Design and Analysis of Algorithms

Lecture-8

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Recurrence relation

3. Give asymptotic upper and lower bounds for $T(n)$ in each of the following recurrences. Assume that $T(n)$ is constant for $n \leq 2$. Make your bounds as tight as possible, and justify your answers.

(a) $T(n) = 2T(n/2) + n^4$

(b) $T(n) = T(7n/10) + n$

(c) $T(n) = 16T(n/4) + n^2$

(d) $T(n) = 2T(n/4) + \sqrt{n}$

(e) $T(n) = T(n-2) + n^2$

(f) $T(n) = 7T(n/3) + n^2$

(g) $T(n) = 3T(n/3 - 2) + n/2$

Recurrence relation

4. Give asymptotic upper and lower bounds for T(n) in each of the following recurrences. Assume that T(n) is constant for sufficiently small n. Make your bounds as tight as possible, and justify your answers.

(a) $T(n) = 4T(n/3) + n \lg n$

(b) $T(n) = 3T(n/3) + n/\lg n$

(c) $T(n) = 2T(n/2) + n/\lg n$

(d) $T(n) = T(n/2) + T(n/4) + T(n/8) + n$

(e) $T(n) = T(n-1) + 1/n$

(f) $T(n) = T(n-1) + \lg n$

(g) $T(n) = T(n-2) + 1/\lg n$

(h) $T(n) = \sqrt{n}\, T(\sqrt{n}) + n$