

Northern Michigan University (Marquette Co, MI)

CS422-01-25W: Algorithms (Andrew A. Poe)
Quiz 2

Name: _____
Monday 3 February 2025 9:00 A.M. EST

Time: 15 minutes

```
public class LinkedList {
    private LinkedListNode head;
}

public class LinkedListNode {
    private int value;
    private LinkedListNode next;
}
```

Write this method as part of the `LinkedList` class: `public void swapfirstlast () {...}`

`swapfirstlast()` swaps the first and last nodes in the linked list, leaving the other nodes unaltered. For example, if the list were `head-->1-->2-->3-->4-->5`, after this method is run the list would be `head-->5-->2-->3-->4-->1`.

Do not create nodes or change the data fields within existing nodes. Do this by pointer manipulation only. Do not use loops; use recursion only.

You may assume that both classes have reasonable sets and gets. You do not need a constructor for this problem. You are free to use helper methods in either class, but you must write them if you do.

```
LinkedList!
public void swapfirstlast () {

    if (head != null && head.getnext() != null) {
        LinkedListNode s2l = head.secondtolast();
        LinkedListNode nh = s2l.getnext();
        if (head==s2l) {
            head.setnext(null); nh.setnext(head); head=nh;
        } else {
            nh.setnext(head.getnext());
            s2l.setnext(head);
            head.setnext(null);
            head = nh;
        }
    }
}
```

```
LinkedListNode:
public LinkedListNode secondtolast () {

    LinkedListNode s2l = null;
    if (next.getnext()==null) s2l = this;
    else s2l = next.secondtolast();
    return s2l;
}
```