Administrivia

- Reminder — Quiz 5 Thursday. Possible topics include exceptions, GUIs, graphics.
- Homework 6 code due Thursday (deadline extended).

Minute Essay From Last Lecture

- Consider the following recursive function.
  
  ```java
  public static int mystery(int m, int n) {
    if (n == 0)
      return m;
    else
      return 1 + mystery(m, n-1);
  }
  
  What does mystery(5, 3) return? 8
  
  Give a short description in general of what mystery accomplishes.
  If n is non-negative, mystery(m, n) returns m+n. Otherwise the recursion is "infinite" (ends when we run out of stack space).
  How to be sure? "Guess" based on examples, then think through as in next slide.

Recursion — Thinking About Correctness

- Does it work for base case(s)?
- Assuming recursive calls work, does it work for other cases?
- Does every recursive call get you at least one step closer to a base case?

Recursion — More Examples

- Quicksort — pick "pivot" element, split array into elements less than pivot and elements greater than pivot, and sort recursively. Why does this work?
- Mergesort — split array (or list) into two pieces of equal size, sort recursively, merge. Why does this work?
- Filling the area inside a border.
Minute Essay

- We said quicksort is usually faster than, say, bubble sort, but there are unusual cases in which it's not. One is if the data is already sorted (and the pivot is chosen as the first element). What's another case in which quicksort would not be especially quick?