

22C:31 Homework 3

Due in class on Tuesday, Oct 20th

1. Solve the following recurrences and obtain an asymptotic upper bound on $T(n)$:

(a) $T(n) = 4T\left(\frac{n}{2}\right) + n.$

(b) $T(n) = T(n-1) + n.$

(c) $T(n) = 3T\left(\frac{n}{4}\right) + n^2.$

(d) $T(n) = T(\sqrt{n}) + 1.$

2. The *maximum subsequence sum* problem takes as input a size- n array A of integers (the elements can be negative also) and finds values i and j , $1 \leq i \leq j \leq n$ such that

$$\sum_{k=i}^j A[k]$$

is maximized. Use *divide-and-conquer* to devise an $O(n \log n)$ time algorithm for this problem.

3. Problem 1, Chapter 5, Page 246.

4. Problem 2, Chapter 5, Page 246.

5. Problem 5, Chapter 5, Page 248.

6. Problem 7, Chapter 5, Pages 248-249.
