Inheritance

Assignment 1

```java
package Inheritance;

//Define the base class Vehicle
class Vehicle {
// Attributes of Vehicle class
    String make;
    String model;
    int year;
    int maximumSpeed;


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


    // Drive method to be overridden in subclasses
    public void drive() {
        System.out.println("Vehicle is driving");
    }


    // To print the details of the vehicle
    public void printDetails() {
        System.out.println("Make: " + make);
        System.out.println("Model: " + model);
        System.out.println("Year: " + year);
        System.out.println("Maximum Speed: " + maximumSpeed + " km/h");
    }
}


//Define the Car class that extends Vehicle
class Car extends Vehicle {
    // Constructor of Car class
    public Car(String make, String model, int year, int maximumSpeed) {
        // Call the parent constructor (super)
        super(make, model, year, maximumSpeed);
    }


    // Overriding the drive method
    @Override
```

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

    //Define the Bike class that extends Vehicle
    class Bike extends Vehicle {
        // Constructor of Bike class
        public Bike(String make, String model, int year, int maximumSpeed) {
            // Call the parent constructor (super)
            super(make, model, year, maximumSpeed);
        }

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

    public class CarDetails {

        public static void main(String[] args) {

            // Create a Car object
            Car car = new Car("Toyota", "Camry", 2023, 180);
            // Create a Bike object
            Bike bike = new Bike("Yamaha", "R15", 2022, 150);

            // Print the details of the Car
            System.out.println("Car Details:");
            car.printDetails();
            car.drive(); // Call the drive method of Car

            System.out.println("\nBike Details:");
            // Print the details of the Bike
            bike.printDetails();
            bike.drive(); // Call the drive method of Bike

        }

    }
```

OUTPUT

```
Car Details:
Make: Toyota
Model: Camry
Year: 2023
Maximum Speed: 180 km/h
Toyota Camry Car is driving


Bike Details:
Make: Yamaha
Model: R15
Year: 2022
Maximum Speed: 150 km/h
Yamaha R15 Bike is driving
```

Assignment-2

```java
package Inheritance;

//Define the base class Shape
abstract class Shape {

// Abstract method to be implemented by subclasses to calculate area
public abstract double getArea();
}


//Define the Circle class that extends Shape
class Circle extends Shape {
    private int radius;

    // Constructor of Circle class
    public Circle(int radius) {
        this.radius = radius;
    }

    // Override getArea method to calculate the area of a circle
    @Override
    public double getArea() {
        return Math.PI * radius * radius; // Formula for the area of a circle (πr^2)
    }
}


//Define the Square class that extends Shape
```

```java
class Square extends Shape {
    private int length;

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

    // Override getArea method to calculate the area of a square
    @Override
    public double getArea() {
        return length * length; // Formula for the area of a square (side^2)
    }
}

//Define the Rectangle class that extends Shape
class Rectangle extends Shape {
    private int width;
    private int height;

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

    // Override getArea method to calculate the area of a rectangle
    @Override
    public double getArea() {
        return width * height; // Formula for the area of a rectangle (width * height)
    }
}

public class ShapeofObject {

    public static void main(String[] args) {


        // Create a Circle object
        Circle circle = new Circle(4);
        // Create a Square object
        Square square = new Square(3);
        // Create a Rectangle object
        Rectangle rectangle = new Rectangle(8, 4);
```

```java
        // Print the areas of each shape by calling getArea()
        System.out.println("Area of Circle: " + circle.getArea());
        System.out.println("Area of Square: " + square.getArea());
        System.out.println("Area of Rectangle: " + rectangle.getArea());


    }

}
```

OUTPUT:

```
Area of Circle: 50.26548245743669
Area of Square: 9.0
Area of Rectangle: 32.0
```