Lab 12: Graphical User Interfaces (GUI's) in Java

For most of the relevant Information on how to build GUIs in Java, see the following reference: Java GUI Programming Primer

The content below discusses material not explicitly covered in the above reference.

Few people code GUI's by hand these days--it's just too complicated. Typically, one would use a "GUI builder" to drag-and-drop GUI components onto a design canvas, greatly simplifying and speeding up the GUI creation process. But it is very helpful to know the basics of how to build a GUI by hand because one often needs to go in an manually tweak the GUI code even when using a sophisticated GUI builder tool.

Basic structure of a simple GUI application:
Some typical GUI initializations:

Set title and size of the frame:
setTitle("My Incredible GUI App");  // set the frame's title
setSize(400, 300);  // set frame size to 400x300

Panels in main frame:

JPanel controlPnl = new JPanel();
controlPnl.setBackground(Color.BLUE);  // Set panel color to blue
contentPane.add(controlPnl, BorderLayout.NORTH);  // Fixed-size panel for control components, e.g. buttons, textfields, etc, at the top of the frame.

JPanel displayPnl = new JPanel();
contentPane.add(displayPnl, BorderLayout.CENTER);  // Adjustable-size panel for display components, e.g. text areas, etc, in the middle of the frame.

A Button with a listener on the control panel:

JButton runBtn = new JButton("Run!");
runBtn.addActionListener(new ActionListener() {
    /**
     * This method runs when the button is clicked.
     */
    public void actionPerformed(ActionEvent evt) {
        // Do stuff here. Generally, delegate to a non-GUI object (the "model").
    }
});
controlPnl.add(runBtn);

A Label and a TextField with a listener on the control panel:

JLabel infoLbl = new JLabel();
infoLbl.setText("Enter text here:");
controlPnl.add(infoLbl);

final JTextField infoTF = new JTextField("default text");  // don't need "final" below if this line was defining a field instead of a local variable.
infoTF.setPreferredSize(new java.awt.Dimension(75, 23));  // set default text field size to 75x23 pixels.
infoTF.addActionListener(new ActionListener() {
    /**
     * This method runs when "Enter" is pressed after entering text into the text field.
     */
    public void actionPerformed(ActionEvent evt) {
        String text = infoTF.getText();  // the text of the text field.
        // Do stuff here. Generally, delegate to a non-GUI object (the "model").
    }
});
controlPnl.add(infoTF);

A text area with scroll bars in the center of the frame:
SerialVersionUID compiler warning:

A very common compiler warning to receive is the following for your frame class and other customized GUI components:

The serializable class XXX does not declare a static final serialVersionUID field of type long

If you do, add the following field to the class:

private static final long serialVersionUID = 42L; // Use a random, unique integer value here

For more information, see this [web page](http://example.com).