Laboratory Component 6

Develop a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX)
a. Insert an Element on to Circular QUEUE
b. Delete an Element from Circular QUEUE
c. Demonstrate Overflow and Underflow situations on Circular QUEUE
d. Display the status of Circular QUEUE
e. Exit
Support the program with appropriate functions for each of the above operations

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

#define MAX 3

int cq[MAX];
int front = -1, rear = -1;

void insert(int);
void delete();
void display();
void main()
{
        int ch, item;
        while(1)
        {
                printf("\n\n---Main Menu-----");
                printf("\n==> 1. Insertion and Overflow Demo");
                printf("\n==> 2. Deletion and Underflow Demo");
                printf("\n==> 3. Display");
                printf("\n==> 4. Exit");
                printf("\nEnter Your Choice: ");
                scanf("%d", &ch);

                switch(ch)
                {
                        case 1: printf("\n\nEnter the element to be inserted: ");
                                scanf("%d", &item);
                                insert(item);
                                break;
                        case 2:         delete();
                                        break;
                        case 3:         display();
                                        break;
                         case 4:        exit(0);
```

```
                        default:    printf("\n\nPlease enter a valid choice");
                    }
                }
}

void insert(int item)
{
        if(front == (rear+1)%MAX)
        {
            printf("\n\n~~Circular Queue Overflow~~");
        }
        else
        {
            if(front == -1)
                front = rear = 0;
            else
                rear = (rear+1)%MAX;
            cq[rear] = item;
        }
}

void delete()
{
        int item;
        if(front == -1)
        {
            printf("\n\n~~Circular Queue Underflow~~");
        }
        else
        {
            item = cq[front];
            printf("\n\nDeleted element from the queue is: %d ",item );

            if(front == rear) //only one element
                front = rear = -1;
            else
                front = (front+1)%MAX;
        }
}


void display ()
{
        int i ;
        if(front == -1)
        {
```

```
                printf("\n\nCircular Queue Empty");
        }
        else
        {
                printf("\nCircular Queue contents are:\n");
                printf("Front[%d]-> ", front);
                for(i = front; i != rear ; i = (i+1)%MAX)
                {
                        printf(" %d", cq[i]);
                }
                printf(" %d", cq[i]);
                printf(" <-[%d]Rear", rear);
        }
}
```