Rajalakshmi Engineering College

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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>
#define MAX 5
int queue[MAX];
int front = -1, rear = -1;
void insert(int data) {
    if (rear == MAX - 1) {
        printf("Queue is full.\n");
        return;
    }
    if (front == -1) {
        front = 0;
    }
    queue[++rear] = data;
    printf("%d is inserted in the queue.\n", data);
}
void dequeue() {
    if (front == -1 || front > rear) {
        printf("Queue is empty.\n");
        return;
    }
    printf("Deleted number is: %d\n", queue[front++]);
    if (front > rear) {
        front = rear = -1;
    }
}
void display() {
    if (front == -1 || front > rear) {
        printf("Queue is empty.\n");
        return;
    }
    printf("Elements in the queue are:");
    for (int i = front; i <= rear; i++) {
        printf(" %d", queue[i]);
    }
    printf("\n");
```

```
}
int main() {
    int option, data;
    while (scanf("%d", &option) != EOF) {
        if (option == 1) {
            scanf("%d", &data);
            insert(data);
        } else if (option == 2) {
            dequeue();
        } else if (option == 3) {
            display();
        } else {
            printf("Invalid option.\n");
        }
    }
    return 0;
}
```

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