What is Programming?

Programming means giving a set of instructions to the computer to perform a ↓ task.
    specific

A Program is a sequence of logical steps written in a programming language.

For ex -

If you want to add two numbers - You will write a program that tells the computer how to take inputs, add them, and display the result.

Levels of Programming Languages -

There are 3 main levels of programming

1) Low-level / Binary programming

- written in machine code (0s and 1s).
- Hard for humans to read or write.
- Very fast for the computer to execute.
- Used in System Programming (firmware, device drivers)

Ex - 10110000 01100001

2) Assembly level - programming -

- Uses mnemonics (short codes) instead of binary.
- Easier than machine code, but still not user - friendly.
- Needs an Assembler to convert assembly to machinecode.

3) High-Level Programming -

- Human -readble syntax.
- Ex- Python, Java, c, c++, JavaScript
- Requires a Complier or Interpreter to convert code to machine language.
- Used for application, web and AI development.

Ex- print(" Hello, world!")

Python -

It's high level, interpreted, object oriented, indent, dynamic programming language.

Features of Python,

high level - Easy to understand; close to human language.

Interpreted - Executes line by line (no need to compile entire code).

Object - oriented :- Based on objects and classes (helps reuse & structure code).

Indentation Based - Uses spaces/tabs instead of {} to define blocks.

Dynamic Typing - No need to declare variable type (it's decided at run time).

Features of Python.

1) Easy to learn & Read - Simple English-like syntax makes it beginner friendly.

2) Platform Independent/ Portable - You can run python on windows, Mac, Linux, etc. without changing the code.

3) Rich libraries - Thousands of pre-built libraries (likes Pandas, NumPy, Matplotlib, etc.)

4) Simple Syntax - Uses indentation instead of brackets makes code clean & readable.

5) Open Source - Free to download, use and modify.

6) Interpreted Language - Executes line by line - easier to debug.

7) Extensible & Embeddable - Can combine with other languages like C, C++, and Java.

Applications -

1) Web development

2) Mobile development

3) desktop app development

4) gaming app development

5) GUI graphical user Interface

6) IOT   7) Data science) analytics

8) AI

Q) What are the pros & cons of python?

Pros -

1) Easy to learn & understand
2) Large & active community support
3) Extensive libraries for every purpose
4) Platform independent.
5) Highly readable and maintainable code
6) Best choice for AI, ML, & data analytics.

Cons-

1) ~~Easy to learn and~~
1) Slower execution (since it's interpreted)
2) Not great for mobile app development
3) High memory usage.
4) Limited multithreading (due to GIL- Global Interpreter Lock).

Q) History of Python?

- Creator → Guido Van Rossum

- Created In → 1989

- Realeased in → 1991

- Developed at → CWI (Centrum Wiskunde & informatica), Netherlands

- Named after → 'Monty Python's Flying Circus" (a British comedy show)

- Latest Version → Python 3.12/3.13 (2025).