

COMP20003 Algorithms and Data Structures

Worksheet 8 Second (Spring) Semester 2016

Overview

The workshop for Week 8 will start with a tutorial on HeapSort, Master Theorem and Recurrences. You will implement Mergesort.

Tutorial Questions

Question 8.1 Construct a max binary heap from the following keys. Insert the items one-at-a-time, where Z is the maximum, and A is the minimum

8 7 16 10 5 13 5 11 15 12 1 17

1. Construct a max binary heap using the top-down approach.
2. Now construct a max binary heap from the same keys, using the bottom-up “heapify” method.
3. What is the complexity of each method? Did the time it took you to do the exercise on paper correlate (roughly) with the theoretical complexity?

Programming exercises

Programming 8.1 Write code for bottom-up mergesort where the data are contained in an initially unsorted `linked list`. You will have to construct an artificial linked list to test your code. You can populate your linked list with random numbers before sorting.

Programming 8.2 Write code for bottom-up mergesort where the data are contained in an initially unsorted `array`. You will have to construct an artificial array to test your code. You can populate your array with random numbers before sorting.

Were there any major differences between your code for the `array` and your code for the `linked list`?

September 9, 2016