

# Lab100 : Array Iterating

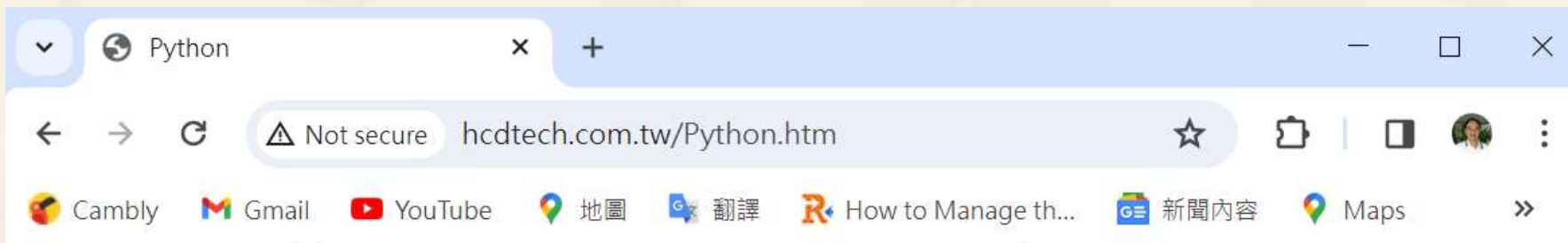
## 陣列疊代

(別怕! 跟著做你就會!)

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請至 [www.hcdtech.com.tw](http://www.hcdtech.com.tw) 下載教材



<http://www.hcdtech.com.tw/Python.htm>



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所有的考卷都可以考100分，是我們自己錯過了！

## 學習秘訣=發問+練習

考卷發下去，時間到了收回來，如果沒有考到100分，這很正常。重點來了，不會的可以問，問完了練習，準備好了考卷再發下去。第二次還是沒有考到100分，這也很正常。沒關係，再來一次，不會的可以問，問完了練習，準備好了考卷第三次再發下去，.....，考到第N次如果還是沒有考到100分。沒關係，再來，不會的可以問，問完了練習，N+1次、N+2次、.....，你們都很聰明，知道我在說什麼，到最後考卷一定可以考100分！看懂了妳/你就會知道，原來學習的秘訣就是發問和練習！今天開始不懂就問，問完了練習，明年的妳/你肯定不一樣！



# 學習如何學習！

1

1 2

1 2 3

.....

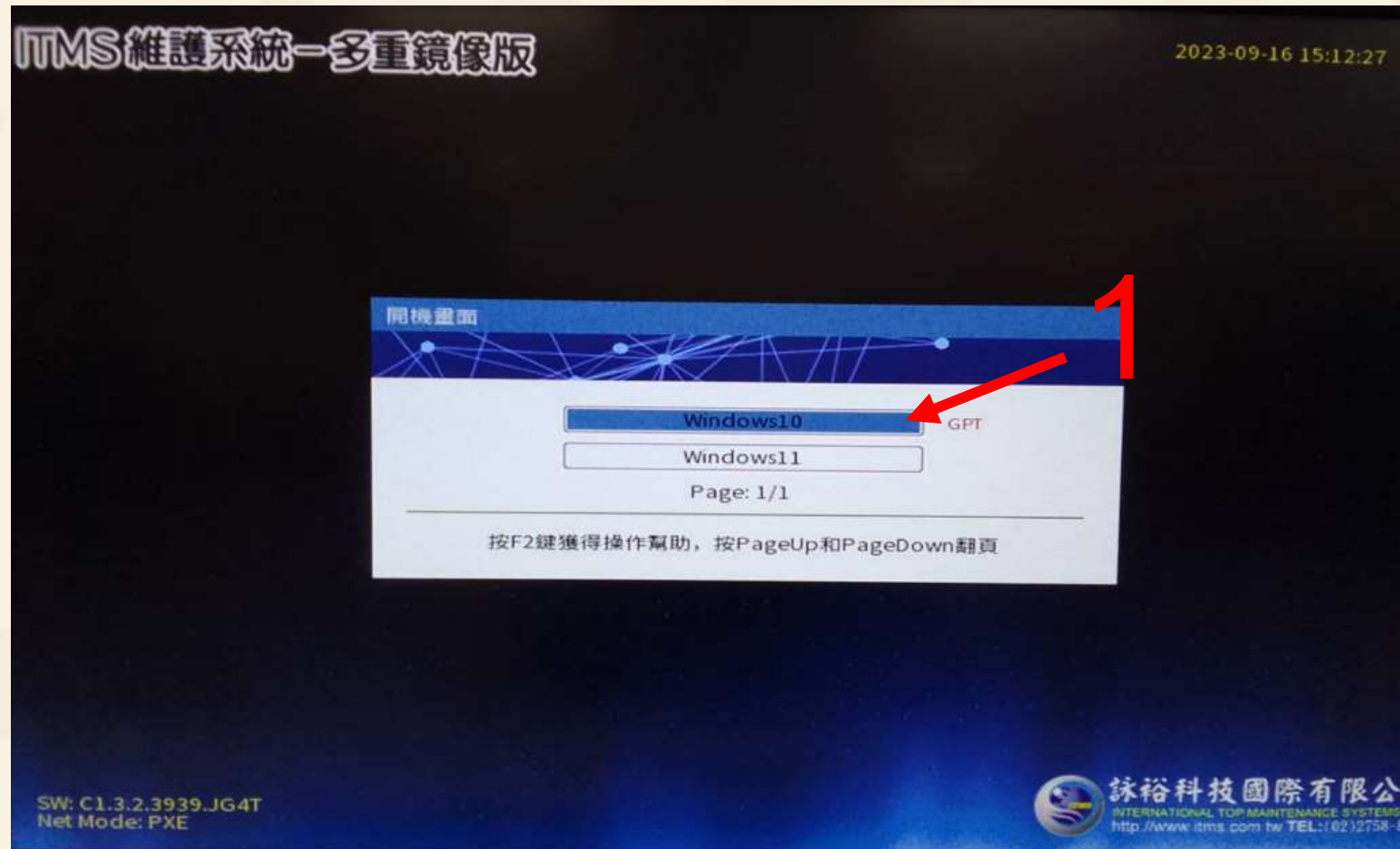
1 2 3 4 5 6 7 8 9 10

## 金字塔念書法



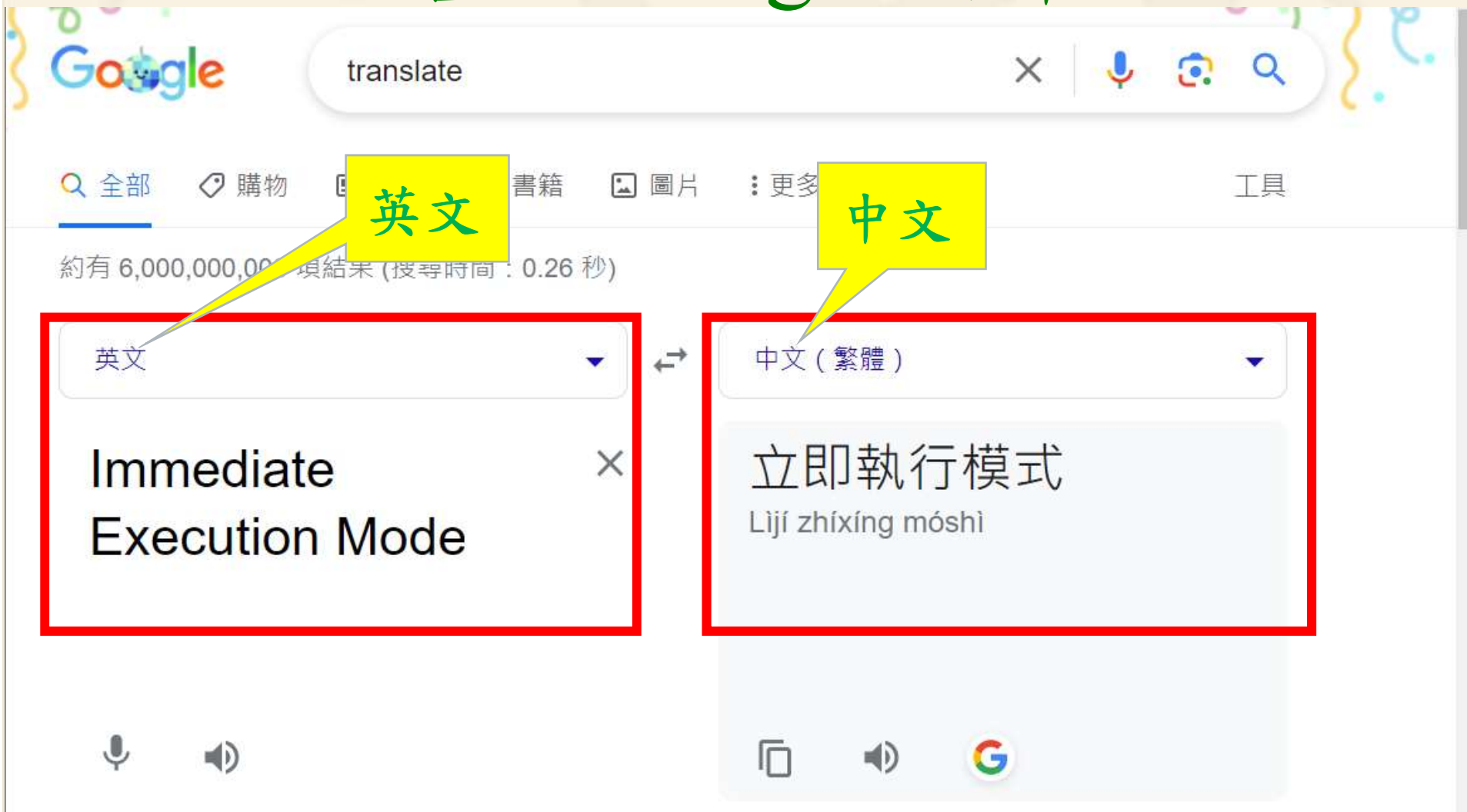
如果一本書有10個章節！先看第1章，在看第2章之前再把第1章看一遍，在看第3章之前再把第1, 2章看一遍，.....，等看到第10章的時候，第1, 2, 3, 4章恐怕已經背起來了！我稱這種念書法為金字塔念書法，今天開始照著做，明年的妳/你肯定不一樣！

# 請使用 Windows 10



## 1. 選用 Windows 10.

# 善用 Google 翻譯





# 請先開啟網頁閱讀

NumPy Array Iterating

w3schools.com/python/numpy/numpy\_array\_iterating.asp

請用善用 Google 翻譯 讀懂 網頁 內容

NumPy Tutorial

- NumPy HOME
- NumPy Intro
- NumPy Getting Started
- NumPy Creating Arrays
- NumPy Array Indexing
- NumPy Array Slicing
- NumPy Data Types
- NumPy Copy vs View
- NumPy Array Shape
- NumPy Array Reshape
- NumPy Array Iterating**
- NumPy Array Join
- NumPy Array Split
- NumPy Array Search
- NumPy Array Sort
- NumPy Array Filter

## Iterating Arrays Using nditer()

The function `nditer()` is a helping function that can be used from very basic to very advanced iterations. It solves some basic issues which we face in iteration, lets go through it with examples.

### Iterating on Each Scalar Element

In basic `for` loops, iterating through each scalar of an array we need to use `n for` loops which can be difficult to write for arrays with very high dimensionality.

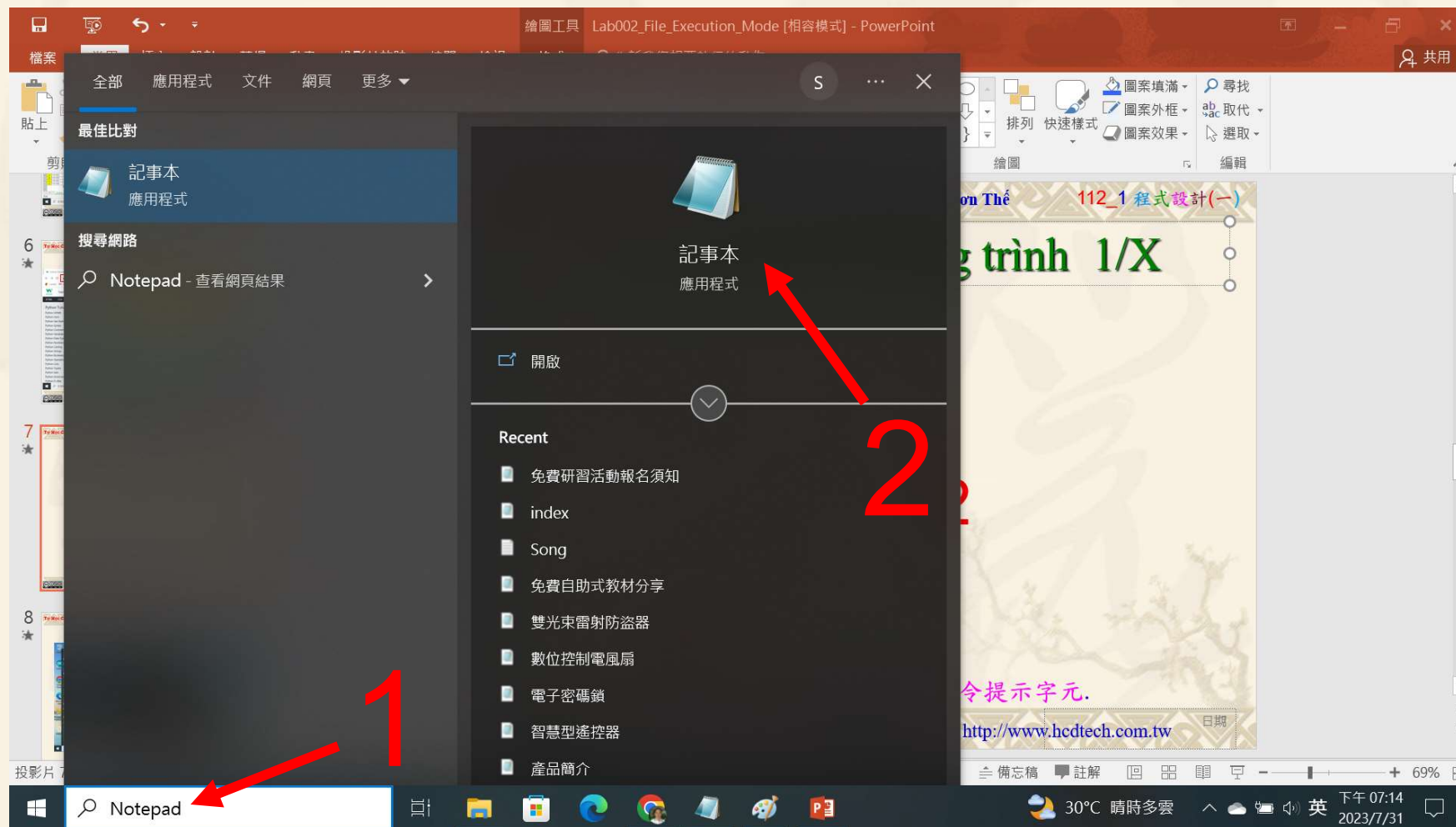
#### Example

Iterate through the following 3-D array:

```
import numpy as np

arr = np.array([[[1, 2], [3, 4]], [[5, 6], [7, 8]]])
```

# 建立程式文件 1/4



1. 鍵盤輸入Notepad. 2. 用滑鼠點選記事本.



# 建立程式文件 2/4

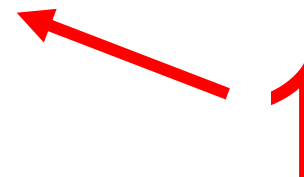
\*未命名 - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

print("P11211XXX practices Lab100.")

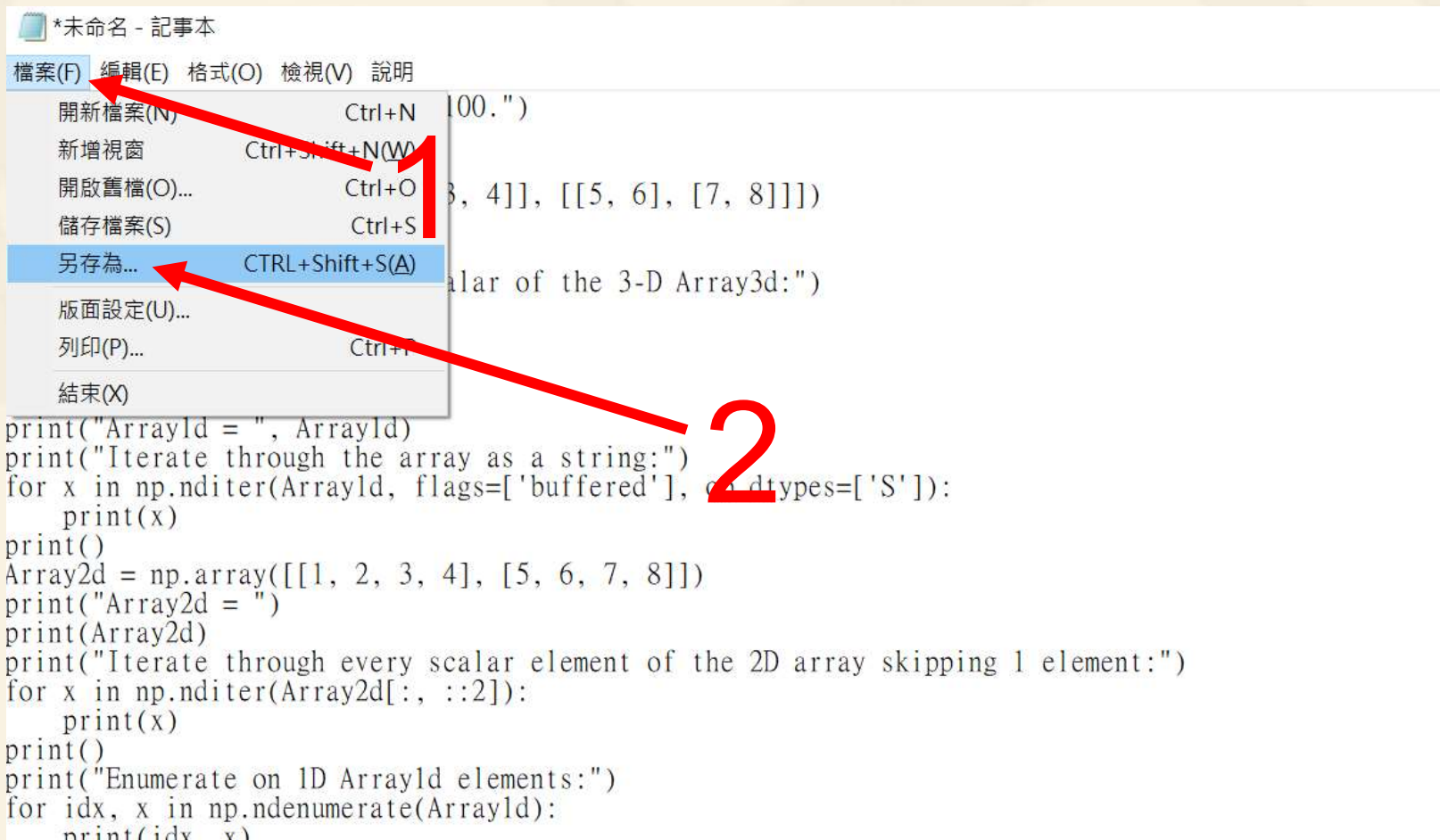
Replace P11211XXX with your student ID

```
import numpy as np
Array3d = np.array([[[[1, 2], [3, 4]], [[5, 6], [7, 8]]]])
print("Array3d = ")
print(Array3d)
print("Iterate through each scalar of the 3-D Array3d:")
for x in np.nditer(Array3d):
    print(x)
print()
Array1d = np.array([1, 2, 3])
print("Array1d = ", Array1d)
print("Iterate through the array as a string:")
for x in np.nditer(Array1d, flags=['buffered'], op_dtypes=['S']):
    print(x)
print()
Array2d = np.array([[1, 2, 3, 4], [5, 6, 7, 8]])
print("Array2d = ")
print(Array2d)
print("Iterate through every scalar element of the 2D array skipping 1 element:")
for x in np.nditer(Array2d[:, ::2]):
    print(x)
print()
print("Enumerate on 1D Array1d elements:")
for idx, x in np.ndenumerate(Array1d):
    print(idx, x)
print()
print("Enumerate on 2D Array2d's elements:")
for idx, x in np.ndenumerate(Array2d):
    print(idx, x)
```



## 1. 用鍵盤輸入程式代碼.

# 建立程式文件 3/4



1. 用滑鼠點選檔案. 2. 用滑鼠點選另存為....

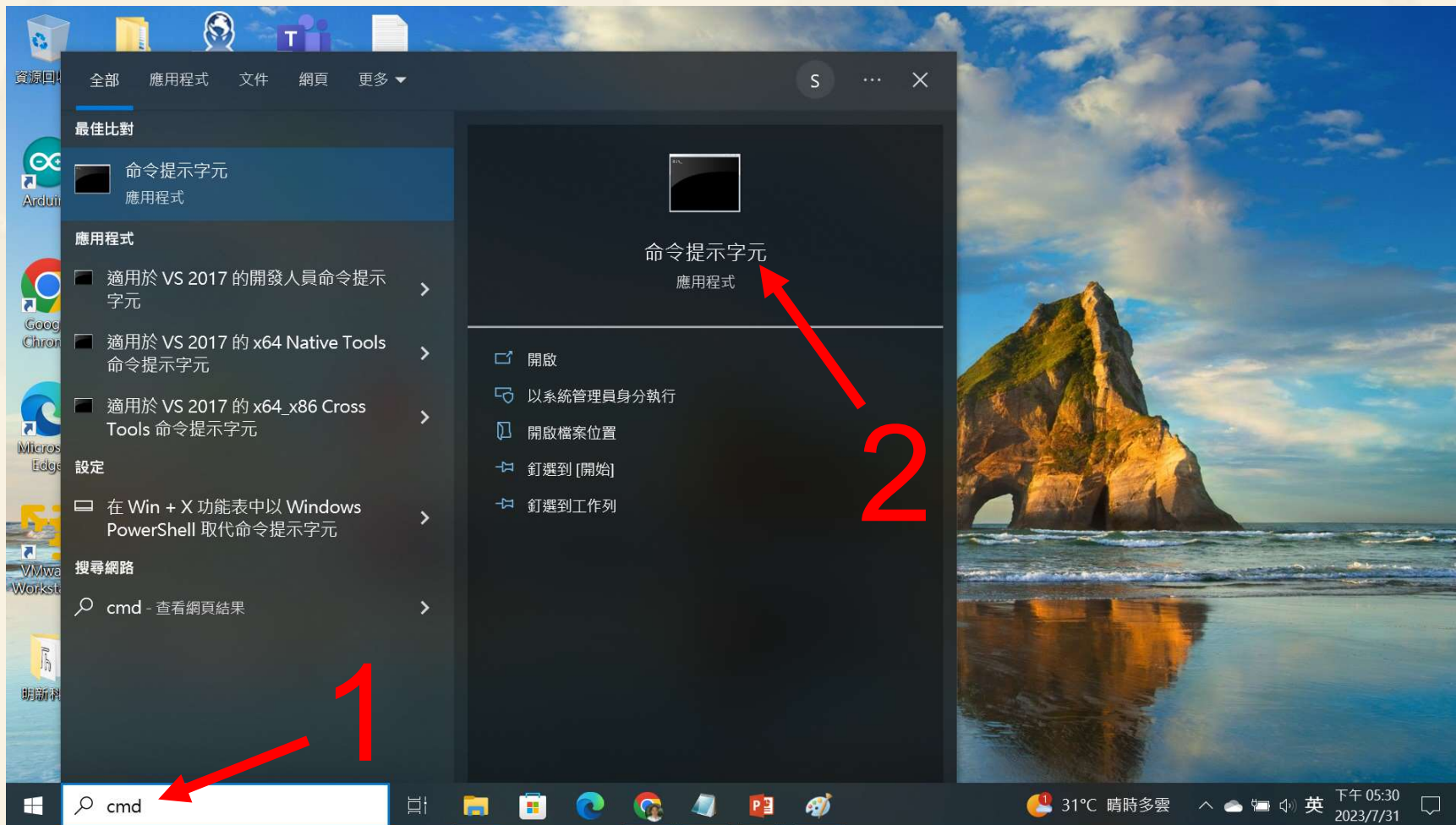
# 建立程式文件 4/4



1. 資料夾 = C:\使用者>User>.
2. 檔案名稱 = P11211XXX.py .
3. 存檔類型(T) = 所有檔案.
4. 用滑鼠點選存檔.

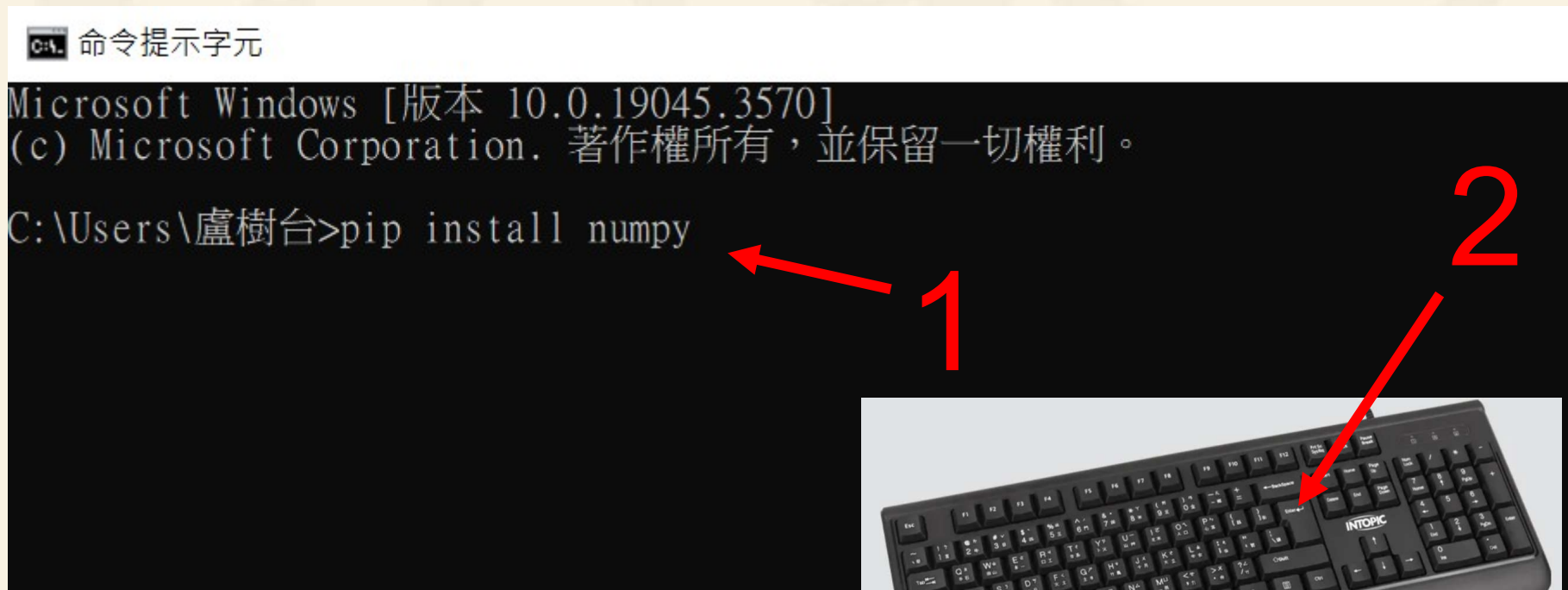


# 檔案執行模式 1/3



1. 鍵盤輸入cmd.
2. 用滑鼠點選命令提示字元.

# 檔案執行模式 2/3



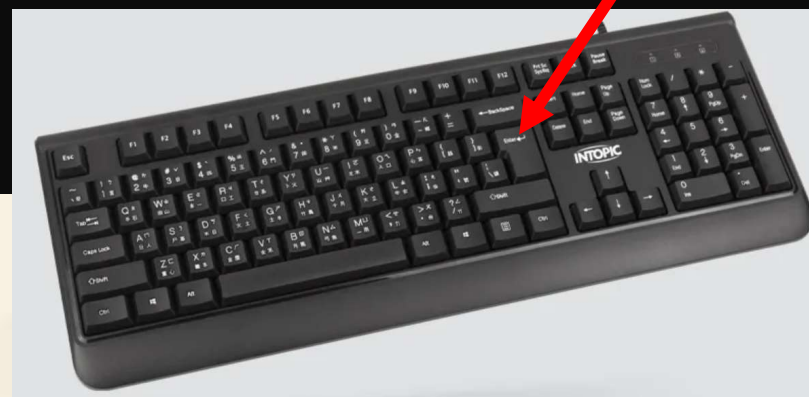
1. 用鍵盤輸入pip install numpy.
2. 按一下Enter.

# 檔案執行模式 3/3

C:\> 命令提示字元

```
Microsoft Windows [版本 10.0.19045.3570]  
(c) Microsoft Corporation. 著作權所有，並保留一切權利。  
C:\Users\盧樹台>pip install numpy  
Requirement already satisfied: numpy in c:\python39\lib\site-packages (1.26.1)  
C:\Users\盧樹台>Python P11211XXX.py
```

Replace P11211XXX with your student ID



1. 用鍵盤輸入Python P11211XXX.py .
2. 按一下Enter.



# Verification Criteria of Lab100

## (Lab100的驗收規範)陣列疊代

**P11211XXX 必需  
更換為您的學號**

Ask the teacher to give you points after completing the illustrated results.

(完成右圖指定成果後請教師在您的座位驗收並讓您簽名加分)

```

c:\ 命令提示字元
Microsoft Windows [版本 10.0.19045.3570]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Users\User>Python P11211XXX.py
P11211XXX practices Lab100.
Array3d =
[[[1 2]
  [3 4]]
 [[5 6]
  [7 8]]]
Iterate through each scalar of the 3-D Array3d:
1
2
3
4
5
6
7
8
Array1d = [1 2 3]
Iterate through the array as a string:
b'1'
b'2'
b'3'
Array2d =
[[1 2 3 4]
 [5 6 7 8]]
Iterate through every scalar element of the 2D array skipping 1 element:
1
3
5
7
Enumerate on 1D Array1d elements:
(0,) 1
(1,) 2
(2,) 3
Enumerate on 2D Array2d's elements:
(0, 0) 1
(0, 1) 2
(0, 2) 3
(0, 3) 4
(1, 0) 5
(1, 1) 6
(1, 2) 7
(1, 3) 8
C:\Users\User>

```

```

P11211XXX - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明
print("P11211XXX practices Lab100.")

import numpy as np
Array3d = np.array([[[1, 2], [3, 4]], [[5, 6], [7, 8]]])
print("Array3d = ")
print(Array3d)
print("Iterate through each scalar of the 3-D Array3d:")
for x in np.nditer(Array3d):
    print(x)
print()
Array1d = np.array([1, 2, 3])
print("Array1d = ", Array1d)
print("Iterate through the array as a string:")
for x in np.nditer(Array1d, flags=['buffered'], op_dtypes=['S']):
    print(x)
print()
Array2d = np.array([[1, 2, 3, 4], [5, 6, 7, 8]])
print("Array2d = ")
print(Array2d)
print("Iterate through every scalar element of the 2D array skipping 1 element:")
for x in np.nditer(Array2d[:, ::2]):
    print(x)
print()
print("Enumerate on 1D Array1d elements:")
for idx, x in np.ndenumerate(Array1d):
    print(idx, x)
print()
print("Enumerate on 2D Array2d's elements:")
for idx, x in np.ndenumerate(Array2d):
    print(idx, x)

```

**Every student must do Lab100 once!**



# 養成良好的工作態度

- 離開實驗室時請整理自己的工作座位，為自己的工作態度加分：
  - (1)滑鼠鍵盤歸位 (2)電腦關機 (3)螢幕關閉電源 (4)椅背靠妥 (5)個人責任區(工作座位及週邊範圍)應整潔，不遺留垃圾紙屑等。

