# 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){
        front=0;
     }
     rear++;
     queue[rear]=*data;
     return 1;
  }
}

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

```
        front=-1;
        rear=-1;
    }
    printf("Deleted number is:%d\n",item);
    return item;
}
}

void display()
{
   int i;
   if(front==-1){
      printf("Queue is empty.\n");
   }
   else{
      printf("Elements in the queue are:\n");
      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***