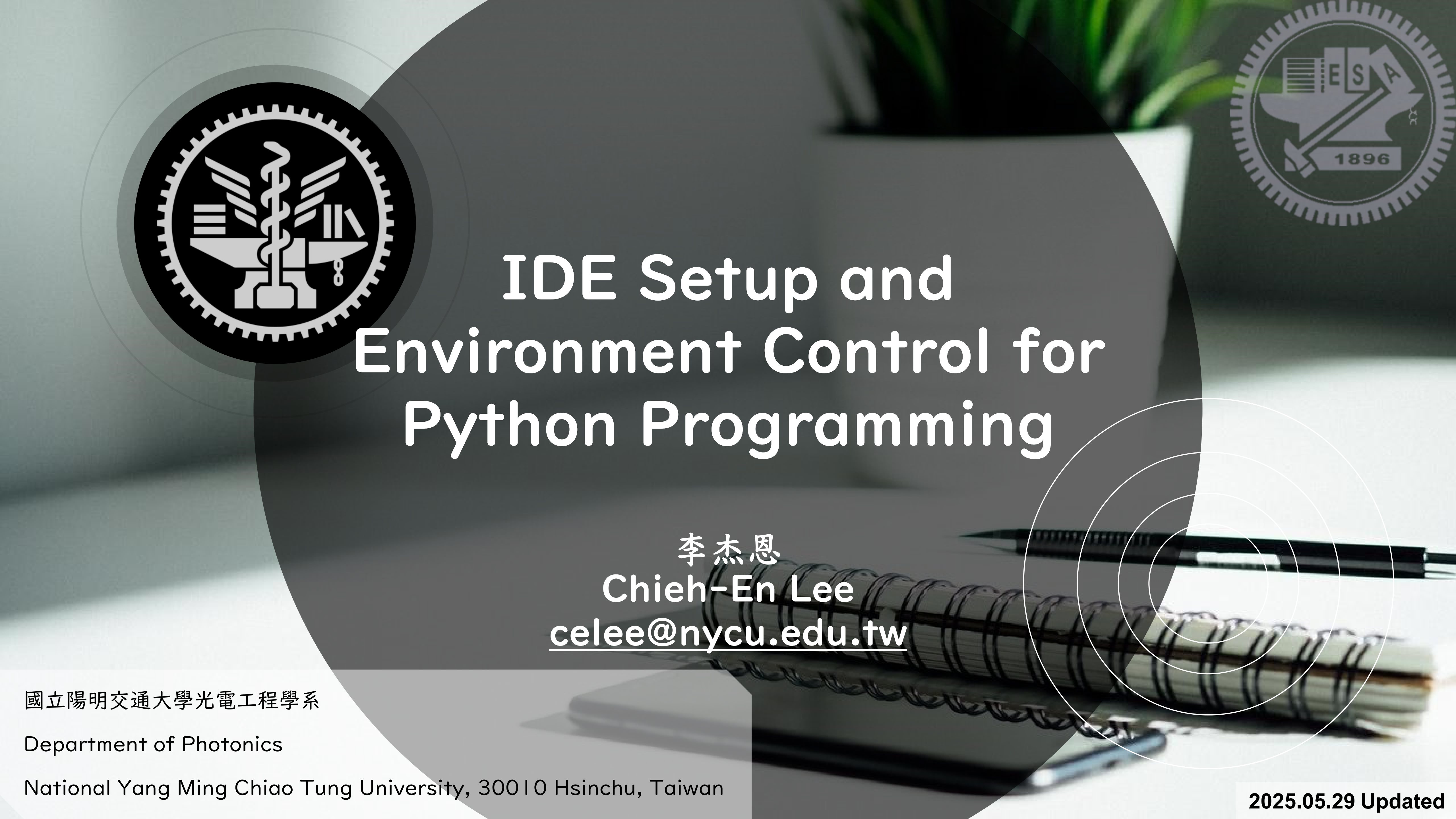

IDE Setup and Environment Control for Python Programming

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Department of Photonics

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2025.05.29 Updated

Today

- Python
  Welcome to Python.org
- VS code
  Visual Studio Code - Code Editing. Redefined
- Git and GitHub
  Git (git-scm.com), GitHub
- Windows Terminal (optional)
  Windows Terminal - Microsoft Store 應用程式

- If you feel annoying...
  Free Download | Anaconda

Python

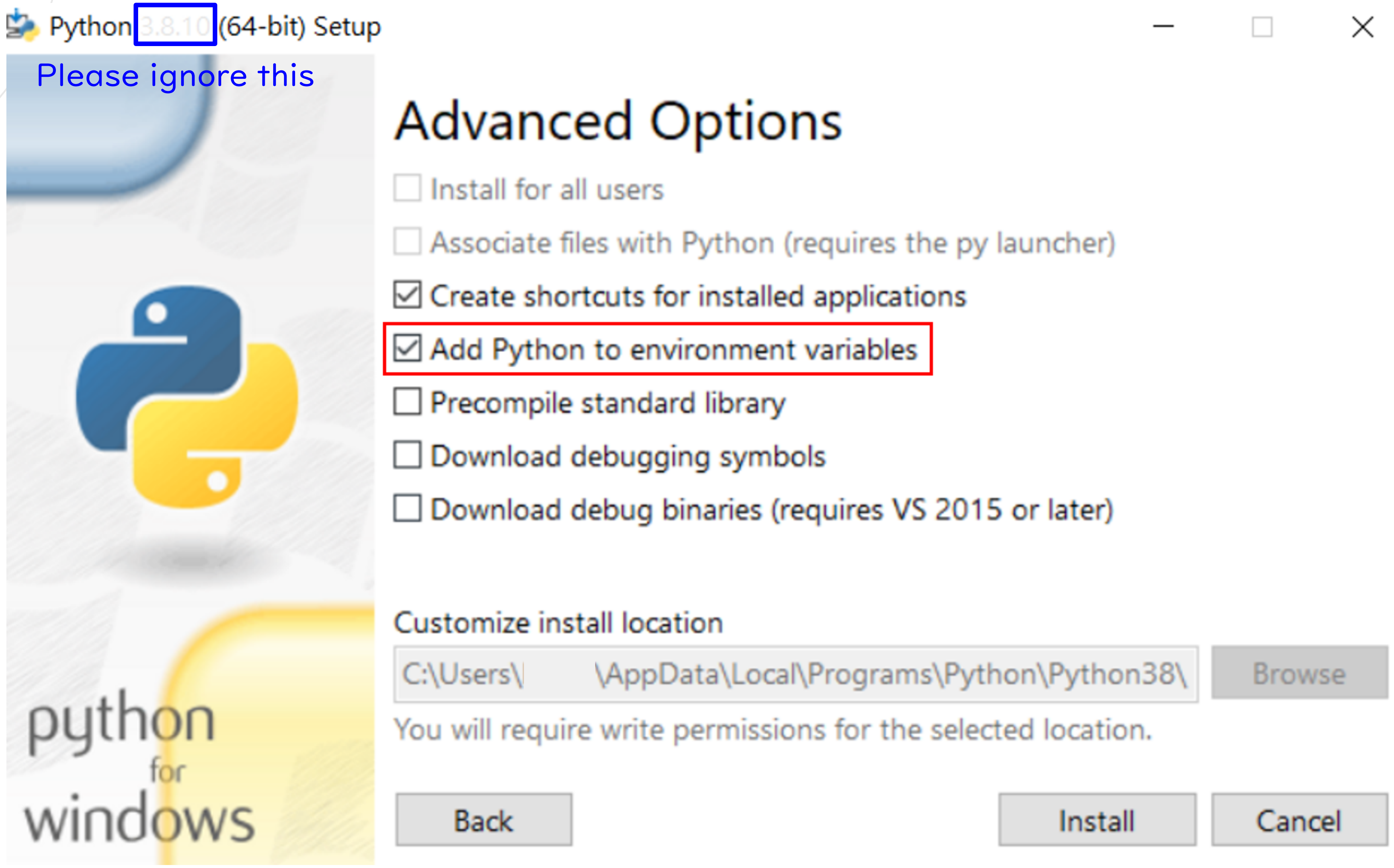
- Please download and install Python (otherwise you can withdraw...)
  Welcome to Python.org

Version	Released Date	End of Support
3.11	2022-10-24	2027-10
3.12	2023-10-02	2028-10
3.13	2024-10-07	2029-10
3.14	2025-10-01 (planned)	2030-10

- Recommended to choose the version whose maintenance status is security. An unsupported version is not recommended.

All of the source code of this course will be written in 3.11.4

Add Python to Environment Variables



Python 3.8.10 (64-bit) Setup

Please ignore this

Advanced Options

□ Install for all users

□ Associate files with Python (requires the py launcher)

☑ Create shortcuts for installed applications

☑ Add Python to environment variables

□ Precompile standard library

□ Download debugging symbols

□ Download debug binaries (requires VS 2015 or later)

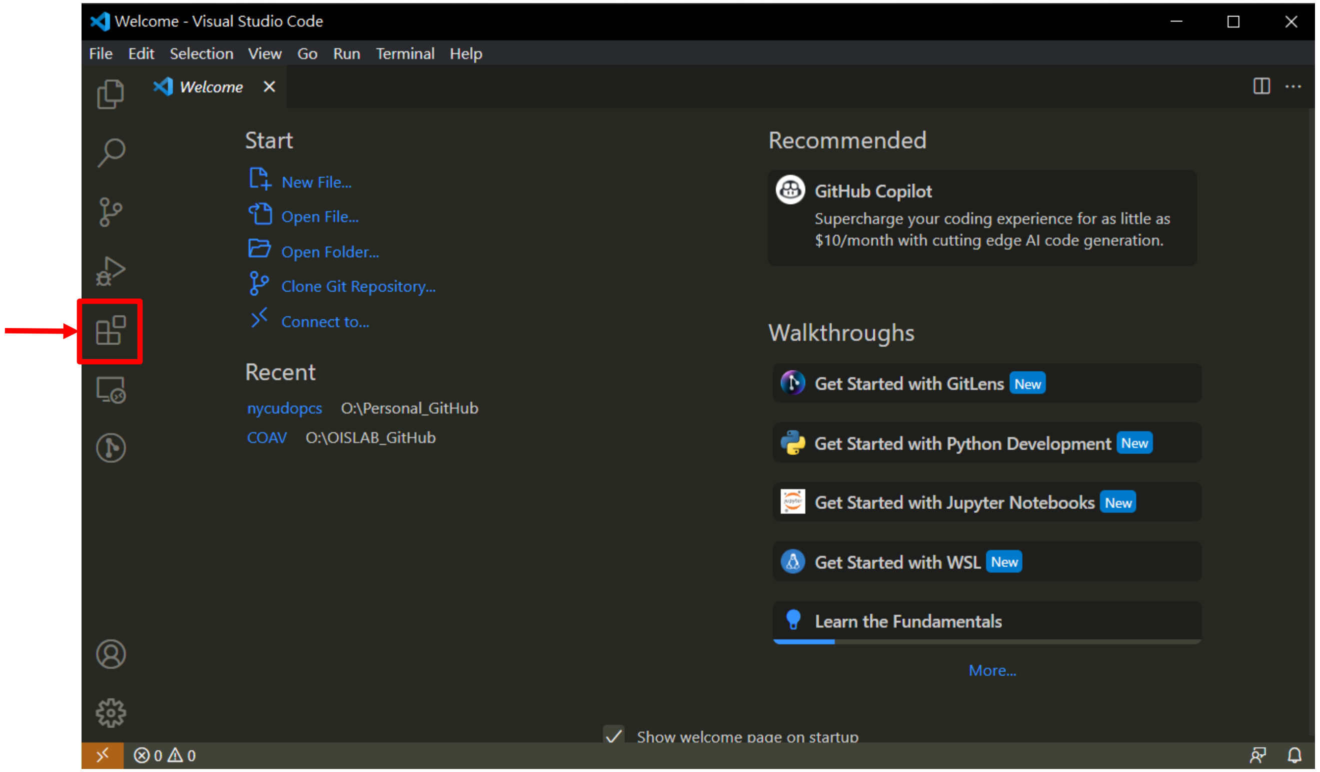
Customize install location

C:\Users\ \AppData\Local\Programs\Python\Python38\

You will require write permissions for the selected location.

Visual Studio Code

- Download Visual Studio Code - Mac, Linux, Windows
- A powerful integrated development environment (IDE)
- VS code Python extension



Supercharge your coding experience for as little as $10/month with cutting edge AI code generation.

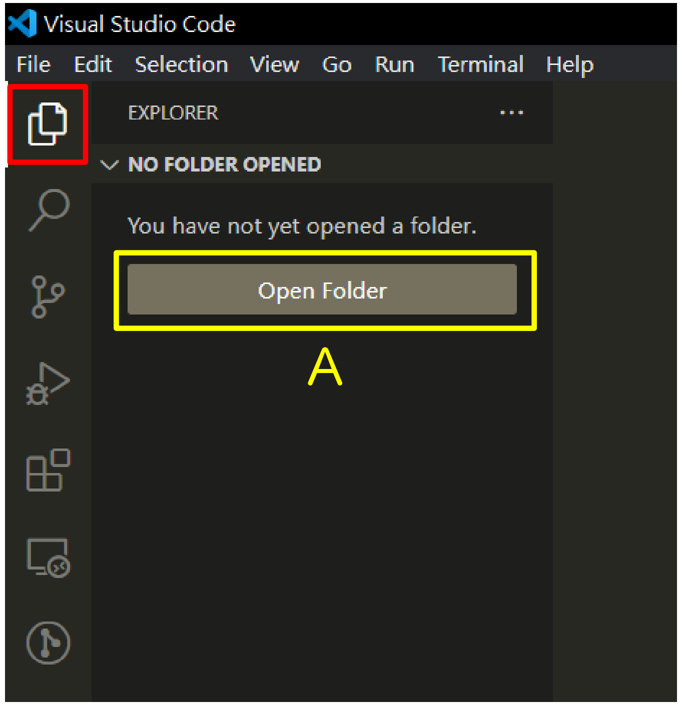
Extensions →

Run Your Python Script on VS Code

A. Open a folder.

B. Create a *.py file

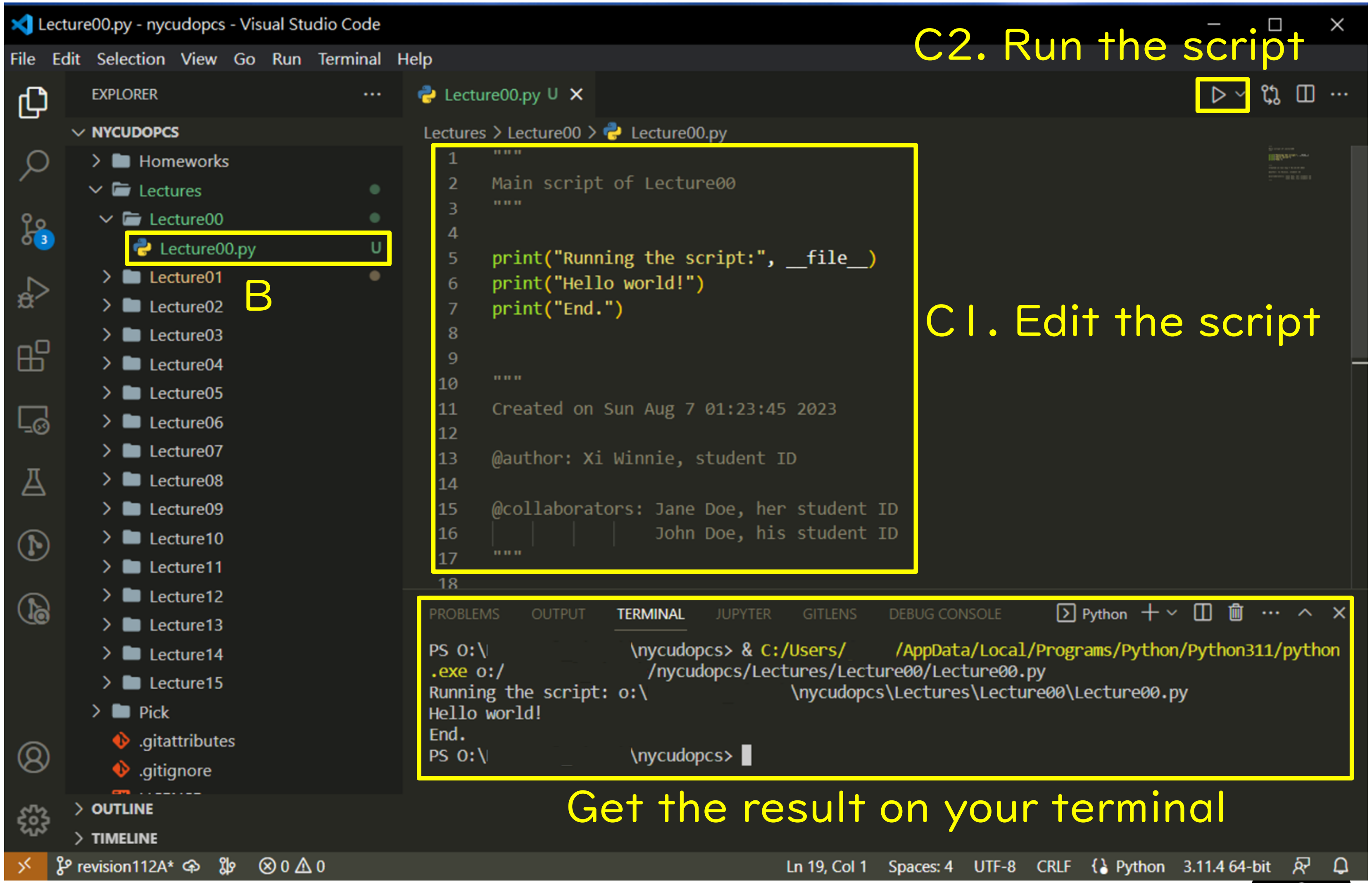
C. Edit and run the script



You have not yet opened a folder.

Open Folder

A



B

C2. Run the script

C1. Edit the script

```python
"""
Main script of Lecture00
"""

print("Running the script:", __file__)
print("Hello world!")
print("End.")


"""
Created on Sun Aug 7 01:23:45 2023

@author: Xi Winnie, student ID

@collaborators: Jane Doe, her student ID
                John Doe, his student ID
"""
```

```
PS O:\[redacted]\nycudopcs> & C:/Users/[redacted]/AppData/Local/Programs/Python/Python311/python
.exe o:/[redacted]/nycudopcs/Lectures/Lecture00/Lecture00.py
Running the script: o:\[redacted]\nycudopcs\Lectures\Lecture00\Lecture00.py
Hello world!
End.
PS O:\[redacted]\nycudopcs> █
```

Get the result on your terminal

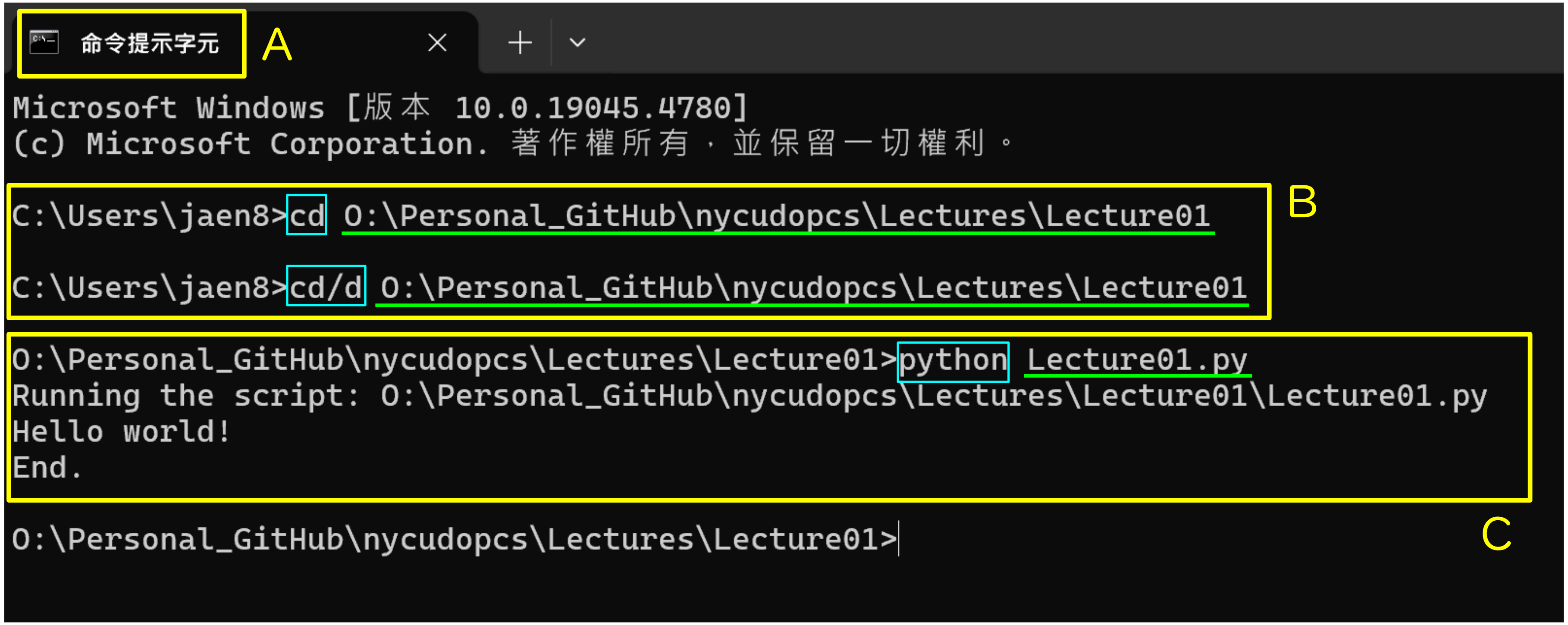
Run Your Python Script on Terminal

A. Open your terminal

B. Change the directory

C. Run the script

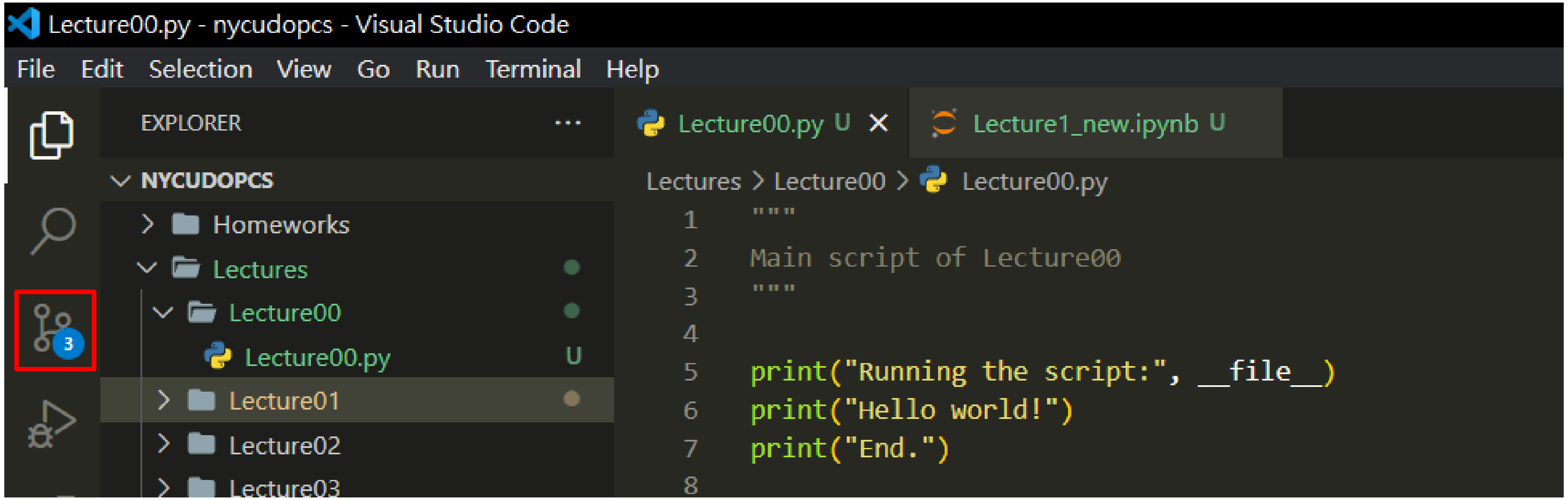
RECOMMENDED!



```
Microsoft Windows [版本 10.0.19045.4780]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\jaen8>cd O:\Personal_GitHub\nycudopcs\Lectures\Lecture01

C:\Users\jaen8>cd/d O:\Personal_GitHub\nycudopcs\Lectures\Lecture01

O:\Personal_GitHub\nycudopcs\Lectures\Lecture01>python Lecture01.py
Running the script: O:\Personal_GitHub\nycudopcs\Lectures\Lecture01\Lecture01.py
Hello world!
End.

O:\Personal_GitHub\nycudopcs\Lectures\Lecture01>
```

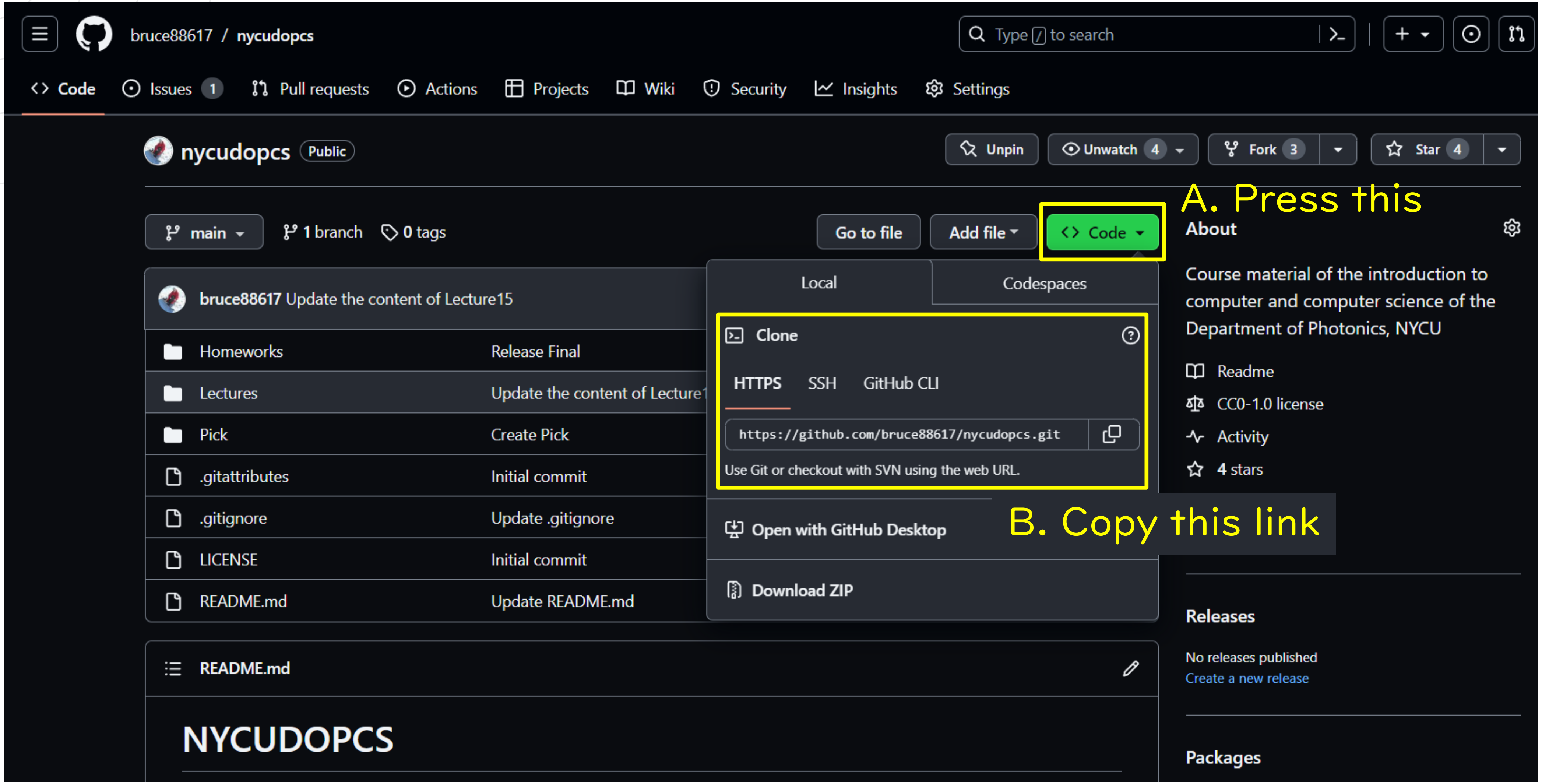
Git & GitHub

- Download and install Git: [Git (git-scm.com)]
- A free and open source distributed version control system
- The handouts of this course have been pushed onto GitHub: [Course material of the introduction to computer and computer science of the Department of Photonics, NYCU (github.com)]



```python
"""
Main script of Lecture00
"""

print("Running the script:", __file__)
print("Hello world!")
print("End.")

```

Clone a Repository from GitHub (1/3)



bruce88617 Update the content of Lecture15

Homeworks	Release Final
Lectures	Update the content of Lecture1
Pick	Create Pick
.gitattributes	Initial commit
.gitignore	Update .gitignore
LICENSE	Initial commit
README.md	Update README.md

```
https://github.com/bruce88617/nycudopcs.git
```

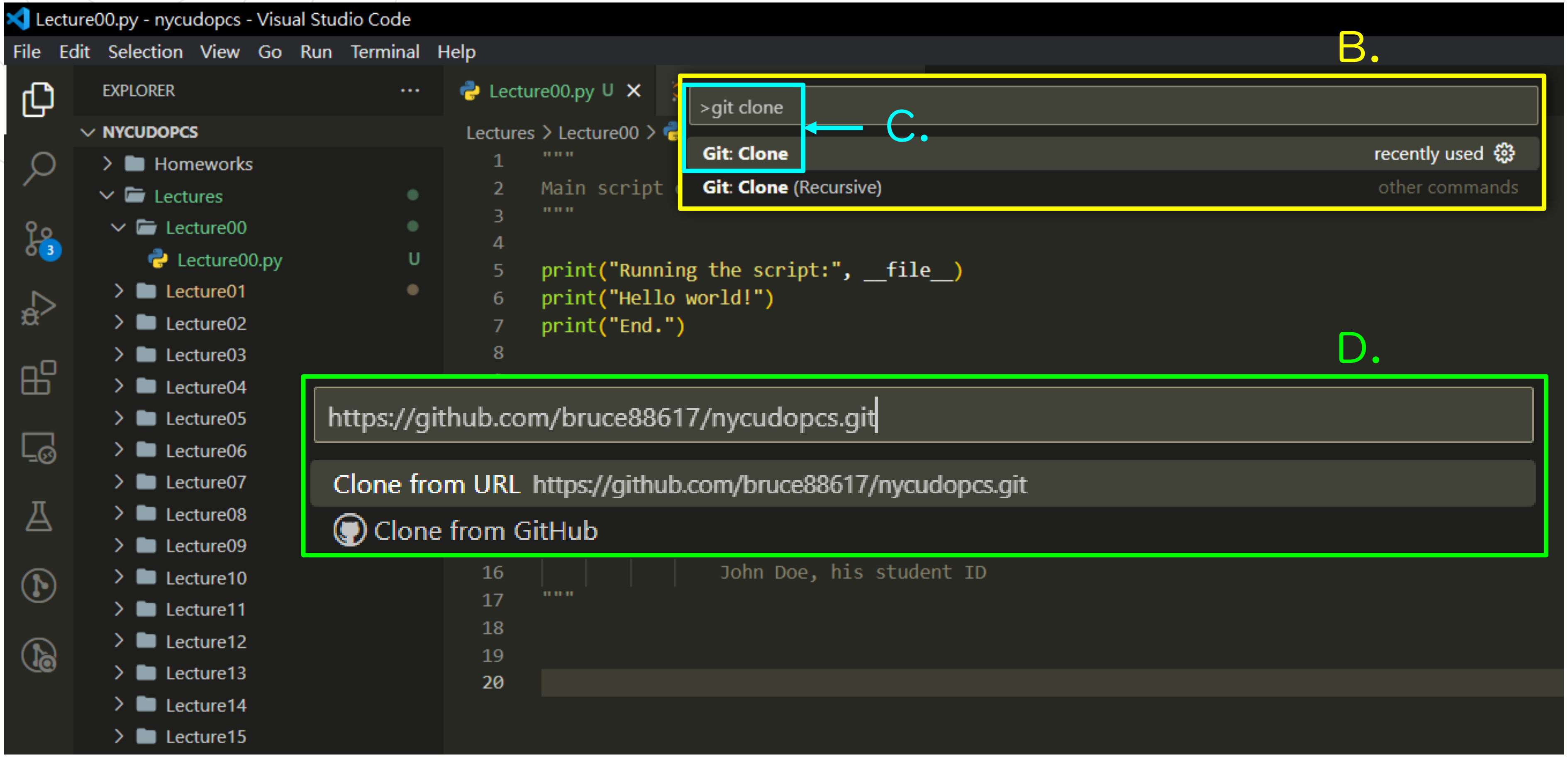
Use Git or checkout with SVN using the web URL.

Course material of the introduction to computer and computer science of the Department of Photonics, NYCU

A. Press this

B. Copy this link

Clone a Repository from GitHub (2/3)



```
"""
Main script
"""

print("Running the script:", __file__)
print("Hello world!")
print("End.")

        John Doe, his student ID
"""
```

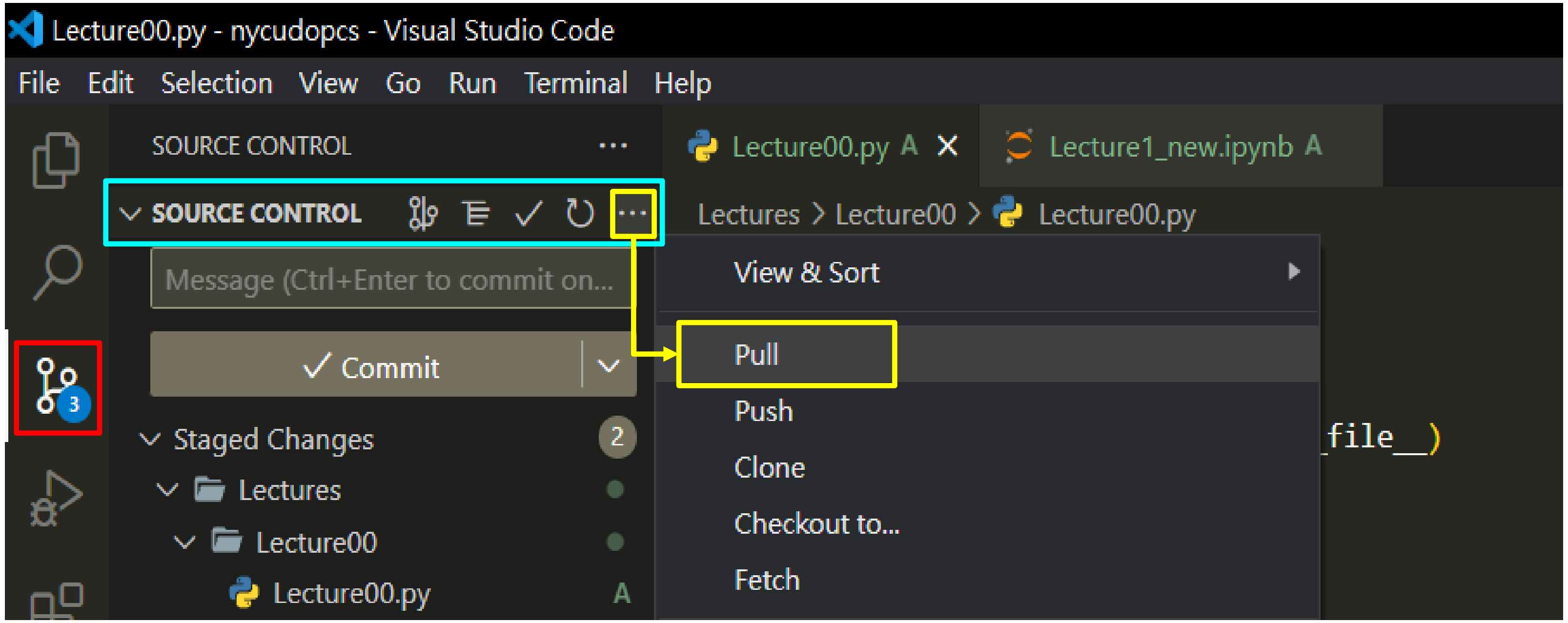
https://github.com/bruce88617/nycudopcs.git

Clone from URL https://github.com/bruce88617/nycudopcs.git

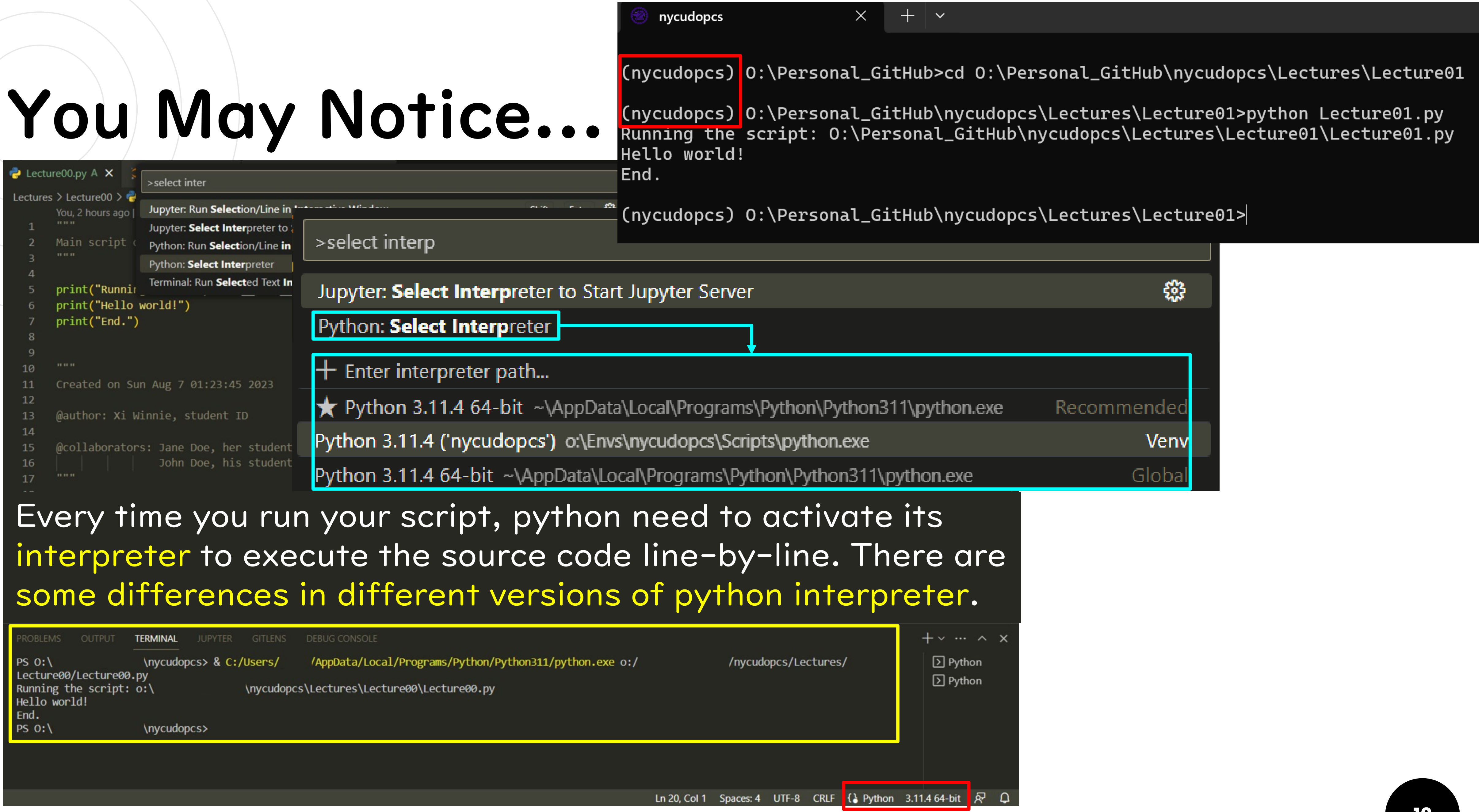
A. Back to VS code
B. Ctrl + Shift + P
C. “Git clone”
D. Paste the link
E. Choose directory

Clone a Repository from GitHub (3/3)

- Now you can pull any updates from GitHub.
- Attention, you don’t have authority to make any change (e.g. push something to the repository). We strongly recommend you to copy the entire repository (or only the lectures) to another directory in your computer if you want to change the content.



You May Notice...



```
(nycudopcs) O:\Personal_GitHub>cd O:\Personal_GitHub\nycudopcs\Lectures\Lecture01

(nycudopcs) O:\Personal_GitHub\nycudopcs\Lectures\Lecture01>python Lecture01.py
Running the script: O:\Personal_GitHub\nycudopcs\Lectures\Lecture01\Lecture01.py
Hello world!
End.

(nycudopcs) O:\Personal_GitHub\nycudopcs\Lectures\Lecture01>
```

```
"""
Main script 
"""

print("Runnir
print("Hello world!")
print("End.")


"""
Created on Sun Aug 7 01:23:45 2023

@author: Xi Winnie, student ID

@collaborators: Jane Doe, her student
                John Doe, his student
"""
```

>select inter

- Jupyter: Run Selection/Line in Interactive Window
- Jupyter: Select Interpreter to
- Python: Run Selection/Line in
- Python: Select Interpreter
- Terminal: Run Selected Text In

>select interp

- Jupyter: Select Interpreter to Start Jupyter Server
- Python: Select Interpreter

- + Enter interpreter path...
- ★ Python 3.11.4 64-bit ~\AppData\Local\Programs\Python\Python311\python.exe — Recommended
- Python 3.11.4 ('nycudopcs') o:\Envs\nycudopcs\Scripts\python.exe — Venv
- Python 3.11.4 64-bit ~\AppData\Local\Programs\Python\Python311\python.exe — Global

Every time you run your script, python need to activate its interpreter to execute the source code line-by-line. There are some differences in different versions of python interpreter.

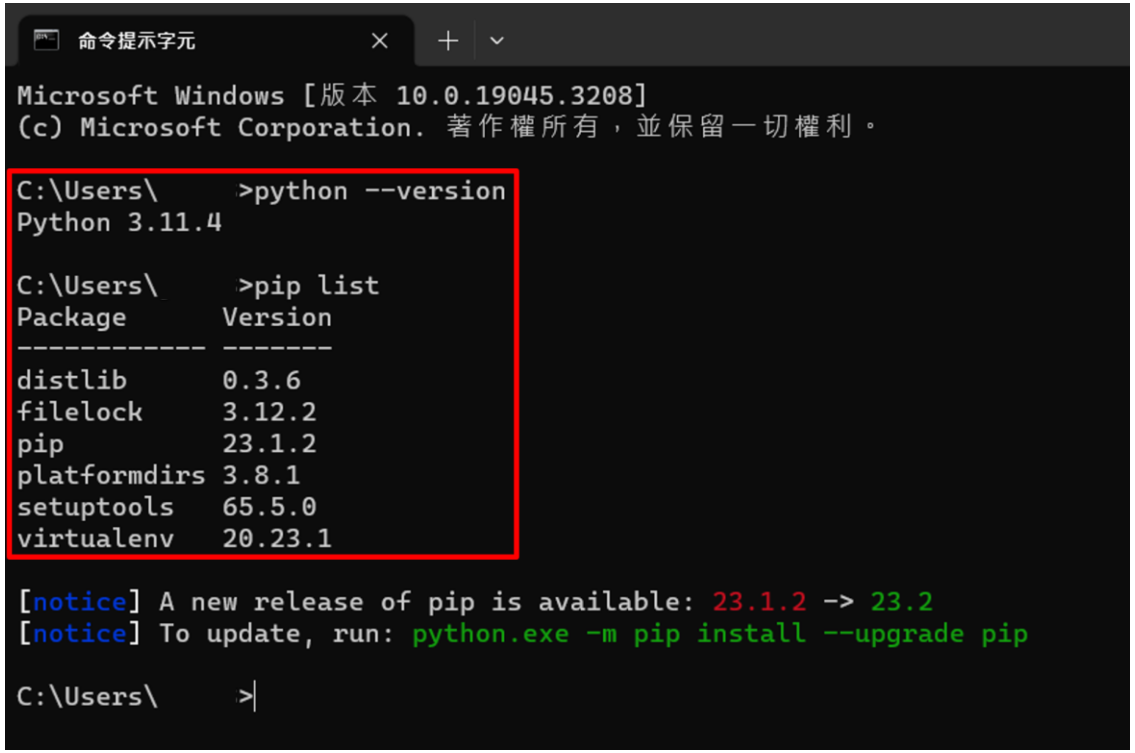
```
PS O:\             \nycudopcs> & C:/Users/      /AppData/Local/Programs/Python/Python311/python.exe o:/             /nycudopcs/Lectures/
Lecture00/Lecture00.py
Running the script: o:\             \nycudopcs\Lectures\Lecture00\Lecture00.py
Hello world!
End.
PS O:\             \nycudopcs>
```

Ln 20, Col 1   Spaces: 4   UTF-8   CRLF   Python 3.11.4 64-bit

Environment Control

- Why do we need this?
  - Version compatibility of different python modules or packages
  - Development for different projects
  - Convenience
- Rule of thumb

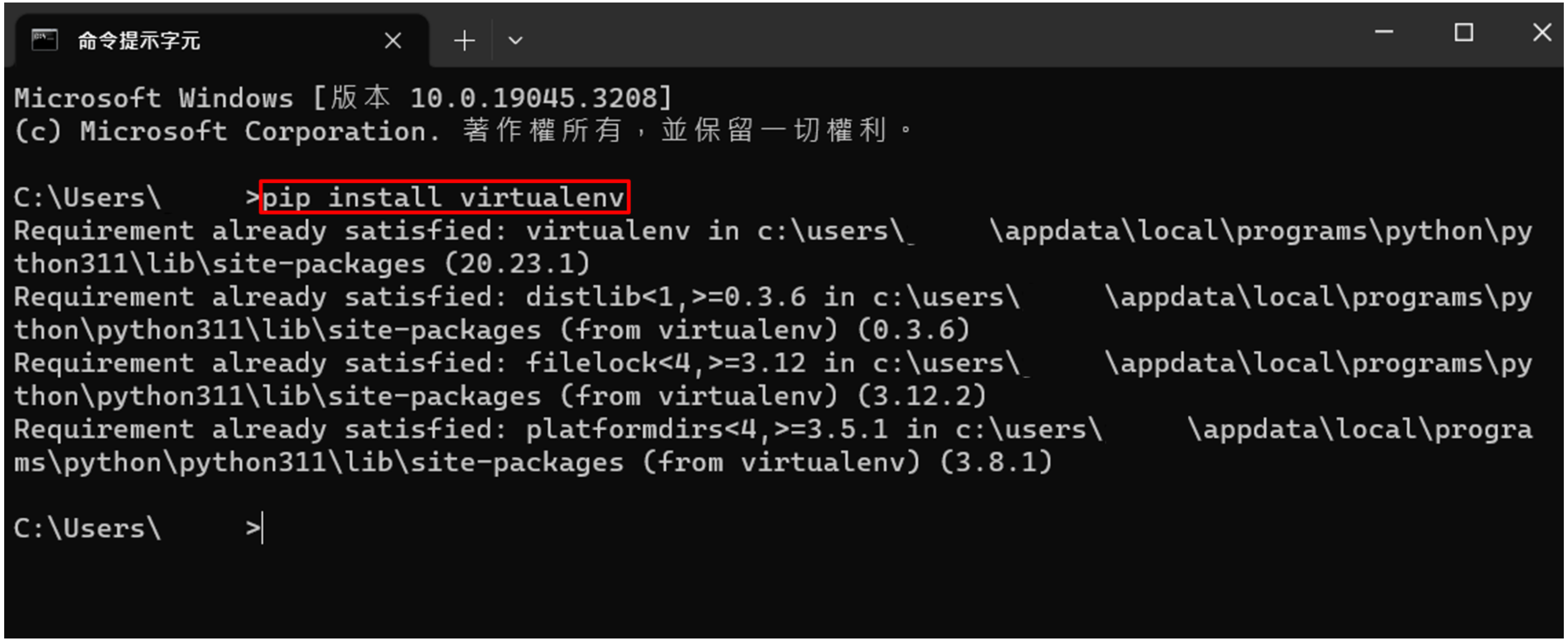
  Keep your base environment clean!



```
Microsoft Windows [版本 10.0.19045.3208]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\      >python --version
Python 3.11.4

C:\Users\      >pip list
Package      Version
------------ -------
distlib      0.3.6
filelock     3.12.2
pip          23.1.2
platformdirs 3.8.1
setuptools   65.5.0
virtualenv   20.23.1

[notice] A new release of pip is available: 23.1.2 -> 23.2
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\      >
```

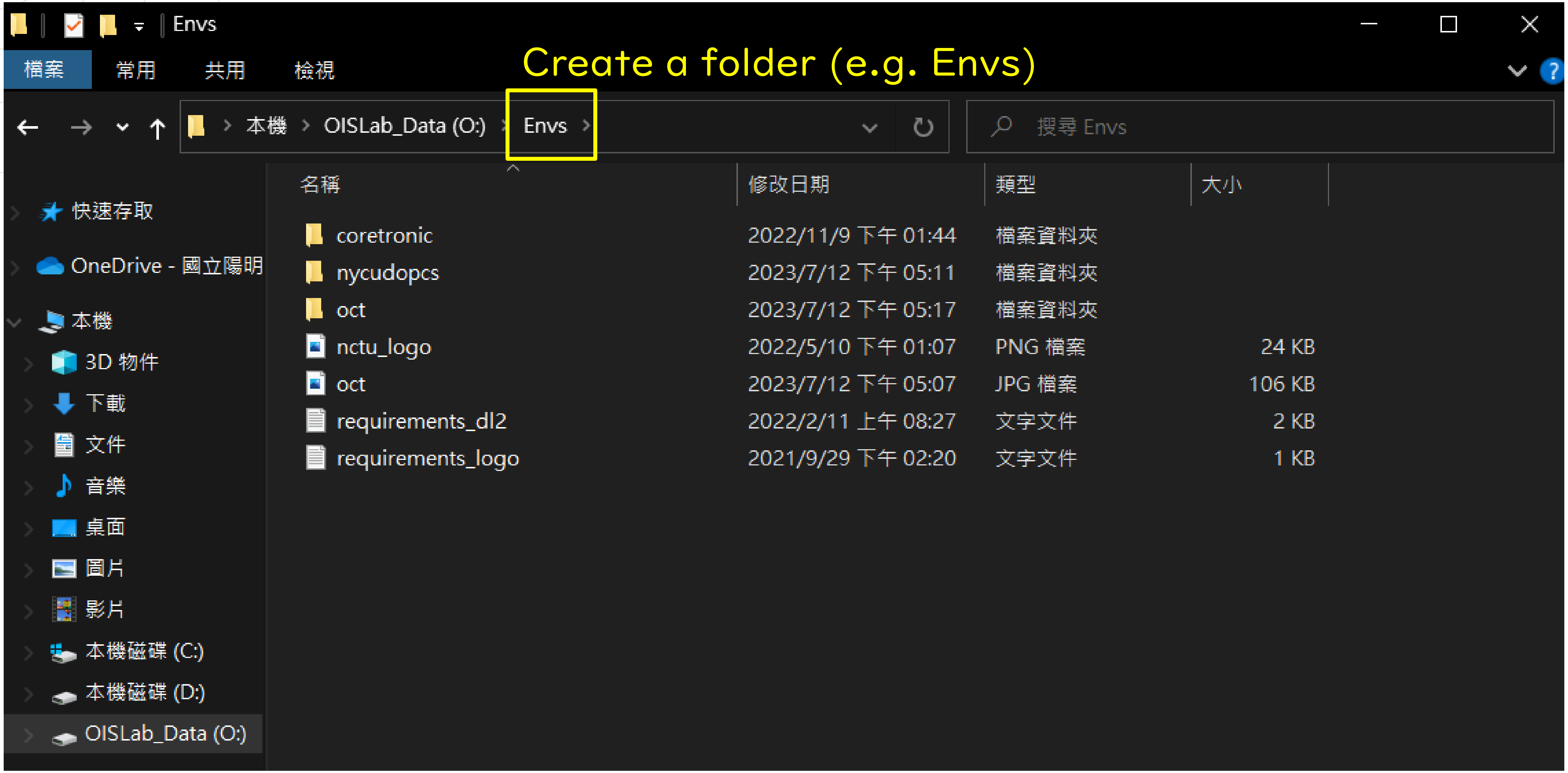
Virtual Environment

- Use venv or virtualenv (optional) packages
- If you choose virtualenv, install virtualenv via pip install virtualenv



```
Microsoft Windows [版本 10.0.19045.3208]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。

C:\Users\      >pip install virtualenv
Requirement already satisfied: virtualenv in c:\users\_     \appdata\local\programs\python\py
thon311\lib\site-packages (20.23.1)
Requirement already satisfied: distlib<1,>=0.3.6 in c:\users\     \appdata\local\programs\py
thon\python311\lib\site-packages (from virtualenv) (0.3.6)
Requirement already satisfied: filelock<4,>=3.12 in c:\users\_     \appdata\local\programs\py
thon\python311\lib\site-packages (from virtualenv) (3.12.2)
Requirement already satisfied: platformdirs<4,>=3.5.1 in c:\users\     \appdata\local\progra
ms\python\python311\lib\site-packages (from virtualenv) (3.8.1)

C:\Users\      >
```

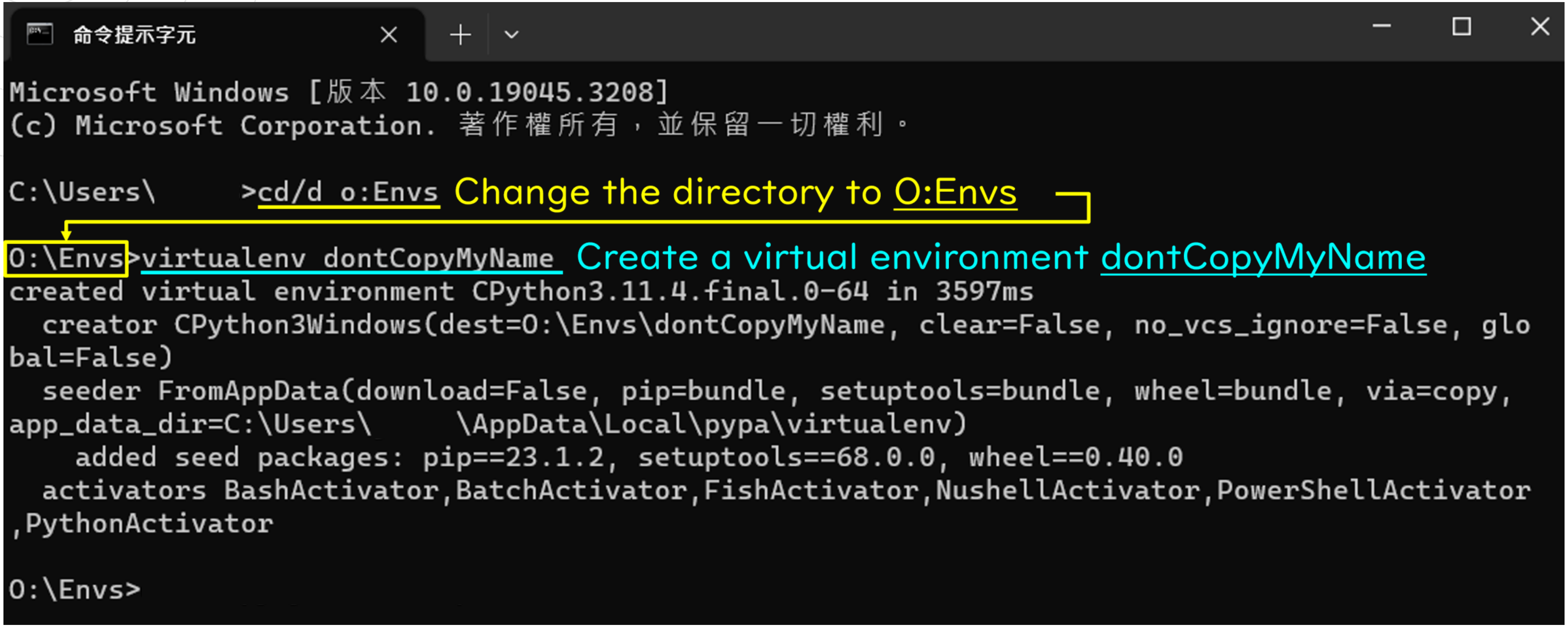
Create A Folder for Your Environments



Create a folder (e.g. Envs)

名稱	修改日期	類型	大小
coretronic	2022/11/9 下午 01:44	檔案資料夾	
nycudopcs	2023/7/12 下午 05:11	檔案資料夾	
oct	2023/7/12 下午 05:17	檔案資料夾	
nctu_logo	2022/5/10 下午 01:07	PNG 檔案	24 KB
oct	2023/7/12 下午 05:07	JPG 檔案	106 KB
requirements_dl2	2022/2/11 上午 08:27	文字文件	2 KB
requirements_logo	2021/9/29 下午 02:20	文字文件	1 KB

Change The Directory to Your Folder



```
Microsoft Windows [版本 10.0.19045.3208]
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C:\Users\     >cd/d o:Envs

O:\Envs>virtualenv dontCopyMyName
created virtual environment CPython3.11.4.final.0-64 in 3597ms
  creator CPython3Windows(dest=O:\Envs\dontCopyMyName, clear=False, no_vcs_ignore=False, glo
bal=False)
  seeder FromAppData(download=False, pip=bundle, setuptools=bundle, wheel=bundle, via=copy,
app_data_dir=C:\Users\     \AppData\Local\pypa\virtualenv)
    added seed packages: pip==23.1.2, setuptools==68.0.0, wheel==0.40.0
  activators BashActivator,BatchActivator,FishActivator,NushellActivator,PowerShellActivator
,PythonActivator

O:\Envs>
```

Change the directory to O:Envs

Create a virtual environment dontCopyMyName

Step-by-step Prompts

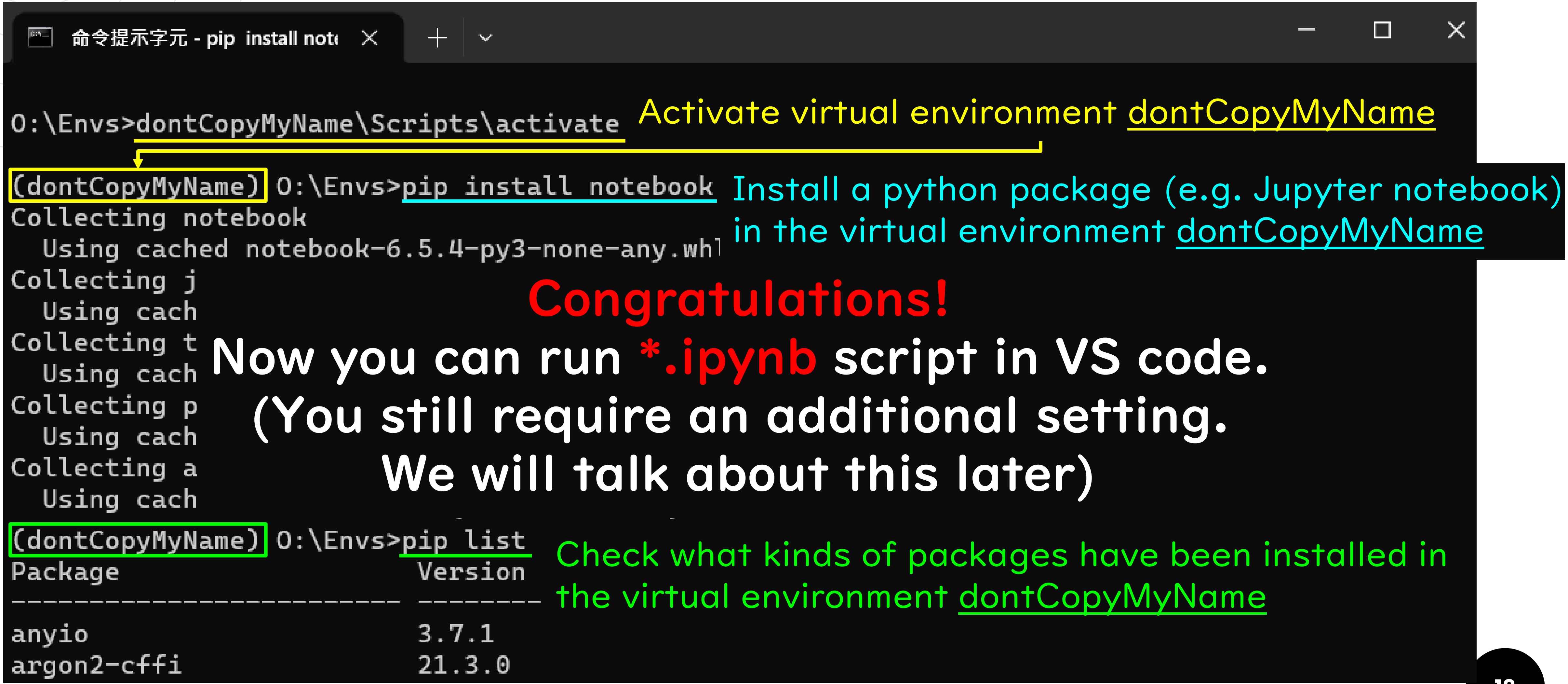
If you use venv

1. Change the directory
   `cd [your directory]`
2. Create virtual environment
   `venv [envName]` or
   `python –m venv [envName]`
3. Activate your virtual environment
   (Windows)
   `cd [envName/Scripts]` then `activate`
   (MacOS & Linux)
   `cd [envName/bins]` then `source activate`
4. Install the packages you need
   `pip install [packages]` or
   `python –m pip install [packages]`

If you use virtualenv

1. Change the directory
   `cd [your directory]`
2. Create virtual environment
   `virtualenv [envName]` or
   `python –m virtualenv [envName]`
3. Activate your virtual environment
   (Windows)
   `cd [envName/Scripts]` then `activate`
   (MacOS & Linux)
   `cd [envName/bin]` then `source activate`
4. Install the packages you need
   `pip install [packages]` or
   `python –m pip install [packages]`

Activate Your Virtual Environment



```
O:\Envs>dontCopyMyName\Scripts\activate

(dontCopyMyName) O:\Envs>pip install notebook
Collecting notebook
  Using cached notebook-6.5.4-py3-none-any.whl
Collecting j
  Using cach
Collecting t
  Using cach
Collecting p
  Using cach
Collecting a
  Using cach

(dontCopyMyName) O:\Envs>pip list
Package                   Version
------------------------- ---------
anyio                     3.7.1
argon2-cffi               21.3.0
```

Activate virtual environment dontCopyMyName

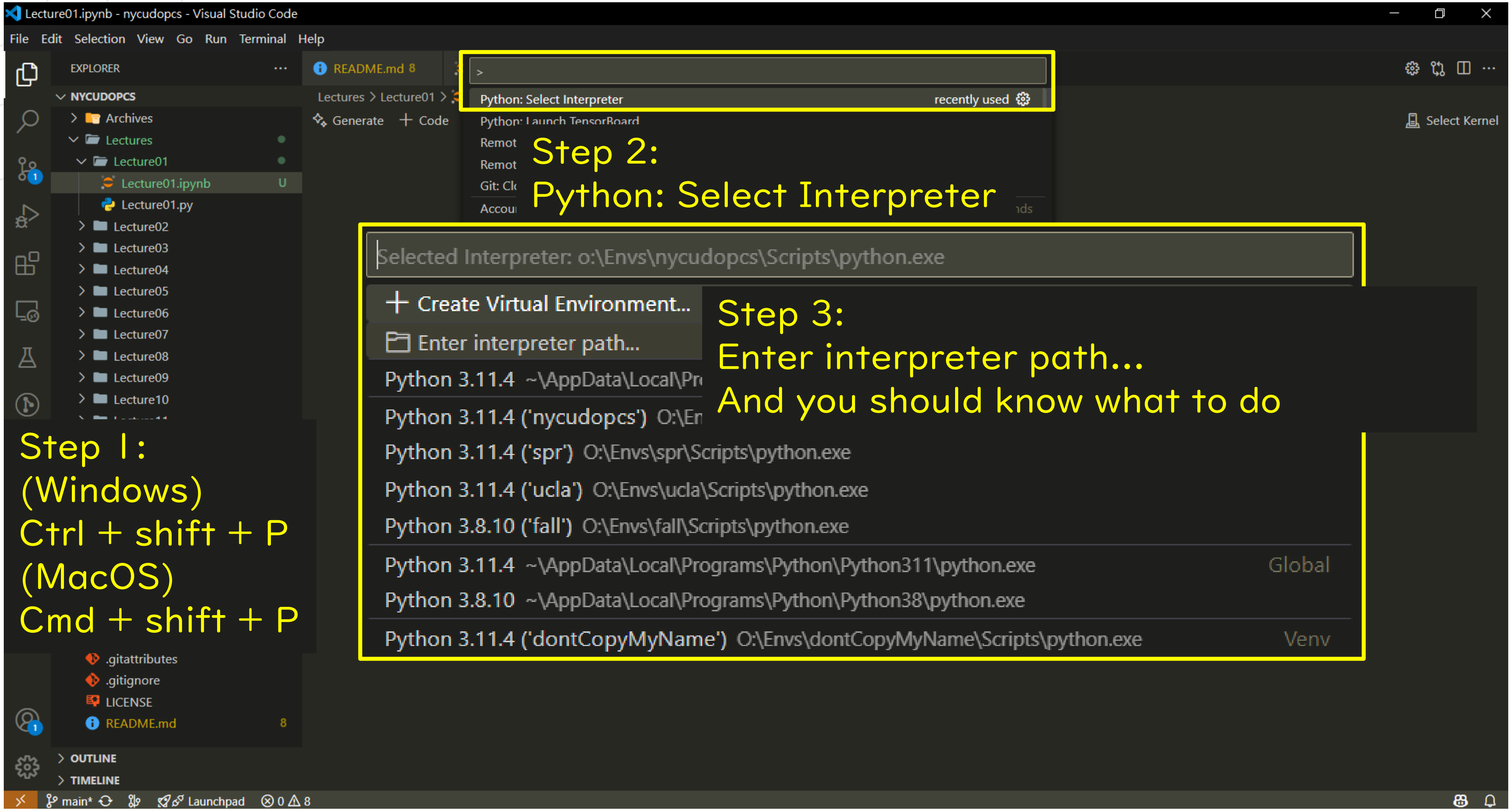
Install a python package (e.g. Jupyter notebook) in the virtual environment dontCopyMyName

Congratulations!

Now you can run *.ipynb script in VS code.
(You still require an additional setting.
We will talk about this later)

Check what kinds of packages have been installed in the virtual environment dontCopyMyName

Select Python Interpreter for VS Code



>

Python: Select Interpreter recently used

Python: Launch TensorBoard

Step 2:
Python: Select Interpreter

Selected Interpreter: o:\Envs\nycudopcs\Scripts\python.exe

+ Create Virtual Environment...

Enter interpreter path...

Python 3.11.4 ~\AppData\Local\Pr

Python 3.11.4 ('nycudopcs') O:\En

Python 3.11.4 ('spr') O:\Envs\spr\Scripts\python.exe

Python 3.11.4 ('ucla') O:\Envs\ucla\Scripts\python.exe

Python 3.8.10 ('fall') O:\Envs\fall\Scripts\python.exe

Python 3.11.4 ~\AppData\Local\Programs\Python\Python311\python.exe Global

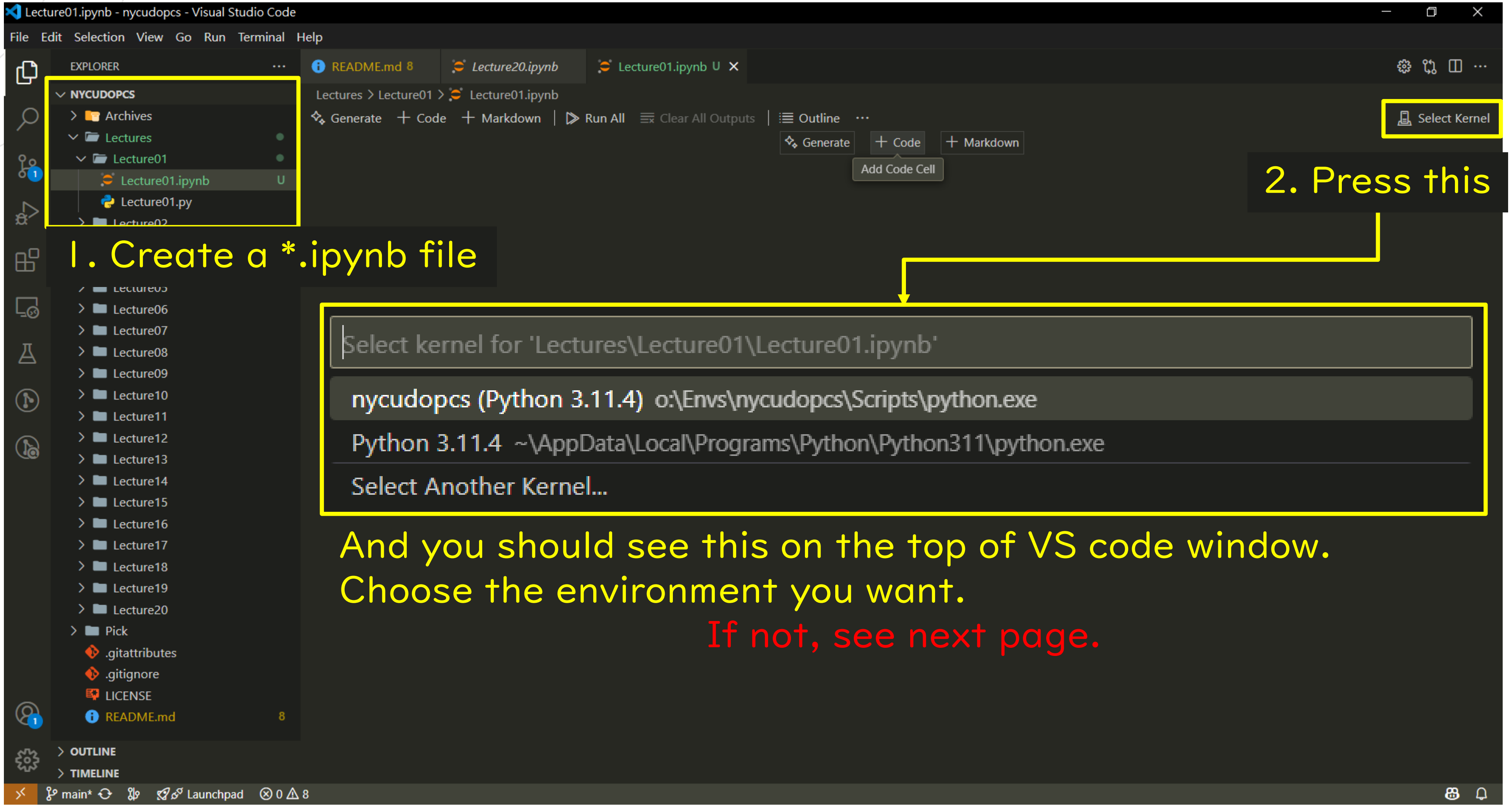
Python 3.8.10 ~\AppData\Local\Programs\Python\Python38\python.exe

Python 3.11.4 ('dontCopyMyName') O:\Envs\dontCopyMyName\Scripts\python.exe Venv

Step 3:
Enter interpreter path...
And you should know what to do

Step 1:
(Windows)
Ctrl + shift + P
(MacOS)
Cmd + shift + P

Select Kernel for *.ipynb in VS Code



Select kernel for 'Lectures\Lecture01\Lecture01.ipynb'

nycudopcs (Python 3.11.4) o:\Envs\nycudopcs\Scripts\python.exe

Python 3.11.4 ~\AppData\Local\Programs\Python\Python311\python.exe

Select Another Kernel...

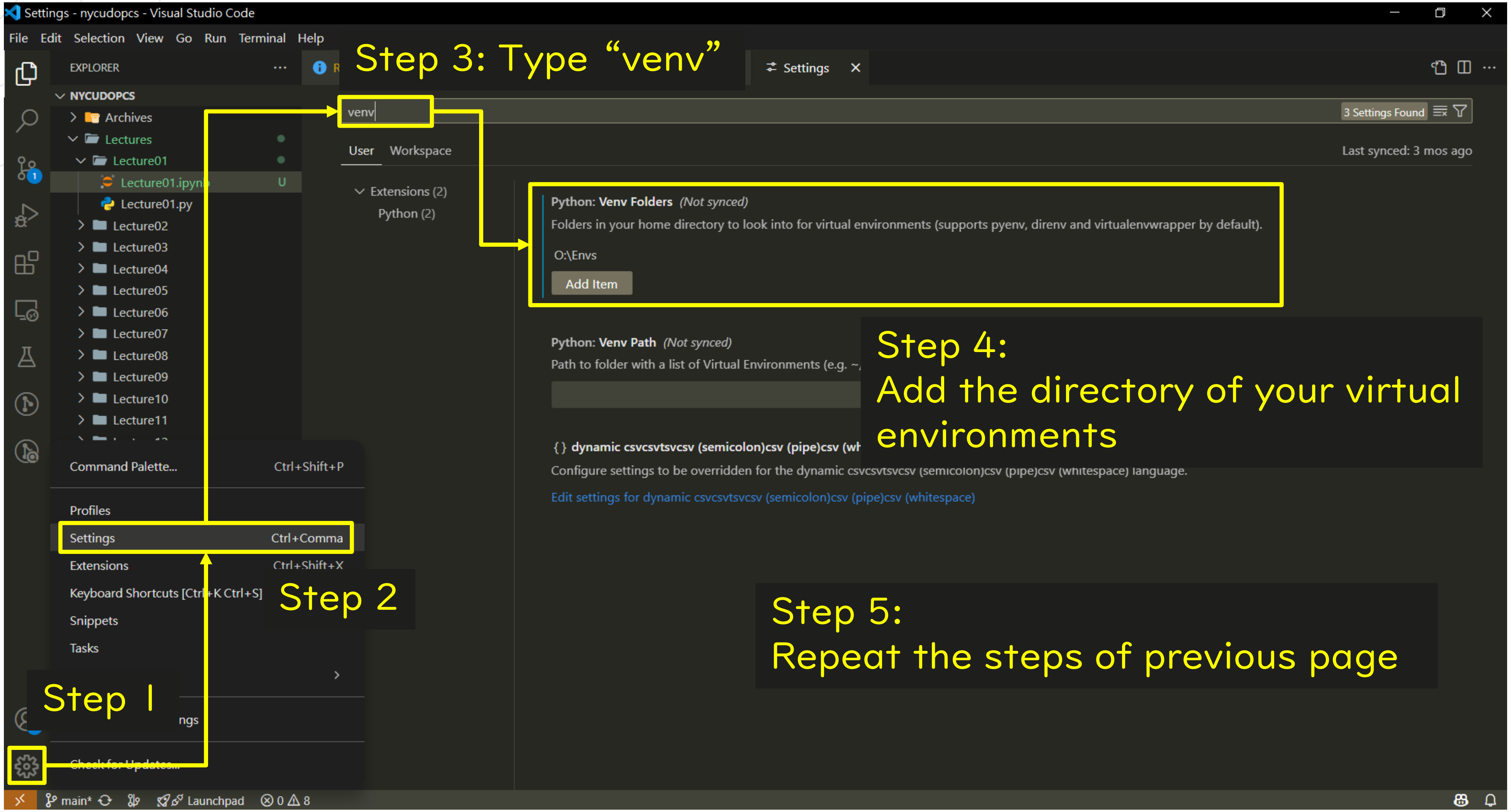
1. Create a *.ipynb file

2. Press this

And you should see this on the top of VS code window.
Choose the environment you want.

If not, see next page.

Change the Default Directory



Step 1

Step 2

Step 3: Type “venv”

Step 4:
Add the directory of your virtual environments

Step 5:
Repeat the steps of previous page

venv

3 Settings Found

Python: Venv Folders *(Not synced)*

Folders in your home directory to look into for virtual environments (supports pyenv, direnv and virtualenvwrapper by default).

O:\Envs

Add Item

Python: Venv Path *(Not synced)*

Path to folder with a list of Virtual Environments (e.g. ~,

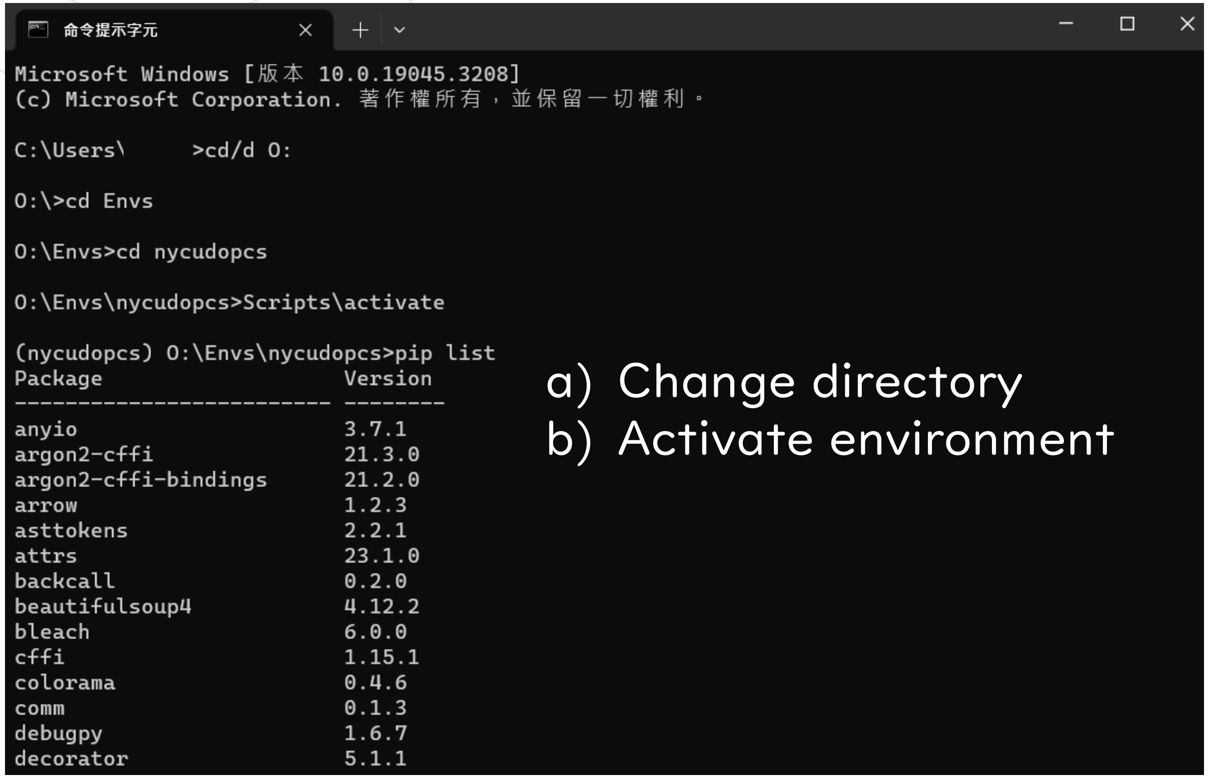
{} **dynamic csvcsvtsvcsv (semicolon)csv (pipe)csv (wh**

Configure settings to be overridden for the dynamic csvcsvtsvcsv (semicolon)csv (pipe)csv (whitespace) language.

Edit settings for dynamic csvcsvtsvcsv (semicolon)csv (pipe)csv (whitespace)

CMD vs Windows Terminal

Command Prompt (CMD)



```
Microsoft Windows [版本 10.0.19045.3208]
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C:\Users\      >cd/d O:

O:\>cd Envs

O:\Envs>cd nycudopcs

O:\Envs\nycudopcs>Scripts\activate

(nycudopcs) O:\Envs\nycudopcs>pip list
Package                   Version
------------------------- --------
anyio                     3.7.1
argon2-cffi               21.3.0
argon2-cffi-bindings      21.2.0
arrow                     1.2.3
asttokens                 2.2.1
attrs                     23.1.0
backcall                  0.2.0
beautifulsoup4            4.12.2
bleach                    6.0.0
cffi                      1.15.1
colorama                  0.4.6
comm                      0.1.3
debugpy                   1.6.7
decorator                 5.1.1
```
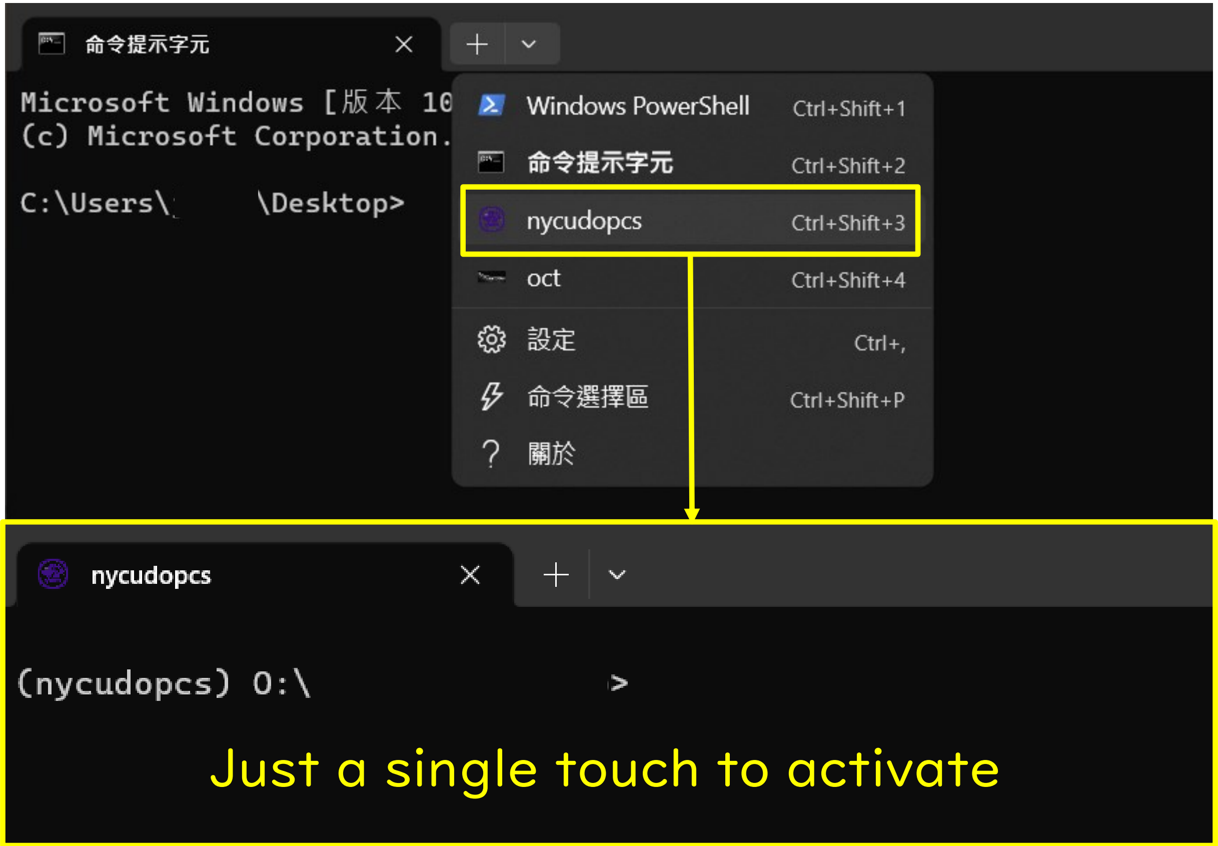

a) Change directory
b) Activate environment

This is not user-friendly because I’m lazy.

Windows Terminal



```
Microsoft Windows [版本 10
(c) Microsoft Corporation.

C:\Users\       \Desktop>
```

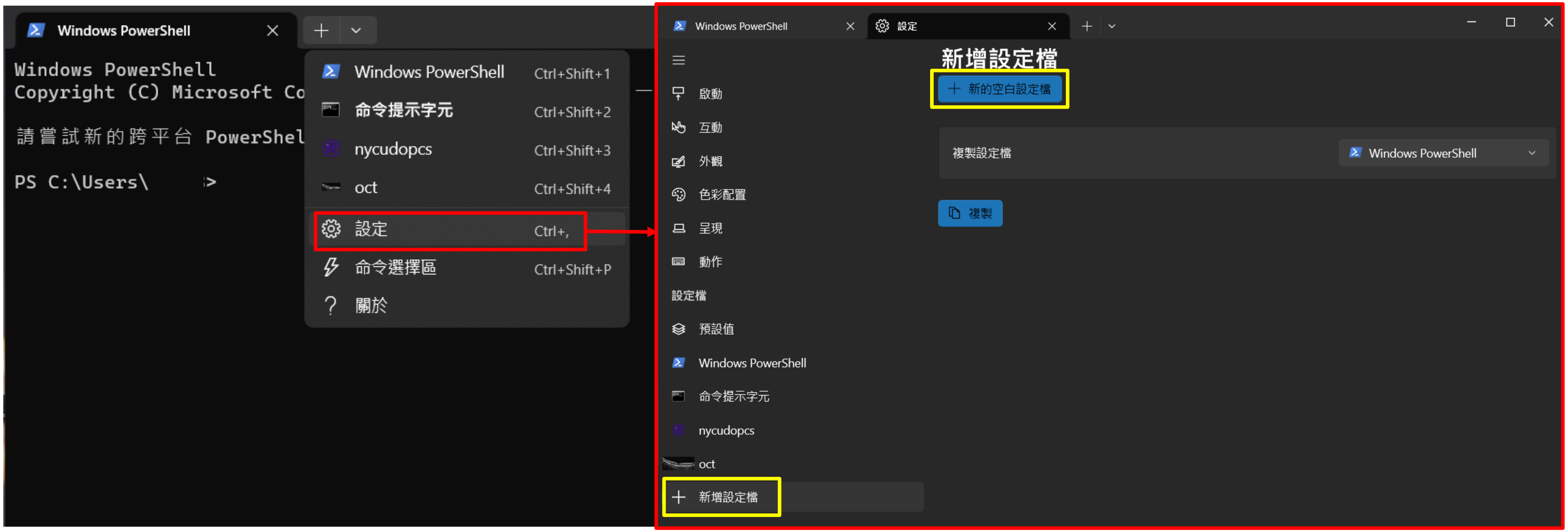
```
(nycudopcs) O:\                    >
```

Just a single touch to activate

Introduction to Computer and Computer Science, 2024 Fall, DoP, NYCU

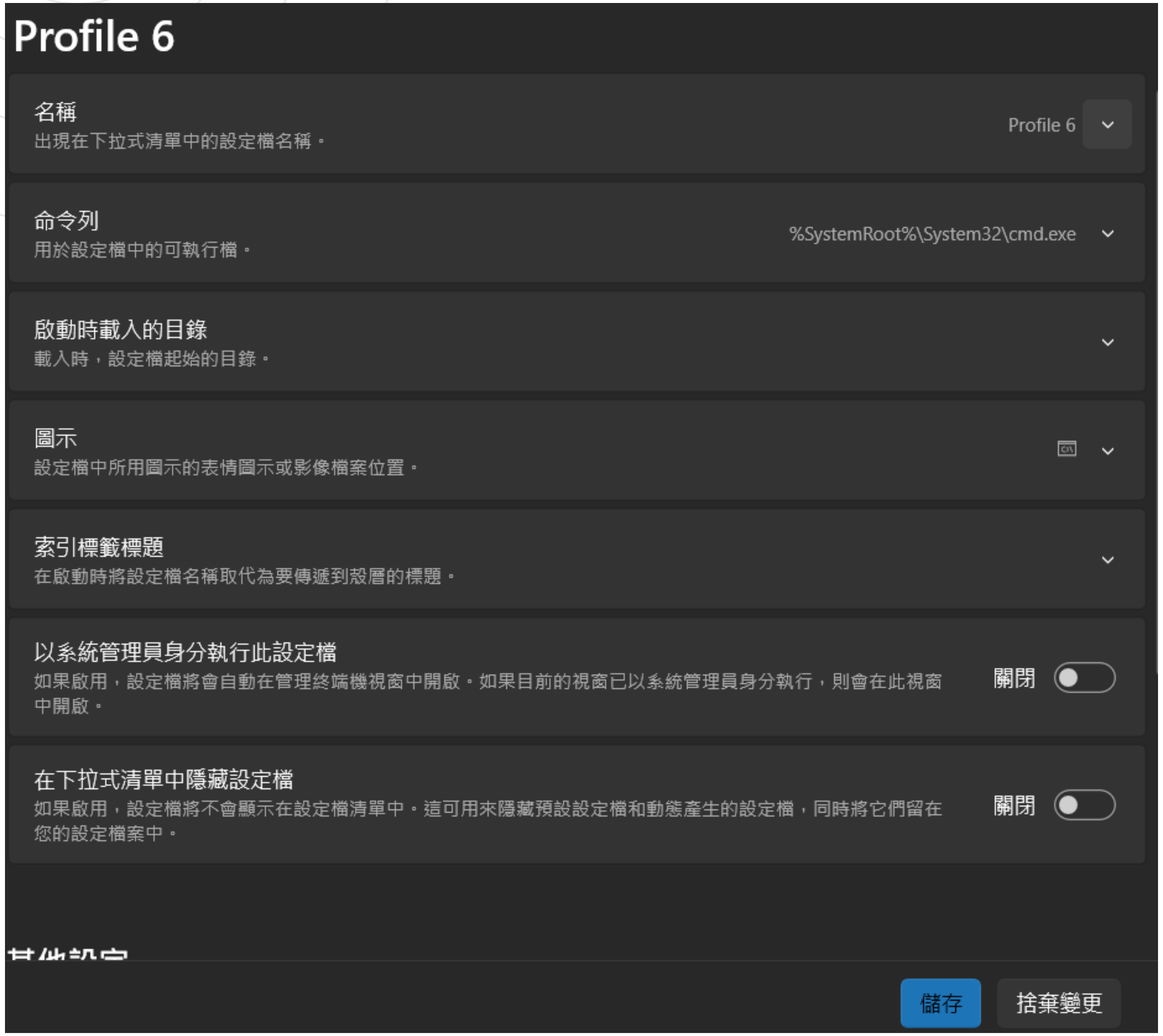
Settings for Windows Terminal (optional)

- Please download and install Windows Terminal (optional)
  Windows Terminal - Microsoft Store 應用程式



```
Windows PowerShell
Copyright (C) Microsoft Co

請嘗試新的跨平台 PowerShel

PS C:\Users\      >
```

Settings for Windows Terminal (optional)



Profile 6

名稱
出現在下拉式清單中的設定檔名稱。
Profile 6

命令列
用於設定檔中的可執行檔。
%SystemRoot%\System32\cmd.exe

啟動時載入的目錄
載入時，設定檔起始的目錄。

圖示
設定檔中所用圖示的表情圖示或影像檔案位置。

索引標籤標題
在啟動時將設定檔名稱取代為要傳遞到殼層的標題。

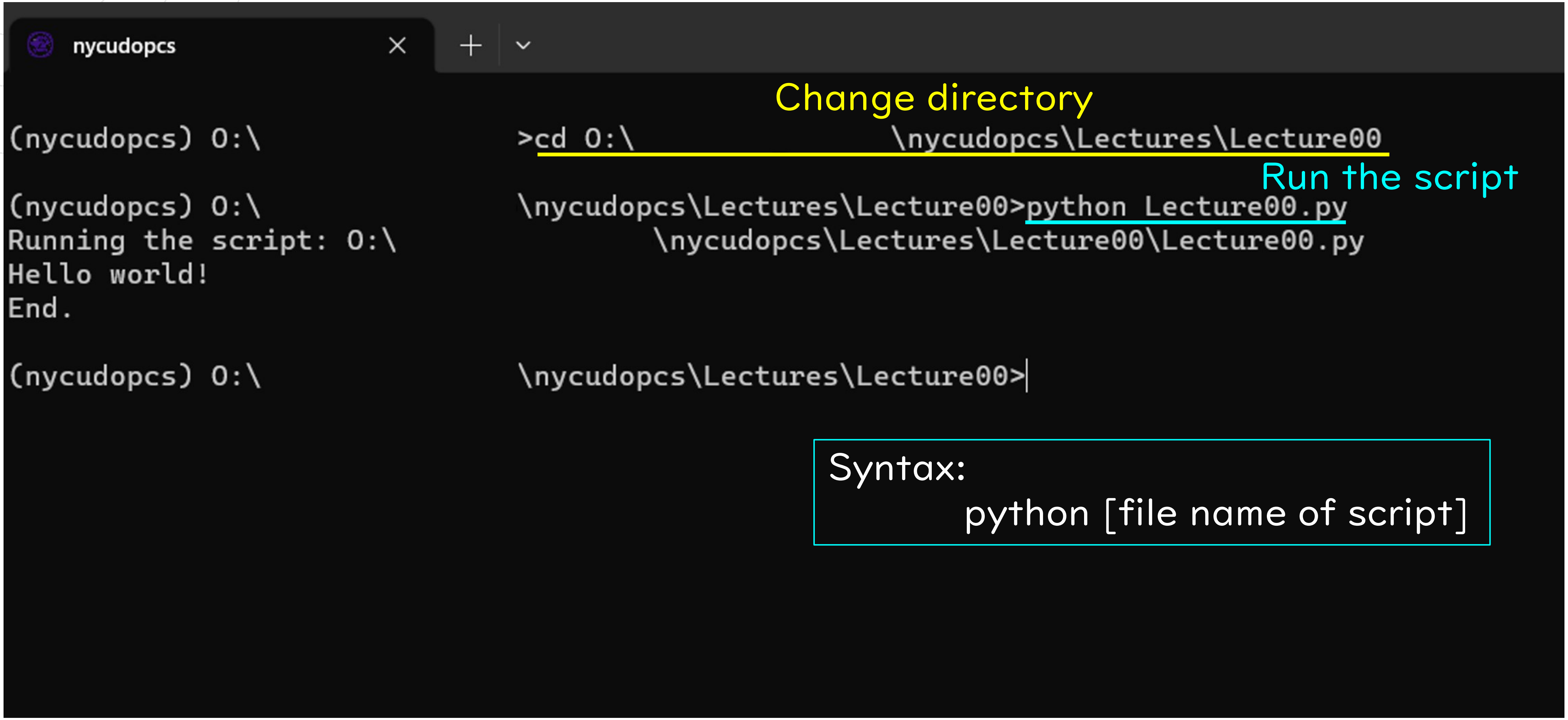
以系統管理員身分執行此設定檔
如果啟用，設定檔將會自動在管理終端機視窗中開啟。如果目前的視窗已以系統管理員身分執行，則會在此視窗中開啟。
關閉

在下拉式清單中隱藏設定檔
如果啟用，設定檔將不會顯示在設定檔清單中。這可用來隱藏預設設定檔和動態產生的設定檔，同時將它們留在您的設定檔案中。
關閉

其他設定

Item	Description & Example
名稱	這個頁面的名字叫什麼 Whatever you like
命令列	使用 cmd.exe 執行環境的 activate 以啟動環境 cmd.exe /k [the directory of your activate.bat] cmd.exe /k O:\Envs\nycudopcs\Scripts\activate
啟動時載入的目錄	當環境啟動的時候，cmd 的預設路徑 Whatever you like
圖示	他在頁面的圖案是什麼 Whatever you like

Run Your Python Script on Terminal



Change directory

Run the script

```
(nycudopcs) O:\                          >cd O:\                  \nycudopcs\Lectures\Lecture00

(nycudopcs) O:\                          \nycudopcs\Lectures\Lecture00>python Lecture00.py
Running the script: O:\                          \nycudopcs\Lectures\Lecture00\Lecture00.py
Hello world!
End.

(nycudopcs) O:\                          \nycudopcs\Lectures\Lecture00>
```

Syntax:

python [file name of script]

If You Feel Annoying...

- Embrace the Anaconda
  Free Download | Anaconda
- From IDE to Python packages, all-in-one
- But you have to learn how to do environment management via Google yourself.

jupyter
SciPy
SPYDER
NumPy
DASK
bokeh
scikit learn
pandas
TensorFlow
Numba
Panel
matplotlib
HoloViews
PYTORCH
CONDA

Summary

- Course information
- Python
  Welcome to Python.org
- VS code
  Visual Studio Code – Code Editing. Redefined
- Git and GitHub (optional)
  Git (git-scm.com), GitHub
- Windows Terminal (optional)
  Windows Terminal – Microsoft Store 應用程式
- Anaconda
  Free Download | Anaconda

Homework #0

- Please create a python script (.py file) and print your answer of the following questions:

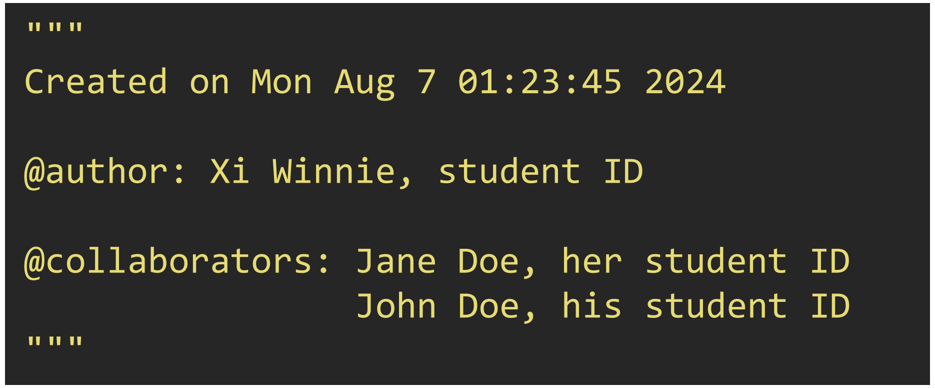
  1) Who are you?
  2) Why are you here?
  3) What do you expect to learn in this course?
  4) What do you want to do in this campus?
  5) Anything you like to say.

- Please printscreen (hot key: windows + shift + S) and summarize the results of every question in your report (a .pdf file).

  This means you have to submit two files (.py and .pdf).

Hand-in Procedure

- As we had mentioned, you should list all of your collaborators in your programs. Here is the template:



```
"""
Created on Mon Aug 7 01:23:45 2024

@author: Xi Winnie, student ID

@collaborators: Jane Doe, her student ID
                John Doe, his student ID
"""
```

- Please submit your homework as a .zip, .7z, or .rar file, where the file name should follow this format:

113A_hw0_ID.zip

Please note.

We are **NOT** going to accept any homework with **wrong file format**, **wrong file name**, or **without signature**. Please double check your content.