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Oop

Lab 12

Bscs 2

Lab Exercises

task 1

Create an abstract class `Vehicle` with an abstract method `start()`. Implement two subclasses, `Car` and `Motorcycle`, that extend `Vehicle`. Include a parameterized constructor in each subclass. Implement the `start()` method to print a message indicating the vehicle is starting.

Program

```
abstract class Vehicle {  
    abstract void start();  
}  
  
class Car extends Vehicle {  
    String model;  
    Car(String model) {  
        this.model = model;  
    }  
    void start() {  
        System.out.println(model + " Car is starting...");  
    }  
}  
  
class Motorcycle extends Vehicle {  
    String brand;  
    Motorcycle(String brand) {  
        this.brand = brand;  
    }  
    void start() {  
        System.out.println(brand + " Motorcycle is starting...");  
    }  
}  
  
class Main {
```

```

public static void main(String[] args) {

    Vehicle car = new Car("Toyota");

    Vehicle bike = new Motorcycle("Honda");

    car.start();

    bike.start();

}

}

```

The screenshot shows the Programiz Online Java Compiler interface. On the left, the code editor displays a Java program with the following content:

```

1 // Online Java Compiler
2 // Use this editor to write, compile and run your Java code online
3
4
5- abstract class Vehicle {
6     abstract void start();
7 }
8- class Car extends Vehicle {
9     String model;
10    Car(String model) {
11        this.model = model;
12    }
13    void start() {
14        System.out.println(model + " Car is starting...");
15    }
16 }
17- class Motorcycle extends Vehicle {
18     String brand;
19    Motorcycle(String brand) {

```

On the right, the Output window shows the following text:

```

Toyota Car is starting...
Honda Motorcycle is starting...
=== Code Execution Successful ===

```

Lab Task 2

1. Abstract Class "Seat" ○ Create an abstract class Seat with an abstract method calculateSeatPrice(int numberOfSeats). ○ Use throws IllegalArgumentException for seat numbers. Wherever you use it.
2. BusinessClass, FirstClass, and EconomyClass ○ Extend Seat in three concrete classes: BusinessClass, FirstClass, and EconomyClass. ○ Each class implements calculateSeatPrice(int numberOfSeats) with different pricing logic.

3. Main Class "AirlineTicketSystem" ○ Create instances of all seat types and call the calculateSeatPrice() method for each. ○ Display the calculated seat prices on the console

program

```
abstract class Seat {  
  
    abstract double calculateSeatPrice(int numberOfSeats);  
  
}
```

```
class BusinessClass extends Seat {  
  
    double pricePerSeat = 50000;  
  
    double calculateSeatPrice(int numberOfSeats) {  
        if (numberOfSeats <= 0) {  
            System.out.println("Invalid seat number!");  
            return 0;  
        }  
        return numberOfSeats * pricePerSeat;  
    }  
}
```

```
class FirstClass extends Seat {  
  
    double pricePerSeat = 80000;  
  
    double calculateSeatPrice(int numberOfSeats) {  
        if (numberOfSeats <= 0) {  
            System.out.println("Invalid seat number!");  
            return 0;  
        }  
        double total = numberOfSeats * pricePerSeat;  
        double tax = total * 0.10; // 10% luxury tax
```

```
        return total + tax;
    }
}
```

```
class EconomyClass extends Seat {

    double pricePerSeat = 20000;

    double calculateSeatPrice(int numberOfSeats) {
        if (numberOfSeats <= 0) {
            System.out.println("Invalid seat number!");
            return 0;
        }
        if (numberOfSeats > 5) {
            double total = numberOfSeats * pricePerSeat;
            double discount = total * 0.05; // 5% discount
            return total - discount;
        } else {
            return numberOfSeats * pricePerSeat;
        }
    }
}
```

```
class Main {

    public static void main(String[] args) {
        Seat business = new BusinessClass();

        Seat first = new FirstClass();

        Seat economy = new EconomyClass();
    }
}
```


```
        System.out.println("Business Class : Rs. " + business.calculateSeatPrice(3));

        System.out.println("First Class Rs. " + first.calculateSeatPrice(2));


        System.out.println("Economy Class Rs. " + economy.calculateSeatPrice(6));

    }

}
```


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Main.java

48 }
49 }
50
51
52 class Main {
53 public static void main(String[] args) {
54 Seat business = new BusinessClass();
55 Seat first = new FirstClass();
56 Seat economy = new EconomyClass();
57
58
59 System.out.println("Business Class : Rs. " + business
60 .calculateSeatPrice(3));
61 System.out.println("First Class Rs. " + first
62 .calculateSeatPrice(2));
63 System.out.println("Economy Class Rs. " + economy
64 .calculateSeatPrice(6));
65 }
66 }

Run

Output

Clear

Business Class : Rs. 150000.0
First Class Rs. 176000.0
Economy Class Rs. 114000.0

=== Code Execution Successful ===