

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 4\_COD\_Question 1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Imagine a bustling coffee shop, where customers are placing their orders for their favorite coffee drinks. The cafe owner Sheeren wants to efficiently manage the queue of coffee orders using a digital system. She needs a program to handle this queue of orders.

You are tasked with creating a program that implements a queue for coffee orders. Each character in the queue represents a customer's coffee order, with 'L' indicating a latte, 'E' indicating an espresso, 'M' indicating a macchiato, 'O' indicating an iced coffee, and 'N' indicating a nabob.

Customers can place orders and enjoy their delicious coffee drinks.

##### **Input Format**

The input consists of integers corresponding to the operation that needs to be performed:

Choice 1: Enqueue the coffee order into the queue. If the choice is 1, the following input is a space-separated character ('L', 'E', 'M', 'O', 'N').

Choice 2: Dequeue a coffee order from the queue.

Choice 3: Display the orders in the queue.

Choice 4: Exit the program.

### ***Output Format***

The output displays messages according to the choice and the status of the queue:

If the choice is 1:

1. Insert the given order into the queue and display "Order for [order] is enqueued." where [order] is the coffee order that is inserted.
2. If the queue is full, print "Queue is full. Cannot enqueue more orders."

If the choice is 2:

1. Dequeue a character from the queue and display "Dequeued Order: " followed by the corresponding order that is dequeued.
2. If the queue is empty without any orders, print "No orders in the queue."

If the choice is 3:

1. The output prints "Orders in the queue are: " followed by the space-separated orders present in the queue.
2. If there are no orders in the queue, print "Queue is empty. No orders available."

If the choice is 4:

1. Exit the program and print "Exiting program"

If any other choice is entered, the output prints "Invalid option."

Refer to the sample output for the exact text and format.

### **Sample Test Case**

Input: 1 L

1 E

1 M

1 O

1 N

1 O

3

2

3

4

Output: Order for L is enqueued.

Order for E is enqueued.

Order for M is enqueued.

Order for O is enqueued.

Order for N is enqueued.

Queue is full. Cannot enqueue more orders.

Orders in the queue are: L E M O N

Dequeued Order: L

Orders in the queue are: E M O N

Exiting program

### **Answer**

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

```
#define MAX_SIZE 5
```

```
char orders[MAX_SIZE];
```

```
int front = -1;
```

```
int rear = -1;
```

```
void initializeQueue() {
```

```
    front = -1;
```

```
    rear = -1;
```

```
}
```

```
int isEmpty()
```

```
{
```

```
    return front == -1;
```

```
}
```

```
int isFull()
```

```
{
```

```
    return (rear + 1) % MAX_SIZE == front;
```

```
}
```

```
int enqueue(char order)
```

```
{
```

```
    if (isFull())
```

```
{
```

```
    printf("Queue is full. Cannot enqueue more orders.\n");  
    return 0;
```

```
}
```

```
    if (isEmpty())
```

```
{
```

```
        front = 0; // First element being added
```

```
}
```

```
    rear = (rear + 1) % MAX_SIZE;
```

```
orders[rear] = order;
printf("Order for %c is enqueued.\n", order);
return 1;
```

```
}
```

```
int dequeue()
```

```
{
```

```
    if (isEmpty())
```

```
    {
```

```
        printf("No orders in the queue.\n");
        return 0;
```

```
    }
```

```
    char order = orders[front];
    if (front == rear)
```

```
    {
```

```
        front = -1; // Queue is now empty
        rear = -1;
```

```
    } else
```

```
    {
```

```
        front = (front + 1) % MAX_SIZE;
```

```
    }
```

```
    printf("Dequeued Order: %c\n", order);
    return 1;
```

```
}
```

```
void display()
```

```
{
```

```
    if (isEmpty())
```

```
{
```

```
    printf("Queue is empty. No orders available.\n");  
    return;
```

```
}
```

```
    printf("Orders in the queue are: ");  
    int i = front;  
    while (1)
```

```
{
```

```
    printf("%c", orders[i]);  
    if (i == rear) break;  
    printf(" ");  
    i = (i + 1) % MAX_SIZE;
```

```
}
```

```
    printf("\n");
```

```
}
```

```
int main() {
```

```
    char order;
```

```
    int option;
```

```
    initializeQueue();
```

```
    while (1) {
```

```
        if (scanf("%d", &option) != 1) {  
            break;
```

```
}
switch (option) {
    case 1:
        if (scanf(" %c", &order) != 1) {
            break;
        }
        if (enqueue(order)) {
        }
        break;
    case 2:
        dequeue();
        break;
    case 3:
        display();
        break;
    case 4:
        printf("Exiting program");
        return 0;
    default:
        printf("Invalid option.\n");
        break;
}
}
return 0;
}
```

**Status :** Correct

**Marks :** 10/10