AP Computer Science Name: _____
Linked List M/C Homework

1. Consider the following method:

```
public static void mystery(ListNode p){
      if (p != null){
            mystery(p.getNext().getNext());
            p.setNext(p.getNext().getNext());
      }
}
```

What changes does mystery make to the list whose first node is `p` ?

(A) It makes no changes to the list.
(B) It removes the first, third, and all odd nodes from the list.
(C) It removes the second, fourth, and all even nodes from the list.
(D) It removes all nodes except the first node of the list.
(E) If the number of nodes in the list is odd, it will cause a `NullPointerException`; otherwise, it removes half of the nodes from the list.

2. Consider the following partial class declaration.

```
public class LList{
      private ListNode front;
      public LList(){
            front = null;
      }
      public void addToLList(Comparable obj){
            front = addHelper(front, obj);
      }
      private ListNode addHelper(ListNode list, Comparable obj){
            if (list == null || obj.compareTo(list.getValue()) == 0){
                  list = new ListNode(obj, list);
                  return list;
            }
            else{
                  list.setNext(addHelper(list.getNext(), obj));
                  return list;
            }
      }
      // ... other methods and data not shown
}
```

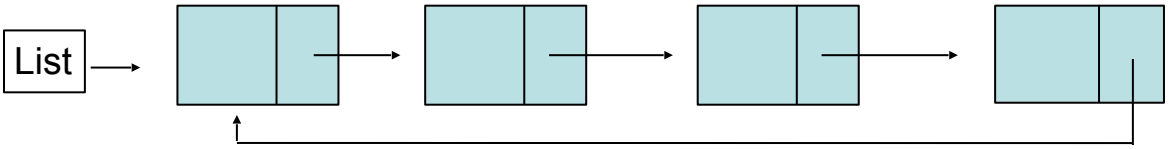
Consider the following code segment that appears in a client program.

```
LList list = new LList();
list.addToLList("manager");
list.addToLList("boy");
list.addToLList("girl");
list.addToLList("anyone");
list.addToLList("place");
list.addToLList("vector");
```

What values are in `list` after the code segment has been executed?

(A) `[anyone, boy, girl, manager, place, vector]`
(B) `[manager, boy, girl, anyone, place, vector]`
(C) `[vector, place, anyone, girl, boy, manager]`
(D) `[vector, place, manager, girl, boy, anyone]`
(E) Nothing is in `list` because a `NullPointerException` was thrown during the execution.

3. A circular linked list is defined to be a linked list where the last node points back to the first node (see below:)



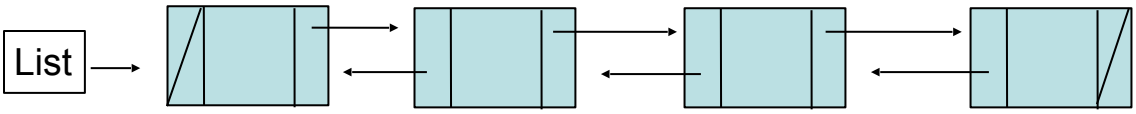
Which of the following indicates changes that would need to be made to a system that already used a regular linked list in order to implement this data structure correctly?

I. The ListNode class would have to be modified
II. The code used to build the list would have to be modified
III The code to print the list would have to be modified

a. I, II, and III
b. I and II only
c. II and III only
d. I only
e. II only

Consider the following data structure for questions 4 and 5.

A doubly linked list is a linked list where each node not only points to the one after it, but also to the previous node. (see below:)



4. Which of the following indicates changes that would need to be made to a system that already used a regular linked list in order to implement this data structure correctly?

I. The ListNode class would have to be modified
II. The code used to build the list would have to be modified
III The code to print the list would have to be modified

a. I, II, and III
b. I and II only
c. II and III only

d. I only
e. II only

5. Which of the following operations would be more efficient with a doubly linked list, as opposed to a singly linked list?

I. Sorting (Standard Insertion Sort)
II. Searching for a specific element (standard Linear Search)
III. Inserting an element into sorted order

a. I only
b. II only
c. III only
d. I and III only
e. none of the above algorithms would have added efficiency from a doubly linked list.