```java
 1 import java.awt.EventQueue;
 2
 3 import javax.swing.JFrame;
 4 import java.awt.Toolkit;
 5 import java.awt.GridBagLayout;
 6 import javax.swing.JLabel;
 7 import java.awt.GridBagConstraints;
 8 import java.awt.Font;
 9 import java.awt.Color;
10 import javax.swing.BoxLayout;
11 import javax.swing.SwingConstants;
12 import javax.swing.UIManager;
13
14 import com.jgoodies.forms.layout.FormLayout;
15 import com.jgoodies.forms.layout.ColumnSpec;
16 import com.jgoodies.forms.layout.RowSpec;
17 import java.awt.BorderLayout;
18 import javax.swing.JPanel;
19 import java.awt.GridLayout;
20 import java.awt.Insets;
21 import javax.swing.JButton;
22 import javax.swing.JDialog;
23 import javax.swing.AbstractAction;
24 import java.awt.event.ActionEvent;
25 import javax.swing.Action;
26 import java.awt.event.ActionListener;
27 import javax.swing.JSeparator;
28 import javax.swing.PopupFactory;
29
30 public class App {
31
32     private JFrame frame;
33     private final Action circlePopup = new SwingAction();
34
35     /**
36      * Launch the application.
37      */
38     public static void main(String[] args) {
39         EventQueue.invokeLater(new Runnable() {
40             public void run() {
41                 try {
42                     App window = new App();
43                     window.frame.setVisible(true);
44                 } catch (Exception e) {
45                     e.printStackTrace();
46                 }
47             }
48         });
49     }
50
51     /**
52      * Create the application.
53      */
54     public App() {
```

```java
 55            initialize();
 56        }
 57
 58        /**
 59         * Initialize the contents of the frame.
 60         */
 61        private void initialize() {
 62
 63            frame = new JFrame();
 64            frame.setIconImage(Toolkit.getDefaultToolkit().getImage
    (App.class.getResource("/resources/cal_icon_3.png")));
 65            frame.setBounds(100, 100, 600, 400);
 66            frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
 67            frame.getContentPane().setLayout(new BorderLayout(0, 10));
 68
 69            JLabel titleLabel = new JLabel("2D and 3D Shapes Surface Area Calculator
    Menu");
 70            titleLabel.setHorizontalAlignment(SwingConstants.CENTER);
 71            titleLabel.setForeground(new Color(0, 128, 255));
 72            titleLabel.setFont(new Font("Tahoma", Font.BOLD, 22));
 73            frame.getContentPane().add(titleLabel, BorderLayout.NORTH);
 74
 75            JPanel panel = new JPanel();
 76            frame.getContentPane().add(panel, BorderLayout.CENTER);
 77            GridBagLayout gbl_panel = new GridBagLayout();
 78            gbl_panel.columnWidths = new int[]{10, 200, 0, 200, 10, 0};
 79            gbl_panel.rowHeights = new int[]{10, 40, 10, 50, 50, 50, 50, 50, 50, 10, 0};
 80            gbl_panel.columnWeights = new double[]{0.0, 0.0, 1.0, 0.0, 0.0,
    Double.MIN_VALUE};
 81            gbl_panel.rowWeights = new double[]{0.0, 1.0, 0.0, 1.0, 1.0, 1.0, 1.0, 1.0,
    1.0, 0.0, Double.MIN_VALUE};
 82            panel.setLayout(gbl_panel);
 83
 84            JSeparator separator_2 = new JSeparator();
 85            GridBagConstraints gbc_separator_2 = new GridBagConstraints();
 86            gbc_separator_2.gridwidth = 5;
 87            gbc_separator_2.fill = GridBagConstraints.HORIZONTAL;
 88            gbc_separator_2.insets = new Insets(0, 0, 5, 5);
 89            gbc_separator_2.gridx = 0;
 90            gbc_separator_2.gridy = 0;
 91            panel.add(separator_2, gbc_separator_2);
 92
 93            JSeparator separator_1 = new JSeparator();
 94            separator_1.setOrientation(SwingConstants.VERTICAL);
 95            GridBagConstraints gbc_separator_1 = new GridBagConstraints();
 96            gbc_separator_1.fill = GridBagConstraints.VERTICAL;
 97            gbc_separator_1.gridheight = 10;
 98            gbc_separator_1.insets = new Insets(0, 0, 0, 5);
 99            gbc_separator_1.gridx = 2;
100            gbc_separator_1.gridy = 0;
101            panel.add(separator_1, gbc_separator_1);
102
103            JLabel twoDLabel = new JLabel("2D Shapes");
104            twoDLabel.setHorizontalAlignment(SwingConstants.CENTER);
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105            twoDLabel.setFont(new Font("Tahoma", Font.BOLD | Font.ITALIC, 18));
106            GridBagConstraints gbc_twoDLabel = new GridBagConstraints();
107            gbc_twoDLabel.insets = new Insets(0, 0, 5, 5);
108            gbc_twoDLabel.fill = GridBagConstraints.HORIZONTAL;
109            gbc_twoDLabel.gridx = 1;
110            gbc_twoDLabel.gridy = 1;
111            panel.add(twoDLabel, gbc_twoDLabel);
112
113            JLabel threeDLabel = new JLabel("3D Shapes");
114            threeDLabel.setHorizontalAlignment(SwingConstants.CENTER);
115            threeDLabel.setFont(new Font("Tahoma", Font.BOLD | Font.ITALIC, 18));
116            GridBagConstraints gbc_threeDLabel = new GridBagConstraints();
117            gbc_threeDLabel.fill = GridBagConstraints.HORIZONTAL;
118            gbc_threeDLabel.insets = new Insets(0, 0, 5, 5);
119            gbc_threeDLabel.gridx = 3;
120            gbc_threeDLabel.gridy = 1;
121            panel.add(threeDLabel, gbc_threeDLabel);
122
123            JButton btnCircle = new JButton("Circle");
124            btnCircle.setAction(circlePopup);
125            btnCircle.addActionListener(new ActionListener() {
126                public void actionPerformed(ActionEvent e) {
127                }
128            });
129            btnCircle.setFont(new Font("Tahoma", Font.BOLD, 16));
130            GridBagConstraints gbc_btnCircle = new GridBagConstraints();
131            gbc_btnCircle.fill = GridBagConstraints.HORIZONTAL;
132            gbc_btnCircle.insets = new Insets(0, 0, 5, 5);
133            gbc_btnCircle.gridx = 1;
134            gbc_btnCircle.gridy = 3;
135            panel.add(btnCircle, gbc_btnCircle);
136
137            JButton btnCube = new JButton("Cube");
138            btnCube.setFont(new Font("Tahoma", Font.BOLD, 16));
139            GridBagConstraints gbc_btnCube = new GridBagConstraints();
140            gbc_btnCube.fill = GridBagConstraints.HORIZONTAL;
141            gbc_btnCube.insets = new Insets(0, 0, 5, 5);
142            gbc_btnCube.gridx = 3;
143            gbc_btnCube.gridy = 3;
144            panel.add(btnCube, gbc_btnCube);
145
146            JButton btnTriangle = new JButton("Triangle");
147            btnTriangle.setFont(new Font("Tahoma", Font.BOLD, 16));
148            GridBagConstraints gbc_btnTriangle = new GridBagConstraints();
149            gbc_btnTriangle.fill = GridBagConstraints.HORIZONTAL;
150            gbc_btnTriangle.insets = new Insets(0, 0, 5, 5);
151            gbc_btnTriangle.gridx = 1;
152            gbc_btnTriangle.gridy = 4;
153            panel.add(btnTriangle, gbc_btnTriangle);
154
155            JButton btnRectangularPrism = new JButton("Rectangular Prism");
156            btnRectangularPrism.setFont(new Font("Tahoma", Font.BOLD, 16));
157            GridBagConstraints gbc_btnRectangularPrism = new GridBagConstraints();
158            gbc_btnRectangularPrism.fill = GridBagConstraints.HORIZONTAL;
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159            gbc_btnRectangularPrism.insets = new Insets(0, 0, 5, 5);
160            gbc_btnRectangularPrism.gridx = 3;
161            gbc_btnRectangularPrism.gridy = 4;
162            panel.add(btnRectangularPrism, gbc_btnRectangularPrism);
163
164            JButton btnSquare = new JButton("Square");
165            btnSquare.setFont(new Font("Tahoma", Font.BOLD, 16));
166            GridBagConstraints gbc_btnSquare = new GridBagConstraints();
167            gbc_btnSquare.fill = GridBagConstraints.HORIZONTAL;
168            gbc_btnSquare.insets = new Insets(0, 0, 5, 5);
169            gbc_btnSquare.gridx = 1;
170            gbc_btnSquare.gridy = 5;
171            panel.add(btnSquare, gbc_btnSquare);
172
173            JSeparator separator = new JSeparator();
174            separator.setOrientation(SwingConstants.VERTICAL);
175            GridBagConstraints gbc_separator = new GridBagConstraints();
176            gbc_separator.insets = new Insets(0, 0, 5, 5);
177            gbc_separator.gridx = 2;
178            gbc_separator.gridy = 5;
179            panel.add(separator, gbc_separator);
180
181            JButton btnCylinder = new JButton("Cylinder");
182            btnCylinder.setFont(new Font("Tahoma", Font.BOLD, 16));
183            GridBagConstraints gbc_btnCylinder = new GridBagConstraints();
184            gbc_btnCylinder.fill = GridBagConstraints.HORIZONTAL;
185            gbc_btnCylinder.insets = new Insets(0, 0, 5, 5);
186            gbc_btnCylinder.gridx = 3;
187            gbc_btnCylinder.gridy = 5;
188            panel.add(btnCylinder, gbc_btnCylinder);
189
190            JButton btnRectangle = new JButton("Rectangle");
191            btnRectangle.setFont(new Font("Tahoma", Font.BOLD, 16));
192            GridBagConstraints gbc_btnRectangle = new GridBagConstraints();
193            gbc_btnRectangle.fill = GridBagConstraints.HORIZONTAL;
194            gbc_btnRectangle.insets = new Insets(0, 0, 5, 5);
195            gbc_btnRectangle.gridx = 1;
196            gbc_btnRectangle.gridy = 6;
197            panel.add(btnRectangle, gbc_btnRectangle);
198
199            JButton btnSphere = new JButton("Cone");
200            btnSphere.setFont(new Font("Tahoma", Font.BOLD, 16));
201            GridBagConstraints gbc_btnSphere = new GridBagConstraints();
202            gbc_btnSphere.fill = GridBagConstraints.HORIZONTAL;
203            gbc_btnSphere.insets = new Insets(0, 0, 5, 5);
204            gbc_btnSphere.gridx = 3;
205            gbc_btnSphere.gridy = 6;
206            panel.add(btnSphere, gbc_btnSphere);
207
208            JButton btnParallelogram = new JButton("Parallelogram");
209            btnParallelogram.setFont(new Font("Tahoma", Font.BOLD, 16));
210            GridBagConstraints gbc_btnParallelogram = new GridBagConstraints();
211            gbc_btnParallelogram.fill = GridBagConstraints.HORIZONTAL;
212            gbc_btnParallelogram.insets = new Insets(0, 0, 5, 5);
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213            gbc_btnParallelogram.gridx = 1;
214            gbc_btnParallelogram.gridy = 7;
215            panel.add(btnParallelogram, gbc_btnParallelogram);
216
217            JButton btnSphere_1 = new JButton("Sphere");
218            btnSphere_1.setFont(new Font("Tahoma", Font.BOLD, 16));
219            GridBagConstraints gbc_btnSphere_1 = new GridBagConstraints();
220            gbc_btnSphere_1.fill = GridBagConstraints.HORIZONTAL;
221            gbc_btnSphere_1.insets = new Insets(0, 0, 5, 5);
222            gbc_btnSphere_1.gridx = 3;
223            gbc_btnSphere_1.gridy = 7;
224            panel.add(btnSphere_1, gbc_btnSphere_1);
225
226            JButton btnTrapezoid = new JButton("Trapezoid");
227            btnTrapezoid.setFont(new Font("Tahoma", Font.BOLD, 16));
228            GridBagConstraints gbc_btnTrapezoid = new GridBagConstraints();
229            gbc_btnTrapezoid.fill = GridBagConstraints.HORIZONTAL;
230            gbc_btnTrapezoid.insets = new Insets(0, 0, 5, 5);
231            gbc_btnTrapezoid.gridx = 1;
232            gbc_btnTrapezoid.gridy = 8;
233            panel.add(btnTrapezoid, gbc_btnTrapezoid);
234
235            JButton btnHemisphere = new JButton("Hemisphere");
236            btnHemisphere.setFont(new Font("Tahoma", Font.BOLD, 16));
237            GridBagConstraints gbc_btnHemisphere = new GridBagConstraints();
238            gbc_btnHemisphere.insets = new Insets(0, 0, 5, 5);
239            gbc_btnHemisphere.fill = GridBagConstraints.HORIZONTAL;
240            gbc_btnHemisphere.gridx = 3;
241            gbc_btnHemisphere.gridy = 8;
242            panel.add(btnHemisphere, gbc_btnHemisphere);
243        }
244
245    private class SwingAction extends AbstractAction {
246        public SwingAction() {
247            putValue(NAME, "Circle");
248            putValue(SHORT_DESCRIPTION, "Launch Circle Popup");
249        }
250        public void actionPerformed(ActionEvent e) {
251            CalculatorPopup calculator = new CalculatorPopup(frame, "Circle");
252            calculator.pack();
253            calculator.show();
254        }
255    }
256 }
257
```