

Group Assignment 1

Each exercise is worth 10 points.

1. Demonstrate that heapsort is not a stable sort.
2. Do Problem 7-6 on Fuzzy sorting of intervals, found on page 189 of the third edition of the textbook.
3. Do Problem 8-3b on sorting variable-length strings in linear time, found on page 206 of the third edition of the textbook.
4. One step in the SELECT algorithm (Section 9.3) is to take five numbers at a time and find their median value. Write an algorithm that does this with 6 comparisons and prove that it does find the median of 5 numbers.
5. Do Problem 13-3a on AVL trees. found on page 333 of the third edition of the textbook. This problem is to show that the number of nodes in an AVL tree of height h is at least as large as the h th Fibonacci number.
6. Take a look at Problem 17-5 on page 476 on the third edition of the textbook. This problem deals with self-organizing lists where a node that has been found is moved step by step to the front of the list by repeatedly transposing it with its predecessor. This approach will work for both linked lists and lists that are stored in arrays. On page 478, however, there is a comment that by moving the node directly to the front of the list without all those transpositions is twice as efficient as what is presented in Problem 17-5. I don't want you to do Problem 17-5; instead, change the problem to the case where a found node is moved immediately to the front of a linked list in a single step. This will require removing the 2 factor in parts b, d, f and the definition of the potential function Φ . In parts g and h, the 4 should be changed to 2. Do the problem with these changes.