

CPSC 311: Analysis of Algorithms
Recurrences: Practice Problems

These problems are solely for your own benefit in practicing solving recurrences. They will not be turned in or graded. A solution sheet will not be handed out. If you want to discuss whether you are doing them correctly, you can meet with the instructor.

Determine upper and lower bounds for the following recurrences. For all problems, assume $T(1) = c$, where c is a constant. It is sufficient that you be able to determine the asymptotic complexity of $T(n)$, i.e., you do not necessarily need to solve the recurrence exactly.

1. $T(n) = T(n/2) + 1$
2. $T(n) = 3T(n/3) + \log n$
3. $T(n) = 4T(n/4) + n$
4. $T(n) = 2T(n/2) + n^2$
5. $T(n) = T(n - a) + T(a) + n$, where $a \geq 1$ is a constant.
6. $T(n) = T(\sqrt{n}) + \log n$, where $T(2) = 1$
7. $T(n) = \sqrt{n} \cdot T(\sqrt{n}) + n$, where $T(2) = 1$