LAPORAN PRAKTIKUM PBO
Polymorphism & Interface

Disusun oleh :

Muhamad Rafli Nur Ikhsan

201511048

D-3 Teknik Informatika 2B

Jurusan Teknik Komputer dan Informatika

Program studi D3 Teknik Informatika

Politeknik Negeri Bandung

1. Soal 1
    - SS Akhir Program

```
Computing amount for Shape Rectangle of length 20.0and width 35.0
Computing amount for Shape Sphere of radius 15.0
Computing amount for Shape Cylinder of radius 10.0 and height 30.0

Number of gallons of paint needed...
Deck 2
Big Ball 8.1
Tank 26.9

Process finished with exit code 0
```

    - Write an abstract class Shape with the following properties:
        - An instance variable shapeName of type String
        - An abstract method area()
        - A toString method that returns the name of the shape

```
abstract class Shape {
    String shapeName;

    public Shape (String shapeName) {
        this.shapeName = shapeName;
    }

    abstract public double area();

    public String toString()
    {
        return " Shape " + shapeName;
    }
}
```

    - The file Sphere.java contains a class for a sphere which is a descendant of Shape. A sphere has a radius and its area (surface area) is given by the formula 4*PI*radius^2. Define similar classes for a rectangle and a cylinder. Both the Rectangle class and the Cylinder class are descendants of the Shape class. A rectangle is defined by its length and width and its area is length times width. A cylinder is defined by a radius and height and its area (surface area) is PI*radius^2*height. Define the toString method in a way similar to that for the Sphere class.

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

    public Rectangle (double length, double width)
    {
        super ( shapeName: "Rectangle");
        this.length = length;
        this.width = width;
    }

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

    public String toString()
    {
        return super.toString() + " of length " + length + "and width " + width;
    }
}
```

```java
public class Cylinder extends Shape{
    private double radius;
    private double height;

    public Cylinder (double radius, double height)
    {
        super ( shapeName: "Cylinder");
        this.radius = radius;
        this.height = height;
    }

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

    public String toString()
    {
        return super.toString() + " of radius " + radius + " and height " + height;
    }
}
```

- The file Paint.java contains a class for a type of paint (which has a "coverage" and a method to compute the amountvof paint needed to paint a shape). Correct the return statement in the amount method so the correct amount will bevreturned. Use the fact that the amount of paint needed is the area of the shape divided by the coverage for the paint. (NOTE: Leave the print statement - it is there for illustration purposes, so you can see the method operating on different types of Shape objects.)

```
public class Paint {
    private double coverage;

    public Paint (double c)
    {
        coverage = c;
    }

    public double amount (Shape s)
    {
        System.out.println("Computing amount for" + s);
        return s.area()/coverage;
    }
}
```

- The file PaintThings.java contains a program that computes the amount of paint needed to paint various shapes. A paint object has been instantiated. Add the following to complete the program:
    - Instantiate the three shape objects: deck to be a 20 by 35 foot rectangle, bigBall to be a sphere of radius 15, and tank to be a cylinder of radius 10 and height 30.
    - Make the appropriate method calls to assign the correct values to the three amount variables.
    - Run the program and test it. You should see polymorphism in action as the amount method computes the amount of paint for various shapes.

```
    final double COVERAGE = 350;
    Paint paint = new Paint (COVERAGE);

    Rectangle deck;
    Sphere bigBall;
    Cylinder tank;

    deck = new Rectangle ( length: 20,  width: 35);
    bigBall = new Sphere( r: 15);
    tank = new Cylinder ( radius: 10,  height: 30);

    double deckAmt, ballAmt, tankAmt;

    deckAmt = paint.amount(deck);
    ballAmt = paint.amount(bigBall);
    tankAmt = paint.amount(tank);


    DecimalFormat fmt = new DecimalFormat( pattern: "0.#");
    System.out.println ("\nNumber of gallons of paint needed...");
    System.out.println ("Deck " + fmt.format(deckAmt));
    System.out.println ("Big Ball " + fmt.format(ballAmt));
    System.out.println ("Tank " + fmt.format(tankAmt));
}
```

2. Soal 2
    - SS akhir program

```
==============================
It's Gennichiro, the FlyingDutchMan! It has the power level of 0
.....HEED ME.....
FOR MY NAAAAAAAME IS Gennichiro
TIME TO SHOW YOU MY POWERS
SUPERIOR SIGHT, BEHOLD LASER EYE!
DISGUST ME! BEHOLD SUPER STRENGTH!
==============================
==============================
It's Shirai, the FlyingDutchMan! It has the power level of 225
.....HEED ME.....
FOR MY NAAAAAAAME IS Shirai
TIME TO SHOW YOU MY POWERS
EAT DIRT MORTAL, BEHOLD THE POWER OF LIGTH
SUPERIOR SIGHT, BEHOLD LASER EYE!
==============================
==============================
It's Gyoubu Masataka Oniwa, the FlyingDutchMan! It has the power level of 553
.....HEED ME.....
FOR MY NAAAAAAAME IS Gyoubu Masataka Oniwa
TIME TO SHOW YOU MY POWERS
SUPERIOR SIGHT, BEHOLD LASER EYE!
DISGUST ME! BEHOLD SUPER STRENGTH!
==============================
```

```
==============================
It's Arnastria, the FlyingDutchMan! It has the power level of 666
.....HEED ME.....
FOR MY NAAAAAAAME IS Arnastria
TIME TO SHOW YOU MY POWERS
DISGUST ME! BEHOLD SUPER STRENGTH!
EAT DIRT MORTAL, BEHOLD THE POWER OF LIGTH
==============================
==============================
It's Tatenari, the FlyingDutchMan! It has the power level of 36556
.....HEED ME.....
FOR MY NAAAAAAAME IS Tatenari
TIME TO SHOW YOU MY POWERS
EAT DIRT MORTAL, BEHOLD THE POWER OF LIGTH
SUPERIOR SIGHT, BEHOLD LASER EYE!
==============================
```