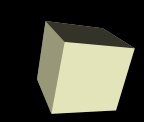
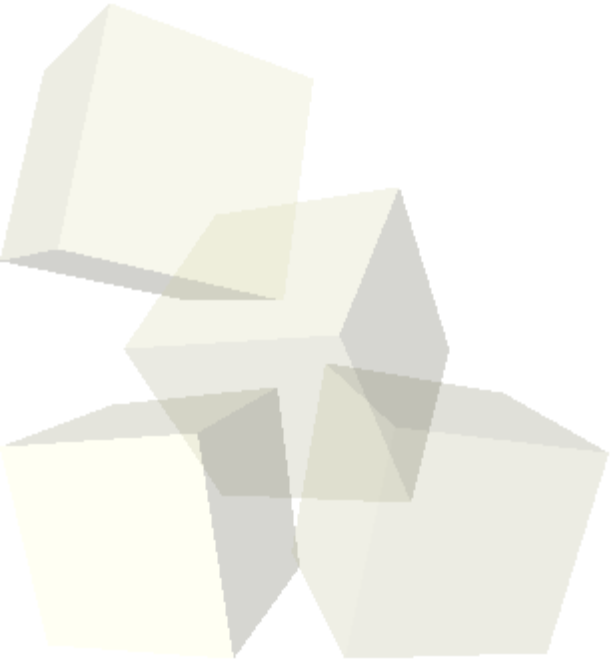


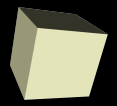
Linked Lists and Iterators

2-21-2006



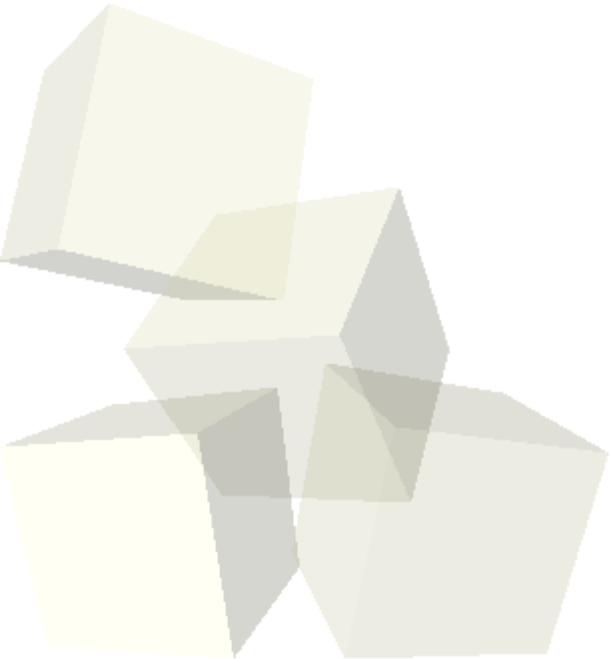
Opening Discussion

- What did we talk about last class?
- Do you have any questions about the reading?
- Do you have any questions about the assignment?



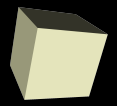
Implementing Linked Lists

- Last time we started to implement a linked list. Today we need to continue working on that. We can begin by implementing the add and remove methods.



Running Through a Linked List

- A number of the functions we wrote had to walk through our list. You might have noticed that there is a nice pattern for how that can be done with a for loop. It is much like what is done when we iterate through an array, but the statements we use are distinctly different.
- The pattern is to start with a reference to the head, then keep moving the reference to the next element as long as we haven't hit the end of the list. Typically the end is either a null or where we run back into our sentinel.
- The real question is how could we write a loop that could loop through a list regardless of implementation?



Iterators

- The answer to that question is the iterator pattern. An iterator is an object that can take you from one element of a container to another. Iterators can be used not only with lists, but with any other type of collection of objects. This way, a single loop could be written that walks through anything.
- The iterator is also the underpinning of the for-each loop in Java 5.0. You can only use that loop with objects that are Iterable. That tells you that they have an iterator method in them.
- Let's look at a loop that uses an Iterator and implement the iterator method of our list.

Sorted Linked Lists

- In the list that we have been working on, we have the ability to control exactly where things go in the list. Some collections don't give that ability, they keep their elements in a specified order.
- A sorted linked list is a simple example of this. With a sorted linked list items have to be placed into proper sorted order. This changes the interface as a number of our methods from before will lose their meaning.
- What methods lose their meaning? What other methods are going to change their implementation? How will they change?

Minute Essay

- Write the add method for a sorted double linked list with a sentinel. Assume you have a Comparator object named comp.
- Remember that the design for assignment #3 is due today.