S.No: 13	Exp. Name: ***C program to performs all operations on singly linked list***	Date:2023-05-19

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,ptr, 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

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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
```