

Python 快速上手

環境建置

2020/09/23

Why Python?

簡單好學!

Hello world in Python:

```
print( "Hello world" )
```

Hello world in Java:

```
public class HelloWorld {  
    public static void main(String[] args) {  
        System.out.println("Hello, World");  
    }  
}
```

環境建置

Anaconda

Google Colab

Before installing...

Highly recommend learning Python 3.x

- Different syntax
- Different implementation
- No more support for Python 2.7

Anaconda (miniconda)

Anaconda

- 除了Python，許多資料分析常用的套件也包含在內
- Windows / Linux / MacOS
- [Download](#)
- conda install
- Anaconda Prompt

[Miniconda](#)



環境管理

- 輕鬆建立虛擬環境
- `conda create -n env_name list_of_package`
- e.g. `conda create -n myenv python=3.7`
- 建立環境完成後，輸入
 - Linux / MacOS : `source activate env_name`
 - Windows : `activate env_name`

```
(base) C:\Users\david>activate AI_course  
(AI_course) C:\Users\david>
```

環境管理



- 講完了建立環境，那移除環境呢？
- `conda env remove -n myenv`

Running Script

running by line

```
(AI_course) C:\Users\david>python
Python 3.7.2 (default, Feb 21 2019, 17:35:59) [MSC v.1915 64 bit (AMD64)] :: Anaconda, Inc. on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World")
Hello World
>>>
```

安裝 python packages

在 Anaconda Prompt 中輸入

```
pip install {package name}
```

or

```
conda install {package name}
```

(較建議)

Anaconda Prompt

```
(AI_course) C:\Users\david\jupyter_notebook>pip install pandas_
```

interactive – jupyter lab

- `conda install jupyterlab`
- include magic commands
- running by cell
- TAB for autocomplete

(記得要確認是否有進入自己建立的虛擬環境)

Jupyter

在虛擬環境下，我們先建立一個叫做 jupyter_notebook 的目錄：

```
Anaconda Prompt

(AI_course) C:\Users\david>mkdir jupyter_notebook
(AI_course) C:\Users\david>cd jupyter_notebook
(AI_course) C:\Users\david\jupyter_notebook>_
```

Jupyter



在 Anaconda Prompt 中輸入 `jupyter lab` 就會自動跳出瀏覽器畫面

Jupyter

當 Anaconda Prompt 出現像這樣的畫面時代表已經成功執行

```
Anaconda Prompt - jupyter notebook

(AI_course) C:\Users\david>mkdir jupyter_notebook

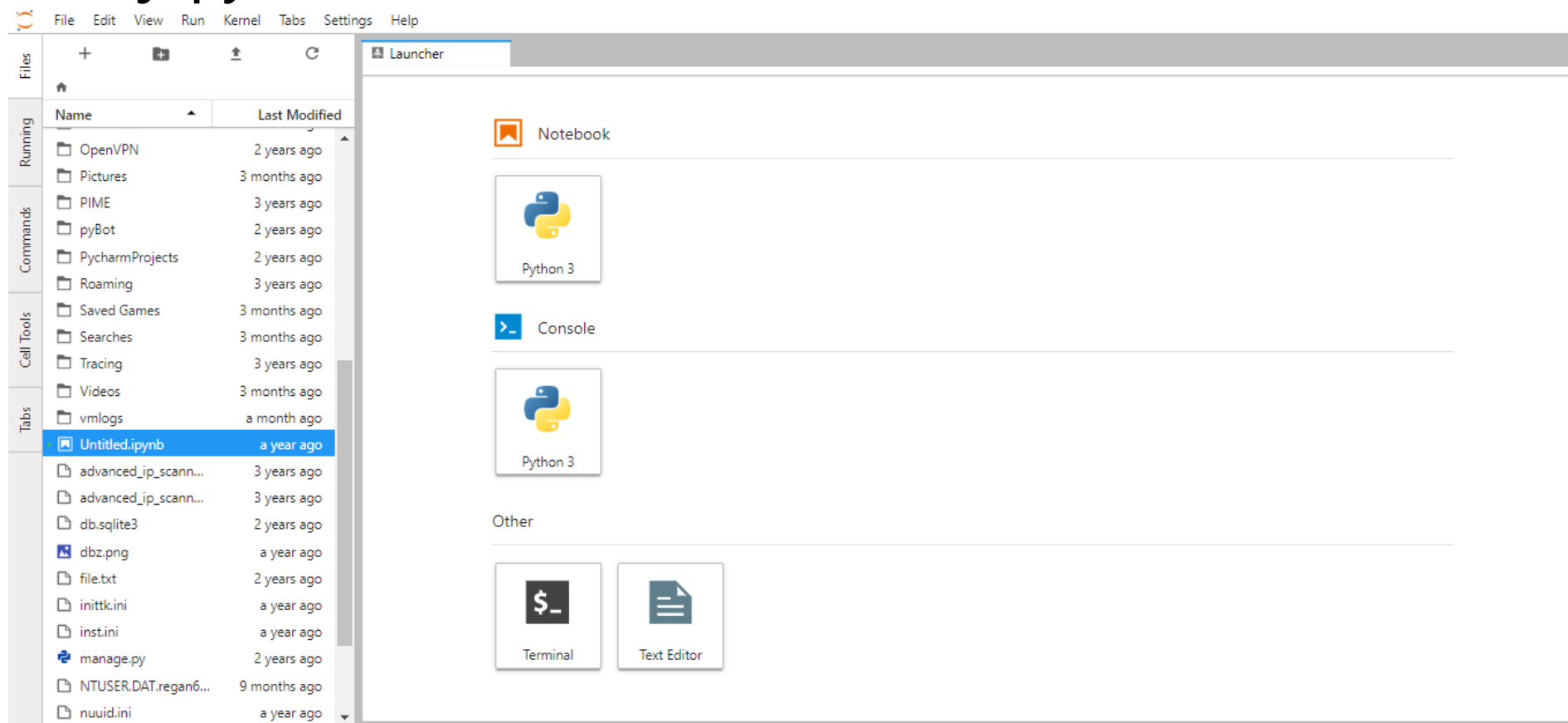
(AI_course) C:\Users\david>cd jupyter_notebook

(AI_course) C:\Users\david\jupyter_notebook>jupyter notebook
[I 14:24:52.590 NotebookApp] Serving notebooks from local directory: C:\Users\david\jupyter_notebook
[I 14:24:52.590 NotebookApp] The Jupyter Notebook is running at:
[I 14:24:52.591 NotebookApp] http://localhost:8888/?token=b5502c5e8de7e7115dec7ce01df03246247a4e4190bdfb91
[I 14:24:52.591 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 14:24:52.682 NotebookApp]

To access the notebook, open this file in a browser:
    file:///C:/Users/david/AppData/Roaming/jupyter/runtime/nbserver-25440-open.html
Or copy and paste one of these URLs:
    http://localhost:8888/?token=b5502c5e8de7e7115dec7ce01df03246247a4e4190bdfb91
```

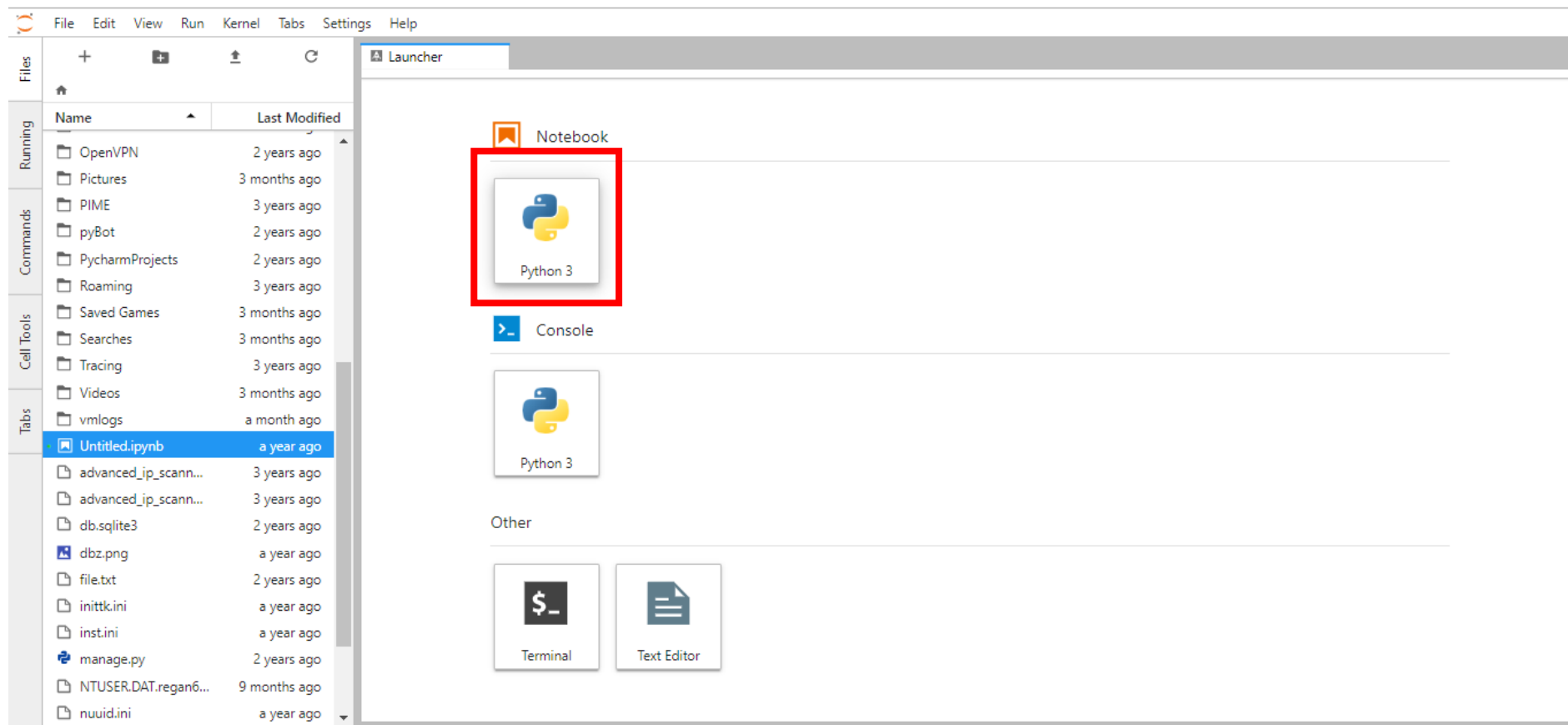
Jupyter

看到裡面是空的完全沒有東西，因為我們是在剛剛新增的目錄下做執行，在哪裡執行 jupyter lab 就會從哪個目錄開始當根目錄（home）。



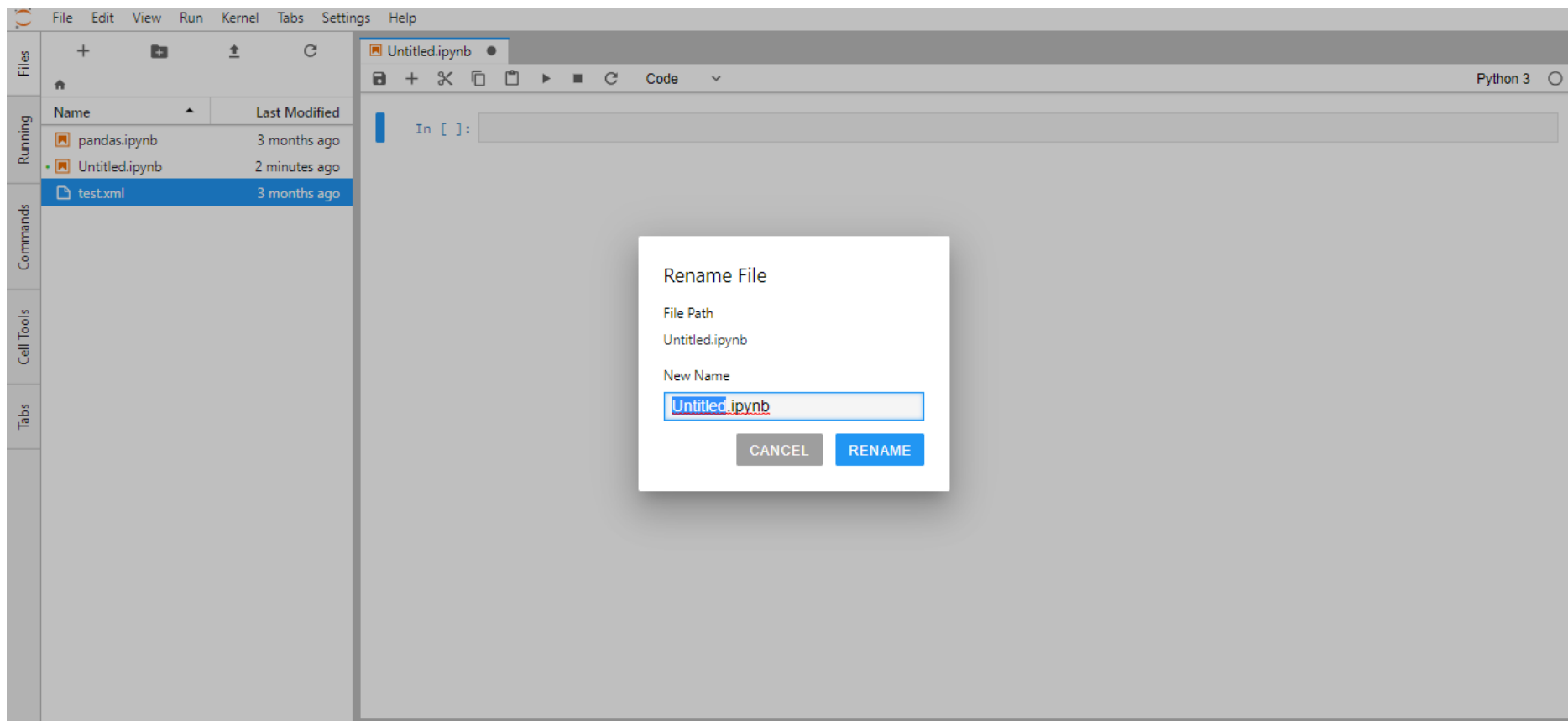
開啟 ipynb 檔

我們可以點選紅框的地方並建立一個 notebook。



開啟 ipynb 檔

進到 notebook 的畫面後，在標籤上點選右鍵即可修改檔名，這裡我們改成 01_hello_world

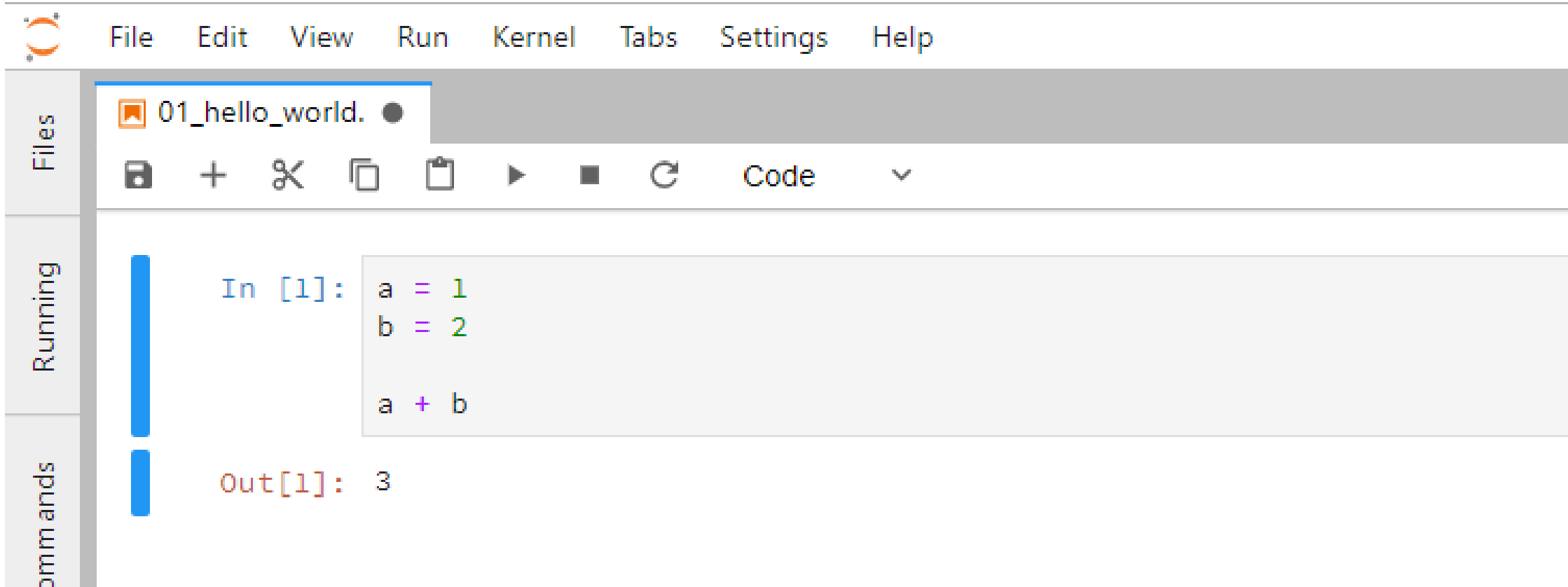


查看 ipynb 檔

看到右邊的檔案管理就可以看到剛才建立的 01_hello_world.ipynb，綠色點點表示它正在執行。

Files	<div><div>+</div><div><div></div><div>+</div></div><div><div></div><div>↑</div></div><div><div></div><div>↺</div></div></div>	
	<div><div>🏠</div></div>	
Running	Name	Last Modified
	<div><div><div></div></div>01_hello_world.ipynb</div>	a minute ago
	<div><div><div></div></div>pandas.ipynb</div>	3 months ago
mands	<div><div><div></div></div>test.xml</div>	3 months ago

開始在 notebook 裡寫程式吧!



cell 的狀態

- 有一個快捷鍵方式按 **shift + enter** 會自動執行目前正在選取的cell。
- 當點選一個 cell 的旁邊的線條會變成綠色，這時候就可以編寫。
- 按下 **ESC** 會看到變成藍色就可以做其他“動作”而不會是輸入指令。

notebook 常用快捷鍵

cell 在藍色的狀態下：

- **x**：剪下當前選擇的 cell
- **c**：複製當前選擇的 cell
- **v**：貼上 cell
- **z**：還原 cell
- **a / b**：在當前選擇的上方 / 下方新增一個 cell
- **o**：顯示 / 隱藏該 cell 的結果
- **Shift+Enter**：執行當前的 cell 並且選到下一個 cell
- **Ctrl+Enter**：執行當前 cell
- **Shift+m**：將目前 cell 與下一個 cell 合併

Google Colab

免費的Google雲端GPU

by cswu, <https://github.com/exeex>

Hello World of Colab

1. 登入你的 Google 雲端帳號
2. 建立新的 colab 筆記本檔案
在空白處點右鍵開啟選單，選 **More > Colaboratory**

如果第一次開啟沒有這個選項，請至

More > Connect more apps > 搜尋 Colaboratory

搜尋到後將其連結到你的Google Drive

Hello World of Colab



The screenshot displays the Google Drive web interface. On the left sidebar, the 'New' button is highlighted, and the 'New' menu is open, showing options: 'New folder', 'Upload files', 'Upload folder', 'Google Docs', 'Google Sheets', 'Google Slides', 'More', 'Google Sites', 'Colaboratory' (highlighted), 'draw.io Diagrams', and 'Google Jamboard'. The main area shows 'My Drive' with a 'Quick Access' section containing four items: 'Untitled0.ipynb' (edited today), '資訊資料部 週誌' (edited yesterday), '各部門每周工作紀錄2019' (edited yesterday), and '氣象站觀測資料-log' (edited this month). Below this is a 'Folders' section with items like 'Movie', 'Invoice of WeatherRisk', '工作日誌', 'CWB OPENDATA 出包...', '路由器設定', '短期預報校驗', 'Colab Notebooks', 'WeatherRisk LOGO', 'Line備份', 'Mactype', and 'NSPO'. A 'Files' section is partially visible at the bottom. The right sidebar shows a 'Details' view for 'My Drive' with a message: 'Select a file or folder to view its details.'

Hello World of Colab



01_hello_world.ipynb ☆

文件 修改 视图 插入 代码执行程序 工具 帮助

+ 代码 + 文字 ↑ 单元格 ↓ 单元格

```
a = 0
b = 1
a + b
```

1

[]

Tensorflow運行範例

1. 從[這裡](#)取得tensorflow線性回歸模型的範例程式。
2. 把程式貼到colab內，直接執行看看吧!
基本上tensorflow, numpy 還有 matplotlib等常用的套件都已經預先裝在colab裡面了。

Tensorflow運行範例

```
01_hello_world.ipynb ☆
文件 修改 视图 插入 代码执行程序 工具 帮助
+ 代码 + 文字 + 单元格 - 单元格

'''
A linear regression learning algorithm example using TensorFlow library.
Author: Aymeric Damien
Project: https://github.com/aymericdamien/TensorFlow-Examples/
'''

from __future__ import print_function

import tensorflow as tf
import numpy
import matplotlib.pyplot as plt
rng = numpy.random

# Parameters
learning_rate = 0.01
training_epochs = 1000
display_step = 50

# Training Data
train_X = numpy.asarray([3.3, 4.4, 5.5, 6.71, 6.93, 4.168, 9.779, 6.182, 7.59, 2.167,
                          7.042, 10.791, 5.313, 7.997, 5.654, 9.27, 3.1])
train_Y = numpy.asarray([1.7, 2.76, 2.09, 3.19, 1.694, 1.573, 3.366, 2.596, 2.53, 1.221,
                          2.827, 3.465, 1.65, 2.904, 2.42, 2.94, 1.3])
n_samples = train_X.shape[0]

# tf Graph Input
X = tf.placeholder("float")
Y = tf.placeholder("float")

# Set model weights
W = tf.Variable(rng.randn(), name="weight")
b = tf.Variable(rng.randn(), name="bias")

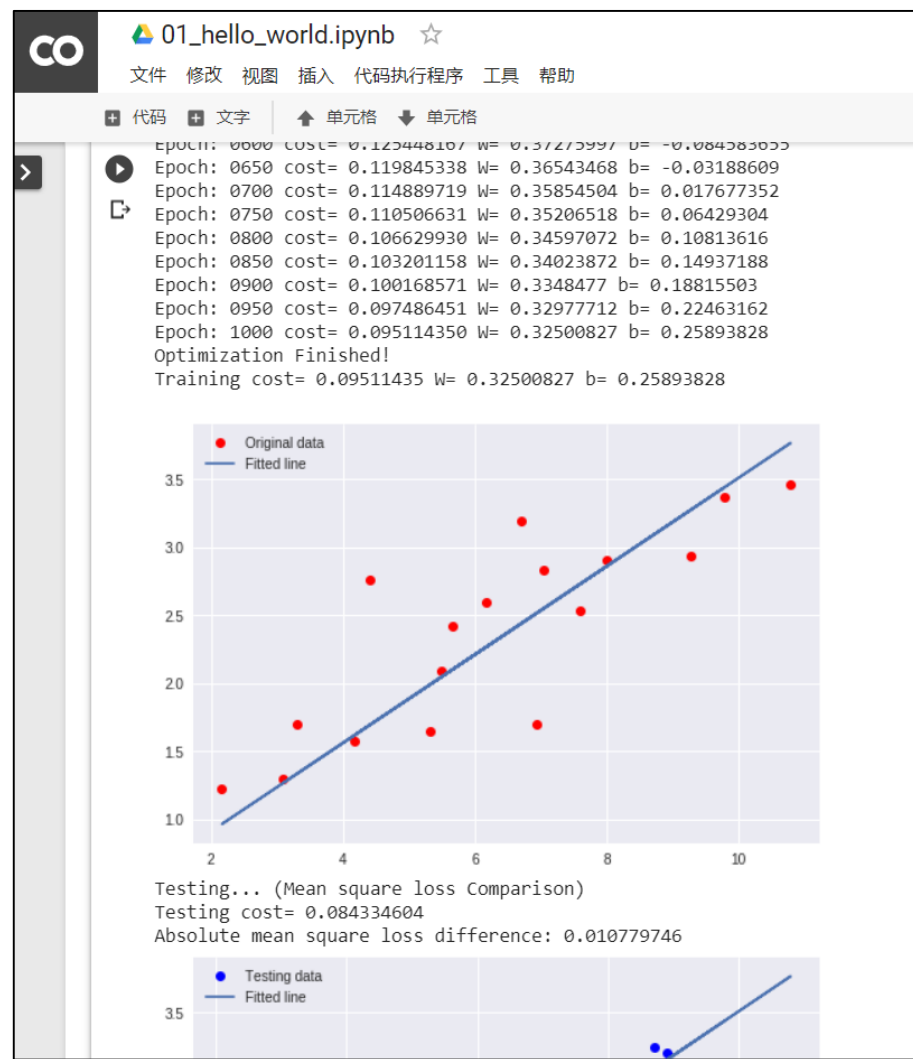
# Construct a linear model
pred = tf.add(tf.multiply(X, W), b)

# Mean squared error
cost = tf.reduce_sum(tf.pow(pred-Y, 2))/(2*n_samples)
# Gradient descent
# Note, minimize() knows to modify W and b because Variable objects are trainable=True by default
optimizer = tf.train.GradientDescentOptimizer(learning_rate).minimize(cost)

# Initialize the variables (i.e. assign their default value)
init = tf.global_variables_initializer()

# Start training
with tf.Session() as sess:
```

Tensorflow運行範例

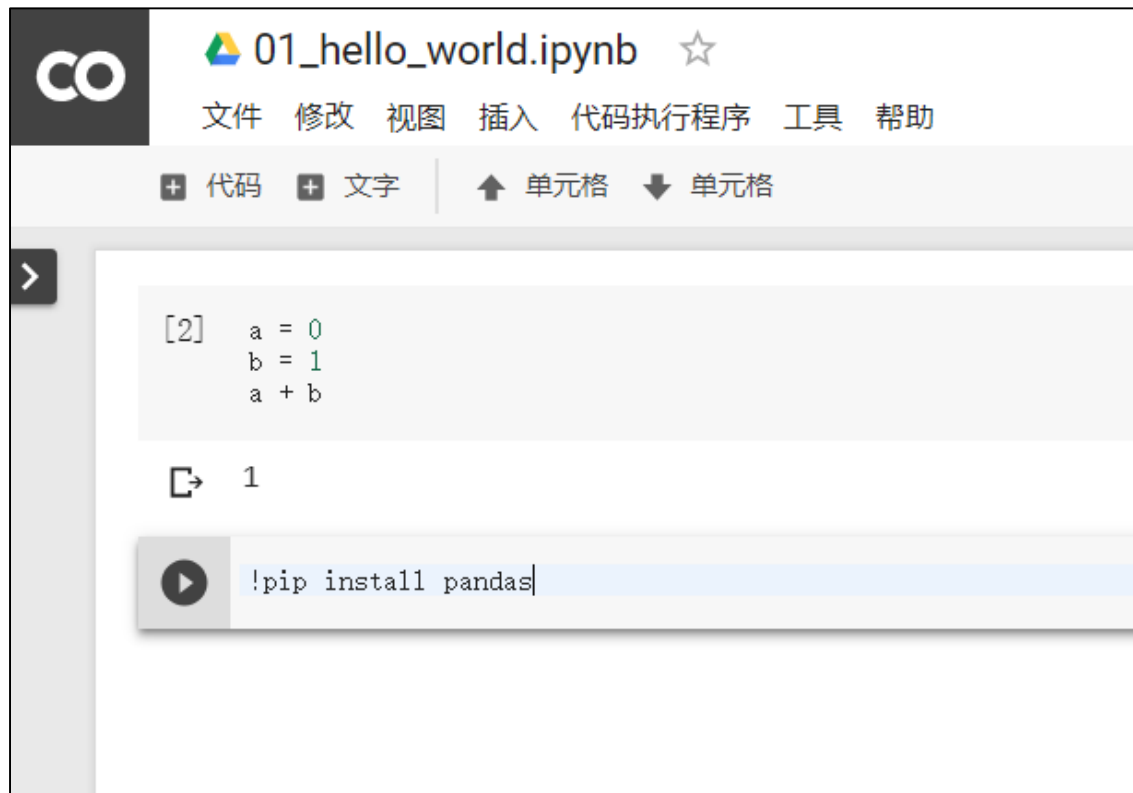


安裝 python packages

語法為：

```
!pip install {package name}
```

直接在code block中輸入並執行即可



The screenshot shows a Jupyter Notebook interface. At the top, the title bar reads "01_hello_world.ipynb" with a star icon. Below the title bar is a menu bar with options: "文件", "修改", "视图", "插入", "代码执行程序", "工具", and "帮助". Below the menu bar is a toolbar with icons for adding code, text, and cells. The main area of the notebook shows a code cell with the following code:

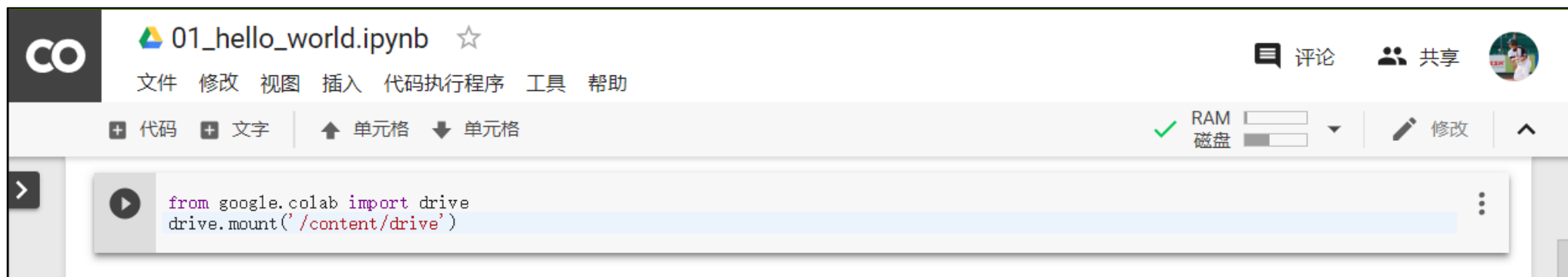
```
[2] a = 0  
    b = 1  
    a + b
```

Below the code cell is a cell number "1" with a copy icon. At the bottom, there is a command prompt area with a play button icon and the text "!pip install pandas".

掛載 google drive 的資料夾到 colab 的虛擬機

只要上傳自己的資料到 google drive 中，再透過掛載 google drive 的資料夾到 colab，我們就可以用 colab 來跑自己的資料集啦。


輸入並執行下列程式：



The screenshot shows the Google Colab web interface. At the top, the file name '01_hello_world.ipynb' is displayed with a star icon. Below it is a menu bar with options: 文件 (File), 修改 (Edit), 视图 (View), 插入 (Insert), 代码执行程序 (Run), 工具 (Tools), and 帮助 (Help). On the right side of the menu bar are icons for 评论 (Comments), 共享 (Share), and a user profile picture. Below the menu bar is a toolbar with buttons for adding code (+ 代码), text (+ 文字), and cell types (单元格). On the right of the toolbar are status indicators for RAM (with a green checkmark) and 磁盘 (Disk), along with a 修改 (Edit) button and an expand/collapse icon. The main area shows a code cell with the following Python code:

```
from google.colab import drive
drive.mount('/content/drive')
```

掛載 google drive 的資料夾到 colab 的虛擬機



The screenshot shows the Google Colab web interface. At the top, the file name '01_hello_world.ipynb' is visible. Below the file name, there are tabs for '文件' (Files), '修改' (Edit), '视图' (View), '插入' (Insert), '代码执行程序' (Code execution), '工具' (Tools), and '帮助' (Help). On the right side, there are buttons for '评论' (Comments), '共享' (Share), and a user profile icon. Below these, there are indicators for 'RAM' and '磁盘' (Disk) usage, and a '修改' (Edit) button. The main area displays a code cell with the following code:

```
1. from google.colab import drive
2. drive.mount('/content/drive')
```

Below the code cell, there is a message: 'Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=947318989803-6bn6qk8qdgf4n4g3pfe'. Below this message, there is a text input field labeled 'Enter your authorization code:'.

掛載 google drive 的資料夾到 colab 的虛擬機

Google

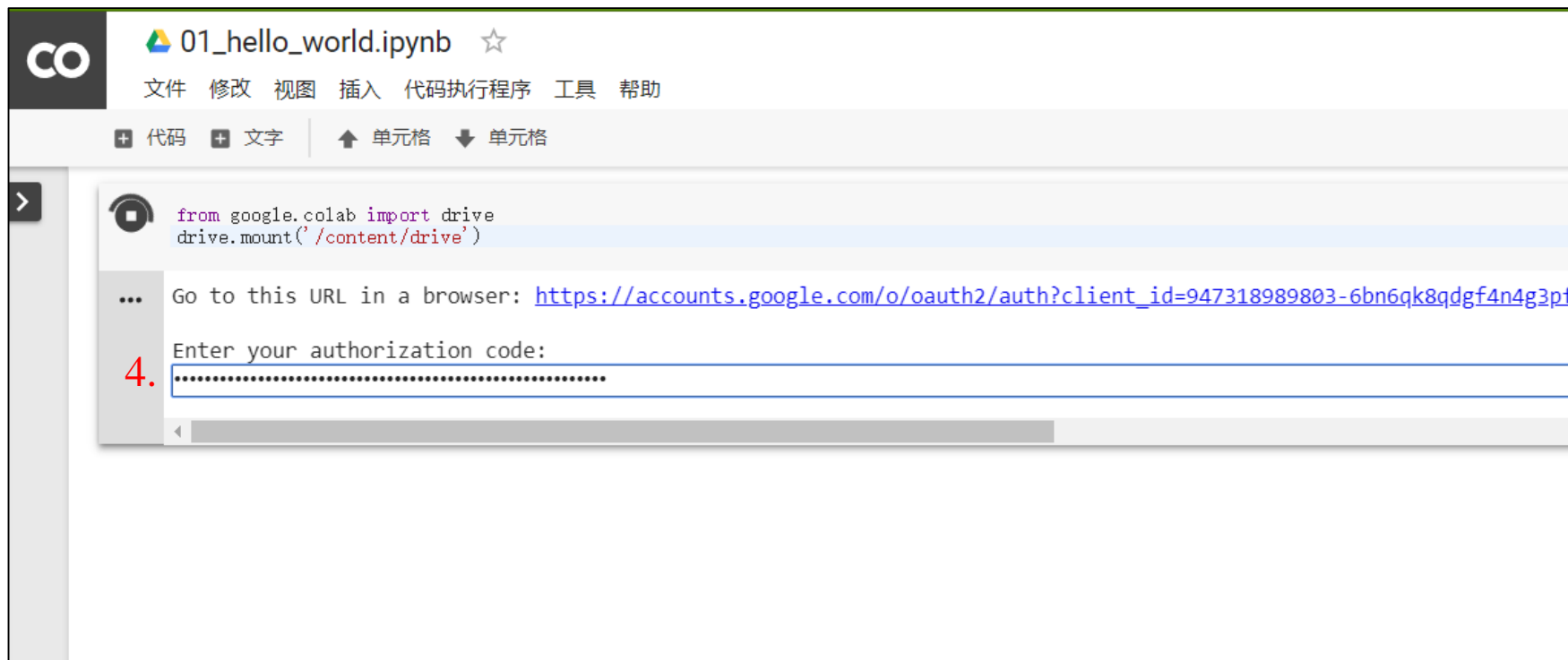
登入

請複製這組授權碼，然後切換至您的應用程式，再貼上授權碼：

4/_QD7KUYvfFYG9C9QiNKdMSSjz03nz4ufdd0r8aBqdYkzfwJVc
EFmHNI



掛載 google drive 的資料夾到 colab 的虛擬機



掛載 google drive 的資料夾到 colab 的虛擬機

可以使用`os.listdir()`來列出系統下某資料夾中包含的所有檔案。



```
01_hello_world.ipynb ☆
文件 修改 视图 插入 代码执行程序 工具 帮助
+ 代码 + 文字 | ↑ 单元格 ↓ 单元格
>
import os
os.listdir('/content/drive/My Drive')

['sample.pdf',
 'rain.rar',
 '20160706新北市天氣日報.docx',
 '20160706新北市天氣日報.docx.gdoc',
 'MobaXterm',
 'putty.reg',
 'MobaXterm Sessions.mxtsessions',
 'AWS Cluster 建置筆記.gdoc',
 '無標題文件.gdoc',
 'LETOPS 執行流程整理.docx']
```