**OOP LAB**

**ASSIGNMENT-5: INTERFACE**

* Code: -

/\*

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//importing java scanner package

import java.util.Scanner;

//interface vehicle

interface vehicle{

    void changegear(int speed\_ch); //function to change gear

    void speedup(int speed\_ch); //function to increase speed

    void applybrakes(int speed\_ch); //function to decrease speed

    void display(); //function to display current speed and gear

}

//class bicycle implementing the interface vehicle

class bicycle implements vehicle{

    private int speed,gear; //private data members speed and gear

    bicycle(){ //bicycle class constructor to initialise speed

        speed=0;

        gear=0;

    }

    public void display(){ //defining the function display from interface vehicle

        System.out.println("The current speed is=>"+speed+" Km/Hr"); //printing the current

        System.out.println("The current gear is=>"+gear); //printing the current gear

    }

    public void changegear(int gear\_ch){ //defining the function changegear from interface vehicle

        if(gear\_ch==1){  //if gear changing to one

            if(speed>0 && speed<=10) //validating the speed according to the gear

            {

                gear=1; //if speed is within the rnge of gear then changing the gear

            }

            else

            {

                //if speed is not within the gear range then informing the user to maintian speed in given gear range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 0-10");

            }

        }

        if(gear\_ch==2){ //if gear changing to two

            if(speed>10 && speed<=20) //validating the speed according to the gear

            {

                gear=2; //if speed is within the rnge of gear then changing the gear

            }

            else

            {

                //if speed is not within the gear range then informing the user to maintian speed in given gear range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 10-20");

            }

        }

        if(gear\_ch==3){ //if gear changing to three

            if(speed>20 && speed<=30)

            {

                gear=3;//if speed is within the rnge of gear then changing the gear

            }

            else

            {

                //if speed is not within the gear range then informing the user to maintian speed in given gear range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 20-30");

            }

        }

        if(gear\_ch==4){

            if(speed>30 && speed<=40)

            {

                gear=4;//if speed is within the rnge of gear then changing the gear

            }

            else

            {

                //if speed is not within the gear range then informing the user to maintian speed in given gear range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 30-40");

            }

        }

    }

    public void speedup(int speed\_ch){ //defining speedup function from interface vehicle

        speed=speed+speed\_ch; //increasing the speed as given by the user

    }

    public void applybrakes(int speed\_ch){ //defining applybrakes function from interface vehicle

        speed=speed-speed\_ch; //decreasing the spede as given by the user

    }

}

//class bike implementing the interface vehicle

class bike implements vehicle{

    private int speed,gear; //private variable speed and gear

    bike(){ //constructor of class bike

        speed=0;

        gear=0;

    }

    public void display(){ //defining the function display from interface vehicle

        System.out.println("The current speed is=>"+speed+" Km/Hr"); //printing the current

        System.out.println("The current gear is=>"+gear); //printing the current gear

    }

    public void changegear(int gear\_ch){ //defining the function changegear from interface vehicle

        if(gear\_ch==1){

            if(speed>0 && speed<=15) //validating the speed according to the gear

            {

                gear=1;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 0-15");

            }

        }

        if(gear\_ch==2){

            if(speed>15 && speed<=25)//validating the speed according to the gear

            {

                gear=2;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 15-25");

            }

        }

        if(gear\_ch==3){

            if(speed>25 && speed<=35)//validating the speed according to the gear

            {

                gear=3;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 25-35");

            }

        }

        if(gear\_ch==4){

            if(speed>35 && speed<=50)//validating the speed according to the gear

            {

                gear=4;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 35-50");

            }

        }

        if(gear\_ch==5){ //if gear change to 5

            if(speed>50) //validating speed limit of gear

            {

                gear=5; //changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed above 50");

            }

        }

    }

    public void speedup(int speed\_ch){ //defining speedup function from interface vehicle

        speed=speed+speed\_ch; //increasing the speed as given by the user

    }

    public void applybrakes(int speed\_ch){ //defining applybrakes function from interface vehicle

        speed=speed-speed\_ch; //decreasing the spede as given by the user

    }

}

class car implements vehicle{

    private int speed,gear;

    car(){ //constructor of class car

        speed=0;

        gear=0;

    }

    public void display(){ //displaying current gear and speed

        System.out.println("The current speed is=>"+speed+" Km/Hr.");

        System.out.println("The current gear is=>"+gear);

    }

    public void changegear(int gear\_ch){

        if(gear\_ch==1){

            if(speed>0 && speed<=20)//validating the speed according to the gear

            {

                gear=1;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 0-20");

            }

        }

        if(gear\_ch==2){

            if(speed>20 && speed<=35)//validating the speed according to the gear

            {

                gear=2;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 20-35");

            }

        }

        if(gear\_ch==3){

            if(speed>35 && speed<=50)//validating the speed according to the gear

            {

                gear=3;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 35-50");

            }

        }

        if(gear\_ch==4){

            if(speed>50 && speed<=70)//validating the speed according to the gear

            {

                gear=4;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed betweeen 50-70");

            }

        }

        if(gear\_ch==5){

            if(speed>70)//validating the speed according to the gear

            {

                gear=5;//changing gear if within speed limit

            }

            else

            {

                //pompting the user to maintain speed within range

                System.out.println("Your current speed is "+speed+" Km/Hr. Please maintain speed above 70");

            }

        }

    }

    public void speedup(int speed\_ch){ //defining speedup funtion of interfrace vehicle

        speed=speed+speed\_ch; //increasing the speed

    }

    public void applybrakes(int speed\_ch){ //defining applybrakes funtion of interface vehicle

        speed=speed-speed\_ch; //decreasing the speed

    }

}

public class interface\_gear{

    public static void main(String[] args) {

        int choice\_vehicle,speed\_ch,gear\_ch; //variables to accept change of speed and gear and choice of vehicle from user

        int choice\_operation; //variable to accep choice of operation

        Scanner sc=new Scanner(System.in); //scanner sc to take inputs

        do{

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

            System.out.println("What do you want to take out for a ride today?\n1.Schnell Bicycle\n2.Thunderbird 350\n3.Honda City\n4.Quit");

            choice\_vehicle=sc.nextInt(); //accepting choice of vehicle from user

            switch(choice\_vehicle){ //switch case for choice of vehicle

                case 1:

                vehicle v1=new bicycle(); //creating an object

                do{

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

                System.out.println("Enter the action to be performed\n1.Accelerate\n2.Change Gear\n3.Apply brake\n4.Display Current Speed and gear\n5.Quit");

                choice\_operation=sc.nextInt(); //accepting choice of operation

                switch(choice\_operation) //switch case for choice of operation

                {

                    case 1:

                    System.out.println("How much speed you want to increase?");

                    speed\_ch=sc.nextInt(); //accepting increase speed from user

                    v1.speedup(speed\_ch); //passing speed to be incresed to speedup function

                    break;

                    case 2:

                    System.out.println("Enter the gear you want to change to=>");

                    gear\_ch=sc.nextInt(); //accepting gear change from user

                    v1.changegear(gear\_ch); //passing changed gear to function

                    break;

                    case 3:

                    System.out.println("How much speed you want to decrease?");

                    speed\_ch=sc.nextInt(); //aceepting how much speed to decrease from user

                    v1.applybrakes(speed\_ch); //passing decreased speed to function applybrakes

                    break;

                    case 4:

                    v1.display(); //displaying current speed and gear

                    break;

                    case 5:

                    System.out.println("Ignition off"); //ignition off

                    break;

                    default:

                    System.out.println("Enter valid operation"); //default case for invalid operation

                }

            }while(choice\_operation!=5);

            break;

            case 2:

                vehicle v2=new bike(); //creating object

                do{

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

                System.out.println("Enter the action to be performed\n1.Accelerate\n2.Change Gear\n3.Apply brake\n4.Display Current Speed and gear\n5.Quit");

                choice\_operation=sc.nextInt(); //taking input for choice of operation

                switch(choice\_operation) //switch case for choice of operation

                {

                    case 1:

                    System.out.println("How much speed you want to increase?");

                    speed\_ch=sc.nextInt(); //accepting speed to increased from user

                    v2.speedup(speed\_ch); //passing the increased speed to speedup function

                    break;

                    case 2:

                    System.out.println("Enter the gear you want to change to=>");

                    gear\_ch=sc.nextInt(); //accepting gear change from user

                    v2.changegear(gear\_ch); //passing gear to be changed from user to changegear function

                    break;

                    case 3:

                    System.out.println("How much speed you want to decrease?");

                    speed\_ch=sc.nextInt(); //accepting speed to be decreased from user

                    v2.applybrakes(speed\_ch); //passsing the speed to be decreased to applybrakes function

                    break;

                    case 4:

                    v2.display(); //displaying current gear and speed

                    break;

                    case 5:

                    System.out.println("Ignition off");

                    break;

                    default:

                    System.out.println("Enter valid operation"); //default case for invalid operation choice

                }

            }while(choice\_operation!=5);

            break;

            case 3:

                vehicle v3=new car();//creating object

                do{

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

                System.out.println("Enter the action to be performed\n1.Accelerate\n2.Change Gear\n3.Apply brake\n4.Display Current Speed and gear\n5.Quit");

                choice\_operation=sc.nextInt();//taking input for choice of operation

                switch(choice\_operation)//switch case for choice of operation

                {

                    case 1:

                    System.out.println("How much speed you want to increase?");

                    speed\_ch=sc.nextInt();//accepting speed to increased from user

                    v3.speedup(speed\_ch);//passing speed to be incresed to speedup function

                    break;

                    case 2:

                    System.out.println("Enter the gear you want to change to=>");

                    gear\_ch=sc.nextInt(); //accepting gear change from user

                    v3.changegear(gear\_ch); //passing gear to be changed from user to changegear function

                    break;

                    case 3:

                    System.out.println("How much speed you want to decrease?");

                    speed\_ch=sc.nextInt();//accepting speed to be decreased from user

                    v3.applybrakes(speed\_ch); //passsing the speed to be decreased to applybrakes function

                    break;

                    case 4:

                    v3.display();//displaying current gear and speed

                    break;

                    case 5:

                    System.out.println("Ignition off");

                    break;

                    default:

                    System.out.println("Enter valid operation");//default case for invalid operation choice

                }

            }while(choice\_operation!=5);

            break;

            case 4:

            System.out.println("Exiting the program");break;

            default:

            System.out.println("Enter valid choice");break;

            }

        }while(choice\_vehicle!=4);

    }

}