CS 2420-003 Algorithms and Data Structures

Fall Semester, 2018

Assignment 7: Sorting Algorithms

Due Date: 4:30 p.m., Monday, Nov. 12, 2018 (at the beginning of CS 2420 class)

(**Note:** This assignment has three programming exercises.)

1. In this exercise, we implement the bubble sort algorithm studied in class. **(10 points)**

   On Canvas, go to the following folder: homework/hw7. There are a starter java file "hw7_Q1.java" and an input file "hw7_input.txt". The same input file will be used in the next two questions as well. The program first reads the numbers in the input file into an array and then calls a function *bubbleSort*() on the array. Finally, the sorted list will be output on the screen.

   Your task is to complete the function *bubbleSort*().

   I put a file "solution_hw7_output.txt" in the same folder, which contains the correct output.

2. In this exercise, we implement the merge sort algorithm discussed in class. **(25 points)**

   Go to the same folder as the first question, and use "hw7_Q2.java" as the starter file. The program first reads the numbers in the input file "hw7_input.txt" into an array and then calls a function *mergeSort*() on the array. Finally, the sorted list will be output on the screen.

   Your task is to complete the function *mergeSort*(). In order to do so, as discussed in class, you will also need to complete a merge function *merge*().

   Again, use the file "solution_hw7_output.txt" to check the correctness of your output.

3. In this exercise, we implement the quick sort algorithm discussed in class. **(25 points)**

   Go to the same folder as the first question, and use "hw7_Q3.java" as the starter file. The program first reads the numbers in the input file "hw7_input.txt" into an array and then calls a function *quickSort*() on the array. Finally, the sorted list will be output on the screen.

   Your task is to complete the function *quickSort*(). In order to do so, as discussed in class, you will also need to complete a function *partition*(). In the partition function, you may use any element as the pivot (for example, you may use $A[high]$, as discussed in class).

   Again, use the file "solution_hw7_output.txt" to check the correctness of your output.

Total Points: 60