

1. 理解資料集操作

- R/Python/SQL/Julia 程式設計與應用
(R/Python/SQL/Julia Programming and Application)
- 資料視覺化 (Data Visualization)
- 機器學習 (Machine Learning)
- 統計品管 (Statistical Quality Control)
- 最佳化 (Optimization)
- 人工智慧 (Artificial Intelligence)



李明昌博士

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大綱

- 1.理解資料集操作

- 1.1 R與RStudio下載、安裝與操作
- 1.2 認識datasets套件之資料操作

- 2.資料管線操作

- 2.1 認識dplyr套件
- 2.2 熟悉開放資料集於dplyr應用

- 3.圖形文法繪圖

- 3.1 認識ggplot2套件
- 3.2 熟悉開放資料集於ggplot2應用

- 4.預測模型

- 4.1 認識lm與glm函數
- 4.2 熟悉開放資料集於lm與glm應用
- 4.3 深度學習應用

- 5.資料科學報告整合應用

- 5.1 熟悉管線操作、ggplot2與建立模型
- 5.2 熟悉rmarkdown製作Word報告

1.1 R與RStudio下載、安裝與操作

RWEPA簡介

RWEPA簡介: <http://rwepa.blogspot.com/>

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- 現職：中華R軟體學會 理事
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 - 淡江大學 兼任教師
 - 佛光大學 兼任教師
 - 育達科技大學 兼任教師
 - 國立台北商業大學 兼任教師
 - 東吳大學 兼任教師
 - 育達科技大學 資訊管理系(所) 專任助理教授
 - 崇友實業 行銷企劃專員
 - 國航船務代理股份有限公司 海運市場運籌管理員
- 大專院校、資策會、工業技術研究院、國家發展委員會、中央氣象局、公平交易委員會、衛生福利部、縣市政府與日本名古屋產業大學等公民營單位演講達359場，3384小時。
- 連絡資訊：alan9956@gmail.com



- iPAS AI應用規劃師 證照推廣
- iPAS 營運智慧分析師 證照推廣

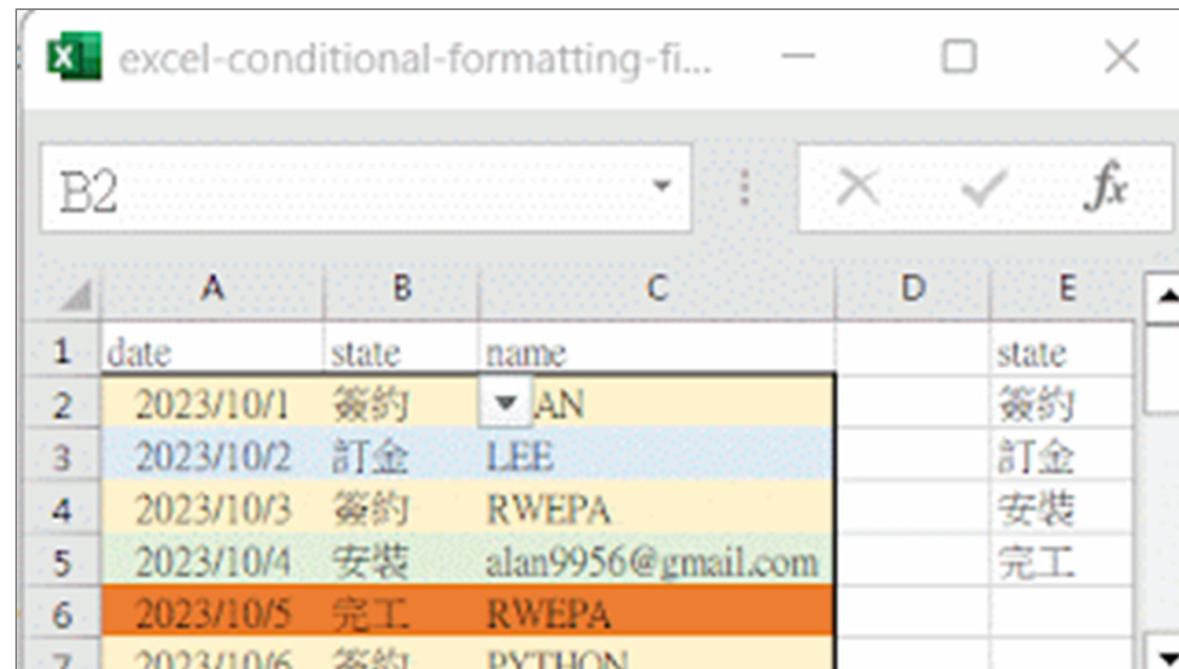
資料分析暨視覺化應用

★★★資料分析架構→APC方法



Excel 下拉式選單與條件式格式設定教學

- YouTube (包括中文字幕) : <https://youtu.be/OVA4dvkrsBM>
- LINK: <https://rwepa.blogspot.com/2023/10/excel-drop-down-list-and-conditional-formatting.html>

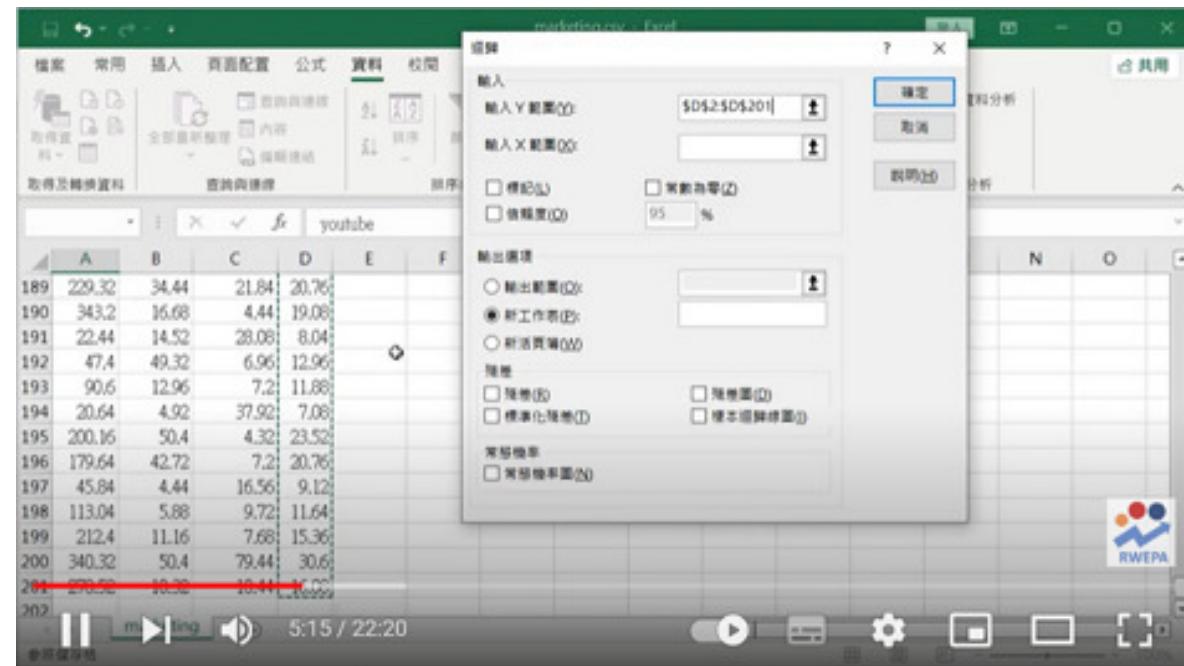


	A	B	C	D	E
1	date	state	name	state	
2	2023/10/1	簽約	AN	簽約	
3	2023/10/2	訂金	LEE	訂金	
4	2023/10/3	簽約	RWEPA	安裝	
5	2023/10/4	安裝	alan9956@gmail.com	完工	
6	2023/10/5	完工	RWEPA		
7	2023/10/6	簽約	PYTHON		

Excel 限制?

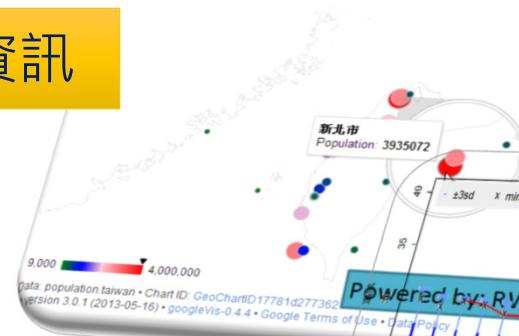
Regression Analysis in Excel (Excel 迴歸分析)

- YouTube : https://youtu.be/i5_urp8XzEs
- LINK: <https://rwepa.blogspot.com/2022/05/httpsrwepa.blogspot.com202205regression-analysis-in-excel.html.html>

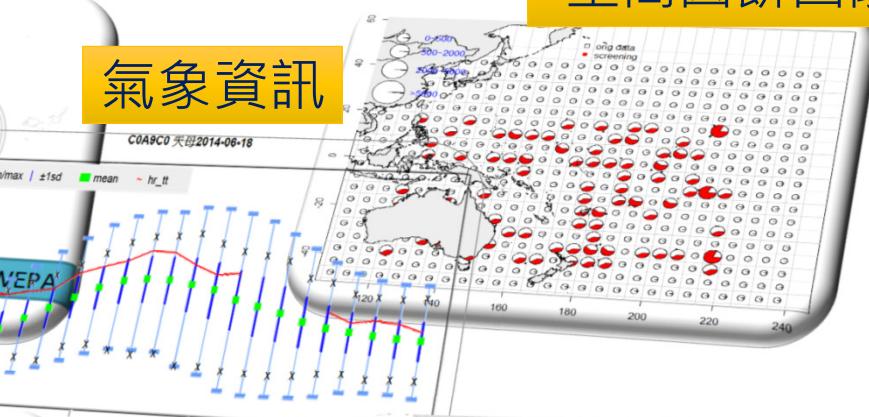


R+Shiny, Python+Streamlit 互動式平台

地理資訊



氣象資訊



空間圓餅圖離群值分析

保險預測



登山路線視覺化

顧客連結資訊





中央氣象局 1,600萬筆資料(14,328檔案)

網頁呈現

The screenshot displays the '气象资料视觉化暨互动式分析平台_qc_v0.16.5.1' interface. Key features shown include:

- 一般 (General) tab selected.**
- Reg_QC圖/表 (Reg_QC chart/table) button highlighted with a red box.**
- 14,328 個檔案，18 個資料夾 (14,328 files, 18 folders).**
- 選取測站 (Select Station): 466900 淡水.**
- 選取月份 (1-12): 6 (highlighted with a blue box).**
- 選取小時 (1-24): 1 (highlighted with a blue box).**
- 選取年之範圍 (Year Range): 1998 to 2014 (highlighted with a blue box).**
- 選取QC閾值 (Select QC threshold): -10 to 10 (highlighted with a blue box).**
- QC_UKref/hr_tt_06mm_01hr_466900.txt: A scatter plot titled 'QC_UKref/hr_tt_06mm_01hr_466900.txt' comparing Actual Value TT vs Estimated Value UK. An outlier is marked with a red 'X'.**
- 學生化殘差直方圖 (Studentized Residual Histogram): A histogram titled '學生化殘差直方圖' showing the distribution of studentized residuals.**
- 客製化選單 (Customized Selection Menu): A yellow box labeled '客製化選單' pointing to the selection menu area.**
- R統計運算 (R Statistical Calculation): A yellow box labeled 'R統計運算' pointing to the statistical calculation table.**
- Show 10 entries table:**

觀測站	日期	時	觀測值TT	推估值UK	學生化殘差	CMT	SD	Outliers
466900	20030601	1	23.8	20.6	5.163	23.751	2.159	0.0227
- Showing 1 to 1 of 1 entries**
- Previous 1 Next**

保險預測模型

機率模型閥值調整

The screenshot shows the iInsurance interactive analysis platform version v.16.3.24. The top navigation bar includes links for document upload, data processing, statistical charts, model evaluation, and prediction models. A red box highlights the 'Prediction Model' dropdown menu. Below it, a slider labeled 'Probability Model Threshold' is set to 0.1, with a red box around its value. A large yellow speech bubble on the left contains the text '機率模型閥值調整'. In the center, there is a table titled '檢視結果' (Review Results) showing 10 entries of data. The table columns include: 編號 (ID), 性別 (Gender), 女性 (Female), 車輛種類 (Vehicle Type), 私家車 (Private Car), 曝露風險 (Exposure Risk), 曝露風險對數 (Exposure Risk Log), 無索償折扣 (No Claim Discount), 被保險人年齡 (Insured Person Age), 私家車一車齡 (Private Car Age 1), 私家車二車齡 (Private Car Age 2), 私家車三車齡 (Private Car Age 3), 私家車車齡組合 (Private Car Age Combination), 車齡 (Age), 車齡組合 (Age Combination), 預測機率 (Prediction Probability), and 理賠 (Claim). The last two columns are highlighted with red boxes. A yellow speech bubble on the right contains the text '預測結果' (Prediction Result). The bottom of the table shows 'Showing 1 to 10 of 12 entries' and navigation buttons for 'Previous', 'Next', and page numbers 1, 2.

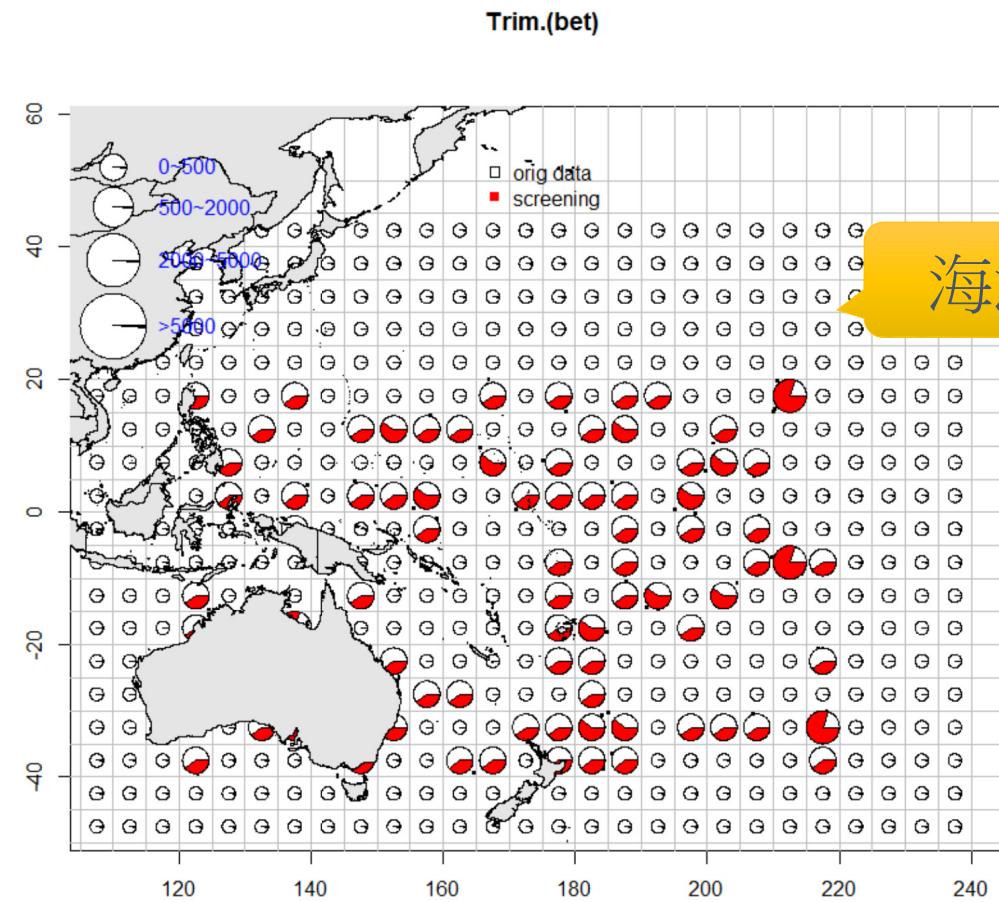
編號	性別	女性	車輛種類	私家車	曝露風險	曝露風險對數	無索償折扣	被保險人年齡	私家車一車齡 0	私家車二車齡 1	私家車三車齡 2	私家車車齡組合 0_1_2	車齡	車齡組合 0_1_2	預測機率	理賠
1	M	0	A	1	0.9144422	-0.08944106	50	4	1	0	0	1	0	2	0.1069	有
2	M	0	A	1	0.8158795	-0.20348856	20	4	0	0	1	1	2	2	0.1441	有
3	M	0	A	1	0.8377823	-0.17699695	50	3	0	0	1	1	2	2	0.1866	有
4	M	0	A	1	0.4325804	-0.83798702	50	6	0	1	0	1	1	2	0.0944	無
5	M	0	A	1	0.7173169	-0.33223755	50	4	0	0	1	1	2	2	0.1218	有
6	M	0	A	1	0.8377823	-0.17699695	50	4	0	0	1	1	2	2	0.1495	有
7	M	0	A	1	0.8487337	-0.16400975	50	5	0	0	1	1	2	2	0.1422	有
8	F	1	A	1	0.8268309	-0.19015503	10	3	0	0	1	1	2	2	0.1733	有
9	M	0	A	1	0.7145791	-0.33606164	0	5	1	0	0	1	0	2	0.0694	無
10	M	0	A	1	0.3340178	-1.09656101	0	3	0	0	1	1	2	2	0.0783	無

Showing 1 to 10 of 12 entries

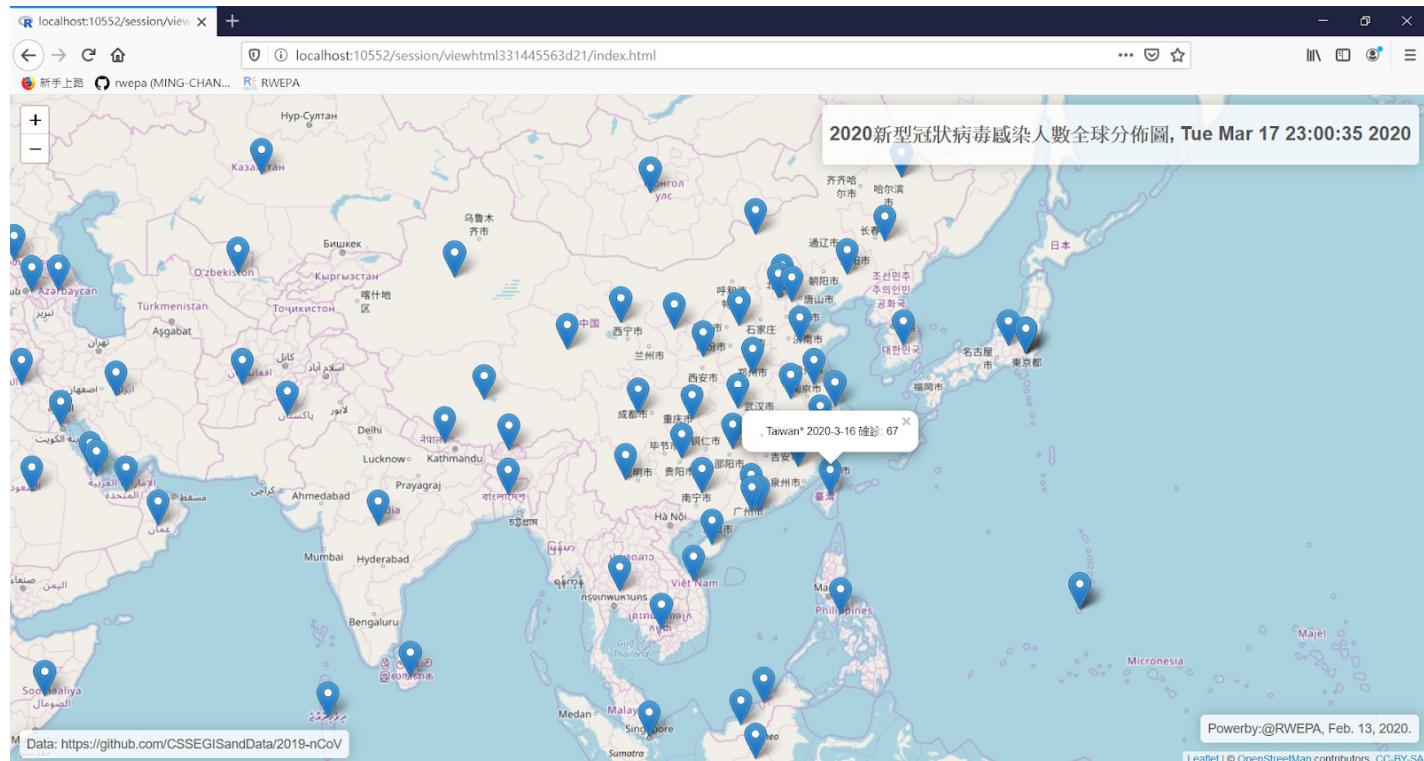
Previous 1 2 Next

127.0.0.1:6177/#tab-9487-2

空間圓餅圖離群值分析



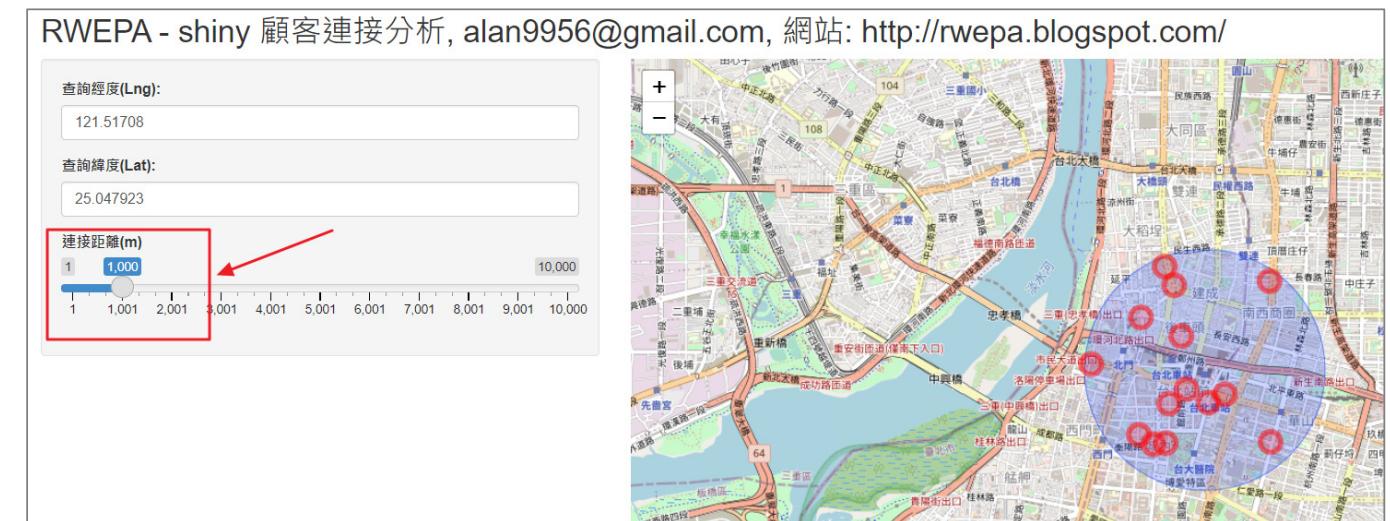
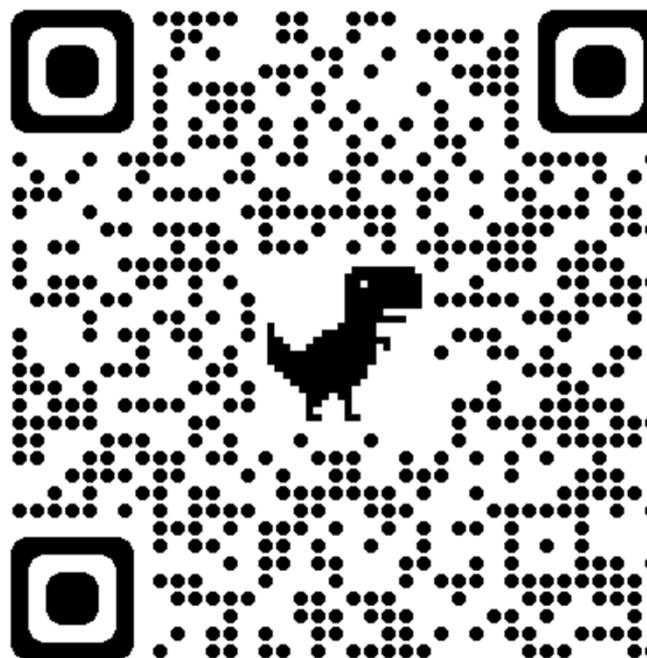
2020新型冠狀病毒視覺化



<http://rwepa.blogspot.com/2020/02/2019nCoV.html>

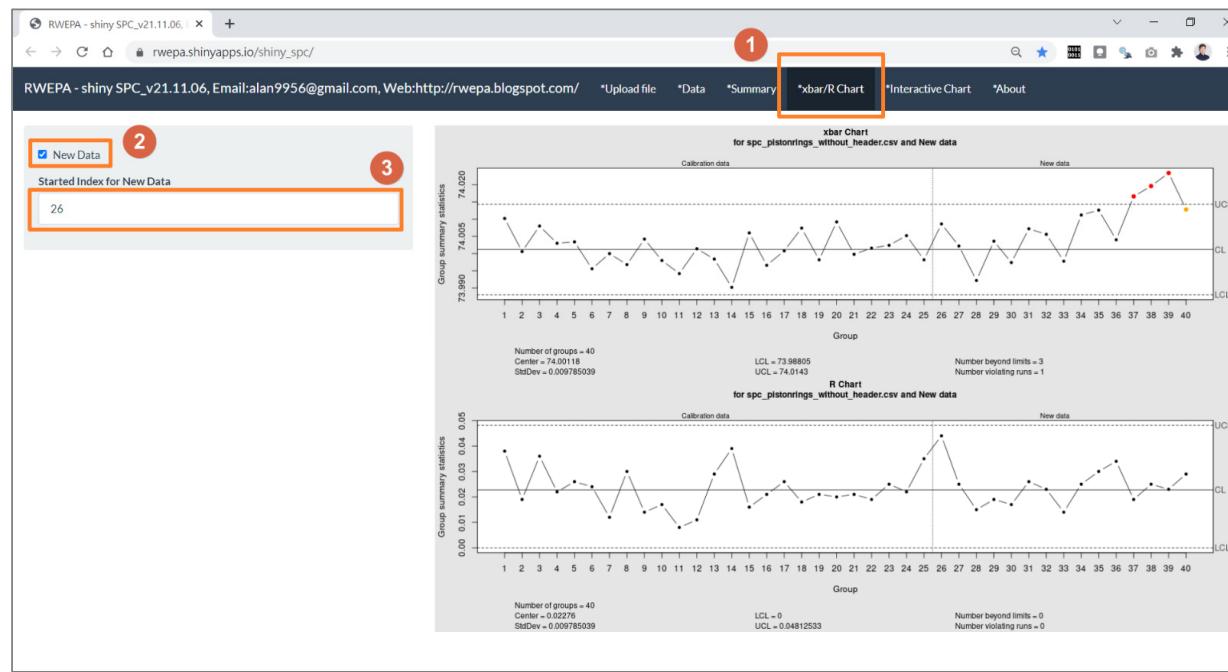
shiny 顧客連接分析

- <https://rwepa.shinyapps.io/shinyCustomerConnect/>



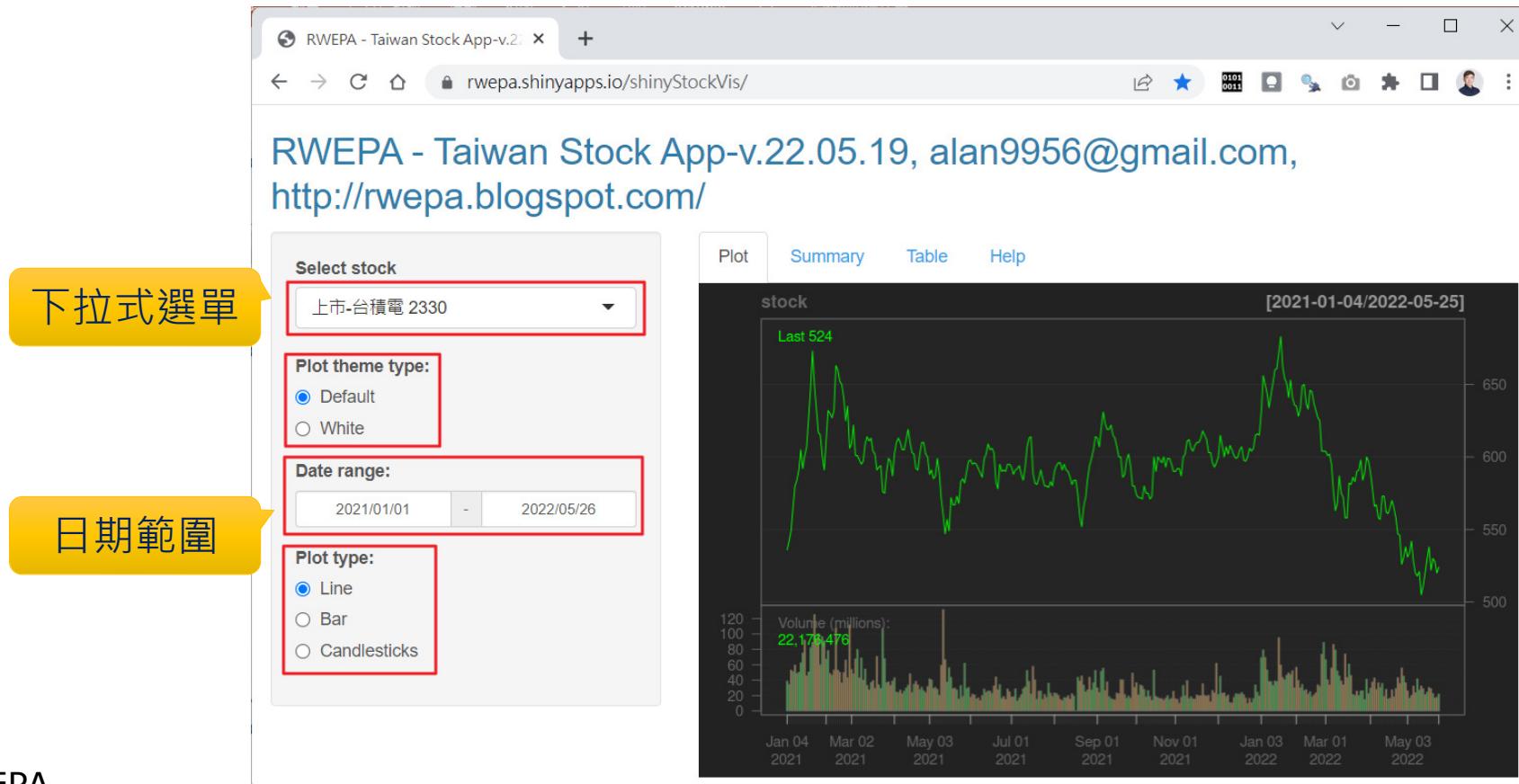
品質管制圖(quality control chart)應用

- 說明: <http://rwepa.blogspot.com/2021/10/r-shiny-quality-control-chart.html>
- 資料1: https://github.com/rwepa/shiny_spc/blob/main/data/spc_wafer_with_header.csv
- 資料2: https://github.com/rwepa/shiny_spc/blob/main/data/spc_pistonrings_without_header.csv
- 線上示範: https://rwepa.shinyapps.io/shiny_spc/

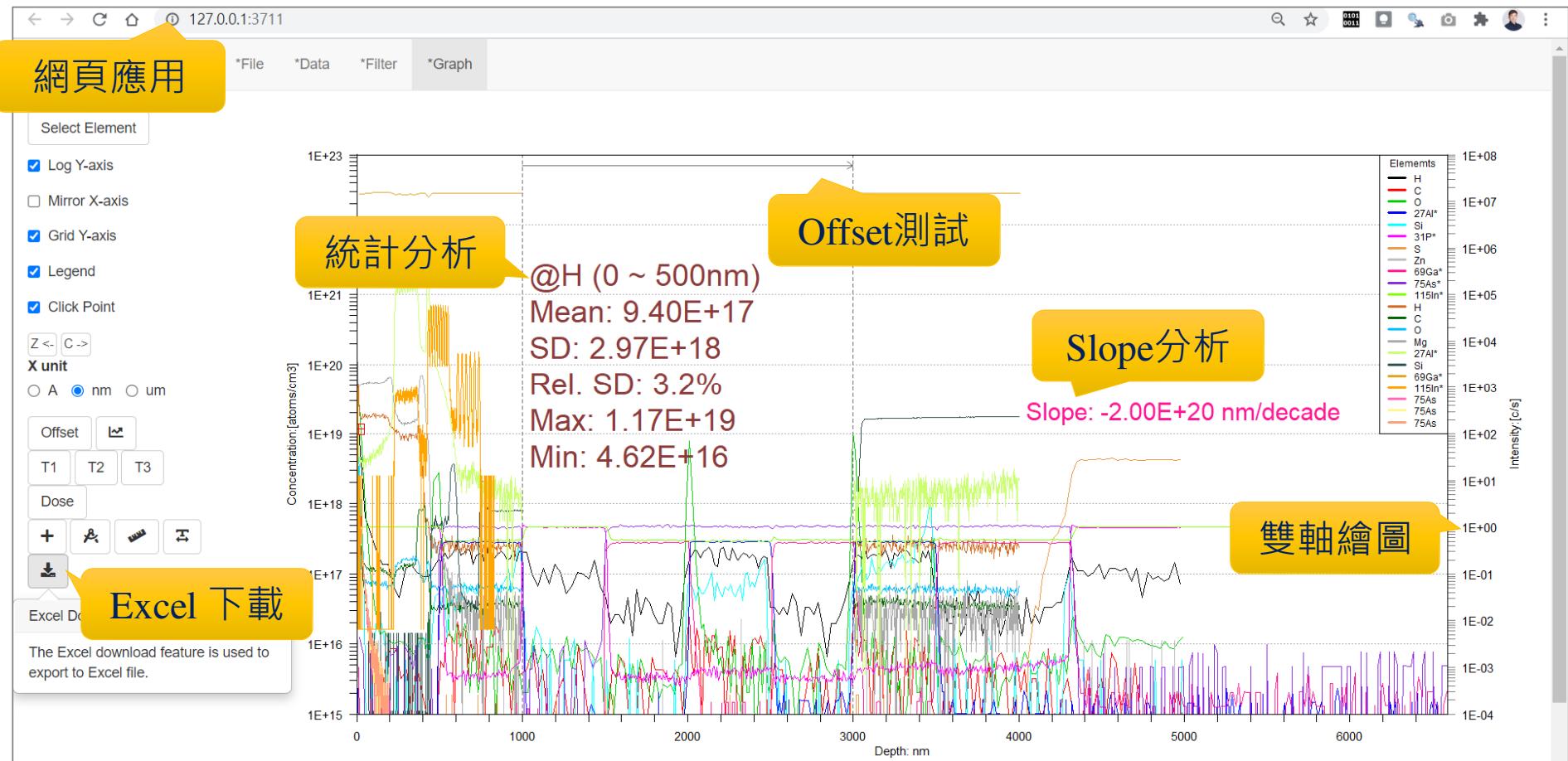


Taiwan Stock App

- <https://rwepa.shinyapps.io/shinyStockVis/>

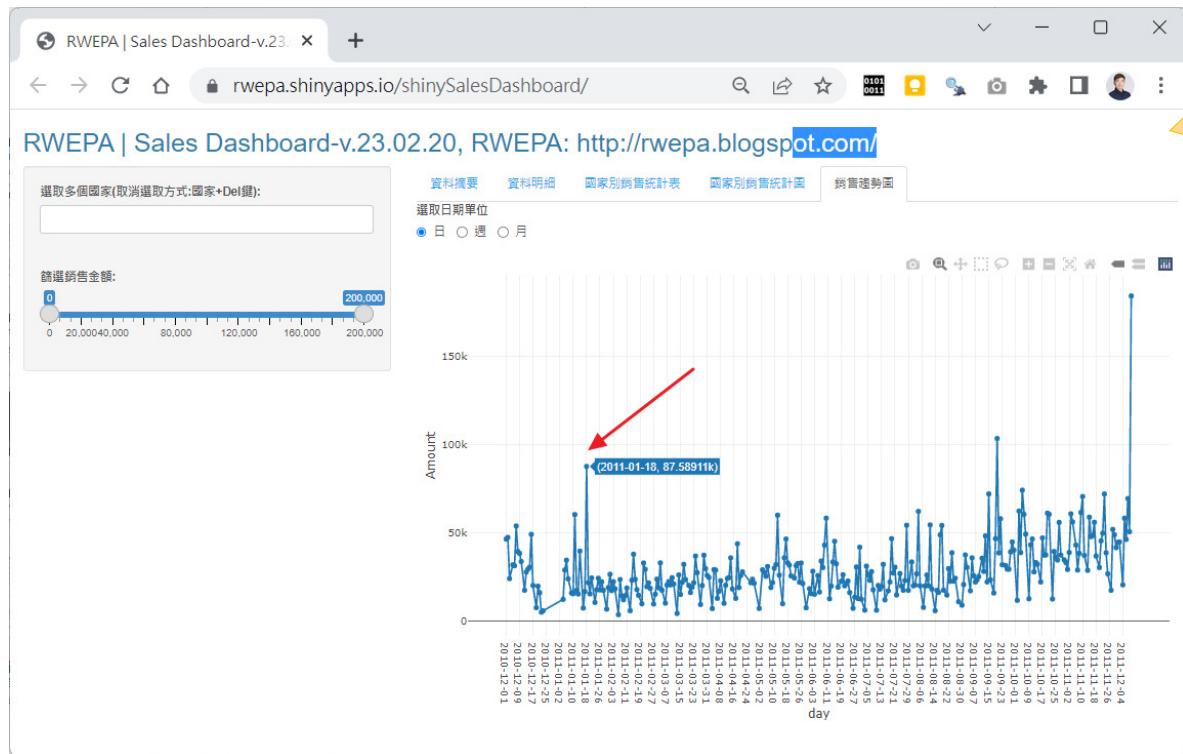


離子資料分析與視覺化應用



RWEPA | shiny企業實務應用 第4集-shiny銷售儀表板

- Shiny: <https://rwepa.shinyapps.io/shinySalesDashboard/>
- YouTube: <https://youtu.be/4GgZlf8heQk>



謝謝 ^_ ^

訂閱 + 讚 + 開啟小鈴鐺

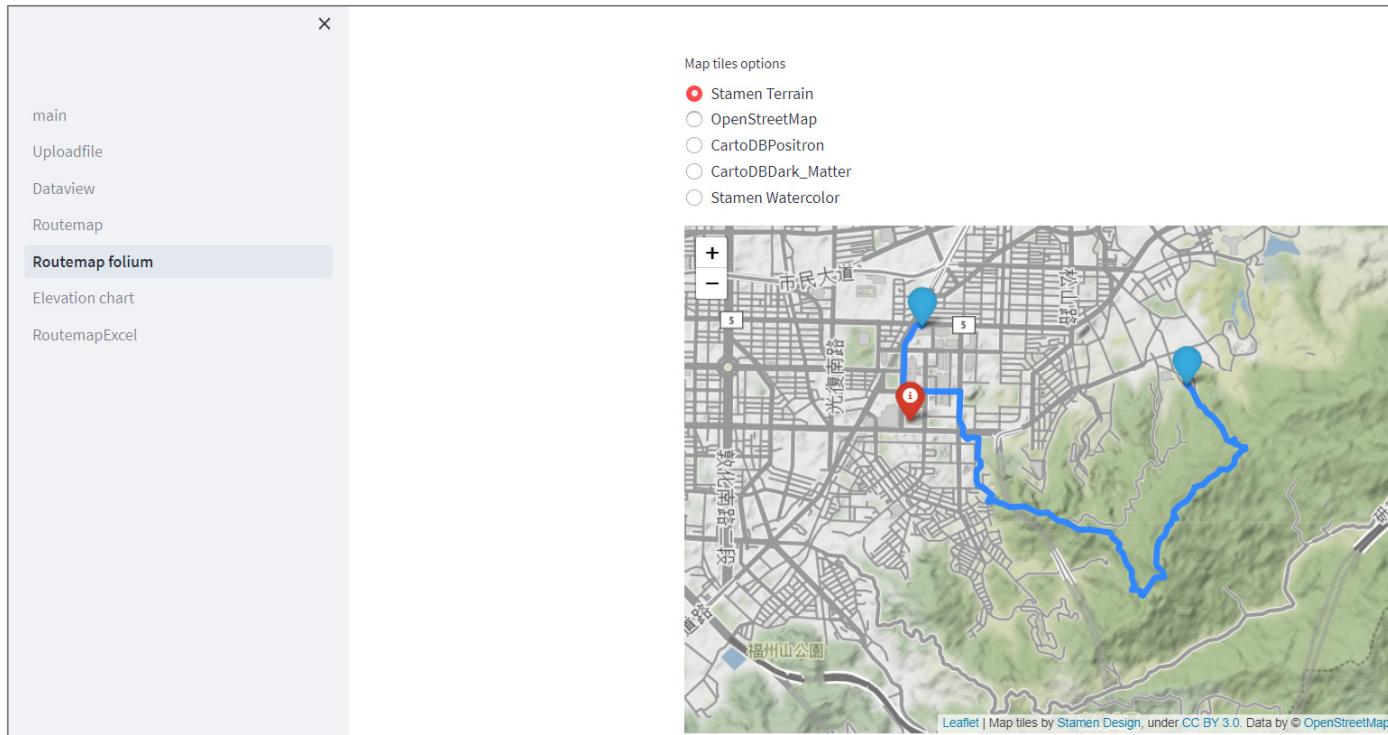
shiny企業實務應用 第6集-小明算命師(下) - 第1季完結篇

- Ubuntu Shiny Server: <https://shiny.rwepa.net/shiny-hr-teller/>
- YouTube: <https://youtu.be/rrD6KV3eV-w>



登山路線視覺化分析平台 (Python + Streamlit)

- YouTube : https://youtu.be/-_zghs2qrlg
- 系統展示 <https://rwepa-climb.streamlit.app/>



銷售儀表板2025 (Python + Streamlit)

- YouTube : <https://youtu.be/QmvIYHspvns>
- 系統展示: <https://rwepa-sales-dashboard.streamlit.app/>



Power BI - 客戶輪廓分析

PowerBI_customer_profile_analysis - Power BI Desktop

登入

檔案 常用 插入 模型化 檢視 最佳化 說明

剪貼簿 貼上 剪下 複製 複製格式 取得資料 Excel 資料中種 SQL 輸入資料 Dataverse 最近使用的來源 資料

查詢 轉換資料 重新整理 新增視覺效果 文字方塊 更多視覺效果 插入 計算 新增量值 快速量值 敏感度 發行 共用

客戶輪廓Overview

客戶等級
全選 VIP客戶 一般客戶 財富管理客戶

客戶數 666 平均年齡 34.8

• FEMALE • MALE

年齡組距

職業

縣市別

區域別

視覺效果 組建視覺效果

資料

搜尋

- DAX量值管理表
- 分行資料表
- 日期對照表
- 刷卡交易資料表
- 刷卡國別對照表
- 刷卡類別對照表
- 客戶資料表
- 理財產品代碼表
- 理財產品交易資料表
- 業務員資料表
- Dynamic_Calendar

於此處新增資料欄位

鑽研 跨報表 保留所有篩選 在此處新增鑽研欄位

頁面 9 之 1 84%

Power BI – RFM分析

- 🌸 YouTube : <https://youtu.be/Lkr9HmzLTtg>
- LINK: <https://rwepa.blogspot.com/2023/07/rwepa-rfm-analysis-using-power-bi.html>

Customer Segmentation Using RFM Analysis, 2023



最近消費 (recency) :
顧客上次消費時間愈近，用戶價值愈大。

消費頻率 (frequency) :
顧客在一段時間中，總購買次數，購買頻率愈高，用戶價值愈大。

消費金額 (monetary) :
顧客總消費金額，消費金額愈高，用戶價值愈大。

Author : Ming-Chang Lee
YouTube : <https://www.youtube.com/@alan9956>
RWEPA : <http://rwepa.blogspot.tw/>
GitHub : <https://github.com/rwepa>
Email : alan9956@gmail.com

RFM分析 X | RFM標準化分析 | RECENCY | FREQUENCY | Monetary | +

Tableau - Superstore

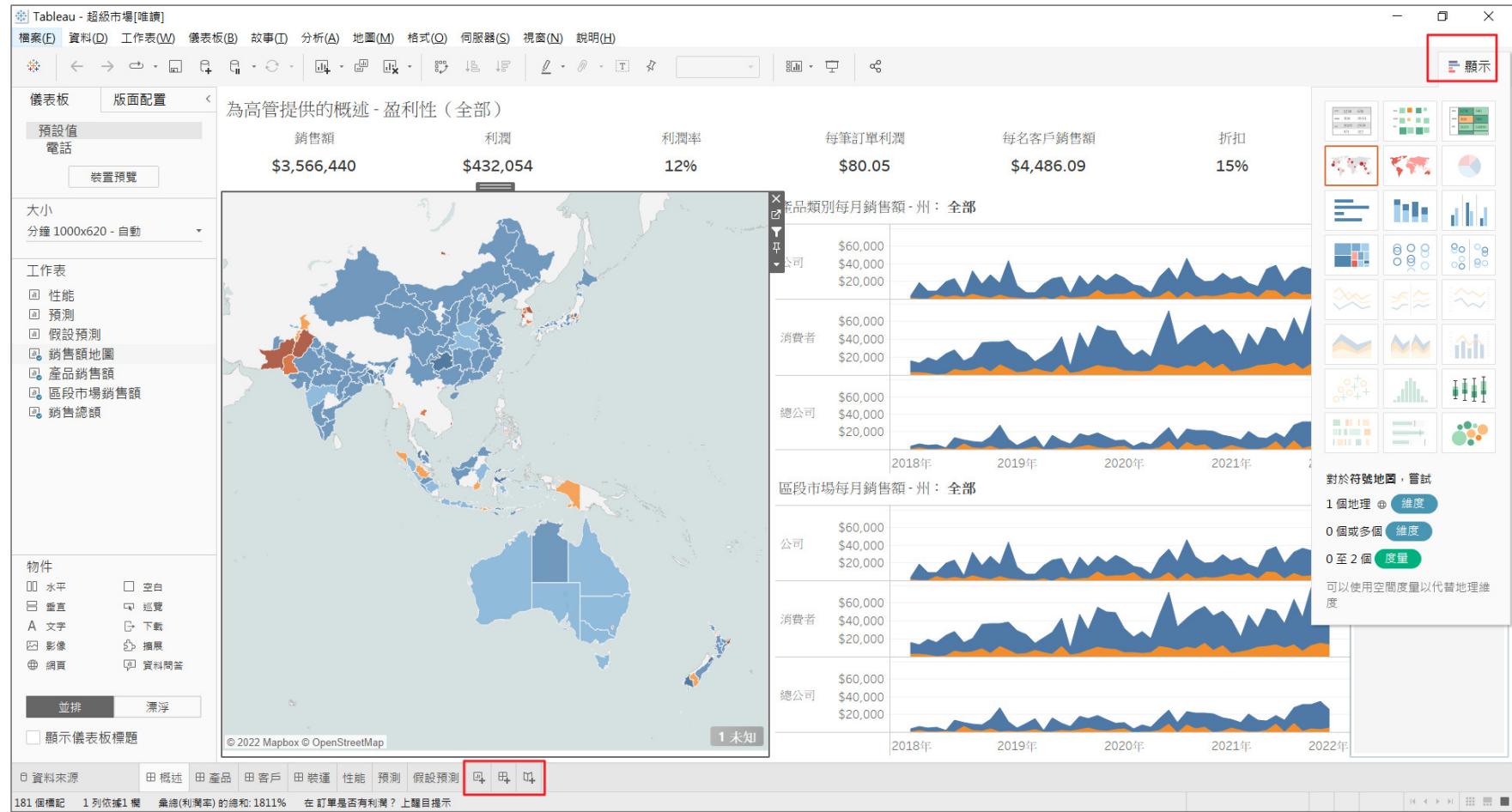
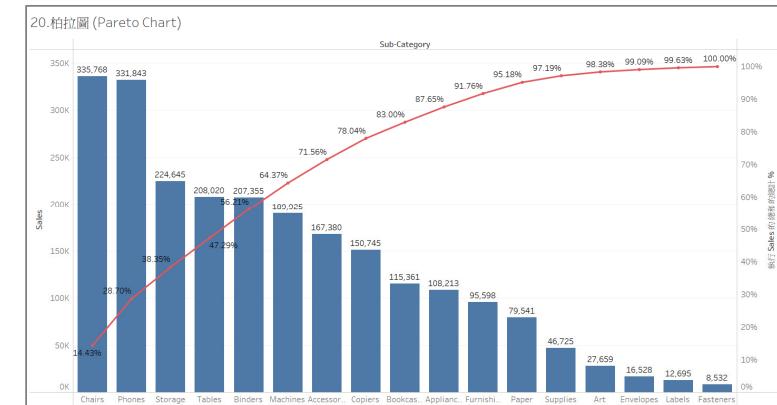
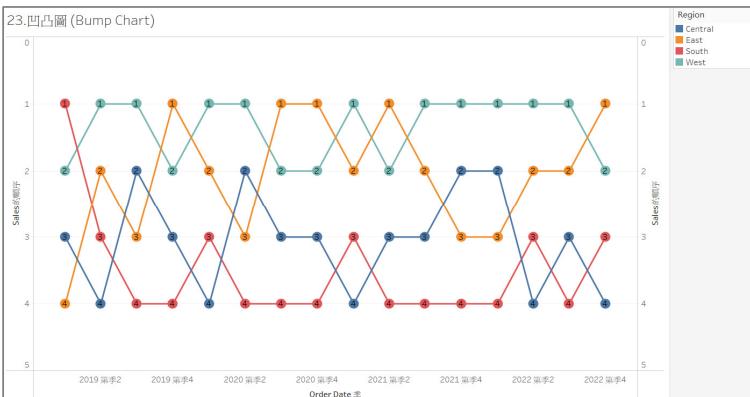
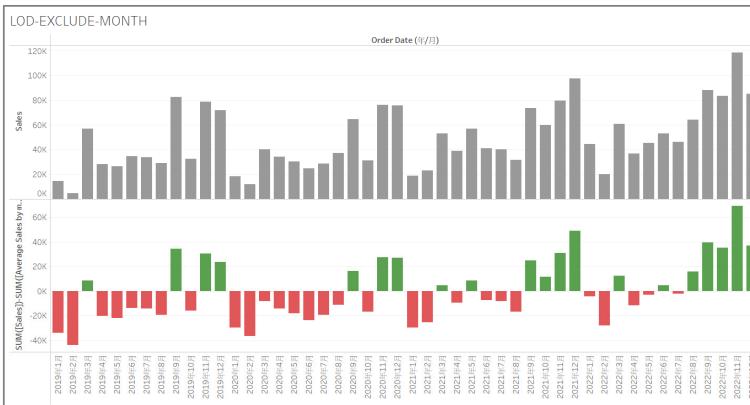


Tableau - 智慧製造應用

- <https://github.com/rwepa/Talks>
- <https://public.tableau.com/app/profile/ming.chang.lee/vizzes>



This table provides a detailed breakdown of market basket analysis, showing the count of items for each sub-category.

Sub-Categ..	Access..	Applianc..	Art	Binders	Bookcas..	Chairs	Copiers	Enviro..	Fasten..	Furnish..	Machin..	Paper	Phones	Storage	Supplies	Tables		
Accessories	718	60	89	161	29	64	6	32	27	115	47	22	153	118	103	25	44	
Appliances	60	459	63	135	13	49	9	21	23	82	21	9	110	78	56	24	32	
Art	89	63	756	159	159	34	87	7	29	30	105	47	12	152	124	100	29	41
Binders	161	135	159	1,339	56	126	19	54	62	200	82	30	276	199	201	43	74	
Bookcas..	29	13	34	56	228	21	2	11	7	30	21	6	48	42	37	10	9	
Chairs	64	49	87	126	21	591	10	29	28	107	36	19	133	91	85	19	36	
Copiers	6	9	7	19	2	10	70	4	5	12	6	2	20	11	14	6	4	
Enviro..	32	21	29	54	11	29	4	251	11	32	11	6	59	41	38	5	12	
Fasteners	27	23	30	62	7	28	5	11	226	48	15	8	59	39	39	13	14	
Furnish..	115	82	105	200	30	107	12	32	48	919	57	29	181	154	140	31	46	
Labels	47	21	47	82	21	36	6	11	15	57	348	8	80	58	61	18	17	
Machin..	22	9	12	30	6	19	2	6	8	29	8	114	28	22	21	1	6	
Paper	153	110	152	276	48	133	20	59	59	181	80	28	1,205	179	178	45	54	
Phones	116	78	124	199	42	91	11	41	39	154	58	22	179	826	117	22	54	
Storage	103	56	100	201	37	95	14	38	39	140	61	21	178	117	797	33	50	
Supplies	25	24	29	43	10	19	6	5	13	31	18	1	45	22	33	189	13	
Tables	44	32	41	74	9	36	4	12	14	46	17	6	54	54	50	13	314	

Tableau 教學

- Tableau資料分析與視覺化工具實作教師工作坊(初階)
 - https://github.com/rwepa/Talks/blob/main/tableau_tutorial_basic.pdf
- Tableau資料分析與視覺化工具實作教師工作坊(進階)
 - https://github.com/rwepa/Talks/blob/main/tableau_tutorial_advanced.pdf
- Tableau與R語言實務應用
 - https://github.com/rwepa/Talks/blob/main/tableau_r.pdf
- Tableau與MySQL資料庫實務應用
 - https://github.com/rwepa/Talks/blob/main/tableau_mysql.pdf



Python 程式設計-李明昌 免費電子書

- <http://rwepa.blogspot.com/2020/02/pythonprogramminglee.html>

主題: Python 程式設計-李明昌 - ipynb

檔名: Python_Programming_Lee_ipynb.zip

包括 Python 程式設計-李明昌電子書的原始 ipynb 檔案, 圖檔, 部分資料集

下載: https://github.com/rwepa/DataDemo/blob/master/Python_Programming_Lee_ipynb.zip



Python_Programming_Lee_ipynb.zip > python.book.lee >	
名稱	類型
.ipynb_checkpoints	檔案資料夾
data	檔案資料夾
img	檔案資料夾
Python程式設計-李明昌.ipynb	IPYNB 檔案

R 入門資料分析與視覺化應用(7小時28分鐘)

- <https://mastertalks.tw/products/r?ref=MCLEE>

課程提供教學範例的原始程式檔案與資料集 +中文字幕



- **主題**

1. R, RStudio簡介與套件使用
2. 認識資料物件
3. 資料處理與分析
4. 資料視覺化應用

- **特色**

1. 資料分析的**關鍵八步**
2. 提供必備**ggplot2**套件的應用知識與使用情境
3. 提供日期時間**zoo, xts**套件的整合應用操作
4. 提供**人力資源**資料與**銷售資料**，強化**實務資料**操作能力

R 商業預測應用(8小時53分鐘)

- <https://mastertalks.tw/products/r-2?ref=MCLEE>



- **主題**

1. R · RStudio工具操作
2. 非監督式學習商業預測
3. 監督式學習商業預測
4. 財金資料預測應用

- **特色**

1. 採用**最有效率**方式學習大數據R語言，並應用於**職場資料分析**與**商業預測應用**
2. 提供**多元線性迴歸**的必備知識
3. 提供**財金資料商業預測應用**的基礎與進階必學技能
4. 提供學員人力資源資料與**台指期tick資料**預測演練

課程提供教學範例的原始程式檔案與資料集 +中文字幕

如何學習 R?

- 熟悉教材內容
- 將教材內容的資料集改為工作資料集(企業, 學術)
- 遇到問題時, 想辦法**尋找答案**
- 掌握 APC方法
- 掌握 ①摘要 ②繪圖 ③建模
- 參考網路應用文章 (進階) & 學術論文

```
> 尋找答案 <- list(方法1 = c("同事", "同學", "朋友等"),
+                         方法2 = "Google",
+                         方法3 = "alan9956@gmail.com")
> print(尋找答案)
$方法1
[1] "同事"    "同學"    "朋友等"

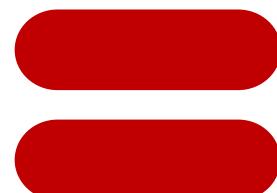
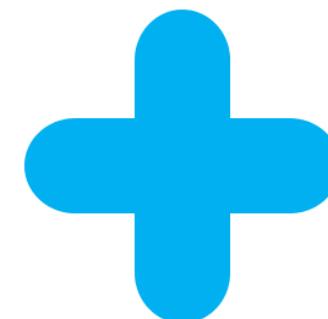
$方法2
[1] "Google"

$方法3
[1] "alan9956@gmail.com"
```

WHY!



學習目標



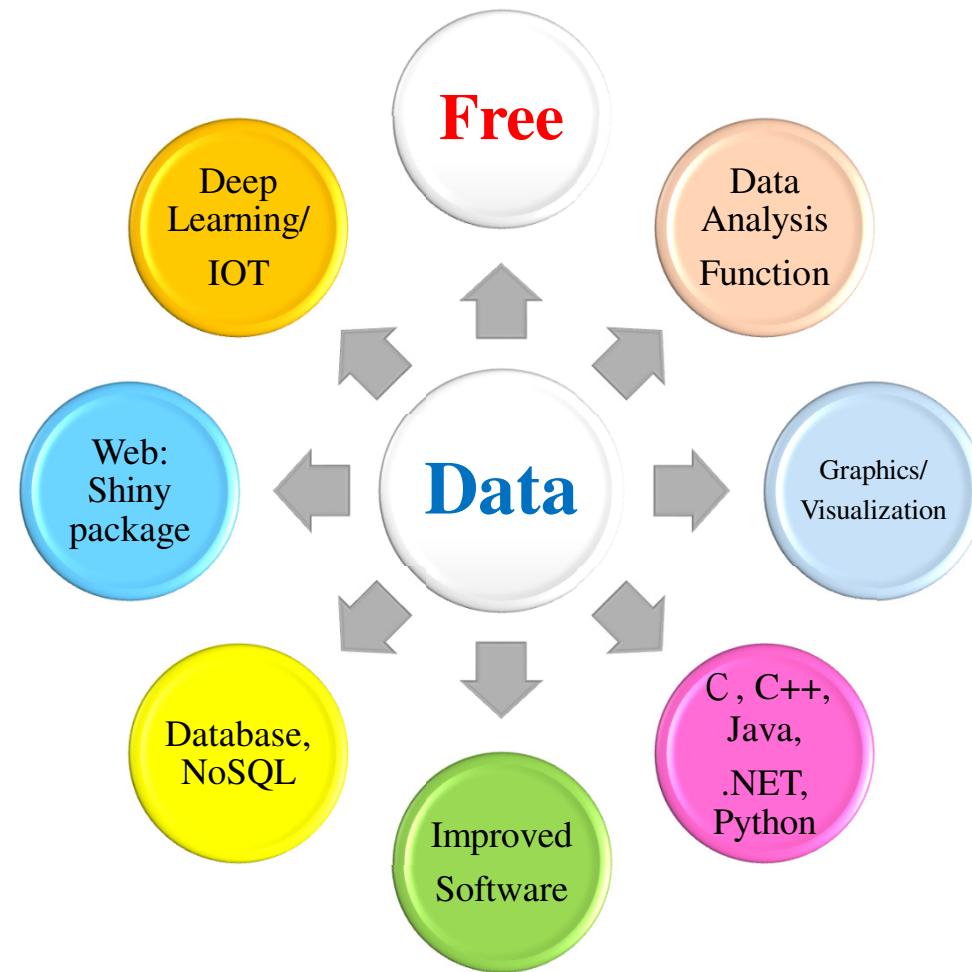
R簡介

認識 R

- 1976 - 貝爾實驗室 John Chambers, Rick Becker, and Allan Wilks 研發 S 語言。
- 1993 - Ross Ihaka and Robert Gentleman, University of Auckland, New Zealand 研發 R 語言。
 - R 是一種基於 S 語言所發展出具備統計分析、繪圖與資料視覺化的程式語言。
- 1997年 - R 的核心開發團隊 (R development core team) 成立，專責 R 原始碼的修改與編寫。
 - 2000年2月 - R 1.0.0
 - 2013年3月 - R 2.15.3
 - 2013年4月 - R 3.0.0
 - 2024年6月 - R 4.5.1

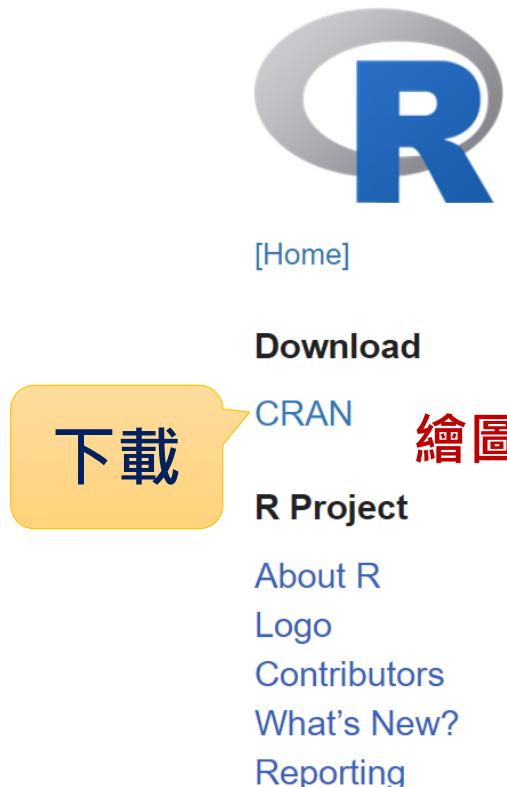


R-八大功能



R安裝

R官方網頁



The screenshot shows the official R Project website. At the top left is the R logo. Below it is a navigation menu with links: [Home], Download, CRAN, 繪圖 (Graphics), 下載 (Download), R Project, About R, Logo, Contributors, What's New?, and Reporting. A yellow speech bubble highlights the 'Download' link. To the right of the menu is a large section titled 'Getting Started' with the subtitle '統計運算' (Statistics). It contains text about R being a free software environment for statistical computing and graphics, mentioning its compatibility with various platforms like UNIX, Windows, and MacOS. It also provides instructions for downloading R via CRAN mirrors. Below this is another section with text about frequently asked questions.

The R Project for Statistical Computing

Getting Started

統計運算

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.

..

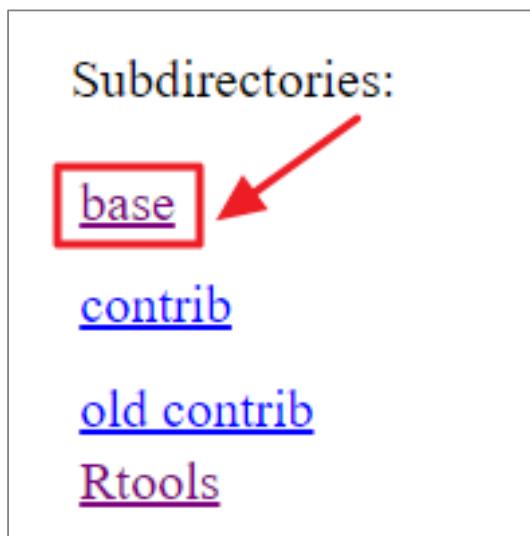
R-下載

- 官網: <http://www.r-project.org/>
- 選取左側 Download \ CRAN
- 選取 Taiwan CRAN: <https://cran.csie.ntu.edu.tw/>
- 選取 Download R for Windows



R-下載 (續)

- 選取 base → 下載 [R-4.5.0-win.exe]



[Download R-4.5.0 for Windows \(86 megabytes, 64 bit\)](#)
[README on the Windows binary distribution](#)
[New features in this version](#)

- R安裝路徑: 保留原路徑,不要修改
- 安裝參考說明, 2006
https://github.com/rwepa/DataDemo/blob/master/windows_intall_R.pdf

Rtools 下載與安裝

- Rtools for Windows: 保留預設安裝路徑 C:\rtoolsXX
- <https://cran.csie.ntu.edu.tw/bin/windows/Rtools/>

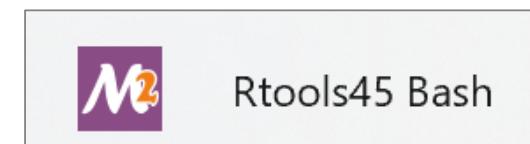
The screenshot shows the Rtools download page. On the left, under 'Subdirectories:', there are links for base, contrib, old contrib, and Rtools. The Rtools link is highlighted with a red box and a red arrow pointing to it. On the right, a box titled 'Choose your version of Rtools:' contains links for RTools 4.5, RTools 4.4, RTools 4.3, RTools 4.2, RTools 4.0, and old versions of RTools. The RTools 4.5 link is also highlighted with a red box. To the right of the version links is a list of supported R versions:

- for R versions from 4.5.0 (R-prerelease and R-devel)
- for R versions 4.4.x (R-release)
- for R versions 4.3.x (R-oldrelease)
- for R versions 4.2.x
- for R from version 4.0.0 to 4.1.3
- for R versions prior to 4.0.0

A large orange arrow points from the Rtools link on the left towards the RTools 4.5 link on the right.

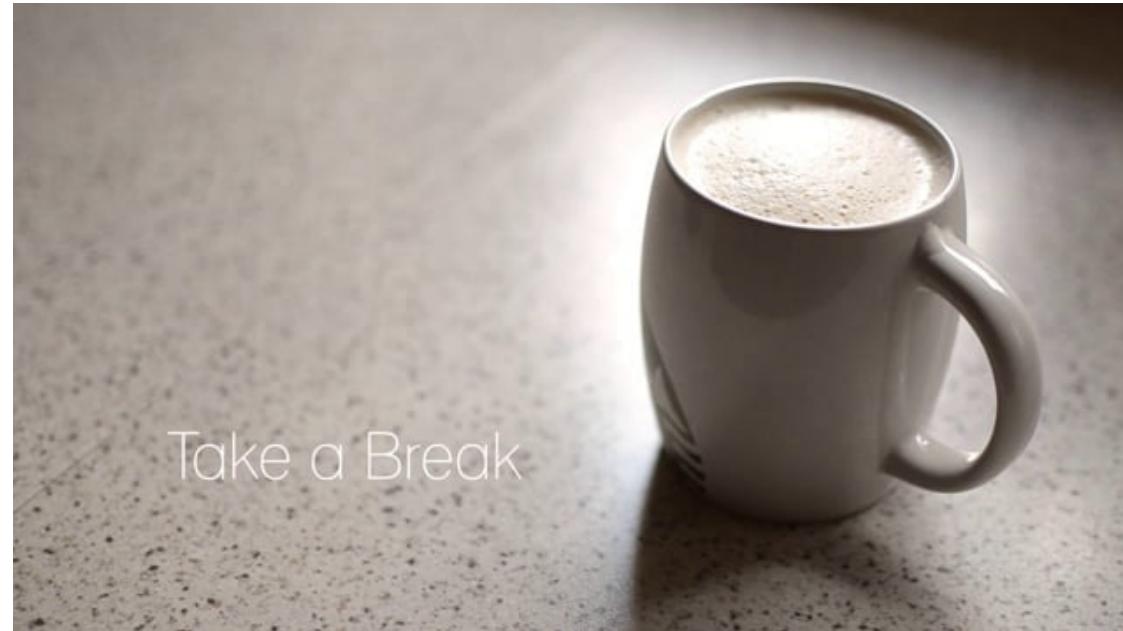
Rtools45 may be installed from the [Rtools45 installer](#) or [64-bit ARM Rtools45 installer](#). It is recommended to use the defaults, including the default installation location of C:\rtools45.

- 安裝完成：程式集 \ Rtools45 Bash



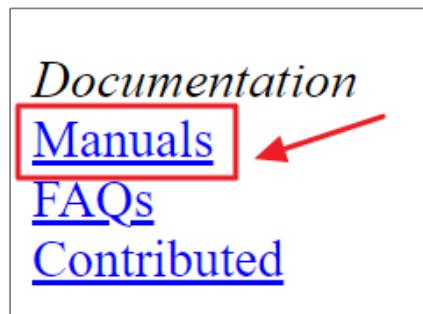
✓ 安裝 R

✓ 安裝 Rtools



R Manuals (使用手冊)

- <https://cran.csie.ntu.edu.tw/manuals.html>



The R Manuals

edited by the R Development Core Team.

The following manuals for R were created on Debian Linux and may differ from the manuals for Mac or Windows on platform-specific pages, but most parts of the manuals for each platform are part of the respective R installations. The manuals change with R, hence we provide versions for the most recent version for the patched release version (R-patched) and finally a version for the forthcoming R version that is still in development (R-devel).

Here they can be downloaded as PDF files, EPUB files, or directly browsed as HTML:

Manual	R-release	R-patched
An Introduction to R is based on the former "Notes on R", gives an introduction to the language and how to use R for doing statistical analysis and graphics.	HTML PDF EPUB	HTML PDF EPUB
R Data Import/Export describes the import and export facilities available either in R itself or via packages which are available from CRAN.	HTML PDF EPUB	HTML PDF EPUB
R Installation and Administration	HTML PDF EPUB	HTML PDF EPUB
Writing R Extensions covers how to create your own packages, write R help files, and the foreign language (C, C++, Fortran, ...) interfaces.	HTML PDF EPUB	HTML PDF EPUB
A draft of The R language definition documents the language <i>per se</i> , that is, the objects that it works on, and the details of the expression evaluation process, which are useful to know when programming R functions.		
R Internals : a guide to the internal structures of R and coding standards used by the core team working on R itself.		
The R Reference Index : contains all help files of the R standard and recommended packages in printable form. (9MB, approx. 3500 pages)		

contributed documentation
(貢獻文件, 免費啦)

Translations of manuals into other languages than English are available from the [contributed documentation](#) section (only a few translations are available).

R Manuals (續)

Contributed Documentation

[English](#) --- [Other Languages](#)

Manuals, tutorials, etc. provided by users of R. The R core team does not take any responsibility for contents, but we appreciate the effort very much and encourage everybody to contribute to this list! To submit, follow the submission instructions on the [CRAN main page](#). All material below is available directly from CRAN, you may also want to look at the list of [other R documentation](#) available on the Internet.

Note: Please use the [directory listing](#) to sort by name, size or date (e.g., to see which documents have been updated lately).

English Documents

Documents with more than 100 pages:

- “**Visual Statistics. Use R!**” by Alexey Shipunov ([PDF](#), 2016-06-06, 301 pages). All books are accessible from [Alexey Shipunov's English R page](#).
- “**Using R for Data Analysis and Graphics - Introduction, Examples and Commentary**” by John Maindonald ([PDF](#), data sets and scripts are available at [JM's homepage](#)).
- “**Practical Regression and Anova using R**” by Julian Faraway ([PDF](#), data sets and scripts are available at the [book homepage](#)).

好書!

LINK: <https://cran.csie.ntu.edu.tw/doc/contrib/usingR.pdf>

R參考文獻

> `citation()`

To cite R in publications use:

正確引用

R Core Team (2025). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <<https://www.R-project.org/>>.

參考文獻:
`citation()`

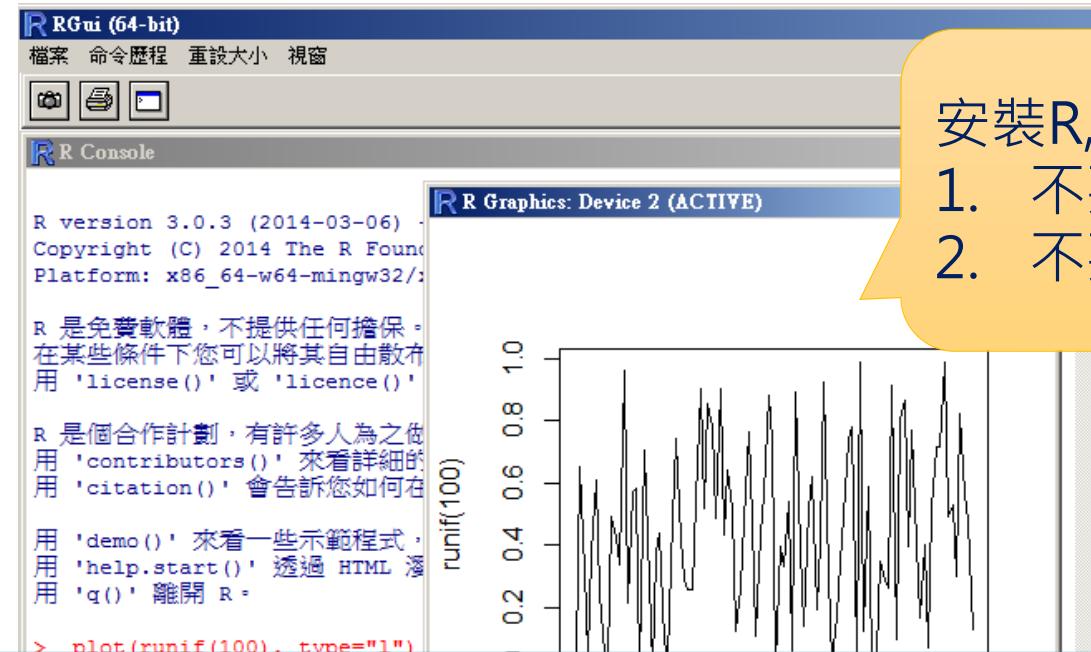
R, ~~<https://www.R-project.org/>~~, 2004

錯誤引用

實作
練習

TRY:
`runif(100000)`

R執行畫面



- 安裝R, 登入名稱:
1. 不要使用空格
 2. 不要使用中文字型

```
plot(runif(100), type="l", main= "R大數據分析")
```

```
demo(graphics)
```

```
demo(persp)
```

大小寫
須一致

R 功能表

檔案



編輯



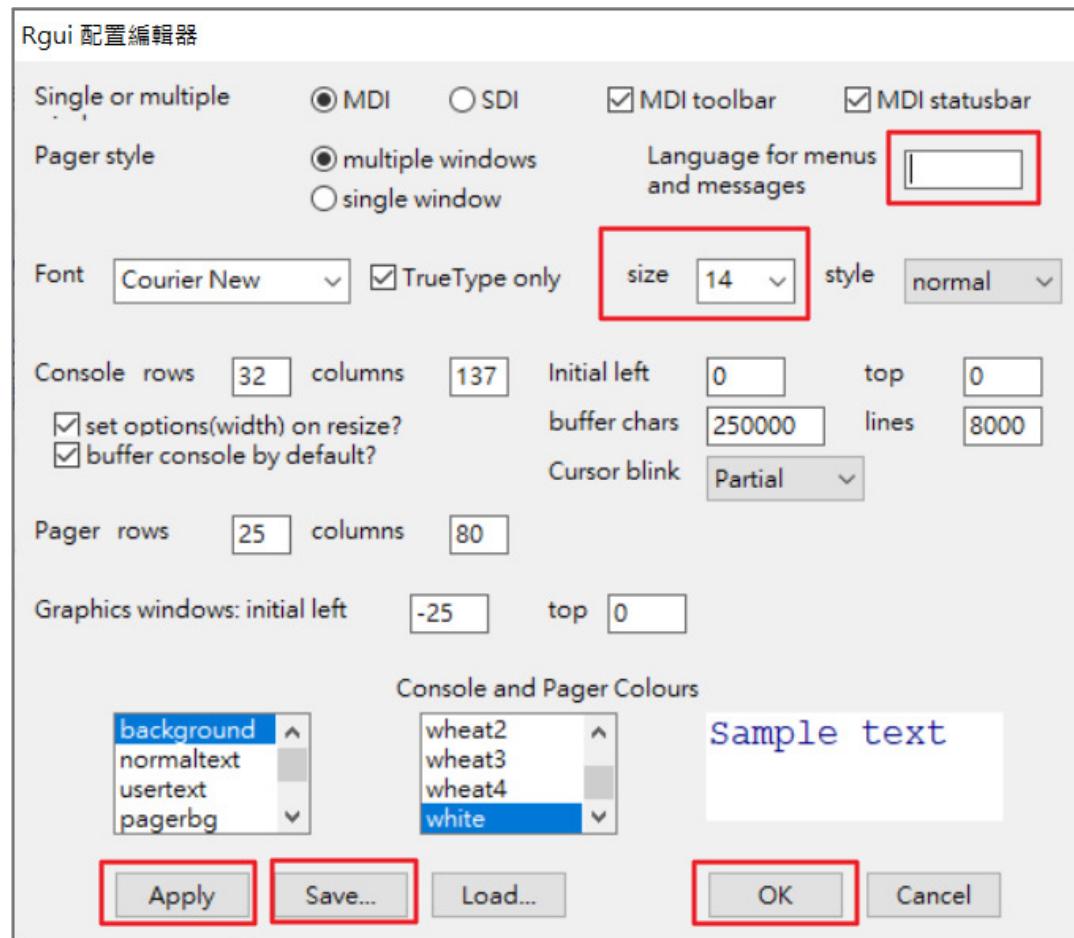
現行目錄 getwd()

儲存控制台-文字檔

輔助



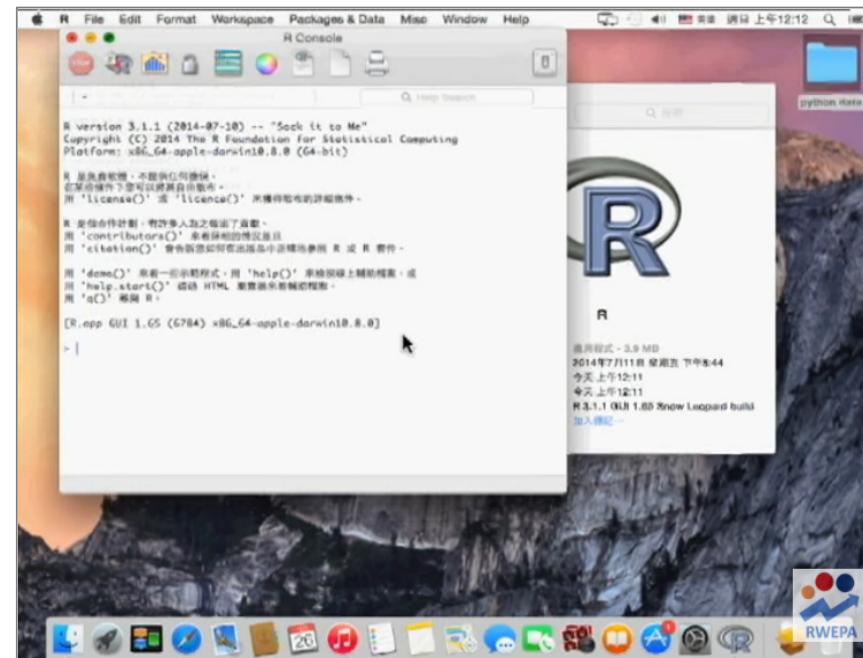
編輯 \ GUI 偏好設定



- Language: en 英文
- size: 字型大小

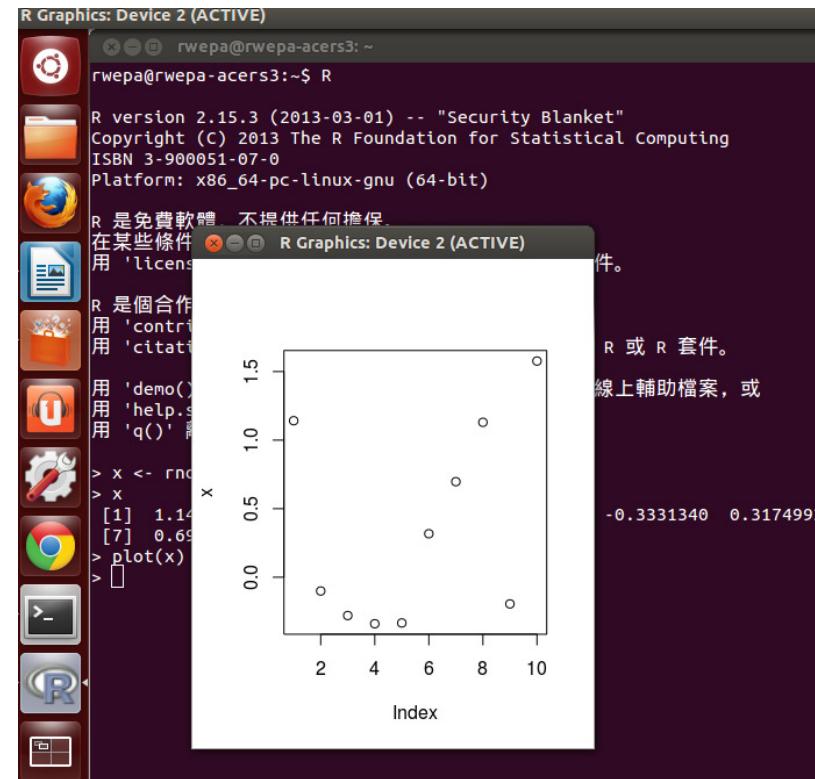
R for macOS

- macOS 安裝 R 軟體: <https://youtu.be/72MYRBNo5Bk>
- macOS 中文字型 plot: <https://rwepa.blogspot.com/2013/11/mac-plot.html>
- Xcode, Fortran compiler: <https://cran.r-project.org/bin/macosx/tools/>



R for Ubuntu

- <http://rwepa.blogspot.com/2013/05/ubuntu-r.html>



實作
練習

新增R檔案練習

The screenshot shows the RGui interface. On the left, the R Editor window contains R code for generating a scatter plot matrix. In the center, the R Console window shows the execution of the code, resulting in a scatter plot matrix titled "RWEPA-iris資料集散佈圖矩陣". The matrix displays relationships between Sepal.Length, Sepal.Width, Petal.Length, and Petal.Width across three species. A yellow callout box highlights the following steps:

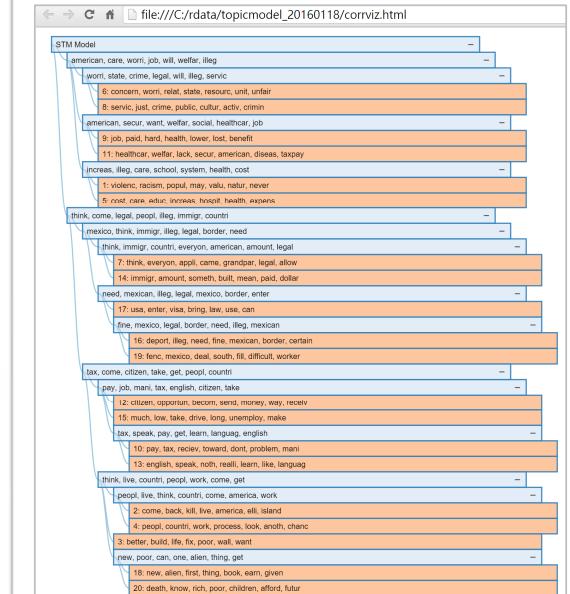
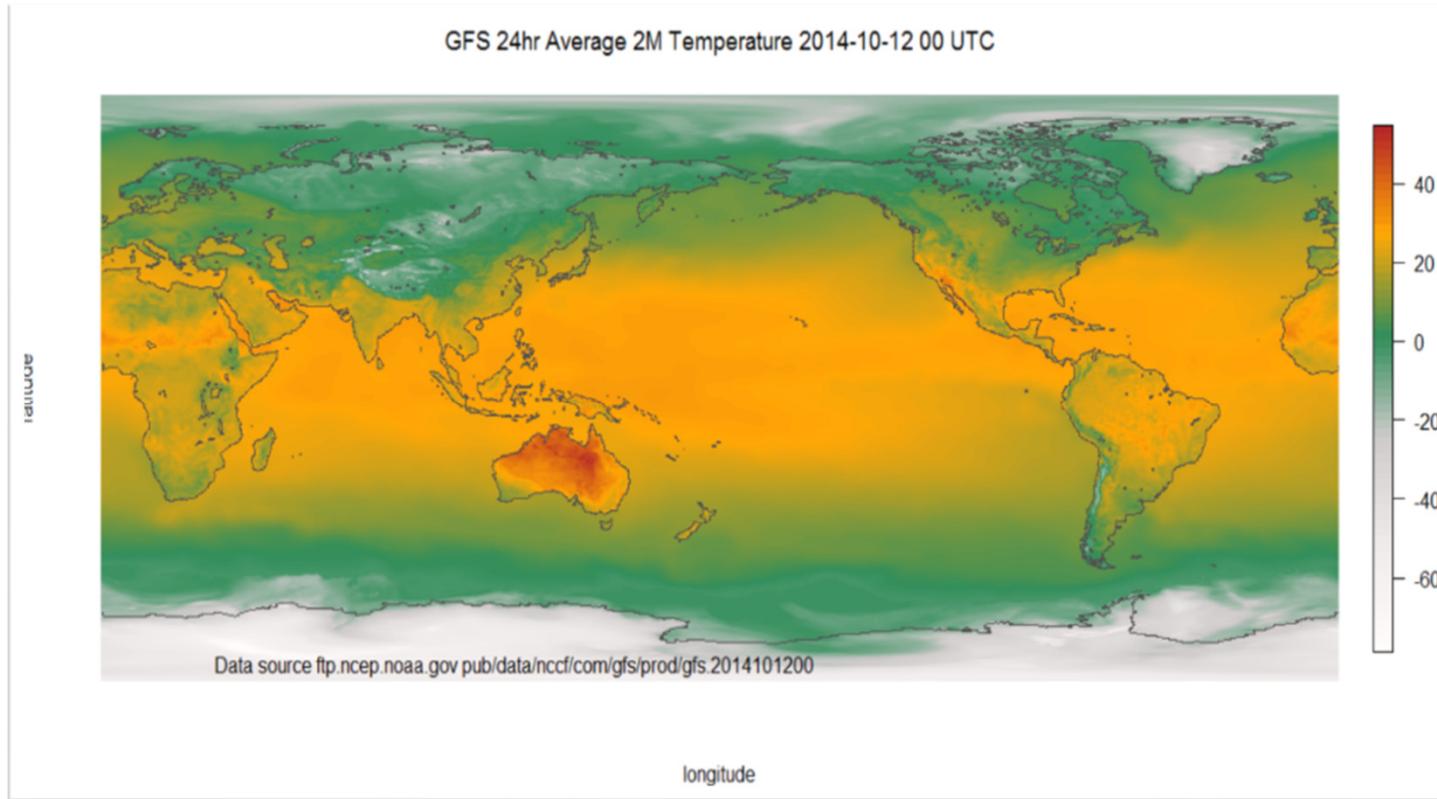
- 步驟1: 選取程式碼
- 步驟2: 按 Run line or selection 或 Ctrl + R
- 步驟3: 按 File \ Save \ MyFirstProject.R

```
plot(runif(10), type="b", main= "R大數據分析")
x <- rnorm(10)
x
pairs(iris[-5],
      pch=16,
      col=iris$Species,
      main="RWEPA-iris資料集散佈圖矩陣")
# end
```

```
[1] > pa
+ pc
+ co
+ main="RWEPA-iris資料集散佈圖矩陣"
> |
```

RStudio 簡介與安裝

整合式開發環境 - RStudio



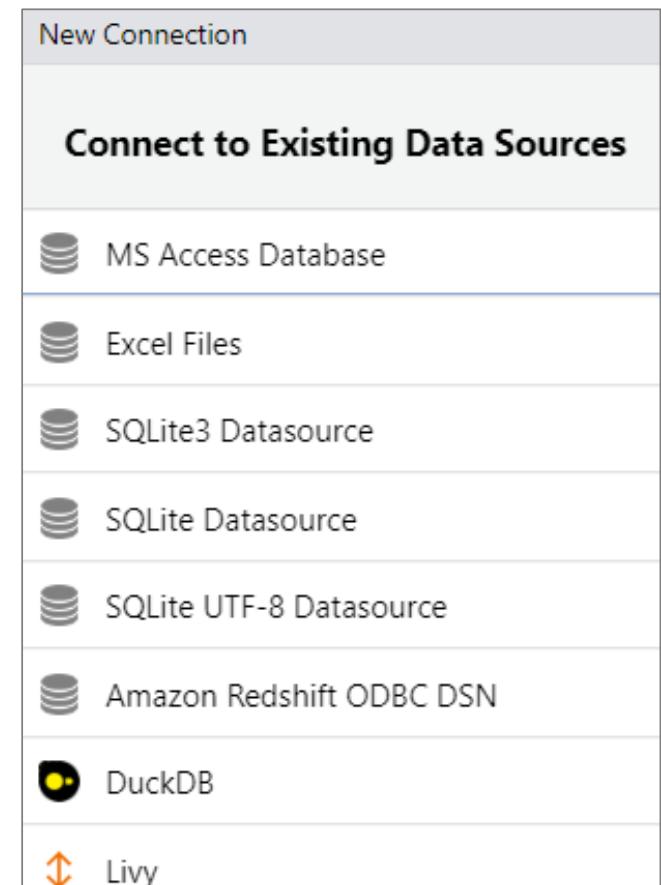
主題模型

視覺化應用

(全球2M氣溫圖)

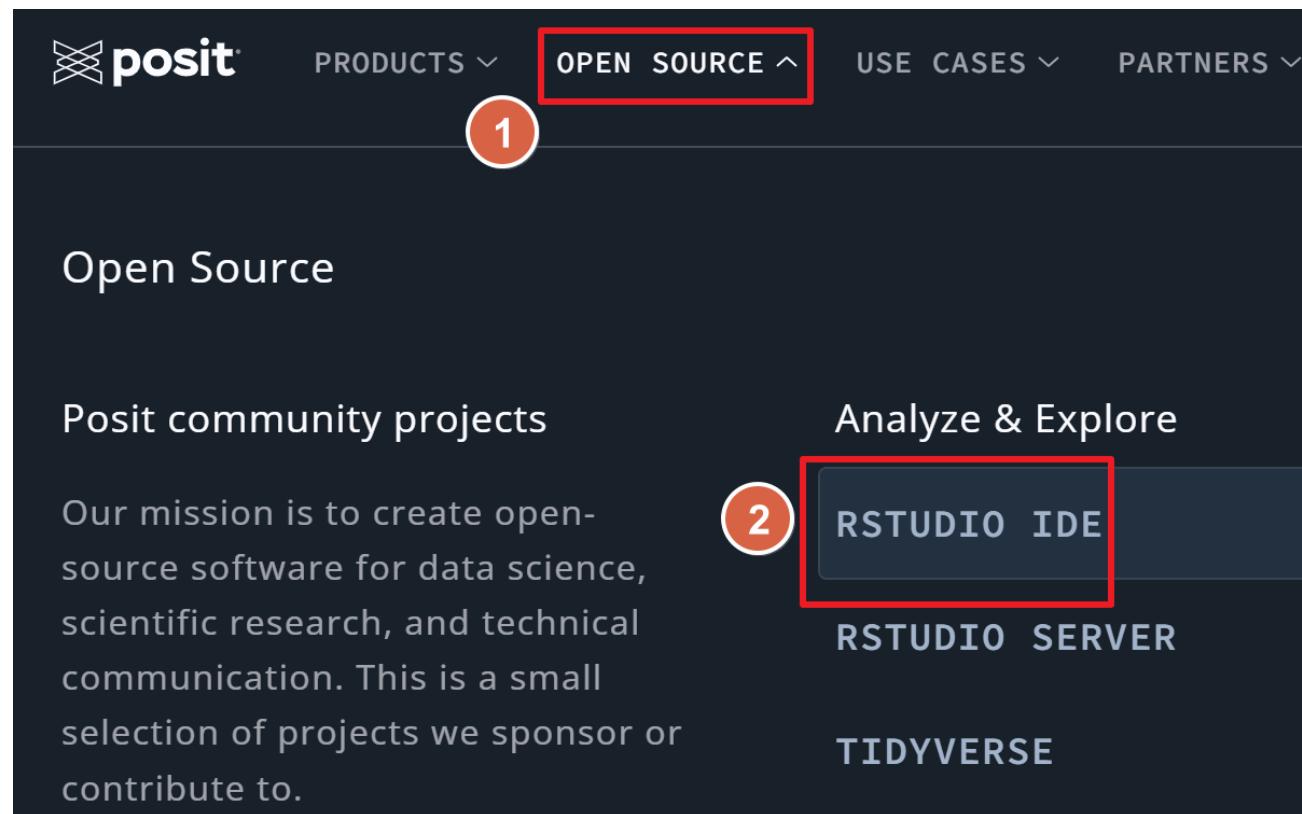
RStudio - 特性

- 支援智慧輸入 (按Tab)
- 高亮度顯示程式碼
- 整合R程式, 控制台, 變數清單, 繪圖視窗
- 整合連接資料庫: SQL, Spark
- 整合R套件: shiny, rmarkdown, Quarto
- 支援 RStudio外掛程式 (Addins)
- 安裝注意:
 - 先安裝R, 再安裝 RStudio
 - 安裝 RStudio時, 請先關閉R



RStudio 下載

- <https://posit.co/>



RStudio 下載 (續)

Open Source Edition
The Premier IDE for R

Pricing
Free

[DOWNLOAD RSTUDIO DESKTOP](#)

單機版

[DOWNLOAD RSTUDIO](#)

[DOWNLOAD RSTUDIO SERVER](#)

伺服器版本



RStudio-2025.05.1-513.exe 下載

- <https://posit.co/download/rstudio-desktop/>

2: Install RStudio

[DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS](#)

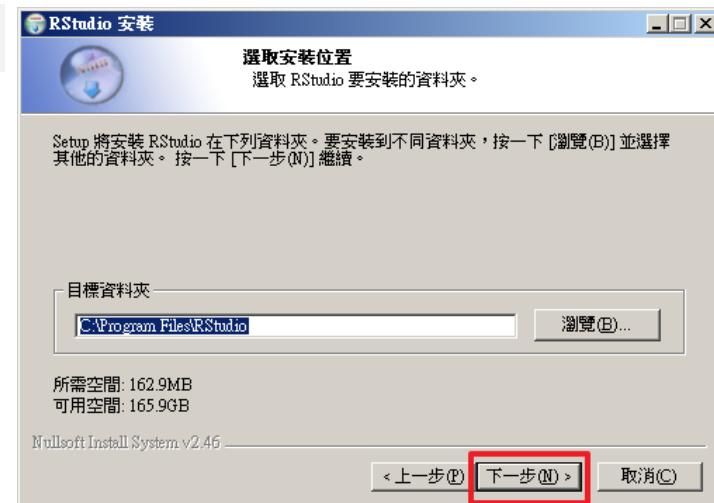
Size: 281.24 MB | [SHA-256: 3A553330](#) | Version: 2025.05.1+513
| Released: 2025-06-05

RStudio 安裝

1



2



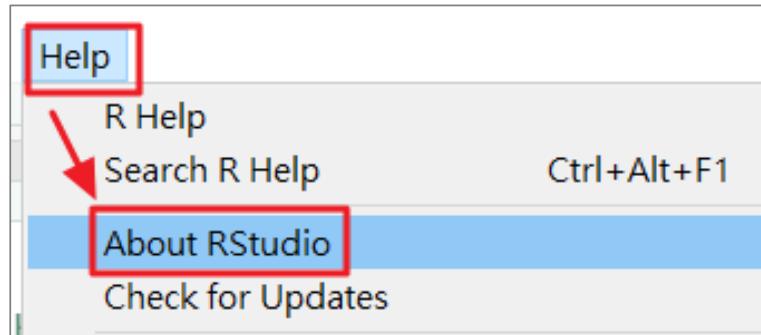
3



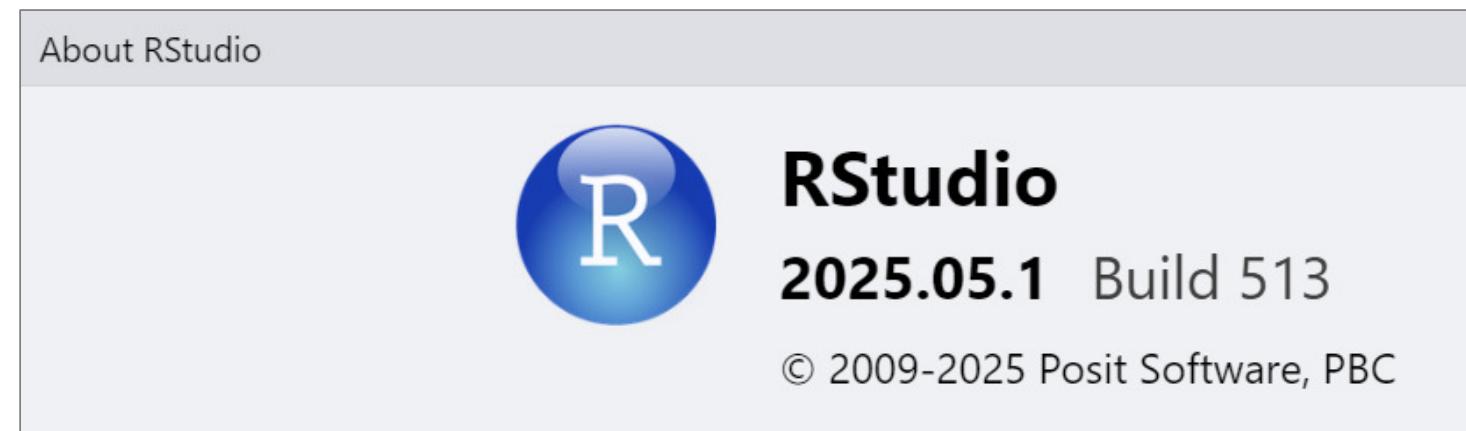
4



RStudio 版本訊息

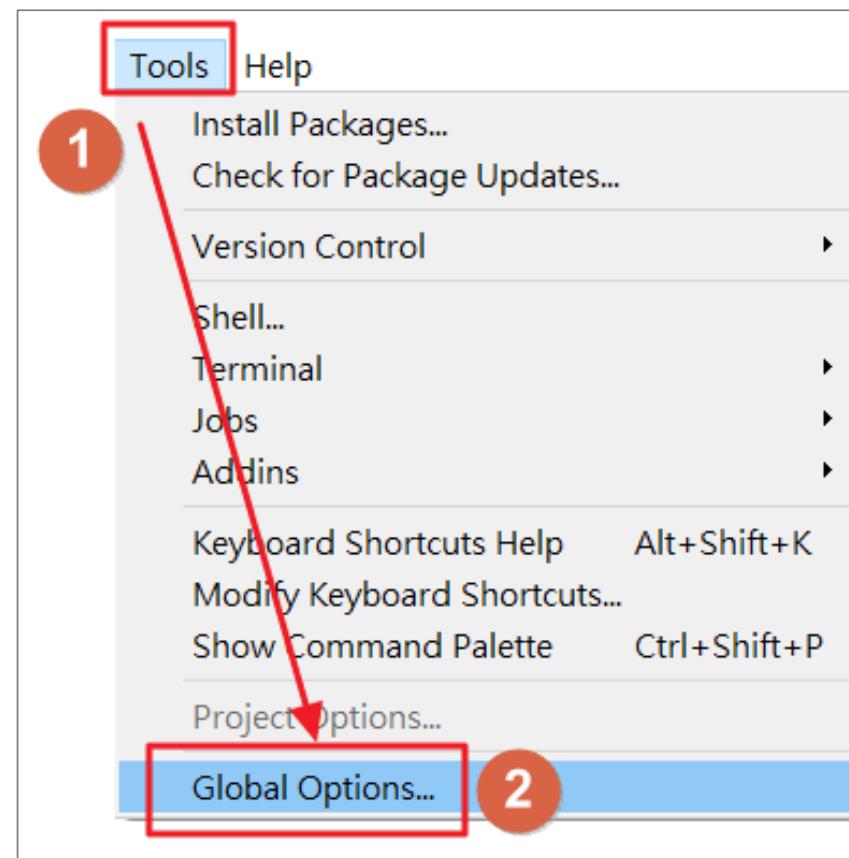


Help \ About RStudio

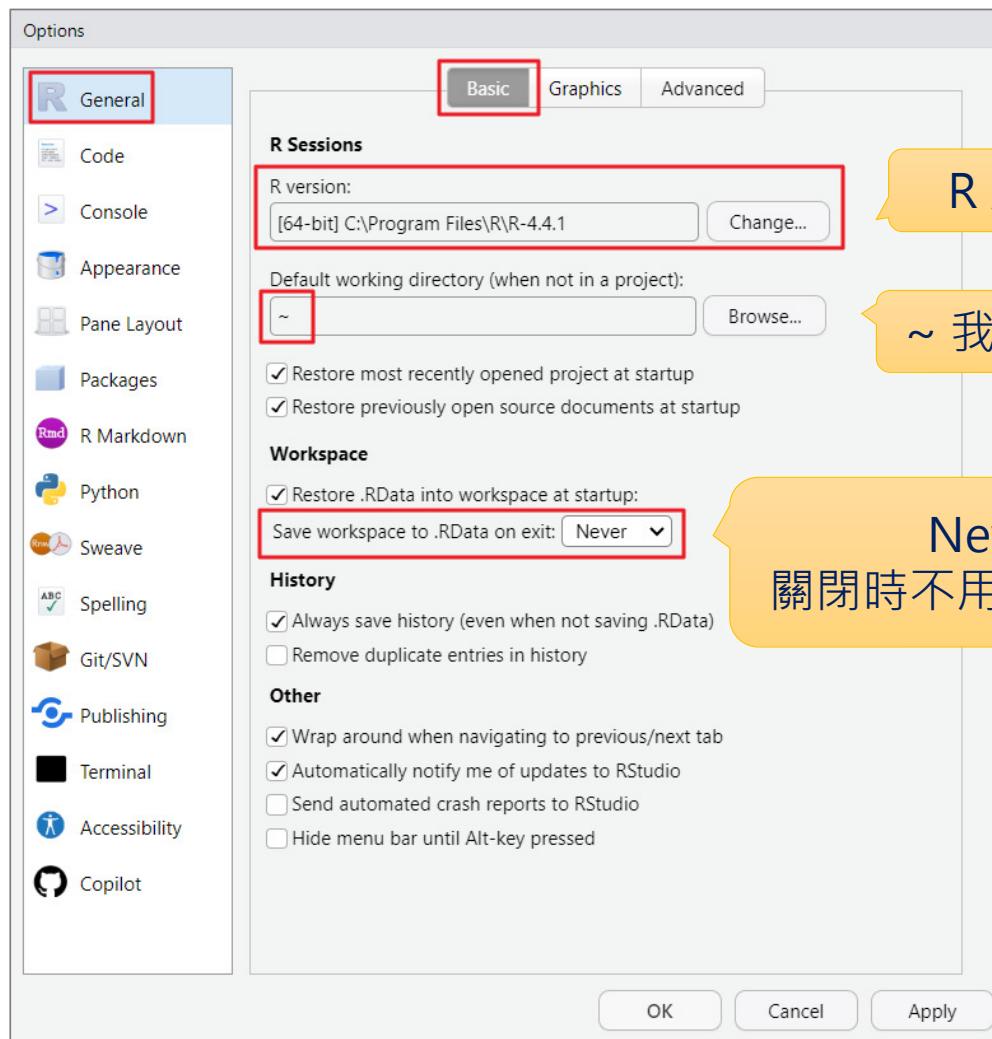


RStudio-選項設定

- Tools \ Global Options



General \ Basic



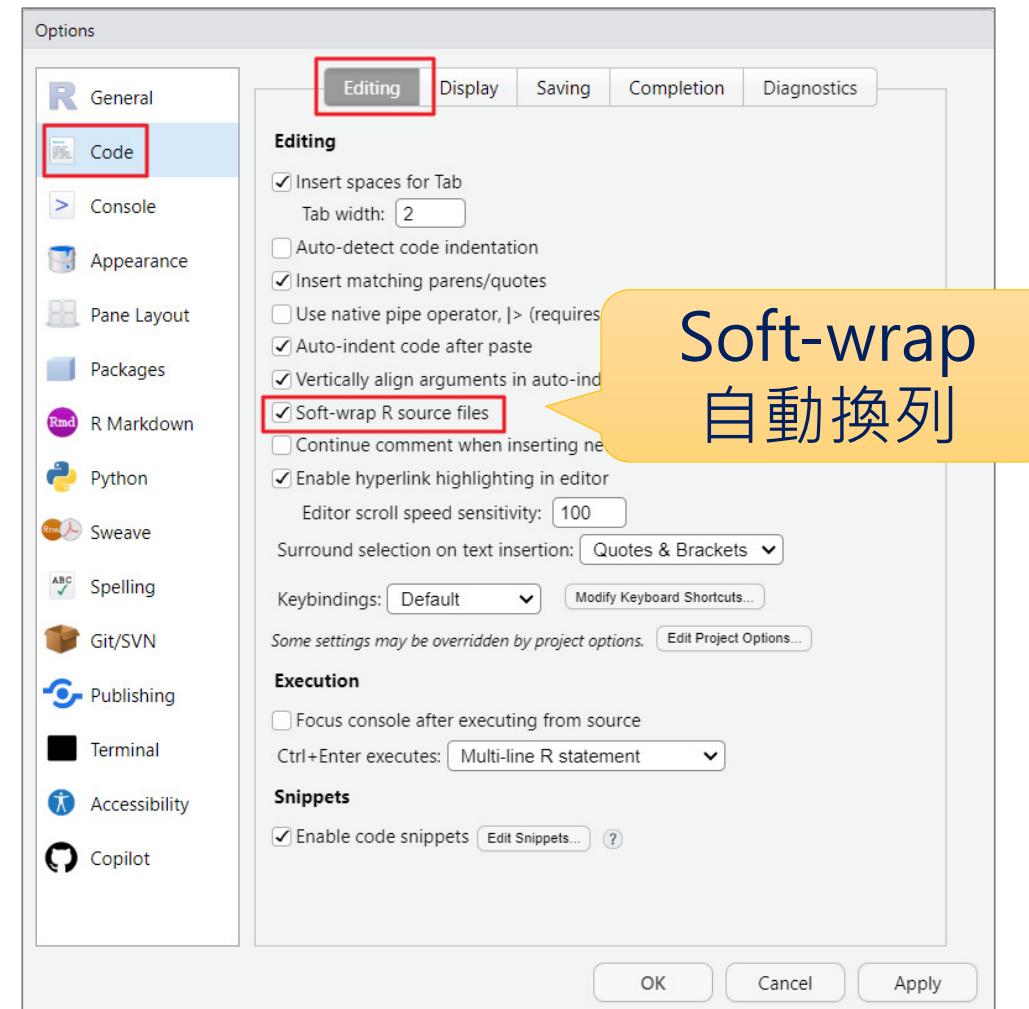
R 版本

~ 我的文件

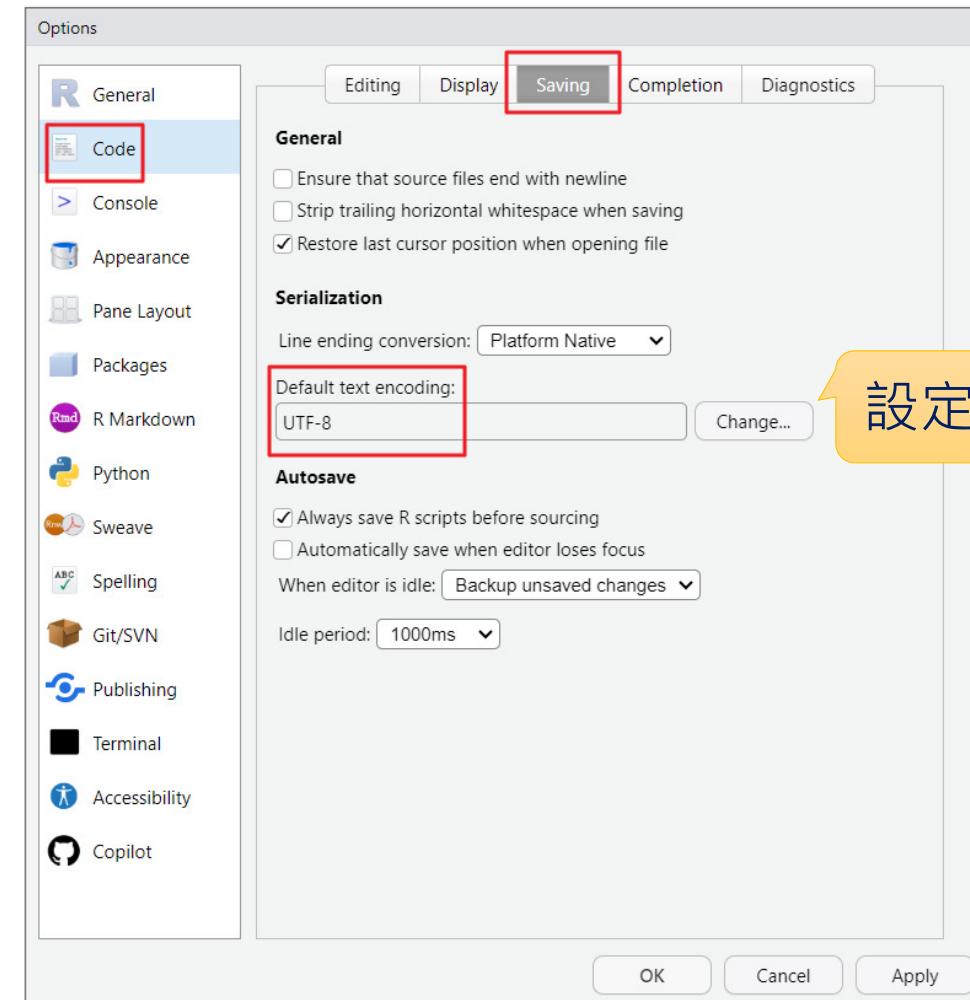
Never:
關閉時不用儲存RData

```
> setwd("~/")
> getwd()
[1] "c:/Users/User/Documents"
>
```

Code \ Editing



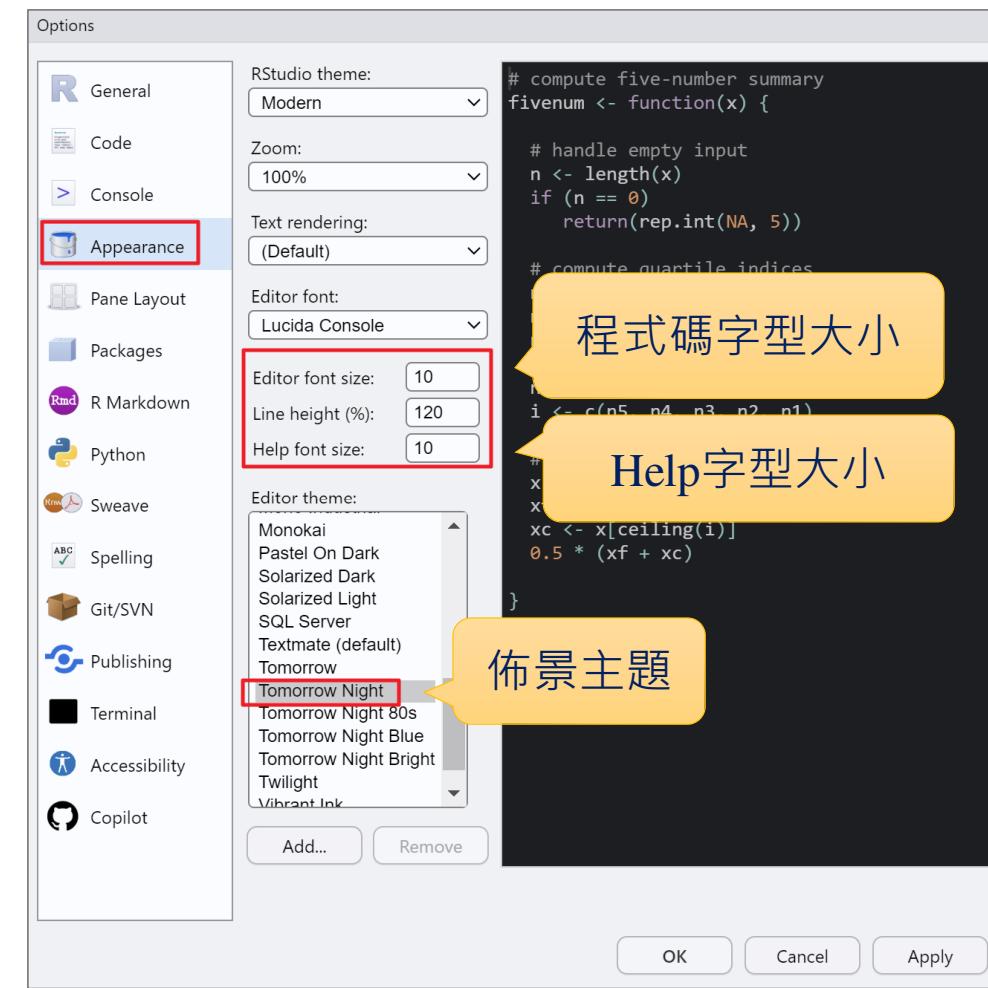
Code \ Saving



RStudio-選項設定(續)

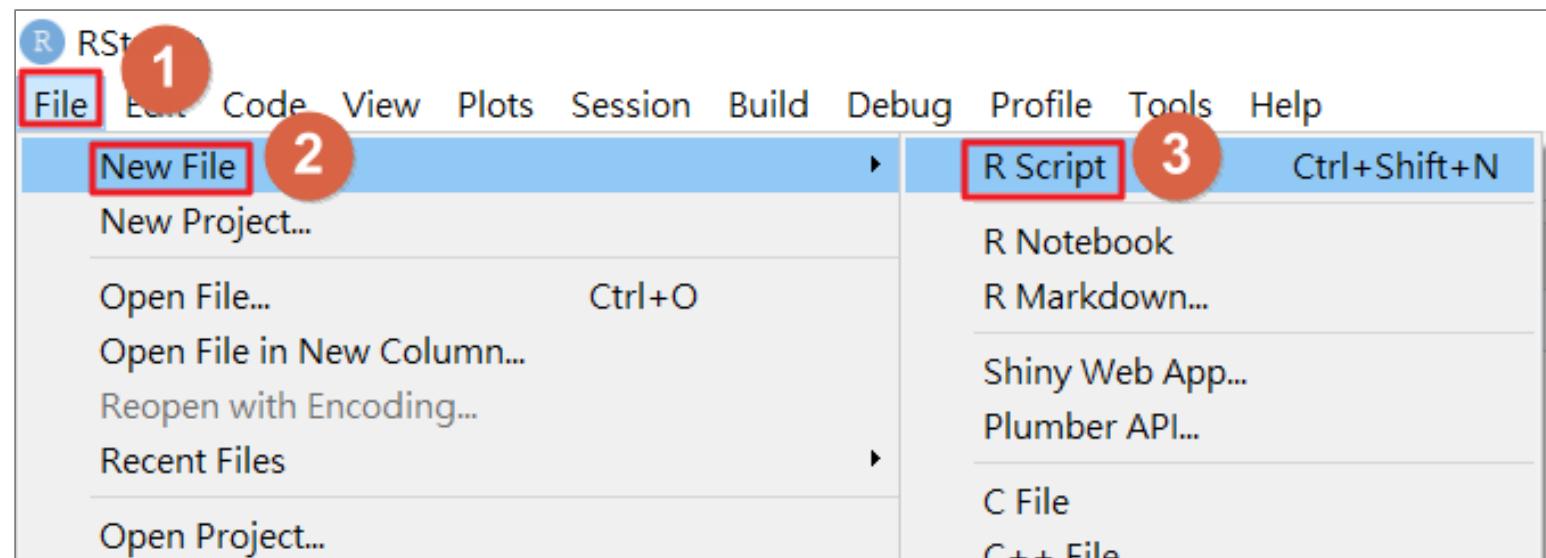
- Appearance \ Editor font size
- Appearance \ Help font size
- Editor theme \ Textmate (default)

設定完成，
可能須重新啟動RStudio



新增檔案

- File \ New File \ R Script
(CTRL + SHIFT + N)



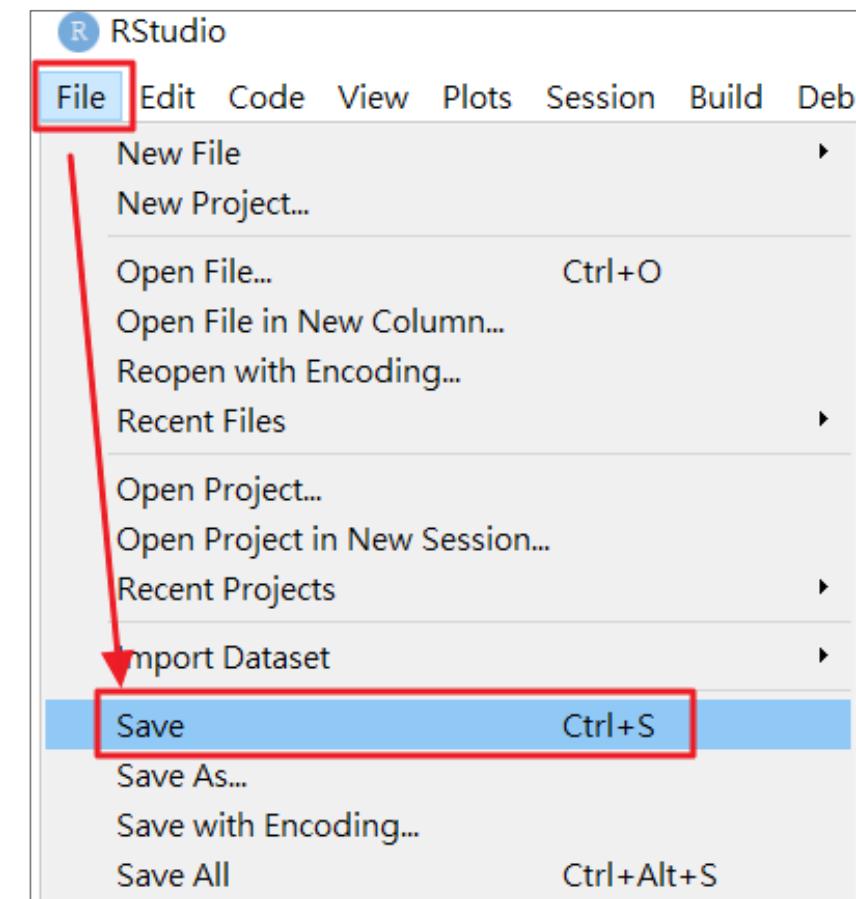
儲存檔案

輸入「新增R檔案練習」

實作
練習

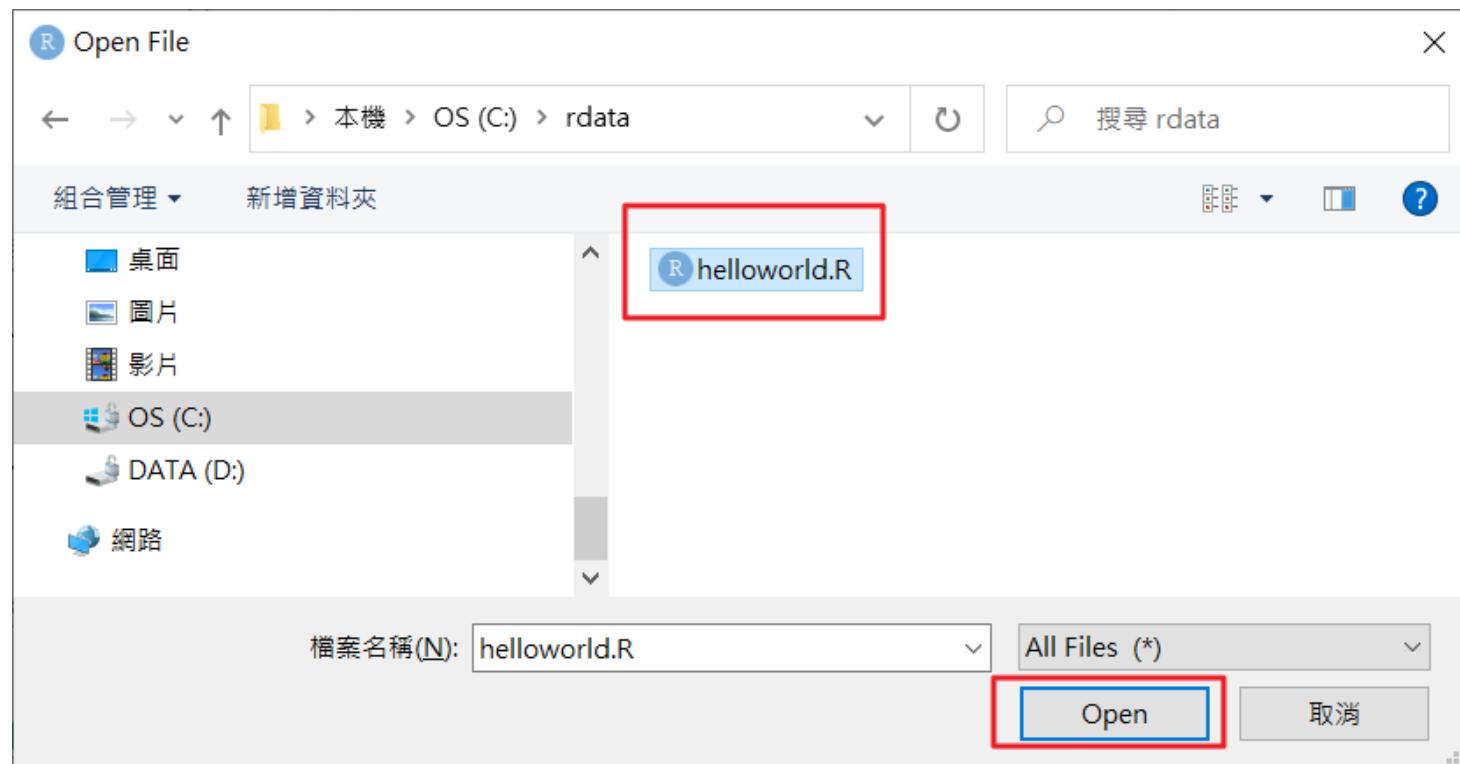
```
1 plot(runif(10), type="b", main= "R大數據分析")
2 x <- rnorm(10)
3 x
4 pairs(iris[-5],
5         pch=16,
6         col=iris$Species,
7         main="RWEPA-iris資料集散佈圖矩陣")
```

- File \ Save (CTRL + S) →
C:\rdata\helloworld.R

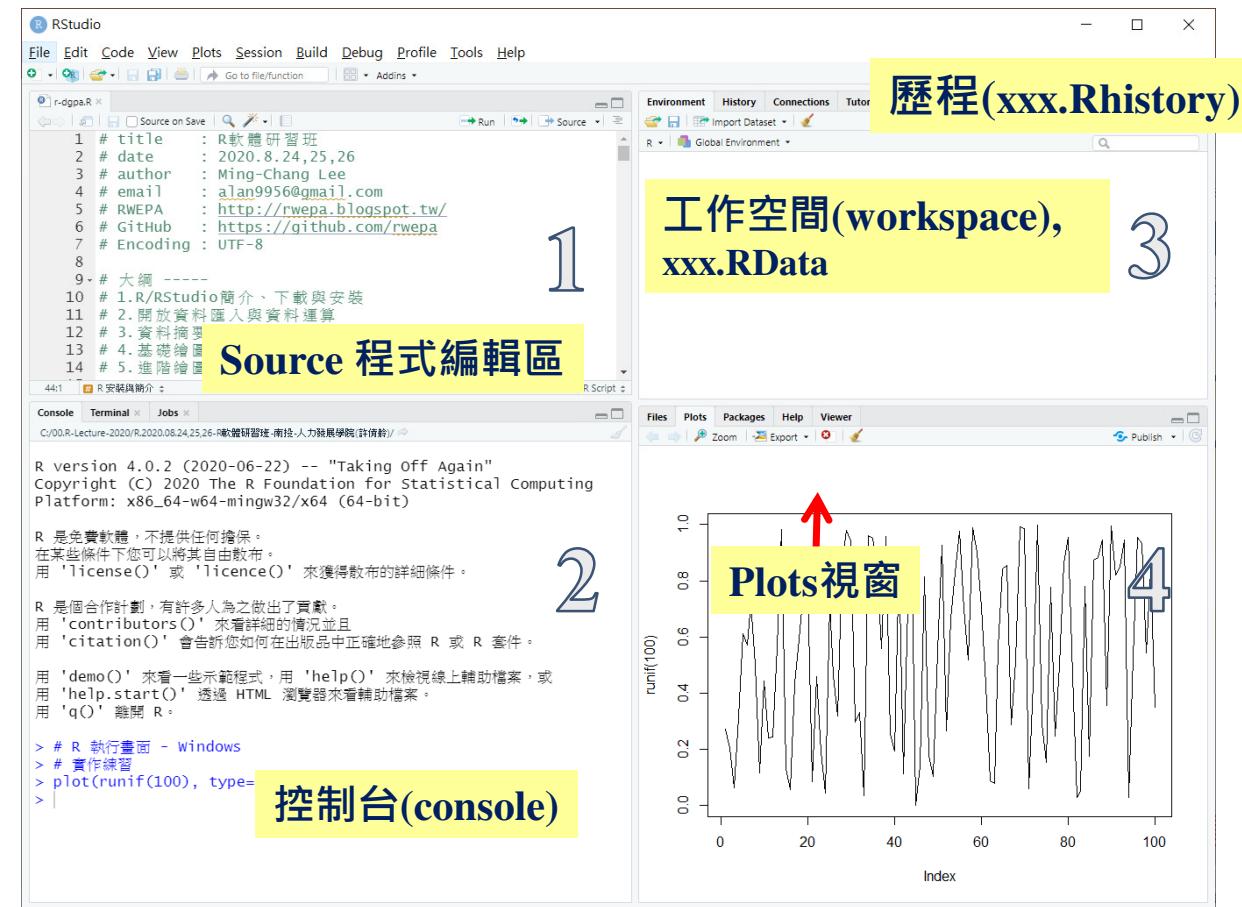


開啟檔案

- File \ Open File \ **helloworld.R**



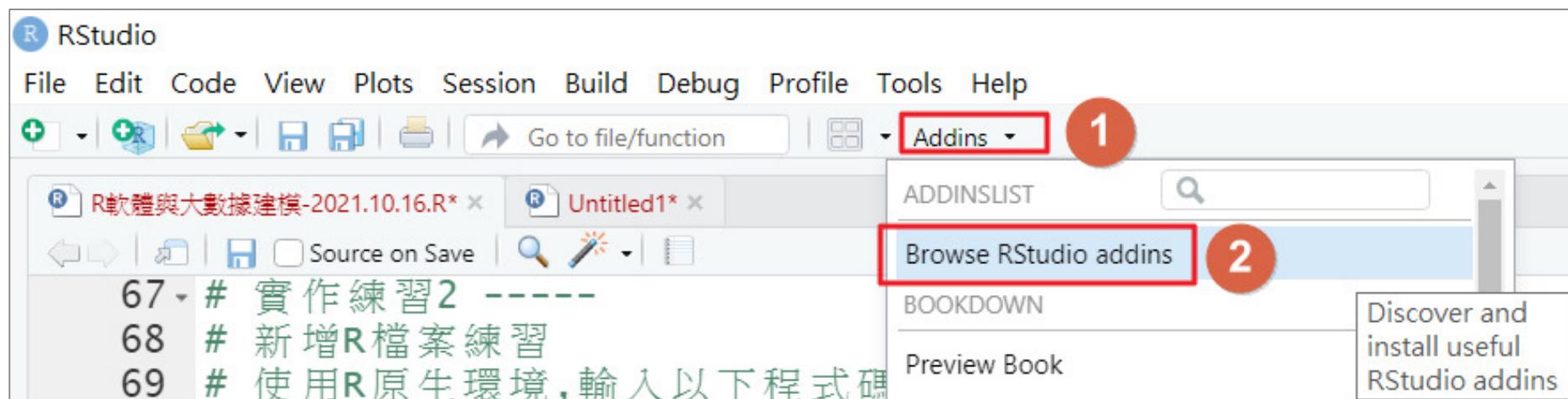
R/RStudio環境的基礎觀念



Ctrl + Shift + F10: 重新啟動R

RStudio Addins (外掛功能)

- `install.packages("addinslist")`
- RStudio \ Addins \ Browse RStudio addins



參考: <https://docs.posit.co/ide/user/ide/guide/productivity/add-ins.html>

RStudio 快速鍵

快速鍵	功能
Ctrl + Shift + N	建立新的R程式
Ctrl + S	儲存檔案
Ctrl + Shift + R	建立章節 (-----)
Alt + -	指派符號
Ctrl + Shift + C	註解
Ctrl + Enter	執行程式
Ctrl + Shift + F10	重新啟動R
Alt + Shift + K	快速鍵總表 (Esc 退出)

- 章節功能可以快速切換程式碼

R + Editor

- R – 原生環境
- RStudio – IDE 整合介面

- Eclipse
 - StatET 4.10.0



An Eclipse based IDE (integrated development environment) plug-in for R.

- <https://projects.eclipse.org/projects/science.statet>

- Visual Studio Code + R

- <https://code.visualstudio.com/docs/languages/r>



- Anaconda + Jupyter Notebook



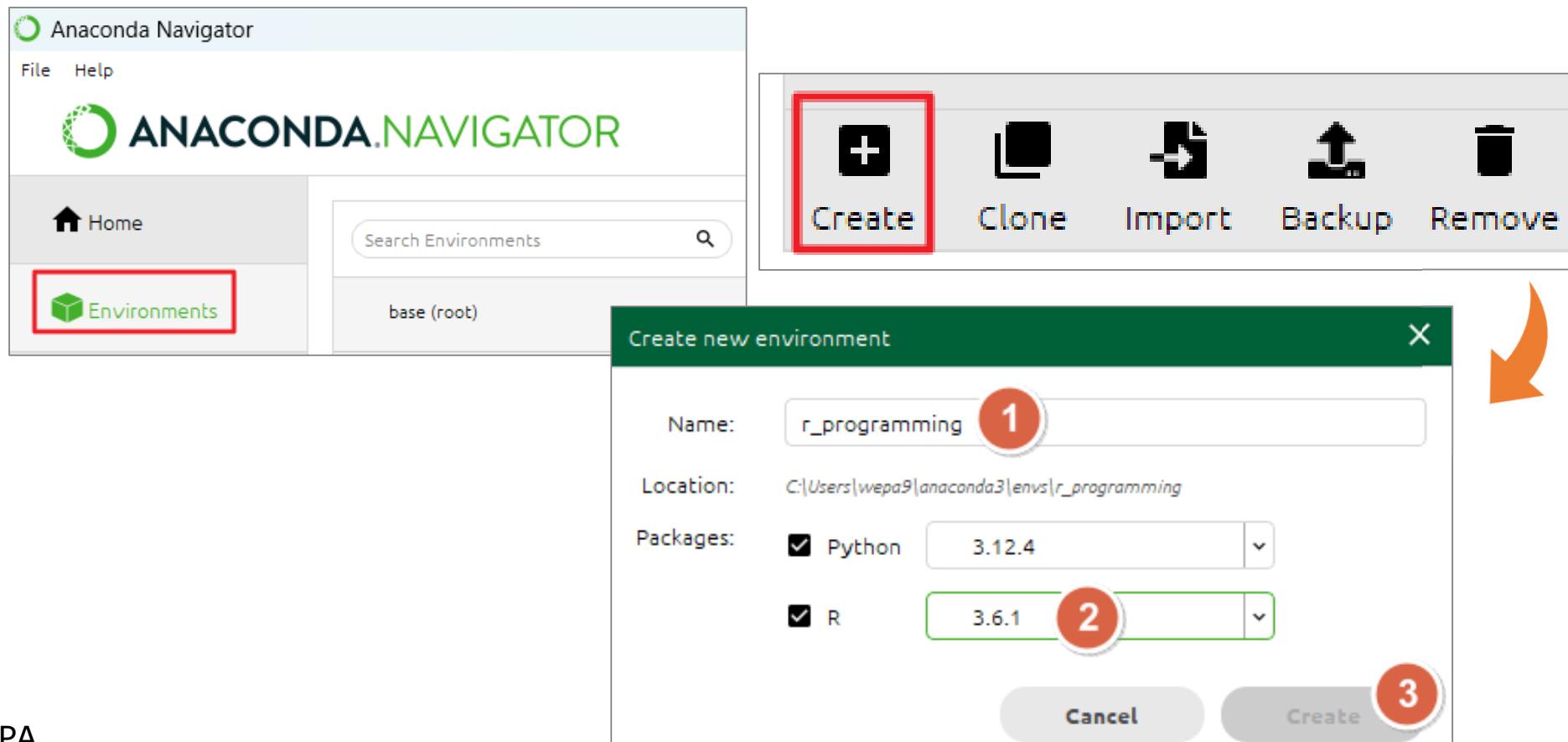
Jupyter Notebook + R

(方法1 使用Anaconda Navigator)

- 僅支援 R-3.6.1
- 先安裝 Anaconda: <https://www.anaconda.com/download>
- <https://docs.anaconda.com/navigator/tutorials/r-lang/>

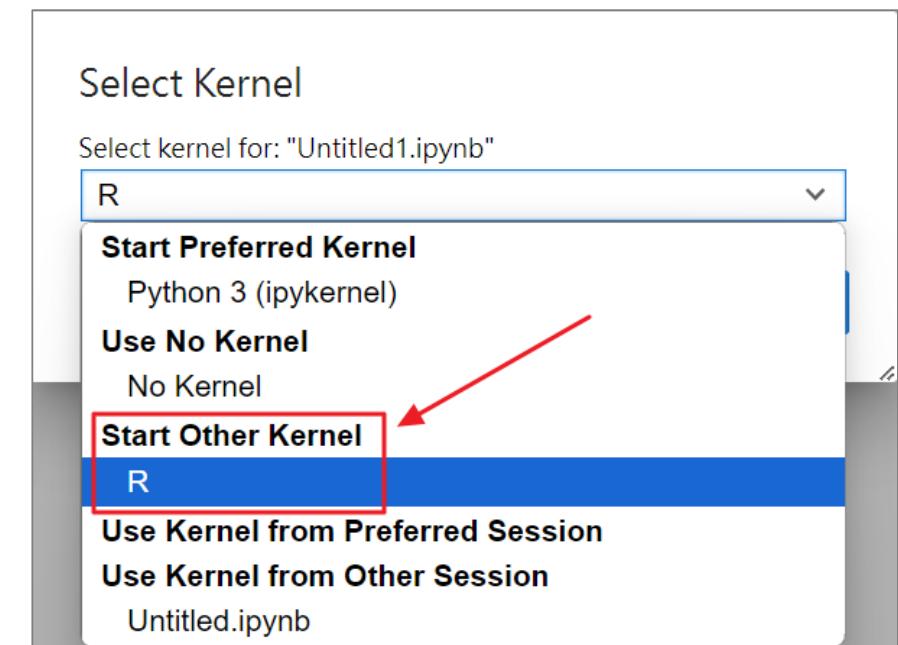
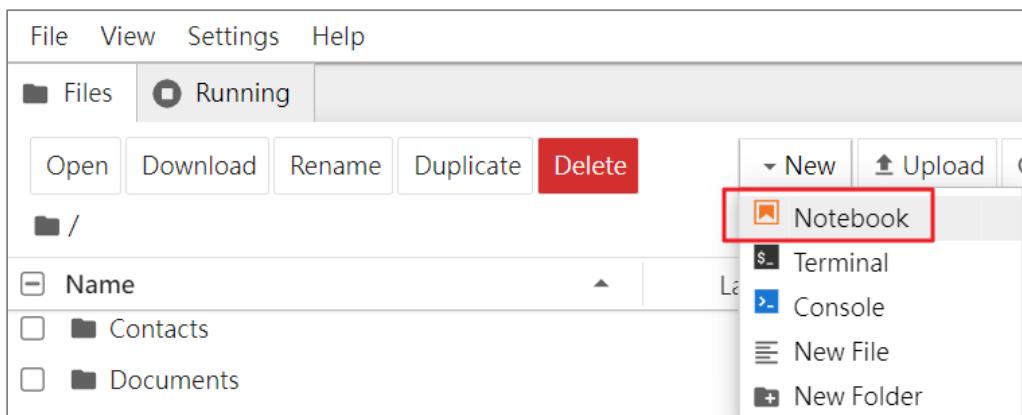
Anaconda Navigator

- Environments \ Create \ 輸入完成後 按 [Create]

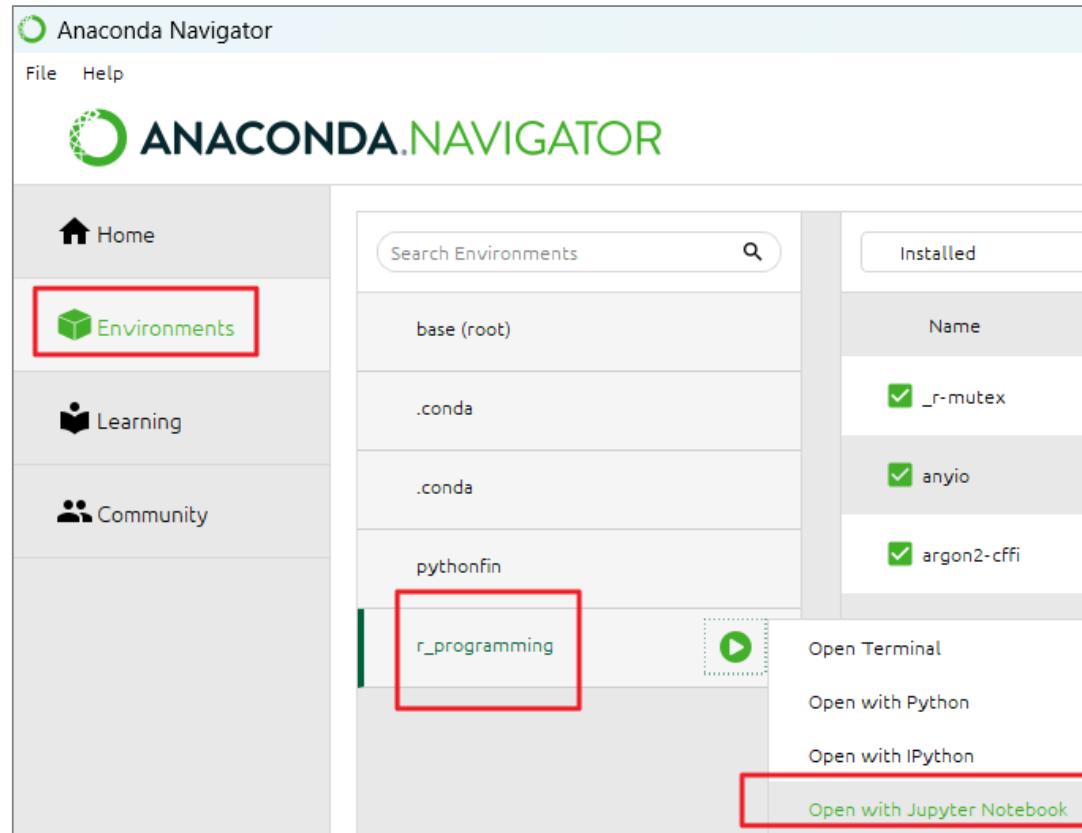


Jupyter Notebook

- New \ Notebook
- Select Kernel \ R



Open with Jupyter Notebook



An orange arrow points from the "Open with Jupyter Notebook" button in the previous screenshot to this Jupyter Notebook interface. The notebook cell [1] displays the following R session information:

```
[1]: sessionInfo()
R version 3.6.1 (2019-07-05)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows 10 x64 (build 22631)

Matrix products: default

locale:
[1] LC_COLLATE=Chinese (Traditional)_Taiwan.950
[2] LC_CTYPE=Chinese (Traditional)_Taiwan.950
[3] LC_MONETARY=Chinese (Traditional)_Taiwan.950
[4] LC_NUMERIC=C
[5] LC_TIME=Chinese (Traditional)_Taiwan.950
```

Jupyter Notebook + R

(方法2 使用R原生環境)

- 支援最新版 R-4.4.1
- <https://www.datacamp.com/blog/jupyter-and-r-markdown-notebooks-with-r>

安裝 IRkernel 三步驟

- # 步驟1 開啟R終端機視窗
- 開啟命令提示字元
- cd C:\Program Files\R\R-4.4.1\bin
- R
- # 步驟2 安裝套件
- install.packages(c('repr', 'IRdisplay', 'evaluate', 'crayon', 'pbdZMQ', 'devtools', 'uuid', 'digest'))
- devtools::install_github('IRkernel/IRkernel')
- IRkernel::installspec()
- # 步驟3 關閉R環境
- q() \ 按 n
- exit

R終端機視窗

The screenshot shows a terminal window titled "Rterm" running on Microsoft Windows. The window displays the standard R startup sequence:

```
Microsoft Windows [版本 10.0.22631.4112]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\wepa9>cd C:\Program Files\R\R-4.4.1\bin
C:\Program Files\R\R-4.4.1\bin>R

R version 4.4.1 (2024-06-14 ucrt) -- "Race for Your Life"
Copyright (C) 2024 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64

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

Natural language support but running in an English locale

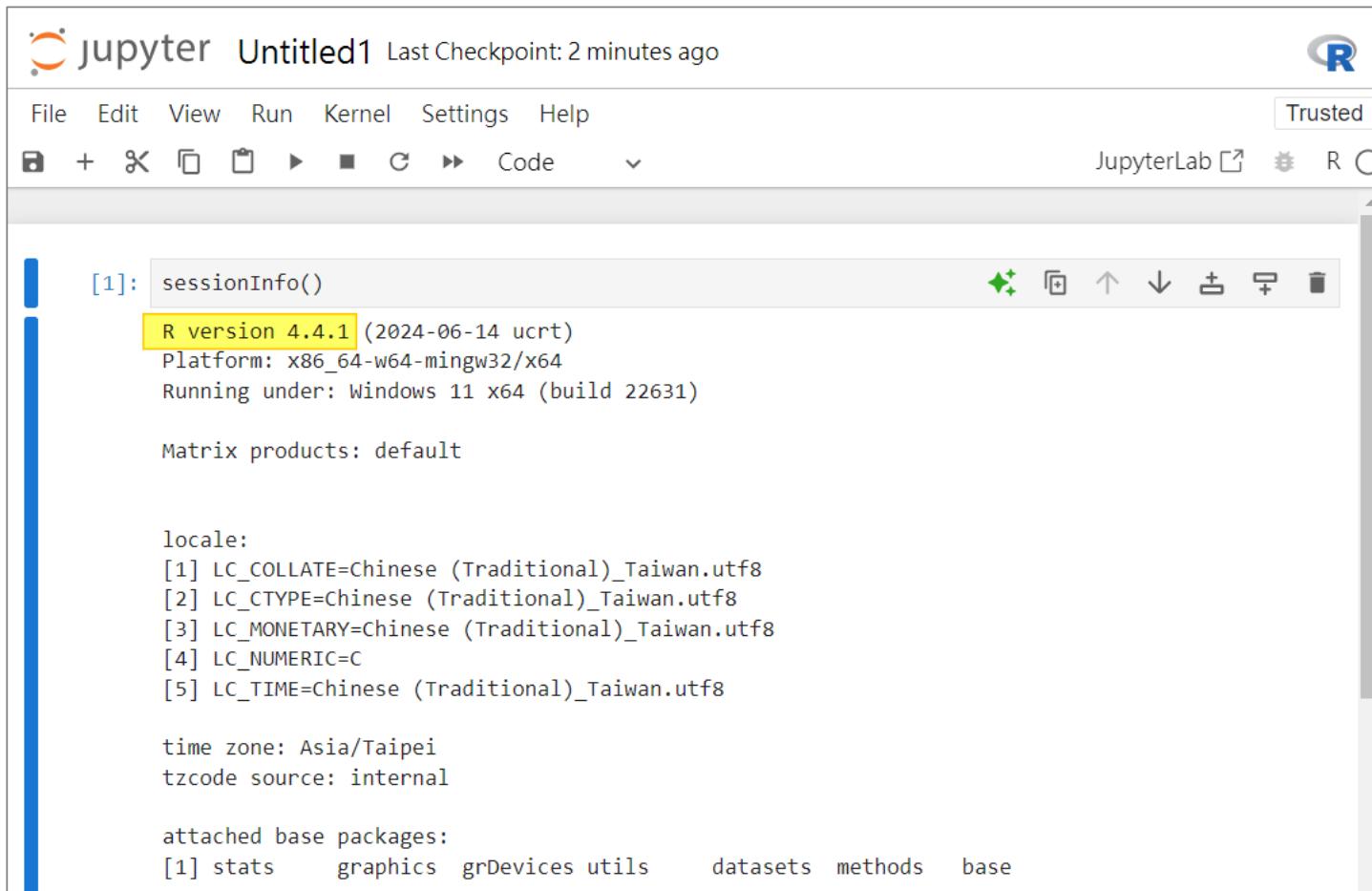
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

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

> install.packages(c('repr', 'IRdisplay', 'evaluate', 'crayon', 'pbздMQ'))
```

The command `install.packages(c('repr', 'IRdisplay', 'evaluate', 'crayon', 'pbздMQ'))` is highlighted with a red box.

Jupyter Notebook – R demo



The screenshot shows a Jupyter Notebook interface with the title "jupyter Untitled1 Last Checkpoint: 2 minutes ago". The notebook has a "Trusted" status. The code cell [1] contains the command `sessionInfo()`. The output displays the following information:

```
R version 4.4.1 (2024-06-14 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: Windows 11 x64 (build 22631)

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

time zone: Asia/Taipei
tzcode source: internal

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

Jupyter Notebook – R demo (續)

File Edit View Run Kernel Settings Help Trusted

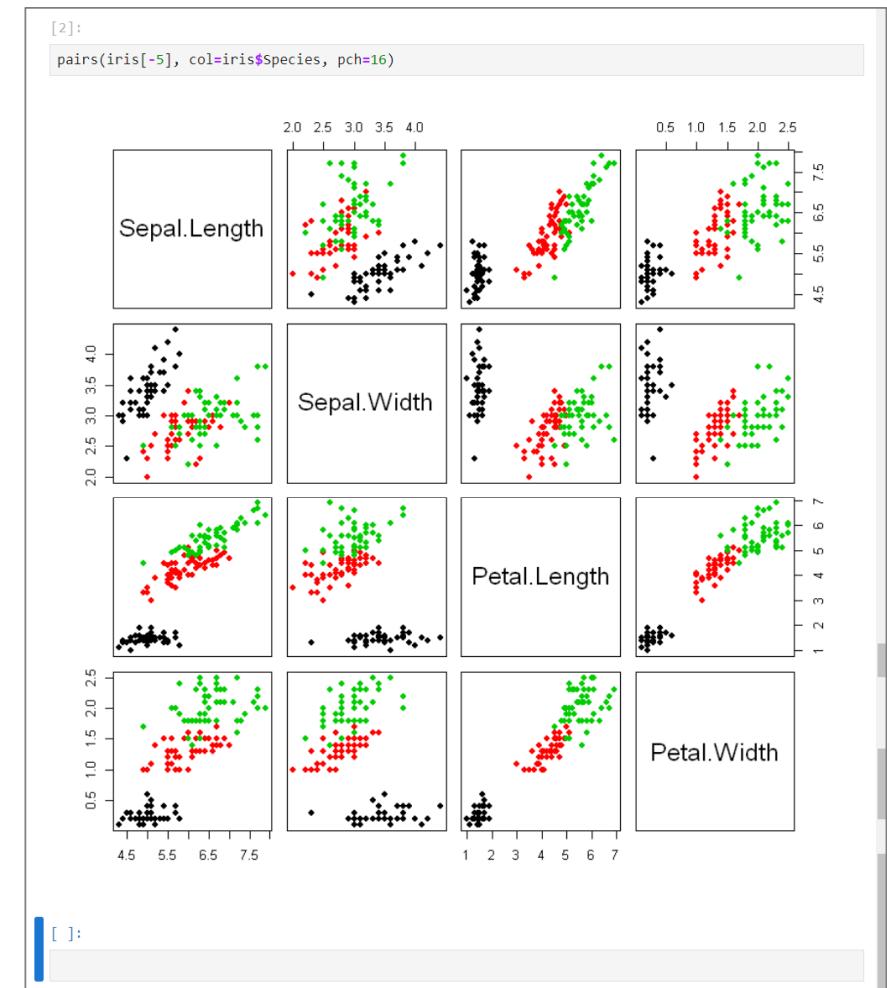
JupyterLab R

Title: Jupyter Notebook + R

Author: Ming-Chang, Lee

```
[1]:  
head(iris, n=3)
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa



Positron (整合 R, Python, Jupyter)

Positron IDE, Since 2024.6

- 首頁: <https://github.com/posit-dev/positron>
- 下載: <https://github.com/posit-dev/positron/releases>

2025.07.0-204 Latest

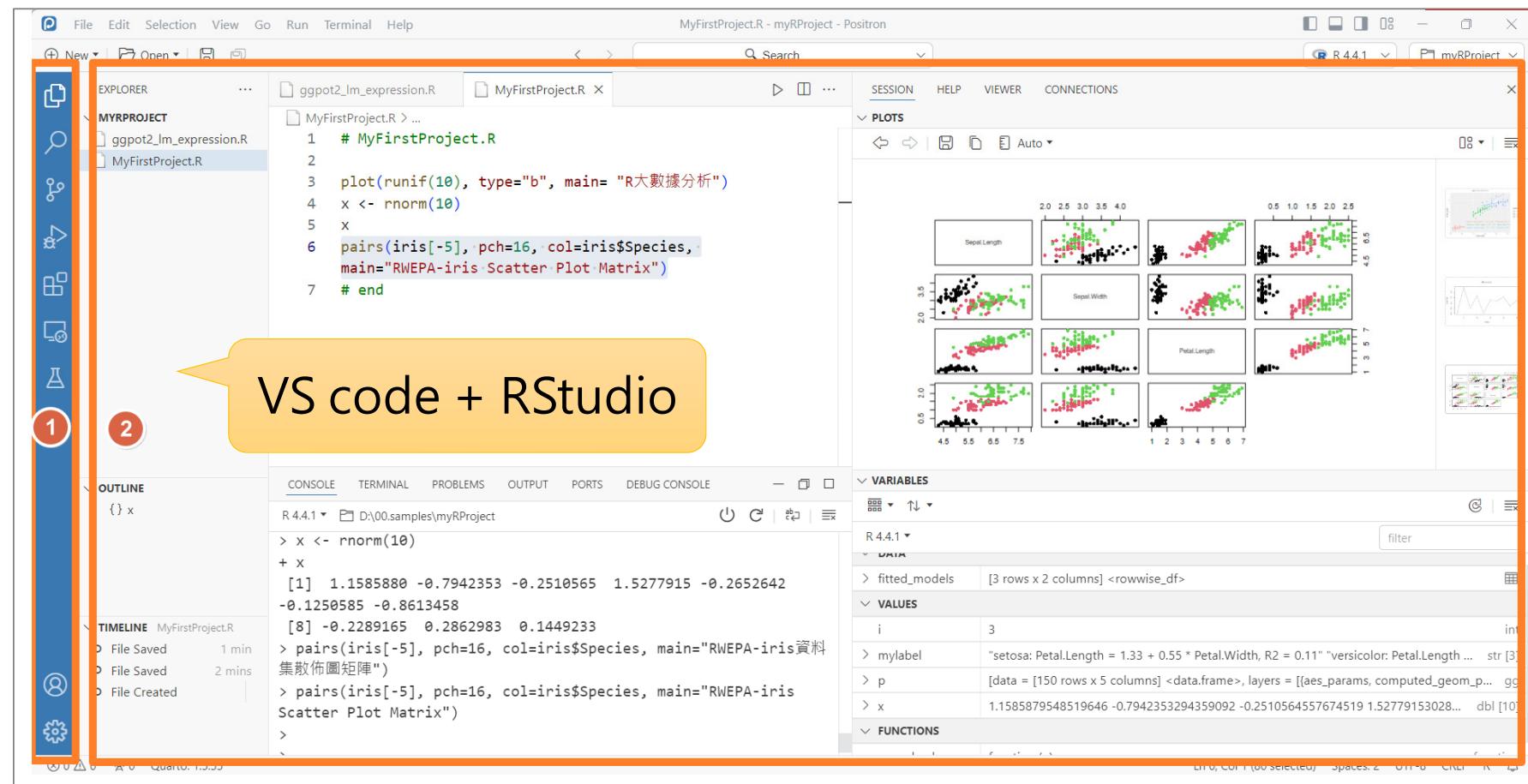
Thank you for using Positron!

Downloads

Please review [Positron's license agreement](#) and [privacy policy](#). Your acceptance of this license agreement is required as a condition to proceeding with your download or use of the software.

Platform	Download
Windows 10, 11 x64 (system level install)	Positron-2025.07.0-204-Setup.exe
Windows 10, 11 x64 (user level install)	Positron-2025.07.0-204-UserSetup.exe
MacOS 10.15+ (universal)	Positron-2025.07.0-204-universal.dmg
MacOS 10.15+ (arm64/Apple Silicon)	Positron-2025.07.0-204-arm64.dmg

Positron+R 執行畫面



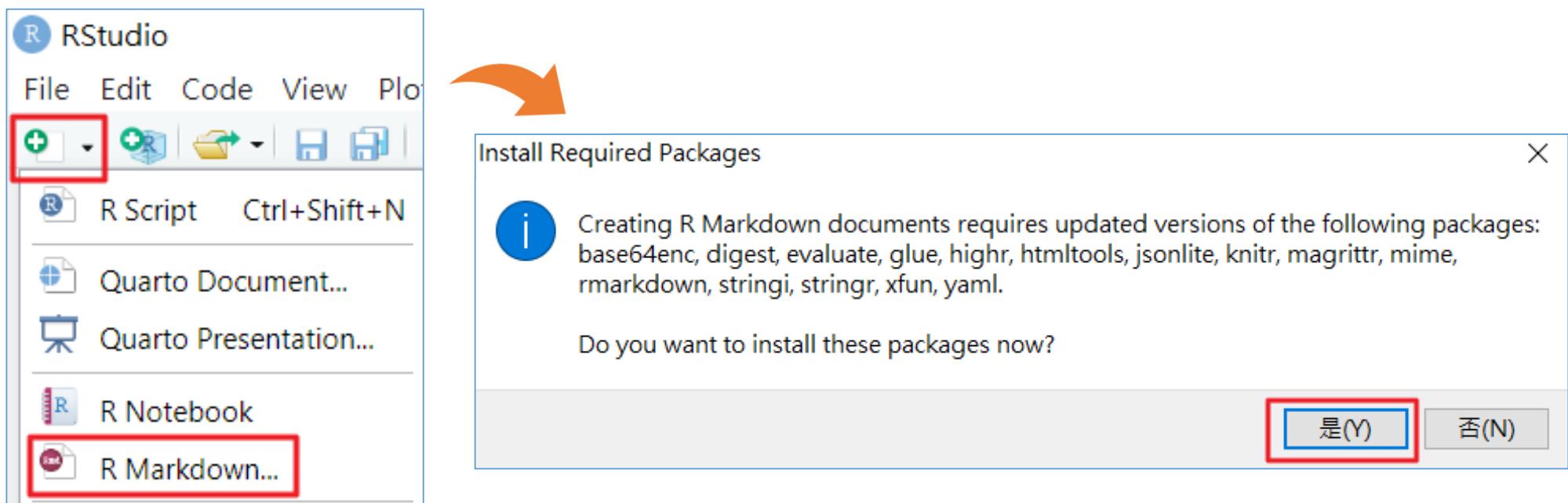


R Markdown

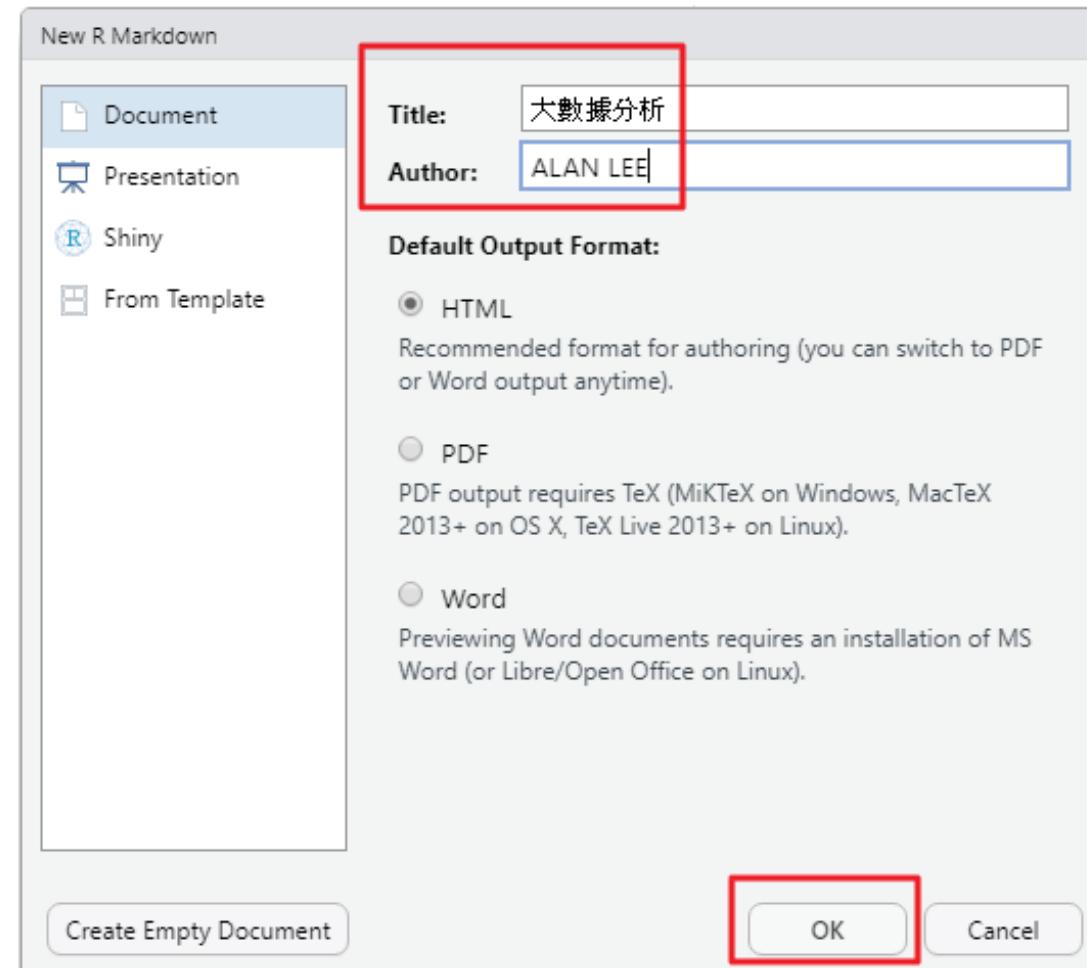
(R 標記語言)

新增 R Markdown 檔案

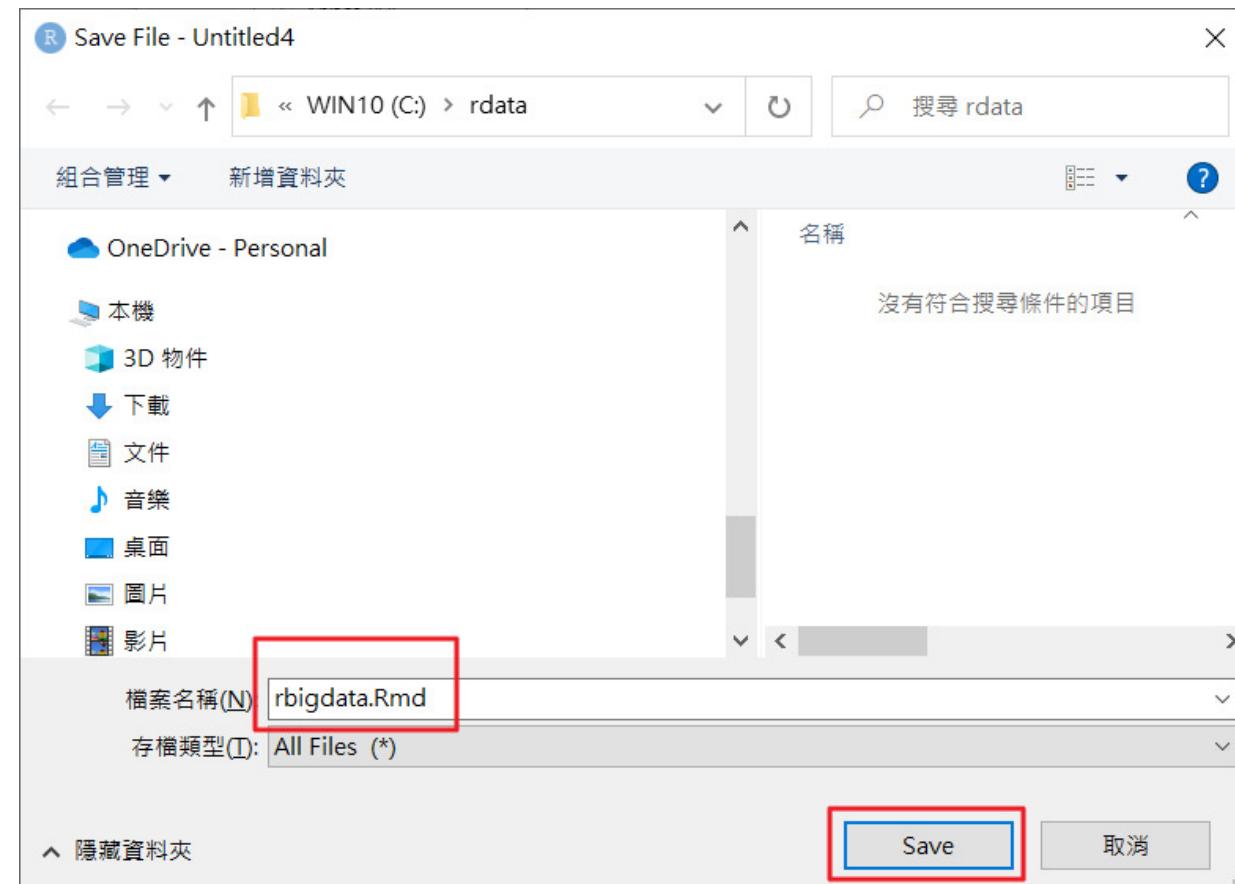
-  New File \ R Markdown
- Install Required Packages \ 是(Y)



New R Markdown



儲存 rbigdata.Rmd



The screenshot shows the RStudio interface with several help resources highlighted:

- 1. Help**: A red box highlights the "Help" tab in the top navigation bar.
- 2. Posit Support**: A red box highlights the "Posit Support" link in the sidebar.
- 3. Posit Cheat Sheets**: A red box highlights the "Posit Cheat Sheets" link in the sidebar.

rbigdata.Rmd is the active file in the left pane, showing R Markdown code. The right pane displays the "Environment" tab with the message "Environment is empty".

Help tab in the top navigation bar is also circled with a red box.

Posit Support and **Posit Cheat Sheets** links in the sidebar are also circled with red boxes.

rbigdata.Rmd

File Edit Code View Plots Session Build Debug Profile Tools Help

Source Visual

```
1 ---  
2 title: "大數據分析"  
3 author: "ALAN LEE"  
4 date: "2024-09-04"  
5 output: html_document  
6 ---  
7  
8 ``{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10 ``  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML,  
15 # 大數據分析 R Markdown
```

Console Terminal × Background Jobs ×

R version 4.4.2
e
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)
R is free software.
Y.
You are welcome to contribute to its development.
Type 'license' or 'about' for more information.

Environment History Connections Tutorial

Import Dataset 203 MiB List C

R Global Environment

Environment is empty

Files Plots Packages Help Viewer Presentation

Find in Topic

Resources

Posit Support

Posit Community Forum for the RStudio IDE

Posit Cheat Sheets

Posit Products

Posit Packages

Posit News

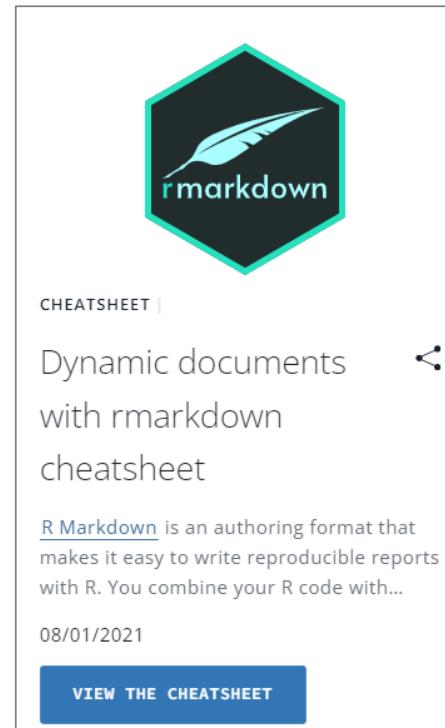
Posit Overflow

Posit Help with R

Posit RStudio

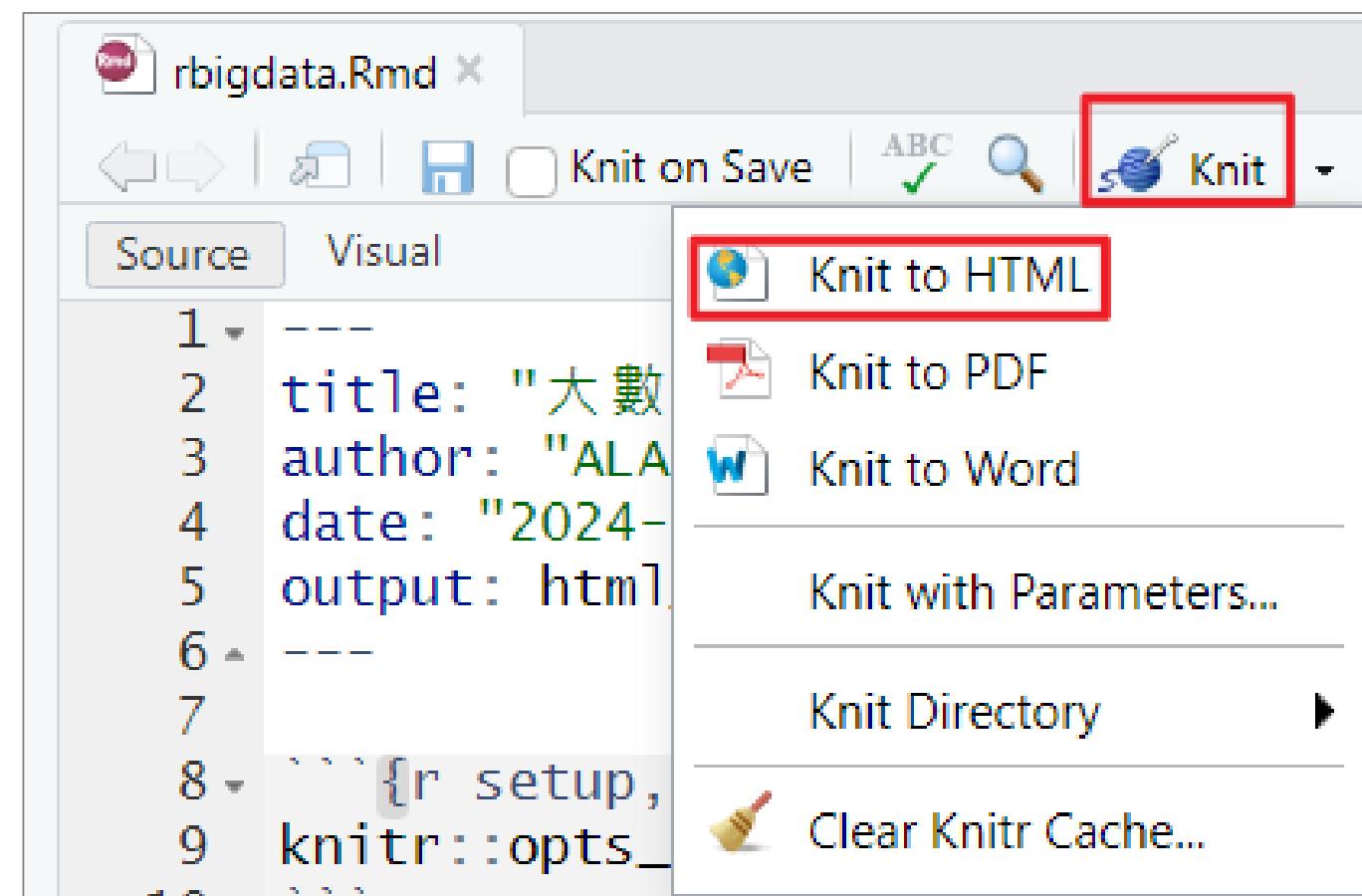
R Markdown Cheatsheet 線上說明

- <https://www.rstudio.com/resources/cheatsheets/>
- <https://rstudio.github.io/cheatsheets/html/rmarkdown.html>



R Markdown (續)

- Knit to HTML
- Knit to PDF
- Knit to Word



實作
練習

R Markdown: HTML

① 檔案 C:/rdata/rbigdata.html 輸出HTML

1 標題
大數據分析
ALAN LEE
2024-09-04

2 文字
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
When you click the Knit button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

speed dist
Min. : 4.0 Min. : 2.00
1st Qu.:12.0 1st Qu.: 26.00
Median :15.0 Median : 36.00
Mean :15.4 Mean : 42.98
3rd Qu.:19.0 3rd Qu.: 56.00
Max. :25.0 Max. :120.00

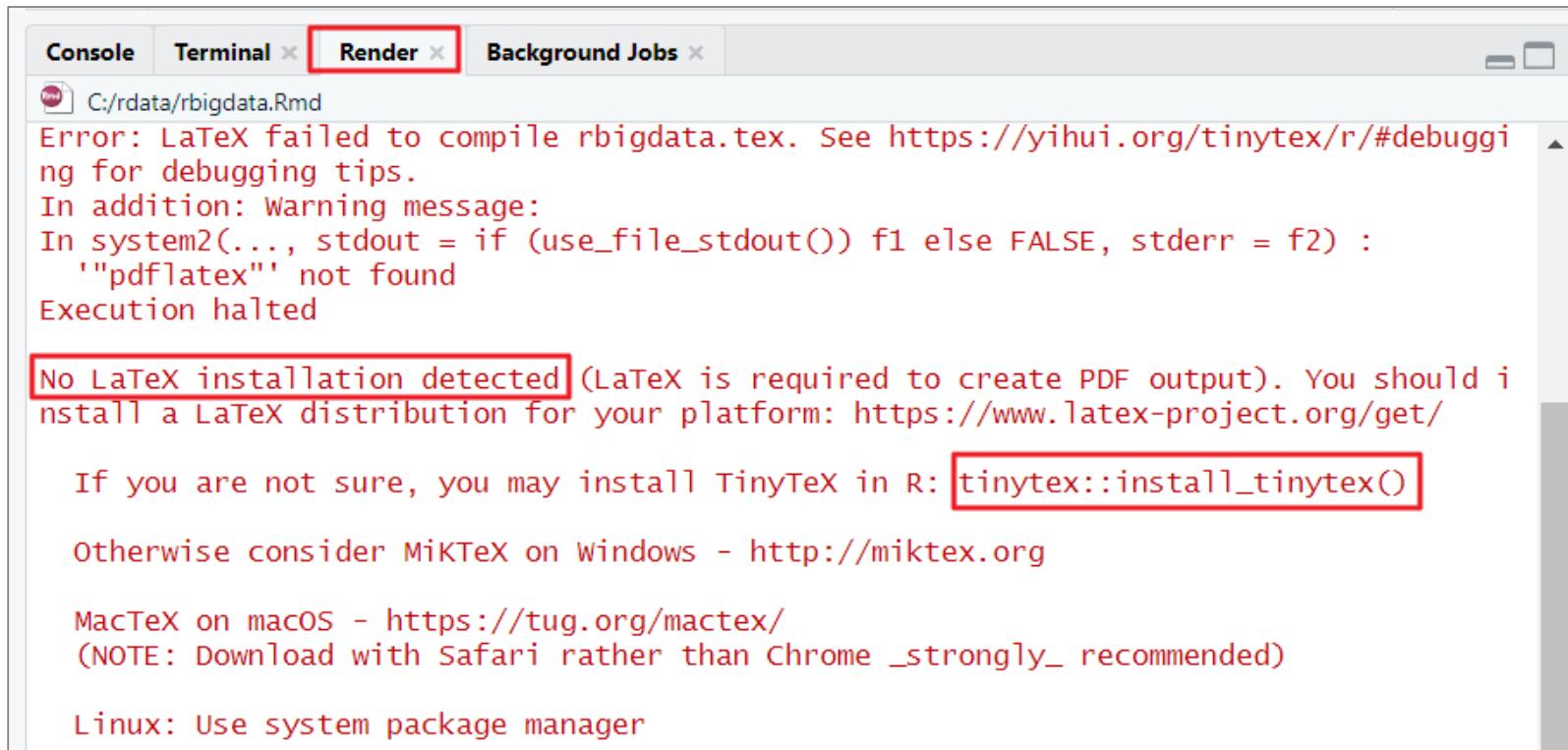
3 R 程式碼與執行結果
Including Plots
You can also embed plots, for example:

Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.

熟悉 .rmd 架構

R Markdown: PDF

- Error: 沒有安裝 LaTeX



The screenshot shows the RStudio interface with the 'Render' tab selected. A red box highlights the 'Render' tab in the top navigation bar. The main pane displays the following error message:

```
C:/rdata/rbigdata.Rmd
Error: LaTeX failed to compile rbigdata.tex. See https://yihui.org/tinytex/r/#debugging for debugging tips.
In addition: Warning message:
In system2(..., stdout = if (use_file_stdout()) f1 else FALSE, stderr = f2) :
  '"pdflatex"' not found
Execution halted

No LaTeX installation detected (LaTeX is required to create PDF output). You should install a LaTeX distribution for your platform: https://www.latex-project.org/get/

If you are not sure, you may install TinyTeX in R: tinytex::install\_tinytex\(\)

Otherwise consider MiKTeX on Windows - http://miktex.org

MacTeX on macOS - https://tug.org/mactex/
(NOTE: Download with Safari rather than Chrome strongly recommended)

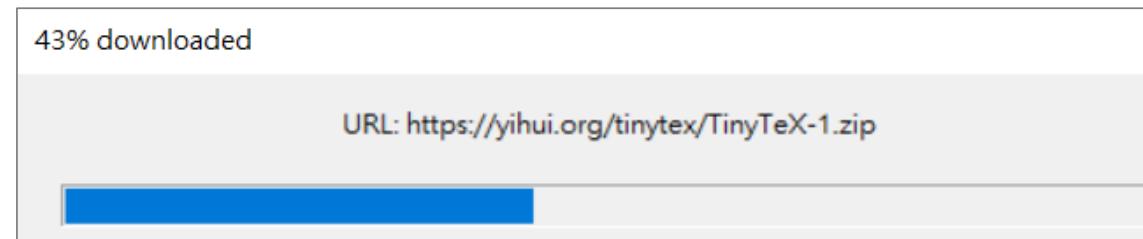
Linux: Use system package manager
```

The text 'No LaTeX installation detected' and its associated explanatory text are highlighted with a red box. The 'tinytex::install_tinytex()' command is also highlighted with a red box.

R Markdown: PDF – 解決方法

- 方法1: `tinytex::install_tinytex()` ← 優先使用方法

```
> tinytex::install_tinytex()
trying URL 'https://yihui.org/tinytex/TinyTeX-1.zip'
Content type 'application/octet-stream' length 137692855 bytes (131.3 MB)
```



- 方法2: 下載 Miktex: <https://miktex.org/download>
 - basic-miktex-21.2-x64.exe (243.83MB)

Execution halted

processing file: rbigdata.Rmd

```
"C:/Program Files/RStudio/resources/app/bin/quarto/bin/tools/pandoc" +RTS -K512m -RTS r  
bigdata.knit.md --to latex --from markdown+autolink_bare_uris+tex_math_single_backslash  
--output rbigdata.tex --lua-filter "C:\Users\IEUser\AppData\Local\R\win-library\4.4\rma  
rmarkdown\rmarkdown\lua\pagebreak.lua" --lua-filter "C:\Users\IEUser\AppData\Local\R\win-l  
ibrary\4.4\rmarkdown\rmarkdown\lua\latex-div.lua" --embed-resources --standalone --high  
light-style tango --pdf-engine pdflatex --variable graphics --variable "geometry:margin  
=1in"
```

output file: rbigdata.knit.md

```
! LaTeX Error: Unicode character å¤§ (U+5927)  
not set up for use with LaTeX.
```

中文編碼錯誤

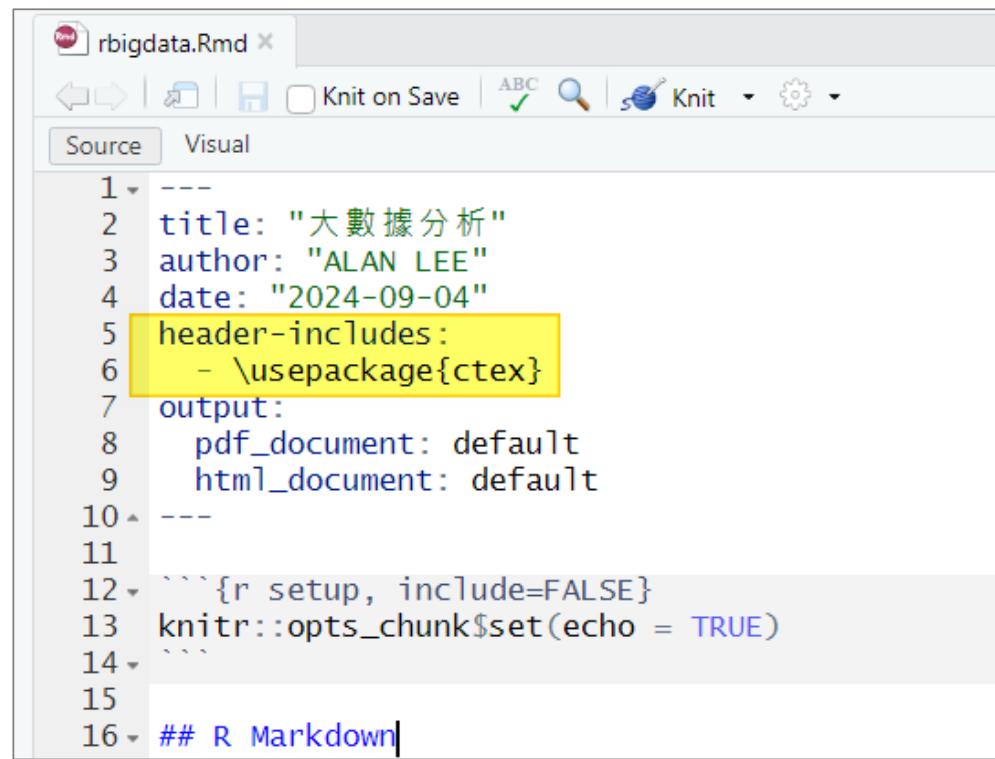
Try other LaTeX engines instead (e.g., xelatex) if you are using pdflatex. See <https://bookdown.org/yihui/rmarkdown-cookbook/latex-unicode.html>

Error: LaTeX failed to compile rbigdata.tex. See <https://yihui.org/tinytex/r/#debugging> for debugging tips. See rbigdata.log for more info.

Execution halted

R Markdown: PDF – 中文設定方法

- <https://rwepa.blogspot.com/2024/09/rmarkdown-chinese-font-pdf.html>
- <https://github.com/rwepa/DataDemo/blob/master/rmarkdown-chinese.Rmd>

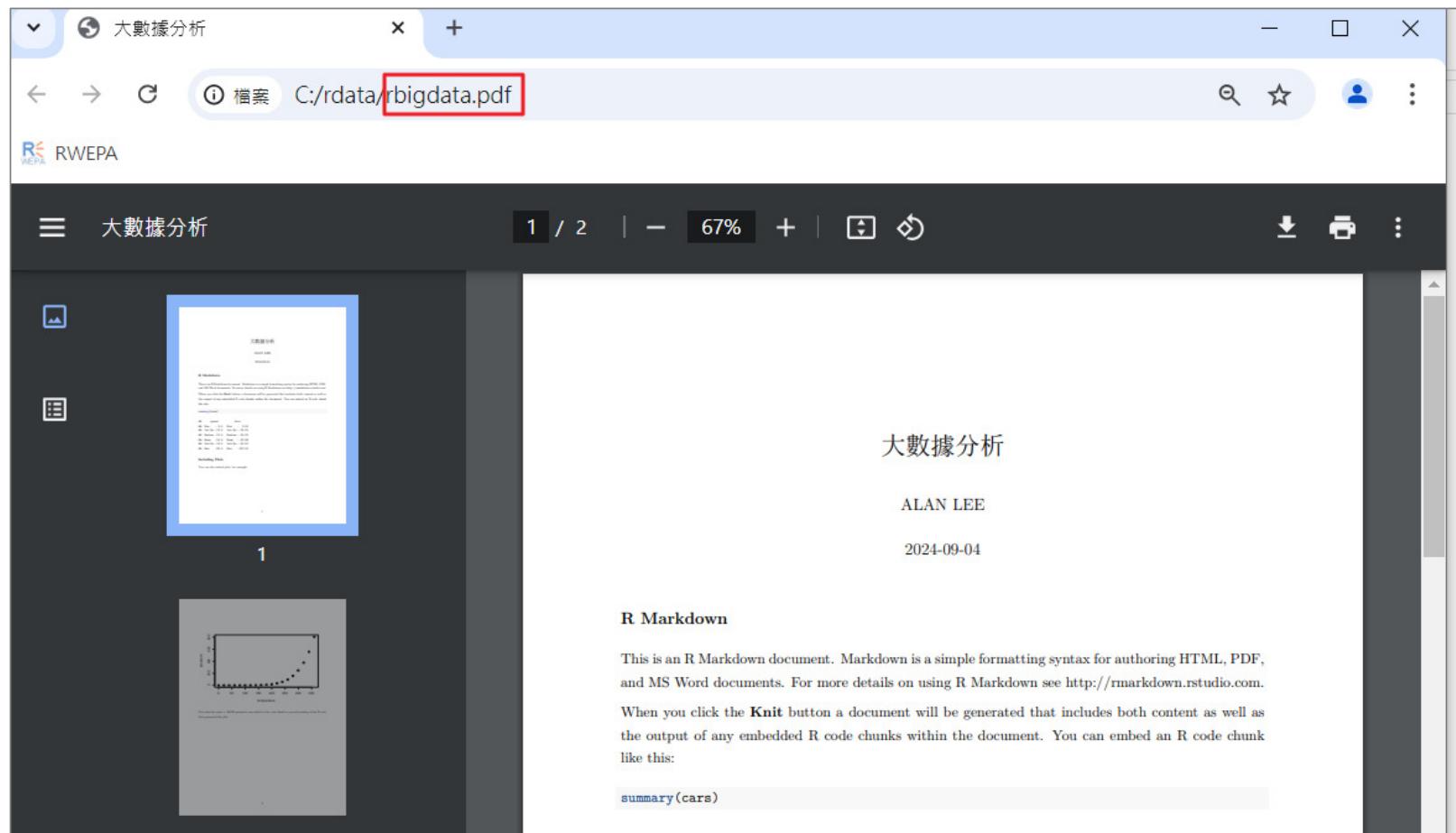


The screenshot shows the RStudio interface with an R Markdown file named "rbigdata.Rmd". The code editor displays the following YAML front matter:

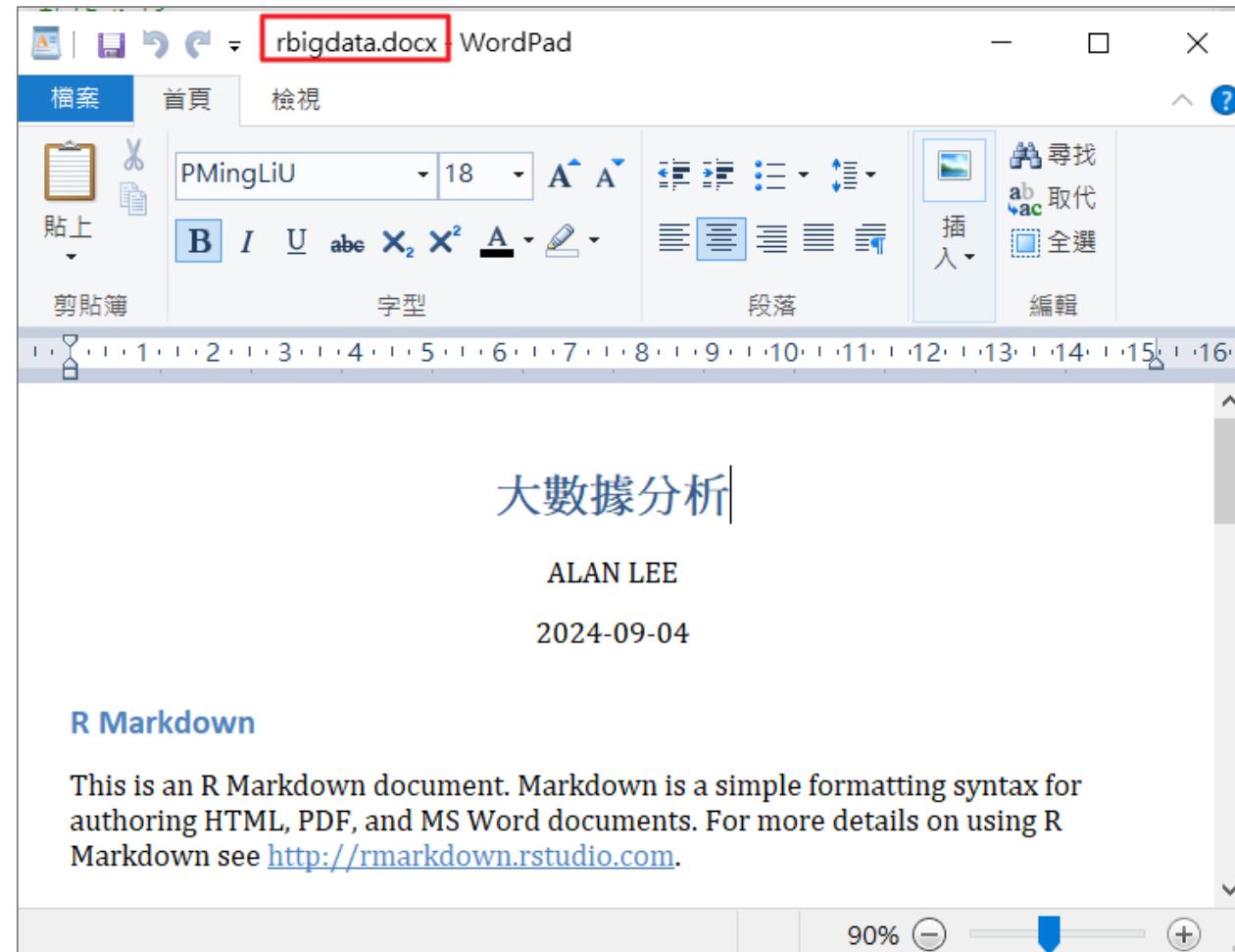
```
1 ---  
2 title: "大數據分析"  
3 author: "ALAN LEE"  
4 date: "2024-09-04"  
5 header-includes:  
6   - \usepackage{ctex}  
7 output:  
8   pdf_document: default  
9   html_document: default  
10 ---  
11  
12 ```{r setup, include=FALSE}  
13 knitr::opts_chunk$set(echo = TRUE)  
14 ```  
15  
16 ## R Markdown|
```

The line `5 header-includes:` and its subsequent line `6 - \usepackage{ctex}` are highlighted with a yellow box.

R Markdown: PDF – 完成版



R Markdown: Word – 完成版



Rmd 轉換為 ppt

New R Markdown

-  Document
-  **Presentation**
-  Shiny
-  From Template

Title: Untitled

Author:

Date: 2025-07-09

Use current date when rendering document

Default Output Format:

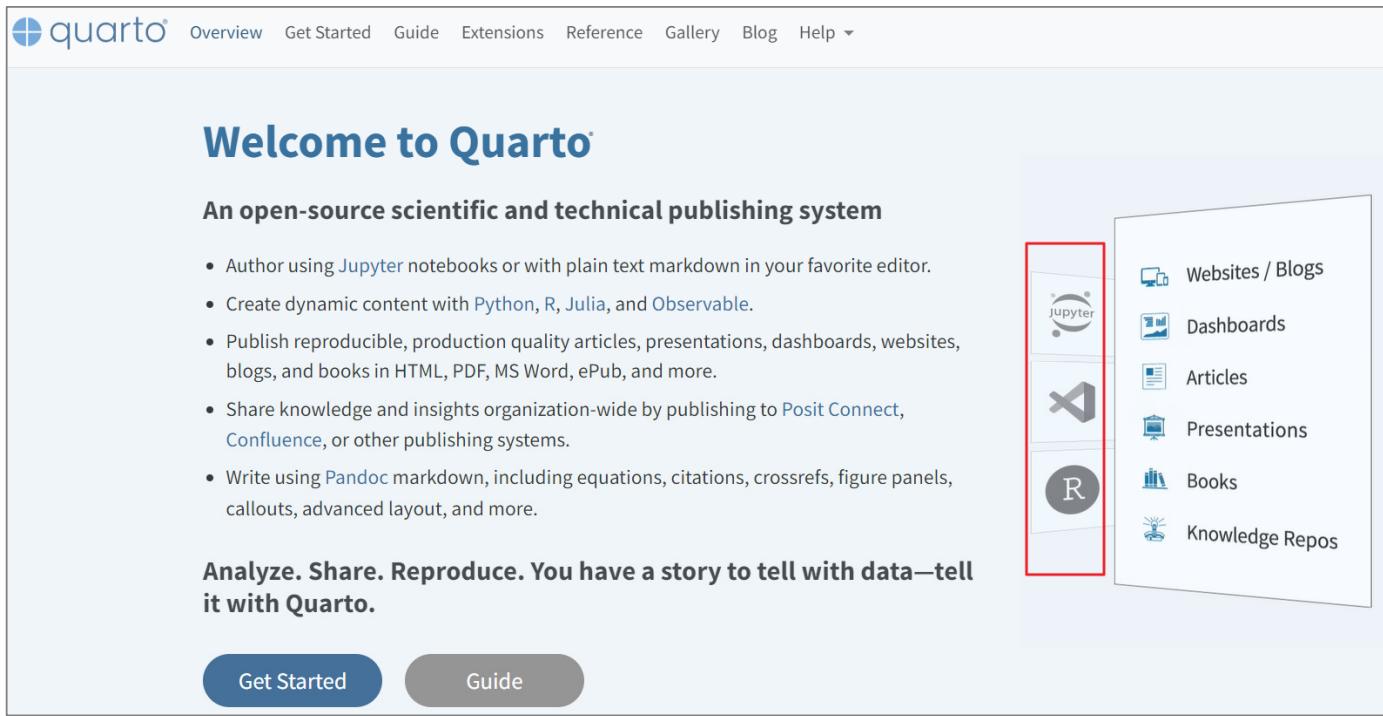
HTML (ioslides)

Quarto

(R Markdown 進階版 – for R and Python)

Quarto, Since 2022.7

- Quarto: RMarkdown 的下一代產品.
- 下載: <https://quarto.org/>



The screenshot shows the Quarto website homepage. At the top, there is a navigation bar with links: Overview, Get Started, Guide, Extensions, Reference, Gallery, Blog, and Help. Below the navigation bar, the title "Welcome to Quarto" is displayed in a large, bold, blue font. Underneath the title, the subtitle "An open-source scientific and technical publishing system" is shown in a smaller, bold, black font. To the right of the subtitle, there is a sidebar with a red border containing icons and text for various publishing options: Websites / Blogs, Dashboards, Articles, Presentations, Books, and Knowledge Repos. The main content area below the sidebar contains a bulleted list of features and a tagline at the bottom.

Welcome to Quarto

An open-source scientific and technical publishing system

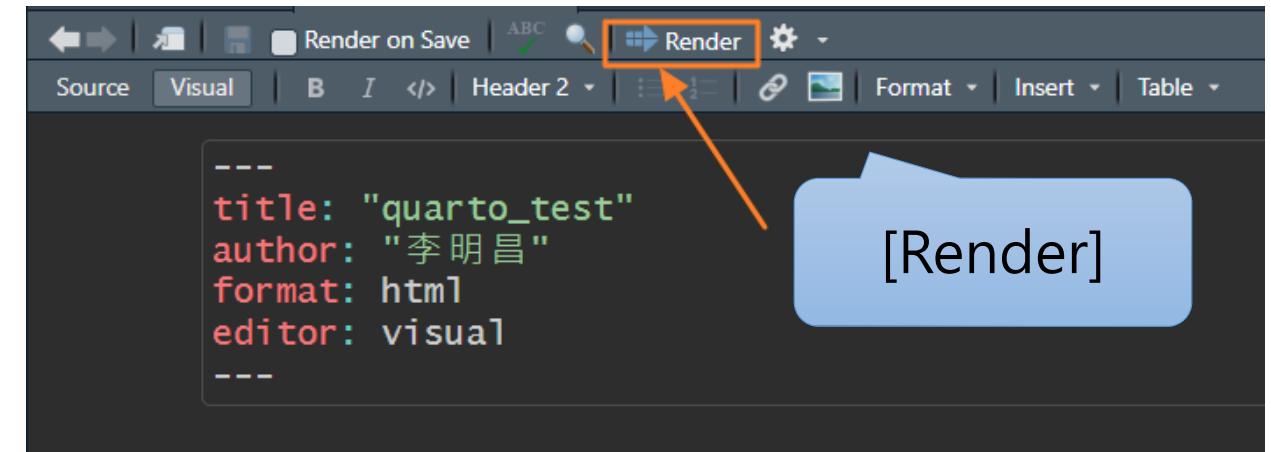
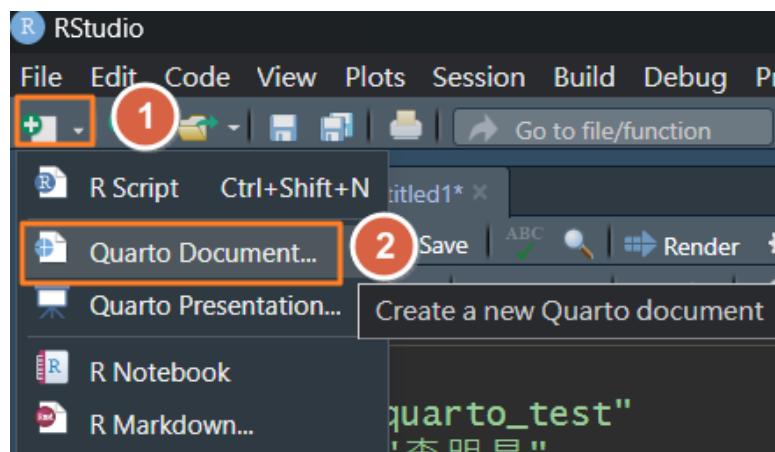
- Author using [Jupyter](#) notebooks or with plain text markdown in your favorite editor.
- Create dynamic content with [Python](#), [R](#), [Julia](#), and [Observable](#).
- Publish reproducible, production quality articles, presentations, dashboards, websites, blogs, and books in [HTML](#), [PDF](#), [MS Word](#), [ePub](#), and more.
- Share knowledge and insights organization-wide by publishing to [Posit Connect](#), [Confluence](#), or other publishing systems.
- Write using [Pandoc](#) markdown, including equations, citations, crossrefs, figure panels, callouts, advanced layout, and more.

Analyze. Share. Reproduce. You have a story to tell with data—tell it with Quarto.

[Get Started](#) [Guide](#)

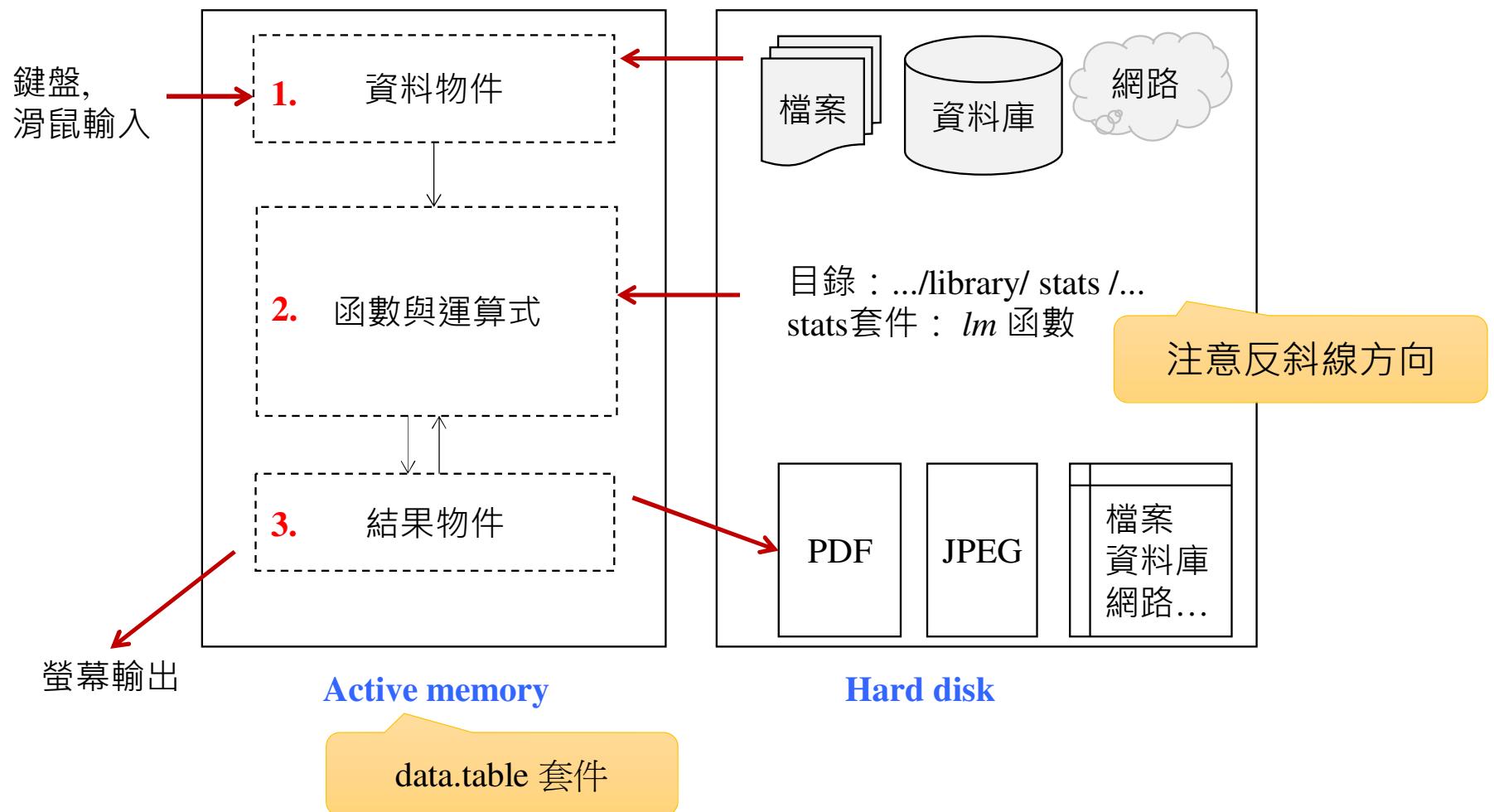
Quarto

- An open-source scientific and technical publishing system
- File \ New File \ Quarto Document...
- File \ Save As \ XXX.qmd → Render 建立 HTML , PDF, Word, ...



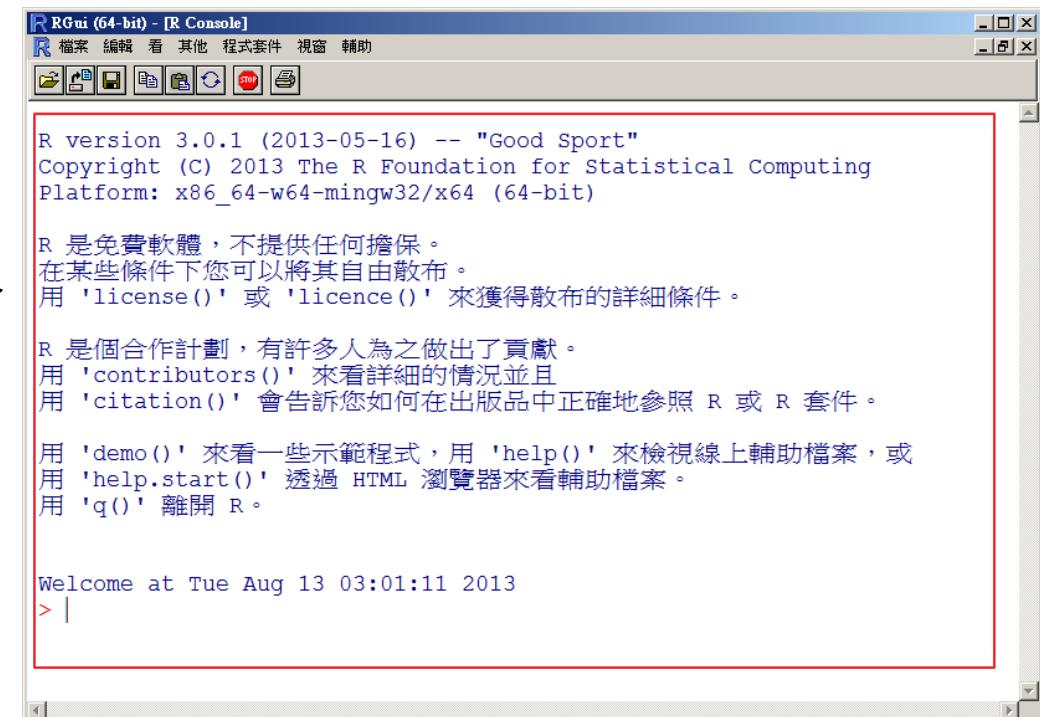
R 基礎操作

R運作方式



基本觀念

- 控制台(console)
- 歷程
 - xxx.Rhistory
- 套件(package)
- 工作空間(workspace) – 變數集合
 - xxx.RData
- 物件(object)-物件導向程式設計



控制台的特定符號

- 命令提示字元(大於) > (等待使用者輸入資料)
- 指令未完提示字元(加號) + (表示尚未輸入完成)
- 註解提示字元(井字號) # (不會編譯註解)
- \$ 符號 資料物件\$變數名稱
- 結果[] 顯示編號

Python: 資料物件.變數名稱

```
> iris$Sepal.Length
[1] 5.1 4.9 4.7 4.6 5.0 5.4 4.6 5.0 4.4 4.9 5.4 4.8 4.8 4.3 5.8 5.7
[17] 5.4 5.1 5.7 5.1 5.4 5.1 4.6 5.1 4.8 5.0 5.0 5.2 5.2 4.7 4.8 5.4
[33] 5.2 5.5 4.9 5.0 5.5 4.9 4.4 5.1 5.0 4.5 4.4 5.0 5.1 4.8 5.1 4.6
[49] 5.3 5.0 7.0 6.4 6.9 5.5 6.5 5.7 6.3 4.9 6.6 5.2 5.0 5.9 6.0 6.1
[65] 5.6 6.7 5.6 5.8 6.2 5.6 5.9 6.1 6.3 6.1 6.4 6.6 6.8 6.7 6.0
[81] 5.5 5.5 5.8 6.0 5.4 6.0 6.7 6.3 5.6 5.5 5.5 6.1 5.8 5.0 5.6
[97] 5.7 6.2 5.1 5.7 6.3 5.8 7.1 6.3 6.5 7.6 4.9 7.3 6.7 7.2 6.5
[113] 6.8 5.7 5.8 6.4 6.5 7.7 7.7 6.0 6.9 5.6 7.7 6.3 6.7 7.2 6.2 ...
[129] 6.4 7.2 7.4 7.9 6.4 6.3 6.1 7.7 6.3 6.4 6.0 6.9 6.7 6.9 5.8 6.8
[145] 6.7 6.7 6.3 6.5 6.2 5.9
```

- 取出第145個值
iris\$Sepal.Length[145]

物件命名原則

- R的大小寫有差異: *a* 與 *A* 是不同的物件。
- R 也保留一些物件與指令人稱, 如 c, C, T, F 等為保留字 (“reserved words”), 命名時避免重覆, 以免引起人類困擾。
- 物件名稱起始字元須以文字或 “.” (句點), 建議少用句點。
- 物件名稱起始字元不可為數字。
- 如果物件名稱以 “.” (句點) 為起始, 名稱第二個位置需為文字, 物件名稱其餘位置, 以文字 (A-Z或a-z), 數字 (0-9), 下底線 _ 皆可。
- 物件名稱中間不可有空格。

Google's R Style Guide

- <https://google.github.io/styleguide/Rguide.html>
- 函數使用 BigCamelCase

```
# Good
DoNothing <- function() {
  return(invisible(NULL))
}
```

- 不要使用 attach 函數
- 使用 **x <- 1**, 不要使用 x = 1
- = 用於函數之參數設定 plot(..., type = "b")
- 不要使用句點 Customer.Sales  改為 CustomerSales

輔助說明

輔助說明

- `help.start()` # 開啟輔助說明的首頁
- `?plot` # plot 函數說明
- `help(plot)` # plot 函數說明
- 選取 plot 按 F1 # plot 函數說明
- `help.search("regression")` # 搜尋關鍵字 regression
- `??regression` # 搜尋關鍵字 regression



在以下這些程式套件裡找到了關於 'plot' 主題的說明:

[The Default Scatterplot Function](#)



(in package [graphics](#) in library C:/Program Files/R/R-4.4.1/library)

[Generic X-Y Plotting](#)

(in package [base](#) in library C:/PROGRA~1/R/R-44~1.1/library)

輔助說明 (續)

1.函數

type="n"

plot.default {graphics}

2.套件

1

2

The Default Scatterplot Function

3

R Documentation

Description

Draw a scatter plot with decorations such as axes and titles in the active graphics window.

Usage

```
## Default S3 method:
plot(x, y = NULL, type = "p", xlim = NULL, ylim = NULL,
      log = "", main = NULL, sub = NULL, xlab = NULL, ylab = NULL,
      ann = par("ann"), axes = TRUE, frame.plot = axes,
      panel.first = NULL, panel.last = NULL, asp = NA,
      xgap.axis = NA, ygap.axis = NA,
      ...)
```

Arguments

x, y

the `x` and `y` arguments provide the `x` and `y` coordinates for the plot. Any reasonable way of defining the coordinates is acceptable. See the function `xy.coords` for details. If supplied separately, they must be of the same length.

4.簡單說明

5

5.詳細說明

6

6.方法

7

7.參數

套件 Package

(Python: 模組 Module)

套件

- 使用套件兩部曲 - 先安裝, 再載入套件
 - `install.packages("套件名稱")` # 安裝套件(一生一次)
 - `library(套件名稱)` # 載入套件(每次使用)
- 範例: 新增與載入 e1071套件(machine learning)

```
> install.packages("e1071")
trying URL 'http://cran.cs.pu.edu.tw/bin/windows/contrib/3.0/e1071_1.6-1.zip'
Content type 'application/zip' length 514468 bytes (502 Kb)
opened URL
downloaded 502 Kb

package 'e1071' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\Administrator\AppData\Local\Temp\RtmpoHS0Ak\downloaded_packages
> library(e1071)
Loading required package: class
>
```

example(svm, package="e1071")

已載入的套件 search()

```
> # 已載入套件
> search()
[1] ".GlobalEnv"
[3] "tools:rstudio"
[5] "package:graphics" package:graphics
[7] "package:utils"
[9] "package:methods"
[11] "package:base"
>
```

package:graphics

package:e1071

package:stats

package:grDevices

package:datasets

Autoloads



R套件 - 48類別

- <https://cran.csie.ntu.edu.tw/web/packages/index.html>

Contributed Packages

(2025.6.2)

Available Packages

Currently, the CRAN package repository features 22492 available packages.

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

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

[CRAN Task Views](#) aim to provide some guidance which packages on CRAN are relevant for tasks related to a certain topic. They provide tools to automatically install all packages from each view. Currently, 48 views are available.

48類別 - 中文說明

- <http://rwepa.blogspot.com/2013/10/packages-list-32.html>

2013年10月8日 星期二

RWEPA → task

Task Views - R套件

更新日期: 2025.04.26 - 48個套件類別

✿ CRAN Task View:

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

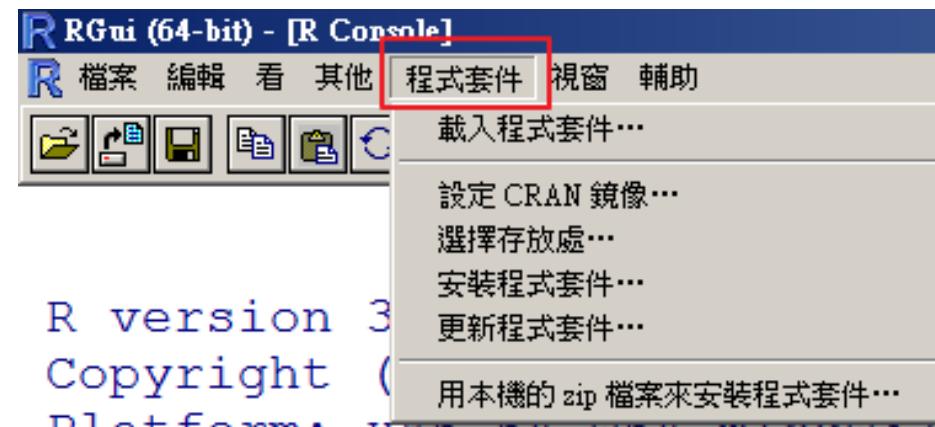
✿ Available CRAN Packages By Name:

https://cran.csie.ntu.edu.tw/web/packages/available_packages_by_name.html

✿ CRAN (Taiwan):

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

R 套件選單



- `update.packages("xxx") # 更新套件`
- `detach("package:xxx") # 卸離套件`
- `remove.packages("xxx") # 移除已安裝套件`
- 上述指令大部份可在 R / RStudio 執行

R對話資訊

- `sessionInfo()` → 理解R安裝訊息: R版本, 作業系統, 載入套件

```
> # R對話資訊 -----
> sessionInfo() ①
R version 4.5.0 (2025-04-11 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: windows 11 x64 (build 26100) ②

Matrix products: default
  LAPACK version 3.12.1

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

time zone: Asia/Taipei ③
tzcode source: internal

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

loaded via a namespace (and not attached):
[1] compiler_4.5.0    tools_4.5.0       rstudioapi_0.17.1
>
```

套件安裝目錄

- .Library

```
> # 預設套件安裝目錄  
> .Library  
[1] "C:/PROGRA~1/R/R-45~1.0/library"
```

- .libPaths()

- 可能全部安裝在 \R\library

```
> # 套件安裝目錄  
> # 可能全部安裝在 \R\library  
> .libPaths()  
[1] "C:/Users/User/AppData/Local/R/win-library/4.5" "C:/Program Files/R/R-4.5.0/library"  
>
```

1

2

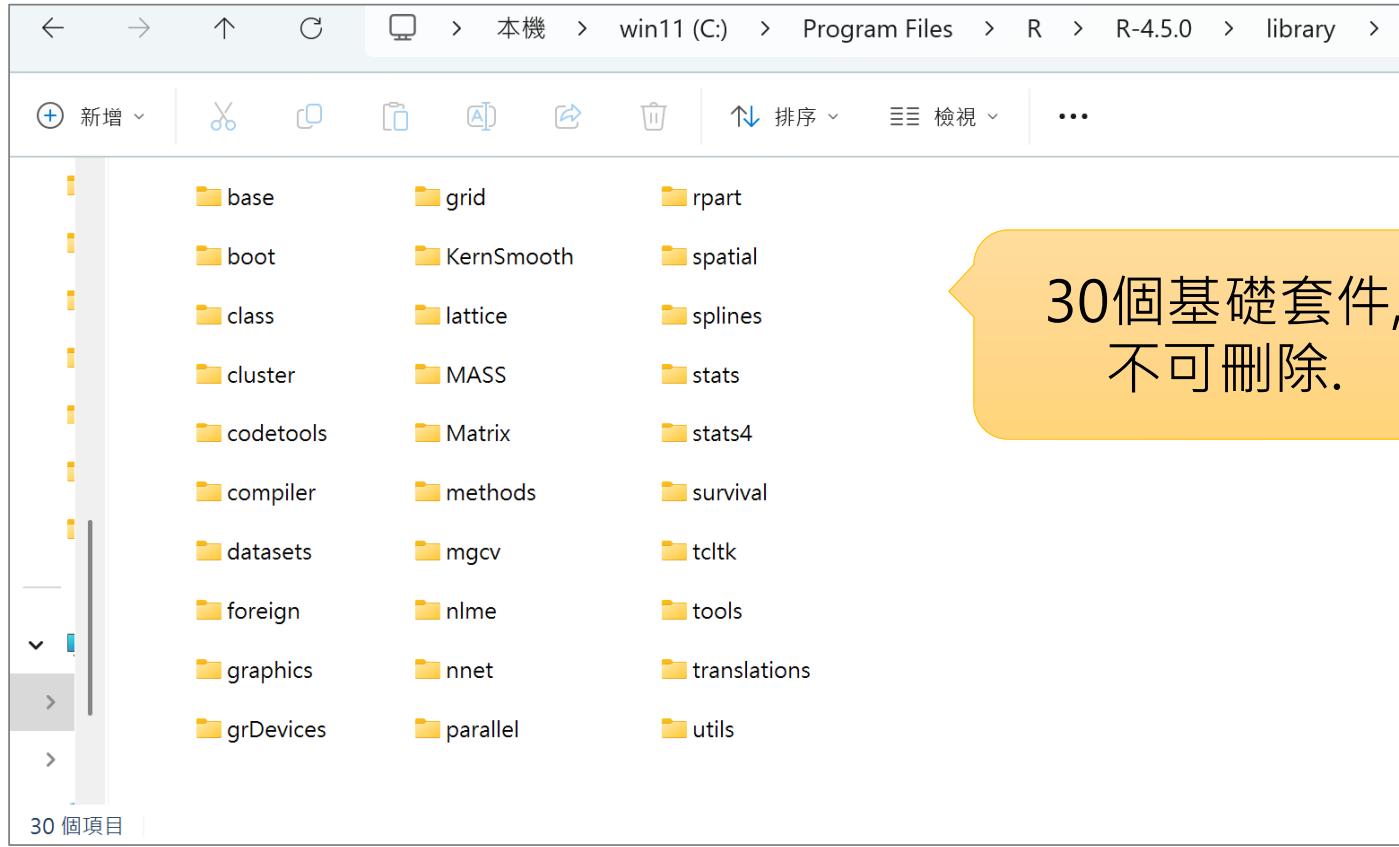
已安裝套件

```
> # 已安裝套件
> myinstalled <- installed.packages()
> class(myinstalled) # "matrix" "array"
[1] "matrix" "array"
> dim(myinstalled)
[1] 719 16
> mypackage <- myinstalled[, 1] # matrix[列, 行]
> mypackage[1:10]
      abind      addinslist      ade4          AER          affy
      "abind"    "addinslist"    "ade4"        "AER"        "affy"
      affydata     affyio      agricolae      airGR      airGRteaching
      "affydata"   "affyio"    "agricolae"    "airGR"    "airGRteaching"
```

```
library() # same as installed.packages()
```

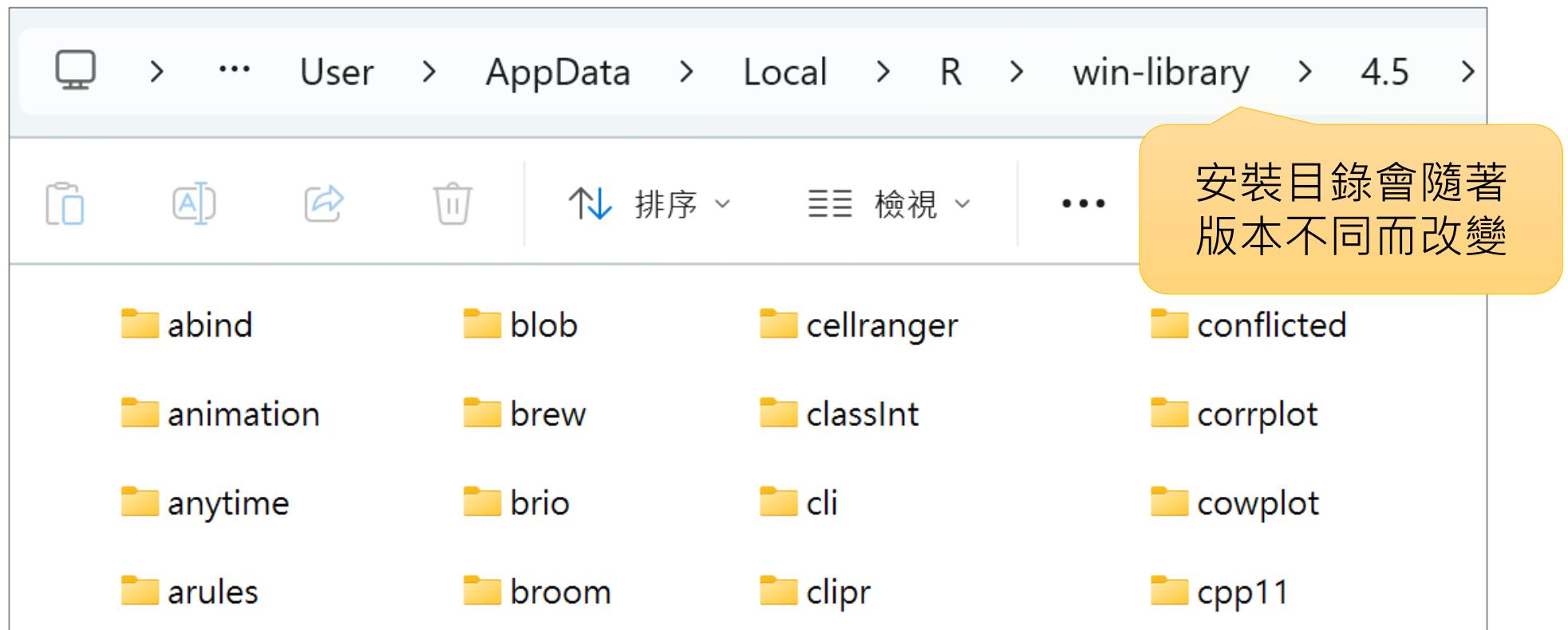
套件安裝目錄1

- C:\Program Files\R\R-4.5.0\library



套件安裝目錄2

- C:\Users\User\AppData\Local\R\win-library\4.5



RStudio 套件管理

The screenshot shows the RStudio interface with the 'Packages' tab selected. A yellow callout bubble points to the 'base' package in the 'System Library' section, indicating it is the currently loaded package.

Name	Description	Version	Actions
Maintained by 'YuLab-SMU'			
<input type="checkbox"/> zeallot	Multiple, Unpacking, and Destructuring Assignment	0.1.0	
<input type="checkbox"/> zip	Cross-Platform 'zip' Compression	2.3.0	
<input type="checkbox"/> zlibbioc	An R packaged zlib-1.2.5	1.46.0	
<input type="checkbox"/> zoo	S3 Infrastructure for Regular and Irregular Time Series (Z's Ordered Observations)	1.8-12	
System Library			
<input checked="" type="checkbox"/> base	The R Base Package	4.3.1	
<input type="checkbox"/> boot	Bootstrap Functions (Originally by Angelo Canty for S)	1.3-28.1	
<input type="checkbox"/> class	Functions for Classification	7.3-22	

打勾表示已經
載入套件

資料型別

資料型別

- 整數
- 數值
- 字串: 須使用 '台北市' 或 "台北市" 符號
- 邏輯值: 包括 TRUE, FALSE

R demo

數學運算

- R 即是計算機
 - log, exp
- 算數操作 (arithmetic operator)
 - +, -, *, /, ^, %% , %/%, %*%
- 關係比較操作 (relation/comparison operator)
 - ==, !=, <, <=, >, >=
- 邏輯操作(logical operator)
 - !, &, |



- x == "台北市"
- x == '台北市'
- y == 3.14

特殊數值

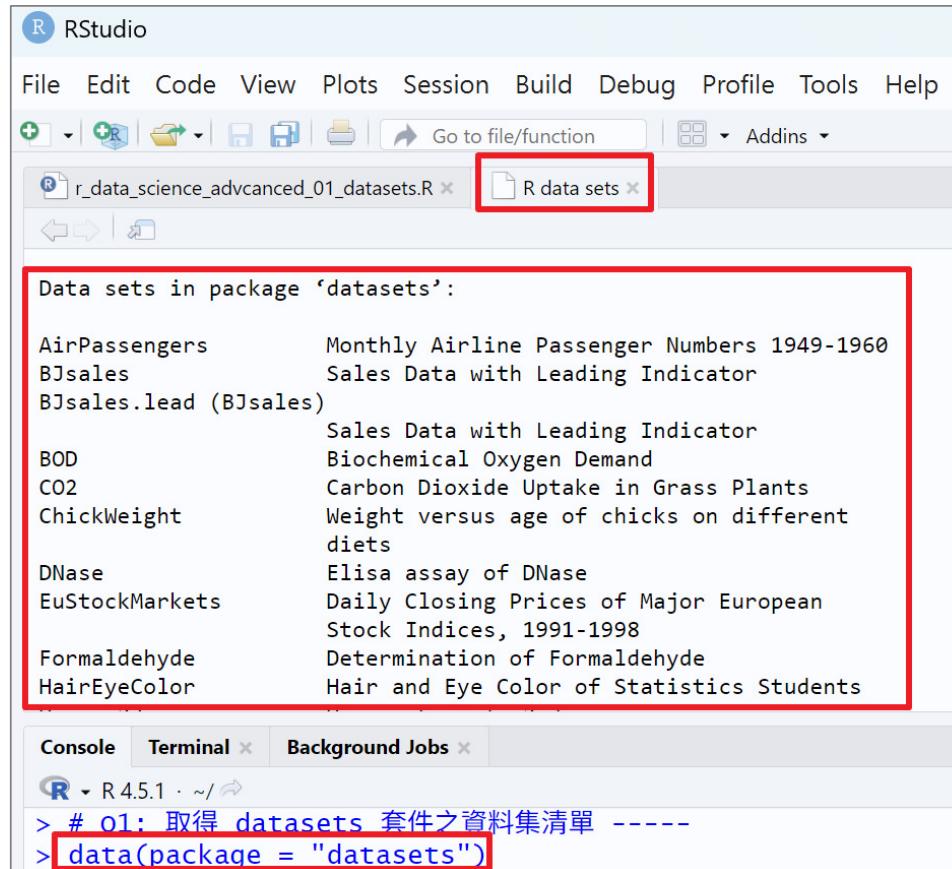
- R 可以正確表示無窮大數值:
 - $+\infty$ (正無窮大): `Inf`
 - $-\infty$ (負無窮大): `-Inf`
- `NaN`: 不是一個數值(數學上無定義,例:0/0)
- `NA`: 表示遺漏值(missing values)或(Not Available)
- `is.finite(1/3)` 判定是否為有限的
- `is.infinite(Inf)` 判定是否為無窮大
- `is.nan(x)` 判定是否為NaN
- `pi, letters, LETTERS, month.abb, month.name`

英文月份

1.2 認識datasets套件之資料操作

Q1: 取得 datasets 套件之資料集清單

- `data(package = "datasets")`



The screenshot shows the RStudio interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with various icons. The main workspace shows a file tab for 'r_data_science_advanced_01_datasets.R' and a plot tab for 'R data sets'. A red box highlights the plot tab. The plot area displays the output of the R command:

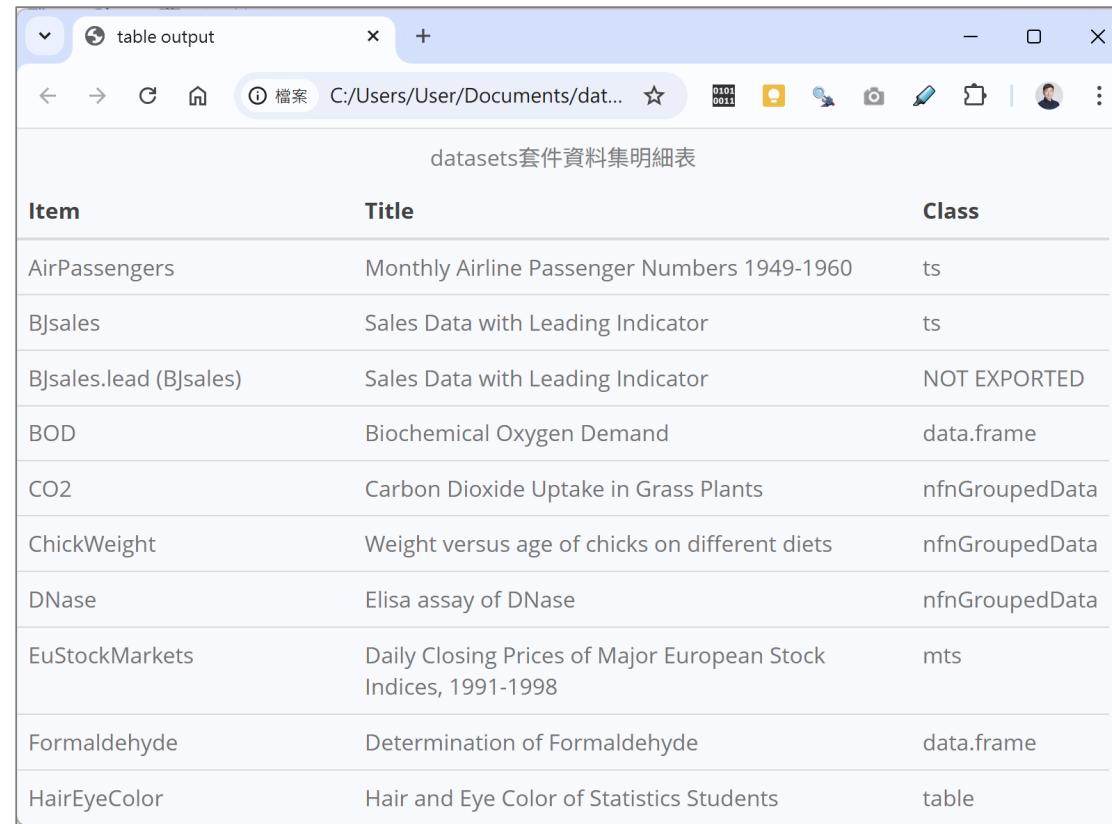
```
Data sets in package 'datasets':  
AirPassengers      Monthly Airline Passenger Numbers 1949-1960  
BJsales            Sales Data with Leading Indicator  
BJsales.lead (BJsales)  
BOD                Sales Data with Leading Indicator  
Biochemical Oxygen Demand  
CO2                Carbon Dioxide Uptake in Grass Plants  
ChickWeight        Weight versus age of chicks on different diets  
DNase              Elisa assay of DNase  
EuStockMarkets    Daily Closing Prices of Major European Stock Indices, 1991-1998  
Formaldehyde       Determination of Formaldehyde  
HairEyeColor       Hair and Eye Color of Statistics Students
```

At the bottom of the RStudio window, the console tab is active, showing the command that was run:

```
> # 01: 取得 datasets 套件之資料集清單 -----  
> data(package = "datasets")
```

Q2: 取得 datasets 套件的資料集清單並以網頁呈現

- 技巧: 使用 kableExtra, DT 套件之表格網頁呈現



The screenshot shows a browser window with the title "table output". The address bar indicates the file is located at "C:/Users/User/Documents/dat...". The main content is a table titled "datasets套件資料集明細表". The table has three columns: "Item", "Title", and "Class". The data rows are:

Item	Title	Class
AirPassengers	Monthly Airline Passenger Numbers 1949-1960	ts
Bjsales	Sales Data with Leading Indicator	ts
Bjsales.lead (Bjsales)	Sales Data with Leading Indicator	NOT EXPORTED
BOD	Biochemical Oxygen Demand	data.frame
CO2	Carbon Dioxide Uptake in Grass Plants	nfnGroupedData
ChickWeight	Weight versus age of chicks on different diets	nfnGroupedData
DNase	Elisa assay of DNase	nfnGroupedData
EuStockMarkets	Daily Closing Prices of Major European Stock Indices, 1991-1998	mts
Formaldehyde	Determination of Formaldehyde	data.frame
HairEyeColor	Hair and Eye Color of Statistics Students	table

R demo

Q3: 取得 datasets 套件的資料集清單並匯出為 .csv

- `write.csv(df, file = "datasets_list.csv", row.names=FALSE)`

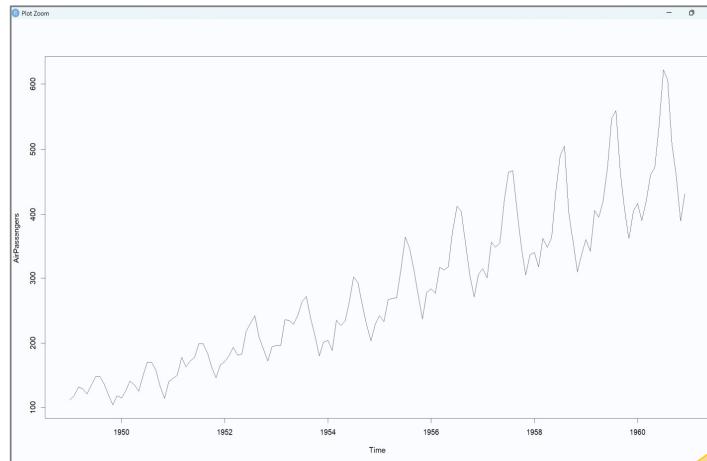
Q4: 取得 datasets 套件的資料集清單並匯出為 .xlsx

- `library(writexl)`
- `write_xlsx(df, path = "datasets_list.xlsx")`

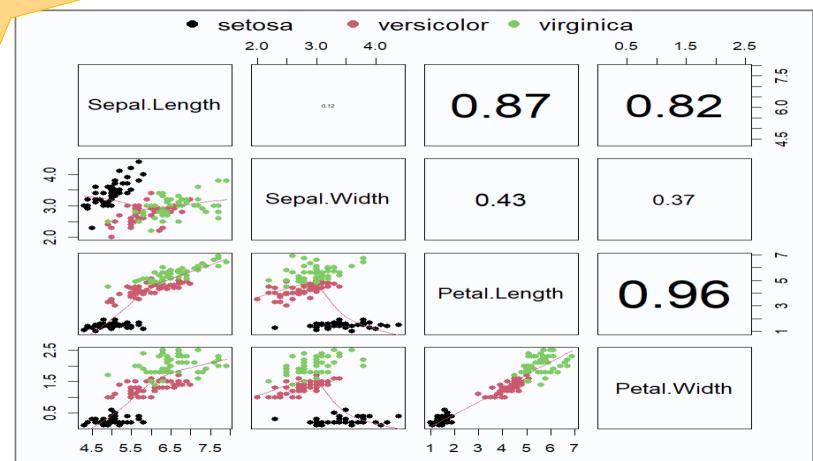
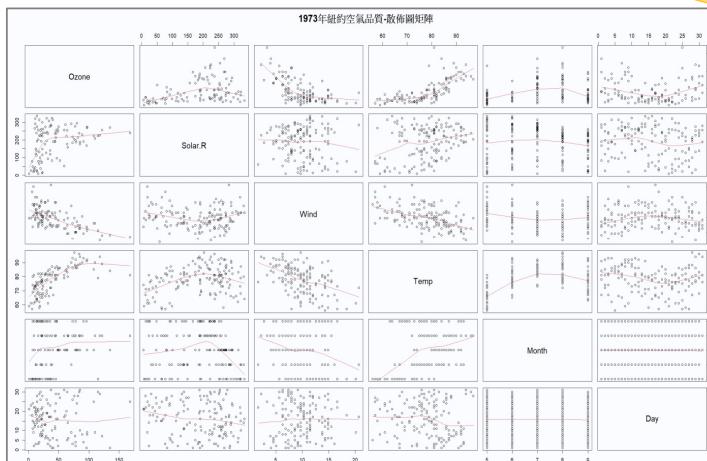
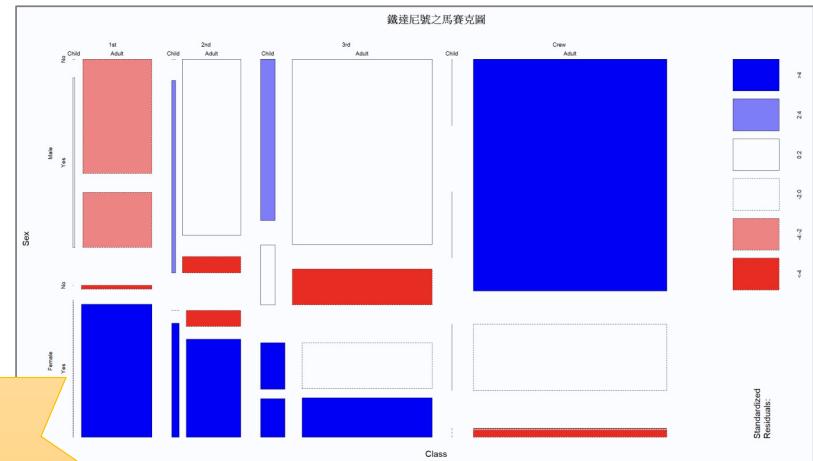
Q5: 熟悉以下資料集之資料操作

- 1. AirPassengers : ts 時間序列
- 2. Titanic : table 表格
- 3. airquality : data.frame 資料框
- 4. iris : data.frame 資料框
- 5. mtcars : data.frame 資料框
- 6. penguins : data.frame 資料框

資料集操作



R demo



謝謝您的聆聽

Q & A



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