

# Analysis of Algorithms

CS 375, Spring 2019

Homework 8

Due **AT THE BEGINNING OF CLASS** Wednesday, March 13

- From your textbook (CLRS), please read Chapter 4, pages 65–67 and 88–97.
- *A general note:* When writing up your homework, please write neatly and **explain your answers clearly**, giving all details needed to make your answers easy to understand. Graders may not award credit to incomplete or illegible solutions. Clear communication *is* the point, on every assignment.

## Exercises

1. Give  $\Theta$  bounds for the following recurrences. *Be sure to use the Master Theorem for these exercises.* As always, be sure to give a brief explanation of your answers—here, that will include the values for each relevant variable in the Master Theorem, what case of the Theorem you are applying, and a very brief explanation of how you know what case to apply. (A full explanation could take no more than 3–4 sentences.)
  - (a)  $T(n) = 4T(n/2) + n^2$ ,  $T(1) = 1$ .
  - (b)  $T(n) = 4T(n/2) + n^3$ ,  $T(1) = 1$ .
2. Give  $\Theta$  bounds for the following recurrences. As always, be sure to give a brief explanation (with appropriate details) of your answers.
  - (a)  $T(n) = 4T(n/3) + n \lg n$ ,  $T(1) = 1$ .
  - (b)  $T(n) = 4T(n/2) + n^2\sqrt{n}$ ,  $T(1) = 1$ .