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 value;
    struct node *next;
};
void insert();
void display();
void delete();
int count();
typedef struct node DATA_NODE;
DATA_NODE *head_node,*first_node,*temp_node=0,*prev_node,next_node;
int data;
int main(){
    int option=0;
    printf("Singly Linked List Example - All Operations\n");
    while(option<5){
        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);
        switch(option){
            case 1:
            insert();
            break;
            case 2:
            delete();
            break;
            case 3:
            display();
            break;
            case 4:
            count();
            break;
            case 5:
            exit(0);
            break;
```

```c
            default:
                printf("Enter options from 1 to 5\n");
                break;
        }
    }
    return 0;
}
void insert(){
    printf("Enter elements for inserting into linked list : ");
    scanf("%d",&data);
    temp_node=(DATA_NODE *)malloc(sizeof (DATA_NODE));
    temp_node->value=data;
    if(first_node==0){
        first_node=temp_node;
    }else{
        head_node->next=temp_node;
    }
    temp_node->next=0;
    head_node=temp_node;
    fflush(stdin);
}
void delete(){
    int countvalue,pos,i=0;
    temp_node=first_node;
    printf("Enter position of the element for deleteing the element : ");
    scanf("%d",&pos);
    if(pos>0&&pos<=countvalue){
        if(pos==1){
            temp_node=temp_node->next;
            first_node=temp_node;
            printf("Deleted successfully\n");
        }else{
            while(temp_node!=0){
                if(i==(pos-1)){
                    prev_node->next=temp_node->next;
                    if(i==(countvalue-1)){
                        head_node=prev_node;
                    }
                    printf("Deleted successfully\n");
                    break;
                }else{
                    i++;
                    prev_node=temp_node;
                    temp_node=temp_node->next;
                }
            }
        }
    }else
    printf("Invalid positon\n");
}
void display(){
    int count=0;
    temp_node=first_node;
    printf("The elements in the linked list are : ");
    while(temp_node!=0){
        printf("%d ",temp_node->value);
```

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