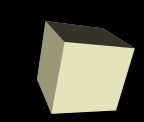
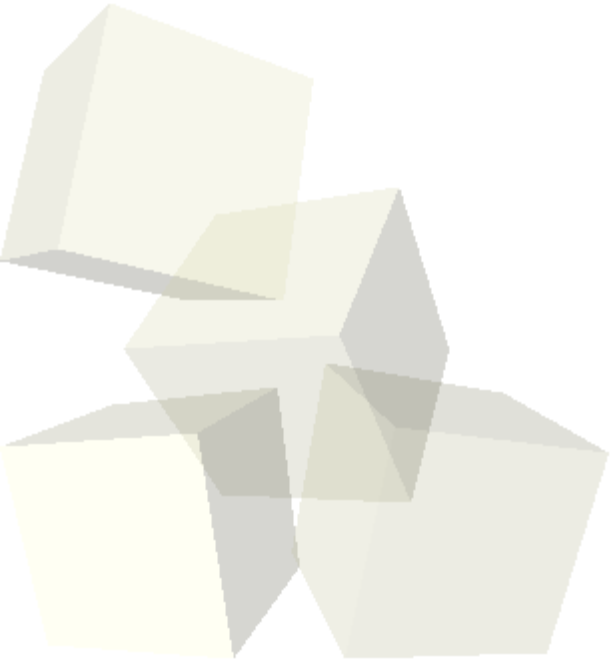


Advanced Algorithms

1-12-2006



Opening Discussion

- So how many people skimmed through the readings? What did you find?

Basics

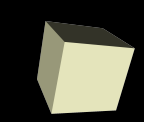
- The course web page is http://www.cs.trinity.edu/~mlewis/CSCI3394-S06/
- My office hours this semester are 10:00-11:30 MWF and 3:30-6:00 TR.
- Hopefully all of you know my contact information and other stuff by this point.
- The required text is CLRS. The “Algorithm Design” (KT) is an optional text. I'll explain later who should consider buying it.
- There is a schedule for the full semester up at the web site.

Description

- This course is a follow on to Data Abstraction. It is somewhat parallel to the Analysis of Algorithms course. We will worry about the analysis of algorithms, but more importantly, we will be implementing algorithms in this course. To do so requires data structures that you will also write.
- This course will do about half of CLRS and the full KT book. We will cover a number of advanced data structures, algorithms, and techniques that you can use for problem solving.

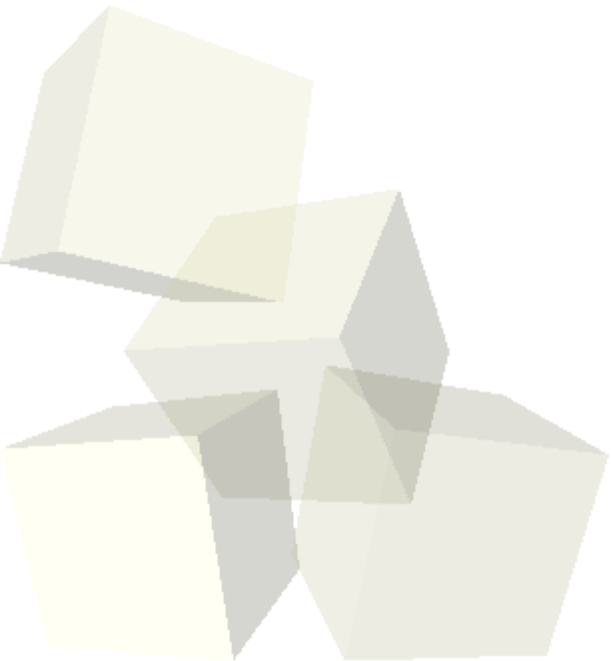
Grading

- The grading for this course is a bit different from other courses. There are going to be 14 items you can turn in during the semester. Every two weeks I will give a 48 hour take home exam and every two weeks there will be a programming assignment.
- Every item is worth up to 10 points and your best 10 will be used to find your final grade.
- I don't care what you turn in or if you even attempt all 14. You will find that some assignments require code from others so don't plan on doing the later assignments without doing the earlier ones.



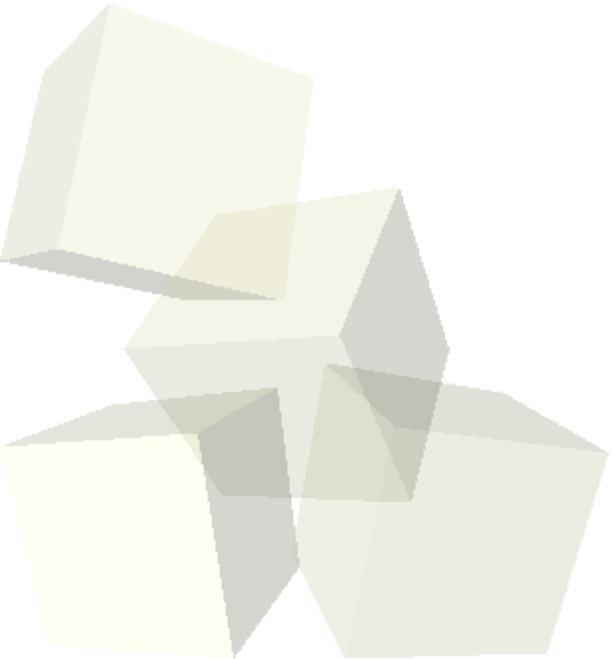
Overview

- Let's look now at the schedule page on the web to see what we will be covering over the course of the semester.



First Assignment

- I have also posted your first assignment for the semester. Let's pull that up and



Algorithm Analysis

- Most of your CS career you have used O notation. There are actually 3 bounds that are commonly used.
- O – Upper bound
  - f(n) is O(g(n)) then there exist c and n_0 such that $0 \le f(n) \le cg(n)$ for all $n \ge n_0$.
- Ω – Lower bound
  - f(n) is Ω(g(n)) then there exist c and n_0 such that $0 \le cg(n) \le f(n)$ for all $n \ge n_0$.
- Θ – Both upper and lower bound
  - f(n) is Θ(g(n)) iff f(n)=O(g(n)) and f(n)=Ω(g(n)).
- Note that these are assymptotic bounds. They are only significant for large enough input sizes.

Less Used Bounds

- These two other types of bounds say that something is distinctly less than a given growth or distinctly higher than it.
- o – exclusive upper bound
- ω – exclusive lower bound
- These mirror the capital equivalents, only we say that a value of n exists for every positive value of c.

Reminders

- Look over the first assignment and do the reading for next class. I will be handing out the first take-home on Tuesday.