Python with Machine learning

Day: 1 & 2, 09/09/25 & 10/09/25

Python :- It is a programming Language.
Computer :- an electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program.
It can store, that can input, and output data following a set of instructions (software).

→ 3 level of programming Language.
1. Binary level / Machine level / low level → 0, 1
2. assembly level - MOMP / Mid level - codes & English
3. high level Language - Completely English.

→ Python programming is a high level Language and it is interpreted Language, oops, dynamically (type-checked) Language, Indented programming Language - one tab space.

Compiled Language :- It is a programming language that is generally compiled and not interpreted. It is one where the program, once compiled, is Express ed in the instructions of the target machine.
Ex :- C, C++, C# etc...

Interpreted Language :- An interpreted language is a programming language that is generally interpreted, without compiling a program into machine instructions. It is one where the instructions are not directly Executed by the target machine, but instead, read and write Executed by some other program.
Ex :- Javascript, Python etc...

Features of Python Programming :- versatile programing

→ Simple Syntax :-
→ Indent - one tab space
→ Open source
→ Inbuilt libraries
→ Support all kind of development
→ less memory
→ open source and free
→ integration with other languages & tools

→ Data science and Machine Learning (NumPy, Pandas, Tensor Flow).

4) What is PEP 8 and why is it important in Python Programming?

PEP 8 is the Python Enhancement Proposal that provides Coding Style guidelines for writing clean, readable, and Consistent python code. It is important because it Ensures better collaboration and maintainability in projects.

5) Who developed Python and in which year was it relased?

Python was developed by Guido van Rossum and First released in 1991.

6) What do you mean by "dynamically typed" in python?

In python, you don't need to declare the data type of a Variable Explicitly. This type is assigned automatically at runtime based on the Value.

Ex:-

```
X=10   # Integer
X="Hi" # Now a string.
```

7) Diff b/w Compiler and Interpreter & which does Python use.

Compiler :- Translates the Entire program into machine Code before Execution. Faster Execution but needs Compilation.

Interpreter :- Translates code line by line during Execution Easier for debugging but slower.

→ Python uses an interpreter, which Executes code line by line.

History of Python :-

The Programming Language Python was conceived in the late 1980s, and its implementation was started in December 1989 by Guido Van Rossum at CWI in the Netherlands as a successor of ABC capable of Exception handling and interfacing with Amoeba OS.
→ Van Rossum was python Principal author and had a central role in deciding the direction of python the title given to him by the Python Community, Benevolent dictator for life (BDFL) until stepping down as leader on July 12, 2018.
Python was named after the BBC TV show Monty Python's Flying circus. → Python 1.0 in Jan 1994.
→ Python 2.0 was released on oct 16, 2000.
→ Python 3.0, a major, backwards-incompatible release, was released on Dec 3, 2008.
→ As of 9 Aug 2025, Python 3.13.6 is the latest stable release. This version currently receives full bug-fix and security updates, while Python 3.12 - released in oct 2023 - had active bug-fix support only until April 2025, and since then only security fixes. Python 3.9 [i.e.] is the oldest supported version of Python., because 3.8 has become an End-of-life product.
→ It was initially designed by Guido van Rossum in 1991 and developed by python Software Foundation.

→ Python is a Case-Sensitive, which means it distinguishes b/w upper case & lower case

Jupyter notebook --notebook-dir=d:/

Key Words :-

They are the reserved words used for particular task and they cannot be used as identifiers (variables, function names).

Ex:- True, False, For, While, if, Else, Else-if, def, return.. etc

It have special meaning and Purpose.

Elif, or, def, global, lambda, Except, in, break, none, Else, await, while, yield, non local.

Variables :-

It is the place / Name where we can store any Value.

→ For repeated usage instead of doing manually we can just call the Variables.

Valid Variables :-	Invalid Variables
a = 7	Emp name = "Priya"
A = 3	1 num = 967
name = "Priya"	Emp@id$ == 875
stu_name = "Priya"	
Stuname = "Priya"	
num1 = 9	
num2 = 7	
num_2 = 15	
_stu_id = 565	

→ Initializing multiple variables in single line.

Ex:- a=4; b=8; c=3

Print (a,b,c) O/P:- 4 8 3

→ x,y,z = 1,2,3

Print (x,y,z) O/P = 1 2 3

→ a=7

b=5

c=8

Print (a,b,c) O/P:= 7 5 8

Advantages and Disadvantages of Python :-

Advantages :-

→ Easy to learn & Readable :- Simple syntax, close to English, makes it beginner-friendly.

→ Versatile & Multi-Purpose :- Used in web development, data science, AI/ML, automation, IoT, game development, etc.

→ Large Community & Libraries :- Huge ecosystem of libraries (Numpy, Pandas, TensorFlow, Django, Flask, etc.)

→ Cross-Platform :- Works on windows, Mac, Linux, and many embedded systems.

→ Rapid Development :- Faster prototyping and development due to simplicity and built-in functions.

→ Integration :- Can integrate with other languages (C, C++, Java) and databases easily.

→ Strong Support for AI & Data Science :- Python is the most popular choice for machine learning, data analysis, and deep learning.

Disadvantages :-

→ Slower Execution Speed :- Interpreted language → slower than Compiled languages like C++ or Java.

→ High Memory Usage :- Not ideal for memory-intensive tasks (like mobile apps or Embedded systems).

→ Not Great for Mobile Development :- Limited use in mobile app development Compared to Java/Kotlin (Android) or Swift (iOS).

→ Weak in Multithreading :- Global Interpreter Lock (GIL) prevents true parallel execution of threads.

→ Runtime Errors :- Being dynamically typed, errors (like type mismatches) often appear at runtime, not compile-time.

→ Database Access Limitations :- slower and less robust Compared to languages like Java when working with heavy enterprise databases.