

### Administrivia

- Reminder: Homework 4 due Thursday.
- We will move the midterm to after the break — clear majority of those responding to e-mail. Tuesday or Thursday? (Vote was for Thursday.)

Slide 1

### Recurrence Relations — Examples Continued

- Divide-and-conquer: practice #25 in textbook.

Slide 2

### Analysis of Algorithms, Overview

Slide 3

- Often there's more than one way to solve a given problem, i.e., more than one algorithm. Which one is "best"? Depends on what "best" means. If we mean "fastest":
- A useful measure of approximate execution time is worst-case (or sometimes average-case) execution time expressed as a function of "problem size" (e.g., for operations on array, size of array) — "time complexity" of algorithm.  
(Another measure is "space complexity".)
- Customary to skip over housekeeping operations and count only "important stuff" — arithmetic operations, comparisons, etc.  
Also customary to "round off" the estimate to an "order of magnitude" — for a problem of size  $N$ , we say an algorithm is  $O(f(N))$  if execution time is somehow comparable to  $f(N)$ .

### Analysis of Algorithms, Examples

Slide 4

- Example — computing a sum of  $N$  numbers. How many additions?
- Example — sequential search of array of size  $N$ . How many comparisons (worst case)?
- Example — binary search of sorted array of size  $N$ . How many comparisons (worst case)?
- (To be continued . . .)

## Minute Essay

- None — quiz.

Slide 5