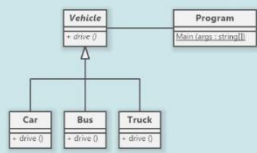


Complete the C# Implementation code of the following UML class diagram.



Note that:

- The method drive in class Car will print out "car drive"
- The method drive in class Bus will print out "bus drive"
- The method drive in class Truck will print out "truck drive"

In the Main method of class Program you will use a **polymorphic reference** to call drive() method, so you need to do the following

- Create an array of 3 vehicles
- Make the elements of the array point to Car, Bus and Truck objects
- Use for loop to call drive() method on each object

using System;  
namespace Final  
{  
class Program

```

{
    // code for drive method
}
public class Car // car header
{
    public // drive method header
    {
        // drive method body
    }
}
public class Bus // Bus header
{
    public // drive method header
    {
        // drive method body
    }
}

```

```

{
    static void Main(string[] args)
    {
        //code to create the array
        //code to initialize the first element of the array with a car object
        //code to initialize the second element of the array with a buss object
        //code to initialize the third element of the array with a truck object
        // for loop header
        {
            //calling drive on each object
        }
    }
}
public //Vehicle header
{

```

```

{
    // drive method body
}
}
public class Truck // Truck header
{
    public // drive method header
    {
        // drive method body
    }
}
}

```

```

using System;

namespace Final
{
    class Program
    {
        static void Main(string[] args)
        {
            Vehicle[] array = new Vehicle[3];    //code to create the array

            array[0] = new Car();    //code to initialize the first element of the array with a car object
            array[1] = new Bus();    //code to initialize the second element of the array with a bus object
            array[2] = new Truck();    //code to initialize the third element of the array with a truck object

            for (int i = 0; i < array.Length; i++)    // for loop header
            {
                array[i].drive();    //calling drive on each object
            }
        }
    }

    public interface Vehicle    //Vehicle header
    {
        void drive();    // code for drive method
    }
}

```

```
}

public class Car : Vehicle // Car Header
{
    public void drive()      // drive method header
    {
        Console.WriteLine("car drive"); // drive method body
    }
}

public class Bus : Vehicle // Bus header
{
    public void drive()      // drive method header
    {
        Console.WriteLine("bus drive"); // drive method body
    }
}

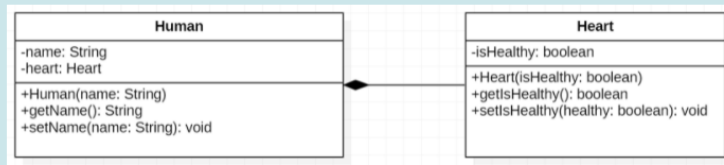
public class Truck : Vehicle // Truck header
{
    public void drive()      // drive method header
    {
        Console.WriteLine("truck drive"); // drive method body
    }
}

}
```

---

1. Based on the below UML diagram, write the implementation code to represent each class?
2. in the main method of HumanTest class create:

- a Human object named human1 with the following information(name is "Ali" with a healthy heart)



```
using System;
public class Heart
{
    //creating variable
    private bool isHealthy;
    //constructor
    public Heart(bool isHealthy)
    {
        //setting value
        this.isHealthy = isHealthy;
    }

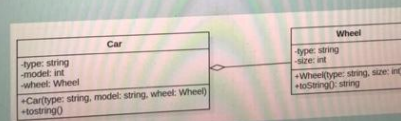
    //getter and setter method
    public bool getIsHealthy()
    {
        return isHealthy;
    }

    public void setItsHealthy(bool isHealthy)
    {
        this.isHealthy = isHealthy;
    }
}
public class Human
{
    //creating variable
    private string name;
    private Heart heart;
    //constructor
    public Human(string name, Heart heart)
    {
        //setting value
        this.name = name;
        this.heart = heart;
    }
    //getter and setter method
    public string getName()
    {
        return name;
    }
    public void setName(string name)
    {
        this.name = name;
    }
}
class HumanTest
{
    static void Main()
```

```
{
    //create Heart and Human object
    Heart heart = new Heart(true);
    Human human1 = new Human("Ali", heart);
    //print details
    Console.WriteLine("Name : " + human1.getName());
    Console.WriteLine("Is Healthy Heart? " + heart.getItsHealthy());
}
```

---

1. Based on the below UML diagram, write the implementation code to represent each class?
2. in the main method of Cartest class create:
  - a wheel object named w1 with following information (size is 14 type is Alloys)
  - a car object named car1 with the following information( type is Toyota Prius model is 2010 wheel is w1)



```

public class Car
{
    private String type; //attributes
    private int model;
    private Wheel w;
    Car(String t, int m, Wheel w1) //Constructor
    {
        type = t;
        model = m;
        w = w1;
    }
    public String toString() //toString method
    {
        return type + " " + model + " " + w.toString();
    }
}
  
```

```

public class Wheel
{
    private String type; //attributes
    private int size;
    Wheel(String t, int s) //Constructor
    {
        type = t;
        size = s;
    }
}
  
```

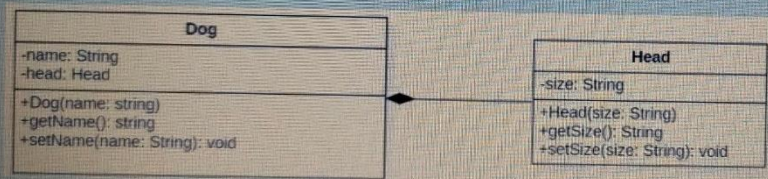
```
        public String toString() //ToString Method
        {
            return type + " " + size;
        }
    }

    public class Cartest
    {
        public static void main(String[] args)
        {
            Wheel w1 = new Wheel("Alloys", 14); //object made
            Car car1 = new Car("Toyota Prius", 2010, w1);
            Console.WriteLine(car1);
        }
    }
}
```

---

1. Based on the below UML diagram, write the implementation code to represent each class?
2. In the main method of DogTest class create:

- a Dog object named dog1 with the following information (name is "foo" with a head size 20)



```

using System.IO;
using System.Xml.Linq;

public class Cartest
{
    static void Main(string[] args)
    {
        Head head = new Head("20");
        Dog dog1 = new Dog("foo ", head);

        Console.WriteLine(dog1.toString());
    }
}

public class Dog
{
    string size;
    Head head;
    public Dog(string size, Head head)
    {
        this.size = size;
        this.head = head;
    }
    public string getSerialNumber()
    {
        return size;
    }
    public void setSerialNumber(string Size)
    {
        Size = size;
    }
    public string toString()
    {
        return "name is " + size + "with a head size " + head ;
    }
}

public class Head

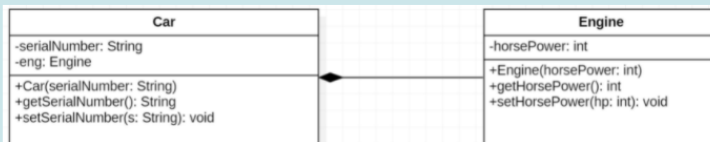
```

```
{  
    string name;  
    public Head(string name)  
    {  
        this.name = name;  
    }  
    public string getHorsePower()  
    {  
        return name;  
    }  
    public void setHorsePower(string Name)  
    {  
        Name = name;  
    }  
}
```

---



1. Based on the below UML diagram, write the implementation code to represent each class?
2. in the main method of CarTest class create:
  - a Car object named car1 with the following information(serial Number is "2020foo" with a 350 horse power engine )



```
using System.IO;

public class CarTest
{
    static void Main(string[] args)
    {
        Engine engine = new Engine(350);
        Car car1 = new Car("2020foo ", engine);

        Console.WriteLine(car1.toString());
    }
}

public class Car
{
    string serialNumber;
    Engine eng;
    public Car(string serialNumber, Engine eng)
    {
        this.serialNumber = serialNumber;
        this.eng = eng;
    }
    public string getSerialNumber()
    {
        return serialNumber;
    }
    public void setSerialNumber(string s)
    {
        s = serialNumber;
    }
    public string toString()
    {

```

```
        return "serial Number is " + serialNumber + "with a " + eng +  
"horse power engine ";  
    }  
}  
public class Engine  
{  
    int horsepower;  
    public Engine(int horsepower)  
    {  
        this.horsePower = horsepower;  
    }  
    public int getHorsePower()  
    {  
        return horsepower;  
    }  
    public void setHorsePower(int hp)  
    {  
        hp = horsepower;  
    }  
}
```

---