CST-246-101 - Data Structures - 20568.201402

News

Homework Assignment #4

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At the end of Chapter 8 of the textbook on pages 216 and 217 are two Exercises related to the Bubble Sort (#8 and #10). Your assignment is to **implement** the **iterative and recursive** versions of Bubble Sort as per **#8**. You will also **reimplement both** of these versions using the modifications discussed in **#10**. Give each version of the method its own name in the **class BubbleSort** (*BubbleIter*, *BubbleRec*, *BubbleIterMod*, *BubbleRecMod*).

Your **main()** method will:

1. create an array of, say, 100 elements
2. fill it with random integer values (see the documentation for the class **Random**) in the range of, say [0, 500)
3. sort the array using all four versions of the algorithm
4. verify that the array has been sorted properly by calling the method **boolean checkSorted(int[] a, int from, int to)** that was discussed in class

Additional, optional, features of this program that you MAY choose to implement (no extra credit, but personal satisfaction):

1. Include instrumentation instructions that will report the relative performance of your algorithms. These would count the number of comparisons and swaps that the algorithm performs and store then in a data structure (this could be a class instance of an inner class called **PerformanceStats**) that you could pass in to the sorting method and the sort algorithm will fill in (and return) its values which will be printed by the **main()** method (note: if the argument reference is **null** then your method will NOT do performance monitoring).
2. Define a mechanism to test if the algorithms (as written) are **stable** (you should try to make them stable, if you can). In class we discussed such a mechanism using the lower half of an **int** array element to hold the *value* and the upper half to hold the *tag* value which is the sequence number of each element when inserted into the array as a random value. *Use your imagination...*

Please submit your source code file to the **Dropbox** labeled **HW4**.

This project is due on or before **11:59 PM on Sunday, 30 March 2014**.

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