Assignment 5

```
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// Batch - AIML (B3)
```

Main.java

```
  import java.util.Scanner;

  public class Main {
      public static void main(String[] args) {
          Scanner scanner = new Scanner(System.in);
          String shape;

          do {
              System.out.println("Enter the shape (Circle, Rectangle,
Square, Sphere, Cylinder, Pyramid) or 'exit' to quit:");
              shape = scanner.nextLine();

              switch (shape.toLowerCase()) {
                  case "circle":
                      Circle circle = new Circle();
                      circle.showShape(shape);
                      circle.calculateShape();
                      circle.calculatePerimeter();
                      break;
                  case "rectangle":
                      Rectangle rectangle = new Rectangle();
                      rectangle.showShape(shape);
                      rectangle.calculateShape();
                      rectangle.calculatePerimeter();
                      break;
                  case "square":
                      Square square = new Square();
                      square.showShape(shape);
                      square.calculateShape();
                      square.calculatePerimeter();
                      break;
                  case "sphere":
                      Sphere sphere = new Sphere();
                      sphere.showShape(shape);
                      sphere.calculateShape();
                      break;
                  case "cylinder":
                      Cylinder cylinder = new Cylinder();
                      cylinder.showShape(shape);
                      cylinder.calculateShape();
                      cylinder.calculatePerimeter();
                      break;
                  case "pyramid":
                      Pyramid pyramid = new Pyramid();
                      pyramid.showShape(shape);
                      pyramid.calculateShape();
                      break;
                  case "exit":
                      System.out.println("Exiting...");
                      break;
```

```
                default:
                    System.out.println("Invalid shape. Please try
again.");
            }
        } while (!shape.equalsIgnoreCase("exit"));

        scanner.close();
    }
}
```

Shape.java

```
public abstract class Shape {
    public void showShape(String shape) {
        System.out.println("Selected shape: " + shape);
    }

    public abstract void calculateShape();

    public abstract void calculatePerimeter();
}
```

Volume.java

```
public interface Volume {
    void calculateVolume();
}
```

Circle.java

```
import java.util.Scanner;

public class Circle extends Shape {
    private double radius;

    @Override
    public void calculateShape() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the radius of the circle:");
        radius = scanner.nextDouble();
        scanner.close();

        double area = Math.PI * radius * radius;
        System.out.println("Area of the circle: " + area);
    }

    @Override
    public void calculatePerimeter() {
        double perimeter = 2 * Math.PI * radius;
        System.out.println("Perimeter of the circle: " + perimeter);
    }
}
```

Rectangle.java

```
import java.util.Scanner;

public class Rectangle extends Shape {
    private double length;
    private double width;

    @Override
```

```
    public void calculateShape() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the length of the rectangle:");
        length = scanner.nextDouble();
        System.out.println("Enter the width of the rectangle:");
        width = scanner.nextDouble();
        scanner.close();

        double area = length * width;
        System.out.println("Area of the rectangle: " + area);
    }

    @Override
    public void calculatePerimeter() {
        double perimeter = 2 * (length + width);
        System.out.println("Perimeter of the rectangle: " + perimeter);
    }
}
```

Cylinder.java

```
import java.util.Scanner;

public class Cylinder extends Shape implements Volume {
    private double radius;
    private double height;

    @Override
    public void calculateShape() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the radius of the cylinder:");
        radius = scanner.nextDouble();
        System.out.println("Enter the height of the cylinder:");
        height = scanner.nextDouble();
        scanner.close();

        double surfaceArea = 2 * Math.PI * radius * (radius + height);
        System.out.println("Surface area of the cylinder: " +
surfaceArea);
    }

    @Override
    public void calculatePerimeter() {
        // Cylinder does not have a perimeter
    }

    @Override
    public void calculateVolume() {
        double volume = Math.PI * Math.pow(radius, 2) * height;
        System.out.println("Volume of the cylinder: " + volume);
    }
}
```

Square.java

```
import java.util.Scanner;

public class Square extends Shape {
    private double side;
```

```
    @Override
    public void calculateShape() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the side length of the square:");
        side = scanner.nextDouble();
        scanner.close();

        double area = side * side;
        System.out.println("Area of the square: " + area);
    }

    @Override
    public void calculatePerimeter() {
        double perimeter = 4 * side;
        System.out.println("Perimeter of the square: " + perimeter);
    }
}
```

Pyramid.java

```
import java.util.Scanner;

public class Pyramid extends Shape implements Volume {
    private double baseLength;
    private double baseWidth;
    private double height;

    @Override
    public void calculateShape() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the base length of the pyramid:");
        baseLength = scanner.nextDouble();
        System.out.println("Enter the base width of the pyramid:");
        baseWidth = scanner.nextDouble();
        System.out.println("Enter the height of the pyramid:");
        height = scanner.nextDouble();
        scanner.close();

        double baseArea = baseLength * baseWidth;
        System.out.println("Base area of the pyramid: " + baseArea);
    }

    @Override
    public void calculatePerimeter() {
        // Pyramid does not have a perimeter
    }

    @Override
    public void calculateVolume() {
        double volume = (1.0 / 3.0) * baseLength * baseWidth * height;
        System.out.println("Volume of the pyramid: " + volume);
    }
}
```