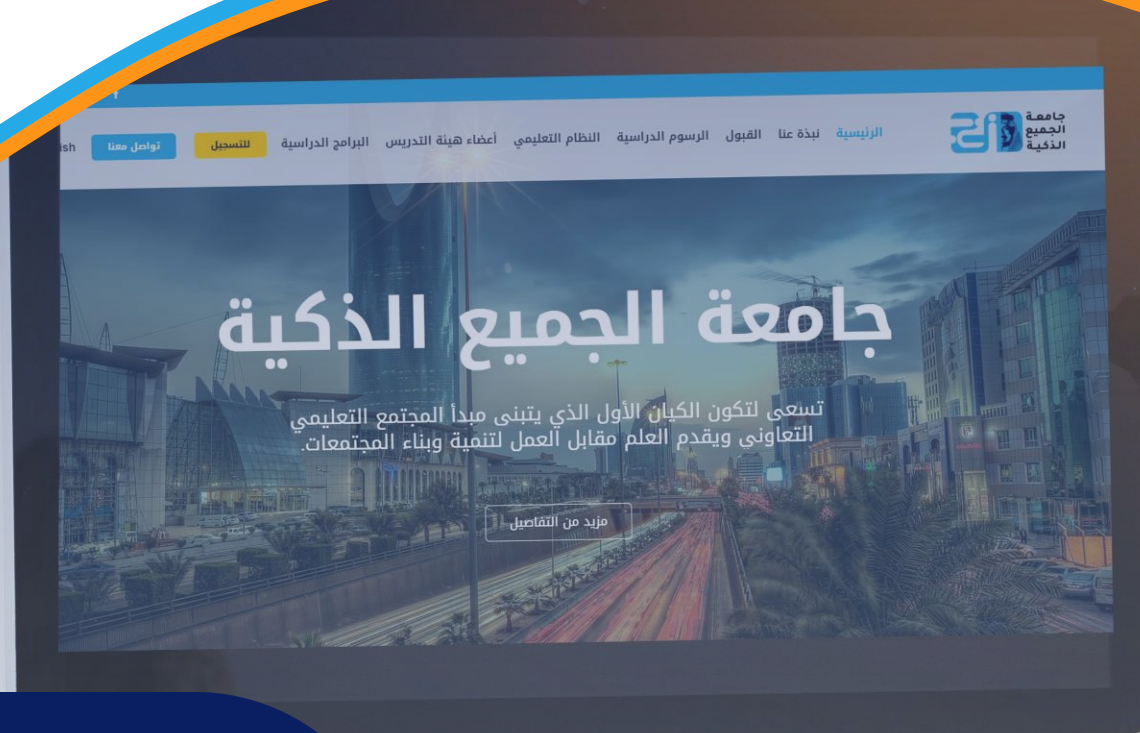




جامعة الجميع الذكية
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Elective 1: Programming Foundations In Python

Prepared by Dr. Hamada I. AbdulWakel

Lecture 1

Dr. Hamada I. AbdulWakel

He received his B.Sc. degree in Computer Science from Minia University (Faculty of Computers and Information), Minia, Egypt. He received his M.Sc. and PhD degrees from Cairo University (Faculty of Computers and Artificial Intelligence).

His M.Sc. work was on employing Semantic Web & Social Networks techniques for sending SMS for groups of Individuals. His Ph.D. work was on using Internet of Things and System

Versification for IoT services verification and validation.



Lecture 1

LEARNING OBJECTIVES OF THIS COURSE

- Teach an example of scripting and interpretative language and compare it with classical compiled programming languages.
- Introduce the student to Python programming fundamentals.
- Learn to apply fundamental problem solving techniques.
- Expose students to application development and prototyping using Python.
- Gain best practice in software development.

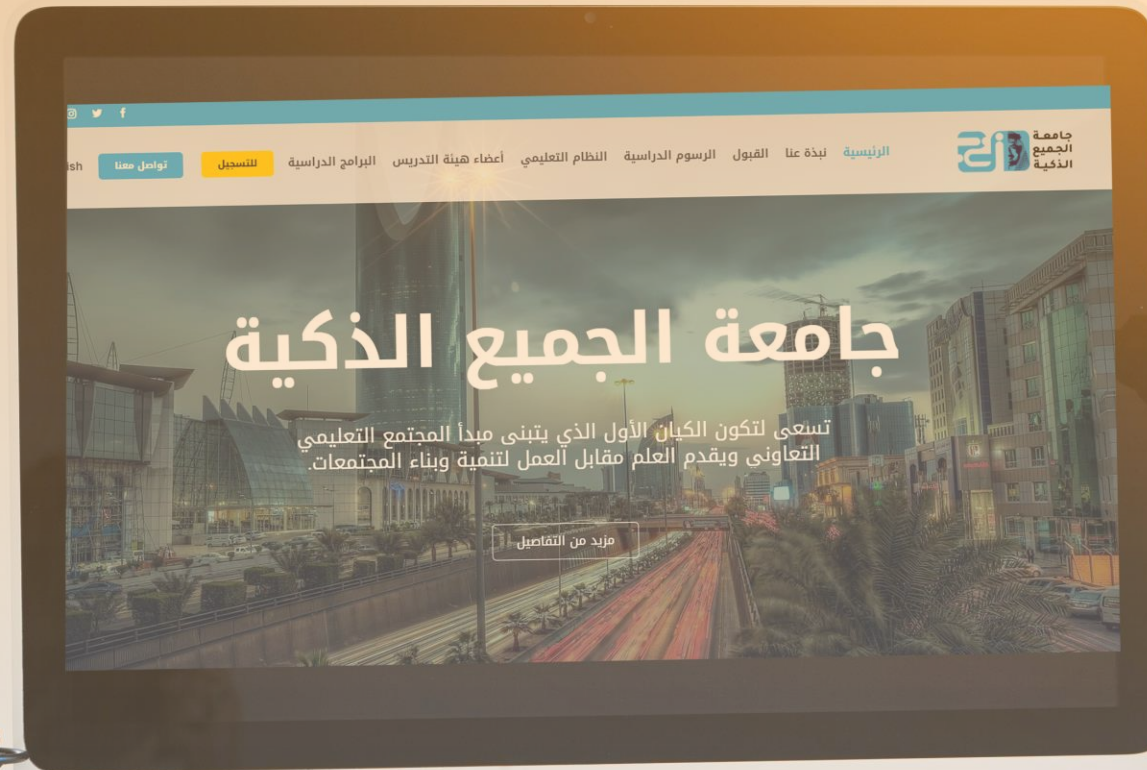
- The main content of the course are:
 - Introduction to Python and Computer Programming.
 - Data Types and Basic I/O Operations.
 - Conditional Execution, Loops and Lists.
 - Functions, Tuples, Dictionaries and Data Processing.

- The main content of the course are:
 - Modules, Packages, String and List Methods and Exceptions.
 - The Object-Oriented Programming, Exception Handling and Working with Files.
 - Writing GUIs in Python.

- All recorded lectures.
- Required resources:
 - The prescribed textbook for the course: "**Fundamentals of Python From First Programs Through Data Structures**", by Kenneth A. Lambert



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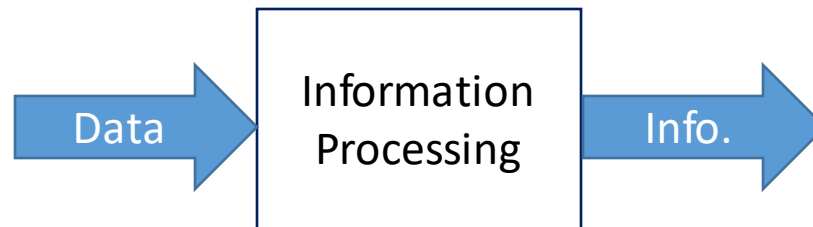
Module 1: Introduction to Python and Computer Programming

- Describe the basic features of an algorithm.
- Explain how hardware and software collaborate in a computer's architecture.
- Give a brief about Python programming.
- Compose and run a simple Python program.

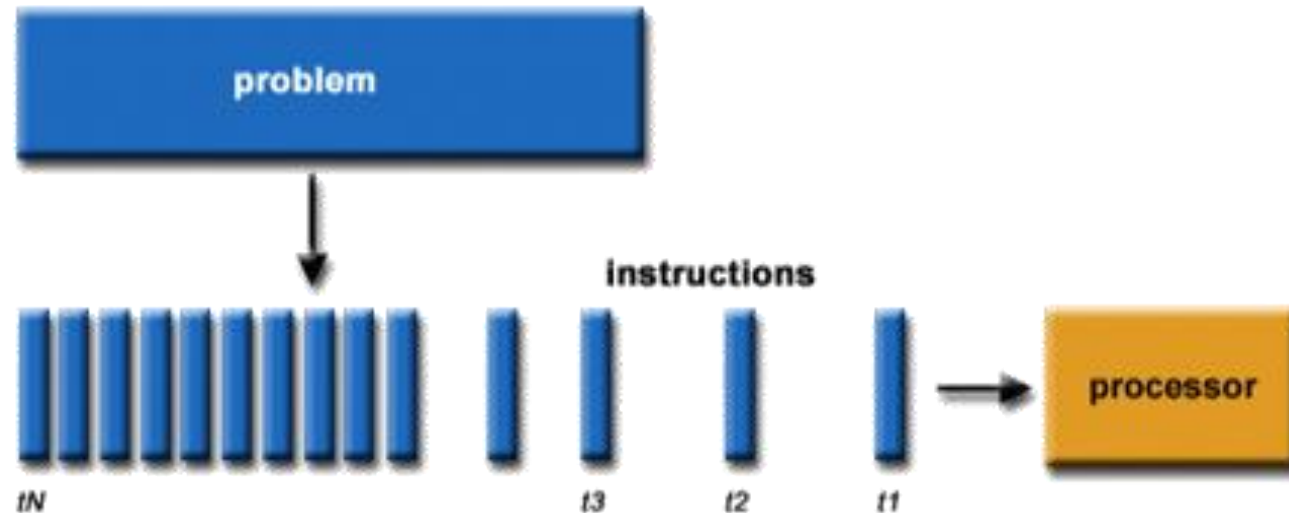
- Computer science is the study of **computation** and **information**.
- Computer science is fundamentally **problem-solving**.
- We can think of problem-solving as the process of taking some **input** (details about the problem) and generate some **output** (the solution to the problem). The "**black box**" in the middle is computer science.



- **Data**; Raw, unorganized facts (can be in the form of text, graphics, audio, or video).
- **Information**; Data that has been processed into a meaningful form.
- **Information Processing**; converting data into information.



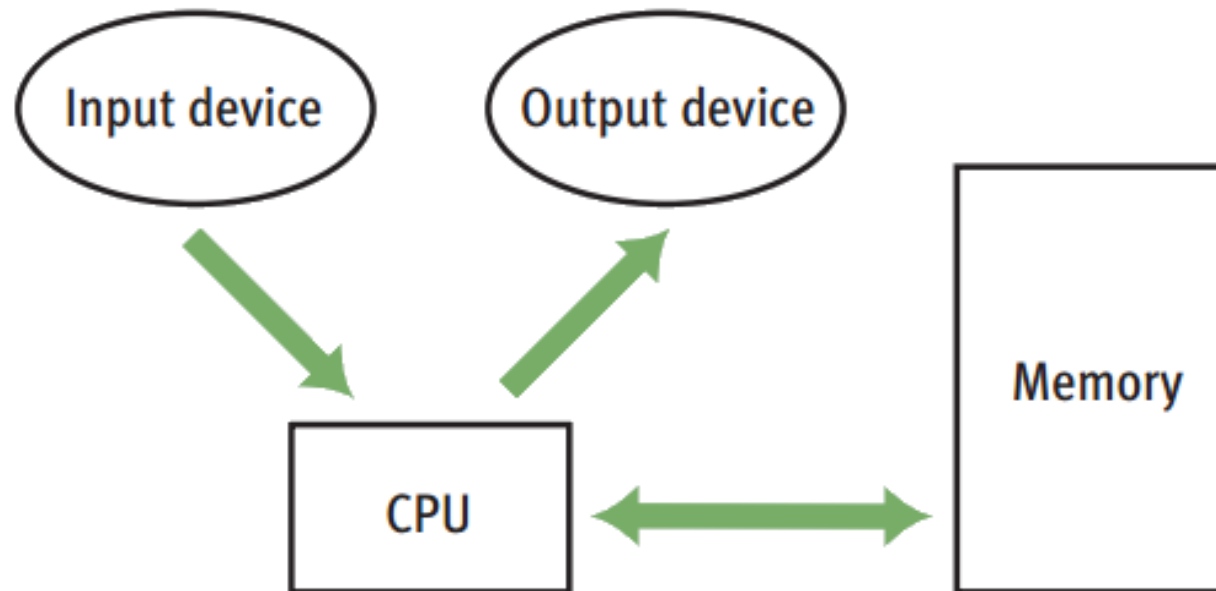
- Sequence of steps that describes each of these computational processes is called an **algorithm**.



- Features of an algorithm:
 - Consists of a finite number of instructions.
 - Each individual instruction is well defined.
 - Describes a process that eventually halts after arriving at a solution to a problem.

Lecture 1

HW & SW COLLABORATION



- A program (i.e., an algorithm) stored in computer memory must be represented in binary digits, or **machine code**.
- A **loader** takes a set of machine language instructions as input and loads them into the appropriate memory locations.

- Famous and fastest growing language.
- Open-source language.
- Scripting, Interpreted, and Expressive language.
- Simple and easy to learn language.

- Multipurpose language.
- High level language.
- Cross platform language.
- +20 years old language.

- Web Development (Django - Flask).
- Games (PyGame).
- Desktop Apps (PyGUI - Tkinter).
- Hacking.
- Machine Learning & Data Science.

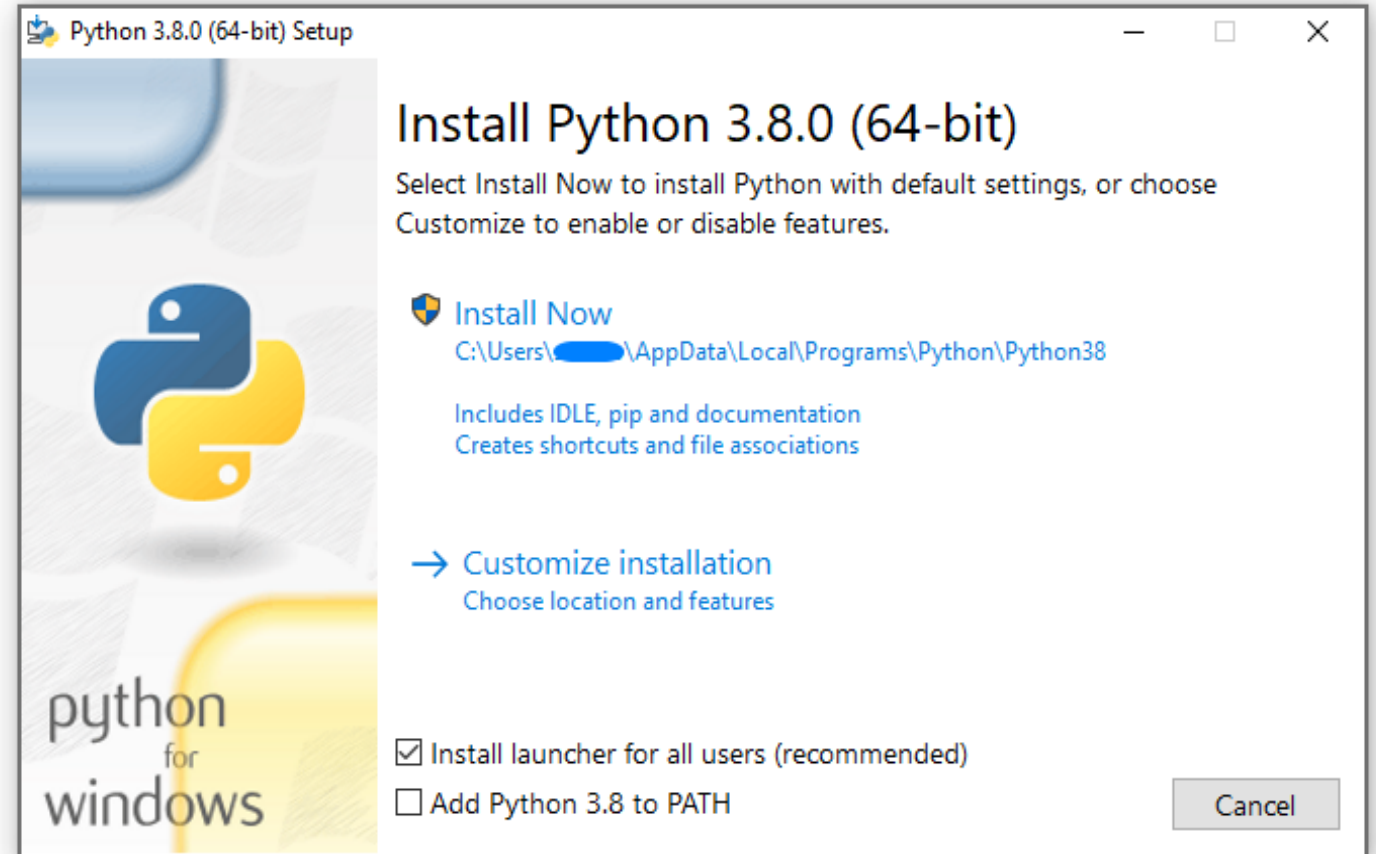


- AI & Robots in Mars.
- Automation.
- Web Scraping.
- Android Games.

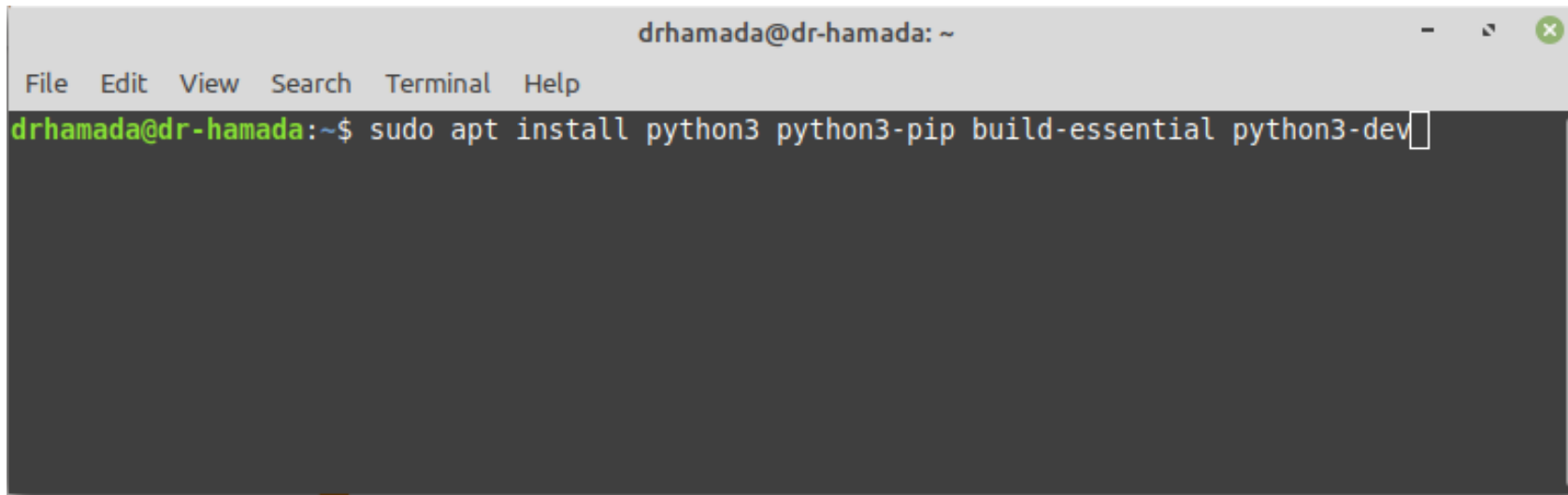
Lecture 1

INSTALLING PYTHON LANGUAGE

- On Windows
 - Straightforward steps.



- On Linux
 - `sudo apt install python3 python3-pip build-essential python3-dev`

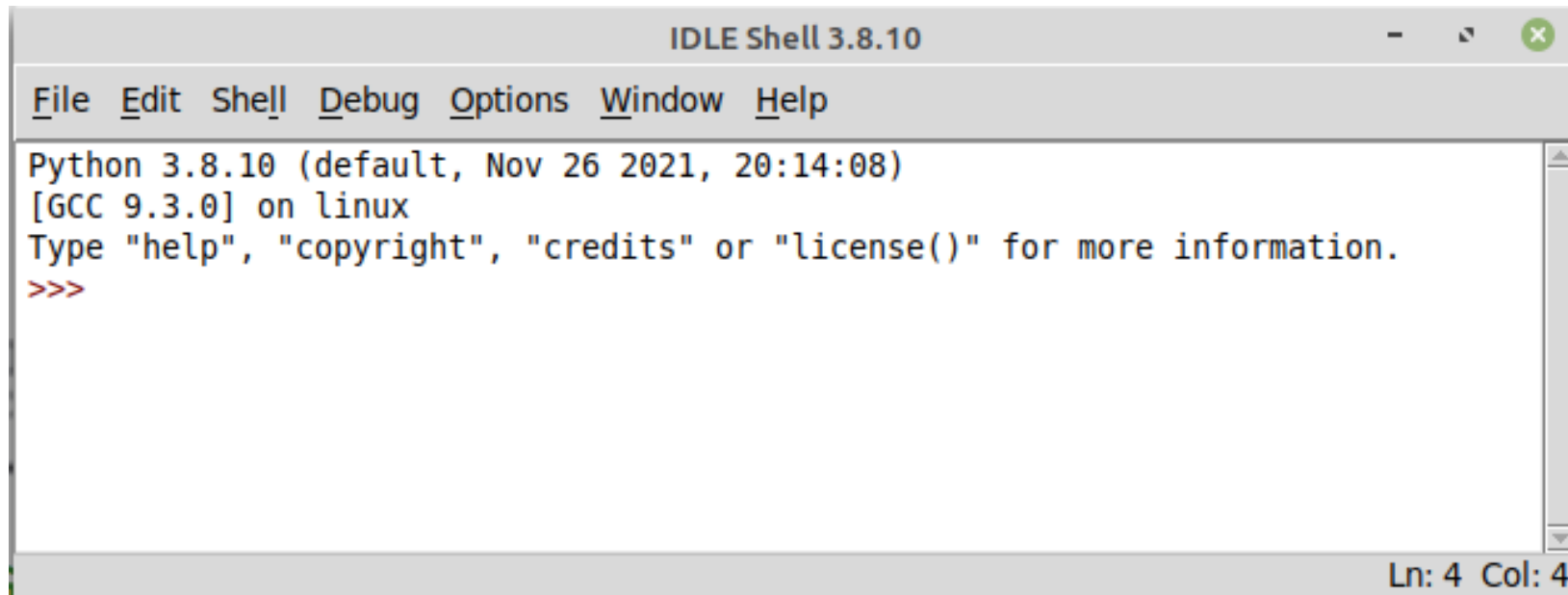


```
drhamada@dr-hamada: ~  
File Edit View Search Terminal Help  
drhamada@dr-hamada:~$ sudo apt install python3 python3-pip build-essential python3-dev
```

- On Mac
 - Straightforward steps.



- Python IDLE.



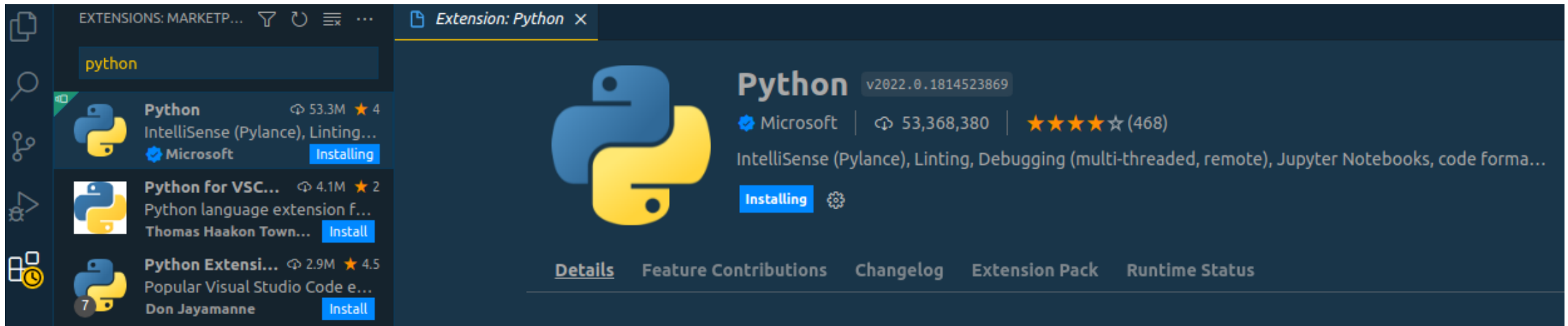
```
Python 3.8.10 (default, Nov 26 2021, 20:14:08)
[GCC 9.3.0] on linux
Type "help", "copyright", "credits" or "license()" for more information.
>>>
```

- Visual Studio Code (VScode)
 - [Download.](#)



Visual Studio Code

- Visual Studio Code (VScode)
 - Python extension.

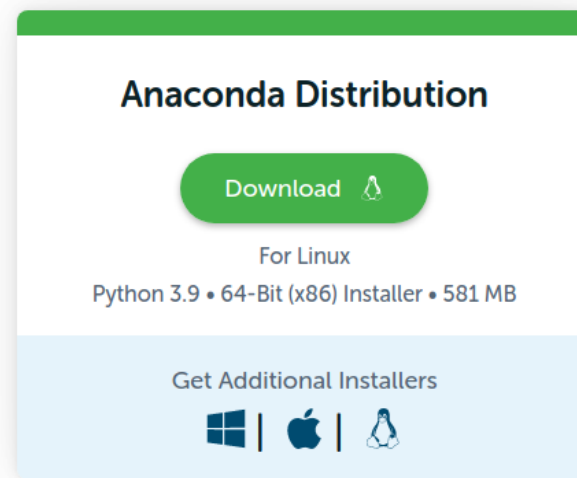


- Jupyter Notebook.
 - [Download](#).

Individual Edition is now

ANACONDA DISTRIBUTION

The world's most popular open-source Python distribution platform



- Online Editors:
 - [Online Python.](#)
 - [Pynative.](#)
 - [Programiz.](#)

- Using cmd (in Windows) or Terminal (in Linux) to do the following:
 - Create code folder.
 - Create code file.
 - Python program files use .py extension.
 - Open code file in the text editor (or IDE).
 - Write your code.

```
print("I Love Python")
```

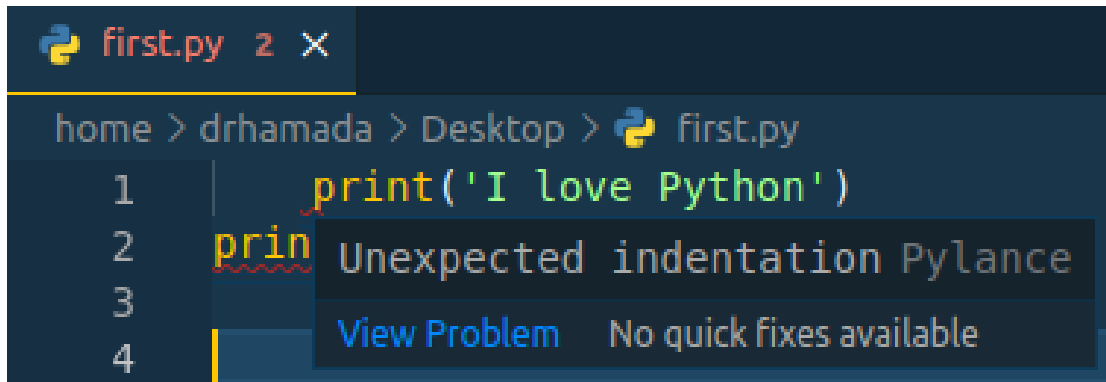
- Using cmd (in Windows) or Terminal (in Linux) to do the following:
 - Run your code in cmd.

```
python3 first.py
```

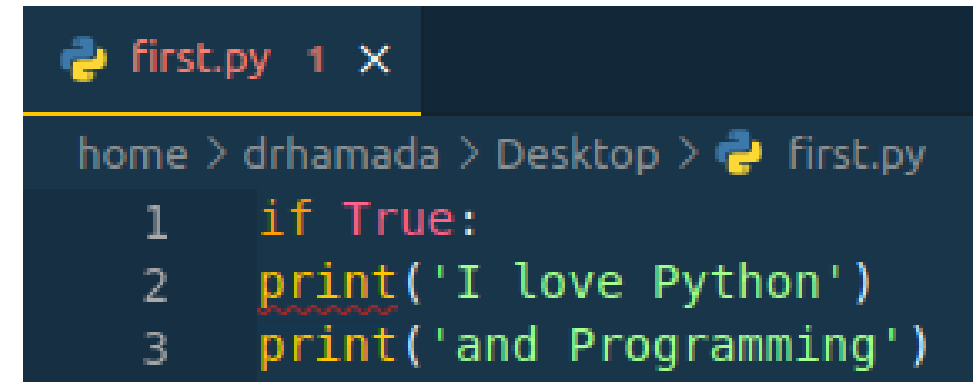
```
"/path/to/python3" "/path/to/code file/first.py"
```

In VScode IDE open new terminal to and press run button on top right.

- Based on **INDENTATION** even if one space!!!



```
first.py 2 X
home > drhamada > Desktop > first.py
1 print('I love Python')
2 prin Unexpected indentation Pylance
3
4 View Problem No quick fixes available
```



```
first.py 1 X
home > drhamada > Desktop > first.py
1 if True:
2     print('I love Python')
3     print('and Programming')
```

- Write a python code to sum two numbers num1 and num2.
 - Steps:
 - Ask the user to enter the first number.
 - Ask the user to enter the second number.
 - Compute the summation of the input numbers.
 - Display the result.

