Aror University of Art, Architecture, Design & Heritage Sukkur.

Department of Artificial Intelligence and Multimedia Gaming

Object Oriented Programming(Spring-2024)

LAB No. 09

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Objective of Lab No. 9:
After performing lab8, students will be able to:

- Implement Abstraction in java
- Create Abstract classes and abstract methods in java

Lab Exercises:

Task #01 Abstract Shape Class:
Create an abstract class Shape with abstract methods calculateArea() and calculatePerimeter(). Implement this class with two subclasses: Circle and Rectangle. Test the implementations by creating instances of Circle and Rectangle and calling their area and perimeter calculation methods.

Task #02 Abstract Animal Class:
Create an abstract class Animal with an abstract method makeSound(). Implement this class with subclasses Dog, Cat, and Cow. Each subclass should implement the makeSound() method to output a sound typical of that animal. Create instances of each subclass and call their makeSound() methods.

Task #03 Bank Account Hierarchy:
Create an abstract class BankAccount with abstract methods deposit(double amount) and withdraw(double amount). Implement this class with subclasses SavingsAccount and CheckingAccount. The SavingsAccount should implement an interest calculation method and the CheckingAccount should implement a method to handle overdrafts. Test these classes by depositing and withdrawing amounts from each type of account.

Task #04 Abstract Employee Class:
Create an abstract class Employee with properties name and salary, and an abstract method

calculateSalary(). Implement this class with subclasses HourlyEmployee and SalariedEmployee. The HourlyEmployee should calculate salary based on hours worked and pay rate, while the SalariedEmployee should calculate salary based on an annual salary. Test these classes by creating instances of each and calculating their salaries.

Task# 05 Abstract Shape Drawing:

Create an abstract class Shape with abstract methods draw() and resize(double factor). Implement this class with subclasses Circle and Rectangle. The draw() method should output a message indicating the shape being drawn, and the resize() method should resize the shape by the given factor. Test these classes by creating instances of each and calling their draw() and resize() methods.