Home Work-2: Recurrences

Algorithms Fall 2013

Deadline 19 Nov 2013, Tuesday, 4 PM

P – 1 [Marks 180] Without using Master Method, give asymptotic tight bounds for $T(n)$ in each of the following recurrences. Assume that $T(n)$ is constant for $n \leq 2$.

1. $T(n) = 2T(n/2) + n^3$
2. $T(n) = T(9n/10) + n$
3. $T(n) = 16T(n/4) + n^2$
4. $T(n) = 7T(n/3) + n^2$
5. $T(n) = 7T(n/2) + n^2$
6. $T(n) = T(n - 1) + n$
7. $T(n) = 2T(n/4) + \sqrt{n}$
8. $T(n) = T(\sqrt{n}) + 1$
9. $T(n) = 3T(n/2) + n \lg n$
10. $T(n) = 5T(n/5) + n/\lg n$
11. $T(n) = 3T(n/3 + 5) + n/2$
12. $T(n) = 2T(n/2) + n/\lg n$
13. $T(n) = T(n/2) + T(n/4) + T(n/8) + n$.
14. $T(n) = T(n - 1) + 1/n$
15. $T(n) = T(n - 1) + \lg n$
16. $T(n) = T(n - 2) + 2 \lg n$
17. $T(n) = 4T(n/2) + n^2\sqrt{n}$
18. $T(n) = \sqrt{n}T(\sqrt{n}) + n$

P – 2 [Marks 180] Repeat P-1 using Master Method wherever possible. Also indicate and show the recurrences in P-1 in which Master method can not be applied.

P – 3 [Marks 20] What is *regularity-condition* in case-3 of Master method? Write a recurrence in which Master method fails just because of the regularity condition, all other conditions are fulfilled.