



程式設計概論

Programming 101

—開發環境及使用者介面說明

授課老師：邱淑怡

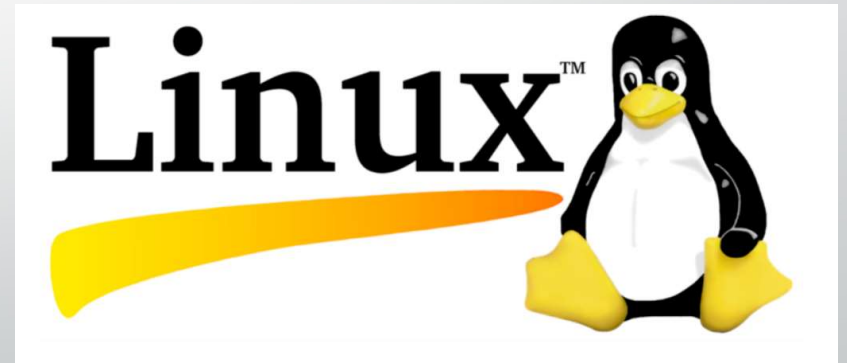
Date: 2/16/2023

大綱

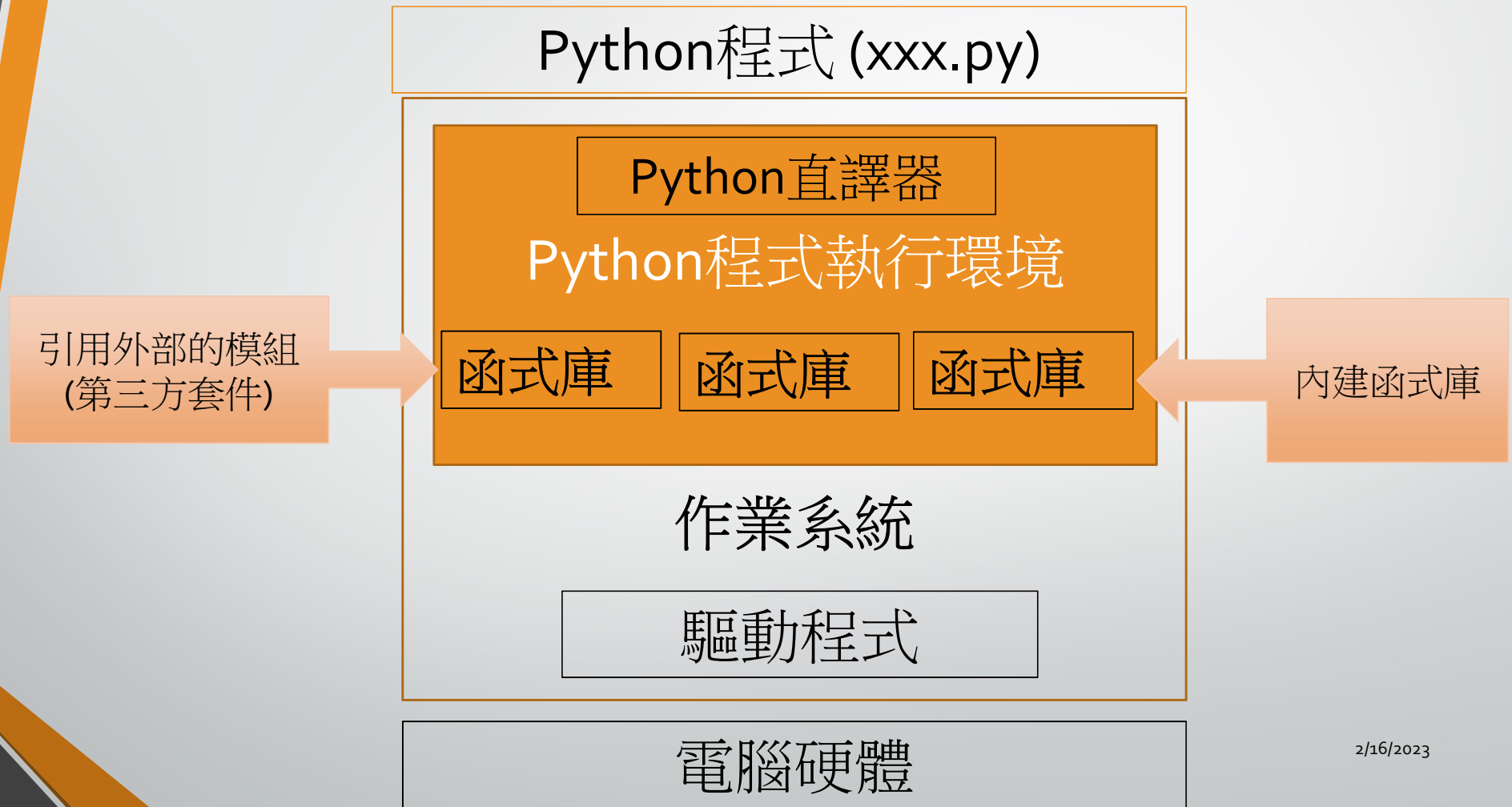
- Python環境說明
- 安裝Python
- Python環境架構示意圖
- 安裝Python IDE(Integrated Development Environment，整合開發環境)
- 開始使用Python了

Python環境說明

- Python跨平台（作業系統的平台）
 - Windows 10/ 7
 - Apple MacOS
 - Linux
 - Red hat
 - Ubuntu
 - CentOS
 - ...
 - ...



Python執行環境架構示意圖



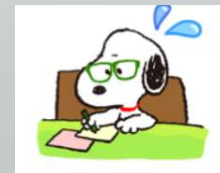
什麼是函式庫(程式庫)

- 函式庫(library)：提供類別和函式，可以讓程式設計人員用來開發應用程式
- Python中所指的函式庫是模組和套件的統稱
 - 內建函式(build-in function):安裝Python時一併安裝的functions，啟動python開發環境之軟體即可使用
 - 標準函式庫(standard library):安裝Python時一併安裝的模組與套件，可查看python module docs，使用時須進行匯入的動作
 - 外部函式庫(external library): 指另外需要安裝的模組和套件，又稱第三方函式庫，網路上針對不同用途所推出的外部函式庫

常見第三方函式庫

- Numpy: 矩陣與資料運算，線性代數、傅立葉轉換
- Matplotlib: 2D 視覺化工具
- Scipy: 科學計算，最佳化與求解、矩陣運算、傅立葉轉換
- Pandas: 資料處理及分析
- Flask: web 框架，開發網站
- Tkinter, PyQt: GUI 程式開發
- PyGame: 多媒體與遊戲軟體開發
- Requests: 存取網際網路資料
- BeautifulSoup: 網路爬蟲
- Scikit-learn, TensorFlow, Keras, PyTorch: 機器學習與深度學習

安裝Python 3.11.2
Release date: Feb 8, 2023
(<https://www.python.org/>)



Run python file (XXX.py)

Python 安裝後

- How to run python file?
 - Python IDLE
 - Python shell
 - 在Windows下，進入“命令提示字元 (cmd)”
 - 先找出python.exe所在資料夾
 - 在“命令提示字元 (cmd)”執行Python file (XXX.py)

Python IDLE

```
Python 3.8.5 Shell
File Edit Shell Debug Options Window Help
Python 3.8.5 (tags/v3.8.5:580fbb0, Jul 20 2020, 15:43:08) [MSC v.1926 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\user\Desktop\20210304.py =====
hello
15
12+4
>>>
```

```
20210304.py - C:\Users\user\Desktop\20210304.py (3.8.5)
File Edit Format Run Options Window Help
1 print("hello")
2 print(12+3)
3 print('12+4')
4
```

Python IDE (Integrated Development Environment, 整合開發環境) 輔助開發的工具

- Python IDLE
- Google colab
- Visual studio code
- Anaconda
 - Jupyter notebook
 - Spyder

Google colab

- 每位同學可以撰寫自己的筆記與程式練習
- 它將程式碼與筆記內容分開
- 可以建立各自的大標題、小標題，做各自筆記內容的階層管理

Colab



歡迎使用 Colaboratory

檔案 編輯 檢視畫面 插入 執行階段 工具 說明

目錄

- 開始使用
- 數據資料學
- 機器學習
- 其他資源
- 機器學習範例
- 區段

+ 程式碼 + 文字 複製到雲端硬碟

連線 編輯

什麼是 Colaboratory?

Colaboratory (簡稱為「Colab」) 可讓你在瀏覽器上撰寫及執行 Python，且具備下列優點：

- 不必進行任何設定
- 免費使用 GPU
- 輕鬆共用

無論你是學生、數據資料學家或是 AI 研究人員，Colab 都能讓你的工作事半功倍。請觀看 [Colab 的簡介影片](#) 瞭解詳情或是直接瀏覽以下的新手入門說明！

開始使用

你正在閱讀的文件並非靜態網頁，而是名為 **Colab 筆記本** 的互動式環境，可讓你撰寫和執行程式碼。

舉例來說，以下是包含簡短 Python 指令碼的 **程式碼儲存格**，可進行運算、將值儲存至變數中並列印運算結果：

```
[ ] seconds_in_a_day = 24 * 60 * 60
seconds_in_a_day
```

Colab program

```
ECKH_mod1.ipynb ☆
檔案 編輯 檢視畫面 插入 執行階段 工具 說明 最近於 6月5日 編輯

+ 程式碼 + 文字

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.linear_model import LogisticRegression
#from sklearn.metrics import accuracy_score, roc_auc_score
from tensorflow import keras
from keras.layers import LSTM
from keras.layers import Activation, Dense
from sklearn.utils import class_weight
from keras.optimizers import SGD
import sklearn.metrics

[ ] from google.colab import files
    uploaded = files.upload()

    選擇檔案 未選擇任何檔案
    Saving bee1.jpg to bee1.jpg
    Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

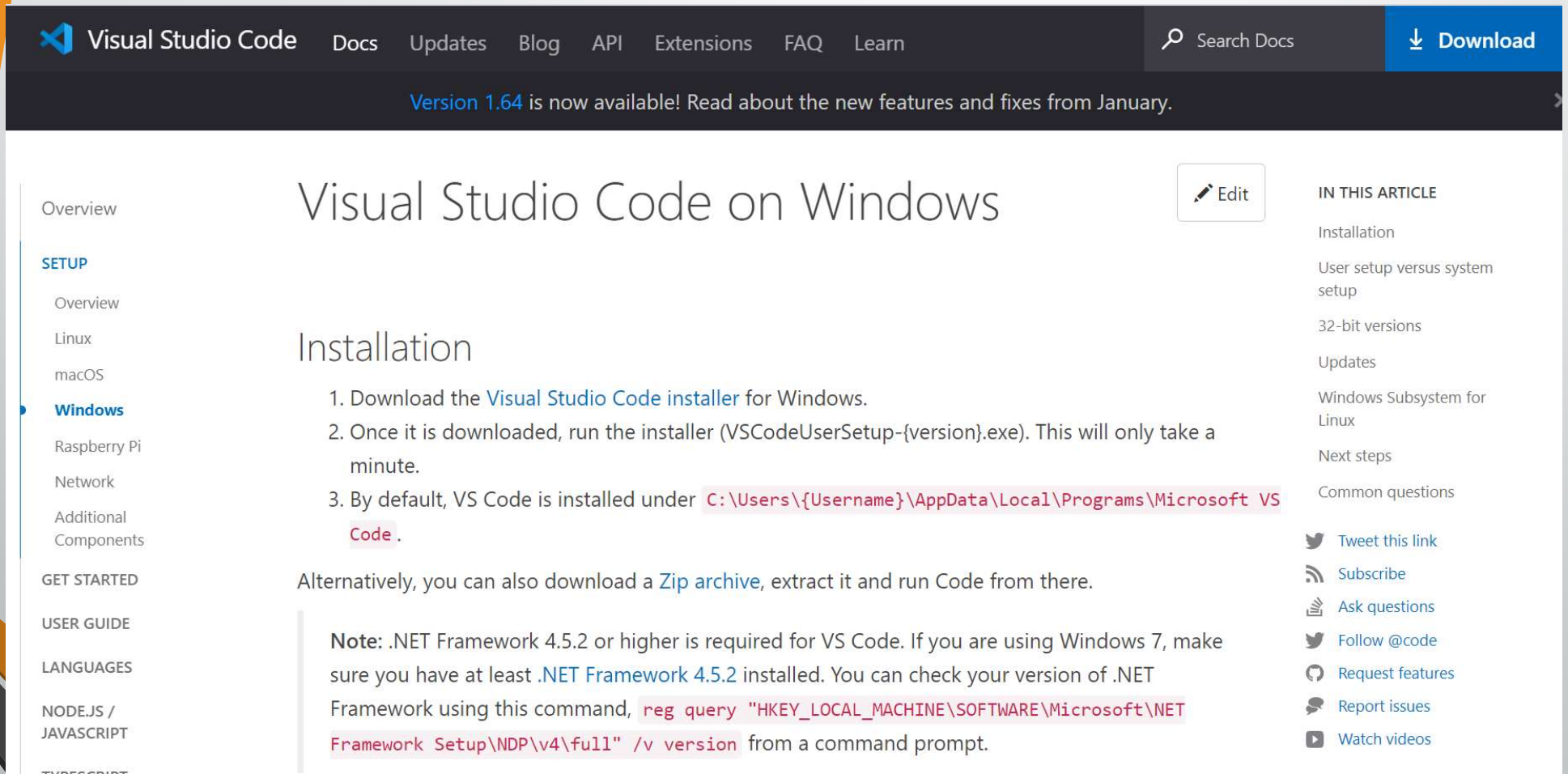
[ ] from PIL import Image
    im=Image.open("bee1.jpg")
    out=im.convert("L")
    out.save("bee2.jpg")
    print(out.size)
    files.download( "bee2.jpg" )

    (700, 465)

[ ] import io
    data1 = io.BytesIO(uploaded['allz_test_3tw.csv'])
    data2 = io.BytesIO(uploaded['allz_train_3tw.csv'])
```

Python in Visual Studio Code

<https://code.visualstudio.com/docs/languages/python>



The screenshot shows the Visual Studio Code documentation website. At the top, there is a navigation bar with links for 'Visual Studio Code', 'Docs', 'Updates', 'Blog', 'API', 'Extensions', 'FAQ', and 'Learn'. A search bar labeled 'Search Docs' and a 'Download' button are also present. A banner below the navigation bar announces 'Version 1.64 is now available! Read about the new features and fixes from January.' The main content area is titled 'Visual Studio Code on Windows' and includes an 'Edit' button. The 'Installation' section lists three steps: 1. Download the Visual Studio Code installer for Windows. 2. Run the installer (VSCodeUserSetup-{version}.exe). 3. Note the default installation path: C:\Users\{Username}\AppData\Local\Programs\Microsoft VS Code. A note specifies that .NET Framework 4.5.2 or higher is required for VS Code on Windows 7, and provides a command to check the .NET Framework version: reg query "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\NET Framework Setup\NDP\v4\full" /v version. A sidebar on the left contains a table of contents with categories like 'Overview', 'SETUP', 'GET STARTED', 'USER GUIDE', 'LANGUAGES', and 'NODE.JS / JAVASCRIPT'. The 'Windows' item under 'SETUP' is highlighted. On the right, there is an 'IN THIS ARTICLE' section listing topics like 'Installation', 'User setup versus system setup', '32-bit versions', 'Updates', 'Windows Subsystem for Linux', 'Next steps', and 'Common questions'. Below this, there are social media sharing options: 'Tweet this link', 'Subscribe', 'Ask questions', 'Follow @code', 'Request features', 'Report issues', and 'Watch videos'.

Visual Studio Code

Docs Updates Blog API Extensions FAQ Learn

Search Docs

Download

Version 1.64 is now available! Read about the new features and fixes from January.

Visual Studio Code on Windows

Edit

Installation

1. Download the [Visual Studio Code installer](#) for Windows.
2. Once it is downloaded, run the installer (VSCodeUserSetup-{version}.exe). This will only take a minute.
3. By default, VS Code is installed under `C:\Users\{Username}\AppData\Local\Programs\Microsoft VS Code`.

Alternatively, you can also download a [Zip archive](#), extract it and run Code from there.

Note: .NET Framework 4.5.2 or higher is required for VS Code. If you are using Windows 7, make sure you have at least [.NET Framework 4.5.2](#) installed. You can check your version of .NET Framework using this command, `reg query "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\NET Framework Setup\NDP\v4\full" /v version` from a command prompt.

Overview

SETUP

- Overview
- Linux
- macOS
- Windows**
- Raspberry Pi
- Network
- Additional Components

GET STARTED

USER GUIDE

LANGUAGES

NODE.JS / JAVASCRIPT

IN THIS ARTICLE

- Installation
- User setup versus system setup
- 32-bit versions
- Updates
- Windows Subsystem for Linux
- Next steps
- Common questions

Tweet this link

Subscribe

Ask questions

Follow @code

Request features

Report issues

Watch videos

Install Anaconda之前

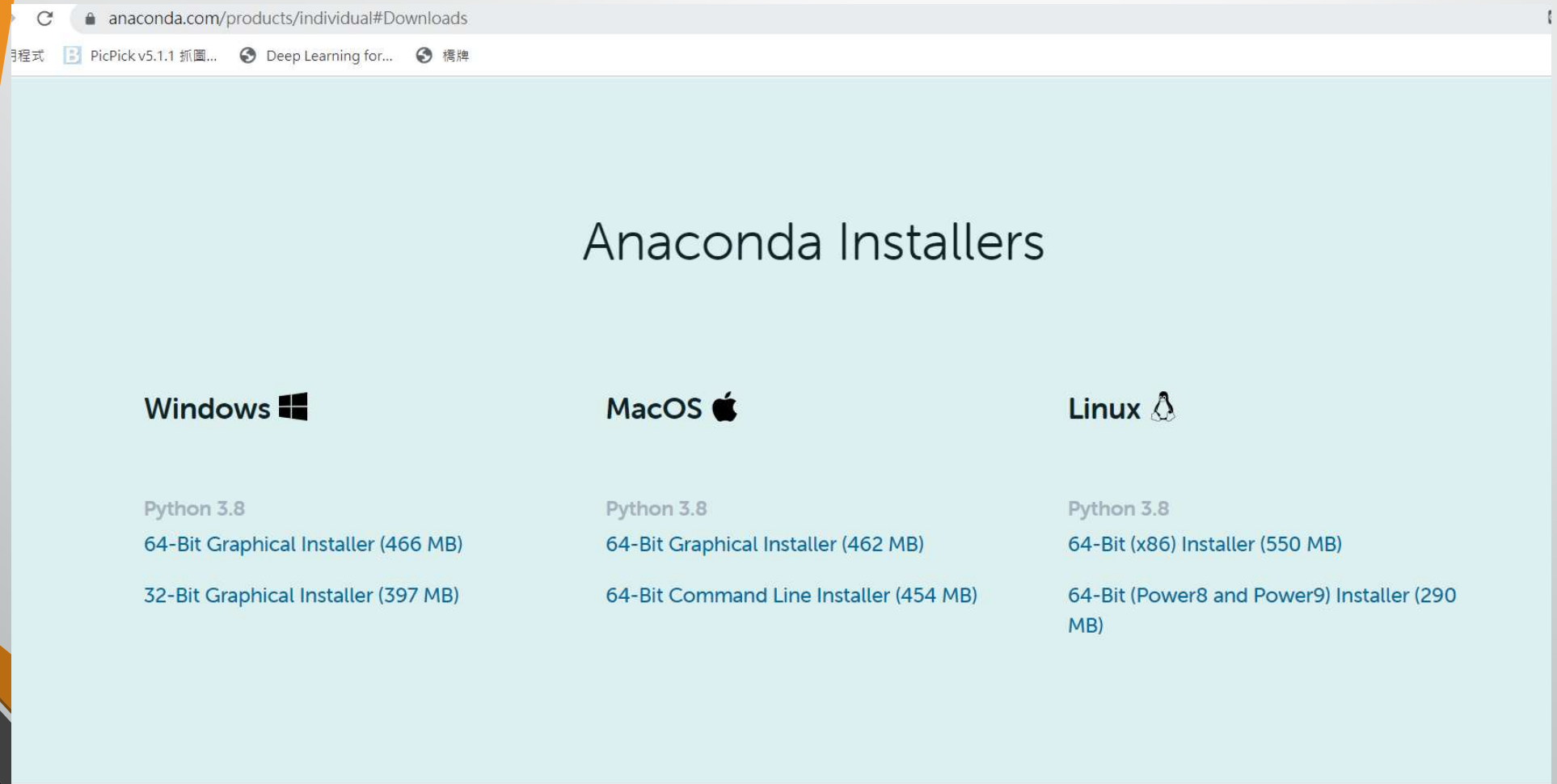
重要事項(for Windows system)：

- 請確認Windows使用者登入名稱須為英文名稱




原因：Anaconda 3 預設路徑

- Windows:
 - C:\Users\您的使用者名稱(不能是中文名稱)\Anaconda3
- 自行指定路徑
 - C:\Users\Anaconda3 (須設定權限問題)

Anaconda



The screenshot shows a web browser window with the URL anaconda.com/products/individual#Downloads. The page title is "Anaconda Installers". It is divided into three columns for different operating systems: Windows, MacOS, and Linux. Each column lists available installers for Python 3.8, including graphical and command-line versions with their respective sizes.

Operating System	Python Version	Installer Type	Size
Windows 	Python 3.8	64-Bit Graphical Installer	466 MB
		32-Bit Graphical Installer	397 MB
		64-Bit Command Line Installer	454 MB
MacOS 	Python 3.8	64-Bit Graphical Installer	462 MB
		64-Bit (Power8 and Power9) Installer	290 MB
Linux 	Python 3.8	64-Bit (x86) Installer	550 MB
		64-Bit (Power8 and Power9) Installer	290 MB

Anaconda

- Anaconda Jupyter notebook
- Spyder

The screenshot displays the Anaconda Navigator desktop application. The interface is divided into a left sidebar and a main content area. The sidebar contains navigation options: Home, Environments, Learning, and Community. The main content area shows a grid of application cards under the heading 'Applications on base (root) Channels'. Each card includes an icon, the application name, version number, a brief description, and a button to either 'Launch' or 'Install' the application.

Application	Version	Description	Action
CMD.exe Prompt	0.1.1	Run a cmd.exe terminal with your current environment from Navigator activated	Launch
JupyterLab	2.1.5	An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.	Launch
Notebook	6.0.3	Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.	Launch
Powershell Prompt	0.0.1	Run a Powershell terminal with your current environment from Navigator activated	Launch
PyCharm	2020.2.1	Full-featured Python IDE by JetBrains. Supports code completion, linting, debugging, and domain-specific enhancements for web development and data science.	Launch
Qt Console	4.7.5	PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.	Launch
Spyder	4.1.4	Scientific Python Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features	Launch
VS Code	1.49.0	Streamlined code editor with support for development operations like debugging, task running and version control.	Launch
Glueviz	0.15.2	Multidimensional data visualization across files. Explore relationships within and among related datasets.	Install
Orange 3	3.26.0	Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.	Install
RStudio	1.1.456	A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks.	Install

Python 虛擬環境與套件

- Python 應用程式通常會用到不在標準函式庫的套件和模組。應用程式有時候會需要某個特定版本的函式庫
- 不太可能安裝一套 Python 就可以滿足所有應用程式的要求
 - 如果應用程式 A 需要一個特定的模組的 1.0 版，但另外一個應用程式 B 需要 2.0 版，那麼這整個需求不管安裝 1.0 或是 2.0 都會衝突
- 解決方案是創建一個虛擬環境（virtual environment）
 - 這是一個獨立的資料夾，並且裡面裝好了特定版本的 Python，以及一系列相關的套件。

Python IDE 工具

- Python IDLE: 陽春版
- Anaconda
 - Jupyter notebook
 - Spyder
- Google Colab
- Microsoft VS Code: 可與微軟相關工具結合，如: C#(sharp)、MS SQL(資料庫)...

說明安裝後的軟體工具



上課的重點

第一階段

- 如何定義變數
- 如何用條件判斷我們要做的事情: True/False
- 如何使用迴圈

第二階段

- 如何使用Python內建函式(built-in function)
- 如何使用Python內建模組的函式(function)
- 已被定義的變數，如何使用該變數的資料型態提供的函式(function)
- 如何利用外部第三方套件提供的函式(function)
- 如何定義自己的函式(function)和類別(class)