


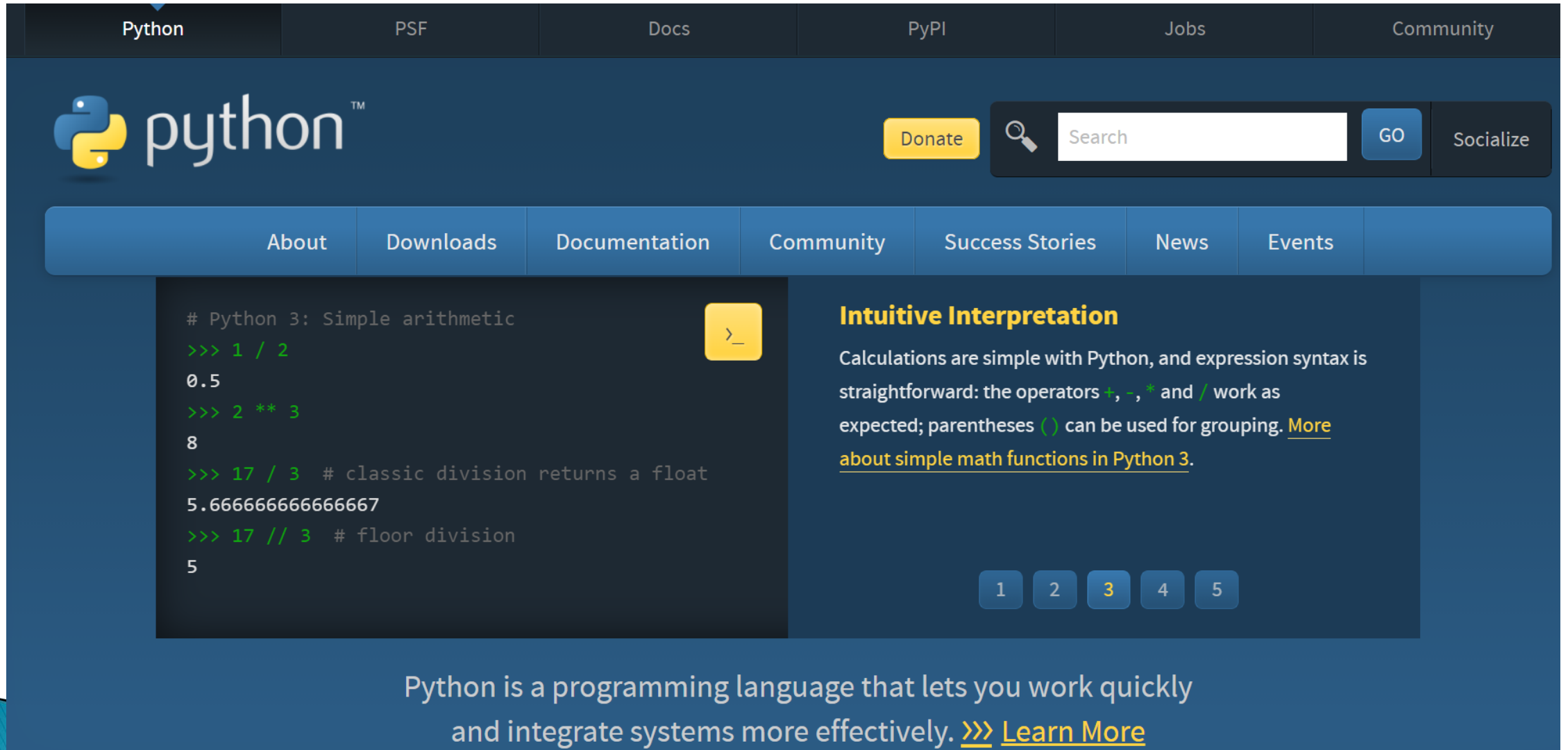
Python

目錄

- ▶ Python安裝
 - ▶ Python環境
 - ▶ Python註解與基礎運算值
 - ▶ Python常見套件
 - ▶ 自學網站
- 

下載Python

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



The image is a screenshot of the Python.org homepage. At the top, there is a navigation bar with links for Python, PSF, Docs, PyPI, Jobs, and Community. Below this is a dark blue header featuring the Python logo and the word 'python' in a large, white, sans-serif font. To the right of the logo is a yellow 'Donate' button, a search bar with a magnifying glass icon and a 'GO' button, and a 'Socialize' button. Below the header is a row of blue buttons for 'About', 'Downloads', 'Documentation', 'Community', 'Success Stories', 'News', and 'Events'. The main content area is divided into two columns. The left column contains a code block with Python 3 arithmetic examples: a comment '# Python 3: Simple arithmetic', followed by '>>> 1 / 2' resulting in '0.5', '>>> 2 ** 3' resulting in '8', '>>> 17 / 3' with a comment '# classic division returns a float' resulting in '5.666666666666667', and '>>> 17 // 3' with a comment '# floor division' resulting in '5'. To the right of the code block is a yellow button with a '>' symbol. The right column has a section titled 'Intuitive Interpretation' in bold yellow text, followed by a paragraph explaining that calculations are simple with Python and expression syntax is straightforward, mentioning operators '+, -, * and /' and parentheses '()'. It includes a link 'More about simple math functions in Python 3.' Below this paragraph is a row of five blue buttons numbered 1 through 5, with button 3 highlighted in yellow. At the bottom of the page, a dark blue banner contains the text 'Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)'.

Python

PSF

Docs

PyPI

Jobs

Community

python™

Donate

Search

GO

Socialize

About Downloads Documentation Community Success Stories News Events

```
# Python 3: Simple arithmetic
>>> 1 / 2
0.5
>>> 2 ** 3
8
>>> 17 / 3 # classic division returns a float
5.666666666666667
>>> 17 // 3 # floor division
5
```

>

Intuitive Interpretation

Calculations are simple with Python, and expression syntax is straightforward: the operators `+`, `-`, `*` and `/` work as expected; parentheses `()` can be used for grouping. [More about simple math functions in Python 3.](#)

1 2 3 4 5

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

下載Python



The screenshot shows the Python.org homepage. The top navigation bar includes the Python logo, a 'Donate' button, a search bar, and a 'Socialize' link. Below this is a secondary navigation bar with links to 'About', 'Downloads', 'Documentation', 'Community', 'Success Stories', 'News', and 'Events'. The 'Downloads' menu is open, displaying a list of options: 'All releases', 'Source code', 'Windows' (highlighted with a red rectangle), 'Mac OS X', 'Other Platforms', 'License', and 'Alternative Implementations'. To the left of the menu, a code snippet for a Fibonacci function is visible. To the right, the 'Download for Windows' section is partially visible, showing the version 'Python 3.9.2' and a note about Windows 7 compatibility.

python

Donate

Search

GO

Socialize

About Downloads Documentation Community Success Stories News Events

```
# Python 3: Fib
>>> def fib(n):
>>>     a, b =
>>>     while a
>>>         pri
>>>         a,
>>>     print()
>>>     fib(1000)
0 1 1 2 3 5 8 1
```

All releases

Source code

Windows

Mac OS X

Other Platforms

License

Alternative Implementations

Download for Windows

Python 3.9.2

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.](#)

ng functions.
ments, keyword
s. [More about](#)

下載Python

[Python](#) >>> [Downloads](#) >>> [Windows](#)

Python Releases for Windows

- [Latest Python 3 Release - Python 3.9.2](#)
- [Latest Python 2 Release - Python 2.7.18](#)

Stable Releases

- [Python 3.9.2 - Feb. 19, 2021](#)

Note that Python 3.9.2 *cannot* be used on Windows 7 or earlier.

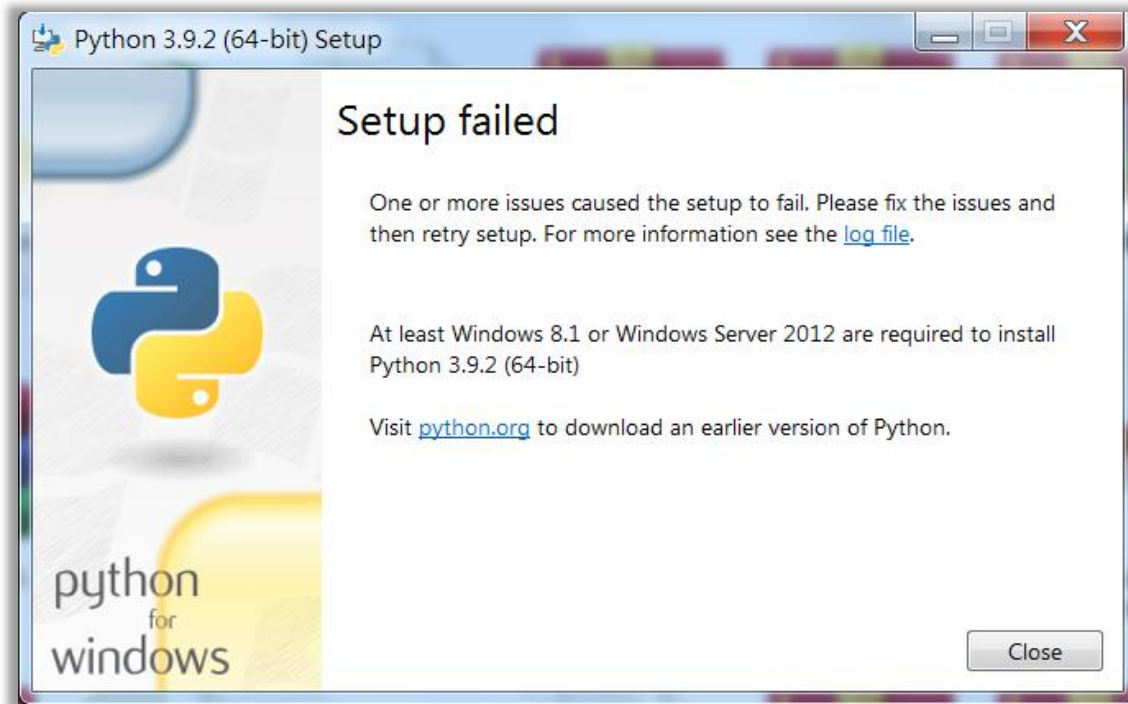
- Download [Windows embeddable package \(32-bit\)](#)
- Download [Windows embeddable package \(64-bit\)](#)
- Download [Windows help file](#)

Pre-releases

- [Python 3.10.0a6 - March 1, 2021](#)

- Download [Windows embeddable package \(32-bit\)](#)
- Download [Windows embeddable package \(64-bit\)](#)
- Download [Windows help file](#)
- Download [Windows installer \(32-bit\)](#)

安裝Python



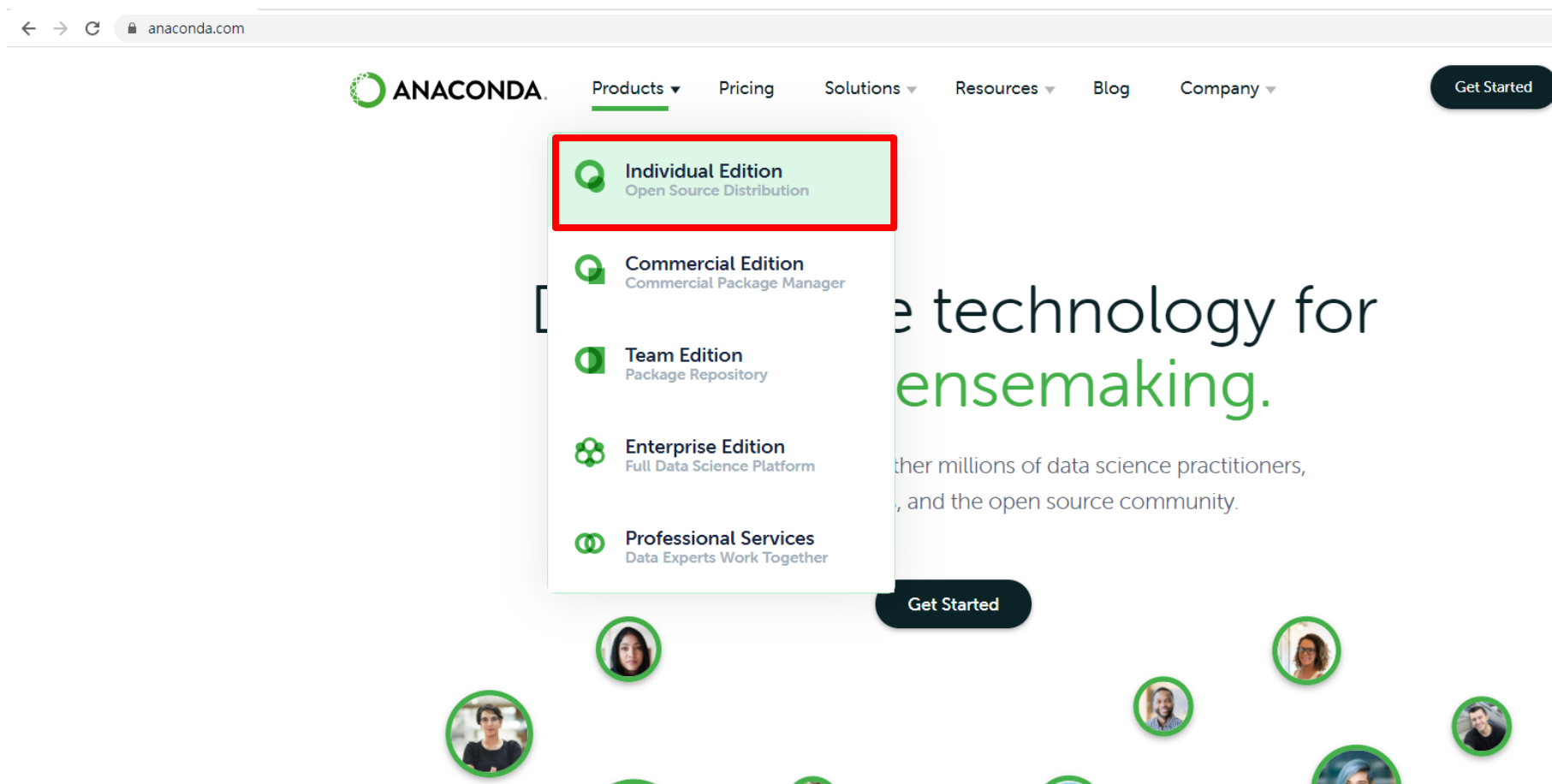
Python環境



ANACONDA[®]

<https://www.anaconda.com/>

ANACONDA安裝過程



ANACONDA安裝過程

← → ↻ anaconda.com/products/individual



Individual Edition


Your data science toolkit

With over 20 million users worldwide, the open-source Individual Edition (Distribution) is the easiest way to perform Python/R data science and machine learning on a single machine. Developed for solo practitioners, it is the toolkit that equips you to work with thousands of open-source packages and libraries.

Download

ANACONDA安裝過程

Anaconda Installers

Windows 

Python 3.8

☒ [64-Bit Graphical Installer \(457 MB\)](#)


32-Bit Graphical Installer (403 MB)

MacOS 

Python 3.8

64-Bit Graphical Installer (435 MB)

64-Bit Command Line Installer (428 MB)

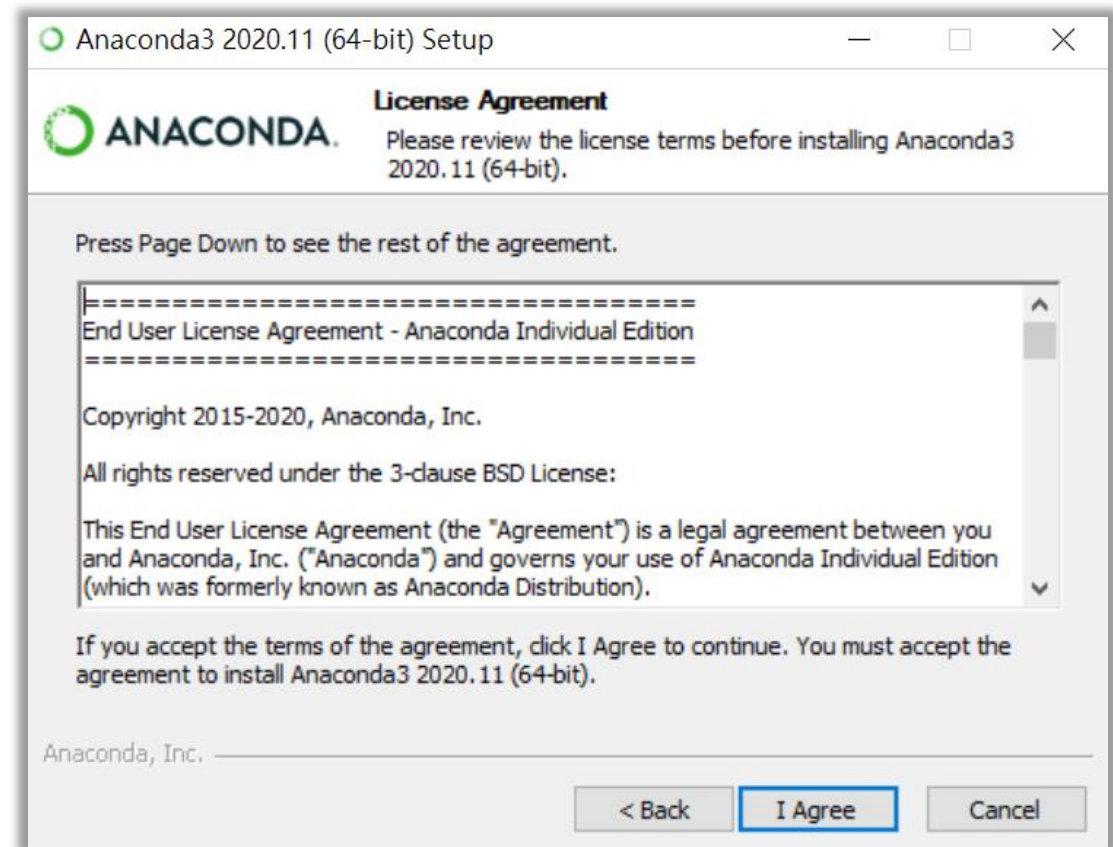
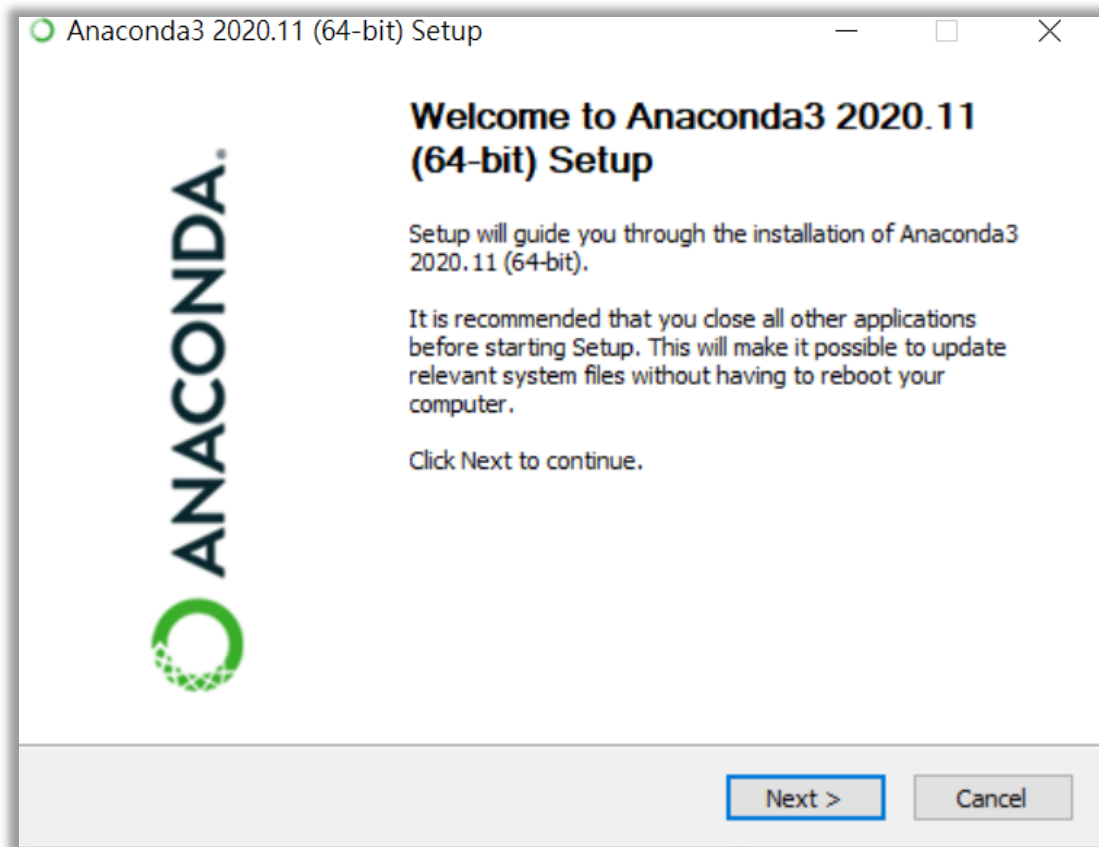
Linux 

Python 3.8

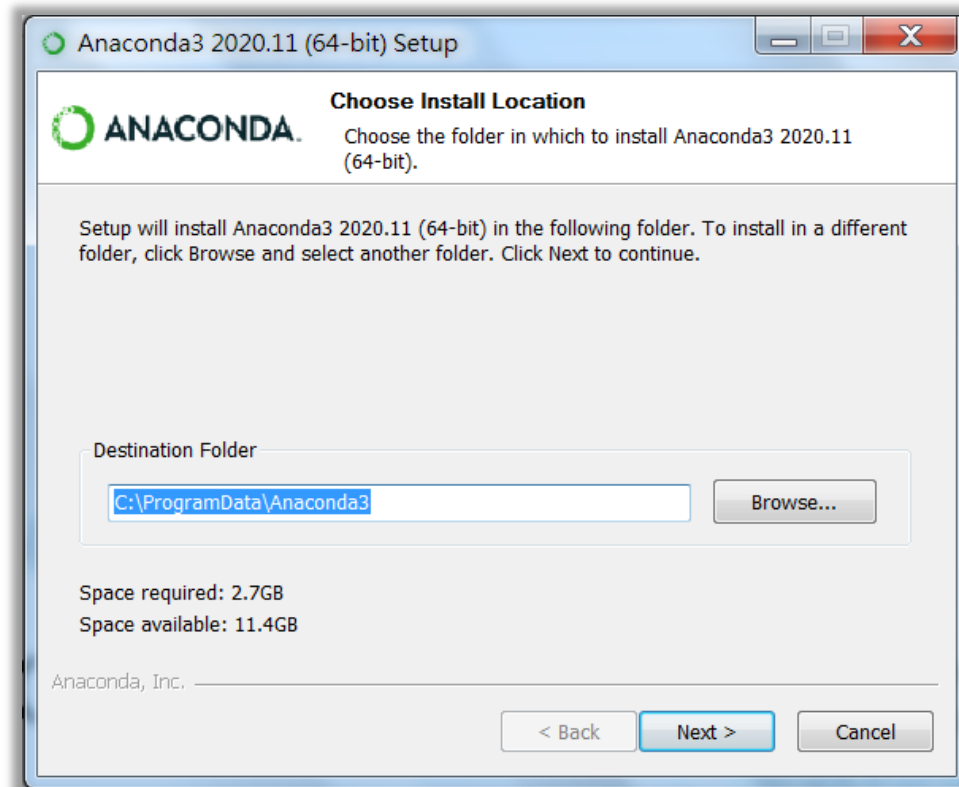
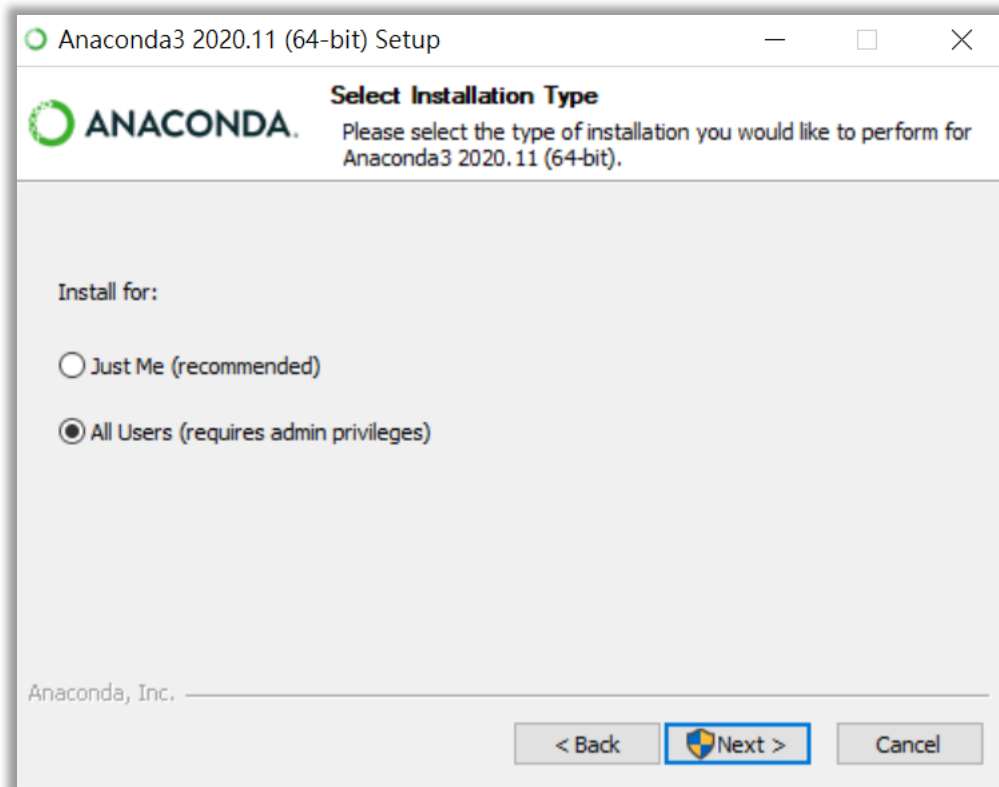
64-Bit (x86) Installer (529 MB)

64-Bit (Power8 and Power9) Installer (279 MB)

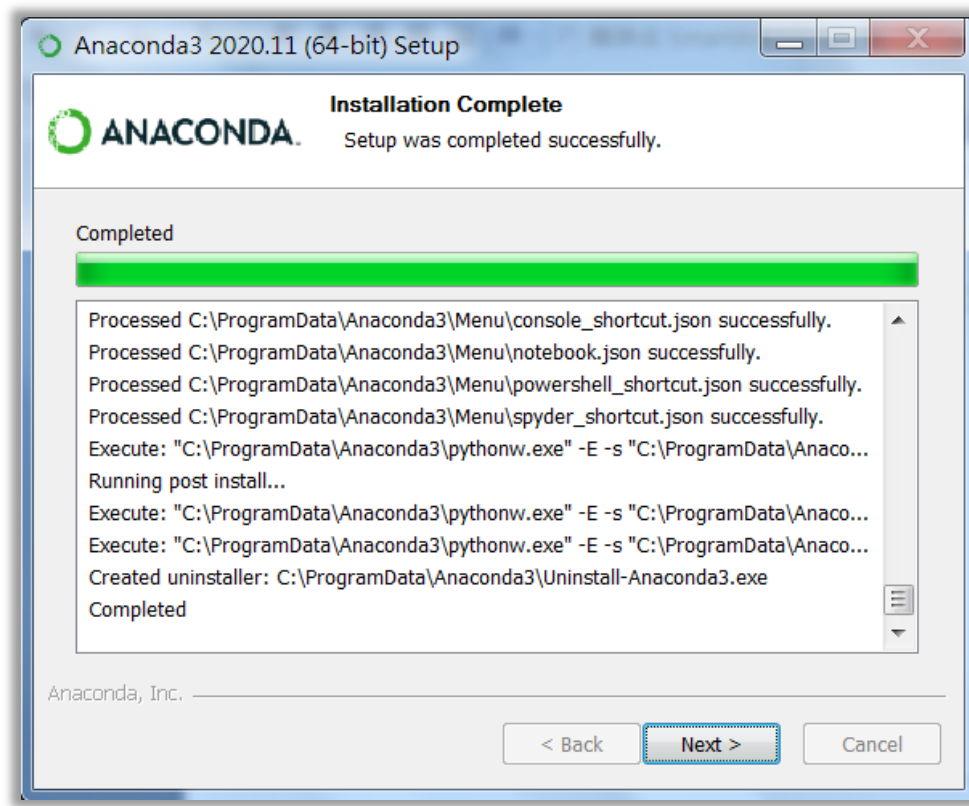
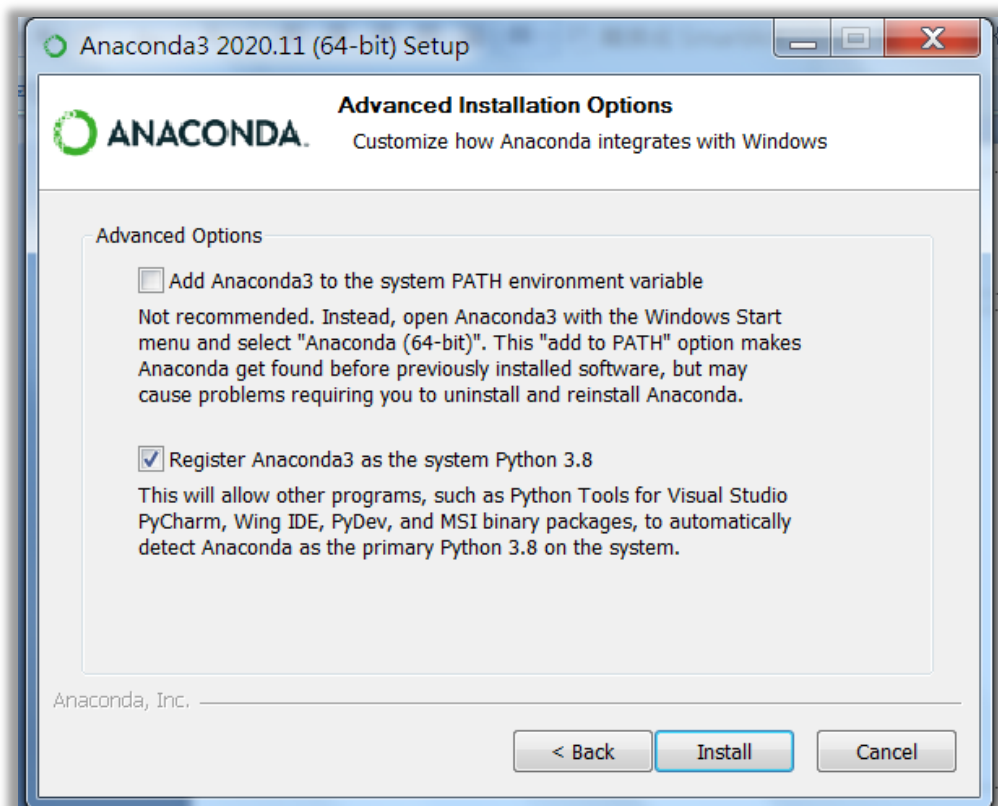
ANACONDA安裝過程



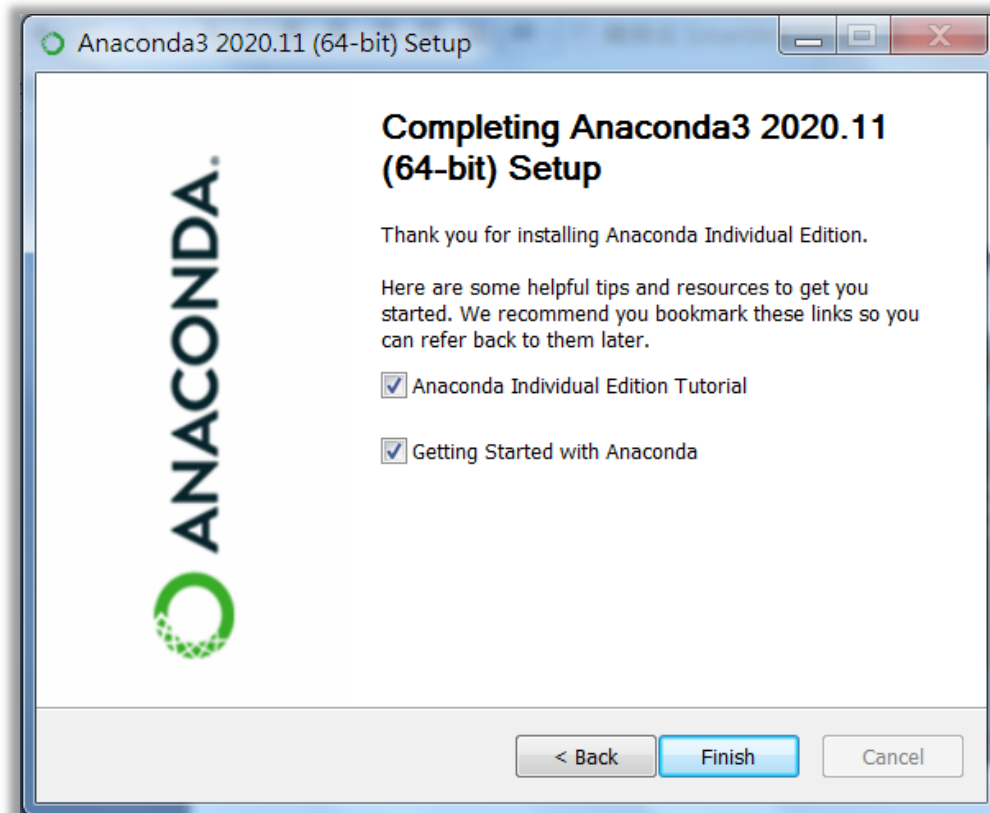
ANACONDA安裝過程



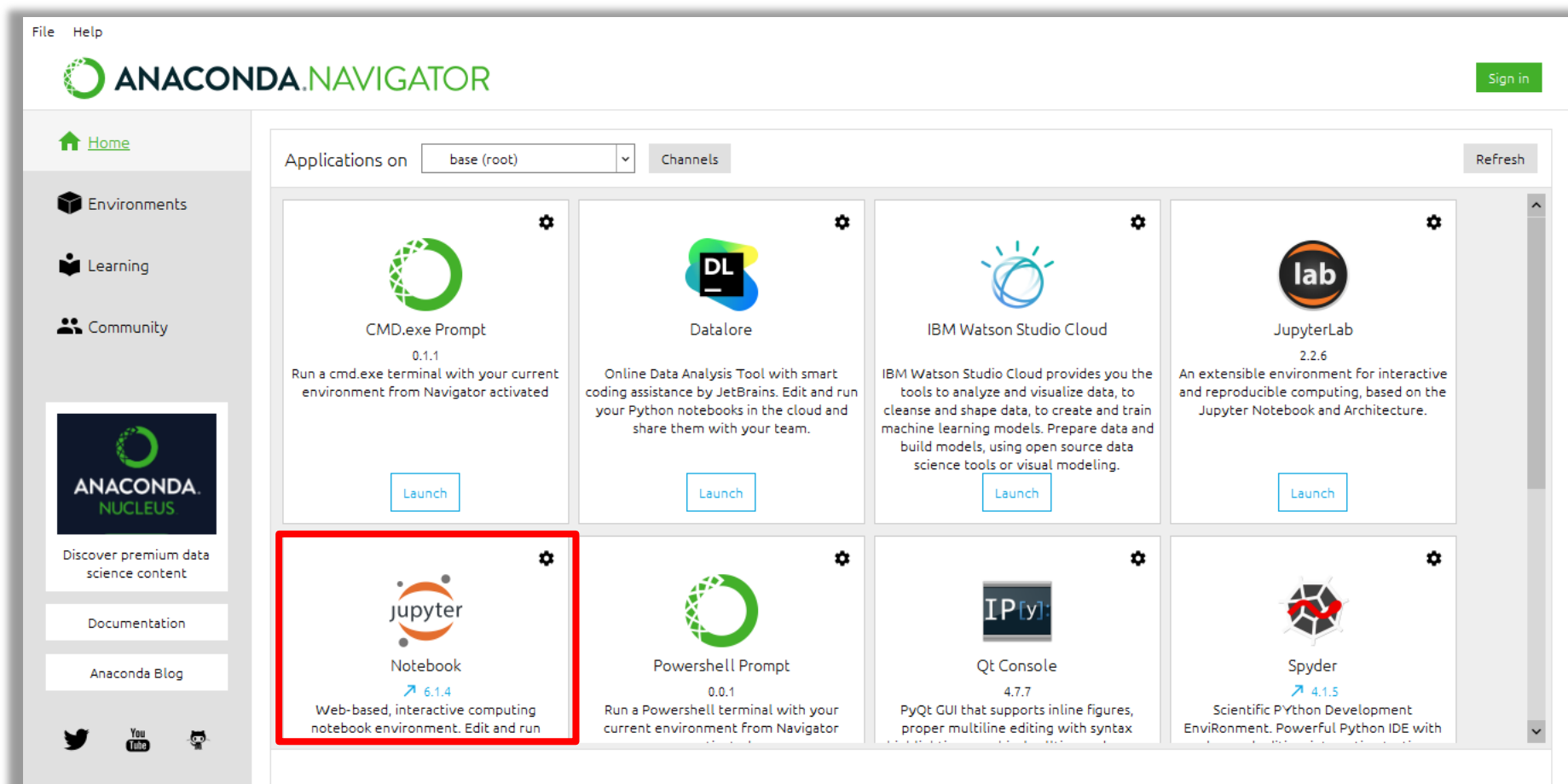
ANACONDA安裝過程



ANACONDA安裝過程



ANACONDA安裝過程



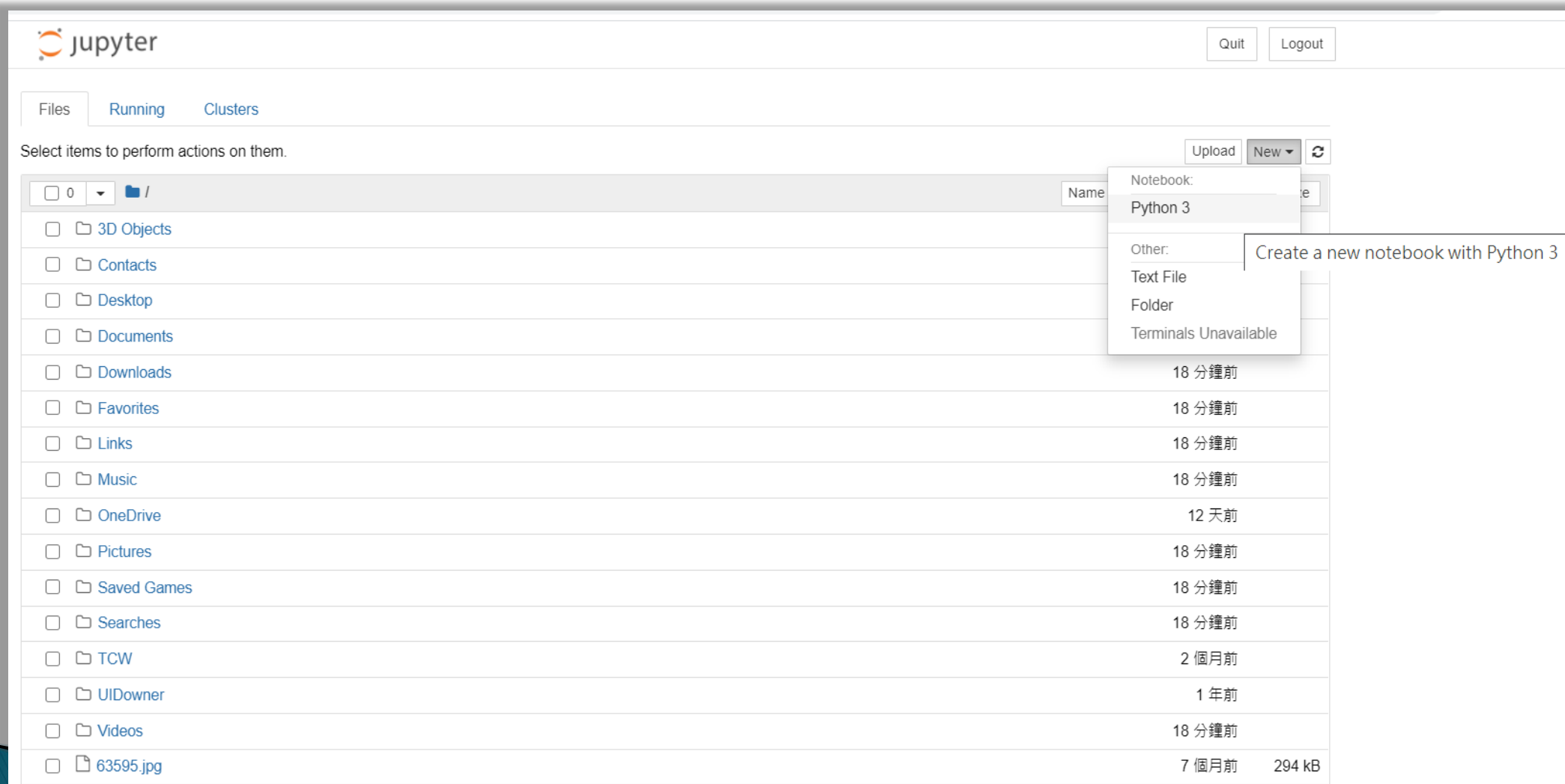
Python編輯器-Jupyter



The screenshot displays the Jupyter web interface. At the top left is the Jupyter logo. To the right are 'Quit' and 'Logout' buttons. Below the logo are three tabs: 'Files' (selected), 'Running', and 'Clusters'. A message states 'Select items to perform actions on them.' To the right of this message are 'Upload', 'New' (with a dropdown arrow), and a refresh icon. The main area shows a file browser for the root directory '/'. It includes a header with a checkbox, a count '0', a dropdown arrow, and the path '/'. Below the header is a table of files and folders.

	Name ↓	Last Modified	File size
<input type="checkbox"/>	Contacts	2 年前	
<input type="checkbox"/>	Desktop	1 分鐘前	
<input type="checkbox"/>	Documents	2 個月前	
<input type="checkbox"/>	Favorites	1 年前	
<input type="checkbox"/>	Hicloud	3 年前	
<input type="checkbox"/>	Links	2 年前	
<input type="checkbox"/>	Music	1 年前	
<input type="checkbox"/>	Nox_share	2 年前	

Python編輯器-Jupyter-新增Notebook



The screenshot displays the JupyterLab web interface. At the top, the 'jupyter' logo is on the left, and 'Quit' and 'Logout' buttons are on the right. Below the logo, there are tabs for 'Files', 'Running', and 'Clusters'. A message 'Select items to perform actions on them.' is shown. The main area is a file browser with a sidebar on the left showing a tree view of the file system. The right pane shows a list of files and folders. A 'New' button in the top right of the file browser is open, showing a dropdown menu with options: 'Notebook: Python 3', 'Other: Text File', 'Folder', and 'Terminals Unavailable'. A tooltip 'Create a new notebook with Python 3' is visible next to the 'Python 3' option.

Files Running Clusters

Select items to perform actions on them.

Upload New

Notebook:
Python 3

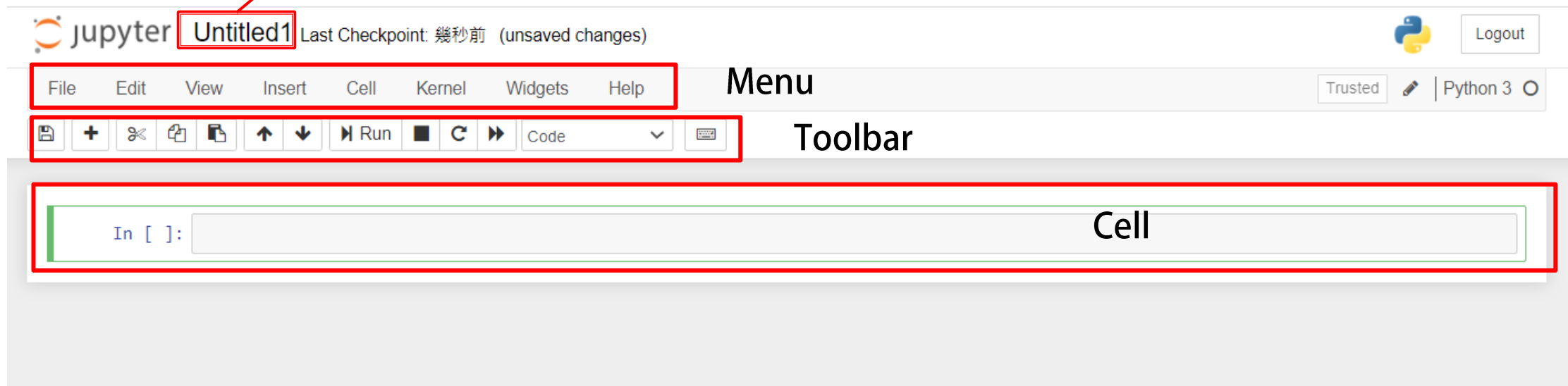
Other:
Text File
Folder
Terminals Unavailable

Create a new notebook with Python 3

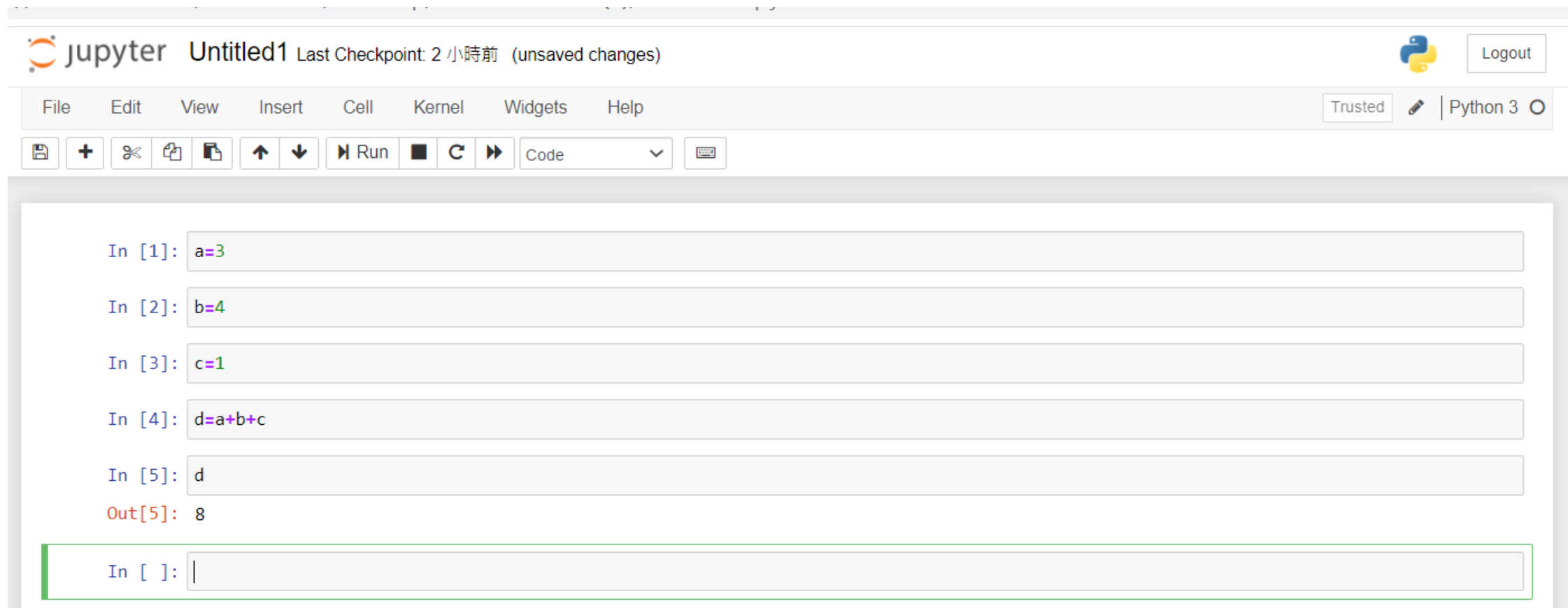
Name	Modified	Size
0		
3D Objects	18 分鐘前	
Contacts	18 分鐘前	
Desktop	18 分鐘前	
Documents	18 分鐘前	
Downloads	18 分鐘前	
Favorites	18 分鐘前	
Links	18 分鐘前	
Music	18 分鐘前	
OneDrive	12 天前	
Pictures	18 分鐘前	
Saved Games	18 分鐘前	
Searches	18 分鐘前	
TCW	2 個月前	
UIDowner	1 年前	
Videos	18 分鐘前	
63595.jpg	7 個月前	294 kB

Jupyter notebook介面

更改檔名



輸入運算值，執行Shift+Enter



The image shows a Jupyter Notebook interface. At the top, the header bar includes the Jupyter logo, the text "jupyter Untitled1", and "Last Checkpoint: 2 小時前 (unsaved changes)". On the right of the header are the Python logo and a "Logout" button. Below the header is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu bar is a "Trusted" status indicator, a pencil icon, and "Python 3" with a dropdown arrow. Below the menu bar is a toolbar with icons for saving, adding a new cell, cutting, copying, pasting, undo, redo, and running code. The main area contains five code cells. The first four cells contain the following code: `a=3`, `b=4`, `c=1`, and `d=a+b+c`. The fifth cell contains `d`. Below the fifth cell, the output is displayed as `Out[5]: 8`. At the bottom, there is an empty code cell with the prompt `In []:` and a cursor.

jupyter Untitled1 Last Checkpoint: 2 小時前 (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [1]: `a=3`

In [2]: `b=4`

In [3]: `c=1`

In [4]: `d=a+b+c`

In [5]: `d`

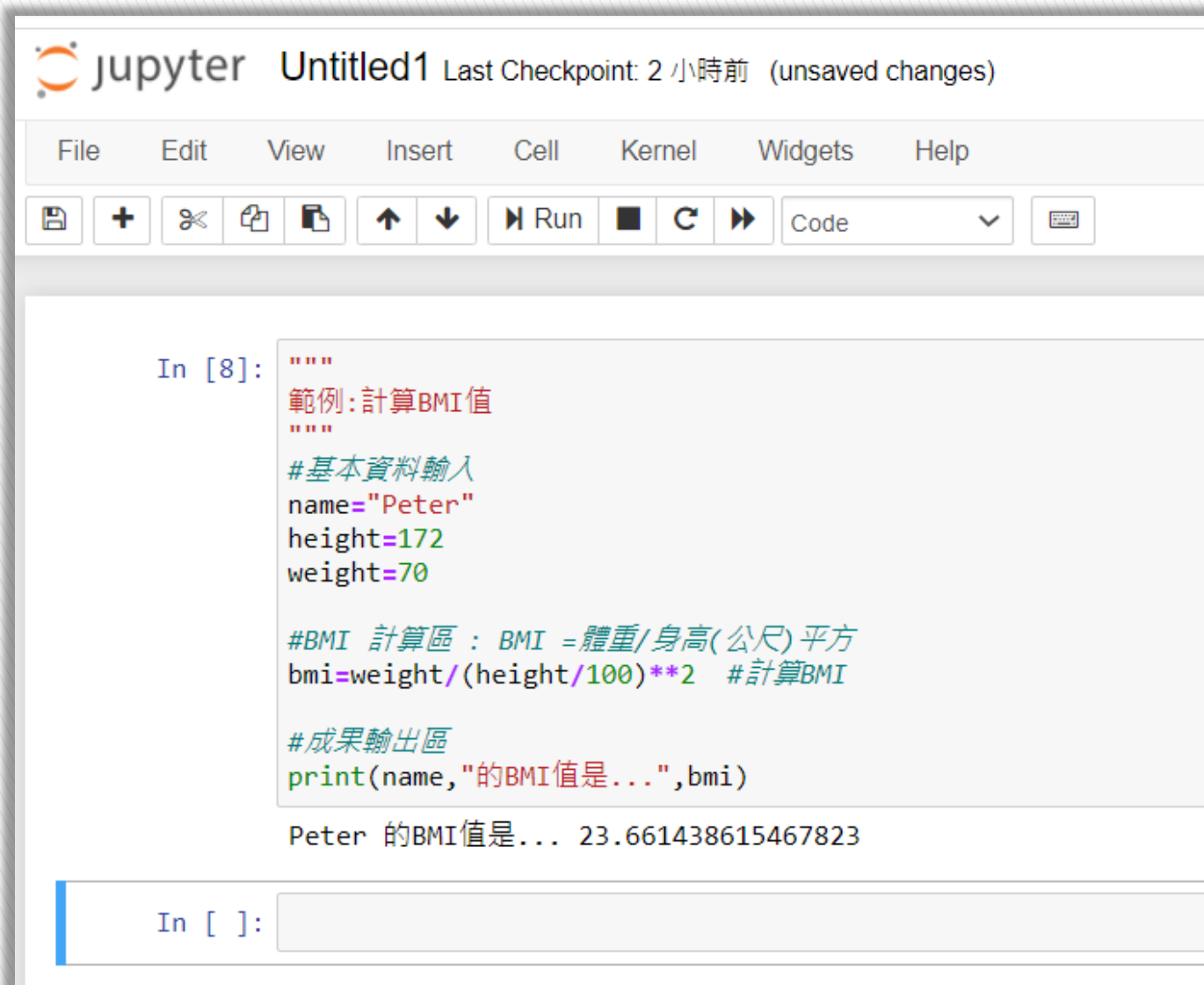
Out[5]: 8

In []: |

Python註解與基礎運算值

Python註解

- ▶ 註解:解釋程式碼的設計
- ▶ 兩種不同註解標示方法
 - 插入#符號，此時同一行在#右邊的所有文字通通是註解
 - 用一對連續三個雙引號(或連續三個單引號)，把說明文字前後包起來，此一整段文字變成註解



The image shows a Jupyter Notebook interface. The title bar says "jupyter Untitled1 Last Checkpoint: 2 小時前 (unsaved changes)". The menu bar includes File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. The toolbar has icons for saving, adding, deleting, copying, pasting, and running code. The code cell is labeled "In [8]:" and contains the following Python code:

```
"""  
範例:計算BMI值  
"""  
#基本資料輸入  
name="Peter"  
height=172  
weight=70  
  
#BMI 計算區 : BMI =體重/身高(公尺)平方  
bmi=weight/(height/100)**2 #計算BMI  
  
#成果輸出區  
print(name,"的BMI值是...",bmi)
```

The output of the code is displayed below the cell:

```
Peter 的BMI值是... 23.661438615467823
```

Below the code cell, there is an input prompt "In []:" followed by an empty text box.

Python基礎運算值

運算子	運算式範例	說明
+	<code>c = a + b</code>	加法
-	<code>c = a - b</code>	減法
	<code>c = -b</code>	加上負號，即 $(-1)*b$ 之意
*	<code>c = a * b</code>	乘法
/	<code>c = a / b</code>	若a,b為整數且無法整除，c為浮點數。b不可為0
//	<code>c = a // b</code>	整數除法運算子，除以b，取小於商的整數值
%	<code>c = a % b</code>	除以b，取餘數
**	<code>c = a ** b</code>	指數運算子，a的b次方， a^b


Python基礎運算值

運算子	運算式範例	對應原始寫法
<code>+=</code>	<code>a += b</code>	<code>a = a + b</code>
<code>-=</code>	<code>a -= b</code>	<code>a = a - b</code>
<code>*=</code>	<code>a *= b</code>	<code>a = a * b</code>
<code>/=</code>	<code>a /= b</code>	<code>a = a / b</code>
<code>//=</code>	<code>a //= b</code>	<code>a = a // b</code>
<code>%=</code>	<code>a %= b</code>	<code>a = a % b</code>
<code>**=</code>	<code>a **= b</code>	<code>a = a ** b</code>

Python常見套件

安裝套件語法

- ▶ 開始cmd 命令提示字元
- ▶ 安裝套件，語法輸入`pip install xxx`
ex. 安裝Pandas套件，則輸入`pip install pandas`

 命令提示字元

```
Microsoft Windows [版本 10.0.18363.1440]  
(c) 2019 Microsoft Corporation. 著作權所有，並保留一切權利。
```

```
C:\Users\gillian>pip install pandas
```

Python常見套件

▶ 數量分析

- NumPy
- SciPy

▶ 統計計量

- Statmodels
- Arch

▶ 資料庫

- Pandas

▶ 繪圖

- Matplotlib

數量分析_Numpy

- ▶ NumPy用來存儲和處理大型矩陣，比Python自身嵌套列表結構要高効的多。
- ▶ 快速有效率的多維陣列物件 **ndarray**
- ▶ 陣列元素計算功能或陣列間數值計算
- ▶ 官網：
<http://www.numpy.org/>

```
>>> a = np.array([2, 5, 7])
>>> b = np.array([(0, 1), (2, 3)])
>>> a.sum()                                # Array-wise sum
14
>>> a.max()                                # Array-wise maximum value
7
>>> a.min()                                # Array-wise minimum value
2
>>> b.max(axis=0)                           # Maximum value of an array row
array([2, 3])
>>> b.max(axis=1)                           # Maximum value of an array row
array([1, 3])
>>> np.median(a)                            # Median
5.0
>>> np.mean(a)                              # Mean
4.666666666666667
>>> np.std(a)                               # Standard deviation
2.0548046676563256
```

數量分析_SciPy

- ▶ SciPy包含的模組有最佳化、線性代數、積分、插值、特殊函數、快速傅立葉變換、訊號處理和圖像處理、常微分方程式求解和其他科學與工程中常用的計算。
- ▶ 官網：
<https://scipy.org/scipylib/>
- ▶ SciPy常用套件介紹
- ▶ `scipy.integrate`
 - 數值積分函式及微分方程求解
- ▶ `scipy.linalg`
 - Numpy.linalg中未提的線性代數與矩陣分解
- ▶ `scipy.special`
 - 實作許多常用數學函式，如gamma函式
- ▶ `scipy.stats`
 - 標準連續及離散機率分布(密度函式、取樣器、連續分布函式)，多種統計檢驗和更多描述性統計

統計計量_Statmodels

- ▶ 包含古典統計和計量經濟學用的演算法
- ▶ 偏重統計推斷，接受不確定估計值和p-value當作參數
- ▶ 包含
 - 迴歸模型:線性迴歸、廣義線性模型、穩健線性模型、線性混和效果模型等
 - 變異數分析(ANOVA)
 - 時間序列分析:AR、ARMA、ARIMA、VAR以及其他模型
 - 非參數方法:核密度估計、核心迴歸
- 官網：<http://www.statsmodels.org/devel/>

統計計量_Arch

▶ Module Contents

- Univariate ARCH Models
 - Unit Root Tests
 - Cointegration Testing and Analysis
 - Bootstrapping
 - Multiple Comparison Tests
 - Long-run Covariance Estimation
-
- 官網：<https://pypi.org/project/arch/>

資料庫_Pandas

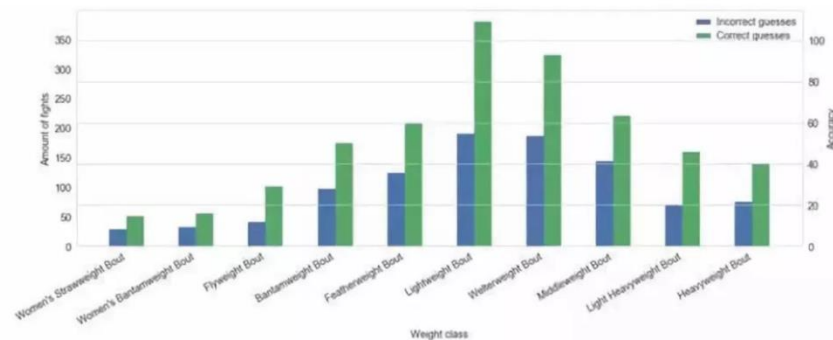
- ▶ Pandas包含許多用於分組、過濾和組合資料的內建方法，以及時間序列功能。
- ▶ 數據結構
 - Series:一維數據
 - Time-Series:以時間為索引的Series
 - DataFrame:二維的表格型數據結構
 - Panel:三維的數據
- 官網：<https://pandas.pydata.org/>

繪圖_Matplotlib

▶ 繪圖系統

▶ 功能

- 散佈圖、折線圖、條形圖、直方圖、餅狀圖、箱形圖等繪製
- 官網：<https://matplotlib.org/index.html>



Matplotlib

優點

- 歷史悠久，有許多參考資料
- 畫圖功能最齊全

缺點

- 圖表不好看
- 畫圖指令複雜

Seaborn

- 畫圖指令非常簡單
- 圖案漂亮

- 雖然99%的使用上都沒問題，但有些進階的圖案很難畫或是沒辦法畫（可與matplotlib互補）

Plotly

- 漂亮的各種視覺化圖表
- 互動化的介面
- 功能齊全，可建立 Dashboard
- 可以即時套用別人做好的視覺化圖案

- 使用起來稍微有點複雜
- 非完全 Opensource
- 比較吃電腦資源

自學網站

- ▶ Jupyter Notebook 使用小技巧
 - ▶ PYTHON 程式設計投影片
 - ▶ 成為python數據分析達人的第一課 GitHub
 - ▶ Programming for Business Computing in Python (1)
 - ▶ Programming for Business Computing in Python (2)
 - ▶ Programming for Business Computing in Python (3)
- 