Assignment 3 Solutions- Yash Awasthi

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

a) Enqueue
b) Dequeue
c) Print and count the elements in the queue

```cpp
#include <iostream>
using namespace std;

int queue[100], n=100, front = -1, rear = -1;

void Insert(){
    int val;
    if(rear == n-1){
        cout<<"Queue Overflow"<<endl;
    }else{
        if(front == -1)
        front = 0;
        cout<<"Insert the Element in the Queue: "<<endl;
        cin>>val;
        rear++;
        queue[rear] = val;
    }
}
void Delete(){
    if(front == -1 || front > rear){
        cout<<"Queue Underflow";
        return ;
    }else{
        cout<<"Element deleted from queue is: "<<queue[front]<<endl;
        front++;
    }
}
void Display(){
    if(front == -1){
        cout<<"Queue is Empty"<<endl;
    }else{
        cout<<"Queue Elements are: ";
        for(int i=front;i<=rear;i++){
            cout<<queue[i]<<" ";
        }
        cout<<endl;
    }
}


int main()
{
    int ch;
    cout<<"1) Insert element to the queue."<<endl;
    cout<<"2) Delete element from the queue."<<endl;
    cout<<"3) Display all the elements of the queue."<<endl;
    cout<<"4) Exit."<<endl;

    do{
        cout<<"Enter your choice: "<<endl;
        cin>>ch;
        switch(ch){
            case 1: Insert();
            break;
            case 2: Delete();
            break;
            case 3: Display();
            break;
            case 4: cout<<"Exit"<<endl;
            break;
            default: cout<<"Invalid Choice"<<endl;
        }
    }while(ch!=4);
    return 0;
}
```

```
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

a) Enqueue
b) Dequeue
c) Print and count the elements in the queue

```cpp
#include<iostream>
using namespace std;
int cqueue[5];
int front= -1, rear= -1, n=5;
 void insertCQ(int val){
     if((front ==0 && rear== n-1)||(front == rear+1)){
         cout<<"Queue Overflow \n";
         return;
     }
     if(front == -1){
         front = 0;
         rear = 0;
         }
         else{
             if(rear == n-1)
             rear = 0;
             else
             rear = rear+1;
         }
         cqueue[rear] = val;
 }
 void deleteCQ(){
     if (front == -1){
         cout<<"Queue Underflow\n";
         return;
     }
     cout<<"Element deleted from queue is:"<<cqueue[front]<<endl;

     if(front == rear){
         front = -1;
         rear = -1;
         }
         else{
             if(front == n-1)
             front = 0;
             else
             front = front + 1;
    }
 }
 void displayCQ(){
     int f = front, r = rear;
     if(front == -1){
         cout<<"Queue is empty"<<endl;
         return;
     }
     cout<<"Queue elements are:\n";
     if(f <= r){
        while( f <= r){
            cout<<cqueue[f]<<" ";
            f++;
        }
     }else{
         while (f <= n-1){
             cout<<cqueue[f]<<" ";
             f++;
         }
         f = 0;
         while(f <= r){
             cout<<cqueue[f]<<" ";
             f++;
         }
     }
     cout<<endl;
     }
     int main(){
         int ch, val;
         cout<<"1)Insert\n";
         cout<<"2)Delete\n";
         cout<<"3)Display\n";
         cout<<"4)Exit\n";
         do{
             cout<<"Enter choice:"<<endl;
             cin>>ch;
             switch(ch){
                 case 1:
                 cout<<"Input for insertion:"<<endl;
                 cin>>val;
                 insertCQ (val);
                 break;
                 case 2:
                 deleteCQ();
                 break;
                 case 3:
                 displayCQ();
                 break;
                 case 4:
                 cout<<"Exit\n";
                 break;
                 default: cout<<"Incorrect\n";
             }
         }
         while(ch!=4);
         return 0;
     }
```

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
```