Introduction to Python

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Roadmap of our journey:

❖ Introduction to Python. (03 Months)

➢ Review & Evaluation of your studies.

❖ Python for AI and Data Science. (03 Months)

➢ Review & Evaluation of your studies.

❖ Industrial Projects in Automotive and Aerospace Engineering. (03 Months)

➢ Review & Evaluation of your studies.

An Introduction to Python

GUIDO VAN ROSSUM

ORIGIN OF THE PYTHON
PROGRAMMING LANGUAGE

An Introduction to Python

What is Python?

Python is a high-level object-oriented programming language that was created by Guido van Rossum. It is also called general-purpose and most popular programming language as it is used in every domain we can think of as mentioned below:

- ❑ Web Development
- ❑ Software Development
- ❑ Game Development
- ❑ Robotics Engineering
- ❑ IoT and Networking
- ❑ AI, ML, NLP, Data Science
- ❑ Embeded Software Application

A Brief History of Python Versions

Python Version	Released Date
Python 1.0	January 1994
Python 1.5	December 31, 1997
Python 1.6	September 5, 2000
Python 2.0	October 16, 2000
Python 2.1	April 17, 2001
Python 2.2	December 21, 2001
Python 2.3	July 29, 2003
Python 2.4	November 30, 2004
Python 2.5	September 19, 2006
Python 2.6	October 1, 2008
Python 2.7	July 3, 2010
Python 3.0	December 3, 2008
Python 3.1	June 27, 2009
Python 3.2	February 20, 2011
Python 3.3	September 29, 2012
Python 3.4	March 16, 2014
Python 3.5	September 13, 2015
Python 3.6	December 23, 2016
Python 3.7	June 27, 2018
Python 3.8	October 14, 2019

Python 2 vs. Python 3

Python 3 isn't just a better version of Python 2 – it is a completely different language, although it's very similar to its predecessor. When you look at them from a distance, they appear to be the same, but when you look closely, though, you notice a lot of differences.

If you're modifying an old existing Python solution, then it's highly likely that it was coded in Python 2. This is the reason why Python 2 is still in use. There are too many existing Python 2 applications to discard it altogether.

Python 3

Python 2

2 VS 3
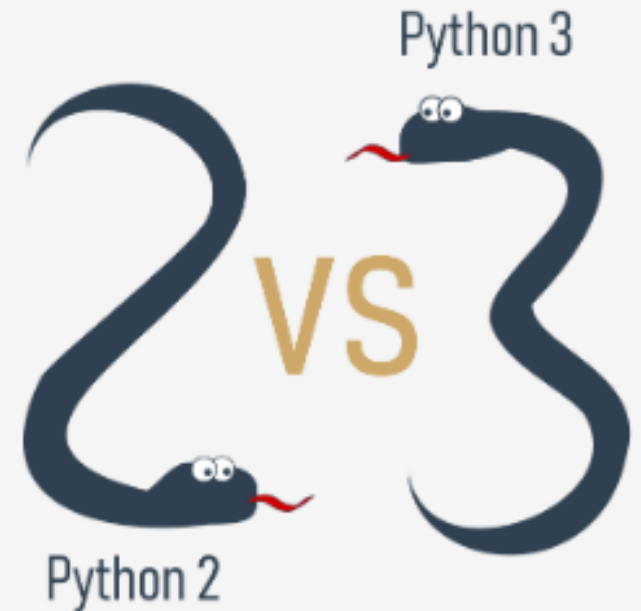
An Introduction to Python

Why Python Programming?

IEEE spectrum list of top programming language 2021. The list of programming languages is based on popularity.

Language Rank	Types	Spectrum Ranking
1. Python	🌐 🖥 ▮	100.0
2. C++	📱 🖥 ▮	99.7
3. Java	🌐 📱 🖥	97.5
4. C	📱 🖥 ▮	96.7
5. C#	🌐 📱 🖥	89.4
6. PHP	🌐	84.9
7. R	🖥	82.9
8. JavaScript	🌐 📱	82.6
9. Go	🌐 🖥	76.4
10. Assembly	▮	74.1

An Introduction to Python

Python is easy to understand

Java

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

C++

```
#include <iostream.h>
main()
{
    cout << "Hello World!" << endl;
    return 0;
}
```

C#

```
class HelloWorld
{
    static void Main()
    {
        System.Console.WriteLine("Hello, World!");
    }
}
```
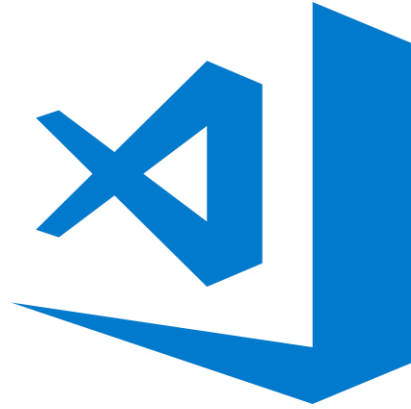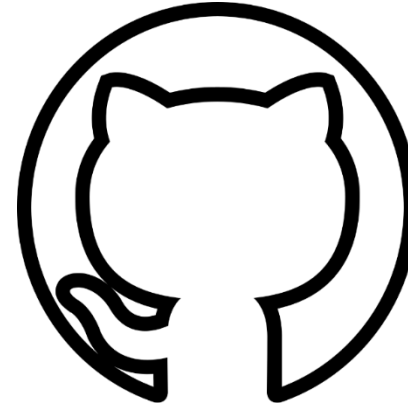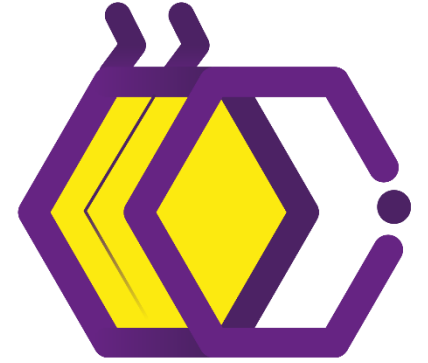
Python

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

Software Installation
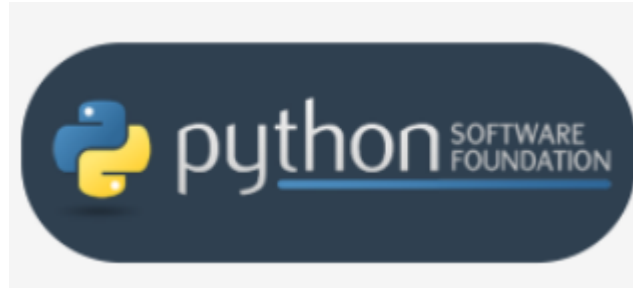
Python VS Code Git Github Beecrowd
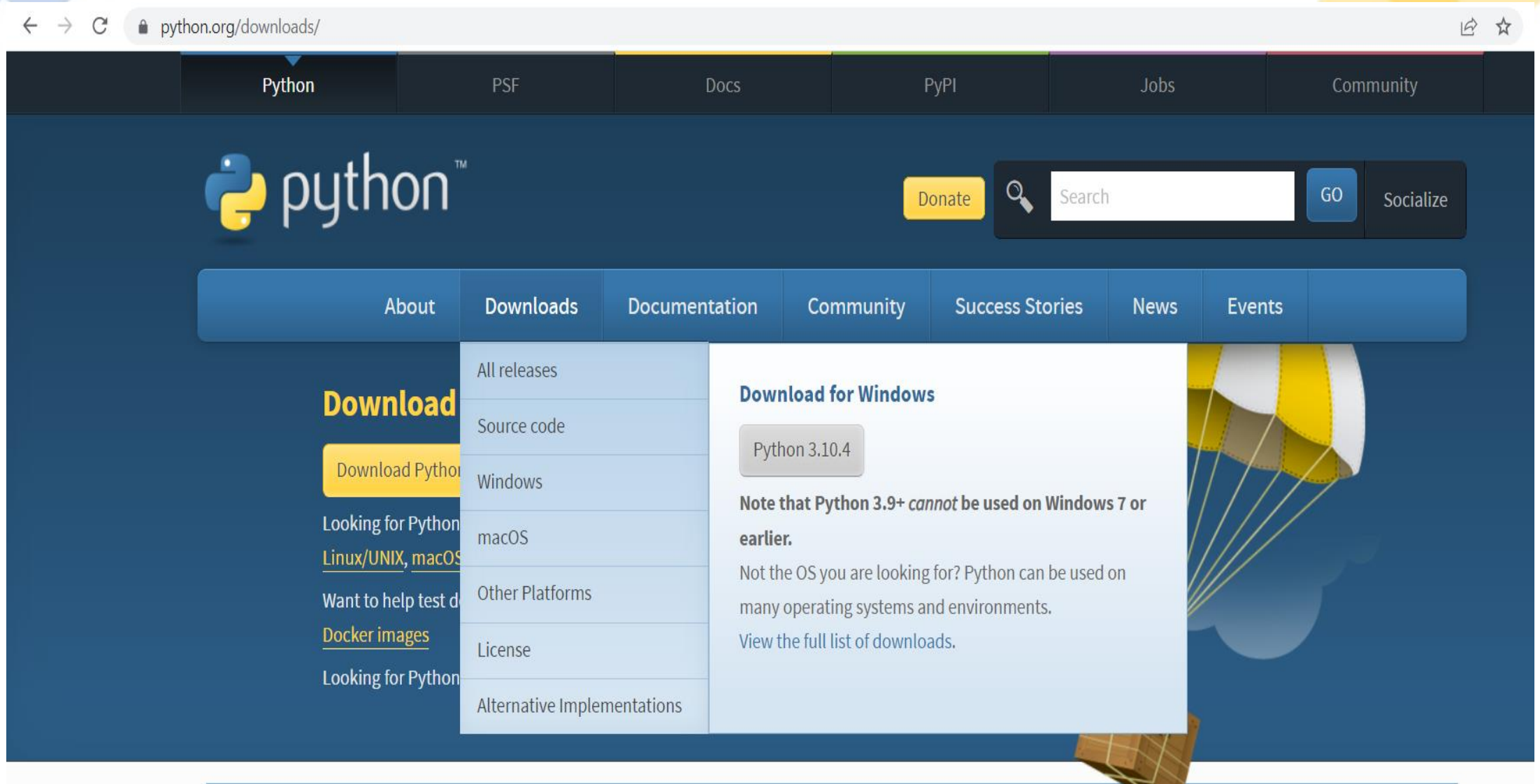
Software Description

- Python: Programming Language

- VS Code: Code Editor

- Git: Version Control System

- Github: Github Server

- Beecrowd: For solving problem

Python Software Foundation

First of all, there are the Pythons which are maintained by the people gathered around the PSF ([Python Software Foundation](#)), a community that aims to develop, improve, expand, and popularize Python and its environment. The PSF's president is Guido von Rossum himself

Installing Python

Installing Python
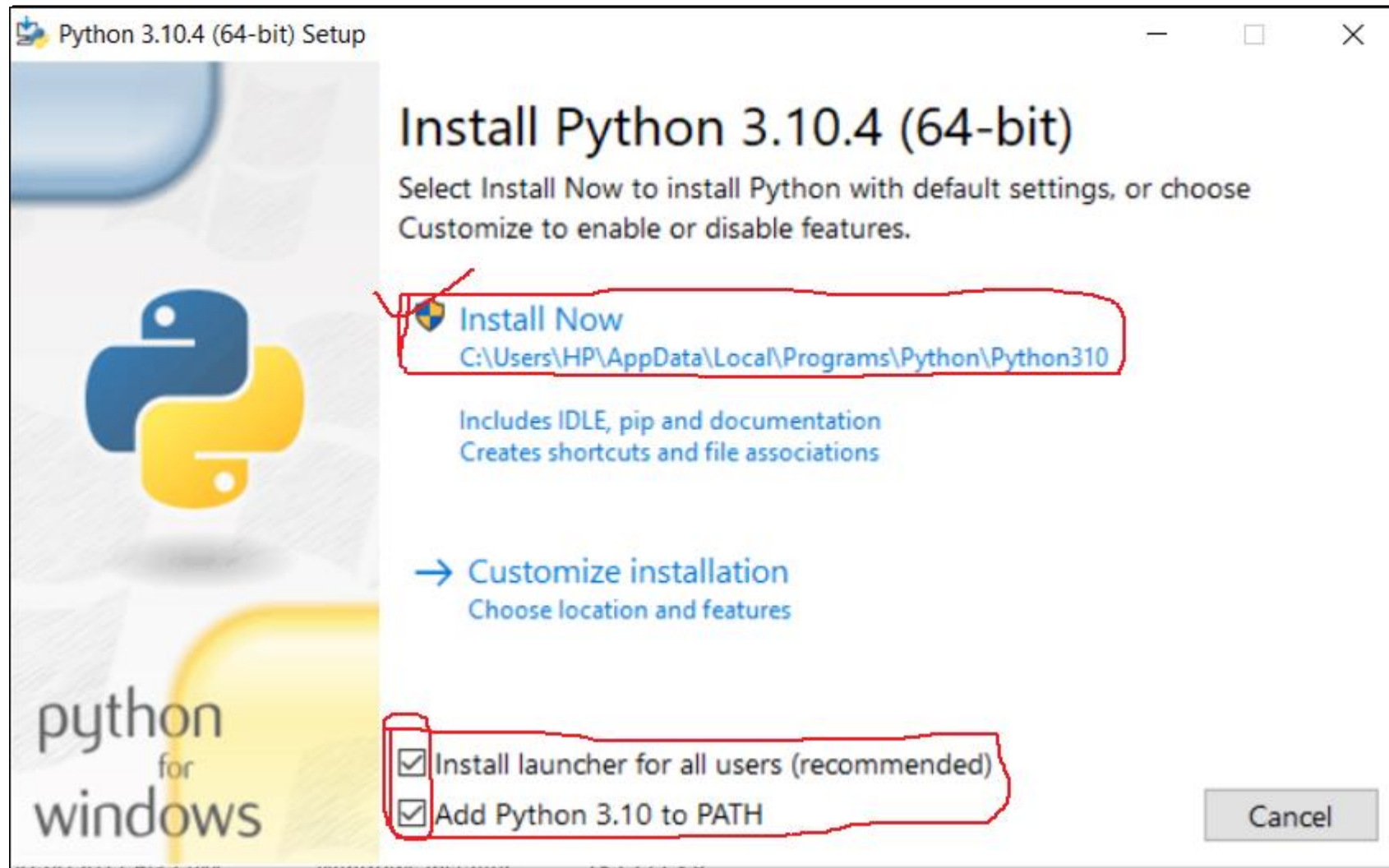
Checking Python in CMD

> python --version

```
Command Prompt                    ×    +    ∨

Microsoft Windows [Version 10.0.22621.1992]
(c) Microsoft Corporation. All rights reserved.


C:\Users\SAIF>python --version
Python 3.10.2
```
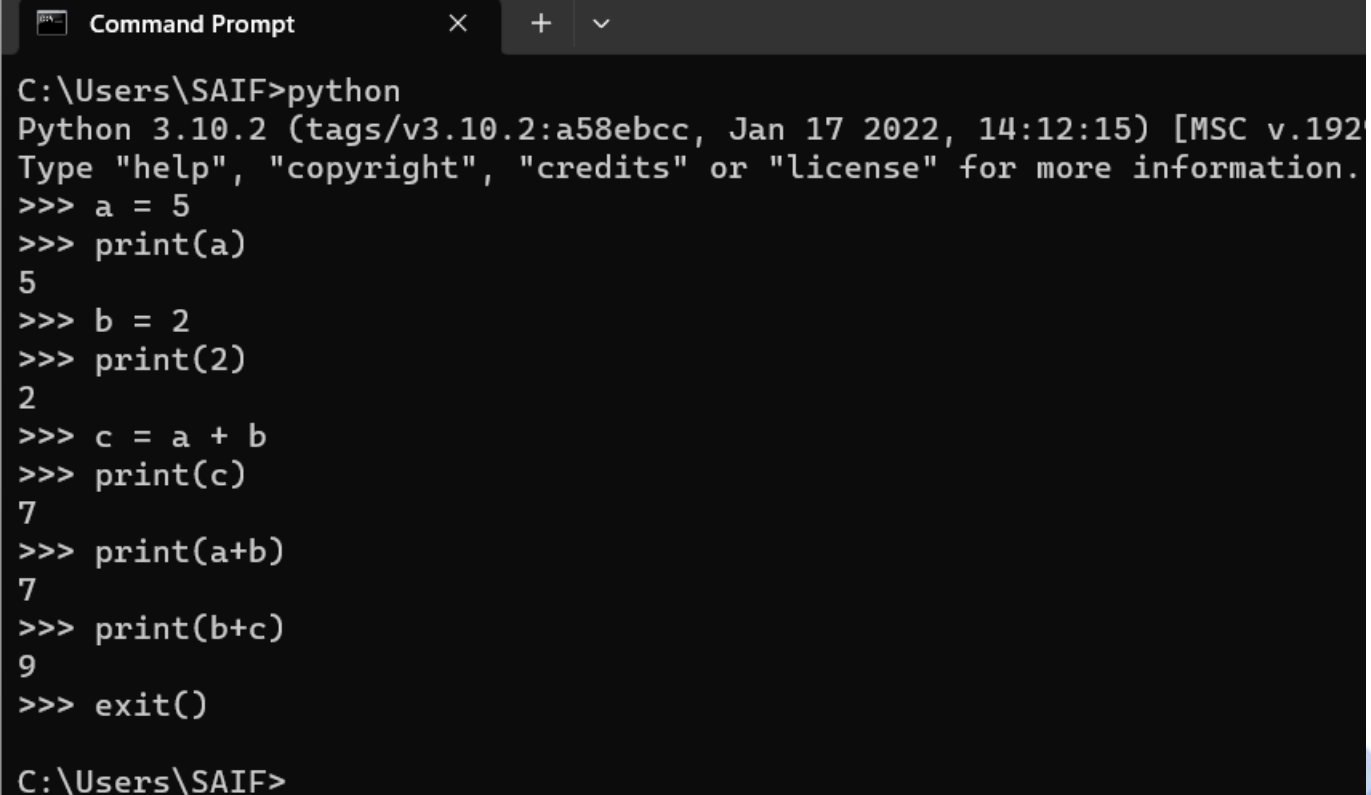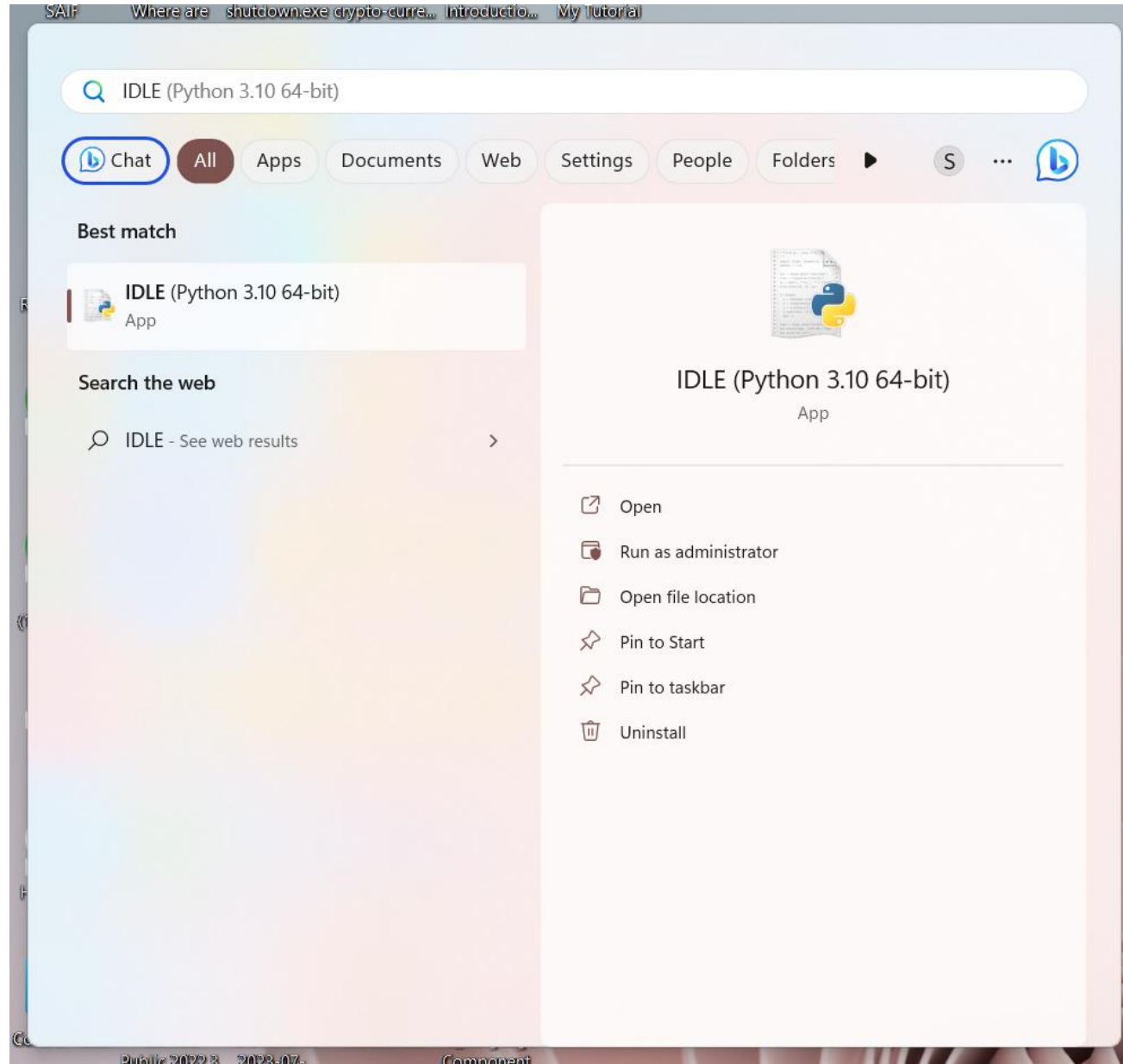
> Python
>>> a = 5
>>> print(a)
>>> b = 2
>>> print(b)
>>> c = a + b
>>> print(c)
>>> print(a+b)
>>> print(b+c)
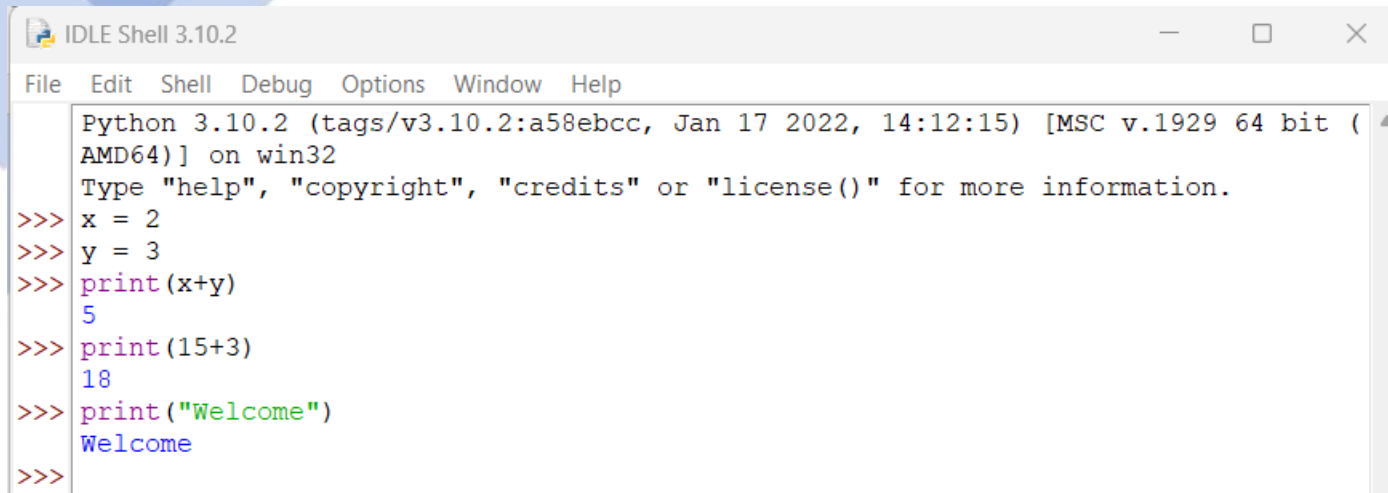>>> print (len(c))
>>> exit()

```
Command Prompt                    ×    +    ∨

C:\Users\SAIF>python
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.192
Type "help", "copyright", "credits" or "license" for more information.
>>> a = 5
>>> print(a)
5
>>> b = 2
>>> print(2)
2
>>> c = a + b
>>> print(c)
7
>>> print(a+b)
7
>>> print(b+c)
9
>>> exit()

C:\Users\SAIF>
```
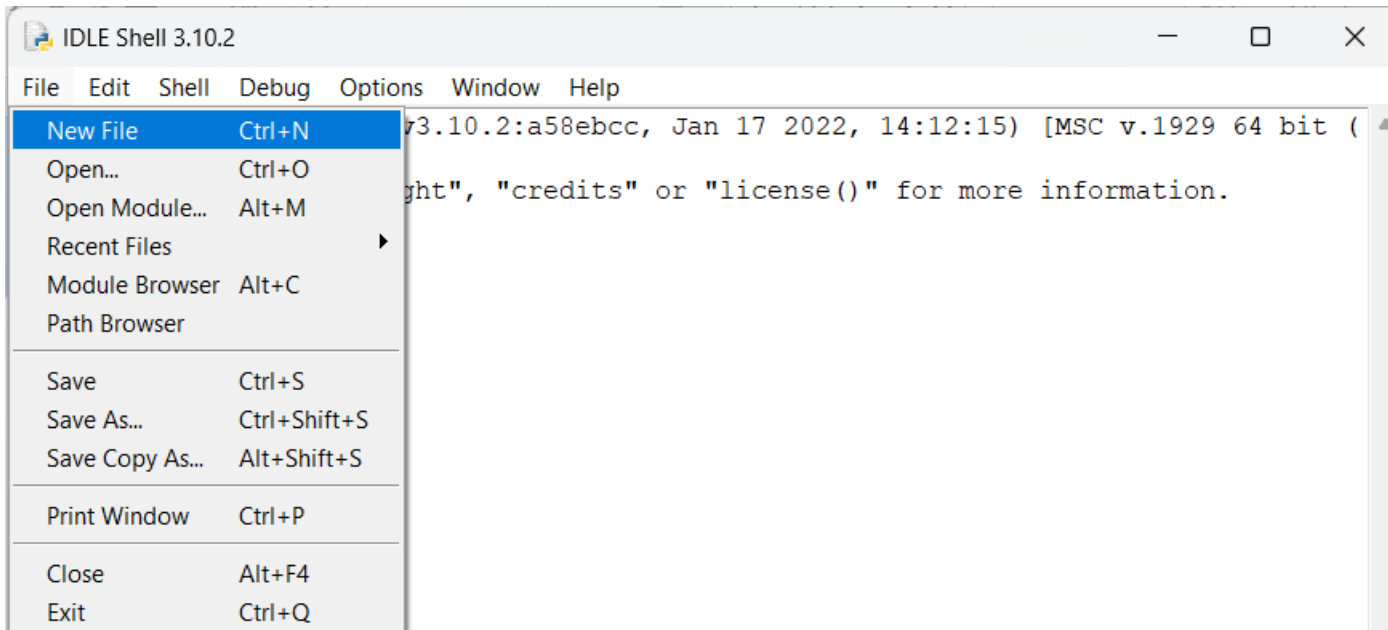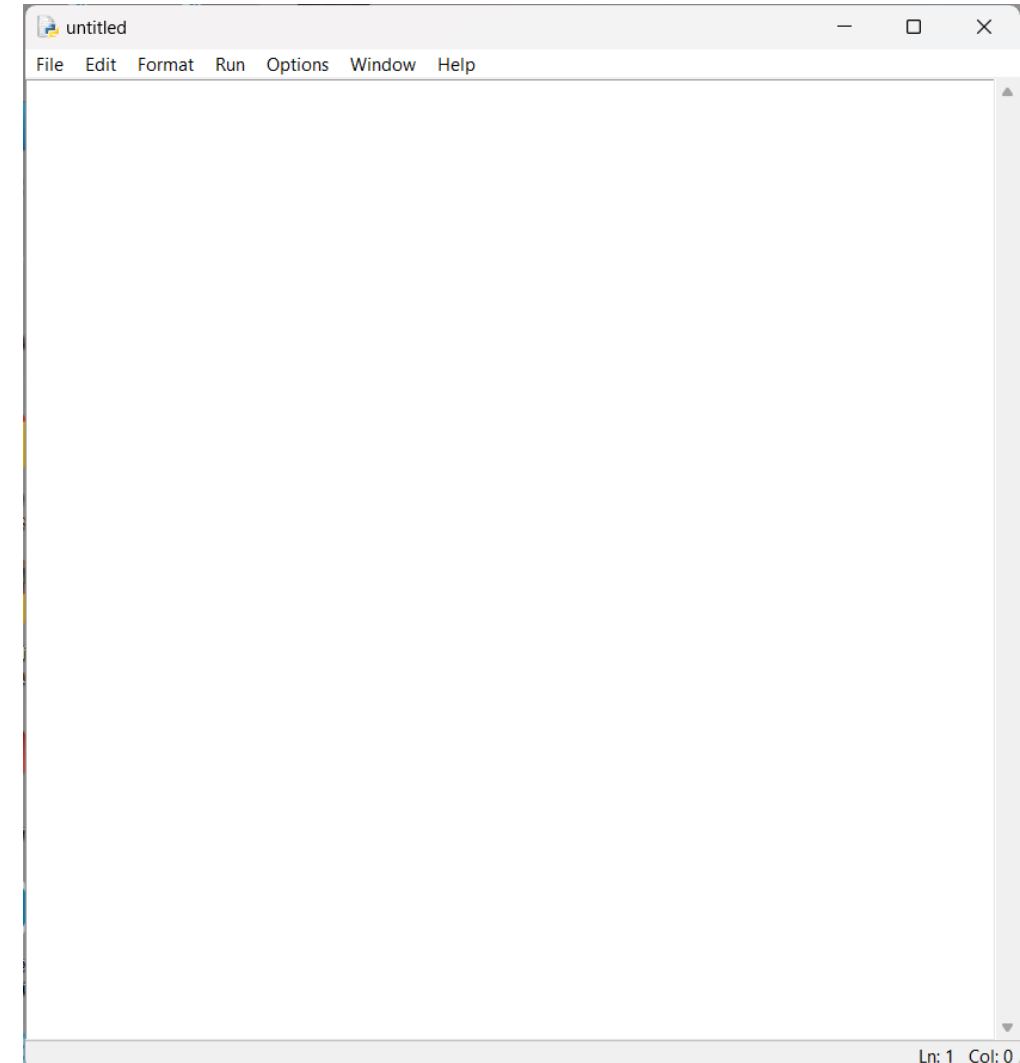
Run Python using IDLE

Run Python using IDLE

Run Python using IDLE

Write your code here

Output

Run the code

Run Python using CMD


```
Command Prompt

Microsoft Windows [Version 10.0.22621.1992]
(c) Microsoft Corporation. All rights reserved.

C:\Users\SAIF>python Today_Class.py
python: can't open file 'C:\\Users\\SAIF\\Today_Class.py': [Errno 2] No such file or directory

C:\Users\SAIF>
```

myClass

This PC > Classroom (G:) > myClass   Search myClass

Home
Saif - Personal

Name
check_idle.py
hello.py
statement.py
Today_Class.py

Desktop
Downloads
Documents
Pictures
Music
Videos

```
Today_Class.py - G:\myClass\Today_Class.py (3.10.2)

File  Edit  Format  Run  Options  Window  Help

x = 15
y = 10

sum = x+y
print("Addition is:", sum)

sub = x-y
print("Substruction is:, sub)

print("End")
```

Run Python using CMD

Command Prompt

```
C:\Users\SAIF>dir
 Volume in drive C is Windows
 Volume Serial Number is 54A6-3AAC

 Directory of C:\Users\SAIF

21-Jul-23  09:21 PM    <DIR>          .
19-Nov-22  05:03 PM    <DIR>          ..
01-Jun-23  11:53 PM    <DIR>          .android
07-Jan-23  02:13 PM             1,779 .bash_history
05-May-23  11:48 PM    <DIR>          .cache
21-Jun-23  07:23 PM               482 .dbshell
03-Jun-23  05:07 PM    <DIR>          .docker
```

1 > dir

Command Prompt

```
G:\myClass>python Today_Class.py
Addition is: 25
Substruction is: 5
End

G:\myClass>cls
```

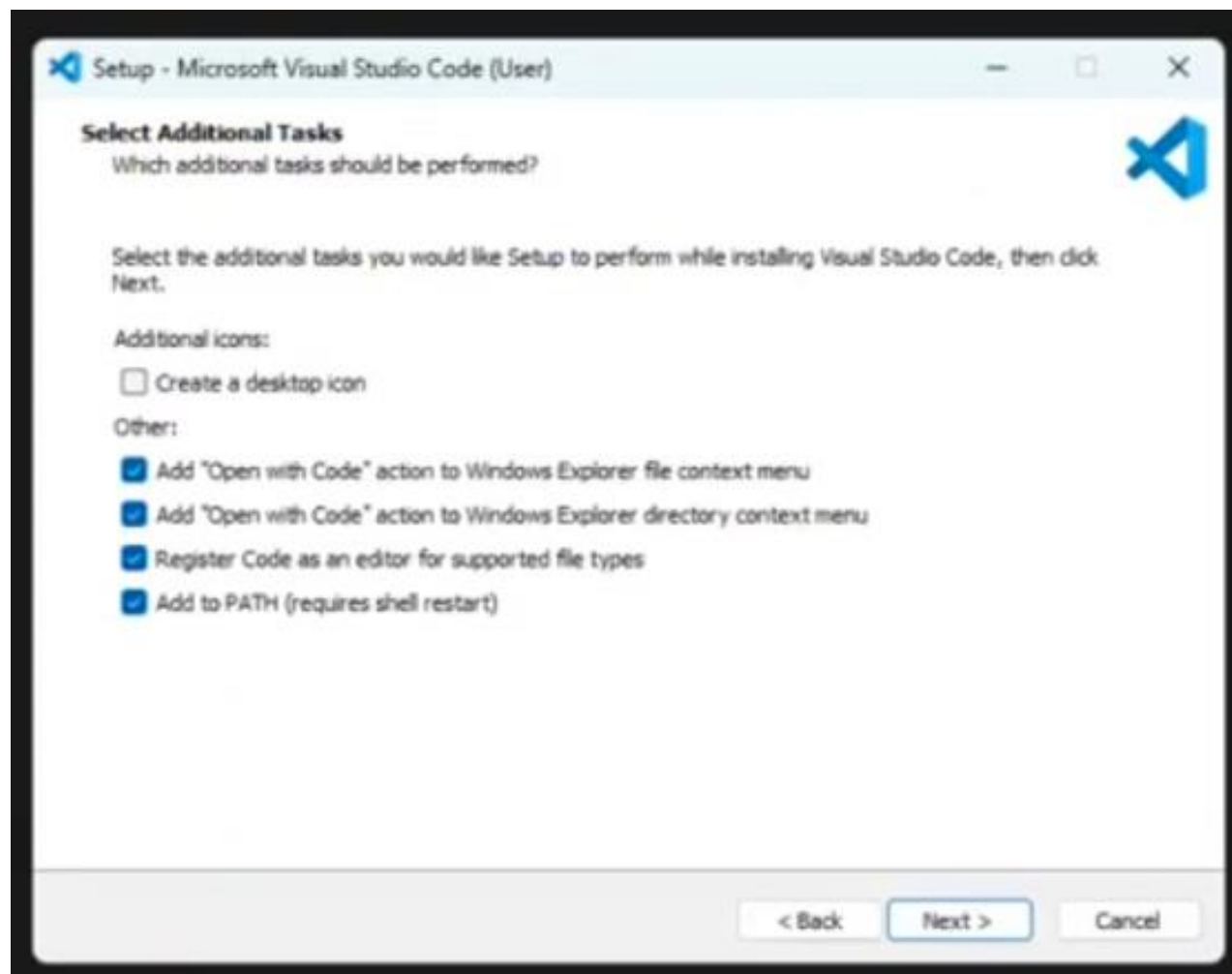**4** # To clean cmd
> cls

Command Prompt

```
G:\myClass>dir
 Volume in drive G is Classroom
 Volume Serial Number is 9050-A026

 Directory of G:\myClass

05-Aug-23  10:57 PM    <DIR>          .
21-Jul-23  09:59 PM               117 check_idle.py
07-Aug-23  11:06 PM               237 hello.py
28-Jul-23  08:31 PM               557 statement.py
08-Aug-23  01:30 AM               643 Today_Class.py
               4 File(s)          1,554 bytes
               1 Dir(s)  182,200,619,008 bytes free

G:\myClass>
G:\myClass>python Today_Class.py
Addition is: 25
Substruction is: 5
End
```

Command Prompt

```
C:\Users\SAIF>
C:\Users\SAIF>G:

G:\>
G:\>cd myClass

G:\myClass>
```

2 > cd folder_name

3 > python file_name.py

Installing VS Code

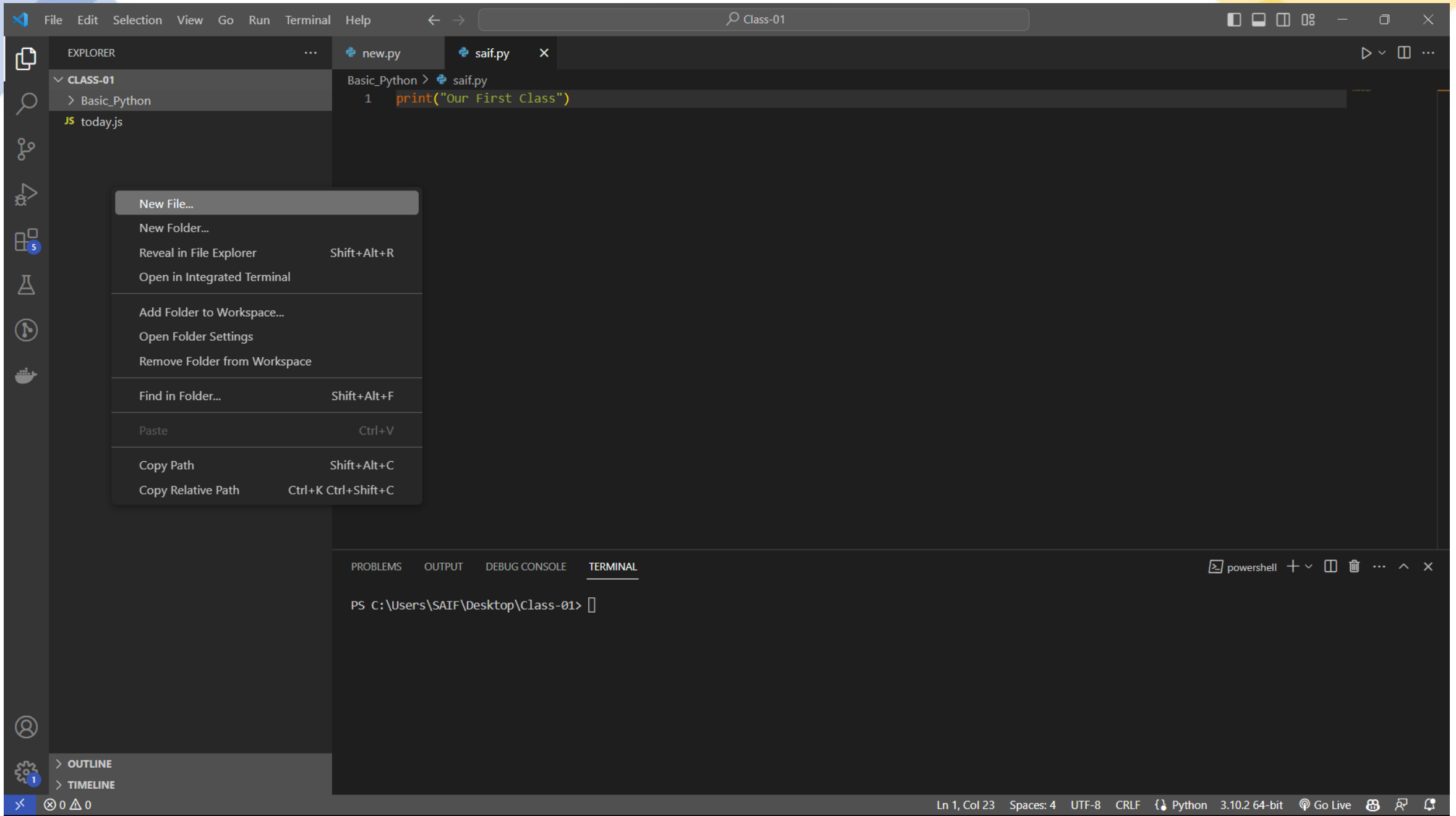# Installing VS Code
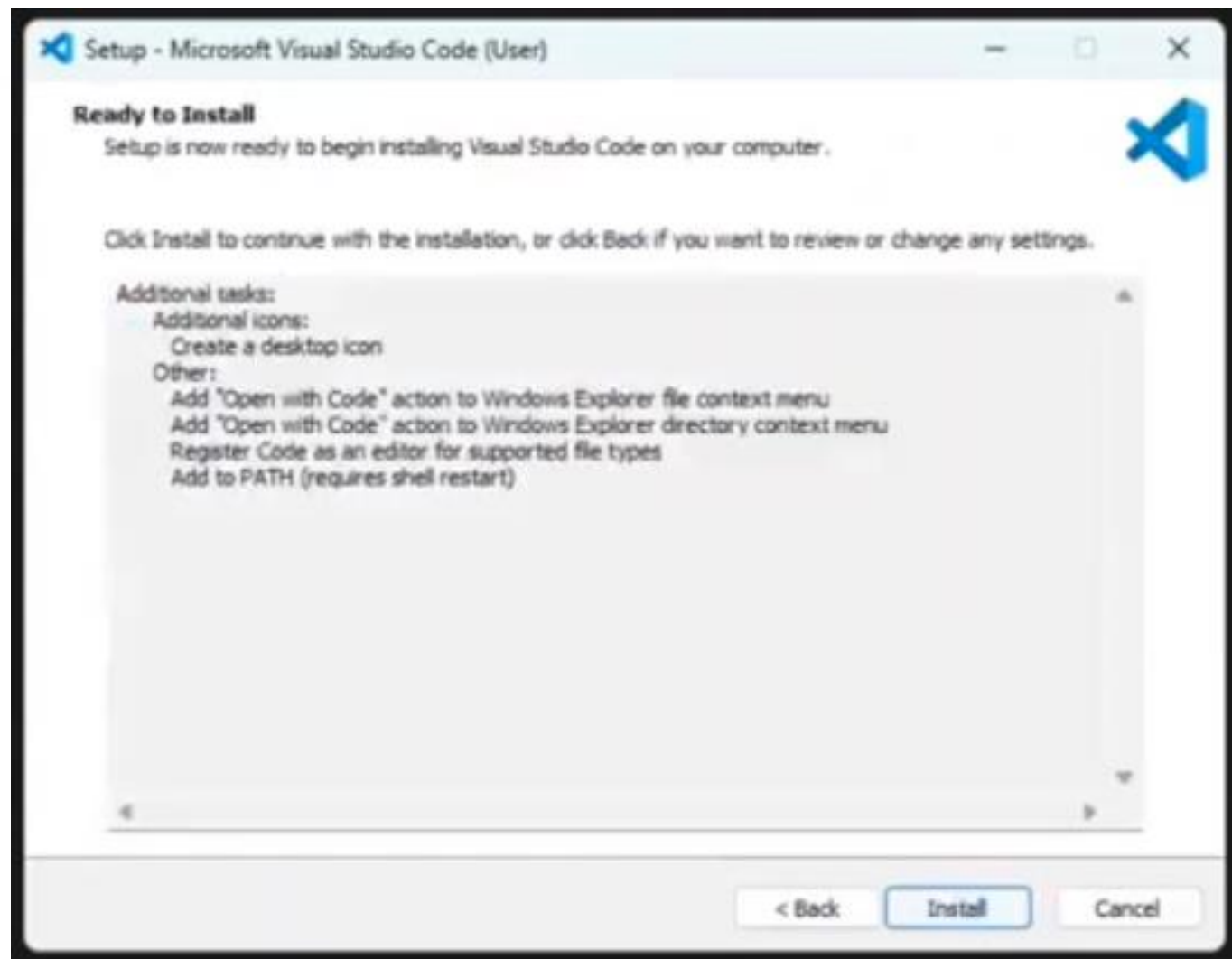
Your First Python Program in VS Code
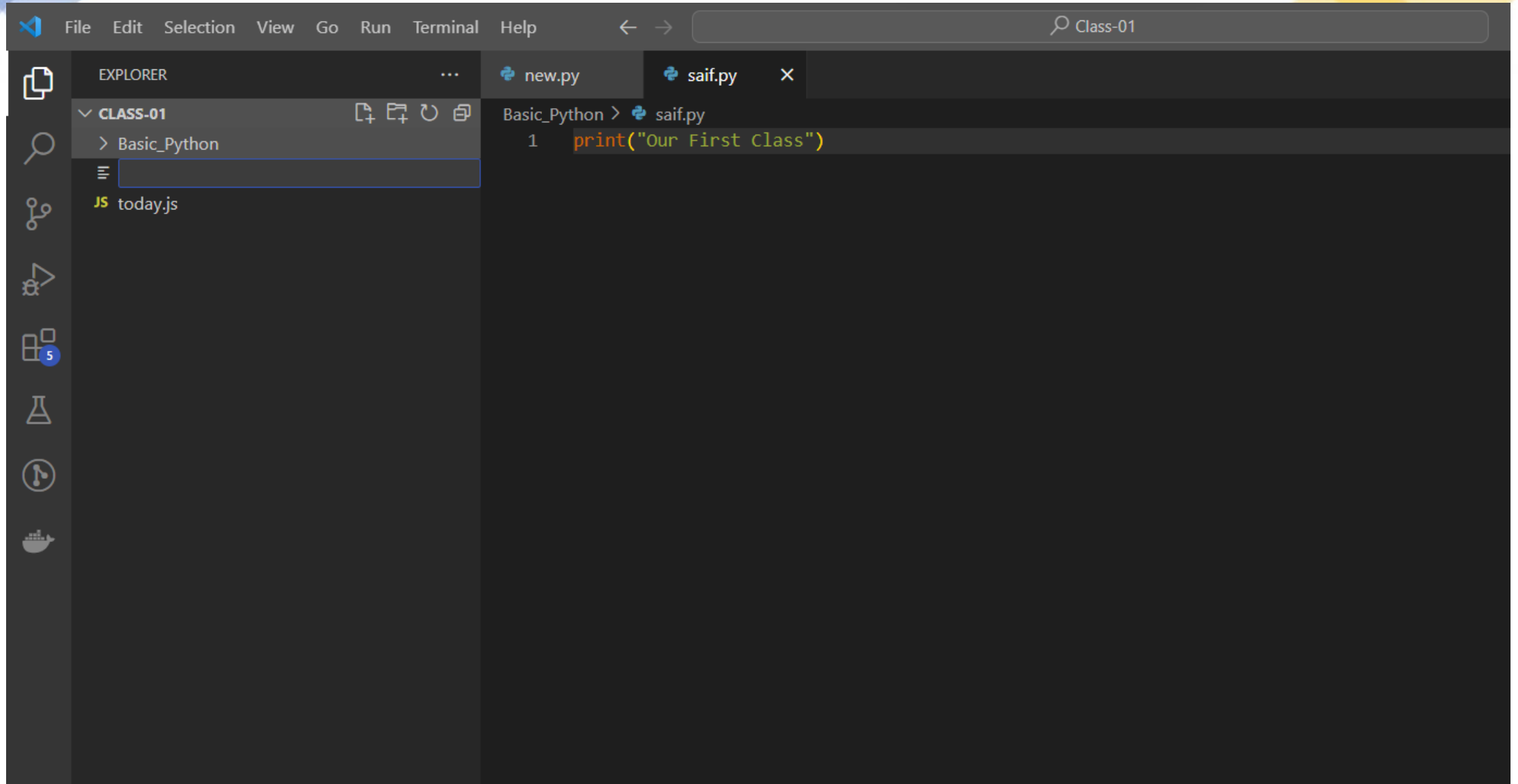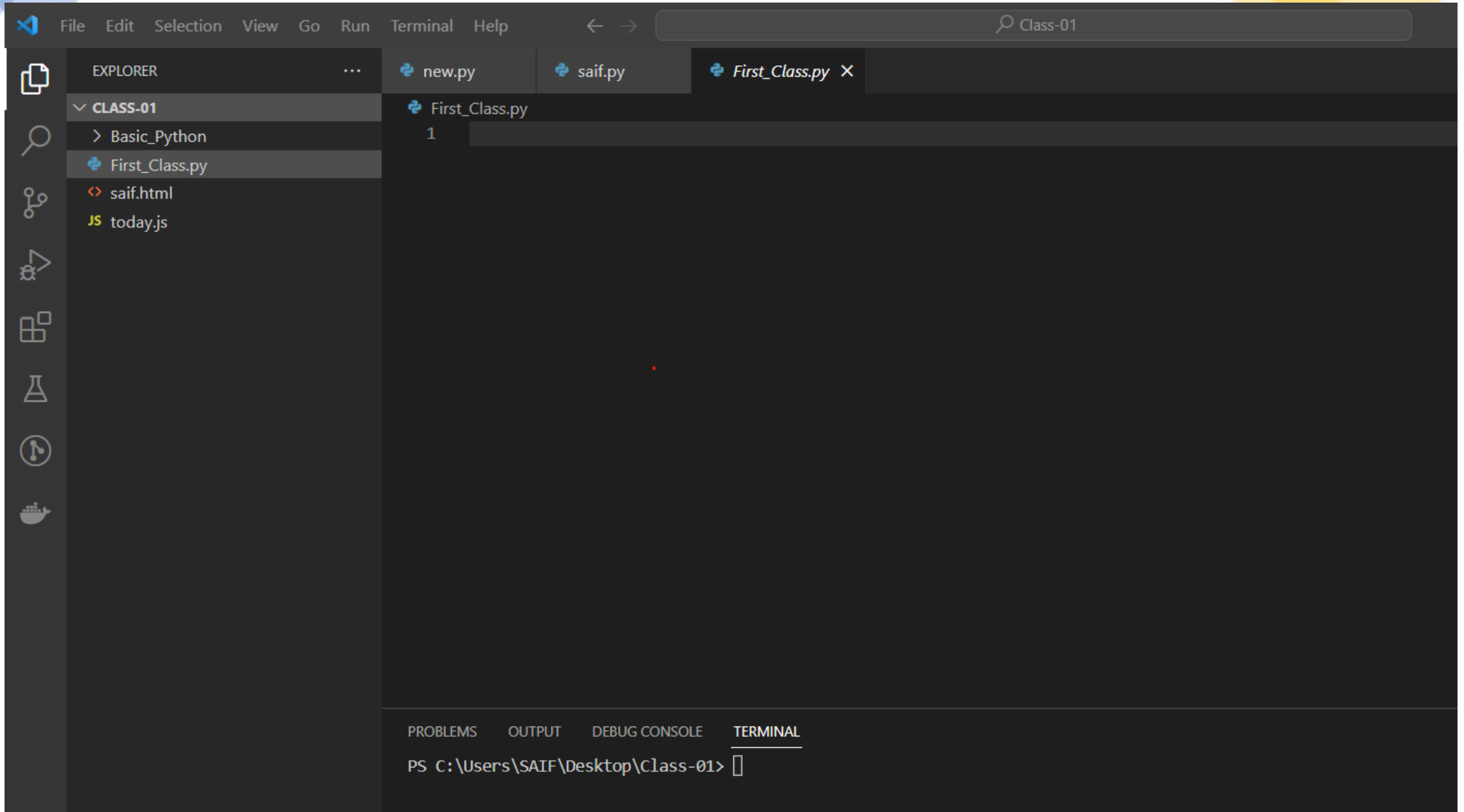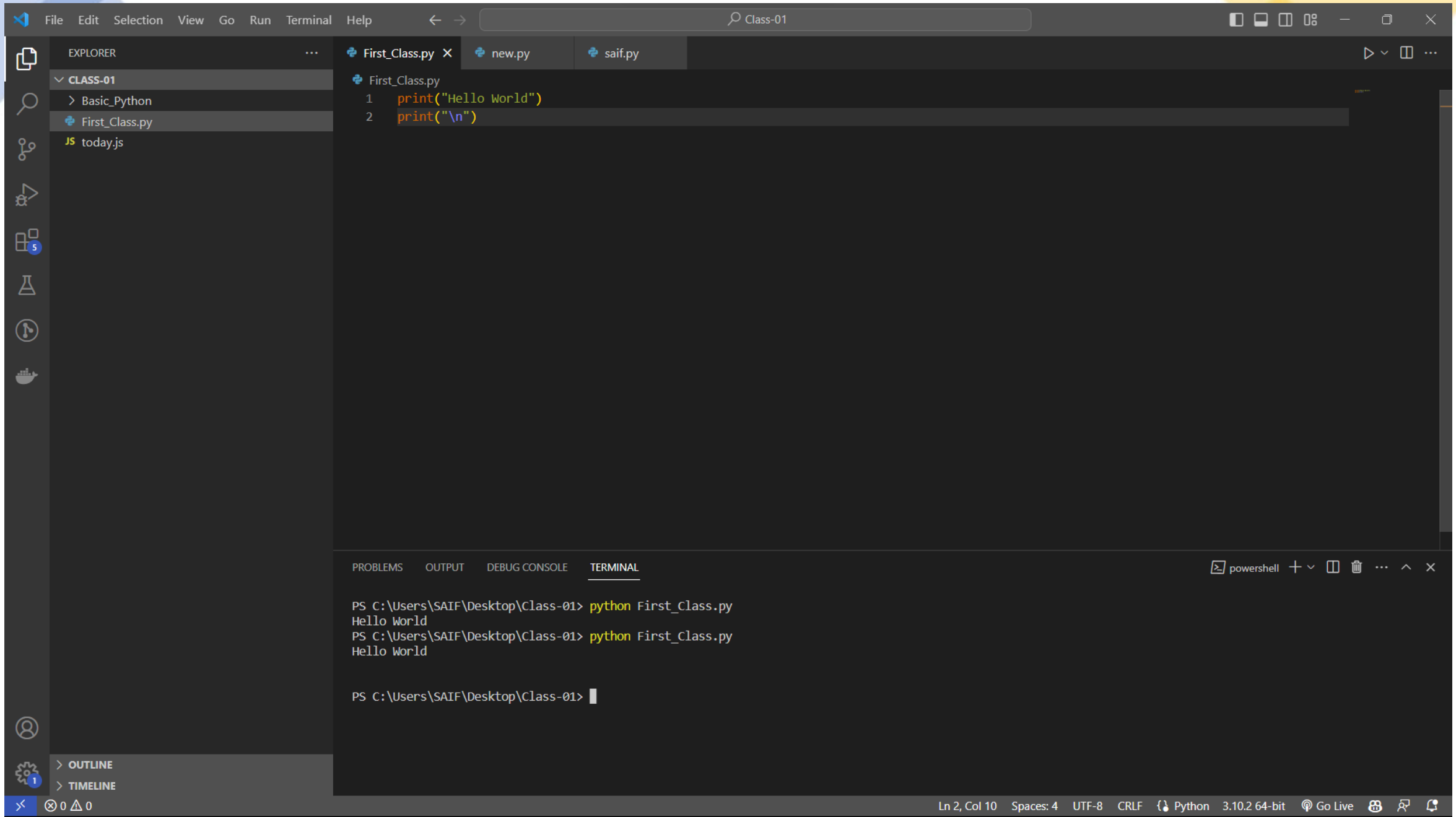
Your First Python Program in VS Code

Your First Python Program in VS Code

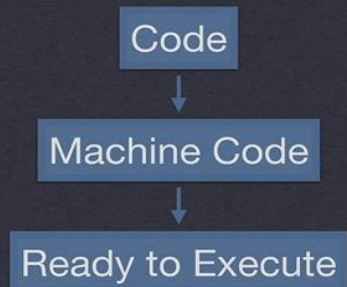# Your First Python Program in VS Code

Dynamic Types

Python is a **dynamically typed** language. It doesn't know about the type of the variable until the code is run.
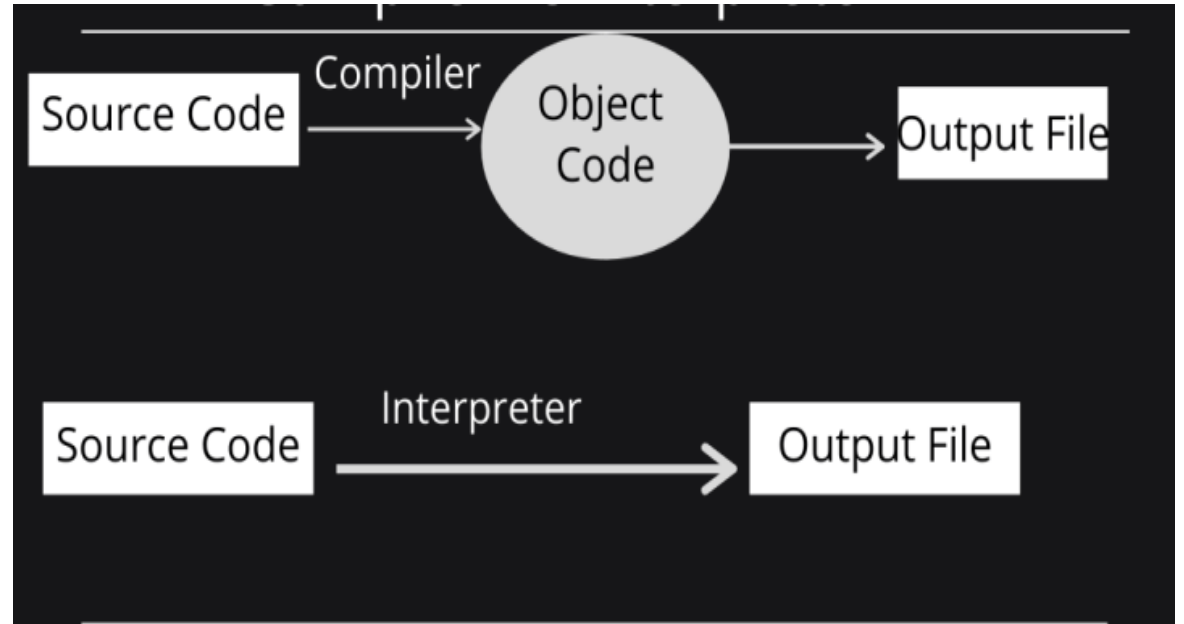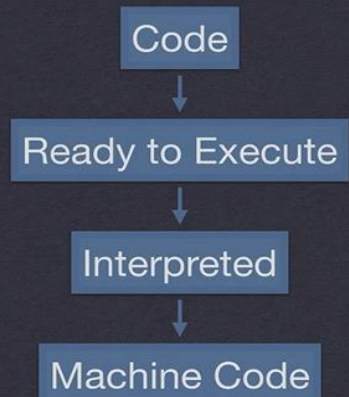
```
x = 6
print(x)
print(len(x))
print(type(x))


y = 'hello'
print(y)
print(len(y))
print(type(y))
```

How Python Code Gets Executed

Difference Between Compiler and Interpreter

Title	Compiler	Interpreter
Input	Compiler takes Entire program as input at a time.	Interpreter takes Single instruction as input at a time.
Output	Intermediate Object code is generated	No Intermediate Object code is generated
Speed	It execute conditional control statements fastly.	It execute conditional control statements slower than Compiler
Memory	More memory is required. Due to the creation of object code.	Less memory is required. It does not create intermediate object code.
Need Compile	Program need not to be compiled every time	Every time higher level program is converted into lower level program
Error	It display error after entire program is checked	It display error after each instruction interpreted (if any)
Example	Example: C	Example: BASIC
Error Detection	Difficult	Easier Comparatively
Pertaining Programming languages	C, C++, C#, Scala, typescript uses compiler.	PHP, Perl, Python, Ruby uses an interpreter.

Rivals & Deficiency

Python rivals

Python has two direct competitors, with comparable properties and predispositions.
These are:
- **Perl** – a scripting language originally authored by Larry Wall;
- **Ruby** – a scripting language originally authored by Yukihiro Matsumoto.

Deficiency

Despite Python's growing popularity, there are still some niches where Python is absent, or is rarely seen:
- **low-level programming** (sometimes called "close to metal" programming): if you want to implement an extremely effective driver or graphical engine, you wouldn't use Python;
- **applications for mobile devices**: although this territory is still waiting to be conquered by Python, it will most likely happen someday.