

Aim:

Write a program that uses functions to perform the following **operations on singly linked list**

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal

Source Code:

singlelinkedlistalloperations.c

```
#include<stdio.h>
#include<stdlib.h>
void menu()
{
    printf("Options\n");
    printf("1 : Insert elements into the linked list\n");
    printf("2 : Delete elements from the linked list\n");
    printf("3 : Display the elements in the linked list\n");
    printf("4 : Count the elements in the linked list\n");
    printf("5 : Exit()\n");
}
struct node
{
    int data;
    struct node *next;
};
typedef struct node node;
struct node *head=NULL;
node* createnode(int data)
{
    node* temp=(node*)malloc(sizeof(node));
    temp->data=data;
    temp->next=NULL;
    return temp;
}
void insert(int data)
{
    node* newnode=createnode(data);
    node* temp;
    if(head==NULL)
    {
        head=createnode(data);
    }
    else
    {
        temp=head;
        while(temp->next!=NULL)
        {
            temp=temp->next;
        }
        temp->next=newnode;
    }
}
```

```

}
void delete(int position)
{
    int i;
    node* temp;
    if(head==NULL)
    {
        printf("List is empty");
    }
    else
    {
        temp=head;
        for(i=1;i<position-1;i++)
        {
            temp=temp->next;
        }
        temp->next=temp->next->next;
        printf("Deleted successfully\n");
    }
}
void display()
{
    node* temp;
    temp=head;
    if(head==NULL)
    {
        printf("List is empty\n");
    }
    while(temp!=NULL)
    {
        printf("%d ",temp->data);
        temp=temp->next;
    }
    printf("\n");
}
void count()
{
    int c=0;
    node * temp;
    if(head==NULL)
    {
        printf("List is Empty\n");
    }
    else
    {
        temp=head;
        while(temp!=NULL)
        {
            c++;
            temp=temp->next;
        }
    }
    printf("No of elements in the linked list are : %d\n",c);
}
void main()
{

```

```

int choice,data,position,c;
printf("Singly Linked List Example - All Operations\n");
menu();
printf("Enter your option : ");
scanf("%d",&choice);
while(choice!=5)
{
    switch(choice)
    {
        case 1:
        {
            printf("Enter elements for inserting into linked list : ");
            scanf("%d",&data);
            insert(data);
            break;
        }
        case 2:
        {
            printf("Enter position of the element for deleteing the element : ");
            scanf("%d",&position);
            delete(position);
            break;
        }
        case 3:
        {
            printf("The elements in the linked list are : ");
            display();
            break;
        }
        case 4:
        {
            count();
            break;
        }
        case 5:
        {
            exit(0);
        }
        default:
        {
            printf("Enter options from 1 to 5\n");
            exit(0);
        }
    }
    menu();
    printf("Enter your option : ");
    scanf("%d",&choice);
}
}

```

Execution Results - All test cases have succeeded!

| Test Case - 1 |
|---------------|
| User Output |

| |
|---|
| Singly Linked List Example - All Operations 1 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 111 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 222 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 333 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 444 |
| Options 3 |
| 1 : Insert elements into the linked list 3 |
| 2 : Delete elements from the linked list 3 |
| 3 : Display the elements in the linked list 3 |
| 4 : Count the elements in the linked list 3 |
| 5 : Exit() 3 |
| Enter your option : 3 |
| The elements in the linked list are : 111 222 333 444 2 |
| Options 2 |
| 1 : Insert elements into the linked list 2 |
| 2 : Delete elements from the linked list 2 |
| 3 : Display the elements in the linked list 2 |
| 4 : Count the elements in the linked list 2 |
| 5 : Exit() 2 |
| Enter your option : 2 |
| Enter position of the element for deleteing the element : 2 |
| Deleted successfully 3 |
| Options 3 |
| 1 : Insert elements into the linked list 3 |
| 2 : Delete elements from the linked list 3 |

| |
|---|
| 3 : Display the elements in the linked list 3 |
| 4 : Count the elements in the linked list 3 |
| 5 : Exit() 3 |
| Enter your option : 3 |
| The elements in the linked list are : 111 333 444 4 |
| Options 4 |
| 1 : Insert elements into the linked list 4 |
| 2 : Delete elements from the linked list 4 |
| 3 : Display the elements in the linked list 4 |
| 4 : Count the elements in the linked list 4 |
| 5 : Exit() 4 |
| Enter your option : 4 |
| No of elements in the linked list are : 3 5 |
| Options 5 |
| 1 : Insert elements into the linked list 5 |
| 2 : Delete elements from the linked list 5 |
| 3 : Display the elements in the linked list 5 |
| 4 : Count the elements in the linked list 5 |
| 5 : Exit() 5 |
| Enter your option : 5 |

| Test Case - 2 |
|---|
| User Output |
| Singly Linked List Example - All Operations 1 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 001 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 010 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 100 |
| Options 1 |
| 1 : Insert elements into the linked list 1 |
| 2 : Delete elements from the linked list 1 |
| 3 : Display the elements in the linked list 1 |

| |
|---|
| 4 : Count the elements in the linked list 1 |
| 5 : Exit() 1 |
| Enter your option : 1 |
| Enter elements for inserting into linked list : 101 |
| Options 3 |
| 1 : Insert elements into the linked list 3 |
| 2 : Delete elements from the linked list 3 |
| 3 : Display the elements in the linked list 3 |
| 4 : Count the elements in the linked list 3 |
| 5 : Exit() 3 |
| Enter your option : 3 |
| The elements in the linked list are : 1 10 100 101 2 |
| Options 2 |
| 1 : Insert elements into the linked list 2 |
| 2 : Delete elements from the linked list 2 |
| 3 : Display the elements in the linked list 2 |
| 4 : Count the elements in the linked list 2 |
| 5 : Exit() 2 |
| Enter your option : 2 |
| Enter position of the element for deleteing the element : 3 |
| Deleted successfully 3 |
| Options 3 |
| 1 : Insert elements into the linked list 3 |
| 2 : Delete elements from the linked list 3 |
| 3 : Display the elements in the linked list 3 |
| 4 : Count the elements in the linked list 3 |
| 5 : Exit() 3 |
| Enter your option : 3 |
| The elements in the linked list are : 1 10 101 4 |
| Options 4 |
| 1 : Insert elements into the linked list 4 |
| 2 : Delete elements from the linked list 4 |
| 3 : Display the elements in the linked list 4 |
| 4 : Count the elements in the linked list 4 |
| 5 : Exit() 4 |
| Enter your option : 4 |
| No of elements in the linked list are : 3 5 |
| Options 5 |
| 1 : Insert elements into the linked list 5 |
| 2 : Delete elements from the linked list 5 |
| 3 : Display the elements in the linked list 5 |
| 4 : Count the elements in the linked list 5 |
| 5 : Exit() 5 |
| Enter your option : 5 |