

## Q-2.What is OOP? List OOP concepts?

### ➤ What is OOP?

- OOP stands for Object-Oriented Programming model that organizes software design around objects, rather than functions and logic. In OOP, programs are made up of objects that interact with each other, and these objects can contain data and code.

### ➤ List of OOP concepts

- Class
- Object
- Encapsulation
- Inheritance
- Polymorphism
- Abstraction

### ➤ Class:

- A blueprint or template for creating objects. It defines the attributes and methods that objects will have.

### ➤ Object:

- An instance of a class. It contains data and functions defined in the class.

### ➤ Encapsulation

- This concept promotes data security and prevents accidental modification.
- Bundling data (attributes) and methods within an object, protecting data from unauthorized access.

### ➤ Inheritance

- Creating new classes (derived classes) based on existing classes (base classes), inheriting their attributes and methods.
- This allows for code reuse and the creation of hierarchical relationships between classes. For example, a "Sports Car" class could inherit from the "Car" class, inheriting its attributes and methods while adding new ones specific to sports cars.

➤ **Type of Inheritance**

- Simple Inheritance
- Multilevel Inheritance
- Multiple Inheritance
- Hierarchical Inheritance
- Hybrid Inheritance

➤ **Polymorphism**

- The ability of objects to take on multiple forms, allowing different objects to be treated as if they were the same type.
- Polymorphism enables you to write generic code that can work with objects of different types.

➤ **Type of Polymorphism**

**1. compile time polymorphism**

- Constructor overloading
- Function overloading
- Operator overloading

**2. Run time polymorphism**

- Function Overloading

➤ **Abstraction**

- Abstraction is the process of only showing the necessary details to the user and hiding the other details in the background.
  - Control and data are the two types of abstraction in C++.
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