6-7 FURTHER READING MATERIALS

The prune-and-search approach is relatively new, and fewer papers have been published in this field compared to other fields. For further research, we recommend the following papers: Avis, Bose, Shermer, Snoeyink, Toussaint and Zhu (1996); Bhattacharya, Jadhav, Mukhopadhyay and Robert (1994); Chou and Chung (1994); Imai (1993); Imai, Kato and Yamamoto (1989); Imai, Lee and Yang (1992); Jadhav and Mukhopadhyay (1993); Megiddo (1983); Megiddo (1984); Megiddo (1985); and Shreesh, Asish and Binay (1996).

For some very interesting newly published papers, consult Eiter and Veith (2002); ElGindy, Everett and Toussaint (1993); Kirpatrick and Snoeyink (1993); Kirpatrick and Snoeyink (1995); and Santis and Persiano (1994).

Exercises

6.1 Make sure that you understand the differences and similarities between divide-and-conquer and prune-and-search. Note that the recurrence formulas may look quite similar.

6.2 Write a program to implement the selection algorithm introduced in this chapter. Another method to find the kth largest number is to perform the quick sort and pick out the kth largest number from the sorted array. Implement this approach also. Compare the two programs. Explain your testing results.

6.3 Two sets of points A and B in R^d are said to be linearly separable if there exists a $(d-1)$-dimensional hyperplane such that A and B lie on opposite sides of it. Show that the linear separability problem is a linear programming problem.

6.4 By the results in Exercise 6.3, show that the linear separability problem can be solved in $O(n)$ time in two and three dimensions.

6.5 Read Theorem 3.3 of Horowitz and Sahni (1978) for the average case analysis of the selection algorithm based on the prune-and-search approach.