

Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 4_COD_Question 5

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

You are tasked with implementing basic operations on a queue data structure using a linked list.

You need to write a program that performs the following operations on a queue:

Enqueue Operation: Implement a function that inserts an integer element at the rear end of the queue. Print Front and Rear: Implement a function that prints the front and rear elements of the queue. Dequeue Operation: Implement a function that removes the front element from the queue.

Input Format

The first line of input consists of an integer N, representing the number of elements to be inserted into the queue.

The second line consists of N space-separated integers, representing the queue elements.

Output Format

The first line prints "Front: X, Rear: Y" where X is the front and Y is the rear elements of the queue.

The second line prints the message indicating that the dequeue operation (front element removed) is performed: "Performing Dequeue Operation:".

The last line prints "Front: M, Rear: N" where M is the front and N is the rear elements after the dequeue operation.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 5

12 56 87 23 45

Output: Front: 12, Rear: 45

Performing Dequeue Operation:

Front: 56, Rear: 45

Answer

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

```
struct Node {
    int data;
    struct Node* next;
};
```

```
struct Node* front = NULL;
struct Node* rear = NULL;
```

```
// You are using GCC
#include <iostream>
using namespace std;
```

```
// Node structure for the linked list
struct Node {
    int data;
    Node* next;
    Node(int val) : data(val), next(nullptr) {}
};
```

```
// Queue class using linked list
class Queue {
private:
    Node* front;
    Node* rear;
```

```
public:
    Queue() {
        front = rear = nullptr;
    }
```

```
// Enqueue operation: Inserts an element at the rear
void enqueue(int data) {
    Node* newNode = new Node(data);
    if (rear == nullptr) { // If queue is empty
        front = rear = newNode;
    } else {
        rear->next = newNode;
        rear = newNode;
    }
}
```

```
// Dequeue operation: Removes the front element
void dequeue() {
    if (front == nullptr) {
        return;
    }
    Node* temp = front;
    front = front->next;
    if (front == nullptr) { // If queue becomes empty
        rear = nullptr;
    }
    delete temp;
}
```

```

// Print front and rear elements of the queue
void printFrontRear() {
    if (front == nullptr) {
        return;
    }
    cout << "Front: " << front->data << ", Rear: " << rear->data << endl;
}
};

```

```

int main() {
    Queue q;
    int N;
    cin >> N; // Read number of elements
    int element;

    // Enqueue elements
    for (int i = 0; i < N; i++) {
        cin >> element;
        q.enqueue(element);
    }

    // Print initial front and rear elements
    q.printFrontRear();

    // Perform dequeue operation
    cout << "Performing Dequeue Operation:" << endl;
    q.dequeue();

    // Print front and rear elements after dequeue
    q.printFrontRear();

    return 0;
}

```

```

int main() {
    int n, data;
    scanf("%d", &n);
    for (int i = 0; i < n; i++) {
        scanf("%d", &data);
        enqueue(data);
    }
    printFrontRear();
    printf("Performing Dequeue Operation:\n");
}

```

```
dequeue();  
printFrontRear();  
return 0;  
}
```

Status : Correct

Marks : 10/10