Java Swing for cool GUIs

Module 2

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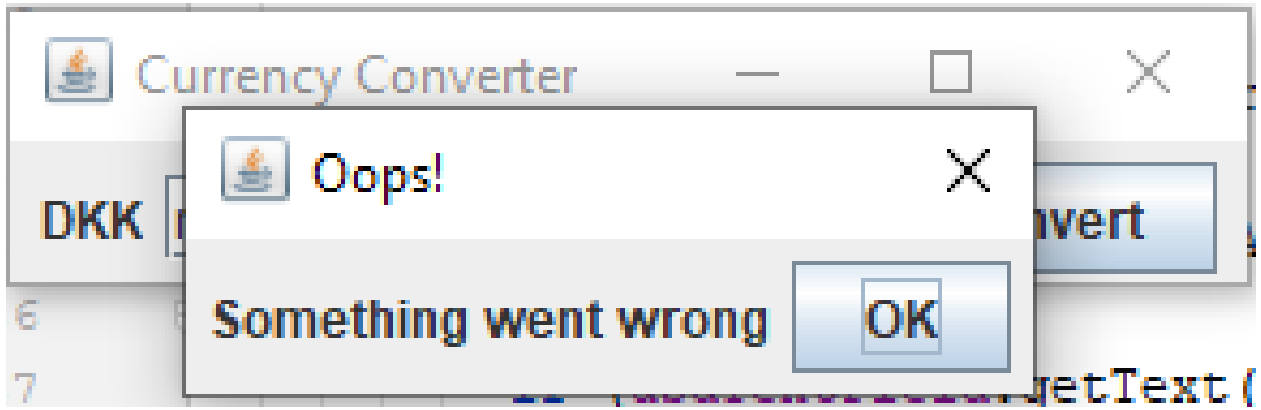
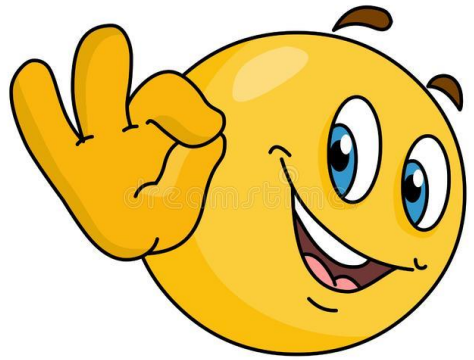


Learning goals

- Refactoring
- validate() and repaint()
- JButton
- ActionListener
- Anonymous ActionListener
- ActionListener in separate class



Refactoring

Refactoring.com

a disciplined technique for
restructuring an existing body of code,
altering its internal structure without
changing its external behavior

https://refactoring.com/

EXERCISE

Exercise 2-1:

Refactoring

Refactoring

```
public class HelloWorldRefactored {
  private JFrame frame;
  private JLabel label;

  HelloWorldRefactored() {
    frame = new JFrame("HelloWorldRefactored");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.add(label = new JLabel("The label"));
    frame.setSize(300, 200);
    frame.setLocationRelativeTo(null);
    frame.setVisible(true);
  }

  void run() {
    try { Thread.sleep(1000); } catch (Exception e) { }
    label.setText("Label's new text");
  }

  public static void main(String[] args) {
    new HelloWorldRefactored().run();
  }
}
```

validate() and repaint()

EXERCISE

Exercise 2-2:

ValidateAndRepaint

validate() and repaint()

```
ValidateAndRepaint() {
  frame = new JFrame("ValidateAndRepaint");
  frame.add(panel = new JPanel());
  panel.add(label = new JLabel("The label"));
  frame.setSize(300, 250);
  frame.setLocationRelativeTo(null);
  frame.setVisible(true);
}

void run() {
  JButton button = new JButton("Click me");
  panel.add(button);
  frame.validate();
  frame.repaint();
}
```

JButton

EXERCISE

Exercise 2-3:

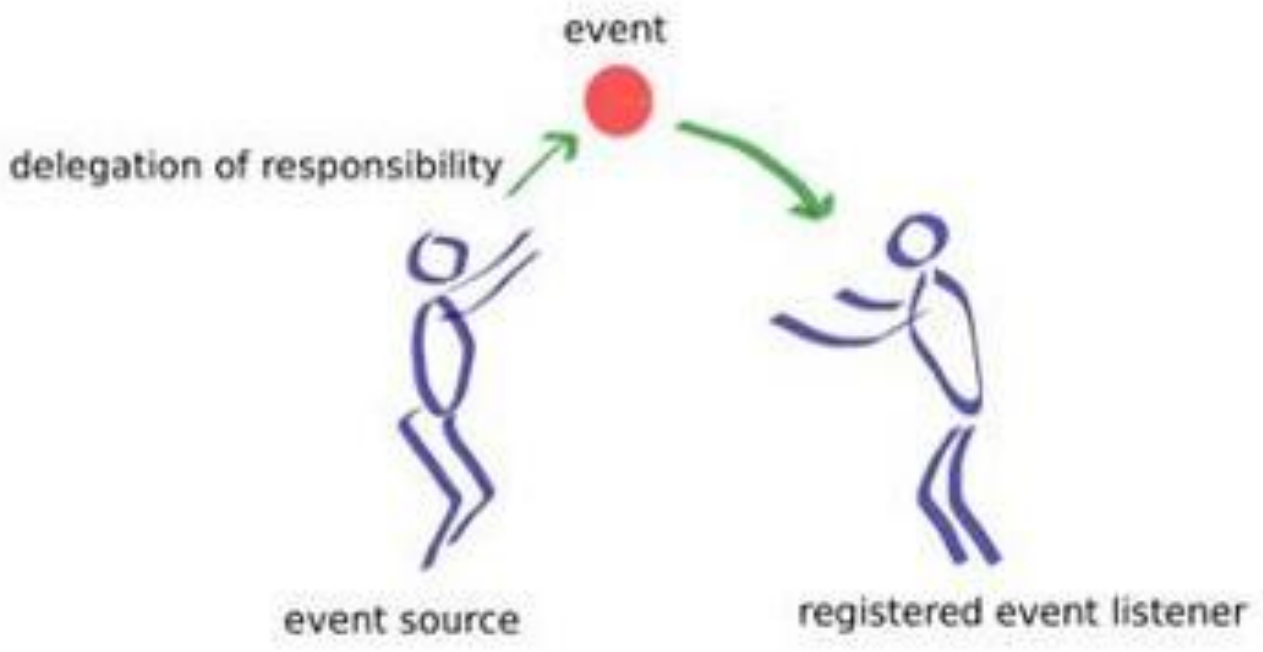
Add a JButton - or two

HelloButton

```
public class HelloButton {
  private JFrame frame;
  private JPanel panel;
  private JButton button;

  HelloButton() {
    frame = new JFrame("HelloButton");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setSize(300, 250);
    frame.setLocationRelativeTo(null);
    frame.add(panel = new JPanel());
    panel.add(button = new JButton("Click me!"));
    frame.setVisible(true);
  }

  void run() { }

  public static void main(String[] args) {
    new HelloButton().run();
  }
}
```

YOU WOULDN'T LET THIS
HAPPEN TO YOUR PHONE.
DON'T LET IT HAPPEN TO YOU EITHER.
SELF-CARE IS A PRIORITY
NOT A LUXURY.

ActionListener



1. The OS fires an EVENT
2. The LISTENER picks up on it
3. The COMPONENT (button, etc.) invokes an action (method)

java.awt.event

Interface ActionListener

All Superinterfaces:

EventListener

All Known Subinterfaces:

Action

```
public interface ActionListener
extends EventListener
```

The listener interface for receiving action events. The class that is interested in processing an action event implements this interface, and the object created with that class is registered with a component, using the component's `addActionListener` method. When the action event occurs, that object's `actionPerformed` method is invoked.

Method Summary

Methods

Modifier and Type	Method and Description
void	**`actionPerformed(ActionEvent e)`** Invoked when an action occurs.

Source: https://docs.oracle.com/javase/7/docs/api/java/awt/event/ActionListener.html

Separate ActionListener class

HelloActionListenerInterface

```
public class HelloActionListenerInterface {
  private JFrame frame; private JPanel panel; private JButton button;

  HelloActionListenerInterface() {
    frame = new JFrame("HelloActionListener");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setSize(300, 250); frame.setLocationRelativeTo(null);
    frame.add(panel = new JPanel());
    panel.add(button = new JButton("Click me!"));
    frame.setVisible(true);
    button.addActionListener(new AL2());
  }

  public static void main(String[] args) { new HelloActionListenerInterface(); }
}

class AL2 implements ActionListener {
  @Override
  public void actionPerformed(ActionEvent e) {
    System.out.println("Click registered by AL2.");
  }
}
```

EXERCISE

Exercise 2-6:

Add an ActionListener from a separate class

Nested ActionListener class

HelloActionListener

```
public class HelloActionListener {
  private JFrame frame;
  private JPanel panel;
  private JButton button;

  HelloActionListener() {
    frame = new JFrame("HelloActionListener");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setSize(300, 250);
    frame.setLocationRelativeTo(null);
    frame.add(panel = new JPanel());
    panel.add(button = new JButton("Click me!"));
    frame.setVisible(true);

    ActionListener al = new ActionListener() {
      @Override
      public void actionPerformed(ActionEvent e) {
        button.setText("I LOVE YOUR CLICKS!!!!");
      }
    };
    button.addActionListener(al);
  }

  public static void main(String[] args) { new HelloActionListener(); }
}
```

EXERCISE

Exercise 2-4:

Add an ActionListener

Anonymous ActionListener

HelloAnonymousActionListener

```
public class HelloAnonymousActionListener {
  private JFrame frame;
  private JPanel panel;
  private JButton button;

  HelloAnonymousActionListener() {
    frame = new JFrame("HelloActionListener");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setSize(300, 250);
    frame.setLocationRelativeTo(null);
    frame.add(panel = new JPanel());
    panel.add(button = new JButton("Click me!"));
    frame.setVisible(true);

    button.addActionListener(new ActionListener() {
      @Override
      public void actionPerformed(ActionEvent e) {
        button.setText("Anonymous AL clicked!");
      }
    });
  }

  public static void main(String[] args) { new HelloAnonymousActionListener(); }
}
```

EXERCISE

Exercise 2-5:

Add an ActionListener

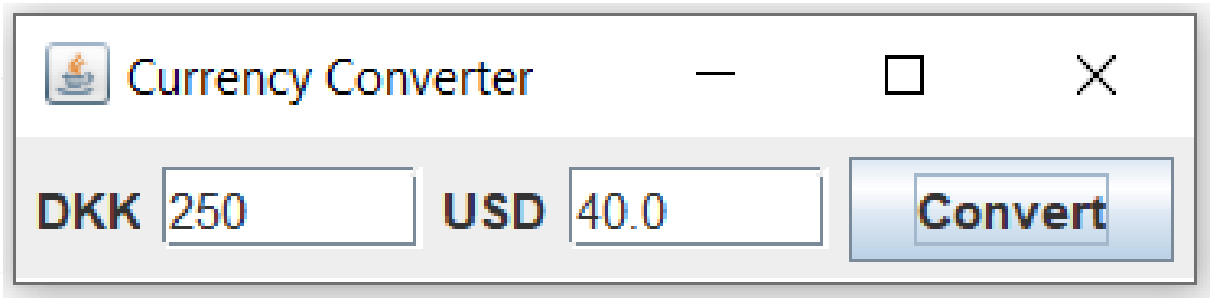
HelloActionListenerNestedClass

```
public class HelloActionListenerNestedClass {
  private JFrame frame; private JPanel panel; private JButton button;

  private class AL3 implements ActionListener {
    public void actionPerformed(ActionEvent e) {
      System.out.println("AL3 here!");
    }
  }

  HelloActionListenerNestedClass() {
    frame = new JFrame("HelloActionListener");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setSize(300, 250);
    frame.setLocationRelativeTo(null);
    frame.add(panel = new JPanel());
    panel.add(button = new JButton("Click me!"));
    frame.setVisible(true);
    button.addActionListener(new AL3());
  }

  public static void main(String[] args) {
    new HelloActionListenerNestedClass();
  }
}
```

EXERCISE

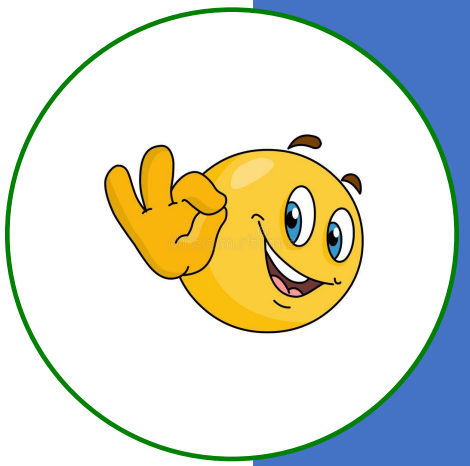
Exercise 2-7:

Currency Converter



What was most important today?

- Refactoring
- validate() and repaint()
- JButton
- ActionListener
- Anonymous ActionListener
- Separate ActionListener class



QUESTIONS

- JButton
- Creating and adding ActionListener
- ActionEvent