Introduction to Python

Agenda

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2. What is Python?
3. Features of Python
4. History of Python
5. Getting started with Python
6. Python Interpreter
7. Introduction to Anaconda distribution

Introduction to Scripting

Introduction to Scripting

- A **scripting** or **script language** is a programming language for a special run-time environment that automates the execution of tasks.
- They do not require the compilation step and are rather **interpreted**.
- Environments that can be automated through scripting include software applications, web pages within a web browser, usage of the shells of operating systems (OS), embedded systems, as well as numerous games.
- The term scripting language is also used loosely to refer to **dynamic high-level general-purpose languages**, such as Perl, PowerShell, Python, and Tcl.
- The term **script** often used for small programs (up to a few thousand lines of code) in such languages.

Introduction to Scripting

- Typical scripting languages are intended to be **very fast to learn and write** in.
- Typically a script is executed from start to finish with **no explicit entry point**.

Printing Hello World in Java:

```
public class Sample {
 public static void main(String args[])
  {
    System.out.println("Hello World");
  }
}
```

In Python:

```
print("Hello World")
```

In Perl:

```
print "Hello World";
```

What is Python?

What is Python?

- Python is a **high level** and **interpreted** programming language.
- Python is beginner friendly and **multi-purpose** language.
- It supports **Object-Oriented** style of programming.
- It is the world’s fastest growing and a popular programming language.
- It is used by Software Engineers, Mathematicians, Data Analysts, Scientists, Accountants, Network Engineers etc..
- It is used in various areas like Data analysis and Visualization, Artificial Intelligence and Machine Learning, Automation, building Web/Mobile/Desktop applications, Software Testing and Hacking etc..

Why do we need Python?

- Solve complex problems in less time with fewer lines of code.
- We can build and run Python applications in Windows, Mac and Linux OS.
- Python has huge community support **https://www.python.org/community/**
- Python has a large ecosystem of libraries, frameworks and tools.
- It is **free** and an **open source** language.

Features of Python

Features of Python

Easy to learn	Object-Oriented language
Readability	Large standard library
Interpreted language	GUI programming support
Cross-platform language	Database support
Free and Open Source	Easy integration with other languages like C, C++, Java.

History of Python

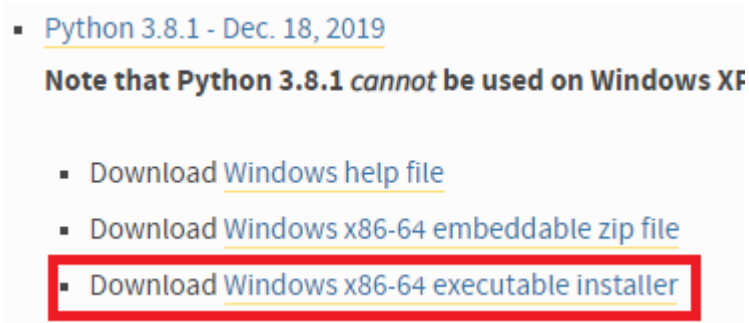
History of Python

- The idea of Python formed in late 1980s and It’s implementation was started in December 1989 by **Guido van Rossum**.
- Python reached version 1.0 in January 1994 and version 2.0 released on October 2000.
- **Python 3.0** (also called "Python 3000" or "Py3K") was released on December 3, 2008.
- This broke backward compatibility, and much Python 2 code does not run unmodified on Python 3.
- **Python 3.8.1** is the latest version, released on December 18, 2019.
- Since 2003, Python has consistently ranked in the top ten most popular programming languages, as of December 2018 it is the third most popular language.

Getting started with Python

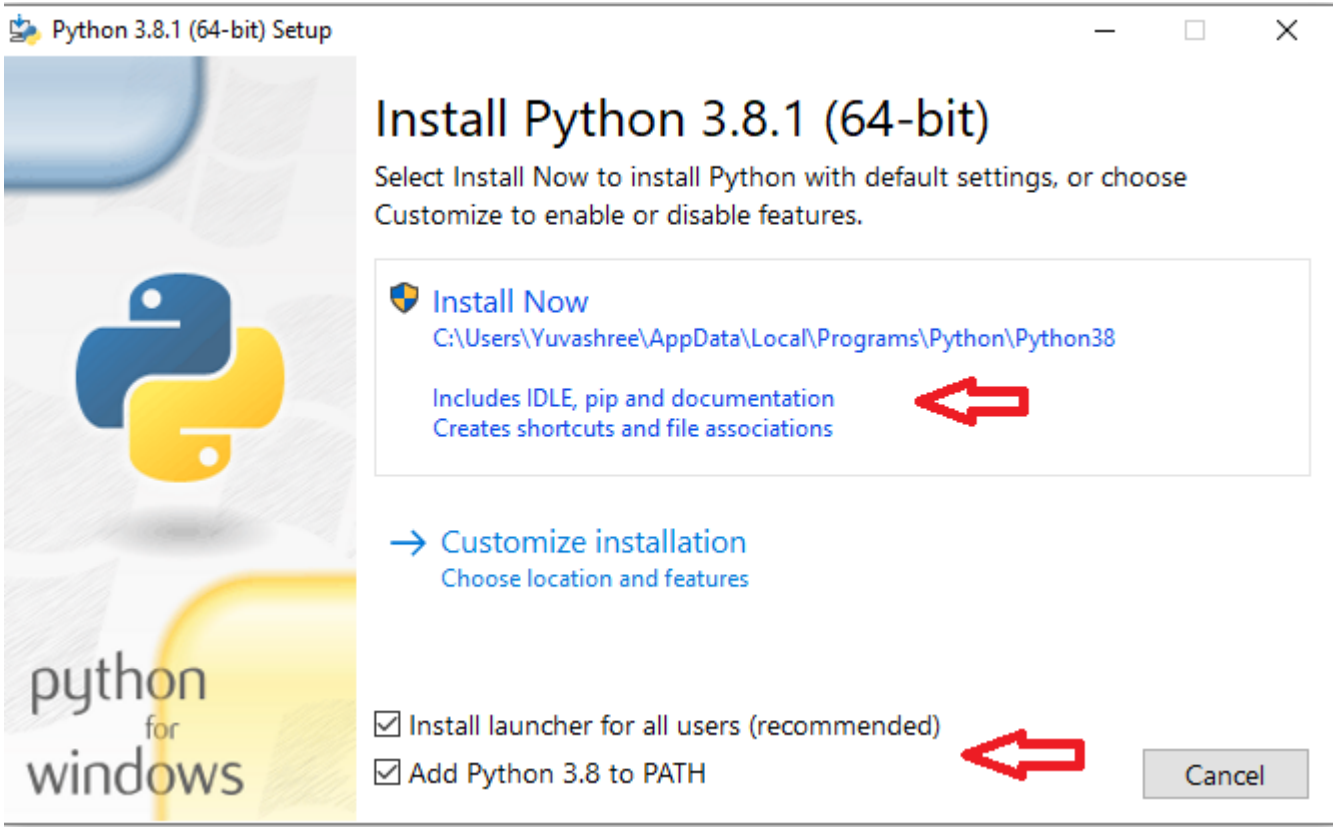
Getting started with Python

- Download the latest version of Python from: **https://www.python.org/downloads/windows/**
- Make sure you are downloading the executable file for the correct version of your windows(32 or 64 bit).

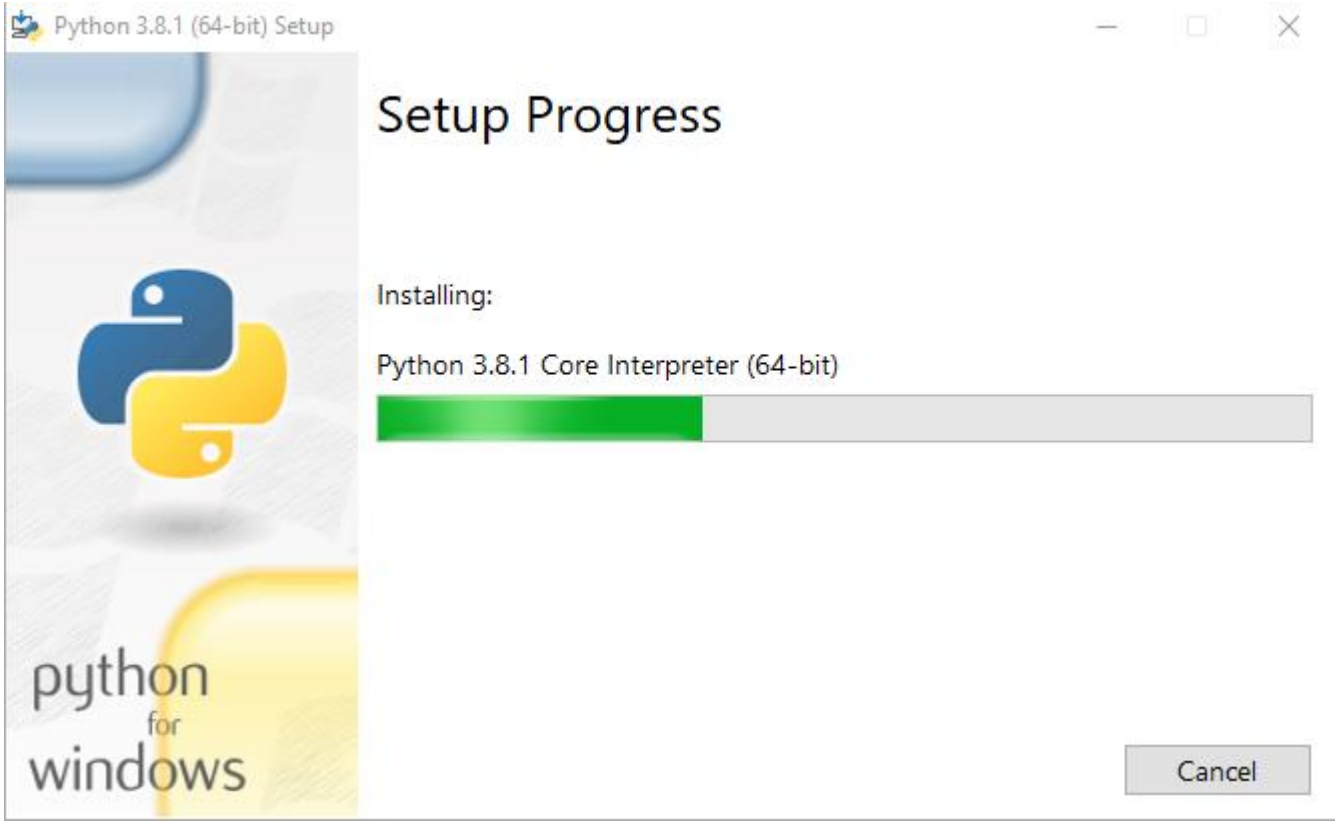


- Double click and run the exe file.
- Check **Install launcher for all users (recommended)** and **Add Python 3.8 to PATH** options.
- Make a note of the installation directory path and select **Install Now**.

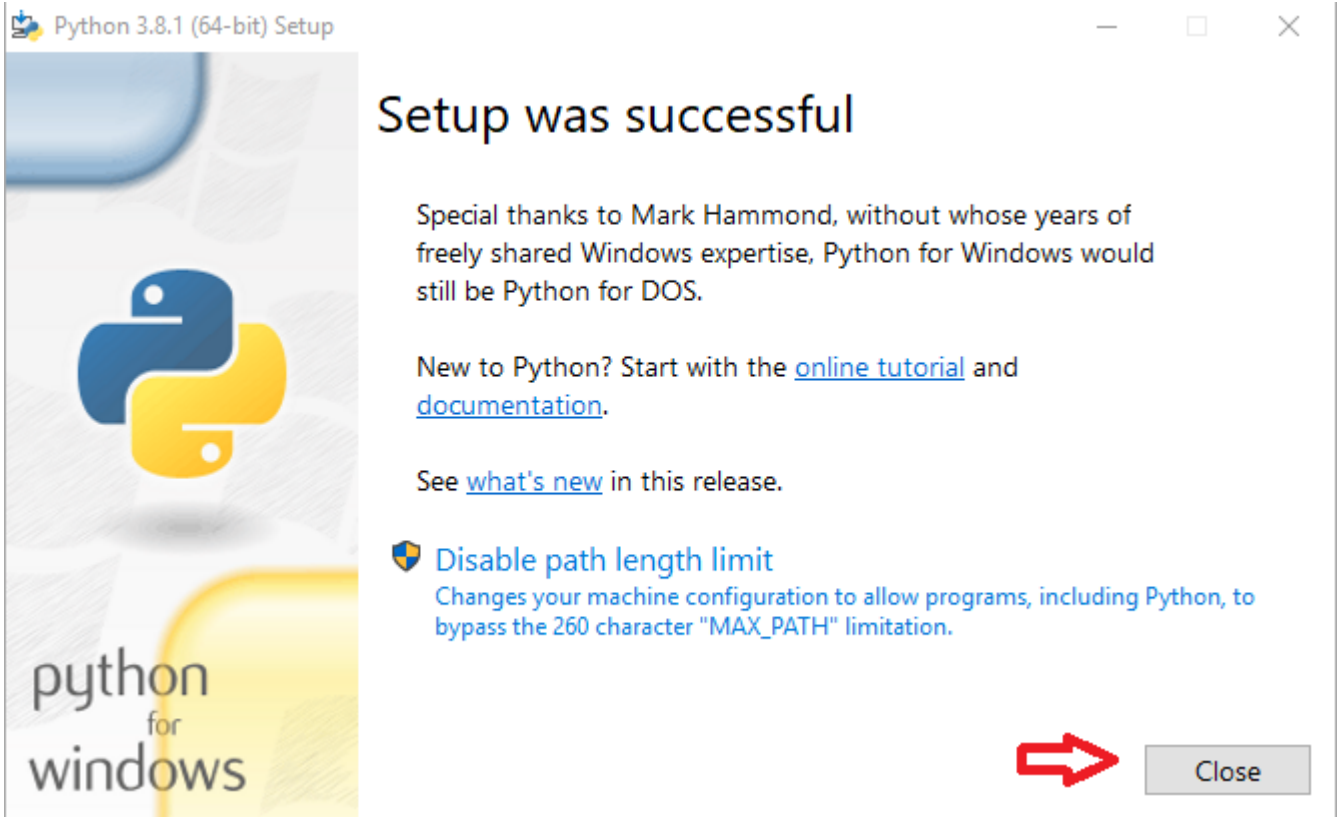
Getting started with Python



Getting started with Python

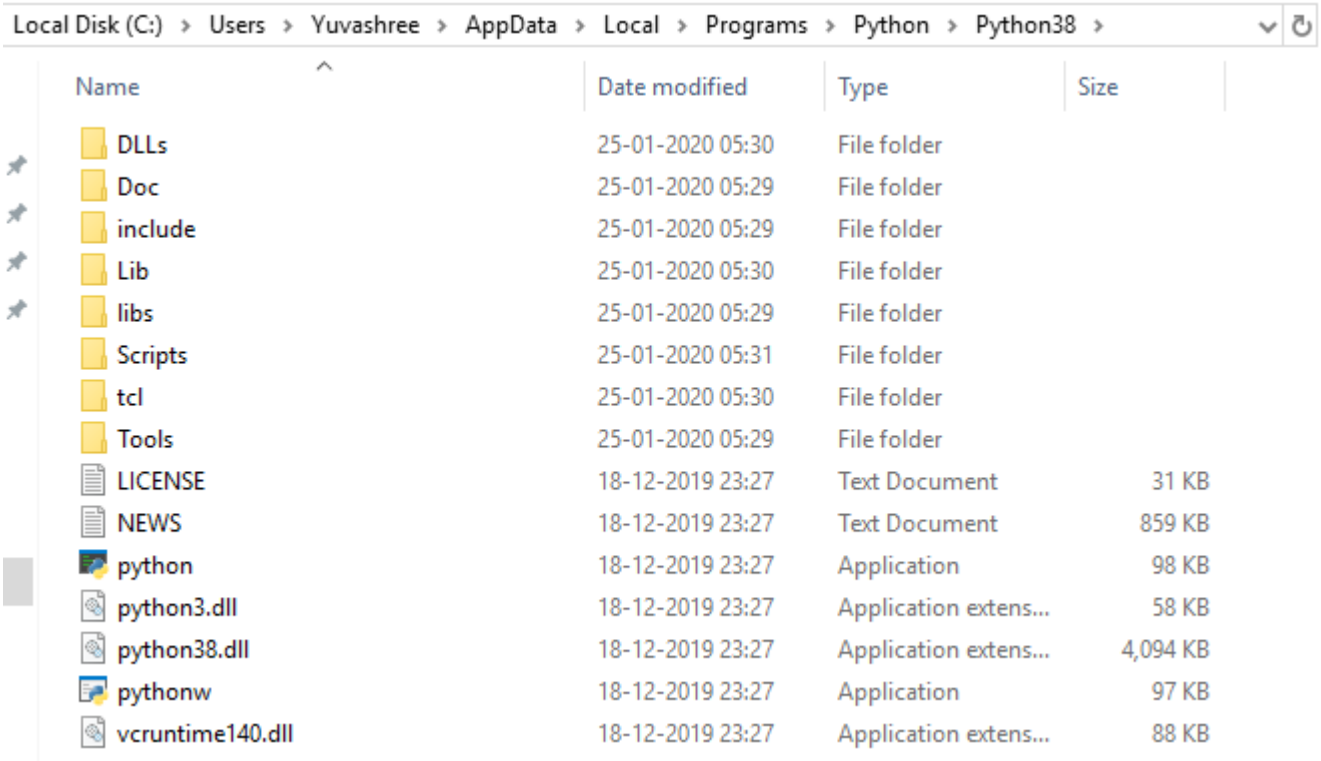


Getting started with Python



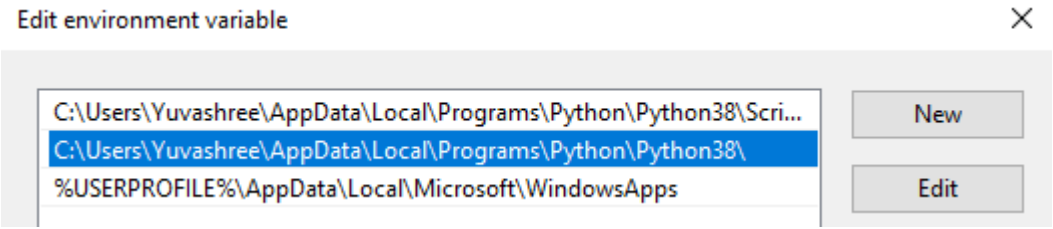
Getting started with Python

Python is installed in the previously noted path:



Getting started with Python

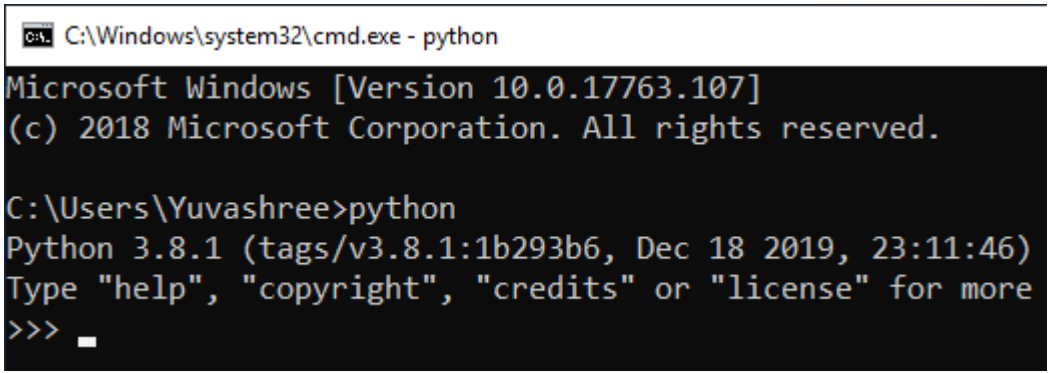
The same path has been added to the Path Environment Variable:



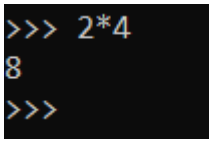
- Right click on This PC → Properties → Advanced System Properties → Environment Variables.
- Under User Variables, select Path and click Edit to view the above details.

Getting started with Python

- Open command prompt and run this command **python**



- Python **interactive mode** is available now, which gives immediate feedback for each statement. Type 2*4 and hit enter.



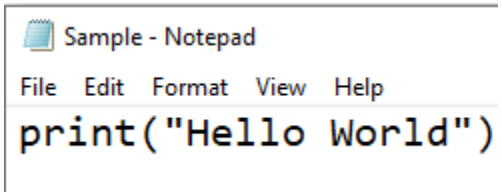
Getting started with Python

Printing Hello World in Interactive mode:

```
>>> print("Hello World")
Hello World
>>> _
```

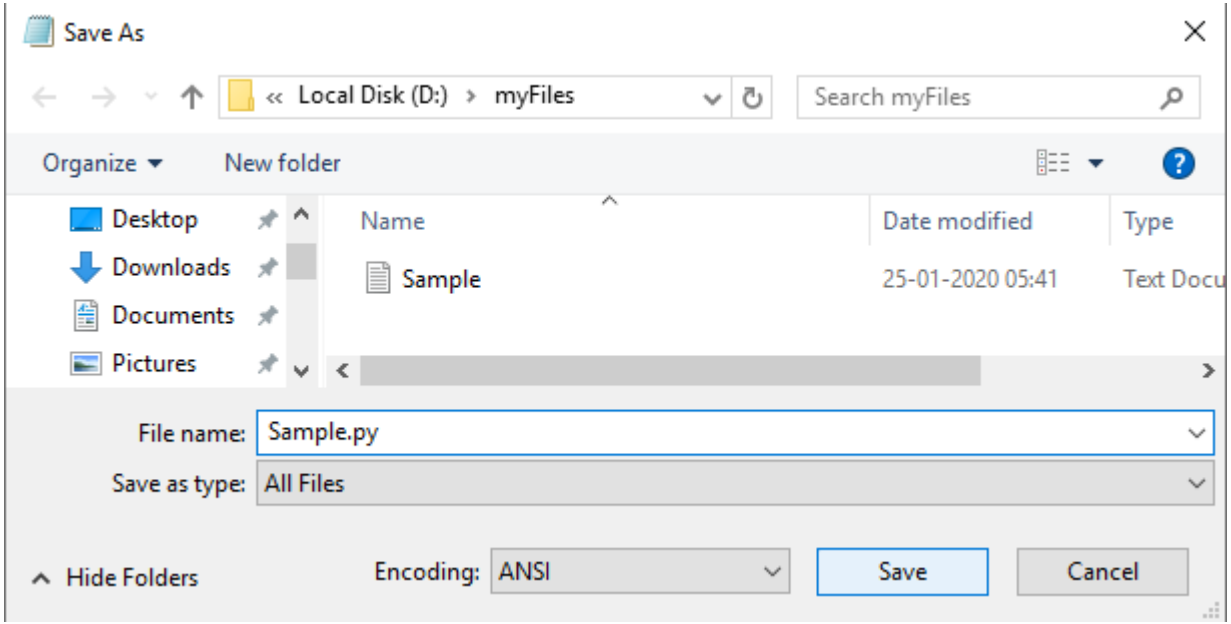
Script file:

- We cannot write the code every-time on the interactive terminal.
- We can write our code in a file which can be executed later.
- For this purpose, open an editor like notepad, write the following code in it.



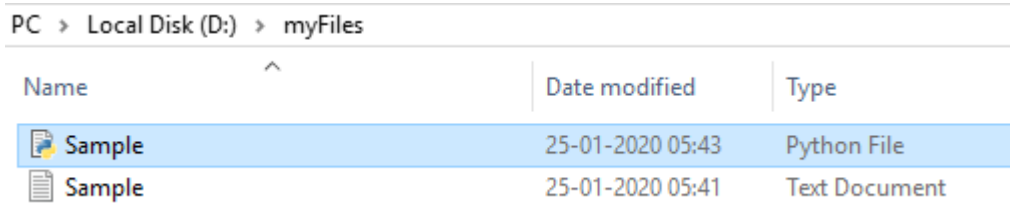
Getting started with Python

- **File → Save as →** Change Save as type to All Files
- File name should be suffixed with **.py**

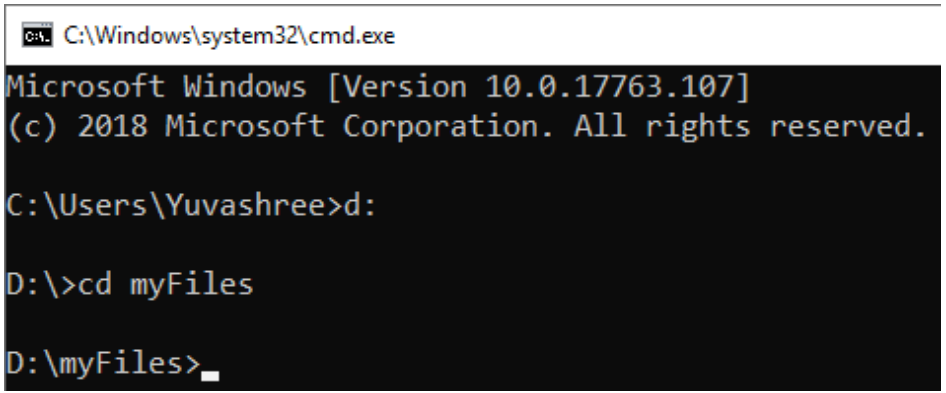


Getting started with Python

- Save the file. Our script file is ready.

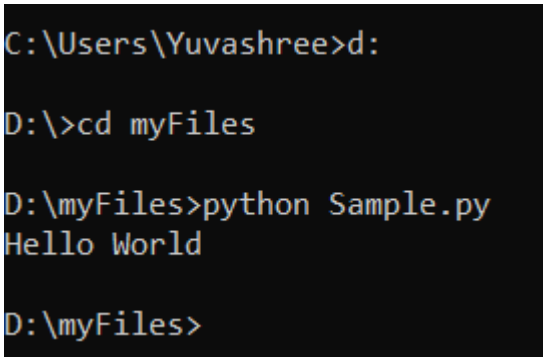


- Open command prompt and navigate to the location where our script file is located.



Getting started with Python

- Run the script file with this command: **python FileName.py**



Python Interpreter

Python Interpreter

Let us understand the runtime structure of Python

When Python runs your script, there are a few steps that Python carries out before you see the output:

1. Source code is translated to **bytecode**.
2. Then it is routed to **Python Virtual Machine (PVM)** which interprets it into machine code.

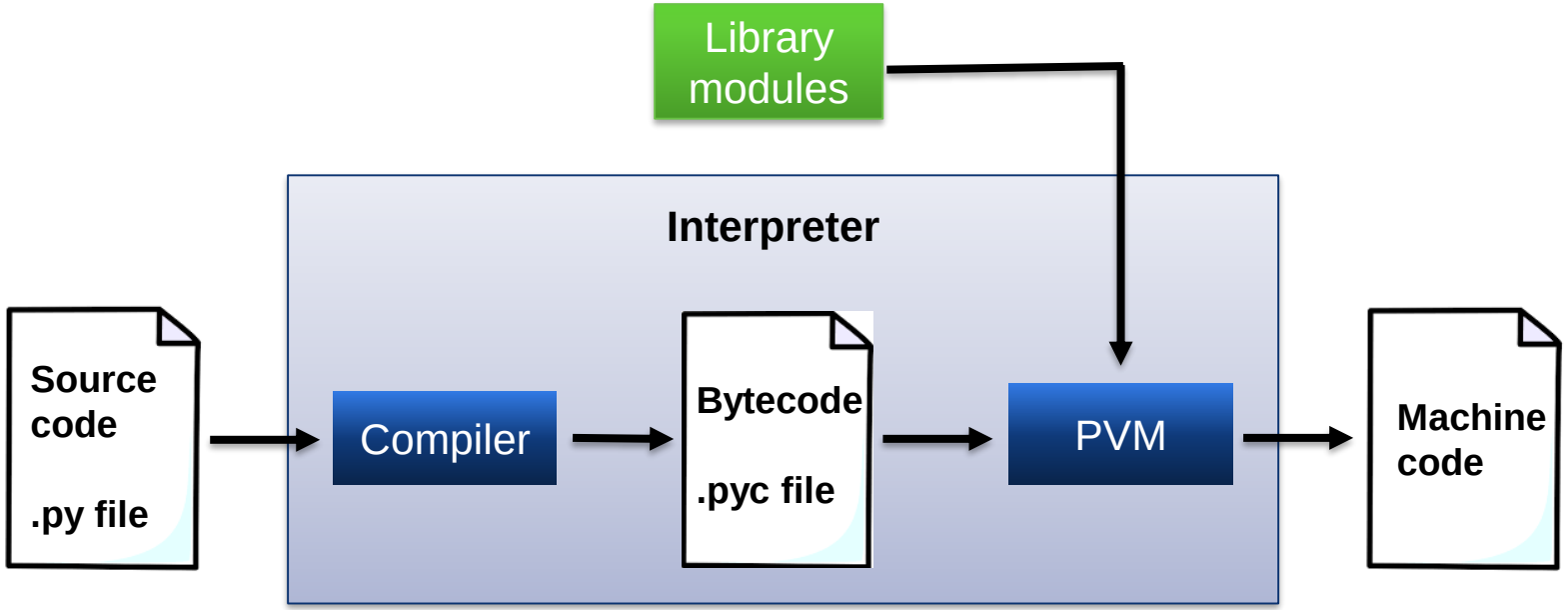
Source code: *.py* file containing human readable format of python statements**.**

Bytecode: Low-level platform-independent representation of source code.

Machine code: 0s and 1s which a computer can understand.

Python Interpreter

- In Python 3.x the **.pyc** files are saved in a **__pycache__** directory.



Introduction to Anaconda distribution

Introduction to Anaconda distribution

- **Anaconda** is a free and open-source distribution of the **Python** and **R** programming languages for scientific computing (data science, machine learning applications, predictive analytics, etc.)
- It aims to simplify package management and deployment.
- Anaconda distribution comes with more than 1,500 packages.
- **The default installation of Anaconda3 includes Python 3.7**
- It also includes a GUI, Anaconda Navigator.
- **Anaconda Navigator** is a desktop graphical user interface (GUI) included in Anaconda distribution that allows users to launch applications and manage packages and environments without using command-line commands.

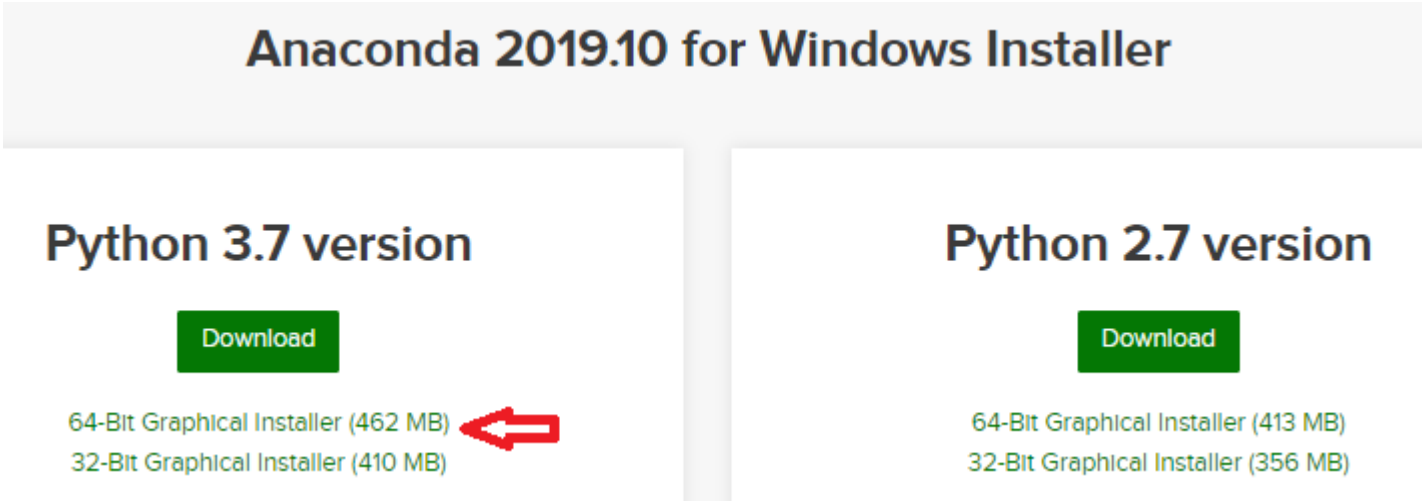
Introduction to Anaconda distribution

The following applications are available by default in Navigator:

- JupyterLab
- Jupyter Notebook
- QtConsole
- Spyder
- Glue
- Orange
- RStudio
- Visual Studio Code

Introduction to Anaconda distribution

- Download Anaconda3 for Windows from: **https://www.anaconda.com/distribution/**



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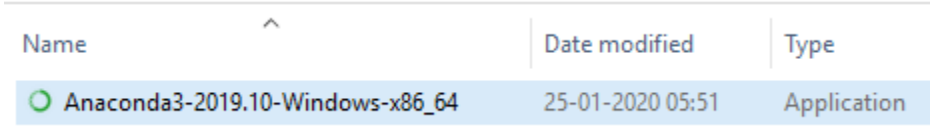
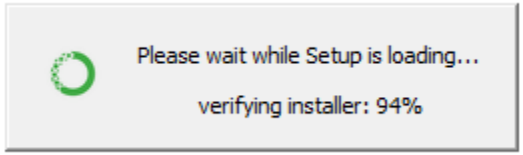
- Double click and run the exe file.





- Accept the license agreement and proceed.
- Choose Install for **Just Me (recommended)** option.

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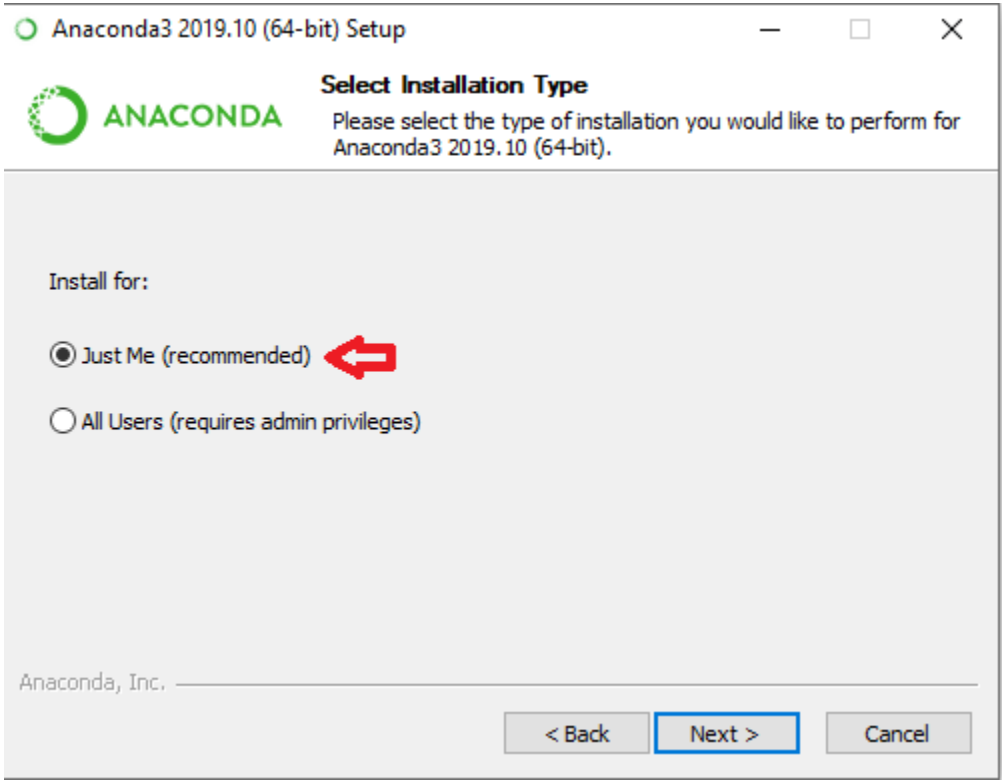
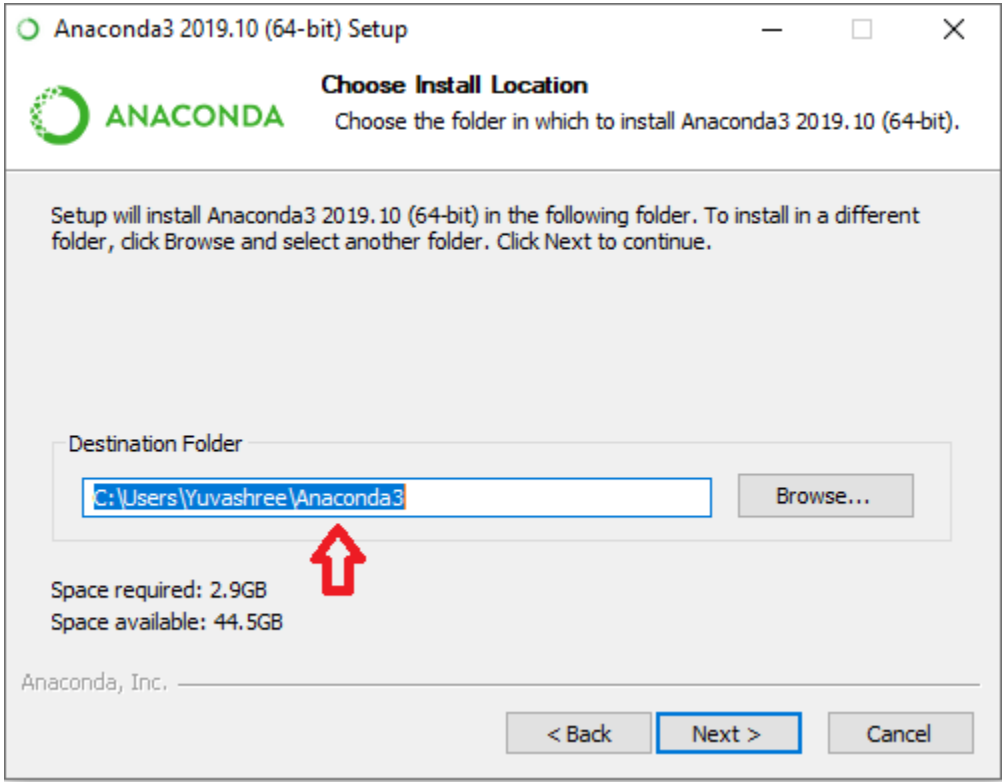


Introduction to Anaconda distribution



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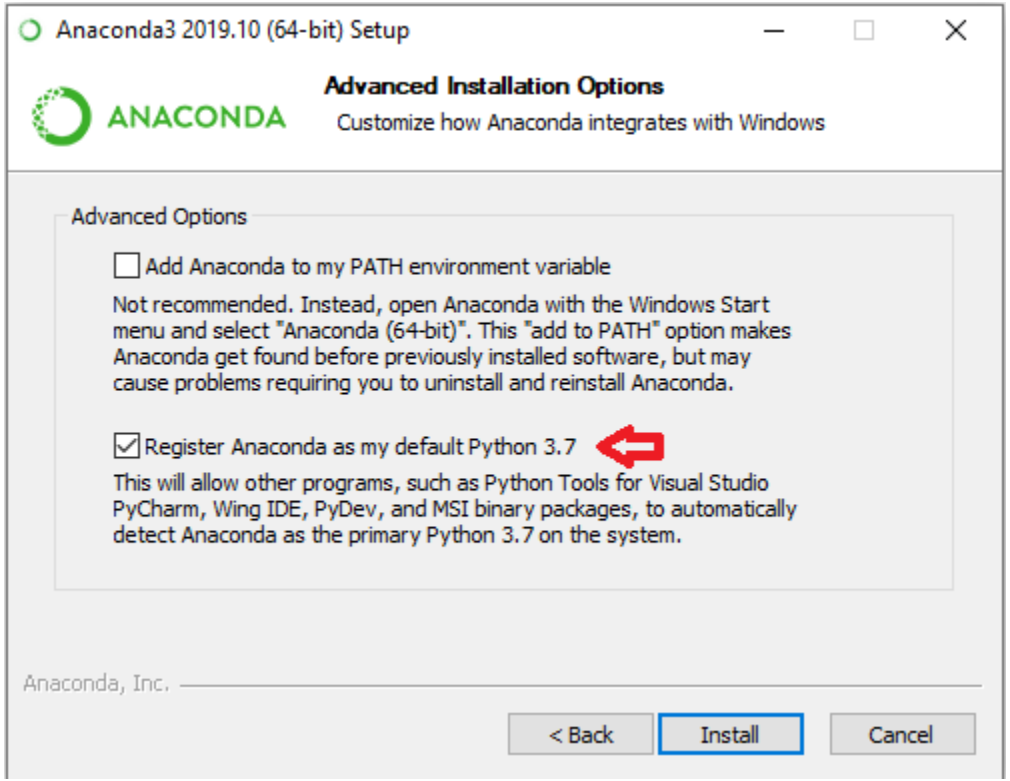

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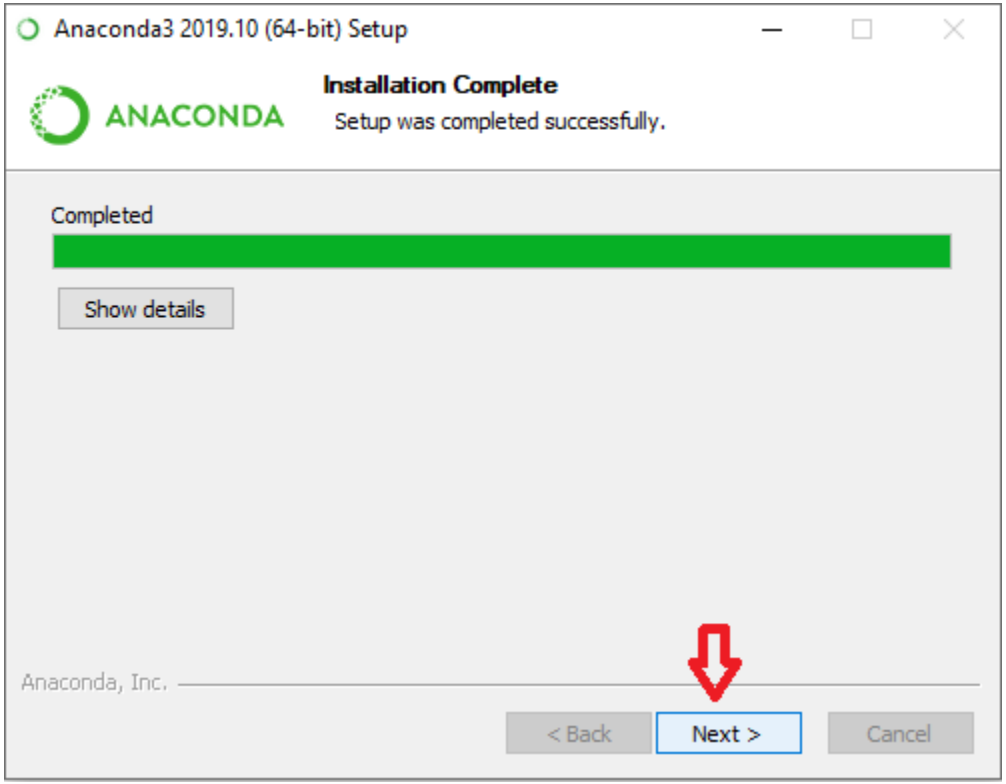
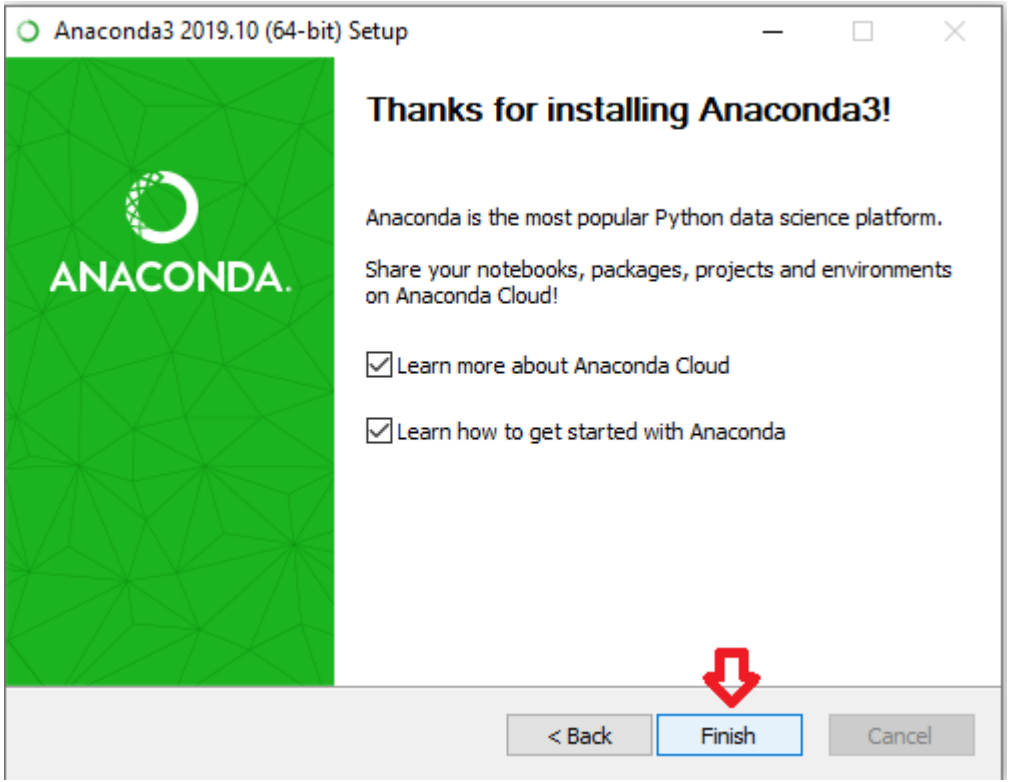
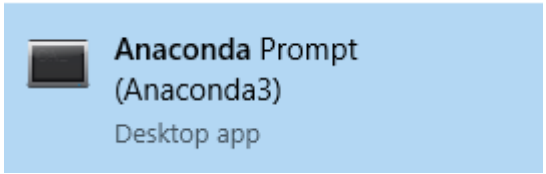


Introduction to Anaconda distribution

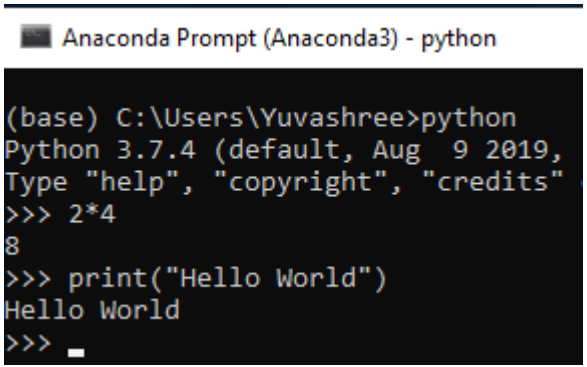


Introduction to Anaconda distribution

- Click Start menu, search and open **Anaconda Prompt**.

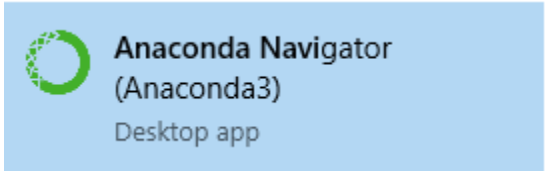


- Issue **python** command and start using the interactive mode.



Introduction to Anaconda distribution

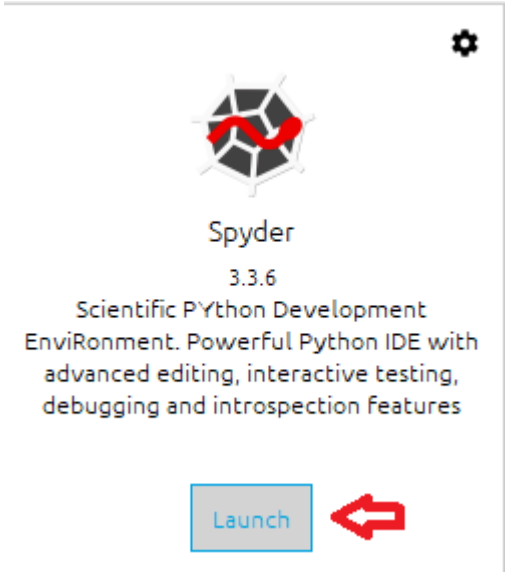
- Click Start menu, search and open Anaconda Navigator.



- In the Home page, you can find JupyterLab, Notebook, Spyder, Visual Studio Code applications are installed and ready to use.

Introduction to Anaconda distribution

- Launch Spyder IDE.



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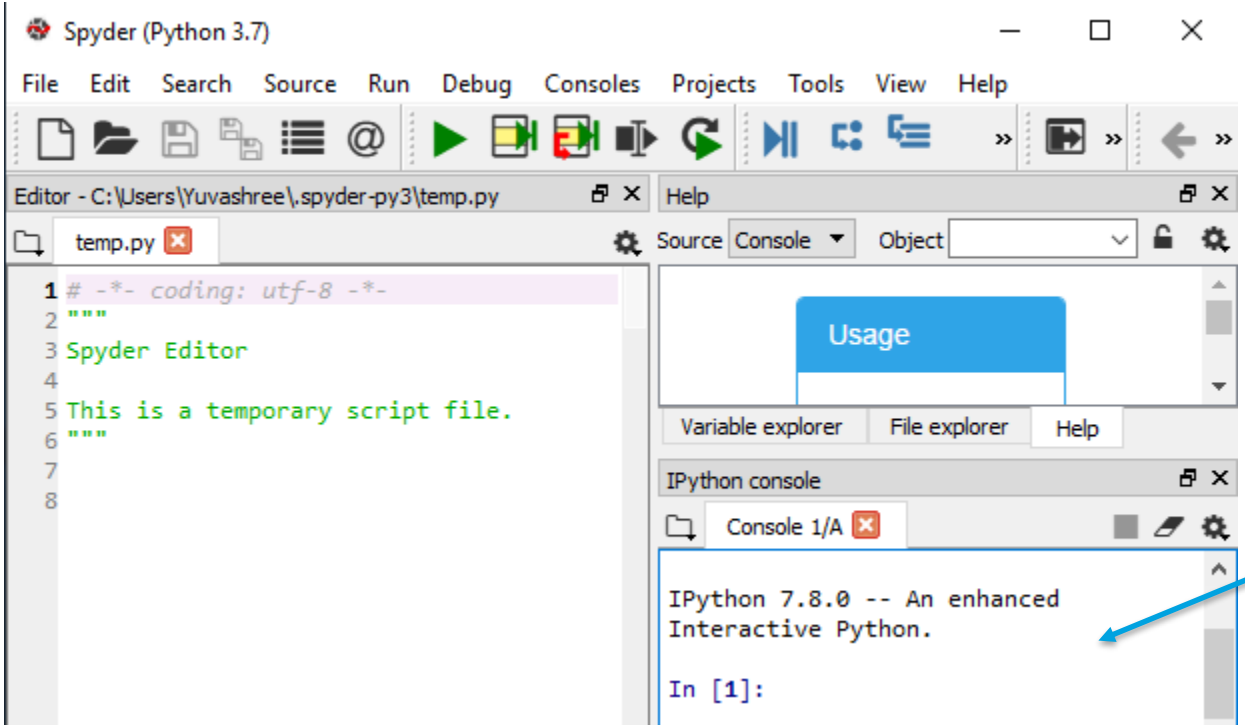
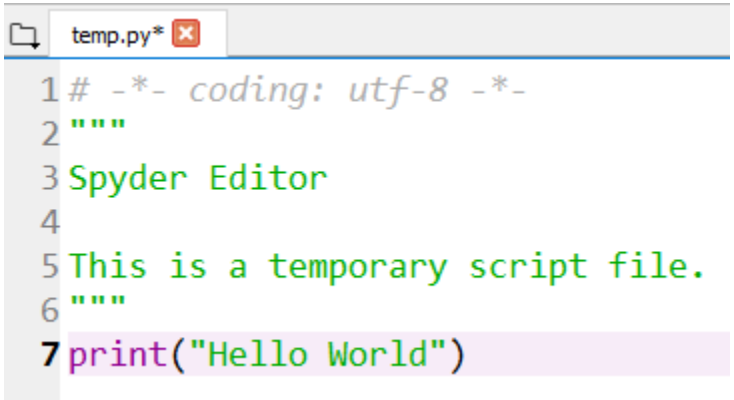


Introduction to Anaconda distribution

Write a script to print Hello World:



- File → Save as → Choose a location to save this file → Change Save as type to **Python Files** → Enter a file name → Save the file.

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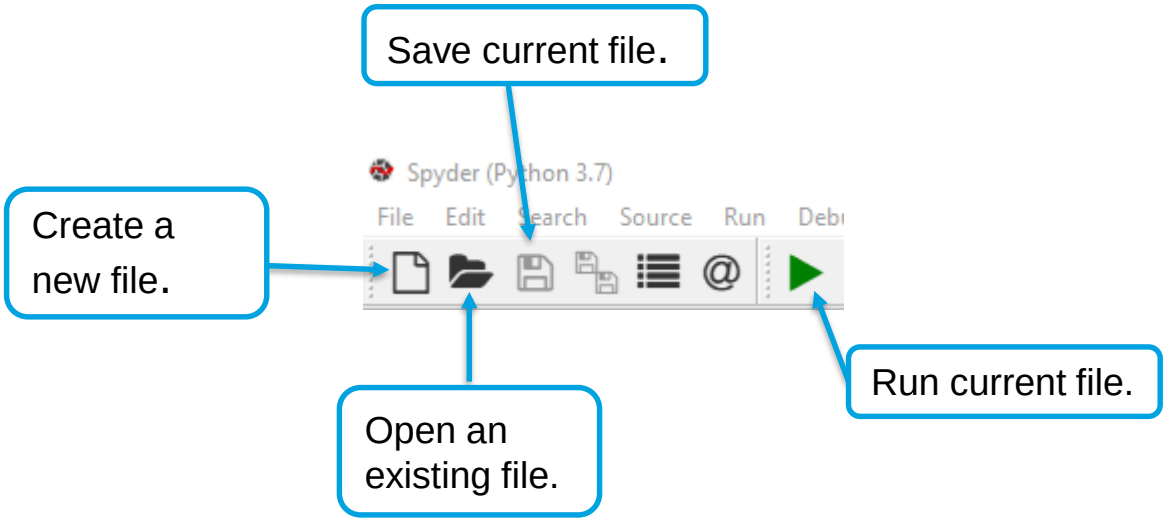

- Click Run.

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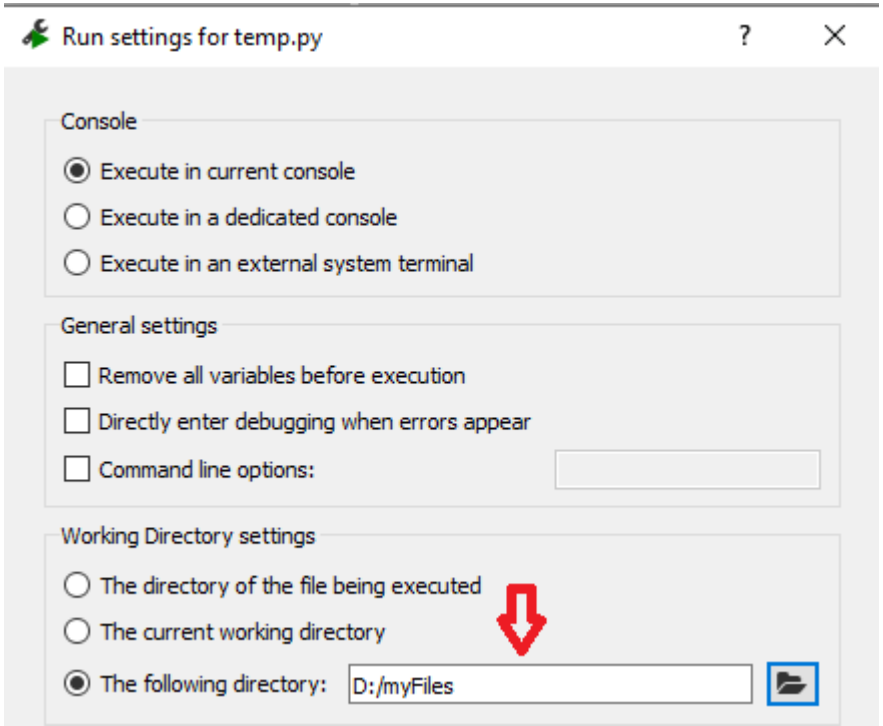
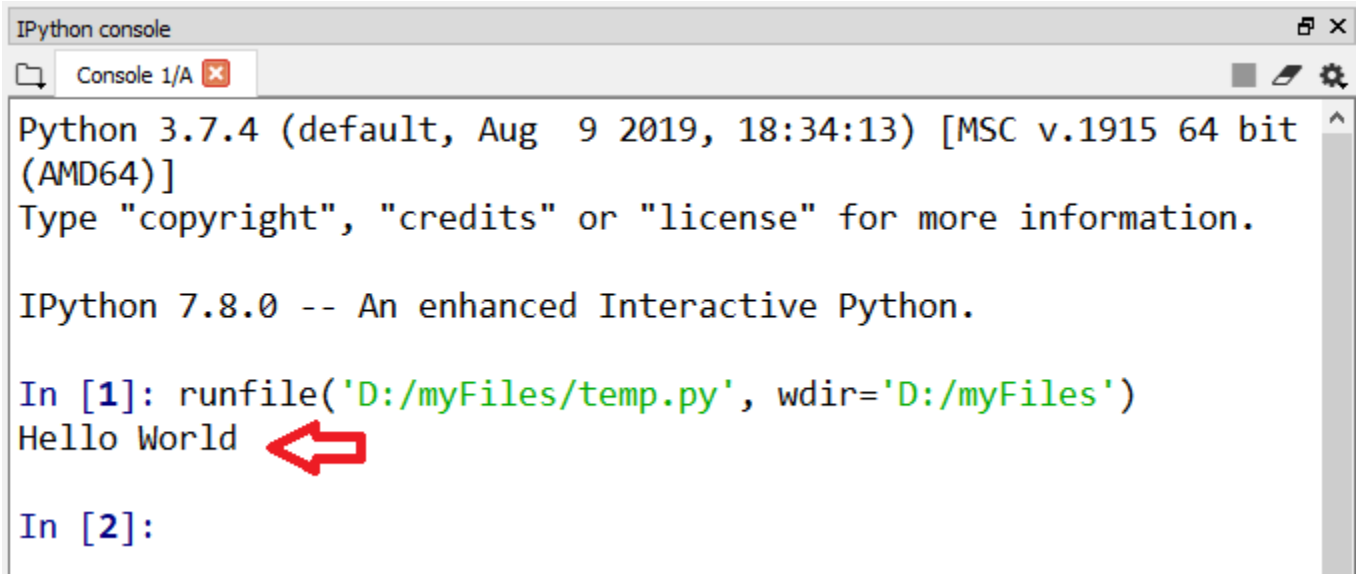
Choose the location in which your python files are stored and Click Run:



Introduction to Anaconda distribution

Output:



Thank you