物聯網實務 HW5

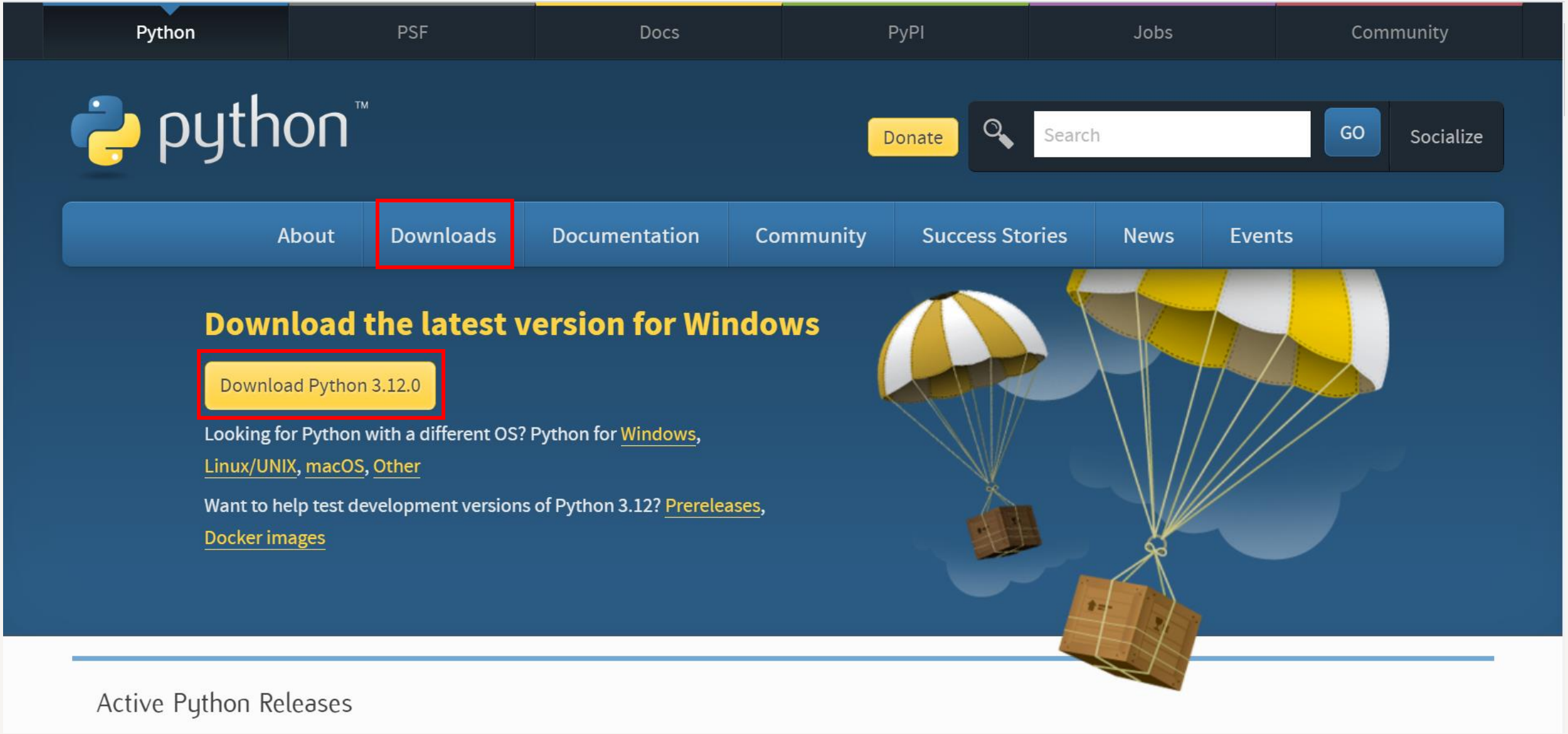
電機碩一 11278008 林佳慧

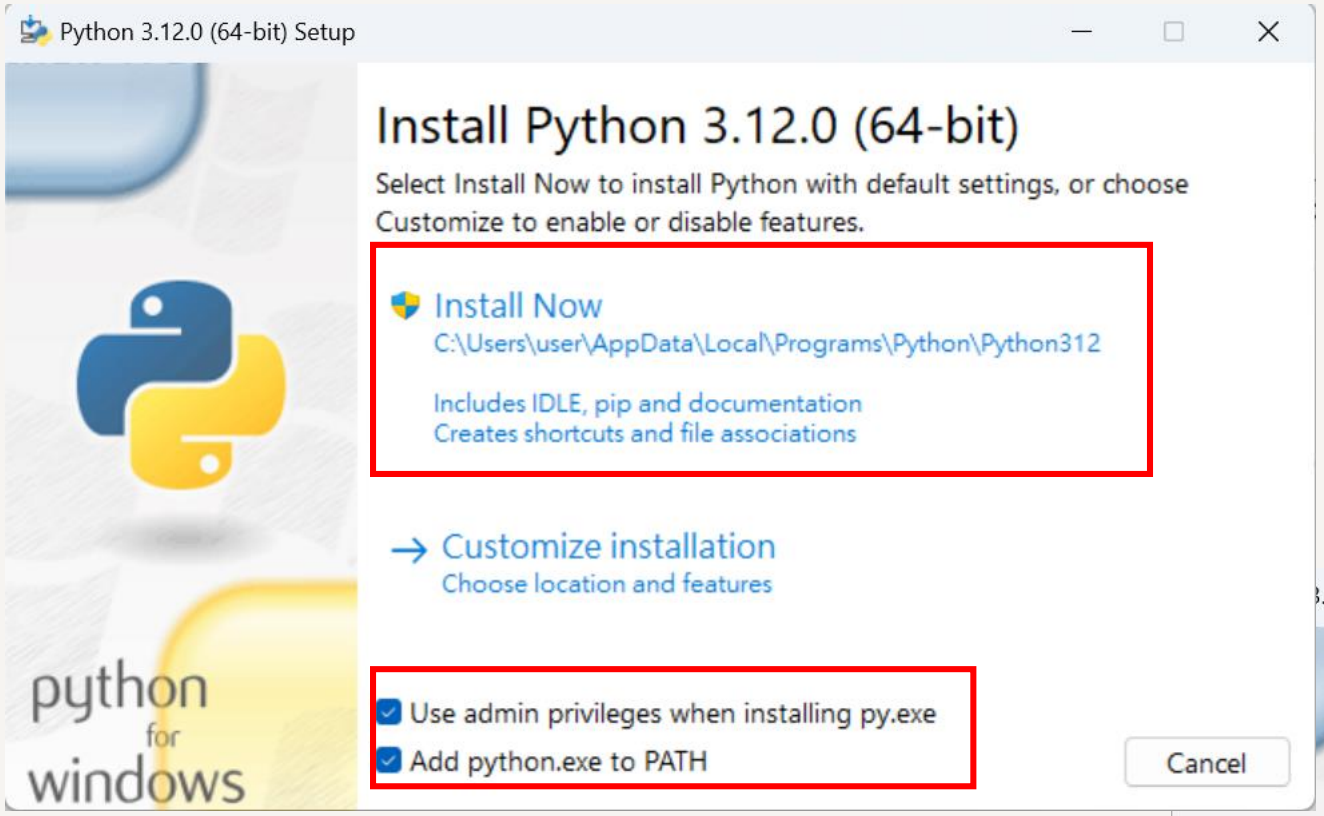
日期:2023/10/11

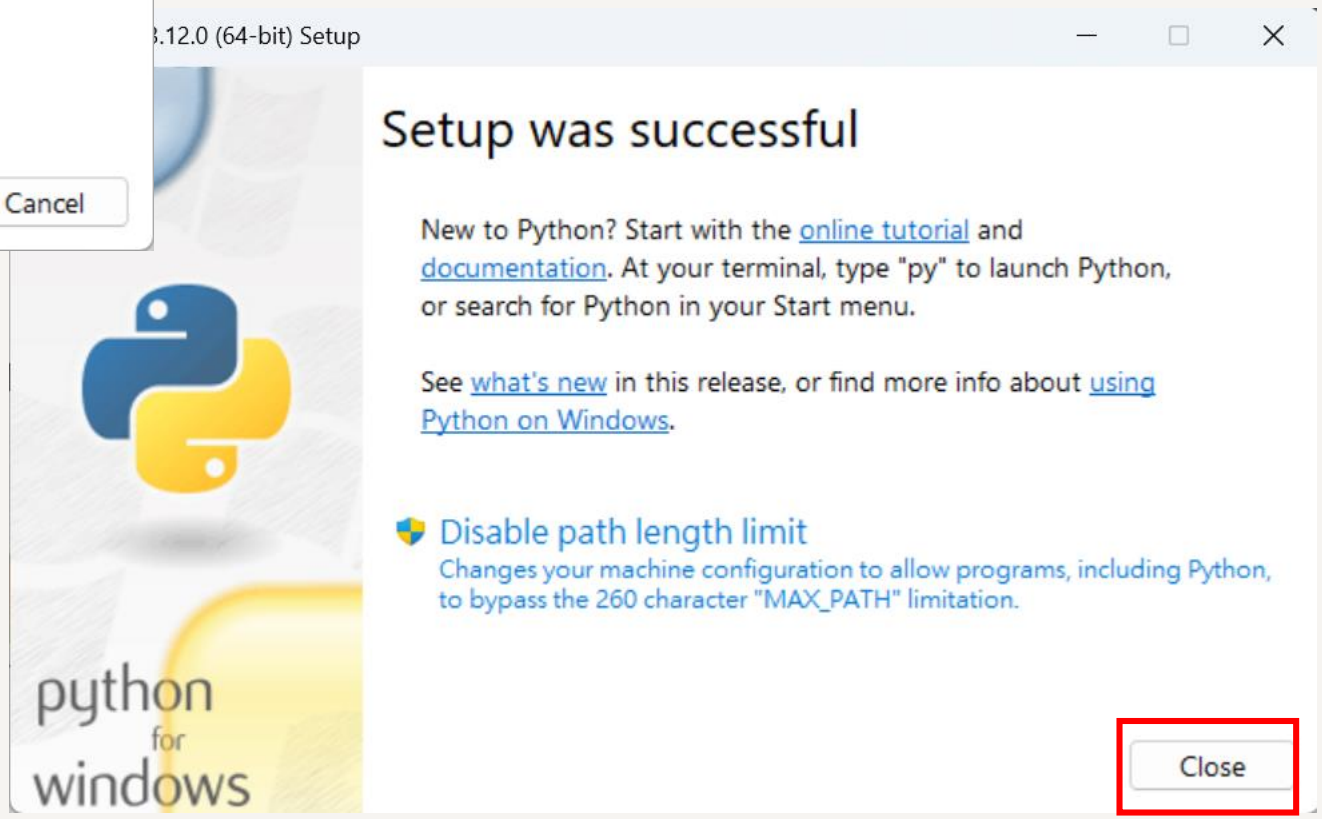
Exercise 5-1

Install Python, Visual Studio Code, and Python extension

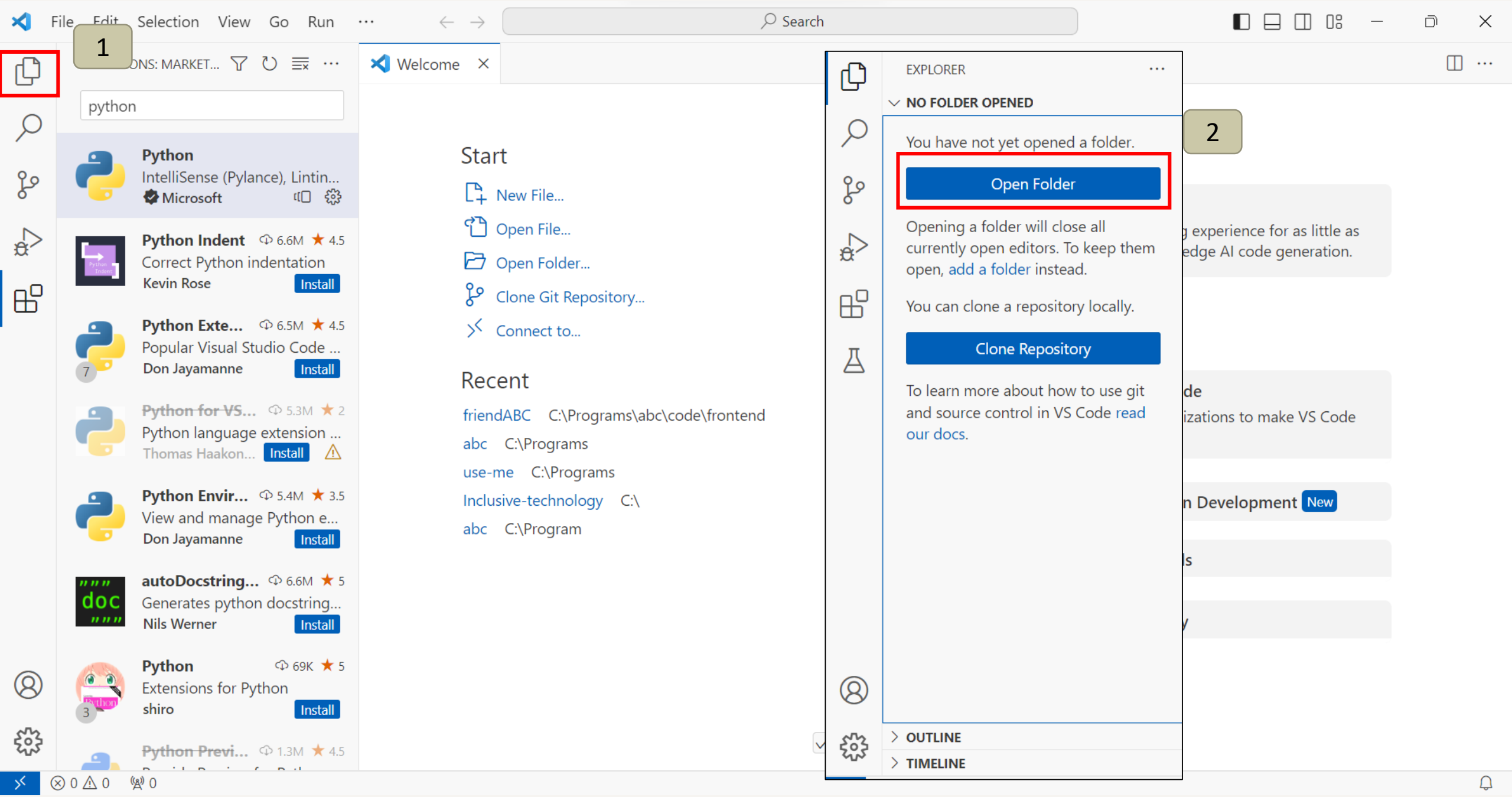
Install Python

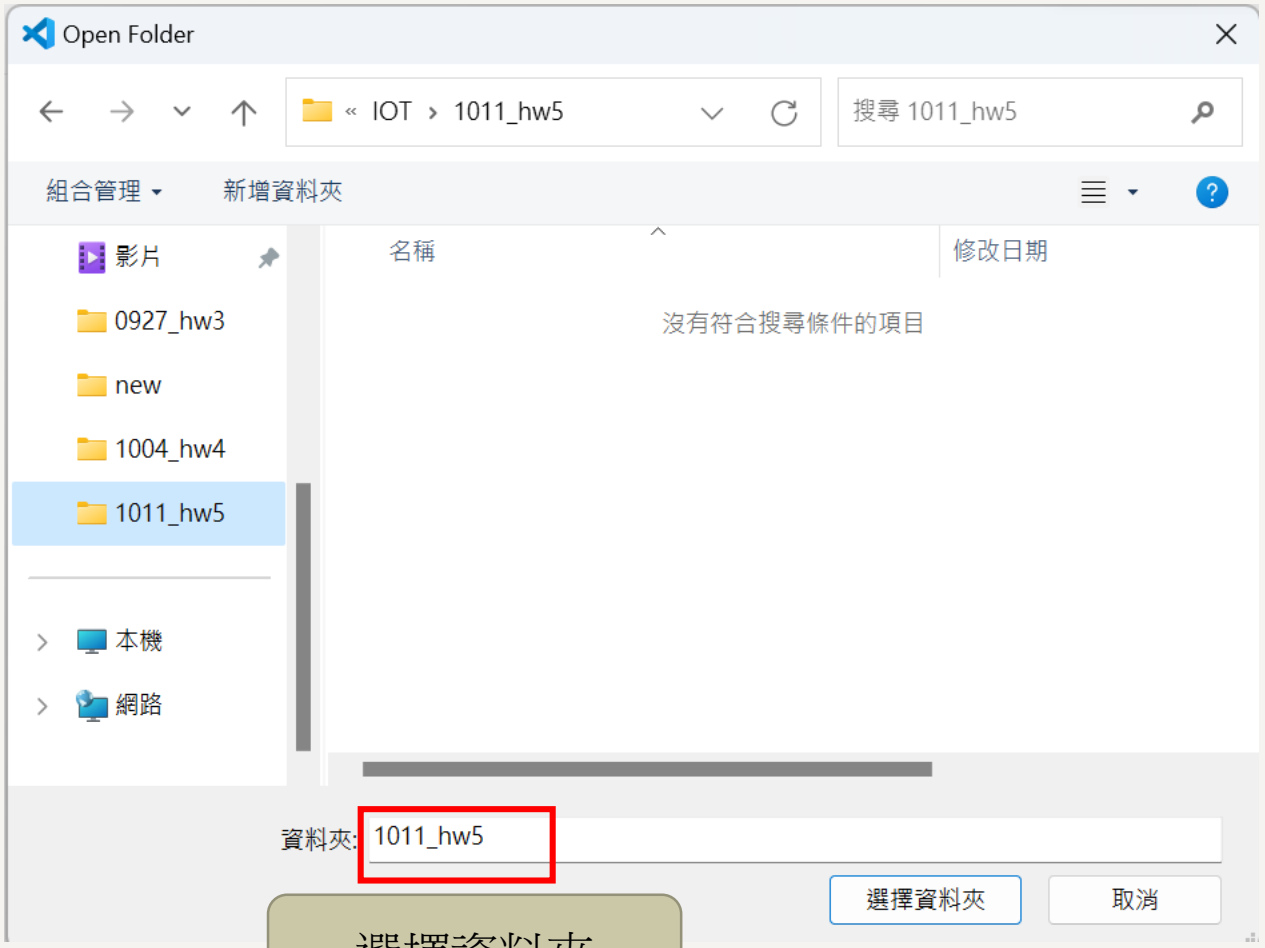


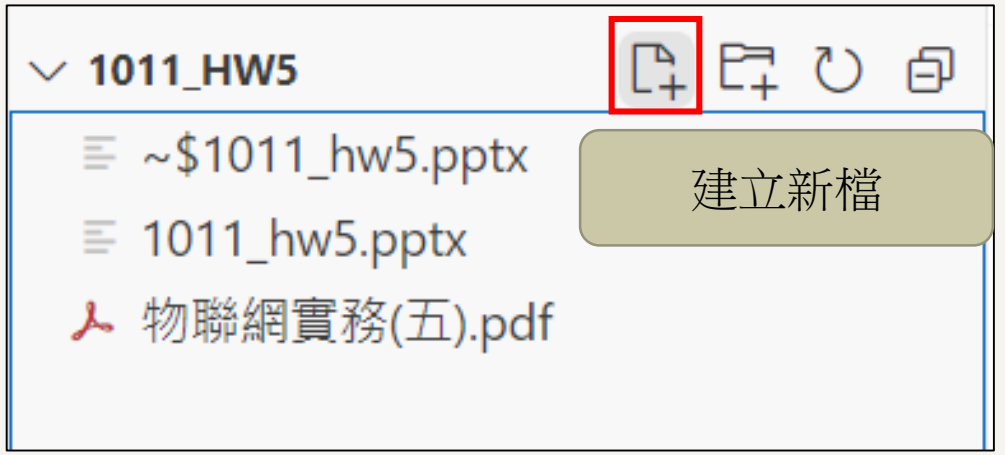

Python 3.12.0 (64-bit) Setup
Install Python 3.12.0 (64-bit)
Select Install Now to install Python with default settings, or choose
Customize to enable or disable features.
Install Now
C:\Users\user\AppData\Local\Programs\Python\Python312
Includes IDLE, pip and documentation
Creates shortcuts and file associations
Customize installation
Choose location and features
python
for
windows
Use admin privileges when installing py.exe
Add python.exe to PATH
Cancel

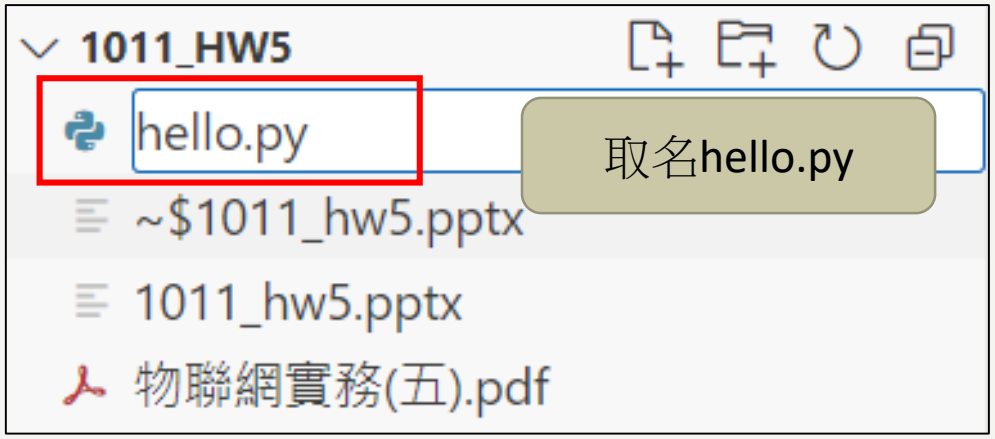

.12.0 (64-bit) Setup
Setup was successful
New to Python? Start with the online tutorial and
documentation. At your terminal, type "py" to launch Python,
or search for Python in your Start menu.
See what's new in this release, or find more info about using
Python on Windows.
Disable path length limit
Changes your machine configuration to allow programs, including Python,
to bypass the 260 character "MAX_PATH" limitation.
python
for
windows
Close

File Edit Selection View Go Run ···
Search
EXTENSIONS: MARKET...
python
Python 99.7M ★ 4
IntelliSense (Pylance), Lintin...
Microsoft
Install
Python Indent 6.6M ★ 4.5
Correct Python indentation
Kevin Rose
Install
Python Exte... 6.5M ★ 4.5
Popular Visual Studio Code ...
Don Jayamanne
Install
7
因為之前載過VSC，直接開啟套件裝Python。讓VSC知道python這個語言以及一些運用。
autoDocstring... 6.6M ★ 5
Generates python docstring...
Nils Werner
Install
Python 69K ★ 5
Extensions for Python
shiro
Install
3
Python Previ... 1.3M ★ 4.5
Extension: Python
Python v2023.18.0
Microsoft microsoft.com 99,758,082 ★★★★☆ (559)
IntelliSense (Pylance), Linting, Debugging (multi-threaded, remote), code formatting, refactori...
Install
DETAILS FEATURE CONTRIBUTIONS CHANGELOG EXTENSION PACK
Python extension for Visual Studio Code
A Visual Studio Code extension with rich support for the Python language (for all actively supported versions of the language: >=3.7), including features such as IntelliSense (Pylance), linting, debugging, code navigation, code formatting, refactoring, variable explorer, test explorer, and more!
Support for vscode.dev
The Python extension does offer some support when running on vscode.dev (which includes github.dev). This includes partial IntelliSense for open files in the editor.
Installed extensions
The Python extension will automatically install the Pylance extension to give you the be
experience when working with Python files. However, Pylance is an optional dependency,
Categories
Programming Languages
Linters
Debuggers
Formatters
Data Science
Machine Learning
Extension Resources
Marketplace
Repository
License
Microsoft
More Info
Published 2016-1-19,
0 0 0

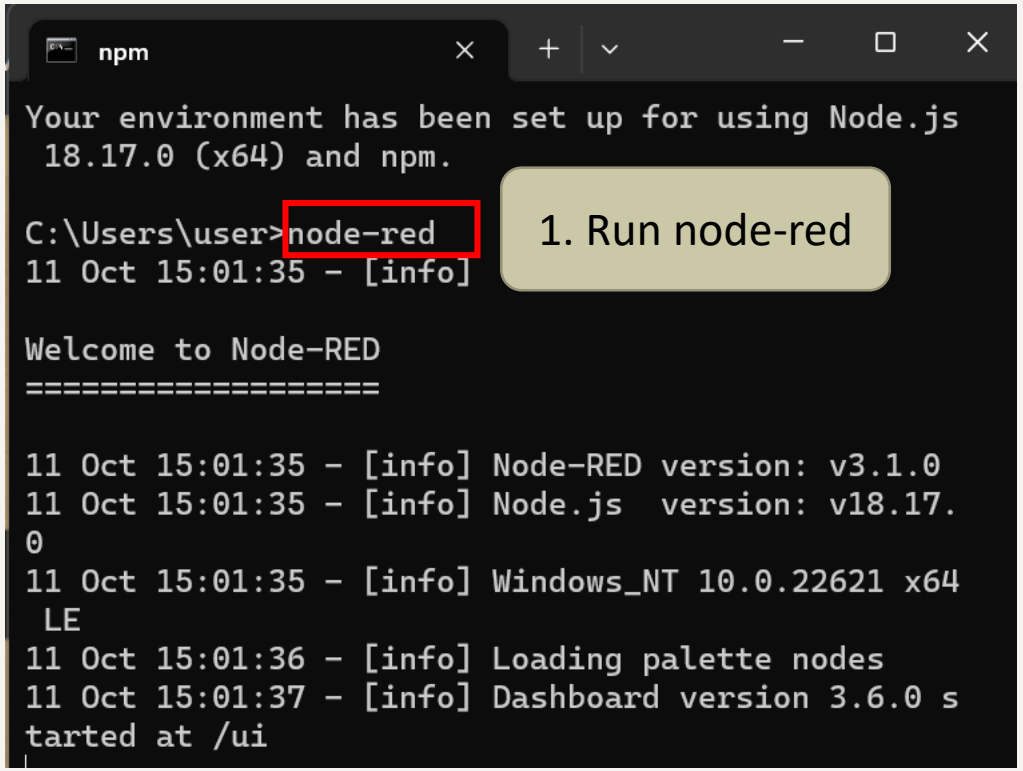

File Edit Selection View Go Run
Search
1
ONS: MARKET...
python
Python
IntelliSense (Pylance), Lintin...
Microsoft
Python Indent 6.6M 4.5
Correct Python indentation
Kevin Rose Install
Python Exte... 6.5M 4.5
Popular Visual Studio Code ...
Don Jayamanne Install
Python for VS... 5.3M 2
Python language extension ...
Thomas Haakon... Install
Python Envir... 5.4M 3.5
View and manage Python e...
Don Jayamanne Install
autoDocstring... 6.6M 5
Generates python docstring...
Nils Werner Install
Python 69K 5
Extensions for Python
shiro Install
Python Previ... 1.3M 4.5
Welcome
Start
New File...
Open File...
Open Folder...
Clone Git Repository...
Connect to...
Recent
friendABC C:\Programs\abc\code\frontend
abc C:\Programs
use-me C:\Programs
Inclusive-technology C:\
abc C:\Program
EXPLORER
NO FOLDER OPENED
You have not yet opened a folder.
Open Folder
Opening a folder will close all currently open editors. To keep them open, add a folder instead.
You can clone a repository locally.
Clone Repository
To learn more about how to use git and source control in VS Code read our docs.
OUTLINE
TIMELINE
2
experience for as little as
edge AI code generation.
de
izations to make VS Code
n Development New
0 0 0

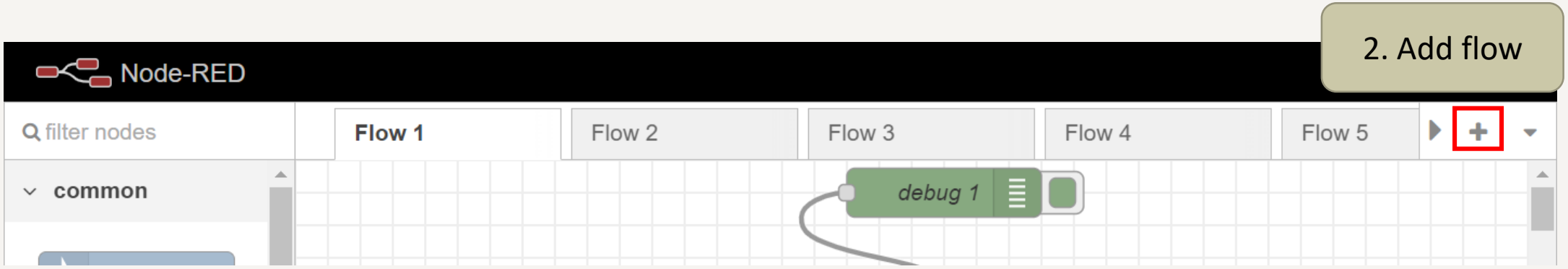

Open Folder
« IOT › 1011_hw5
搜尋 1011_hw5
組合管理
新增資料夾
影片
0927_hw3
new
1004_hw4
1011_hw5
本機
網路
名稱
修改日期
沒有符合搜尋條件的項目
資料夾: 1011_hw5
選擇資料夾
取消
選擇資料夾

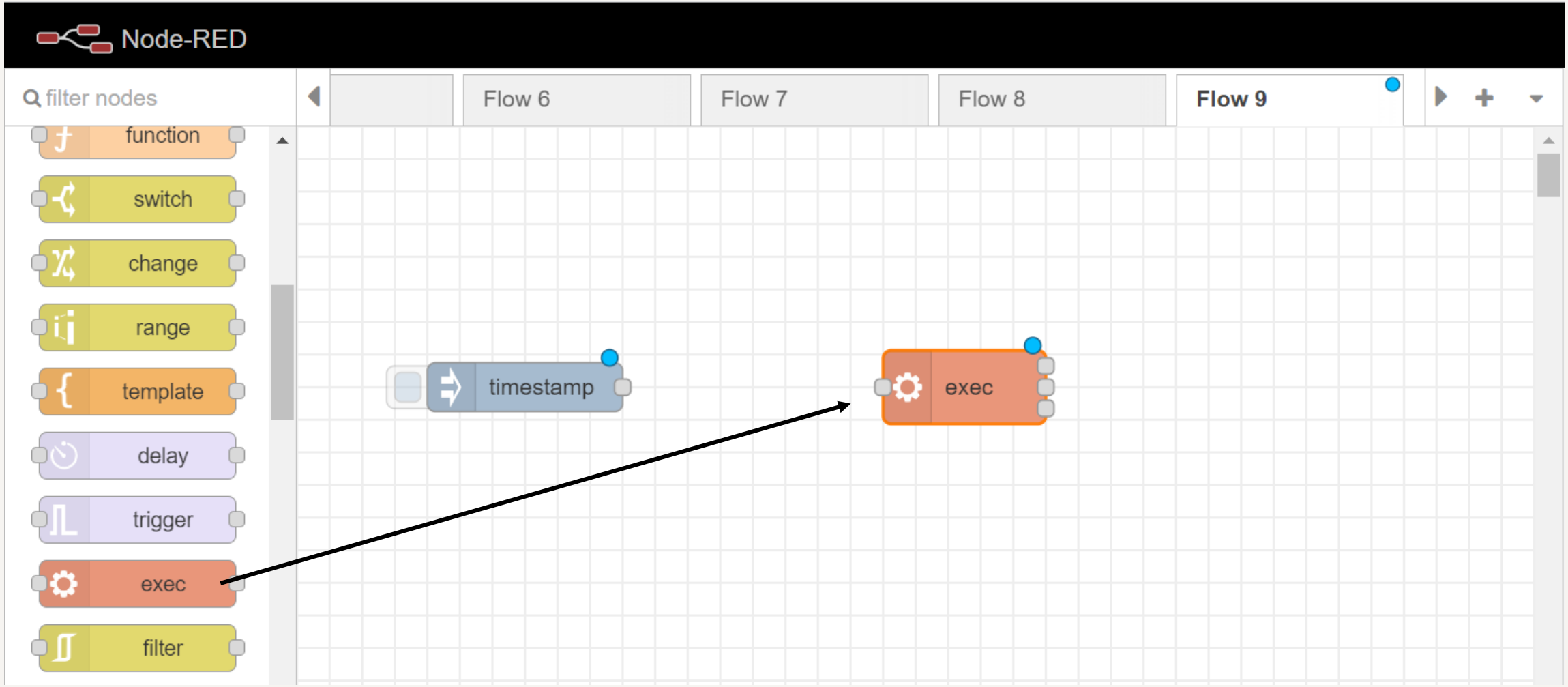

1011_HW5
~$1011_hw5.pptx
1011_hw5.pptx
物聯網實務(五).pdf
建立新檔


1011_HW5
hello.py
~$1011_hw5.pptx
1011_hw5.pptx
物聯網實務(五).pdf
取名hello.py

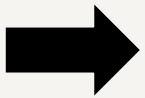
Welcome
hello.py
hello.py
1 print("Hello world!")
1.Edit
3. Run
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Python
PS C:\Programs\IOT\1011_hw5> & C:/Users/user/AppData/Local/Programs/Python/Python312/python.exe c:/Programs/IOT/1011_hw5/hello.
py
Hello world!
PS C:\Programs\IOT\1011_hw5>
2.選擇python版本
Result
Ln 1, Col 22
Spaces: 4
UTF-8
CRLF
Python
3.12.0 64-bit

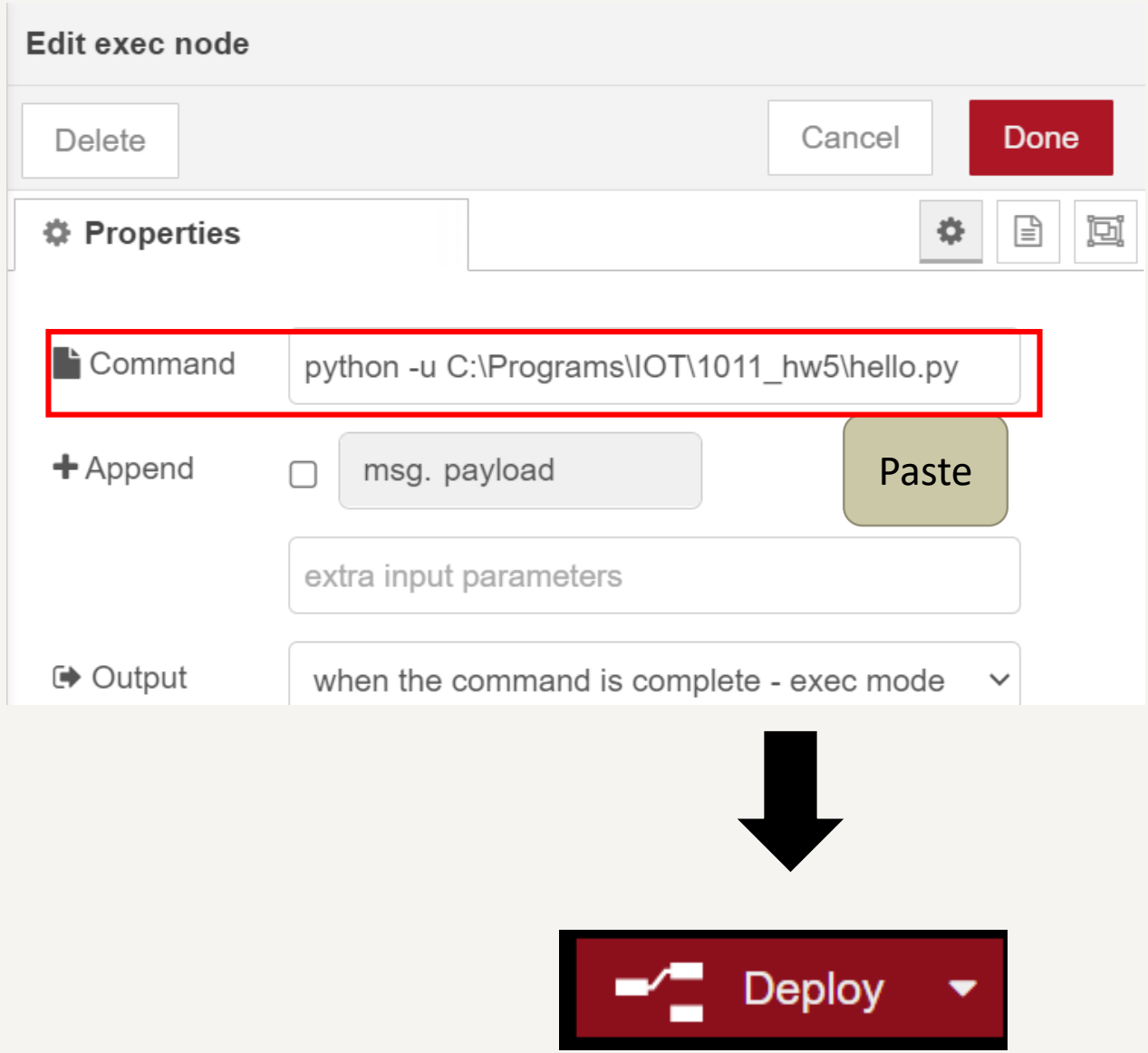

npm
Your environment has been set up for using Node.js
18.17.0 (x64) and npm.
C:\Users\user>node-red
11 Oct 15:01:35 - [info]
Welcome to Node-RED
==========
11 Oct 15:01:35 - [info] Node-RED version: v3.1.0
11 Oct 15:01:35 - [info] Node.js version: v18.17.
0
11 Oct 15:01:35 - [info] Windows_NT 10.0.22621 x64
LE
11 Oct 15:01:36 - [info] Loading palette nodes
11 Oct 15:01:37 - [info] Dashboard version 3.6.0 s
tarted at /ui
1. Run node-red


Node-RED
filter nodes
Flow 1
Flow 2
Flow 3
Flow 4
Flow 5
common
debug 1
2. Add flow

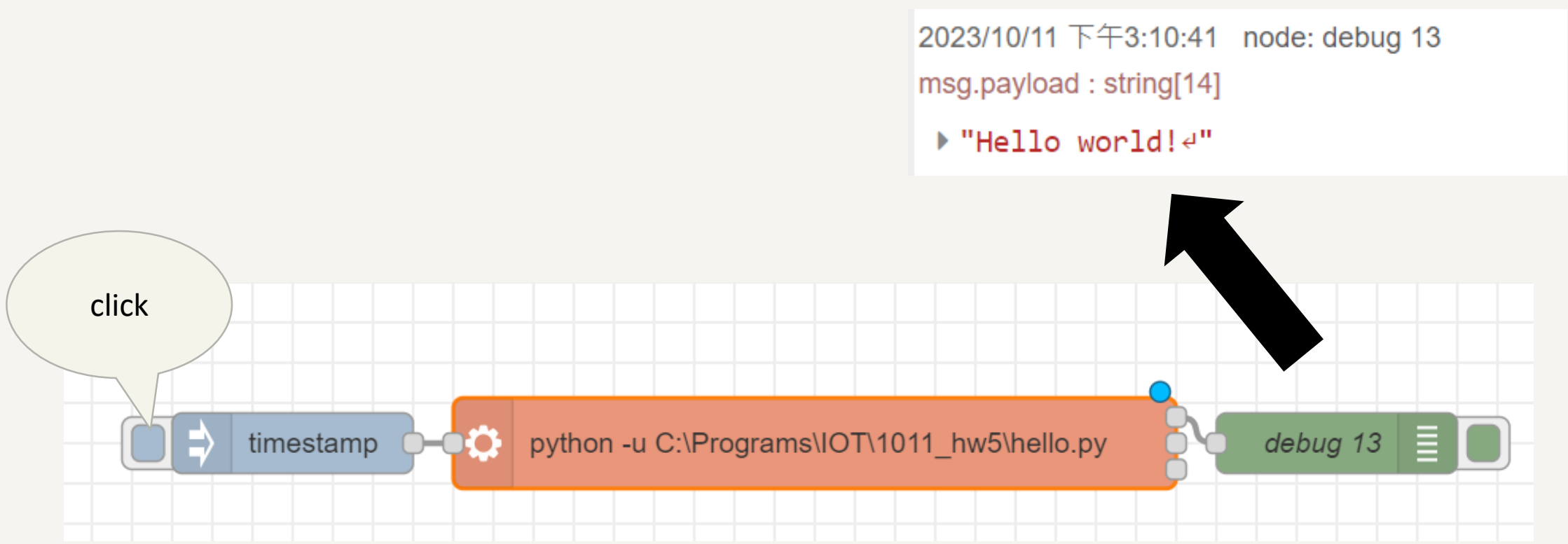

Node-RED
filter nodes
Flow 6
Flow 7
Flow 8
Flow 9
function
switch
change
range
template
delay
trigger
exec
filter
timestamp
exec

1011_HW5
opencv_project
studysession
GeeksForGeeks.jpg
main.py
~$1011_hw5.pptx
U
1011_hw5.pptx
M
hello.py
hello.py > ...
1 # print("Hello wor
2
3 var1 = 1
4 var2 =320
5 var3 =240
6 print(" %d, %d, %d
右鍵
Open to the Side Ctrl+Enter
Open With...
Reveal in File Explorer Shift+Alt+R
Open in Integrated Terminal
Select for Compare
Open Timeline
Cut
Copy
Copy Path
Copy Path Shift+Alt+C
Copy Relative Path Ctrl+K Ctrl+Shift+C
Rename... F2
Delete Delete




Edit exec node
Delete
Cancel
Done
Properties
Command
python -u C:\Programs\IOT\1011_hw5\hello.py
Append
msg. payload
Paste
extra input parameters
Output
when the command is complete - exec mode

Deploy


2023/10/11 下午3:10:41 node: debug 13
msg.payload : string[14]
"Hello world!↵"
click
timestamp
python -u C:\Programs\IOT\1011_hw5\hello.py
debug 13

Exercise 5-2

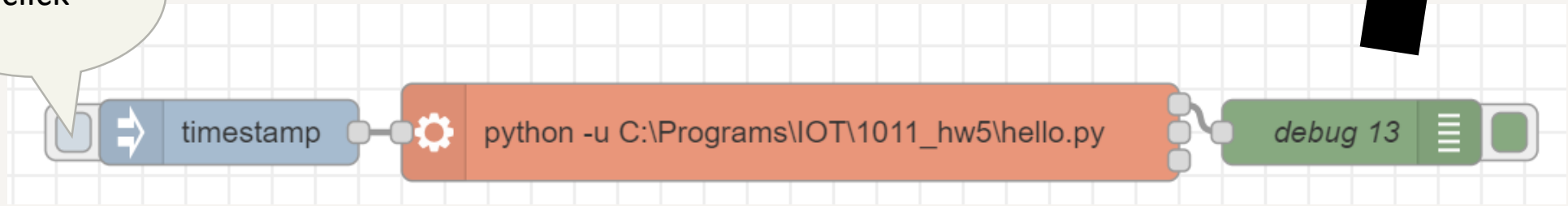
Edit hello.py & Save

hello.py > ...

```python
# print("Hello world!")

var1 = 1
var2 =320
var3 =240
print(" %d, %d, %d" %(var1, var2, var3))
```

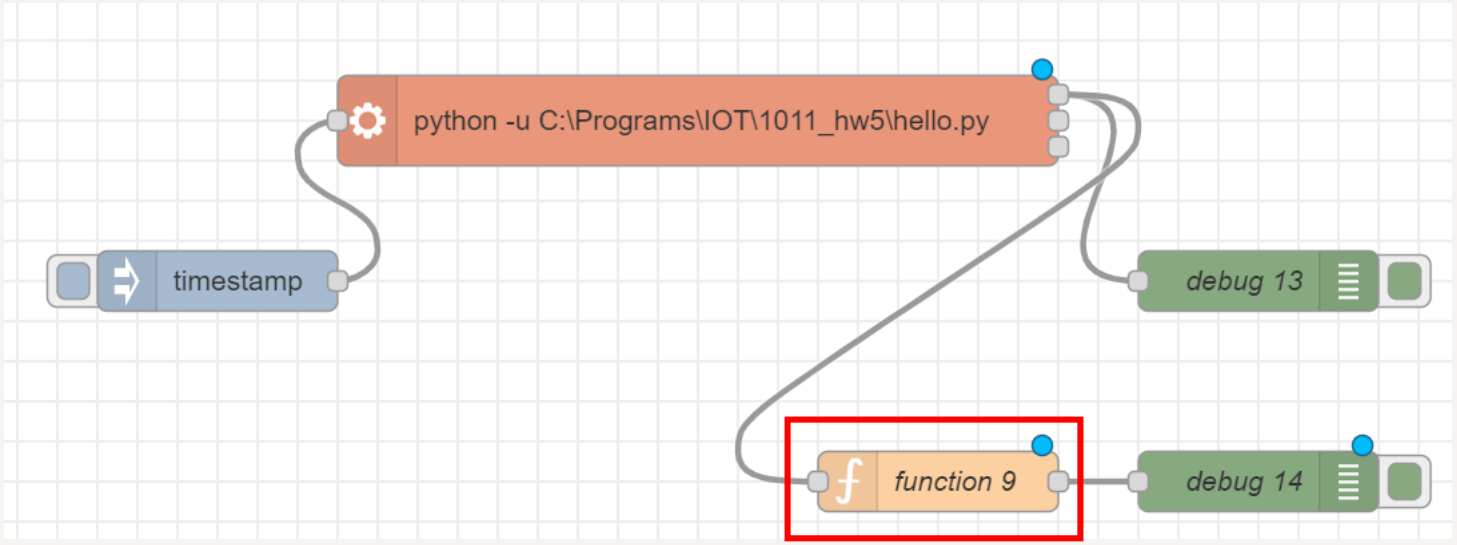
2023/10/11 下午3:20:49 node: debug 13
msg.payload : string[14]
" 1, 320, 240↵"

click



Exercise 5-3

10/9/2023, 12:48:47 AM node: debug 9
msg.payload : string[14]
" 1, 320, 240↵"
Remove spaces & return
10/9/2023, 1:11:38 AM
node: debug 11
msg.payload : string[9]
"1,320,240"



Edit function node

Delete

Cancel

Done

Properties

Name

function 9

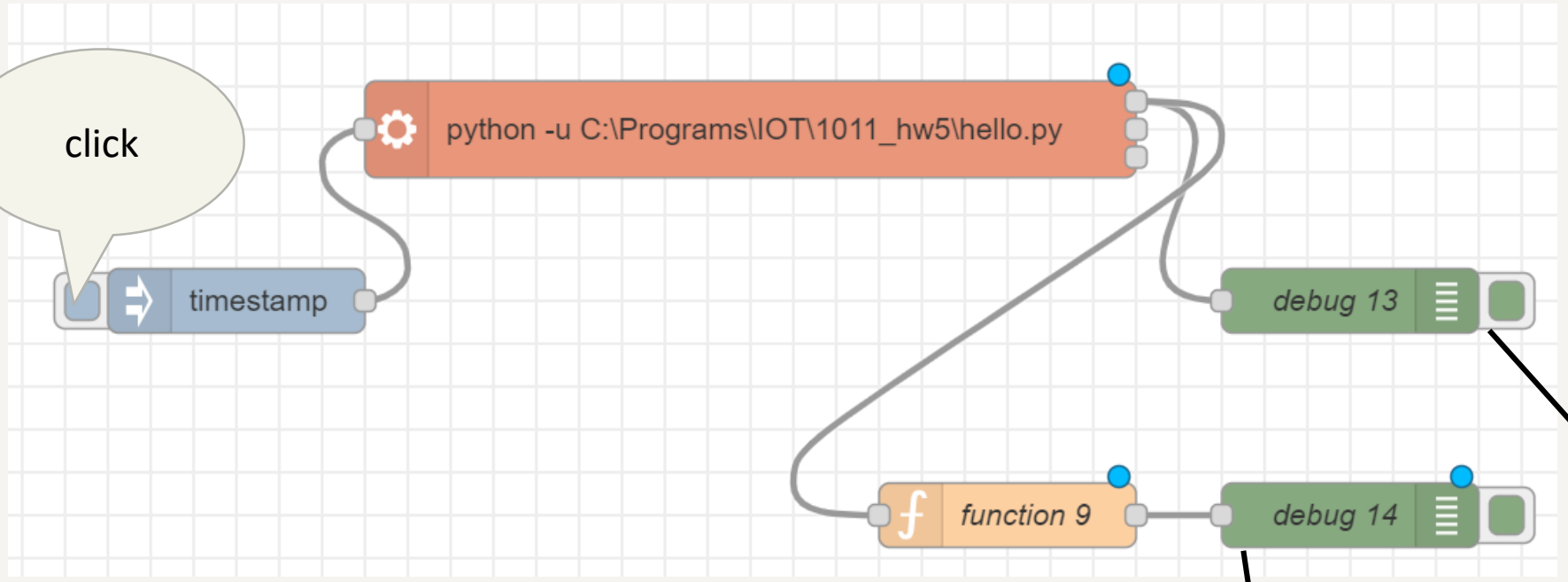
Setup

On Start

On Message

On Stop

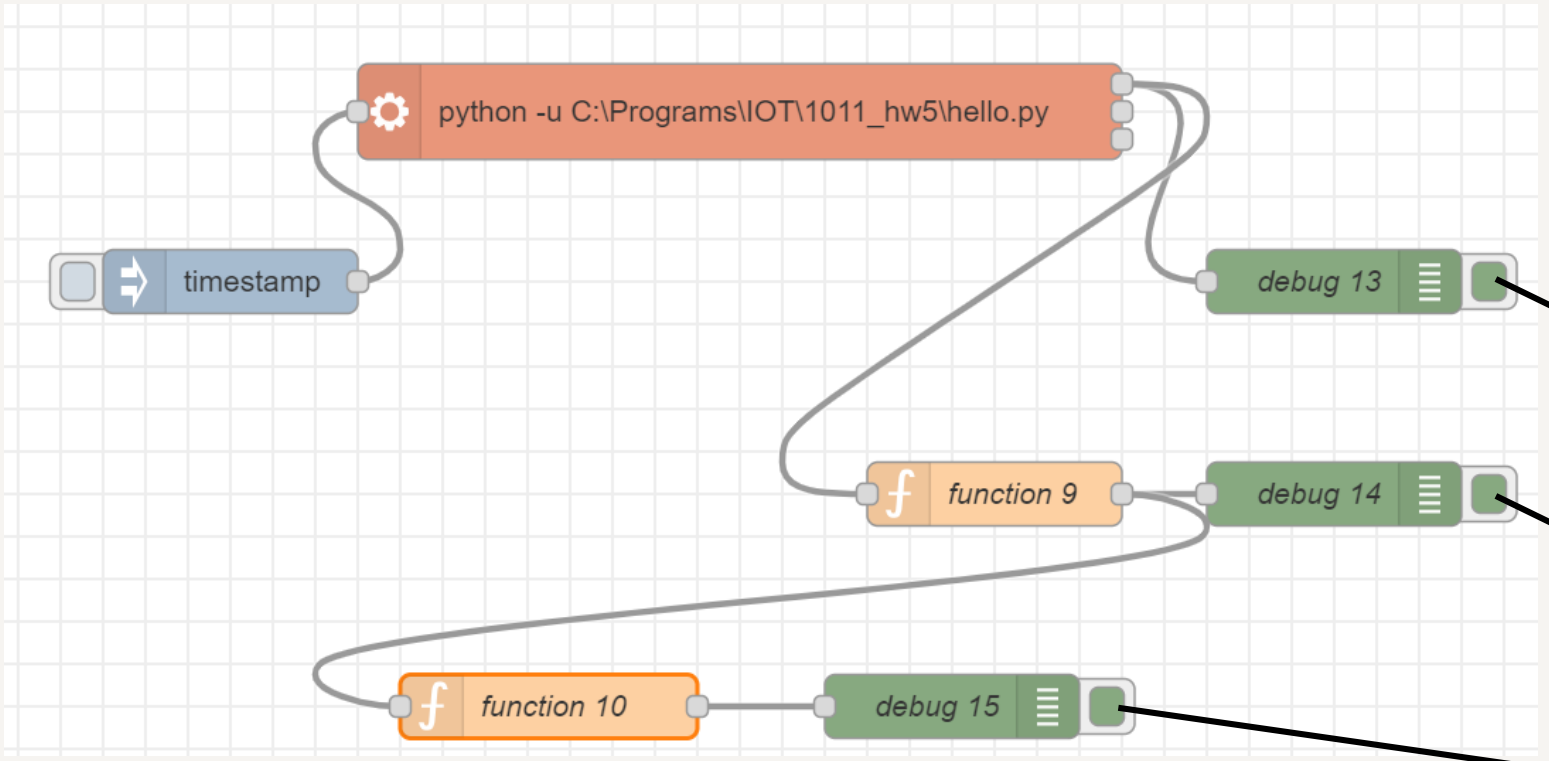
```
1  var temp = msg.payload;
2  msg.payload = temp.trim();
3  return msg;
```



2023/10/11 下午3:25:47 node: debug 13
msg.payload : string[14]
" 1, 320, 240↵"

2023/10/11 下午3:25:47 node: debug 14
msg.payload : string[11]
"1, 320, 240"

Using string.replace(/\s+/g,"")



2023/10/11 下午3:33:02 node: debug 13
msg.payload : string[14]
" 1, 320, 240↵"

2023/10/11 下午3:33:02 node: debug 14
msg.payload : string[11]
"1, 320, 240"

2023/10/11 下午3:33:02 node: debug 15
msg.payload : string[9]
"1,320,240"

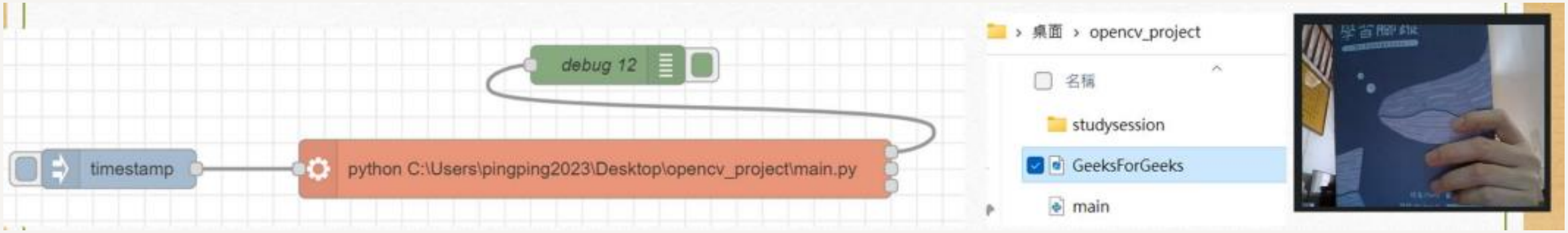
Name function 10

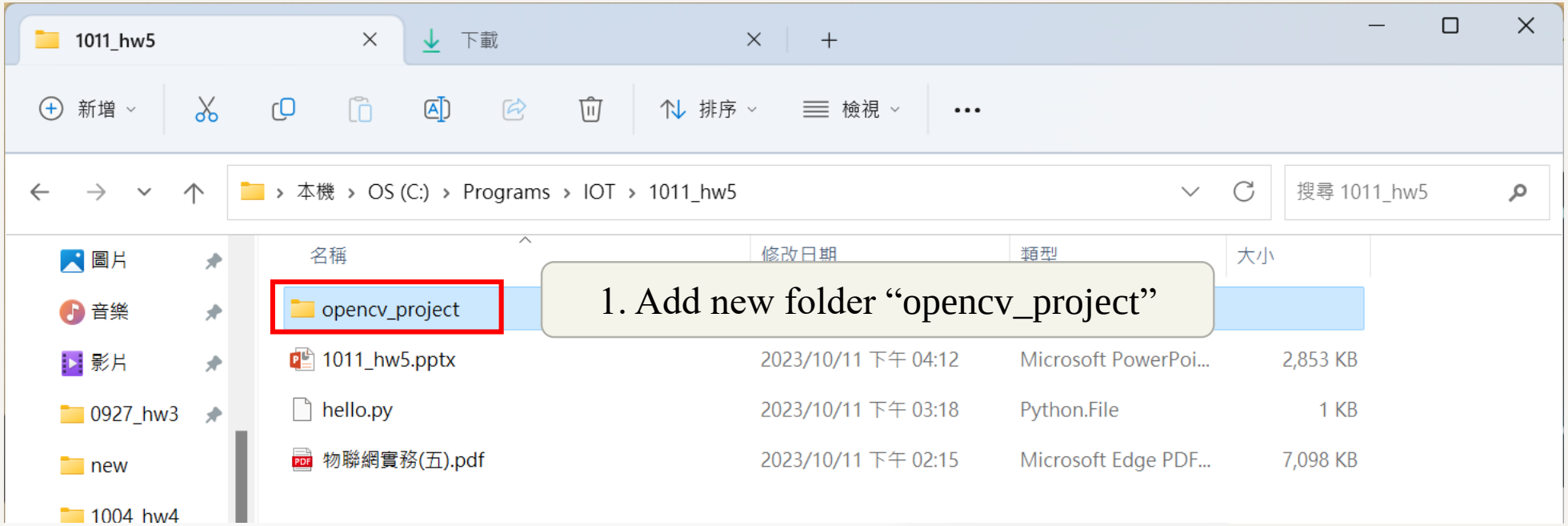
Setup | On Start | **On Message** | On Stop

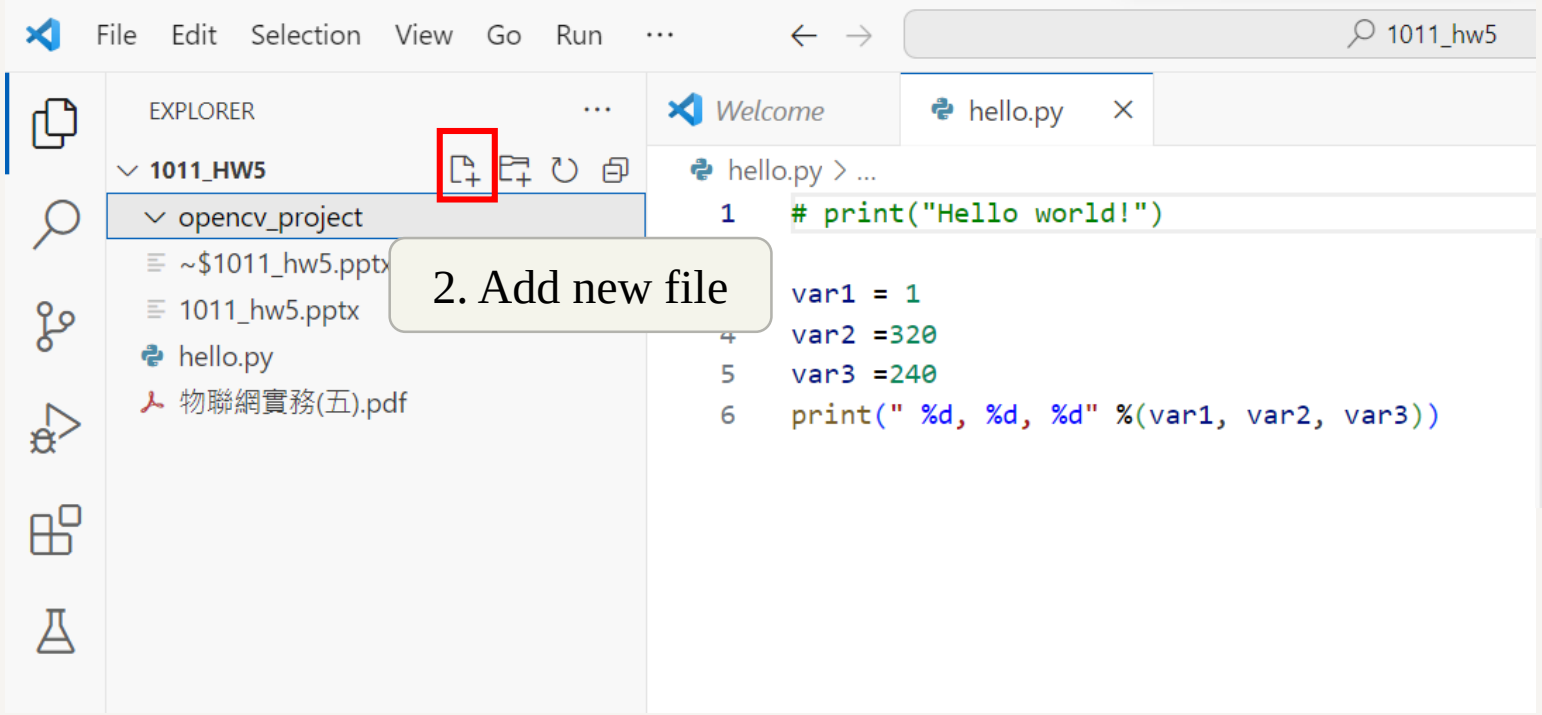
```
1  var temp = msg.payload;
2  msg.payload = temp.replace(/\s+/g,"")
3  return msg;
```

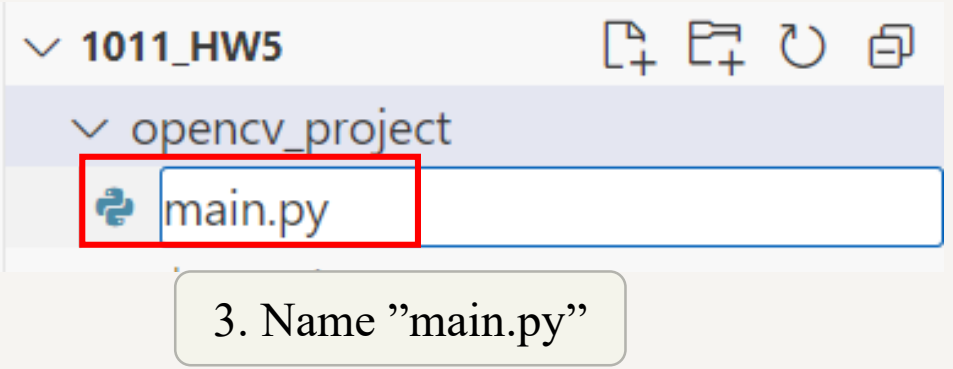
Exercise 5-4

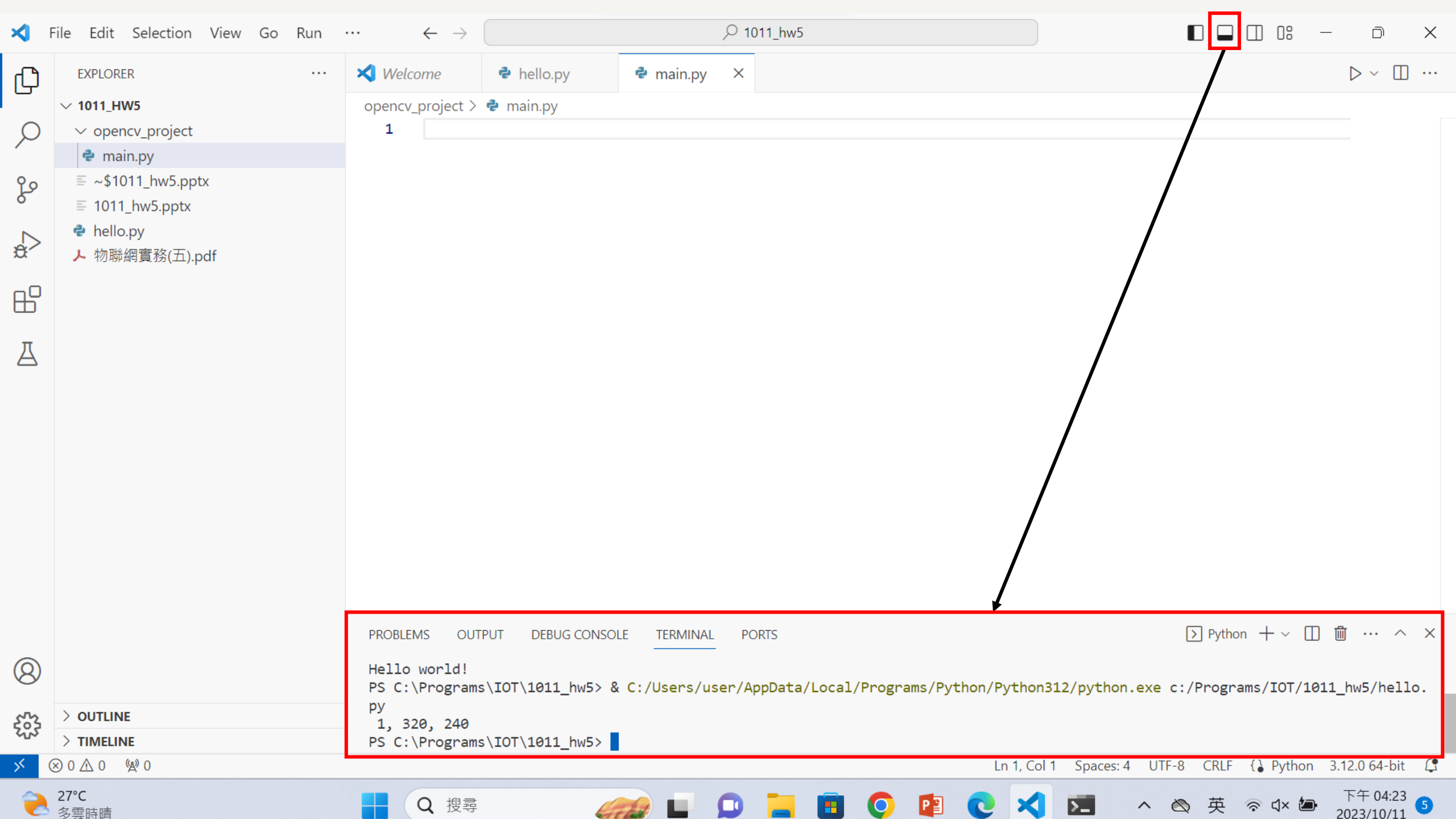
Design a Node-RED flow to take a picture with a camera on Laptop.

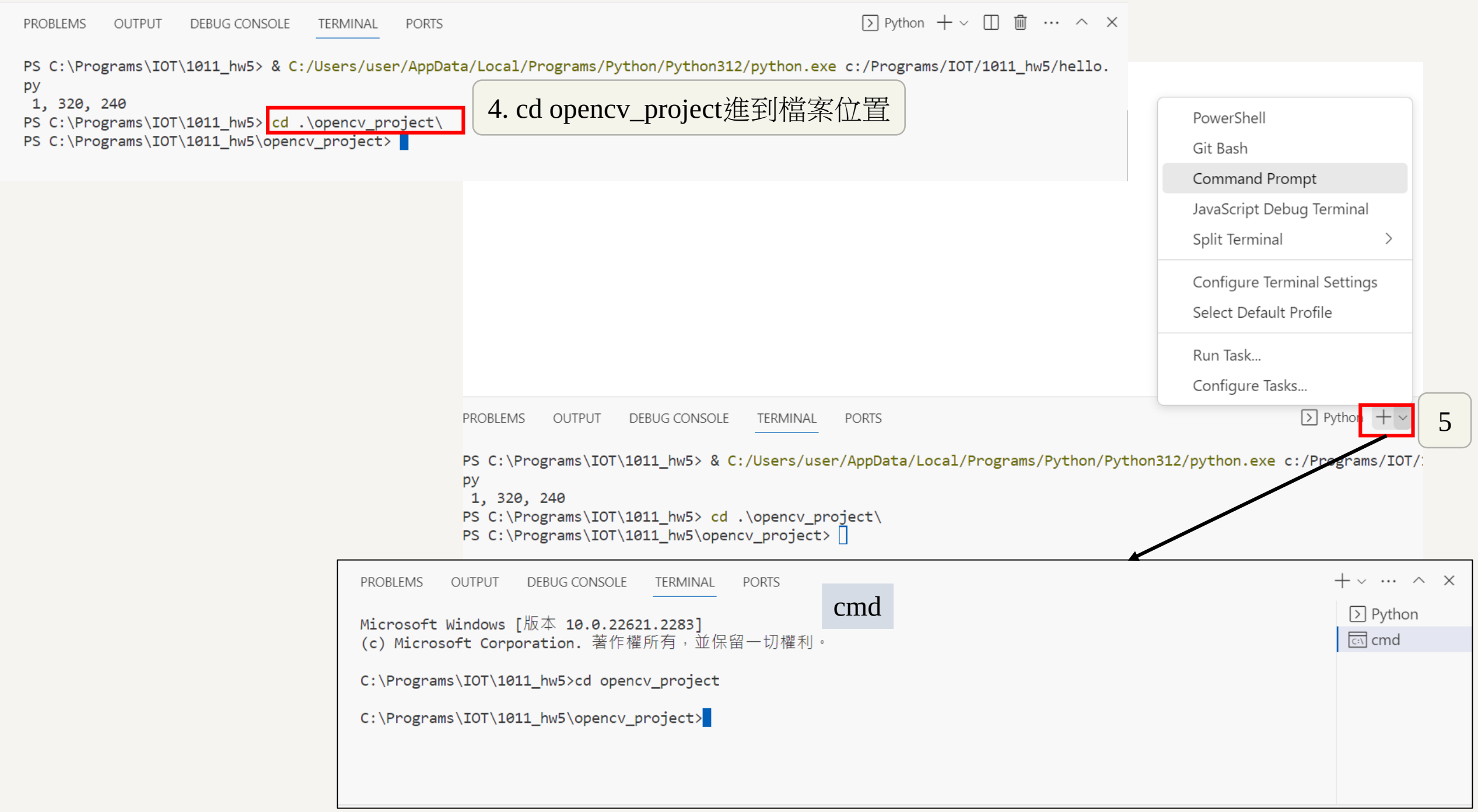



1011_hw5
下載
新增
排序
檢視
本機 › OS (C:) › Programs › IOT › 1011_hw5
搜尋 1011_hw5
圖片
音樂
影片
0927_hw3
new
1004_hw4
名稱
修改日期
類型
大小
opencv_project
1011_hw5.pptx 2023/10/11 下午 04:12 Microsoft PowerPoi... 2,853 KB
hello.py 2023/10/11 下午 03:18 Python.File 1 KB
物聯網實務(五).pdf 2023/10/11 下午 02:15 Microsoft Edge PDF... 7,098 KB
1. Add new folder “opencv_project”

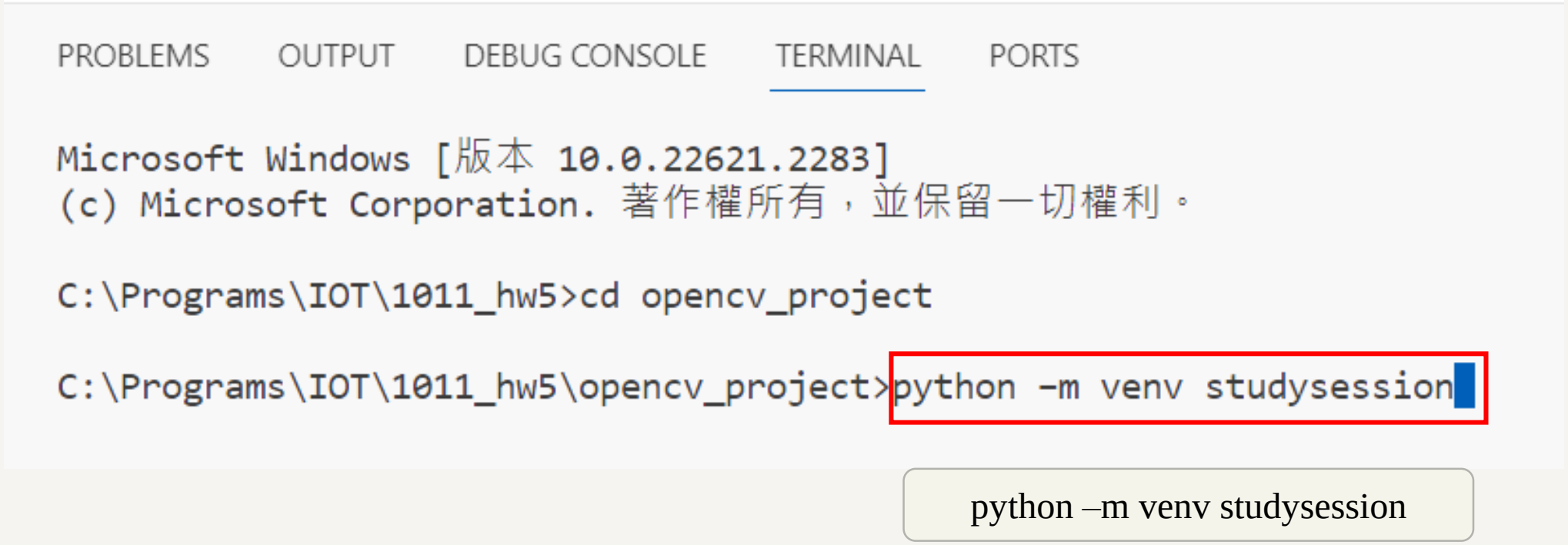

File Edit Selection View Go Run
1011_hw5
EXPLORER
1011_HW5
opencv_project
~$1011_hw5.pptx
1011_hw5.pptx
hello.py
物聯網實務(五).pdf
2. Add new file
Welcome
hello.py
hello.py > ...
1 # print("Hello world!")
var1 = 1
var2 =320
5 var3 =240
6 print(" %d, %d, %d" %(var1, var2, var3))


1011_HW5
opencv_project
main.py
3. Name ”main.py”

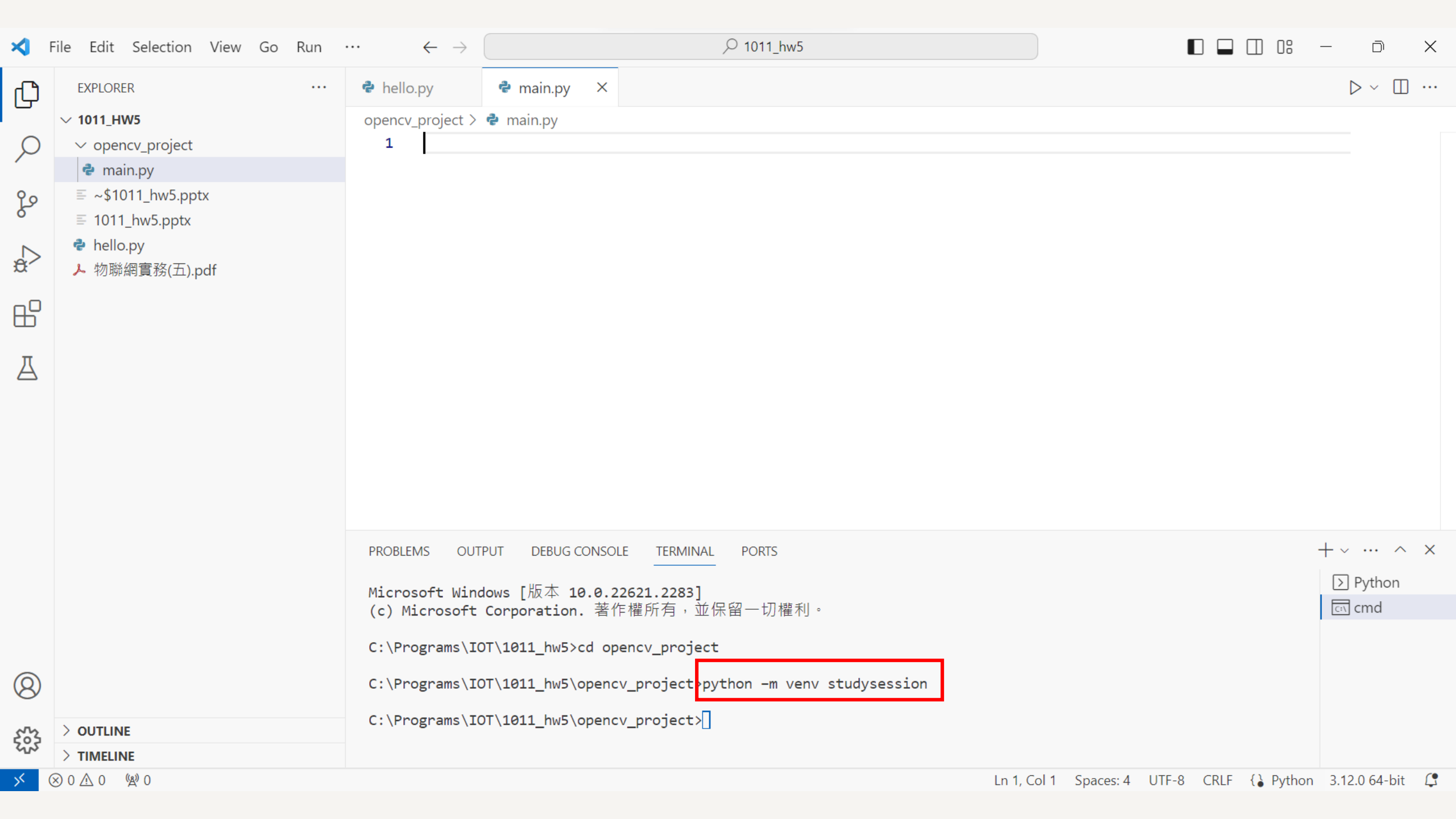

File
Edit
Selection
View
Go
Run
1011_hw5
EXPLORER
1011_HW5
opencv_project
main.py
~$1011_hw5.pptx
1011_hw5.pptx
hello.py
物聯網實務(五).pdf
Welcome
hello.py
main.py
opencv_project > main.py
1
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Python
Hello world!
PS C:\Programs\IOT\1011_hw5> & C:/Users/user/AppData/Local/Programs/Python/Python312/python.exe c:/Programs/IOT/1011_hw5/hello.
py
1, 320, 240
PS C:\Programs\IOT\1011_hw5>
OUTLINE
TIMELINE
Ln 1, Col 1
Spaces: 4
UTF-8
CRLF
Python
3.12.0 64-bit
27°C
多雲時晴
搜尋
英
下午 04:23
2023/10/11

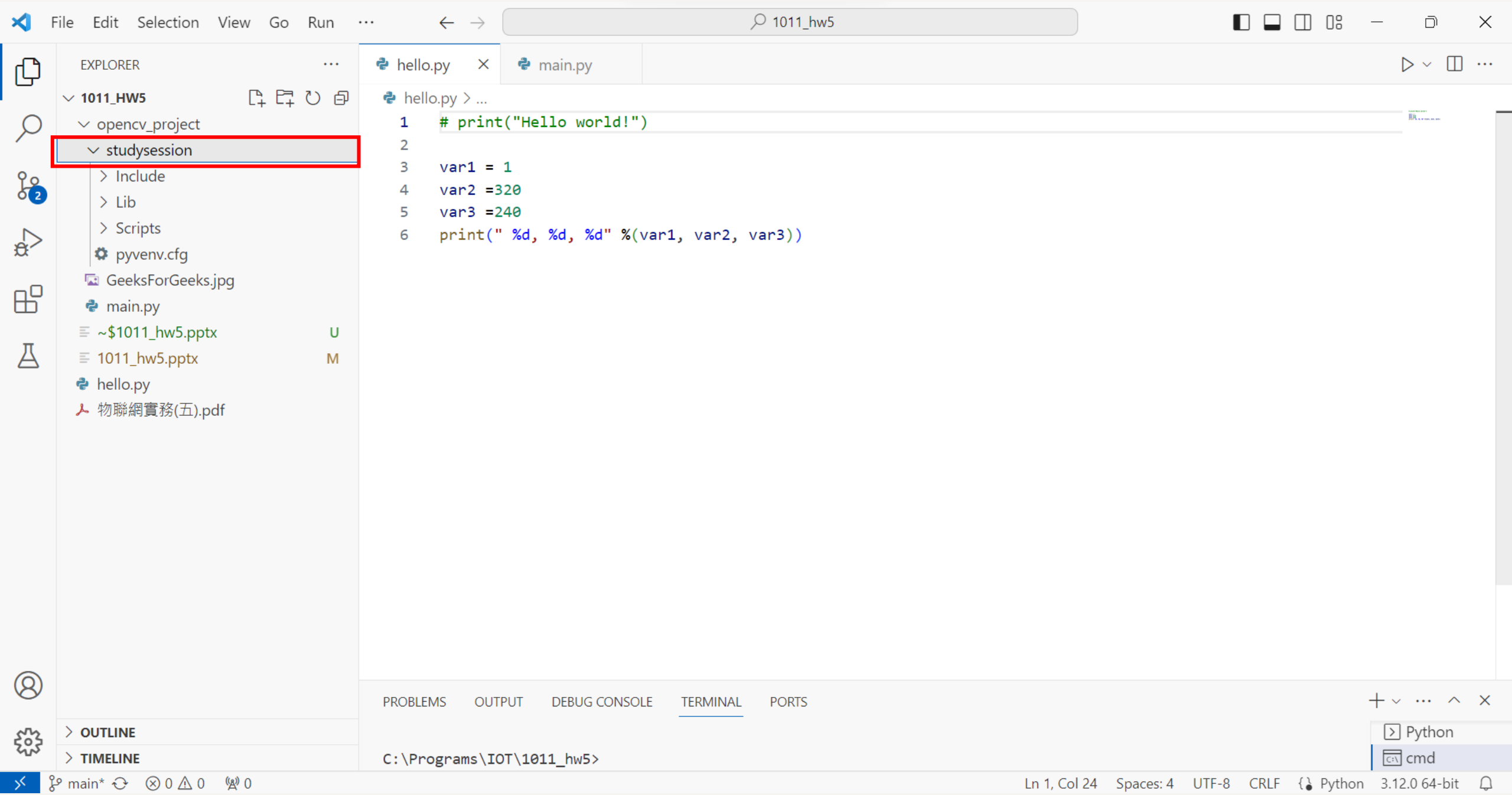

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python
PS C:\Programs\IOT\1011_hw5> & C:/Users/user/AppData/Local/Programs/Python/Python312/python.exe c:/Programs/IOT/1011_hw5/hello.
py
1, 320, 240
PS C:\Programs\IOT\1011_hw5> cd .\opencv_project\
PS C:\Programs\IOT\1011_hw5\opencv_project>
4. cd opencv_project進到檔案位置
PowerShell
Git Bash
Command Prompt
JavaScript Debug Terminal
Split Terminal
Configure Terminal Settings
Select Default Profile
Run Task...
Configure Tasks...
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python
5
PS C:\Programs\IOT\1011_hw5> & C:/Users/user/AppData/Local/Programs/Python/Python312/python.exe c:/Programs/IOT/
py
1, 320, 240
PS C:\Programs\IOT\1011_hw5> cd .\opencv_project\
PS C:\Programs\IOT\1011_hw5\opencv_project>
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
cmd
Microsoft Windows [版本 10.0.22621.2283]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Programs\IOT\1011_hw5>cd opencv_project
C:\Programs\IOT\1011_hw5\opencv_project>
Python
cmd

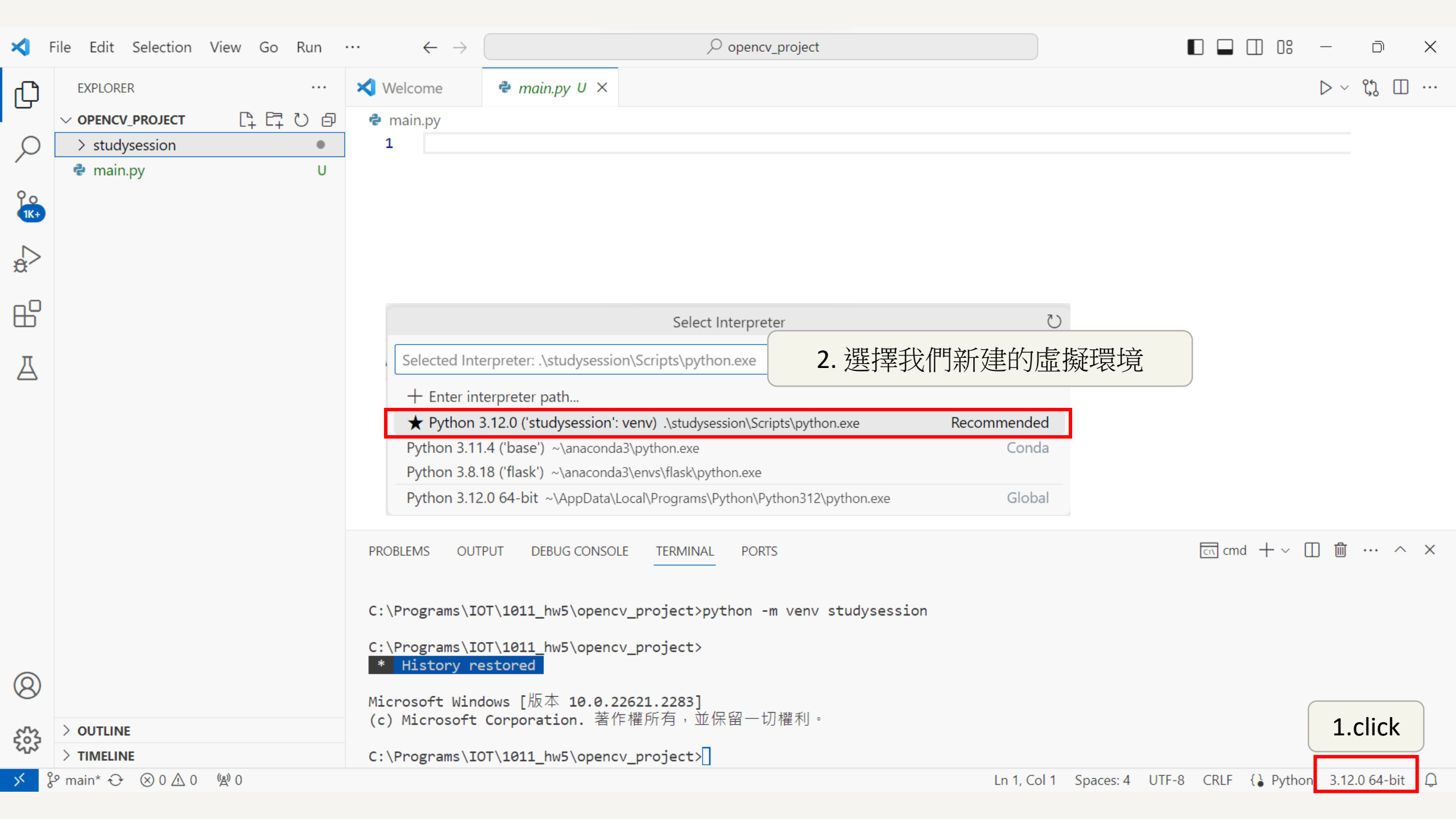
Create a python virtual environment

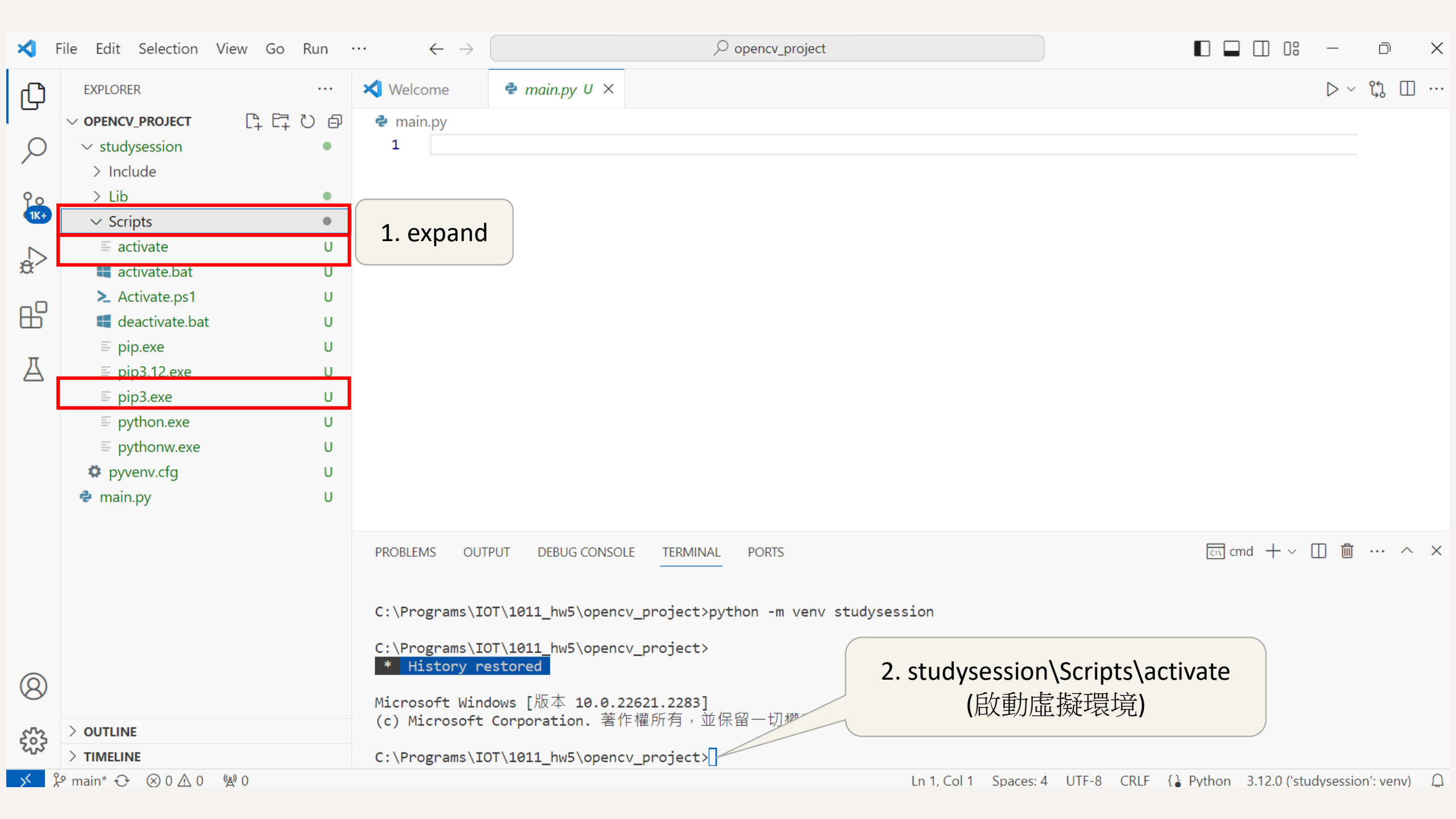


python –m venv studysession


File Edit Selection View Go Run
1011_hw5
EXPLORER
1011_HW5
opencv_project
main.py
~$1011_hw5.pptx
1011_hw5.pptx
hello.py
物聯網實務(五).pdf
hello.py
main.py
opencv_project > main.py
1
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Microsoft Windows [版本 10.0.22621.2283]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Programs\IOT\1011_hw5>cd opencv_project
C:\Programs\IOT\1011_hw5\opencv_project>python -m venv studysession
C:\Programs\IOT\1011_hw5\opencv_project>
Python
cmd
OUTLINE
TIMELINE
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Python 3.12.0 64-bit


File Edit Selection View Go Run ···
1011_hw5
EXPLORER
1011_HW5
opencv_project
studysession
Include
Lib
Scripts
pyvenv.cfg
GeeksForGeeks.jpg
main.py
~$1011_hw5.pptx U
1011_hw5.pptx M
hello.py
物聯網實務(五).pdf
hello.py
main.py
hello.py > ...
1 # print("Hello world!")
2
3 var1 = 1
4 var2 =320
5 var3 =240
6 print(" %d, %d, %d" %(var1, var2, var3))
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
C:\Programs\IOT\1011_hw5>
Python
cmd
OUTLINE
TIMELINE
main* 0 0 0
Ln 1, Col 24 Spaces: 4 UTF-8 CRLF Python 3.12.0 64-bit


File Edit Selection View Go Run
opencv_project
EXPLORER
OPENCV_PROJECT
studysession
main.py U
Welcome
main.py U
main.py
1
Select Interpreter
Selected Interpreter: .\studysession\Scripts\python.exe
2. 選擇我們新建的虛擬環境
Enter interpreter path...
★ Python 3.12.0 ('studysession': venv) .\studysession\Scripts\python.exe Recommended
Python 3.11.4 ('base') ~\anaconda3\python.exe Conda
Python 3.8.18 ('flask') ~\anaconda3\envs\flask\python.exe
Python 3.12.0 64-bit ~\AppData\Local\Programs\Python\Python312\python.exe Global
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
cmd
C:\Programs\IOT\1011_hw5\opencv_project>python -m venv studysession
C:\Programs\IOT\1011_hw5\opencv_project>
* History restored
Microsoft Windows [版本 10.0.22621.2283]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Programs\IOT\1011_hw5\opencv_project>
OUTLINE
TIMELINE
1.click
main* 0 0 0
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Python 3.12.0 64-bit


File Edit Selection View Go Run ···
opencv_project
EXPLORER
OPENCV_PROJECT
studysession
Include
Lib
Scripts
activate U
activate.bat U
Activate.ps1 U
deactivate.bat U
pip.exe U
pip3.12.exe U
pip3.exe U
python.exe U
pythonw.exe U
pyvenv.cfg U
main.py U
OUTLINE
TIMELINE
Welcome
main.py U
main.py
1
1. expand
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
cmd
C:\Programs\IOT\1011_hw5\opencv_project>python -m venv studysession
C:\Programs\IOT\1011_hw5\opencv_project>
* History restored
Microsoft Windows [版本 10.0.22621.2283]
(c) Microsoft Corporation. 著作權所有，並保留一切權
C:\Programs\IOT\1011_hw5\opencv_project>
2. studysession\Scripts\activate
(啟動虛擬環境)
main* 0 0 0
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Python 3.12.0 ('studysession': venv)

```
(studysession) C:\Programs\IOT\1011_hw5\opencv_project>
```

啟動成功

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

(studysession) C:\Programs\IOT\1011_hw5\opencv_project>pip3 install --upgrade pip
```

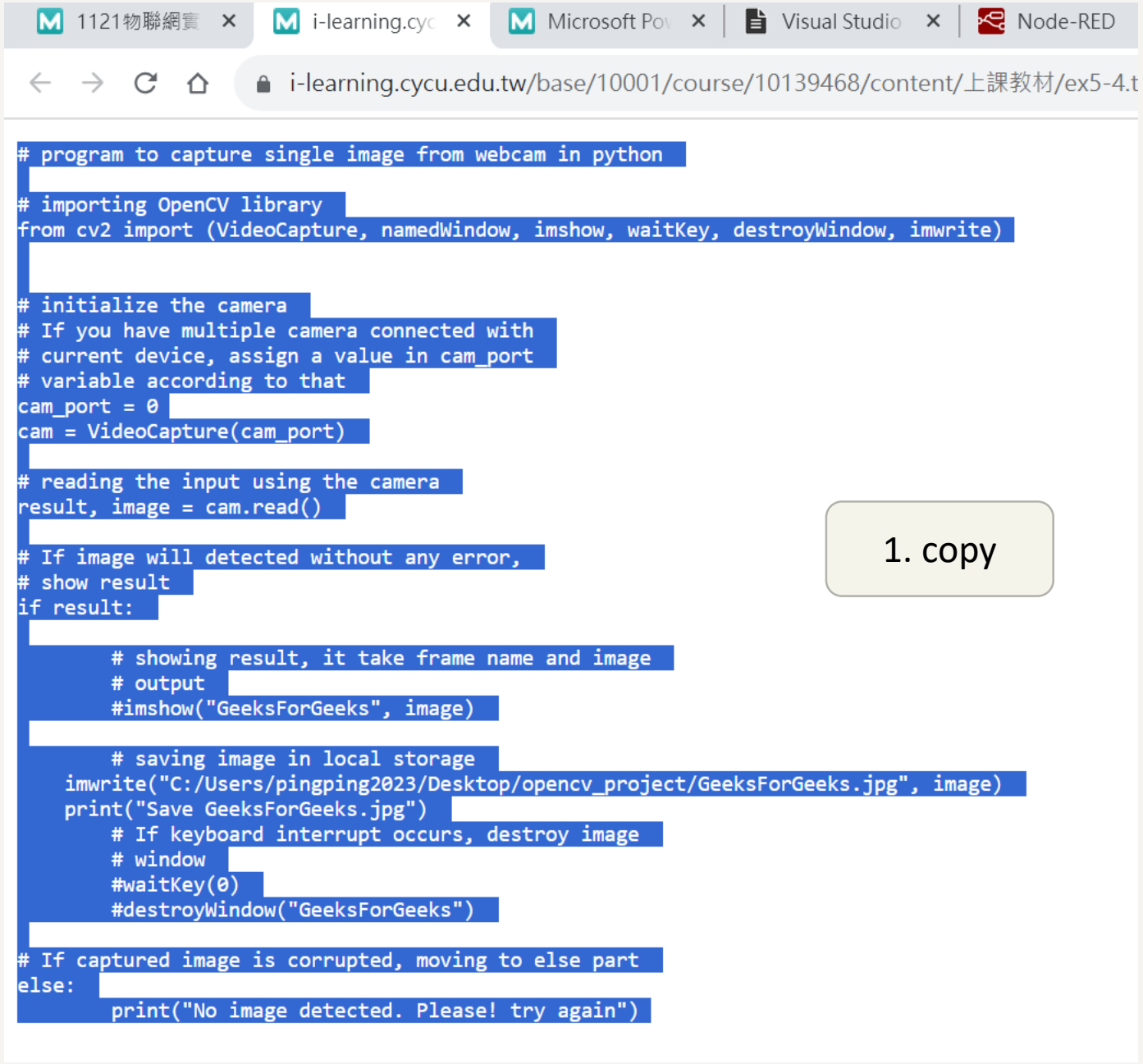
pip3 install --upgrade pip

```
(studysession) C:\Programs\IOT\1011_hw5\opencv_project>pip3 install --upgrade pip
Requirement already satisfied: pip in c:\programs\iot\1011_hw5\opencv_project\studysession\lib\site-packages (23.2.1)

(studysession) C:\Programs\IOT\1011_hw5\opencv_project>pip3 install opencv-python
```

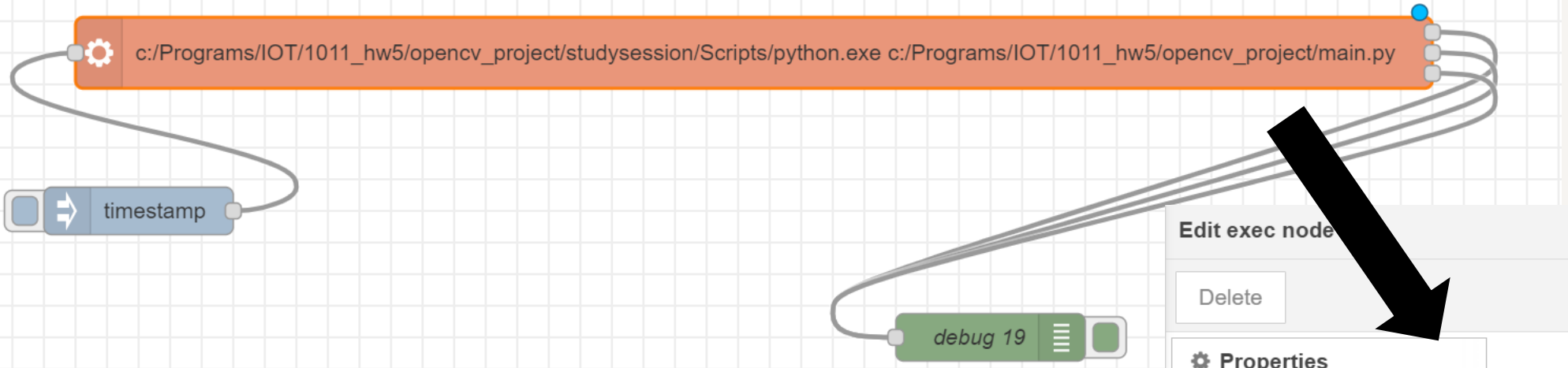
pip3 install opencv-python

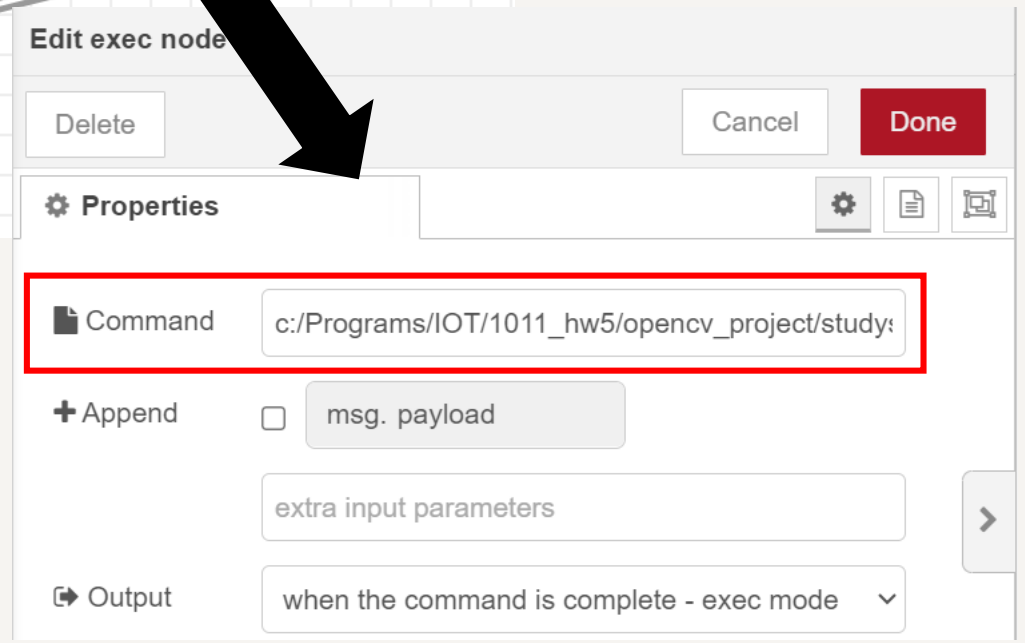
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS                                   cmd

C:\Programs\IOT\1011_hw5\opencv_project>python -m venv studysession
python: can't open file 'C:\\Programs\\IOT\\1011_hw5\\opencv_project\\-m': [Errno 2] No such file or directory


(studysession) C:\Programs\IOT\1011_hw5\opencv_project>pip3 install --upgrade pip
Requirement already satisfied: pip in c:\programs\iot\1011_hw5\opencv_project\studysession\lib\site-packages (23.2.1)

(studysession) C:\Programs\IOT\1011_hw5\opencv_project>pip3 install opencv-python
Collecting opencv-python
  Obtaining dependency information for opencv-python from https://files.pythonhosted.org/packages/38/d2/3e8c13ffc37ca5ebc6f382b
242b44acb43eb489042e1728407ac3904e72f/opencv_python-4.8.1.78-cp37-abi3-win_amd64.whl.metadata
  Downloading opencv_python-4.8.1.78-cp37-abi3-win_amd64.whl.metadata (20 kB)
Collecting numpy>=1.21.2 (from opencv-python)
  Obtaining dependency information for numpy>=1.21.2 from https://files.pythonhosted.org/packages/98/d7/1cc7a11118408ad21a5379f
f2a4e0b0e27504c68ef6e808ebaa90ee95902/numpy-1.26.0-cp312-cp312-win_amd64.whl.metadata
  Downloading numpy-1.26.0-cp312-cp312-win_amd64.whl.metadata (61 kB)
     ---------------------------------------- 61.1/61.1 kB 820.0 kB/s eta 0:00:00
Downloading opencv_python-4.8.1.78-cp37-abi3-win_amd64.whl (38.1 MB)
     ---------------------------------------- 38.1/38.1 MB 499.8 kB/s eta 0:00:00
Downloading numpy-1.26.0-cp312-cp312-win_amd64.whl (15.5 MB)
     ---------------------------------------- 15.5/15.5 MB 377.0 kB/s eta 0:00:00
Installing collected packages: numpy, opencv-python
Successfully installed numpy-1.26.0 opencv-python-4.8.1.78

(studysession) C:\Programs\IOT\1011_hw5\opencv_project>
```

安裝成功


1121物聯網實
i-learning.cyc
Microsoft Po
Visual Studio
Node-RED
i-learning.cycu.edu.tw/base/10001/course/10139468/content/上課教材/ex5-4.t
# program to capture single image from webcam in python
# importing OpenCV library
from cv2 import (VideoCapture, namedWindow, imshow, waitKey, destroyWindow, imwrite)
# initialize the camera
# If you have multiple camera connected with
# current device, assign a value in cam_port
# variable according to that
cam_port = 0
cam = VideoCapture(cam_port)
# reading the input using the camera
result, image = cam.read()
# If image will detected without any error,
# show result
if result:
# showing result, it take frame name and image
# output
#imshow("GeeksForGeeks", image)
# saving image in local storage
imwrite("C:/Users/pingping2023/Desktop/opencv_project/GeeksForGeeks.jpg", image)
print("Save GeeksForGeeks.jpg")
# If keyboard interrupt occurs, destroy image
# window
#waitKey(0)
#destroyWindow("GeeksForGeeks")
# If captured image is corrupted, moving to else part
else:
print("No image detected. Please! try again")
1. copy

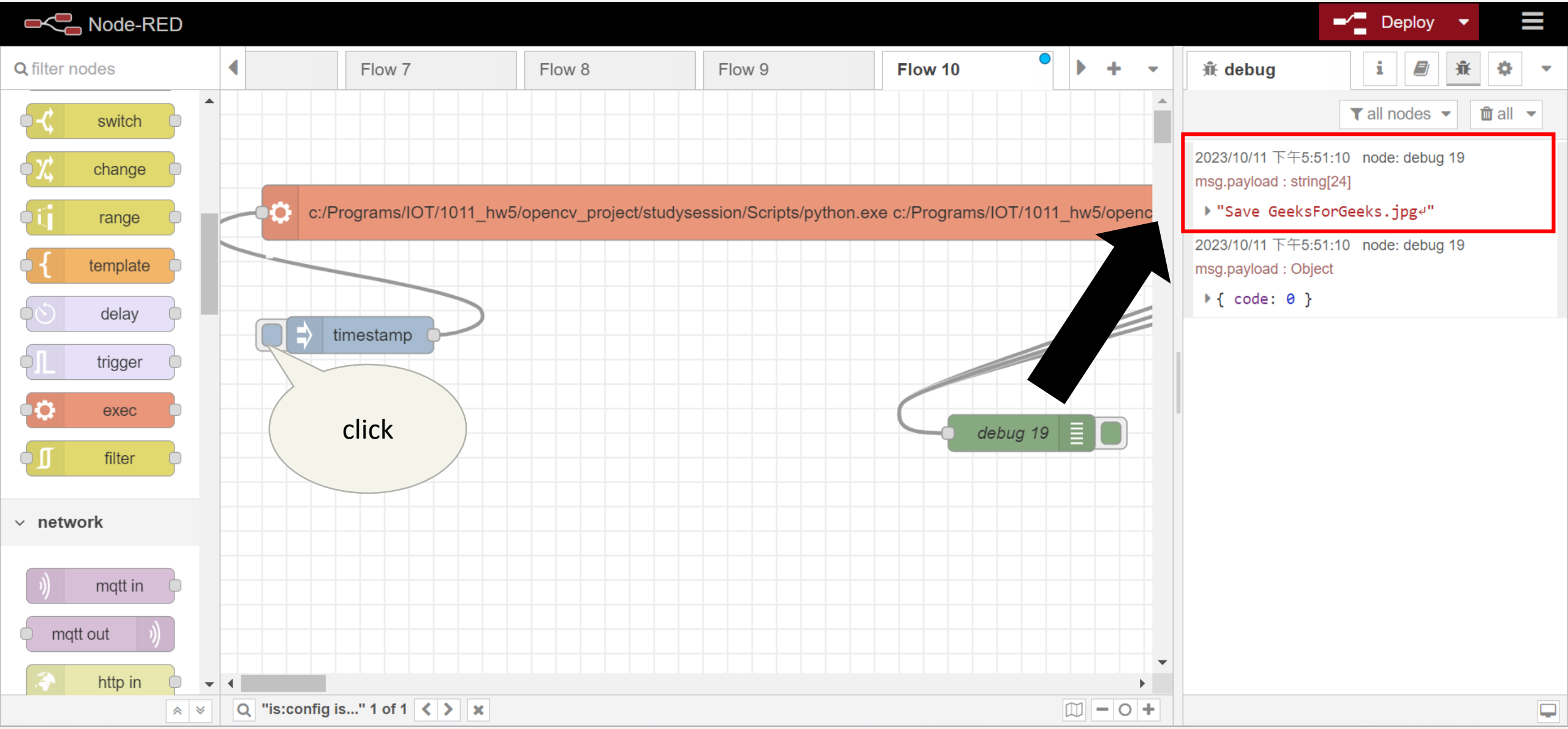
EXPLORER
OPENCV_PROJECT
studysession
Include
Lib
Scripts
activate
activate.bat
Activate.ps1
deactivate.bat
f2py.exe
pip.exe
pip3.12.exe
pip3.exe
python.exe
pythonw.exe
pyvenv.cfg
GeeksForGeeks.jpg
main.py
OUTLINE
TIMELINE
Welcome
main.py U
main.py > ...
from cv2 import (VideoCapture, namedWindow, imshow, waitKey, destroyWindow, imw
# initialize the camera
# If you have multiple camera connected with
# current device, assign a value in cam_port
# variable according to that
cam_port = 0
cam = VideoCapture(cam_port)
# reading the input using the camera
result, image = cam.read()
# If image will detected without any error,
# show result
if result:
# showing result, it take frame name and image
# output
#imshow("GeeksForGeeks", image)
# saving image in local storage
imwrite("C:/Programs/IOT/1011_hw5/opencv_project/GeeksForGeeks.jpg", image)
print("Save GeeksForGeeks.jpg")
# If keyboard interrupt occurs, destroy image
# window
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Save GeeksForGeeks.jpg
PS C:\Programs\IOT\1011_hw5\opencv_project>
4. Run
2. Paste
3. Change
成功會跑出圖以及文字”Save GeeksFormGeeks.jpg”

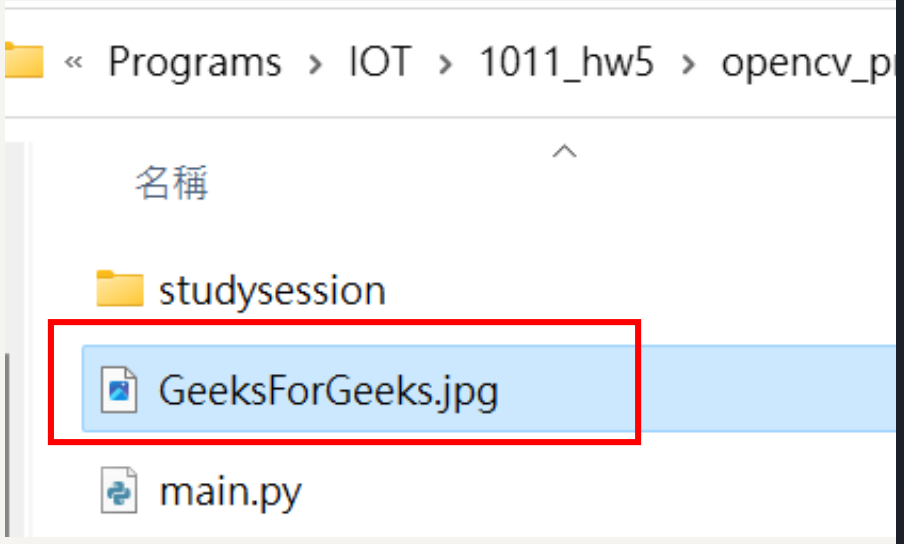


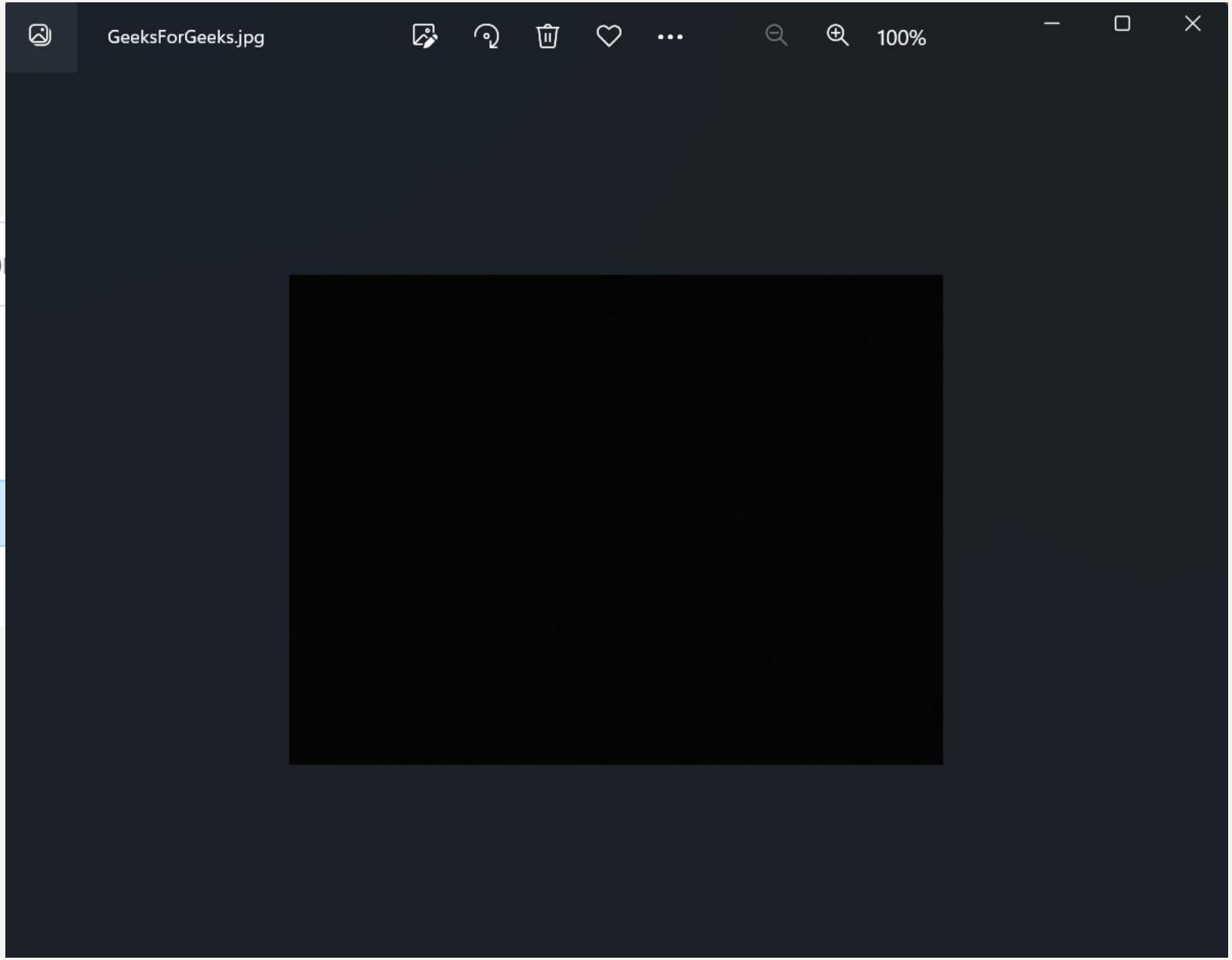



```
PS C:\Programs\IOT\1011_hw5> & c:/Programs/IOT/1011_hw5/opencv_project/studysession/Scripts/python.exe c:/Programs/
IOT/1011_hw5/opencv_project/main.py
Save GeeksForGeeks.jpg
PS C:\Programs\IOT\1011_hw5>
```

因為我打Python無法透過環境變數抓取資料，所以需要複製完整路徑才可抓到。

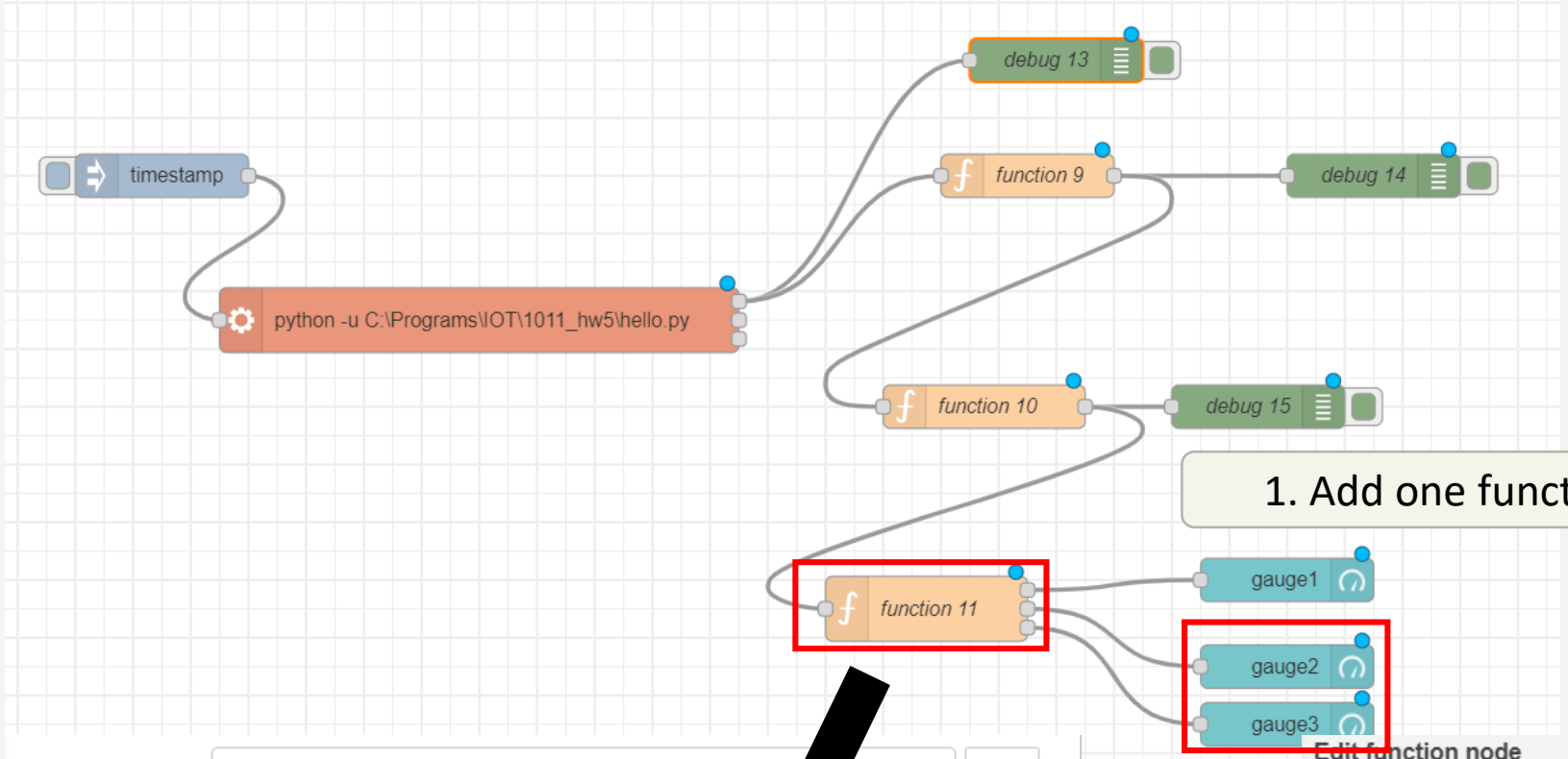

Node-RED
Deploy
filter nodes
Flow 7
Flow 8
Flow 9
Flow 10
debug
all nodes
all
switch
change
range
template
delay
trigger
exec
filter
network
mqtt in
mqtt out
http in
c:/Programs/IOT/1011_hw5/opencv_project/studysession/Scripts/python.exe c:/Programs/IOT/1011_hw5/openc
timestamp
click
debug 19
2023/10/11 下午5:51:10 node: debug 19
msg.payload : string[24]
"Save GeeksForGeeks.jpg"
2023/10/11 下午5:51:10 node: debug 19
msg.payload : Object
{ code: 0 }
"is:config is..." 1 of 1


« Programs › IOT › 1011_hw5 › opencv_p
名稱
studysession
GeeksForGeeks.jpg
main.py


GeeksForGeeks.jpg
100%

Homework 5-1

- Display the results of exercise 5-3 on Node-RED Dashboard.



1. Add one function node and two gauge node

Name function 11

Setup | On Start | **On Message** | On Stop

```
1  var temp = msg.payload;
2  var results = temp.split(",");
3  var msg1 = {};
4  var msg2 = {};
5  var msg3 = {};
6
7  msg1.payload = results[0];
8  msg2.payload = results[1];
9  msg3.payload = results[2];
10
11 return [msg1,msg2,msg3];
```

宣告三個變數

將值存到三個變數

回傳三個值

Edit function node

Delete | Cancel | Done

Properties

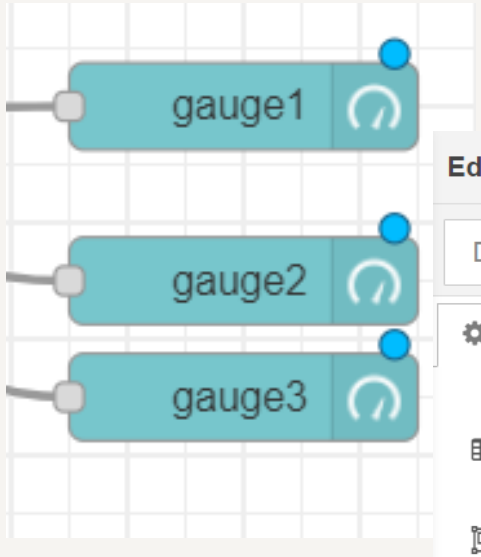
Name function 11

Setup | On Start | On Message | On Stop

Outputs 3 Timeout 0

Modules

Module name Import as



Edit gauge node

Delete | Cancel | Done

Properties

Group [Homework 5-1] Default

Size auto

Type Gauge

Label gauge2

Value format {{value}}

max 10

Edit gauge node

Delete | Cancel | Done

Properties

Group [Homework 5-1] Default

Size auto

Type Gauge

Label gauge3

Value format {{value}}

Units units

Range min 0 max 10

Colour gradient

Enabled

Group [Homework 5-1] Default

Size auto

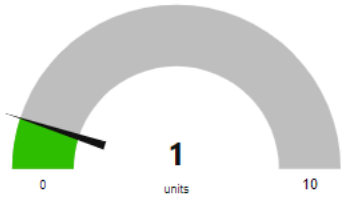
Type Gauge

Label gauge1

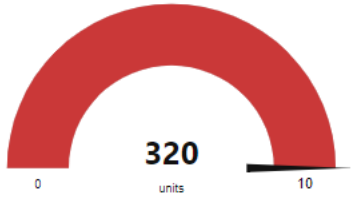
Result

Homework 5-1

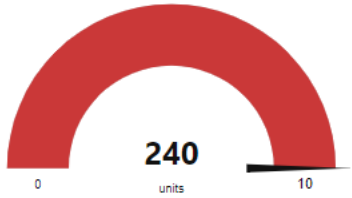
gauge1



gauge2



gauge3



chart