Homework h3 (quiz), due 10 pm, Friday, Sept 30th
Program p1, due 10pm Sunday, Oct 2nd. (Should by about half way by now)

Assignment questions? Post it on Piazza or Consult with a TA during scheduled hours.

Report any exam conflicts or McBurney exam accommodations before Oct 7th.
See Module 3 for links to instructions for submitting requests.

Last Time
Exceptions Review
• throws and checked vs. unchecked
• defining
Java Primitives vs. References Review
Chains of Linked Nodes
• ListNode class
• practice with chains of nodes

Today
Chains of Linked Nodes
• more practice with chains of nodes
Java Visibility Modifiers
LinkedList Class

Next Time
Read: continue Linked Lists
LinkedListIterator Class
Linked List Variations
• tail reference
• header node
• double linking
• circular linking
Recall Chain of Linked Nodes Data Structure

**Listnode class**

class Listnode<E> {

    private E data;
    private Listnode<E> next;

    public Listnode(E d) {
        . . . }
    public Listnode(E d, Listnode<E> n){ . . . }
    public E getData() {
        return data; }
    public Listnode<E> getNext() {
        return next; }
    public void setData(E d) {
        data = d; }
    public void setNext(Listnode<E> n) {
        next = n; }
}

→ **Show how the memory diagrams change** as a result of executing the code beneath each:

```java
head

head.setNext(head.getNext().getNext().getNext().getNext());

head

head.getNext().getNext().setNext(head);

head

n1

n1.setNext(curr.getNext());
curr.setNext(n1);
```
Practice: Making a Chain of Nodes

→ Create a chain of Listnodes containing the Strings "yippie", "ki", and "yay" (as shown below) in as few statements as you can.
Practice: Traversing a Chain of Nodes

Assume `head` points to the first node in a chain of `Listnode`es containing `Strings`.

→ Write a code fragment that counts the number of strings in the chain of nodes.

```java
int count = 0;
```
Practice: Adding a Node at the Chain’s End

Assume head points to the first node in a chain of Listnodes containing Strings.

→ **Write a code fragment** that adds a node containing “rear” to the end of the chain of nodes.
   You may assume the chain has at least one item.

```
head  →  node1  →  node2  →  ...  →  nodeN  →  null
```
Assume `head` points to the first node in a chain of `Listnode` objects containing `String` objects.

→ **Write a code fragment** that removes the third item from the chain of nodes. You may assume the chain has at least three items.

→ **How would you generalize your code** so it removes the Nth item from the chain of nodes?
Practice: Challenge Question

Assume head points to the first node in a chain of Listnodes containing Strings.

→ Write a code fragment that reverses the order of the nodes in the chain.
Java Visibility Modifiers

public:  public class ArrayList<E>

private:  private Object[] items

protected:  protected String name

package:  class ListNode<E>
public class LinkedList<E> implements ListADT<E> {
    private Listnode<E> head;
    private int numItems;

    public LinkedList() {
    }

    public void add(E item) {
}