Antonio Scalfaro

CMSC 451

05/31/2024

**Homework 3**

1) A computer screen shot of a black background

Description automatically generated

This is representative of the worst case of the bubble sort algorithm provided. This tree would look much the same in the best case. The only difference in the best case is that the bubble algorithm would end up doing less work for each call because there would be no need to swap any of the items in the array, as they are already in sorted order.

2) For each sort(array, i), bubble(array, i, j) is called (n – 1) – i times.

This gives the total number of bubble calls to be

The depth of the tree is n – 1 and the deepest bubble call is n – 1 so the height of the tree is

3) A computer screen shot of a black screen

Description automatically generated

A computer screen with a black screen

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

4) The execution time using the given sort() method is:

Since Java’s priority queue has an execution time of it is a more efficient algorithm than the provided sort() algorithm.