Alexandria University
Faculty of Engineering
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CSE x22: Data Structures I

Sheet 2
Linked Lists

1. Write pseudo code to implement these two classes Singly Linked List and Doubly Linked List. Each of the classes has to include the following methods:

1. Insertion at the tail.
2. Deletion from the tail.
3. Insertion at the head.
4. Deletion from the head.

2. Write the following algorithms to search a list for the occurrence of a node having certain data and return a reference to that node if found and null otherwise.

1. Recursive algorithm
2. Iterative algorithm

3. Write the following algorithms for a grounded linked list F1 having head pointing to the front node (Use these pseudocodes in your assignment implementation)

1. Insert a new node y at the front of the list
2. Insert a new node with data value val in a sorted list
3. Insert a new node as the kth node in the list
4. Append an element to the end of the list
5. Delete a node with value val from the list (first occurrence only)
6. Delete all occurrences of a node with value val from the list (write recursive and iterative algorithms)
7. Delete the node at the kth position in the list
8. Make a copy of F1; let F2 be a pointer to the first node of the new list (write the iterative and recursive algorithms)
9. Reverse the order of the nodes in F1 without creating any new node.
10. Test whether the elements in a list are ordered.
11. Interchange the first and last elements in a list.
12. Remove duplicates from the list (Assume F1 is sorted).

4. Consider the two grounded linked lists F1 and F2. Write algorithms for the following:

1. Testing F1 and F2 for equality; two lists are equal if they have the same length and they have the same data values in similar nodes.
2. Concatenating F2 to the end of F1.
3. Copying F1 to F2.

5. Assume F and R are references to the first and last node of a doubly linked list. Write algorithms to:

1. Delete the last element in the list.
2. Insert an element after the last element in the list.