***ASSIGNMENT-3***

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***Year & Branch: II B.Tech CSE - F Section***

***Assignment No: 3***

***Github profile: https://github.com/Jathinpatel/dsa-assignment-3/tree/main***

***1. You are given a task of implementing a simple contact management system using a singly linked list. The system will manage contact names. Implement the following operations using a singly linked list and switch case. After every operation, display thecurrent list of contacts.***

***The operations to implement are:***

***(i) Creation of the list: Allow the user to create a list of contact names by entering them one by one.***

***(ii) Insertion of a new contact: Insert a new contact's name into a specific position***

***in the list. The user should provide the name and the position at which it should be inserted.***

***(iii) Deletion of a contact: Delete a contact's name from the list based on their position or name. Ask the user whether they want to delete by name or by position.***

***(iv) Traversal of the list: Display all the contact names in the list in the current order.***

***(v) Search for a contact: Search for a contact's name in the list and display whether or not the contact is found, along with their position if present.***

***Code:***

***#include <stdio.h>***

***#include <stdlib.h>***

***#include <string.h>***

***struct Node {***

***char name[100];***

***struct Node\* next;***

***};***

***struct Node\* createNode(char\* name) {***

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

***strcpy(newNode->name, name);***

***newNode->next = NULL;***

***return newNode;***

***}***

***void displayContacts(struct Node\* head) {***

***if (head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = head;***

***printf("Contacts in the list:\n");***

***while (temp != NULL) {***

***printf("%s\n", temp->name);***

***temp = temp->next;***

***}***

***}***

***void insertContact(struct Node\*\* head, char\* name, int position) {***

***struct Node\* newNode = createNode(name);***

***if (position == 1) {***

***newNode->next = \*head;***

***\*head = newNode;***

***} else {***

***struct Node\* temp = \*head;***

***for (int i = 1; temp != NULL && i < position - 1; i++) {***

***temp = temp->next;***

***}***

***if (temp == NULL) {***

***printf("Position out of range. Adding at the end of the list.\n");***

***newNode->next = NULL;***

***struct Node\* last = \*head;***

***if (last == NULL) {***

***\*head = newNode;***

***} else {***

***while (last->next != NULL) {***

***last = last->next;***

***}***

***last->next = newNode;***

***}***

***} else {***

***newNode->next = temp->next;***

***temp->next = newNode;***

***}***

***}***

***displayContacts(\*head);***

***}***

***void deleteContactByPosition(struct Node\*\* head, int position) {***

***if (\*head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = \*head;***

***if (position == 1) {***

***\*head = temp->next;***

***free(temp);***

***} else {***

***struct Node\* prev = NULL;***

***for (int i = 1; temp != NULL && i < position; i++) {***

***prev = temp;***

***temp = temp->next;***

***}***

***if (temp == NULL) {***

***printf("Position out of range.\n");***

***} else {***

***prev->next = temp->next;***

***free(temp);***

***}***

***}***

***displayContacts(\*head);***

***}***

***void deleteContactByName(struct Node\*\* head, char\* name) {***

***if (\*head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = \*head;***

***struct Node\* prev = NULL;***

***if (strcmp(temp->name, name) == 0) {***

***\*head = temp->next;***

***free(temp);***

***displayContacts(\*head);***

***return;***

***}***

***while (temp != NULL && strcmp(temp->name, name) != 0) {***

***prev = temp;***

***temp = temp->next;***

***}***

***if (temp == NULL) {***

***printf("Contact not found.\n");***

***} else {***

***prev->next = temp->next;***

***free(temp);***

***}***

***displayContacts(\*head);***

***}***

***void searchContact(struct Node\* head, char\* name) {***

***struct Node\* temp = head;***

***int position = 1;***

***while (temp != NULL) {***

***if (strcmp(temp->name, name) == 0) {***

***printf("Contact '%s' found at position %d.\n", name, position);***

***return;***

***}***

***temp = temp->next;***

***position++;***

***}***

***printf("Contact '%s' not found in the list.\n", name);***

***}***

***int main() {***

***struct Node\* head = NULL;***

***int choice, position;***

***char name[100];***

***while (1) {***

***printf("\n--- Contact Management System ---\n");***

***printf("1. Create Contact List\n");***

***printf("2. Insert New Contact\n");***

***printf("3. Delete Contact\n");***

***printf("4. Display Contacts\n");***

***printf("5. Search for a Contact\n");***

***printf("6. Exit\n");***

***printf("Enter your choice: ");***

***scanf("%d", &choice);***

***switch (choice) {***

***case 1:***

***printf("Enter contact name (or 'done' to finish): ");***

***while (1) {***

***scanf("%s", name);***

***if (strcmp(name, "done") == 0)***

***break;***

***insertContact(&head, name, 1);***

***}***

***break;***

***case 2:***

***printf("Enter contact name to insert: ");***

***scanf("%s", name);***

***printf("Enter the position to insert the contact: ");***

***scanf("%d", &position);***

***insertContact(&head, name, position);***

***break;***

***case 3:***

***printf("Delete by 1) Position or 2) Name: ");***

***int deleteChoice;***

***scanf("%d", &deleteChoice);***

***if (deleteChoice == 1) {***

***printf("Enter position to delete: ");***

***scanf("%d", &position);***

***deleteContactByPosition(&head, position);***

***} else if (deleteChoice == 2) {***

***printf("Enter name to delete: ");***

***scanf("%s", name);***

***deleteContactByName(&head, name);***

***} else {***

***printf("Invalid choice.\n");***

***}***

***break;***

***case 4:***

***displayContacts(head);***

***break;***

***case 5:***

***printf("Enter name to search: ");***

***scanf("%s", name);***

***searchContact(head, name);***

***break;***

***case 6:***

***printf("Exiting...\n");***

***return 0;***

***default:***

***printf("Invalid choice.\n");***

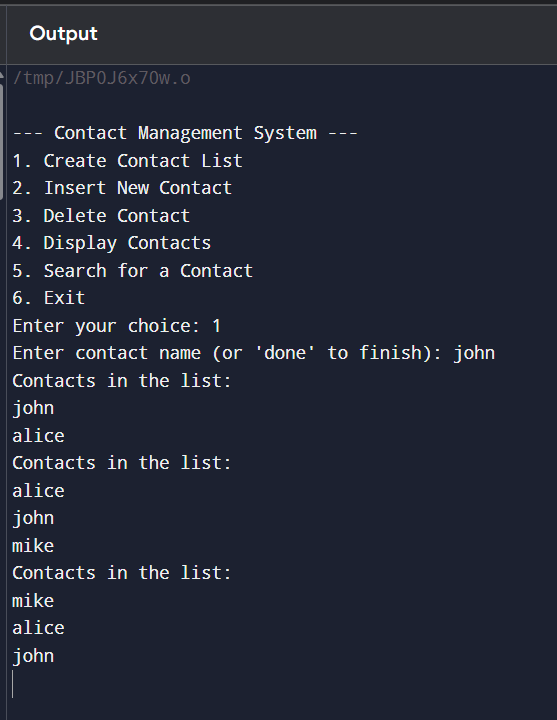
***}***

***}***

***return 0;***

***}***

***Output:***

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***2. You are tasked with implementing a simple contact management system using a doubly linked list. The system will manage contact names. Implement the following operations using a doubly linked list and switch-case. After every operation, display the current list of contacts.***

***The operations to implement are:***

***(i) Creation of the list: Allow the user to create a list of contact names by entering them one by one.***

***(ii) Insertion of a new contact: Insert a new contact’s name into a specific position in the list. The user should provide the name and the position at which it should be inserted.***

***(iii)Deletion of a contact: Delete a contact’s name from the list based on their position or name. Ask the user whether they want to delete by name or by position.***

***(iv)Traversal of the list (in both directions): Display all the contact names in the list in the current order (forward traversal) and then display them in reverse order (backward traversal).***

***(v) Search for a contact: Search for a contact’s name in the list and display whether or not the contact is found, along with their position if present.***

***Code:***

***#include <stdio.h>***

***#include <stdlib.h>***

***#include <string.h>***

***struct Node {***

***char name[100];***

***struct Node\* next;***

***struct Node\* prev;***

***};***

***struct Node\* createNode(char\* name) {***

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

***strcpy(newNode->name, name);***

***newNode->next = NULL;***

***newNode->prev = NULL;***

***return newNode;***

***}***

***void displayContactsForward(struct Node\* head) {***

***if (head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = head;***

***printf("Contact list (forward): ");***

***while (temp != NULL) {***

***printf("%s <-> ", temp->name);***

***temp = temp->next;***

***}***

***printf("NULL\n");***

***}***

***void displayContactsBackward(struct Node\* tail) {***

***if (tail == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = tail;***

***printf("Contact list (backward): ");***

***while (temp != NULL) {***

***printf("%s <-> ", temp->name);***

***temp = temp->prev;***

***}***

***printf("NULL\n");***

***}***

***void insertContact(struct Node\*\* head, struct Node\*\* tail, char\* name, int position) {***

***struct Node\* newNode = createNode(name);***

***if (position == 0) {***

***newNode->next = \*head;***

***if (\*head != NULL) {***

***(\*head)->prev = newNode;***

***}***

***\*head = newNode;***

***if (\*tail == NULL) {***

***\*tail = newNode;***

***}***

***} else {***

***struct Node\* temp = \*head;***

***for (int i = 0; temp != NULL && i < position - 1; i++) {***

***temp = temp->next;***

***}***

***if (temp == NULL || temp->next == NULL) {***

***newNode->prev = \*tail;***

***if (\*tail != NULL) {***

***(\*tail)->next = newNode;***

***}***

***\*tail = newNode;***

***} else {***

***newNode->next = temp->next;***

***temp->next->prev = newNode;***

***temp->next = newNode;***

***newNode->prev = temp;***

***}***

***}***

***displayContactsForward(\*head);***

***displayContactsBackward(\*tail);***

***}***

***void deleteContactByPosition(struct Node\*\* head, struct Node\*\* tail, int position) {***

***if (\*head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = \*head;***

***if (position == 0) {***

***\*head = temp->next;***

***if (\*head != NULL) {***

***(\*head)->prev = NULL;***

***} else {***

***\*tail = NULL;***

***}***

***free(temp);***

***} else {***

***for (int i = 0; temp != NULL && i < position; i++) {***

***temp = temp->next;***

***}***

***if (temp == NULL) {***

***printf("Position out of range.\n");***

***return;***

***}***

***if (temp->next != NULL) {***

***temp->next->prev = temp->prev;***

***} else {***

***\*tail = temp->prev;***

***}***

***if (temp->prev != NULL) {***

***temp->prev->next = temp->next;***

***}***

***free(temp);***

***}***

***displayContactsForward(\*head);***

***displayContactsBackward(\*tail);***

***}***

***void deleteContactByName(struct Node\*\* head, struct Node\*\* tail, char\* name) {***

***if (\*head == NULL) {***

***printf("The contact list is empty.\n");***

***return;***

***}***

***struct Node\* temp = \*head;***

***while (temp != NULL && strcmp(temp->name, name) != 0) {***

***temp = temp->next;***

***}***

***if (temp == NULL) {***

***printf("Contact not found.\n");***

***return;***

***}***

***if (temp == \*head) {***

***\*head = temp->next;***

***}***

***if (temp == \*tail) {***

***\*tail = temp->prev;***

***}***

***if (temp->next != NULL) {***

***temp->next->prev = temp->prev;***

***}***

***if (temp->prev != NULL) {***

***temp->prev->next = temp->next;***

***}***

***free(temp);***

***displayContactsForward(\*head);***

***displayContactsBackward(\*tail);***

***}***

***void searchContact(struct Node\* head, char\* name) {***

***struct Node\* temp = head;***

***int position = 0;***

***while (temp != NULL) {***

***if (strcmp(temp->name, name) == 0) {***

***printf("Contact '%s' found at position %d.\n", name, position);***

***return;***

***}***

***temp = temp->next;***

***position++;***

***}***

***printf("Contact '%s' not found.\n", name);***

***}***

***int main() {***

***struct Node\* head = NULL;***

***struct Node\* tail = NULL;***

***int choice, position;***

***char name[100];***

***while (1) {***

***printf("\n--- Contact Management System ---\n");***

***printf("1. Create Contact List\n");***

***printf("2. Insert New Contact\n");***

***printf("3. Delete Contact\n");***

***printf("4. Display Contact List\n");***

***printf("5. Search for a Contact\n");***

***printf("6. Exit\n");***

***printf("Enter your choice: ");***

***scanf("%d", &choice);***

***switch (choice) {***

***case 1:***

***printf("Enter the number of contacts: ");***

***int numContacts;***

***scanf("%d", &numContacts);***

***for (int i = 0; i < numContacts; i++) {***

***printf("Enter contact name %d: ", i + 1);***

***scanf("%s", name);***

***insertContact(&head, &tail, name, i);***

***}***

***break;***

***case 2:***

***printf("Enter the contact's name to insert: ");***

***scanf("%s", name);***

***printf("Enter the position (0-based index) to insert the contact: ");***

***scanf("%d", &position);***

***insertContact(&head, &tail, name, position);***

***break;***

***case 3:***

***printf("Delete by name or position? (n/p): ");***

***char deleteChoice;***

***scanf(" %c", &deleteChoice);***

***if (deleteChoice == 'p') {***

***printf("Enter position to delete (0-based index): ");***

***scanf("%d", &position);***

***deleteContactByPosition(&head, &tail, position);***

***} else if (deleteChoice == 'n') {***

***printf("Enter name to delete: ");***

***scanf("%s", name);***

***deleteContactByName(&head, &tail, name);***

***} else {***

***printf("Invalid choice.\n");***

***}***

***break;***

***case 4:***

***displayContactsForward(head);***

***displayContactsBackward(tail);***

***break;***

***case 5:***

***printf("Enter name to search: ");***

***scanf("%s", name);***

***searchContact(head, name);***

***break;***

***case 6:***

***printf("Exiting the program...\n");***

***return 0;***

***default:***

***printf("Invalid choice.\n");***

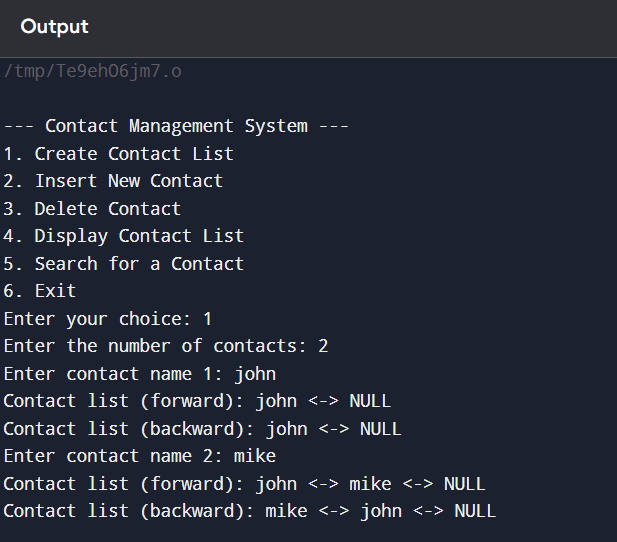
***}***

***}***

***return 0;***

***}***

***Output:***

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