

Introduction to Computer Science

Topic 1: Python

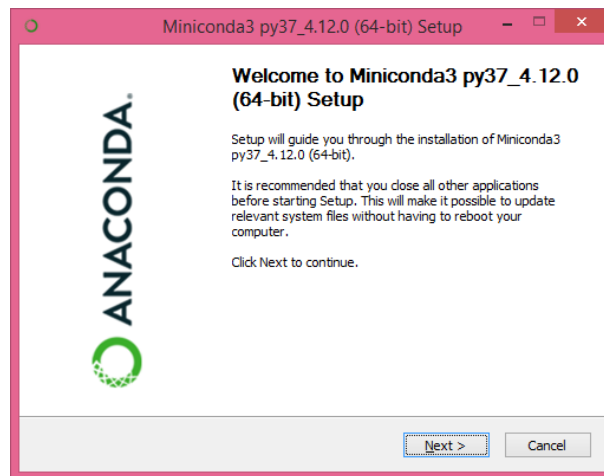
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1 Get started with Conda

1.1 Install Miniconda

Download the latest version Miniconda from [here](#). Click the installation file to start



1.2 Conda virtual enviroment

Conda is a package and environment manager that handles the tools we use to develop applications in Python. Conda lets us easily create and manage separate virtual environments to isolate installation of Python and its libraries, preventing these types of version conflicts. After the successful installation, we can start with several command line commands at the Anaconda Prompt for Windows. At first, open the Anaconda Prompt window

- Create a new virtual environment `conda create -n <env name> python=<version>`

```
Anaconda Prompt
(base) C:\Users\Hoang Pham>conda create -n example python=3.8
WARNING: A directory already exists at the target location 'C:\Anaconda3\envs\example'
but it is not a conda environment.
Continue creating environment (y/[n])? y
Collecting package metadata (current_repodata.json): done
Solving environment: done
```

- List all virtual environments *conda env list*

```
Anaconda Prompt
(base) C:\Users\Hoang Pham>conda env list
# conda environments:
#
base                * C:\Anaconda3
Temp                C:\Anaconda3\envs\Temp
bt1                 C:\Anaconda3\envs\bt1
bt2                 C:\Anaconda3\envs\bt2
example             C:\Anaconda3\envs\example
tensorflow           C:\Anaconda3\envs\tensorflow
tensorflow-gpu       C:\Anaconda3\envs\tensorflow-gpu
tf_gpu              C:\Anaconda3\envs\tf_gpu
                    C:\ProgramData\Miniconda3

(base) C:\Users\Hoang Pham>
```

- Activate a virtual environment *conda activate <env name>*

```
Anaconda Prompt
(base) C:\Users\Hoang Pham>conda activate example
(example) C:\Users\Hoang Pham>
```

- Deactivate a current virtual environment *conda deactivate*

```
Anaconda Prompt
(example) C:\Users\Hoang Pham>conda deactivate
(base) C:\Users\Hoang Pham>
```

- Remove a virtual environment *conda remove --name <env name> --all*

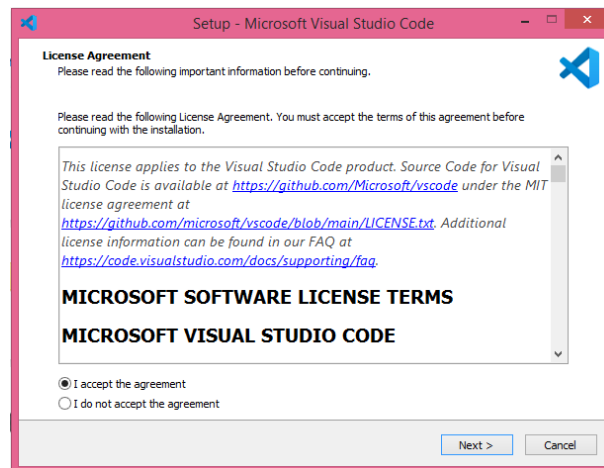
```
Anaconda Prompt
(base) C:\Users\Hoang Pham>conda remove --name example --all
Remove all packages in environment C:\Anaconda3\envs\example:
```

2 Get started with Visual Studio Code

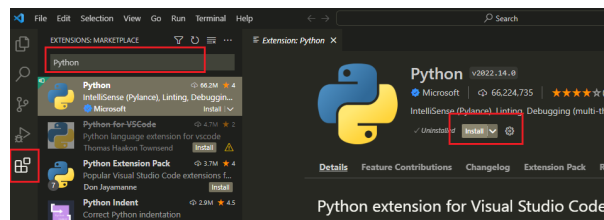
Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages and runtimes (such as C++, C#, Java, Python, PHP, Go, .NET).

2.1 Install Visual Studio Code

Download the latest version Visual Studio Code from [here](#). Click the installation file to start

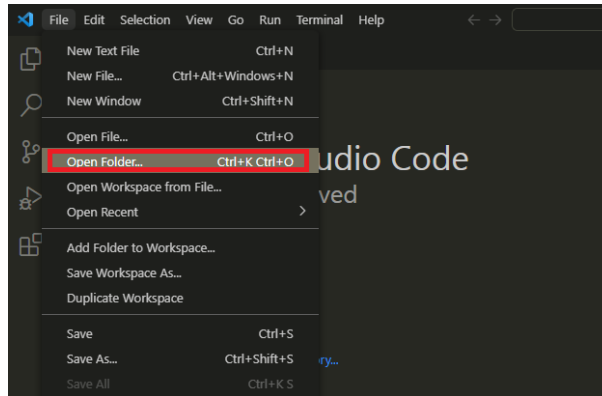


You can browse and install extensions from within VS Code. Extensions let you add languages, debuggers, and tools to your installation to support your development workflow. Installing a new extension by clicking on the Extensions icon in the Activity Bar on the left side of VS Code or the choose menu *View > Extensions* To support Python programming, you can install Python extension by open Extension, search Python, and install

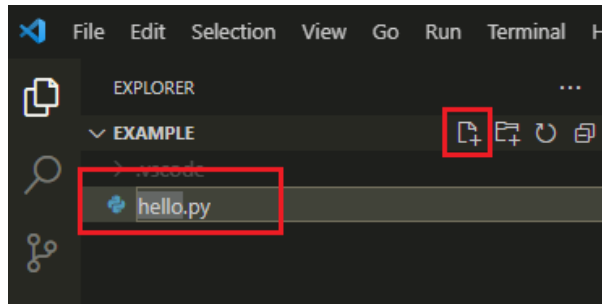


2.2 Run the first Python "Hello world"

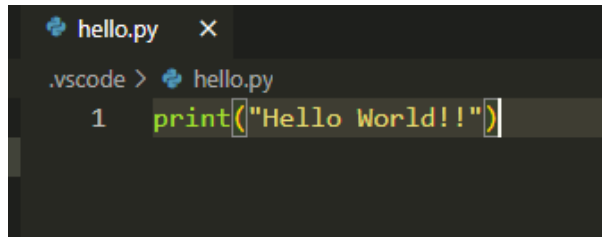
To open a folder, click *File* menu, choose *Open Folder*



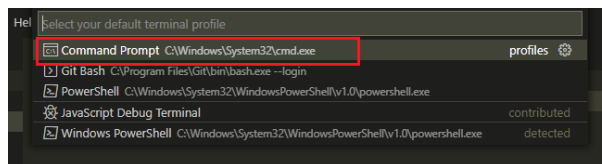
To create a new Python script, select the folder, click the icon *New File*, and rename your file *"hello.py"*



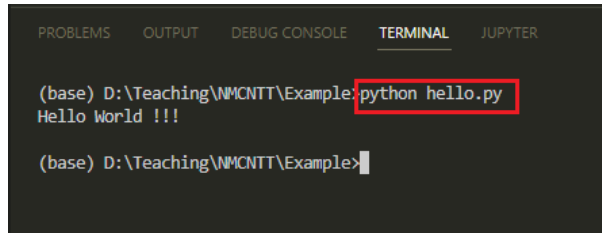
In *"hello.py"*, write the below script



To open Terminal, press *"Ctrl + ~"* or choose *Terminal > New Terminal* To select Command Prompt as a terminal, press *"Ctrl + Shift + P"*, type *"Terminal Select Default Profile"*, choose *"Command Prompt"*



To run python script, type *python <script-name.py>*

A screenshot of a Jupyter Notebook interface. At the top, there are tabs for 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', and 'JUPYTER'. The 'TERMINAL' tab is active. The terminal shows a command prompt with the path '(base) D:\Teaching\NNCNTT\Example>' followed by the command 'python hello.py' which is highlighted with a red box. Below the command, the output 'Hello World !!!' is displayed. The prompt then shows '(base) D:\Teaching\NNCNTT\Example>' with a cursor.

3 Python programming

3.1 Variable

A variable can be declared by an assignment. Variables do not need to be declared with any particular type, and can even change type after they have been set.

Source Code 1: Example of variable assignment

```
# a is assign to a integer
a = 1

# a is assigned to a string
a = "Hello_world!"

# a is assigned to a list consisting of integer
a = [1, 2, 3]

# a is assigned to a list consisting of multiple values
a = [1.2, "Hello", 4]
```

3.2 List

Lists are used to store multiple items in a single variable. More details about list can be found [here](#) and [here](#)

3.3 Function

A function is a block of code which only runs when it is called. You can pass data, known as parameters, into a function. A function can return data as a result. More details about function can be found [here](#) and [here](#)

3.4 If..else

More details about *if/else* can be found [here](#)

3.5 For loop

More details about *for loop* can be found here

3.6 While loop

More details about *while loop* can be found here

References

- [1] The OpenCV Tutorials
- [2] The OpenCV Document page
<https://docs.opencv.org/3.4/index.html>
- [3] OpenCV Tutorial C++
<https://www.opencv-srf.com/2011/11/track-bars.html>
- [4] Learn OpenCV by Examples
<http://opencvexamples.blogspot.com/2013/10/adding-trackbar.html>