

```

1 // fo1/1/lights/TrafficLight.java
2 //
3 //
4 // Copyright 2003 Bill Campbell and Ethan Bolker
5
6 import java.awt.*;
7 import java.awt.event.*;
8
9 /**
10  * A TrafficLight has three lenses: red, yellow and green.
11  * It can be set to signal Go, Caution, Stop or Walk.
12  */
13 * @version 1
14 */
15
16 public class TrafficLight extends Panel
17 {
18     // Three Lenses and a Button
19
20     private Lens red      = new Lens( Color.red );
21     private Lens yellow   = new Lens( Color.yellow );
22     private Lens green    = new Lens( Color.green );
23     private Button nextButton = new Button("Next");
24
25     /**
26      * Construct a traffic light.
27      */
28
29     public TrafficLight()
30     {
31         this.setLayout(new BorderLayout());
32
33         // create a Panel for the Lenses
34         Panel lensPanel = new Panel();
35         lensPanel.setLayout( new GridLayout( 3, 1 ) );
36         lensPanel.add( red );
37         lensPanel.add( yellow );
38         lensPanel.add( green );
39         this.add( BorderLayout.NORTH, lensPanel );
40
41         // configure the "Next" button
42         Sequencer sequencer = new Sequencer( this );
43         NextButtonListener payAttention =
44             new NextButtonListener( sequencer );
45         nextButton.addActionListener( payAttention );
46         this.add( BorderLayout.CENTER, nextButton);
47     }
48
49     // Methods that change the light
50
51     /**
52      * Set the light to stop (red).
53      */
54
55     public void setStop()
56     {

```

```

57         red.turnOn();
58         yellow.turnOff();
59         green.turnOff();
60     }
61
62     /**
63      * Set the light to caution (yellow).
64      */
65
66     public void setCaution()
67     {
68         red.turnOff();
69         yellow.turnOn();
70         green.turnOff();
71     }
72
73     /**
74      * Set the light to go (green).
75      */
76
77     public void setGo()
78     {
79         red.turnOff();
80         yellow.turnOff();
81         green.turnOn();
82     }
83
84     /**
85      * Set the light to walk.
86      *
87      * (In Boston, red and yellow signal walk.)
88      */
89
90     public void setWalk()
91     {
92         red.turnOn();
93         yellow.turnOn();
94         green.turnOff();
95     }
96
97     /**
98      * The traffic light simulation starts at main.
99      *
100     * @param args ignored.
101     */
102
103     public static void main( String[] args )
104     {
105         JFrame frame
106             = new JFrame();
107         TrafficLight light = new TrafficLight();
108         frame.add( light );
109         frame.addWindowListener( new ShutdownLight() );
110         frame.pack();
111         frame.show();
112     }

```

```
113 // A Shutdownlight instance handles close events generated
114 // by the underlying window system with its windowClosing
115 // method.
116 //
117 // This is an inner class, declared inside the
118 // TrafficLight class since it's used only here.
119
120 private static class ShutdownLight extends WindowAdapterr
121 {
122     // Close the window by shutting down the light.
123     public void windowClosing (WindowEvent e)
124     {
125         System.exit(0);
126     }
127 }
128 }
129 }
130 }
131 }
```

```
1 // foj/l/lights/NextButtonListener.java
2 //
3 //
4 // Copyright 2003 Bill Campbell and Ethan Bolker
5
6 import java.awt.event.*;
7
8 /**
9  * A NextButtonListener sends a "next" message to its
10  * Sequencer each time a button to which it is listening
11  * is pressed.
12  *
13  * @version 1
14  */
15
16 public class NextButtonListener implements ActionListener
17 {
18     private Sequencer sequencer;
19
20     /**
21      * Construct a listener that "listens for" a user's
22      * pressing the "Next" button.
23      *
24      * @param sequencer the Sequencer for the TrafficLight.
25      */
26
27     public NextButtonListener( Sequencer sequencer )
28     {
29         this.sequencer = sequencer;
30     }
31
32     /**
33      * The action performed when a push of the button is detected:
34      * send a next message to the Sequencer to advance it to
35      * its next state.
36      *
37      * @param event the event detected at the button.
38      */
39
40     public void actionPerformed( ActionEvent event )
41     {
42         this.sequencer.next();
43     }
44 }
```

```

1 // fo1/1/lights/Sequencer.java
2 //
3 //
4 // Copyright 2003 Bill Campbell and Ethan Bolker
5
6 /**
7  * A Sequencer controls a TrafficLight. It maintains fields
8  * for the light itself and the current state of the light.
9
10 * Each time it receives a "next" message, it advances to the
11 * next state and sends the light an appropriate message.
12 *
13 * @version 1
14 */
15
16 public class Sequencer
17 {
18     // the TrafficLight this Sequencer controls
19     private TrafficLight light;
20
21     // represent the states by ints
22     private final static int GO      = 0;
23     private final static int CAUTION = 1;
24     private final static int STOP    = 2;
25
26     private int currentState;
27
28     /**
29      * Construct a sequencer to control a TrafficLight.
30      *
31      * @param light the TrafficLight we wish to control.
32      */
33
34     public Sequencer( TrafficLight light )
35     {
36         this.light = light;
37         this.currentState = GO;
38         this.light.setGo();
39     }
40
41     /**
42      * How the light changes when a next Button is pressed
43      * depends on the current state. The sequence is
44      * GO -> CAUTION -> STOP -> GO.
45      */
46
47     public void next()
48     {
49         switch ( currentState ) {
50
51             case GO:
52                 this.currentState = CAUTION;
53                 this.light.setCaution();
54                 break;
55
56             case CAUTION:

```

```

57         this.currentState = STOP;
58         this.light.setStop();
59         break;
60
61         case STOP:
62             this.currentState = GO;
63             this.light.setGo();
64             break;
65
66         default: // This will never happen
67             System.err.println("What color is the light?!");
68         }
69     }
70 }

```

```

1 // fo1/1/lights/Lens.java
2 //
3 //
4 // Copyright 2003 Bill Campbell and Ethan Bolker
5
6 import java.awt.*;
7
8 /**
9  * A Lens has a certain color and can either be turned on
10 * (the color) or turned off (black).
11 *
12 * @version 1
13 */
14
15 public class Lens extends Canvas
16 {
17     private Color onColor; // color on
18     private Color offColor = Color.black; // color off
19     private Color currentColor; // color the lens is now
20
21     private final static int SIZE = 100; // how big is this Lens?
22     private final static int OFFSET = 20; // offset of Lens in Canvas
23
24     /**
25      * Construct a Lens to display a given color.
26      *
27      * The lens is black when it's turned off.
28      *
29      * @param color the color of the lens when it is turned on.
30      */
31
32     public Lens( Color color )
33     {
34         this.setBackground( Color.black );
35         this.onColor = color;
36         this.setSize( SIZE , SIZE );
37         this.turnOff();
38     }
39
40     /**
41      * How this Lens paints itself.
42      *
43      * @param g a Graphics object to manage brush and color information.
44      */
45
46     public void paint( Graphics g )
47     {
48         g.setColor( this.currentColor );
49         g.fillRect( OFFSET, OFFSET,
50                 SIZE - OFFSET*2, SIZE - OFFSET*2 );
51     }
52
53     /**
54      * Have this Lens display its color.
55      */
56

```

```

57     public void turnOn()
58     {
59         currentColor = onColor;
60         this.repaint();
61     }
62
63     /**
64      * Darken this lens.
65      */
66
67     public void turnOff()
68     {
69         currentColor = offColor;
70         this.repaint();
71     }
72 }

```