

**LAPORAN PRAKTIKUM
PEMROGRAMAN II
MODUL 5**



POLIMORFISME

Oleh:

Indra Suryadilaga

NIM. 2410817310014

**PROGRAM STUDI TEKNOLOGI INFORMASI
FAKULTAS TEKNIK
UNIVERSITAS LAMBUNG MANGKURAT
NOVEMBER 2025**

LEMBAR PENGESAHAN
LAPORAN PRAKTIKUM PEMROGRAMAN II
MODUL 5

Laporan Praktikum Pemrograman II Modul 5: Polimorfisme ini disusun sebagai syarat lulus mata kuliah Praktikum Pemrograman II. Laporan Praktikum ini dikerjakan oleh:

Nama Praktikan : Indra Suryadilaga
NIM : 2410817310014

Menyetujui,
Asisten Praktikum

Mengetahui,
Dosen Penanggung Jawab Praktikum

Galih Aji Sabdaraya
NIM. 2310817210005

Andreyan Rizky Baskara, S.Kom.,
M.Kom.
NIP. 19930703 201903 1 011

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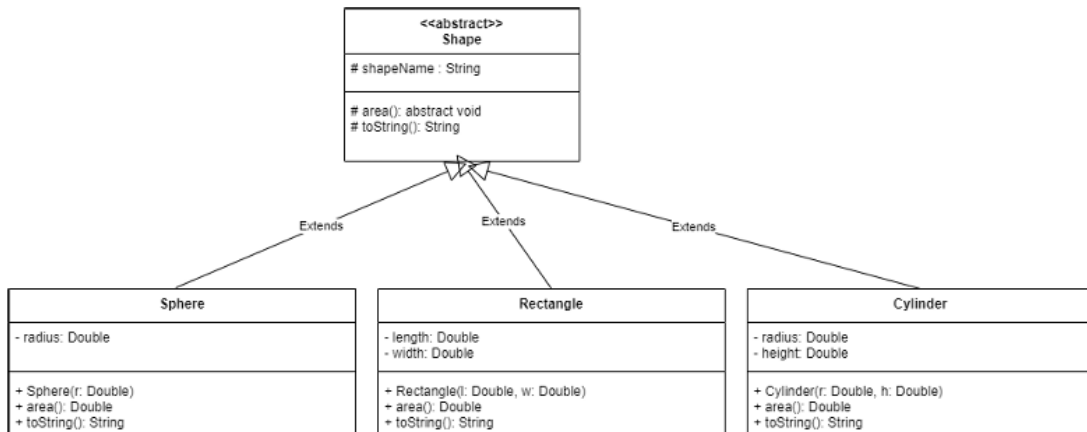
SOAL 1

Pada praktikum kali ini anda akan diminta untuk membuat sebuah program yang dapat menghitung

banyaknya liter cat yang digunakan untuk mewarnai bentuk ruang yang beragam.

Buatlah sebuah hierarki kelas abstrak Shape dimana memiliki 3 kelas anak yaitu Sphere,

Rectangle, dan Cylinder seperti ditunjukkan oleh diagram kelas berikut.



Method `area()` digunakan untuk menghitung luas masing-masing objek. Berikut adalah formula yang digunakan untuk menghitung luas masing-masing bangun yang harus diimplementasikan.

Sphere: $4 \times \pi \times radius^2$

Rectangle: $length \times width$

Cylinder: $\pi \times radius^2 \times height$

Method `toString()` digunakan untuk mengembalikan nilai String dari nama bangun

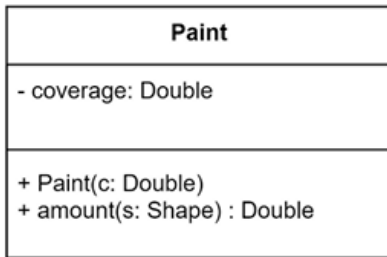
Berikut adalah ilustrasi dari kelas `Sphere.java`. Implementasikan kelas lainnya untuk `Shape`, `Rectangle` dan `Cylinder`

Tabel 1.1 Soal No. 1

Contoh Ilustrasi Sphere.java

```
public class Sphere extends Shape
{
    private double radius; //radius in feet
    //-----
    // Constructor: Sets up the sphere.
    //-----
    public Sphere(double r)
    {
        super("Sphere");
        radius = r;
    }
    //-----
    // Returns the surface area of the sphere.
    //-----
    public double area()
    {
        return 4*Math.PI*(radius*radius);
    }
    //-----
    // Returns the sphere as a String.
    //-----
    public String toString()
    {
        return super.toString() + " of radius " + radius;
    }
}
```

Selanjutnya, Buatlah kelas Paint.java seperti ditunjukkan diagram kelas berikut.



Method amount digunakan untuk menghitung banyaknya liter cat yang digunakan dengan persamaan berikut:

$$\text{amount of pain} = \frac{\text{area of shape}}{\text{covarge}}$$

Lengkapi kode dibawah supaya menghasilkan keluaran yang diinginkan

Paint.java
<pre> public class Paint { private double coverage; //number of square feet per gallon //----- // Constructor: Sets up the paint object. //----- public Paint(double c) { coverage = c; } //----- // Returns the amount of paint (number of gallons) // needed to paint the shape given as the parameter. //----- public double amount(Shape s) </pre>

```

{
System.out.println ("Computing amount for " + s);
return 0;
}
}

```

Terakhir, Buatlah kelas main bernama PaintThings.java. Tambahkan beberapa hal berikut agar program berjalan sesuai yang diinginkan.\

1. Instansiasi 3 bentuk objek:
 - a. objek bernama deck berbentuk persegi panjang dengan ukuran Panjang 20cm dan lebar 30cm.
 - b. objek bernama bigBall berbentuk bola dengan ukuran radius 15cm.
 - c. objek bernama tank berbentuk silinder dengan ukuran radius 10cm dan tinggi 30cm.
2. Panggil fungsi yang tepat agar dapat menghitung jumlah cat yang diperlukan.

Petunjuk untuk kelas main PaintThings.java

```

import java.text.DecimalFormat;

public class PaintThings
{
//-----
// Creates some shapes and a Paint object
// and prints the amount of paint needed
// to paint each shape.
//-----

public static void main (String[] args)
{
final double COVERAGE = 350;
Paint paint = new Paint(COVERAGE);
Rectangle deck;
Sphere bigBall;

```

```

Cylinder tank;
double deckAmt, ballAmt, tankAmt;

// Instantiate the three shapes to paint

// Compute the amount of paint needed for each shape

// Print the amount of paint for each.
DecimalFormat fmt = new DecimalFormat("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));
}
}

```

1. Jalankan program dan perhatikan hasil untuk ketiga bentuk yang berbeda, screenshot hasil yang didapatkan dan lampirkan di dalam source code.
2. Simpan coding anda dengan nama package: soal1
3. Pastikan terdapat screenshoot pada repositori github

A. Source Code

Tabel 1.2 Shape.java Source Code

File:Shape.java	
1	package modul_05;
2	
3	public abstract class Shape {
4	protected String shapeName;
5	
6	protected Shape(String name) {
7	this.shapeName = name;
8	}
9	
10	protected abstract double area();

11	
12	public String toString() {
13	return this.shapeName;
14	}
15	
16	}

Tabel 1.3 Sphere.java Source Code

File: Sphere.java	
1	package <u>modul 05</u> ;
2	
3	public class Sphere extends Shape {
4	private double radius;
5	
6	public Sphere(double r) {
7	super("Sphere");
8	this.radius = r;
9	}
10	
11	@Override
12	public double area() {
13	return 4 * Math. PI * (radius * radius);
14	}
15	
16	@Override
17	public String toString() {
18	return super.toString() + " of radius " +
19	radius;
20	}
21	}

Tabel 1.4 Ractangle.java Source Code

File:Ractangle.java	
1	package <u>modul 05</u> ;
2	
3	public class Rectangle extends Shape {
4	private double length;
5	private double width;
6	
7	public Rectangle(double l, double w) {
8	super("Rectangle");
9	this.length = l;

10	this.width = w;
11	}
12	
13	@Override
14	public double area() {
15	return length * width;
16	}
17	
18	@Override
19	public String toString() {
20	return super.toString() + " of length " +
21	length + " and width " + width;
22	}
23	}

Tabel 1.5 Cylinder.java Source Code

File:Cylinder.java	
1	package <u>modul 05</u> ;
2	
3	public class Rectangle extends Shape {
4	private double length;
5	private double width;
6	
7	public Rectangle(double l, double w) {
8	super("Rectangle");
9	this.length = l;
10	this.width = w;
11	}
12	
13	@Override
14	public double area() {
15	return length * width;
16	}
17	
18	@Override
19	public String toString() {
20	return super.toString() + " of length " +
21	length + " and width " + width;
22	}
23	}

Tabel 1.6 Paint.java Source Code

File:Paint.java	
1	package <u>modul 05</u> ;
2	
3	public class Paint {
4	private double coverage;
5	
6	public Paint(double c) {
7	this.coverage = c;
8	}
9	
10	public double amount(Shape s) {
11	<u>System.out</u> .println("Computing amount for "
12	+ s);
13	return s.area() / coverage;
14	}
15	
16	}

Tabel 1.7 PaintThings.java Source Code

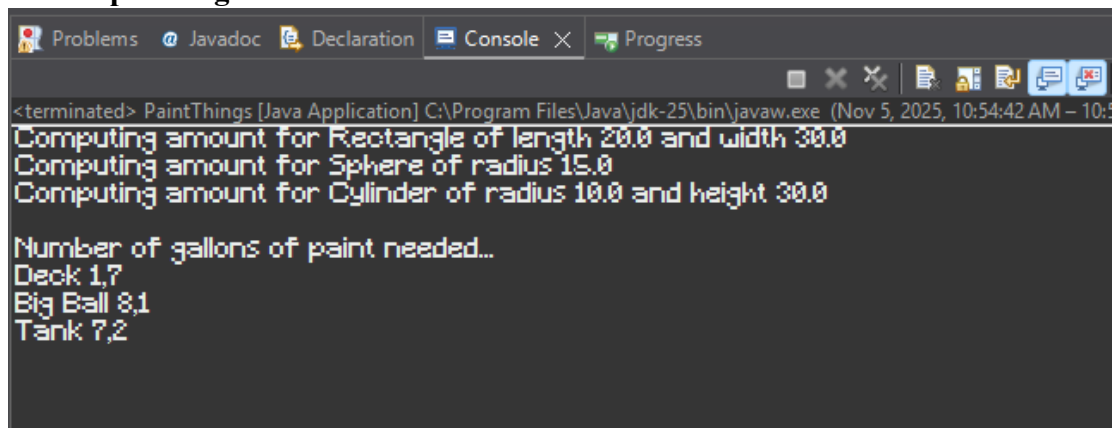
File:PaintThings.java	
1	package <u>modul 05</u> ;
2	
3	import java.text.DecimalFormat;
4	
5	public class PaintThings {
6	public static void main(String[] args) {
7	final double COVERAGE = 350;
8	Paint paint = new Paint(COVERAGE);
9	
10	Rectangle deck;
11	Sphere bigBall;
12	Cylinder tank;
13	
14	double deckAmt, <u>ballAmt</u> , tankAmt;
15	
16	deck = new Rectangle(20, 30);
17	bigBall = new Sphere(15);
18	tank = new Cylinder(10, 30);
19	
20	deckAmt = paint.amount(deck);
21	ballAmt = paint.amount(bigBall);

```

22         tankAmt = paint.amount(tank);
23
24         DecimalFormat fmt = new
25 DecimalFormat("0.##");
26
27         System.out.println("\nNumber of gallons of
28 paint needed...");
29         System.out.println("Deck " +
30 fmt.format(deckAmt));
31         System.out.println("Big Ball " +
32 fmt.format(ballAmt));
33         System.out.println("Tank " +
34 fmt.format(tankAmt));
35     }
36 }

```

B. Output Program



```

<terminated> PaintThings [Java Application] C:\Program Files\Java\jdk-25\bin\javaw.exe (Nov 5, 2025, 10:54:42 AM - 10:54:42 AM)
Computing amount for Rectangle of length 20.0 and width 30.0
Computing amount for Sphere of radius 15.0
Computing amount for Cylinder of radius 10.0 and height 30.0

Number of gallons of paint needed...
Deck 1.7
Big Ball 8.1
Tank 7.2

```

Gambar 1. Screenshot Hasil Jawaban Soal 1

C. Pembahasan

GITHUB

https://github.com/IndraSuryadilaga/Pemrograman_II