

## Assignment 3 Solutions- Yash Awasthi

Q1. Write a menu driven program to implement the simple queue using Array for the following operations

- Enqueue
- Dequeue
- Print and count the elements in the queue

```
1 #include <iostream>
2 using namespace std;
3
4 int queue[100], n=100, front = -1, rear = -1;
5
6 void Insert(){
7     int val;
8     if(rear == n-1){
9         cout<<"Queue Overflow"<<endl;
10    }else{
11        if(front == -1)
12            front = 0;
13        cout<<"Insert the Element in the Queue: "<<endl;
14        cin>>val;
15        rear++;
16        queue[rear] = val;
17    }
18 }
19 void Delete(){
20     if(front == -1 || front > rear){
21         cout<<"Queue Underflow";
22         return ;
23     }else{
24         cout<<"Element deleted from queue is: "<<queue[front]<<endl;
25         front++;
26     }
27 }
28 void Display(){
29     if(front == -1){
30         cout<<"Queue is Empty"<<endl;
31     }else{
32         cout<<"Queue Elements are: ";
33         for(int i=front; i<=rear; i++){
34             cout<<queue[i]<<" ";
35         }
36         cout<<endl;
37     }
38 }
39
40 int main()
41 {
42     int ch;
43     cout<<"1) Insert element to the queue."<<endl;
44     cout<<"2) Delete element from the queue."<<endl;
45     cout<<"3) Display all the elements of the queue."<<endl;
46     cout<<"4) Exit."<<endl;
47
48     do{
49         cout<<"Enter your choice: "<<endl;
50         cin>>ch;
51         switch(ch){
52             case 1: Insert();
53                 break;
54             case 2: Delete();
55                 break;
56             case 3: Display();
57                 break;
58             case 4: cout<<"Exit"<<endl;
59                 break;
60             default: cout<<"Invalid Choice"<<endl;
61         }
62     }while(ch!=4);
63     return 0;
64 }
```

```
1) Insert element to the queue.
2) Delete element from the queue.
3) Display all the elements of the queue.
4) Exit.
Enter your choice:
1
Insert the Element in the Queue:
4
Enter your choice:
1
Insert the Element in the Queue:
3
Enter your choice:
1
Insert the Element in the Queue:
2
Enter your choice:
1
Insert the Element in the Queue:
1
Enter your choice:
3
Queue Elements are: 4 3 2 1
Enter your choice:
2
Element deleted from queue is: 4
Enter your choice:
2
Element deleted from queue is: 3
Enter your choice:
2
Element deleted from queue is: 2
Enter your choice:
2
Element deleted from queue is: 1
Enter your choice:
4
Exit

...Program finished with exit code 0
Press ENTER to exit console.
```

Q2. Write a menu driven program to implement the circular queue using Array for the following operations

- Enqueue
- Dequeue
- Print and count the elements in the queue

```
1 #include<iostream>
2 using namespace std;
3 int cqueue[5];
4 int front= -1, rear= -1, n=5;
5 void insertQ(int val){
6     if(((front ==0 && rear== n-1)|| (front == rear-1))){
7         cout<<"Queue Overflow \n";
8         return;
9     }
10    if(front == -1){
11        front = 0;
12        rear = 0;
13    }
14    else{
15        if(rear == n-1)
16            rear = 0;
17        else
18            rear = rear+1;
19    }
20    cqueue[rear] = val;
21 }
22 void deleteQ(){
23     if (front == -1){
24         cout<<"Queue Underflow\n";
25         return;
26     }
27     cout<<"Element deleted from queue is:"<<cqueue[front]<<endl;
28
29     if(front == rear){
30         front = -1;
31         rear = -1;
32     }
33     else{
34         if(front == n-1)
35             front = 0;
36         else
37             front = front + 1;
38     }
39 }
40 void displayQ(){
41     int f = front, r = rear;
42     if(front == -1){
43         cout<<"Queue is empty"<<endl;
44         return;
45     }
46     cout<<"Queue elements are:\n";
47     if(f <= r){
48         while( f <= r){
49             cout<<cqueue[f]<<" ";
50             f++;
51         }
52     }else{
53         while (f <= n-1){
54             cout<<cqueue[f]<<" ";
55             f++;
56         }
57         f = 0;
58         while(f <= r){
59             cout<<cqueue[f]<<" ";
60             f++;
61         }
62     }
63     cout<<endl;
64 }
65 int main(){
66     int ch, val;
67     cout<<"1)Insert\n";
68     cout<<"2)Delete\n";
69     cout<<"3)Display\n";
70     cout<<"4)Exit\n";
71     do{
72         cout<<"Enter choice:"<<endl;
73         cin>>ch;
74         switch(ch){
75             case 1:
76                 cout<<"Input for insertion:"<<endl;
77                 cin>>val;
78                 insertQ (val);
79                 break;
80             case 2:
81                 deleteQ();
82                 break;
83             case 3:
84                 displayQ();
85                 break;
86             case 4:
87                 cout<<"Exit\n";
88                 break;
89             default: cout<<"Incorrect\n";
90         }
91     }
92     while(ch!=4);
93     return 0;
94 }
```

#### Output

```
/tmp/A3k5uAiojk.o
1)Insert
2)Delete
3)Display
4)Exit
Enter choice:
1
Input for insertion:
34
Enter choice:
1
Input for insertion:
29
Enter choice:
3
Queue elements are:
34 29
Enter choice:
2
Element deleted from queue is:34
Enter choice:
2
Element deleted from queue is:29
Enter choice:
2
Queue Underflow
Enter choice:
4
Exit
```