CLASS 1
PART 1: Python Basics

1. What is Python? Why is it popular in AI & Data Science?

Python is a high-level, interpreted, general-purpose programming language known for its simple syntax and readability.

Why popular in AI & Data Science:

- Easy to learn and use
- Large ecosystem of libraries (NumPy, Pandas, Scikit-learn, TensorFlow, PyTorch)
- Strong community support
- Excellent for data handling, visualization, and rapid prototyping

2. Difference between List, Tuple, Set, and Dictionary

Data Structure	Ordered	Mutable	Allows Duplicates	Syntax
List	Yes	Yes	Yes	[1, 2, 3]
Tuple	Yes	No	Yes	(1, 2, 3)
Set	No	Yes	No	{1, 2, 3}
Dictionary	Yes	Yes	Keys: No, Values: Yes	{key: value}

3. What are Variables and Data Types in Python?

- **Variables** are used to store data values.
- Python is dynamically typed, so no need to declare data types explicitly.

Common Data Types:

- int – Integer numbers
- float – Decimal numbers
- str – Text
- bool – True/False
- list, tuple, set, dict

4. Difference between == and =

- **=** : Assignment operator (assigns a value)
- **==** : Comparison operator (checks equality)

5. Explain if, elif, and else

Used for decision-making in Python.

- **if** – checks the first condition
- **elif** – checks additional conditions
- **else** – executes if all conditions are false

6. What is a Function? Why do we use Functions?

A **function** is a reusable block of code that performs a specific task.

Why we use functions:

- Code reusability
- Better readability
- Easy debugging and maintenance

7. Difference between for Loop and while Loop

For Loop	While Loop
Used when number of iterations is known	Used when condition-based looping is needed
Iterates over sequence	Runs until condition is false

8. What is a Module? Example

A **module** is a file containing Python code (functions, variables, classes).

Example:

- **math** module for mathematical operations
- **numpy**, **pandas** modules

9. What is Exception Handling?

Exception handling is used to handle runtime errors using **try**, **except**, **finally** blocks.

It prevents program termination due to errors.

10. What is pip?

pip is the Python package manager used to install, update, and manage external libraries.