

General Instructions

1. For general advice on homework, homework lateness policy, and honor code, refer to the *Course Syllabus* (on the CS 25 web page), which we discussed at the beginning of the term.
2. When describing an algorithm, you can use pseudocode or English, whichever is convenient. The important thing is that the description be both unambiguous and clear to the reader.
3. **Whenever** you are asked to give an algorithm, even if the problem does not explicitly ask for all of the following three parts, **you must supply** all of the following three parts:
 - (a) The algorithm.
 - (b) Proof of correctness of the algorithm, i.e., a clear and convincing argument that the algorithm is correct.
 - (c) Analysis of its running time.

Please note that all three components are assigned points in our grading guide and so an algorithm, even if correct, gets little credit unless the other components are also supplied.

1. (16 points) Exercise 9.3-1
2. (12 points) Recall QuickSort and then do Exercise 9.3-3
3. (12 points) Exercise 9.3-5. Note that i th order statistic of a set of numbers is simply the i th smallest number in the set.
4. (5 points) Exercise 13.1-5
5. (10 points) Exercise 13.1-7
6. (10 points) Exercise 14.1-6
7. (20 points) Exercise 14.1-7
8. (5 points) Exercise 14.2-2
9. (10 points) Can the depths of nodes in a red-black tree be efficiently maintained as fields in the nodes of the tree? Show how or argue why not.