```java
/**
settingsWindow.java
This file is used to create/open the window in which the user can edit the settings.
**/

import org.eclipse.swt.widgets.Display;
import org.eclipse.swt.widgets.Shell;
import org.eclipse.swt.widgets.Button;
import org.eclipse.swt.widgets.ColorDialog;

import java.awt.FileDialog;
import java.io.*;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;

import org.eclipse.core.runtime.Path;
import org.eclipse.swt.SWT;
import org.eclipse.swt.layout.GridLayout;
import org.eclipse.swt.widgets.Text;
import org.eclipse.swt.widgets.Label;
import org.eclipse.swt.layout.GridData;
import org.eclipse.swt.widgets.Scale;
import org.eclipse.swt.events.SelectionAdapter;
import org.eclipse.swt.events.SelectionEvent;
import org.eclipse.swt.graphics.Color;
import org.eclipse.swt.events.MouseAdapter;
import org.eclipse.swt.events.MouseEvent;

public class settingsWindow {

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```
32      public Settings currentSettings = new Settings();
33      protected Shell shlSettings;
34      private Text textSaveName;
35
36      /**
37       * Launch the application.
38       * @param args
39       */
40      public static void main(String[] args) {
41          try {
42              settingsWindow window = new settingsWindow();
43              Settings dummySettings = new Settings();
44              window.open(dummySettings);
45          } catch (Exception e) {
46              e.printStackTrace();
47          }
48      }
49
50      /**
51       * Open the window.
52       */
53      public void open(Settings mainWindowSettings) {
54          Display display = Display.getDefault();
55          Shell shlSettings = new Shell();
56          shlSettings.setSize(758, 272);
57          shlSettings.setText("Settings");
58          shlSettings.setLayout(new GridLayout(3, false));
59
60          currentSettings = mainWindowSettings;
61
62          Button btnShowAxes = new Button(shlSettings, SWT.CHECK);
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63          btnShowAxes.setSelection(currentSettings.showAxes);
64          btnShowAxes.addSelectionListener(new SelectionAdapter() {
65              @Override
66              public void widgetSelected(SelectionEvent e) {
67                  currentSettings.showAxes = btnShowAxes.getSelection();
68              }
69          });
70          btnShowAxes.setText("Show axes");
71
72          Label lblInequalityTransparency = new Label(shlSettings, SWT.NONE);
73          lblInequalityTransparency.setLayoutData(new GridData(SWT.RIGHT, SWT.CENTER, false, false,
    1, 1));
74          lblInequalityTransparency.setText("Inequality Transparency");
75
76          Scale scaleTransparency = new Scale(shlSettings, SWT.NONE);
77          scaleTransparency.setEnabled(false);
78          scaleTransparency.addMouseListener(new MouseAdapter() {
79              @Override
80              public void mouseUp(MouseEvent e) {
81                  currentSettings.inequalityTransparency = scaleTransparency.getIncrement()/100.0;
82              }
83          });
84          scaleTransparency.setLayoutData(new GridData(SWT.LEFT, SWT.CENTER, true, false, 1, 1));
85
86          Button btnShowGridlines = new Button(shlSettings, SWT.CHECK);
87          btnShowGridlines.setEnabled(false);
88          btnShowGridlines.setSelection(currentSettings.showGridlines);
89          btnShowGridlines.addSelectionListener(new SelectionAdapter() {
90              @Override
91              public void widgetSelected(SelectionEvent e) {
92                  currentSettings.showGridlines = btnShowGridlines.getSelection();
```

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            }
        });
        btnShowGridlines.setText("Show gridlines");

        Button btnPickBackgroundColour = new Button(shlSettings, SWT.NONE);
        btnPickBackgroundColour.setLayoutData(new GridData(SWT.FILL, SWT.CENTER, false, false, 1,
1));
        btnPickBackgroundColour.addSelectionListener(new SelectionAdapter() {
            @Override
            public void widgetSelected(SelectionEvent e) {
                ColorDialog newColourPicker = new ColorDialog(shlSettings);
                newColourPicker.open();
                currentSettings.backgroundColor = new Color(Display.getCurrent(),
newColourPicker.getRGB());
            }
        });
        btnPickBackgroundColour.setText("Pick Background Colour");

        Button btnPickPenColour = new Button(shlSettings, SWT.NONE);
        btnPickPenColour.addSelectionListener(new SelectionAdapter() {
            @Override
            public void widgetSelected(SelectionEvent e) {
                ColorDialog newColourPicker = new ColorDialog(shlSettings);
                newColourPicker.open();
                currentSettings.penColor = new Color(Display.getCurrent(),
newColourPicker.getRGB());
            }
        });
        btnPickPenColour.setText("Pick Pen Colour");

        Button btnLabelAxes = new Button(shlSettings, SWT.CHECK);
```

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121         btnLabelAxes.setEnabled(false);
122         btnLabelAxes.setGrayed(true);
123         btnLabelAxes.addSelectionListener(new SelectionAdapter() {
124             @Override
125             public void widgetSelected(SelectionEvent e) {
126                 currentSettings.labelAxes = btnLabelAxes.getSelection();
127             }
128         });
129         btnLabelAxes.setText("Label axes");
130 
131         Button btnOpenFile = new Button(shlSettings, SWT.NONE);
132         btnOpenFile.addSelectionListener(new SelectionAdapter() {
133             @Override
134             public void widgetSelected(SelectionEvent e) {
135                 try {
136                     org.eclipse.swt.widgets.FileDialog newFilePicker = new
    org.eclipse.swt.widgets.FileDialog(shlSettings, FileDialog.LOAD);
137                     newFilePicker.open();
138                     newFilePicker.setFilterExtensions(new String[] { "*.gwf", "*.*" });
139 
140                     String fileName = newFilePicker.getFilterPath() + "\\" +
    newFilePicker.getFileName();
141                     //Reads the contents of the file at the given location into a string.
142                     //Note that this does not need to be paired with a 'close' statement.
143                     String fileContents = Files.readString(Paths.get(fileName));
144 
145                     currentSettings.currentEquations += "\n" + fileContents;
146                 } catch (IOException ioException) {
147                     ioException.printStackTrace();
148                 }
149             }
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150         });
151         btnOpenFile.setLayoutData(new GridData(SWT.FILL, SWT.CENTER, false, false, 1, 1));
152         btnOpenFile.setText("Open file");
153 
154         Button btnSaveToFile = new Button(shlSettings, SWT.NONE);
155         btnSaveToFile.addSelectionListener(new SelectionAdapter() {
156             @Override
157             public void widgetSelected(SelectionEvent e) {
158                 org.eclipse.swt.widgets.MessageBox saveWarningDialog = new
    org.eclipse.swt.widgets.MessageBox(shlSettings, SWT.OK | SWT.CANCEL);
159                 saveWarningDialog.setText("Save/Overwrite");
160                 saveWarningDialog.setMessage("Warning: This will overwrite any file named " +
    textSaveName.getText() + " in the specified folder.");
161                 saveWarningDialog.open();
162                 try {
163                     org.eclipse.swt.widgets.DirectoryDialog newFolderPicker = new
    org.eclipse.swt.widgets.DirectoryDialog(shlSettings, SWT.SAVE);
164                     File location =
    Path.fromOSString(newFolderPicker.open()).makeAbsolute().toFile();
165                     String fileName = location.toString() + "\\" + textSaveName.getText();
166                     if (currentSettings.debugMode) {
167                         System.out.println("Writing to file "+fileName);
168                         System.out.println("Equations to be written:
    "+currentSettings.currentEquations);
169                     }
170                     PrintWriter printWriter = new PrintWriter(fileName);
171                     printWriter.println(currentSettings.currentEquations);
172                     printWriter.close();
173                 } catch (Exception exceptionInstance) {
174                     exceptionInstance.printStackTrace();
175                 }
```

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176             }
177         });
178         btnSaveToFile.setText("Pick folder and save/overwrite");
179 
180         Button btnLabelIntercepts = new Button(shlSettings, SWT.CHECK);
181         btnLabelIntercepts.setEnabled(false);
182         btnLabelIntercepts.setGrayed(true);
183         btnLabelIntercepts.addSelectionListener(new SelectionAdapter() {
184             @Override
185             public void widgetSelected(SelectionEvent e) {
186                 currentSettings.labelIntersections = btnLabelIntercepts.getSelection();
187             }
188         });
189         btnLabelIntercepts.setText("Label intercepts with axes");
190 
191         Label lblFileName = new Label(shlSettings, SWT.NONE);
192         lblFileName.setLayoutData(new GridData(SWT.RIGHT, SWT.CENTER, false, false, 1, 1));
193         lblFileName.setText("File name:");
194 
195         textSaveName = new Text(shlSettings, SWT.BORDER);
196         textSaveName.setText("Graph.gwf");
197         GridData gd_textSaveName = new GridData(SWT.LEFT, SWT.CENTER, true, false, 1, 1);
198         gd_textSaveName.widthHint = 143;
199         textSaveName.setLayoutData(gd_textSaveName);
200 
201         Button btnLabelIntersections = new Button(shlSettings, SWT.CHECK);
202         btnLabelIntersections.setEnabled(false);
203         btnLabelIntersections.setGrayed(true);
204         btnLabelIntersections.addSelectionListener(new SelectionAdapter() {
205             @Override
206             public void widgetSelected(SelectionEvent e) {
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207                 currentSettings.labelIntersections = btnLabelIntersections.getSelection();
208             }
209         });
210         btnLabelIntersections.setText("Label intersections on curves");
211         new Label(shlSettings, SWT.NONE);
212         new Label(shlSettings, SWT.NONE);
213 
214         shlSettings.open();
215         shlSettings.layout();
216         while (!shlSettings.isDisposed()) {
217             if (!display.readAndDispatch()) {
218                 display.sleep();
219             }
220         }
221     }
222 }
```