S.No: 13	Exp. Name: ***C program to performs all operations on singly linked list***	Date:2023-07-30

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 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;
```

```
         }
      }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

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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

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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