**Ex 1: SINGLY LINKED LIST**

**Program:**

#include <stdio.h>

#include<malloc.h>

void createfnode(int ele);

void insertfront(int ele);

void insertend(int ele);

void display();

struct node

{

int data;

struct node\* next;

};

struct node\* head = NULL;

struct node \*newnode;

void insertfront(int ele)

{

newnode=(struct node\*)malloc(sizeof(struct node));

if(newnode!=NULL)

{ newnode->data=ele;

if(head!=NULL)

{

newnode->next=head;

head=newnode;

}

else

{

newnode->next=NULL;

head=newnode;

}

}

}

void insertend(int ele)

{

newnode=(struct node\*)malloc(sizeof(struct node));

if(newnode!=NULL)

{

newnode->data=ele;

newnode->next=NULL;

if(head!=NULL)

{

struct node \*t;

t=head;

while(t->next!=NULL)

{

t=t->next;

}

newnode->next=NULL;

t->next=newnode;

}

else

{

head=newnode;

}

}

}

int listsize()

{

int c=0;

struct node \*t;

t=head;

while(t!=NULL)

{

c=c+1;

t=t->next;

}

printf("\n The size of the list is %d:\n",c);

return c;

}

void insertpos(int ele,int pos)

{

int ls=0;

ls=listsize();

if(head == NULL && (pos <= 0 || pos > 1))

{

printf("\nInvalid position to insert a node\n");

return;

}

if(head != NULL && (pos <= 0 || pos > ls))

{

printf("\nInvalid position to insert a node\n");

return;

}

struct node\* newnode = NULL;

newnode=(struct node\*)malloc(sizeof(struct node));

if(newnode != NULL)

{

newnode->data=ele;

struct node\* temp = head;

int count = 1;

while(count < pos-1)

{

temp = temp -> next;

count += 1;

}

if(pos == 1)

{

newnode->next = head;

head = newnode;

}

else

{

newnode->next = temp->next;

temp->next = newnode;

}

}

}

void findnext(int s)

{

struct node \*temp;

temp=head;

if(temp==NULL&&temp->next==NULL)

{

printf("No next element ");

}

else

{

while(temp->data!=s)

{

temp=temp->next;

}

printf("\nNext Element of %d is %d\n",s,temp->next->data);

}

}

void findprev(int s)

{

struct node \*temp;

temp=head;

if(temp==NULL)

{

printf("List is empty ");

}

else

{

while(temp->next->data!=s)

{

temp=temp->next;

}

printf("\n The previous ele of %d is %d\n",s,temp->data);

}

}

void find(int s)

{

struct node \*temp;

temp=head;

if(head==NULL)

{

printf("\n List is empty");

}

else

{

while(temp->data!=s && temp->next!=NULL)

{

temp=temp->next;

}

if(temp!=NULL && temp->data==s)

{

printf("\n Searching ele %d is present in the addr of %p",temp->data,temp);

}

else

{

printf("\n Searching elem %d is not present",s);

}

}

}

void isempty()

{

if(head==NULL)

{

printf("\nList is empty\n");

}

else

{

printf("\nList is not empty\n");

}

}

void deleteAtBeginning()

{

struct node \*t;

t=head;

head=t->next;

}

void deleteAtEnd()

{

struct node \*temp;

temp=head;

if(head==NULL)

{

printf("\n List is empty");

}

else

{

while(temp->next->next!=NULL)

{

temp=temp->next;

}

temp->next=NULL;

}

}

void display()

{

struct node \*t;

t=head;

while(t!=NULL)

{

printf("%d\t",t->data);

t=t->next;

}

}

void delete(int ele)

{

struct node \*t;

t=head;

if(t->data==ele)

{

head=t->next;

}

else

{

while(t->next->data!=ele)

{

t=t->next;

}

t->next=t->next->next;

}

}

int main()

{

do

{

int ch,a,pos;

printf("\n Choose any one operation that you would like to perform\n");

printf("\n 1.Insert the element at the beginning");

printf("\n 2.Insert the element at the end");

printf("\n 3. To insert at the specified position");

printf("\n 4. To view list");

printf("\n 5.To view list size");

printf("\n 6.To delete first element");

printf("\n 7.To delete last element");

printf("\n 8.To find next element");

printf("\n 9. To find previous element");

printf("\n 10. To find search for an element");

printf("\n 11. To quit");

printf("\n Enter your choice\n");

scanf("%d",&ch);

switch(ch)

{

case 1:

printf("\n Insert an element to be inserted at the beginning\n");

scanf("%d",&a);

insertfront(a);

break;

case 2:

printf("\n Insert an element to be inserted at the End\n");

scanf("%d",&a);

insertend(a);

break;

case 3:

printf("\n Insert an element and the position to insert in the list\n");

scanf("%d%d",&a,&pos);

insertpos(a,pos);

break;

case 4:

display();

break;

case 5:

listsize();

break;

case 6:

printf("\n Delete an element to be in the beginning\n");

deleteAtBeginning();

break;

case 7:

printf("\n Delete an element to be at the end\n");

deleteAtEnd();

break;

case 8:

printf("\n enter the element to which you need to find next ele in the list\n");;

scanf("%d",&a);

findnext(a);

break;

case 9:

printf("\n enter the element to which you need to find prev ele in the list\n");;

scanf("%d",&a);

findprev(a);

break;

case 10:

printf("\n enter the element to find the address of it\n");;

scanf("%d",&a);

find(a);

break;

case 11:

printf("Ended");

exit(0);

default:

printf("Invalid option is chosen so the process is quit");

}

}while(1);

return 0;

}

OUTPUT:

