Rajalakshmi Engineering College

Name: Kavyasri M
Email: 240701248@rajalakshmi.edu.in
Roll no: 240701248
Phone: 6383586337
Branch: REC
Department: I CSE AH
Batch: 2028
Degree: B.E - CSE

Scan to verify results

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

```
// You are using GCC
#include <stdio.h>
#define MAX 5
int queue[MAX];
int *front = NULL;
int *rear = NULL;
int isFull() {
   return rear == &queue[MAX - 1];
}
int isEmpty() {
   return front == NULL || front > rear;
}
void enqueue(int data) {
   if (isFull()) {
      printf("Queue is full.\n");
      return;
   }
   if (isEmpty()) {
      front = queue;
      rear = queue;
   } else {
      rear++;
   }
   *rear = data;
   printf("%d is inserted in the queue.\n", data);
}
void dequeue() {
   if (isEmpty()) {
      printf("Queue is empty.\n");
      return;
   }
   printf("Deleted number is: %d\n", *front);
   front++;
   if (front > rear) {
      front = rear = NULL;
```

```
    }
}
void display() {
    if (isEmpty()) {
        printf("Queue is empty.\n");
        return;
    }
    printf("Elements in the queue are: ");
    int *ptr = front;
    while (ptr <= rear) {
        printf("%d ", *ptr);
        ptr++;
    }
    printf("\n");
}
int main() {
    int choice, value;

    while (scanf("%d", &choice) == 1) {
        switch (choice) {
            case 1:
                if (scanf("%d", &value) == 1) {
                    enqueue(value);
                }
                break;
            case 2:
                dequeue();
                break;
            case 3:
                display();
                break;
            default:
                printf("Invalid option.\n");
        }
    }

    return 0;
}
```

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