

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>
struct node {
    int data;
    struct node *next;
} *head = NULL, *tail = NULL;
void insert();
void Delete();
void display();
void count();
typedef struct node *NODE;
NODE temp, newNode, ptr, ptr2;
int value;
void main() {
    int option = 0;
    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<=5) {
            switch(option) {
                case 1:
                    insert();
                    break;
                case 2:
                    Delete();
                    break;
                case 3:
                    display();
                    break;
                case 4:
                    count();
                    break;
                case 5:
                    exit(0);
            }
        }
    }
}
```

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

void insert() {
    printf("Enter elements for inserting into linked list : ");
    scanf("%d",&value);
    newNode = (NODE) malloc(sizeof(struct node));
    newNode->data = value;
    newNode->next = NULL;
    if(head == NULL) {
        head = newNode;
        tail = newNode;
    }
    else {
        tail->next = newNode;
        tail = newNode;
    }
}

void Delete() {
    int i = 1, j = 1, pos, spot, cnt = 0;
    temp = head, ptr2 = head;
    while(ptr2!=NULL) {
        cnt++;
        ptr2 = ptr2->next;
    }
    printf("Enter position of the element for deleteing the element : ");
    scanf("%d",&spot);
    while(i<=cnt) {
        if(i == spot){
            pos = spot;
            break;
        }
        i++;
    }
    if(pos != spot)
        printf("Invalid Position.\n");
    else {
        if(pos == 1){
            head = head->next;
            free(temp);
        }
        else{
            while(j<pos) {
                ptr = temp;
                temp = temp->next;
                j++;
            }
            if(temp->next == NULL) {
                ptr->next = NULL;
                free(temp);
            }
            else {
```

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