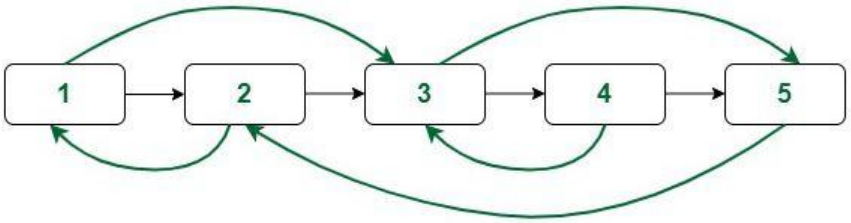
Assignment-57 : [A Job Ready Bootcamp in C++, DSA and IOT]

DSA doubly linked list

1. An example of a linked list with a random pointerGiven a linked list of size N where each node has two links: one pointer points to the next node and the second pointer points to any node in the list. The task is to create a clone of this linked list in O(N) time.

   An example of the linked list is shown in the below image:

2. Given a sorted doubly linked list of positive distinct elements, the task is to find pairs in a doubly-linked list whose sum is equal to given value x, without using any extra space?
   Example:

   ```
   Input : head : 1 <-> 2 <-> 4 <-> 5 <-> 6 <-> 8 <-> 9
           x = 7
   Output: (6, 1), (5,2)
   ```

3. Given a sorted doubly linked list and a value to insert, write a function to insert the value in a sorted way. Initial doubly linked list
4. Given a sorted doubly linked list containing n nodes. The problem is removing duplicate nodes from the given list.
5. Given an unsorted doubly linked list containing n nodes. The problem is to remove duplicate nodes from the given list.
6. Sort the given biotonic doubly linked list. A biotonic doubly linked list is a doubly linked list which is first increasing and then decreasing. A strictly increasing or a strictly decreasing list is also a biotonic doubly linked list.
7. Given a doubly-linked list, rotate the linked list counter-clockwise by N nodes. Here N is a given positive integer and is smaller than the count of nodes in the linked list.
8. Write a Program to reverse the Doubly Linked List.
9. Given a Doubly linked list containing N nodes, the task is to remove all the nodes from the list which contains elements whose digit sum is even.
   Example:

   Input: DLL = 18 <=> 15 <=> 8 <=> 9 <=> 14
   Output: 18 <=> 9 <=> 14
   Explanation:

The linked list contains :
18 -> 1 + 8 = 9
15 -> 1 + 5 = 6
8 -> 8
9 -> 9
14 -> 1 + 4 = 5
Here, digit sum for nodes containing 15 and 8 are even.
Hence, these nodes have been deleted.
Input: DLL = 5 <=> 3 <=> 4 <=> 2 <=> 9
Output: 5 <=> 3 <=> 9
Explanation:
The linked list contains two digit sum values 4 and 2.
Hence, these nodes have been deleted.

10. Given a doubly linked list containing N nodes, the task is to remove all the nodes from the list which contains Fibonacci numbers.

    Example:

    Input: DLL = 15 <=> 16 <=> 8 <=> 7 <=> 13
    Output: 15 <=> 16 <=> 7
    Explanation:
    The linked list contains two fibonacci numbers 8 and 13.
    Hence, these nodes have been deleted.
    Input: DLL = 5 <=> 3 <=> 4 <=> 2 <=> 9
    Output: 4 <=> 9
    Explanation:
    The linked list contains three fibonacci numbers 5, 3 and 2.
    Hence, these nodes have been deleted.