

*** Assignment No: 5**

Design and develop a context for given case study and implement an interface for Vehicles Consider the example of vehicles like bicycle, car and bike. All Vehicles have common functionalities such as Gear Change, Speed up and apply breaks. Make an interface and put all these common functionalities. Bicycle, Bike, Car classes should be implemented for all these functionalities in their own class in their own way

***/**

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

```
interface vehicle {           //vehicle interface
    void gear_change(int a);
    void speed_up();
    void apply_brakes();
    void display();
}
```

```
//BICYCLE CLASS
```

```
class bicycle implements vehicle
```

```
{
    int gear,speed;

    bicycle()                //default constructor for bicycle
    {
        System.out.println("\tBicycle started successfully\n ");
        gear=1;              //gear is 1 when Cycle starts
        speed=10;            //speed is 10 when Cycle Starts
    }

    public void gear_change(int gearex)
    {
        if(gearex<7 && gearex>0)        //maximum gear for vehicle is 6
        {
            gear=gearex;
            System.out.println("\tGear changed Successfully \n\t Current Gear Is "+gear);
        }
        else
            System.out.println("Gear is Out Of Range \n");
    }

    public void speed_up()
    {
```

```

        if((speed+5)<50 ) {           //50 as maximum speed
            speed+=5;
            System.out.println("\n\tBicycles speed increased \n\t current speed is
"+speed);
        }
        else
            System.out.println("Speed Cannot Be Increased Above 50 Kmhr\n");
    }

    public void apply_brakes()           //function to apply brakes
    {
        Scanner sc=new Scanner(System.in);
        int x;
        System.out.println("1. DECREASE SPEED\n2. STOP BICYCLE\n");
        x=sc.nextInt();

        if(x==1)
            if((speed-5)>0)               // speed never be negative
            {
                speed-=5;                 //per apply brakes bicycles speed is
reduced by 5
                System.out.println("Speed Reduced Successfull \n\tCurrent speed is
"+speed+" Kmhr \n");
            }
            else {
                speed=0;
                gear=0;
                System.out.println("Bicycle stopped Successfully\n ");}

        if(x==2)               //to stop bicycle
        {
            speed=0;
            gear=0;
            System.out.println("Bicycle stopped Successfully\n ");
        }
    }

    public void display()           //displays current status of bicycle
    {
        System.out.println("YOUR BICYCLE'S SPEED IS "+speed +" Kmhr AND GEAR IS "+gear);
    }
}

```

class car implements vehicle

```
{
    int gear,speed;

    car()
    {
        System.out.println("\tCar started successfully\n ");
        gear=1;           //speed when car started
        speed=10;         //gear when car started
    }
    public void gear_change(int gearex)
    {
        if(gearex<7 && gearex >0)    //maximum gear is 6
        {
            this.gear=gearex;
            System.out.println("\tGear changed Successfully \n\t Current Gear is "+gear);
        }
        else
            System.out.print(" Gear Out Of Range \n");
    }

    public void speed_up()
    {
        if((speed+20)<150 )           //150 as maximum speed
        {
            speed+=20;
            System.out.println("Cars speed increased \n\t Current speed is "+speed+"
Kmhr\n");
        }
        else
            System.out.println("Speed Cannot Be Increased Above 150 Kmhr\n");
    }

    public void apply_brakes()
    {
        Scanner sc=new Scanner(System.in);
        int x;
        System.out.println("1. TO DECREASE SPEED\n2. TO STOP CAR\n");
    }
}
```

```

        x=sc.nextInt();
        if(x==1)
            if((speed-20)>0)                //checks speed is negative or positive if
reduced by 20
            {
                speed-=20;                //per apply brakes vehicle speed is
reduced by 20
                System.out.println("Speed Reduced Successfully \n\tCurrent Speed Is
"+speed+" kmhr\n");
            }
            else {
                speed=0;
                gear=0;
                System.out.println("Car stopped Successfully\n ");}
        if(x==2)
        {
            speed=0;
            gear=0;
            System.out.println("Car stopped Successfully \n");
        }
    }

    public void display()                //displays current status of car
    {
        System.out.println("YOUR CAR'S SPEED IS "+speed +" Kmhr AND GEAR IS
"+gear+"\n");
    }
}

```

//BIKE CLASS

```

class bike implements vehicle
{
    int gear,speed;                //data members of bike class

    bike()
    {
        System.out.println("\tBike started successfully \n");
        gear=1;                //initial gear when bike starts
        speed=10;                //initial speed of bike when starts
    }
    public void gear_change(int gearex)

```

```

{
    if(gearex<6 && gearex>0)                //maximum gears is 5
    {
        gear=gearex;
        System.out.println("\tGear changed Successfully \n\t Current Gear IS "+gear);
    }
    else
        System.out.println("Gear out of range \n");
}

public void speed_up()
{
    if((speed+20)<100 )                    //maximum speed is 100 for bike
    {
        speed+=20;
        System.out.println("Bike's speed increased \n\t Current speed is "+speed+"
Kmhr.\n");
    }
    else
        System.out.println("Speed Cannot Be Increased Above 100 Kmhr \n");
}

public void apply_brakes()                //method to reduce bike speed or stop bike
{
    Scanner sc=new Scanner(System.in);
    int x;
    System.out.println("1. TO DECREASE SPEED\n2. TO STOP bike\n");
    x=sc.nextInt();
    if(x==1)
        if((speed-20)>0)                    //checks speed is negative or positive if reduced by 20
        {
            speed-=20;                    //per apply brakes vehicle speed is
reduced by 20
            System.out.println("Speed Reduced Successfull \n\tCurrent speed is
"+speed+ "kmhr\n" );
        }
        else {
            speed=0;
            gear=0;
            System.out.println("Bike stopped Successfully \n");}
    if(x==2)
    {
        speed=0;

```

```

        gear=0;
        System.out.println("Bike stopped Successfully \n");
    }

}

public void display()           //displays current bike status
{
    System.out.println("YOUR BIKE'S SPEED IS "+speed +" Kmhr AND GEAR IS
"+gear+"\n");
}
}

//----- Class Main -----//
class Mauli5 {

    public static void main(String[] args)
    {
        // TODO Auto-generated method stub
        Scanner sc=new Scanner(System.in);

        vehicle v=null;           // vehicle interface reference created

        System.out.println("=====
=====");
        int y;
        bb:           //variable to choose vehicle
           //label for do while loop
        do {
            System.out.print(" SELECT VEHICLE \n\t1.BICYCLE \n\t2.CAR \n\t3.BIKE
\n\t4.Exit \nChoice::");
            y=sc.nextInt();

            System.out.println("=====
==");

            if(y==1)
                v=new bicycle();           //object of bicycle class
            else if(y==2)
                v= new car();           //object of car class
            else if(y==3)
                v=new bike();           //object of bike class
            else if(y==4)

```

```

                break bb;                //label break
            else
                System.out.println("INVALID INPUT");

        System.out.println("=====
=====");

        if(0<y&& y<4) {
            aa:                //label for inner do while loop
                do {
                    System.out.print(" \tPress 1. Speed Up \n\tPress 2. Change
gear \n\tPress 3. Apply Brakes "
                                + "\n\tPress 4. Display Vehicle Status \n\tPress 5.
change Vehicle /Exit \nChoice::");
                    int z=sc.nextInt();

                    System.out.println("=====
=====");

                    switch(z)
                    {
                        case 1:
                            v.speed_up();

                            System.out.println("=====
=====");

                            break;
                        case 2:
                            System.out.print("which gear you want? ");
                            int a=sc.nextInt();
                            v.gear_change(a);

                            System.out.println("=====
=====");

                            break;
                        case 3:
                            v.apply_brakes();

                            System.out.println("=====
=====");

                            break;
                        case 4:
                            v.display();

```

```

        System.out.println("=====
=====");

        break;
    case 5:
        break aa;           //label break
    default:
        System.out.println("Invalid Input");

    }
    }while(true);
}

```

```

    }while(y!=4); //loop break when input y=4
}

```

}OUTPUT:

```

=====
SELECT VEHICLE
1.BICYCLE
2.CAR
3.BIKE
4.Exit
Choice::1
=====
Bicycle started successfully

=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes
Press 4. Display Vehicle Status
Press 5. change Vehicle /Exit
Choice::1
=====

Bicycles speed increased
current speed is 15
=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes

```


Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::2

=====

which gear you want? 4

Gear changed Successfully

Current Gear Is 4

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::3

=====

1. DECREASE SPEED

2. STOP BICYCLE

1

Speed Reduced Successfull

Current speed is 10 Kmhr

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::4

=====

YOUR BICYCLE'S SPEED IS 10 Kmhr AND GEAR IS 4

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::5

=====

SELECT VEHICLE

1.BICYCLE

2.CAR

3.BIKE

4.Exit

Choice::2

=====
Car started successfully

=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes
Press 4. Display Vehicle Status
Press 5. change Vehicle /Exit

Choice::1

=====
Cars speed increased
Current speed is 30 Kmhr

=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes
Press 4. Display Vehicle Status
Press 5. change Vehicle /Exit

Choice::2

=====
which gear you want? 5
Gear changed Successfully
Current Gear is 5

=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes
Press 4. Display Vehicle Status
Press 5. change Vehicle /Exit

Choice::3

=====
1. TO DECREASE SPEED
2. TO STOP CAR

2
Car stopped Successfully

=====
Press 1. Speed Up
Press 2. Change gear
Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::4

=====

YOUR CAR'S SPEED IS 0 Kmhr AND GEAR IS 0

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::5

=====

SELECT VEHICLE

1.BICYCLE

2.CAR

3.BIKE

4.Exit

Choice::3

=====

Bike started successfully

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::1

=====

Bike's speed increased

Current speed is 30 Kmhr.

=====

Press 1. Speed Up

Press 2. Change gear

Press 3. Apply Brakes

Press 4. Display Vehicle Status

Press 5. change Vehicle /Exit

Choice::2

=====

which gear you want? 3

Gear changed Successfully

Current Gear IS 3

- =====
- Press 1. Speed Up
 - Press 2. Change gear
 - Press 3. Apply Brakes
 - Press 4. Display Vehicle Status
 - Press 5. change Vehicle /Exit

Choice::3

- =====
- 1. TO DECREASE SPEED
 - 2. TO STOP bike

1

Speed Reduced Successfull
Current speed is 10kmhr

- =====
- Press 1. Speed Up
 - Press 2. Change gear
 - Press 3. Apply Brakes
 - Press 4. Display Vehicle Status
 - Press 5. change Vehicle /Exit

Choice::4

=====

YOUR BIKE'S SPEED IS 10 Kmhr AND GEAR IS 3

- =====
- Press 1. Speed Up
 - Press 2. Change gear
 - Press 3. Apply Brakes
 - Press 4. Display Vehicle Status
 - Press 5. change Vehicle /Exit

Choice::5

=====

SELECT VEHICLE

- 1.BICYCLE
- 2.CAR
- 3.BIKE
- 4.Exit

Choice::4

=====