Lab – 05

Assignment -1.

- Write a Java program to create a class called Vehicle with a method called drive().
- Vehicle should have attributes such as make (String), model (String) , year (int) and maximumSpeed (int).
- Create a constructor in Vehicle with all fields as constructor parameters.
- Create a subclass called Car and override constructor. Call super().
- Write a function that overrides the drive() method to print (make + “ ” + model + " Car is driving".)
- Also create another subclass Bike extending the vehicle class.
- Override the drive() method to print (make + “ ” + model + " Bike is driving".)
- Instantiate both Bike and Car class. Print their attributes.

```java
package labAssignment4;
//Base class
class Vehicle {
 String make;
 String model;
 int year;
 int maximumSpeed;

 // Constructor
 public Vehicle(String make, String model, int year, int maximumSpeed) {
     this.make = make;
     this.model = model;
     this.year = year;
     this.maximumSpeed = maximumSpeed;
 }

 // Drive method
 public void drive() {
     System.out.println(make + " " + model + " is driving.");
 }

 // Method to display vehicle details
 public void displayDetails() {
     System.out.println("Make: " + make + ", Model: " + model + ", Year: " + year + ", Max Speed: " + maximumSpeed + " km/h");
 }
}

//Subclass Car
class Car extends Vehicle {
 // Constructor
 public Car(String make, String model, int year, int maximumSpeed) {
     super(make, model, year, maximumSpeed);
 }
```

```java
    // Overridden drive method
    @Override
    public void drive() {
        System.out.println(make + " " + model + " Car is driving.");
    }
}

//Subclass Bike
class Bike extends Vehicle {
    // Constructor
    public Bike(String make, String model, int year, int maximumSpeed) {
        super(make, model, year, maximumSpeed);
    }

    // Overridden drive method
    @Override
    public void drive() {
        System.out.println(make + " " + model + " Bike is driving.");
    }
public class vehicle{

}
    public static void main(String[] args) {
        // Instantiate Car and Bike
        Car car = new Car("Toyota", "Camry", 2022, 240);
        Bike bike = new Bike("Yamaha", "MT-09", 2021, 200);

        // Print details and invoke drive method
        car.displayDetails();
        car.drive();

        bike.displayDetails();
        bike.drive();
    }
}
```

Output

```
Make: Toyota, Model: Camry, Year: 2022, Max Speed: 240 km/h
Toyota Camry Car is driving.
Make: Yamaha, Model: MT-09, Year: 2021, Max Speed: 200 km/h
Yamaha MT-09 Bike is driving.
```

Assignment -2.

• Write a Java program to create a class called Shape with a method called getArea().

• Create a subclass called Circle and create a constructor that takes the value of radius(int) as input parameter.

• Override the getArea() method. • Create a class called square that takes an attribute length. Create a constructor that takes length as input.

• Override the getArea() method. • Create a subclass of Shape called Rectangle that takes width and height as input to the constructor.

• Override the getArea() method to calculate the area of a rectangle. Instantiate and call getArea() method.

```java
package lab;
//Base class
abstract class Shape {
 // Abstract method to get area
 public abstract double getArea();
}

//Subclass Circle
class Circle extends Shape {
 private int radius;

 // Constructor
 public Circle(int radius) {
     this.radius = radius;
 }
 // Overridden getArea method
 @Override
 public double getArea() {
     return Math.PI * radius * radius; // Area = π * r²
 }
}

//Subclass Square
class Square extends Shape {
 private int length;

 // Constructor
 public Square(int length) {
     this.length = length;
 }

 // Overridden getArea method
 @Override
 public double getArea() {
     return length * length; // Area = side²
 }
}


//Subclass Rectangle
class Rectangle extends Shape {
 private int width;
 private int height;

 // Constructor
 public Rectangle(int width, int height) {
     this.width = width;
     this.height = height;
 }

 // Overridden getArea method
 @Override
 public double getArea() {
     return width * height; // Area = width * height
 }


//Main class to test the program

 public static void main(String[] args) {
     // Instantiate Circle, Square, and Rectangle
     Circle circle = new Circle(5);
     Square square = new Square(4);
     Rectangle rectangle = new Rectangle(3, 6);

     // Print areas
     System.out.printf("Area of Circle: %.2f%n", circle.getArea());
     System.out.printf("Area of Square: %.2f%n", square.getArea());
     System.out.printf("Area of Rectangle: %.2f%n", rectangle.getArea());
 }
}
```

Output

```
Area of Circle: 78.54
Area of Square: 16.00
Area of Rectangle: 18.00
```