Computer Science 121

Lab 11
100 Points

In this lab, you will be practicing sorting arrays.
There is only one question and you must finish it in lab. This is your last lab, you are also advised to finish demo of your previous lab as we will not be meeting next week.
By the end of the lab, demo whatever your progress to your instructor.

Also, include the following comment at the beginning of your code: /*
* Your Name
* Submission Date
* CS 121 Lab
* Name of Program
*
* Describe what the program does in one to two sentences.
*/

Sorting data means to put the data in either ascending or descending order. In this lab, we will sort elements of an array in ascending order.

Q. Implement the method sortArrays in the given partial code.   (100 Points)

Suppose you have an array, [4, 2, 5, 1]

Then the sorted array will be [1, 2, 4, 5]
There are many ways sorting could be done, let us look at one very basic way of comparing each elements to the earlier elements in the list and putting them in their correct position to sort them.

[4, 2, 5, 1] is the original array
First, you can compare the element at the 1st index with the element at 0th index,
If the element at 1st index is smaller, then you need to exchange those elements.
Here element at 1st index is 2 and element at 0th index is 4, since 2< 4, we need to switch them. Then the array becomes
[2, 4, 5, 1]
Now we continue the process, next we compare element at 2nd index with all previous indexes to find the correct position. Here the element at 2nd index is 5 and at 1st index is 4, since 5<4 is false, 5 is already in correct ascending position and we do not need to do anything.
[2, 4, 5, 1] So the array list is same as before.
Next, we compare element at 3rd index with elements at lower indexes. Element at 3rd index is 1 and element at 2nd index is 5, since 1<5 we will exchange the elements and the resulting array will be
[2, 4, 1, 5]
We need to place 1 at the correct position, which means we need to compare 1 with all the elements before it.

This process will be continued, and element at 2nd index is now 1 and element at 1st index is 4, since 1<4, we will interchange elements so the resulting array is
[2, 1, 4, 5]
Now the element at 1st index is 1 and element at 0th index is 2, since 1<2, we will interchange elements and the resulting array is
[1, 2, 4, 5]
Since we compared upto index 0, we need to stop otherwise it will be index out of bounds error.
Also, we have tested all the elements so we are done sorting and the final result is
[1, 2, 4, 5]

Here is the summary of the steps:

[4, 2, 5, 1]
[2, 4, 5, 1]
[2, 4, 5, 1]
[2, 4, 1, 5]
[2, 1, 4, 5]
[1, 2, 4, 5]

You do not need to show all the steps, but only the final sorted result.
A class is already given to you where random numbers are stored in the array. Your job is to complete the sortArrays method.

Here are a few other examples showing the sorting process for you to understand how it is working:

[2, 1]
[1, 2]

[3, 2, 1]
[2, 3, 1]
[2, 1, 3]
[1, 2, 3]

[98, 34, 30, 8, 32]
[34, 98, 30, 8, 32]
[34, 30, 98, 8, 32]
[30, 34, 98, 8, 32]
[30, 34, 8, 98, 32]
[30, 8, 34, 98, 32]
[8, 30, 34, 98, 32]
[8, 30, 34, 32, 98]
[8, 30, 32, 34, 98]
[8, 30, 32, 34, 98]

You do not need to print the steps, just print the final output.
Complete the sortArrays method in the given SimpleSort.java and show it to your instructor.
Even if you are unable to get correct answer, show it to your instructor to get partial points for your code.