**Oops**

**Assignment Questions**

**1. What is Inheritance in Java?**

1. Inheritance in Java: Inheritance enables a class to inherit properties and behaviors from another class, forming a hierarchical relationship among classes.

**2. What is superclass and subclass?**2. Superclass and Subclass: A superclass is the higher-level class that passes its attributes and methods to subclasses, which are the derived classes inheriting from the superclass.

**3. How is Inheritance implemented/achieved in Java?**  
3. Implementation of Inheritance in Java: In Java, Inheritance is achieved using the "extends" keyword, where a subclass extends a superclass to inherit its properties and behaviors.

**4. What is Polymorphism?**4. Polymorphism: Polymorphism allows objects of different classes to be treated as objects of a common superclass. It enables methods to be overridden or overloaded, exhibiting different behaviors based on the object.

**5. Differentiate between method overriding and method overloading.**5. Method Overriding vs. Method Overloading: Method overriding involves redefining a superclass method in a subclass, whereas method overloading occurs within the same class by defining multiple methods with the same name but different parameters.

**6. What is an abstraction explained with an example?**6. Abstraction with Example: Abstraction hides complex implementation details and only shows the necessary features. For instance, a "Car" class might have methods like "start()" and "stop()" without revealing the internal combustion engine mechanism.

**7. What is the difference between an abstract method and a final method in Java? Explain with an Example.**  
7. Abstract vs. Final Methods: An abstract method is declared in an abstract class but doesn't contain implementation. A final method, when declared in a class, cannot be overridden in any subclass. For example, an abstract method "draw()" in a "Shape" class versus a final method "calculateArea()" in a "Circle" class.

**8. What is the final class in Java?**8. Final Class in Java: A final class cannot be subclassed. It prevents inheritance and is often used to safeguard sensitive or critical classes from modification.

**9. Differentiate between abstraction and Encapsulation?**  
9. Abstraction vs. Encapsulation: Abstraction focuses on hiding implementation complexities, while encapsulation involves wrapping data and methods into a single unit (class) and controlling access to them.

**10. Difference between runtime and compile-time Polymorphism? Explain with an Example.**  
10. Runtime vs. Compile-time Polymorphism: Runtime polymorphism occurs when the method to be executed is decided at runtime based on the object's type. Compile-time polymorphism (method overloading) determines the method to be called at compile-time based on method signature. For instance, runtime polymorphism with overriding in inheritance versus compile-time polymorphism with method overloading in the same class.