python

Python一天學會

吳佳諺 老師

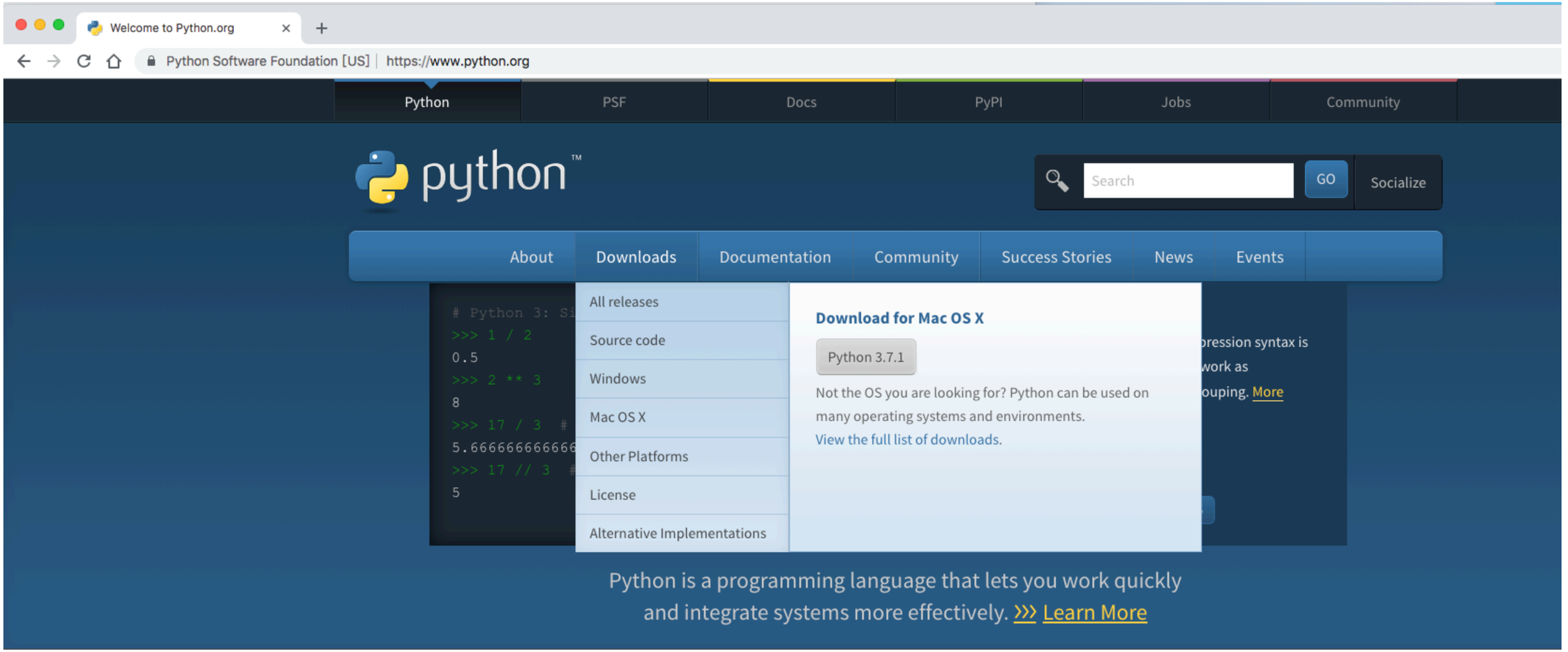
1.下載及安裝Python軟體
2.Python直譯器與計算機
3.資料結構
4.控制結構
5.函數
6.類別
7.繼承
8.異常或錯誤處理
9.使用matplotlib畫圖
10.網站擷取使用Python
11.行程和執行緒
12.資料及檔案處理
13.SQLite資料庫
14.人機界面及影像處理
15.Python遊戲設計

1.下載及安裝Python軟體

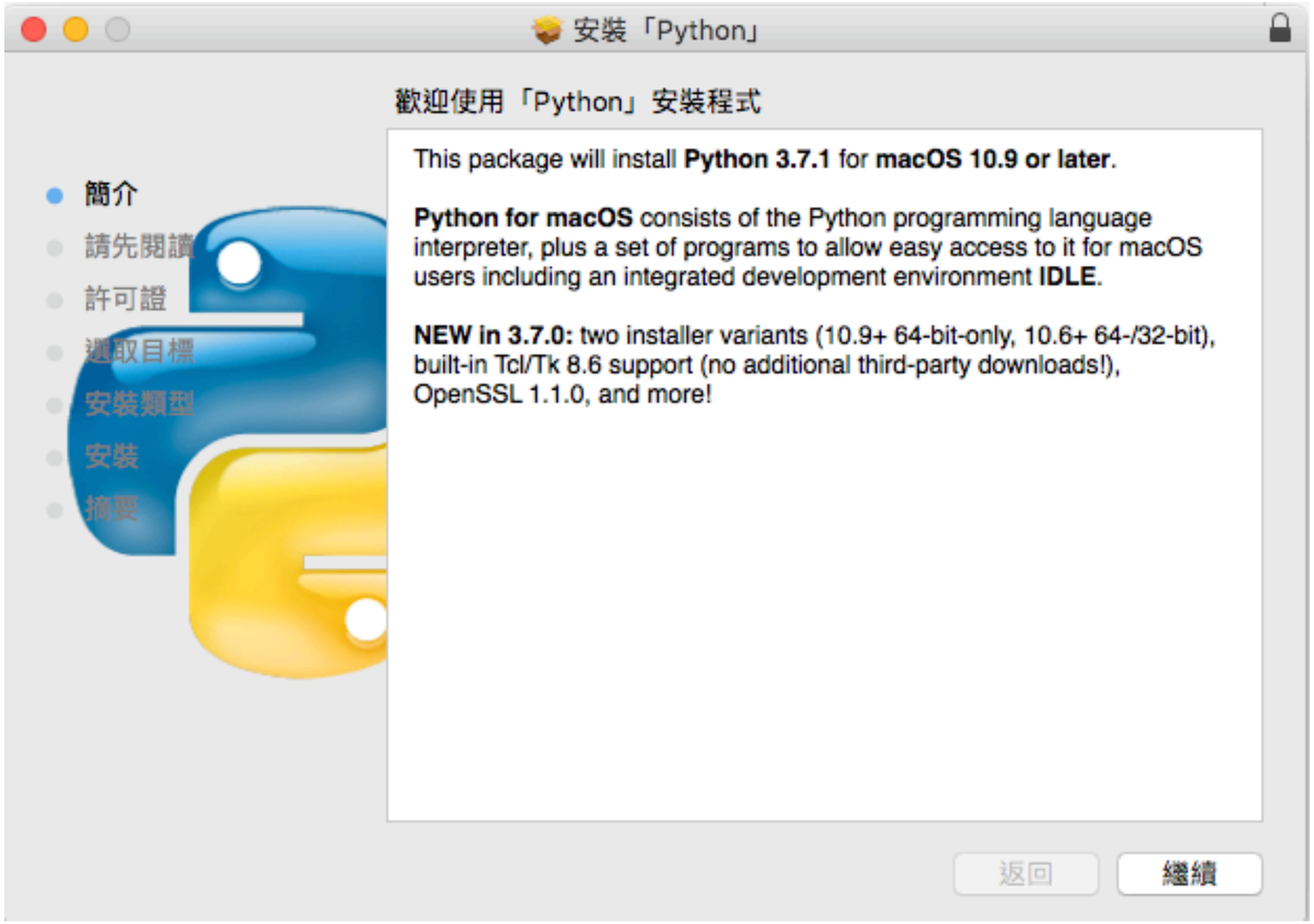
到python.org下載軟體

到Aanconda下載Python組合

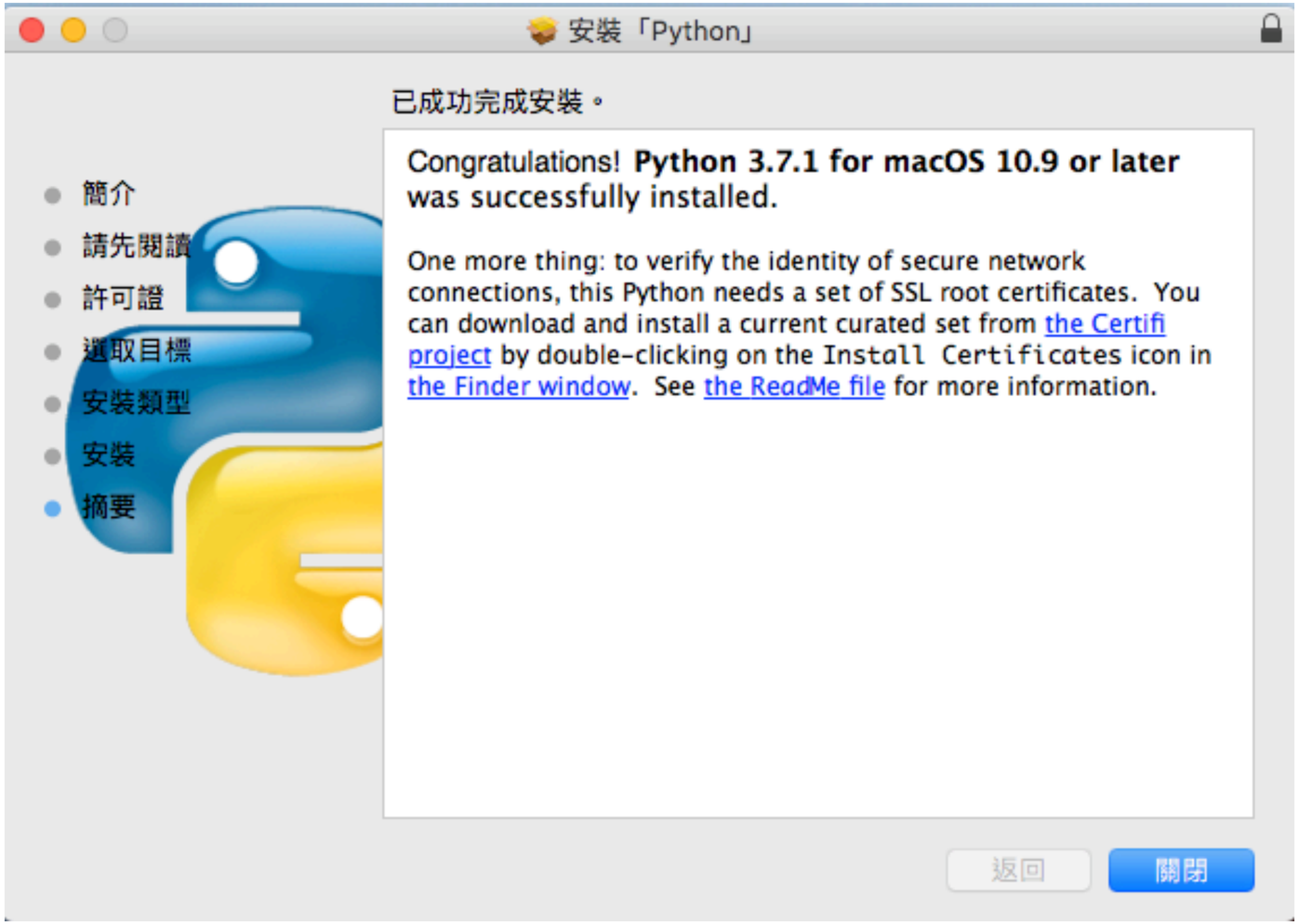
到python.org下載軟體



安裝Python


安裝「Python」
歡迎使用「Python」安裝程式
簡介
請先閱讀
許可證
選取目標
安裝類型
安裝
摘要
This package will install Python 3.7.1 for macOS 10.9 or later.
Python for macOS consists of the Python programming language interpreter, plus a set of programs to allow easy access to it for macOS users including an integrated development environment IDLE.
NEW in 3.7.0: two installer variants (10.9+ 64-bit-only, 10.6+ 64-/32-bit), built-in Tcl/Tk 8.6 support (no additional third-party downloads!), OpenSSL 1.1.0, and more!
返回
繼續

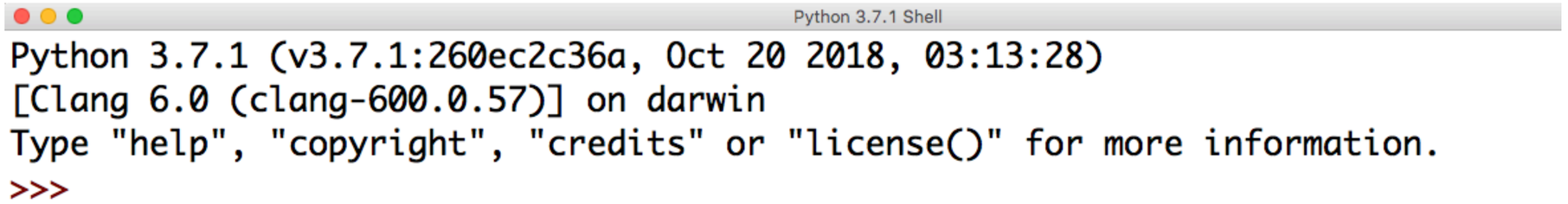
安裝完成Python


安裝「Python」
已成功完成安裝。
簡介
請先閱讀
許可證
選取目標
安裝類型
安裝
摘要
Congratulations! Python 3.7.1 for macOS 10.9 or later was successfully installed.
One more thing: to verify the identity of secure network connections, this Python needs a set of SSL root certificates. You can download and install a current curated set from the Certifi project by double-clicking on the Install Certificates icon in the Finder window. See the ReadMe file for more information.
返回
關閉

Python安裝

- 這是在Mac上安裝完的Python Launcher
- 啟動IDLE

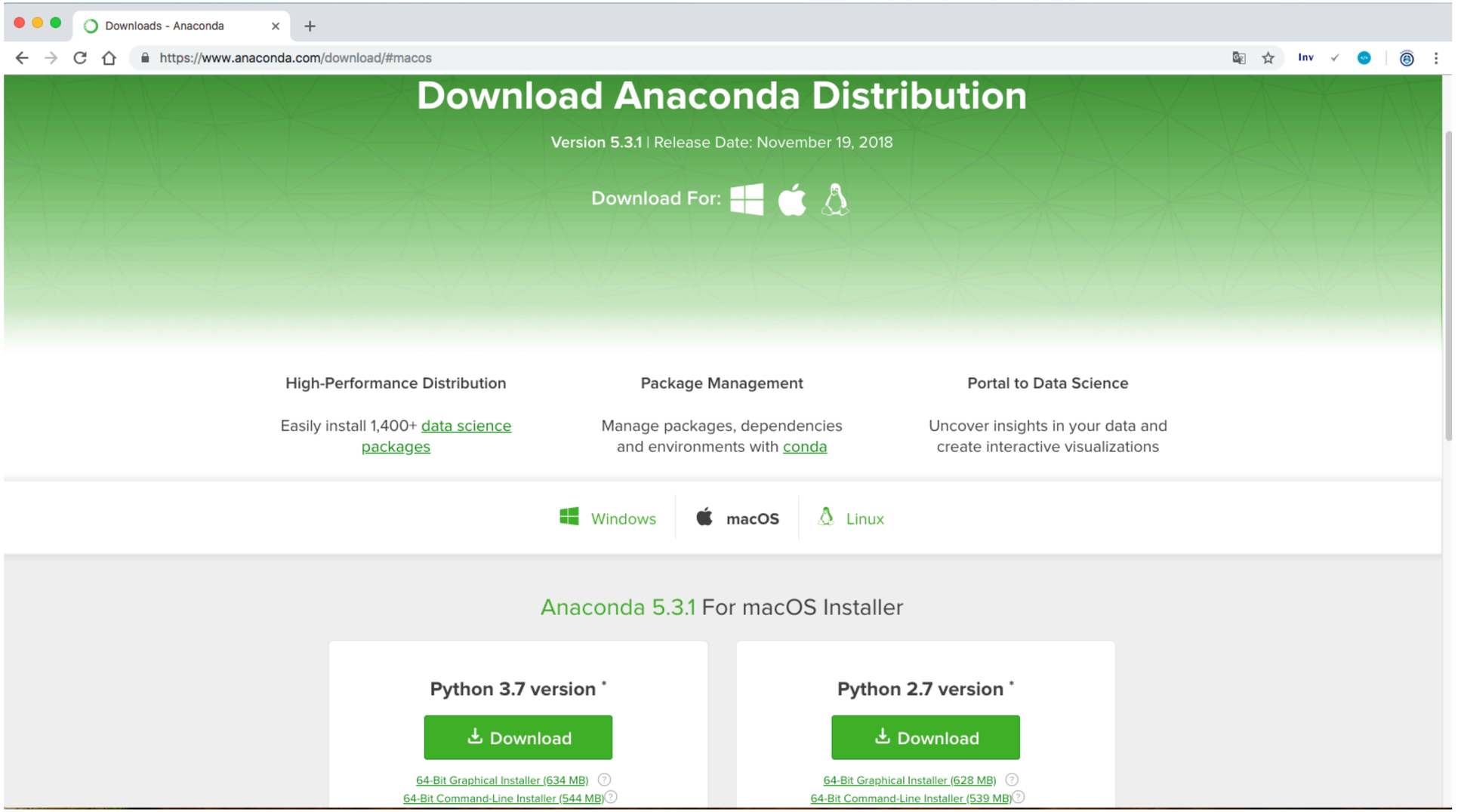
這是安裝完Python的直譯環境



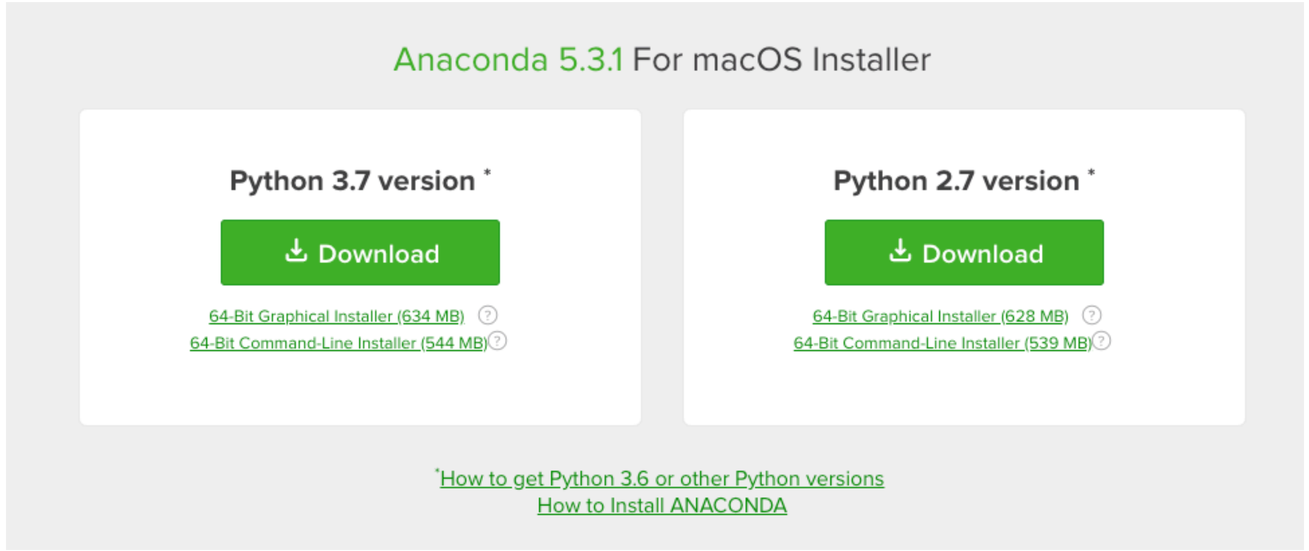
1-1 Mac安裝Anaconda

- 在Mac安裝Anaconda組合包

- 到Anconda下載Python組合包https://www.anaconda.com/

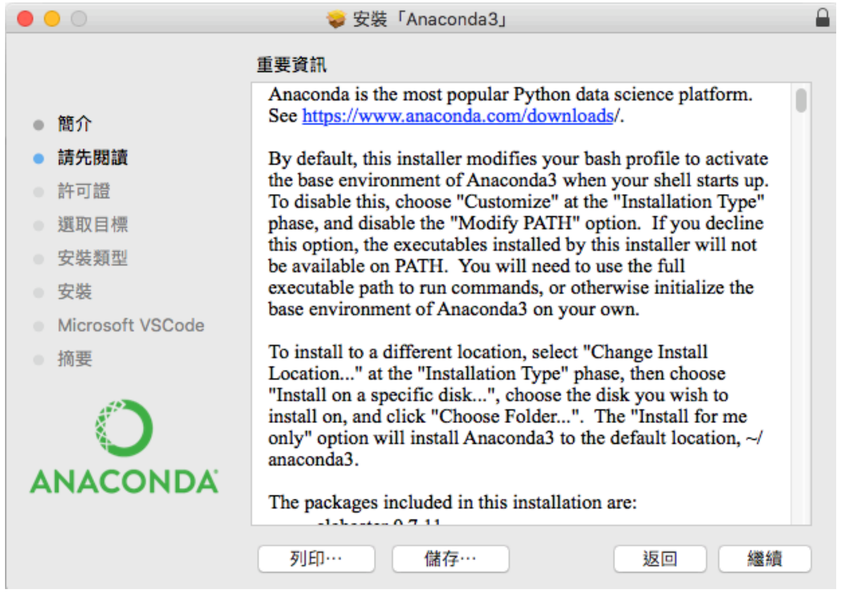


下載Python 3.7

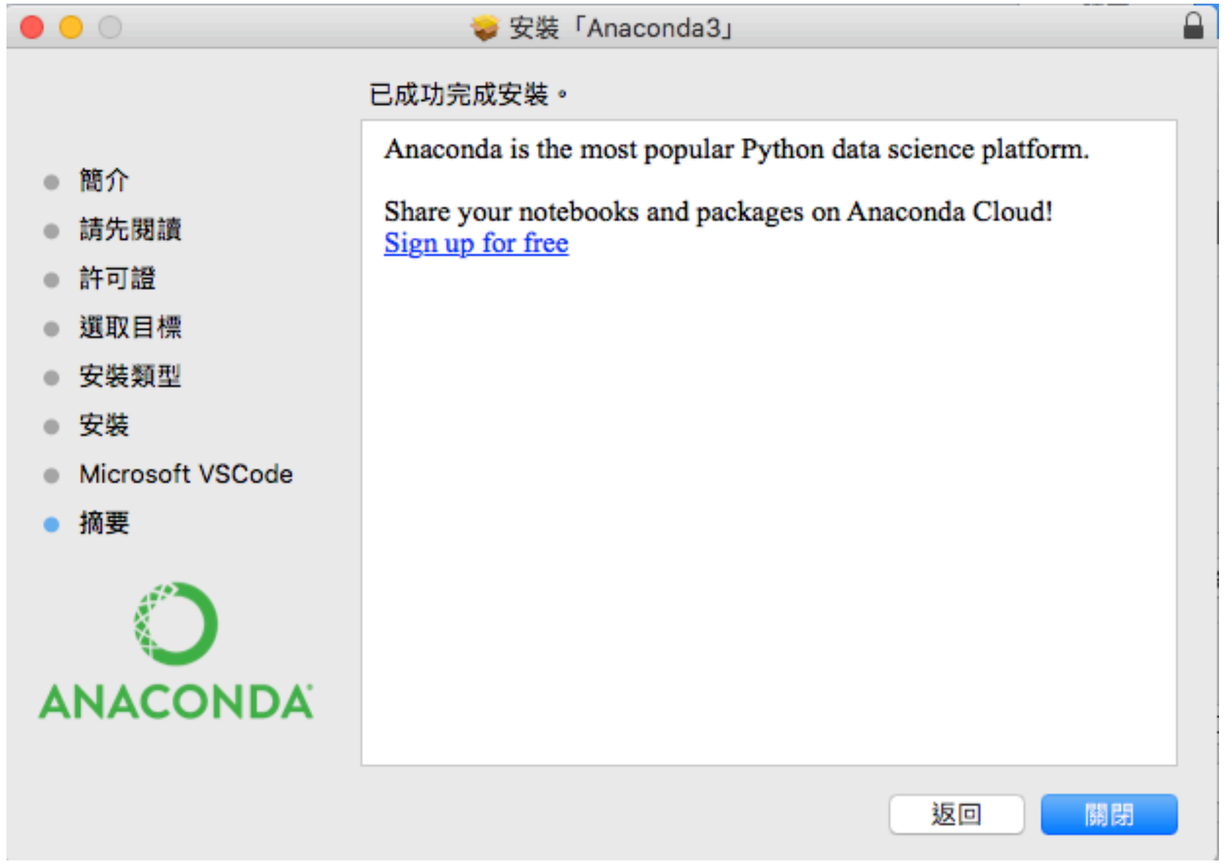

Anaconda 5.3.1 For macOS Installer
Python 3.7 version *
Download
64-Bit Graphical Installer (634 MB)
64-Bit Command-Line Installer (544 MB)
Python 2.7 version *
Download
64-Bit Graphical Installer (628 MB)
64-Bit Command-Line Installer (539 MB)
*How to get Python 3.6 or other Python versions
How to Install ANACONDA

安裝Anaconda


安裝「Anaconda3」
歡迎使用「Anaconda3」安裝程式
將會引導您完成安裝此軟體的所需步驟。
簡介
請先閱讀
許可證
選取目標
安裝類型
安裝
Microsoft VSCode
摘要
ANACONDA
返回
繼續

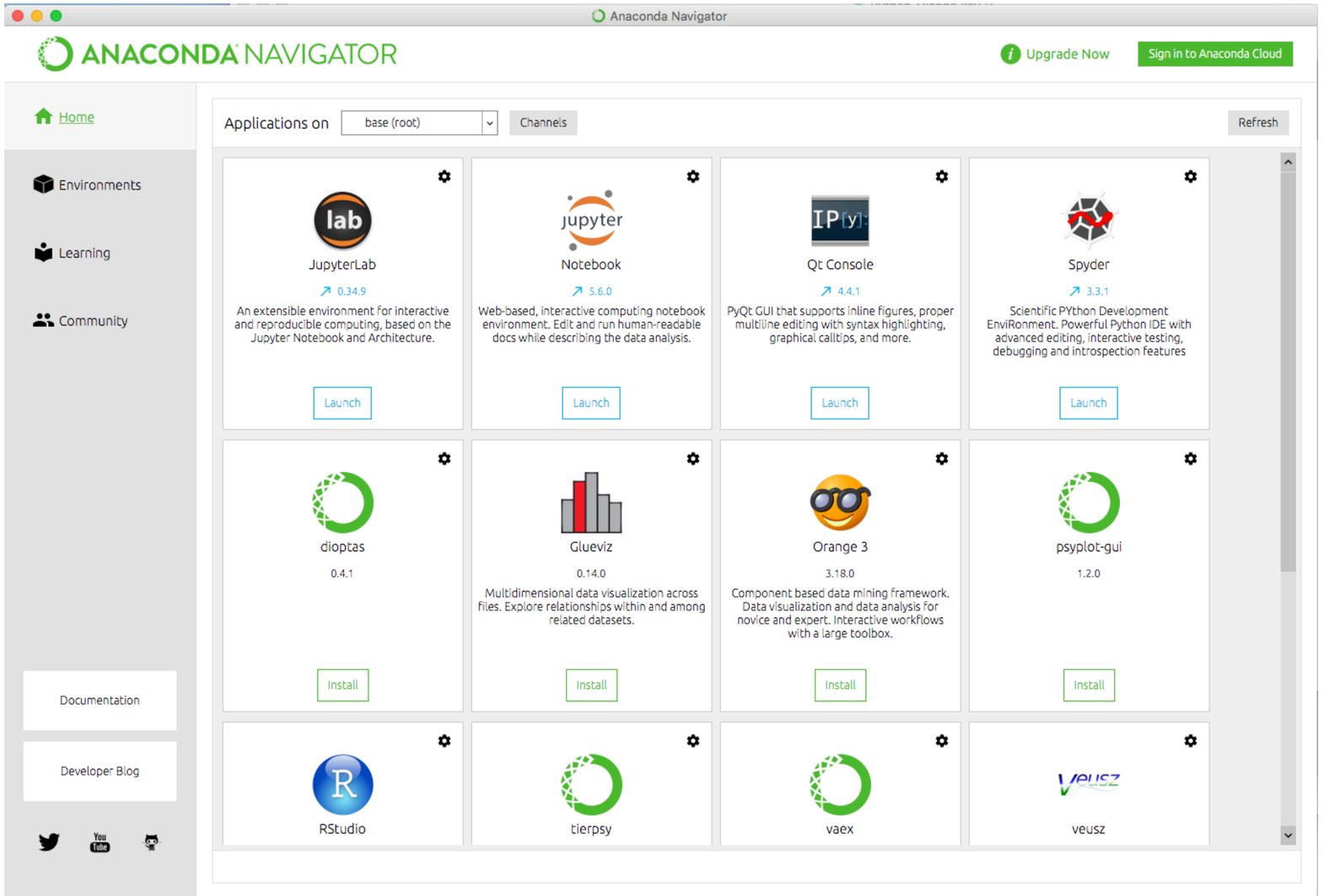

安裝「Anaconda3」
重要資訊
Anaconda is the most popular Python data science platform.
See https://www.anaconda.com/downloads/.
By default, this installer modifies your bash profile to activate the base environment of Anaconda3 when your shell starts up. To disable this, choose "Customize" at the "Installation Type" phase, and disable the "Modify PATH" option. If you decline this option, the executables installed by this installer will not be available on PATH. You will need to use the full executable path to run commands, or otherwise initialize the base environment of Anaconda3 on your own.
To install to a different location, select "Change Install Location..." at the "Installation Type" phase, then choose "Install on a specific disk...", choose the disk you wish to install on, and click "Choose Folder...". The "Install for me only" option will install Anaconda3 to the default location, ~/anaconda3.
The packages included in this installation are:
簡介
請先閱讀
許可證
選取目標
安裝類型
安裝
Microsoft VSCode
摘要
ANACONDA
列印⋯
儲存⋯
返回
繼續

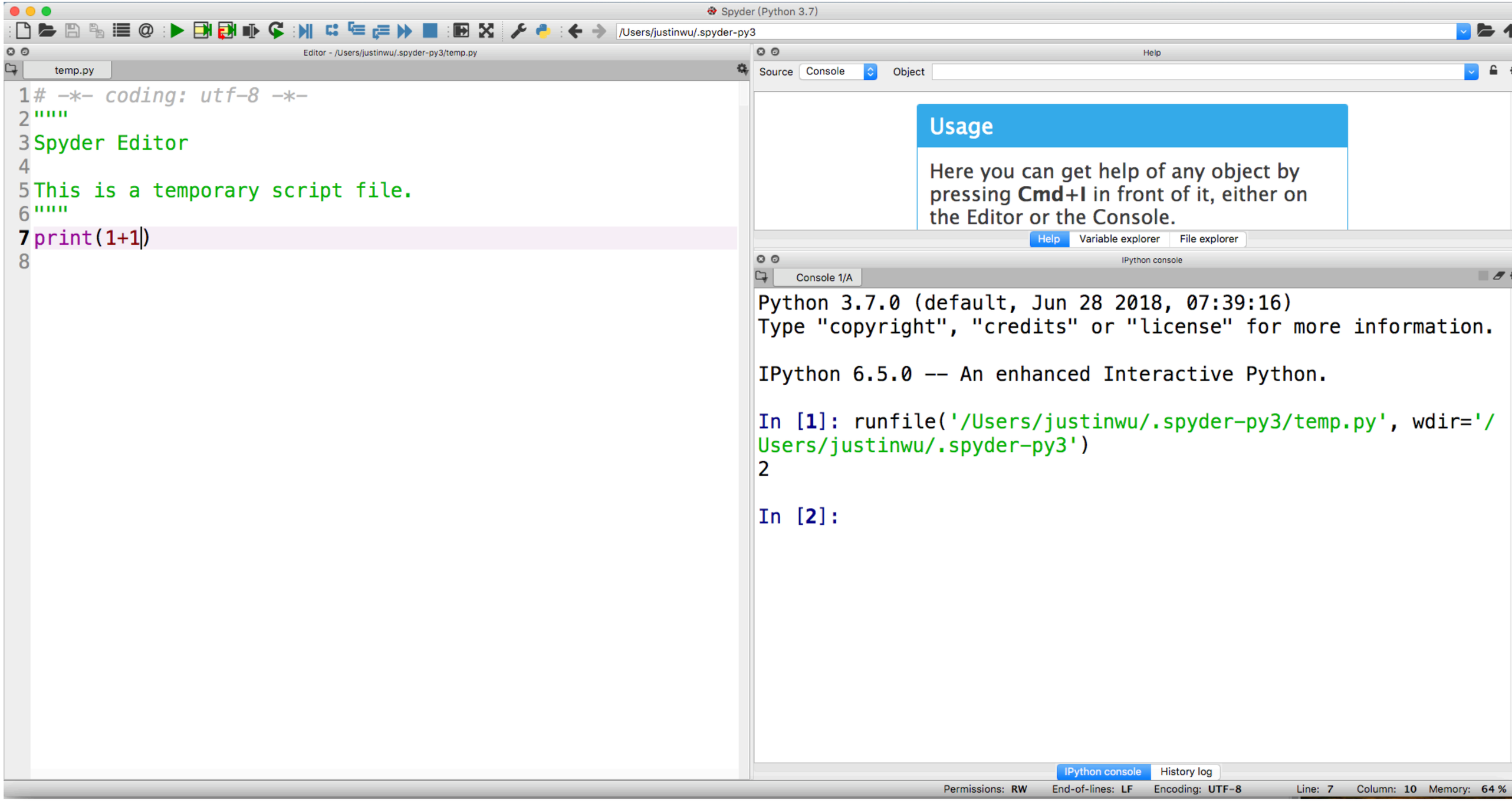
完成安裝Anaconda



選取Launchpad選取Anaconda-Navigator

選取Spider


Anaconda Navigator
ANACONDA NAVIGATOR
Upgrade Now
Sign in to Anaconda Cloud
Home
Environments
Learning
Community
Documentation
Developer Blog
Applications on
base (root)
Channels
Refresh
JupyterLab
0.34.9
An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.
Launch
Notebook
5.6.0
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.
Launch
Qt Console
4.4.1
PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.
Launch
Spyder
3.3.1
Scientific PYthon Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features
Launch
dioptas
0.4.1
Install
Glueviz
0.14.0
Multidimensional data visualization across files. Explore relationships within and among related datasets.
Install
Orange 3
3.18.0
Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.
Install
psyplot-gui
1.2.0
Install
RStudio
tierpsy
vaex
veusz


Spyder (Python 3.7)
/Users/justinwu/.spyder-py3
Editor - /Users/justinwu/.spyder-py3/temp.py
temp.py
1 # -*- coding: utf-8 -*-
2 """
3 Spyder Editor
4
5 This is a temporary script file.
6 """
7 print(1+1)
8
Help
Source Console Object
Usage
Here you can get help of any object by pressing Cmd+I in front of it, either on the Editor or the Console.
Help Variable explorer File explorer
IPython console
Console 1/A
Python 3.7.0 (default, Jun 28 2018, 07:39:16)
Type "copyright", "credits" or "license" for more information.
IPython 6.5.0 -- An enhanced Interactive Python.
In [1]: runfile('/Users/justinwu/.spyder-py3/temp.py', wdir='/Users/justinwu/.spyder-py3')
2
In [2]:
IPython console History log
Permissions: RW End-of-lines: LF Encoding: UTF-8 Line: 7 Column: 10 Memory: 64 %

使用conda更新pip

- `conda config --add channels conda-forge`

```
$ conda update pip
```

```
60-250-191-81:~ justinwu$ conda config --add channels conda-forge
Warning: 'conda-forge' already in 'channels' list, moving to the top
60-250-191-81:~ justinwu$ conda update pip
Solving environment: done

## Package Plan ##

  environment location: /anaconda3

  added / updated specs:
    - pip


The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    openssl-1.0.2p             |       h470a237_1         2.9 MB  conda-forge
    pip-18.1                   |        py37_1000         1.7 MB  conda-forge
    conda-4.5.11               |        py37_1000         651 KB  conda-forge
    twisted-18.9.0             |   py37h470a237_0         4.9 MB  conda-forge
```

如果有使用舊版pip

安裝virtualenv虛擬環境

```
60-250-191-81:~ justinwu$ pip install virtualenv
Requirement already satisfied: virtualenv in /anaconda3/lib/python3.7/site-packa
ges (16.1.0)
```

使用virtualenv來建立MyWebSite專案

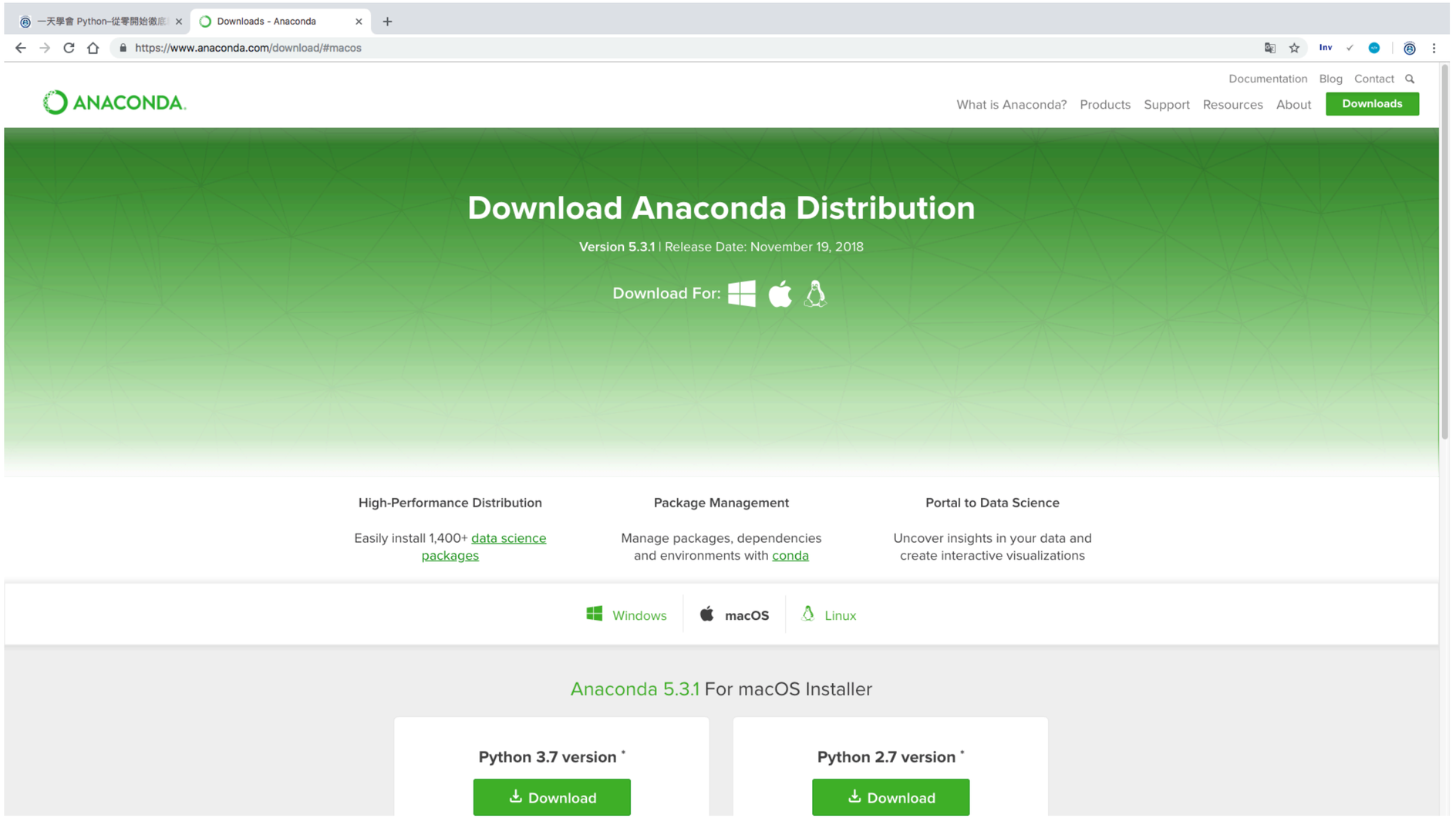
```
60-250-191-81:~ justinwu$ virtualenv MyWebSite
Using base prefix '/anaconda3'
New python executable in /Users/justinwu/MyWebSite/bin/python
Installing setuptools, pip, wheel...
done.
```

-

1-2Win 10安裝Anaconda

- 在Win 10安裝Anaconda組合包
-

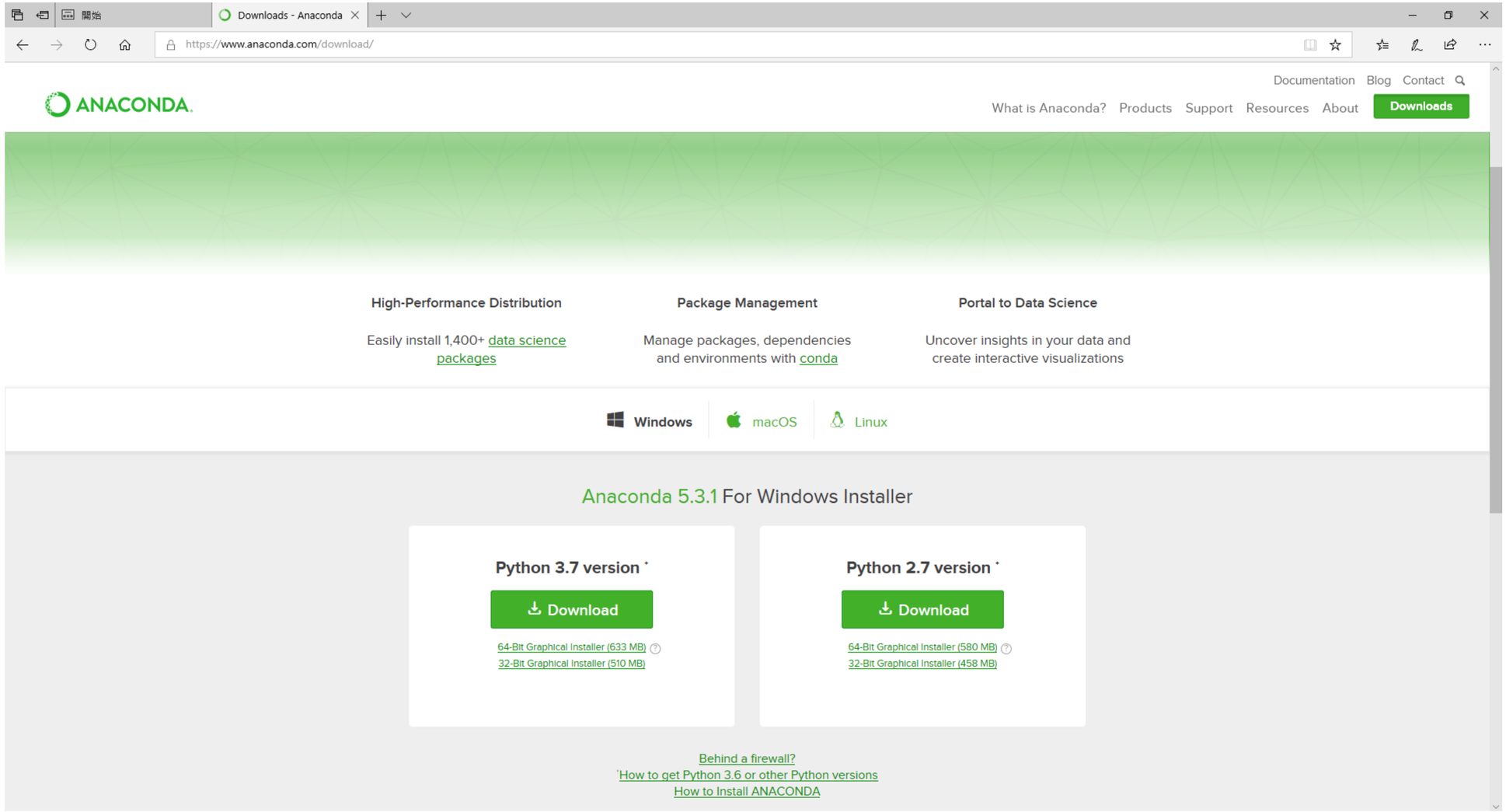
- 到Anconda下載Python組合包https://www.anaconda.com/



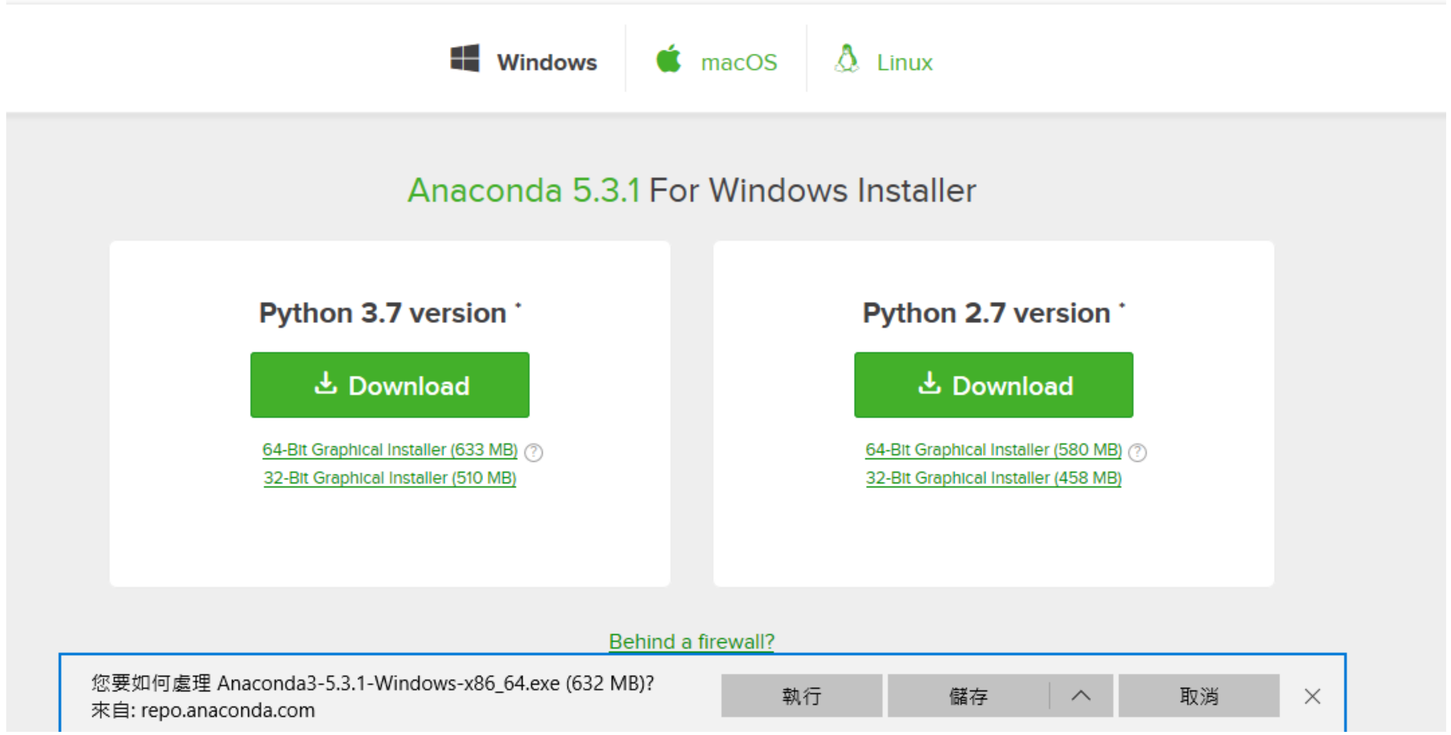
使用conda升級套件

```
justinwu — -bash — 86×22
Last login: Sun Dec 16 19:03:06 on ttys000
60-250-191-81:~ justinwu$ pip install scipy
Requirement already satisfied: scipy in /anaconda3/lib/python3.7/site-packages (1.1.0)
60-250-191-81:~ justinwu$ pip install -U scipy
Requirement already up-to-date: scipy in /anaconda3/lib/python3.7/site-packages (1.1.0
)
60-250-191-81:~ justinwu$ conda install numpy
Solving environment: done

## Package Plan ##

  environment location: /anaconda3

  added / updated specs:
    - numpy
```

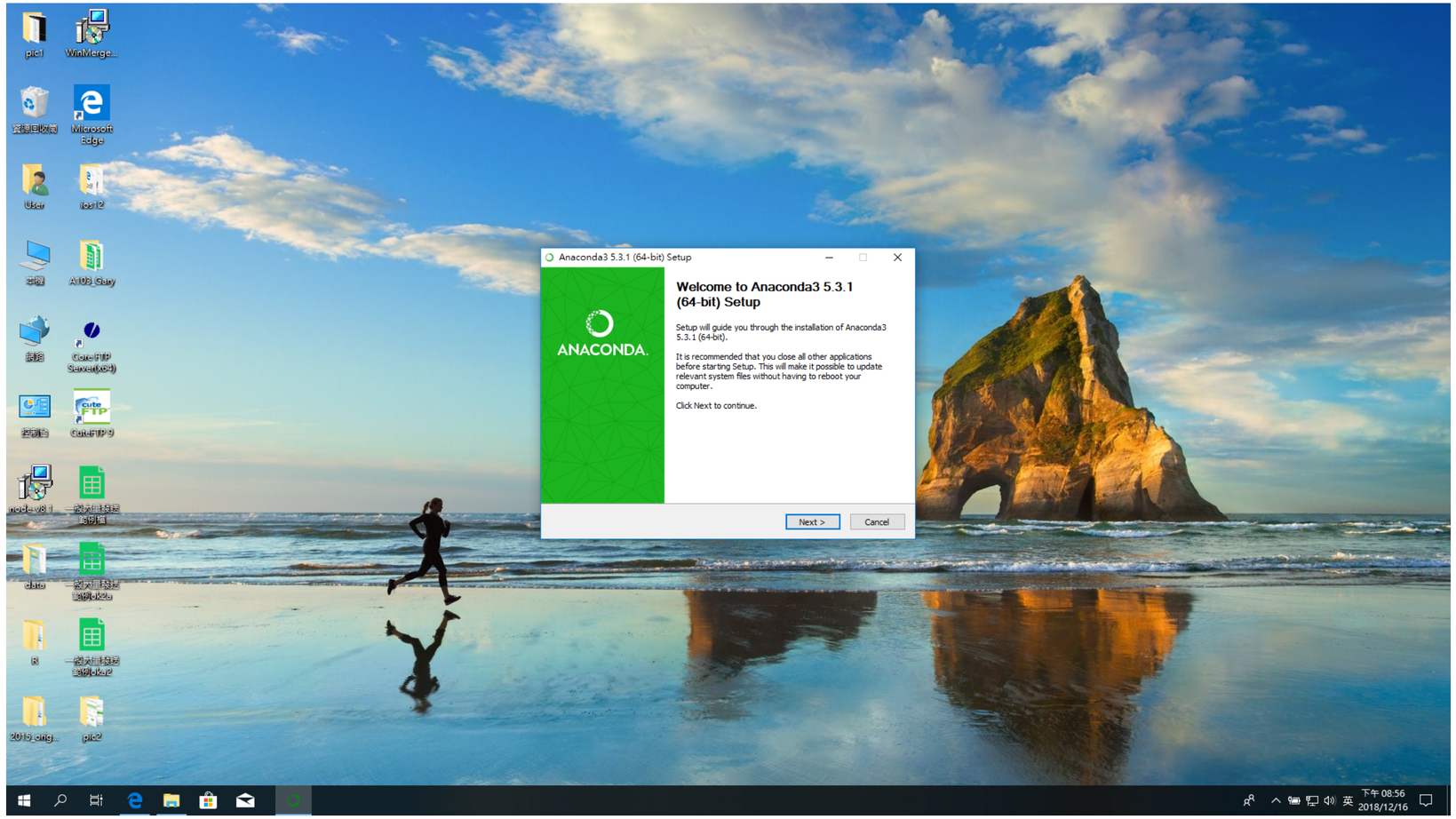
在Windows上安裝



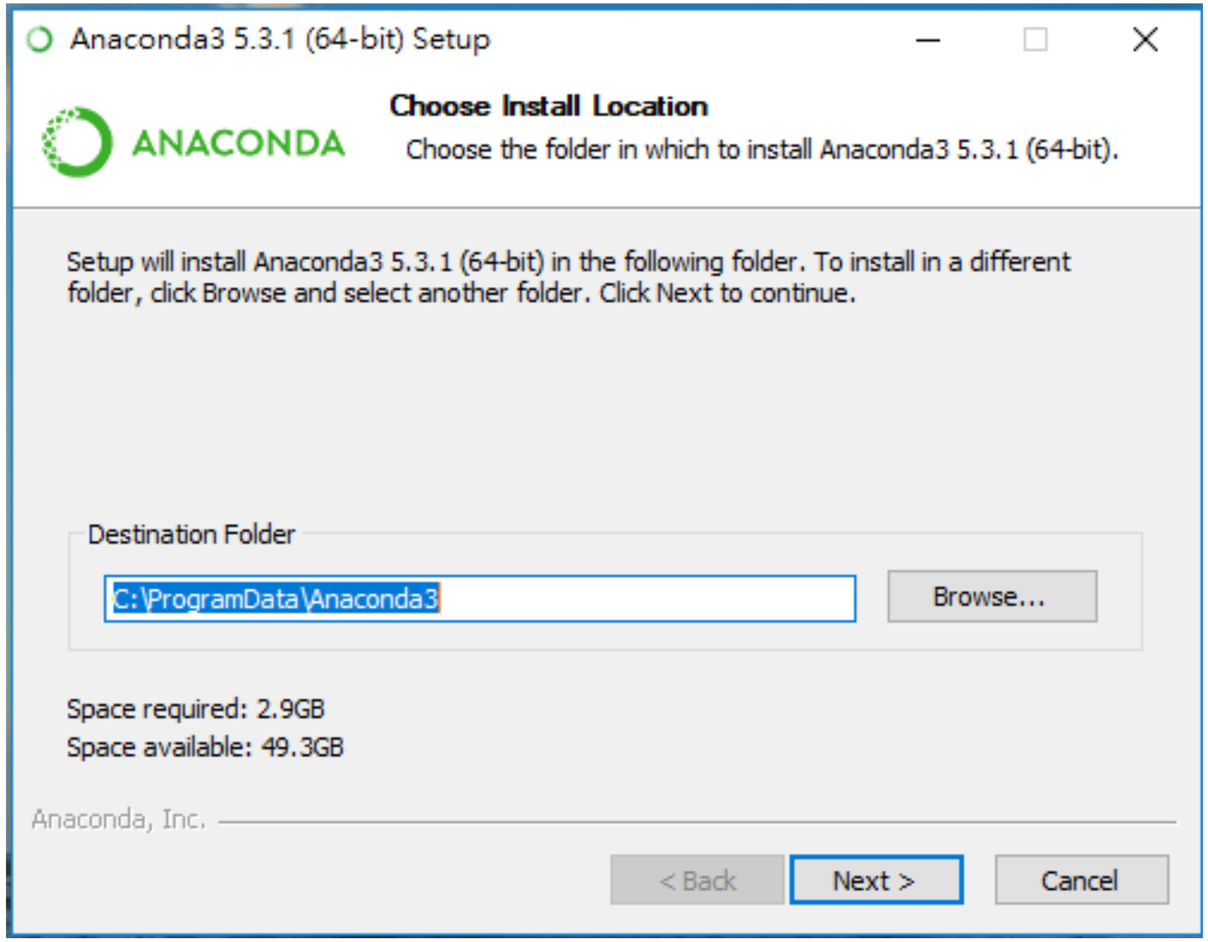
下載並且安裝Anaconda



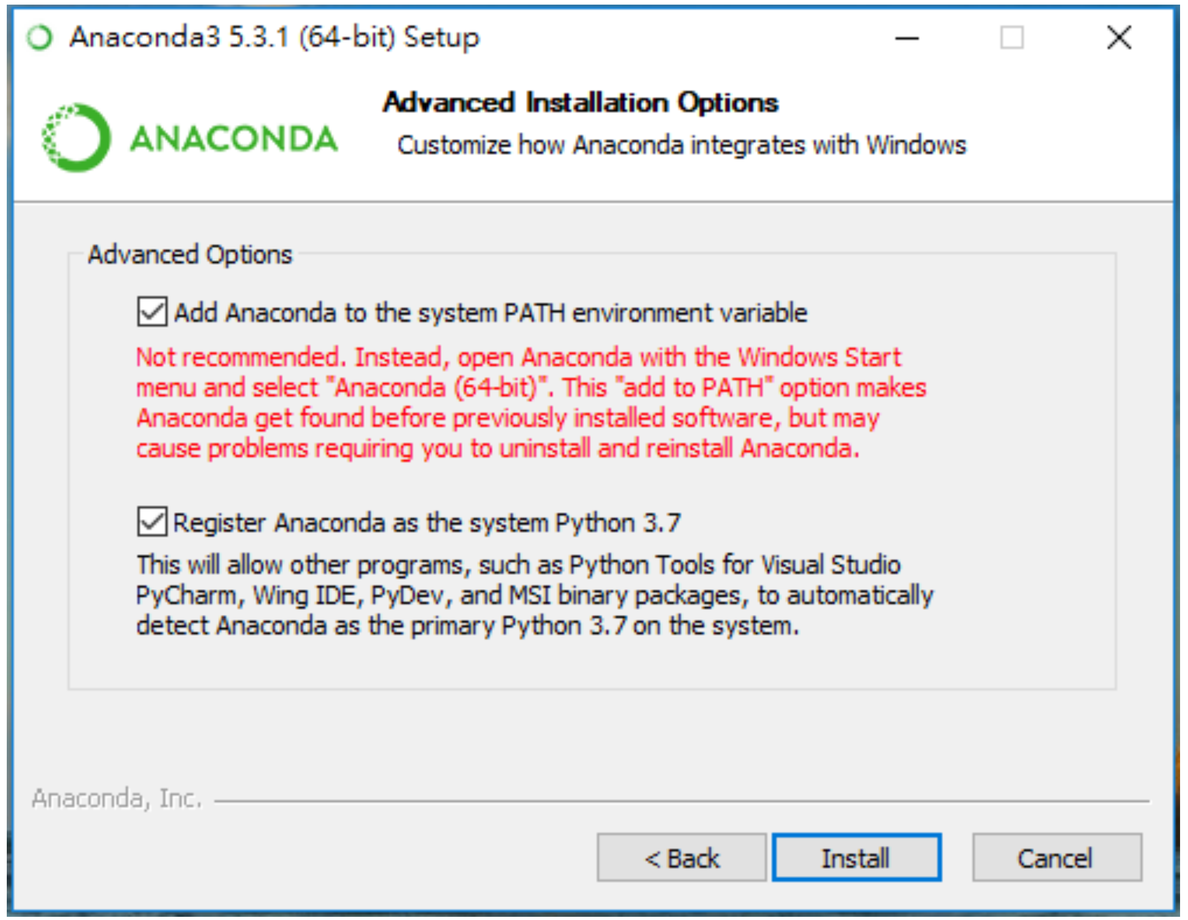
安裝軟體Anaconda



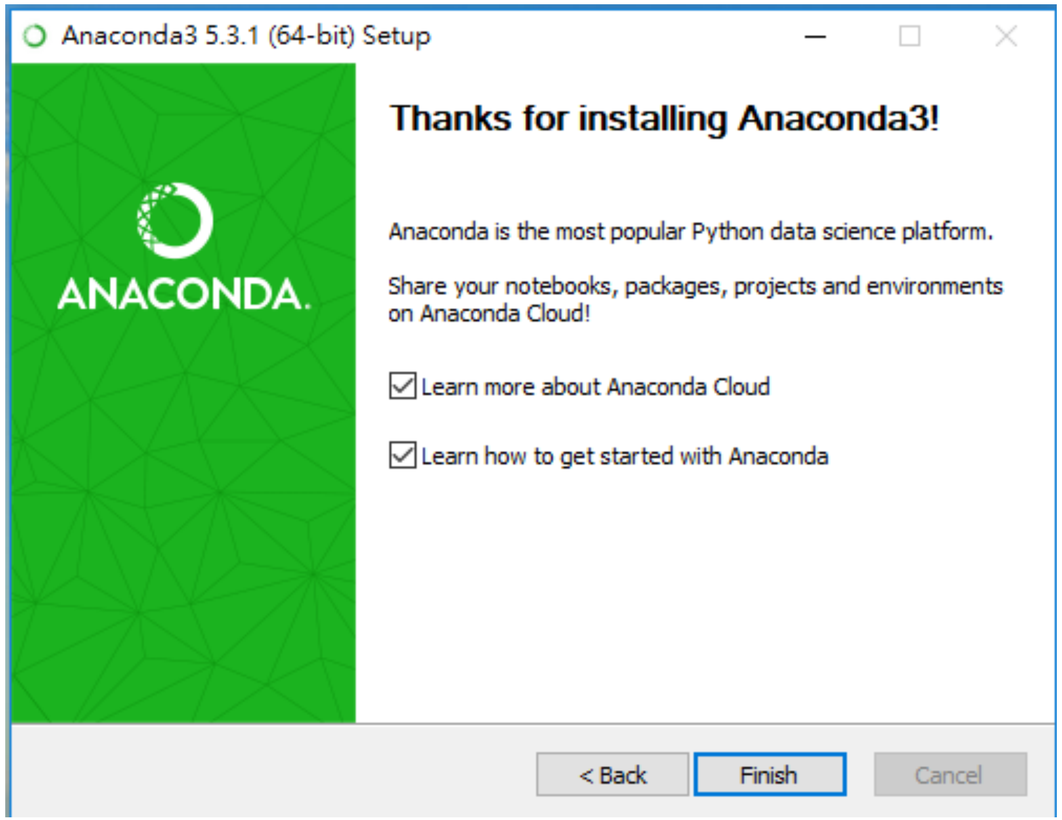
設定安裝目錄


Anaconda3 5.3.1 (64-bit) Setup
ANACONDA
Choose Install Location
Choose the folder in which to install Anaconda3 5.3.1 (64-bit).
Setup will install Anaconda3 5.3.1 (64-bit) in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
Destination Folder
C:\ProgramData\Anaconda3
Browse...
Space required: 2.9GB
Space available: 49.3GB
Anaconda, Inc.
< Back
Next >
Cancel

將Anaconda加入系統環境變數打勾



成功安装


Anaconda3 5.3.1 (64-bit) Setup
ANACONDA.
Thanks for installing Anaconda3!
Anaconda is the most popular Python data science platform.
Share your notebooks, packages, projects and environments on Anaconda Cloud!
Learn more about Anaconda Cloud
Learn how to get started with Anaconda
< Back
Finish
Cancel

選取Anaconda Navigator和Spyder

Anaconda Navigator

File Help

ANACONDA NAVIGATOR

Sign in to Anaconda Cloud

Home

Environments

Learning

Community

Documentation

Developer Blog

Applications on base (root) Channels Refresh

JupyterLab
0.34.9
An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.
Launch

Notebook
5.6.0
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.
Launch

Qt Console
4.4.1
PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.
Launch

Spyder
3.3.1
Scientific PYthon Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features
Launch

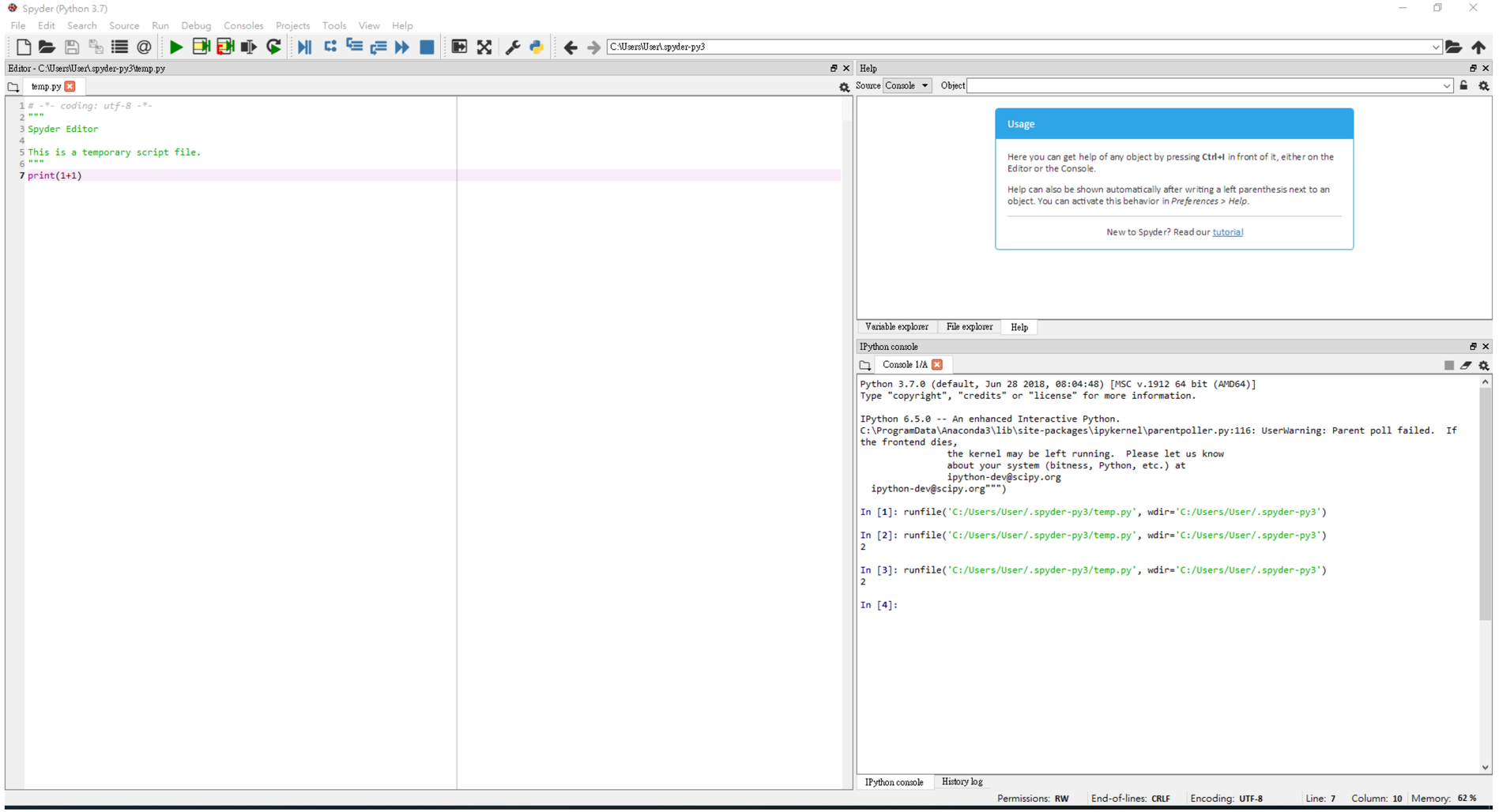
VS Code
1.25.1
Streamlined code editor with support for development operations like debugging, task running and version control.
Launch

Glueviz
0.13.3
Multidimensional data visualization across files. Explore relationships within and among related datasets.
Install

Orange 3
3.17.0
Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.
Install

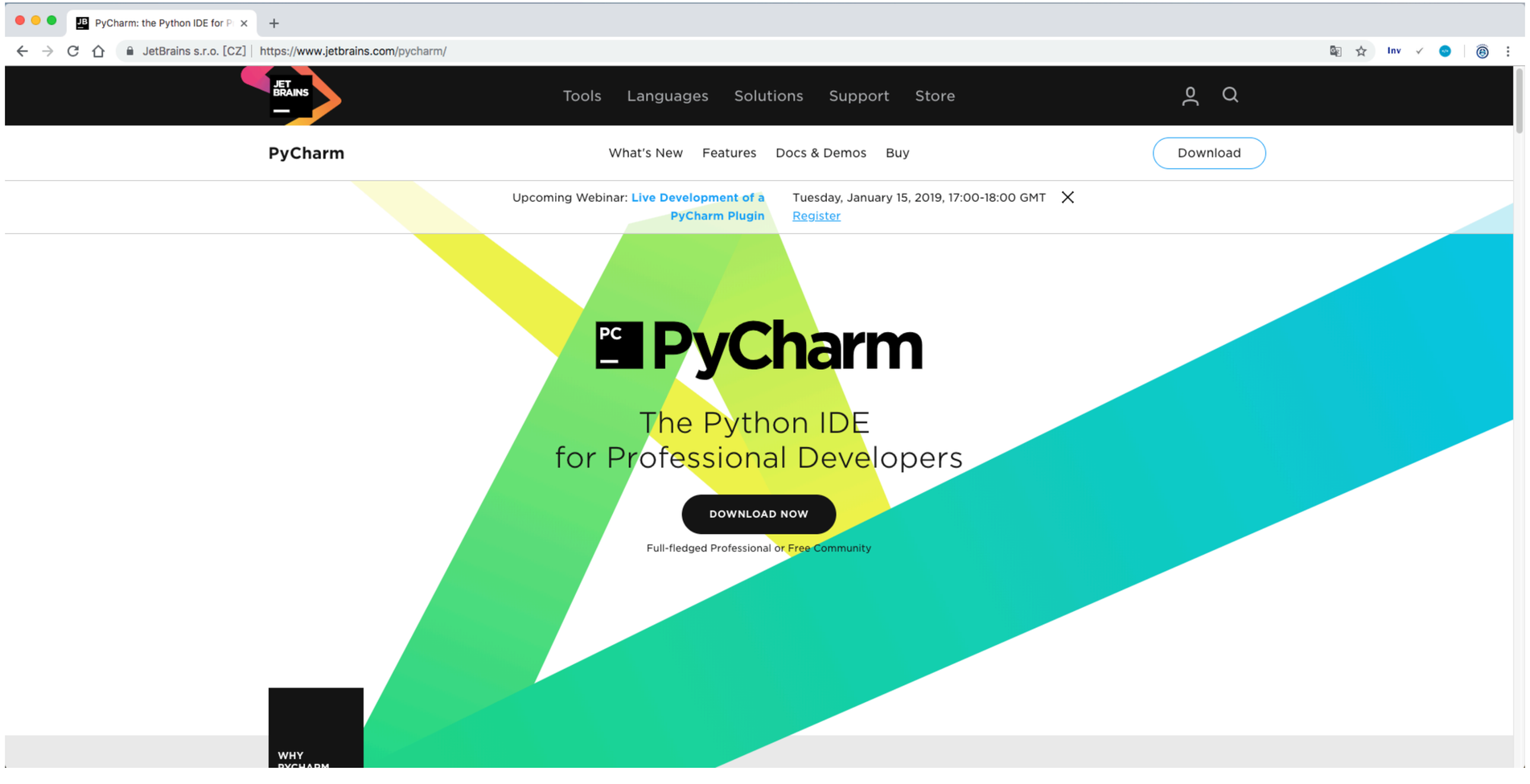
RStudio
1.1.456
A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks.
Install

選取Anaconda Navigator和Spyder

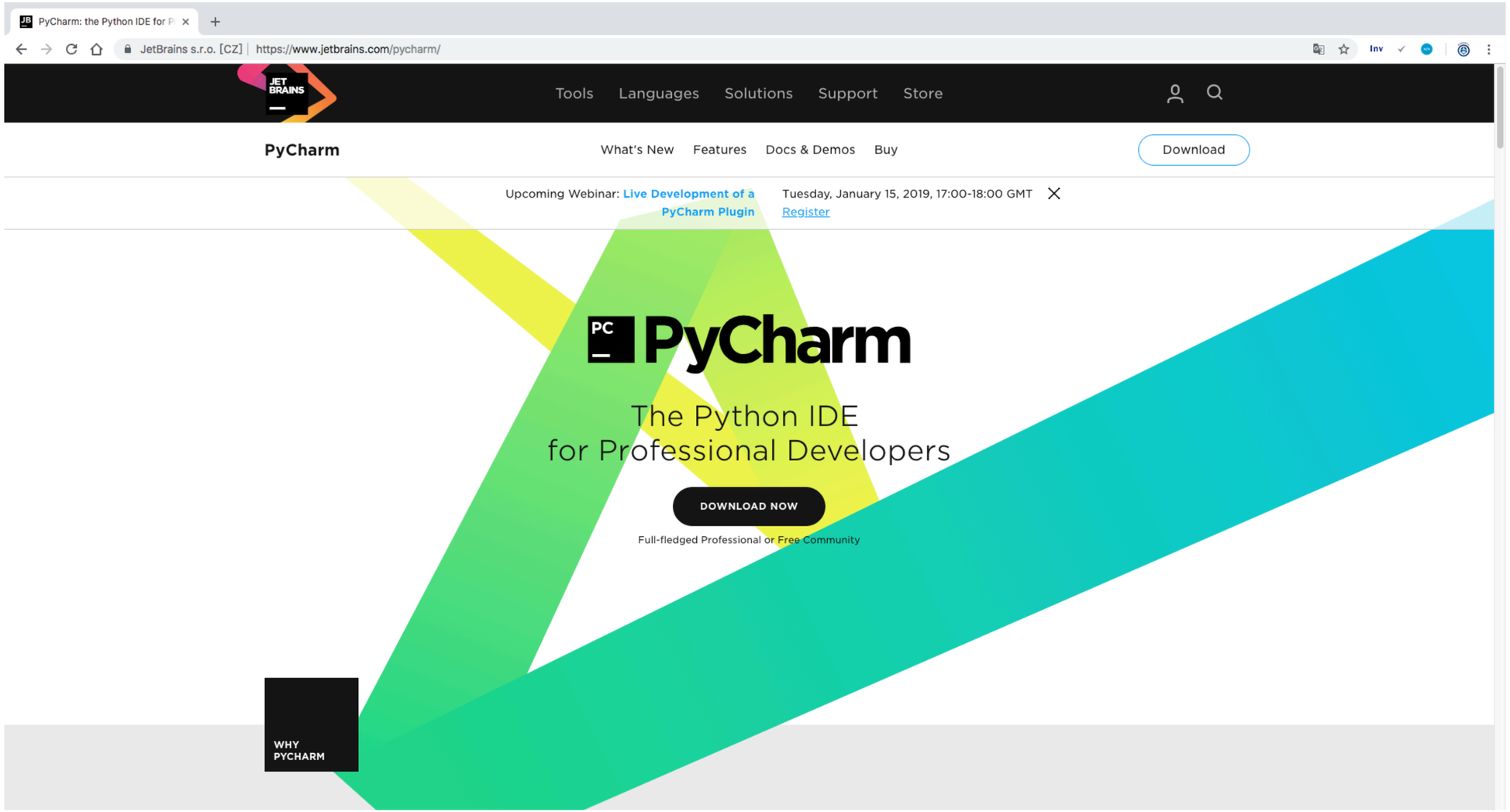


1-3在Mac下載及安裝PyCharm

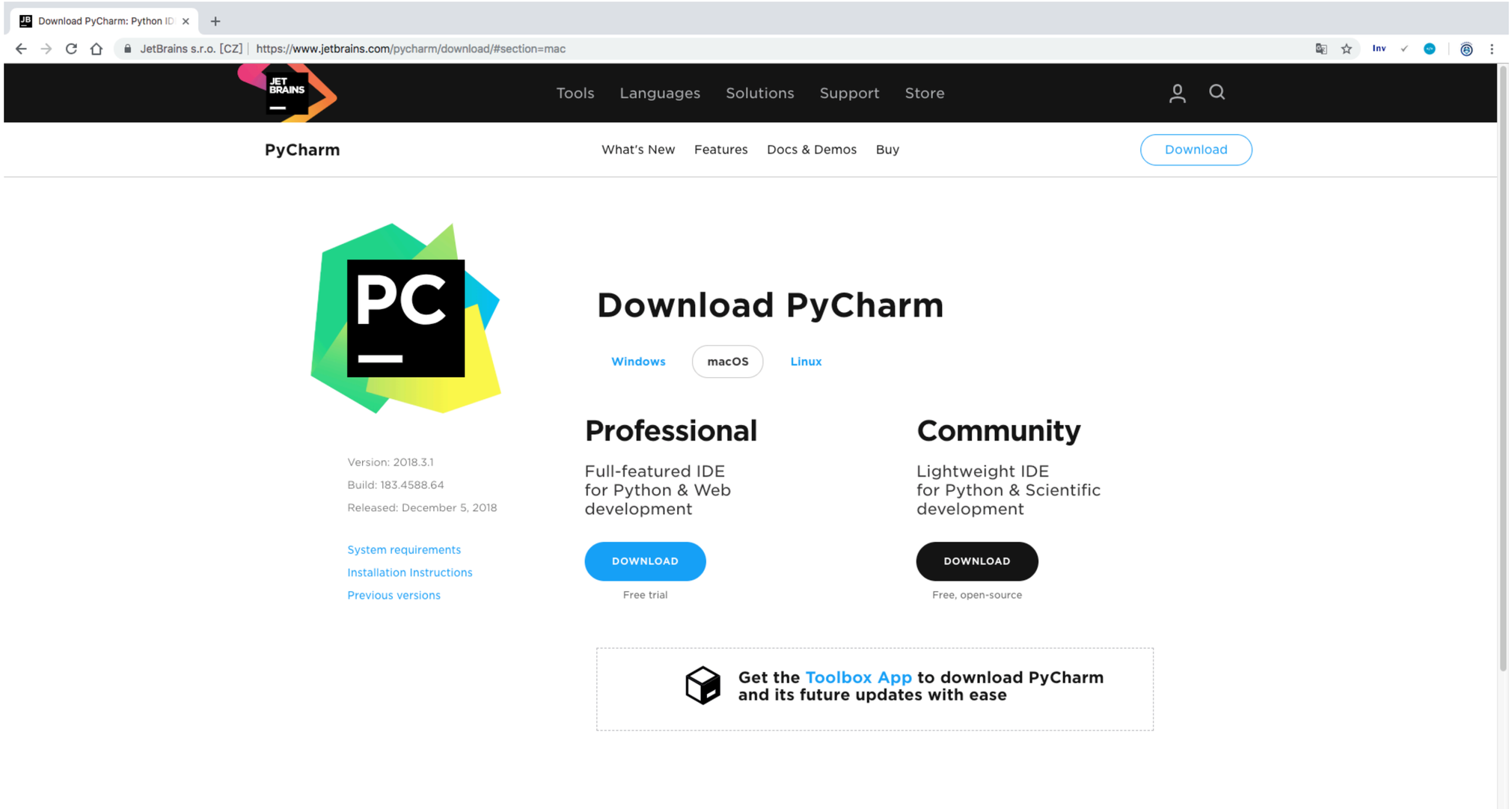
- https://www.jetbrains.com/pycharm/



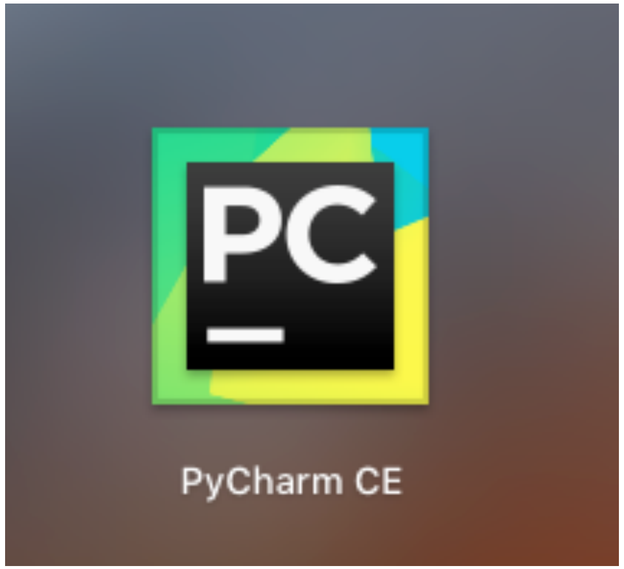
選取Download


PyCharm: the Python IDE for P
JetBrains s.r.o. [CZ] | https://www.jetbrains.com/pycharm/
Tools
Languages
Solutions
Support
Store
PyCharm
What's New
Features
Docs & Demos
Buy
Download
Upcoming Webinar: Live Development of a PyCharm Plugin
Tuesday, January 15, 2019, 17:00-18:00 GMT
Register
PyCharm
The Python IDE for Professional Developers
DOWNLOAD NOW
Full-fledged Professional or Free Community
WHY PYCHARM

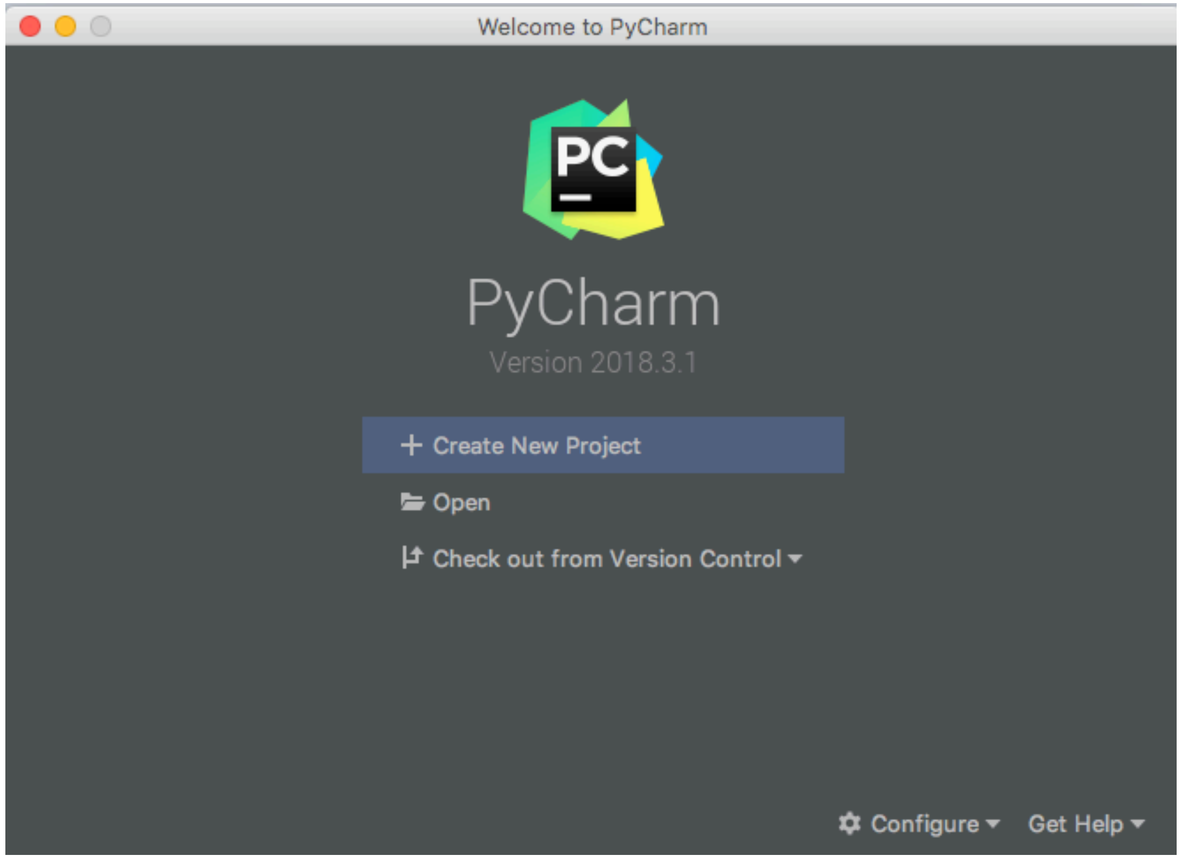
選取Community



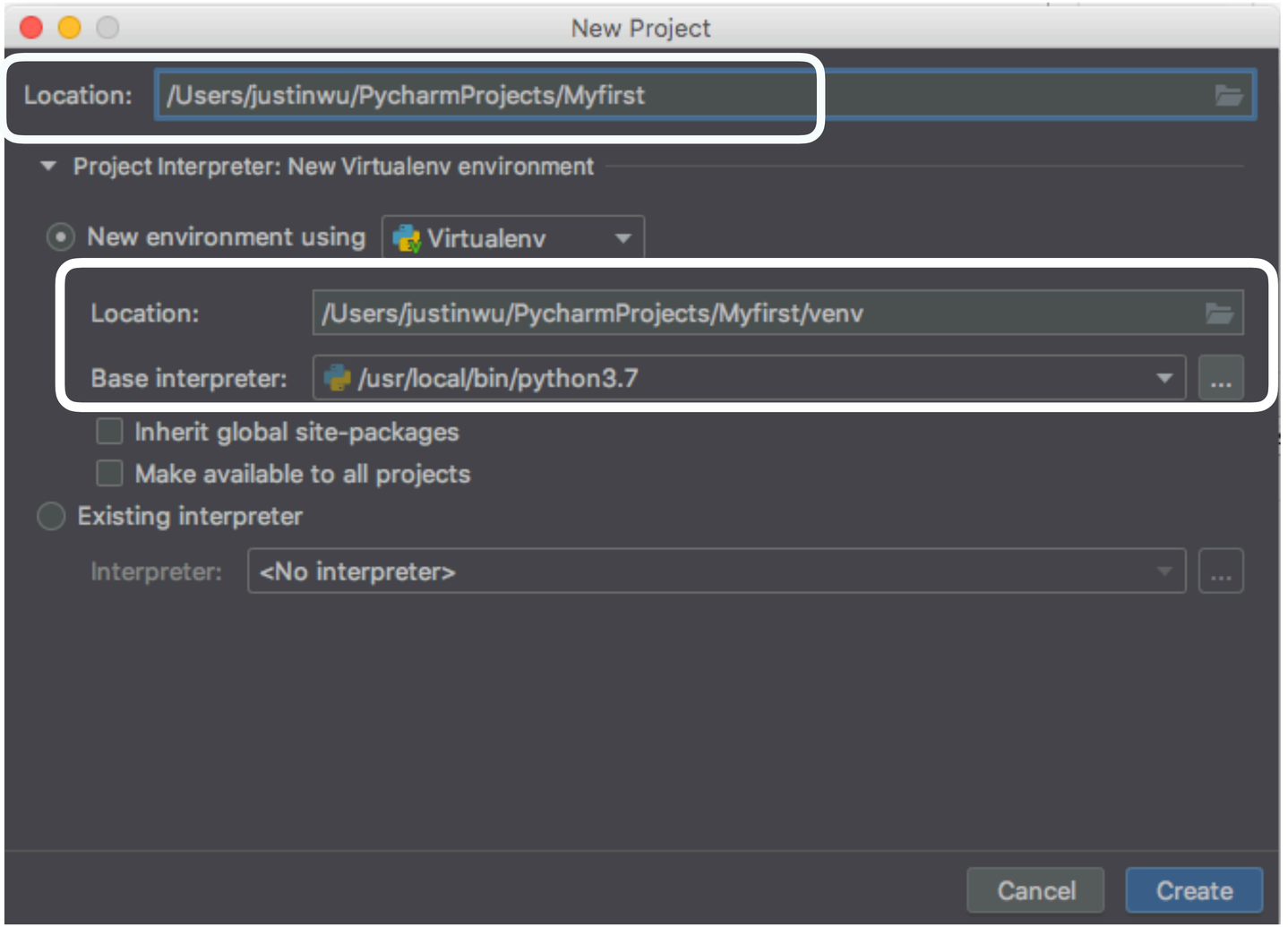
選取Launchpad選取PyCharm



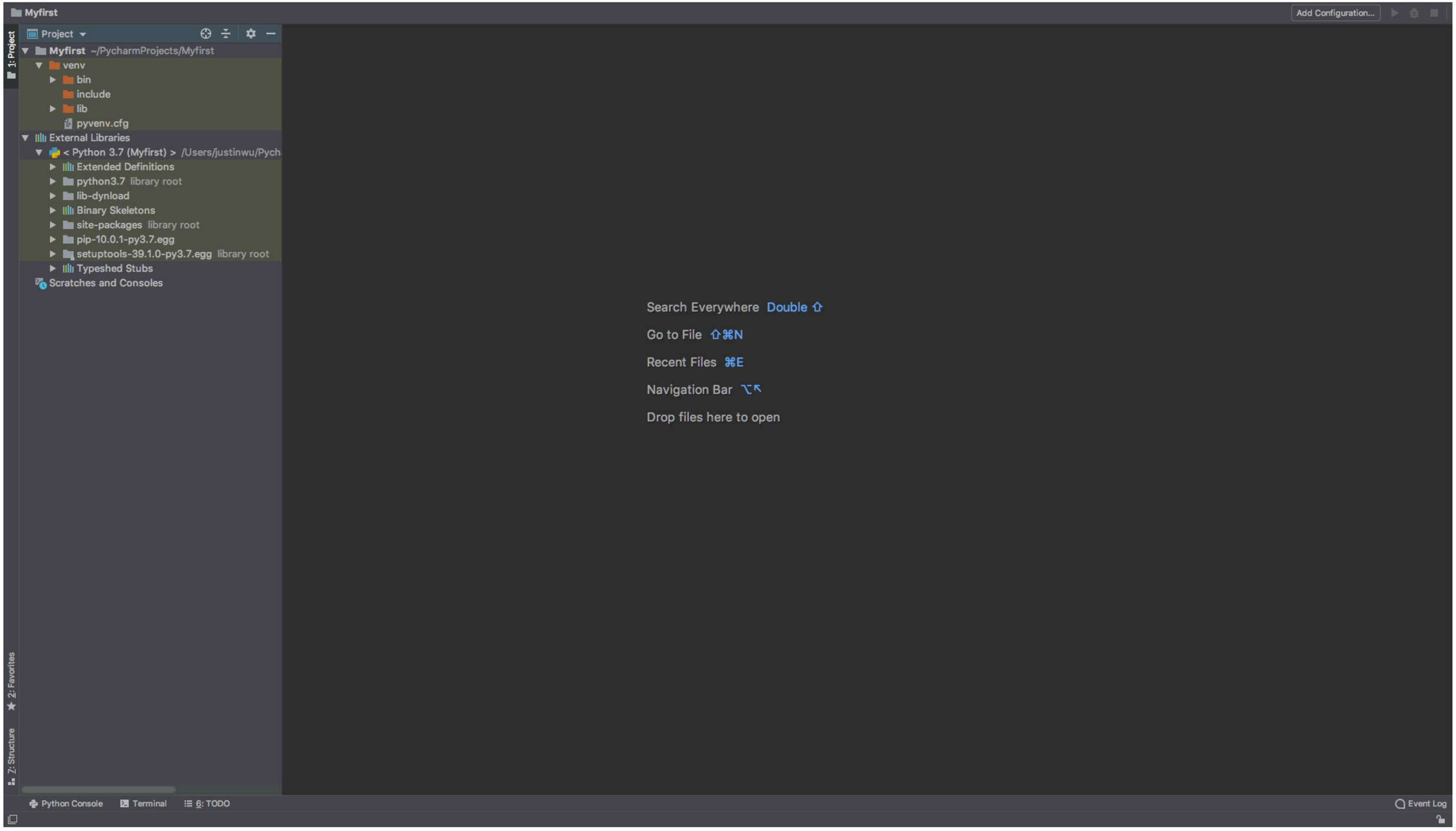
Create New Project



輸入Myfirst



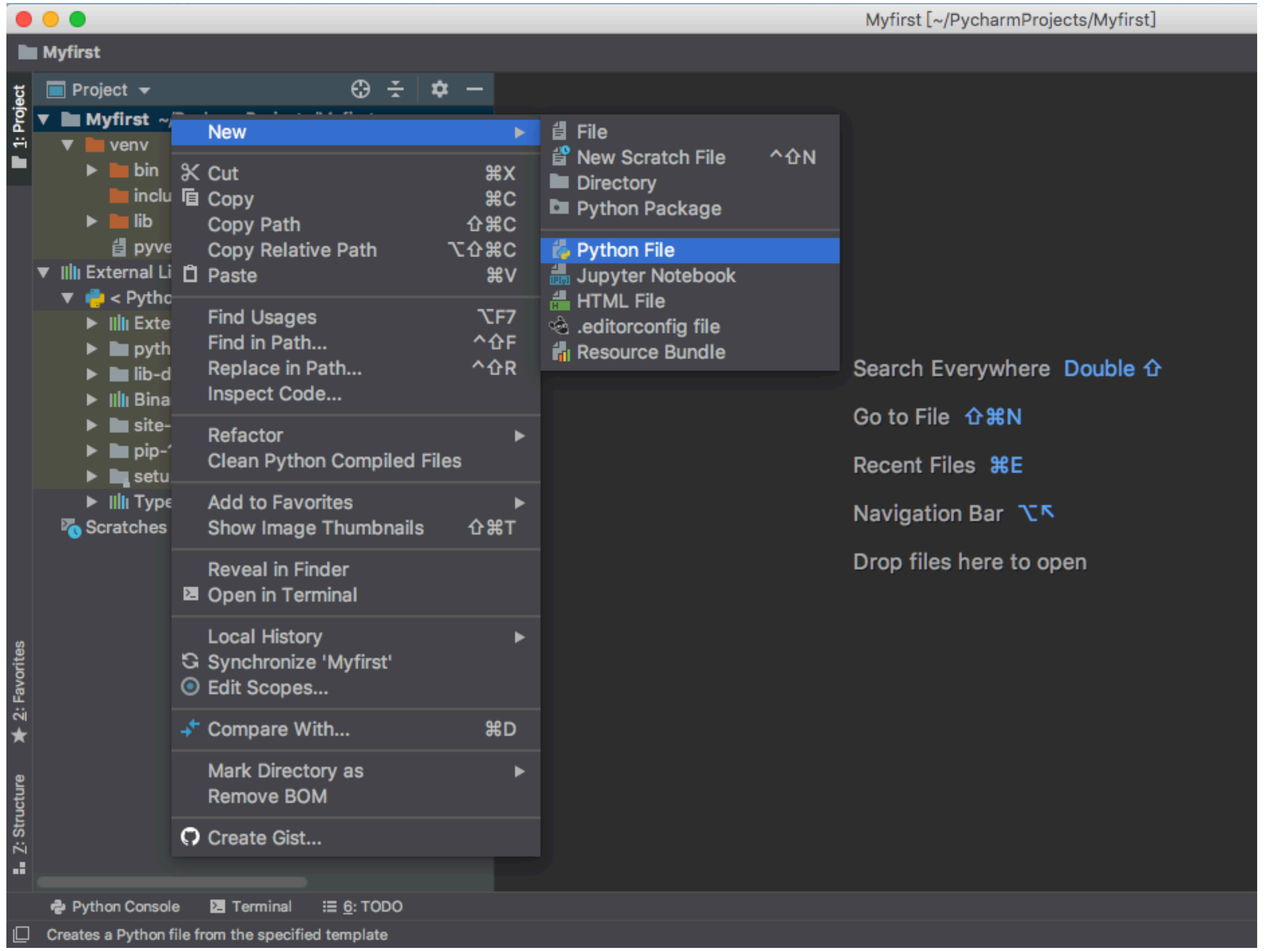
直譯器路徑


Myfirst
Add Configuration...
1: Project
Project
Myfirst ~/PycharmProjects/Myfirst
venv
bin
include
lib
pyvenv.cfg
External Libraries
< Python 3.7 (Myfirst) > /Users/justinwu/Pych
Extended Definitions
python3.7 library root
lib-dynload
Binary Skeletons
site-packages library root
pip-10.0.1-py3.7.egg
setuptools-39.1.0-py3.7.egg library root
Typeshed Stubs
Scratches and Consoles
Search Everywhere Double ⇧
Go to File ⇧⌘N
Recent Files ⌘E
Navigation Bar ⌥↖
Drop files here to open
2: Favorites
7: Structure
Python Console
Terminal
6: TODO
Event Log

Pycharm可以使用Python和Jupyter notebook的檔案

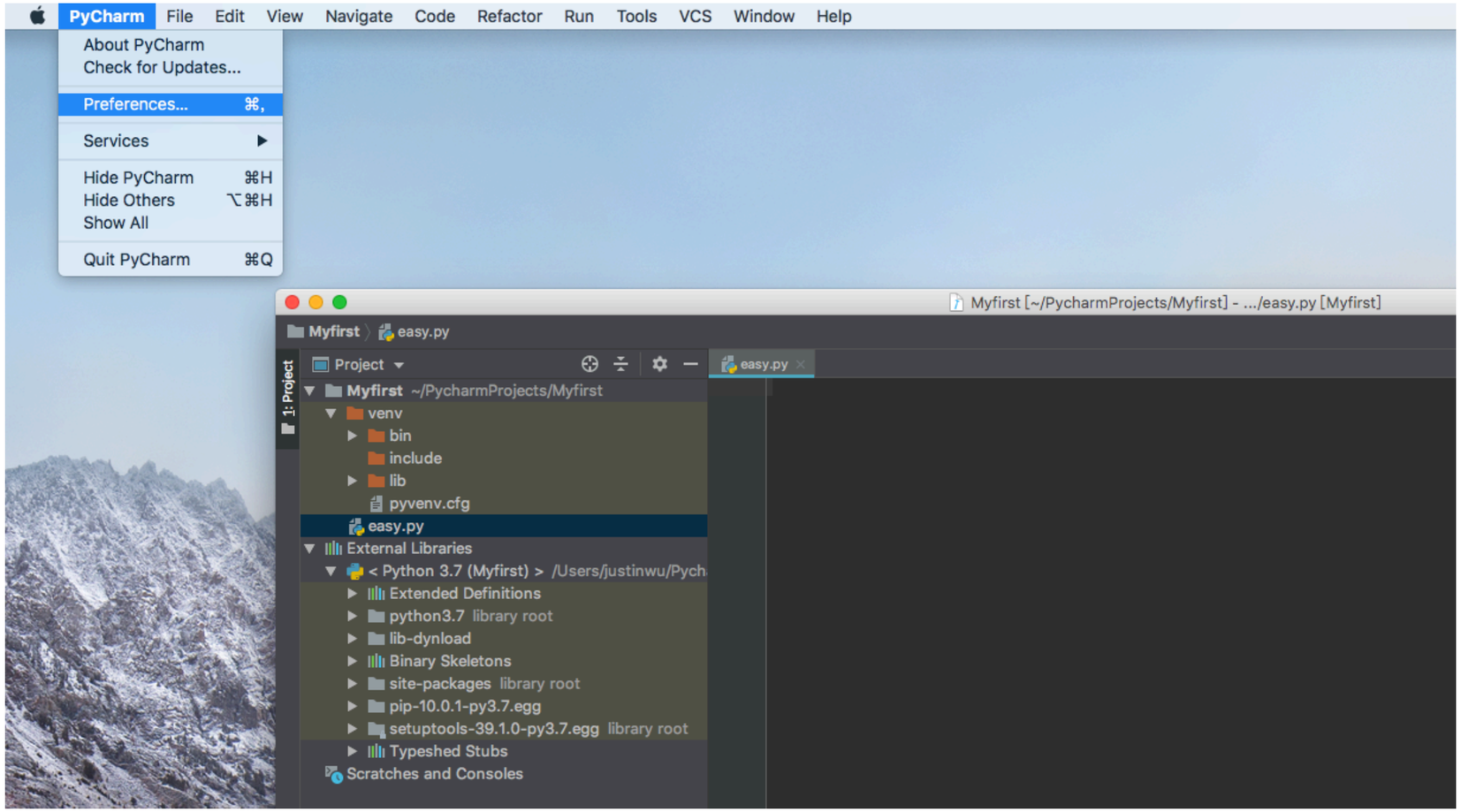
- 我們可以新增Python的檔案
- 選取File->NEW->Python File

選取File->NEW->Python File

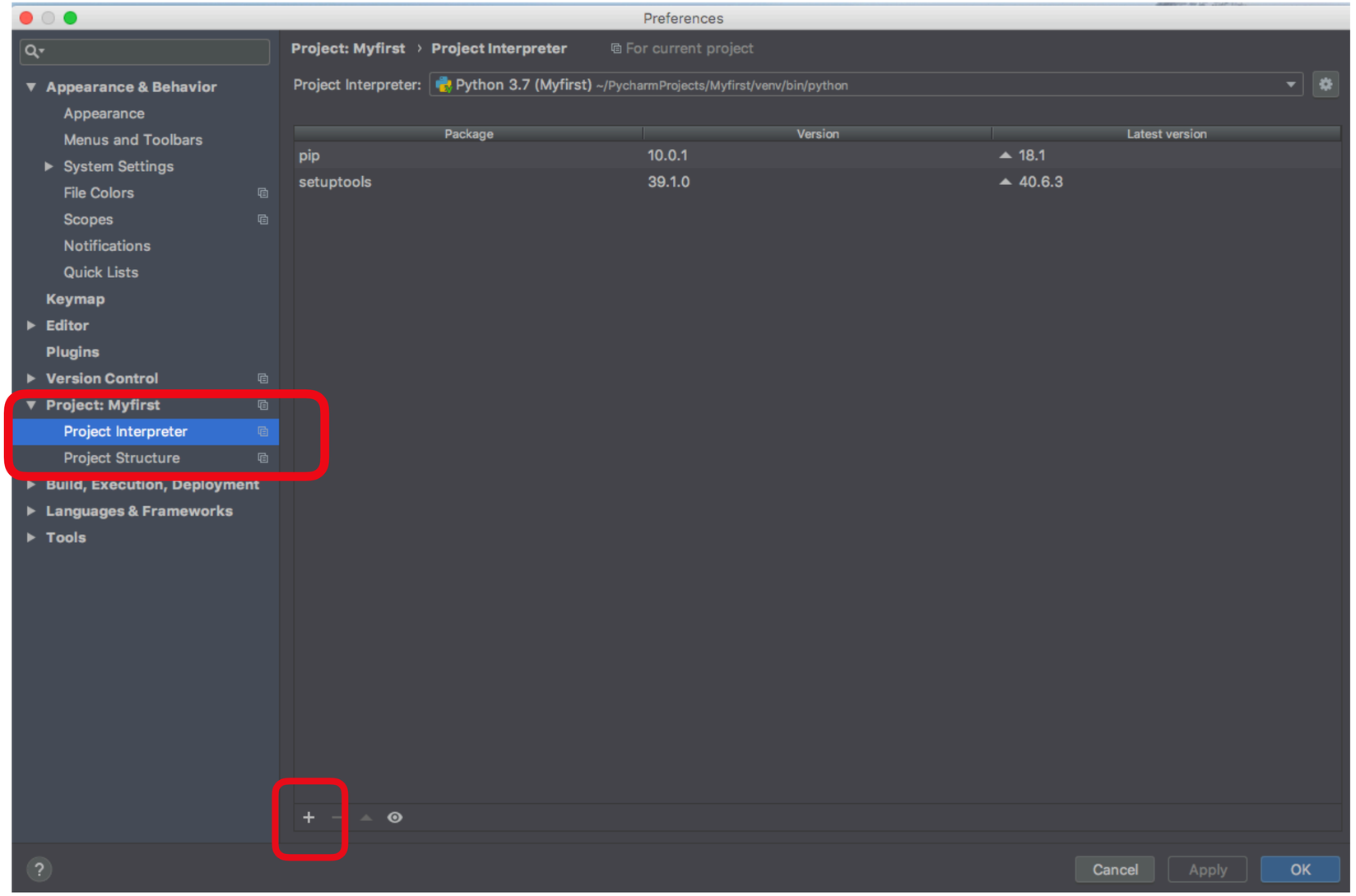


1-3-1在Pycharm新增函式庫

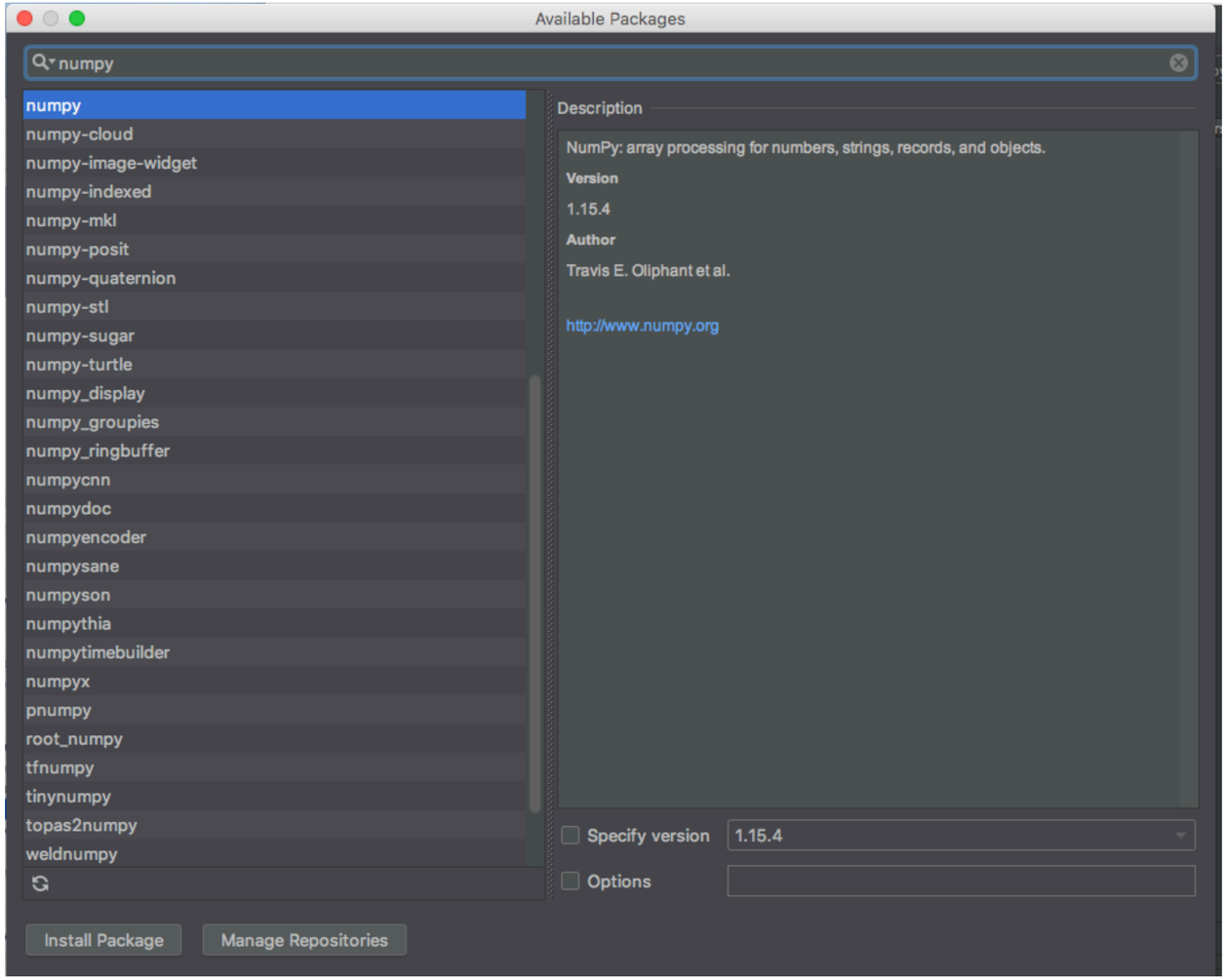
- 選取PyCharm->Preference

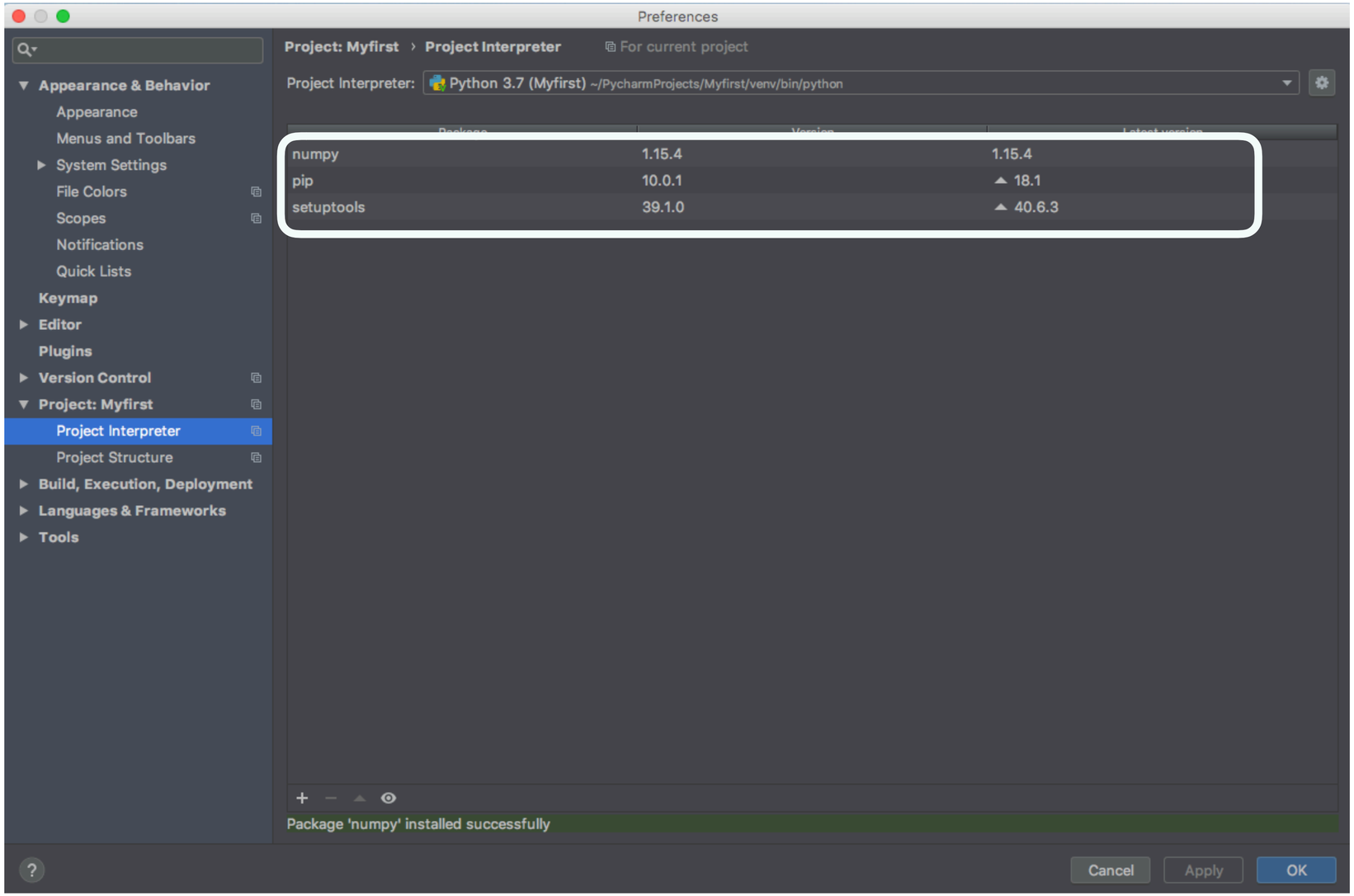


選取直譯器，選取＋

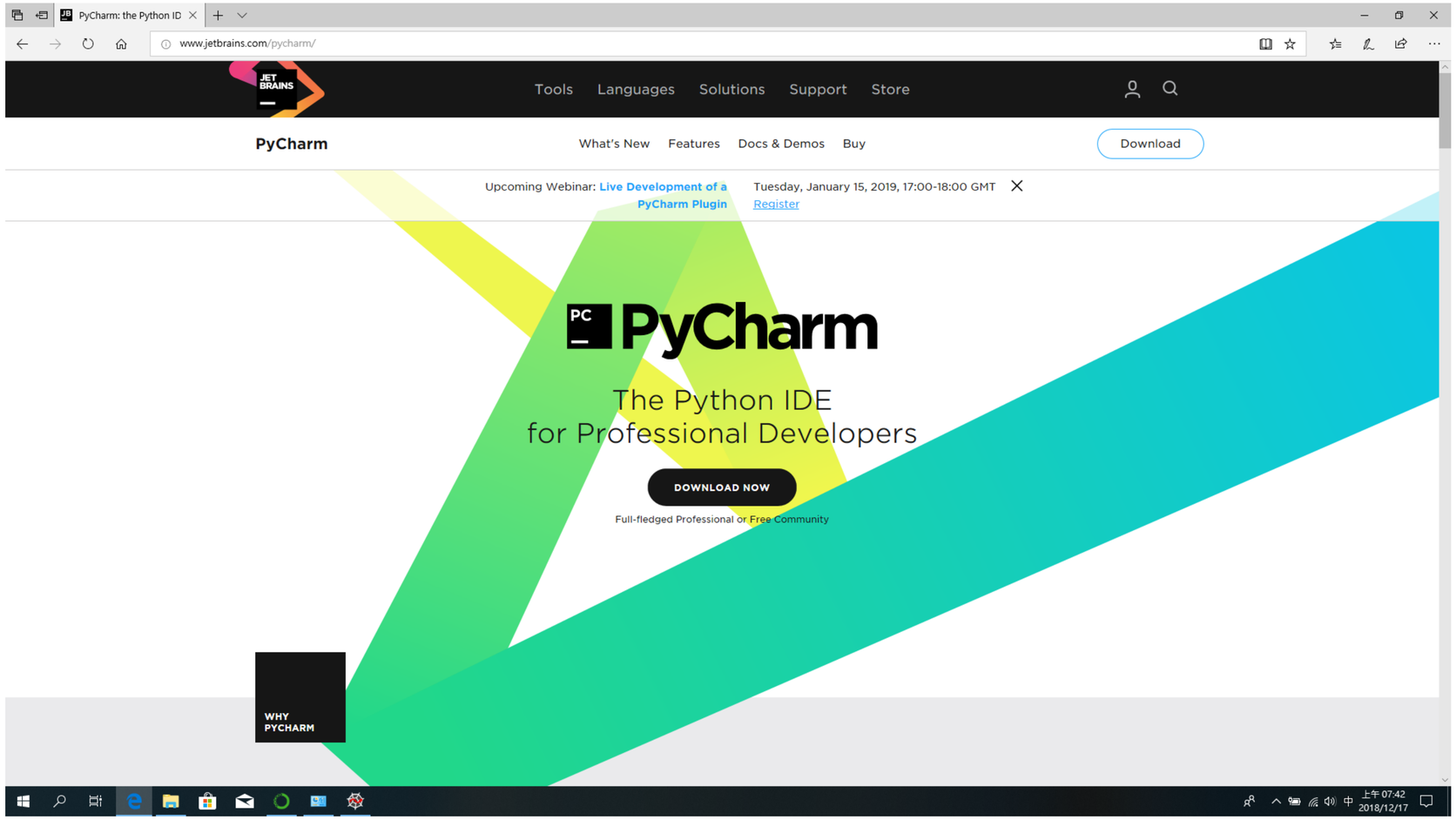

Preferences
Project: Myfirst › Project Interpreter
For current project
Project Interpreter: Python 3.7 (Myfirst) ~/PycharmProjects/Myfirst/venv/bin/python
Package
Version
Latest version
pip
10.0.1
18.1
setuptools
39.1.0
40.6.3
Appearance & Behavior
Appearance
Menus and Toolbars
System Settings
File Colors
Scopes
Notifications
Quick Lists
Keymap
Editor
Plugins
Version Control
Project: Myfirst
Project Interpreter
Project Structure
Build, Execution, Deployment
Languages & Frameworks
Tools
Cancel
Apply
OK

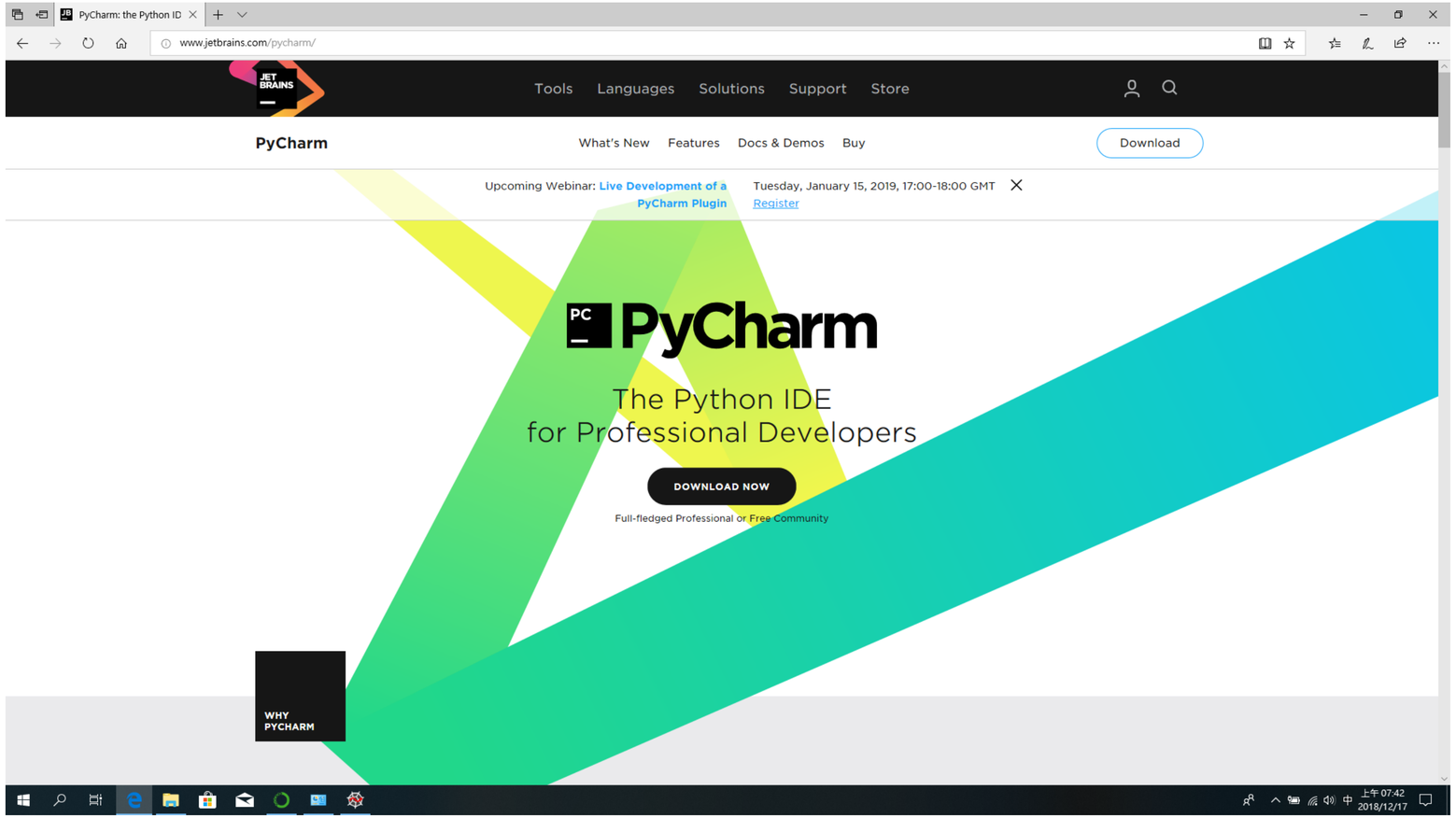
選取函式庫numpy，再install Package

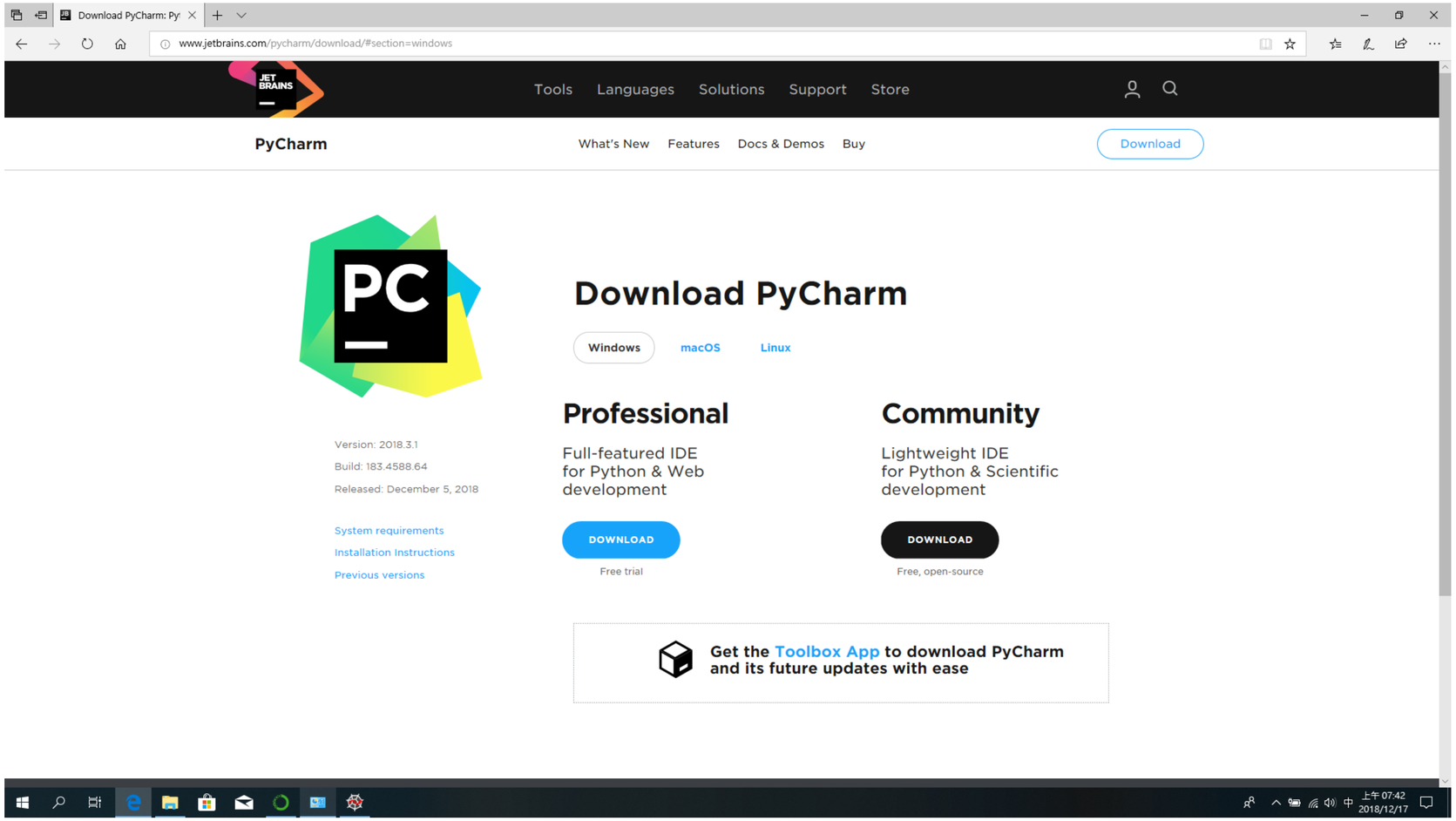



Preferences
Project: Myfirst › Project Interpreter
For current project
Project Interpreter: Python 3.7 (Myfirst) ~/PycharmProjects/Myfirst/venv/bin/python
Appearance & Behavior
Appearance
Menus and Toolbars
System Settings
File Colors
Scopes
Notifications
Quick Lists
Keymap
Editor
Plugins
Version Control
Project: Myfirst
Project Interpreter
Project Structure
Build, Execution, Deployment
Languages & Frameworks
Tools
numpy 1.15.4 1.15.4
pip 10.0.1 18.1
setuptools 39.1.0 40.6.3
Package 'numpy' installed successfully
Cancel
Apply
OK

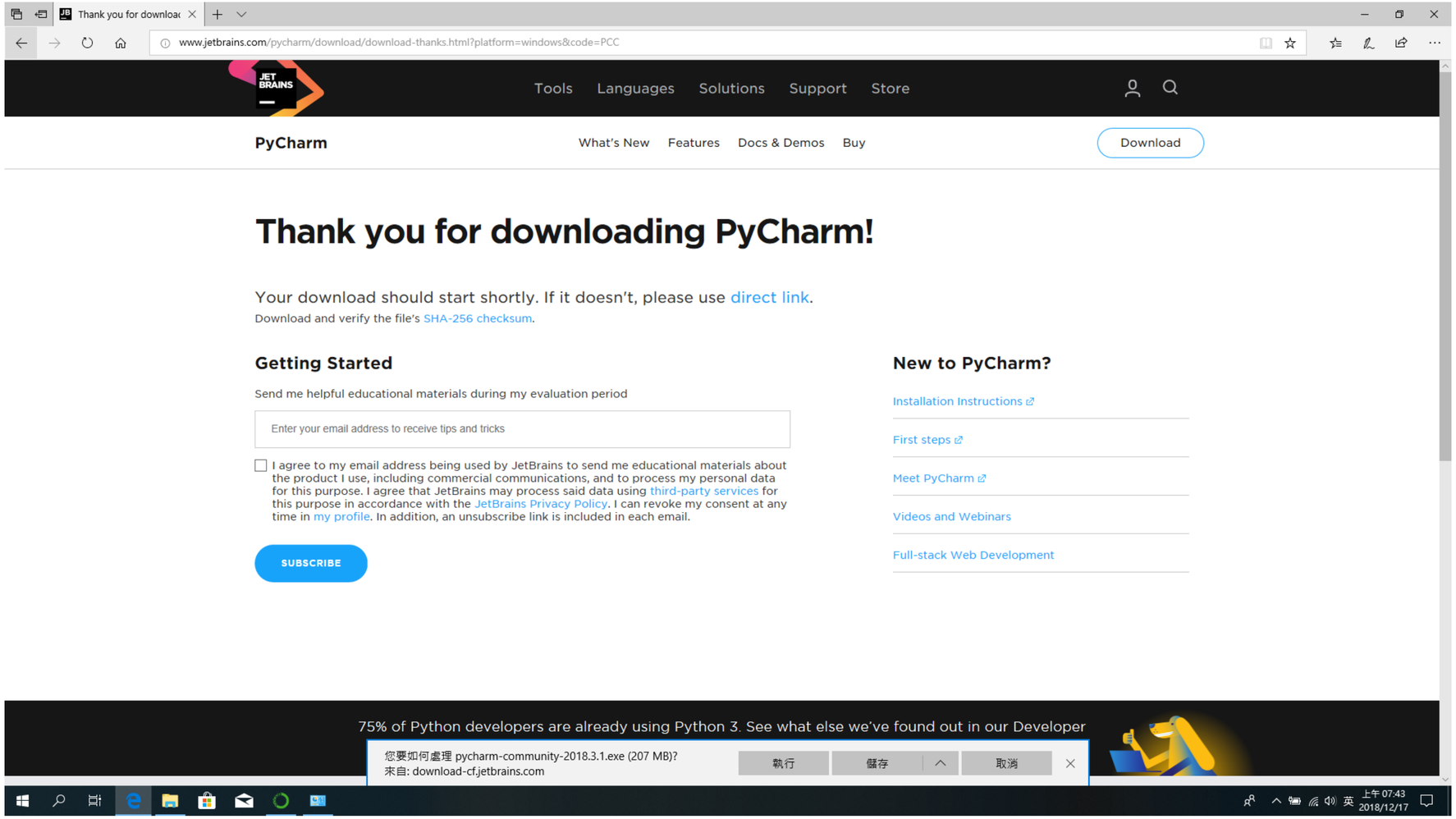
1-4在Win 10安裝及下載 Pycharm

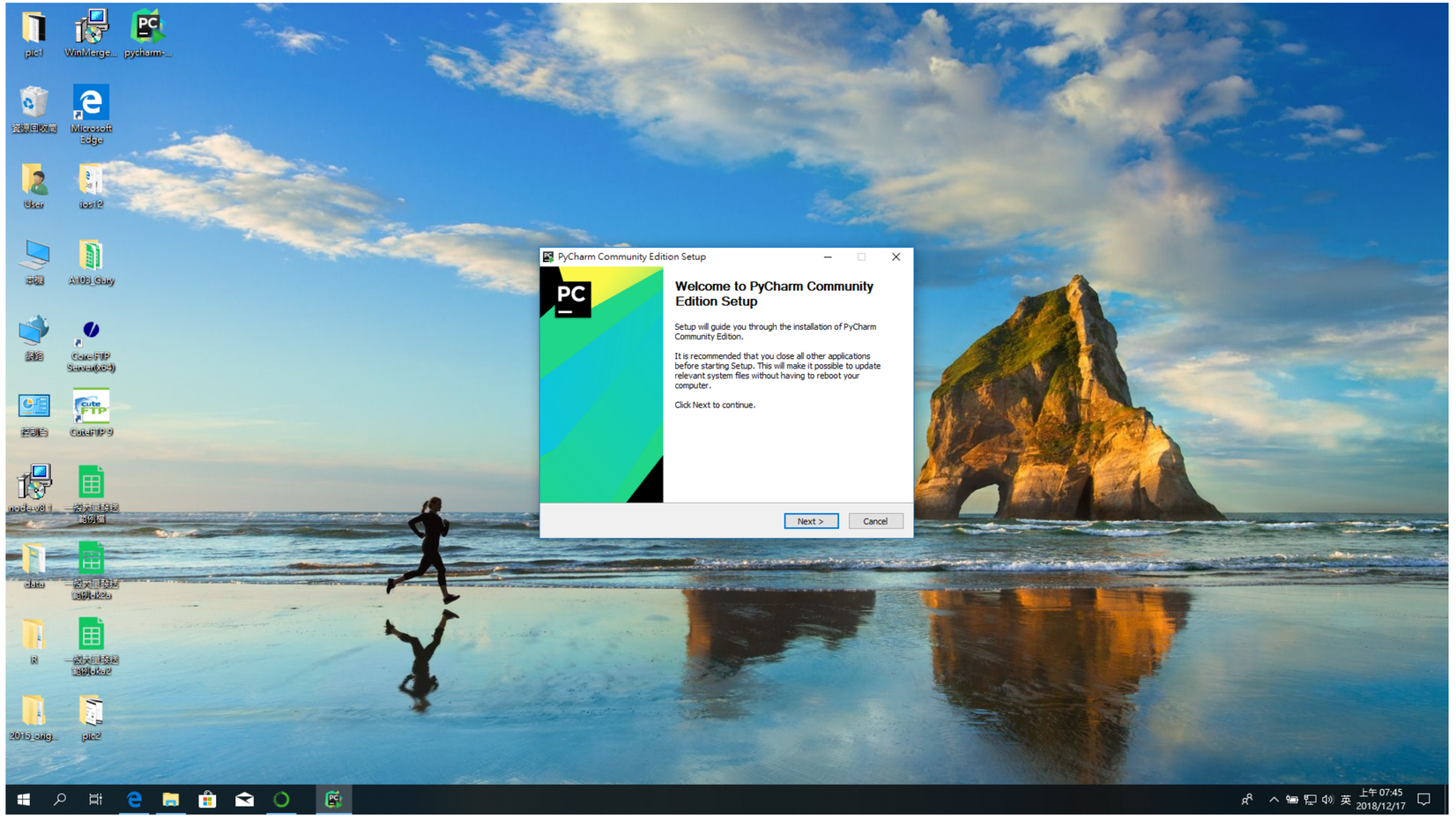



PyCharm: the Python ID
www.jetbrains.com/pycharm/
JET BRAINS
Tools
Languages
Solutions
Support
Store
PyCharm
What's New
Features
Docs & Demos
Buy
Download
Upcoming Webinar: Live Development of a PyCharm Plugin
Tuesday, January 15, 2019, 17:00-18:00 GMT
Register
PC
PyCharm
The Python IDE
for Professional Developers
DOWNLOAD NOW
Full-fledged Professional or Free Community
WHY PYCHARM
上午 07:42
2018/12/17

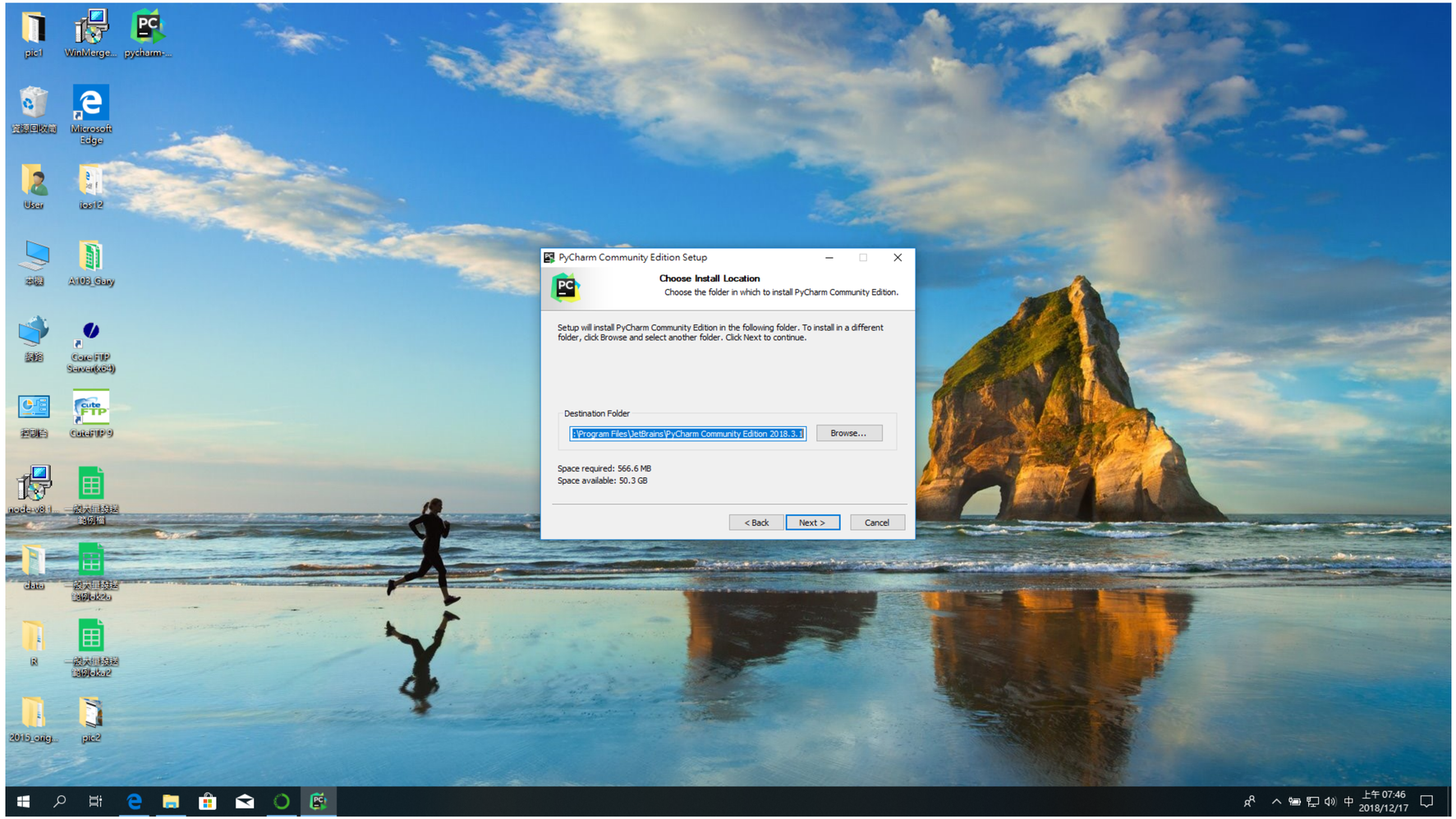

Download PyCharm: Py
www.jetbrains.com/pycharm/download/#section=windows
Tools
Languages
Solutions
Support
Store
PyCharm
What's New
Features
Docs & Demos
Buy
Download
Version: 2018.3.1
Build: 183.4588.64
Released: December 5, 2018
System requirements
Installation Instructions
Previous versions
Download PyCharm
Windows
macOS
Linux
Professional
Full-featured IDE
for Python & Web
development
DOWNLOAD
Free trial
Community
Lightweight IDE
for Python & Scientific
development
DOWNLOAD
Free, open-source
Get the Toolbox App to download PyCharm
and its future updates with ease
上午 07:42
2018/12/17

選取儲存並且執行

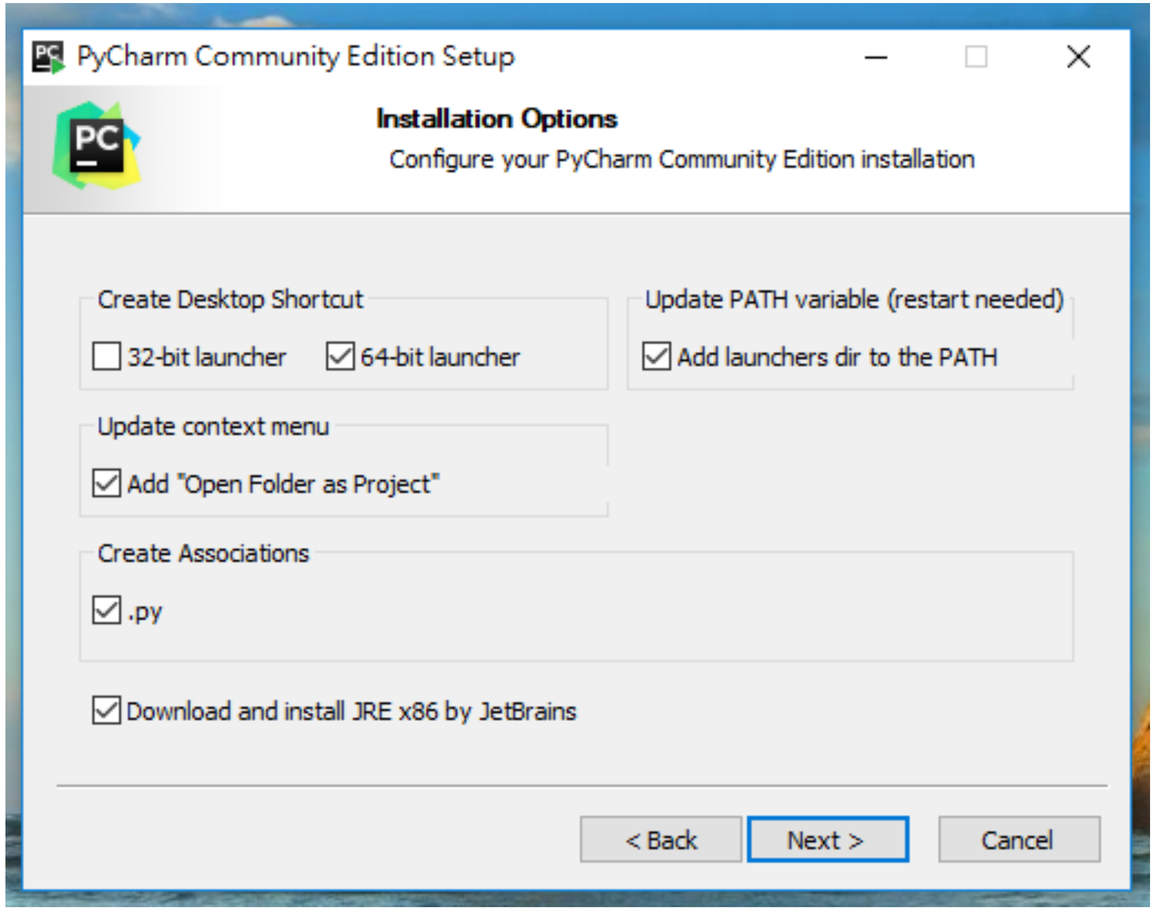

Thank you for downloac
www.jetbrains.com/pycharm/download/download-thanks.html?platform=windows&code=PCC
Tools
Languages
Solutions
Support
Store
PyCharm
What's New
Features
Docs & Demos
Buy
Download
Thank you for downloading PyCharm!
Your download should start shortly. If it doesn't, please use direct link.
Download and verify the file's SHA-256 checksum.
Getting Started
Send me helpful educational materials during my evaluation period
Enter your email address to receive tips and tricks
I agree to my email address being used by JetBrains to send me educational materials about the product I use, including commercial communications, and to process my personal data for this purpose. I agree that JetBrains may process said data using third-party services for this purpose in accordance with the JetBrains Privacy Policy. I can revoke my consent at any time in my profile. In addition, an unsubscribe link is included in each email.
SUBSCRIBE
New to PyCharm?
Installation Instructions
First steps
Meet PyCharm
Videos and Webinars
Full-stack Web Development
75% of Python developers are already using Python 3. See what else we've found out in our Developer
您要如何處理 pycharm-community-2018.3.1.exe (207 MB)?
來自: download-cf.jetbrains.com
執行
儲存
取消
上午 07:43
2018/12/17

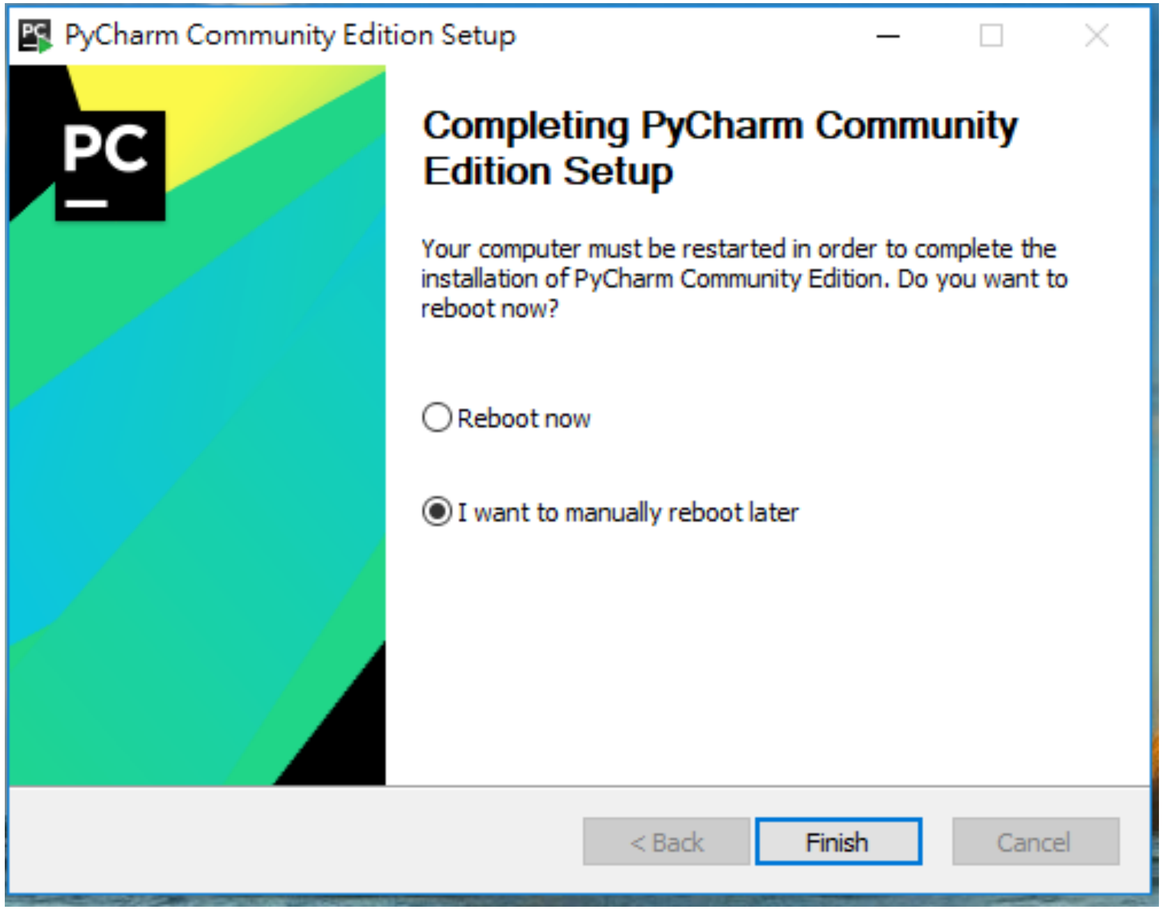

PyCharm Community Edition Setup
Welcome to PyCharm Community Edition Setup
Setup will guide you through the installation of PyCharm Community Edition.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel
pic1
WinMerge...
pycharm-...
Microsoft Edge
User
test2
A103_Gary
Core FTP Server(x64)
Cute FTP 9
node-v8.1...
data
R
2015_ong...
pic2
英
上午 07:45
2018/12/17

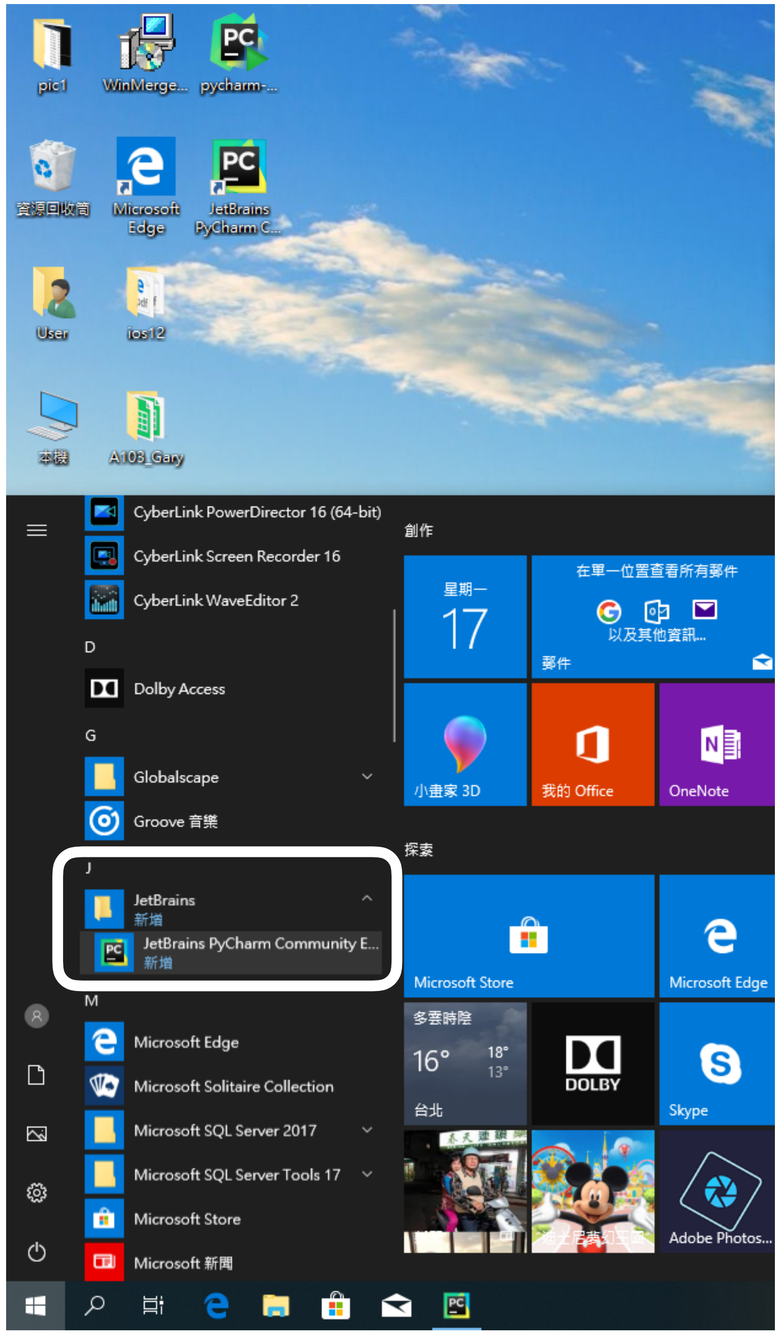
設定Pycharm安裝目錄



安裝組態選項

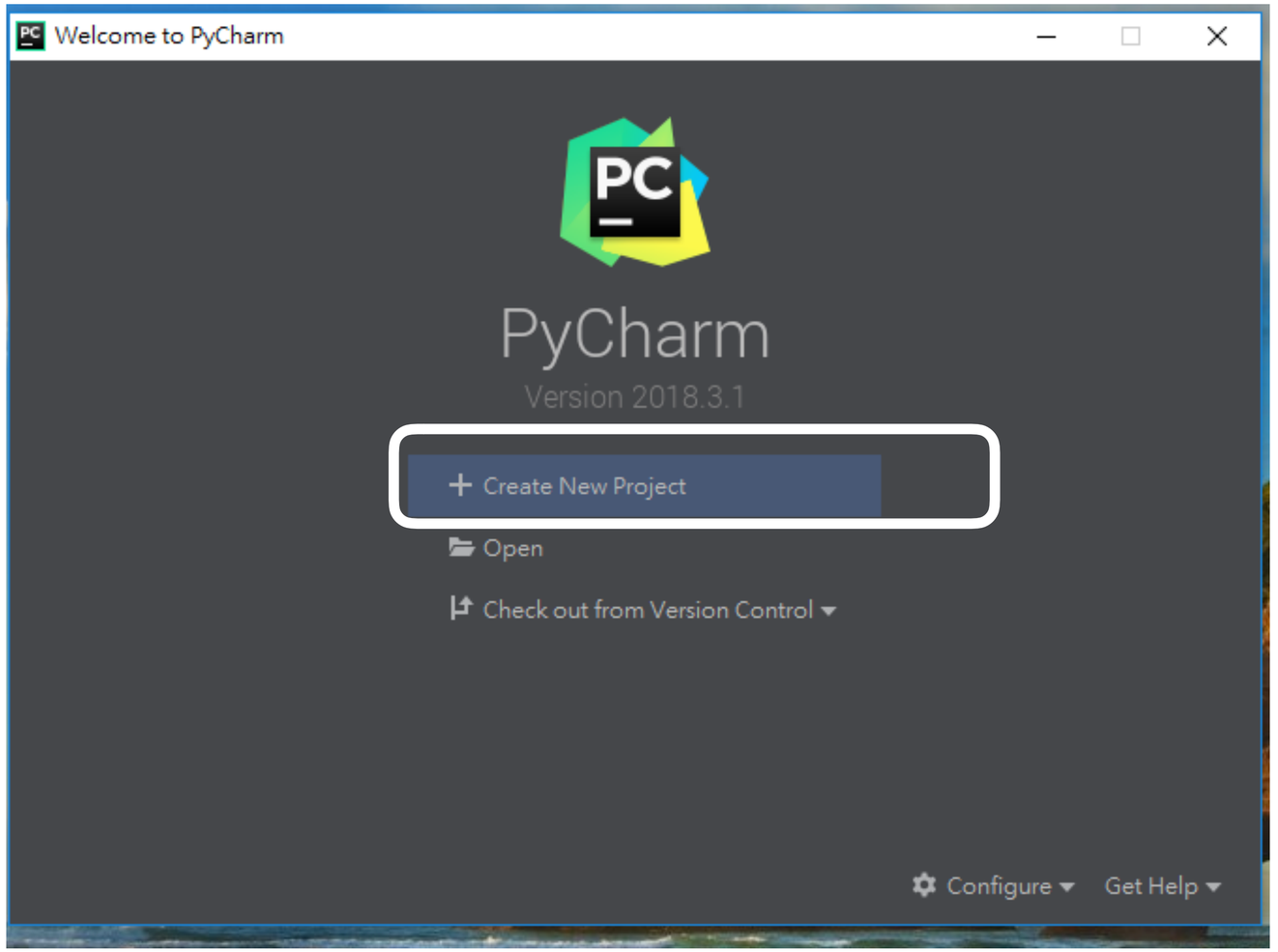

PyCharm Community Edition Setup
Installation Options
Configure your PyCharm Community Edition installation
Create Desktop Shortcut
32-bit launcher
64-bit launcher
Update PATH variable (restart needed)
Add launchers dir to the PATH
Update context menu
Add "Open Folder as Project"
Create Associations
.py
Download and install JRE x86 by JetBrains
< Back
Next >
Cancel


PyCharm Community Edition Setup
Completing PyCharm Community Edition Setup
Your computer must be restarted in order to complete the installation of PyCharm Community Edition. Do you want to reboot now?
Reboot now
I want to manually reboot later
< Back
Finish
Cancel

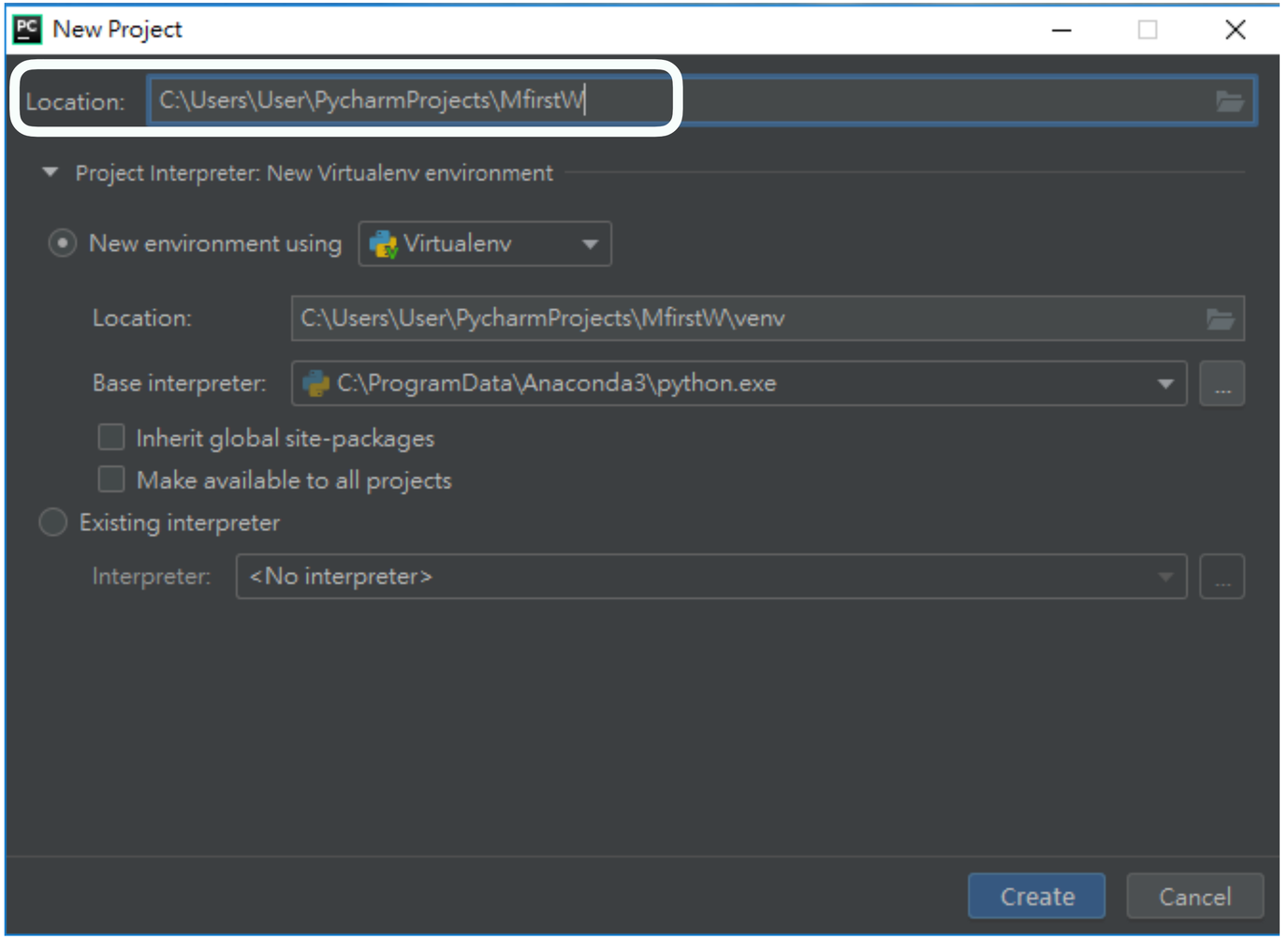

pic1
WinMerge...
pycharm-...
資源回收筒
Microsoft Edge
JetBrains PyCharm C...
User
ios12
本機
A103_Gary
CyberLink PowerDirector 16 (64-bit)
CyberLink Screen Recorder 16
CyberLink WaveEditor 2
D
Dolby Access
G
Globalscape
Groove 音樂
J
JetBrains
新增
JetBrains PyCharm Community E...
新增
M
Microsoft Edge
Microsoft Solitaire Collection
Microsoft SQL Server 2017
Microsoft SQL Server Tools 17
Microsoft Store
Microsoft 新聞
創作
星期一
17
在單一位置查看所有郵件
以及其他資訊...
郵件
小畫家 3D
我的 Office
OneNote
探索
Microsoft Store
Microsoft Edge
多雲時陰
16°
18°
13°
台北
DOLBY
Skype
Adobe Photos...

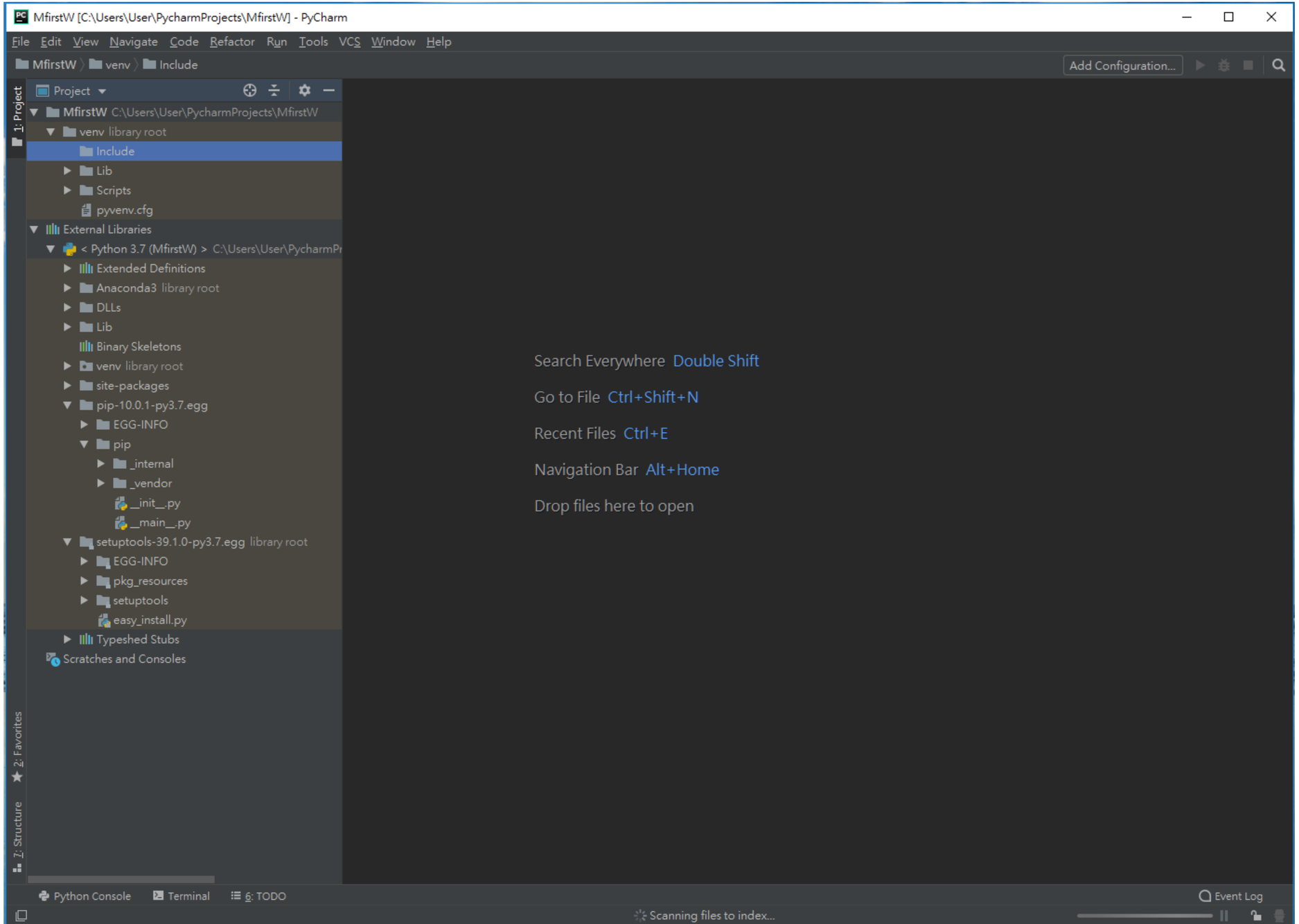
打開Pycharm

建立新專案Myfirstw

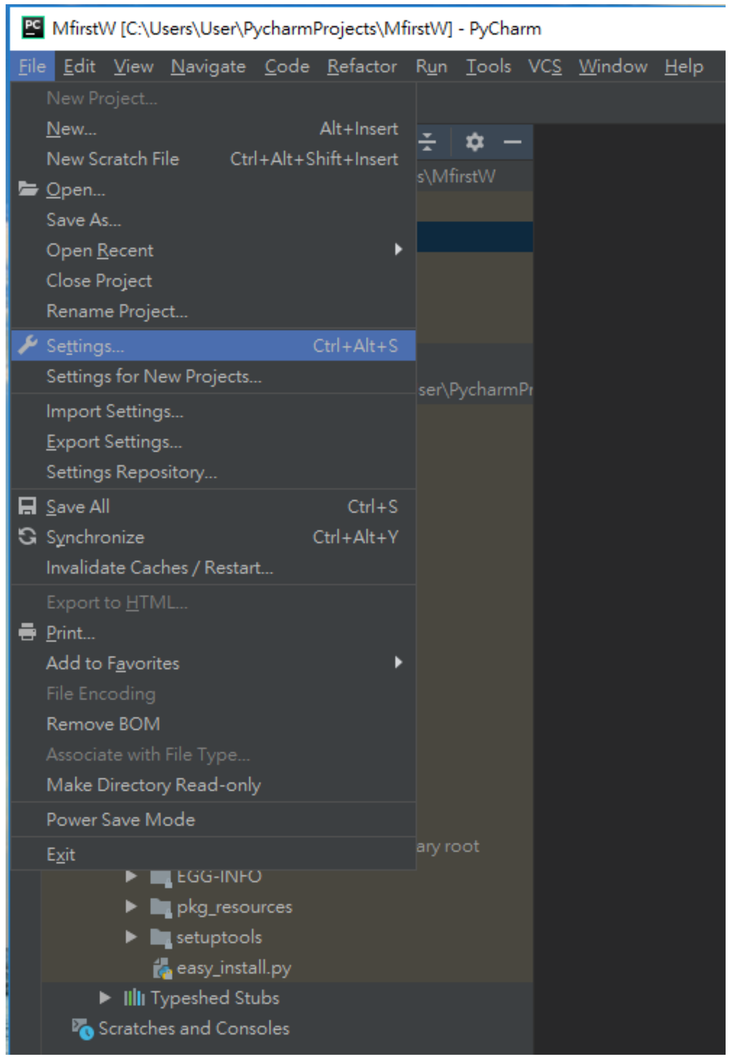


輸入MyfirstW專案名稱

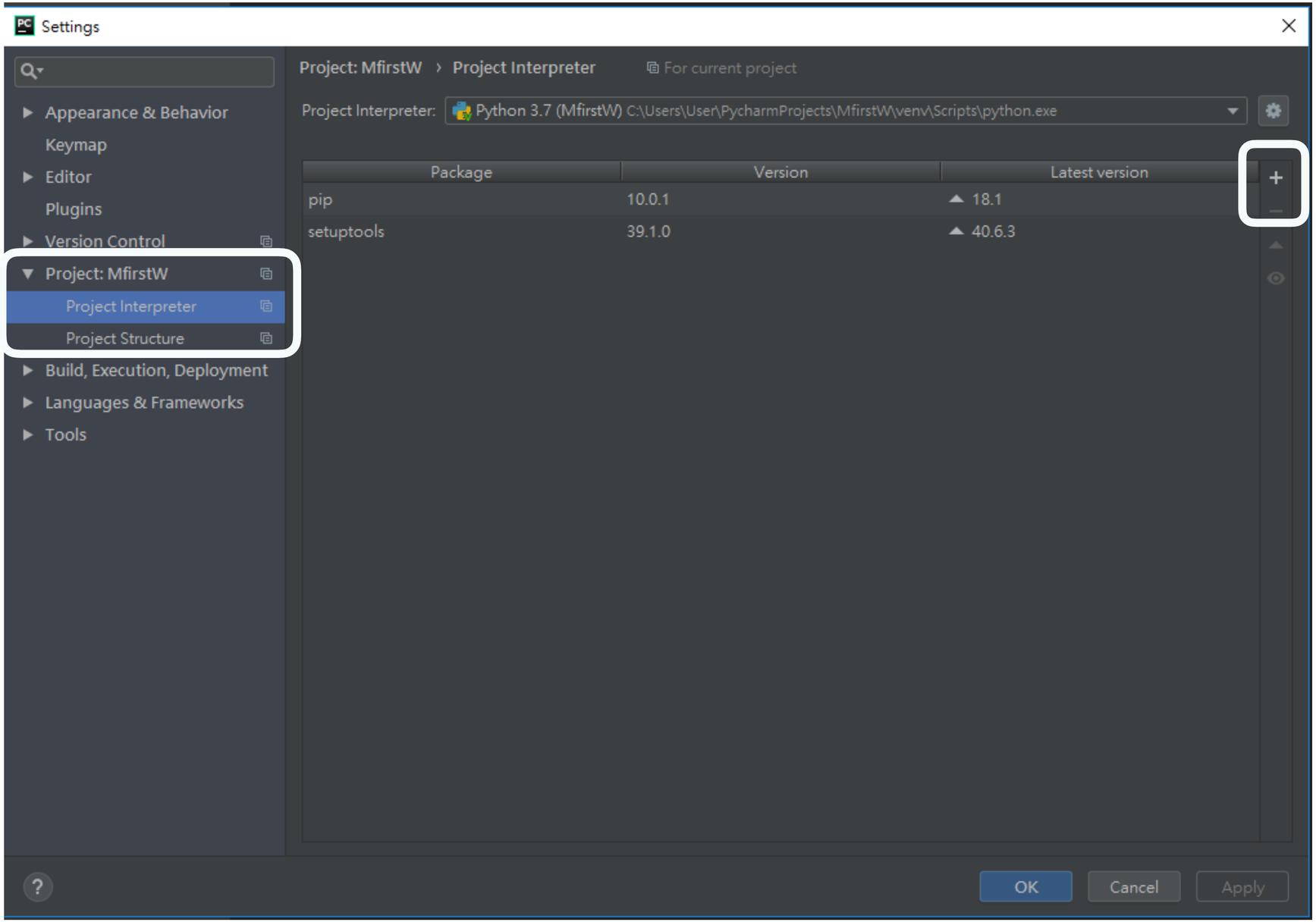


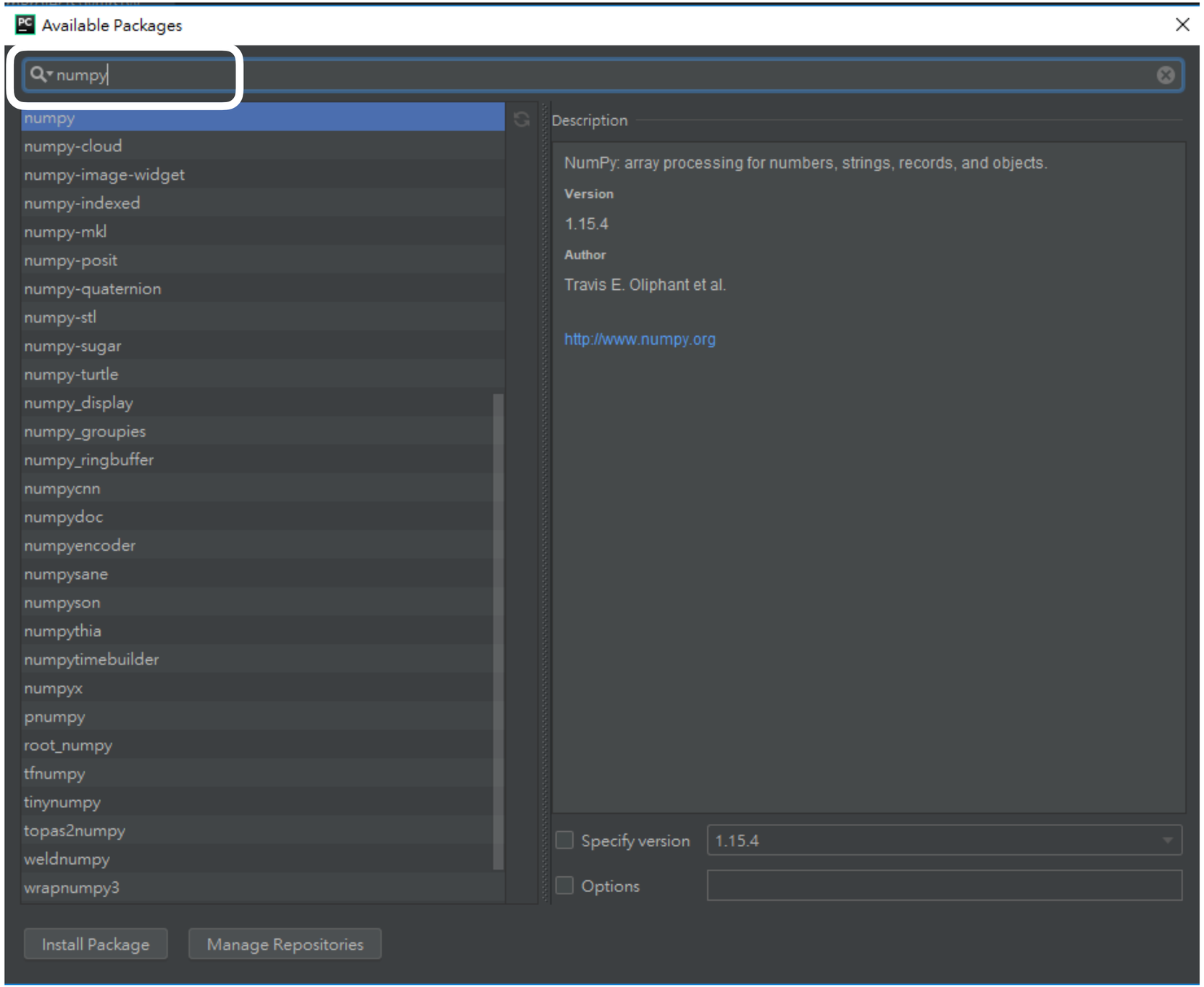

MfirstW [C:\Users\User\PycharmProjects\MfirstW] - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
MfirstW venv Include
Add Configuration...
Project
1: Project
MfirstW C:\Users\User\PycharmProjects\MfirstW
venv library root
Include
Lib
Scripts
pyvenv.cfg
External Libraries
< Python 3.7 (MfirstW) > C:\Users\User\PycharmPr
Extended Definitions
Anaconda3 library root
DLLs
Lib
Binary Skeletons
venv library root
site-packages
pip-10.0.1-py3.7.egg
EGG-INFO
pip
_internal
_vendor
__init__.py
__main__.py
setuptools-39.1.0-py3.7.egg library root
EGG-INFO
pkg_resources
setuptools
easy_install.py
Typeshed Stubs
Scratches and Consoles
Search Everywhere Double Shift
Go to File Ctrl+Shift+N
Recent Files Ctrl+E
Navigation Bar Alt+Home
Drop files here to open
2: Favorites
7: Structure
Python Console
Terminal
6: TODO
Event Log
Scanning files to index...

1-4-1在Pycharm新增函式庫

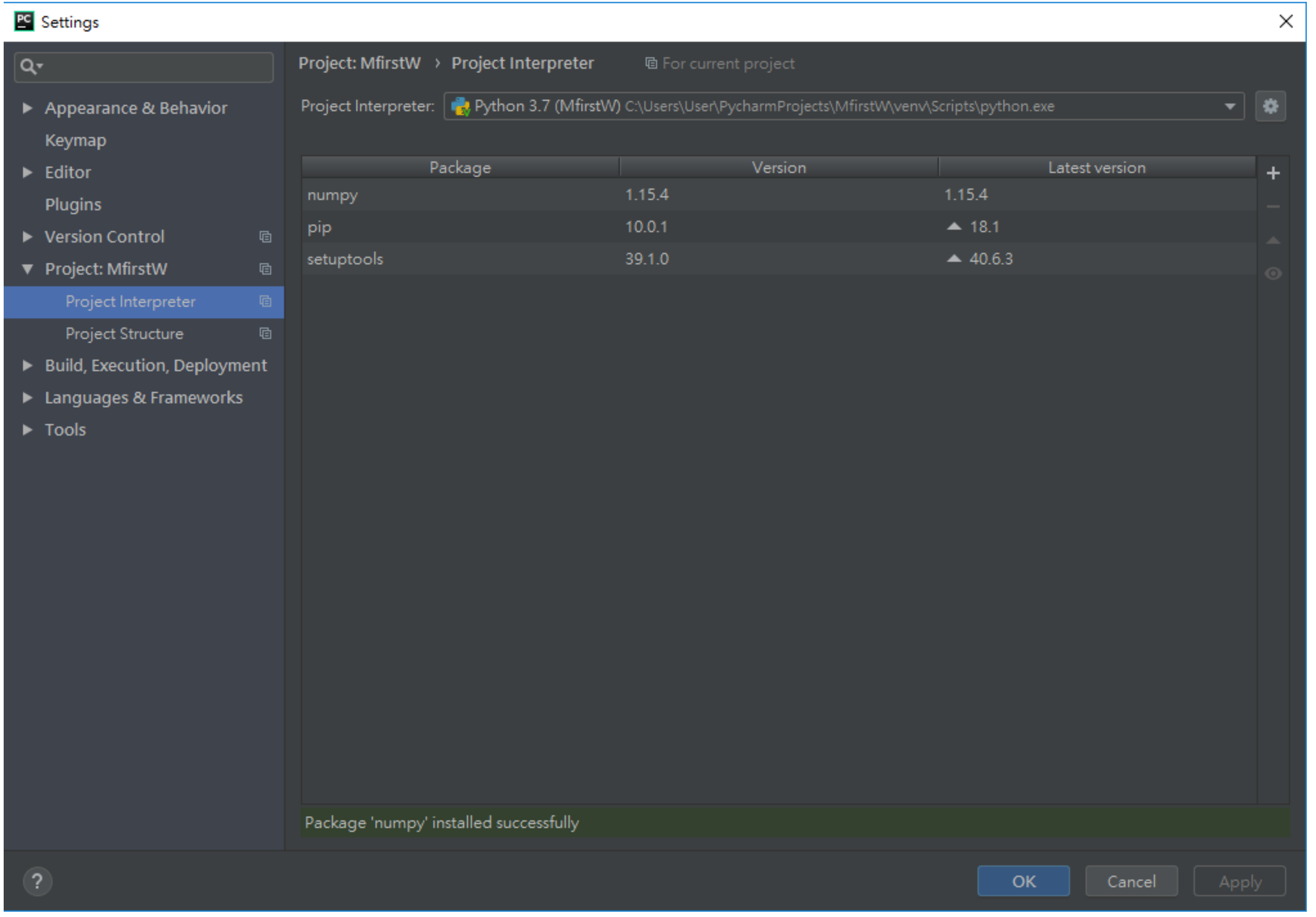


選取File->Settings


Settings
Project: MfirstW › Project Interpreter
For current project
Project Interpreter: Python 3.7 (MfirstW) C:\Users\User\PycharmProjects\MfirstW\venv\Scripts\python.exe
Appearance & Behavior
Keymap
Editor
Plugins
Version Control
Project: MfirstW
Project Interpreter
Project Structure
Build, Execution, Deployment
Languages & Frameworks
Tools
Package
Version
Latest version
pip
10.0.1
18.1
setuptools
39.1.0
40.6.3
OK
Cancel
Apply



輸入套件名稱
numpy


Settings
Appearance & Behavior
Keymap
Editor
Plugins
Version Control
Project: MfirstW
Project Interpreter
Project Structure
Build, Execution, Deployment
Languages & Frameworks
Tools
Project: MfirstW › Project Interpreter
For current project
Project Interpreter: Python 3.7 (MfirstW) C:\Users\User\PycharmProjects\MfirstW\venv\Scripts\python.exe
Package
Version
Latest version
numpy
1.15.4
1.15.4
pip
10.0.1
18.1
setuptools
39.1.0
40.6.3
Package 'numpy' installed successfully
OK
Cancel
Apply

2.Python直譯器與計算機

- Mac電腦/usr/local/bin
- Windows電腦C:\python37
- set path=%path%;C:\python37

輸入python執行

```
$ python
Python 3.7.0 (default, Jun 28 2018, 07:39:16)
[Clang 4.0.1 (tags/RELEASE_401/final)] :: Anaconda, Inc.
on darwin
Type "help", "copyright", "credits" or "license" for
more information.
>>>
```

UTF-8編碼

-*- coding: encoding -*-

這是設定utf-8-*-編碼

#-*- coding: utf-8 -*-

●

註解

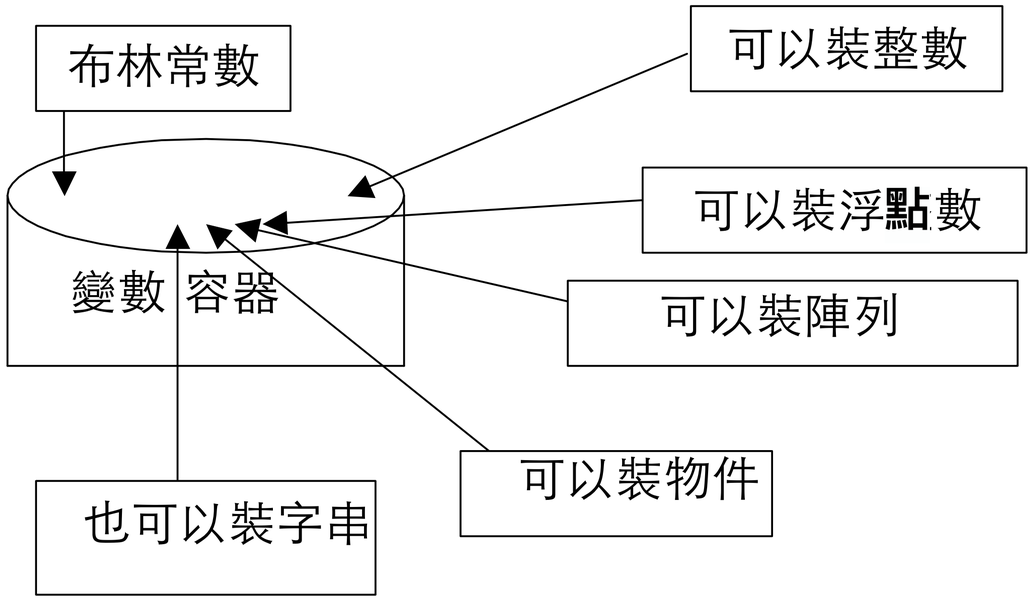
- #是註解符號
-

python計算機

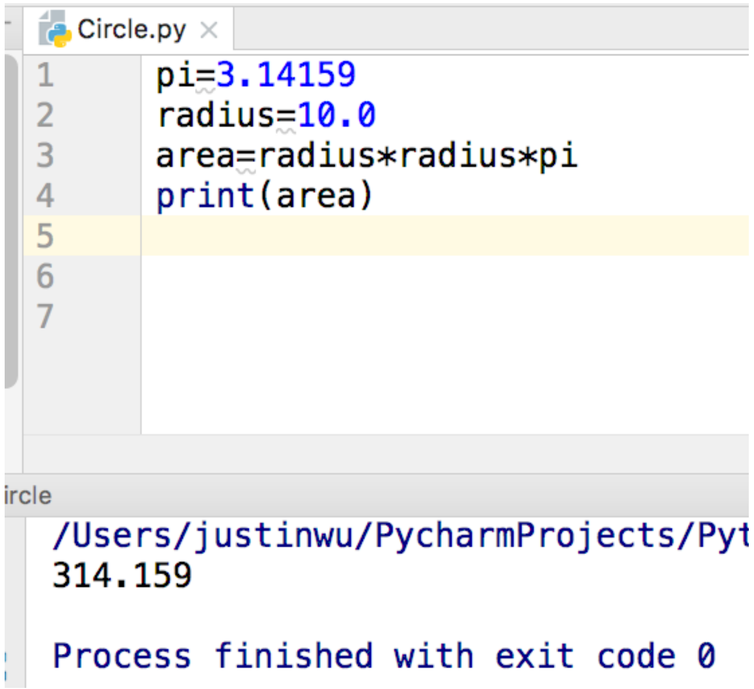
```
>>> 1+2
3
>>> 2-1
1
>>> 3*2
6
>>> 3/2
1.5
>>> 3%2
1
>>> 50-5/6
49.166666666666664
>>> (50-5*6)/4
5.0
>>> 5**2
25
>>> 2**5
32
>>>
```

2-1簡單的程式

- Python支援的資料型態:
- 浮點數(floating point)
- 字元(char)
- 整數(integer)
- 物件(object)
- 布林常數(Boolean)
- 空值(null)
- 字串(string)。



- 範例：Circle.py
- 第一行宣告了pi的資料型態為雙精度浮點數，並且給予初始值3.14159。
- 第二行宣告了radius半徑的資料型態為雙精度浮點數。
- 第三行宣告了area面積的資料型態為雙精度浮點數。
-



2-2識別名稱

- 每一個變數都有識別名稱。
- 我們變數宣告時，就是給該變數一個識別名稱。
- 所有的識別名稱是由字元、數字、下底線(_)所組成。
- Python是有大小寫的區隔，a和A是不一樣的變數。

2-3數值資料型態與運算子

- 變數a=1+1,c，c=5，變數c的值為5在這個中
- a=1+1是一個運算式
- c=5是一個運算式
- +和=是運算子，變數a和數值5，和數值1是運算元。
- 運算式就是由運算子和運算元所組成。
-

運算子優先順序,先乘除後加減

Arithmatic.py

```
1   a = 1+1
2   b = 2-1
3   div=6/2
4   pi=3.14159
5   radius=10
6   area=radius*radius*pi
7   c=5
8   x=2*3+4/2+1-3%2+5
9   print(a)
10  print(b)
11  print(div)
12  print(area)
13  print(c)
14  print(x)
```

thmatic

```
/Users/justinwu/PycharmProjects/Pythc
2
1
3.0
314.159
5
13.0
```

2-4運算子結合優先順序

Arithmatic.py | operator_preference.py

```
1  x=2**3+5*2-5/5+5%2
2  y=1<<2
3  print(x)
4  print(y)
5  b=3
6  c=3
7  d=b&c
8  print(d)
9  e=b^c
10 print(e)
11 f=b|c
12 print(f)
13 g=1<5
14 print(g)
15 h=1>5
16 print(h)
```

```
18.0
4
3
0
3
True
False
```

3.資料結構

- 變數
- 運算式與運算子
- 串列
- 堆疊
- 佇列

變數

- 資料型態
  - 整數
  - 浮點數
  - 字串

```python
#!/usr/bin/env python3
#_*_coding:utf-8_*_
"""
Created on Thu Oct 26 07:40:42 2017

@author: justinwu
"""
#這是註解

#這是註解
1+2
#print(1+2)
x=2-1
print(x)
y=3+2
print(y)
z=3.2*2
print(z)
str='大家好'
print(str)
str2='Python'
mychar=str[0]
print(mychar)
```

Name	Type	Size	
mychar	str	1	大
str	str	1	大家好
str2	str	1	Python
x	int	1	1
y	int	1	5
z	float	1	6.4

Console 1/A

```
In [28]: runfile('/Users/ju
wdir='/Users/justinwu/Deskt
1
5
6.4
大家好
大

In [29]:
```

運算式與運算子

- 運算式是由運算子與運算元組成
- +加-減*乘/除是運算子,先乘除後加減的結合優先順序
- 運算元是變數,數字,字串和資料結構
- =是分配符號,將右邊的值分配給左邊變數

```python
#!/usr/bin/env python3
#_*_coding:utf-8_*_
"""
Created on Thu Oct 26 07:40:42 2017

@author: justinwu
"""
#這是註解

#這是註解
1+2
#print(1+2)
x=2-1
print(x)
y=3+2
print(y)
z=3.2*2
print(z)
str='大家好'
print(str)

```

Name	Type	Size	
str	str	1	大家好
x	int	1	1
y	int	1	5
z	float	1	6.4

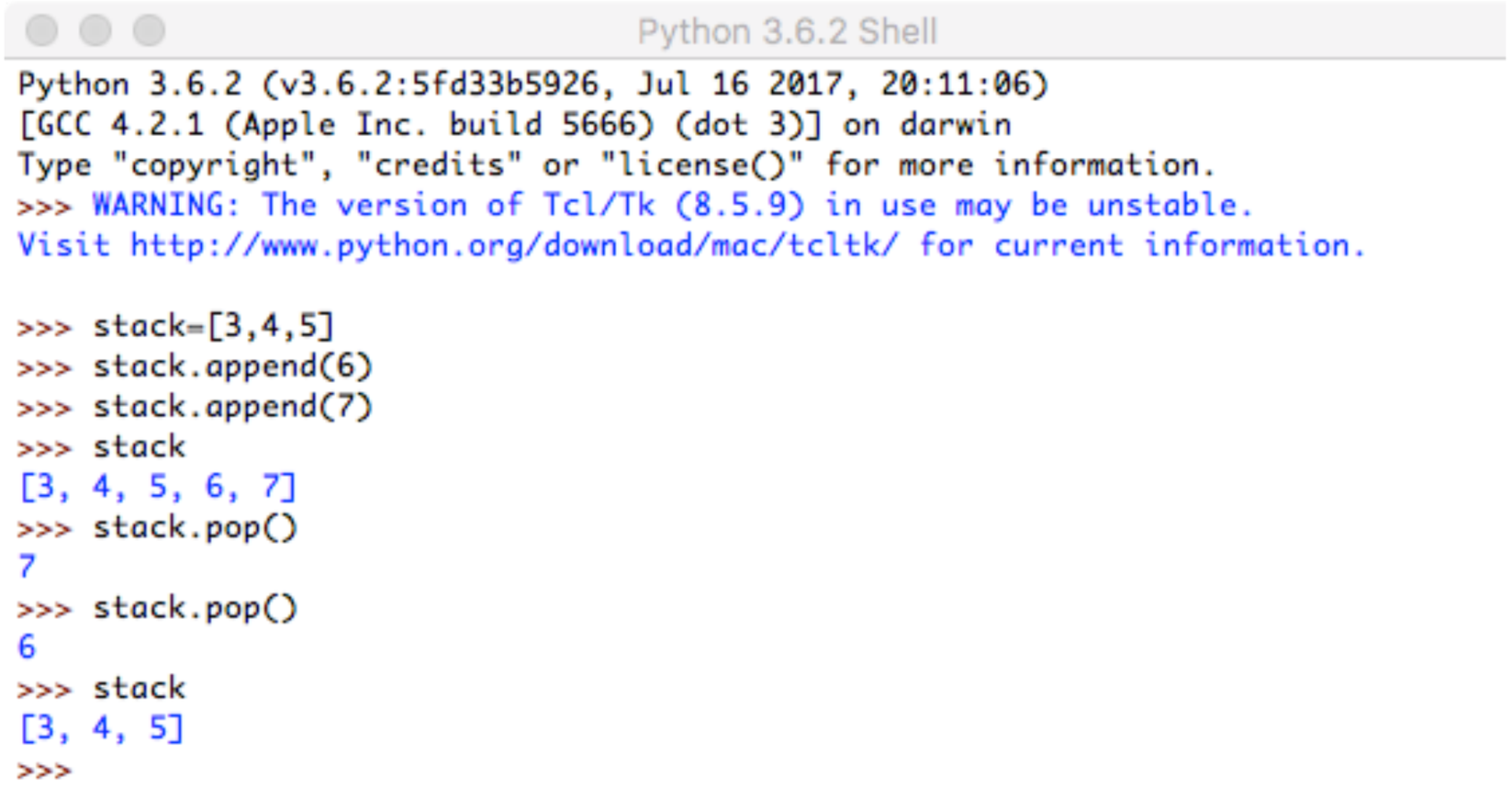
Console 1/A

```
In [22]: runfile('/Users/j
wdir='/Users/justinwu/Desk
1
5
6.4
大家好

In [23]:
```

串列

```
>>> fruits = ['orange','apple','pear','banana','kiwi','apple','banana']
>>> fruits.count('apple')
2
>>> fruits.index('banana')
3
>>> fruits.index('banana',4)#Finding next banana starting a position 4
6
>>> fruits.reverse()
>>> fruits
['banana', 'apple', 'kiwi', 'banana', 'pear', 'apple', 'orange']
>>> fruits.append('grape')
>>> fruits
['banana', 'apple', 'kiwi', 'banana', 'pear', 'apple', 'orange', 'grape']
>>> fruits.sort()
>>> fruits
['apple', 'apple', 'banana', 'banana', 'grape', 'kiwi', 'orange', 'pear']
>>> fruits.pop()
'pear'
>>>
```

堆疊


Python 3.6.2 Shell
Python 3.6.2 (v3.6.2:5fd33b5926, Jul 16 2017, 20:11:06)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "copyright", "credits" or "license()" for more information.
>>> WARNING: The version of Tcl/Tk (8.5.9) in use may be unstable.
Visit http://www.python.org/download/mac/tcltk/ for current information.
>>> stack=[3,4,5]
>>> stack.append(6)
>>> stack.append(7)
>>> stack
[3, 4, 5, 6, 7]
>>> stack.pop()
7
>>> stack.pop()
6
>>> stack
[3, 4, 5]
>>>

佇列

```
 8
 9 from collections import deque
10 queue = deque(['阿呆','Eric','John','Michael','小寶','小文'])
11 queue.append("Terry")
12 queue.append("Graham")
13 print(queue.popleft())
14 print(queue.popleft())
15 print(queue)
16
```

```
In [1]: runfile('/Users/justinwu/Desktop/queue.py', wdir='/Us
阿呆
Eric
deque(['John', 'Michael', '小寶', '小文', 'Terry', 'Graham'])

In [2]:
```

數組tuple,集合set和字典

- 可以用數組tuple來儲存固定的元素,使用小括號()來建立一數組tuple
- 集合的元素放置沒有按照順序,可以使用{}大括號來建立一集合Set
- 集合加上索引就是字典{索引:值}

Tuple數組

- 也可以從字串中建立數組
- tp5 = tuple(‘Ivy Lin’)
- 從數組得到串列
- list1 = list(tp5)

```python

tp1=()
print(tp1)
tp2=(1,2,3,4,5,6,7,8)
print(tp2)
print(sum(tp2))
print('--------------------')
print(tp2[2:5])#切割運算子
print(tp2[-1])
tp3 =tuple([2*x for x in range(1,8)])
print(tp3)
print('---------------')
tp4=tuple('Ivy Lin')
print(tp4)
tp5=("John",'小寶','小文')
print(tp5)
print(len(tp5))
print(tp4+tp5)
print('-------------')
tp6=tuple([1,2,3,4,5,6,7,8,9])
print(tp6)
print(max(tp6))
print(min(tp6))

```

```
In [6]: runfile('/Users/justinwu/Desktop/tuple.py', wdir='
Desktop')
()
(1, 2, 3, 4, 5, 6, 7, 8)
36
--------------------
(3, 4, 5)
8
(2, 4, 6, 8, 10, 12, 14)
---------------
('I', 'v', 'y', ' ', 'L', 'i', 'n')
('John', '小寶', '小文')
3
('I', 'v', 'y', ' ', 'L', 'i', 'n', 'John', '小寶', '小文')
-------------
(1, 2, 3, 4, 5, 6, 7, 8, 9)
9
1

In [7]:
```

```
 8
 9 tp6=tuple([66,22,3,46,5,65,7,83,19])
10 print(tp6)
11 list1 = list(tp6)
12 list1.sort()#排序串列
13 print(list1)
14 print('-----------')
15 tp8=tuple(list1)
16 tp9=tuple(list1)
17 print(tp8)
18 print(tp8 == tp9)#比較兩個數組tuple
19
20
21
```

```
In [15]: runfile('/Users/justinwu/
Desktop')
(66, 22, 3, 46, 5, 65, 7, 83, 19)
[3, 5, 7, 19, 22, 46, 65, 66, 83]
-----------
(3, 5, 7, 19, 22, 46, 65, 66, 83)
True

In [16]:
```

Set集合

- 集合(set)用來儲存沒有重複的元素.
- 集合的元素是不可以複製的,元素放置也沒有按照順序
- 可以使用{}大括號來建立一集合Set

Set集合

```
 8
 9 st1=set()#建立一個空集合
10 st2=set([1,2,3,4,5])
11 print(st2)
12 st3={'a','b','c','d','e'}
13 print(st3)
14 print('------------------')
15 st3.add('f')
16 print(st3)
17 st3.remove('d')
18 print(st3)
19 print('----------')
20 print(st3.union(st2))
21 st5={'a','b','c','d','e'}
22 print(st3.intersection(st5))
23 print(st3.difference(st5))
```

```
In [30]: runfile('/Users/justinwu/Deskto
Desktop')
{1, 2, 3, 4, 5}
{'d', 'a', 'e', 'c', 'b'}
------------------
{'d', 'f', 'a', 'e', 'c', 'b'}
{'f', 'a', 'e', 'c', 'b'}
----------
{1, 2, 3, 4, 5, 'f', 'a', 'e', 'c', 'b'}
{'b', 'a', 'c', 'e'}
{'f'}

In [31]:
```

字典

- 集合加上索引就是字典{索引:值}

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Fri Oct 27 19:40:39 2017

@author: justinwu
"""
tel={'Justin':'0920909872','Ivy':'0922876895'}
tel['Johny']='0920885356'
print(tel)
print(tel['Johny'])
del tel['Johny']
tel['Mary']='0922865255'
print(tel)
print(list(tel.keys()))
print(sorted(tel.keys()))
print('Ivy' in tel)
print('Johny' in tel)
```

```
In [5]: runfile('/Users/justinwu/Desktop/TOP/python/
example/dictionary_1.py', wdir='/Users/justinwu/Desktop/
TOP/python/example')
{'Justin': '0920909872', 'Ivy': '0922876895', 'Johny':
'0920885356'}
0920885356
{'Justin': '0920909872', 'Ivy': '0922876895', 'Mary':
'0922865255'}
['Justin', 'Ivy', 'Mary']
['Ivy', 'Justin', 'Mary']
True
False

In [6]:
```

4.控制結構

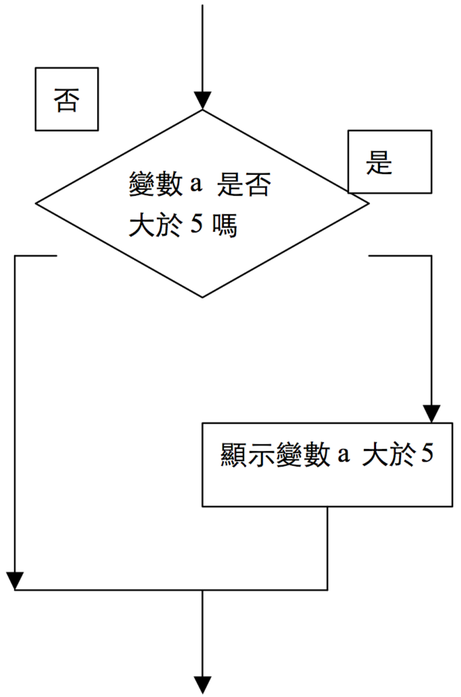
- 選取結構if
- 迴圈結構while,for

選取結構if

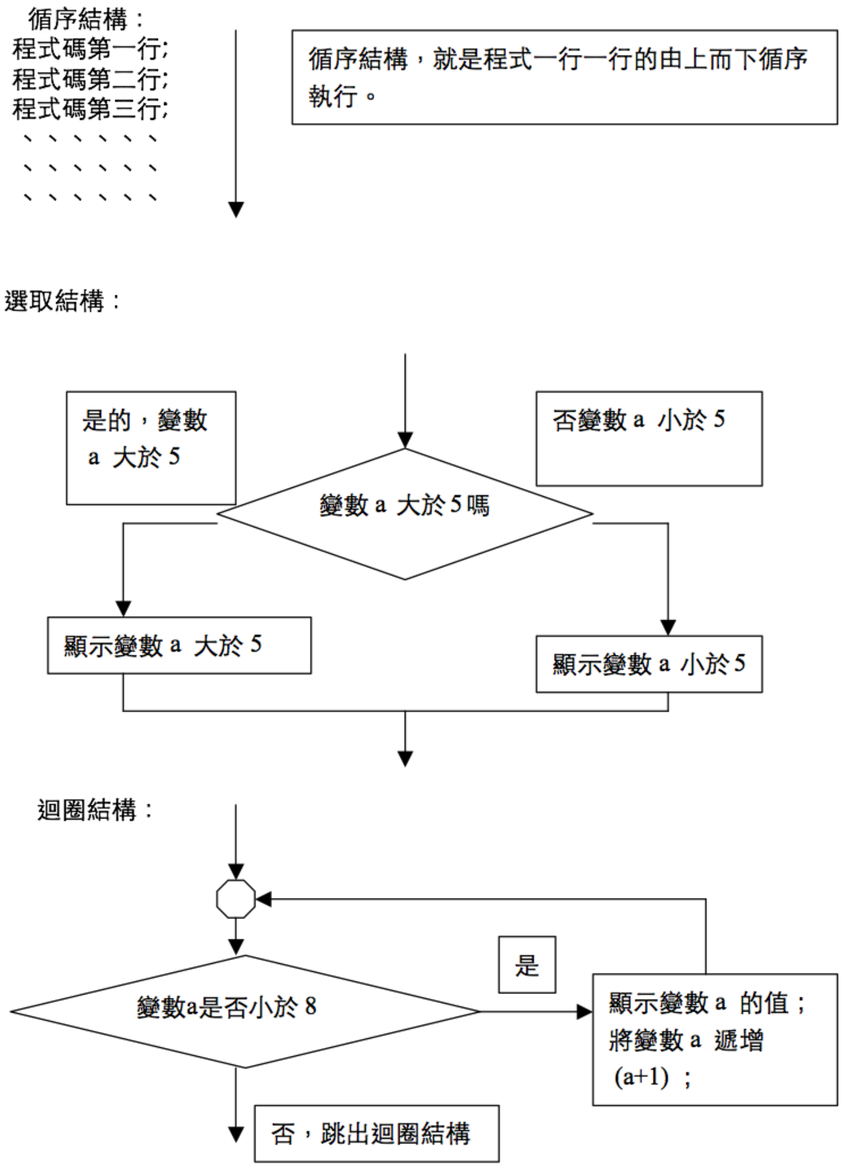
- 語法if:
- if 條件運算式:
- 　　程式敘述1
- else:
- 　　程式敘述2

布林運算式

- 如何來選擇流程前進的方向，我們必須經過測試條件，例如，當條件成立時往左方，當條件不成立時往右方。我們使用布林表示式來測試工作。
- 布林Boolean代數定義在一個二元素的集合上，即B={true,false}，true為真，false為假。我們可以使用這個值的結果來決定我們行進的方向。
- 當下列菱形四邊形成立true時會執行右方的流程，當下列菱形四邊行的條件不成立false時會執行左方的流程。true和false就是屬於布林代數，這是用在if判別式。

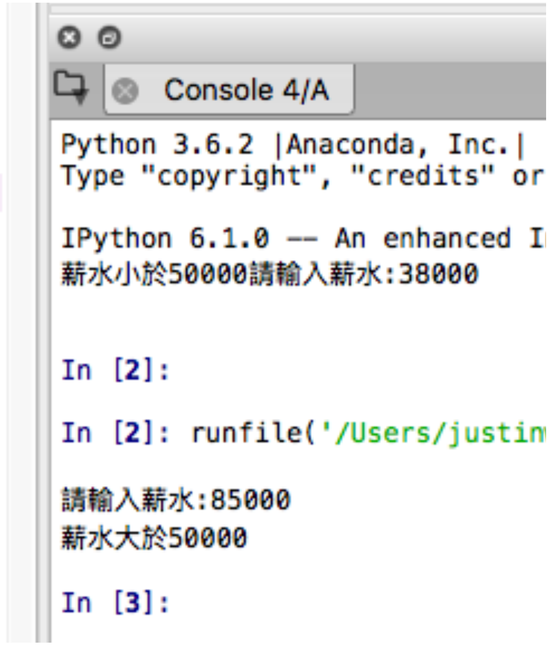


- 當下列菱形四邊形成立true時會執行右方的流程，當下列菱形四邊行的條件不成立false時會執行下方或右方的流程。True和false就是屬於布林代數，這是運用在迴圈結構。



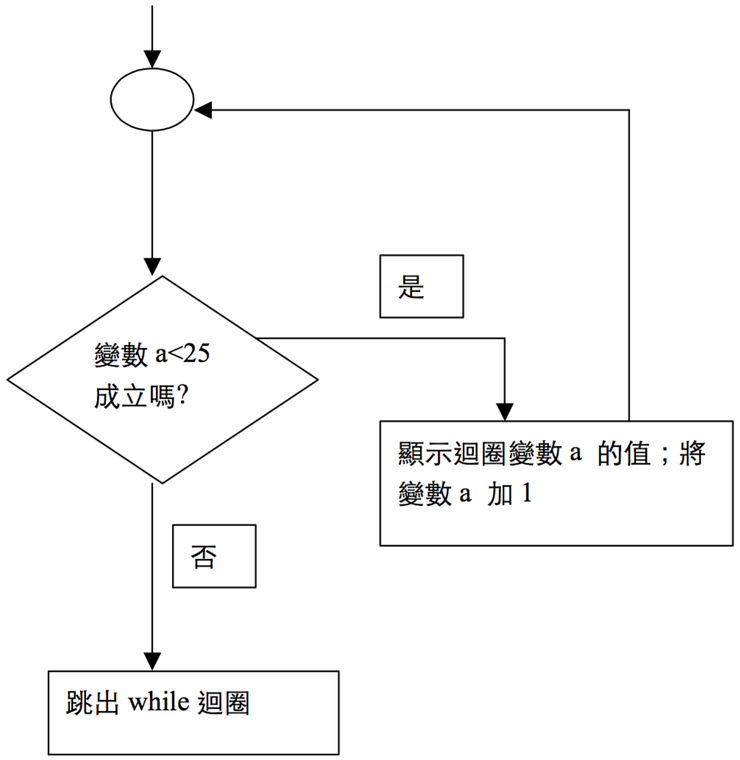
選取結構if

```
8
9  a = int(input("請輸入薪水:"))
10 if a < 50000:
11     print("薪水小於50000")
12 else:
13     print("薪水大於50000")
```



while迴圈

- 在if敘述中，條件後的敘述只執行一次，而在while敘述中，則可執行一次以上。While敘述的程序圖形中.選取結構和循序結構，都只執行程式敘述一次，如果我們要讓同一行程式重複執行好幾遍則要用迴圈敘述。迴圈敘述可以重複執行某一段程式好幾遍，直到條件的不成立才跳出這個迴圈。迴圈敘述：while、do……while。



迴圈結構for,while

迴圈結構for
迴圈結構while

迴圈結構for

- 語法:
- for 計數變數 in range(起始值,終始值):
  - 程式敘述

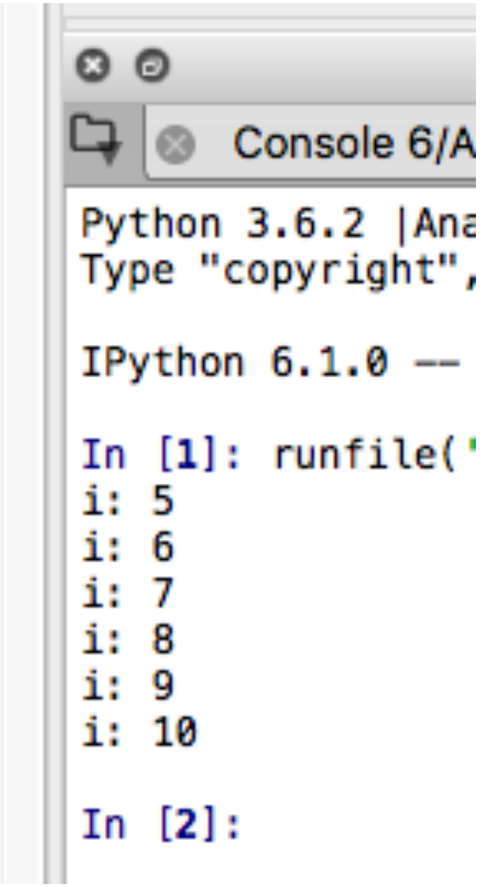
range(8,19)為8到18的數值

```
8
9  for i in range(8,19):
10     print("i的值:",i)
```

```
Console 5/A
Python 3.6.2 |An
Type "copyright"

IPython 6.1.0 --

In [1]: runfile(
i的值: 8
i的值: 9
i的值: 10
i的值: 11
i的值: 12
i的值: 13
i的值: 14
i的值: 15
i的值: 16
i的值: 17
i的值: 18
```

迴圈結構while

```
 8
 9 i=5
10 while i<=10:
11     print("i:",i)
12     i=i+1
```



布林運算式

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Thu Oct 26 14:30:21 2017

@author: justinwu
"""

x=True
y=False
print(x&y)
print(x|y)
if (x&y):
    print(x&y)
else:
    print(x&y)
z=True
print(z&y)
print(z|y)

```

```
In [30]: runfil
Users/justinwu/
False
True
False
False
True

In [31]:
```

continue繼續執行迴圈

```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Thu Oct 26 14:07:44 2017
5
6 @author: justinwu
7 """
8
9 for i in range(8,19):
10     if(i%2==1):
11         continue
12     print("i的值:",i)
```

```
In [19]: ru
Users/justi
i: 5
i: 6
i: 7
i: 8
i: 9

In [20]:
```

break跳出while迴圈

```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Thu Oct 26 14:09:11 2017
5
6 @author: justinwu
7 """
8
9 i=5
10 x =True
11 while x:
12     print("i:",i)
13     i=i+1
14     if(i>=10):
15         break;
16
```

```
In [19]: runfile('
Users/justinwu/Des
i: 5
i: 6
i: 7
i: 8
i: 9

In [20]:
```

4-1邏輯運算子

- 邏輯運算子可以結合條件，以一個表達式判斷許多條件，而這些條件的結果不是真True就是假False。
- and稱為”與邏輯運算子”，只有當所有條件都成立時才會回傳真True，否則回傳假False。
- or稱為或邏輯運算子，只要運算式中一個條件成立就會回傳真True，只有當所有的條件都為假Fasle時，才會回傳假False。
- not為相反邏輯運算子，真True的條件加上not相反邏輯運算子時，就會變成假False；當假False的條件加上not相反邏輯運算子時，就會變成真True。

邏輯運算子

```
1   x=True
2   y=False
3   z=x and y
4   print(z)
5   z1=x or y
6   print(z1)
7   z2=not x
8   z3=not y
9   print(z2)
10  print(z3)
```

```
/Users/justinwu/PycharmProjects/Pyth
False
True
False
True

Process finished with exit code 0
```

4-2一個選擇的if敘述

- if 條件:

  敘述

一個選擇的if敘述

```
1    x=8
2    if x>5 :
3        print("x is bigger than 5")
```

trol_if

```
/Users/justinwu/PycharmProjects/Pytho
x is bigger than 5

Process finished with exit code 0
```

python

5.函數

```
 8 i = 10
 9 def f():
10     print(i)
11
12 i = 42
13 f()
```

函數與參數

```
14
15 def addf(x,y):
16     print(x+y)
17
18 i1=23
19 i2=12
20 addf(23,12)
21
22
```

return回傳

```
 8 i = 10
 9 def f():
10     print(i)
11
12 i = 42
13 f()
14
15 def addf(x,y):
16     print(x+y)
17
18 i1=23
19 i2=12
20 addf(23,12)
21
22 def myreturn(x,y):
23     return x*y
24
25 i3=2
26 i5=5
27 i8=myreturn(i3,i5)
28 print(i8)
29
30 def myreturn(a,x=2,y=3):
31     return a*x*y
32
33 i3=2
34 i5=5
35 i8=myreturn(8,i3,i5)
36 print(i8)
```

```
Console 2/A
Python 3.6.2 |An
Type "copyright"

IPython 6.1.0 --

In [1]: runfile(
42
35
10
80

In [2]:
```

遞迴函數

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Thu Oct 26 16:25:09 2017

@author: justinwu
"""

def factorial(n):
    if(n==0):
        return 0
    if(n==1):
        return 1
    else:
        return n*factorial(n-1)

print(factorial(1))
print(factorial(2))
print(factorial(3))
```

```
In [2]: runfile('/Us
wdir='/Users/justinw
1
2
6

In [3]:
```

費式係數

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Thu Oct 26 16:28:50 2017

@author: justinwu
"""

def fibonaci(n):
    if(n==0):
        return 0
    if(n==1):
        return 1
    else:
        return fibonaci(n-1)+fibonaci(n-2)

print(fibonaci(1))
print(fibonaci(2))
print(fibonaci(3))
print(fibonaci(10))
print(fibonaci(20))

```

```
In [2]: runfile
wdir='/Users/ju
1
2
6

In [3]:
```

python

6.類別


```
 8 class MyClass:
 9     #範例屬性參考
10     i=12345
11
12
13 print(MyClass.i)
14
15
16 class Complex:
17     #實體建構
18     def __init__(self,realpart,imagpart):
19         self.r = realpart
20         self.i = imagpart
21
22 x=Complex(3.0,-4.5)
23 print(x.r,x.i)
24
25
```

成員屬性與成員方法

```
 8
 9 class MyClass2:
10     #範例屬性參考
11     i=12345
12     def f(self):
13         return 'hello world'
14
15 x=MyClass2()
16 print(x.i)
17 print(x.f())
18
19
```

類別和實體變數

- __init__(self,..)為建構函數,實體化物件時會呼叫它
- self為自己這個物件

```
>>> class Dog:
        kind = 'small dog'
        def __init__(self,name):
            self.name = name


>>> d =Dog('small dog')
>>> e = Dog('very small dog')
>>> print(d.kind)
small dog
>>> print(e.kind)
small dog
>>> print(d.name)
small dog
>>> print(e.name)
very small dog
>>>
```

__init__(self)建構物件,
__del__(self)解構物件

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Fri Oct 27 04:52:38 2017

@author: justinwu
"""

class MyClass:
    i=12345

print(MyClass.i)

class Complex:
    def __init__(self,realpart,imagepart):
        self.r=realpart
        self.i=imagepart
    def __del__(self):
        print('delete object')
x=Complex(3.0,-4.5)
print(x.r,x.i)
x=None
```

```
In [4]: runfile('/
wdir='/Users/justi
12345
3.0 -4.5
delete object

In [5]:
```

7.繼承

- class 子類別(父類別):
- 敘述1
- 敘述2

__為私有存取控制修飾,只有該類別方法才能存取

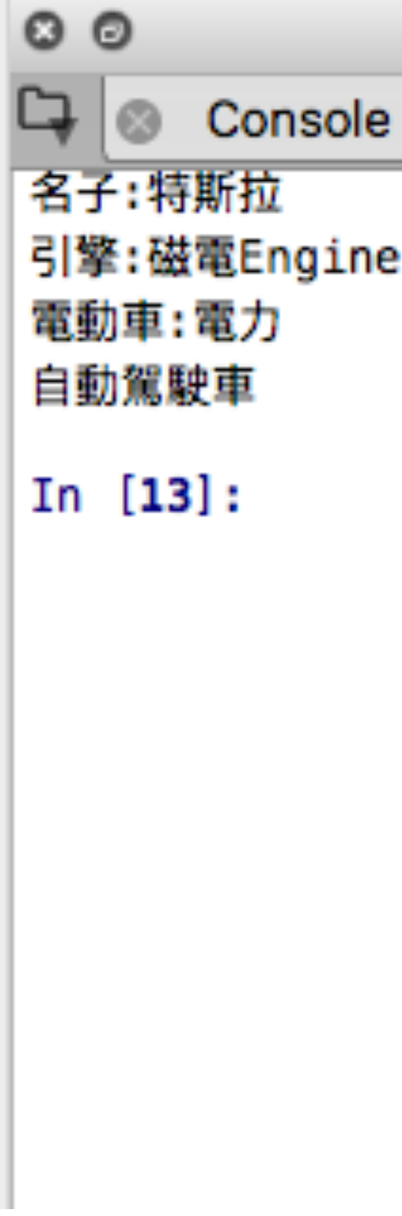
```
7
8  class Vehicle:
9      def __init__(self,name,engine):
10         self.__name = name
11         self.__engine = engine
12
13     def getName(self):
14         return self.__name
15
16     def getEngine(self):
17         return self.__engine
18
19     def setEngine(self,engine):
20         self.__engine = engine
21
22
23 class Car(Vehicle):
24     def __init__(self,name,engine,electric):
25         super().__init__(name,engine)
26         self.__electric = electric
27
28     def getCarName(self):
29         print("名子"+self.getName())
30         print("引擎"+self.getEngine())
31         print("電動車"+self.__electric)
32
33     def getAuto(self):
34         print("自動駕駛車")
35
36 myCar = Car("特斯拉","磁電Engine","電力")
37 myCar.getCarName()
38 print(myCar.getAuto())
```

```
Console 2/A

Python 3.6.2 |Anacon
Type "copyright", "c

IPython 6.1.0 -- An
名子特斯拉
引擎磁電Engine
電動車電力
自動駕駛車
None

In [2]:

In [2]:
```

多重繼承

- class 子類別(父類別1,父類別2,父類別3,..):
- 敘述1
- 敘述2
- 當子類別繼承 (inheritance) 超過一個來源的時候，會以寫在最左邊的父類別優先繼承，多個父類別如果有相同名稱的屬性 (attribute) 與方法 (method) ，就會以最左邊的父類別優先。

```
 8 class Vehicle:
 9     def __init__(self,name,engine):
10         self.__name = name
11         self.__engine = engine
12 
13     def getName(self):
14         return self.__name
15 
16     def getEngine(self):
17         return self.__engine
18 
19     def setEngine(self,engine):
20         self.__engine = engine
21 
22 class Electric:
23     def __init_(self,PowerElectric):
24         self.__PowerElectric = PowerElectric
25 
26     def getPower(self):
27         return self.__PowerElectric
28 
29     def setPower(self,PowerElectric):
30         self.__PowerElectric = PowerElectric
```



```
33
34 class Car(Vehicle,Electric):
35     def __init__(self,name,engine,PowerElectric,auto):
36         super().__init__(name,engine)
37         self.setPower(PowerElectric)
38         self.__Auto = auto
39
40     def getCarName(self):
41         print("名子:"+self.getName())
42         print("引擎:"+self.getEngine())
43         print("電動車:"+self.getPower())
44
45     def getAuto(self):
46         return self.__Auto
47
48
49 myCar = Car("特斯拉","磁電Engine","電力","自動駕駛車")
50 myCar.getCarName()
51 print(myCar.getAuto())
```

多型

子類別和父類別
有同名的
getEngine()名稱

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-

class Vehicle:
    def __init__(self,name,engine):
        self.__name=name
        self.__engine=engine

    def getName(self):
        return self.__name
    def getEngine(self):
        return self.__engine

class Car(Vehicle):
    def __init__(self,name,engine,electric):
        super().__init__(name,engine)
        self.__electric=electric

    def getEngine(self):
        return ("超級")

    def getAuto(self):
        print("自動駕駛車")

myCar=Car("特斯拉","磁電Engine","電力")
myCar.getAuto()
print(myCar.getEngine())
```

```
In [17]: r
car_in.py'
自動駕駛車
超級

In [18]:
```

8.異常或錯誤處理

```
>>> while True:
        try:
            x = int(input("Please enter a number: "))
            break
        except ValueError:
            print("input error")
```

```
Please enter a number: f
input error
Please enter a number: f
input error
Please enter a number: ffffff
input error
Please enter a number:
```

異常或錯誤處理

```
1  import sys
2  try:
3      #f = open('myle.txt')
4      f = open('mysql.py')
5      s = f.readline()
6      i = int(s.strip())
7  except OSError as err:
8      print("OS error: {0}".format(err))
9  except ValueError:
10     print("Could not convert data to an integer.")
11 except:
12     print("Unexpected error:", sys.exc_info()[0])
13
```

Name	Type	Size	
s	str	1	#!/usr/bin/python

Variable explorer | File ex

IPython con

Console 1/A

```
In [5]:

In [5]: runfile('/Users/justinwu/Desktop/exception.py', wdi
OS error: [Errno 2] No such file or directory: 'myle.txt'

In [6]: runfile('/Users/justinwu/Desktop/exception.py', wdi
Could not convert data to an integer.

In [7]:
```

使用raise關鍵字丟出例外

```
 8
 9 import sys
10
11 def displaySalary(salary):
12     if salary<0:
13         raise ValueError("薪水為正")
14     print("薪水="+str(salary))
15
16 try:
17     #f = open('myle.txt')
18     Salary = eval(input("請輸入薪水:"))
19     displaySalary(Salary)
20 except OSError as err:
21     print("OS error: {0}".format(err))
22 except ValueError:
23     print("錯誤:輸入薪水值為正")
24 except:
25     print("Unexpected error:", sys.exc_info()[0])
```

```
Console 2/A
Unexpected error: <class 'SyntaxError'>

In [14]: runfile('/Users/justinwu/Deskto

請輸入薪水:80000
薪水=80000

In [15]: runfile('/Users/justinwu/Deskto

請輸入薪水:x
Unexpected error: <class 'NameError'>

In [16]: runfile('/Users/justinwu/Deskto

請輸入薪水:-10000
錯誤:

In [17]: runfile('/Users/justinwu/Deskto

請輸入薪水:-10000
錯誤:輸入薪水值為正
```

檔案處理

- fp=open(‘檔案名稱’,’檔案開啟模式’)

模式字串	當開啟檔案已存在	當開啟檔案不存在
r	開啟唯獨的檔案	產生異常錯誤
w	清除檔案內容後寫入	建立寫入檔案
a	開啟檔案從檔尾後開始寫入	建立寫入檔案
r+	開啟讀寫的檔案	產生錯誤
w+	清除檔案內容後讀寫內容	建立讀寫檔案
a+	從檔案尾巴開使讀寫	建立讀寫檔案

開啟,關閉及寫入檔案

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Sat Oct 28 06:39:38 2017

@author: justinwu
"""
fp=open('file.txt','w')
if fp !=None:
    print('檔案開啟成功')
fp.close()

fp=open('file.txt','w')
if fp !=None:
    fp.write("小白")
fp.close()

fp=open('file.txt','w')
if fp !=None:
    fp.write("宇哲")
fp.close()
```

```
In [8]: runfile
Users/justinwu/
檔案開啟成功

In [9]:
```

讀取檔案

```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Sat Oct 28 06:46:03 2017
5
6 @author: justinwu
7 """
8
9 fp=open('file.txt','r')
10 if fp !=None:
11     str=fp.read()
12     print(str)
13 fp.close()
14
15 fp=open('file.txt','r')
16 if fp !=None:
17     strList=fp.readlines()
18     print(strList)
19 fp.close()
```

```
In [11]: runfil
Users/justinwu/
宇哲
['宇哲']

In [12]:
```

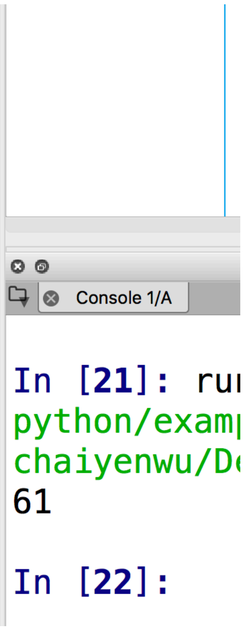
8-1讀寫資料

- 檔案輸入輸出
- mode第一個字母代表操作
- mode第二個字母是檔案的類型
- t或無代表文字，b代表二進位

開啟寫入文字檔模式wt

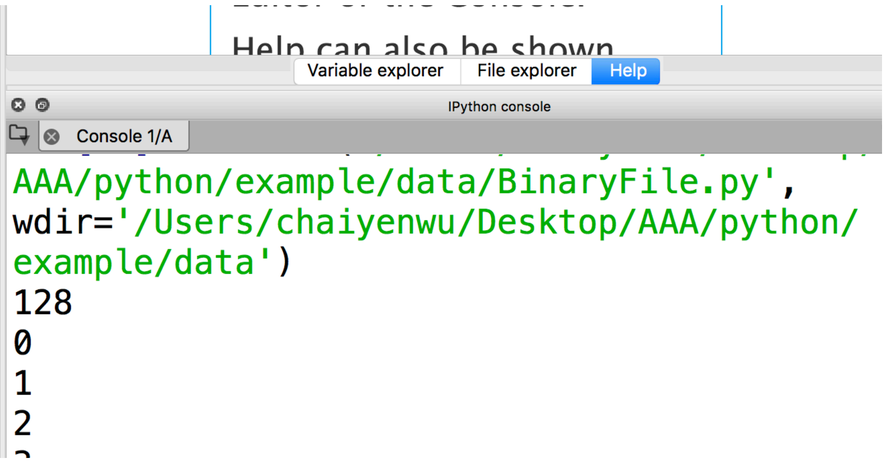
write()寫入文字檔

```
7  poem='''呱呱呱呱呱
8  醜小鴨呀醜小鴨
9  腿兒短短腳掌大
10 長長脖子扁嘴巴
11 走起路來搖呀搖
12 愛到河邊去玩耍
13 喉嚨雖小聲音大
14 可是只會呱呱呱'''
15 print(len(poem))
16
17 fout=open('song.txt','wt')
18 fout.write(poem)
19 fout.close()
20
```



開啟寫入二進位檔模式wb

```
 8 binaryData=bytes(range(0,128))
 9 print(len(binaryData))
10 fout=open('BinaryFile','wb')
11 fout.write(binaryData)
12 fout.close()
13
14 fileIn=open('BinaryFile','rb')
15 bdata=fileIn.read()
16 len(bdata)
17 for i in bdata:
18     print(bdata[i])
```

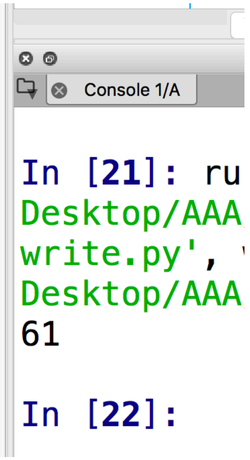


用with來關閉檔案

- Python可清除已開啟的檔案環境管理器context managers.

- 語法:　運算式 as 變數

```
 9 binaryData=bytes(range(0,128))
10 print(len(binaryData))
11 fout=open('BinaryFile','wb')
12 fout.write(binaryData)
13 fout.close()
14
15 with open('BinaryFile','rb') as fileIn:
16     bdata=fileIn.read()
17     len(bdata)
18     for i in bdata:
19         print(bdata[i])
```



8-2文字檔案結構JSON

- JavaScript Object Notation(JSON)是網路的資料傳輸交換物件.
- JSON為文字檔案結構,常用在網路網頁傳輸
- 使用json.dumps(Employee)將資料結構Employee轉成JSON字串
- 使用json.loads(company_employee)來將JSON物件company_employee轉成Python資料結構字典company2
- company2.keys()顯示資料字典的鍵

文字檔案結構JSON

```
 8 import json
 9
10 Employee={
11 "employee_1":{
12 "姓名":   "林小寶",
13 "年齡":   25,
14 "地址": "台北市復興南路199號2F",
15 "電話":
16 {
17 "公司":   "0922828835",
18 "住家":   "02-23567890"
19 }},
20 "employee_2":{
21 "姓名":   "江美麗",
22 "年齡":   35,
23 "地址": "台北市敦化南路19號2F",
24 "電話":
25 {
26 "公司":   "02-25879099",
27 "住家":   "02-56890989"
28 }}}
```

Employee	dict	2	{'empl…
company2	dict	2	{'empl…

Variable explorer | File explorer | Help

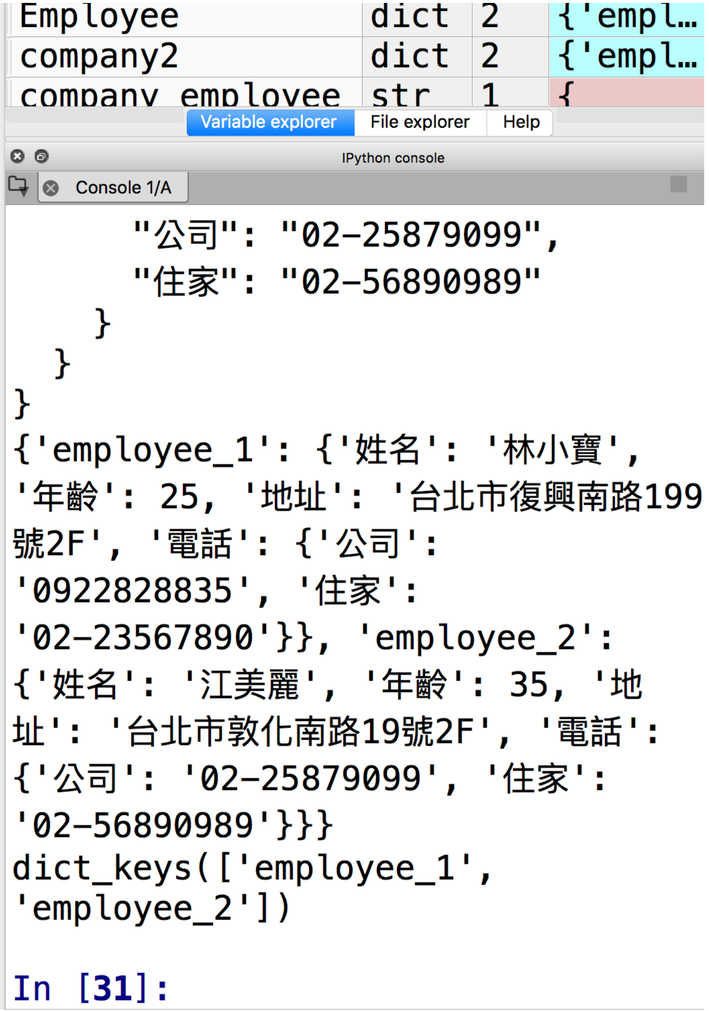
IPython console

Console 1/A

```
{
  "employee_1": {
    "姓名": "林小寶",
    "年齡": 25,
    "地址": "台北市復興南路199號2F",
    "電話": {
      "公司": "0922828835",
      "住家": "02-23567890"
    }
  },
  "employee_2": {
    "姓名": "江美麗",
    "年齡": 35,
    "地址": "台北市敦化南路19號2F",
    "電話": {
      "公司": "02-25879099",
      "住家": "02-56890989"
    }
```

ensure_ascii=False,indent=2設定dump為中文字

```
14 "地址": "台北市復興南路199號2F",
15 "電話":
16 {
17 "公司":   "0922828835",
18 "住家":   "02-23567890"
19 }},
20 "employee_2":{
21 "姓名":   "江美麗",
22 "年齡":   35,
23 "地址": "台北市敦化南路19號2F",
24 "電話":
25 {
26 "公司":   "02-25879099",
27 "住家":   "02-56890989"
28 }}}
29 #,ensure_ascii=False,indent=2設定dump為中文字
30 company_employee=json.dumps(Employee,
31                 ensure_ascii=False,indent=2)
32 print(company_employee)
33 company2=json.loads(company_employee)
34 print(company2)
35 print(company2.keys())
36
```

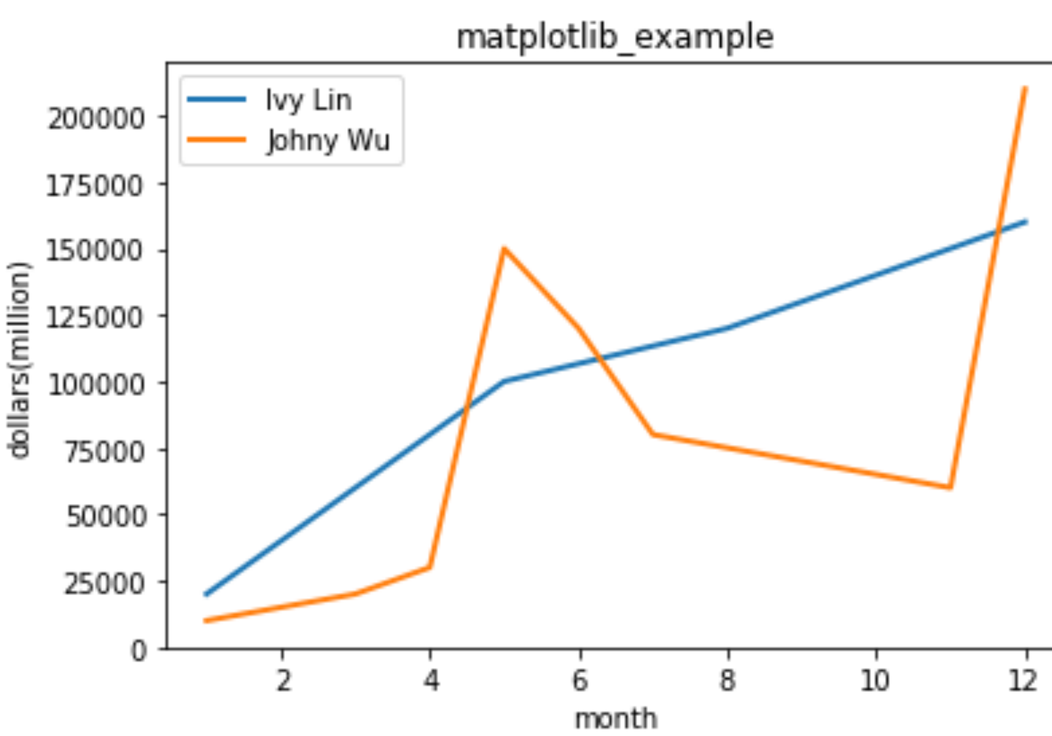


9.使用matplotlib畫圖

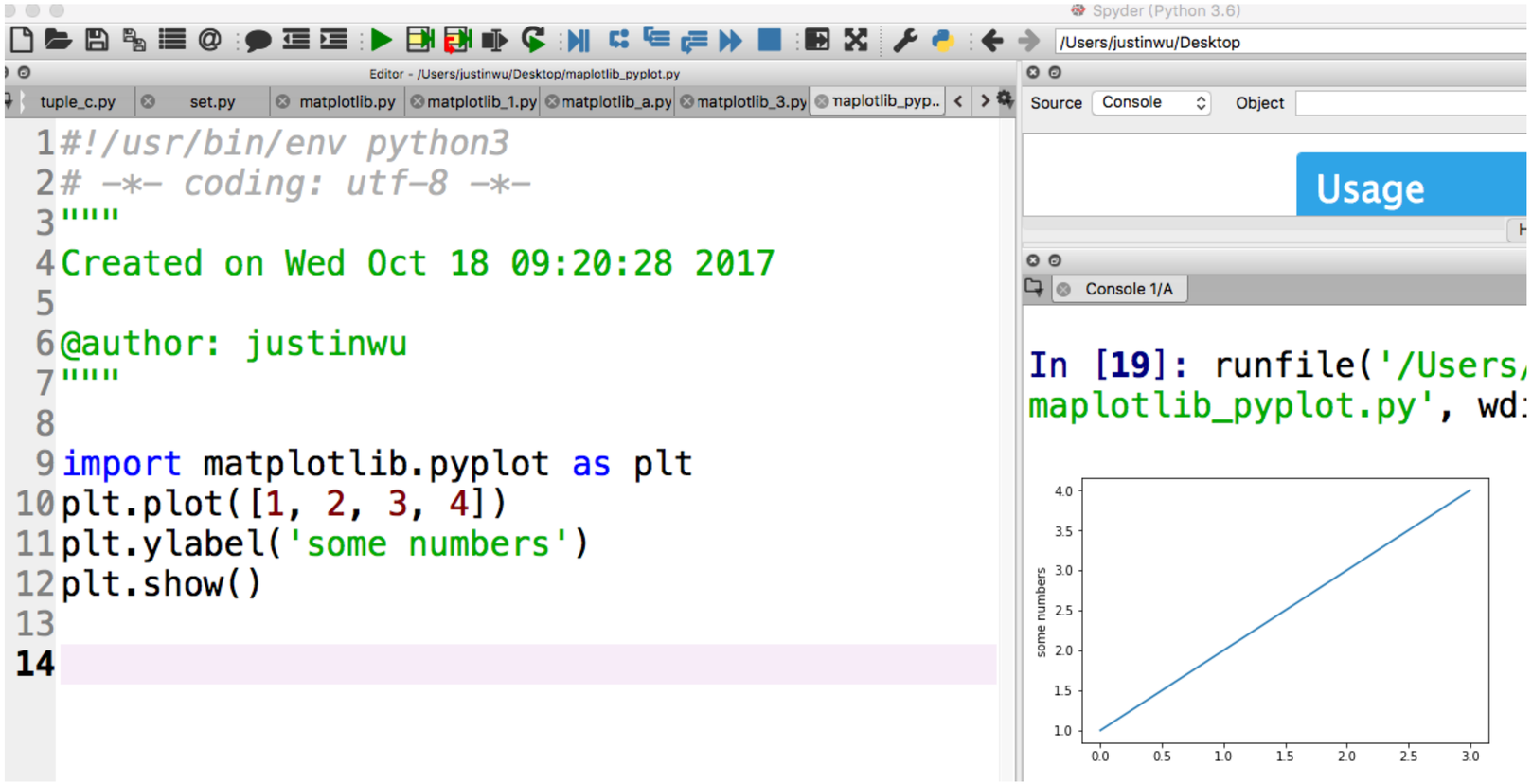
- Matplotlib.pyplot是畫圖的命令集合函數.每一個pyplot函數可以建立或修改圖形

使用matplotlib畫圖

```python
@author: justinwu
"""
import matplotlib.pyplot as mpt

month1 = [1,2,3,4,5,8,10,12]
month2 = [1,3,4,5,6,7,11,12]
sales1 = [20000,40000,60000,80000,100000,120000,140000,160000]
sales2 = [10000,20000,30000,150000,120000,80000,60000,210000]

mpt.plot(month1,sales1,lw=2,label='Ivy Lin')
mpt.plot(month2,sales2,lw=2,label='Johny Wu')
mpt.xlabel('month')
mpt.ylabel('dollars(million)')
mpt.legend()
mpt.title('matplotlib_example')
mpt.show()
```



plt.plot([1,2,3,4])預設是X軸,而Y軸是我們輸入的資料串列[1,2,3,4].



第一個[1,2,3,4]參數是X軸,第二個參數是Y軸

Spyder (Python 3.6)

/Users/justinwu/Desktop

Editor - /Users/justinwu/Desktop/matplotlib_a1.py

tuple.py | tuple_c.py | set.py | matplotlib.py | matplotlib_1.py | matplotlib_a1.py | matplotlib_3.py

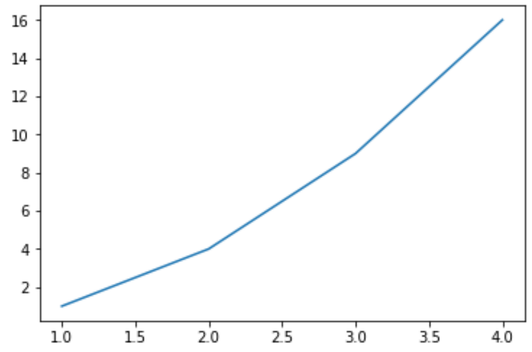
```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Wed Oct 18 08:51:23 2017
5
6 @author: justinwu
7 """
8
9 import matplotlib.pyplot as plt
10
11
12 plt.plot([1, 2, 3, 4], [1, 4, 9, 16])
13 plt.show()
14
```

Source | Console | Object

Usage

Console 1/A

```
In [24]: runfile('/Use
wdir='/Users/justinwu/
```



plot()第三個參數是格式字串點
plot,'ro'為顯示紅色圓圈

Spyder (Python 3.6)

/Users/justinwu/Desktop/python/example

Editor - /Users/justinwu/Desktop/python/example/plot_ro.py

plot_ro.py

```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Wed Oct 18 09:34:44 2017
5
6 @author: justinwu
7 """
8 import matplotlib.pyplot as plt
9 #第三個參數是格式字串點plot,'ro'為顯示紅色圓圈
10 plt.plot([1, 2, 3, 4], [1, 4, 9, 16], 'ro')
11 plt.axis([0, 6, 0, 20])
12 plt.show()
```

Source Console Object

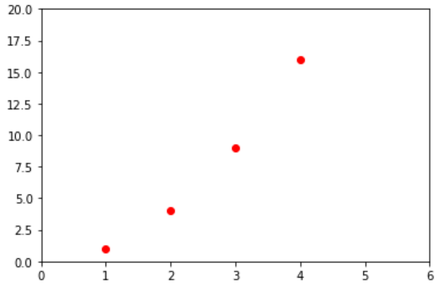
Usage

Here you can g
pressing Cmd+
the Editor or th

Help

Console 1/A

```
In [30]: runfile('/Users/j
plot_ro.py', wdir='/Users/
```



'r--'紅色虛線,'bs'藍色矩形,'g^'綠色三角形

Spyder (Python 3.6)

/Users/justinwu/Desktop/python/example

Editor - /Users/justinwu/Desktop/python/example/plot_s.py

plot_ro.py | plot_s.py

```
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """
4 Created on Wed Oct 18 09:42:54 2017
5
6 @author: justinwu
7 """
8
9 import numpy as np
10
11 # 0到5每步0.2
12 t = np.arange(0., 5., 0.2)
13
14 # red dashes, blue squares and green triangles
15 # 'r--'紅色虛線,'bs'藍色矩形,'g^'綠色三角形
16 plt.plot(t, t, 'r--', t, t**2, 'bs', t, t**3,
17 plt.show()
```

Source | Console | Object

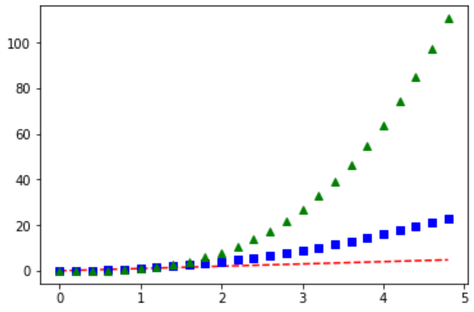
Usage

Here you can g
pressing Cmd+
the Editor or th

Help

Console 1/A

```
In [33]: runfile('/Users/ju
plot_s.py', wdir='/Users/ju
```



- Thanks.