Feb 7nd Morning Assignment

By Surya Teja Chandolu

1. Research and write the difference between abstract class and interface in C#

Abstract Class	**Interface Class**
Abstract class doesn't provide full abstraction.	By default Interface class provide full abstraction.
Abstract class can have fields	Interface can't have fields
Abstract class members can have access modifiers.	Interface members can't have access modifiers.
It can contain different types of access modifiers like public, private, protected etc.	It only contains public access modifier because everything in the interface is public.
Abstract class does not support Multiple Inheritance.	Interface class support Multiple Inheritance.
It support static method	It does not support static method

2. Write the 6 points about interface discussed in the class

- Interface is pure abstract class.
- Interface name start with "**I**".
- Interface acts like a Contract.
- By default interface methods are abstract and public.
- Any class that implements interface must override abstract methods.
- Interface support multiple inheritance.

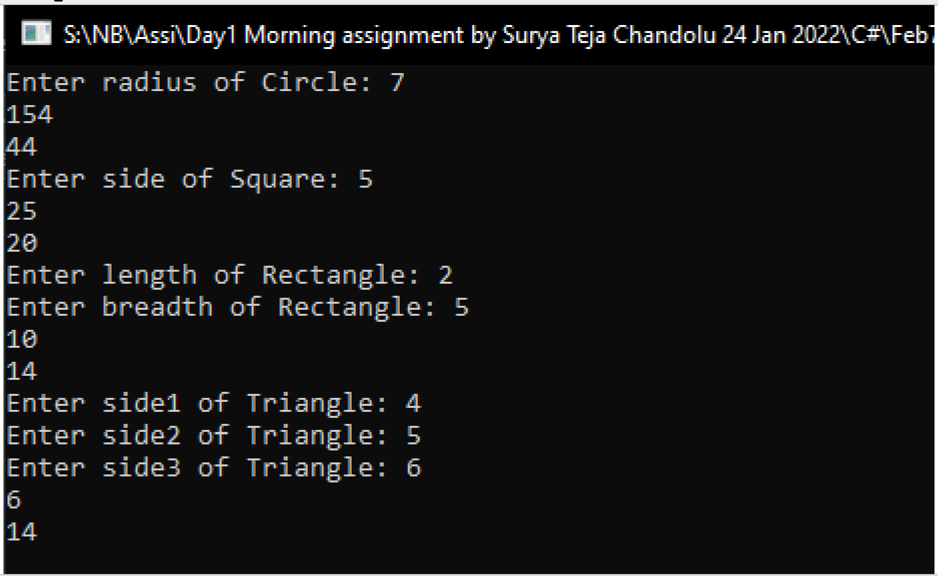
3. Write example program for interfaces discussed in the class IShape include the classes

- **Cricle**
- **Square**
- **Triangle**
- **Rectangle**

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Shape
* ********************************************************************/

namespace InterfaceShape
{
    interface IShape
    {
        int CalculatePerimeter();
        int CalculateArea();
    }
    /// <summary>
    /// To calculate area and perimeter of circle
    /// </summary>
    class Circle : IShape
    {
        int radius;

        public void ReadRadius()
        {
            Console.Write("Enter radius of Circle: ");
            radius = Convert.ToInt32(Console.ReadLine());
        }

        public int CalculateArea()
        {
            return 22 * radius * radius / 7;
        }

        public int CalculatePerimeter()
        {
            return 2 * 22 * radius / 7;
        }
    }
    /// <summary>
    /// To calculate area and perimeter of square
    /// </summary>
    class Square : IShape
    {
        int side;

        public void ReadSide()
        {
            Console.Write("Enter side of Square: ");
            side = Convert.ToInt32(Console.ReadLine());
        }

        public int CalculateArea()
        {
            return side * side;
        }

        public int CalculatePerimeter()
        {
            return 4 * side;
        }
    }

    class Rectangle : IShape
    {
        int length, breadth;

        public void ReadLengthBreadth()
        {
            Console.Write("Enter length of Rectangle: ");
            length = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter breadth of Rectangle: ");
            breadth = Convert.ToInt32(Console.ReadLine());
        }

        public int CalculateArea()
        {
            return length * breadth;
        }
        public int CalculatePerimeter()
        {
            return 2 * (length + breadth);
        }
    }

    class Triangle : IShape
    {
        int side, side1, side2, side3;

        public void ReadSides()
        {
            Console.Write("Enter side1 of Triangle: ");
            side1 = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter side2 of Triangle: ");
            side2 = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter side3 of Triangle: ");
            side3 = Convert.ToInt32(Console.ReadLine());

            side = (side1 + side2 + side3) / 2;
        }

        public int CalculateArea()
        {
            return (int)Math.Sqrt(side * (side - side1) * (side - side2) *
(side - side3));
        }

        public int CalculatePerimeter()
        {
            return 2 * side;
        }
    }
    internal class Program
    {
        static void Main(string[] args)
        {
            Circle c = new Circle();
            c.ReadRadius();
            Console.WriteLine(c.CalculateArea());
            Console.WriteLine(c.CalculatePerimeter());

            Square s = new Square();
            s.ReadSide();
            Console.WriteLine(s.CalculateArea());
            Console.WriteLine(s.CalculatePerimeter());

            Rectangle r = new Rectangle();
            r.ReadLengthBreadth();
            Console.WriteLine(r.CalculateArea());
            Console.WriteLine(r.CalculatePerimeter());

            Triangle t = new Triangle();
            t.ReadSides();
            Console.WriteLine(t.CalculateArea());
            Console.WriteLine(t.CalculatePerimeter());

            Console.ReadLine();
        }
    }
}
```

Output:



S:\NB\Assi\Day1 Morning assignment by Surya Teja Chandolu 24 Jan 2022\C#\Feb

```
Enter radius of Circle: 7
154
44
Enter side of Square: 5
25
20
Enter length of Rectangle: 2
Enter breadth of Rectangle: 5
10
14
Enter side1 of Triangle: 4
Enter side2 of Triangle: 5
Enter side3 of Triangle: 6
6
14
```

4. Write the 7 points discussed about properties.

- Properties are same like class variables with **get; set;** methods.
- A property with get is read only.
- A property with set is write only.
- A property with get and set can read and assign values.
- Property introduced to deal with private variables.
- EX:
  Public int Id { get; set; }
- Property name start with upper case.

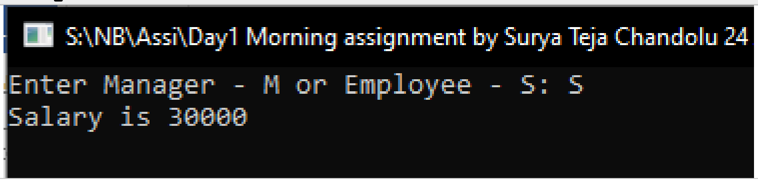
5. Write sample code to illustrate properties as discussed in class.

- **Id**
- **Name**
- **Designation**
- **Salary**

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Property
* ********************************************************************/

namespace Prop
{
    class Employee
    {
        private int id;
        private string name;
        private string designation;
        private int salary;
        public int Id { get { return id; } set { id = value; } }
        public string Name { get { return name; } set { name = value; } }
        public string Designation { set { designation = value; } }
        public int Salary
        {
            get
            {
                salary = (designation == "S") ? 30000 : 60000;
                return salary;
            }
            set { salary = value; }
        }
    }
    internal class Program
    {
        static void Main(string[] args)
        {
            Employee emp = new Employee();
            Console.Write("Enter Manager - M or Employee - S: ");
            emp.Designation = Console.ReadLine();
            Console.WriteLine($"Salary is {emp.Salary}");

            Console.ReadLine();
        }
    }
}
```

Output:



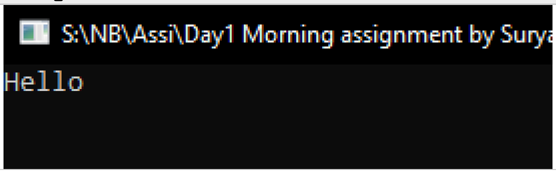
```
S:\NB\Assi\Day1 Morning assignment by Surya Teja Chandolu 24
Enter Manager - M or Employee - S: S
Salary is 30000
```

6. Create a class Employee with only properties.

Code:

```
using System;

/**********************************************************************
* Author: Surya Teja
* Purpose: PropertyOnly
* *********************************************************************/

namespace PropWithPrivate
{
    class Employee
    {
        public int Id { get { return Id; } set { Id = value; } }
        public string Name { get { return Name; } set { Name = value; } }
        public string Designation { get { return Designation; } set {
Designation = "S"; } }
        public int Salary
        {
            get { return Salary; } set { Salary = value; } }
    }
    internal class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Hello");
            Console.ReadLine();
        }
    }
}
```

Output:



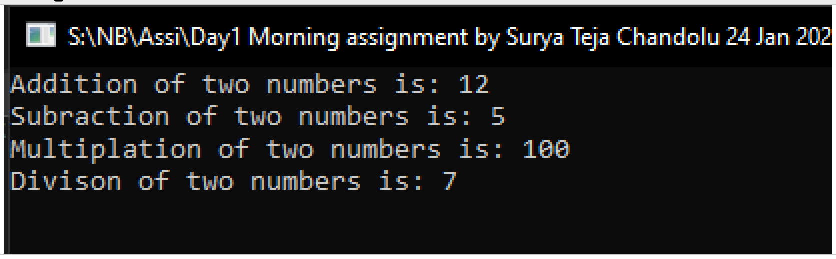
```
S:\NB\Assi\Day1 Morning assignment by Surya
Hello
```

7. Create Mathematics class and add three static methods and call the methods in main method.

Code:

```
using System;

/***********************************************************************
* Author: Surya Teja
* Purpose: Static Method
* **********************************************************************/

namespace Mathematics
{
    class Maths
    {
        public static int Add(int a, int b)
        {
            return a + b;
        }

        public static int Sub(int a, int b)
        {
            return a - b;
        }

        public static int Mul(int a, int b)
        {
            return a * b;
        }
        public static int Div(int a, int b)
        {
            return a / b;
        }
    }
    internal class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine($"Addition of two numbers is: {Maths.Add(5,7)}");
            Console.WriteLine($"Subraction of two numbers is: 
{Maths.Sub(30,25)}");
            Console.WriteLine($"Multiplation of two numbers is: 
{Maths.Mul(20,5)}");
            Console.WriteLine($"Divison of two numbers is: {Maths.Div(21,3)}");

            Console.ReadLine();
        }
    }
}
```

Output:



```
S:\NB\Assi\Day1 Morning assignment by Surya Teja Chandolu 24 Jan 202
Addition of two numbers is: 12
Subraction of two numbers is: 5
Multiplation of two numbers is: 100
Divison of two numbers is: 7
```

8. Research and understand when to create static methods.

- The static method should be used whenever you have a function that does not rely on a specific object in a class.
- If you don't know the type of the object you are creating in advance, factory methods can be very useful.
- A special handling is required before an object is instantiated.
- These operations are used for sorting multiple objects of the same class without being tied to a particular instance.
- When declaring constants.