```
1
2  class ComplexNum {
3      int real, img;
4
5      ComplexNum(int r, int i) {
6          real = r;
7          img = i;
8      }
9  }
10
11 class Queue {
12     private ComplexNum arr[];
13     private int size, front, rear;
14
15    void Initialization(int n) {
16         arr = new ComplexNum[n];
17         size = n;
18         front = rear = -1;
19     }
20
21     protected boolean isEmpty() {
22         return front == -1;
23     }
24
25     protected boolean isFull() {
26         return (rear + 1) % size == front;
27     }
28
29     void Enqueue(ComplexNum x) {
30         if (isFull()) {
31             System.out.println("Queue overflow");
32             return;
33         }
34         if (front == -1) {
35             front = rear = 0;
36         } else {
37             rear = (rear + 1) % size;
38         }
39         arr[rear] = x;
40     }
41
42     ComplexNum Dequeue() {
43         if (isEmpty()) {
44             System.out.println("Queue underflow");
45             return new ComplexNum(-1, -1);
46         }
47
48         ComplexNum x = arr[front];
49
50         if (front == rear) {
```

```
            front = rear = -1;
        } else {
            front = (front + 1) % size;
        }
        return x;
    }

    void display() {
        if (isEmpty()) {
            System.out.println("Queue is empty");
            return;
        }

        int i = front;
        while (true) {
            System.out.print("(" + arr[i].real + "," + arr[i].img + "i), ");
            if (i == rear) break;
            i = (i + 1) % size;
        }
        System.out.println();
    }
}

class Question3
{
    public static void main(String arg[])
    {
        Queue s = new Queue();
        s.Initialization(5);
        System.out.println(s.isEmpty());
        ComplexNum c1 = new ComplexNum(1,2);
        ComplexNum c2 = new ComplexNum(7,4);
        ComplexNum c3 = new ComplexNum(11,23);
        ComplexNum c4 = new ComplexNum(8,25);
        ComplexNum c5 = new ComplexNum(12,22);
        ComplexNum c6 = new ComplexNum(17,42);
        s.Dequeue();
        s.Enqueue(c1);
        s.Enqueue(c2);
        s.Enqueue(c3);
        s.Enqueue(c4);
        // System.out.println(s.isEmpty());
        s.Enqueue(c5);
        System.out.println(s.isFull());

        // System.out.println(s.isEmpty());
        s.Enqueue(c6);
        System.out.println(s.isFull());
        System.out.println(s.isEmpty());
        ComplexNum c = s.Dequeue();
        System.out.println("(" + c.real + "," + c.img + "i) ");
```

```
        s.display();
    }
}


//output
// PS C:\Users\Dell\Desktop\JAVA\Assignments\Assignment-3> java Question3
// true
// Queue underflow
// true
// Queue overflow
// true
// false
// (1,2i),
// (7,4i), (11,23i), (8,25i), (12,22i),
```