S.No: 13	Exp. Name: ***C program to performs all operations on singly linked list***	Date:2023-07-11

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\n1 : Insert elements into the linked list\n2 : Delete elements
from the linked list\n3 : Display the elements in the linked list\n4 : Count the elem
ents in the linked list\n5 : Exit()\nEnter 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);
         }
      }
      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{
            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