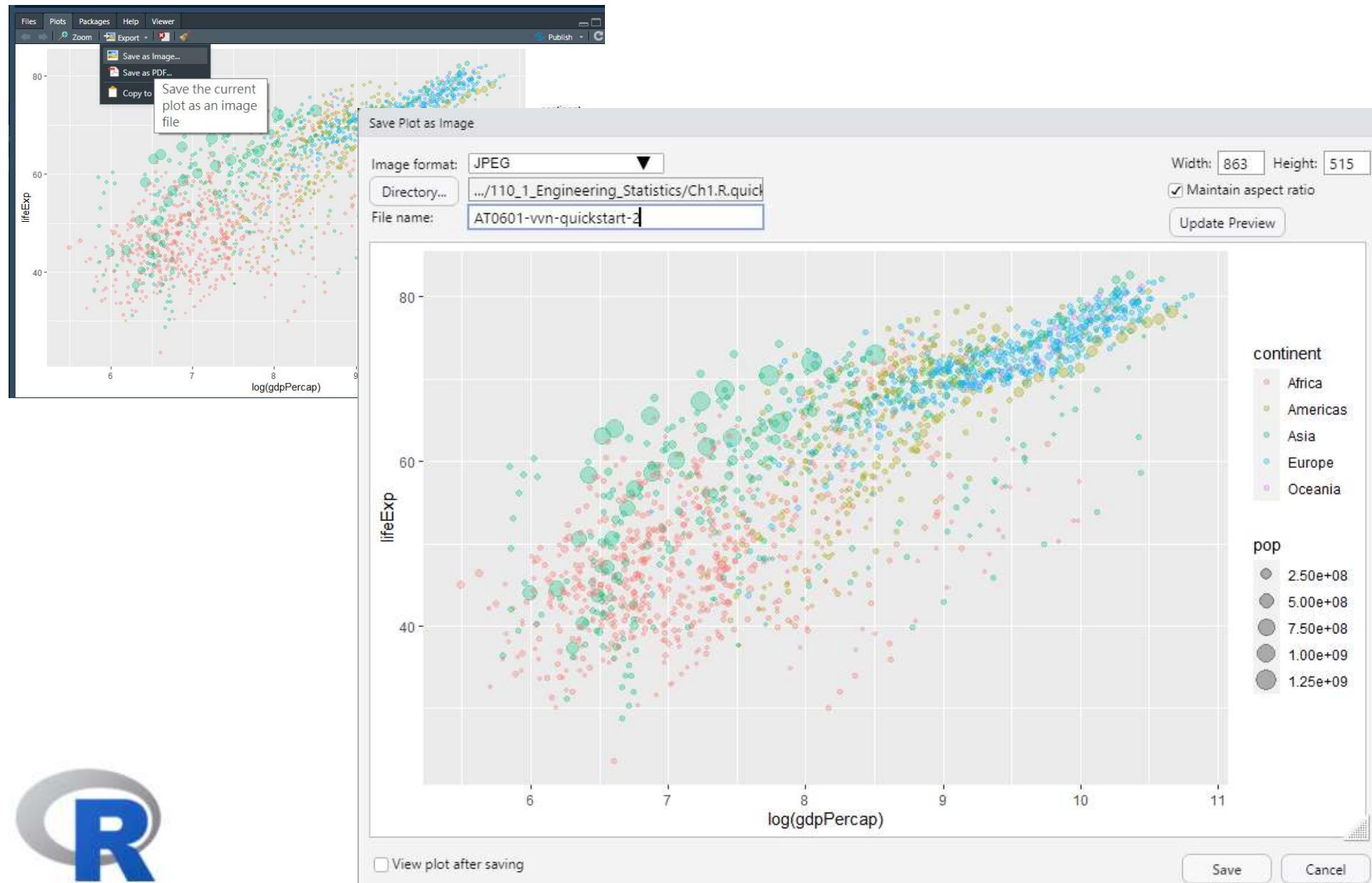
執行程式dplyr\_demo.R後將繪圖成果，

儲存檔案名稱為

學號-姓名-quickstart-2.jpg



# 課堂練習2: 上傳dplyr\_demo.R 繪圖成果



## Exercise (課堂/課後練習) 60%

- 課堂當天晚上**11:55**分以前繳交
- 評分準則
  - (1) 繳交時間
  - (2) 完成度
  - (程式碼 + 圖檔美感 + 文字說明)