



# Introduction to Python

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# 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



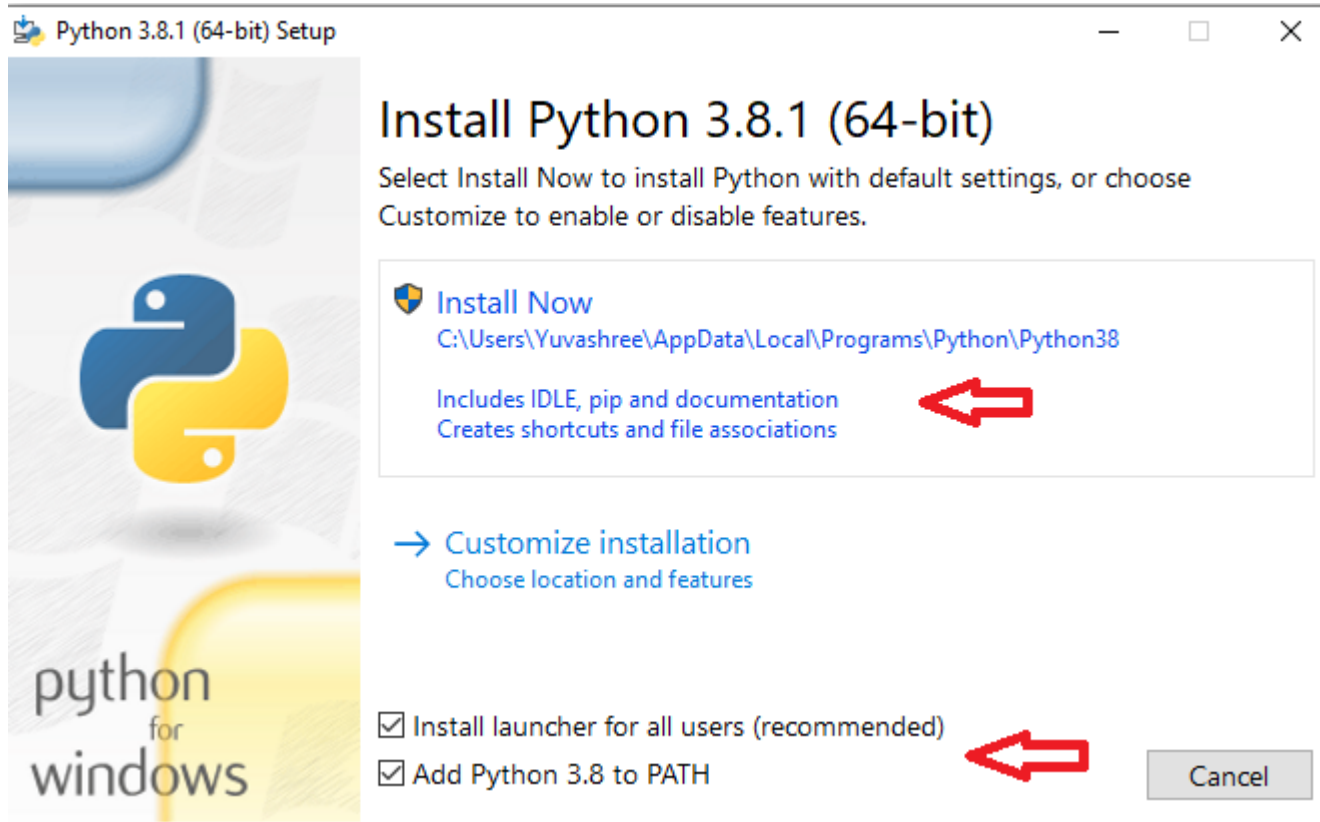
# Getting started with Python

- 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).

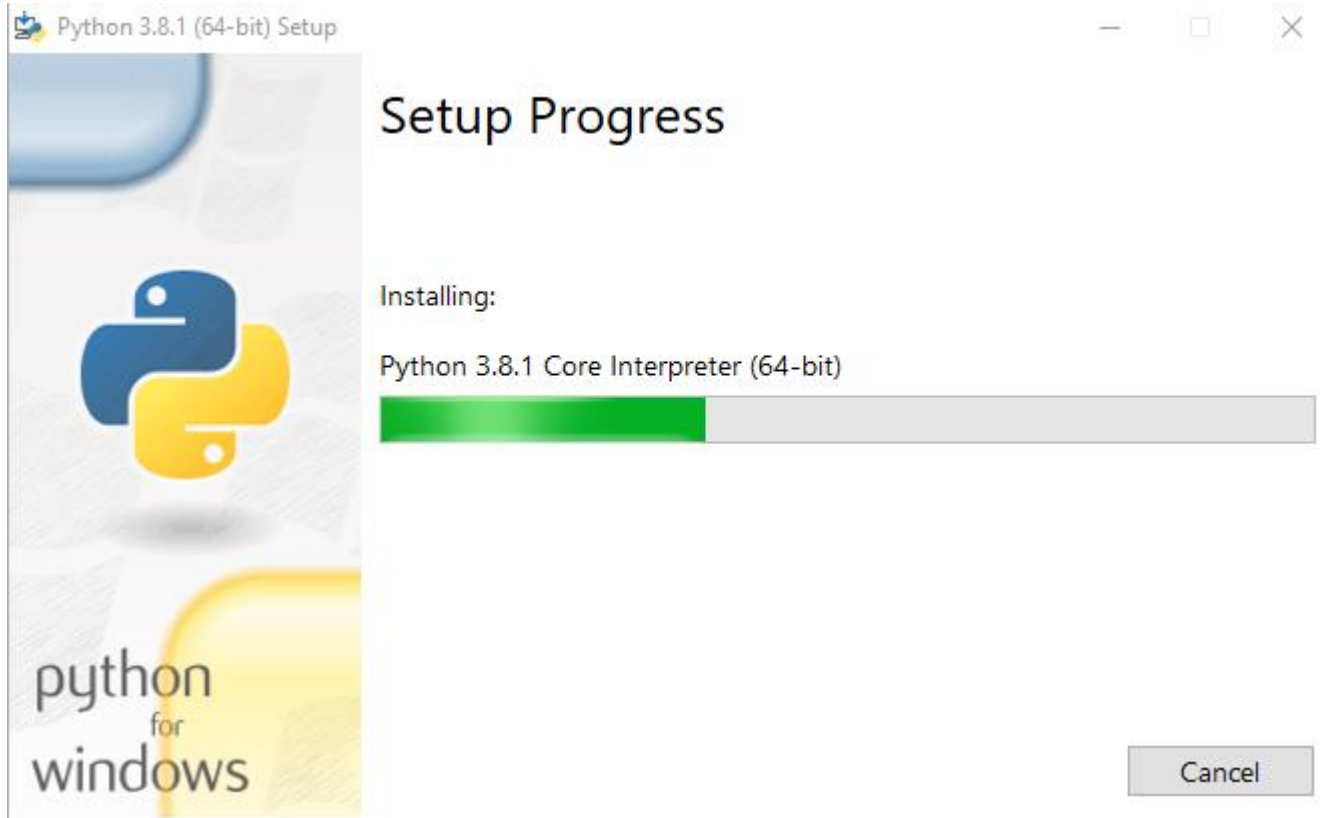
- [Python 3.8.1 - Dec. 18, 2019](#)  
**Note that Python 3.8.1 cannot be used on Windows XF**
  - Download [Windows help file](#)
  - Download [Windows x86-64 embeddable zip file](#)
  - Download [Windows x86-64 executable installer](#)

- 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

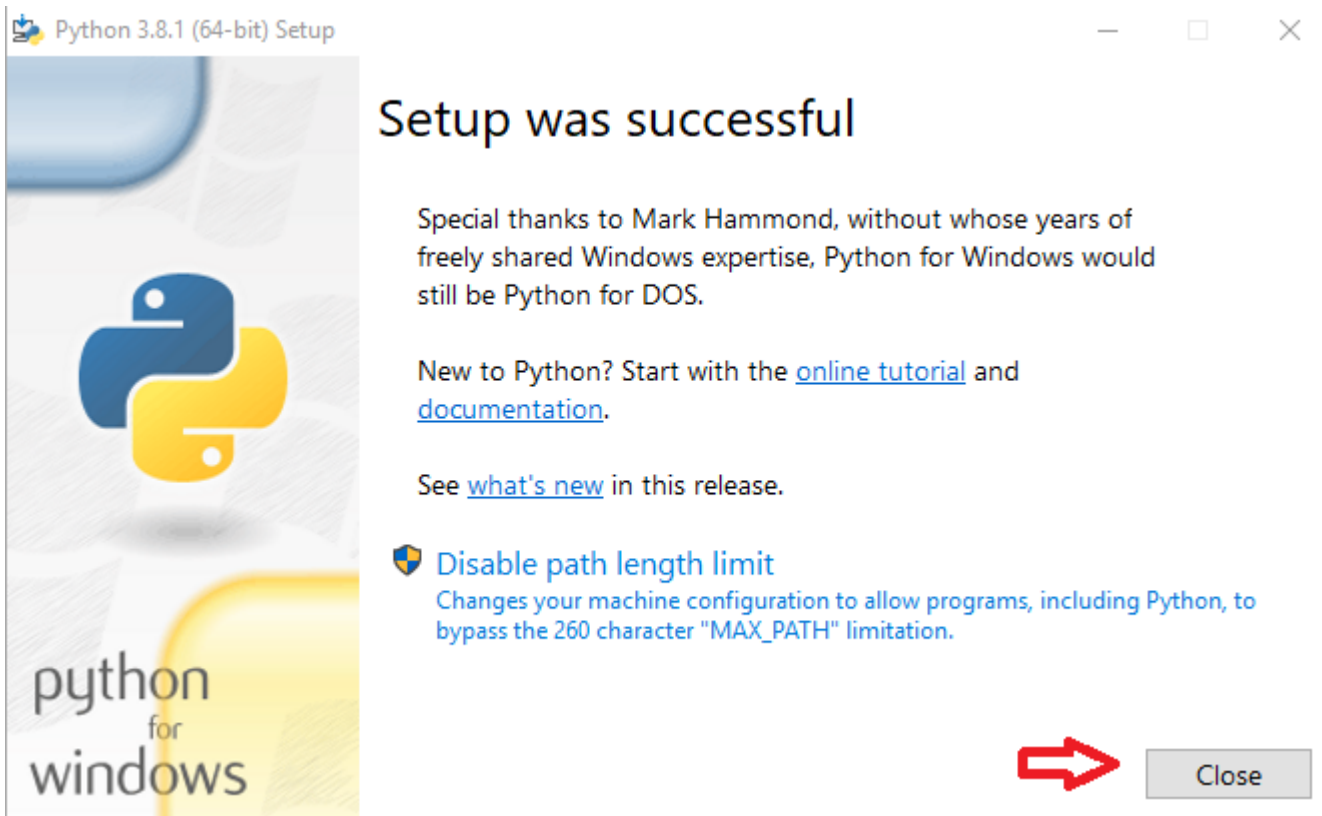


# Getting started with Python





# Getting started with Python



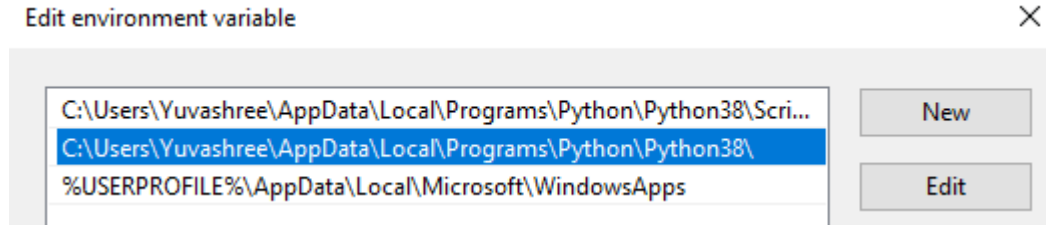
# Getting started with Python

Python is installed in the previously noted path:

| Local Disk (C:) > Users > Yuvashree > AppData > Local > Programs > Python > Python38 > |                  |                  |                       |          | ▼ | 🔄 |
|--|------------------|------------------|-----------------------|----------|---|---|
| Name   |                  | Date modified    | Type                  | Size     |   |   |
| 📁  | DLLs             | 25-01-2020 05:30 | File folder           |          |   |   |
| 📁  | Doc              | 25-01-2020 05:29 | File folder           |          |   |   |
| 📁  | include          | 25-01-2020 05:29 | File folder           |          |   |   |
| 📁  | Lib              | 25-01-2020 05:30 | File folder           |          |   |   |
| 📁  | libs             | 25-01-2020 05:29 | File folder           |          |   |   |
| 📁  | Scripts          | 25-01-2020 05:31 | File folder           |          |   |   |
| 📁  | tcl              | 25-01-2020 05:30 | File folder           |          |   |   |
| 📁  | Tools            | 25-01-2020 05:29 | File folder           |          |   |   |
| 📄  | LICENSE          | 18-12-2019 23:27 | Text Document         | 31 KB    |   |   |
| 📄  | NEWS             | 18-12-2019 23:27 | Text Document         | 859 KB   |   |   |
| 🖥️   | python           | 18-12-2019 23:27 | Application           | 98 KB    |   |   |
| 🔗  | python3.dll      | 18-12-2019 23:27 | Application extens... | 58 KB    |   |   |
| 🔗  | python38.dll     | 18-12-2019 23:27 | Application extens... | 4,094 KB |   |   |
| 🖥️   | pythonw          | 18-12-2019 23:27 | Application           | 97 KB    |   |   |
| 🔗  | vcruntime140.dll | 18-12-2019 23:27 | Application extens... | 88 KB    |   |   |

# 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**

```
C:\Windows\system32\cmd.exe - python
Microsoft Windows [Version 10.0.17763.107]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Yuvashree>python
Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019, 23:11:46)
Type "help", "copyright", "credits" or "license" for more
>>> _
```

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

```
>>> 2*4
8
>>>
```

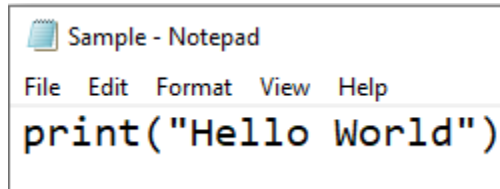
# Getting started with Python

Printing Hello World in Interactive mode:

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

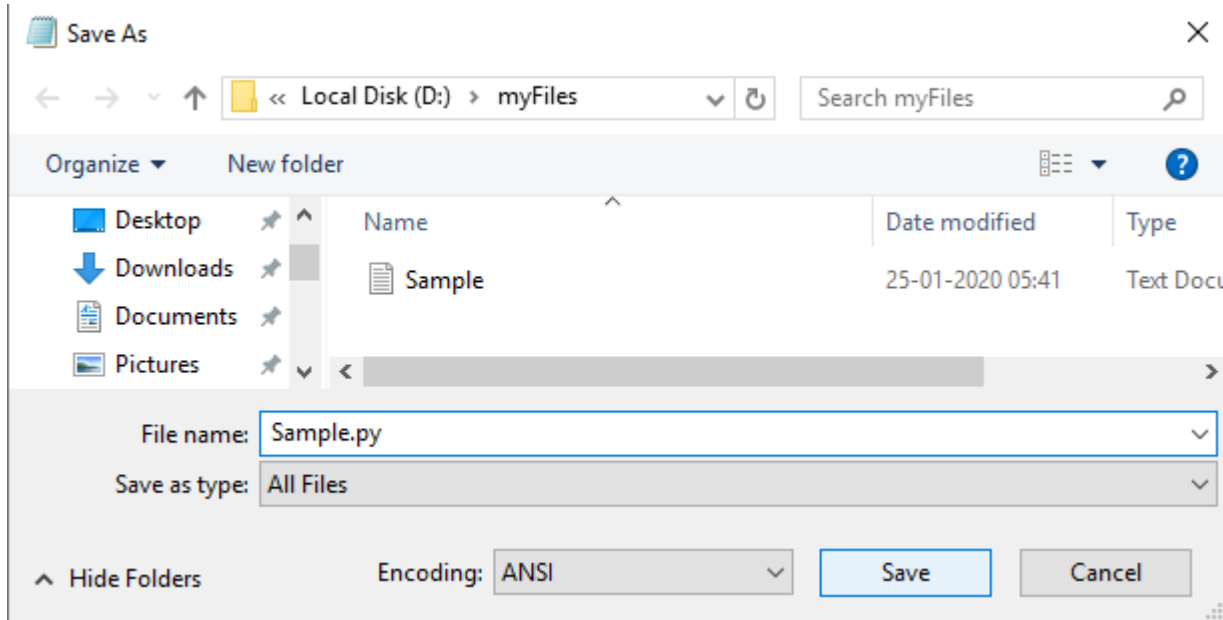
Script file:

- 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.

| PC > Local Disk (D:) > myFiles   |                  |               |
|--|------------------|---------------|
| Name   | Date modified    | Type          |
|  Sample | 25-01-2020 05:43 | Python File   |
|  Sample | 25-01-2020 05:41 | Text Document |

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

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17763.107]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Yuvashree>d:

D:\>cd myFiles

D:\myFiles>_
```

# Getting started with Python

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

```
C:\Users\Yuvashree>d:
D:\>cd myFiles
D:\myFiles>python Sample.py
Hello World
D:\myFiles>
```



# 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.

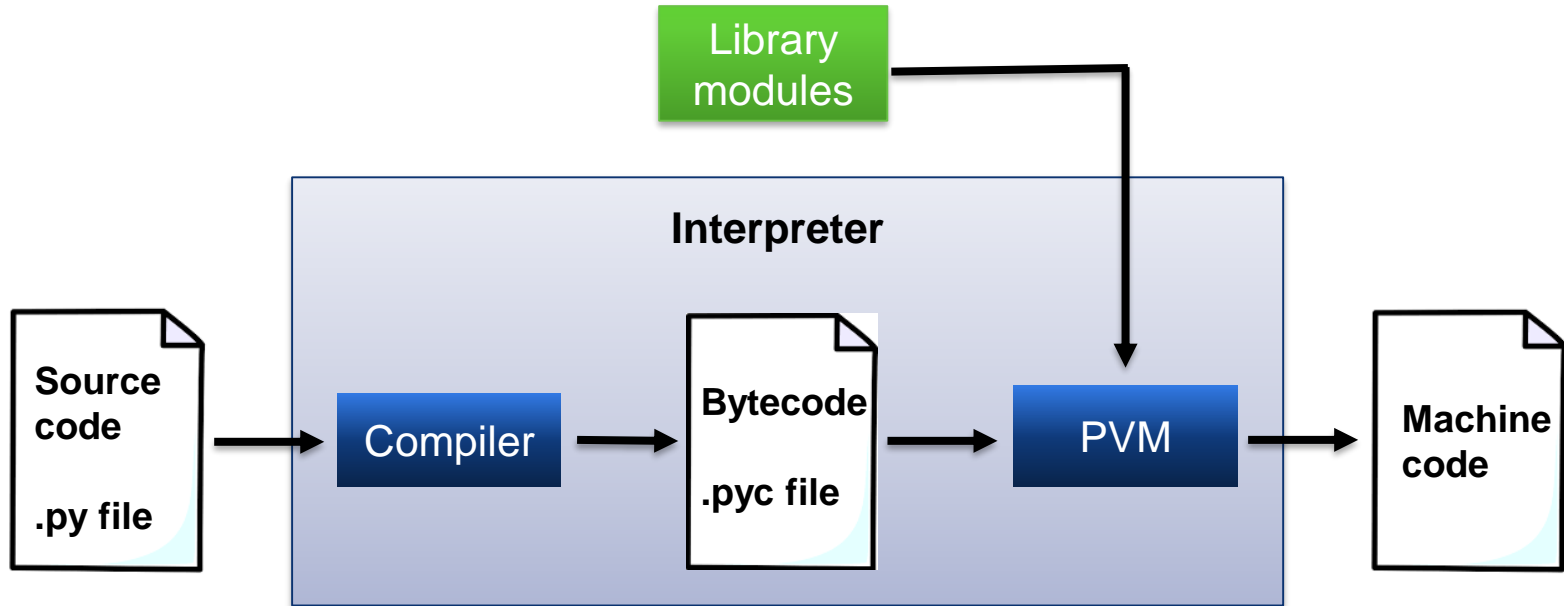
**Source code:** `.py` file containing human readable format of python statements.

**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/>

## Anaconda 2019.10 for Windows Installer

### Python 3.7 version

Download

64-Bit Graphical Installer (462 MB)  
32-Bit Graphical Installer (410 MB)


### Python 2.7 version

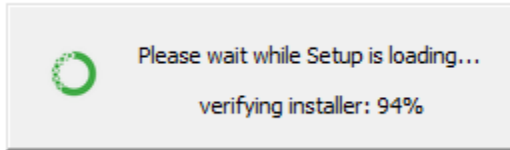
Download

64-Bit Graphical Installer (413 MB)  
32-Bit Graphical Installer (356 MB)

# Introduction to Anaconda distribution

- Double click and run the exe file.

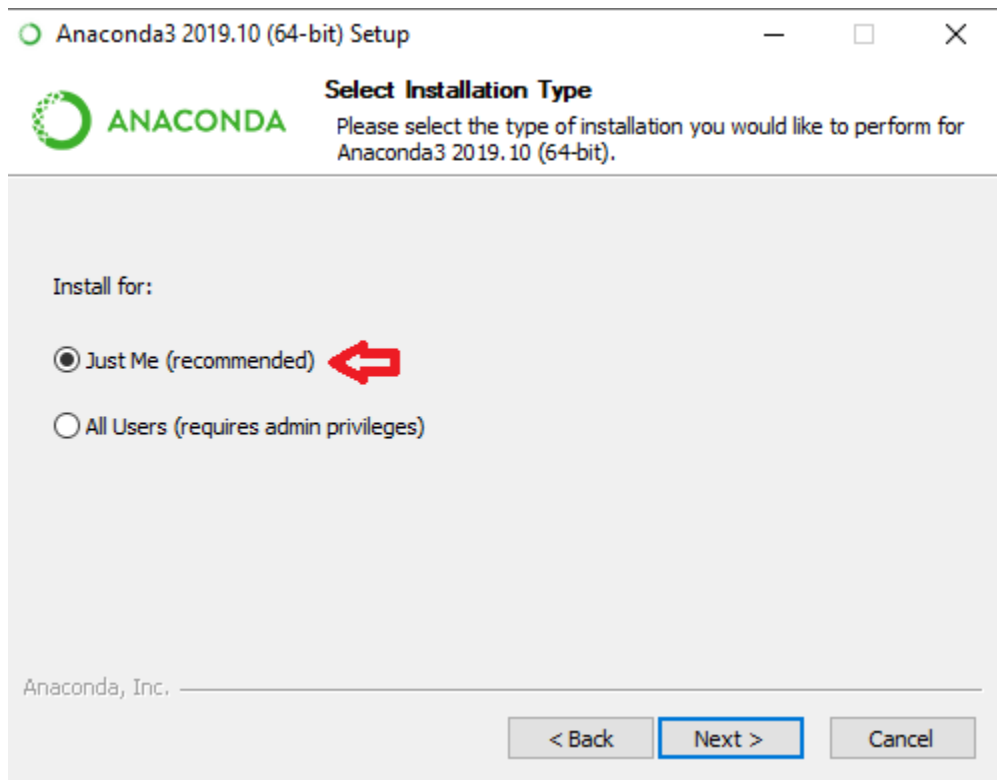
| Name   | Date modified    | Type        |
|--|------------------|-------------|
|  Anaconda3-2019.10-Windows-x86_64 | 25-01-2020 05:51 | Application |



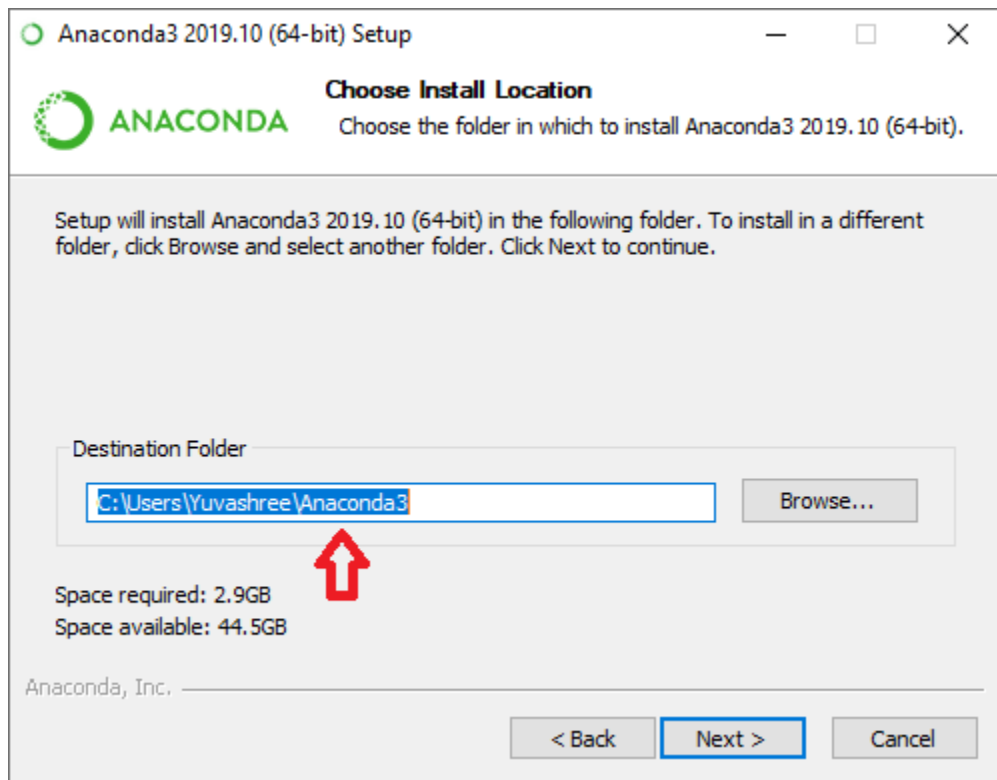
- Accept the license agreement and proceed.
- Choose Install for **Just Me (recommended)** option.



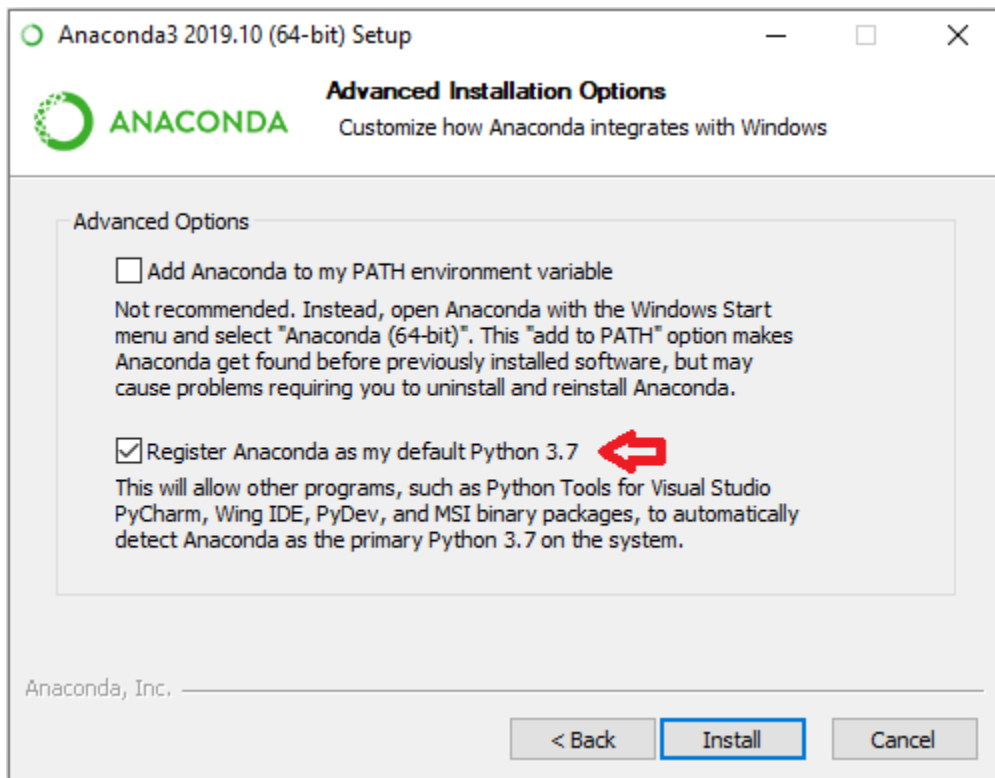
# Introduction to Anaconda distribution



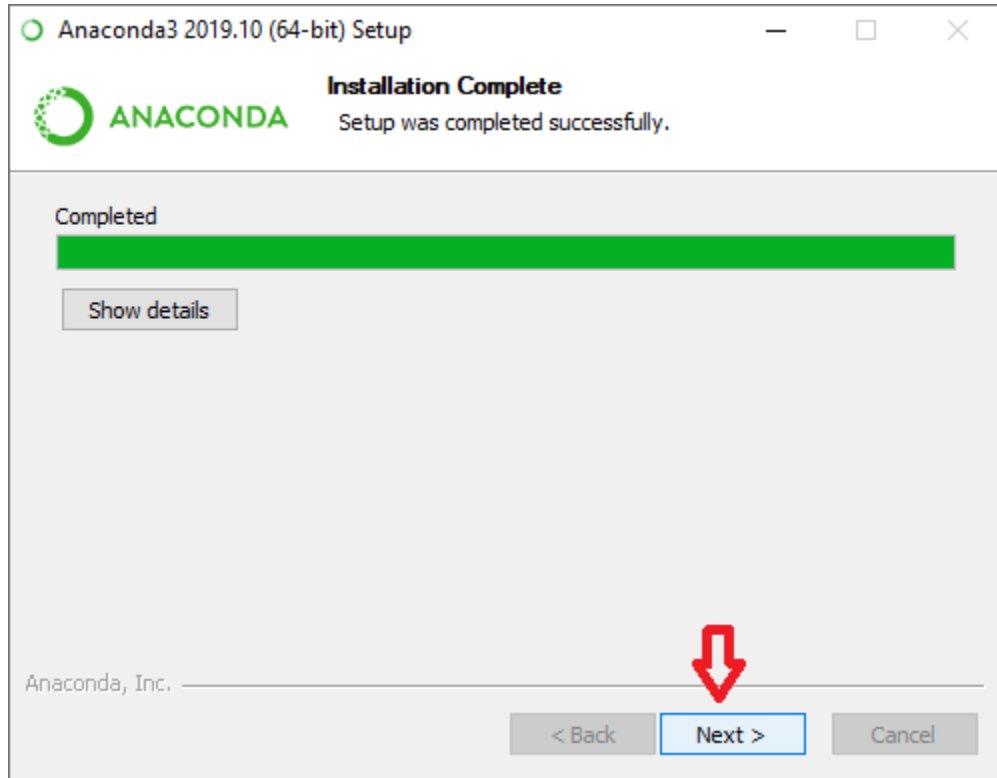
# Introduction to Anaconda distribution



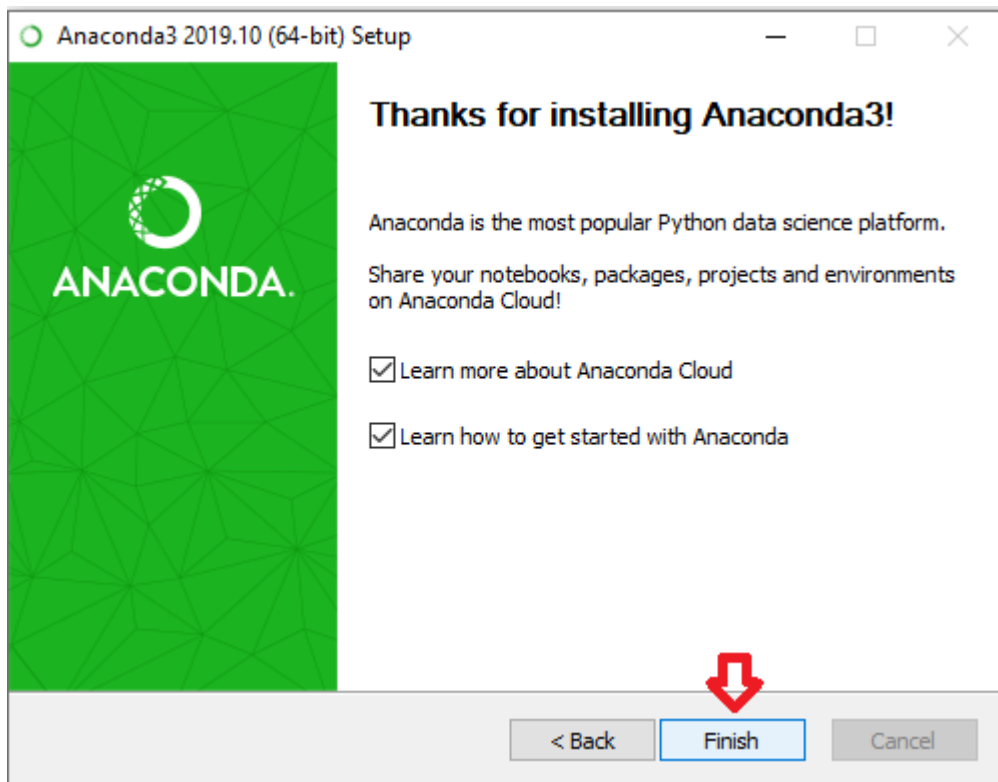
# Introduction to Anaconda distribution



# Introduction to Anaconda distribution

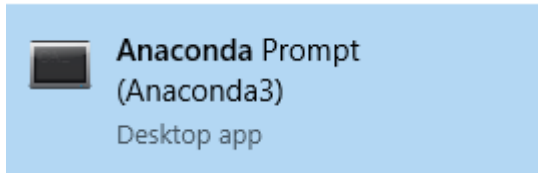


# Introduction to Anaconda distribution

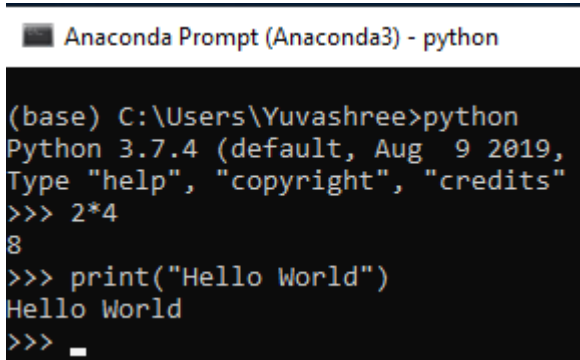


# Introduction to Anaconda distribution

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

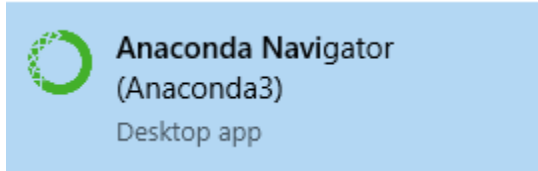


- Issue **python** command and start using the interactive mode.

A screenshot of the Anaconda Prompt terminal window. The title bar reads 'Anaconda Prompt (Anaconda3) - python'. The terminal content shows the command prompt at 'C:\Users\Yuvashree>', followed by the command 'python'. This opens the Python 3.7.4 interactive shell, which displays 'Python 3.7.4 (default, Aug 9 2019, Type "help", "copyright", "credits")'. The user enters '>>> 2\*4', and the shell returns '8'. Then, the user enters '>>> print("Hello World")', and the shell returns 'Hello World'. The prompt '>>>' is followed by a cursor.

# Introduction to Anaconda distribution

- Click Start menu, search and open Anaconda Navigator.

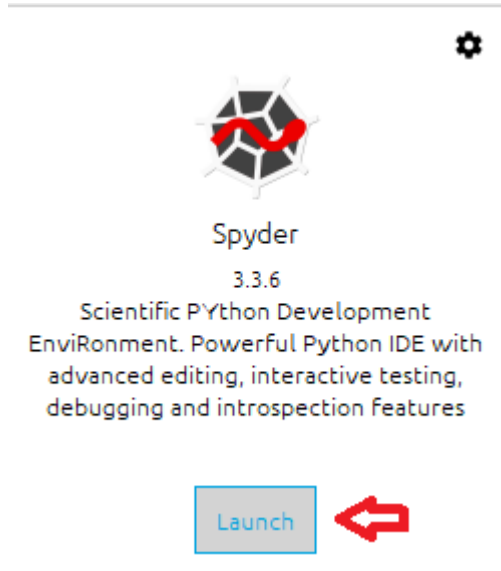


- In the Home page, you can find JupyterLab, Notebook, Spyder, Visual Studio Code applications are installed and ready to use.



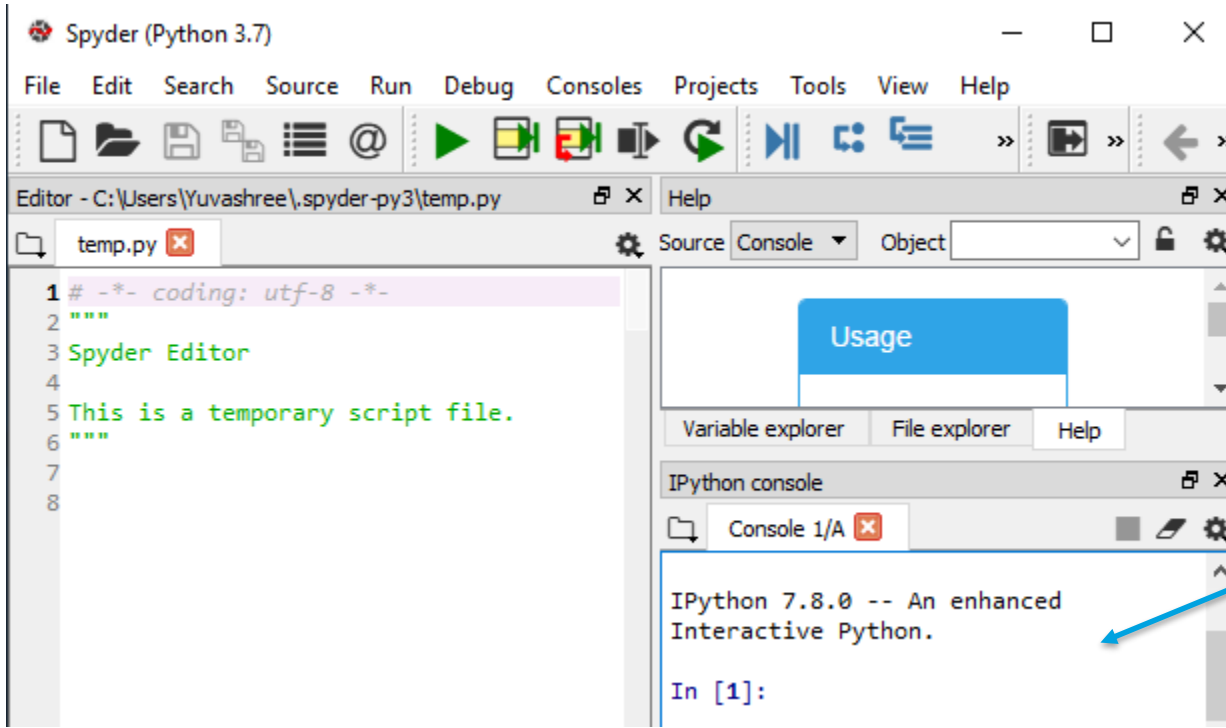
# Introduction to Anaconda distribution

- Launch Spyder IDE.





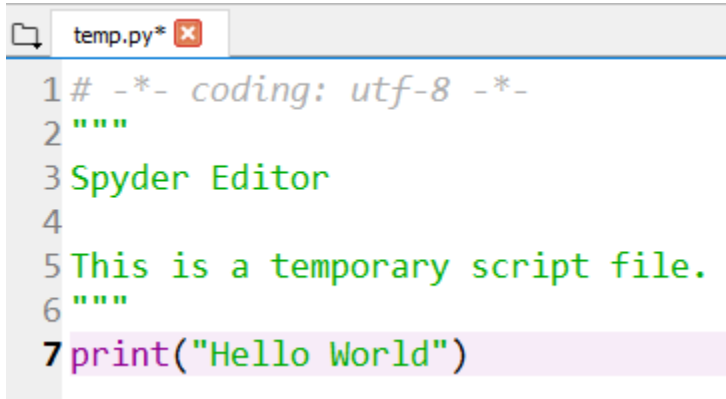
# Introduction to Anaconda distribution



Console to see  
the output.

# Introduction to Anaconda distribution

Write a script to print Hello World:

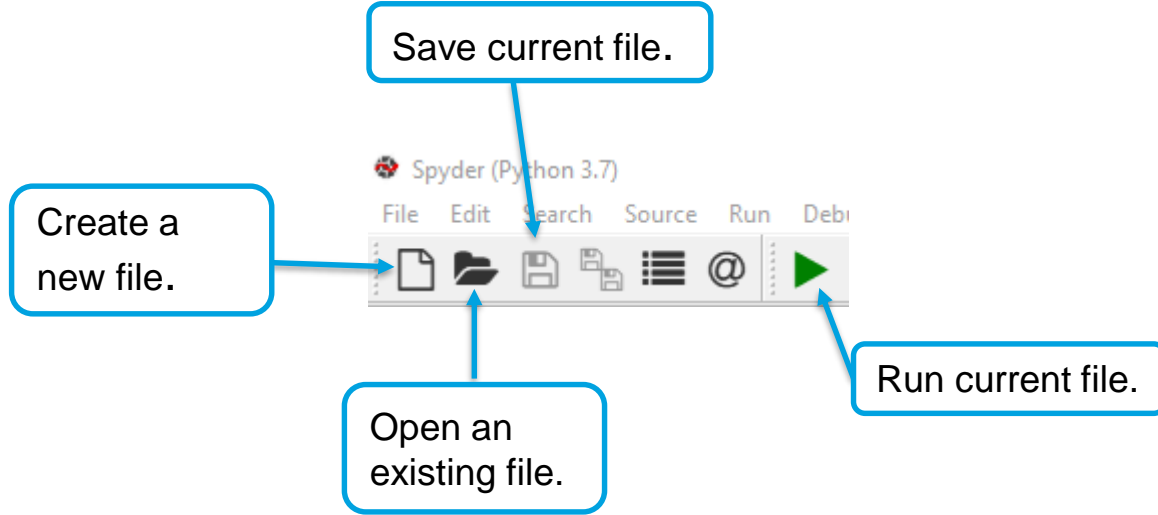


```
1 # -*- coding: utf-8 -*-
2 """
3 Spyder Editor
4
5 This is a temporary script file.
6 """
7 print("Hello World")
```

- File → Save as → Choose a location to save this file → Change Save as type to **Python**

**Files** → Enter a file name → Save the file.

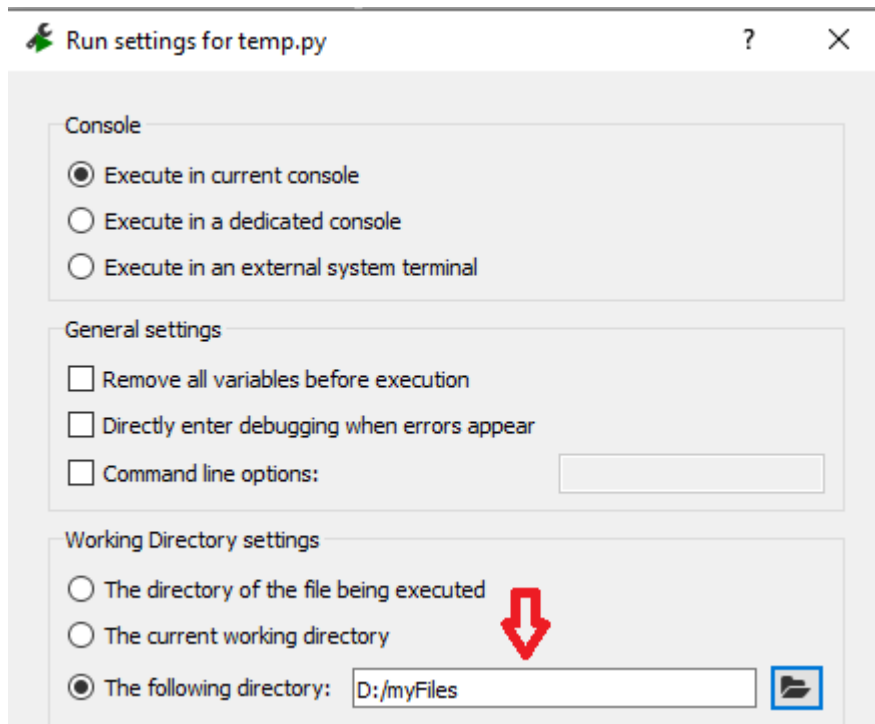
# Introduction to Anaconda distribution



- Click Run.

# Introduction to Anaconda distribution

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



Run settings for temp.py


Console

- ☒ Execute in current console
- ☐ Execute in a dedicated console
- ☐ Execute in an external system terminal

General settings

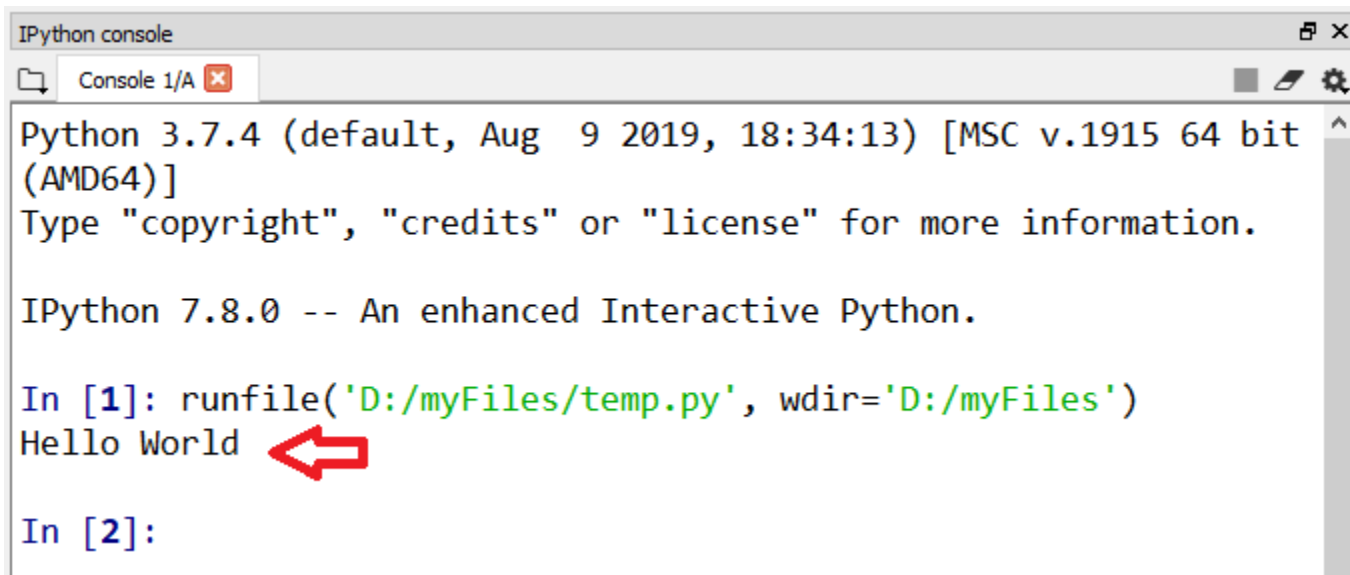
- ☐ Remove all variables before execution
- ☐ Directly enter debugging when errors appear
- ☐ Command line options:

Working Directory settings

- ☐ The directory of the file being executed
- ☐ The current working directory
- ☒ The following directory:  

# Introduction to Anaconda distribution

Output:



The screenshot shows an IPython console window with the following text:

```
IPython console
Console 1/A x
Python 3.7.4 (default, Aug 9 2019, 18:34:13) [MSC v.1915 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 7.8.0 -- An enhanced Interactive Python.

In [1]: runfile('D:/myFiles/temp.py', wdir='D:/myFiles')
Hello World
In [2]:
```

A red arrow points to the output "Hello World".



**Thank you**