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>
#include <stdlib.h>

#define max 5

int queue[max];
int front = -1, rear = -1;
// You are using GCC
int insertq(int *data)
{
  if (rear==max-1){
     return 0;
  }
  else{
     if (front==-1 && rear ==-1){
        front+=1;
     }
     rear+=1;
     queue[rear]=*data;
     return 1;
  }

}

int delq()
{
   if(front>rear||rear==-1){
     printf("Queue is empty.\n");
   }
   else{
      printf("Deleted number is: %d\n",queue[front]);
      front+=1;
   }
   return 1;
```

```
}
void display()
{
   if(front>rear||rear==-1){
     printf("Queue is empty.\n");
   }
   else{
      printf("Elements in the queue are:");
      for(int i=front;i<=rear;i++){
        printf(" %d",queue[i]);
     }
     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***