**Assignment 1: (MLP)**

**1. What is Python and why is it called an interpreted language?**  
Python is a high-level, general-purpose programming language known for its simplicity and readability. It is called an **interpreted language** because its code is executed line by line by the Python interpreter at runtime, without the need for prior compilation into machine code.

**2. What are the key features of Python that make it popular for beginners and professionals?**

* Easy to learn and read (simple syntax close to English).
* Cross-platform (runs on Windows, macOS, Linux, etc.).
* Large standard library with many built-in modules.
* Supports multiple programming paradigms (object-oriented, procedural, functional).
* Huge community support and third-party libraries.
* Open-source and free to use.

**3. What is the difference between Python 2 and Python 3?**

* **Print statement:** Python 2 → print "Hello", Python 3 → print("Hello").
* **Division:** Python 2 → 5/2 = 2, Python 3 → 5/2 = 2.5.
* **Unicode:** Python 3 has full Unicode support by default.
* **Support:** Python 2 is no longer maintained (ended in 2020); Python 3 is the present and future.

**4. What are Python’s applications in real-world projects?**

* **Web development** (Django, Flask).
* **Data analysis and visualization** (Pandas, Matplotlib).
* **Artificial Intelligence & Machine Learning** (TensorFlow, Scikit-learn).
* **Automation & scripting** (task automation, bots).
* **Game development** (Pygame).
* **Networking and IoT** (sockets, Raspberry Pi).
* **Desktop applications** (Tkinter, PyQt).

**5. What is PEP 8 and why is it important in Python programming?**  
PEP 8 is the official **style guide** for writing Python code. It provides coding conventions (like indentation, naming rules, line length). It is important because it makes code **consistent, readable, and maintainable**, especially in collaborative projects.

**6. Who developed Python and in which year was it released?**  
Python was developed by **Guido van Rossum** and was first released in **1991**.

**7. What do you mean by “dynamically typed” in Python?**  
Python is **dynamically typed**, meaning you don’t need to declare variable types explicitly. The type is determined automatically at runtime.  
Example:

x = 5 # integer

x = "Hi" # now a string

**8. What is the difference between a compiler and an interpreter, and which does Python use?**

* **Compiler:** Translates the entire code into machine code before execution → runs faster but requires compilation step (e.g., C, C++).
* **Interpreter:** Translates and executes code line by line → easier debugging but slower execution.
* **Python uses an interpreter** (CPython is the default implementation).