1) What are classes and objects in OOP?

In OOP, a class is a template that defines the structure and behaviour of an object. It outlines the attributes (data members) and methods (functions) that the object will have.

It acts like a blueprint for example, a 'Car' class may be define properties like 'brand' and 'speed' and behaviours like 'drive'.

An object is an individual instance of a class, holding specific values for the class's attributes and using its methods.

2) What is inheritance?

Inheritance is an essential OOP feature that lets a class inherit attributes and methods from another class, enabling code reuse and creating a relationship between classes. It models real-world hierarchies, like 'Vehicle' being a superclass and 'Car' being a subclass.

Types of inheritance:

Single Inheritance: Child inherits from one parent class.

Multilevel Inheritance: A class inherits from a derived class.

Hierarchical Inheritance : Multiple classes inherit from one parent.

Multiple Inheritance: Java supports this through interfaces.

3) What is encapsulation ?

Encapsulation is the practice of bundling data (variables) and behaviour (methods) into a single unit (class) while restricting direct access to the data. It is achieved using access specifiers :

Private : Data is accessible only within the class.

Public: Data is accessible from anywhere.

Protected : Data is accessible within the class and subclass.

Default (Package-private) : Data is accessible within the same package.

4) What is abstraction?

Abstraction simplifies complex systems by focusing on what an object does instead of how it does it. It hides internal details and exposes only relevant functionalities. This can be achieved in two ways:

Abstract Classes: Defined with the abstract keyword, they can have both abstract (no implementation) and concrete (implemented) methods.

Interfaces: Define a contract of methods that a class must implement.

5) What are access modifiers in Java OOP?

Access modifiers in Java define the visibility of variables, methods, and classes. The four main types are public, private, protected, and default (package-private).