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**\* Batch: D**

**\* 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**

**======================================================================**