Programming the .Net Framework using C#

# Sorted Pair – Generic Programming

Object Oriented programming in C#

**Instructions:**

* Write a Generic class named “SortedPair”. The class is to be used in order to created sorted pairs of elements/items (the two items in the pair should be of the same type). The Generic part requires that the two items should be of a type that implements IComparable<T>. That is, all we know about the type of the items is that they are comparable via the method CompareTo
  1. The SortedPair class should include a Constructor that enables creation of object representing a pair of elements of the type T. The constructor gets the two parameters representing its elements in any order and creates a sorted pair. In case both parameters are equal, an exception should be thrown – IllegalPair (define such an exception class as subclass of the Exception base class)
  2. Add “First” and “Second” get properties to return the first (smallest) and second (larger) element of the pair
  3. Override object’s ToString() method to return a string with the pair elements: the smaller and then the larger
  4. Override object’s Equal method for this class. Two pairs are equal iff all their elements (first and second) are equal to the other pair.
* Test your SortedPair class for pairs of strings. Write a Main function that inputs pairs of strings, creates SortedPair elements and keeps the SortedPairs in a List. When done, iterate over the list and show the SortedPairs in the list (call ToString of the elements in the list)
* Test SortedPair class for pairs of points (each point has x,y coordinates). Following are instructions to **building Struct Point**:
  1. Given two points, point a will be considered smaller than point b if a.x is smaller than b.x, and a.y is smaller than b.y. Any other case will result in the points considered equal. For example: the point (5,7) is greater than point (3,2), but points (2,4) and (1,5) will be considered equal
  2. Write a program that creates 10 pairs of points with x,y values as random numbers between 0..100. For each pair, the program creates a SortedPair object, and shows it on the console window. If an attempt to create illegal pair occurred, catch the exception and show a corresponding message.

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## Detailed Instructions

## Features in C# that may be used in this project:

* **All** C# features from our course, including Generics, Generic collections, Interfaces, Exceptions, structs classes etc.

## Important Notes

* Build your classes based on the principles we learned in class.
* Define private and public as needed.
* As always, make sure your code is readable, using meaningful names, indentation and documentation.
* Avoid code duplication
* Do not use Console methods in the SortedPair class – make sure your class can be added in the future to an application with Graphical User Interface without changes. ( you may use Console WriteLine etc in the Main function in Program)