

Design and Analysis of Algorithms

Problem #1.

Suppose we are given a sequence S of n elements, each of which is an integer in the range $[0, n^3 - 1]$. Describe a simple method for sorting S in $O(n)$ time.

Problem #2.

Professor Marley hypothesizes that he can obtain substantial performance gains in hashing by modifying the chaining scheme to keep each linked list in sorted order. How does the professor's modification effect the running time for successful searches, unsuccessful searches, insertions, deletions? Explain.

Problem #3.

Given a tree T with N nodes, the *diameter* of T is the length of a longest path between two nodes of T . Give an efficient (linear-time, if possible) algorithm for computing the diameter of T . What is the running time of your algorithm?
