

Lab095 : NumPy Data Types

NumPy的資料型態

(別怕! 跟著做你就會!)

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請至 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

.....

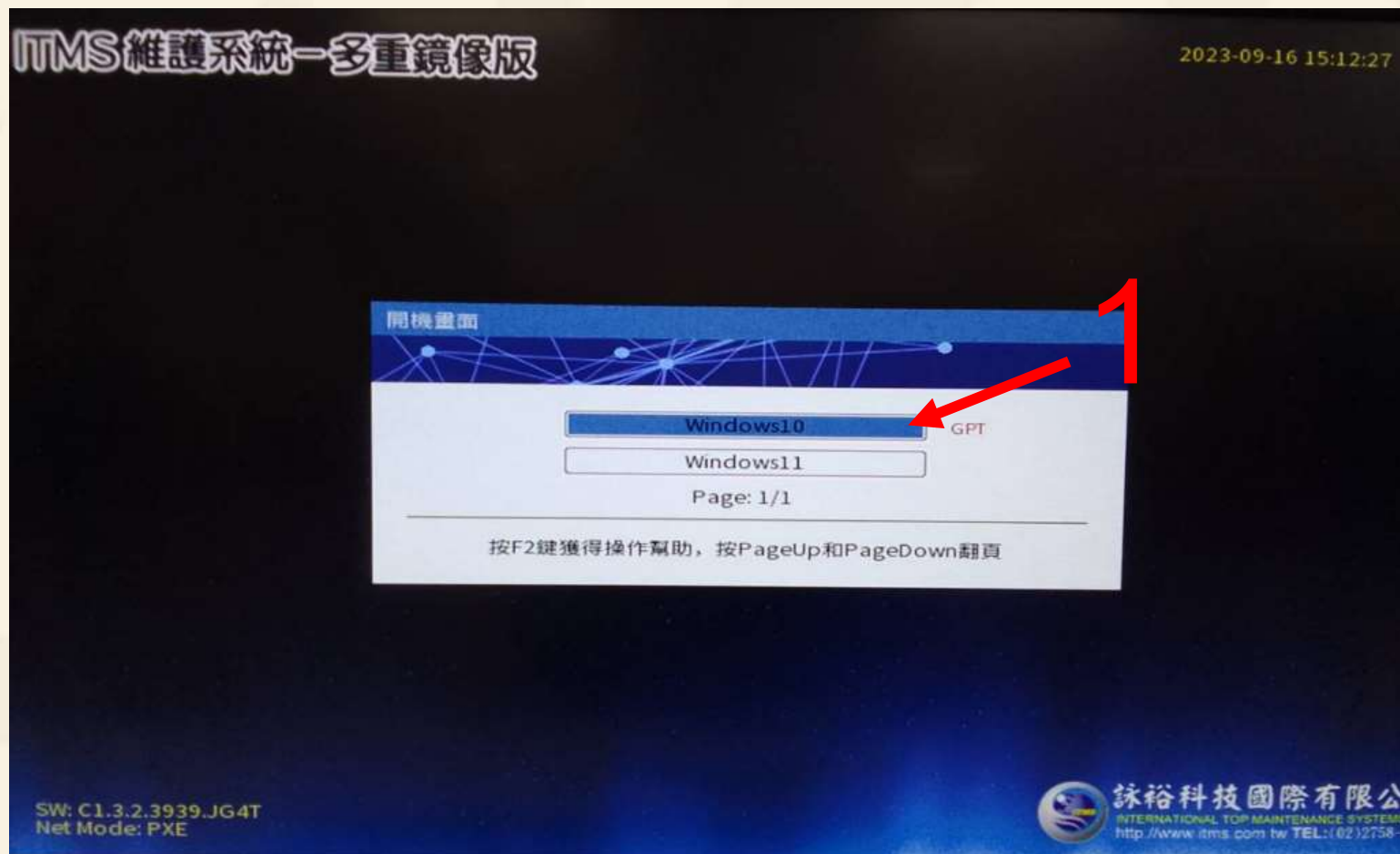
1 2 3 4 5 6 7 8 9 10

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 Data Types

w3schools.com/python/numpy/numpy_data_types.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

NumPy Data types

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Data Types in Python

By default Python have these data types:

- strings** - used to represent text data, the text is given under quote marks. e.g. "ABCD"
- integer** - used to represent integer numbers. e.g. -1, -2, -3
- float** - used to represent real numbers. e.g. 1.2, 42.42
- boolean** - used to represent True or False.
- complex** - used to represent complex numbers. e.g. 1.0 + 2.0j, 1.5 + 2.5j

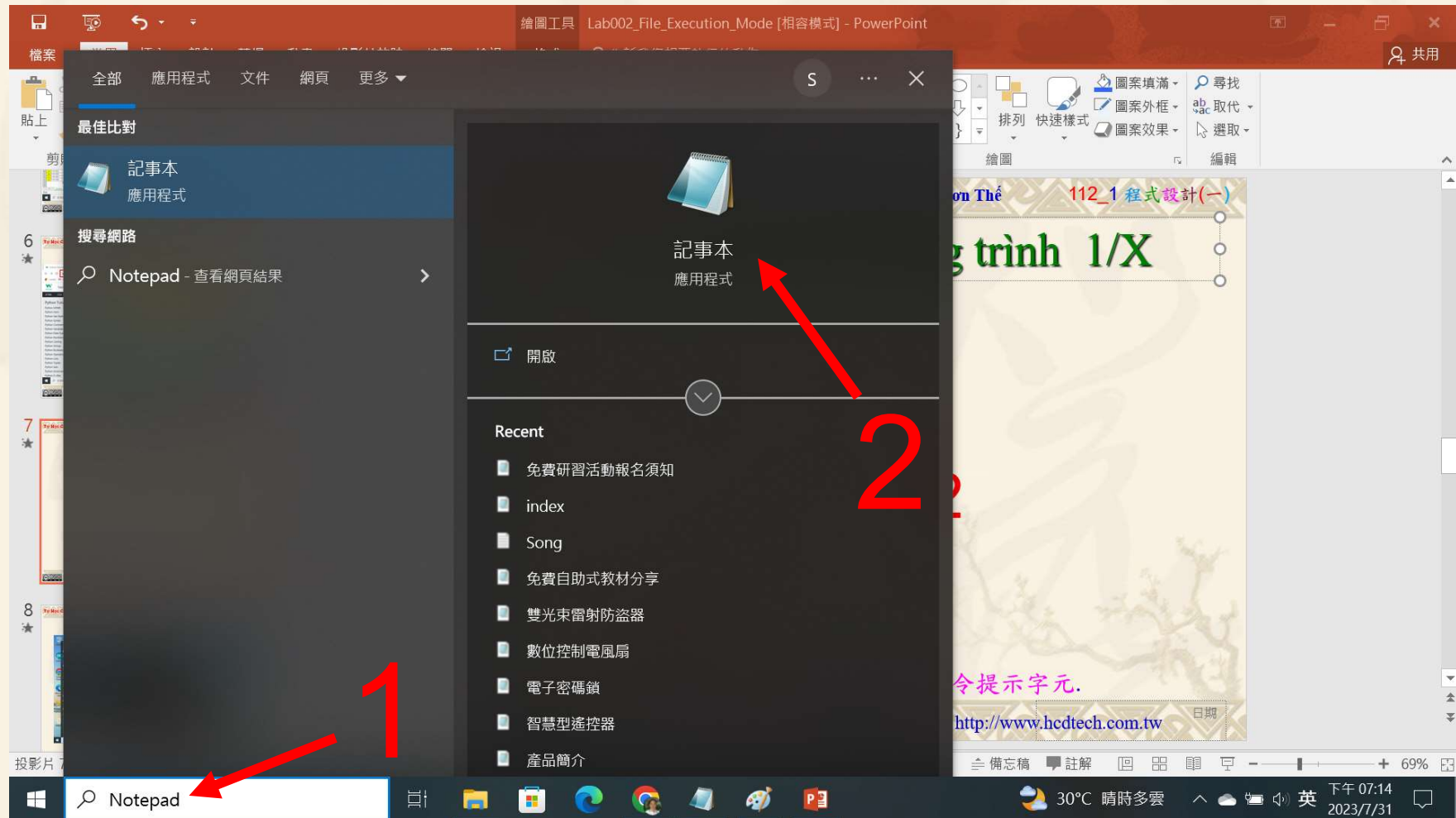
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建立程式文件 1/4



1. 用鍵盤輸入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 Lab095.")

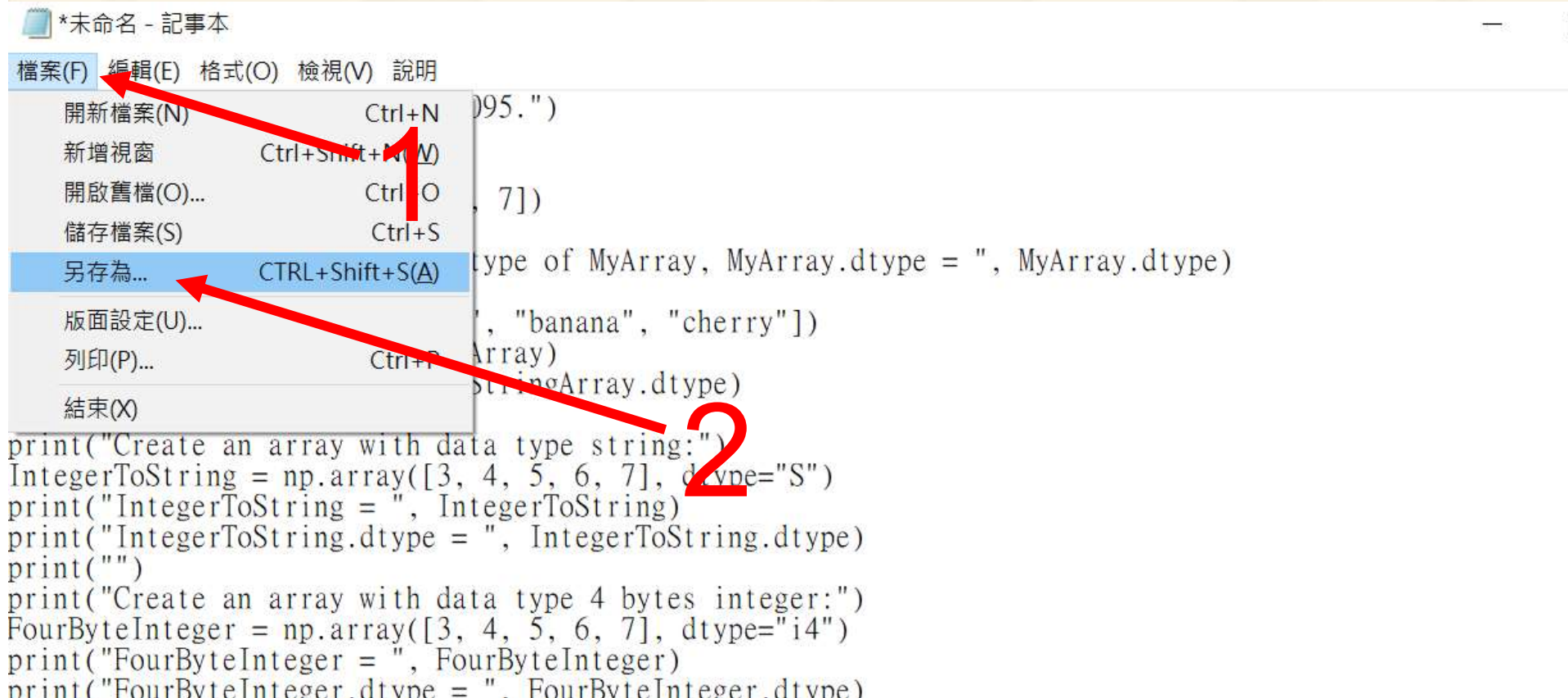
import numpy as np
MyArray = np.array([3, 4, 5, 6, 7])
print("MyArray = ", MyArray)
print("dtype returns the data type of MyArray, MyArray.dtype = ", MyArray.dtype)
print("")
StringArray = np.array(["apple", "banana", "cherry"])
print("StringArray = ", StringArray)
print("StringArray.dtype = ", StringArray.dtype)
print("")
print("Create an array with data type string:")
IntegerToString = np.array([3, 4, 5, 6, 7], dtype="S")
print("IntegerToString = ", IntegerToString)
print("IntegerToString.dtype = ", IntegerToString.dtype)
print("")
print("Create an array with data type 4 bytes integer:")
FourByteInteger = np.array([3, 4, 5, 6, 7], dtype="i4")
print("FourByteInteger = ", FourByteInteger)
print("FourByteInteger.dtype = ", FourByteInteger.dtype)
print("")
print("Change data type from float to integer:")
FloatArray = np.array([1.1, 2.1, 3.1])
print("FloatArray = ", FloatArray)
FloatToInteger = FloatArray.astype("i")
print("FloatToInteger = ", FloatToInteger)
print("FloatToInteger.dtype = ", FloatToInteger.dtype)
print("")
print("Change data type from integer to boolean:")
IntegerArray = np.array([1, 0, 2])
print("IntegerArray = ", IntegerArray)
IntegerToBoolean = IntegerArray.astype(bool)
print("IntegerToBoolean = ", IntegerToBoolean)
print("IntegerToBoolean.dtype = ", IntegerToBoolean.dtype)
    
```

Replace P11211XXX with your student ID



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....

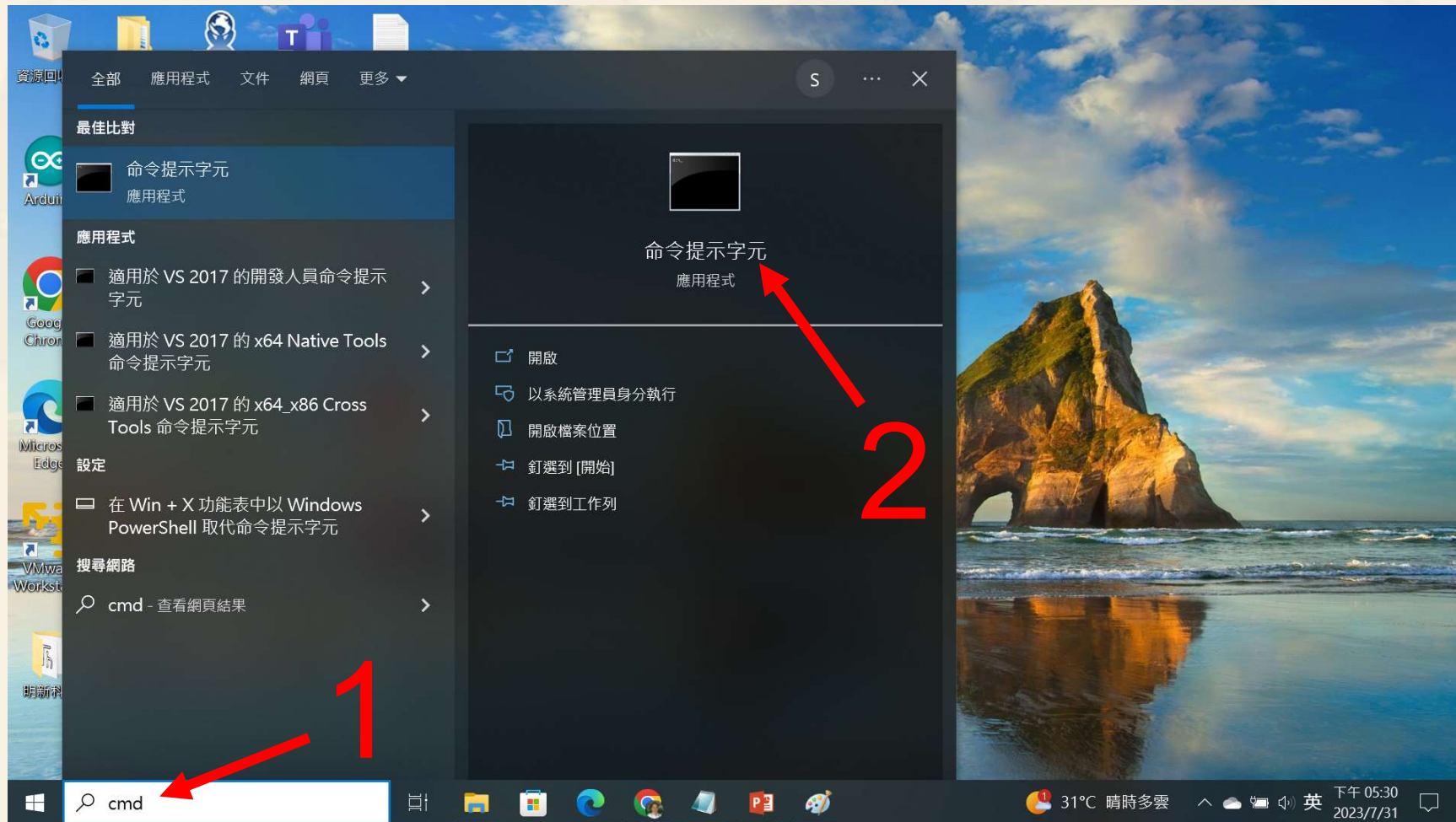
建立程式文件 4/4



Replace P11211XXX with your student ID

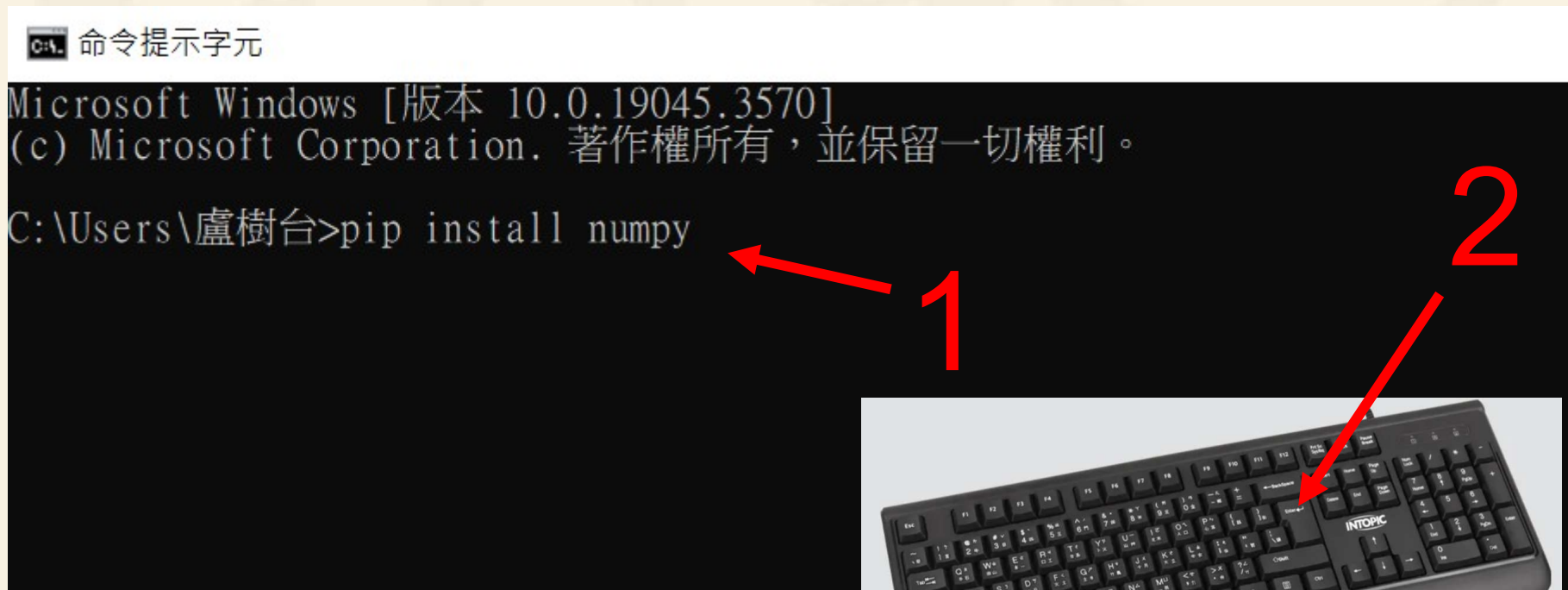
1. 資料夾 = C:\使用者>User>.
2. 檔案名稱 = P11211XXX.py .
3. 存檔類型(T) = 所有檔案.
4. 用滑鼠點選存檔.

檔案執行模式 1/3



1. 用鍵盤輸入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 Lab095 (Lab095的驗收規範) Numpy的資料型態

P11211XXX

必需更換為您的學號

```

命令提示字元
C:\Users\盧樹台>Python P11211XXX.py
P11211XXX practices Lab095.
MyArray = [3 4 5 6 7]
dtype returns the data type of MyArray, MyArray.dtype = int32

StringArray = ['applebanana' 'banana' 'cherry']
StringArray.dtype = <U11

Create an array with data type string:
IntegerToString = [b'3' b'4' b'5' b'6' b'7']
IntegerToString.dtype = |S1

Create an array with data type 4 bytes integer:
FourByteInteger = [3 4 5 6 7]
FourByteInteger.dtype = int32

Change data type from float to integer:
FloatArray = [1.1 2.1 3.1]
FloatToInteger = [1 2 3]
FloatToInteger.dtype = int32

Change data type from integer to boolean:
IntegerArray = [1 0 2]
IntegerToBoolean = [ True False  True]
IntegerToBoolean.dtype = bool

C:\Users\User>

```

```

P11211XXX - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明
print("P11211XXX practices Lab095.")

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print("FloatToInteger = ", FloatToInteger)
print("FloatToInteger.dtype = ", FloatToInteger.dtype)
print("")
print("Change data type from integer to boolean:")
IntegerArray = np.array([1, 0, 2])
print("IntegerArray = ", IntegerArray)
IntegerToBoolean = IntegerArray.astype(bool)
print("IntegerToBoolean = ", IntegerToBoolean)
print("IntegerToBoolean.dtype = ", IntegerToBoolean.dtype)

```

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)

Every student must do Lab095 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。

