S.No: 13	Exp. Name: ***C program to performs all operations on singly linked list***	Date:2023-08-11

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>
void menu()
{
   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");
}
struct node
{
   int data;
   struct node *next;
};
typedef struct node node;
struct node *head=NULL;
node* createnode(int data)
{
   node* temp=(node*)malloc(sizeof(node));
   temp->data=data;
   temp->next=NULL;
   return temp;
}
void insert(int data)
{
   node* newnode=createnode(data);
   node* temp;
   if(head==NULL)
   {
      head=createnode(data);
   }
   else
   {
      temp=head;
      while(temp->next!=NULL)
      {
         temp=temp->next;
      }
      temp->next=newnode;
   }
```


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```
}
void delete(int position)
{
   int i;
   node* temp;
   if(head==NULL)
   {
      printf("List is empty");
   }
   else
   {
      temp=head;
      for(i=1;i<position-1;i++)
      {
         temp=temp->next;
      }
      temp->next=temp->next->next;
      printf("Deleted successfully\n");
   }
}
void display()
{
   node* temp;
   temp=head;
   if(head==NULL)
   {
      printf("List is empty\n");
   }
   while(temp!=NULL)
   {
      printf("%d ",temp->data);
      temp=temp->next;
   }
   printf("\n");
}
void count()
{
   int c=0;
   node * temp;
   if(head==NULL)
   {
      printf("List is Empty\n");
   }
   else
   {
      temp=head;
      while(temp!=NULL)
      {
         c++;
         temp=temp->next;
      }
   }
   printf("No of elements in the linked list are : %d\n",c);;
}
void main()
{
```


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```
   int choice,data,position,c;
   printf("Singly Linked List Example - All Operations\n");
   menu();
   printf("Enter your option : ");
   scanf("%d",&choice);
   while(choice!=5)
   {
      switch(choice)
      {
         case 1:
         {
            printf("Enter elements for inserting into linked list : ");
            scanf("%d",&data);
            insert(data);
            break;
         }
         case 2:
         {
            printf("Enter position of the element for deleteing the element :
");
            scanf("%d",&position);
            delete(position);
            break;
         }
         case 3:
         {
            printf("The elements in the linked list are : ");
            display();
            break;
         }
         case 4:
         {
            count();
            break;
         }
         case 5:
         {
            exit(0);
         }
         default:
         {
            printf("Enter options from 1 to 5\n");
            exit(0);
         }
      }
      menu();
      printf("Enter your option : ");
      scanf("%d",&choice);
   }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1

User Output

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```
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
```