Announcements

- Vector HW - up today
Lists:

Motivation: Insert in vectors is slow!

(Running time?) $O(n)$

Idea: If I know where the element should go, inserting should be easy.
Doubly Linked Lists

```
lead

insert (ORD) - where?
```

1 node allocation

4 pointer updates
Better: Circularly linked lists

empty:  Sentinel

Sentinel
Problem: Pointers!

What do we need in order to know where we should insert?

- need pointer to a node

Solution: Iterator class whose private data is simply one pointer. Hide all possibility of seg fault.
Iterators

An iterator will give the user a "pointer", but with a heavily controlled structure. (So they can't touch nodes directly.)

Compromise: Functionality versus info. encapsulation

Goal: protect data & user
STL functions
Usage:

```cpp
List <int> my_list;
List <int> :: iterator it;
```
Code:

2 internal classes