National University of Computer and Emerging Sciences

Lab Manual 04
Data Structures

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Section	BCS-3F2
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Important Note:

- ✓ Names of your submission files should start with your roll number throughout this semester.
- ✓ Make sure that the interface of your program is user friendly i.e. properly display information.
- ✓ Properly follow the coding standards.

Task1

Implement a Doubly linked list using template classes which supports the following operations:

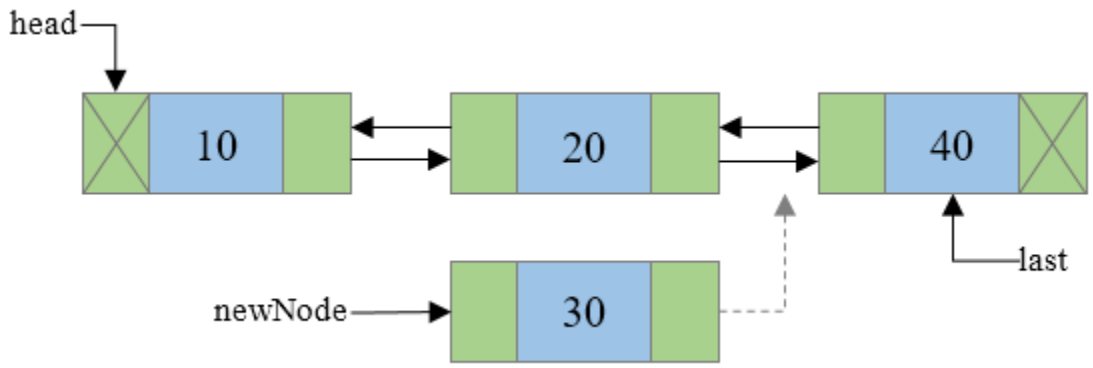
a. Insert at start `void insertAtHead(T const element);`
b. Insert at end `void insertAtTail (T const element);`
c. Print `void print() const;`
d. Delete at Start `void deleteAtStart ();`
e. Delete at End `void deleteAtTail();`
f. Destructor

Task2

Make a function insertSorted that takes an element as argument and inserts in doubly linked list in sorted order.

Example:

Inserting 30 in the give LL

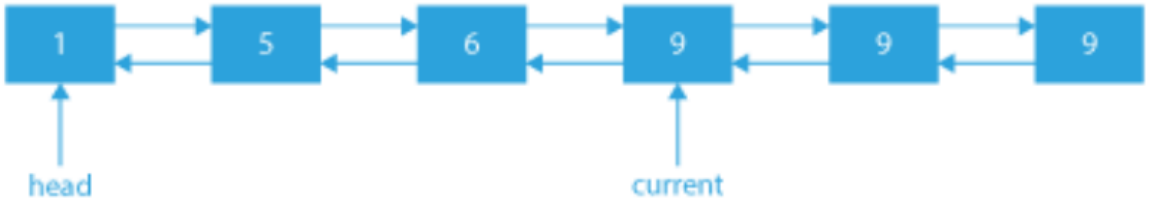


Task 3

Make a function DeleteDuplicates that deletes the duplicate elements from this sorted list.(Traverse only once)

Example:

Input:



Output:

Task 4

Make a function **swapNodes** in **doubly linked list** that takes a number **'n'** as argument and swaps the nth node from start with the nth node from end.
you are not allowed to swap the data, you have to swap the addresses of these nodes to apply the Swap take care of the edge cases like swapping the first and last value.
Maintain the previous pointers as well. (BONUS)

Input

List : 2 -> 3 -> 5 -> 9 -> 10 -> 7

n : 2

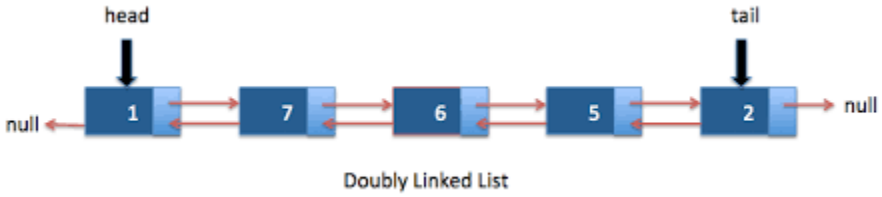
Output:

2 -> 10 -> 5 -> 9 -> 3 -> 7

Task 5

Get_nth_node_from_end(int n): Returns the nth node from end of DLL.

Example:
Get_nth_node_from_end(int 2):



Output: 5

Task 6

Partition(int n): Rearranges the DLL such that all the values less than the given value come before all values greater than or equal to n.

Example:

Input : 3 -> 5 -> 10 -> 2 -> 8 -> 2 -> 1

x = 5

Output : 1-> 2-> 2-> 3-> 5-> 10-> 8

- Create a main function to test all the operations