CS 103 Lab 11

1. Write a program which reads the size of an integer array from the user and create an array using that size. Then it fills the array with random numbers between 0-99 and sorts the array in ascending order using bubble sort algorithm. The program shall print the array elements to console before and after sorting.

   Bubble sort algorithm is very simple: Scan the whole array and swap two elements if first is greater than the second element. Following example shows working of bubble sort algorithm on array of 5 elements.

   Example:
   Pass 1:
   //put first element (i.e. 5) in its desrved position
   (**5 1** 4 2 8) –> (**1 5** 4 2 8) //swap 5 and 1
   (1 **5 4** 2 8) –> (1 **4 5** 2 8) //swap 5 and 4
   (1 4 **5 2** 8) –> (1 4 **2 5** 8) //swap 5 and 2
   (1 4 2 **5 8**) –> (1 4 2 **5 8**) //No need to swap as 5 is already smaller than 8
   //Note that now we are sure that last element is in its deserved location i.e. it is greatest number in the array
   //At least one swap is performed in this pass, so a next pass is needed

   Pass2:
   (**1 4** 2 5 8) –> (**1 4** 2 5 8) //no need to swap 1 and 4
   (1 **4 2** 5 8) –> (1 **2 4** 5 8 //swap 4 and 2
   (1 2 **4 5** 8) –> (1 2 **4 5** 8) //no need to wap 4 and 5
   (1 2 4 **5 8**) –> (1 2 4 **5 8**) //NO NEED to even compare with last element as it was already sorted in Pass1
   //at least on swap is performed in this pass, so a next pass is needed

   Pass 3:
   (**1 2** 4 5 8) –> (**1 2** 4 5 8) //no need to swap 1 and 2
   (1 **2 4** 5 8) –> (1 **2 4** 5 8) //no need to swap 2 and 4
   (1 2 **4 5** 8) –> (1 2 **4 5** 8) //no need to swap 4 and 5
   (1 2 4 **5 8**) –> (1 2 4 **5 8**) //no need to swap 5 and 8

   //No swap is performed in this pass, so next pass is NOT needed

```
//Example Output

Enter size of the array as a positive integer: naveed
Enter size of the array as a positive INTEGER: 10
Unsorted array: 41 75 11 34 22 35 34 3 83 6
Sorted array: 3 6 11 22 34 34 35 41 75 83
```

2. Modify the code in question 1 such that sorted and unsorted arrays are written to a file "arrays.txt"., instead of writing to the console.

```
//Example Output

//Console

Enter size of the array as a positive integer: naveed
Enter size of the array as a positive INTEGER: 20


//arrays.txt

Unsorted array: 20 84 90 49 76 22 74 14 3 56 63 49 12 29 21 17 49 85 70 67

Sorted array: 3 12 14 17 20 21 22 29 49 49 49 56 63 67 70 74 76 84 85 90
```