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Python Introduction

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Outline

- The Python Programming Language
- Installing from python.org
- IPython and Jupyter Notebook
- Google Colab
- Anaconda – DS Toolkit
- Spyder IDE
- PyCharm IDE
- Python in Visual Studio
- Homework

The Python Programming Language

- YouTube Video from **Programming with Mosh**

What is Python? Why Python is So Popular?

<https://youtu.be/Y8Tko2YC5hA>

Introduction

- Python is an **interpreted, high-level, general-purpose** programming language.
- Created by Guido van Rossum and first released in **1991**.
- Python's design philosophy emphasizes **code readability**.
- Its language constructs and **object-oriented** approach aim to help programmers write **clear, logical** code for small and large-scale projects.

Features and Philosophy

- **Features**

- Batteries Included
- Everything is an Object
- Interactive Shell
- Cross Platform

- **Philosophy**

- Beautiful is better than ugly
- Explicit is better than implicit
- Simple is better than complex
- Complex is better than complicated
- Readability counts

Python Resources

- **Official documentation:** <https://docs.python.org>
- **Tutorials:** <https://www.learnpython.org/>
- **Python Books**
 1. **A Whirlwind Tour of Python**, by Jake VanderPlas, <https://learning.oreilly.com/library/view/a-whirlwind-tour/9781492037859/> (short)
 2. **Python for Everybody**, by Charles R. Severance, <https://py4e.com/book.php> (medium)
 3. **Fundamentals of Python Programming**, by Richard Halterman, <https://freecomputerbooks.com/Fundamentals-of-Python-Programming-by-Richard-Halterman.html> (long)

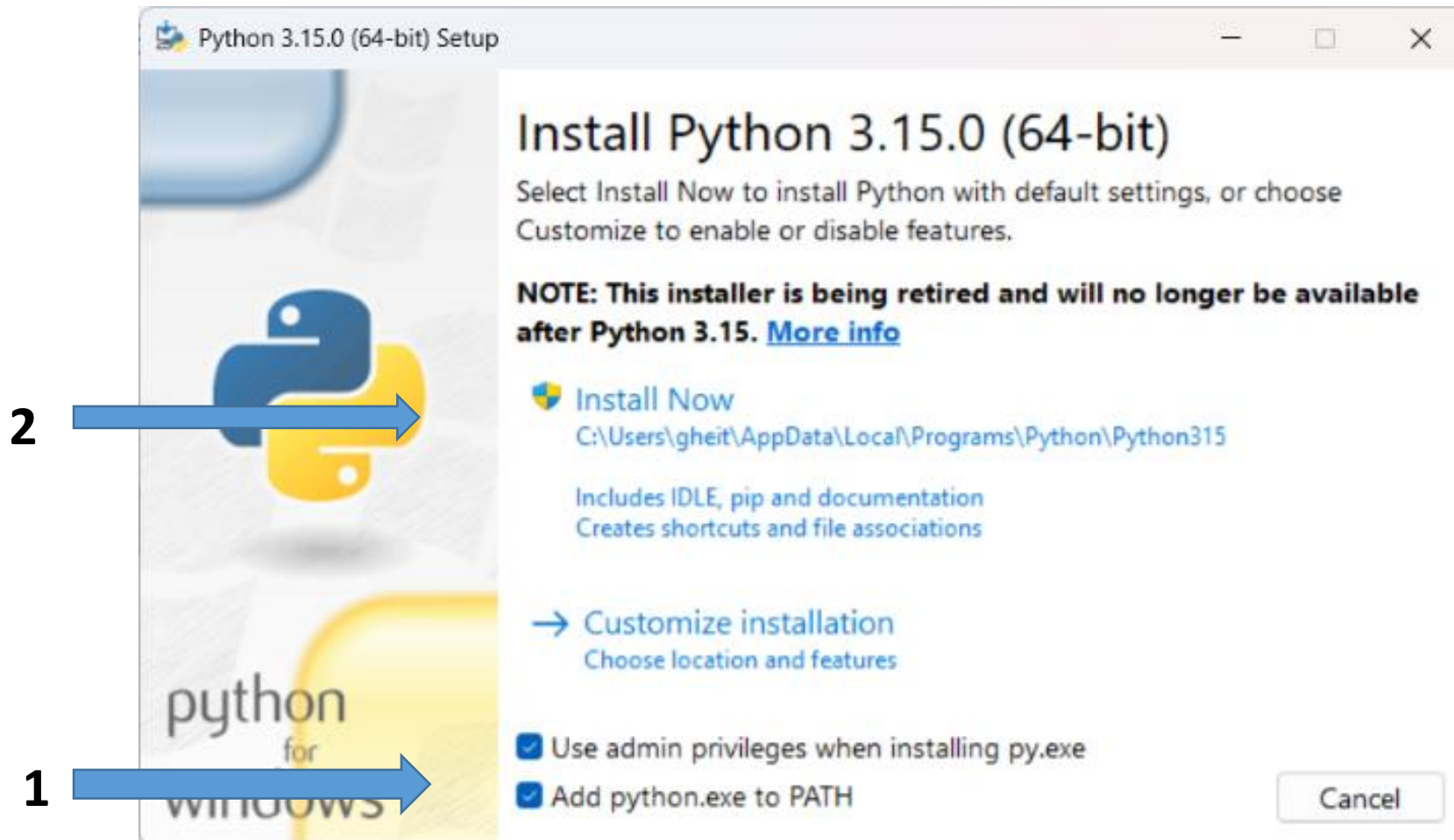
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Installation from python.org

- Install Python 3 from <https://www.python.org/downloads/>
- The latest version in October 2026 is 3.15
- It is recommended to use a 64-bit Python version, e.g.,
<https://www.python.org/ftp/python/3.15.0/python-3.15.0-amd64.exe>

When installing Python, check the “Add to PATH” option



Installing Python Packages

- From your OS command prompt, check the **options** of the package installing system by:

```
C:\>pip help
```

- **Check** the installed packages using:

```
C:\>pip list
```

- **Install** needed packages through:

```
C:\>pip install --upgrade jupyter matplotlib numpy  
pandas scipy scikit-learn torch
```

Executing Python Code

- **Starting** and using Python Interpreter
- **Creating** a Python script file
file: test.py
print("Running test.py")
x = 5
print("Result is", 3 * x)
- **Running** the script file

```
PS C:\Users\Hp> python
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct 5 2020,
Type "help", "copyright", "credits" or "license"
>>> x = 5
>>> print(3 * x)
15
>>> exit()
PS C:\Users\Hp>
```

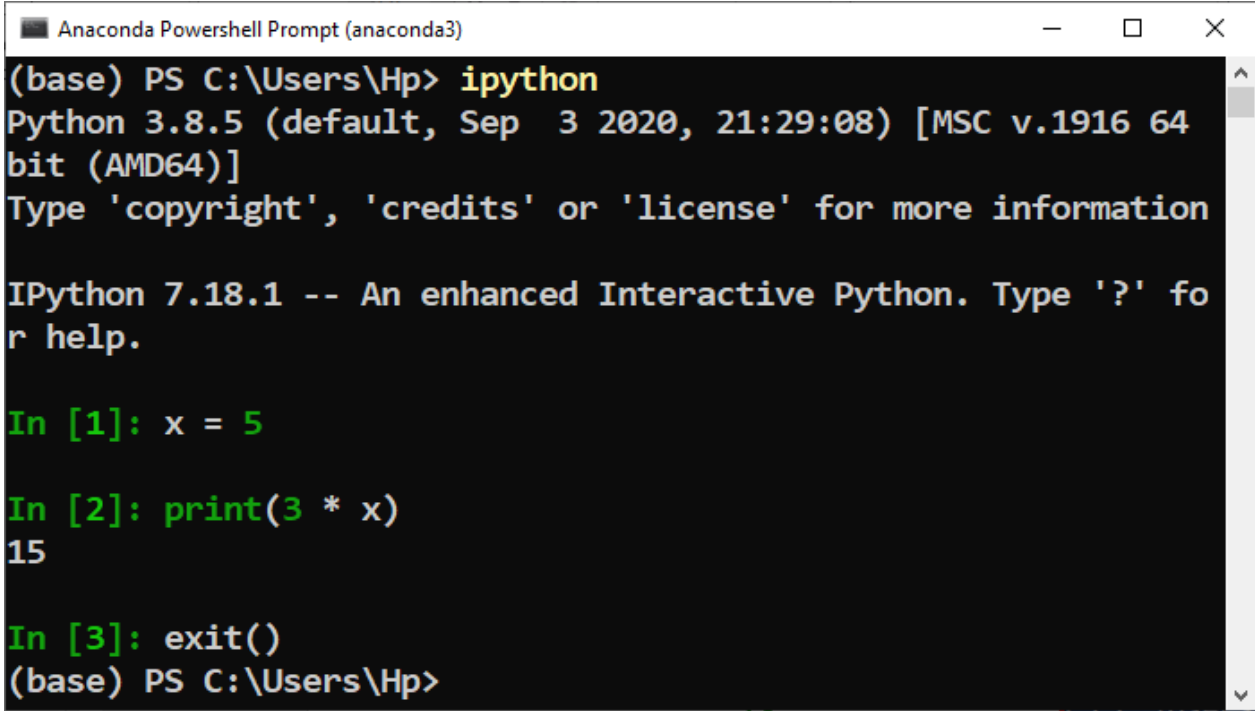
```
PS C:\Users\Hp> python test.py
Running test.py
Result is 15
PS C:\Users\Hp>
```

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IPython

- **Interactive Python shell**
- It provides a more useful shell environment to execute python code in REPL (Read Eval Print Loop).
- It makes it **more interactive** by adding features like:
 - **Syntax highlighting**
 - **Code completion**
 - **?, %run, %paste, %timeit, %reset**
- IPython also comes with other tools like **Jupyter Notebooks**.



```
Anaconda PowerShell Prompt (anaconda3)
(base) PS C:\Users\Hp> ipython
Python 3.8.5 (default, Sep  3 2020, 21:29:08) [MSC v.1916 64
bit (AMD64)]
Type 'copyright', 'credits' or 'license' for more information

IPython 7.18.1 -- An enhanced Interactive Python. Type '?' fo
r help.

In [1]: x = 5

In [2]: print(3 * x)
15

In [3]: exit()
(base) PS C:\Users\Hp>
```

Jupyter Notebook

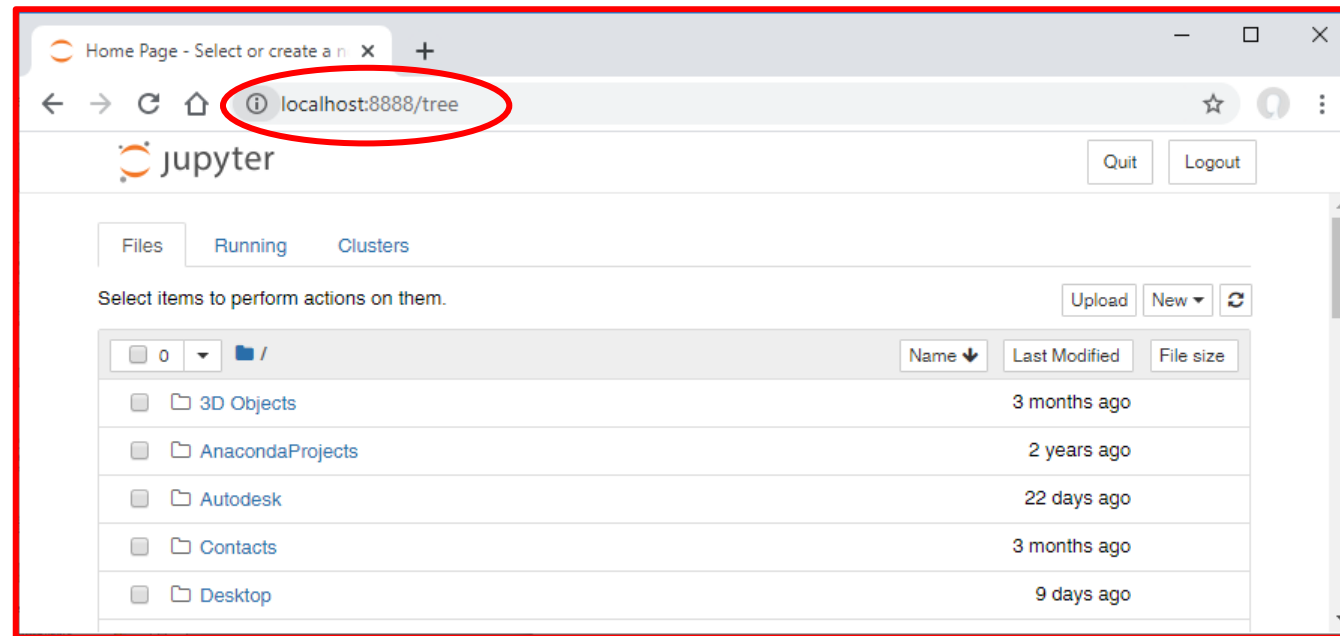
- The Jupyter Notebook is an open-source **web application** that allows you to create and share **documents** that contain live **code**, **equations**, **visualizations** and narrative **text**.
- **Website**: <http://jupyter.org/>
- **Tutorial** on Jupyter's website: <https://jupyter-notebook.readthedocs.io/en/stable/notebook.html>

Starting Jupyter Notebook

- To **start** Jupyter notebooks server from your OS command prompt enter:

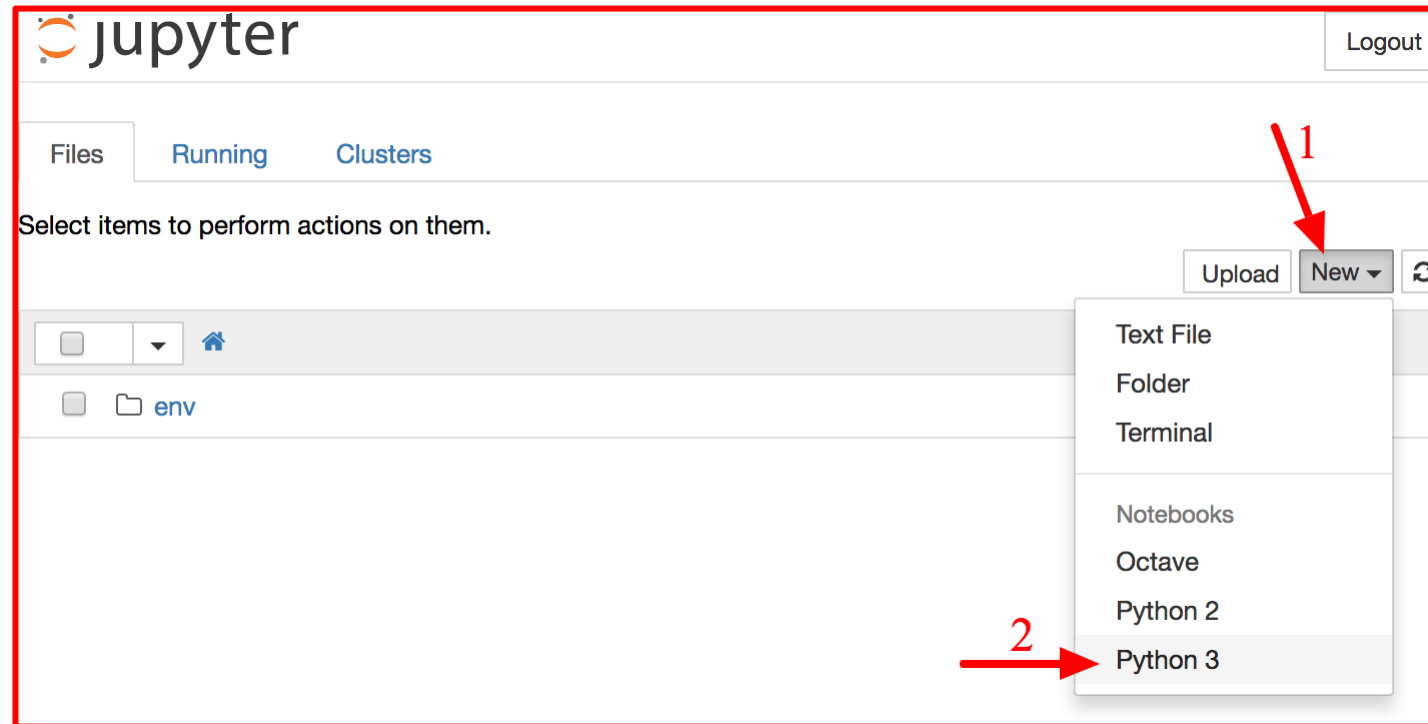
C:\>jupyter notebook

- Then **browse** to <http://localhost:8888/>.



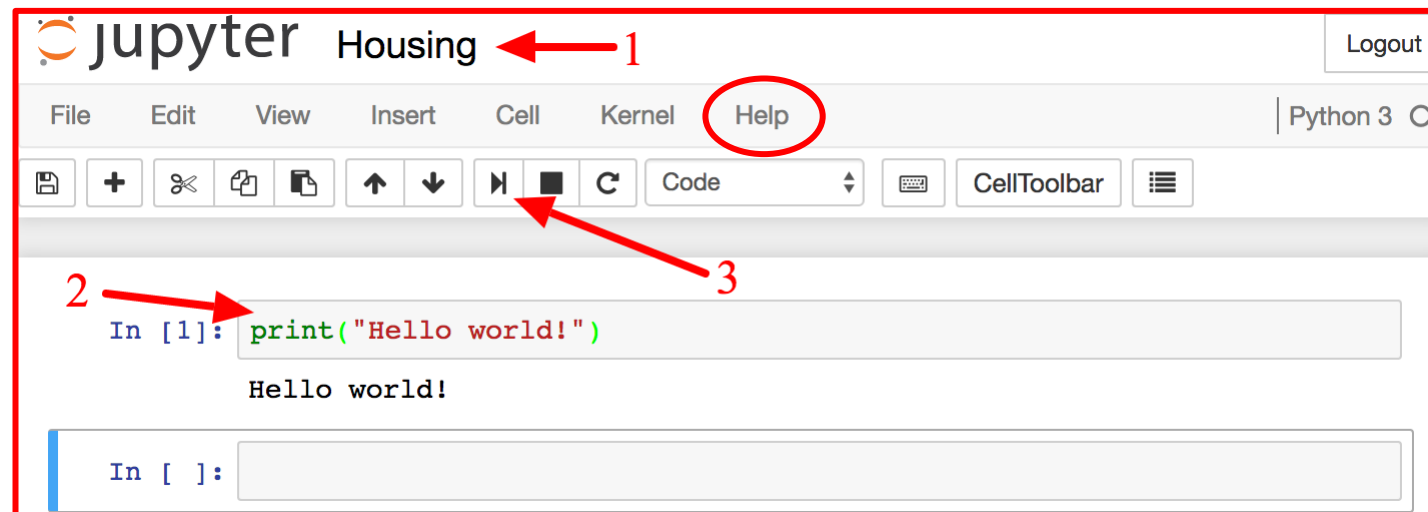
Creating Python Notebook

- Click on the **New** button and select the appropriate Python version.



Working with Notebooks

- A notebook contains a list of **cells**. Each cell can contain executable **code** or formatted **text**.
- To change the notebook **name**, click on the title bar.
- Type **`print("Hello world!")`** in the first cell, and click on the **play** button. The result is displayed below the cell.
- Check the **User Interface Tour** from Jupyter's Help menu.



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Google Colab

- **Colaboratory** is a **free** Jupyter notebook environment that requires no setup and runs entirely in the **cloud**.
With **Colaboratory** you can write and execute code, save and share your analyses, and Colab provides a free hosted notebook environment, with optional paid services.

<https://colab.research.google.com/>

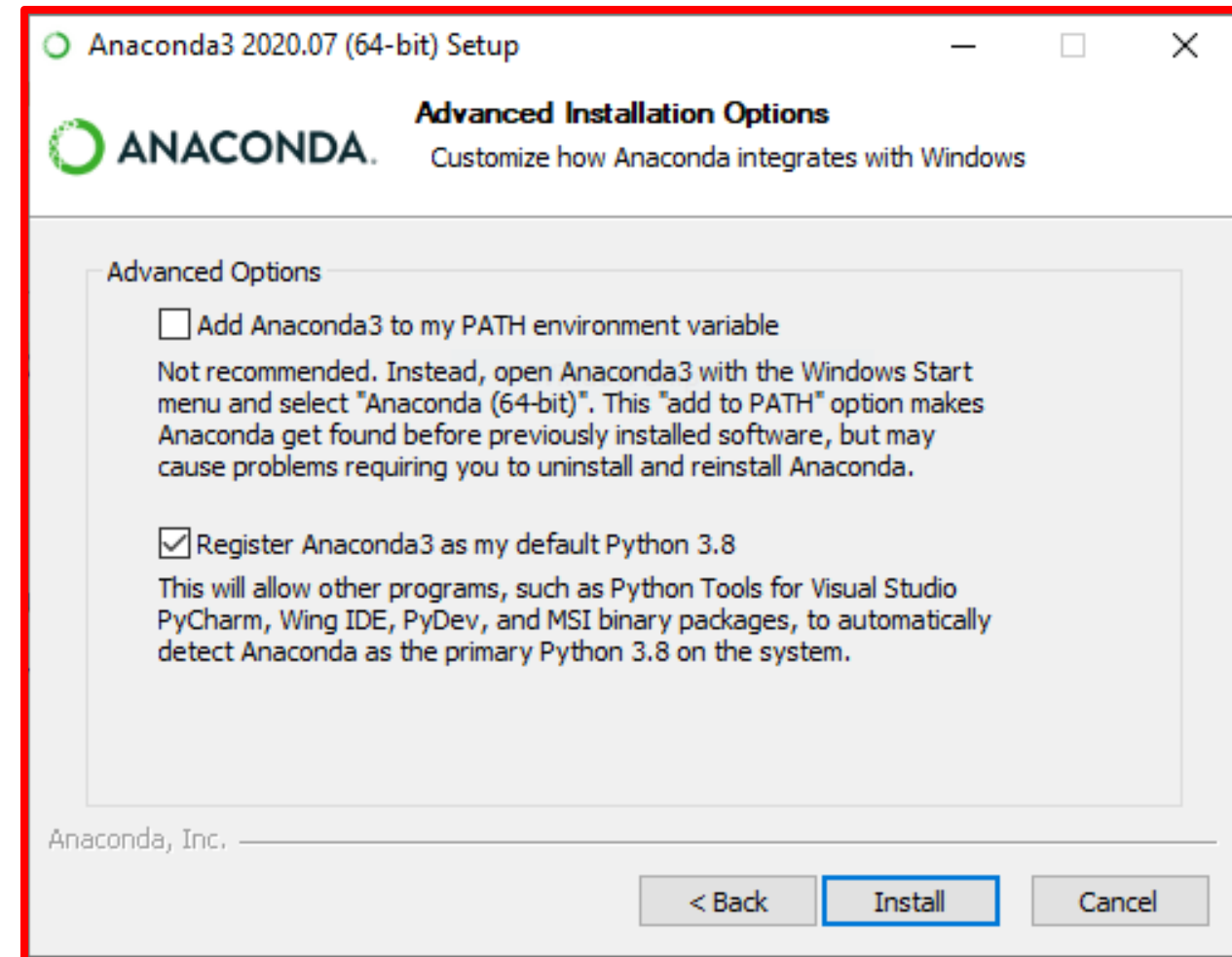
- Check the **introduction** in
<https://colab.research.google.com/notebooks/intro.ipynb#>

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Anaconda – DS Toolkit

- **The recommended** local environment manager
 - Download packages
 - Manage environments
 - Access Python applications and help
- **Install** the 64-bit version
 - <https://www.anaconda.com/products/individual>
- **Tutorial**
 - <https://docs.anaconda.com/navigator/tutorials/index.html>



Conda from the Powershell

```
Anaconda Powershell Prompt (anaconda3)

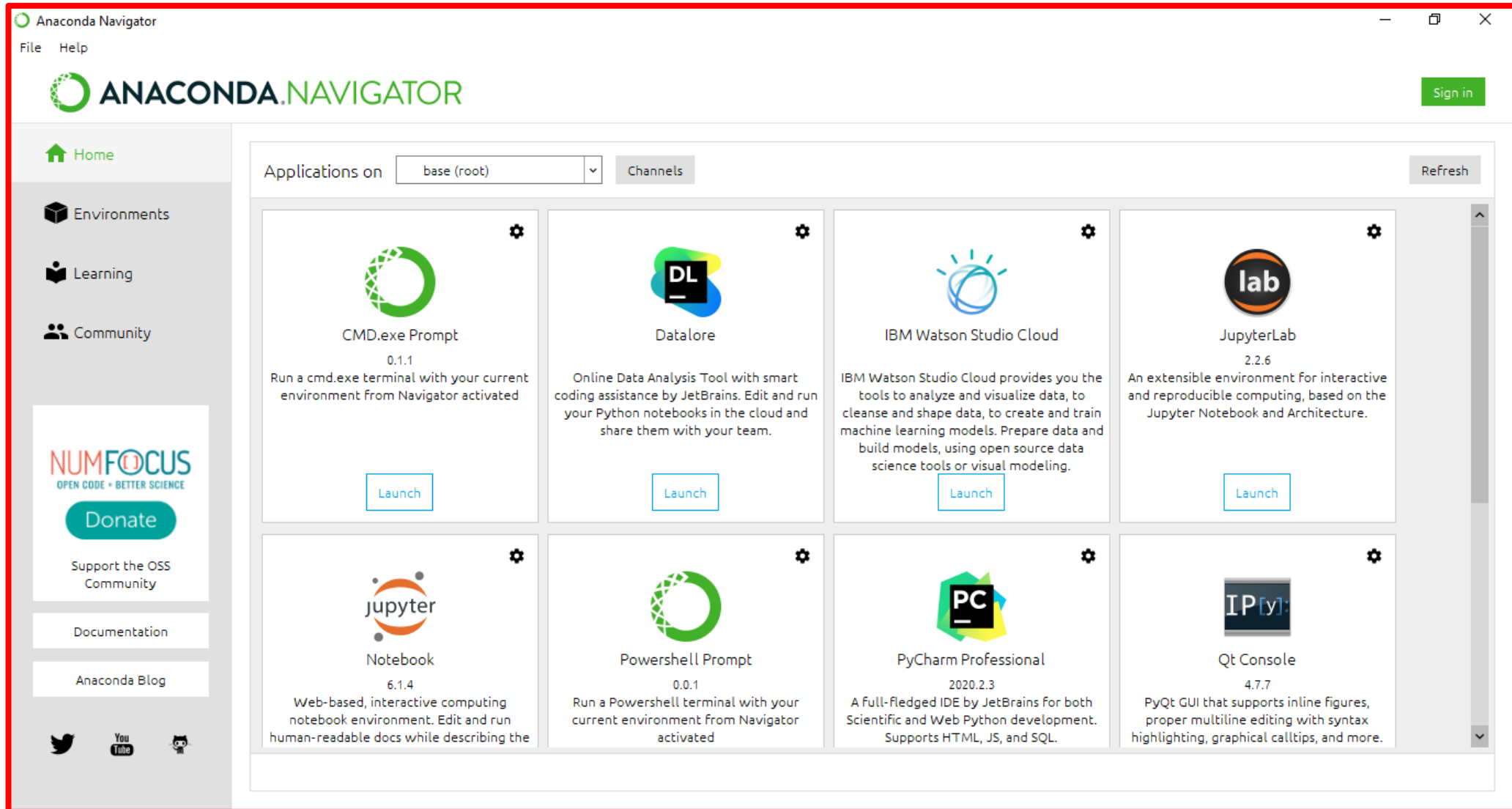
(base) PS C:\Users\Hp> conda update --all
Collecting package metadata (current_repodata.json): done
Solving environment: done

# All requested packages already installed.

(base) PS C:\Users\Hp> conda --version
conda 4.9.0
(base) PS C:\Users\Hp> conda info --envs
# conda environments:
#
base                  * C:\Users\Hp\anaconda3
First_Project         C:\Users\Hp\anaconda3\envs\First_Project
ML_env                C:\Users\Hp\anaconda3\envs\ML_env

(base) PS C:\Users\Hp> conda activate ML_env
(ML_env) PS C:\Users\Hp> python test.py
Running test.py
Result is 15
(ML_env) PS C:\Users\Hp>
```

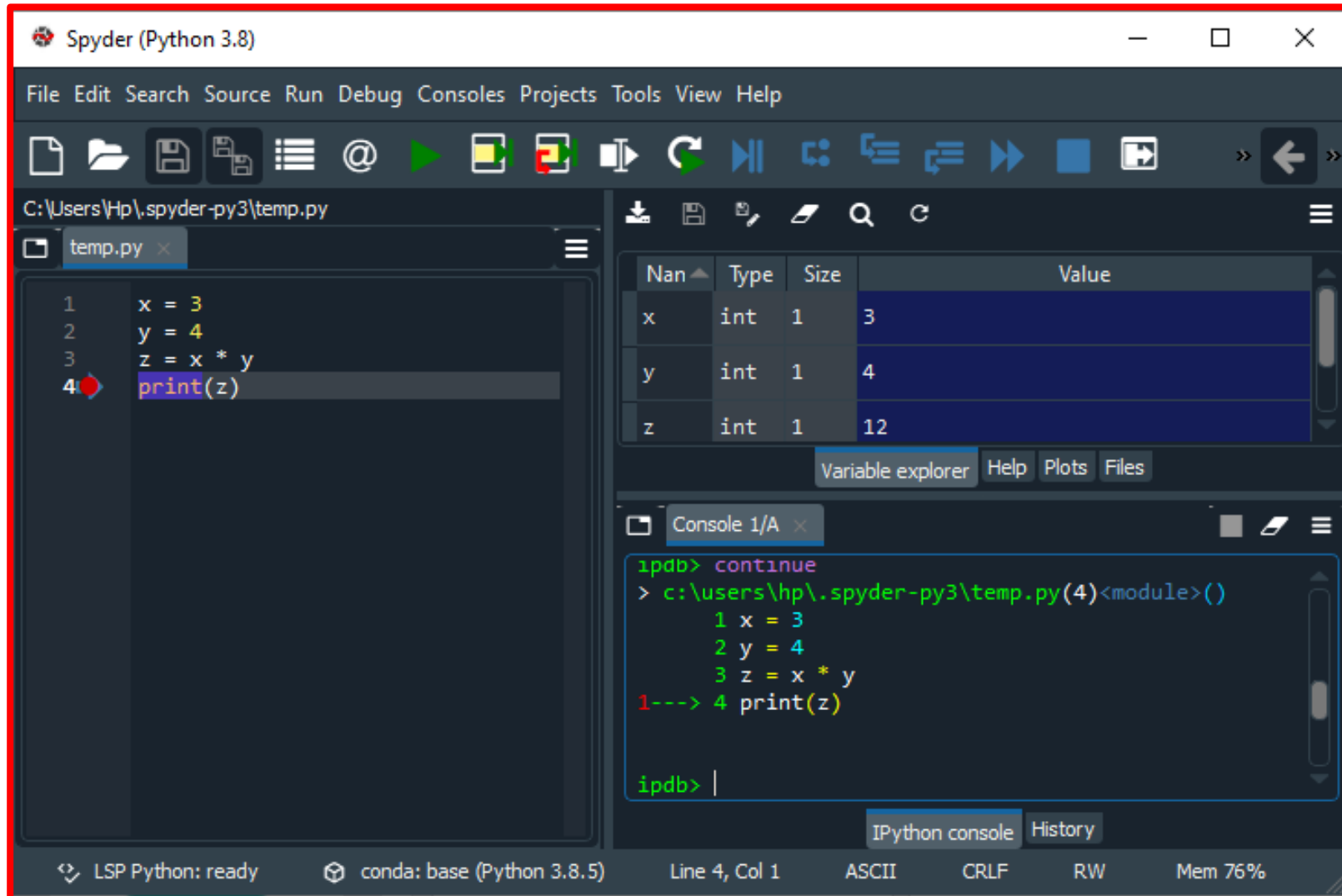
Anaconda Navigator



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Spyder IDE



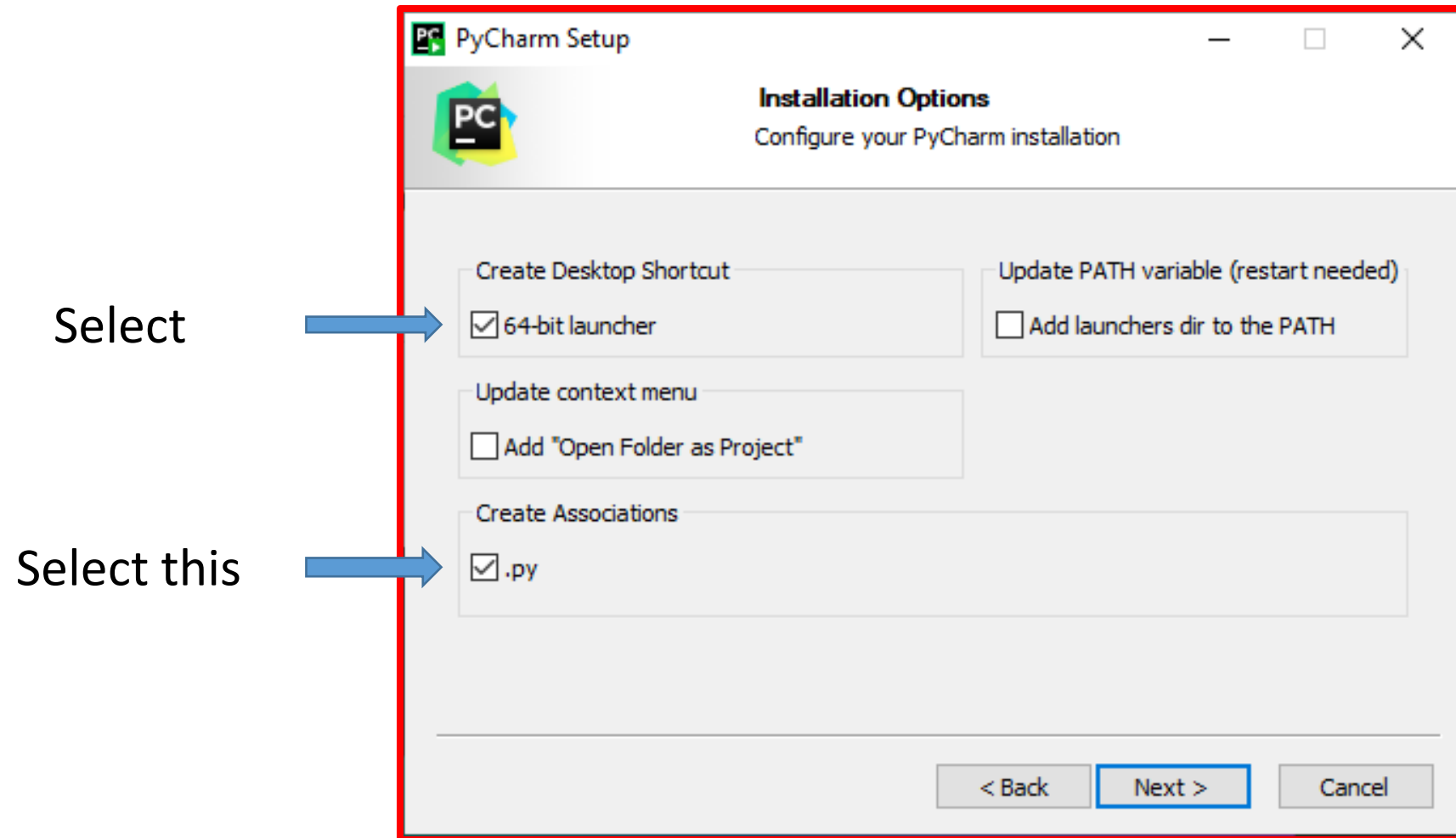
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PyCharm IDE

- **PyCharm** is a powerful Python IDE. Install it from <https://www.jetbrains.com/pycharm/>
- Install the free **Community** version.
- Students can also install the **Professional** version for free. You need university email address.
- Read the first two steps of **First Steps** at <https://www.jetbrains.com/help/pycharm/first-steps.html>

PyCharm Installation



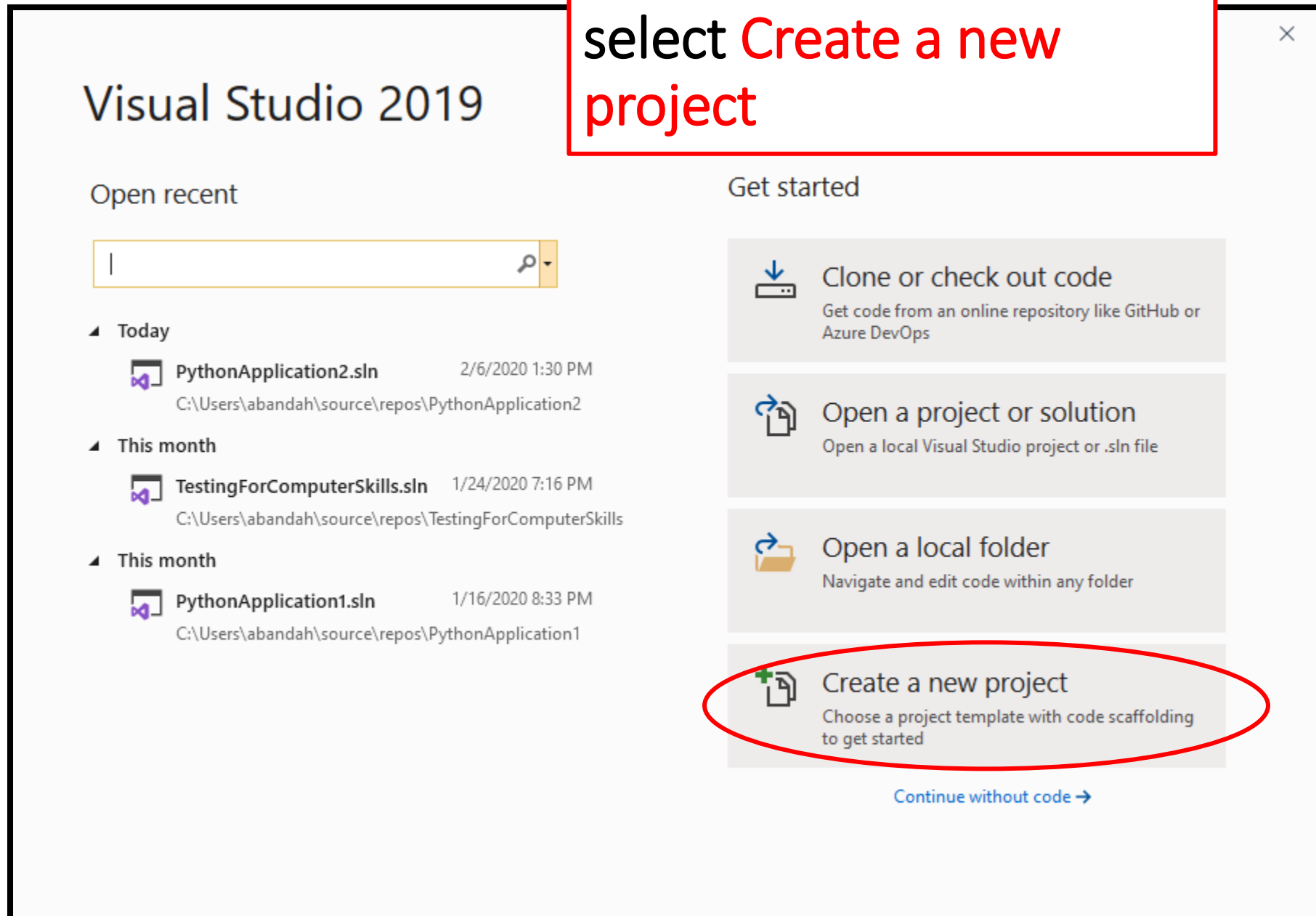
PyCharm Installation

- Check the following **tutorial** to learn how to **connect PyCharm** to an **Conda environment**:
 - <https://docs.anaconda.com/anaconda/user-guide/tasks/pycharm/>

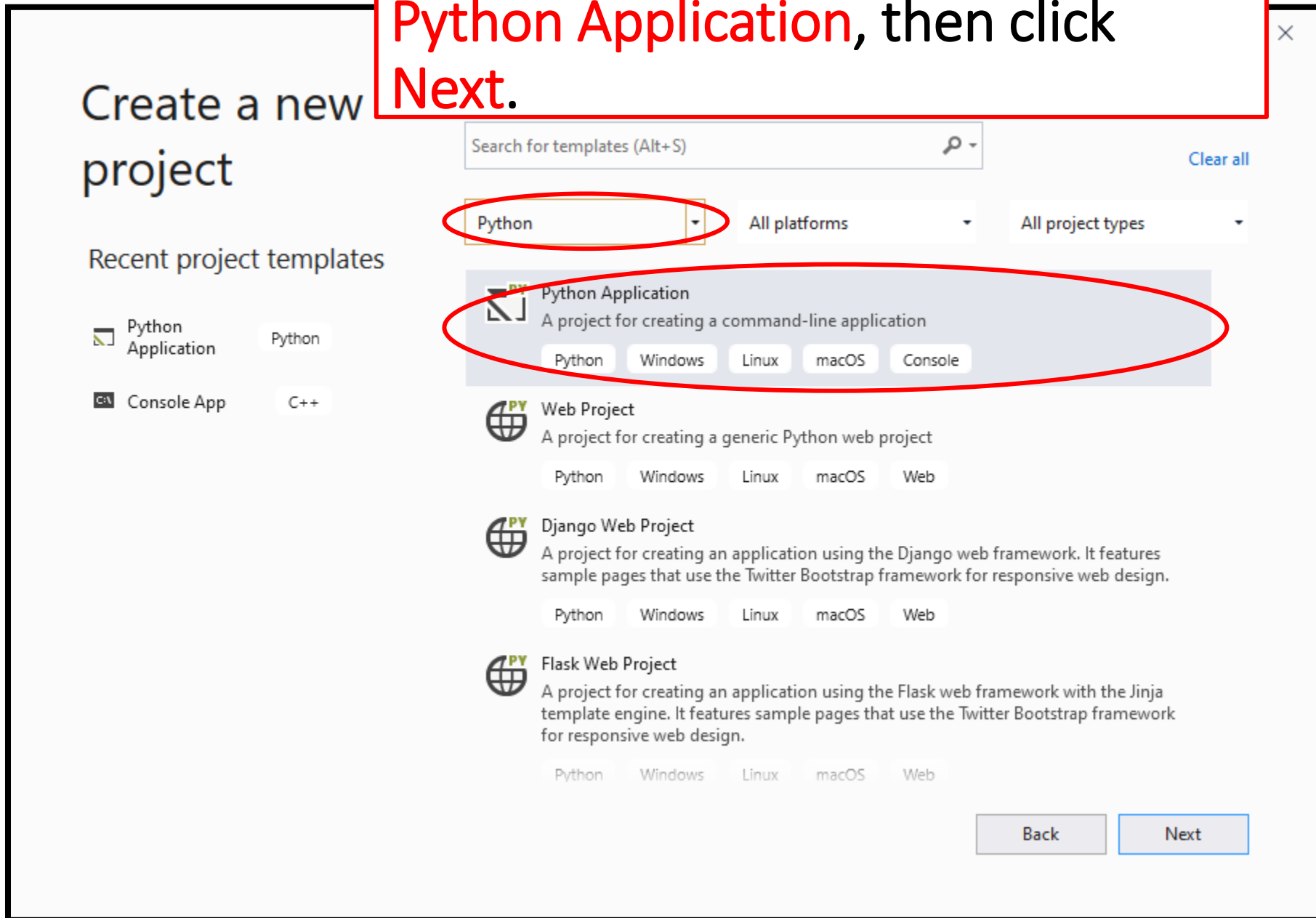
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1. Start Visual Studio and select **Create a new project**



2. Select the language **Python** and **Python Application**, then click **Next**.



3. Enter a name for your project then press **Create**.

Configure your new project

Python Application Python Windows Linux macOS Console

Project name

PythonApplication3

Location

C:\Users\abandah\source\repos

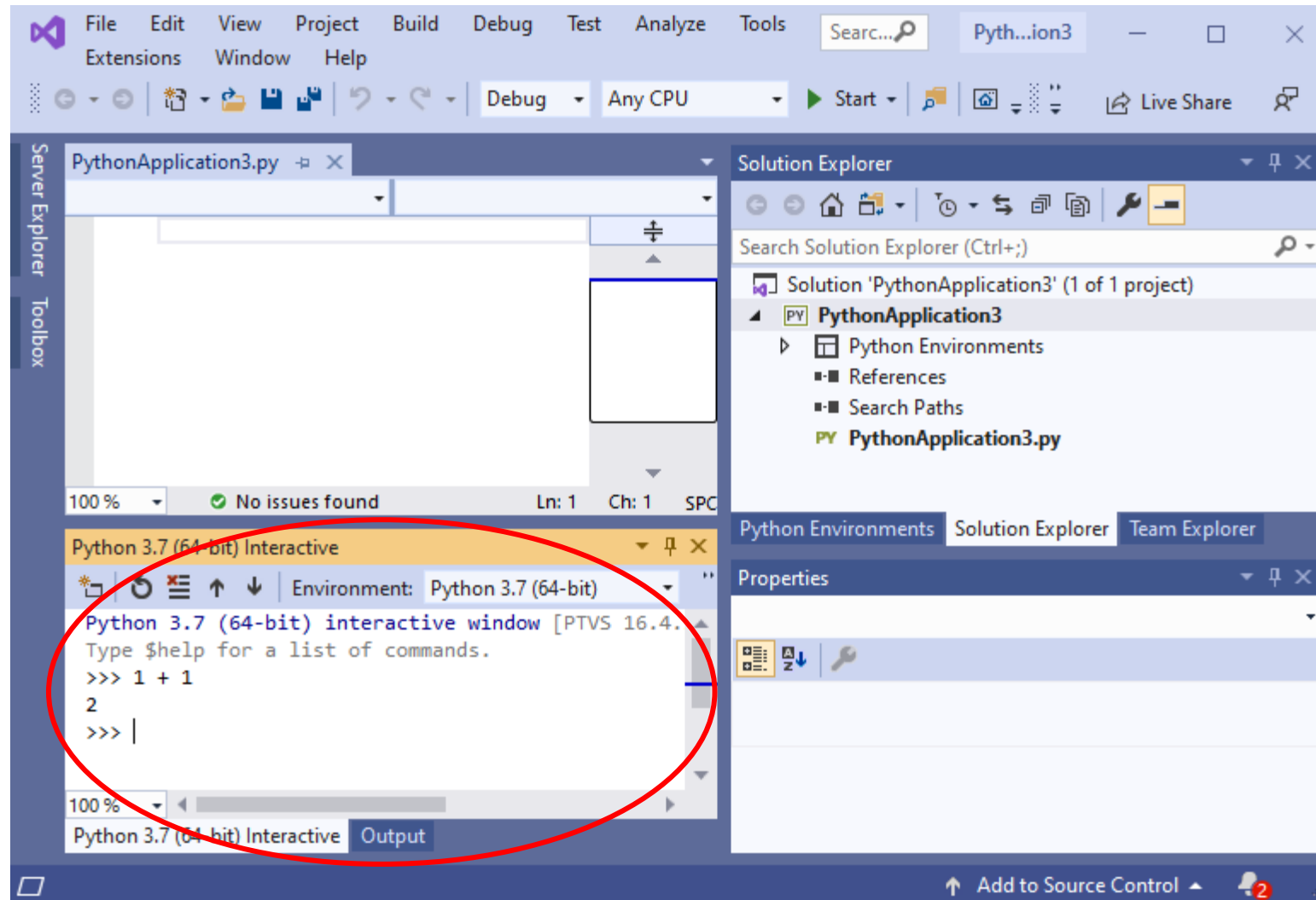
Solution name ⓘ

PythonApplication3

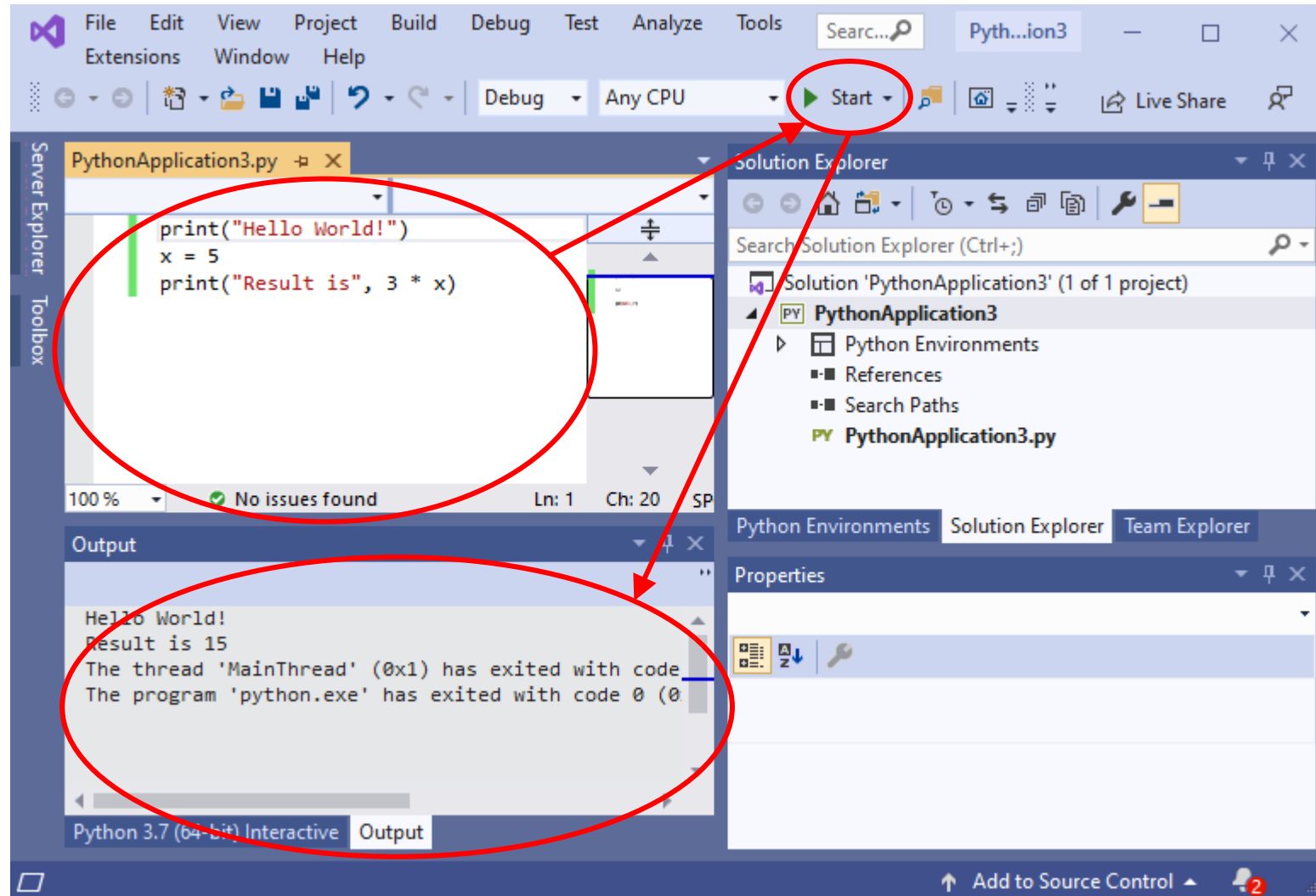
☒ Place solution and project in the same directory

Back Create

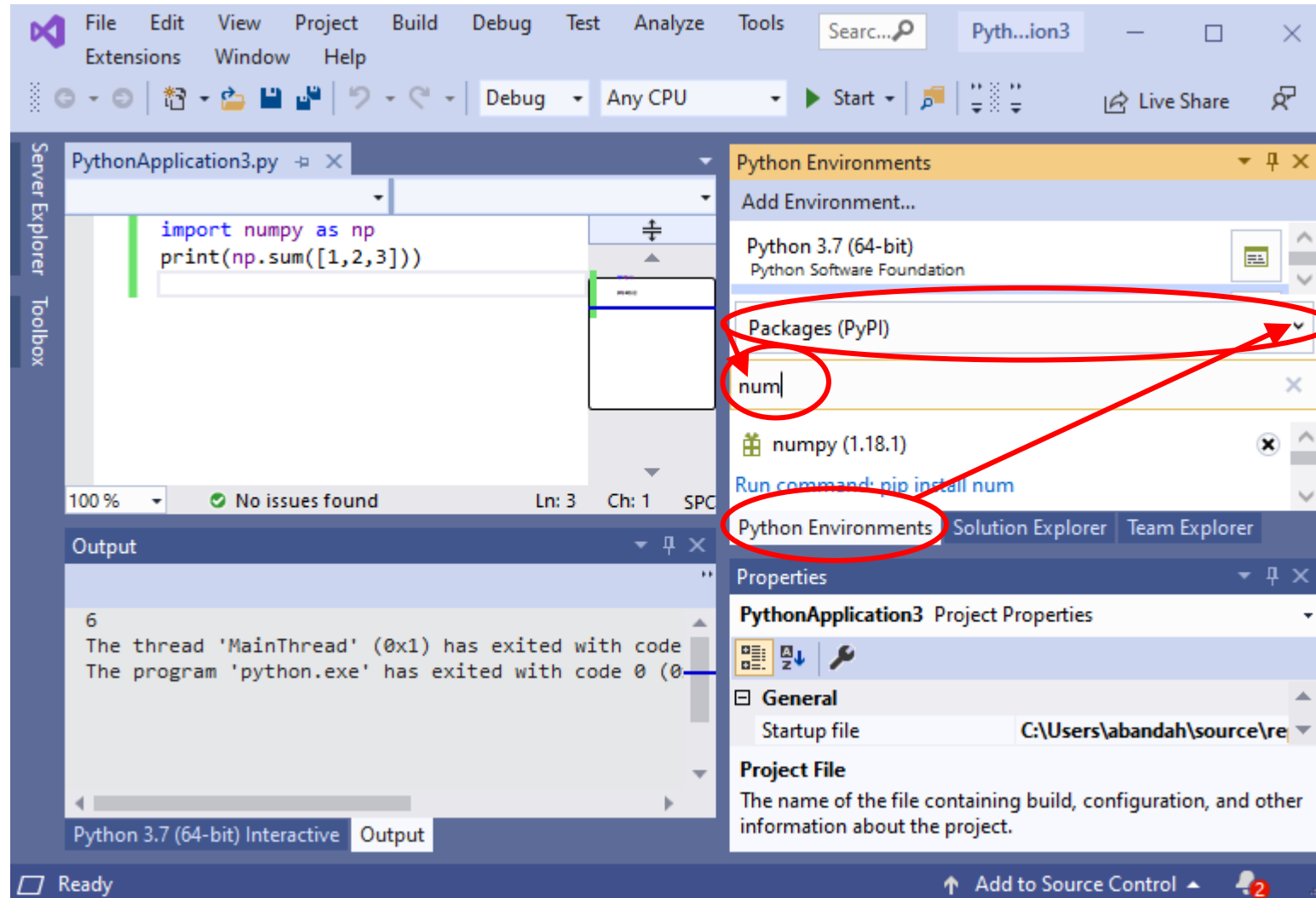
4. You can directly enter and run Python code in the **Python Interactive** window.



5. You can enter your Python program in the **Editor** window and execute it by clicking **Start**. The output appears in the **Output** window.



6. To install or list packages, select the **Python Environments** and **Packages (PyPI)**, then enter the name of the package in the **search box**.



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Homework 1 - Toolkits

1. **Read** all **tutorials** suggested in this presentation.
2. **Install Anaconda**.
3. Open Anaconda prompt and **update** it.
4. From Anaconda prompt, **execute** a Python **script file**.
5. From Anaconda Navigator, launch **Jupyter Notebook** and experiment with entering and executing code and text cells.
6. Create a new **Conda environment** and install in it the package **numpy**.
7. Install **PyCharm** and create a **new project** that uses the created Conda environment and **execute** the following code:

```
import numpy as np
a= np.random.random(10)
print(a)
```

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