Assignment 5

```
//Problem Statement::
/*
 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 ----------------------//
public class Main {

        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;                          //variable to choose vehicle
                bb:                     //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
            }

}



/*

 ##OUTOUT##

==========================================================================
  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::1

==========

Bicycles speed increased

current speed is 20

==========

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. DECREASE SPEED

2. STOP BICYCLE

1

Speed Reduced Successfull

Current speed is 15 Kmhr

==========

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::3

==========

1. DECREASE SPEED

2. STOP BICYCLE

2

Bicycle 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 BICYCLE'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::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::1

==========

Cars speed increased

Current speed is 50 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? 8

Gear Out Of Range

==========

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. TO DECREASE SPEED

2. TO STOP CAR

1

Speed Reduced Successfully

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::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? 6

Gear out of range

==========

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::3

==========

1. TO DECREASE SPEED

2. TO STOP bike

2

Bike 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::5

==========

SELECT VEHICLE

1.BICYCLE

```
        2.CAR
        3.BIKE
        4.Exit
Choice::6
==========================================================================
INVALID INPUT
==========================================================================
  SELECT VEHICLE
        1.BICYCLE
        2.CAR
        3.BIKE
        4.Exit
Choice::4
==========================================================================


 */
```