

CS 2420-001 ALGORITHMS AND DATA STRUCTURES

Spring Semester, 2014

Assignment 7: Sorting Algorithms

Due Date: Friday, Apr. 4, 2014 (at the beginning of CS 2420 class)

(**Note:** This assignment has three programming exercises. Please submit **ONLY** your source files to Canvas.)

1. In this exercise, we implement the bubble sort algorithm studied in class. **(20 points)**

On Canvas, go to the following directory: homework/hw7. There are a starter cpp file “hw7_Q1.cpp” 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 “Wang_hw7_output.txt” in the same directory, which contains the correct output.

2. In this exercise, we implement the merge sort algorithm studied in class. **(20 points)**

Go to the same directory as the first question, and use “hw7_Q2.cpp” as the starter file. The program first reads the numbers in the input file 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 the merge function *merge()*.

Again, use the file “Wang_hw7_output.txt” to check the correctness of your output.

3. In this exercise, we implement the quick sort algorithm studied in class. **(20 points)**

Go to the same directory as the first question, and use “hw7_Q3.cpp” as the starter file. The program first reads the numbers in the input file 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 the function *partition()*. In the partition function, you may use any number as the pivot (for example, use $A[high]$ as we discussed in class).

Again, use the file “Wang_hw7_output.txt” to check the correctness of your output.

For your convenience, all the above files are packed in a zip file.

Total Points: 60