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PRAKTIKUM 8

Polymorphism

PersegiPanjang.java

```java
public class PersegiPanjang{
    double p, l, luas;
    void hitungLuas(){
        luas = p*l;
    }
    void cetak(){
        System.out.println("Panjang\t: " + p);
        System.out.println("Lebar\t: " + l);
        System.out.println("Luas\t: " + luas);
    }
}
```

Balok.java

```java
public class Balok extends PersegiPanjang {
    double t, volume;

    void hitungVolume() {
        volume = luas * t;
    }

    void cetak() {
        super.cetak();
        System.out.println("Tinggi\t: " + t);
        System.out.println("Volume\t: " + volume);
    }

    void cetak(String nama) {
        System.out.println("Balok\t: " + nama);
        cetak();
    }
}
```

BalokDemo.java

```java
public class BalokDemo {
    Run | Debug
    public static void main(String[] args) {
        Balok b = new Balok();
        b.p = 10;
        b.l = 5;
        b.t = 5;
        b.hitungLuas();
        b.hitungVolume();
        b.cetak();

        System.out.println(x:" ");
        b.l = 7;
        b.hitungLuas();
        b.hitungVolume();
        b.cetak(nama:"Balokku");
    }
}
```

Output

```
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> javac BalokDemo.java
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> java BalokDemo
Panjang : 10.0
Lebar   : 5.0
Luas    : 50.0
Tinggi  : 5.0
Volume  : 250.0

Balok   : Balokku
Panjang : 10.0
Lebar   : 7.0
Luas    : 70.0
Tinggi  : 5.0
Volume  : 350.0
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO>
```

Latihan 1

Matematika.java

```java
public class Matematika {
    float hasil;
    float a, b;

    public Matematika(float a, float b) {
        this.a = a;
        this.b = b;
    }

    public Matematika() {
    }

    void pertambahan() {
        hasil = a + b;
        System.out.println("Hasil Pertambahan: " + a + " + " + b + " = " + hasil);
    }

    void pengurangan() {
        hasil = a - b;
        System.out.println("Hasil Pengurangan: " + a + " - " + b + " = " + hasil);
    }

    void perkalian() {
        hasil = a * b;
        System.out.println("Hasil Perkalian: " + a + " x " + b + " = " + hasil);
    }

    void pembagian() {
        hasil = a / b;
        System.out.println("Hasil Pembagian: " + a + " : " + b + " = " + hasil);
    }

    double pertambahan(double a, double b, double c) {
        return a + b + c;
    }

    double pengurangan(double a, double b, double c) {
        return a - b - c;
    }

    double perkalian(double a, double b, double c) {
        return a * b * c;
    }

    double pembagian(double a, double b, double c) {
        return a / b / c;
    }
```

MatematikaDemo.java

```java
public class MatematikaDemo {
    public static void main(String[] args) {

        Matematika hitung = new Matematika();
        double hsl;
        hitung.a = 99;
        hitung.b = 7;
        hitung.pertambahan();
        hitung.pengurangan();
        hitung.perkalian();
        hitung.pembagian();

        System.out.println(x:"------------------------------------------------");

        double a = 12.5, b = 28.7, c = 14.2;
        hsl = hitung.pertambahan(a, b, c);
        System.out.println("Hasil Pertambahan " + a + " + " + b + " + " + c + " = " + hsl);
        hsl = hitung.pengurangan(a, b, c);
        System.out.println("Hasil Pengurangan " + a + " + " + b + " + " + c + " = " + hsl);
        hsl = hitung.perkalian(a, b, c);
        System.out.println("Hasil Perkalian " + a + " x " + b + " x " + c + " = " + hsl);
        hsl = hitung.pembagian(a, b, c);
        System.out.println("Hasil Pembagian " + a + " + " + b + " + " + c + " = " + hsl);

    }
}
```

Output

```
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> javac .\MatematikaDemo.java
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> java MatematikaDemo
Hasil Pertambahan: 99.0 + 7.0 = 106.0
Hasil Pengurangan: 99.0 - 7.0 = 92.0
Hasil Perkalian: 99.0 x 7.0 = 693.0
Hasil Pembagian: 99.0 : 7.0 = 14.142858
------------------------------------------------
Hasil Pertambahan 12.5 + 28.7 + 14.2 = 55.400000000000006
Hasil Pengurangan 12.5 + 28.7 + 14.2 = -30.4
Hasil Perkalian 12.5 x 28.7 x 14.2 = 5094.25
Hasil Pembagian 12.5 + 28.7 + 14.2 = 0.03067183589340924
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO>
```

Latihan 2

Pesawat.java

```java
public class Pesawat {
    public int sayap = 2;
    public int ekor = 1;

    public Pesawat() {
        System.out.println(x:"object Pesawat dibuat............");
    }

    public void terbang() {
        System.out.println(x:"Terbang..........");
    }

    public void mendarat() {
        System.out.println(x:"Mendarat..........");
    }
}
```

PesawatTempur.java

```java
public class PesawatTempur extends Pesawat {
    public PesawatTempur() {
        System.out.println(x:"object pesawat tempur dibuat..........");
    }

    public void manuver() {
        System.out.println(x:"Manuver..........");
    }

    public void terbang() {
        super.terbang();
        System.out.println(x:"Terbang ala tempur..........");
    }
}
```

TestPesawat.java

```java
public class TestPesawat {
    Run | Debug
    public static void main(String[] args) {
        Pesawat airbus = new Pesawat();
        PesawatTempur f16 = new PesawatTempur();

        System.out.println(x:"...airbus...");
        airbus.terbang();
        airbus.mendarat();

        System.out.println(x:"...f16...");
        f16.terbang();
        f16.mendarat();
        f16.manuver();
    }
}
```

Output

```
Windows PowerShell                                    □  ×

PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> javac .\TestPesawat.java
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> java TestPesawat
object Pesawat dibuat............
object Pesawat dibuat............
object pesawat tempur dibuat..........
...airbus...
Terbang..........
Mendarat..........
...f16...
Terbang..........
Terbang ala tempur..........
Mendarat..........
Manuver..........
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO>
```

Latihan Overriding

Hewan.java

```java
public class Hewan {
    String jenis, ciri;

    Hewan() {
    };

    Hewan(String jenis, String ciri) {
        this.jenis = jenis;
        this.ciri = ciri;
    }

    public void suara() {
        System.out.println(x:"Suara hewan");
    }

    public void berjalan() {
        System.out.println(x:"Cara berjalan hewan");
    }

    public void bernafas() {
        System.out.println(x:"Cara bernafas hewan");
    }
}
```

Singa.java

```java
public class Singa extends Hewan {
    Singa(String jenis, String ciri) {
        super(jenis, ciri);
    }

    @Override
    public void suara() {
        System.out.println(x:"Suara\t: Raaawwrrr");
    }

    @Override
    public void berjalan() {
        System.out.println(x:"Singa berjalan dengan empat kaki");
    }

    @Override
    public void bernafas() {
        System.out.println(x:"Singa bernafas menggunakan paru-paru");
    }
}
```

Elang.java

```java
public class Elang extends Hewan {
    Elang(String jenis, String ciri) {
        super(jenis, ciri);
    }

    @Override
    public void suara() {
        System.out.println(x:"Suara\t: Cieeeettt");
    }

    public void berjalan() {
        System.out.println(x:"Elang berjalan dengan dua kaki");
    }

    public void bernafas() {
        System.out.println(x:"Elang bernafas menggunakan paru-paru");
    }
}
```

Lebah.java

```java
public class Lebah extends Hewan {
    Lebah(String jenis, String ciri) {
        super(jenis, ciri);
    }

    @Override
    public void suara() {
        System.out.println(x:"Suara\t: Ngingngng");
    }

    public void berjalan() {
        System.out.println(x:"Lebah terbang");
    }

    public void bernafas() {
        System.out.println(x:"Lebah bernafas menggunakan trakea");
    }
}
```

Paus.java

```java
public class Paus extends Hewan {
    public Paus(String jenis, String ciri){
        super(jenis,ciri);
    }

    @Override
    public void suara() {
        System.out.println(x:"Suara\t: Wuussshhhhh");
    }

    @Override
    public void berjalan() {
        System.out.println(x:"Paus berenang");
    }

    @Override
    public void bernafas() {
        System.out.println(x:"Paus bernafas menggunakan insang");
    }
}
```

TestHewan.java

```java
import java.util.Scanner;

public class TestHewan {
    Run | Debug
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        Hewan singa = new Singa(string:"Mamalia", string2:"Berbulu tebal");
        Hewan elang = new Elang(string:"Burung", string2:"Memiliki sayap lebar");
        Hewan lebah = new Lebah(string:"Serangga", string2:"Memiliki sengat");
        Hewan paus = new Paus(string:"Mamalia laut", string2:"Berukuran besar");

        while (true) {
            System.out.println(x:"Pilihan Hewan : ");
            System.out.println(x:"1. Singa");
            System.out.println(x:"2. Elang");
            System.out.println(x:"3. Lebah");
            System.out.println(x:"4. Paus");
            System.out.println(x:"5. Keluar");
            System.out.print(s:"Pilihan Anda [1-5]: ");
            int choose = input.nextInt();
            switch (choose) {
                case 1:
                    System.out.println(x:"Info Singa:");
                    System.out.println("Jenis\t: " + singa.jenis);
                    System.out.println("Ciri\t: " + singa.ciri);
                    singa.suara();
                    singa.berjalan();
                    singa.bernafas();
                    break;
                case 2:
                    System.out.println(x:"Info Elang:");
                    System.out.println("Jenis\t: " + elang.jenis);
                    System.out.println("Ciri\t: " + elang.ciri);
                    elang.suara();
                    elang.berjalan();
                    elang.bernafas();
                    break;
                case 3:
                    System.out.println(x:"Info Lebah:");
                    System.out.println("Jenis\t: " + lebah.jenis);
                    System.out.println("Ciri\t: " + lebah.ciri);
                    lebah.suara();
                    lebah.berjalan();
                    lebah.bernafas();
                    break;
```

```java
46                        case 4:
47                            System.out.println(x:"Info Paus:");
48                            System.out.println("Jenis\t: " + paus.jenis);
49                            System.out.println("Ciri\t: " + paus.ciri);
50                            paus.suara();
51                            paus.berjalan();
52                            paus.bernafas();
53                            break;
54                        case 5:
55                            System.out.println(x:"Terima kasih! Program selesai.");
56                            input.close();
57                            System.exit(status:0);
58                        default:
59                            System.out.println(x:"Pilihan tidak valid, silakan pilih lagi.");
60                    }
61                }
62            }
63    }
```

Output

```
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> javac .\TestHewan.java
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> java TestHewan
Pilihan Hewan :
1. Singa
2. Elang
3. Lebah
4. Paus
5. Keluar
Pilihan Anda [1-5]: 1
Info Singa:
Jenis   : Mamalia
Ciri    : Berbulu tebal
Suara   : Raaawwrrr
Singa berjalan dengan empat kaki
Singa bernafas menggunakan paru-paru
Pilihan Hewan :
1. Singa
2. Elang
3. Lebah
4. Paus
5. Keluar
Pilihan Anda [1-5]: 5
Terima kasih! Program selesai.
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO>
```

Latihan 3

Shape.java

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

    Shape() {
    }

    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;
    }

    @Override
    public String toString() {
        return super.toString();
    }
}
```

Circle.java

```java
class Circle extends Shape {
    double radius = 1.0;

    Circle() {
    }

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

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

    public double getRadius() {
        return radius;
    }

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

    public double getArea() {
        return radius * 2;
    }

    public double getPerimeter() {
        return radius * radius;
    }

    @Override
    public String toString() {
        return super.toString();
    }
}
```

Rectangle.java

```java
class Rectangle extends Shape {
    double width = 1.0;
    double length = 1.0;

    Rectangle() {
    }

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

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

    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 width * length;
    }

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

    @Override
    public String toString() {
        return super.toString();
    }
}
```

Square.java

```java
class Square extends Rectangle {
    public Square() {
    }

    public Square(double side) {
        super(side, side);
    }

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

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

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

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

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

    public String toString(){
        return super.toString();
    }
}
```

TestShapes.java

```java
public class TestShapes {
    Run | Debug
    public static void main(String[] args) {
        Rectangle rectangle = new Rectangle(width:4.0, length:6.0, color:"Merah", filled:true);

        System.out.println(x:"------- Rectangle -------");
        System.out.println("Warna: " + rectangle.getColor());
        System.out.println("Tinggi: " + rectangle.getLength());
        System.out.println("Lebar: " + rectangle.getWidth());
        System.out.println("Luas: " + rectangle.getArea());
        System.out.println();

        Circle circle = new Circle(radius:3.0, color:"Biru", filled:true);

        System.out.println(x:"------- Circle -------");
        System.out.println("Warna: " + circle.getColor());
        System.out.println("Radius: " + circle.getRadius());
        System.out.println("Luas: " + circle.getArea());
        System.out.println("Keliling: " + circle.getPerimeter());
        System.out.println();

        Square square = new Square(side:5.0, color:"Hijau", filled:true);

        System.out.println(x:"------- Square -------");
        System.out.println("Warna: " + square.getColor());
        System.out.println("Sisi: " + square.getSide());
        System.out.println("Luas: " + square.getArea());
        System.out.println("Keliling: " + square.getPerimeter());
    }
}
```

Output

```
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> javac .\TestShapes.java
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> java TestShapes
------- Rectangle -------
Warna: Merah
Tinggi: 6.0
Lebar: 4.0
Luas: 24.0

------- Circle -------
Warna: Biru
Radius: 3.0
Luas: 6.0
Keliling: 9.0

------- Square -------
Warna: Hijau
Sisi: 5.0
Luas: 25.0
Keliling: 50.0
PS D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_8_PBO> |
```