**6. Design, Develop and Implement 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 10

int q[10],front=0,rear=-1;

void main()

{

int ch;

void insert();

void delet();

void display();

printf("\nCircular Queue operations\n");

printf("1.insert\n2.delete\n3.display\n4.exit\n");

while(1)

{

printf("Enter your choice:");

scanf("%d",&ch);

switch(ch)

{

case 1: insert();

break;

case 2: delet();

break;

case 3: display();

break;

case 4: exit(1);

default: printf("Invalid option\n");

}

}

}

void insert()

{

int x;

if((front==0&&rear==max-1)||(front>0&&rear==front-1))

printf("Queue is overflow\n");

else

{

printf("Enter element to be insert:");

scanf("%d",&x);

if(rear==max-1&&front>0)

{

rear=0;

q[rear]=x;

}

else

{

if((front==0&&rear==-1)||(rear!=front-1))

q[++rear]=x;

}

}

}

void delet()

{

int a;

if((front==0)&&(rear==-1))

{

printf("Queue is underflow\n");

exit(1);

}

if(front==rear)

{

a=q[front];

rear=-1;

front=0;

}

else

if(front==max-1)

{

a=q[front];

front=0;

}

else a=q[front++];

printf("Deleted element is:%d\n",a);

}

void display()

{

int i,j;

if(front==0&&rear==-1)

{

printf("Queue is underflow\n");

exit(1);

}

if(front>rear)

{

for(i=0;i<=rear;i++)

printf("\t%d",q[i]);

for(j=front;j<=max-1;j++)

printf("\t%d",q[j]);

printf("\nrear is at %d\n",q[rear]);

printf("\nfront is at %d\n",q[front]);

}

else

{

for(i=front;i<=rear;i++)

{

printf("\t%d",q[i]);

}

printf("\nrear is at %d\n",q[rear]);

printf("\nfront is at %d\n",q[front]);

}

printf("\n");

}

**Output:**

root:~/dslab #gedit cirQ.c

root:~/dslab #cc cirQ.c

root:~/dslab # ./a.out

Circular Queue operations

1.insert

2.delete

3.display

4.exit

Enter your choice:1

Enter element to be insert:10

Enter your choice:1

Enter element to be insert:20

Enter your choice:1

Enter element to be insert:30

Enter your choice:3

10 20 30

rear is at 30

front is at 10

Enter your choice:2

Deleted element is:10

Enter your choice:3

20 30

rear is at 30

front is at 20

Enter your choice:4