

CMSC132 Summer 2008 Quiz #2 Soln, Duration 20 Minutes

Name (last name followed by first name):

Implement the methods below based on the following Java class definitions. You may not add any instance variables, static variables or auxiliary methods to the LinkedList class. In addition, you may not use the Java API LinkedList class, the ArrayList class or arrays.

```
public class LinkedList<T> {
    private class Node {
        private T data;
        private Node next;
        public Node(T data) {
            this.data = data;
            next = null;
        }
    }

    private Node head;

    public LinkedList() { // YOU MUST IMPLEMENT THIS METHOD }
    public T removeElementAtIndex(int idx) { // YOU MUST IMPLEMENT THIS METHOD }
}
```

1. Implement a constructor that defines an empty list.
2. Implement a method named **removeElementAtIndex** that removes the element of the list associated with the specified index value (first element is at index 0, second element is at index 1, etc.). You can assume the method will not be called with an empty list. The method will:
 - o Remove the element at the specified index position.
 - o Return the removed element.
 - o Throw an `IllegalArgumentException` with the message ("Invalid index") if the index is out of range.

One Possible Solution:

```
public LinkedList() {
    head = null;
}

public T removeElementAtIndex(int idx) {
    if (idx < 0)
        throw new IllegalArgumentException("Invalid index");

    Node curr=head, prev=null;
    int i=0;
    while (i<idx && curr!=null) {
        prev = curr;
        curr = curr.next;

        i++;
    }
    if (curr == null)
        throw new IllegalArgumentException("Invalid index");
    if (curr == head)
        head = head.next;
    else
        prev.next = curr.next;
    return curr.data;
}
```