CS1003/1004: Intro to CS, Spring 2004

Lecture #8: Algorithms IV
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Administrivia
- HW#2 due now
  - Won’t be returned before midterm, so I’ll release solutions
- HW#3 out
  - All programming
- I’m teaching C lab this week
- Midterm next Tuesday
  - Topics list posted
  - Extra review session?

Agenda
- One more recursive example
- Talk about one more class of algorithms: sorting
- Spend some more time on big-Oh notation
- Midterm review
  - More midterm review in labs…
Recursion, redux

- Idea: instead of using explicit loops, cast problem in terms of itself
- Base case(s) and recursive case
- How can we compute $n!$ recursively?
- I won’t make you design a recursion on the exam, but you should be able to recognize one

Sorting

- Common problem: given data, sort it in some fashion
- Most common-type is comparison-based sort
- Can you come up with way to sort information?
- Many different kinds; we’ll look at two today
  - Bubble sort
  - Insertion sort
- Let’s make this interesting…

Big-Oh notation, redux

- Basic intuition:
  - Find the number of steps in terms of $n$ or other variables
  - Drop any constants or additive lower-order terms
  - Put a $O(\ )$ around the result
  - Common: $O(1), O(\log N), O(N), O(N^2), O(2^N)$
- What’s the complexity of the algorithms we just talked about?
Next time

- Midterm
- Then break! 😊
- Then HW3 is due… 😊