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**ASSIGNMENT NO:-05**

**AIM** **:-** : Department of Computer Engineering has student's club named 'Pinnacle Club'. Students of Second, third and final year of department can be granted membership on request. Similarly one may cancel the membership of club. First node is reserved for president of club and last node is reserved for secretary of club. Write C++ program to maintain club member‘s information using singly linked list.

Store student PRN and Name. Write functions to

a) Add and delete the members as well as president or even secretary.

b)Compute total number of members of club .

b)Display members .

c)Display list in reverse order using recursion .

e) Two linked lists exists for two divisions. Concatenate two lists.

**PROGRAM:-**

#include <iostream>

#include<string.h>

using namespace std;

//data structure for student information i:e node

struct node

{

 int prn;

 char name[20];

 node \*next;

};

class panclub

{

    int num,cnt;

    char nm[20];  //Data memebers

    node \*head;

 public:

    panclub()//Constructor to initialize object

    {

     num=cnt=0;

     head=NULL;

    }

    node \*create();

    void display(node \*);

    node \*concat(node \*,node \*);  //Memeber Functions with arguments

    void reverse(node \*);

    node\* insert\_president(node \*);

    void insert\_sec(node \*);

    void insert\_member(node \*);

    node\* del\_president(node \*);

    node\* del\_secretary(node \*);

    node\* del\_member(node \*);

};

//To Create the list of Divisions.

node\* panclub::create()

{

    node \*temp,\*n1;

    temp=n1=NULL;

    //int flag=1;

    //char ans='y';

    cout<<"\nHow many students data u want to insert in panclub database: ";

    cin>>cnt;

    do

    {

        n1=new node; //first of allocate the memory for all feilds of struct.

        cout<<"\nEnter the prn number of student:";

        cin>>num;

        n1->prn=num;

        //storing the prn in node feild prn;

        cout<<"\nEnter the name of student:";

        cin>>nm;

        strcpy(n1->name,nm);

        //Storing the name in node feild name.;

        n1->next=NULL; //making the next feild null.

        if(head==NULL) //check for head is empty.

        {

            head=n1;   //make new node as head

            temp=head;

        }

        else

        {

            temp=head;

            while(temp->next!=NULL) //attach at the end of list

            {

                temp=temp->next;

            }

            temp->next=n1;

        }

        cnt--;

    }while(cnt>0);

    return head;

}

void panclub::display(node \*head) //display the list of both divisions.

{

 node \*temp;

 temp=head;

 while(temp!=NULL)

 {

     if(temp->next==NULL)

     {

      cout<<”president->”<<"["<<temp->prn<<"|"<<temp->name<<"]->secretary";

     }

     else

     {

      cout<<”president->”<<"["<<temp->prn<<"|"<<temp->name<<"]-> secretary";

     }

     temp=temp->next;

 }

}

node\* panclub::concat(node \*head1,node \*head2) //To concatinate both the divisions data in one list.

{

    node \*head3,\*temp,\*temp1;

    head3=temp=temp1=NULL;

    temp=head1;

    head3=head1;

    while(temp->next!=NULL)

    {

        temp=temp->next;

    }

    temp1=head2;

    temp->next=temp1;

    return head3;

}

void panclub::reverse(node \*head)

{

    node \*temp;

    temp=head;

    if(temp==NULL)

        return;

    reverse(temp->next);

    cout<<”secretary”<<”->”<<"["<<temp->prn<<"|"<<temp->name<<"]->"<<”president”;

}

node\* panclub::insert\_president(node \*head)

{

 node \*temp,\*n2;

 temp=n2=NULL;

 temp=head;

 n2=new node;

 cout<<"\nEnter the PRN number of President: ";

 cin>>n2->prn;

 cout<<"\nEnter the name of President: ";

 cin>>n2->name;

 n2->next=temp;

 head=n2;

 return head;

}

void panclub::insert\_member(node \*head)

{

 node \*temp,\*n2,\*t;

int pos=1,loc;

cout<<”enter the location member to be inserted: ”;

cin>>loc;

temp=head;

while(pos!=loc)

{

n2=t;

t=t->next;

pos++;

}

n2->next=temp;

temp->next=t;

 cout<<"\n\nMember added sucessfully....!!";

}

void panclub::insert\_sec(node \*head)

{

 node \*temp,\*n2;

 temp=head;

 n2=new node;

 cout<<"\nEnter the PRN number of Secretary: ";

 cin>>n2->prn;

 cout<<"\nEnter the Name of Secretary: ";

 cin>>n2->name;

 n2->next=NULL;

 while(temp->next!=NULL)

 {

  temp=temp->next;

 }

 temp->next=n2;

}

//delete the president node from list

node\* panclub::del\_president(node \*head)

{

 node \*temp;

 temp=head;

 head=temp->next;

 free(temp);

 return head;

}

//Delete the secretary node from the list.

node\* panclub::del\_secretary(node \*head)

{

 node \*temp,\*t1;

 temp=head;

 while(temp->next!=NULL)

 {

  t1=temp;

  temp=temp->next;

 }

 t1->next=NULL;

 free(temp);

 return head;

}

//Delete the memeber from the list.

node\* panclub::del\_member(node \*head)

{

 node \*temp,\*t;

int pos=1,loc;

cout<<”enter the location member to be inserted: ”;

cin>>loc;

temp=head;

t=head;

while(pos!=loc)

{

t=temp;

temp=temp->next;

pos++;

}

t->next=temp->next;

delete temp;

 cout<<"\n\nMember removed sucessfully....!!";

 return head;

}

int main()

{

    panclub p1,p2,p3;

    node \*h1,\*h2,\*h3;

    h1=h2=h3=NULL;

    int ch;

   do

   {

    cout<<"\n\n1.Enter data of SE A Division:";

    cout<<"\n2.Enter data of SE B Division:";

    cout<<"\n3.Concatination of List..";

    cout<<"\nEnter your choice: ";

    cin>>ch;

    switch(ch)

    {

     case 1:

            cout<<"\n\nPlease enter the student info who is register memeber..";

            cout<<"\n\nEnter the Panclub Data of SE A Division:\n";

            h1=p1.create();

        cout<<"\nSE Comp Division A List are as follows..\n\n";

        p1.display(h1);

        cout<<"\n\nReverse List of SE Div A:\n\n";

        p1.reverse(h1);

        p1.insert\_sec(h1);

        cout<<"\nAfter insertion of Secretary: \n";

        p1.display(h1);

        h1=p1.insert\_president(h1);

        cout<<"\nAfter insertion of President: \n";

        p1.display(h1);

        p1.insert\_member(h1);

        cout<<"\n After insertion of member...\n";

        p1.display(h1);

        h1=p1.del\_president(h1);

        cout<<"\n\nAfter deletion of president...\n";

        p1.display(h1);

        h1=p1.del\_secretary(h1);

        cout<<"\n\nAfter deletion of secretary...\n";

        p1.display(h1);

        h1=p1.del\_member(h1);

        cout<<"\n\nAfter deletion of member...\n";

        p1.display(h1);

        break;

    case 2:

        cout<<"\n\nEnter the Panclub Data of SE B Division:\n";

        h2=p2.create();

        cout<<"\nSE Comp Division B List are as follows..\n\n";

        p2.display(h2);

        cout<<"\n\nReverse List of SE Div B:\n\n";

        p1.reverse(h2);

        p2.insert\_sec(h2);

        cout<<"\nAfter insertion of Secretary: \n";

        p2.display(h2);

        h2=p2.insert\_president(h2);

        cout<<"\nAfter insertion of President: \n";

        p2.display(h2);

        p2.insert\_member(h2);

        cout<<"\n After insertion of member...\n";

        p2.display(h2);

        h2=p2.del\_president(h2);

        cout<<"\n\nAfter deletion of president...\n";

        p1.display(h2);

        h2=p2.del\_secretary(h2);

        cout<<"\n\nAfter deletion of secretary...\n";

        p1.display(h2);

        h2=p2.del\_member(h2);

        cout<<"\n\nAfter deletion of member...\n";

        p2.display(h2);

            break;

    case 3:

        h3=p3.concat(h1,h2);

        cout<<"\n\nThe concatenation of Div : A and Div : B of SE Comp Class are as follows.\n\n";

        p3.display(h3);

            break;

  }

 }while(ch!=4);

        return 0;

}

**OUTPUT:-**

1.Enter data of SE A Division:

2.Enter data of SE B Division:

3.Concatinaton of List..

Enter your choice: 1

Please enter the student info who is register member..

Enter the Pinaclub Data of SE A Division:

How many students data u want to insert in the pinaclub database: 3

Enter the prn number of student : 1

Enter the name of student : riya

Enter the prn number of student : 2

Enter the name of student : priya

Enter the prn number of student : 3

Enter the name of student : siya

SE Comp Division A List are as follows..

President->[1|riya]->[2|priya]->[3|siya]->secretary

Reverse List of SE Div A:

secretary->[1|riya]->[2|priya]->[3|siya]->president

Enter the prn number of Secretary:99

Enter the name of Secretary:last

After insertion of Secretary:

president->[1|riya]->[2|priya]->[3|siya]->[99|last]->secretary

Enter the prn number of President: 11

Enter the name of President: first

After insertion of President:

President->[11|first]->[1|riya]->[2|priya]->[3|siya]->[99|last]->secretary

Enter the prn number of Member: 55

Enter the name of Member: middle

Enter the location member to be inserted:3

After insertion of Member:

President->[11|first]->[1|riya]->[2|priya]->[55|middle]->[3|siya]->[99|last]->secretary

After deletion of president…

President->[1|riya]->[2|priya]->[55|middle]->[3|siya]->[99|last]->secretary

After deletion of secretary…

President->[1|riya]->[2|priya]->[55|middle]->[3|siya]->secretary

Enter the location member to be inserted: 3

Member removed successfully….!!

After deletion of member…

President->[1|riya]->[2|priya]-->[3|siya]->secretary

1.Enter data of SE B Division:

2.Enter data of SE B Division:

3.Concatinaton of List..

Enter your choice: 2

Enter the Pinaclub Data of SE B Division:

How many students data u want to insert in the pinaclub database: 4

Enter the prn number of student : 9

Enter the name of student : tina

Enter the prn number of student : 8

Enter the name of student : mina

Enter the prn number of student : 7

Enter the name of student : aina

Enter the prn number of student : 6

Enter the name of student : kriya

SE Comp Division A List are as follows..

President->[9|tina]->[8|mina]->[7|aina]->[6|kriya]->secretary

Reverse List of SE Div B:

secretary->[6|kriya]->[7|aina]->[8|mina]->[9|tina]->president

Enter the prn number of Secretary:999

Enter the name of Secretary:end

After insertion of Secretary:

President->[9|tina]->[8|mina]->[7|aina]->[6|kriya]->[999|end]->secretary

Enter the prn number of President: 111

Enter the name of President: star

After insertion of President:

President->[111|star]->[9|tina]->[8|mina]->[7|aina]->[6|kriya]->[999|end]->secretary

Enter the prn number of Member: 555

Enter the name of Member: jiya

Enter the location member to be inserted:4

After insertion of Member:

President->[111|star]->[9|tina]->[8|mina]->[555|jiya]->[7|aina]->[6|kriya]->[999|end]->secretary

After deletion of president…

President->[9|tina]->[8|mina]->[555|jiya]->[7|aina]->[6|kriya]->[999|end]->secretary

After deletion of secretary…

President->[9|tina]->[8|mina]->[555|jiya]->[7|aina]->[6|kriya]->secretary

Enter the location member to be inserted: 2

Member removed successfully….!!

After deletion of member…

President->[9|tina]->[555|jiya]->[7|aina]->[6|kriya]->secretary

1.Enter data of SE A Division:

2.Enter data of SE B Division:

3.Concatinaton of List..

Enter your choice: 3

The concatenation of Div : B of SE Comp Class are as follows:

[1|riya]->[2|priya]-->[3|siya]-> [9|tina]->[555|jiya]->[7|aina]->[6|kriya]->NULL

1.Enter data of SE A Division:

2.Enter data of SE B Division:

3.Concatinaton of List..

Enter your choice: 4