Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 4

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Ravi is developing a student registration system for a college. To efficiently store and manage the student IDs, he decides to implement a doubly linked list where each node represents a student's ID.

In this system, each student's ID is stored sequentially, and the system needs to display all registered student IDs in the order they were entered.

Implement a program that creates a doubly linked list, inserts student IDs, and displays them in the same order.

Input Format

The first line contains an integer N the number of student IDs.

The second line contains N space-separated integers representing the student IDs.

Output Format

The output should display the single line containing N space-separated integers representing the student IDs stored in the doubly linked list.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
10 20 30 40 50
Output: 10 20 30 40 50

Answer

```
#include <stdio.h>
#include <stdlib.h>

// Structure for a node in the doubly linked list
struct Node {
    int data;
    struct Node* next;
    struct Node* prev;
};

// Function to create a new node
struct Node* createNode(int data) {
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
    if (!newNode) {
        printf("Memory allocation failed");
    }
    newNode->data = data;
    newNode->next = NULL;
    newNode->prev = NULL;
    return newNode;
}

// Function to insert a node at the end of the doubly linked list
void insertAtEnd(struct Node** head, struct Node** tail, int data) {
```

```
    struct Node* newNode = createNode(data);
    if (!*head) {
        *head = newNode;
        *tail = newNode;
        return;
    }
    newNode->prev = *tail;
    (*tail)->next = newNode;
    *tail = newNode;
}

// Function to display the doubly linked list
void displayList(struct Node* head) {
    struct Node* current = head;
    while (current) {
        printf("%d", current->data);
        if (current->next != NULL) {
            printf(" ");
        }
        current = current->next;
    }
    printf("\n");
}

// Function to free the memory allocated for the doubly linked list
void freeList(struct Node* head) {
    struct Node* current = head;
    struct Node* nextNode;
    while (current) {
        nextNode = current->next;
        free(current);
        current = nextNode;
    }
}

int main() {
    int n, studentID;
    struct Node* head = NULL;
    struct Node* tail = NULL;

    // Read the number of student IDs
    if (scanf("%d", &n) != 1) {
```

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```
        return 1;
    }

    // Read the student IDs and insert them into the doubly linked list
    for (int i = 0; i < n; i++) {
        if (scanf("%d", &studentID) != 1) {
            freeList(head);
            return 1;
        }
        insertAtEnd(&head, &tail, studentID);
    }

    // Display the doubly linked list
    displayList(head);

    // Free the allocated memory
    freeList(head);

    return 0;
}
```

Status : Correct ***Marks : 10/10***