

Homework 9 — due Tuesday, April 11

Problem 1 Exercise 17.2–4, page 337 of CLR.

Problem 2 Exercise 17.3–2, page 344 of CLR.

Problem 3 Construct the optimum binary search tree for a set of four keys $x_1 < x_2 < x_3 < x_4$, if

- keys $x < x_1$ are searched with probability 0.03
- $x = x_1$ is searched with probability 0.07
- keys $x_1 < x < x_2$ are searched with probability 0.03
- $x = x_2$ is searched with probability 0.22
- keys $x_2 < x < x_3$ are searched with probability 0.21
- $x = x_3$ is searched with probability 0.07
- keys $x_3 < x < x_4$ are searched with probability 0.09
- $x = x_4$ is searched with probability 0.17
- keys $x > x_4$ are searched with probability 0.11

Problem 4 We can sort a given set of n elements by first building a binary search tree containing these numbers (using TREE-INSERT repeatedly to insert the numbers one by one) and then printing the numbers by an inorder tree walk. What are the worst-case, best-case, and average-case running times of this sorting algorithm? (Hint: how does this algorithm relate to quick-sort?)