

RWEPA | 程式設計 Python

01_Python語言簡介

- 按訂閱、讚、開啟小鈴鐺
- <https://youtube.com/@alan9956>
- <http://rwepa.blogspot.com/>



Business Data Analytics



大綱

1.1 程式設計是什麼？

1.2 程式設計能幫助我做什麼？

1.3 程式設計**資料分析應用**

1.4 如何學習程式設計

1.5 Python語言簡介

1.1 程式設計是什麼?

程式設計

- 電腦程式設計（英語：Computer programming），或稱程式設計（programming），是給程式解決出特定問題的過程，也是軟體開發過程中的重要步驟。
- 程式設計方法往往以某種程式設計語言為工具，給出這種語言下的程式。
- 程式設計過程一般包括分析、設計、編碼、測試、除錯等不同階段。



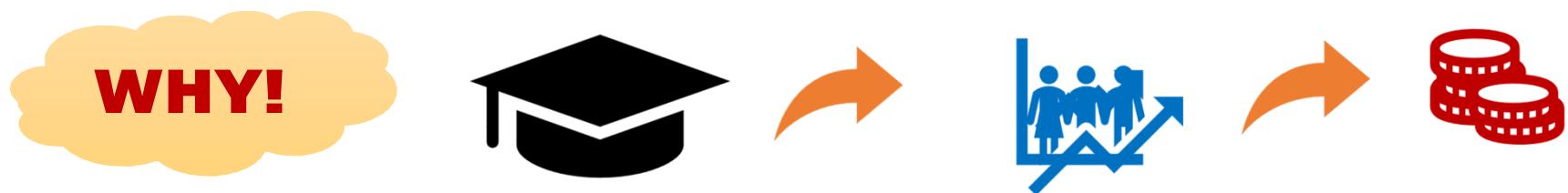
拉夫萊斯伯爵夫人艾達·金
(Ada Lovelace的水彩肖像, 1840.)

參考: https://en.wikipedia.org/wiki/Computer_programming

1.2 程式設計能幫助我做什麼？

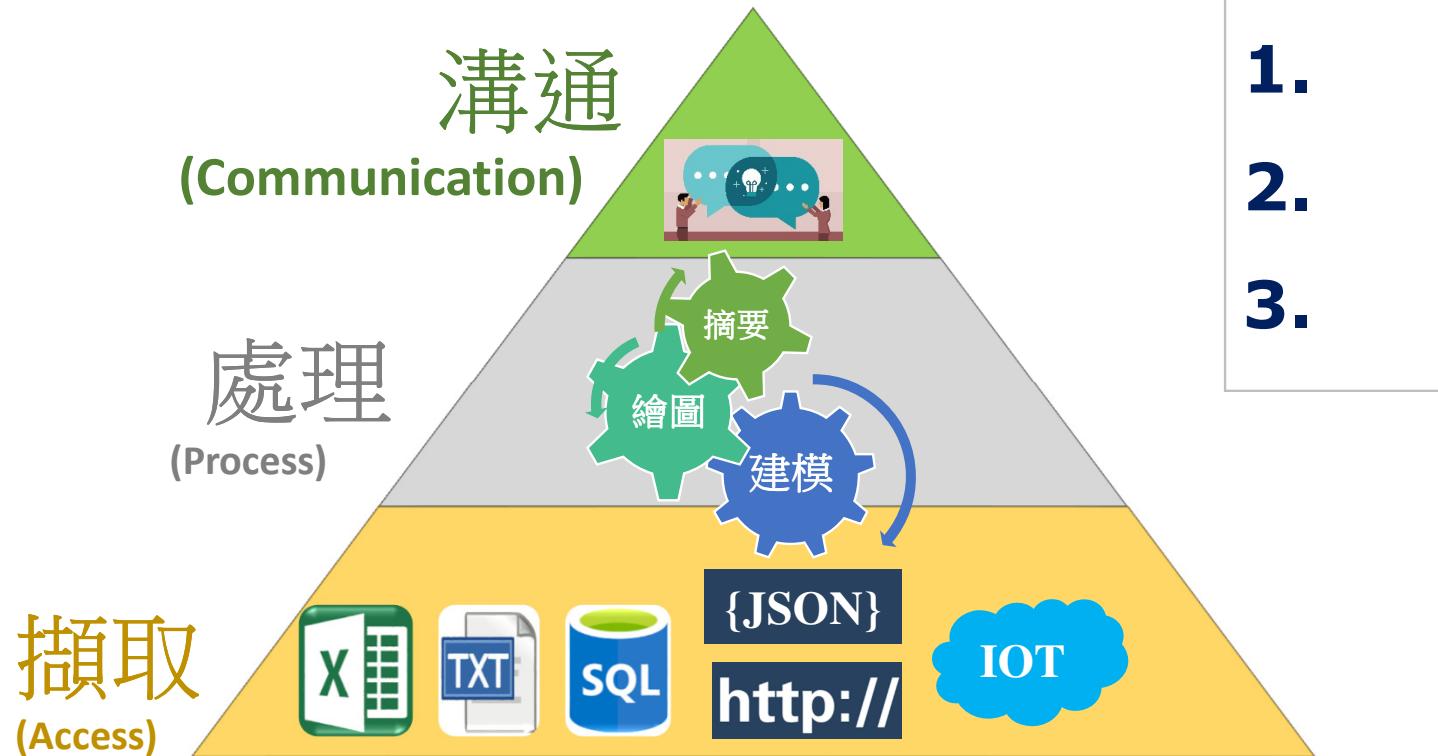
程式設計能幫助 → \$\$\$

- 學校作業、報告、專題、論文
- 職場業務報告
- 產銷人發財應用



1.3 程式設計資料分析應用

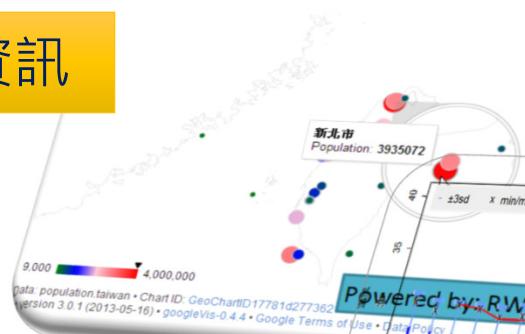
★★★資料分析架構→APC方法



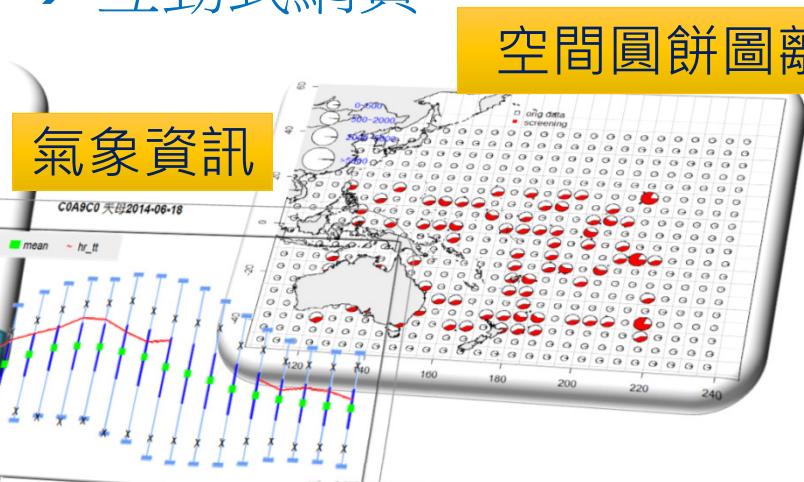
資料分析與視覺化應用

R + shiny → 互動式網頁

地理資訊



氣象資訊

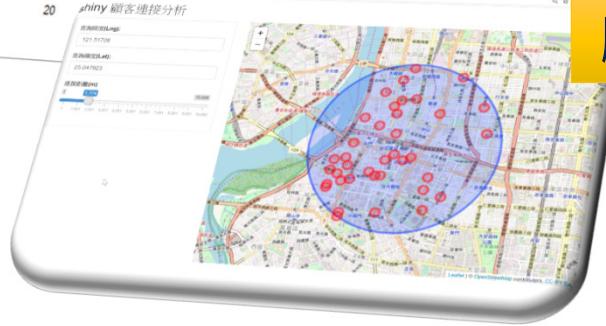


空間圓餅圖離群值分析

保險預測



顧客連結資訊



中央氣象局1,600萬筆互動分析平台

網頁呈現



客製化選單

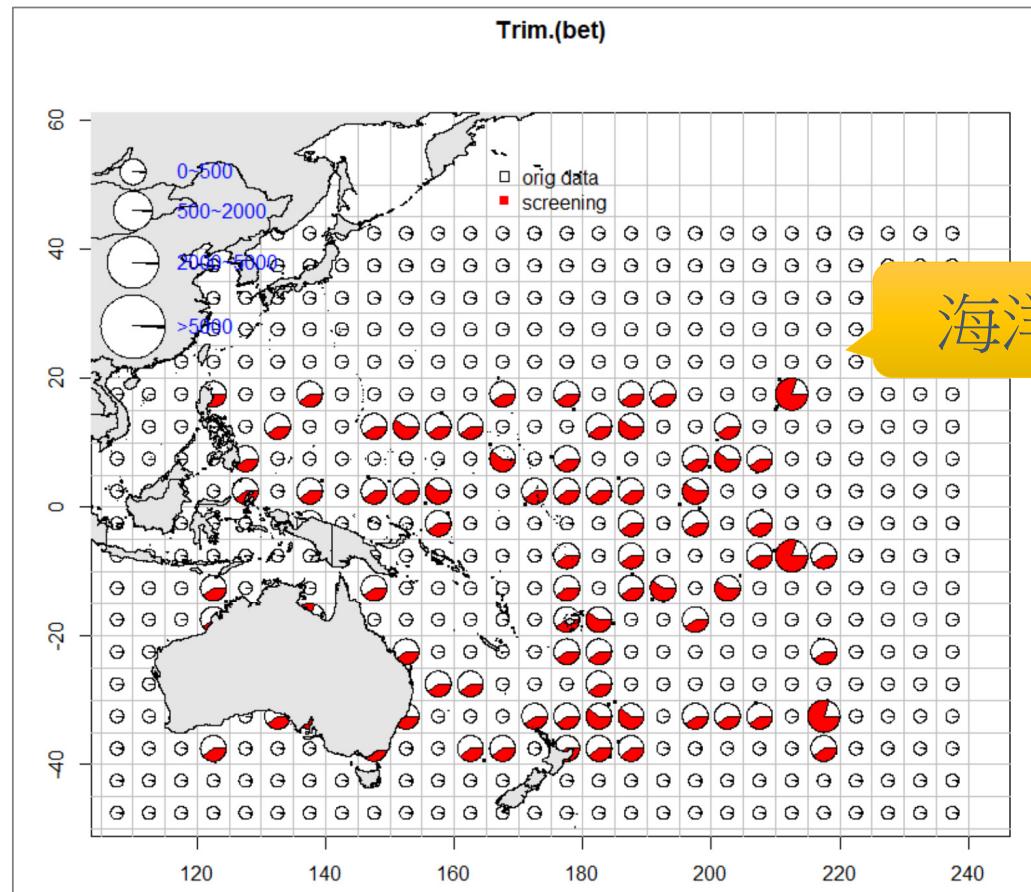
R統計運算

汽車產險預測模型

The screenshot shows a web-based data analysis interface for the iinsurance platform. The top navigation bar includes links for file upload, data processing, statistical charts, model evaluation, and prediction models. A yellow callout bubble labeled "機率模型閾值調整" (Probability Model Threshold Adjustment) points to a slider control labeled "機率模型閾值" (Probability Model Threshold) with a value of 0.1. Another yellow callout bubble labeled "預測結果" (Prediction Results) points to a red box around the "檢視結果" (View Result) button in the top right corner of the main content area. The main content area displays a table titled "Show 10 entries" with 12 rows of data. The columns represent various factors: 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 0 (Private Car Age 0), 私家車一車齡 1 (Private Car Age 1), 私家車一車齡 2 (Private Car Age 2), 私家車車齡 0_1_2 組合 (Private Car Age 0_1_2 Combination), 車齡 0_1_2 組合 (Age 0_1_2 Combination), 預測機率 (Prediction Probability), and 理賠 (Claim). The last column "理賠" contains values such as "有" (Yes) and "無" (No). Red boxes highlight the "檢視結果" button, the "私家車車齡 0_1_2 組合" column header, and the "預測機率" and "理賠" columns.

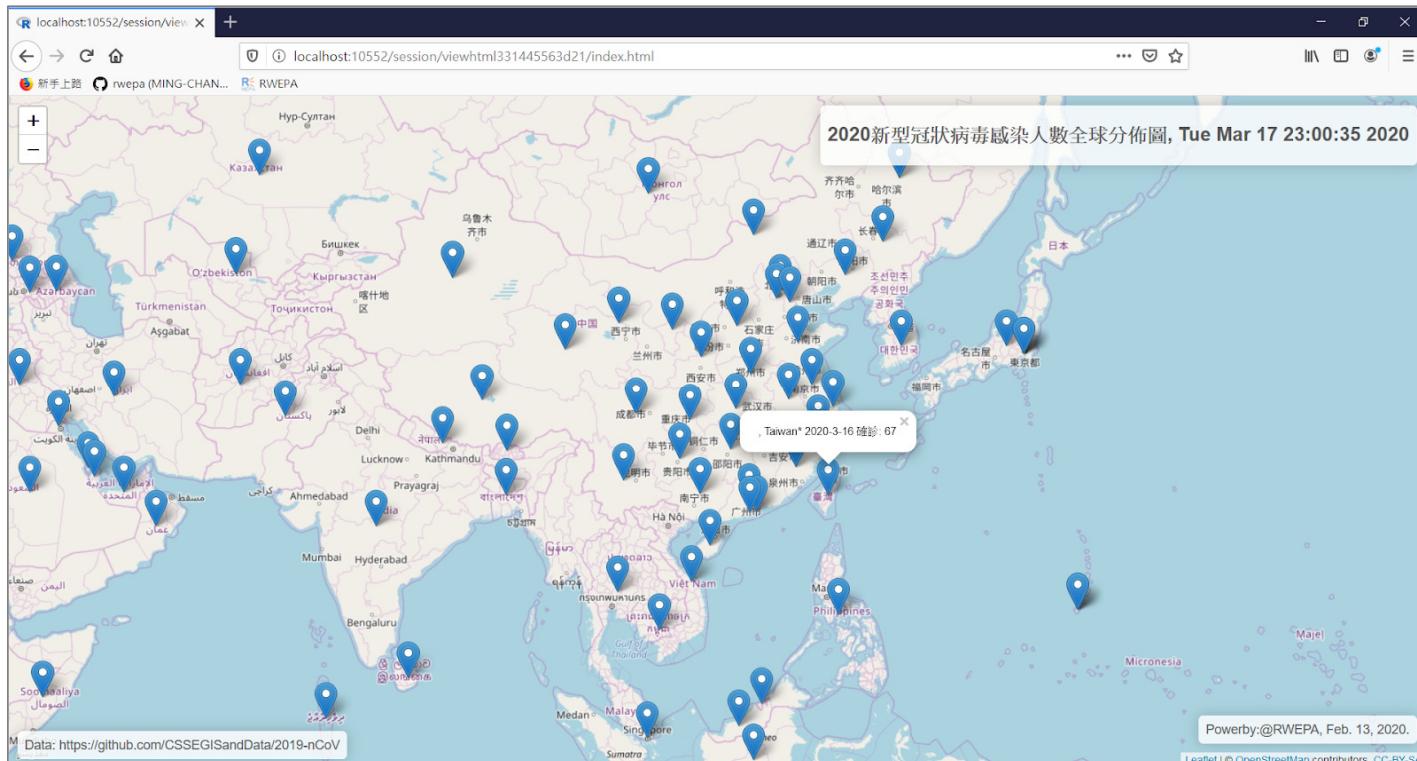
M	0	A	1	0.9144422	-0.08944106	50	4	1	0	0	1	0	2	0.1069	有	
M	0	A	1	0.8158795	-0.20348856	20	4	0	0	1	1	2	2	0.1441	有	
3	M	0	A	1	0.8377823	-0.17699695	50	3	0	0	1	1	2	2	0.1866	有
4	M	0	A	1	0.4325804	-0.83798702	50	6	0	1	0	1	1	2	0.0944	無
5	M	0	A	1	0.7173169	-0.33223755	50	4	0	0	1	1	2	2	0.1218	有
6	M	0	A	1	0.8377823	-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

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>

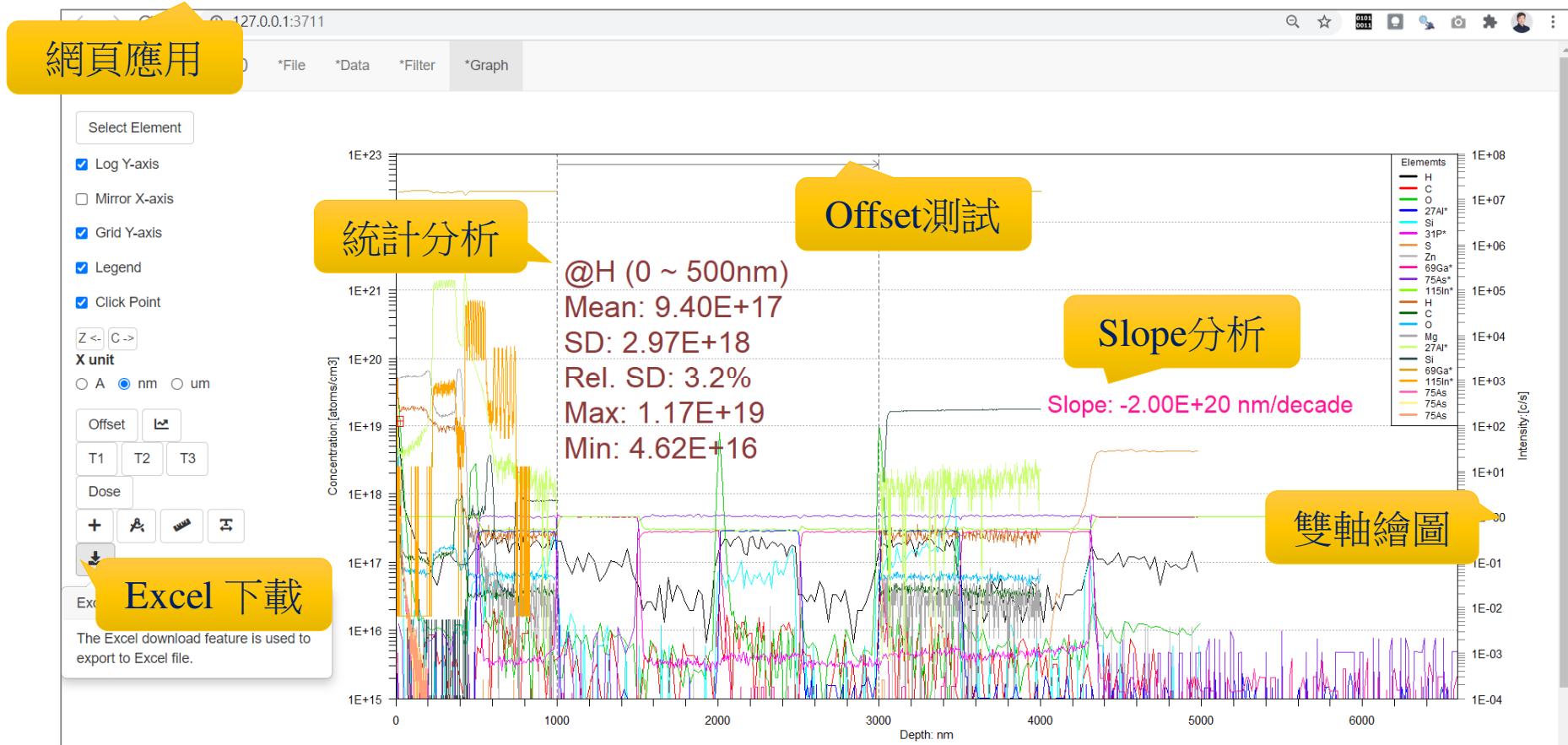


品質管制圖(quality control chart)應用

- <http://rwepa.blogspot.com/2021/10/r-shiny-quality-control-chart.html>

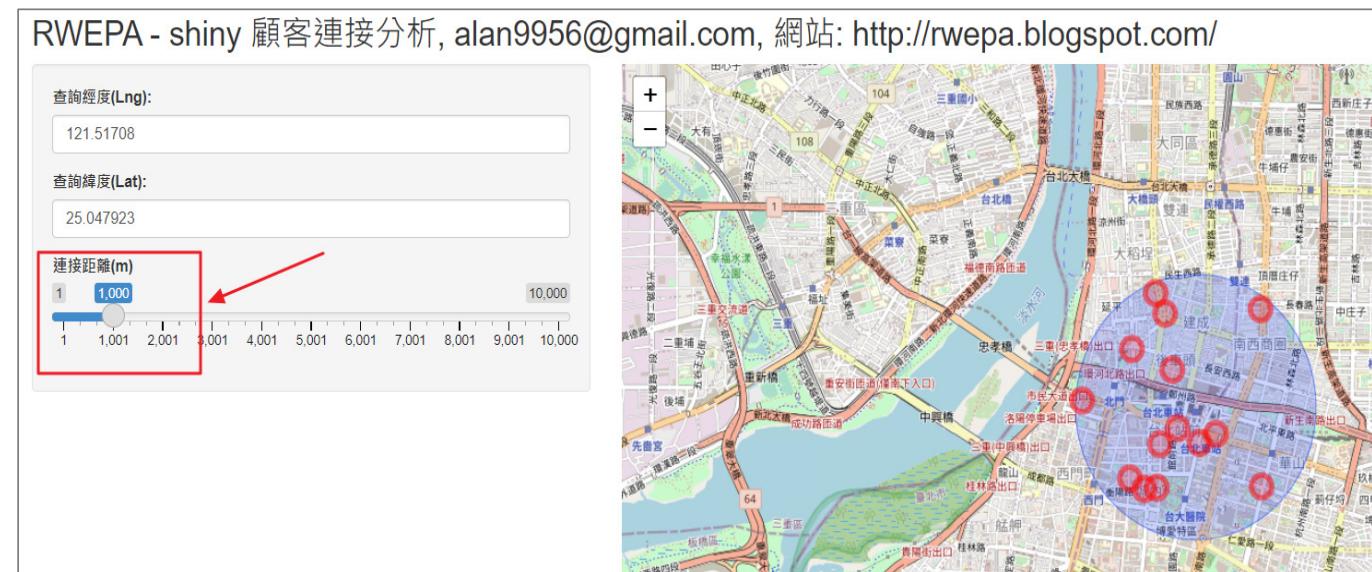
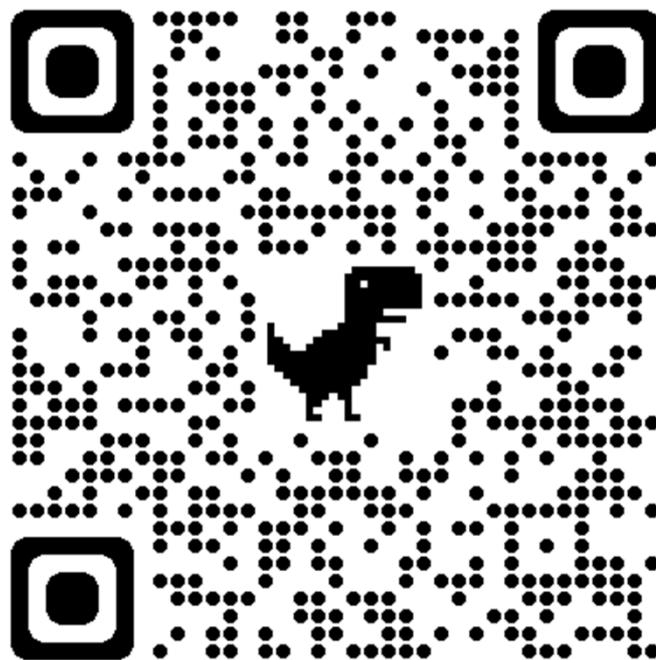


離子資料分析與視覺化應用



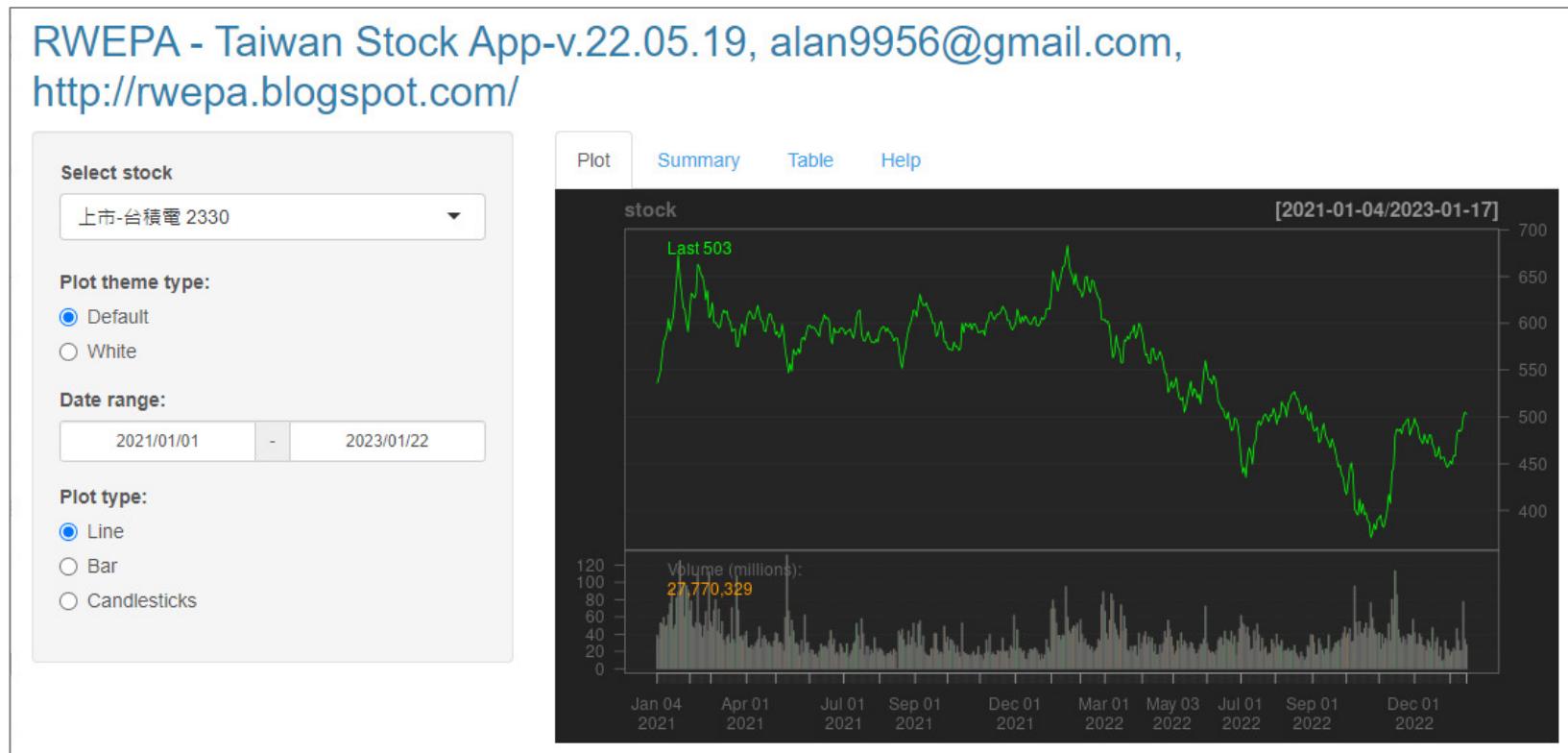
顧客連接分析 - demo

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



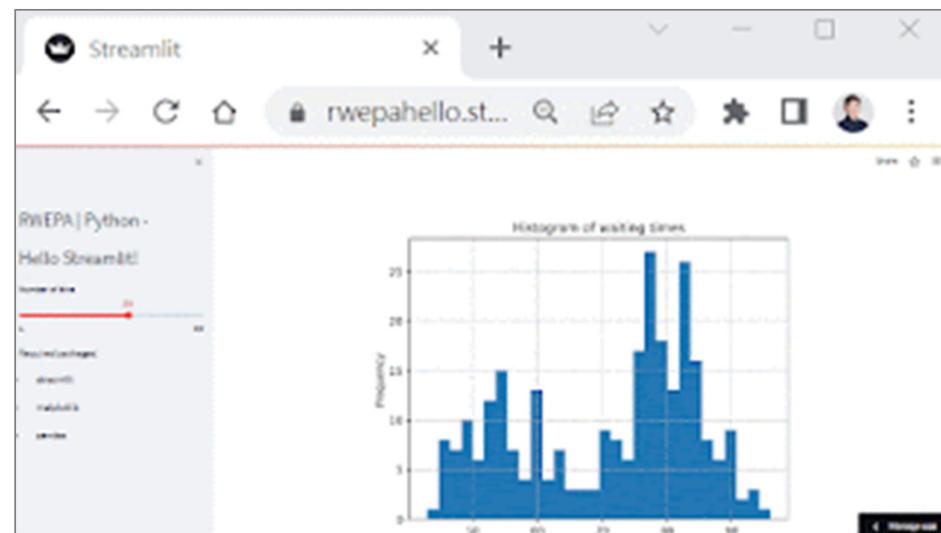
Taiwan Stock App - demo

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



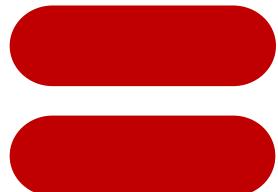
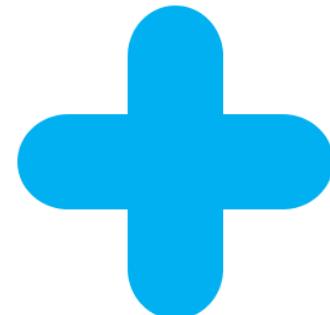
Python - Streamlit

- YouTube: <https://youtu.be/FW-dl-flLvk>
- 【記得按 讚、訂閱、開啟小鈴鐺】
- <http://rwepa.blogspot.com/2023/01/python-streamlit-dashboard.html>



1.4 如何學習程式設計

學習目標



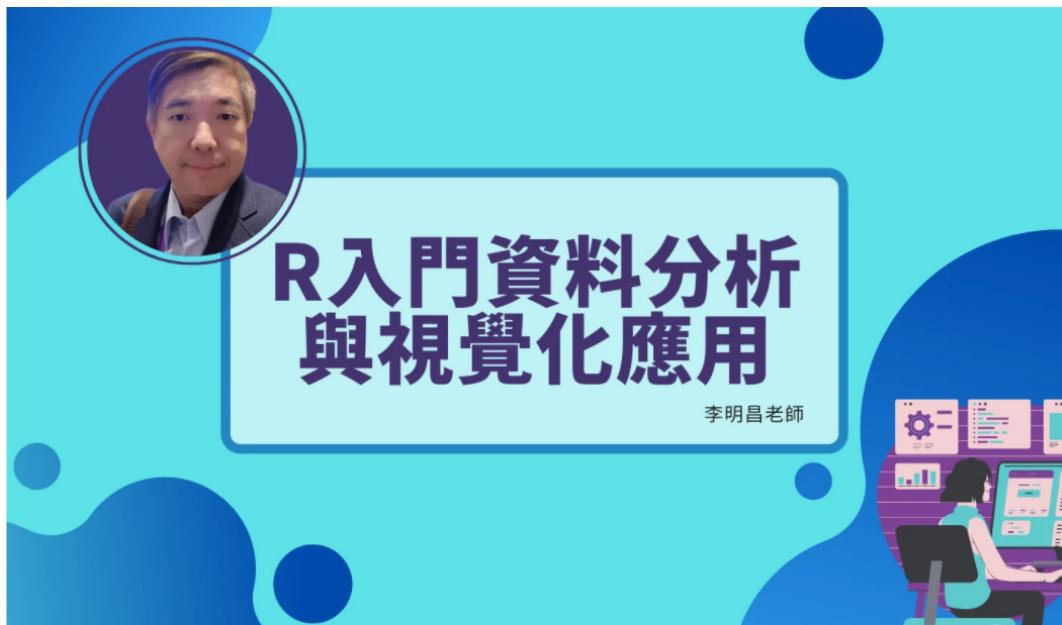
如何學習 Python/R?

- 熟悉教材內容
- 將教材的資料集改為工作職場資料集
- 遇到問題時，想辦法尋找答案
- 掌握 APC方法
- 掌握 摘要, 繪圖, 建模
- 參考網路應用文章 (進階) & 學術論文

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



- **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>



課程提供教學範例的原始程式檔案與資料集

- **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

1.5 Python語言簡介

Python 簡介

- 吉多·范羅蘇姆 (Guido van Rossum) 在1989年的聖誕節期間研發 Python 語言。
 - https://en.wikipedia.org/wiki/Guido_van_Rossum
 - Python 3.11.1 – 2023年1月26日
- 特性：
 - 跨平台
 - 開放性
 - 易讀性
 - 動態語言
 - 直譯語言
 - 豐富套件(模組)
 - 其他語言結合, 例: Cython 編譯成執行檔(.exe)

Python 下載

- <https://www.python.org/>

The screenshot shows the Python.org homepage with a focus on the 'Downloads' section. A red box and arrow highlight the 'Python 3.9.0' download button under the 'Download for Windows' heading. The page also features a sidebar with code snippets and a main content area with a note about compatibility.

Python

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python™

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About Downloads Documentation Community Success Stories News Events

All releases
Source code
Windows
Mac OS X
Other Platforms
License
Alternative Implementations

Download for Windows

Python 3.9.0

Note that Python 3.9+ cannot be used on Windows 7 or earlier.

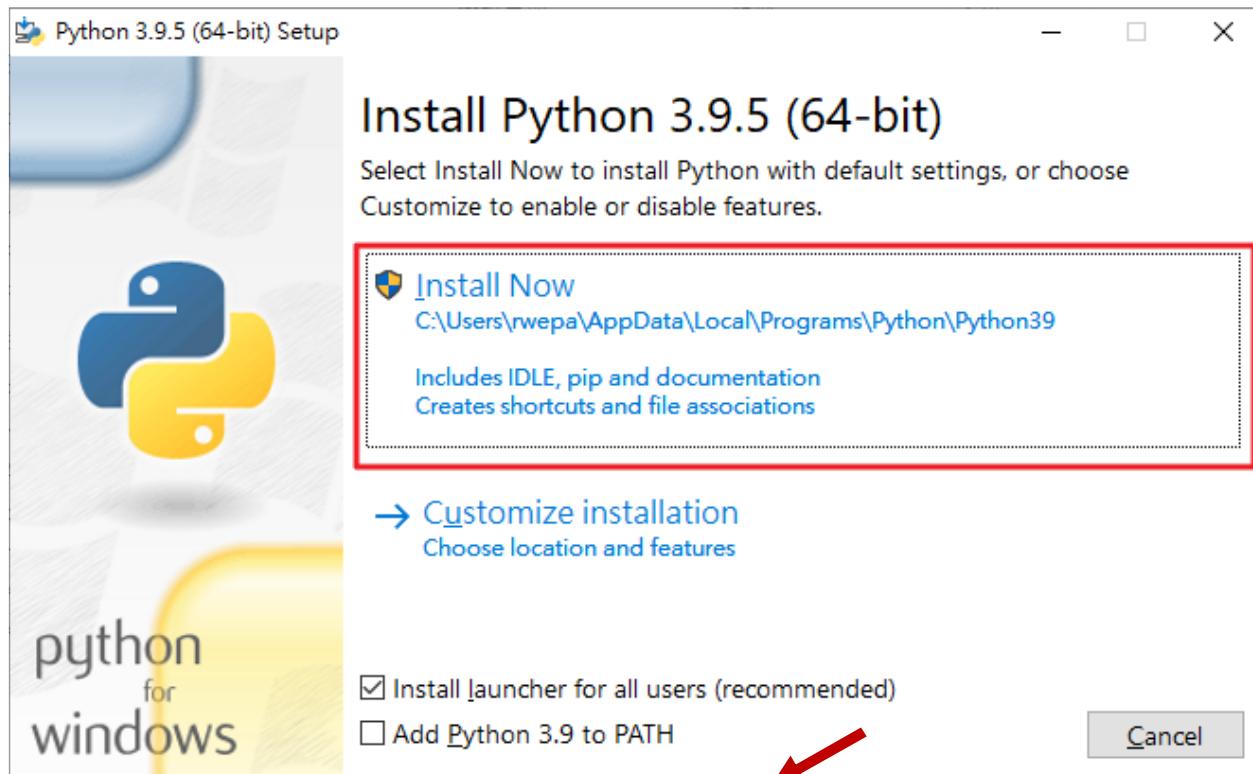
Not the OS you are looking for? Python can be used on many operating systems and environments.

[View the full list of downloads.](#)

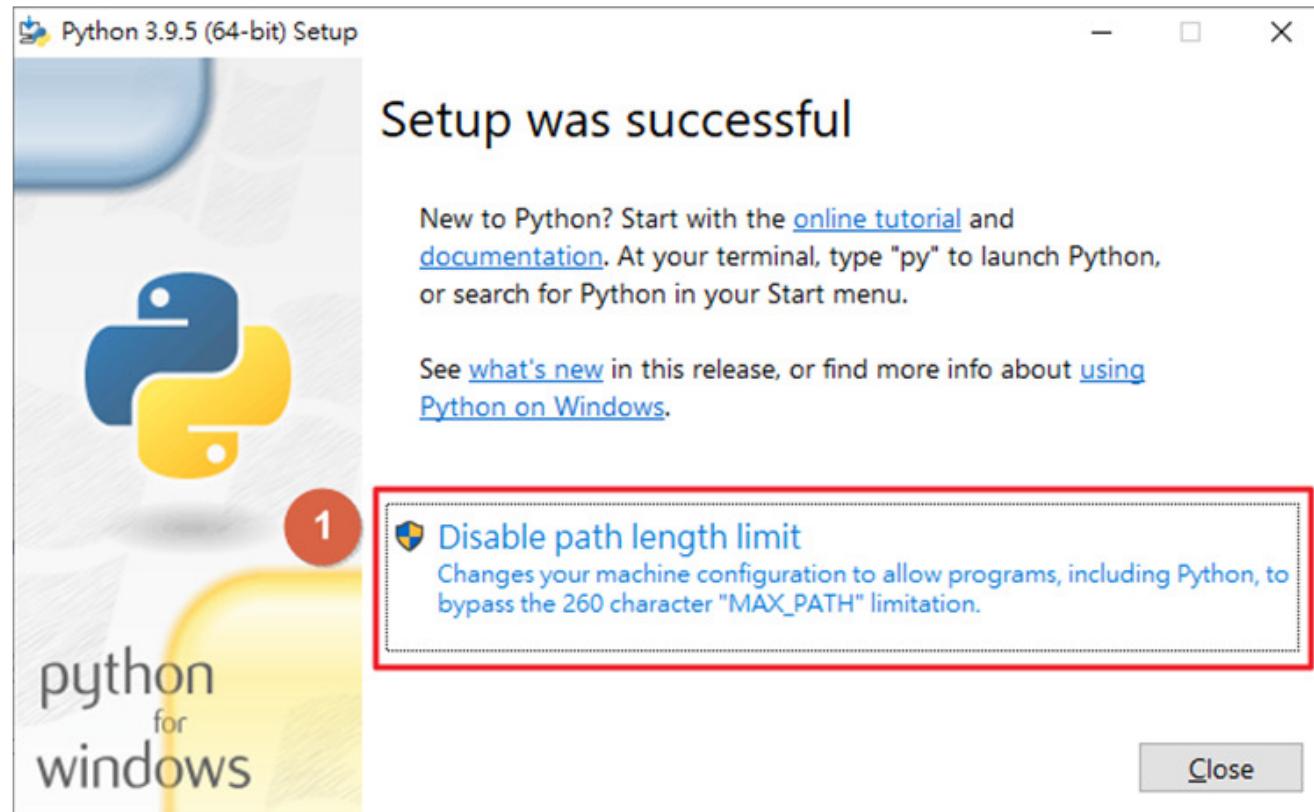
Python is a programming language that lets you work quickly and integrate systems more effectively. [» Learn More](#)

Python 安裝

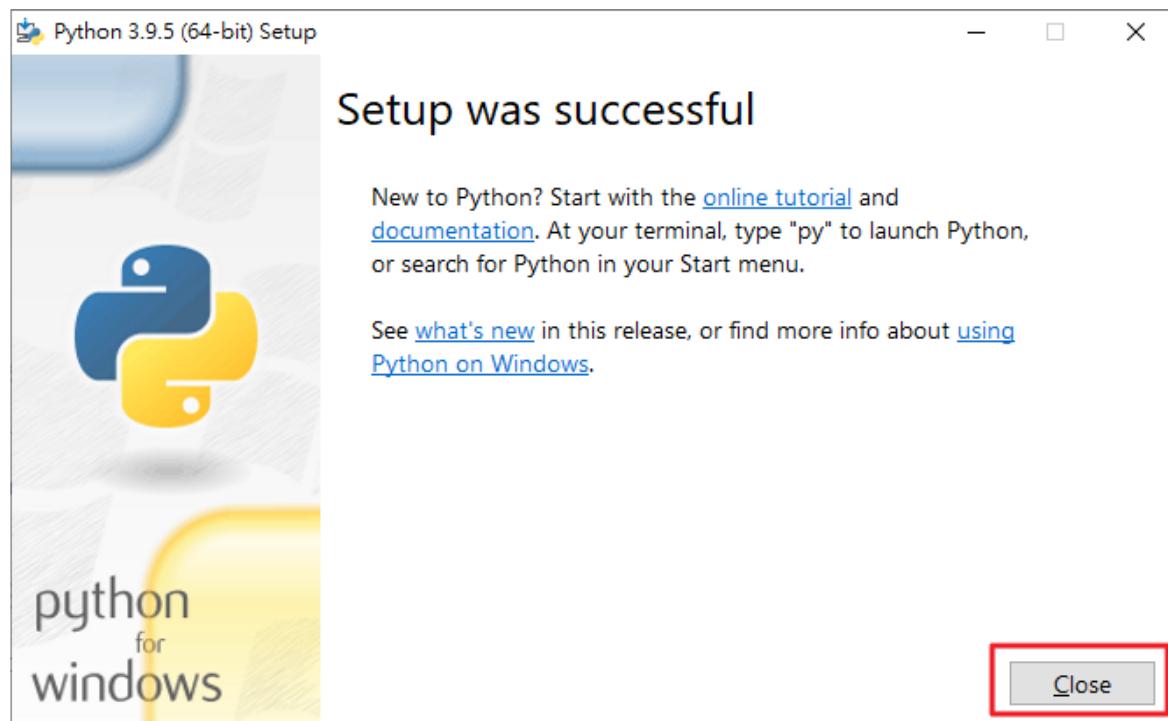
- python-3.9.5-amd64.exe



Python 安裝 – 取消字元長度限制



Python 安裝完成



Python 執行 <方法1> Python 3.9(64-bit)

```
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> help('print')
Help on built-in function print in module builtins:

print(...)
    print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)

    Prints the values to a stream, or to sys.stdout by default.
    Optional keyword arguments:
        file: a file-like object (stream); defaults to the current sys.stdout.
        sep:   string inserted between values, default a space.
        end:   string appended after the last value, default a newline.
        flush: whether to forcibly flush the stream.

>>> print('Hello World - RWEPA')
Hello World - RWEPA
>>> quit()
```

Windows 環境變數 Path: 加入
;C:\Windows\System32

- `help(print)`
- `print('Hello world')`
- `quit()`

Python 執行 <方法2> 命令提示字元



```
命令提示字元
Microsoft Windows [版本 10.0.19042.928]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\rwepa>python
Python 3.8.5 (default, Sep  3 2020, 21:29:08) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32
Warning:
This Python interpreter is in a conda environment, but the environment has
not been activated. Libraries may fail to load. To activate this environment
please see https://conda.io/activation

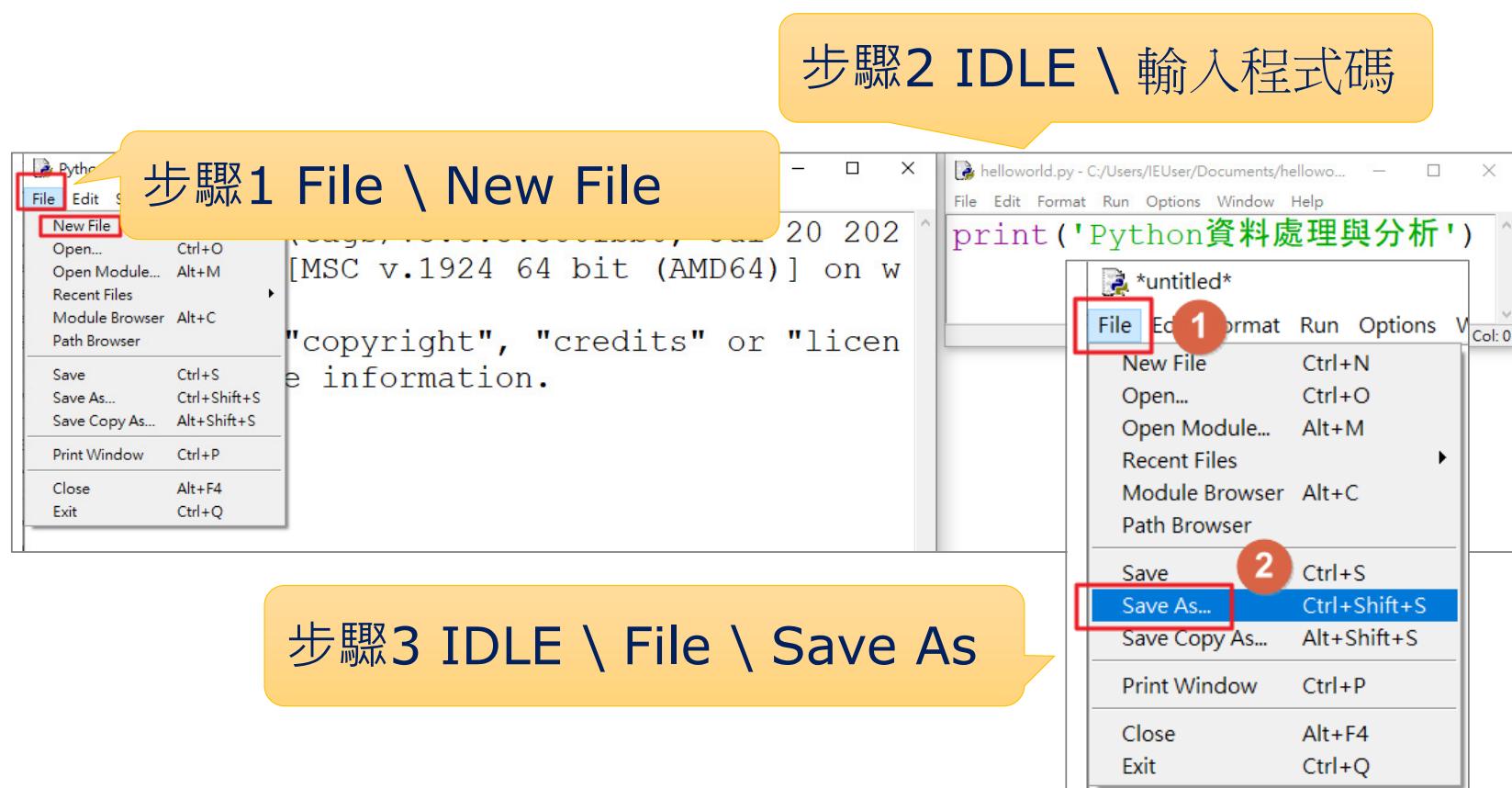
Type "help", "copyright", "credits" or "license" for more information.
>>> quit()

C:\Users\rwepa>
```

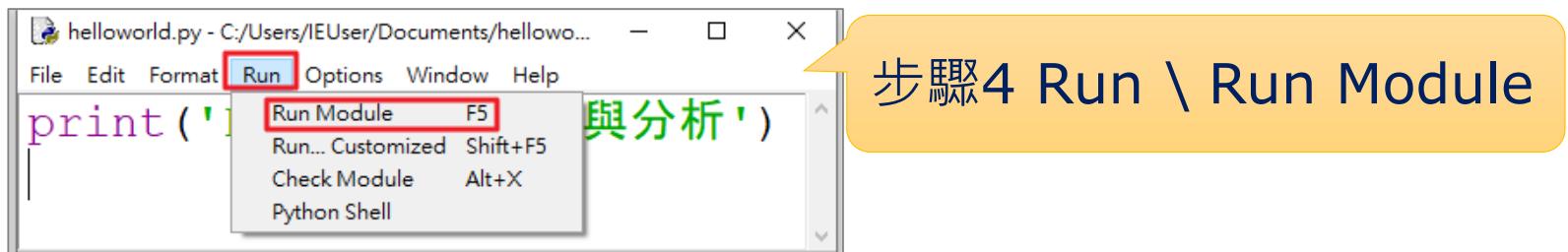
- python
- 1+2
- quit()

Python 執行 <方法3> IDLE模式

- IDLE 可先將檔案編輯與儲存



Python 執行 <方法3> IDLE模式 (續)



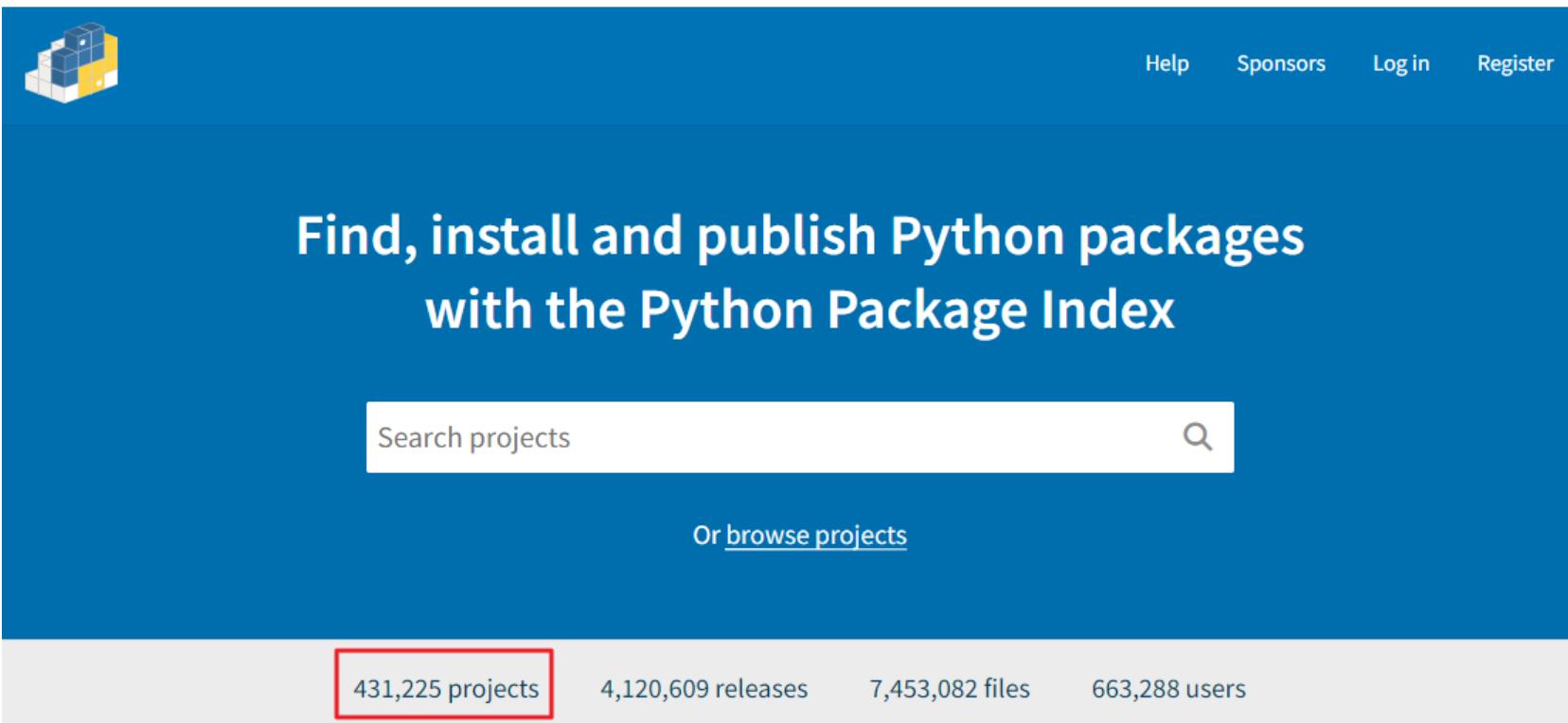
步驟4 Run \ Run Module

A screenshot of the Python 3.8.5 Shell window. The title bar says "Python 3.8.5 Shell". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The shell area displays the Python version information: "Python 3.8.5 (tags/v3.8.5:580fbb0, Jul 20 2020, 15:57:54) [MSC v.1924 64 bit (AMD64)] on win32" and the instruction "Type "help", "copyright", "credits" or "license()" for more information. Below this, the command line shows: ">>>" followed by the path "= RESTART: C:/Users/IEUser/Documents/helloworld.py", and then "Python資料處理與分析". A red box highlights this last line. A yellow callout bubble points to this red box with the text "步驟5 執行結果".

步驟5 執行結果

PyPI (Python Package Index)

- <https://pypi.org/>
- 43萬以上專案



已安裝模組(pip)

The image shows two command-line windows. The top window is titled '命令提示字元' and shows the output of the command 'pip list'. It lists several Python packages and their versions. The bottom window is titled '命令提示字元 - python -c help('os')' and shows the help documentation for the 'os' module. A yellow callout bubble points from the right side of the 'pip list' window towards the bottom window, containing instructions for using pip and module help.

```
Microsoft Windows [版本 10.0.19043.1055]
(c) Microsoft Corporation. 著作權所有，並保有所有權利。
C:\Users\88697>pip list
Package           Version
-----
absl-py          0.12.0
appdirs          1.4.4
astunparse       1.6.3
cachetools      4.2.1
certifi          2021.5.30
chardet          4.0.2
defusedxml       0.5.0
distlib          0.3.1
engineering-numpy 1.2.1

命令提示字元 - python -c help('os')
C:\Users\88697>python -c help('os')
Help on module os:

NAME
    os - OS routines for NT or Posix depending on what system we're on.

MODULE REFERENCE
    https://docs.python.org/3.8/library/os

    The following documentation is automatically generated from the Python
    source files. It may be incomplete, incorrect or include features that
    are considered implementation detail and may vary between -- More --
```

- **pip list**
- 模組說明
- python -c help('模組')**
- 按 Q 關閉說明

Python IDE

- Anaconda, 包括 Spyder:
 - <https://www.anaconda.com/>
- PyCharm:
 - <https://www.jetbrains.com/pycharm/>
- WinPython:
 - <http://winpython.github.io/>
- RStudio - Terminal 視窗
 - <https://www.rstudio.com/products/rstudio/>
- Visual Studio Code (VSCode)
 - <https://code.visualstudio.com/docs/python/python-tutorial>
- Google:
 -  Google Colaboratory

上課示範軟體 (Spyder)

IDE 整合開發環境-
Integrated
Development
Environment

RStudio – 執行 Python

The screenshot shows the RStudio interface with a Python script named '01.python.讀我.py' open in the code editor. The script contains several lines of Python code, including imports for os and matplotlib, and code to change the working directory to 'C:/pythondata'. A yellow callout bubble points to this code with the text '步驟2 執行 Ctrl + Alt + Enter'.

```

5 author: Ming-Chang Lee
6 email : alan9956@gmail.com
7 RWEPA : http://rwepa.blogspot.tw/
8 """
9
10 # 檔案資料夾 c:/pythondata
11 # 01.python.讀我.py      , 檔案說明
12 # 02.type.operations.py , 資料操作
13 # 03.matplotlib.demo.py , matplotlib繪圖
14 # 04.understandingdata.py , 資料理解 pandas
15 # 05.regression.py     , 迴歸分析,線性模型
16 # 06.logistic.regression.py , logistic regression-分類
17 # 07.decision.tree.py   , 決策樹 decision tree & 隨機森林法 random forest
18 # 08.decision.tree-codes.py , 決策樹 Python 程式碼
19 # 09.associationrule.py , 關聯規則
20
21 # 切換工作目錄
22 import os # 載入 os 套件
23 os.getcwd() # 讀取工作目錄
24 os.chdir("C:/pythondata") # 變更工作目錄
25 os.getcwd()
26 os.listdir(os.getcwd()) # 顯示檔案清單
27
28 # 顯示模組提供之函數
2633

```

The RStudio environment pane shows an 'Environment' tab with a message 'Environment is empty'. The file browser pane shows a folder structure with files like '01.python.讀我.py', '02.type.operations.py', etc., and various plots and PDFs.

步驟1 先在 Terminal 視窗輸入 python

A red arrow points to the 'Terminal' tab in the bottom-left corner of the RStudio interface. Another red arrow points to the command 'python' entered in the terminal window.

步驟2 執行 Ctrl + Alt + Enter

A yellow callout bubble points to the terminal output area where Python has been successfully launched. The text 'Python 3.7.1 (default, Dec 10 2018, 22:54:23) [MSC v.1915 64 bit (AMD64)] :: Anaconda custom (64-bit) on win32' is visible.

步驟3 顯示結果

A yellow callout bubble points to the terminal output area where the script's execution results are displayed, including the list of files in the current directory.

謝謝您的聆聽

Q & A



李明昌

alan9956@gmail.com

<http://rwepa.blogspot.tw/>