21.7.23

Fundamental of Computer

Assignment - 4

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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).

* The Subclass can then extend, modify, or specialize the functionality of the Superclass, promoting code reuse and hierarchical organization of classes.

* 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 have its own unique attributes and methods.

Benefits of Inheritance

⇒ **Code reusability:** Common functionality can be defined in the base class and reused across multiple subclasses.

⇒ **Modularity and extensibility:** New functionality can be added to subclasses without modifying the base class, promoting a modular design.

⇒ **Hierarchical organization:** Classes can be organized in a hierarchical manner, making the codebase more structured and easier to understand.

Polymorphism:

* Polymorphism is another key 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 classes.

* Polymorphism is achieved through method overriding and method overloading

* method overriding occurs when a subclasses provides a specific implementation for a method that is already defined in its superclasses, allowing the subclass to be inherited method.

* method overloading, on the other hand, refer to defining multiple methods with the same name but different parameter lists, allowing the appropriate method to be selected based on the arguments provided

Benefits of polymorphism:

⇒ Flexibility: Code can be written to work with a common interface, allowing it to handle objects of various classes interchangeably.

⇒ Code clarity: Polymorphism simplifies code by promoting 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.