Python

Definition of Python

Python is a high-level, interpreted, general-purpose programming language. It was created by Guido van Rossum in 1991. Python emphasizes readability and simplicity, which makes it easier for beginners as well as professionals to use. It supports multiple programming paradigms, including object-oriented, procedural, and functional programming.

Applications of Python

1. Web Development – Using frameworks like Django, Flask, and FastAPI.
2. Data Science & Machine Learning – With libraries such as NumPy, Pandas, Matplotlib, Scikit-learn, and TensorFlow.
3. Artificial Intelligence – AI model building, deep learning, and NLP tasks.
4. Automation & Scripting – Writing scripts to automate repetitive tasks.
5. Game Development – Using libraries like Pygame and Panda3D.
6. Desktop Applications – Creating GUI-based applications with Tkinter, PyQt, or Kivy.
7. Networking – Building socket programming and network applications.
8. Cybersecurity – Penetration testing and ethical hacking tools.
9. Embedded Systems – MicroPython and CircuitPython for IoT devices.
10. Education – Popular as a teaching language due to its simplicity.

Features of Python

1. Easy to Learn and Use – Simple syntax, close to English.
2. Interpreted Language – No need for compilation, executed line by line.
3. Open-Source – Free to use and distribute.
4. Portable – Works on Windows, Mac, Linux, and other platforms.
5. High-Level Language – Abstracts memory management and system-level details.

6. Extensive Libraries – Rich set of built-in modules and external packages.

7. Object-Oriented – Supports classes, objects, inheritance, and encapsulation.

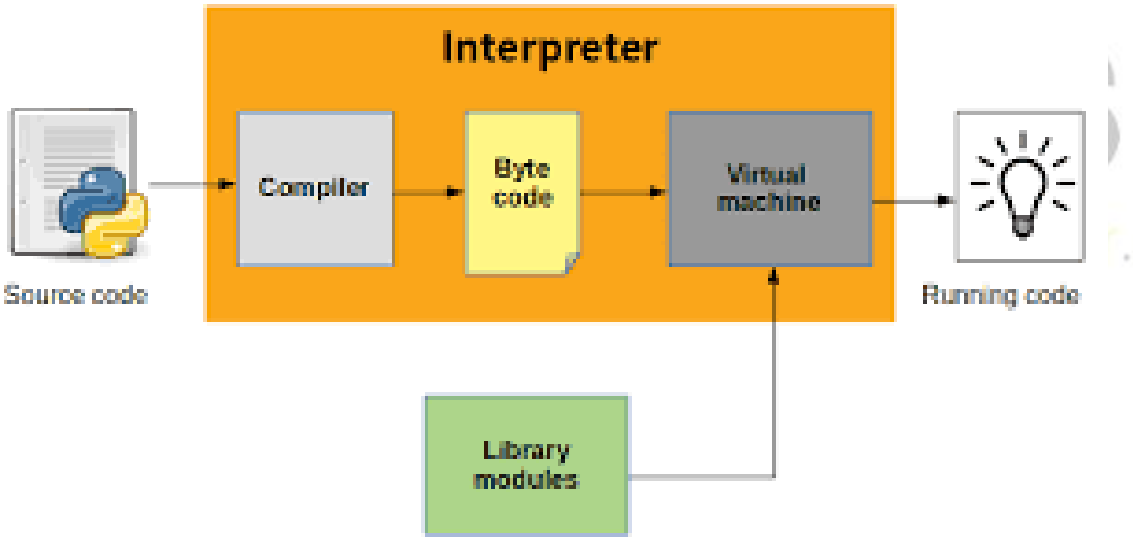
8. Dynamically Typed – No need to declare variable types explicitly.

9. Extensible – Can integrate with other languages like C, C++, and Java.

10. Strong Community Support – Huge developer base and active forums.

PVM (PYTHON VIRTUAL MACHINE):

1. **It makes Python a platform-independent language (bytecode runs on any machine with PVM installed).**
2. **It handles memory management and garbage collection.**
3. **It interprets code line by line, so Python is slower than compiled languages like C or Java.**
4. **PVM is part of the Python interpreter that you install on your computer.**



How to create python file

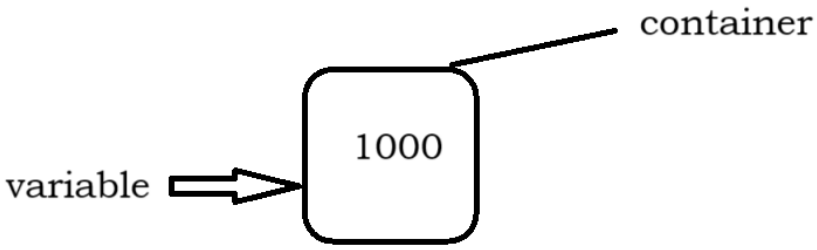
- hello.py ✅
- my_script.py ✅
- student_details.py ✅
- test1.py ✅
- _config.py ✅

🔹 Invalid Python File Names ❌

- 1hello.py ❌ (cannot start with a digit)
- hello-world.py ❌ (hyphen - not allowed, use _ instead)
- class.py ❌ (class is a Python keyword)
- my file.py ❌ (space not allowed, use _)
- @code.py ❌ (special characters not allowed)

What is a Variable?

- A variable is a name that stores data (value).
- It acts as a container for data in memory.
- In Python, we don't need to declare the type (int, float, string) explicitly.



Ex:2