

長庚大學 / 暑期 / 大數據應用

Python 開發環境介紹、基礎語法

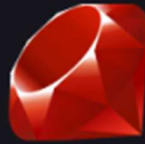
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博士後研究員

2022/07/12



TOP 10 Programming languages for 2022

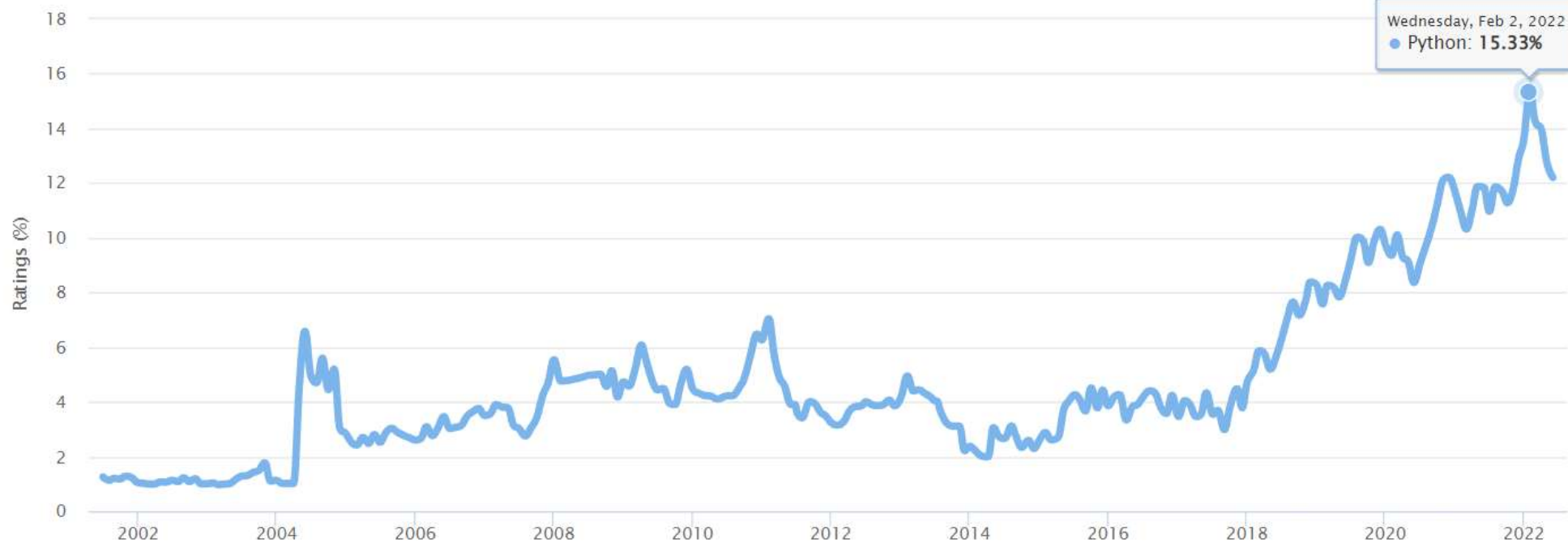


<https://nexttechnology.io/top-10-programming-languages-for-2022/>

1	2	▲		Python	12.20%	+0.35%
2	1	▼		C	11.91%	-0.64%
3	3			Java	10.47%	-1.07%
4	4			C++	9.63%	+2.26%
5	5			C#	6.12%	+1.79%
6	6			Visual Basic	5.42%	+1.40%
7	7			JavaScript	2.09%	-0.24%
8	10	▲		SQL	1.94%	+0.06%
9	9			Assembly language	1.85%	-0.21%
10	16	▲▲		Swift	1.55%	+0.44%

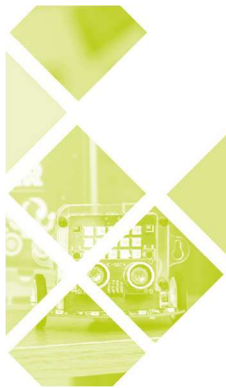
TIOBE Index for Python

Source: www.tiobe.com



<https://www.tiobe.com/tiobe-index/python/>





從簡單的遊戲入門- 邏輯思考

挑戰自己的邏輯思考能力-1

A Code with Google PROGRAM

<https://blockly.games/>

The screenshot shows the Blockly Games website interface. At the top right, there is a language dropdown menu set to "正體中文". The main header features the "Blockly Games beta" logo. Below the logo, a line of text reads: "為了明日的程式設計師所設計的遊戲。給教育者的資訊...". A central navigation path consists of several circular icons connected by a grey line. From left to right, the icons and their labels are: 1. A puzzle icon labeled "拼圖"; 2. A maze icon labeled "迷宮"; 3. A bird icon labeled "小鳥"; 4. A turtle icon labeled "烏龜"; 5. A film reel icon labeled "影片"; 6. A musical note icon labeled "音樂"; 7. A yellow duck icon labeled "池塘遊戲教程"; 8. A red ladybug icon labeled "池塘". At the bottom left, there is a question "要重新開始嗎?" followed by a blue button labeled "清除資料".

A Code with Google PROGRAM

過關

Blockly Games : Maze

1

10

English

GO



move forward



Stack a couple of 'move forward' blocks together to help me reach the goal.



move forward

提示

▶ Run Program

即時執行

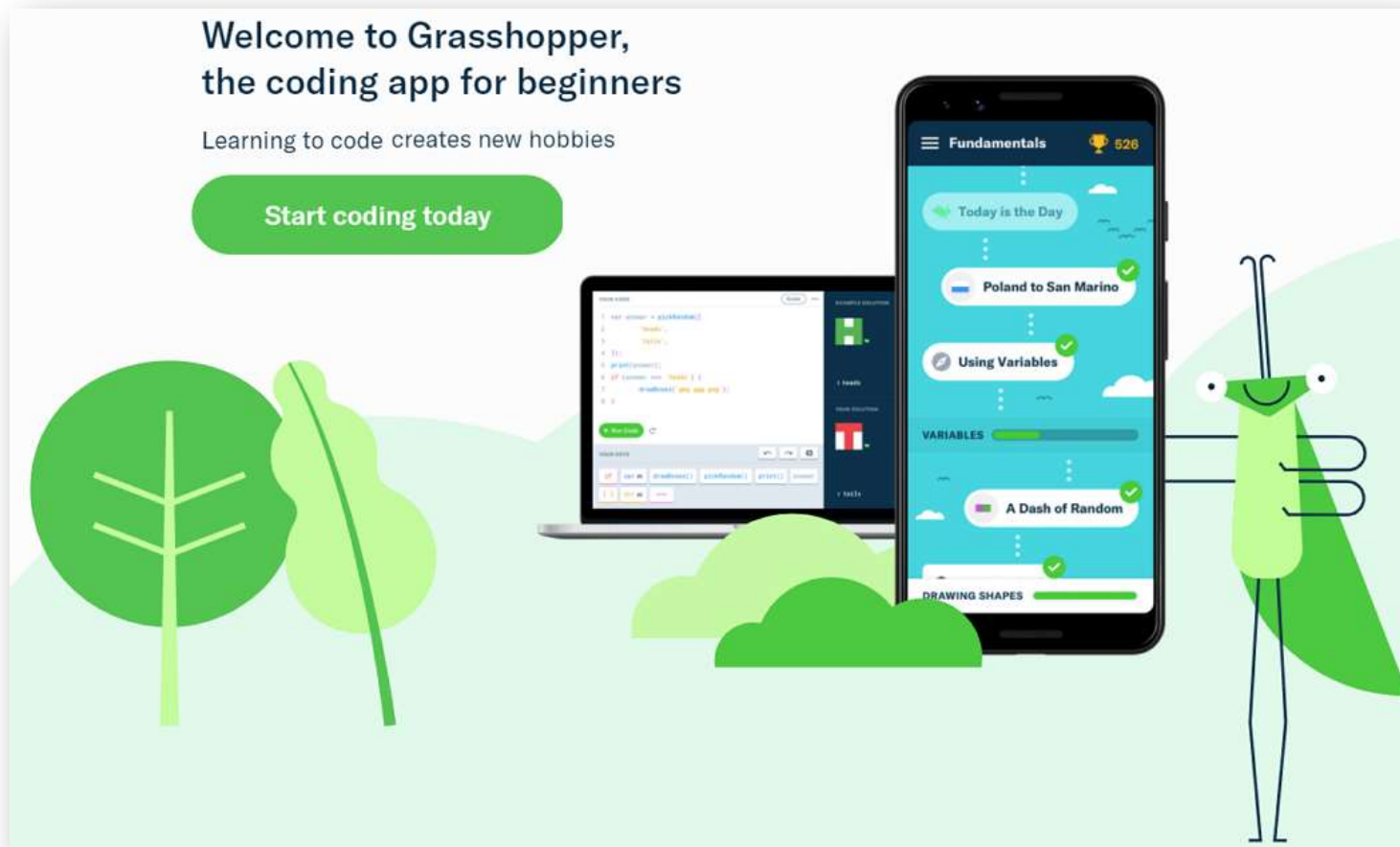
<https://blockly.games/>



挑戰自己的邏輯思考能力-2

A Code with Google PROGRAM

<https://grasshopper.app/>



A Code with Google PROGRAM

Getting Started

Animations

Learn how to create, manipulate, and animate shapes. This course uses the D3 library, Scalable Vector Graphics (SVG), and JavaScript. If this seems a little difficult, try reviewing some puzzles in the Fundamentals course.

 Locked

Animations II

This course shows you how to create interactive, manipulatable animations. You'll get to create more complex functions and use arrow functions for the first time.

 Locked

Array Methods

Learn different ways to search arrays, combine elements, and transform elements using arrow functions.

 Locked

Automation

Learn how to automate tasks using Apps Script, a Google product powered by JavaScript.

 Locked

Debugging Code

Learn how to spot errors of different types and how to use coding tools such as try catch statements and the console for debugging.

 Locked

Fundamentals

Learn about functions, create variables, control code flow, and much more. This course uses JavaScript, but the concepts can be applied to any coding language.

[Hop Back In](#)



過關

從基礎開始，
過關才能解鎖
下一關

A Code with Google PROGRAM

< grasshopper

Project

YOUR CODE

Guide



EXAMPLE SOLUTION



Gabonese Flag

In this puzzle, you'll draw another flag. This time the flag's stripes are horizontal rather than vertical.

INSTRUCTIONS

Complete the Gabonese flag.

- Add 2 new `drawBox()` functions with the argument `yellow`
- Use the `newLine()` function to start a new row of boxes
- Add 3 more `drawBox()` functions, this time with the argument `blue`

Show hint

提示

```
drawBox(green);  
drawBox(green);  
drawBox(green);  
newLine();  
drawBox(yellow);  
drawBox(yellow);  
drawBox(yellow);  
newLine();  
drawBox(blue);  
drawBox(blue);  
drawBox(blue);
```

Correct!

You used 2 different functions to create the Gabonese Flag.

Continue

Run Code



即時執行

YOUR KEYS

`drawBox()`

`newLine()`

`blue`

`green`

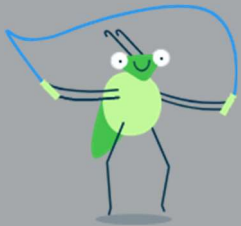
`yellow`



YOUR SOLUTION



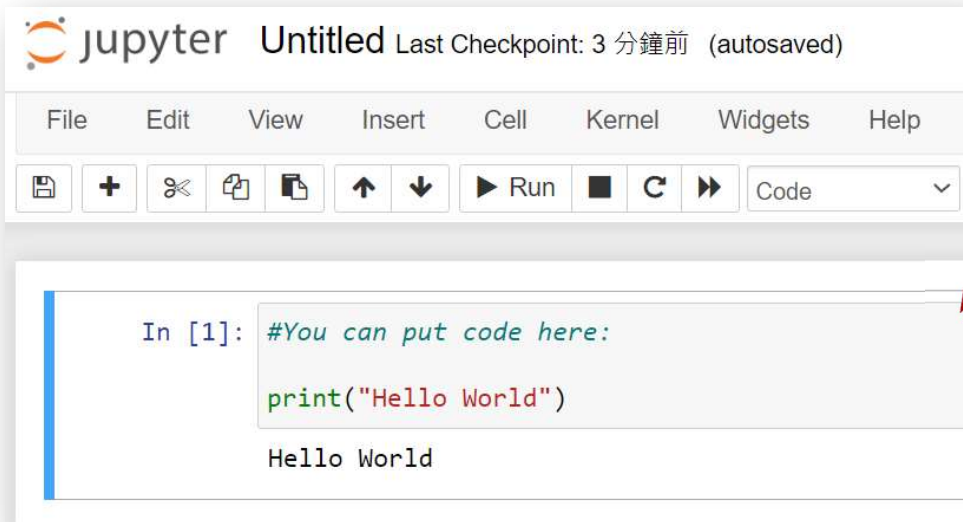
Get Puzzle Help



Python 的優點

- 代碼的可讀性和簡潔的語法
- 支援套件多
- 社群廣大
- 支援各領域應用：網頁開發/資料分析/機器學習/影響處理...

Python 環境安裝



```
In [1]: #You can put code here:
print("Hello World")

Hello World
```



```
1 #You can put code here:
2
3 print("Hello World")

Hello World
```

- *Anaconda > Jupyter Notebook*

- *Google Drive > Colab Notebooks*

- *雲端 Python 筆記本*
- *Colab 筆記本是由 Colab 代管的 Jupyter 筆記本*

Anaconda > Jupyter Notebook



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Individual Edition is now

ANACONDA DISTRIBUTION

The world's most popular open-source Python distribution platform

Anaconda Distribution

[Download](#) 

For Windows

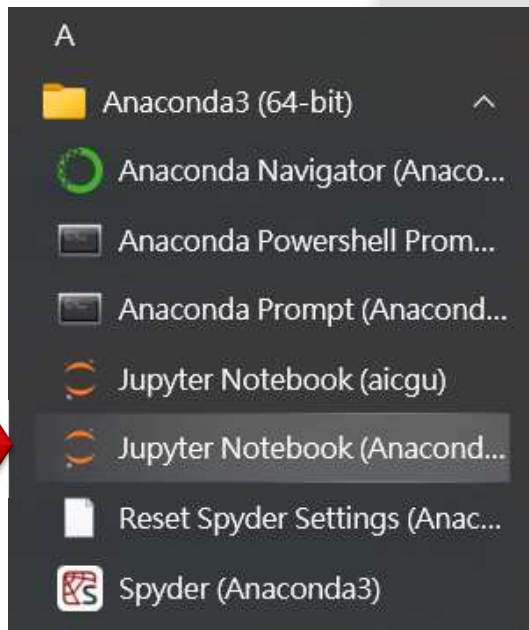
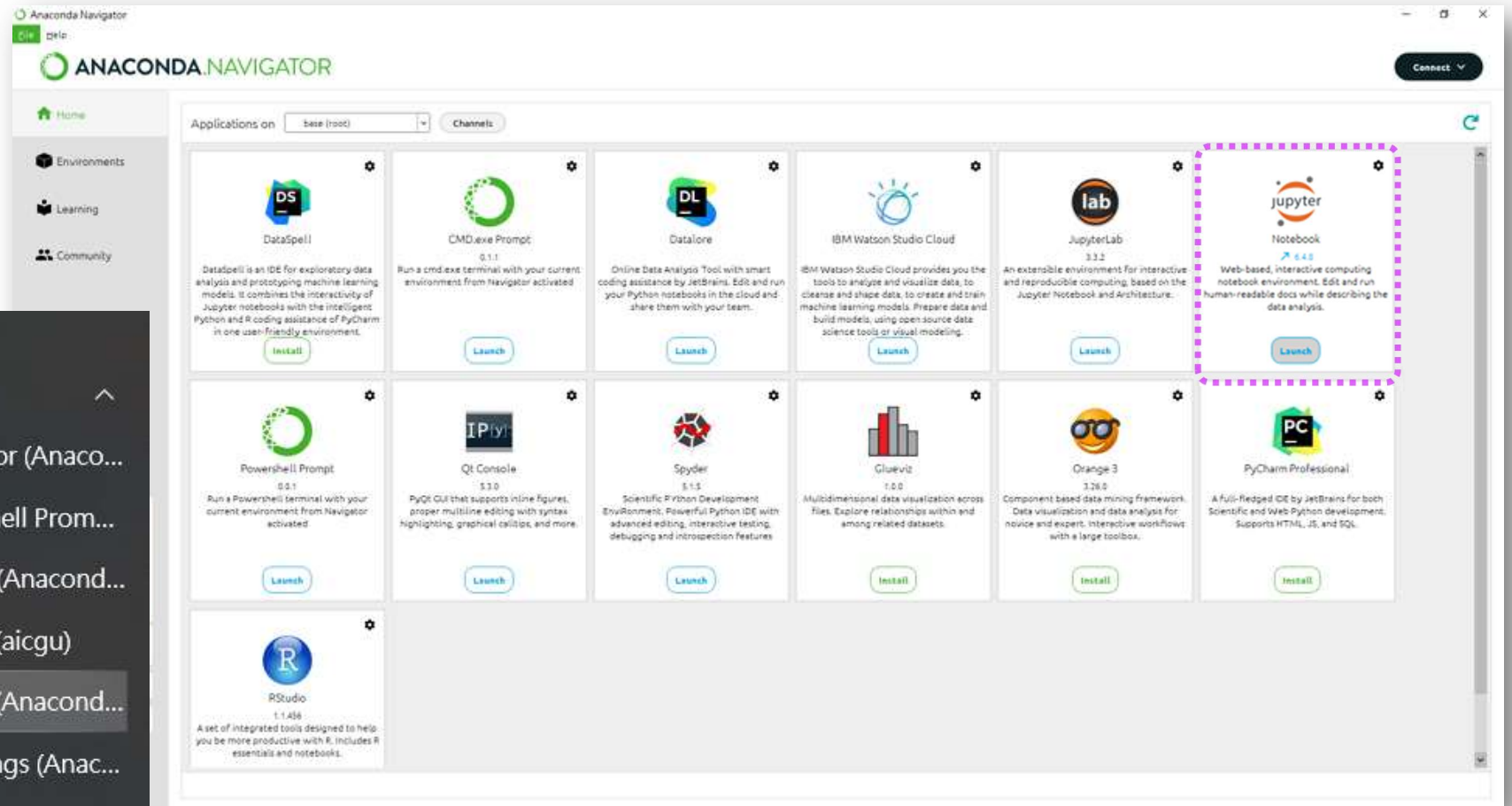
Python 3.9 • 64-Bit Graphical Installer • 594 MB

Get Additional Installers

 |  | 

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

Anaconda > Jupyter Notebook



Why Colab ?

- 有Google 帳號就能使用
- 類似 Jupyter Notebook 的操作介面
- 雲端運算
- 相關檔案可存在Google Drive

Google Drive > Colab Notebooks

The screenshot shows the Google Workspace Marketplace interface. At the top, the breadcrumb navigation reads "我的雲端硬碟 > Colab Notebooks > aicgu-note". The search bar contains the text "colab" and shows a dropdown suggestion for "Colaboratory". Below the search bar, a message in Chinese states: "支援雲端硬碟 ⓘ 您可以直接在 Google 雲端硬碟中使用這些應用程式建立或編輯檔案。" (Support cloud storage ⓘ You can use these applications to create or edit files directly in Google cloud storage). The main content area displays a grid of application cards. The "Colaboratory" card is highlighted with a dashed purple border and features a "已安裝" (Installed) badge. Other visible cards include Lumio, Fluency Tutor, TeX Equation Editor, Scribble Writer, Document Viewer for Drive, Lumin PDF, and draw.io.

*登入Google Drive, 搜尋 Colab

Google Drive > Colab Notebooks

The screenshot shows the Google Drive interface in Chinese. At the top left is the Google Drive logo and the text '雲端硬碟'. A search bar contains the text '在雲端硬碟中搜尋'. Below the search bar, the breadcrumb path is '雲端硬碟 > Colab Notebooks > aicgu-note'. The 'Colab Notebooks' folder is highlighted with a purple dashed box. On the left side, there is a '新增' (New) button with a plus sign icon. Below it, a list of options includes '資料夾', '檔案上傳', '資料夾上傳', 'Google 文件', 'Google 試算表', 'Google 簡報', and 'Google 表單'. At the bottom left, there is a '儲存空間' (Storage) section showing '目前使用量: 8.29 GB (儲存空間配額: 15 GB)' and a '購買儲存空間' button. On the right side, a list of Google services is shown, with 'Google Colaboratory' highlighted by a red arrow. The text '從「Google Colaboratory」新增' is written in red next to the arrow.

雲端硬碟 > Colab Notebooks > aicgu-note

	擁有者	上次修改時間
titled0.ipynb	我	下午1:38
220712-note.ipynb	我	上午11:22
220712_Lecture.ipynb	我	清晨6:16

Google 繪圖
Google 我的地圖
Google 協作平台
Google Apps Script
Google Colaboratory
Google Jamboard

從「Google Colaboratory」新增

新建 .ipynb

The screenshot shows the Jupyter Notebook interface for a new file named "Untitled0.ipynb". The top navigation bar includes the Jupyter logo, the file name, a star icon, and a menu with options: 檔案 (File), 編輯 (Edit), 檢視畫面 (View), 插入 (Insert), 執行階段 (Run), 工具 (Tools), 說明 (Help), and 已儲存所有變更 (Save all changes). On the right side of the top bar, there are icons for 留言 (Comments), 共用 (Share), 設定 (Settings), and a user profile picture.

Below the top bar, there are two tabs: "+ 程式碼" (Code) and "+ 文字" (Text). The main workspace contains a code cell with a play button icon on the left. The code cell is currently selected, and its content is:

```
1 #You can put code here:  
2  
3 print("Hello World")
```

Below the code cell, the output is displayed: "Hello World". To the right of the code cell, there are several icons: a green checkmark, RAM usage, disk usage, a pencil icon for editing, and a caret icon. Below the code cell, there are two more tabs: "+ 程式碼" (Code) and "+ 文字" (Text).

儲存格的上下框線都可新增 程式碼或文字

從 Google 雲端資料夾開啟 Colab



在雲端硬碟中搜尋



新增

我的雲端硬碟 > Colab Notebooks > aicgu-note



名稱 ↓

開啟現有的檔案

擁有者

上次修改時間

檔案大小



Untitled0.ipynb

下午3:41

716 個位元組



20220712-note.ipynb



20220712_Lecture.ipynb



預覽



選擇開啟工具



共用



取得連結



顯示檔案位置



新增雲端硬碟捷徑



移至



Google Colaboratory



連結更多應用程式



電腦上的應用程式

我的雲端硬碟

電腦

與我共用

近期存取

已加星號

垃圾桶

儲存空間

Colab常用相關配置

The screenshot shows the Google Colab interface for a file named 'Untitled0.ipynb'. The 'Execution' menu is open, displaying various options. The option '變更執行階段類型' (Change execution stage type) is highlighted with a dashed purple border. The code cell contains the following Python code:

```
1 #You can put code here
2
3 print("Hello World")
```

The output of the code cell is 'Hello World'. The menu items and their keyboard shortcuts are as follows:

- 全部執行 (Ctrl+F9)
- 執行上方的儲存格 (Ctrl+F8)
- 執行聚焦的儲存格 (Ctrl+Enter)
- 執行選取範圍 (Ctrl+Shift+Enter)
- 執行下方的儲存格 (Ctrl+F10)
- 中斷執行 (Ctrl+M |)
- 重新啟動執行階段 (Ctrl+M .)
- 重新啟動並執行所有儲存格
- 中斷連線並刪除執行階段
- 變更執行階段類型** (highlighted)
- 管理工作階段
- 查看執行階段記錄

• 更改為GPU運算

The screenshot shows the '筆記本設定' (Notebook Settings) dialog box. The '硬體加速器' (Hardware Accelerator) section is expanded, showing a dropdown menu with 'GPU' selected. The other options are 'None' and 'TPU'. Below the dropdown, there is a checkbox for '想要在關閉瀏覽器後也持續執行筆記本嗎?' (Do you want to keep running the notebook after closing the browser?). The '升級至 Colab Pro+' (Upgrade to Colab Pro+) button is visible. At the bottom right, there are '取消' (Cancel) and '儲存' (Save) buttons.

Colab常用相關配置

- 查看 GPU 資訊

!nvidia-smi

➔ 終端機 (Terminal) 指令只要在前方加入 **!+指令** 即可執行

Colab上有幾種GPU可供使用：K80、T4、P100、V100

```
0 秒
1 !nvidia-smi
Sun Jul 3 13:07:01 2022
+-----+
| NVIDIA-SMI 460.32.03      Driver Version: 460.32.03      CUDA Version: 11.2      |
+-----+-----+-----+-----+-----+-----+
| GPU   Name           Persistence-M| Bus-Id        Disp. A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
|                                           MIG M.         |
+-----+-----+-----+-----+-----+-----+
|  0   Tesla T4             Off          | 00000000:00:04.0 Off |   0          0      |
| N/A   57C    P8             10W / 70W      |  0MiB / 15109MiB |   0%      Default  |
|                                           MIG M.         |
+-----+-----+-----+-----+-----+-----+
+-----+
| Processes:                                                       GPU Memory |
|  GPU   GI    CI          PID    Type    Process name                  Usage    |
|-----+-----+-----+-----+-----+-----+
|
| No running processes found
+-----+
```

Colab常用相關配置

- 更改為英文版(選用) *繁體中文目前排版不是等間距字元*

The screenshot shows the Google Colab interface for a file named 'Untitled0.ipynb'. The top navigation bar includes '檔案' (File), '編輯' (Edit), '檢視畫面' (View), '插入' (Insert), '執行階段' (Runtime), '工具' (Tools), '說明' (Help), and '已儲存所有變更' (Save all changes). The '說明' menu is open, displaying options: '常見問題' (FAQ), '查看版本資訊' (View version info), '搜尋程式碼片段' (Search code snippets) with 'Ctrl+Alt+P', '回報錯誤' (Report error), '提供意見' (Provide feedback) with '改成英文版' (Switch to English) in red text, and '查看英文版本' (View English version) which is highlighted with a dashed purple border. The main editor area shows a code cell with the following content:

```
[ ] 1 #You can put code here:  
2  
3 print("Hello World")
```

Below the code cell, the output 'Hello World' is displayed. At the bottom, there is a terminal cell with the command '1 !nvidia-smi' and a green checkmark icon to its left.

Colab 操作介紹

歡迎使用 Colaboratory



The screenshot shows the Google Colaboratory interface. At the top left is the Colab logo and the text "歡迎使用 Colaboratory". Below this is a navigation menu with options: 檔案, 編輯, 檢視畫面, 插入, 執行階段, 工具, 說明. On the top right, there are icons for 共用, settings, and a user profile. The left sidebar contains a "目錄" (Table of Contents) with sections: 開始使用, 數據資料學, 機器學習, 其他資源, 主要範例, and 區段. The main content area displays "歡迎使用 Colab!" followed by a paragraph in Chinese: "如果你已經熟悉 Colab, 請觀看這部影片瞭解互動式表格、執行過的程式碼歷史記錄檢視畫面, 以及指令區塊面板。" Below the text is a video player thumbnail titled "3 Cool Google Colab Features" featuring a man's face and a play button icon.

<https://colab.research.google.com/notebooks/welcome.ipynb?hl=zh-tw>

Markdown 語法設定



儲存格 (Cell) : Colab 就像是一個 Notebook 一樣，由一個又一個的「儲存格」所組成。

- 儲存格可以是「程式碼」或是「文字」
- 程式碼儲存格，可以輸入 Python 程式碼
- 文字儲存格必須透過 Markdown 語法來撰寫

*可參考 [Markdown 語法說明](https://markdown.tw/) : <https://markdown.tw/>

MarkDown 語法設定

CO Untitled0.ipynb ☆

檔案 編輯 檢視畫面 插入 執行階段 工具 說明 已儲存所有變更

留言

RAM 磁碟

目錄

- 新增區段
- 新增區段
- 新增區段
- 新增區段
- 區段

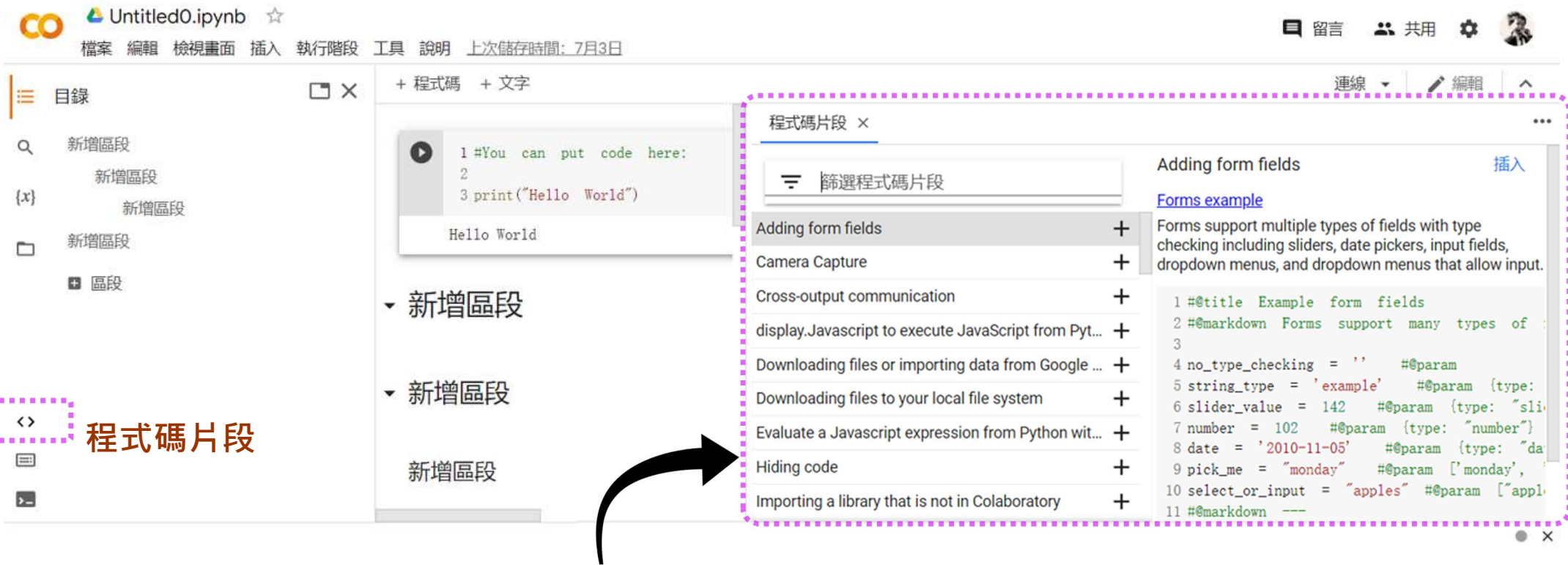
+ 程式碼 + 文字

- 新增區段 # 新增區段
- 新增區段 ## 新增區段
- 新增區段 ### 新增區段
- 新增區段

*標題
總共分為六個層級，依據 HTML 的結構會轉為 `<h1>` ~ `<h6>`，形式上是在文字前方補上不同數量的 #，# 數量越少層級越高

目錄的產生來自您文字欄位的 MarkDown 語法設定的 # 大標 ## 次標

程式碼片段



The screenshot shows the Google Colab interface. At the top, the file name is "Untitled0.ipynb". Below it, there are tabs for "檔案", "編輯", "檢視畫面", "插入", "執行階段", "工具", "說明", and "上次儲存時間: 7月3日". On the left, there is a sidebar with a "目錄" (Table of Contents) and several "新增區段" (Add Cell) buttons. The main area shows a code cell with the following code:

```
1 #You can put code here:  
2  
3 print("Hello World")
```

The output of the code cell is "Hello World". Below the code cell, there are several "新增區段" buttons. On the right, there is a "程式碼片段" (Code Snippets) panel. This panel has a search bar and a list of snippets. The snippet "Adding form fields" is selected and highlighted. The snippet content is:

```
1 #title Example form fields  
2 #markdown Forms support many types of  
3  
4 no_type_checking = '' #param  
5 string_type = 'example' #param (type:  
6 slider_value = 142 #param (type: "sli  
7 number = 102 #param (type: "number")  
8 date = '2010-11-05' #param (type: "da  
9 pick_me = "monday" #param ['monday',  
10 select_or_input = "apples" #param ["appl  
11 #markdown ---
```

An arrow points from the "程式碼片段" label in the sidebar to the "程式碼片段" panel.

程式碼片段

可以在此搜尋一些常用的程式碼片段，直接複製到 Colab 中使用。例如：如果要從 Colab 中使用 Google Drive 的檔案，就可以在此搜尋「Google Mount」找到如何將 Google Drive 引入 Colab 環境中。

讓 Colab 可讀取 GoogleDrive 資料

授權Colab與你的google雲端硬碟帳戶連結

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

要允許這個筆記本存取你的 Google 雲端硬碟檔案嗎？

這個筆記本要求存取你的 Google 雲端硬碟檔案。獲得 Google 雲端硬碟存取權後，筆記本中執行的程式碼將可修改 Google 雲端硬碟的檔案。請務必在允許這項存取權前，謹慎審查筆記本中的程式碼。

不用了，謝謝

連線至 Google 雲端硬碟

List資料夾內容

```
!ls "/content/drive/My Drive/Colab Notebooks/"
```

新建biopython資料夾

```
!mkdir "/content/drive/My Drive/Colab Notebooks/biopython"
```

List

```
!ls "/content/drive/My Drive/Colab Notebooks/biopython"
```

*只需要在 shell 命令前加一個驚嘆號"!", 就能夠執行 Shell 命令

Python 基本元素介紹

Python 程式的主要元素

1. 資料型態： 在 Python 中變數的基本型態有

1. integer (int)： 整數（沒有大小的限制，與 C 語言不同）
2. string (str)： 字串（要用 ' 單引號 ' 或 " 雙引號 " 括起來的）
3. float (float)： 浮點數
4. boolean (bool)： 布林值 (True, False)

2. 物件參照：

```
>>> x = 'blue'
>>> y = 'green'
>>> z = x
>>> x
'blue'
>>> x, y, z
('blue', 'green', 'blue')
```

Python 程式的主要元素

3. 群集(collection)資料型態：

Python 資料儲存容器

分為元組(tuple), 串列(list), 字典(dict), 集合(set) · 每一種結構都有其適合使用的情況與使用限制。

4. 邏輯運算：

- 身分(Identity)運算子：is, 常用於檢查兩個物件參照是否指向相同物件
- 比較運算子：<, <=, ==, !=, >=, >, 用於比較物件的值
- 隸屬(Membership)運算子：in, not in, 用於測試隸屬或是無隸屬關係
- 邏輯運算子：and, or, not

Python 程式的主要元素

5. 控制執行流程的陳述句：

- if 陳述句
- while 陳述句
- for ... in 陳述句

6. 算數運算子：

- + 加、- 減、* 乘、/ 除、% 取餘數、// 整除、** 次方
- 增強賦值：a += 8 等同 a = a + 8

Python 程式的主要元素

7. 輸入/輸出：

- `print()`
- `input()`
- 檔案處理, 編寫與讀取

8. 函式的建立與呼叫：

- 函式常用於反覆進行相同處理的需求
- `def functionName (arguments)`

`suite`

`arguments`可有可無, 有多個引數要指定時, 必須以逗號隔開

Next

Upload

20220712_Lecture.ipynb

To

Colab Notebooks

Thank You

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