```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
struct Node {
    char data;
    struct Node* next;
    struct Node* prev;
};
struct Node* createNode(char data) {
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
    newNode->data = data;
    newNode->next = NULL;
    newNode->prev = NULL;
    return newNode;
}
void insert(struct Node** head, char data) {
    struct Node* newNode = createNode(data);
    struct Node* temp = *head;

    if (*head == NULL) {
        *head = newNode;
        return;
    }

    while (temp->next != NULL)
        temp = temp->next;

    temp->next = newNode;
    newNode->prev = temp;
}
void deleteNode(struct Node** head, char data) {
```

```
    struct Node* temp = *head;
    if (*head == NULL) {
        printf("List is empty, nothing to delete.\n");
        return;
    }
    while (temp != NULL && temp->data != data)
        temp = temp->next;
    if (temp == NULL) {
        printf("Node with data '%c' not found.\n", data);
        return;
    }
    if (*head == temp)
        *head = temp->next;

    if (temp->next != NULL)
        temp->next->prev = temp->prev;

    if (temp->prev != NULL)
        temp->prev->next = temp->next;

    free(temp);
}

void displayForward(struct Node* head) {
    struct Node* temp = head;

    if (head == NULL) {
        printf("List is empty.\n");
        return;
    }
```

```
    printf("Doubly Linked List (Forward): ");
    while (temp != NULL) {
        printf("%c ", temp->data);
        temp = temp->next;
    }
    printf("\n");
}

void displayBackward(struct Node* head) {
    struct Node* temp = head;

    if (head == NULL) {
        printf("List is empty.\n");
        return;
    }


    while (temp->next != NULL)
        temp = temp->next;

    printf("Doubly Linked List (Backward): ");
    while (temp != NULL) {
        printf("%c ", temp->data);
        temp = temp->prev;
    }
    printf("\n");
}

int main() {
    struct Node* head = NULL;
    char str[100], ch;
```

```
int choice, pos;

printf("Enter a string: ");
gets(str);

for (int i = 0; i < strlen(str); i++) {
   insert(&head, str[i]);
}

while (1) {
   printf("\nMenu:\n");
   printf("1. Insert a character\n");
   printf("2. Delete a character\n");
   printf("3. Display Forward\n");
   printf("4. Display Backward\n");
   printf("5. Exit\n");
   printf("Enter your choice: ");
   scanf("%d", &choice);
   getchar();

   switch (choice) {
      case 1:
         printf("Enter the character to insert: ");
         scanf("%c", &ch);
         insert(&head, ch);
         break;
      case 2:
         printf("Enter the character to delete: ");
         scanf("%c", &ch);
         deleteNode(&head, ch);
         break;
```

```
            case 3:
                displayForward(head);
                break;
            case 4:
                displayBackward(head);
                break;
            case 5:
            printf("\n THANK YOU!!!");
             printf("\n Course Teacher : Mrs.Archana Chitte");
                exit(0);

            default:
                printf("Invalid choice! Please try again.\n");
        }
    }
    return 0;
}
```

```
Enter a string: DATA

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 1
Enter the character to insert: S

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 3
Doubly Linked List (Forward): D A T A S

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 4
Doubly Linked List (Backward): S A T A D

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 2
Enter the character to delete: S
```

```
Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 3
Doubly Linked List (Forward): D A T A

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 4
Doubly Linked List (Backward): A T A D

Menu:
1. Insert a character
2. Delete a character
3. Display Forward
4. Display Backward
5. Exit
Enter your choice: 5

 THANK YOU!!!
 Course Teacher : Mrs.Archana Chitte
PS C:\Users\varad_0kfzvy3\AppData\Local\Temp>
```