TUGAS : POLYMORPHISM

PERTEMUAN 8

PEMROGRAMAN BERORIENTASI OBJEK (TE)

Disusun oleh :

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PROGRAM DIPLOMA III TEKNIK INFORMATIKA

JURUSAN TEKNIK KOMPUTER DAN INFORMATIKA

POLITEKNIK NEGERI BANDUNG

DAFTAR ISI

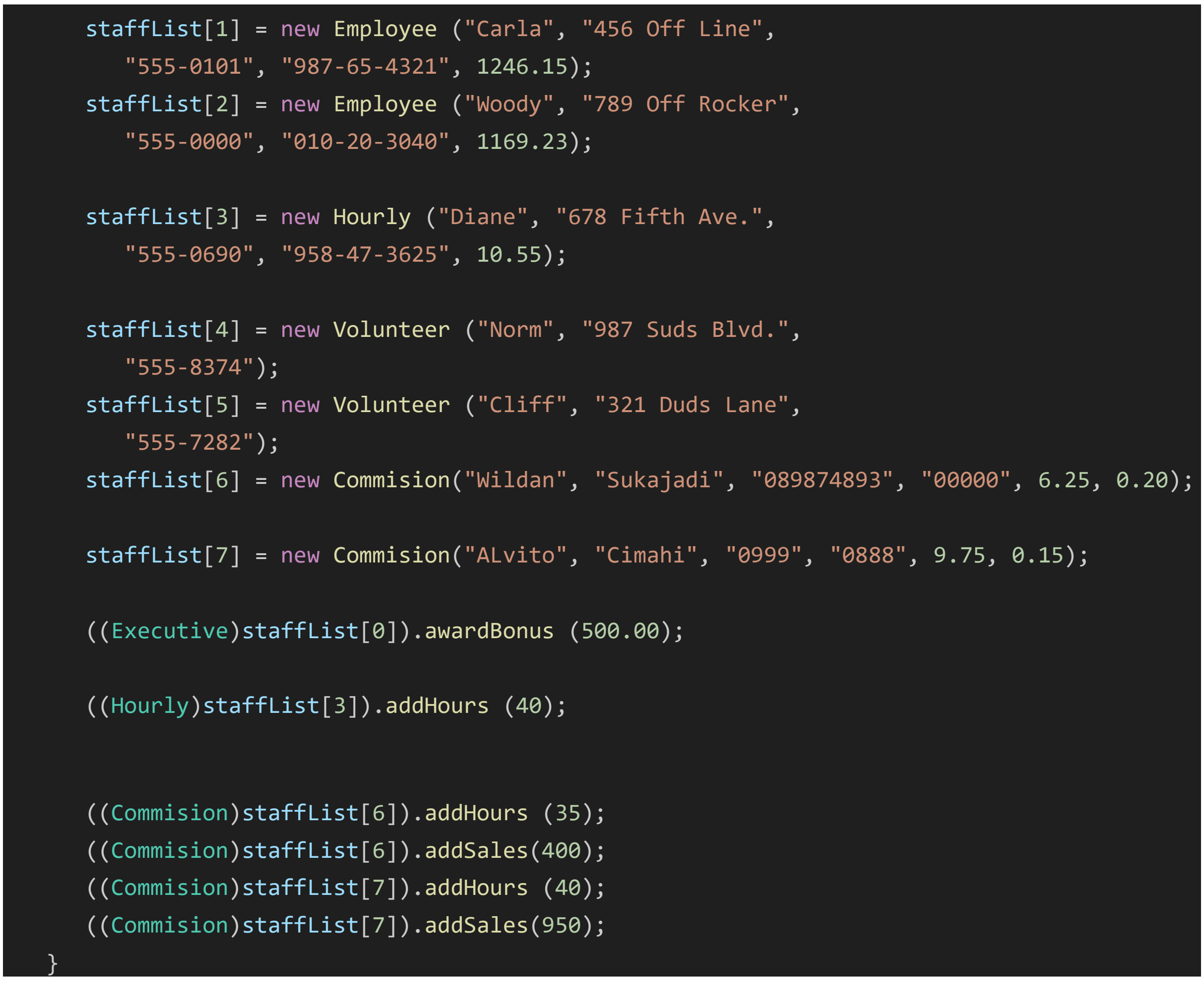
Studi Kasus 1

Commision.java

```
public class Commision extends Hourly
{
    private double totalSales;
    private double commisionRate;
    public Commision(String eName, String eAddress, String ePhone, String socSecNumber,
double rate, double commisionRate) {
        super(eName, eAddress, ePhone, socSecNumber, rate);
        this.commisionRate = commisionRate;
    }

    public void addSales(double totalSales)
    {
        this.totalSales = totalSales;
    }

    @Override
    public double pay() {
        double payment = super.pay() + (totalSales * commisionRate);
        totalSales = 0;
        return payment;
    }

    @Override
    public String toString()
   {
      String result = super.toString();
      result += "\nTotal Sales : " + totalSales;

      return result;
   }
}
```

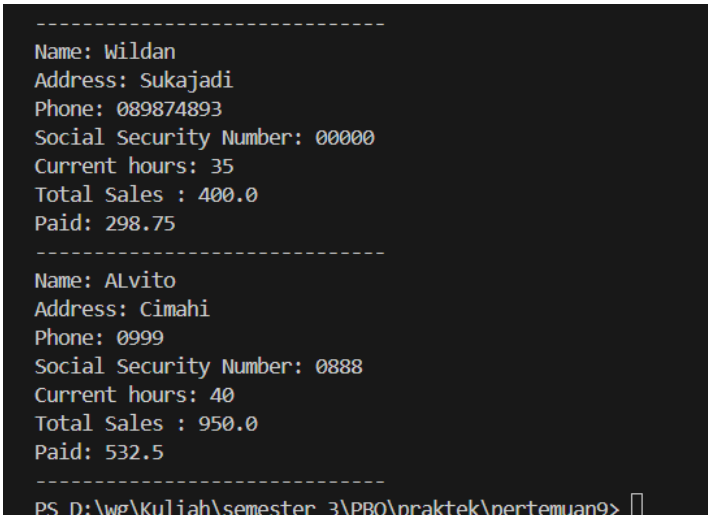
Staff.java

```
private StaffMember[] staffList;

   //-----------------------------------------------------------
   //  Constructor: Sets up the list of staff members.
   //-----------------------------------------------------------
   public Staff ()
   {
      staffList = new StaffMember[8];

      staffList[0] = new Executive ("Sam", "123 Main Line",
         "555-0469", "123-45-6789", 2423.07);
```



```
       staffList[1] = new Employee ("Carla", "456 Off Line",
          "555-0101", "987-65-4321", 1246.15);
       staffList[2] = new Employee ("Woody", "789 Off Rocker",
          "555-0000", "010-20-3040", 1169.23);

       staffList[3] = new Hourly ("Diane", "678 Fifth Ave.",
          "555-0690", "958-47-3625", 10.55);

       staffList[4] = new Volunteer ("Norm", "987 Suds Blvd.",
          "555-8374");
       staffList[5] = new Volunteer ("Cliff", "321 Duds Lane",
          "555-7282");
       staffList[6] = new Commision("Wildan", "Sukajadi", "089874893", "00000", 6.25, 0.20);

       staffList[7] = new Commision("ALvito", "Cimahi", "0999", "0888", 9.75, 0.15);

       ((Executive)staffList[0]).awardBonus (500.00);

       ((Hourly)staffList[3]).addHours (40);


       ((Commision)staffList[6]).addHours (35);
       ((Commision)staffList[6]).addSales(400);
       ((Commision)staffList[7]).addHours (40);
       ((Commision)staffList[7]).addSales(950);
    }
```

Output dari dua karyawan yang ditambahkan :



```
-----------------------------------
Name: Wildan
Address: Sukajadi
Phone: 089874893
Social Security Number: 00000
Current hours: 35
Total Sales : 400.0
Paid: 298.75
-----------------------------------
Name: ALvito
Address: Cimahi
Phone: 0999
Social Security Number: 0888
Current hours: 40
Total Sales : 950.0
Paid: 532.5
-----------------------------------
PS D:\wg\Kuliah\semester 3\PBO\praktek\pertemuan9> 
```

Polimorphism yang terjadi dalam program ini adalah ketika objek dari subclass (Commission) adalah sebagai objek dari superclassnya (Hourly atau Employee). Meskipun objek Commission disimpan dalam array StaffMember[] tapi ketika metode pay() dipanggil yang dijalankan adalah implementasi pay() milik Commission. Bukan Hourly ataupun Employee.

Studi Kasus 2

Shape.java

```
public abstract class Shape {
    protected String shapeName;

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

    public abstract double area();

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

}
```

Sphere.java

```
public class Sphere extends Shape {
    private double radius;

    public Sphere(String shapeName, double radius) {
        super("Sphere");
        this.radius = radius;
    }

    @Override
    public double area()
    {
        return 4*Math.PI*radius*radius;

    }

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

Paint.java

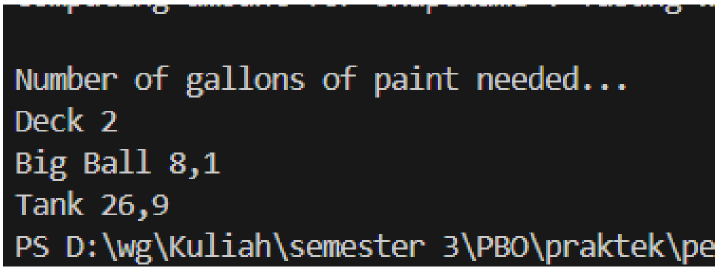
```
public class Paint {
    private double coverage;

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

```

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

PaintThings.java

```java
import java.text.DecimalFormat;

public class PaintThings {
    public static void main(String[] args) {
        final double COVERAGE = 350;
        Paint paint = new Paint(COVERAGE);

        Shape deck = new Rectangle("Persegi Panjang", 20, 35);
        Shape bigBall = new Sphere("Bola", 15);
        Shape tank = new Cylinder("Tabung", 10, 30);

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

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

Output :



```

Number of gallons of paint needed...
Deck 2
Big Ball 8,1
Tank 26,9
PS D:\wg\Kuliah\semester 3\PBO\praktek\pe
```

Polimorphism yang terjadi pada program ini adalah pada method amout dalam class Paint yang dapat digunakan pada beberapa objek dari subclassnya (Sphere, Rectangle, dan Cylinder) yang semuanya adalah turunan dari abstract class Shape. Meskipun objek tersebut berbeda kelas turunan, metode amount() dapat memanggil metode area(). Sehingga, meskipun amount() dipanggil pada objek-objek yang berbeda seperti Sphere, Rectangle, atau Cylinder, program akan secara memanggil metode area() yang sesuai untuk setiap bentuk, tanpa harus mengetahui tipe objek pada saat program dikompilasi.

Studi Kasus 3

Numbers.java

```java
import java.util.Scanner;

public class Numbers {
    public static void main(String[] args) {
        Integer[] intList;
        int size;

        Scanner scan = new Scanner(System.in);

        System.out.print("\nHow many integers do you want to sort? ");
        size = scan.nextInt();
        intList = new Integer[size];

        System.out.println("\nEnter the numbers:");
        for (int i = 0; i < size; i++) {
            intList[i] = scan.nextInt();
        }
        Sorting.selectionSort(intList);

        System.out.println("\nYour numbers in sorted order:");
        for (int i = 0; i < size; i++) {
            System.out.print(intList[i] + " ");
        }
        System.out.println();
    }
}
```

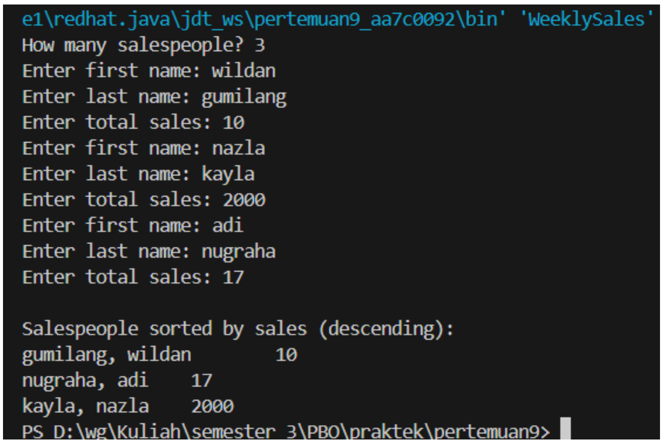
Function insertionSort

```java
public static void insertionSort(Comparable[] list) {
        for (int index = 1; index < list.length; index++)
        {
            Comparable key = list[index];
            int position = index;
            while (position > 0 && key.compareTo(list[position - 1]) > 0)
            {
                list[position] = list[position - 1];
                position--;
            }

            list[position] = key;
        }
     }
```

weeklySales.java

```java
import java.util.Scanner;

public class WeeklySales {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);

        System.out.print("How many salespeople? ");
        int numSalespeople = scan.nextInt();
        SalesPerson[] salesPeople = new SalesPerson[numSalespeople];

        for (int i = 0; i < numSalespeople; i++) {
            System.out.print("Enter first name: ");
            String firstName = scan.next();

            System.out.print("Enter last name: ");
            String lastName = scan.next();

            System.out.print("Enter total sales: ");
            int totalSales = scan.nextInt();

            salesPeople[i] = new SalesPerson(firstName, lastName, totalSales);
        }

        Sorting.insertionSort(salesPeople);

        System.out.println("\nSalespeople sorted by sales (descending):");
        for (SalesPerson person : salesPeople) {
            System.out.println(person);
        }

        scan.close();
    }
}
```

Output :



```
e1\redhat.java\jdt_ws\pertemuan9_aa7c0092\bin' 'WeeklySales'
How many salespeople? 3
Enter first name: wildan
Enter last name: gumilang
Enter total sales: 10
Enter first name: nazla
Enter last name: kayla
Enter total sales: 2000
Enter first name: adi
Enter last name: nugraha
Enter total sales: 17

Salespeople sorted by sales (descending):
gumilang, wildan        10
nugraha, adi    17
kayla, nazla    2000
PS D:\wg\Kuliah\semester 3\PBO\praktek\pertemuan9>
```

Polimorphism pada program ini aadalah yaitu pada method compareTo yang diimplementasikan dalam kelas Salesperson. Yaitu pada saat method Sorting.insertionSort() memanggil method compareTo pada berbagai objek Salesperson. Sehingga hal ini menunjukkan bahwa satu method insertionSort dapat digunakan untuk berbagai tipe objek yang mengimplementasikan Comparable.

Link Repository GitHub

https://github.com/WildanGumilang/PBO-praktek.git