Fall 2019 – CS 303 Algorithms and Data Structures
Lab 6
Deadline: October 6,2019 Sunday 11:59pm

Notes:

- Implement the algorithm and analyze the results using the give input files
- **Deliverables**: Report.pdf file and your code file (please do not send a zip file. If you have more than one class in your code, then submit each file separately through Canvas.)
- Homework report must follow the guidelines provided in the sample report uploaded in Canvas

Objectives:

- Learn to come up with novel sorting ideas
- Learn to choose the best sorting algorithm for a given problem

Problems

1. Consider an algorithm that sorts an array of *n* elements by finding the smallest and largest elements and then exchanges those elements with the elements in the first and last positions in the array. Then the size of the array is reduced by two elements after excluding the two elements that are already in the proper positions, and the process is repeated on the remaining part of the array until the entire array is sorted.
   Write a code to implement the above algorithm. Write a driver program to show the novel sorting algorithm works correctly.

2. Consider an application that logs transactions. The log includes the location where a transaction originated and the time the transaction occurred and this information is stored such that they are ordered by the time of the transaction (see sample input below). You are required to sort this log by location while preserving the order of the time field (see sample output below). Implement an algorithm of your choice to sort this array based on the location while preserving the order of the time field. Test your algorithm with the input file provided in Canvas named "NovelSortInput.txt". Explain in your report why the sorting algorithm you chose is the best for the job.

   See a sample output below:

Sample Input

```
Chicago  09:00:00
Phoenix  09:00:03
Houston  09:00:13
Chicago  09:00:59
Houston  09:01:10
Chicago  09:03:13
Seattle  09:10:11
Seattle  09:10:25
Phoenix  09:14:25
Chicago  09:19:32
Chicago  09:19:46
Chicago  09:21:05
Seattle  09:22:43
Seattle  09:22:54
Chicago  09:25:52
Chicago  09:35:21
Seattle  09:36:14
Phoenix  09:37:44
```

Sample Output