

# ① Explain inheritance and polymorphism.

## Inheritance :-

→ Inheritance is a fundamental concept in object-oriented programming (OOP) that allows a new class (called the subclass or derived class) to inherit the properties and behaviors of an existing class (called the superclass or base class).

→ Inheritance creates a parent-child relationship between classes, where the subclass is a specialized version of the superclass, inheriting its characteristics.

→ This means that the subclass inherits all the attributes and methods defined in the superclass and can also add its own unique attributes and methods.

→ The subclass can then extend, modify, or specialize the functionality of the superclass, promoting code reuse and hierarchical organization of class.

## Benefits of inheritance:-

→ Code reusability :- common functionality can be defined in the base class and reused across multiple subclass.

→ Modularity and extensibility :- New functionality can be added to subclass without modifying the base class, promoting a modular design.

## Polymorphism:-

→ Polymorphism is another important concept in OOP that allows objects of different classes to be treated as objects of a common superclass.

→ It enables the same interface to represent various types of objects, and it allows methods to work with objects of different types without needing to know their specific class.

→ Polymorphism is achieved through method overriding and method overloading.

→ Method overriding occurs when a subclass provides a specific implementation for a method that is already defined in its superclass, allowing the subclass to be inherited method.

→ Method overloading, or the other, refer to defining multiple method with the same but different parameter lists.

### Benefits of polymorphism:-

→ Flexibility :- Code can be written to work with a common interface, allowing it to operate on objects of various classes interchangeably.

→ Code clarity :- Polymorphism simplifies code by providing a unified approach to handling different types of objects.

→ Interoperability :- Polymorphism enhances the compatibility of code, as new classes can be introduced without affecting existing code that relies on the common interface.