Program 7

Write A Program to Implement doubly link list with primitive operations

- a) Create a doubly linked list.
- b) Insert a new node to the left of the node.
- c) Delete the node based on a specific value
- d) Display the contents of the list

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Code:
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#include <stdio.h>
#include <stdlib.h>
struct Node {
  int data;
  struct Node* prev;
  struct Node* next;
};
struct Node* createNode(int data) {
  struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
  newNode->data = data:
  newNode->prev = NULL;
  newNode->next = NULL;
  return newNode;
}
void insertAtBeginning(struct Node** head, int data) {
  struct Node* newNode = createNode(data);
  if (*head == NULL) {
     *head = newNode;
  } else {
    newNode->next = *head;
    (*head)->prev = newNode;
    *head = newNode;
  }
}
void insertAtPosition(struct Node** head, int data, int position) {
  if (position < 1) {
    printf("Invalid position!\n");
    return;
  }
  struct Node* newNode = createNode(data);
  if (position == 1) {
    insertAtBeginning(head, data);
    return;
  }
```

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struct Node* temp = *head;
  for (int i = 1; temp != NULL && i < position - 1; i++) {
    temp = temp->next;
  if (temp == NULL) {
    printf("Position out of bounds!\n");
    free(newNode);
    return;
  }
  newNode->next = temp->next;
  newNode->prev = temp;
  if (temp->next != NULL) {
    temp->next->prev = newNode;
  temp->next = newNode;
}
void insertAtEnd(struct Node** head, int data) {
  struct Node* newNode = createNode(data);
  if (*head == NULL) {
    *head = newNode;
    return;
  }
  struct Node* temp = *head;
  while (temp->next != NULL) {
    temp = temp->next;
  temp->next = newNode;
  newNode->prev = temp;
}
void displayList(struct Node* head) {
  if (head == NULL) {
    printf("List is empty!\n");
    return;
  }
  struct Node* temp = head;
  printf("List contents: ");
  while (temp != NULL) {
    printf("%d ", temp->data);
    temp = temp->next;
  printf("\n");
int main() {
```

```
struct Node* head = NULL;
int choice, data, position;
while (1) {
  printf("\nDoubly Linked List Operations:\n");
  printf("1. Insert at Beginning\n");
  printf("2. Insert at Position\n");
  printf("3. Insert at End\n");
  printf("4. Display List\n");
  printf("5. Exit\n");
  printf("Enter your choice: ");
  scanf("%d", &choice);
  switch (choice) {
     case 1:
       printf("Enter data to insert at beginning: ");
       scanf("%d", &data);
       insertAtBeginning(&head, data);
       break;
     case 2:
       printf("Enter data to insert: ");
       scanf("%d", &data);
       printf("Enter position: ");
       scanf("%d", &position);
       insertAtPosition(&head, data, position);
       break:
     case 3:
       printf("Enter data to insert at end: ");
       scanf("%d", &data);
       insertAtEnd(&head, data);
       break;
     case 4:
       displayList(head);
       break;
     case 5:
       printf("Exiting program.\n");
       exit(0);
     default:
       printf("Invalid choice! Please try again.\n");
  }
return 0;
```

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Doubly Linked List Operations:
1. Insert at Beginning
2. Insert at Position
3. Insert at End
4. Display List
Enter your choice: 1
Enter data to insert at beginning: 1
Doubly Linked List Operations:

    Insert at Beginning
    Insert at Position

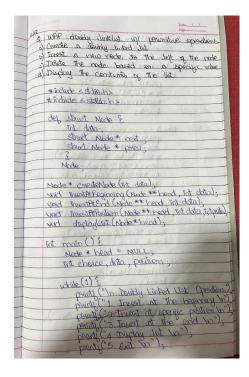
3. Insert at End
4. Display List
5. Exit
Enter your choice: 2
Enter data to insert: 2
Enter position: 2
Doubly Linked List Operations:

    Insert at Beginning
    Insert at Position
    Insert at End

4. Display List
5. Exit
Enter your choice: 3
Enter data to insert at end: 3
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Doubly Linked List Operations: 1. Insert at Beginning 2. Insert at Position 3. Insert at End 4. Display List 5. Exit Enter your choice: 4 List contents: 1 2 3 Doubly Linked List Operations: 1. Insert at Beginning 2. Insert at Position 3. Insert at End 4. Display List 5. Exit Enter your choice: 5

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