1. Key Components of a Microprocessor and Their Roles:

A microprocessor has several main parts that help it run instructions:

Arithmetic Logic Unit (ALU): Performs calculations and logic operations.

Control Unit (CU): Manages instructions and coordinates with memory.

Registers: Temporary storage for quick data access.

Cache Memory: Stores frequently used data to speed up access for the processor.

2. Difference Between Machine Language (MLL), Assembly Language (ALL), and High-Level Language (HLL):

Machine Language (MLL): Written in binary (0s and 1s) and directly understood by the computer.

Assembly Language (ALL): A readable version of machine code with simple words, converted to machine code by an assembler.

High-Level Language (HLL): Similar to human language, like C or Python. It needs to be compiled or interpreted to run on a computer.

3. Functions of an Assembler, Compiler, and Interpreter with Examples:

Assembler: Converts assembly code to machine code. Example: Used in embedded systems.

Compiler: Converts entire code at once. Example: Used with Java and C.

Interpreter: Reads and runs code line by line. Example: Used with Python or JavaScript.

4. Imperative, Functional, and Object-Oriented Programming Paradigms:

Imperative Programming: Uses step-by-step commands. Example: C.

Functional Programming: Focuses on functions and avoids changing data. Example: Haskell.

Object-Oriented Programming: Uses objects and classes. Example: Java, Python.

5. History of Three Popular High-Level Programming Languages:

C: Created in 1972 by Dennis Ritchie. Important for operating systems and compilers.

Python: Created in 1991 by Guido van Rossum. Known for its simple syntax.

Java: Created in 1995 by James Gosling. Offers platform independence and security.

6. Five Important Features of the Java Programming Language:

Platform Independence: "Write Once, Run Anywhere."

Object-Oriented: Uses objects and classes.

Security: Offers advanced security features.

Robustness: Helps prevent errors.

Multithreading: Allows multiple tasks at the same time.

7. Overview of Major Versions of the Java Programming Language:

Java 1.0 (1996): First version, platform independence.

Java 5 (2004): Added enums, generics, and autoboxing.

Java 8 (2014): Introduced lambda expressions and Stream API.

Java 11 (2018): Long-term support (LTS) with many updates.

Java 17 (2021): Latest LTS version with security and performance improvements.