

## OOPM Lab

### Lab Assingment number 06

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**Batch:** A

**Roll no.** 01

**Aim:** Write a JAVA program to implement the concept of Interface

#### **Problem statement:**

Create an interface vehicle and classes like Bicycle, Bike and Car having common functionalities like and put all the common functionalities in the interface. Classes like Bicycle, Bike and Car implement all these functionalities in their own class in their own way. Write another class to use these functionalities from at least one class.

#### **Theory:**

##### 1) Interface

An interface is a reference type in Java. It is similar to class. It is a collection of abstract methods. A class implements an interface, thereby inheriting the abstract methods of the interface.

Along with abstract methods, an interface may also contain constants, default methods, static methods, and nested types. Method bodies exist only for default methods and static methods.

Writing an interface is similar to writing a class. But a class describes the attributes and behaviors of an object. And an interface contains behaviors that a class implements.

##### 2) Why and When to use

In JAVA multiple inheritance is not primitively allowed, in order to perform multiple inheritance, Interface is used.

Interface is used to achieve absolute abstraction.

Interface is used to achieve loose coupling.

##### 3) Interface with Inheritance example

```
// example
public class MammalInt implements Animal {
    public void eat() {
        System.out.println("Mammal eats");
    }

    public void travel() {
        System.out.println("Mammal travels");
    }

    public int noOfLegs() {
        return 0;
    }

    public static void main(String args[]) {
        MammalInt m = new MammalInt();
        m.eat();
    }
}
```

```

        m.travel();
    }
}

```

```

// output
Mammal eats
Mammal travels

```

## Code (A)

```

import java.util.*;

interface Vehicle {
    void setDescriptions();
    void displayDescription();
}

class Bicycle implements Vehicle {
    String companyName = "";
    String color = "";
    int registrationNumber = 0;
    int numberOfWheels = 0;

    // gets and sets information of Bicycle
    public void setDescriptions() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter name of the company : ");
        this.companyName = sc.nextLine();

        System.out.print("Enter colour of the Bicycle : ");
        this.color = sc.nextLine();

        System.out.print("Enter registration number of the Bicycle : ");
        this.registrationNumber = sc.nextInt();

        System.out.print("Enter number of wheels of the Bicycle : ");
        this.numberOfWheels = sc.nextInt();
    }

    // display information of Bicycle
    public void displayDescription() {
        System.out.println();
        System.out.println("**** Description of BICYCLE ****");
        System.out.println("COMPANY    : " + this.companyName);
        System.out.println("COLOUR    : " + this.color);
        System.out.println("Reg Number : " + this.registrationNumber);
        System.out.println("No of Wheels : " + this.numberOfWheels);
        System.out.println("*****");
        System.out.println();
    }
}

```

```

class Bike implements Vehicle {
    String companyName = "";
    String color = "";
    int registrationNumber = 0;
    String namePlate = "";
    int numberOfWheels = 0;

    // gets and sets information of Bike
    public void setDescription() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter name of the company : ");
        this.companyName = sc.nextLine();

        System.out.print("Enter colour of the Bike : ");
        this.color = sc.nextLine();

        System.out.print("Enter registration number of the Bike : ");
        this.registrationNumber = sc.nextInt();
        sc.nextLine();

        System.out.print("Enter name plate of the Bike : ");
        this.namePlate = sc.nextLine();

        System.out.print("Enter number of wheels of the Bike : ");
        this.numberOfWheels = sc.nextInt();
    }
    // display information of Bike
    public void displayDescription() {
        System.out.println();
        System.out.println("**** Description of Bike ****");
        System.out.println("Company    : " + this.companyName);
        System.out.println("Colour    : " + this.color);
        System.out.println("Reg Number : " + this.registrationNumber);
        System.out.println("Name plate : " + this.namePlate);
        System.out.println("No of Wheels : " + this.numberOfWheels);
        System.out.println("*****");
        System.out.println();
    }
}

```

```

class Car implements Vehicle {
    String companyName = "";
    String color = "";
    int registrationNumber = 0;
    String namePlate = "";
    int numberOfWheels = 0;

    // gets and sets information of Car
    public void setDescription() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter name of the company : ");
        this.companyName = sc.nextLine();
    }
}

```



```

        case 3:
            Car objOfCar = new Car();
            objOfCar.setDescriptions();
            objOfCar.displayDescription();
            break;

        case 4:
            System.out.println("*** E X I T I N G ***");
            System.exit(0);

        default:
            System.out.println("*** INVALID INPUT ***");
    }
}
}
}
// output

```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code>javac InterfaceProgram.java
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code>java InterfaceProgram
```

```

(1) Bicycle
(2) BIKE
(3) CAR
(4) EXIT
Enter your choice : 1
Enter name of the company : Yamaha
Enter colour of the Bicycle : Neon Blue
Enter registration number of the Bicycle : 8008
Enter number of wheels of the Bicycle : 2

```

```

*** Description of BICYCLE ***
COMPANY      : Yamaha
COLOUR       : Neon Blue
Reg Number   : 8008
No of Wheels : 2
*****

```

```

(1) Bicycle
(2) BIKE
(3) CAR
(4) EXIT
Enter your choice : 2
Enter name of the company : Pagani
Enter colour of the Bike : Crimson Red
Enter registration number of the Bike : 007
Enter name plate of the Bike : BABA YAGA 7
Enter number of wheels of the Bike : 4

```

```

*** Description of Bike ***
Company      : Pagani
Colour       : Crimson Red
Reg Number   : 7
Name plate   : BABA YAGA 7
No of Wheels : 4
*****

```

```
(1) Bicycle
(2) BIKE
(3) CAR
(4) EXIT
Enter your choice : 3
Enter name of the company : Mazda
Enter colour of the Car : Silver
Enter registration number of the Car : 666
Enter name plate of the Car : MH04 3393
Enter number of wheels of the Car : 4
```

```
*** Description of CAR ***
Company      : Mazda
Colour       : Silver
Reg Number   : 666
Name plate   : MH04 3393
No of Wheels : 4
*****
```

```
(1) Bicycle
(2) BIKE
(3) CAR
(4) EXIT
Enter your choice : 1
Enter name of the company : Checking input
Enter colour of the Bicycle : for second time
Enter registration number of the Bicycle : 989
Enter number of wheels of the Bicycle : 2
```

```
*** Description of BICYCLE ***
COMPANY      : Checking input
COLOUR       : for second time
Reg Number    : 989
No of Wheels  : 2
*****
```

```
(1) Bicycle
(2) BIKE
(3) CAR
(4) EXIT
Enter your choice : 4
*** E X I T I N G ***
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code>■
```

## Code (B)

```
import java.util.*;
import java.lang.*;

interface Dad {
    void getXorY();
}

interface Mom {
    void getX();
}

class Child implements Dad, Mom {
    String XorY = "";
    String X = "";

    // get a gene from Dad
    public void getXorY() {
        if (Math.random() < 0.5) {
            this.XorY = "Y";
        } else {
            this.XorY = "X";
        }
    }

    // get a gene from Mom
    public void getX() {
        this.X = "X";
    }

    // Reveal the gender of child
    public void genderReveal() {
        String gender = this.X + this.XorY;
        if (gender.equals("XX")) {
            System.out.println("!!!!!!!!!!!!!!!!!!!!");
            System.out.println("!! It's a GIRL !!");
            System.out.println("!!!!!!!!!!!!!!!!!!!!");
        } else if (gender.equals("XY")) {
            System.out.println("!!!!!!!!!!!!!!!!!!!!");
            System.out.println("!! It's a BOY !!");
            System.out.println("!!!!!!!!!!!!!!!!!!!!");
        }
    }

    public static void main(String args[]) {
        Child baby = new Child();
        baby.getXorY();
        baby.getX();
        baby.genderReveal();
    }
}
```

// output

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>javac Child.java
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a BOY !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a BOY !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a BOY !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a BOY !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a GIRL !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a BOY !!
!!!!!!!!!!!!!!!
```

```
E:\Sem-3\LabWork - Assignments\OOPM\Lab Assignment 6\Code\B>java Child
!!!!!!!!!!!!!!!
!! It's a GIRL !!
!!!!!!!!!!!!!!!
```