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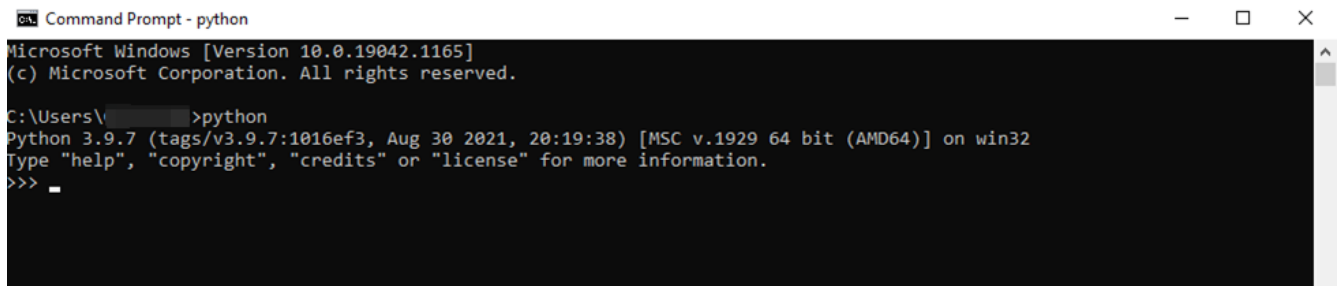UNIVERSITY AT ALBANY

State University of New York

Python Basics I: Running Python Scripts and Code

A Python script is a .py file containing multiple Python commands. A Python module is a file containing Python code that can be imported and used in another Python file. The main difference between a script and a module is that scripts are structured to be directly executed like a program, while modules are designed to be imported. In the following tutorial, you will learn how to write Python code and scripts and execute them from the command line.

Run Python code interactively

Python has two basic modes: **interactive** and **script**. Python interactive mode, or Python REPL (read–eval–print loop) mode, is a command line shell where each Python statement is evaluated and executed immediately. On the other hand, Python script mode is the mode where a python program can be written in a .py file and run in the Python interpreter. In this section, you are going to run Python code through an interactive session.

To start a Python interactive session, open a command-line or terminal and type in 'python' (Windows) or 'python3' (macOS), and then hit enter.

The standard prompt for the interactive mode is **>>>**, which indicates that the Python shell is ready to execute and send your commands to the Python interpreter. The result will be immediately displayed on the Python shell as soon as the Python interpreter interprets the command.

To run your Python statements, type them and hit the enter key. You will get the results immediately, unlike in Python script mode. For example, to print the text "Hello, World!", we can type the following:

```
print("Hello, World!")
```

The **print()** function prints the specified message to the screen, or other standard output device. The message can be a string, or any other object, the object will be converted into a string before written to the screen.


```
Command Prompt - python
Microsoft Windows [Version 10.0.19042.1165]
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C:\Users\        >python
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello, World!")
Hello, World!
>>> 1 + 2
3
>>> print("Welcome to the World of Python")
Welcome to the World of Python
>>>
```

Let's try more:

```
# Two numbers

a = 2

b = 6

# Basic math operations

c = a + b

d = b - a

e = a * b

f = b / a

# Printing value

print(c)

print(d)

print(e)

print(f)
```



```
Command Prompt - python
>>> # Two numbers
>>> a = 2
>>> b = 6
>>> # Basic math operations
>>> c = a + b
>>> d = b - a
>>> e = a * b
>>> f = b / a
>>> print(c)
8
>>> print(d)
4
>>> print(e)
12
>>> print(f)
3.0
>>>
```

Note: In Python, the # symbol ("pound sign" or "hash") in any line of instructions denotes the start of a comment. The rest of the line will be ignored when the program is run.
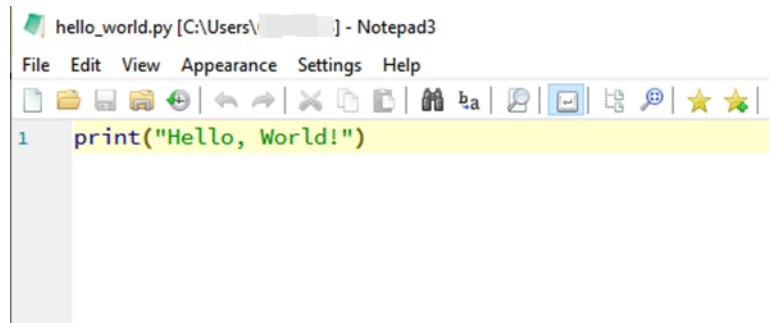
Run Python Scripts from the Terminal

Python code files can be created with any text editor or IDE (Integrated Development Environment). Let's create a simple Python script called *Hello World*. This program outputs "Hello, World!" on the screen.
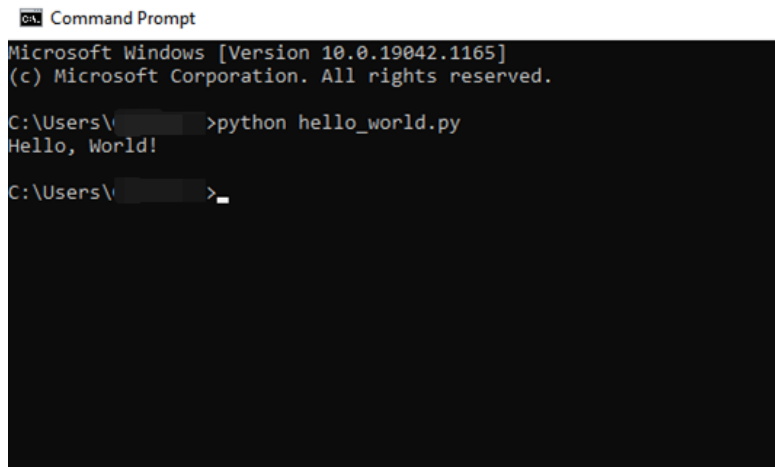
Using the python command

1. Open any text editor or an IDE
2. Type the following code and save it as hello_world.py.


```
print("Hello, World!")
```

3. Open a command line
4. Type in the word python (Windows) or python3 (MacOS) followed by the path to your script file, hello_world.py.

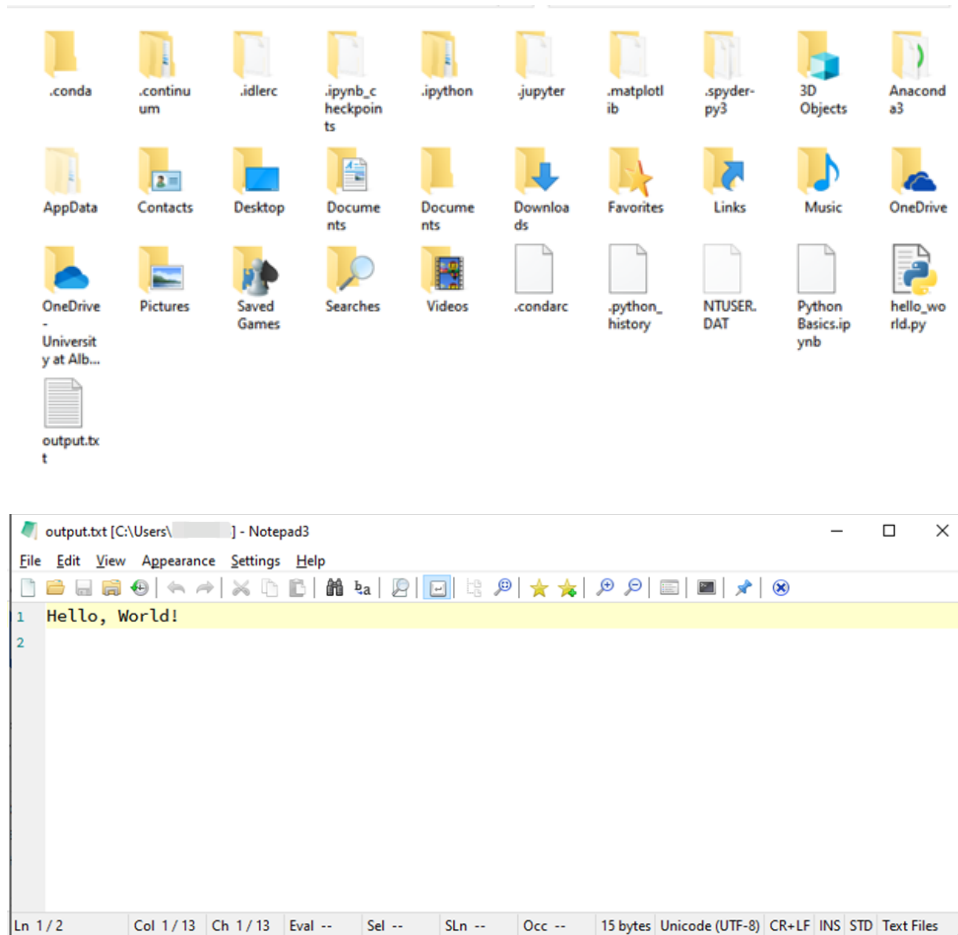   *Note*: If you do not get the output, you might want to check your system PATH and the place where you saved your file.

Redirecting the output

In order to save the output of a script, type the following code:
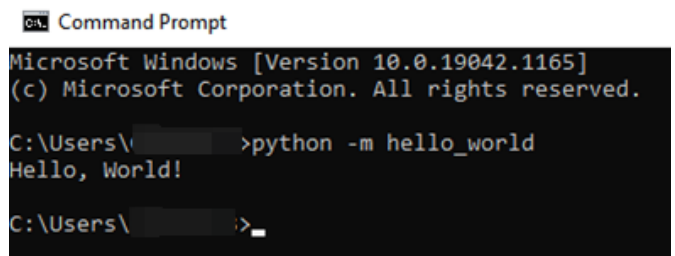
python hello_world.py > output.txt

This operation redirects the output of your script to output.txt. If the file doesn't exist, it is automatically created. On the other hand, if the file already exists, its contents will be replaced with the new output.

Running modules with the -m option

If you want to run a Python module, you can use the following command:

python -m <module-name>

The -m option searches the module name in the sys.path and runs its content as __main__:
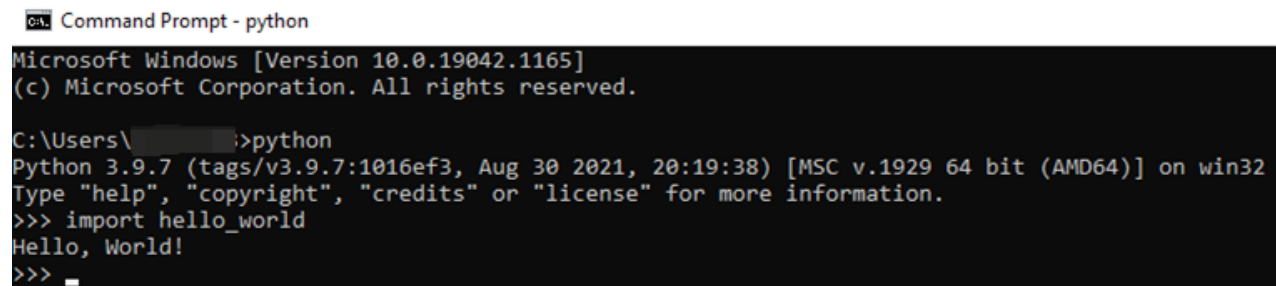
Run Python scripts interactively

You can also run Python scripts and modules from a Python interactive session. The following are the most commonly used ways to run Python scripts.

Using import

The **import** statement loads module contents for later access and use. Try the following command:

import hello_world

```
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C:\Users\          >python
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import hello_world
Hello, World!
>>>
```

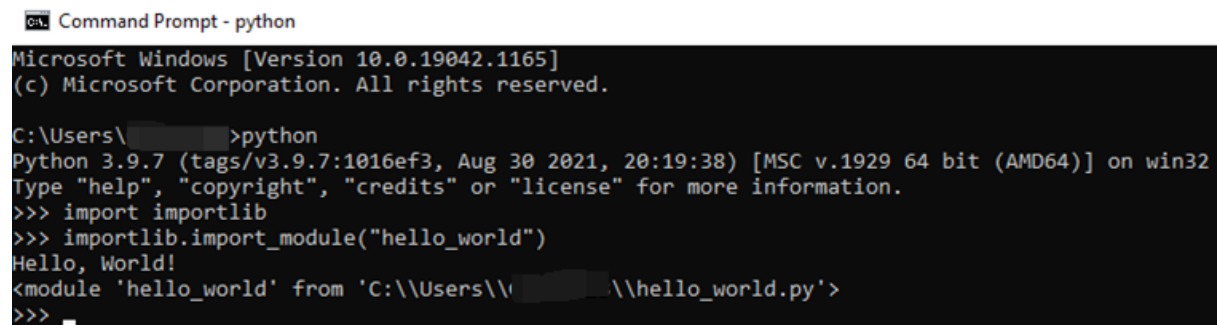*Note*: The import option works only once per session.

The file with the Python code must be located in your current working directory and also in the Python Module Search Path (PMSP), where the modules and packages are imported.

Using importlib

In the Python Standard Library, there is a module called **importlib**. The importlib module is an implementation of the import statement in the Python source code. The following commands will run your python script by imitating the import operation:

import importlib

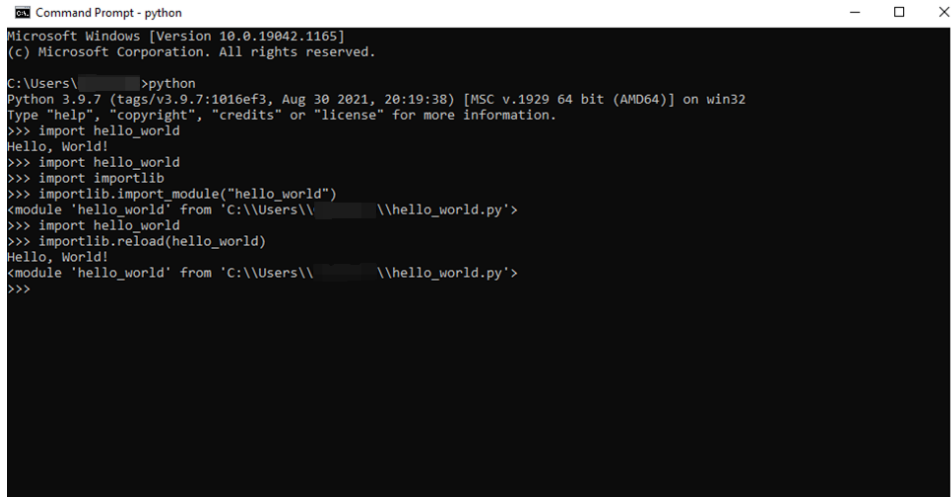importlib.import_module("hello_world")

```
Command Prompt - python
Microsoft Windows [Version 10.0.19042.1165]
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C:\Users\          >python
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import importlib
>>> importlib.import_module("hello_world")
Hello, World!
<module 'hello_world' from 'C:\\Users\\          \\hello_world.py'>
>>>
```

If you already used the import statement, try importlib.reload(hello_world) instead of importlib.import_module("hello_world"). Note that the argument of reload() has to be the name of a module object, unlike import_module().

importlib.reload(hello_world)

```
Command Prompt - python                                                    —    □    ×

Microsoft Windows [Version 10.0.19042.1165]
(c) Microsoft Corporation. All rights reserved.

C:\Users_____>python
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import hello_world
Hello, World!
>>> import hello_world
>>> import importlib
>>> importlib.import_module("hello_world")
<module 'hello_world' from 'C:\\Users\_____\\hello_world.py'>
>>> import hello_world
>>> importlib.reload(hello_world)
Hello, World!
<module 'hello_world' from 'C:\\Users\_____\\hello_world.py'>
>>>
```

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