

ICS H22 Homework 4

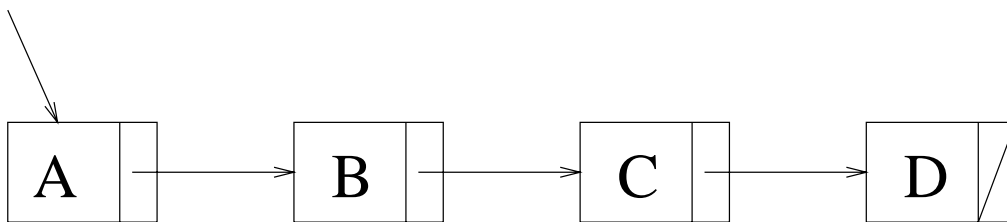
Fall 2004

3PM, Monday, October 25, 2004

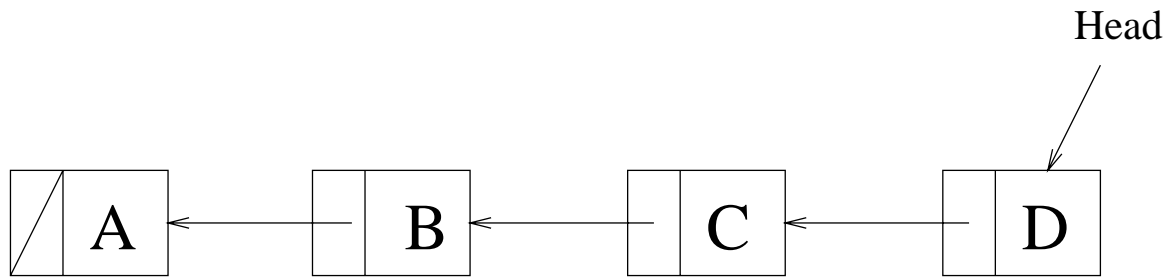
1. Suppose you have a class `LinkedList` which maintains a singly linked list. Each element in the list is an object of class `ListNode` given below. The `LinkedList` class has a `head` reference which points to the first item in the list. Write a **NON-RECURSIVE** method which will reverse the list.

That is, if the linked list looks like this before the call to `reverseList()`:

Head



then it should look like this after the call to `reverseList()`:



Your method should be as efficient as possible in terms of the extra memory used and the time it takes to run. Specifically, you should use only $O(1)$ extra space. That is, it should only use a constant number of additional references, so storing the items temporarily in an array is not allowed. Give the running time (in O -notation) of your method.

```
public class ListNode<E>
{
    E element;
    ListNode<E> next;
}
```

```
public class LinkedList<E>
{
    ListNode<E> head;

    public void reverseList()
    {
        // your code goes here.
    }
}
```

2. In class, we have implemented (parts of) the **Vector** and **List** abstract data types. Augment each implementation with an **iterator()** method which returns an iterator for each class. You will need to create an iterator class for each one that implements **hasNext()** and **next()**. The **next()** method should throw a **NoSuchElementException** if the iterator has no next element.