Administrivia

- Reminder — Quiz 5 Thursday. Possible topics include exceptions, GUIs, graphics.

- Homework 6 code due Thursday (deadline extended).

Slide 1

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?

Slide 3

Minute Essay From Last Lecture

- Consider the following recursive function.

```
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.

Slide 2

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.

Slide 4

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?