Assignment 1

Time to practice generics and collections (10%)

DUE DATE

Session 7

OBJECTIVE

The main objectives of this assignment are to:

- Interpret specifications and analysis performed
- Design a solution based on the requirements and specifications
- Design the logic required
- Use of generics
- Use of collections
- Translate design documents and algorithms into source code
- Implement data validation and handle edge cases
- Use debugging tools, and error-handling techniques
- Integrate the knowledge acquired thus far
- Have fun while programming with C#

DESCRIPTION

This Assignment required you to work on different concepts covered so far. It contains total 4 questions. You are required to work on understanding the problem statement, building logic for that and then finally implementation of the specifications or features.

REQUIRED MATERIAL/SOFTWARE

You will need the following material to complete this project:

- Microsoft Visual Studio.NET (specifically C#.NET)
- Visio (Standard or Professional version)
- Microsoft Visual Studio.NET documentation or any other reference material suggested or provided by your instructor

INSTRUCTIONS

Question 1: You have learned major concepts of C#, now its time to give hands on that. You need to build Console application which can easily classify between student and teacher by just seeing its name.

For example, if you enter you instructor name it should say “Explain” and if you enter your name, it should say “Study”.

- Specifications:
    - Create a C# program that prompts the user for three names of people and stores them in an array of Person-type objects. There will be two people of the Student type and one person of the Teacher type.
    - To do this, create a Person class that has a Name property of type string, a constructor that receives the name as a parameter and overrides the ToString () method.
    - Then create two more classes that inherit from the Person class, they will be called Student and Teacher. The Student class has a Study method that writes by console that the student is studying. The Teacher class will have an Explain method that writes to the console that the teacher is explaining. Remember to also create two constructors on the child classes that call the parent constructor of the Person class.
    - End the program by reading the people (the teacher and the students) and execute the Explain and Study methods.
    - When defining all the properties, use property concept of C#

  Input
  1. Juan
  2. Sara
  3. Carlos

  Output
  4. Explain
  5. Study
  6. Study

Question 2: Queue is very important concept in coding environment, you use queues very regularly, like when sending emails to 20 people, it stores your sending list in queue and sends the email to each person one by one. In this questions, instead of using default Queue which is implemented in C# already, https://docs.microsoft.com/en-us/dotnet/api/system.collections.generic.queue-1?view=net-6.0, you are required to build your own Queue class and implements some of the functionality.

Specifications

- Implement class "MyQueue" using the concept of generics.
- it should have two methods "enqueue" and "peek".
- In "MyQueue" class kindly use array of 5.
- In the main class try to insert element in the array using enqueue method and peek the first value.

Question 3: Stack have the property called “LIFO” which means Last in First out. Write a program that reads in a sequence of characters eg “teacher” and prints them in reverse order eg “rehcaet”. You should use Stack to implement this question.

Question 4: Reuse your Student class defined in Question 1 and add properties name, id, course enrolled. In the main class try to store 5 student’s information into the queue. Then create a function which uses lambda expression to sort the students and print the name in sorting order. After calling that method, iterate the queue and remove all element and print at the same time.

SUBMISSION INSTRUCTIONS

Work must be submitted in the correct file type and be properly labelled as per the College naming convention:
NAME_COURSE_ASSIGNMENT. E.g. XuXiaLing_FM50D_A01.

Sumit all things together in one single zipped file as NAME_COURSE_ASSIGNMENT1 and include following:

- Submit screenshots of input and output of your code in one single pdf file named as NAME_COURSE_ASSIGNMENT_code_screenshots
- Submit your code, each question code should be placed in a separate folder NAME_COURSE_ASSIGNMENT_code
- Submit your diagrams, pseudocode and flowcharts in separate folder NAME_COURSE_ASSIGNMENT_design

GRADING CRITERIA

Assignment Value: 10**%**

Grading Criteria	Grading
Question 1	25
Correctness of code	5
Right use of properties	5
Proper use of inheritance	5
Question 2	25
Correctness of code	10
Right use of Queue and its implementation	15
Question 3	25
Correctness of code	10
Right use of Stack and its implementation	15
Question 4	25
Correctness of code	10
Right use of Queue and its properties	15
TOTAL	**/100**