

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 <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;
        }
    }
}
```

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        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 position\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);
    }
}

```

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        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