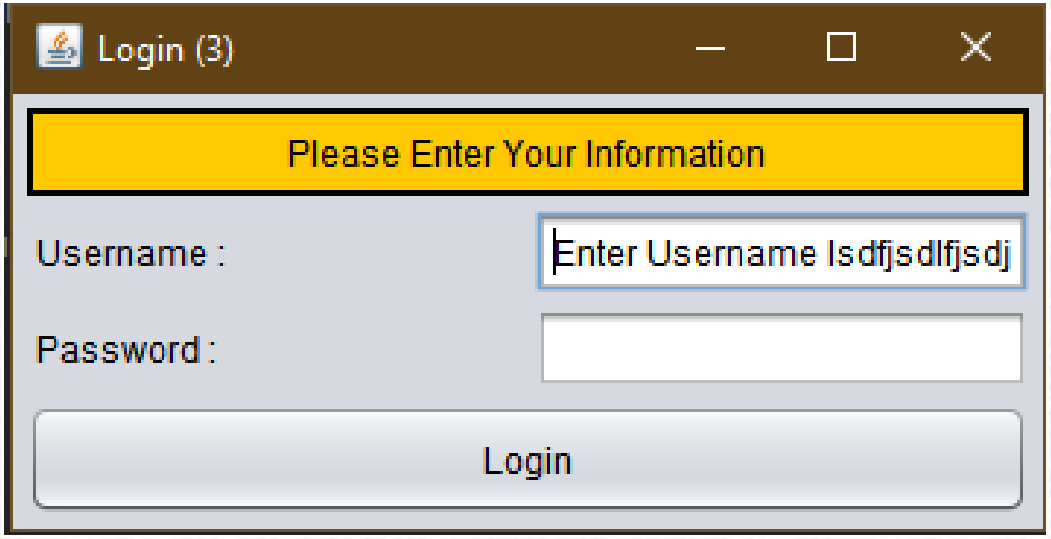
JavaGUIProgramming
Part 2

Chapter 12 and 22
P. Deitel , H. Deitel - Java How To Program, 10th Edition

LoginFrame-ActionListener



Steps to Set Up Event Handling for a GUI Component

- **Coding steps for an application to respond to events:**
  - Create a private class for the event handler
  - Implement an appropriate event-listener interface

```
private class ButtonHandler implements ActionListener, FocusListener {
                    ....
```

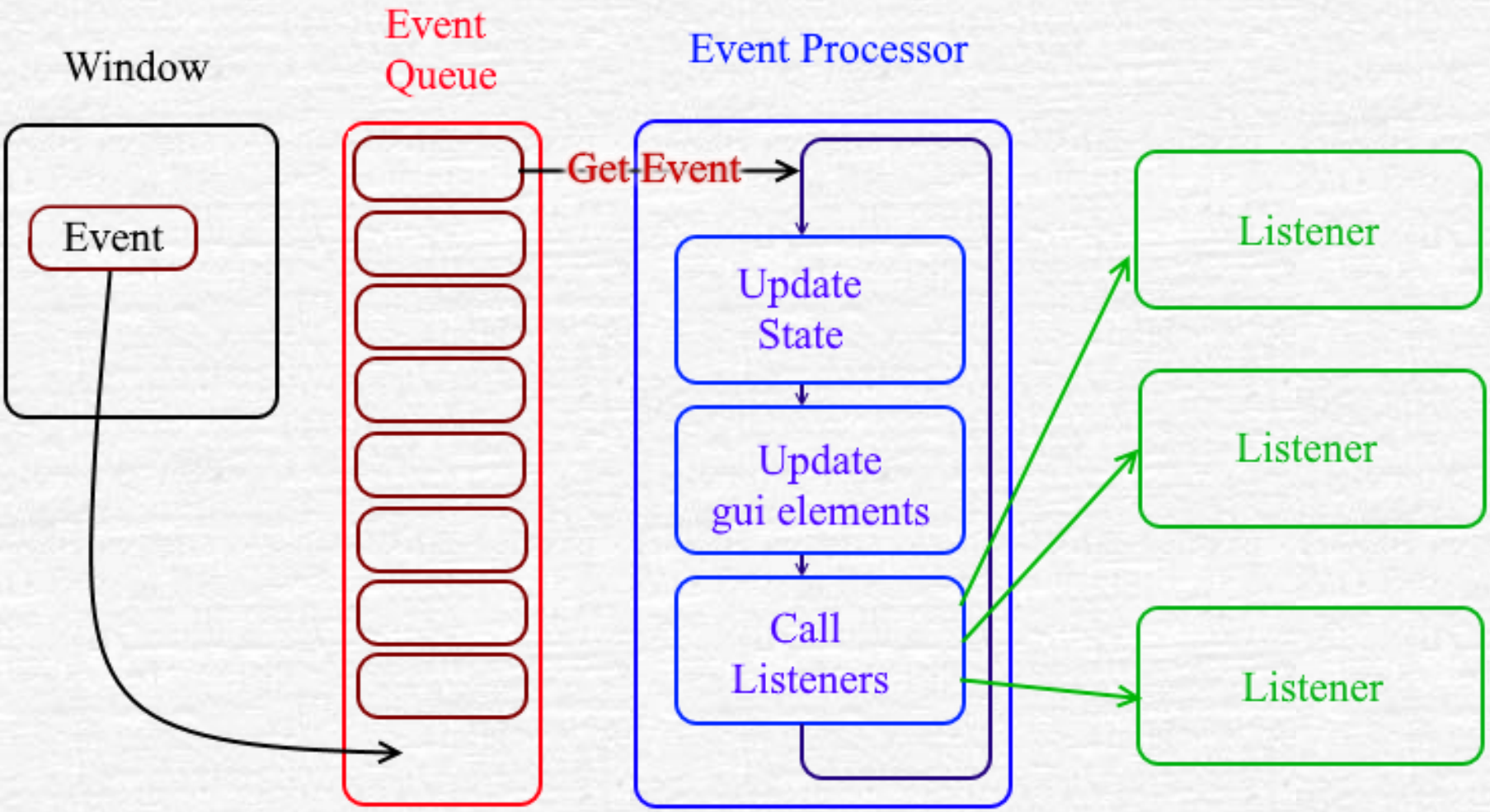
  - Register the event handler

```
ButtonHandler handler = new ButtonHandler();
unameField.addActionListener(handler);
unameField.addFocusListener(handler);
psswdField.addActionListener (handler);
psswdField.addFocusListener(handler);
loginButton.addActionListener (handler);
```

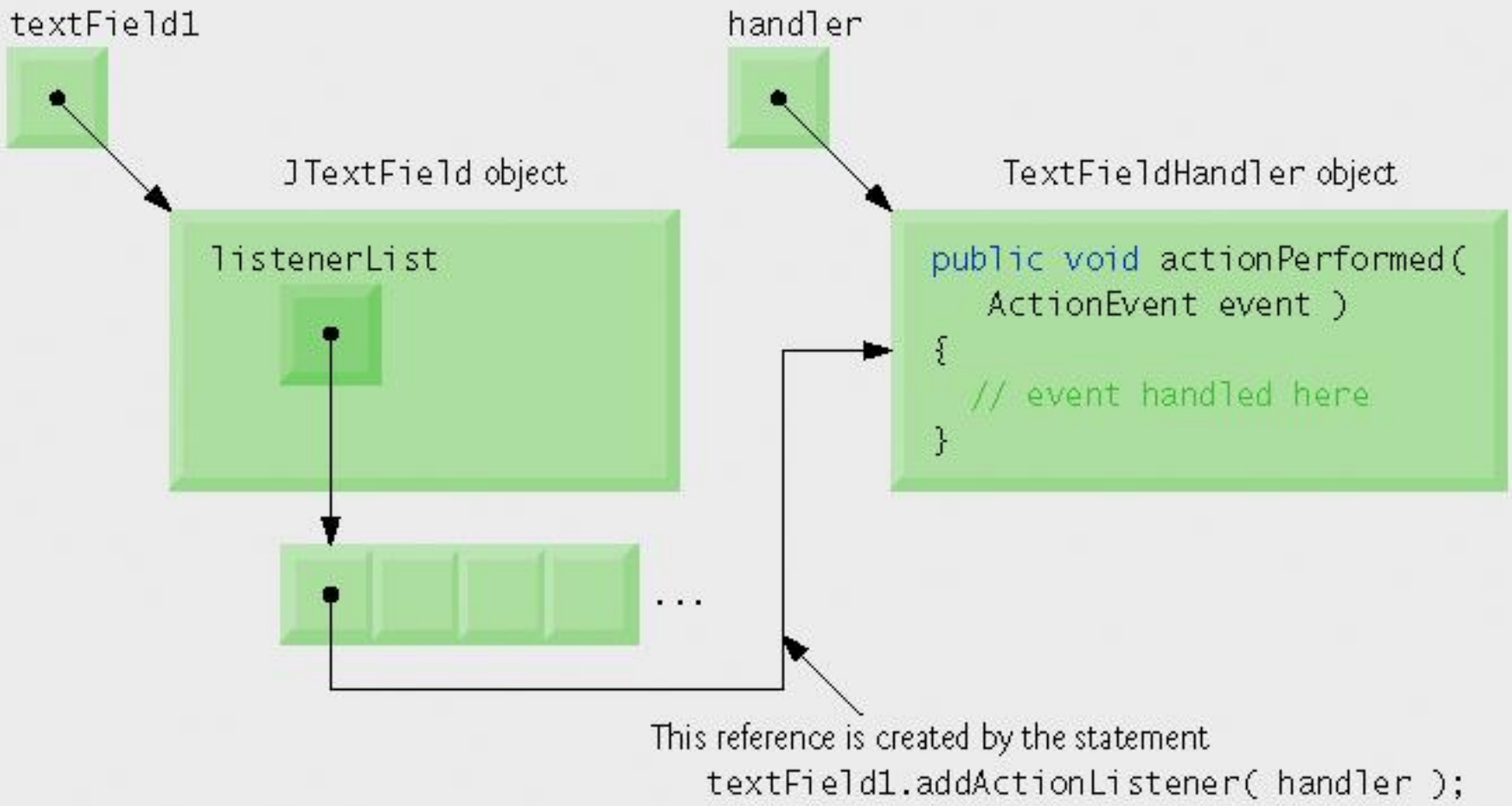
Using a Nested Class to Implement an Event Handler

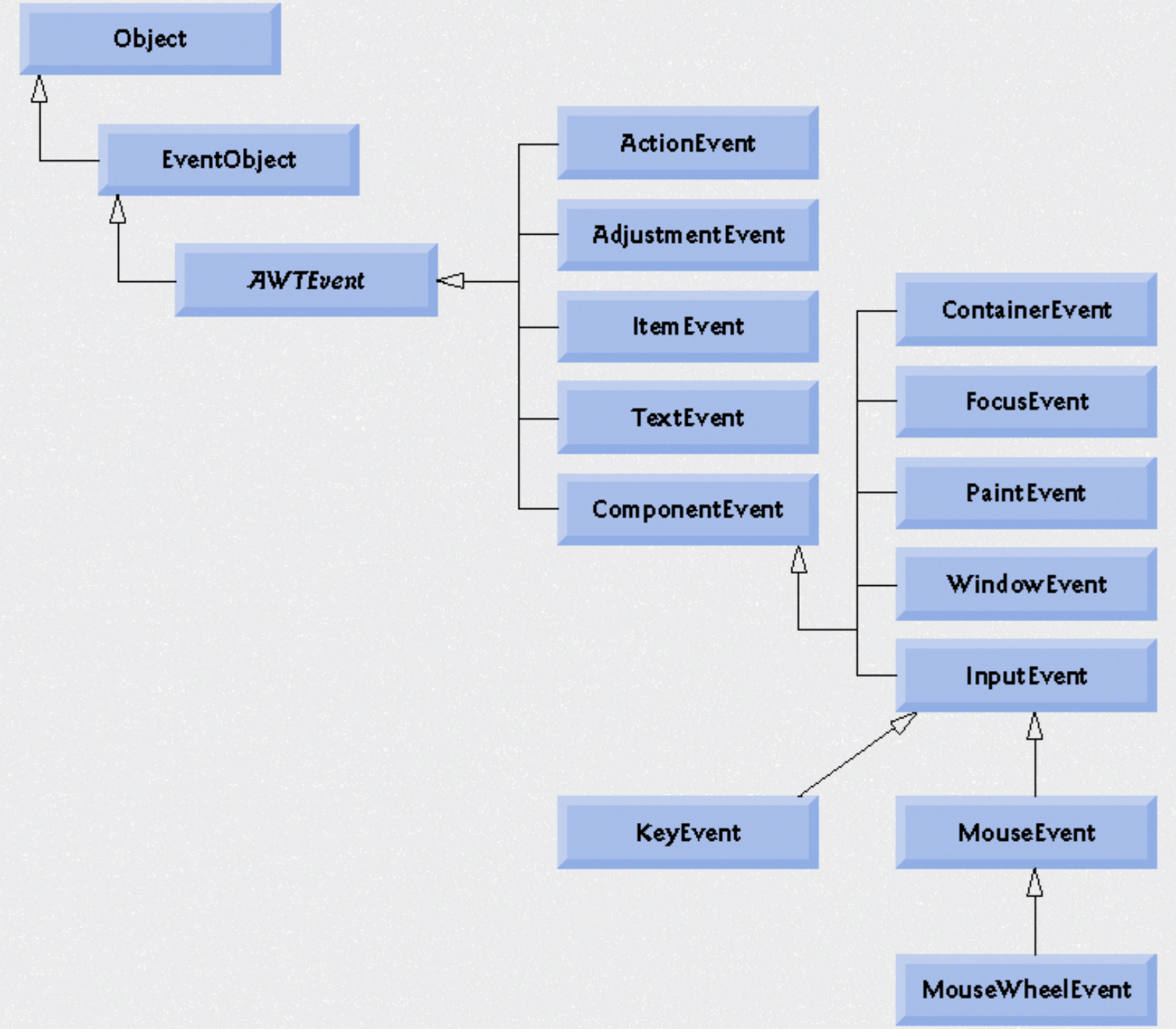
- **Top-level classes**
  - Not declared within another class
- **Nested classes**
  - Declared within another class
  - Non-`static` nested classes are called inner classes
    - Frequently used for event handling

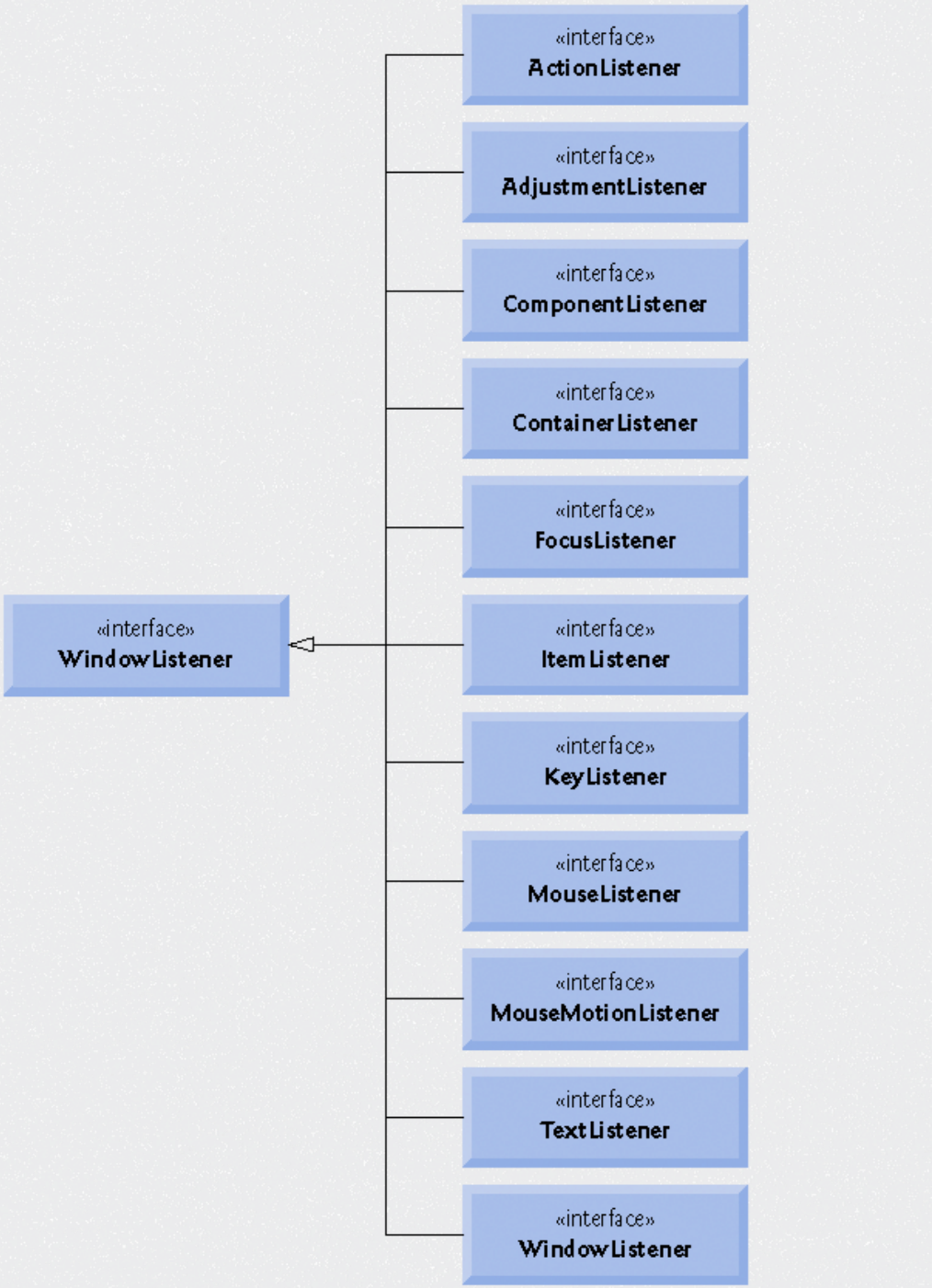
How Event Handling Works



How Event Handling Works




Object
EventObject
AWTEvent
ActionEvent
AdjustmentEvent
ItemEvent
TextEvent
ComponentEvent
ContainerEvent
FocusEvent
PaintEvent
WindowEvent
InputEvent
KeyEvent
MouseEvent
MouseWheelEvent

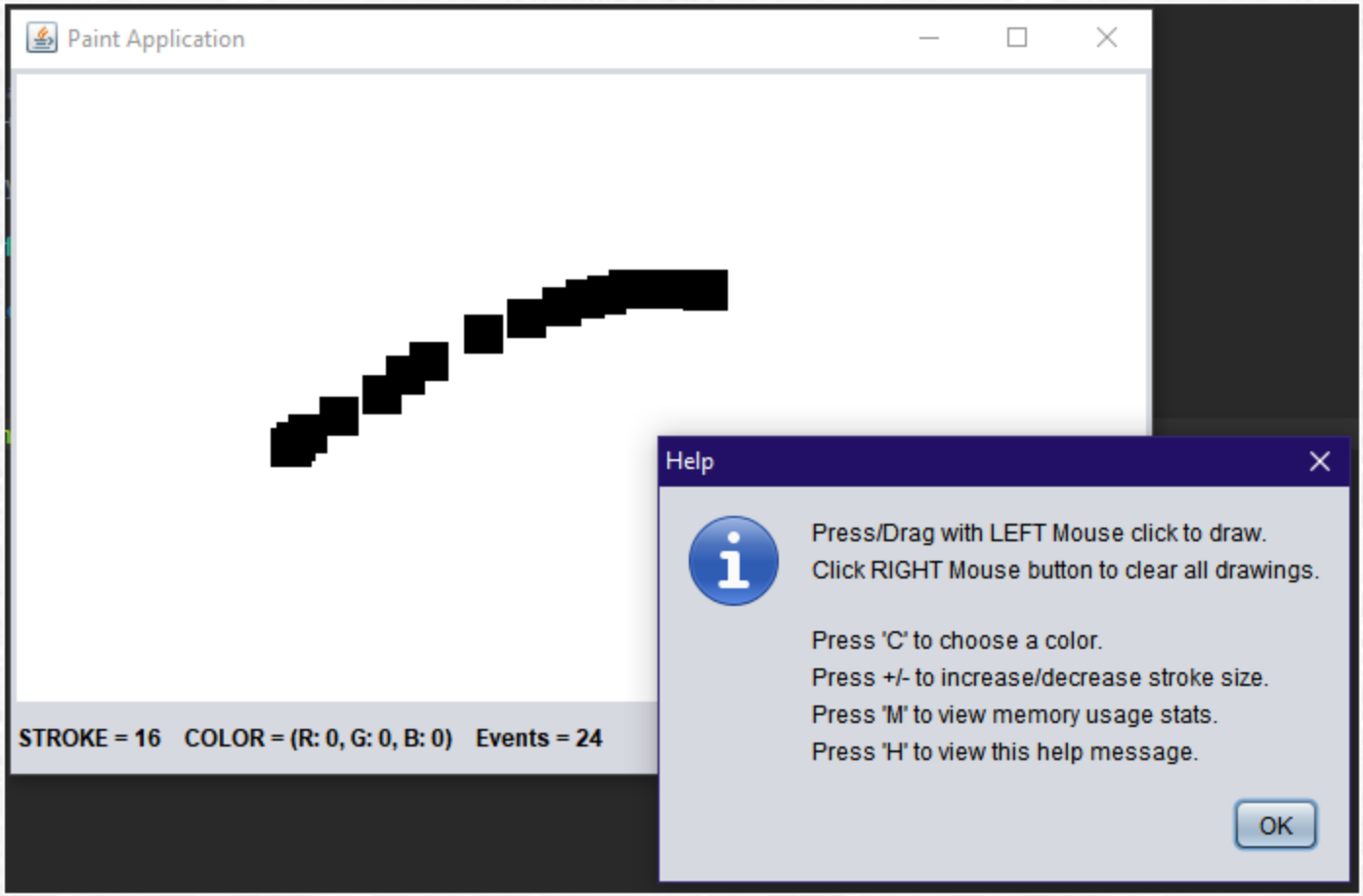

«interface»
ActionListener
«interface»
AdjustmentListener
«interface»
ComponentListener
«interface»
ContainerListener
«interface»
FocusListener
«interface»
WindowListener
«interface»
ItemListener
«interface»
KeyListener
«interface»
MouseListener
«interface»
MouseMotionListener
«interface»
TextListener
«interface»
WindowListener

Adapter Classes

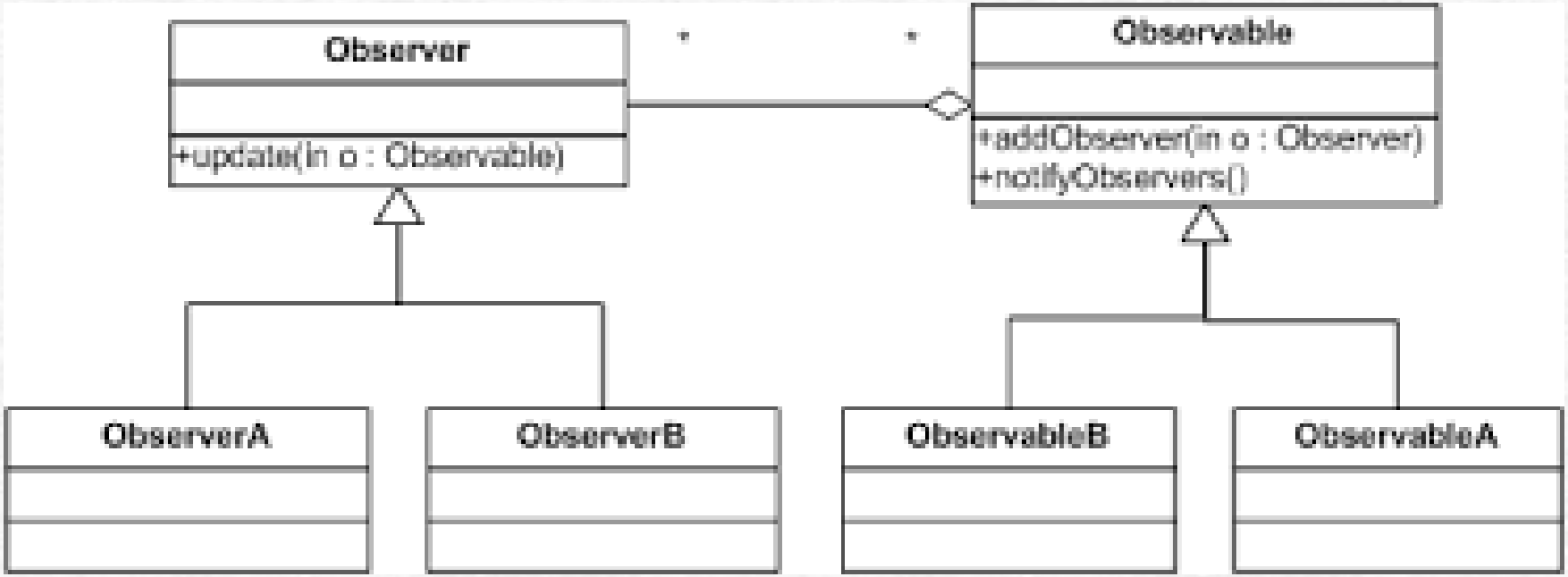
Event-adapter class in `java.awt.event`	Implements interface
`ComponentAdapter`	`ComponentListener`
`ContainerAdapter`	`ContainerListener`
`FocusAdapter`	`FocusListener`
`KeyAdapter`	`KeyListener`
`MouseAdapter`	`MouseListener`
`MouseMotionAdapter`	`MouseMotionListener`
`WindowAdapter`	`WindowListener`

Simple Paint Application

Mouse and Keyboard Event Handling



Observer Design Pattern



Observer Design Pattern

- Think about two robots, which imitate each other actions. How can we code these two with the Observer design pattern? What are the challenges of programming it?
- Code a simple Java program for practicing the question.