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

```c
#include<stdio.h>
#include<malloc.h>
#include<stdlib.h>
struct node{
    int data;
    struct node *next;
}*head=NULL,*tail=NULL;
typedef struct node *NODE;
NODE temp,newNode,ptr,prev;
void insert();
void Delete();
void diaplay();
void count();
void main(){
    int option;
    printf("Singly Linked List Example - All Operations\n");
    while(1){
        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");
        printf("Enter your option : ");
        scanf("%d",&option);
        if(option>0&&option<=5){
            switch(option){
                case 1:
                insert();
                break;
                case 2:
                Delete();
                break;
                case 3:
            display();
            break;
            case 4:
            count();
            break;
            case 5:
            exit(0);
            break;
```

```c
        }
    }else {
        printf("Enter options from 1 to 5\n");

        break;
    }
  }
}
void insert(){
    newNode=(NODE)malloc(sizeof(struct node));
    printf("Enter elements for inserting into linked list : ");
    scanf("%d",&newNode->data);
    newNode->next=NULL;
    if(head==NULL){
        head=newNode;
        tail=newNode;
    }else {
        tail->next=newNode;
        tail=newNode;
    }
}
void Delete(){
    int cnt=0,pos,i=1;
    ptr=temp=head;
    while(ptr!=NULL){
        cnt++;
        ptr=ptr->next;
    }
    printf("Enter position of the element for deleteing the element : ");
    scanf("%d",&pos);
    if(pos>0&&pos<=cnt){
        if(pos==1){
            head=head->next;
            free(head);
        }else {
            while(i<pos){
                i++;
                prev=temp;
                temp=temp->next;
            }
            prev->next=temp->next;
            free(temp);
        }
        printf("Deleted successfully\n");
    }
    else
    printf("Invalid position\n");
}
void display(){
    printf("The elements in the linked list are : ");
    temp=head;
    while(temp!=NULL){
        printf("%d ",temp->data);
        temp=temp->next;
    }
    printf("\n");
```

```
 }
 void count(){
     int count=0;
     printf("No of elements in the linked list are : ");
     temp=head;
     while(temp!=NULL){
         count++;
         temp=temp->next;
     }
     printf("%d\n",count);
 }
```

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