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

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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;
```

```
         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);
```

```
      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