Ex. No. 03	APPLICATION USING INHERITANCE & POLYMORPHISM
14.08.2023	

Aim

To develop C# application using Inheritance &Polymorphism.

Description

Class: Blue print of an object

Contains:

- Fields: variables to store data
- Methods: Functions to perform specific tasks.

Syntax: class <class_name>

Object: Instance of a class

Syntax: <class_name> <variable> = new <class_name>();

Using dot operator with the object reference variable fields and methods of the class can be accessed

Constructor: looks like a method has same name as that of the class and it will be called automatically while creating an object to the class.

3 types: Default Constructor, Parameter less Constructor & Parameterized Constructor

Getter: Gives access to private fields, returns the value.

Setter: Allows to change the private fields, validation before the value is set

Source Code

1.

```
class Student : Person{
    private int[] testScores;
    public Student(string firstName, string lastName, int idNumber, int[]
scores):base(firstName,lastName,idNumber){
        this.testScores=scores;
    }
    public char Calculate(){
        int avg=0;
        foreach(int i in this.testScores){
            avg+=i;
        }
        avg/=this.testScores.Length;
        if (avg>=90 && avg<=100) return 'O';
        else if (avg>=80 && avg<90) return 'E';
        else if (avg>=70 && avg<80) return 'A';
        else if (avg>=55 && avg<70) return 'P';
        else if (avg>=40 && avg<55) return 'D';
        else return 'T';
    }
```

2.

```
using System;
namespace Ex3{
```

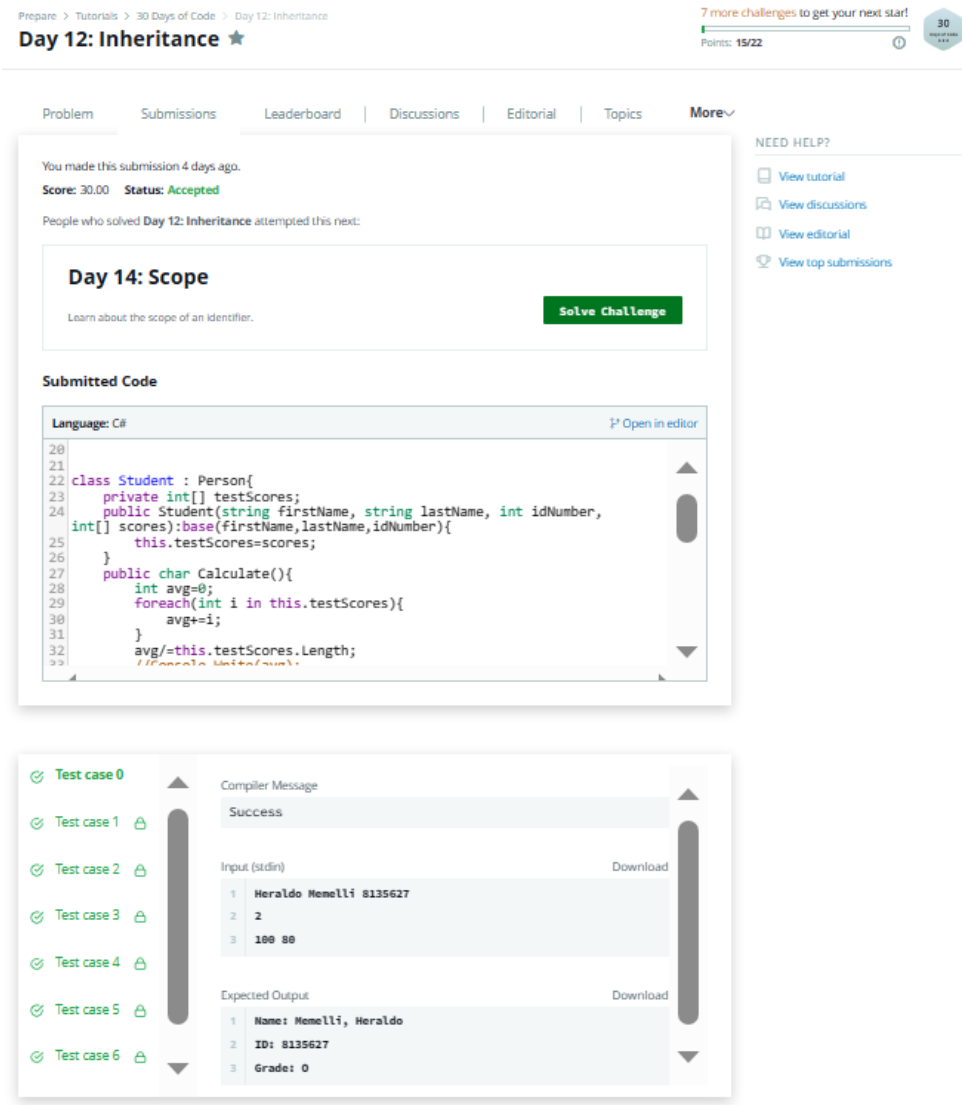
```
internal class Shape{
    public double side1, side2;
    public Shape(double side1, double side2){
        this.side1 = side1;
        this.side2 = side2;
    }
    public virtual double findArea(){
        Console.WriteLine("Please Derive this class using any of the shapes and then call the function");
        return 0;
    }
    public virtual int findPerimeter(){
        Console.WriteLine("Please Derive this class using any of the shapes and then call the function");
        return 0;
    }

internal class Triangle:Shape{
public Triangle(double side1,double side2) : base(side1, side2){}
    public override double findArea(){
        return 0.5 * base.side1 * base.side2;}
    public override int findPerimeter(){
        return (int) base.side1 + (int)base.side2 + (int) base.side1;
    }
```

```
  }

internal class Rectangle:Shape{
   public Rectangle(double side1, double side2) : base(side1, side2){}
   public override double findArea(){
      return base.side1 * base.side2;
   }
   public override int findPerimeter(){
      return (int)base.side1 + (int)base.side2 + (int)base.side1+ (int)base.side2;
   }
  }

 internal class Program{
   static void Main(string[] args){
      Shape sh = null;
      double s1, s2;
      while (true){
         Console.Write("1. Triangle \n2. Rectangle \n3. Exit \nEnter Your Choice: ");
         int ch = Convert.ToInt32(Console.ReadLine());
         if (ch == 3) break;
         else if (ch == 1){
            Console.Write("Enter Base: ");
            s1 = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter Height: ");
```

```
                s2 = Convert.ToInt32(Console.ReadLine());

                sh = new Triangle(s1, s2);

                Console.WriteLine("Area: " + sh.findArea() + "\nPerimeter: " +
sh.findPerimeter() + "\n");

            }

            else if (ch == 2){

                Console.Write("Enter Length: ");

                s1 = Convert.ToInt32(Console.ReadLine());

                Console.Write("Enter Breadth: ");

                s2 = Convert.ToInt32(Console.ReadLine());

                sh = new Rectangle(s1, s2);

                Console.WriteLine("Area: " + sh.findArea() + "\nPerimeter: " +
sh.findPerimeter() + "\n");

            }

            else Console.WriteLine("Enter a Valid Option\n");

        }

        Console.ReadKey();

      }

    }

  }

}
```

Output

1.


Prepare > Tutorials > 30 Days of Code > Day 12: Inheritance
Day 12: Inheritance
7 more challenges to get your next star!
Points: 15/22
Problem
Submissions
Leaderboard
Discussions
Editorial
Topics
More
You made this submission 4 days ago.
Score: 30.00 Status: Accepted
People who solved Day 12: Inheritance attempted this next:
Day 14: Scope
Learn about the scope of an identifier.
Solve Challenge
NEED HELP?
View tutorial
View discussions
View editorial
View top submissions
Submitted Code
Language: C#
Open in editor
class Student : Person{
private int[] testScores;
public Student(string firstName, string lastName, int idNumber,
int[] scores):base(firstName,lastName,idNumber){
this.testScores=scores;
}
public char Calculate(){
int avg=0;
foreach(int i in this.testScores){
avg+=i;
}
avg/=this.testScores.Length;
Test case 0
Test case 1
Test case 2
Test case 3
Test case 4
Test case 5
Test case 6
Compiler Message
Success
Input (stdin)
Download
Heraldo Memelli 8135627
2
100 80
Expected Output
Download
Name: Memelli, Heraldo
ID: 8135627
Grade: O

2.

```
1. Triangle
2. Rectangle
3. Exit
Enter Your Choice: 1
Enter Base: 5
Enter Height: 5
Area: 12.5
Perimeter: 15

1. Triangle
2. Rectangle
3. Exit
Enter Your Choice: 2
Enter Length: 5
Enter Breadth: 5
Area: 25
Perimeter: 20

1. Triangle
2. Rectangle
3. Exit
Enter Your Choice: 3
```

1

Result

The C# application using Inheritance & Polymorphism has been executed successfully and the desired output is displayed on the screen.