**ICS/CSE 22** **Monday, May 9, 2011**

# Quiz 5

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1. Give the worst-case running time of the following methods using big-Oh notation. Both methods are in class **LinkedList**. The reference **head** points to the first node in the list and is a member variable of the class **LinkedList**. The first node in the list is a dummy item and is never removed. $n$ is the number of nodes in the list.

   (a) This method deletes the first item in the list and returns the element stored in that node.

```
public E deleteFirst() throws NoSuchElementException
{
     if ( head.next == null )
          throw new NoSuchElementException();

     E ret = head.next.data;
     head.next = head.next.next;

     return( ret );
}
```

   (b) This method deletes the last item in the list and returns the element stored in that node.

```
public E deleteLast() throws NoSuchElementException
{
     if ( head.next == null )
          throw new NoSuchElementException();

     Node<E> current;

     current = head;

     while ( current.next.next != null )
          current = current.next;

     E ret = current.next.data;
     current.next = null;

     return( ret );
}
```

2. Give the worst-case running time of the following methods using big-Oh notation. The input to both methods is an array of integers and $n$ is the size of the array.

   (a) The following method computes the average of the first and last integers in an array.

```
public double computeAverageOfEnds( int[] list )
{
     double average;

     average = list[0] + list[ list.length-1 ];
     average = average/2;

     return( average );
}
```

   (b) The following method computes the sum of integers in an array.

```
public int computeSum( int[] list )
{
     int sum = 0;

     for ( int i = 0; i < list.length; i++ )
     {
          sum = sum + list[i];
     }

     return( sum );
}
```

3. Which of the following statements are true:

   (a) $6n^2 + 7$ is $O(n)$.

   (b) $4n - 5$ is $O(1)$.

   (c) 27 is $O(1)$.

   (d) $5n - 3$ is $O(n)$.