Class Display07 - Unit 3 Lab 07 GCD and LCM


```
1  import javax.swing.*;
2  import java.awt.*;
3  /**
4  * Display07, a JPanel being used by Panel07 for Unit 03 Lab 07:
5  * GCD and LCM. Contains a JLabel in which the gcd or the lcm is
6  * displayed at, as well as two JTextFields in which the user
7  * may input the two numbers whose gcd and lcm are to be displayed.
8  *
9  * @author Josh Ibad
10 * @author James Park
11 * @version30 November 2017
12 * @teacher Coglianese
13 * @period 2
14 */
15 public class Display07 extends JPanel
16 {
17     private JLabel label;
18     private JTextField box1, box2;
19     /**
20     * Constructs a JPanel with a FlowLayout in which another
21     * JPanel and a label is being put in to. The inner JPanel
22     * also has a FlowLayout, in which two JTextFields are
23     * being added to.
24     */
25     public Display07()
26     {
27         setLayout(new FlowLayout());
28         setPreferredSize(new Dimension(200, 125));
29
30         JPanel subpanel = new JPanel();
31         subpanel.setLayout(new FlowLayout());
32         subpanel.add(new JLabel("One: "));
33         box1 = new JTextField("", 5);
34         box1.setHorizontalAlignment(SwingConstants.CENTER);
35         subpanel.add(box1);
36         subpanel.add(new JLabel("Two: "));
37         box2 = new JTextField("", 5);
38         box2.setHorizontalAlignment(SwingConstants.CENTER);
39         subpanel.add(box2);
40         add(subpanel);
41
42         label = new JLabel("?");
43         label.setFont(new Font("Serif", Font.BOLD, 75));
44         label.setForeground(Color.blue);
45         add(label);
46     }
47
48     /**
49     * Displays the greatest common denominator of the two numbers
```

```
50      * inputed into the two JTextFields, box1 and box2, by using
51      * the gcd helper method.
52      */
53      public void showGCD()
54      {
55          int x = Integer.parseInt(box1.getText());
56          int y = Integer.parseInt(box2.getText());
57          int z = gcd(x, y);
58          label.setText("" + z);
59      }
60
61      /**
62      * Displays the lowest common multiple of the two numbers inputed
63      * into the two JTextFields, box1 and box 2, by dividing the
64      * product of the two numbers by their greatest common
65      * denominator.
66      *
67      * Due to the definition of the lowest common multiple, the smallest
68      * positive integer is displayed.
69      */
70      public void showLCM()
71      {
72          int x = Integer.parseInt(box1.getText());
73          int y = Integer.parseInt(box2.getText());
74          int z = x * y / gcd(x, y);
75          label.setText("" + z);
76      }
77
78      /**
79      * Returns the greatest common denominator of the two integers
80      * inputed, a and b, using the Euclidean Algorithm or Euclid's
81      * algorithm. The Euclidean Algorithm repeatedly replaces the
82      * bigger of the two numbers with the difference between the
83      * two numbers, until they are equal. This works due to the
84      * property of numbers to retain their greatest common
85      * denominator when subtracted from each other. As the algorithm
86      * repeats, the difference between the two numbers shrinks until
87      * the two numbers are the same, and are equivalent to the
88      * greatest common denominator.
89      *
90      * @param a  The first of the two numbers whose greatest common
91      *           denominator is being found and returned.
92      * @param b  The second of the two numbers whose greatest common
93      *           denominator is being found and returned.
94      * @ret      The greatest common denominator of a and b according
95      *           to the Euclidean Algorithm
96      */
97      private int gcd(int a, int b)
98      {
```

```
99          a = Math.abs(a);
100         b = Math.abs(b);
101         while(a != b)
102         {
103             if(a>b)
104             {
105                 a -= b;
106             }
107             else
108             {
109                 b -= a;
110             }
111         }
112         return a;
113     }
114 }
```