NetID: roatis2 QuizID: 98746 Score: 1 / 5 Answer Source: PrairieLearn

1. Let `P` be a singly linked list. Let `Q` be the pointer to an arbitrary node `x` in the list. What is the tightest worst-case time complexity of the best known algorithm to delete the node `x` from the list, assuming that the list has sentinels?

A. [Your Answer] O(n)
B. O(n log n)
C. [Correct Answer] O(1)
D. O(log n)
E. O(log log n)

2. Consider a class `List` that is implemented using a doubly linked list with only a `head` pointer (i.e. pointer to the first node in the list).

Given that implementation, which of the following operations *cannot* be implemented in O(1) time?

I. Insert item at the front of the list
II. Insert item at the rear of the list
III. Delete front item from list
IV. Delete rear item from list

A. All of them
B. [Correct Answer] [Your Answer] II and IV
C. I and III
D. I and II
E. I, II and III

3. Consider the following function definition and suppose that 1) the `node` class consists of an integer `data` element, and a `node` pointer called `next`, and 2) variable `head` is the address of a linked list of such `node`s.

What does the function do?

```
void fun(node * curr) {
   if (curr != NULL) {
      fun(curr->next);
      cout << curr->data;
   }
}

node * head = NULL;
// maybe insert data into the chain here
fun(head);
```

A. `fun` segfaults on lists of odd length.
B. None of the other options is correct.
C. [Your Answer] `fun` prints every other element of the list.
D. `fun` prints the elements of the list from `head` to the end.
E. [Correct Answer] `fun` prints the reverse of the list.

4. Which of the following List ADT implementations gives us an O(1) time for `insertAtEnd`, i.e inserting an element at the end of the list?

I. A singly-linked list with only a `head` pointer.
II. A singly-linked list with `head` and `tail` pointers.
III. A doubly-linked list with only a `head` pointer.
IV. A doubly-linked list with `head` and `tail` pointers.

A. [Correct Answer] II and IV
B. I, II, III and IV
C. I, III and IV
D. I and III
E. [Your Answer] None of the other options is correct

5. In a sorted doubly linked list containing n^2 nodes, the time taken to calculate the sum of all elements in the list is

A. [Your Answer] O(n).
B. O(1).
C. O(log n).
D. [Correct Answer] O(n^2).
E. O(n log n).

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