Application Development with .NET (32998, 31927)

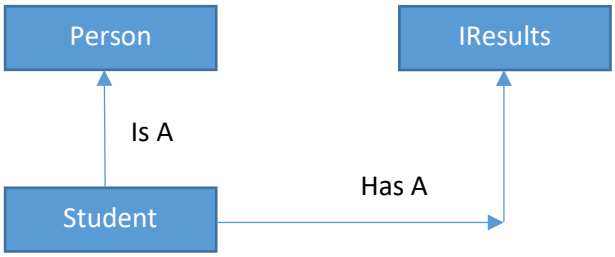
Tutorial -6 Questions

Please download the sample code from Canvas and follow the instructions

Program 1:

Write a program to Create a Student Result management System with the following specifications:

1. There is one *Interface* for Generating the Results
2. There are two classes, Person (*Abstract base class*), Student(derived class from Person and implements IResult)



Please refer to the class diagrams for implementation:

Person //Abstract class
+ String name + String address
- Person()

IResult //Interface
+ void GetMarks() + `string CalculateResult()` + `void DisplayResult()`

Student: Person, IResult
- String Standard - String roll - double[] marks
+ Student(name, address, standard, roll) + void GetMarks() + `string CalculateResult()` + `void DisplayResult()`

Method Descriptions:

1. ***GetMark():*** Accepts marks for 5 subjects from the user and stores in the marks array
2. ***CalculateResult():*** Find the sum and average of the marks obtained. Returns "Pass" (Average marks >40) or "Fail" (Average marks <40)
3. ***DisplayResult():*** Prints the marksheet/result on the screen, which include student details (name, class, address roll), marks obtained in each subject, Average marks, and the grade (Pass/Fail). **Check the test case for the format of printing the marksheet.**
4. ***Student():*** Parameterized constructor to initialize the bass class data members and also the derived class data members.
5. ***Person():*** Constructor to initialize the Person class data members. Include the assessors (get, set) as well.

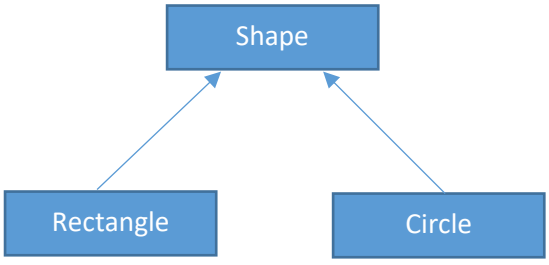
Test Case:

```
/* Test Case:

Enter Marks for Subject-1:56
Enter Marks for Subject-2:42
Enter Marks for Subject-3:89
Enter Marks for Subject-4:69
Enter Marks for Subject-5:95

-------------------------------------------
                Mark Sheet
-------------------------------------------
Name: George Woolsworth
Class: V
Roll: 1004
Address: Ultimo, Sydney 2007, Australia

Marks Obtained:
Subject-0: 57
Subject-1: 43
Subject-2: 90
Subject-3: 70
Subject-4: 96

Average Marks: 70.2
Final Grade: Pass
-------------------------------------------
```

Please note the use of Abstract class and interface. Classes involved in inheritance should have a IS-A relationship, whereas Class implementing an Interface will have HAS-A relationship.

Program 2:

Write a program to create a Shape Class and derive two child class, Rectangle and Circle, as illustrated in the diagram below:



The shape class has generic methods for calculating the area and displaying the dimensions and area. The child classes: Rectangle and Circle overrides the base class methods, Area() and Display() with more specific implementation.

Please refer to the class diagrams below for implementation:

Shape
+ int NumberOfSides
+ Shape(NumberOfSideS) + double Area() + Void Display

Rectangle: Shape
+ double length + double breadth
+ Rectangle(length, breadth) + double Area() + Void Display()

Circle: Shape
+ double radius + const double pi = 3.142
+ Circle(radius) + double Area() + Void Display()

Method Description:

1. ***Area():*** Calculates the area of a shape such as Circle, Rectangle etc. In base class, it is a generic method. In the child class (Overridden) it is more specific to a shape.
2. ***Display()*****:** This method will display the dimensions of a shape and the Area. In base class it s generic method. In the child classes (Overridden) it is displays the dimensions and area of a particular shape such as Circle and Rectangle.

Test Case:

```
The Number of sides of a Circle is : 1
The Radius of the Circle is: 4
The Area of Circle is : 50.272

The Number of sides of a Rectangle is : 4
The Length and Breadth of the Rectangle is: 5, 4
The Area of Rectangle is : 20
```