Introduction to Object Oriented Programming (OOP)

Erwan Majid/08/2i

Link Github: https://github.com/Majid5654/Semester-3/tree/Main/JAVA%20OOP/Week1

Experiment Activity 1

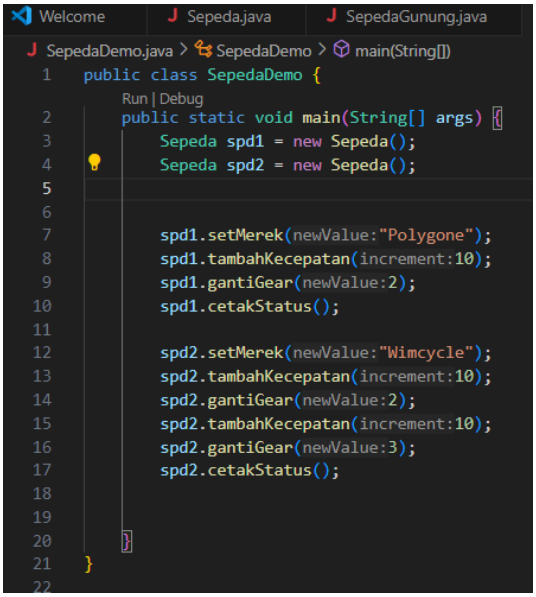
Sepeda:

Welcome | Sepeda.java | SepedaGunung.java | SepedaDemo

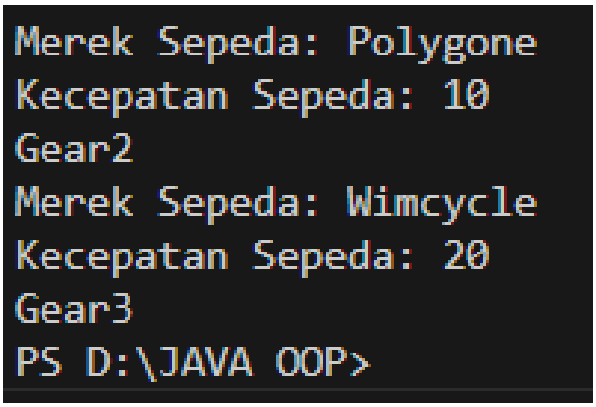
Sepeda.java > Sepeda

```java
public class Sepeda {

    private String merek;
    private int kecepatan;
    private int gear;

    public void setMerek (String newValue){
        merek =newValue;
    }

    public void gantiGear (int newValue){
        gear = newValue;
    }

    public void tambahKecepatan(int increment){
        kecepatan = kecepatan+increment;
    }

    public void rem (int decrement){
        kecepatan = kecepatan-decrement;
    }

    public void cetakStatus(){
        System.out.println("Merek Sepeda: "+merek);
        System.out.println("Kecepatan Sepeda: "+kecepatan);
        System.out.println("Gear"+ gear);
    }

}
```

Sepeda Demo:

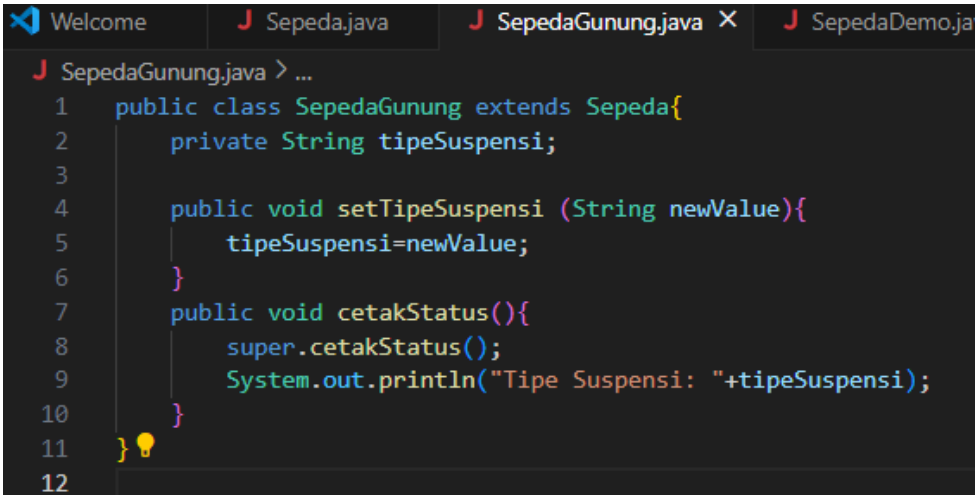


Result:



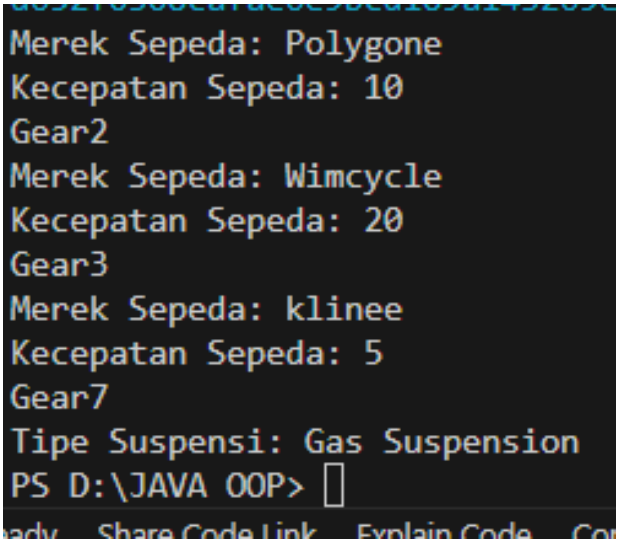
Percobaan 2

SepedaGunung:



SepedaDemo:

Result:



5. Question Test

1. Explain the difference between object and class!

- Classes are used to define the structure and behavior of objects, while objects are used to represent specific entities in a program.

2. State your reason why color and engine type can be classified as attribute for car object!

- Color and engine type are attributes because they have unique aspects of a car object that contribute to its overall state, appearance, and behavior. They help in differentiating one car object from another, making them essential parts of the object's identity.

3. State one of OOP better point than procedural programming

-Encapsulation is a key advantage of OOP over procedural programming. It bundles data and methods into objects, protecting the data from unintended changes and promoting modular, maintainable, and reusable code.

4. Is it allowed to define two attributes in one line code such “public String nama,alamat;”?

- Yes, it is allowed in Java to define two attributes in one line ,for example public String nama, alamat;

5. In SepedaGunung class, state your reason why merk, kecepatan, and gear attributes are not written again in this class!

- merek, kecepatan, and gear are inherited from the Sepeda class, so there's no need to redefine them in SepedaGunung. because they are inherited from the Sepeda class, which SepedaGunung extends.

6. Assignment

1. Follow these instructions to make your practical assignment is performed systematically:

a. Take 4 photographs of objects around you, 2 objects must be implementation of inheritance concept, example: refrigerator, chair, living room table, desk! As we know that living room table and desk are inherited by table class.

- TVLED and TVTabung are subclasses that inherit from TV



b. Observe those objects to define the attribute and method!

-Tv Led

Atribut:

brand: Polytron

screenSize: 43 Inch

resolution: 4K

OS:Android

Memory:4GB

method:

turnOn():

turnOff():

changeChannel(int channel)

displayInfo()

-**TvTabung:**

Atribut:

brand: kaori

screenSize: 12 Inch

resolution: 480

Tube Diameter: 81 inches

Production Year : 2004

method:

turnOn():

turnOff():

changeChannel(int channel)

displayInfo()

-**Sepeda Motor:**

Atribut:

brand: Yamaha

machine:150cc

silinder:2

Production Year : 2018

method:

startengine();

stopengine();

accelerate();

displayinfo();

-**Helm:**

Atribut:

brand: KYT

glass: clear

size:L

method:

displayInfo()

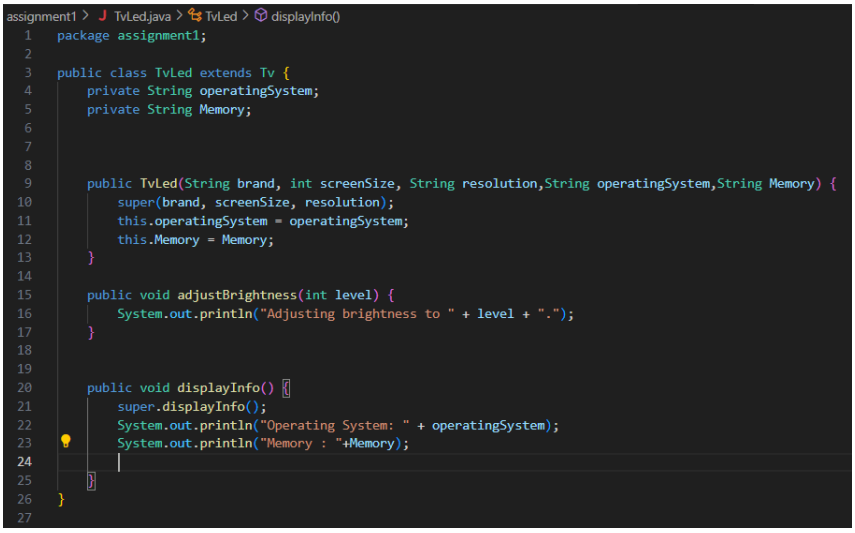
public void adjustStrap()

public void cleanGlass()

public void putOn()

c. Convert those objects into four classes in Java programming!

-TvLed



-tv Tabung:

assignment1 > TvTabung.java > TvTabung > displayInfo()

```java
package assignment1;

public class TvTabung extends Tv{
    private int tubeDiameter;
    private int ProductionYear;

    public TvTabung(String brand,int screenSize,String resolution,int tubeDiameter,int ProductionYear){
        super(brand,screenSize,resolution);
        this.tubeDiameter = tubeDiameter;
        this.ProductionYear=ProductionYear;
    }
    public void displayInfo() {
        super.displayInfo();
        System.out.println("Tube Diameter: " + tubeDiameter + " inches");
        System.out.println("Production Year : "+ProductionYear);

    }
}
```

-Motorcycle:

```java
package assignment1;

public class SepedaMotor {
        private String brand;
        private String machine;
        private int silinder;
        private int productionYear;

        public SepedaMotor(String brand, String machine, int silinder, int productionYear) {
            this.brand = brand;
            this.machine = machine;
            this.silinder = silinder;
            this.productionYear = productionYear;
        }

        public void startEngine() {
            System.out.println(x:"Engine is starting...");
        }

        public void stopEngine() {
            System.out.println(x:"Engine is stopping...");
        }

        public void accelerate() {
            System.out.println(x:"Accelerating...");
        }

        public void displayInfo() {
            System.out.println("Brand: " + brand);
            System.out.println("Machine: " + machine);
            System.out.println("Silinder: " + silinder);
            System.out.println("Production Year: " + productionYear);
        }
    }
```

-Helm:

```java
package assignment1;

public class Helm {
    private String brand;
    private String glass;
    private String size;

    public Helm(String brand, String glass, String size) {
        this.brand = brand;
        this.glass = glass;
        this.size = size;
    }

    public void displayInfo() {
        System.out.println("Brand: " + brand);
        System.out.println("Glass: " + glass);
        System.out.println("Size: " + size);
    }

    public void adjustStrap() {
        System.out.println(x:"Strap has been adjusted.");
    }

    public void cleanGlass() {
        System.out.println(x:"Glass has been cleaned.");
    }

    public void putOn() {
        System.out.println(x:"Helm is now on.");
    }
}
```

d. Add one additional class as a class which inherits its attribute and method to living room table class and desk class!

-

```java
package assignment1;

public class Tv {
    private String brand;
    private int screenSize;
    private String resolution;

    public Tv (String brand,int screenSize,String resolution){
        this.brand = brand;
        this.screenSize = screenSize;
        this.resolution = resolution;
    }

    public void turnOn(){
        System.out.println(x:"TV is now on");
    }
    public void turnOff(){
        System.out.println(x:"TV is now off");
    }
    public void changeChannel(int chanel){
    System.out.println("Channel changed to "+chanel);

    }
    public void adjustVolume(int volume){
        System.out.println("Setting volume to" +volume);
    }
    public void displayInfo(){
        System.out.println("Brand: "+brand);
        System.out.println("Screen size: "+screenSize+" inches");
        System.out.println("Resolution: "+resolution);
    }

}
```

e. Add two attributes for each class!

-Helm:

```
public class Helm {
    private String brand;
    private String glass;
    private String size;
```

-Motorcycle:

```
public class SepedaMotor {
        private String brand;
        private String machine;
        private int silinder;
        private int productionYear;
```

-Tvled:

```
public class TvLed extends Tv {
    private String operatingSystem;
    private String Memory;
```

-TvTabung:

```
public class TvTabung extends Tv{
    private int tubeDiameter;
    private int ProductionYear;
```

f. Add three methods for each class including a method for showing the information!

-Helm:

```
    public Helm(String brand, String glass, String size) {
        this.brand = brand;
        this.glass = glass;
        this.size = size;
    }

    public void displayInfo() {
        System.out.println("Brand: " + brand);
        System.out.println("Glass: " + glass);
        System.out.println("Size: " + size);
    }

    public void adjustStrap() {
        System.out.println(x:"Strap has been adjusted.");
    }

    public void cleanGlass() {
        System.out.println(x:"Glass has been cleaned.");
    }

    public void putOn() {
        System.out.println(x:"Helm is now on.");
    }
}
```

Motorcycle:

```java
public SepedaMotor(String brand, String machine, int silinder, int productionYear) {
    this.brand = brand;
    this.machine = machine;
    this.silinder = silinder;
    this.productionYear = productionYear;
}

public void startEngine() {
    System.out.println(x:"Engine is starting...");
}

public void stopEngine() {
    System.out.println(x:"Engine is stopping...");
}

public void accelerate() {
    System.out.println(x:"Accelerating...");
}

public void displayInfo() {
    System.out.println("Brand: " + brand);
    System.out.println("Machine: " + machine);
    System.out.println("Silinder: " + silinder);
    System.out.println("Production Year: " + productionYear);
}
}
```

TvLed:

```java
    public TvLed(String brand, int screenSize, String resolution,String operatingSystem,String Memory) {
        super(brand, screenSize, resolution);
        this.operatingSystem = operatingSystem;
        this.Memory = Memory;
    }

    public void adjustBrightness(int level) {
        System.out.println("Adjusting brightness to " + level + ".");
    }


    public void displayInfo() {
        super.displayInfo();
        System.out.println("Operating System: " + operatingSystem);
        System.out.println("Memory : "+Memory);

    }
}
```

tvTabung:

```java
public TvTabung(String brand,int screenSize,String resolution,int tubeDiameter,int ProductionYear){
    super(brand,screenSize,resolution);
    this.tubeDiameter = tubeDiameter;
    this.ProductionYear=ProductionYear;
}
public void displayInfo() {
    super.displayInfo();
    System.out.println("Tube Diameter: " + tubeDiameter + " inches");
    System.out.println("Production Year : "+ProductionYear);

}

public void adjustContrast(int level) {
    System.out.println("Adjusting contrast to " + level + ".");
}
}
```

g. Add one class named Demo for main class!

-

assignment1 > Demo.java > Demo > main(String[])

```java
package assignment1;

public class Demo {
    Run | Debug
    public static void main(String[] args) {
        TvLed led1 = new TvLed(brand:"Polytron", screenSize:43, resolution:"4K", operatingSystem…"Android","4GB");
        TvTabung tabung1 = new TvTabung(brand:"Kaori", screenSize:12, resolution:"480", tubeDiameter:81,Pr…2004);

        led1.displayInfo();
        led1.turnOn();
        led1.changeChannel(chanel:31);
        led1.adjustBrightness(level:20);


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

        tabung1.displayInfo();
        tabung1.turnOn();
        tabung1.changeChannel(chanel:21);
        tabung1.adjustContrast(level:50);

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

        //not inheritance

        SepedaMotor motor1 = new SepedaMotor(brand:"Yamaha", machine:"150cc", silinder:2, productionYear:2018);

        motor1.displayInfo();
        motor1.startEngine();
        motor1.accelerate();
        motor1.stopEngine();

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

        Helm helm1 = new Helm(brand:"KYT", glass:"clear", size:"L");
        helm1.displayInfo();
        helm1.putOn();
        helm1.adjustStrap();
        helm1.cleanGlass();


    }
}
```

h. Instance an object for each class!

i. Apply each method for each object in main class!

j. The example which is mentioned in point 1.a should not be included in your task