* Data Structure Lab (DSL) - Practical Number - 7 (Group - C)

Name :- Shaustubh Shrikant Kabra.
Class :- Second Year Engineering.
Div :- A Roll Number :-
Batch :-
Department :- Computer Department
College :- AISSMS's IOIT.

Title :-
Write a C++ program to create a students club.

Aim :-
Depart of computer Engineering has students club named 'Pinnacle Club'. Student of 2nd, 3rd and 4th year of department can be granted membership on request. Similarly, one may cancel the membership of club. Store student PRN and Name. Write functions to:-
a) Add and delete members, president and secretary
b) Compute total number of members.
c) Display members.
d) Two linked list exists for two divisions. Concatenate two lists.

Objective :-
1) To study the concept of linked lists.
2) To understand various operations on singly linked list.

Theory:-

Linked List-

A linked list is a set of nodes where each node has two fields 'data' and 'link'. The 'data' field stores actual piece of information and 'link' field is used to point to the next node. Basically, 'link' field is nothing but address only.

Types of linked list:-

1) Singly linked list.
2) Singly circular linked list.
3) Doubly linear linked list.
4) Doubly circular linked list.

Operations on singly linked list:-

1) Creation
2) Insertion
3) Deletion
4) Reverse
5) Search
6) Display

Algorithm:-

Step 1- Start

Step 2- Create a class node which consists the structure of the

Step 3 - Create a friend class dll which consists of the head pointer, constructor and functions to operate on the linked list.

Step 4 - Display menu to the user and accept his choice.

Step 5 - If user enter 1, then accept details of the president.

Step 6 - Add the president details in first node of linked list.

Step 7 - If user enter 2, then accept details of the secretary.

Step 8 - Add the secretary details in last node of linked list.

Step 9 - If user enter 3, then accept and add member details after a particular node in the linked list.

Step 10 - If user enter 4, then delete the president.

Step 11 - If user enter 5, then delete the secretary.

Step 12 - If user enter 6, then accept the PRN number of a member and delete it.

Step 13 - If user enter 7, then display PRN number and names of all the members.

Step 14 - If user enter 8, then display total number of members in the club.

Step 15 - If user enter 9, then reverse the linked list.

Step 16 - If user enter 10, the concatenate two divisions.

Step 17 - Go to step 4, if user wants to continue.

Step 18 - Stop.

Analysis:-

Time complexity on various operations are -

1) For insert_president, insert_secretary(), del_president, del_secretary it is O(1)

2) For insert_member, del_member, display(), count(), it is O(n)

3) For concatenate and reverse - it is O(n).

Conclusion:-

Thus, we have created a students club using singly linked list.