

CS 332: Algorithms
Homework #3

Assigned: Friday, February 08

Due: Wednesday, February 13 (Note: the day of our first exam)

1. Exercise 9.3-1 (10.3-1 in old book). You must prove your answer for the 7-element case, but you can argue it informally in the 3-element case (since a rigorous proof is a bit difficult).
2. Problem 9-1 (10-1 in old book).
3. Exercise 8.1-3 (9.1-3) Hint: Consider the height of the decision tree, and use the same argument as the proof of theorem 8.1.
4. (9.1-4 in old book, not in the new book): Professor Solomon claims that the $\Omega(n \lg n)$ lower bound for sorting n numbers does not apply to his machine, in which the control flow of a program can split three ways after a single comparison $a_i : a_j$, according to whether $a_i < a_j$, $a_i = a_j$, or $a_i > a_j$. Show that the professor is wrong by proving that the number of three-way comparisons required to sort n elements is still $\Omega(n \lg n)$.