Laporan Tugas Praktikum PBO
Inheritance, Abstract Class and Interface

Disusun Oleh :

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Kelas 2 – B

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Tugas 1

The Circle and Cylinder Classes

1. Hasil Program dan pembahasan dari soal
   - Task 1.1
     a. Variable color : String

     ```java
     public class Circle {
         // Save as "Circle.java"
         // private instance variable, not accessible from outside this class
         private double radius;
         private String color;
     ```

     b. Constructor Circle(radius : double, color : string)
     ```java
     /** Constructs a Circle instance with the given radius and default color */
     public Circle(double r, String color) { // 2nd constructor
     this.radius = r;
     this.color = color;
     }
     ```

     c. Getter and setter for color
     ```java
     public String getColor() {
         return color;
     }

     public void setColor(String color) {
         this.color = "red";
     }
     ```

   - Task 1.2
     ```java
     public double getVolume() {
         return super.getArea()*height;
     }

     public double getArea() {
         return super.getArea() + 2*super.getRadius()*Math.PI*height;
     }
     ```

     Pada getVolume dimodif dengan menggunakan super pada toString untuk memangil method pada kelas parent. Lalu saya mengubah (=2π×radius×height + 2×base-area) dengan rumus awal menggunakan method getArea yang berada pada parent dank arena base-area = getArea() maka harus menuliskan kembali rumus dengan menambah super pada bagian getRadius.

   - Task 1.3
     ```java
     //overrides
     public String toString() { // in Cylinder class
         return "Cylinder: subclass of " + super.toString() // use Circle's toString()
         + " height=" + height;

     }
     ```

2. Permasalahan : -
3. Solusi : -
4. Teman yang membantu : -

Tugas 2

Superclass shape and its Subclass Circle, Rectangle, square

1. Program dan output
   - Shape.java

```java
package soal2;

public class Shape {
    protected String color = "red";
    protected boolean filled = true;

    public Shape() {
        color = "green";
        filled = true;
    }

    public Shape(String color, boolean filled) {
        this.color = color;
        this.filled = filled;
    }

    public String getColor() {
        return color;
    }

    public void setColor(String color) {
        this.color = color;
    }

    public boolean isFilled() {
        return filled;
    }

    public void setFilled(boolean filled) {
        this.filled = filled;
    }

    public String toString() {
        if (isFilled() == true) {
            return "A Shape with color of " + color + " and " + "filled";
        } else {
            return "A Shape with color of " + color + " and " + "not filled";
        }
    }
}
```

Output

```java
        Shape s1 = new Shape();
        System.out.println("Shape," + "\n"
                + "color=" + s1.getColor() + "\n"
                + "filled=" + s1.isFilled() + "\n"
                + s1.toString() + "\n\n");
```

```
Shape,
color=green
filled=true
A Shape with color of green and filled
```

- Circle.java

```java
package soal2;

public class Circle extends Shape {
    private double radius;

    public Circle() {
        radius = 1.0;
    }

    public Circle(double radius) {
        this.radius = radius;
    }

    public Circle(double radius, String color, boolean filled) {
        super(color,filled);
        this.radius = radius;
    }

    public double getradius() {
        return radius;
    }

    public void setradius(double radius) {
        this.radius = radius;
    }

    public double getArea() {
        return radius*radius*Math.PI;
    }

    public double getPerimeter() {
        return Math.PI*2*radius;
    }

    public String toString() {
        return "A Circle with radius=" + radius + " which is a subclass of " + super.toString();
    }
}
```

Output

```java
        Circle c1 = new Circle();
        System.out.println("Circle," + "\n"
                + "color=" + c1.getColor() + "\n"
                + "filled=" + c1.isFilled() + "\n"
                + "ridius=" + c1.getradius() + "\n"
                + "area=" + c1.getArea() + "\n"
                + c1.toString() + "\n\n");
```

```
Circle,
color=green
filled=true
ridius=1.0
area=3.141592653589793
A Circle with radius=1.0 which is a subclass of A Shape with color of green and filled
```

- Rectangle.java

```java
package soal2;

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

    public Rectangle() {
        super();
        width = 1.0;
        length = 1.0;
    }

    public Rectangle(double width, double length) {
        this.width = width;
        this.length = length;
    }

    public Rectangle(double width, double length, String color, boolean filled) {
        super(color, filled);
        this.width = width;
        this.length = length;
    }

    public double getWidth() {
        return width;
    }

    public void setWidth(double width) {
        this.width = width;
    }

    public double getLength() {
        return length;
    }

    public void setLength(double length) {
        this.length = length;
    }


    public double getArea() {
        return length*width;
    }

    public double getPerimeter() {
        return 2*length*width;
    }


    public String toString() {
        return "A Rectangle with width=" + width + " and length=" + length
                + " which is a subclass of " + super.toString();
    }
}
```

Output

```java
        Rectangle r1 = new Rectangle();
        System.out.println("Rectangle," + "\n"
                + "color=" + r1.getColor() + "\n"
                + "filled=" + r1.isFilled() + "\n"
                + "width=" + r1.getWidth() + "\n"
                + "length=" + r1.getLength() + "\n"
                + "area=" + r1.getArea() + "\n"
                + "perimeter=" + r1.getPerimeter() + "\n"
                + r1.toString() + "\n\n");
```

```
Rectangle,
color=green
filled=true
width=1.0
length=1.0
area=1.0
perimeter=2.0
A Rectangle with width=1.0 and length=1.0 which is a subclass of A Shape with color of green and filled
```

- Square.java

```java
package soal2;

public class Square extends Rectangle {

    public Square() {
        super();
    }

    public Square(double side) {
        super(side,side); // Call superclass Rectangle(double, double)
    }

    public Square(double side, String color, boolean filled) {
        super(side, side, color, filled);
    }

    public double getSide() {
        return super.getWidth();
    }

    public void setSide(double side) {
        setWidth(side);
        setLength(side);
    }

    public void setWidth(double side) {
        super.setWidth(side);
    }

    public void setLength(double side) {
        super.setLength(side);
    }

    public double getArea() {
        return getSide()*getSide();
    }

    public double getPerimeter() {
        return 4*getSide();
    }

    public String toString() {
        return "A Square with side=" + getSide() + " which is a subclass of" + super.toString();
    }
}
```

Output

```java
Square ss1 = new Square();
System.out.println("Square," + "\n"
        + "color=" + ss1.getColor() + "\n"
        + "filled=" + ss1.isFilled() + "\n"
        + "width=" + ss1.getWidth() + "\n"
        + "length=" + ss1.getLength() + "\n"
        + "side=" + ss1.getSide() + "\n"
        + "area=" + ss1.getArea() + "\n"
        + "perimeter=" + ss1.getPerimeter() + "\n"
        + ss1.toString() + "\n\n");
```

```
Square,
color=green
filled=true
width=1.0
length=1.0
side=1.0
area=1.0
perimeter=4.0
A Square with side=1.0 which is a subclass ofA Rectangle with width=1.0 and length=1.0 which is a subclass of A Shape with color of green and filled
```

- Test.java

```java
public class Test {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Shape s1 = new Shape();
        System.out.println("Shape," + "\n"
                + "color=" + s1.getColor() + "\n"
                + "filled=" + s1.isFilled() + "\n"
                + s1.toString() + "\n\n");

        Circle c1 = new Circle();
        System.out.println("Circle," + "\n"
                + "color=" + c1.getColor() + "\n"
                + "filled=" + c1.isFilled() + "\n"
                + "ridius=" + c1.getradius() + "\n"
                + "area=" + c1.getArea() + "\n"
                + "perimeter=" + c1.getPerimeter() + "\n"
                + c1.toString() + "\n\n");

        Rectangle r1 = new Rectangle();
        System.out.println("Rectangle," + "\n"
                + "color=" + r1.getColor() + "\n"
                + "filled=" + r1.isFilled() + "\n"
                + "width=" + r1.getWidth() + "\n"
                + "length=" + r1.getLength() + "\n"
                + "area=" + r1.getArea() + "\n"
                + "perimeter=" + r1.getPerimeter() + "\n"
                + r1.toString() + "\n\n");

        Square ss1 = new Square();
        System.out.println("Square," + "\n"
                + "color=" + ss1.getColor() + "\n"
                + "filled=" + ss1.isFilled() + "\n"
                + "width=" + ss1.getWidth() + "\n"
                + "length=" + ss1.getLength() + "\n"
                + "side=" + ss1.getSide() + "\n"
                + "area=" + ss1.getArea() + "\n"
                + "perimeter=" + ss1.getPerimeter() + "\n"
                + ss1.toString() + "\n\n");
    }
}
```

```
Shape,
color=green
filled=true
A Shape with color of green and filled


Circle,
color=green
filled=true
ridius=1.0
area=3.141592653589793
perimeter=6.283185307179586
A Circle with radius=1.0 which is a subclass of A Shape with color of green and filled


Rectangle,
color=green
filled=true
width=1.0
length=1.0
area=1.0
perimeter=2.0
A Rectangle with width=1.0 and length=1.0 which is a subclass of A Shape with color of green and filled


Square,
color=green
filled=true
width=1.0
length=1.0
side=1.0
area=1.0
perimeter=4.0
A Square with side=1.0 which is a subclass ofA Rectangle with width=1.0 and length=1.0 which is a subclass of A Shape with color of green and filled
```

2. Permasalahan :-
3. Solusi :-
4. Teman yang membantu :-