CS2710: Programming and Data Structures Lab
Home Assignment #3: Searching and Sorting

Due at 11:55 pm, August 28, 2016

August 24, 2016

Problem 1

Implement Counting Sort.

Input:
Two space separated values n and k where n is the size of the array and array elements $\in$[0,k]
n array elements

Output A single line containing the array elements sorted in ascending order

Problem 2

Implement the following sorting algorithms:

(a) Selection Sort

(b) Bubble Sort

(c) Insertion Sort

(d) Merge Sort

(e) Quick Sort

implement all the algorithms in a single file called q2_sort.c and use them for both Question 2 and Question 3.
Input
t number of test cases
n, number of elements in the array
The n array elements
Expected Output:
For each test-input there will be 5 output lines and each containing the array elements sorted in ascending order by each of the algorithms in sequence from **a** to **e**. For every test-input write the six space separated values per line to a file named **out2.txt** with the first being the array size and rest being the times(in

microsecond) taken by each of the algorithms, in the above mentioned sequence, to sort the array.

Note: Finally generate a single plot showing the "array-size vs Sorting-time" graph for all five algorithms. Script will be provided to complete this part.

Problem 3

Use all the sorting algorithms implemented in Question 2 to complete this
Input:
t, number of test-inputs
n, size of the array
n unsorted array elements elements
n sorted array elements in ascending order
n sorted array elements in descending order

Expected Output:
For every test-input, write 4 space separated values to files named as out3_bubble.txt, out3_insertion.txt and so on, for each algorithm run on all three arrays. First of 4 values must be the array size and next three being the times(microseconds) taken by the algorithms to run on the three arrays in the specified order.
Note: Script will be provided to plot the graphs