

# Rajalakshmi Engineering College

Name: DARSSHINI P  
Email: 241801042@rajalakshmi.edu.in  
Roll no: 241801042  
Phone: 9003242774  
Branch: REC  
Department: I AI & DS FB  
Batch: 2028  
Degree: B.E - AI & DS

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 4\_COD\_Question 3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Write a program to implement a queue using an array and pointers. The program should provide the following functionalities:

Insert an element into the queue. Delete an element from the queue. Display the elements in the queue.

The queue has a maximum capacity of 5 elements. If the queue is full and an insertion is attempted, a "Queue is full" message should be displayed. If the queue is empty and a deletion is attempted, a "Queue is empty" message should be displayed.

##### *Input Format*

Each line contains an integer representing the chosen option from 1 to 3.

Option 1: Insert an element into the queue followed by an integer representing the element to be inserted, separated by a space.

Option 2: Delete an element from the queue.

Option 3: Display the elements in the queue.

### **Output Format**

For option 1 (insertion):-

1. The program outputs: "<data> is inserted in the queue." if the data is successfully inserted.
2. "Queue is full." if the queue is already full and cannot accept more elements.

For option 2 (deletion):-

1. The program outputs: "Deleted number is: <data>" if an element is successfully deleted and returns the value of the deleted element.
2. "Queue is empty." if the queue is empty no elements can be deleted.

For option 3 (display):-

1. The program outputs: "Elements in the queue are: <element1> <element2> ... <elementN>" where <element1>, <element2>, ..., <elementN> represent the elements present in the queue.
2. "Queue is empty." if the queue is empty no elements can be displayed.

For invalid options, the program outputs: "Invalid option."

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 1 10

3

5

Output: 10 is inserted in the queue.

Elements in the queue are: 10

Invalid option.

### **Answer**

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

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

```
#define max 5
```

```
int queue[max];
```

```
int front = -1, rear = -1;
```

```
// You are using GCC
```

```
int insertq(int *data)
```

```
{
```

```
    //Type your code here
```

```
    if((rear+1)%max==front){
```

```
        return 0;
```

```
    }
```

```
    if(front== -1){
```

```
        front=rear=0;
```

```
    }else{
```

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

```
    }
```

```
    queue[rear]=*data;
```

```
    return 1;
```

```
}
```

```
int delq()
```

```
{
```

```
    //Type your code here
```

```
    if(front== -1)
```

```
    {
```

```
        printf("Queue is empty.\n");
```

```
        return -1;
```

```
    }
```

```
    int data=queue[front];
```

```
    if(front==rear){
```

```

        front=rear=-1;
    }else{
        front=(front+1)%max;
    }
    printf("Deleted number is: %d\n",data);
    return data;
}

```

```

void display()
{
    //Type your code here
    if(front==-1){
        printf("Queue is empty.\n");
        return;
    }
    printf("Elements in the queue are: ");
    int i=front;
    while(1){
        printf("%d ",queue[i]);
        if(i==rear)
            break;
        i=(i+1)%max;
    }
    printf("\n");
}

```

```

int main()
{
    int data, reply, option;
    while (1)
    {
        if (scanf("%d", &option) != 1)
            break;
        switch (option)
        {
            case 1:
                if (scanf("%d", &data) != 1)
                    break;
                reply = insertq(&data);
                if (reply == 0)
                    printf("Queue is full.\n");
                else
                    printf("%d is inserted in the queue.\n", data);
            }
        }
    }
}

```

```
        break;
    case 2:
        delq(); // Called without arguments
        break;
    case 3:
        display();
        break;
    default:
        printf("Invalid option.\n");
        break;
    }
}
return 0;
}
```

**Status :** Correct

**Marks :** 10/10