Program 5

Write A Program to Implement Singly Linked List with following operations

a) Create a linked list.

b) Deletion of first element, specified element and last element in the list.

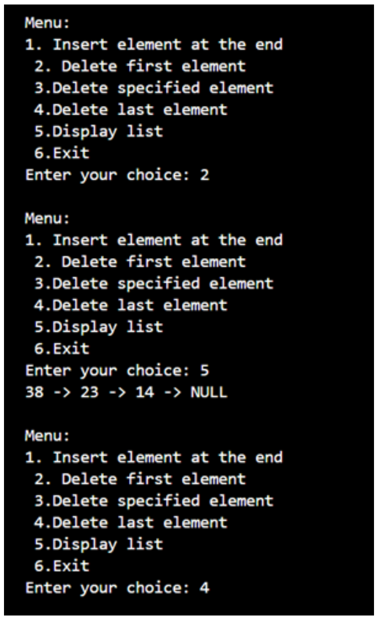
c) Display the contents of the linked list.

Code:

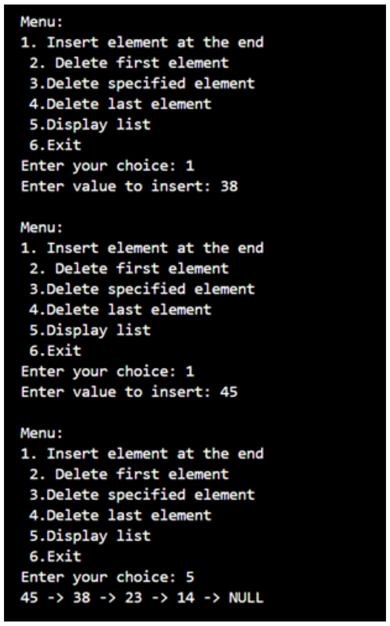
```
#include <stdio.h>

#include <stdlib.h>

 struct Node {

    int data;

    struct Node* next;

};

 struct Node* createNode(int data) {

    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));

    newNode->data = data;

    newNode->next = NULL;

    return newNode;

};


void insertatfirst(struct Node** head, int data){

    struct Node* newnode =createNode(data);

    newnode->next = *head;

    *head = newnode;
```

```
}

void deleteFirst(struct Node** head) {
    if (*head == NULL) {
        printf("The list is empty.\n");
        return;
    }
    struct Node* temp = *head;
    *head = (*head)->next;
    free(temp);
}
 void deleteElement(struct Node** head, int key) {
    if (*head == NULL) {
        printf("The list is empty.\n");
        return;
    }
    struct Node *temp = *head, *prev = NULL;
    if (temp != NULL && temp->data == key) {
        *head = temp->next;
        free(temp);
        return;
    }
    while (temp != NULL && temp->data != key) {
        prev = temp;
        temp = temp->next;
    }
    if (temp == NULL) {
        printf("Element %d not found.\n", key);
        return;
    }
    prev->next = temp->next;
    free(temp);
}
 void deleteLast(struct Node** head) {
    if (*head == NULL) {
        printf("The list is empty.\n");
        return;
    }
    struct Node *temp = *head, *prev = NULL;
    if (temp->next == NULL) {
        *head = NULL;
        free(temp);
        return;
    }
    while (temp->next != NULL) {
        prev = temp;
        temp = temp->next;
    }
    prev->next = NULL;
    free(temp);
}
 void displayList(struct Node* head) {
    if (head == NULL) {
        printf("The list is empty.\n");
        return;
    }
    struct Node* temp = head;
    while (temp != NULL) {
        printf("%d -> ", temp->data);
        temp = temp->next;
    }
    printf("NULL\n");
}

int main() {
    struct Node* head = NULL;
    int choice, value;
    while (1) {
        printf("\nMenu:\n");
    printf("1. Insert element at the end\n 2. Delete first element\n 3.Delete specified element\n
4.Delete last element\n 5.Display list\n 6.Exit\n");

    printf("Enter your choice: ");

    scanf("%d", &choice);

 switch (choice) {

      case 1:

        printf("Enter value to insert: ");

        scanf("%d", &value);

        insertatfirst(&head, value);

        break;

      case 2:

        deleteFirst(&head);

        break;

      case 3:

        printf("Enter value to delete: ");

        scanf("%d", &value);

        deleteElement(&head, value);

        break;

      case 4:

        deleteLast(&head);

        break;

      case 5:

        displayList(head);

        break;
```

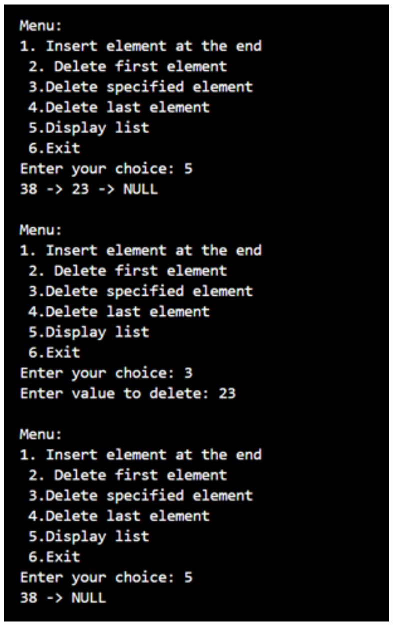
```
            case 6:
                exit(0);
            default:
                printf("Invalid choice.\n");
        }
    }
    return 0;
}
```



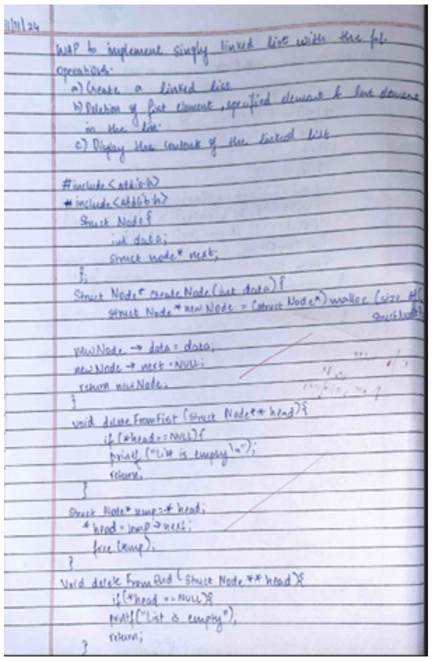
```
Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 2

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 5
38 -> 23 -> 14 -> NULL

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 4
```



```
Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 1
Enter value to insert: 38

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 1
Enter value to insert: 45

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 5
45 -> 38 -> 23 -> 14 -> NULL
```



```
Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 5
38 -> 23 -> NULL

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 3
Enter value to delete: 23

Menu:
1. Insert element at the end
 2. Delete first element
 3.Delete specified element
 4.Delete last element
 5.Display list
 6.Exit
Enter your choice: 5
38 -> NULL
```



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WAP to implement singly linked list with the fol. operations:

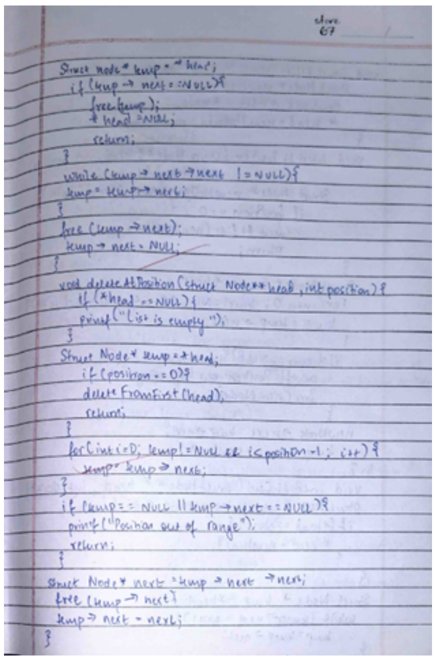
a) Create a linked list

b) Deletion of first element, specified element & last element in the list.

c) Display the contents of the linked list

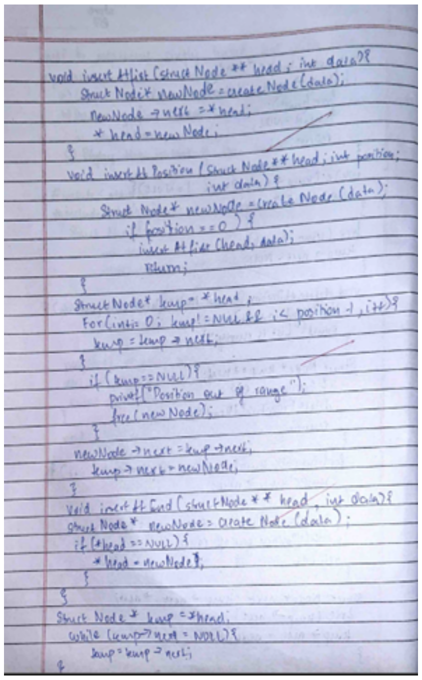
```
#include<stdio.h>
#include<stdlib.h>
  Struct Node{
      int data;
      struct node* next;
  };
 Struct Node* createNode(int data){
      struct Node* newNode = (struct Node*)malloc (size of(
                                                    structNode));

 newNode → data = data;
 newNode → next = NULL;
 return newNode;
 }
 void deleteFromFist (struct Node** head){
      if(*head==NULL){
      printf("List is empty\n");
      return;
   }
 Struct Node* temp=*head;
  *head=temp→next;
   free(temp);
 }
Void delete FromEnd (Struct Node ** head){
        if(*head ==NULL){
        printf("List is empty");
        return;
    }
```

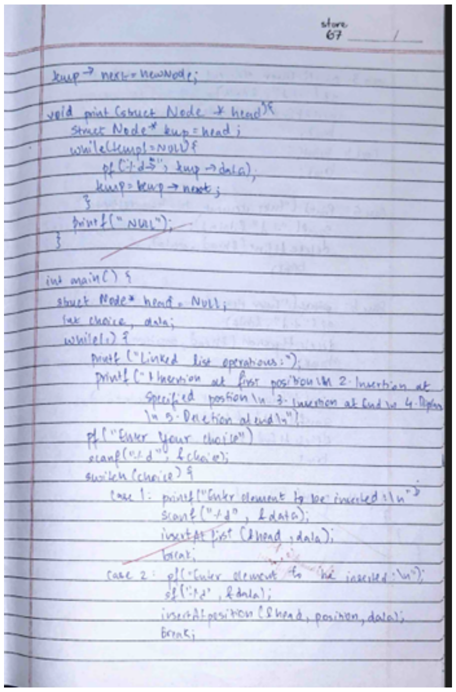


store
67

```
Struct node* temp = *head;
 if (temp → next ==NULL){
    free(temp);
    *head =NULL;
    return;
 }
 while (temp → next → next  !=NULL){
 temp= temp→ next;
}
free (temp →next);
 temp → next = NULL;
}
void deleteAtPosition(struct Node** head, int position){
   if (*head ==NULL){
   printf("List is empty");
  }
Struct Node* temp =*head;
   if(position ==0){
   delete FromFirst(head);
   return;
  }
  for(int i=0; temp!=NULL && i<position-1; i++){
   temp= temp → next;
 }
 if (temp== NULL || temp→next==NULL){
 printf("Position out of range");
 return;
 }
Struct Node* next =temp → next →next;
free (temp → next)
temp → next = next;
}
```



```
void insertAtfirst (struct Node ** head; int data){
   Struct Node* newNode=createNode(data);
    newNode →next =*head;
    * head=newNode;
 }
 void insertAtPosition (Struct Node**head; int position;
                              int data){
     Struct Node* newNode =Create Node (data);
        if position ==0 ){
         insert Atfirst (head, data);
          return;
   }
  StructNode* temp= *head ;
   For(int i= 0; temp!=NULL && i< position -1, i++){
    temp = temp → next;
   }
    if (temp==NULL){
       printf("Position out of range");
       free(new Node);
     }
  newNode → next =temp →next;
    temp→ next = newNode;
 }
 void insertAtEnd (structNode ** head, int data){
 struct Node*  newNode= create Node (data);
  if (*head ==NULL){
     *head = newNode};
    }
 }
Struct Node * temp =*head;
  while (temp→next = NULL){
     temp= temp → next;
}
```



store
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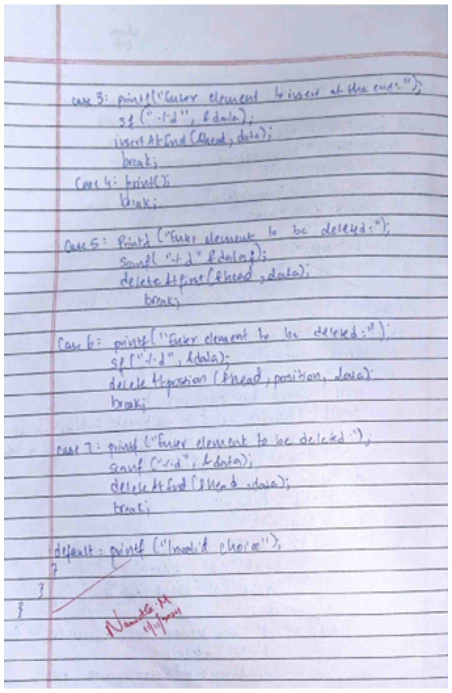
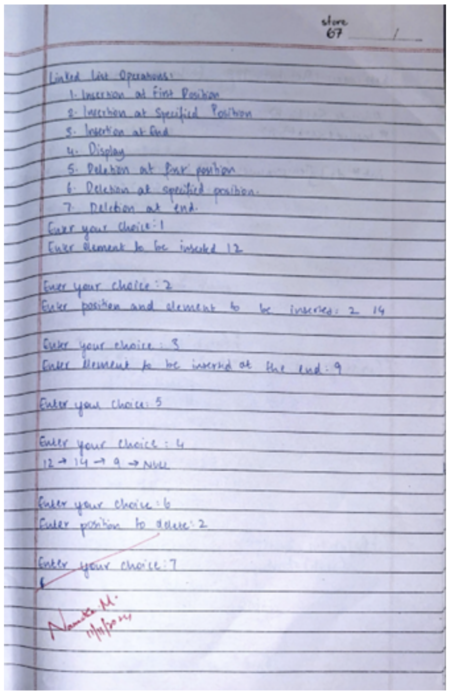
```
temp → next= newNode;

void print (struct Node * head){
   Struct Node* temp=head;
   while(temp!=NULL){
       pf("%d→", temp →data);
      temp=temp → next;
    }
   printf("NULL");
 }

int main() {
 struct Node* head = NULL;
  int choice, data;
  while(1) {
      printf ("Linked list operations:");
      printf ("1.Insertion at first position\n 2. Insertion at
                specified postion\n 3. Insertion at End\n 4.Display
                \n 5. Deletion at end\n");
     pf("Enter your choice")
     scanf("%d", &choice);
     switch (choice) {
        case 1: printf("Enter element to be inserted:\n")
                scanf("%d", &data);
                insertAtfirst (&head, data);
                break;
       case 2: pf("Enter element to be inserted:\n");
                sf("%d", &data);
                insertAtposition (&head, position, data);
                Break;
```



```
case 3: printf("Enter element to insert at the end:");
        sf("%d", &data);
        insertAtEnd(&head, data);
        break;
 case 4: print();
        break;

case 5: Printf("Enter element to be deleted:");
        Scanf("%d" &data);
        deleteAtfirst(&head, data);
            break;

case 6: printf("Enter element to be deleted:");
        sf("%d", &data);
        deleteAtposition(&head, position, data);
        break;

case 7: printf("Enter element to be deleted:");
        scanf("%d", &data);
        deleteAtEnd(&head, data);
        break;

default: printf("Invalid choice");
}
  }
}
```

Namita M
1/11/2024



store
67 ____/____

```
Linked List Operations:
  1. Insertion at First Position
  2. Insertion at Specified Position
  3. Insertion at End
  4. Display
  5. Deletion at first position
  6. Deletion at specified position.
  7. Deletion at end.
Enter your choice: 1
Enter element to be inserted 12

Enter your choice: 2
Enter position and element to be inserted: 2 14

Enter your choice: 3
Enter element to be inserted at the end: 9

Enter your choice: 5

Enter your choice: 4
12 → 14 → 9 → Null

Enter your choice: 6
Enter position to delete: 2

Enter your choice: 7
```

Namita M
1/11/2024