61FIT3JSD
Fall 2022

Lecture 8

GUI programming (3)

Advanced issues

Lecture outline

- GUI application development
- Multi-tasking GUI
- Dialog
- Scroll bar: JScrollBar

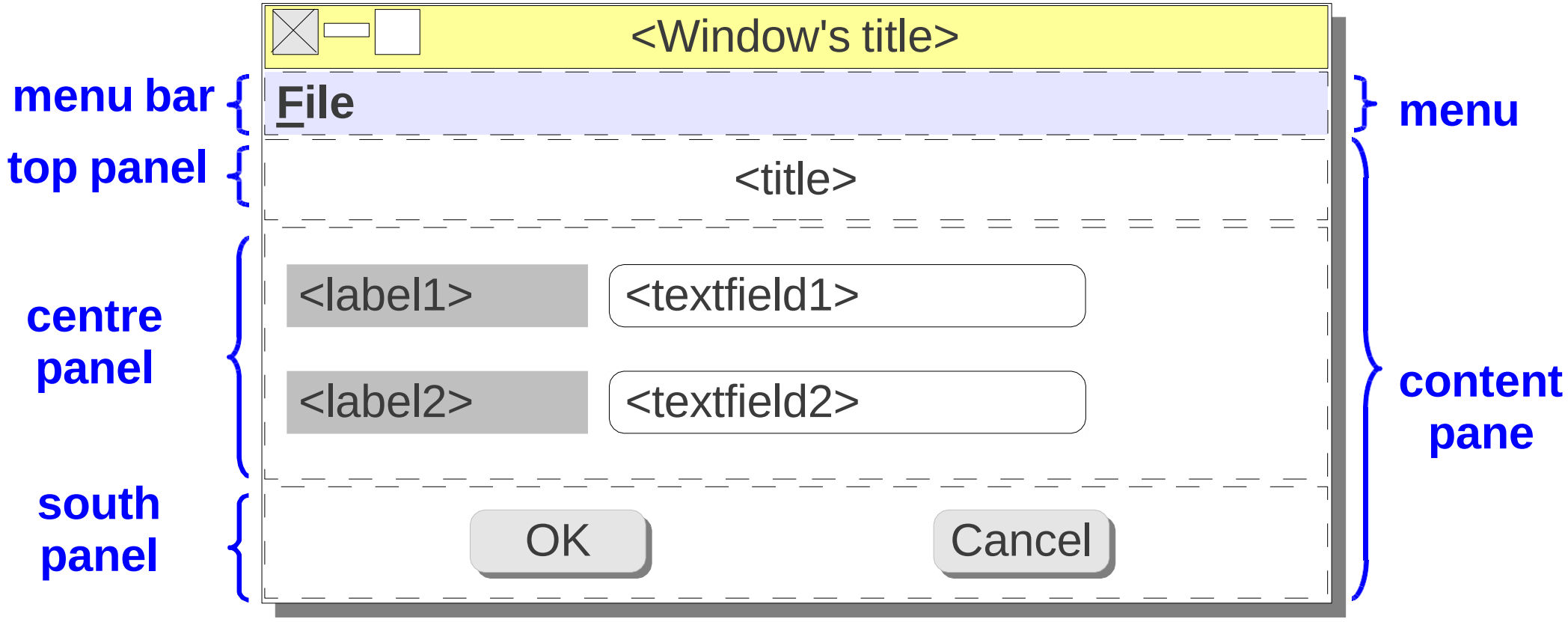
GUI application development

- Design
- Implementation

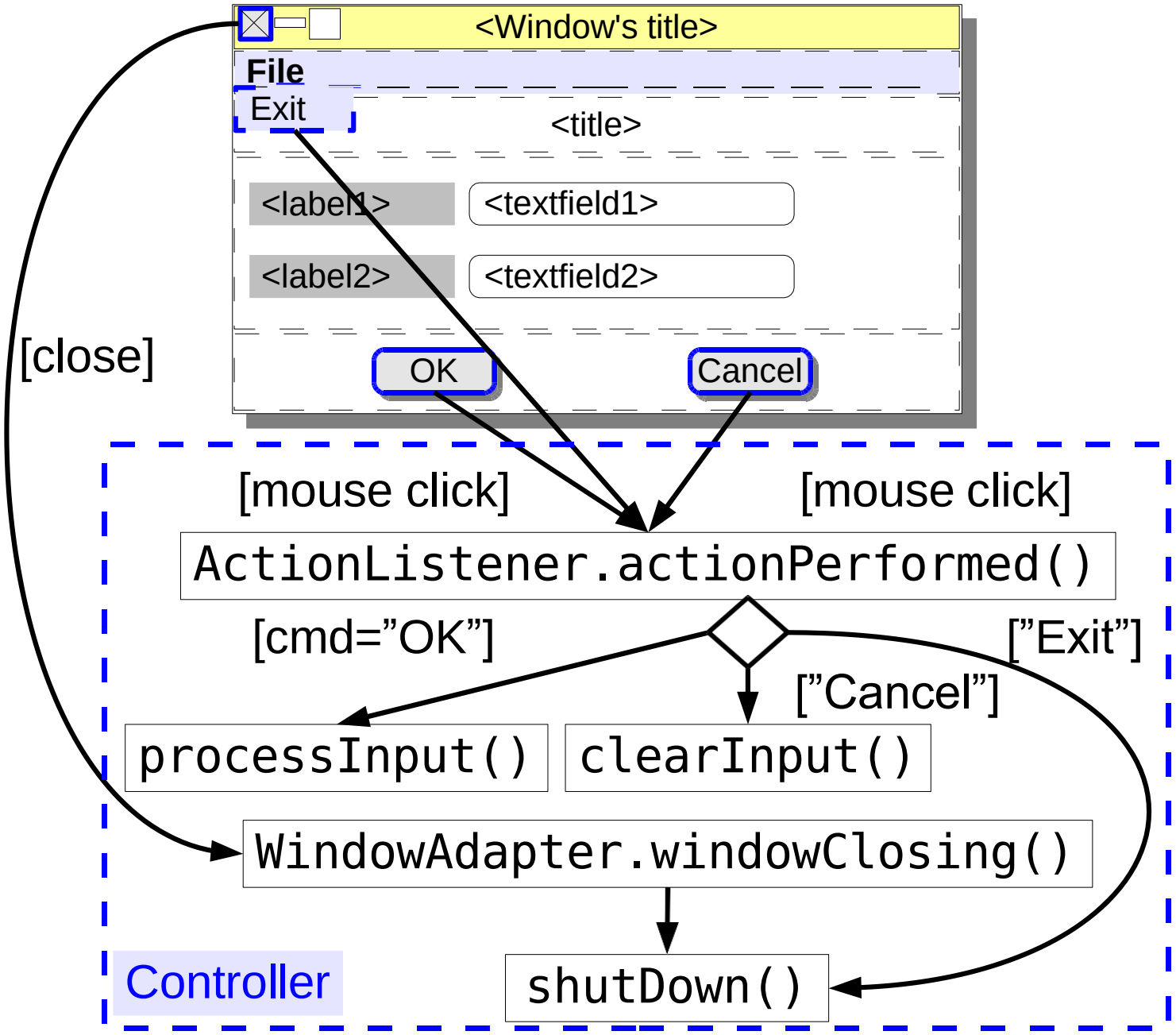
Design

- **Model**:
  - Create domain-specific classes (e.g. Customer)
- **View**:
  - Create window and display components
- **Controller**:
  - Define event handlers (user interaction)
  - Start up: initialise view & model
  - Display the view

View design


<Window's title>
File
<title>
<label1>
<textfield1>
<label2>
<textfield2>
OK
Cancel
menu bar
top panel
centre panel
south panel
menu
content pane

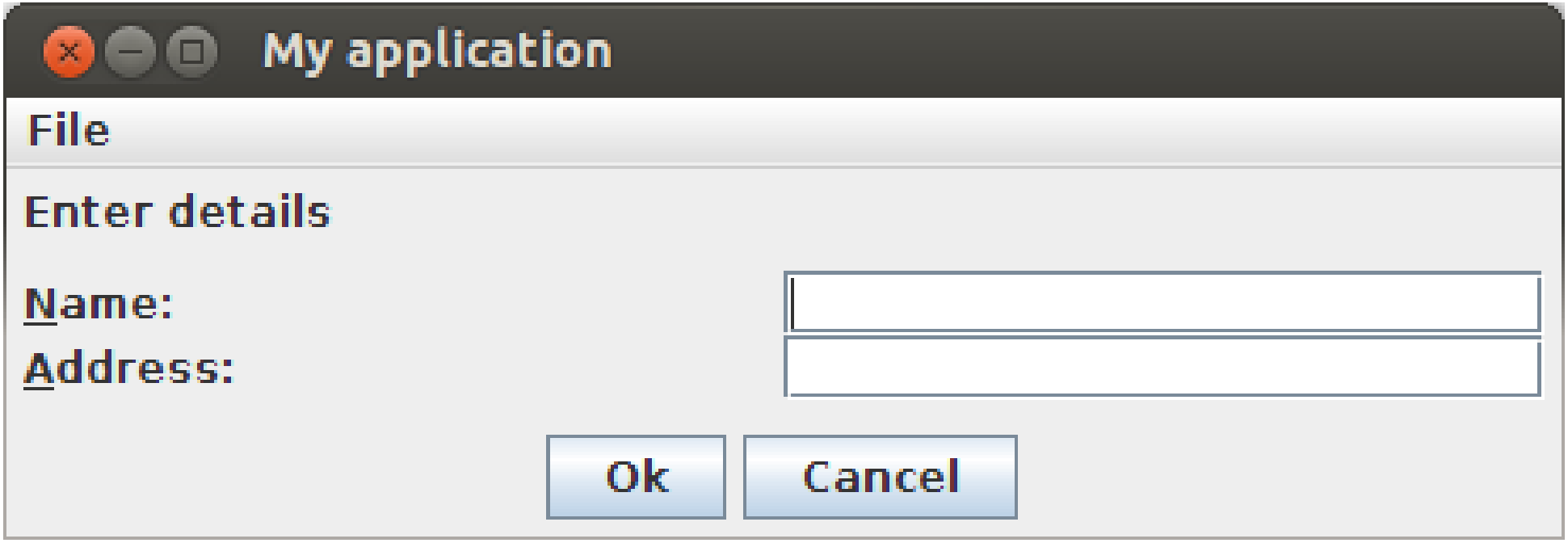
Controller design



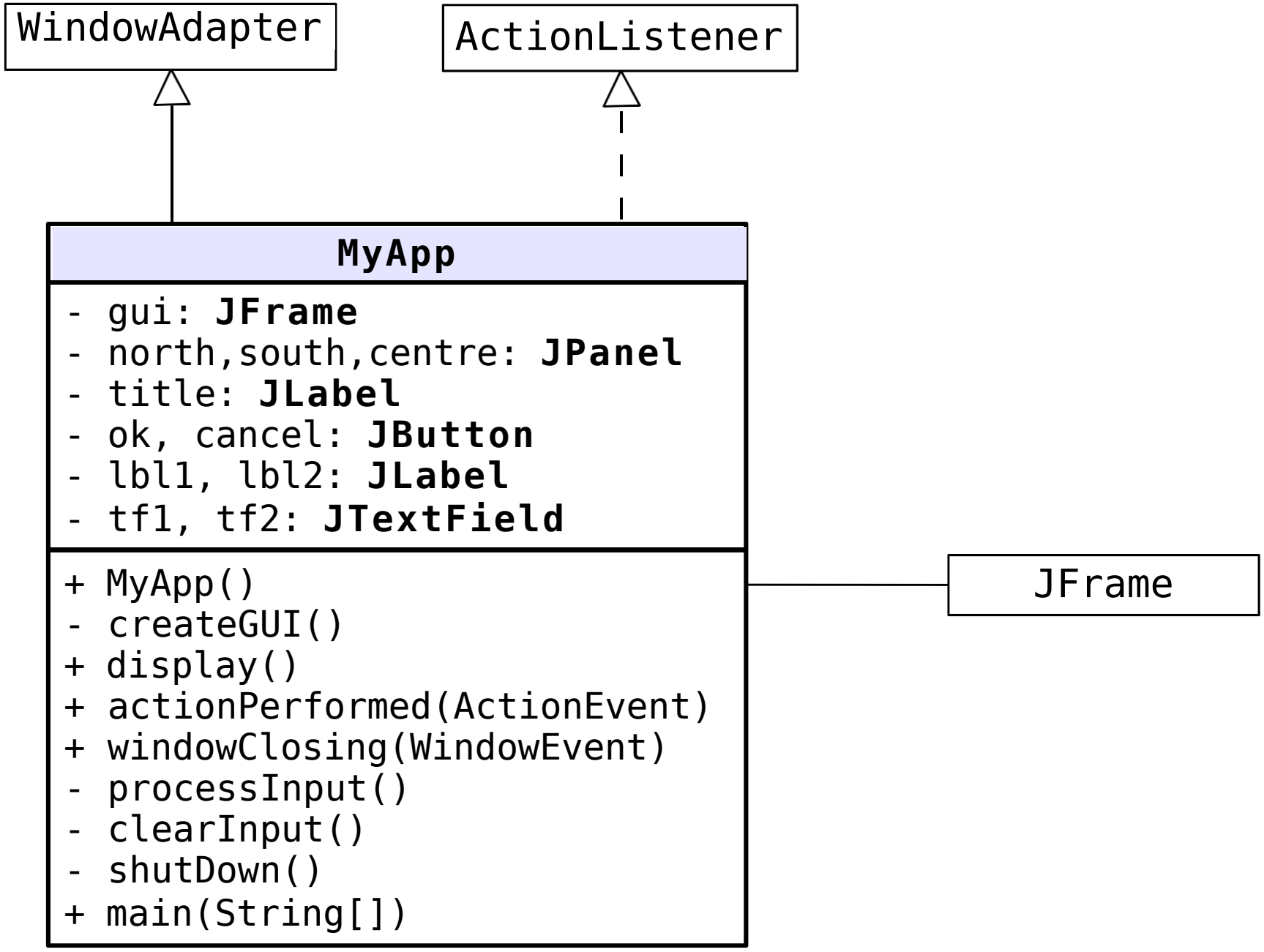
Design #1: all-in-one

- Model, View and Controller are combined into one class
- Used for small applications:
  - **model**: primitive data values
  - **view**: simple interface
  - **controller**: simple user actions
- **Pros**: less code to write
- **Cons**: longer class → more difficult to maintain; not suitable for larger applications

Example: MyApp



MyApp design #1



Implementation

- GUI development tasks:
  - set up the window: layout, menu
  - create & set up the container objects
  - add display components to the containers
  - add the containers to the window

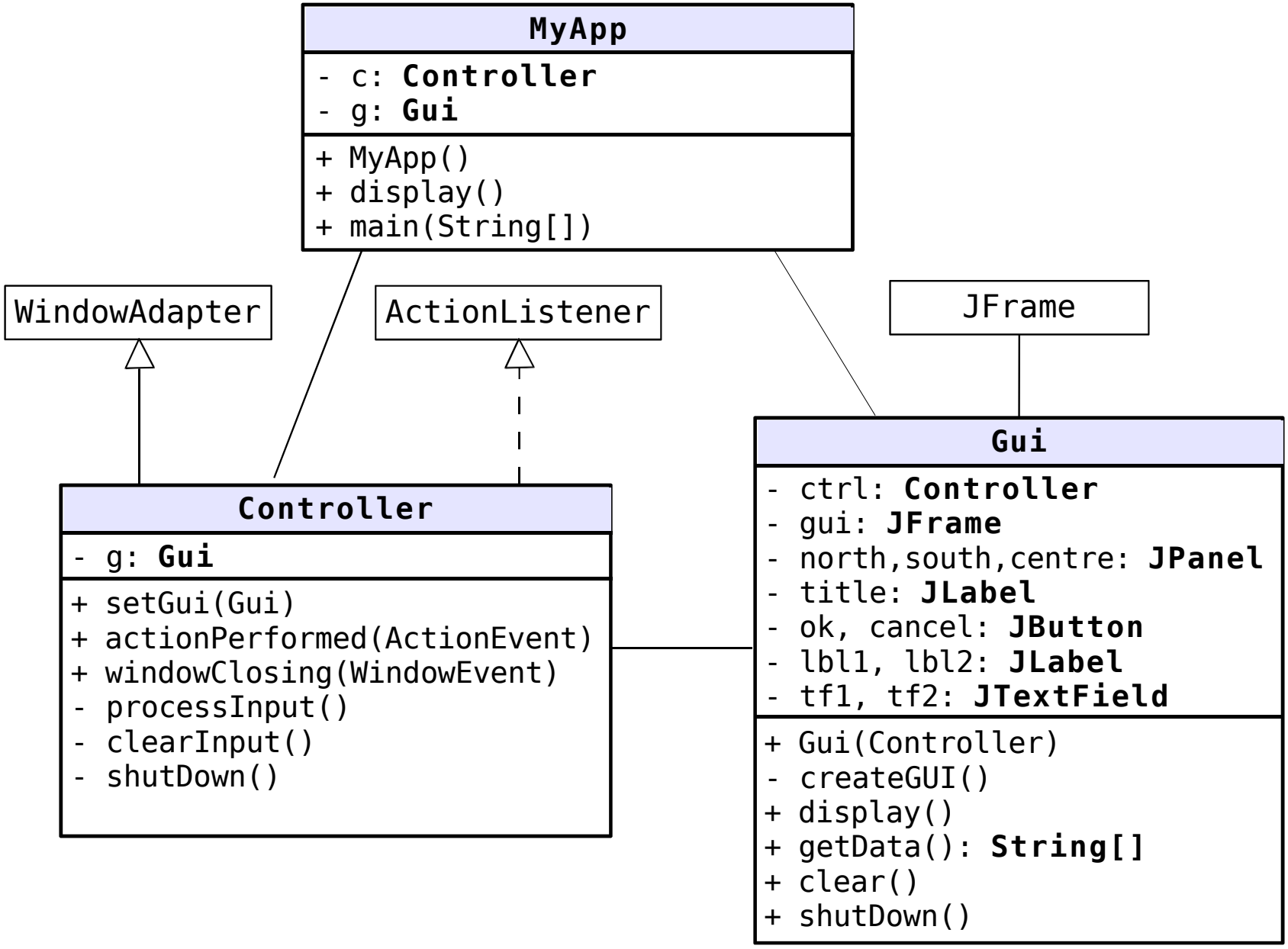
Example: MyApp #1

`lect08.allinone.MyApp`

Design #2: independent controller

- Model, View may be combined into one class
- Controller is a separate class
- Used for medium-large applications:
  - **model**: domain-specific classes (e.g. Customer, Order, etc) that may not require separate classes
  - **view**: simple view, specific to each domain class
  - **controller**: data handling is likely to change
- **Pros**: easier to maintain (e.g. when data handling logics or view specifications are changed)
- **Cons**: more complex to design and code

Example: MyApp design #2



MyApp #2

`lect08.independent.MyApp`

Multi-tasking GUI

- A multi-tasking GUI application can handle multiple events at the same time
- Examples:
  - store program data to a database
  - view a report
  - print data

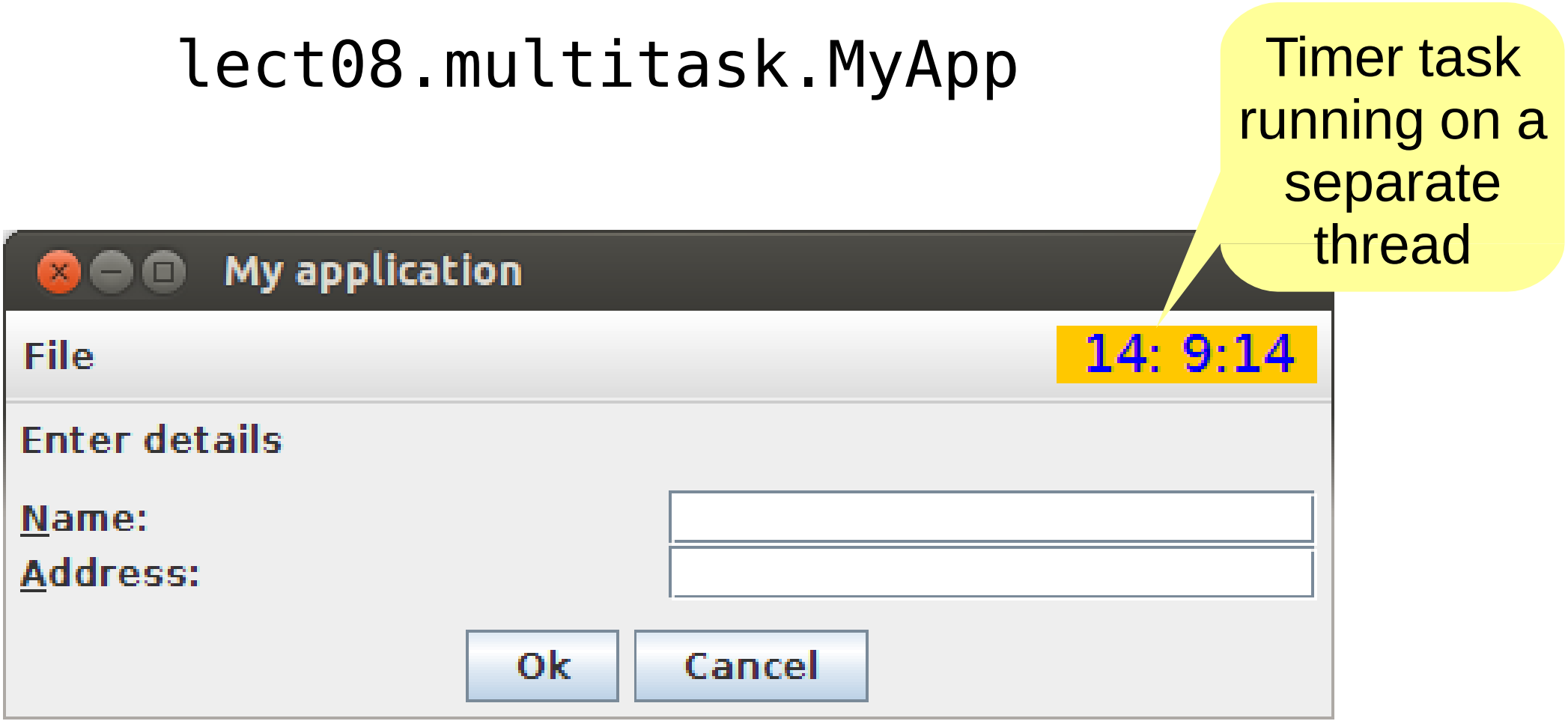
Multi-tasking in Swing

- Wrap the task in a `Runnable` object
- Start the task object using a `Thread` object
- Task thread is run concurrently with the GUI's thread:
  - user interaction is not blocked

DEMO

Multi tasking

`lect08.multitask.MyApp`



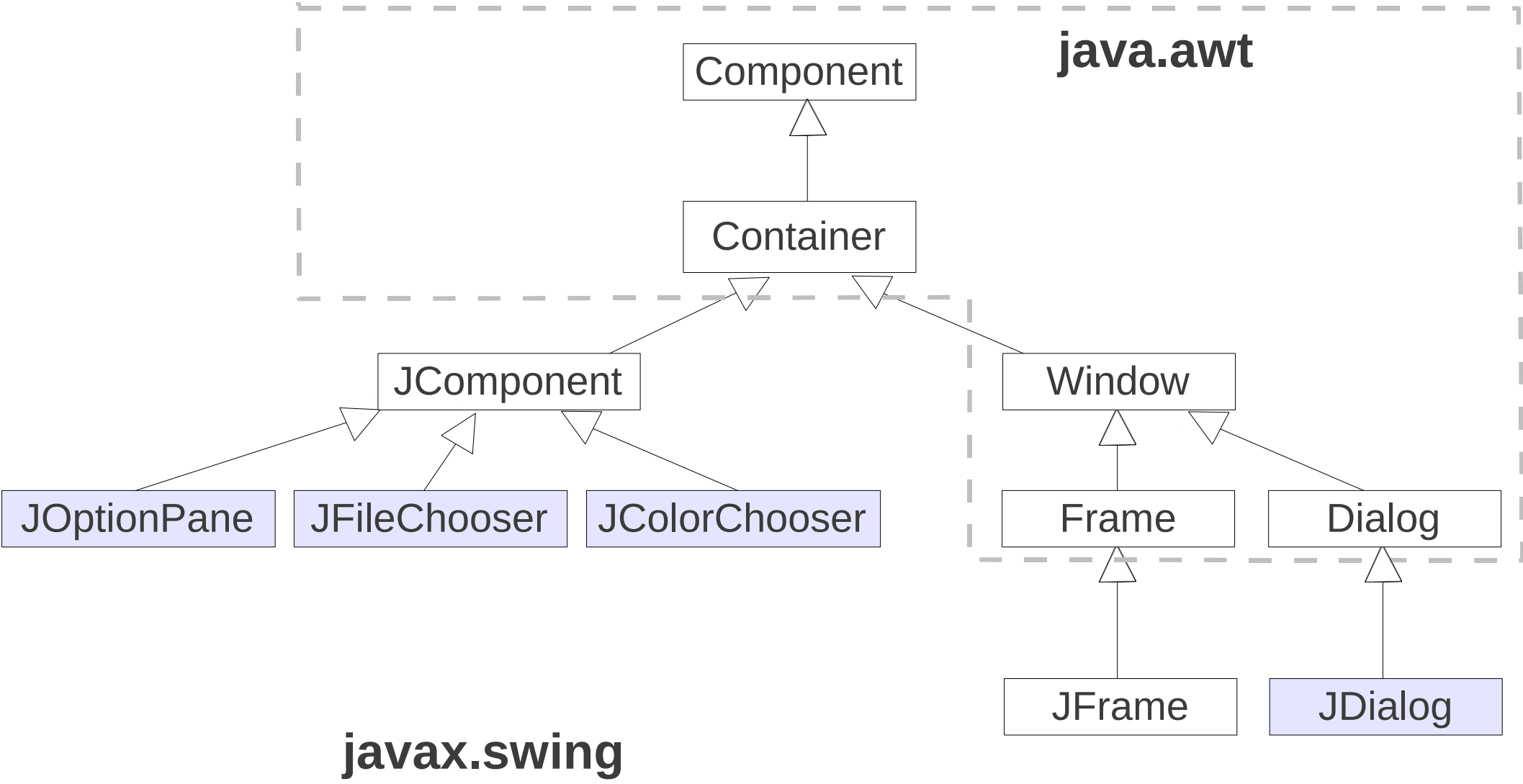
Dialog

- Separate sub-window that:
  - displays temporary notice or
  - obtains basic, context-dependent input
- Examples:
  - program message (informational, error)
  - progress status
  - browse a file or choose a colour
- Attached to a window (its parent)
- Can be modal or non-modal

Swing dialogs

- `JOptionPane`: simple, standard dialog
- `JFileChooser`: browse a file
- `JColorChooser`: choose a color
- `JDialog`: custom dialog

Dialog component hierarchy



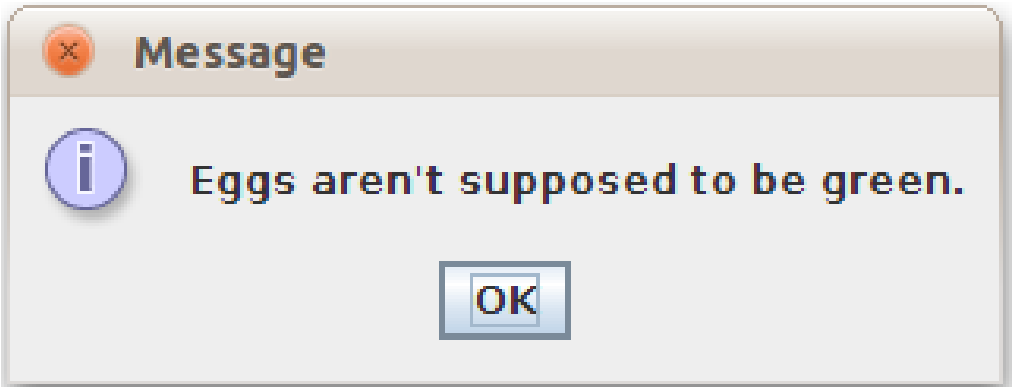
Class `JOptionPane`

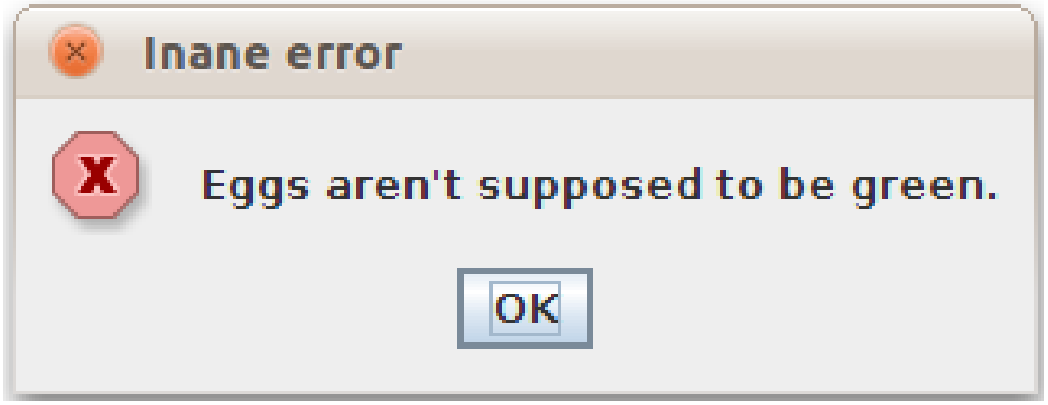
- A container that uses `JDialog` as the window
- Creates modal dialogs
- Customisable features:
  - title
  - message or a collection of components
  - icons
  - buttons
  - button texts

Types of dialog

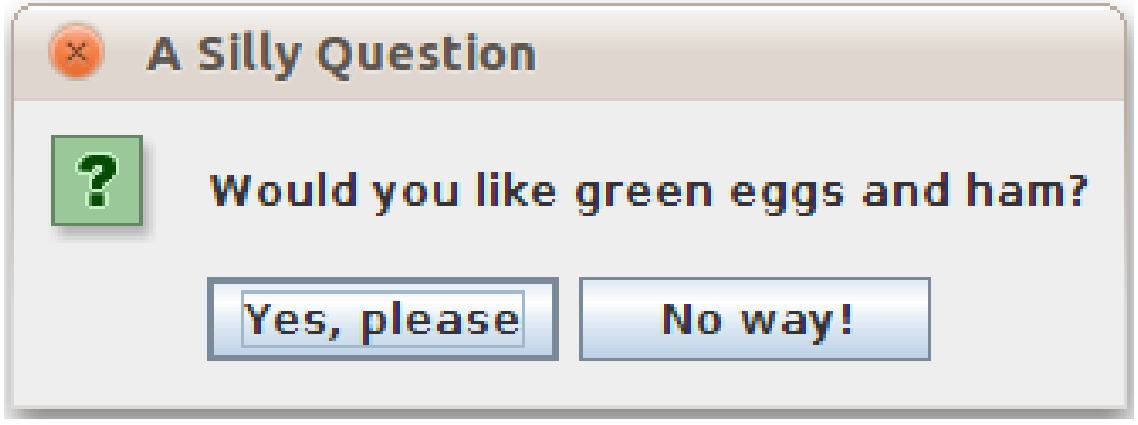
- Message dialog:
  - one-button dialog
- Option dialog:
  - like a message but has a variety of buttons
- Input dialog:
  - to obtain a text input

Example (1)



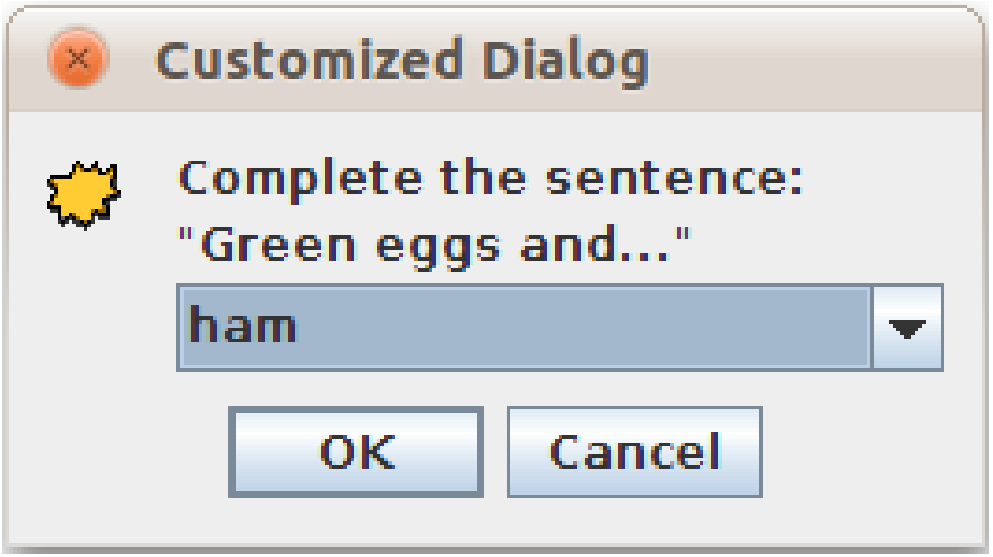


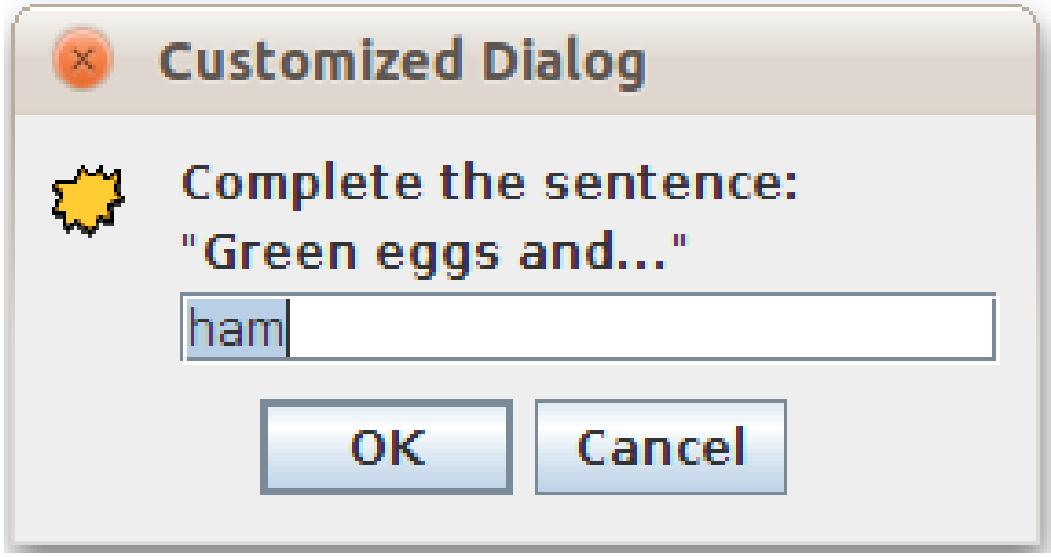
message dialogs



option dialog

Example (2)





input dialogs

Methods to create dialogs

- `showMessageDialog`
- `showOptionDialog`
- `showInputDialog`

showMessageDialog

- `parentComponent`: the parent window (frame)
- `mesg`: the message to show
- `title`: the dialog title
- `messageType`:
  - INFORMATION_MESSAGE
  - ERROR_MESSAGE
  - WARNING_MESSAGE
  - PLAIN_MESSAGE

showOptionDialog

- `parentComponent`
- `mesg`
- `title`
- `optionType`: a combination of Yes/No/Cancel
- `messageType`
- `icon`: an Icon object
- `options` (optional): list of button texts (matches with optionType)
- `initialValue`: initial (selected) button

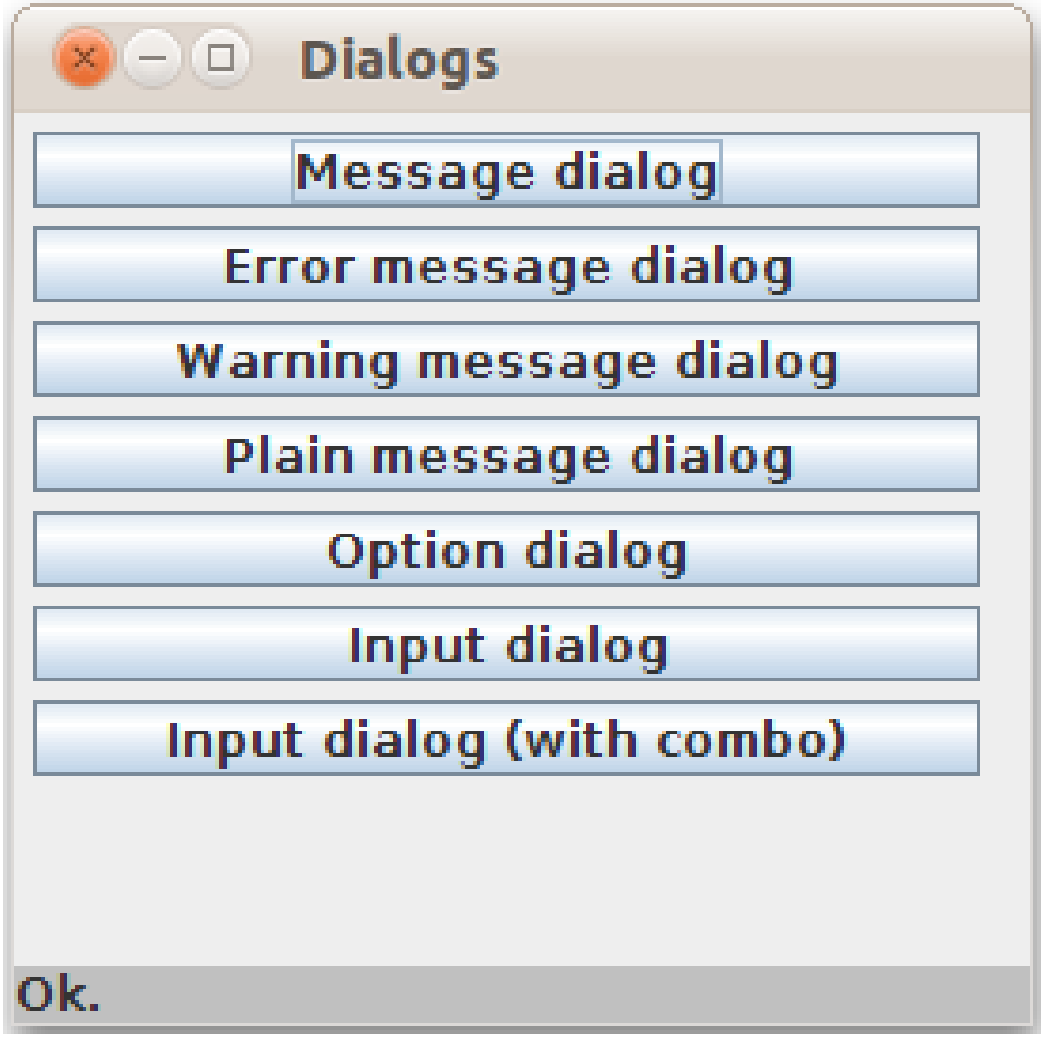
showInputDialog

- `parentComponent`
- `mesg`
- `title`
- `messageType`
- `icon`: an Icon object
- `options` (optional): list of allowed values to select
- `initialValue`: initially (selected) value

DEMO

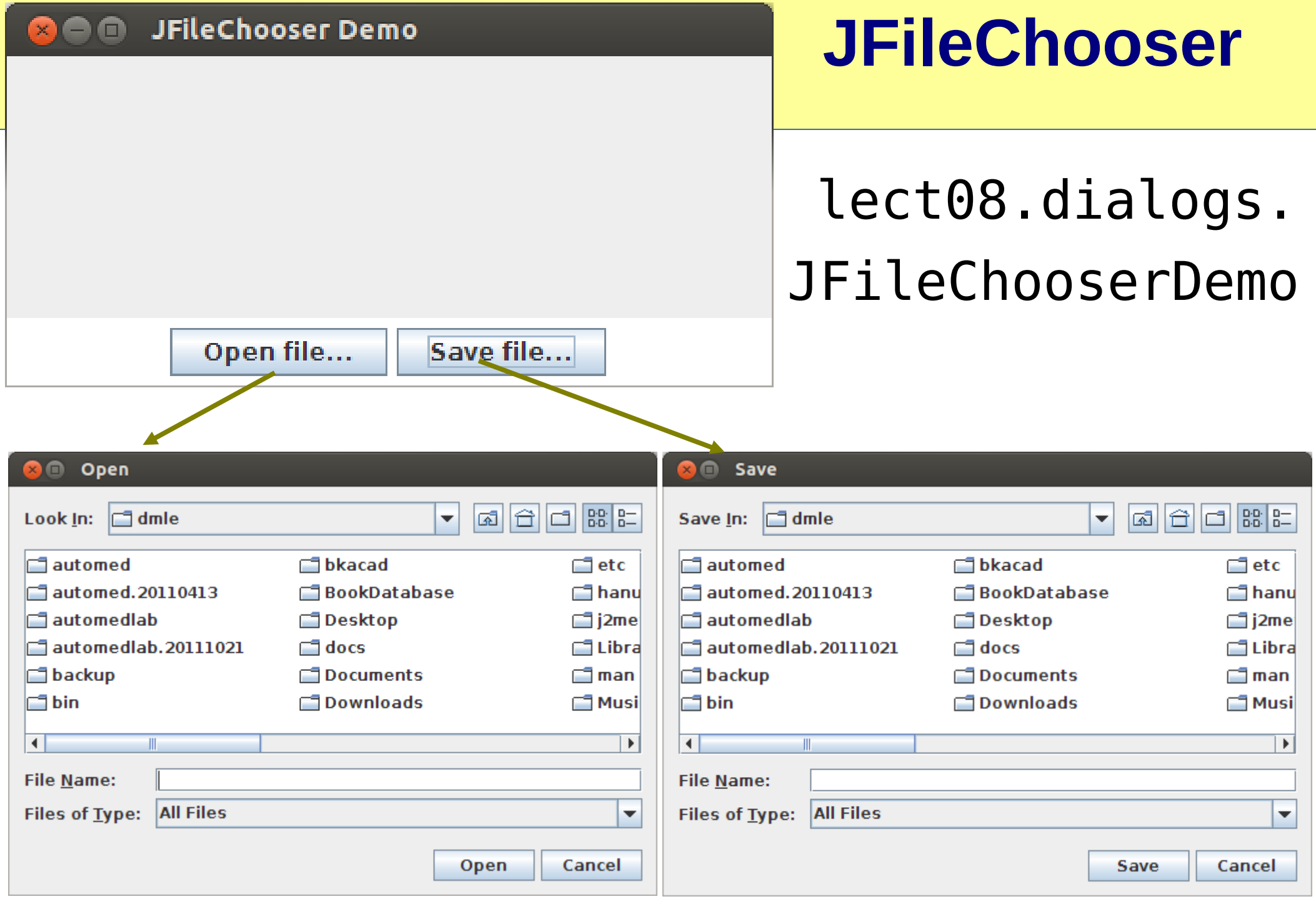
JOptionPane

lect08.dialogs.SimpleDialogDemo



JFileChooser

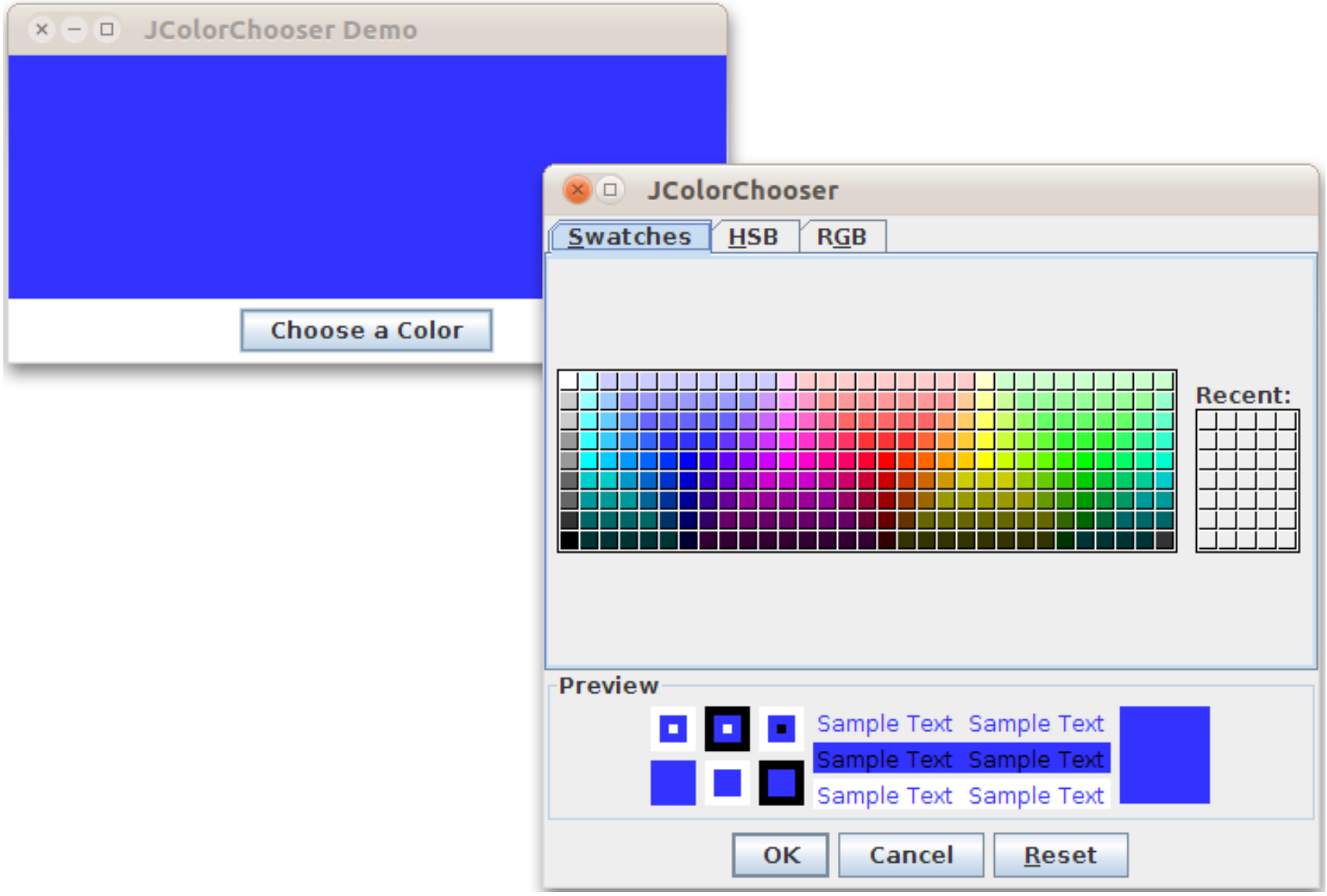
lect08.dialogs.
JFileChooserDemo



DEMO

JColorChooser

lect08.dialogs.JColorChooserDemo



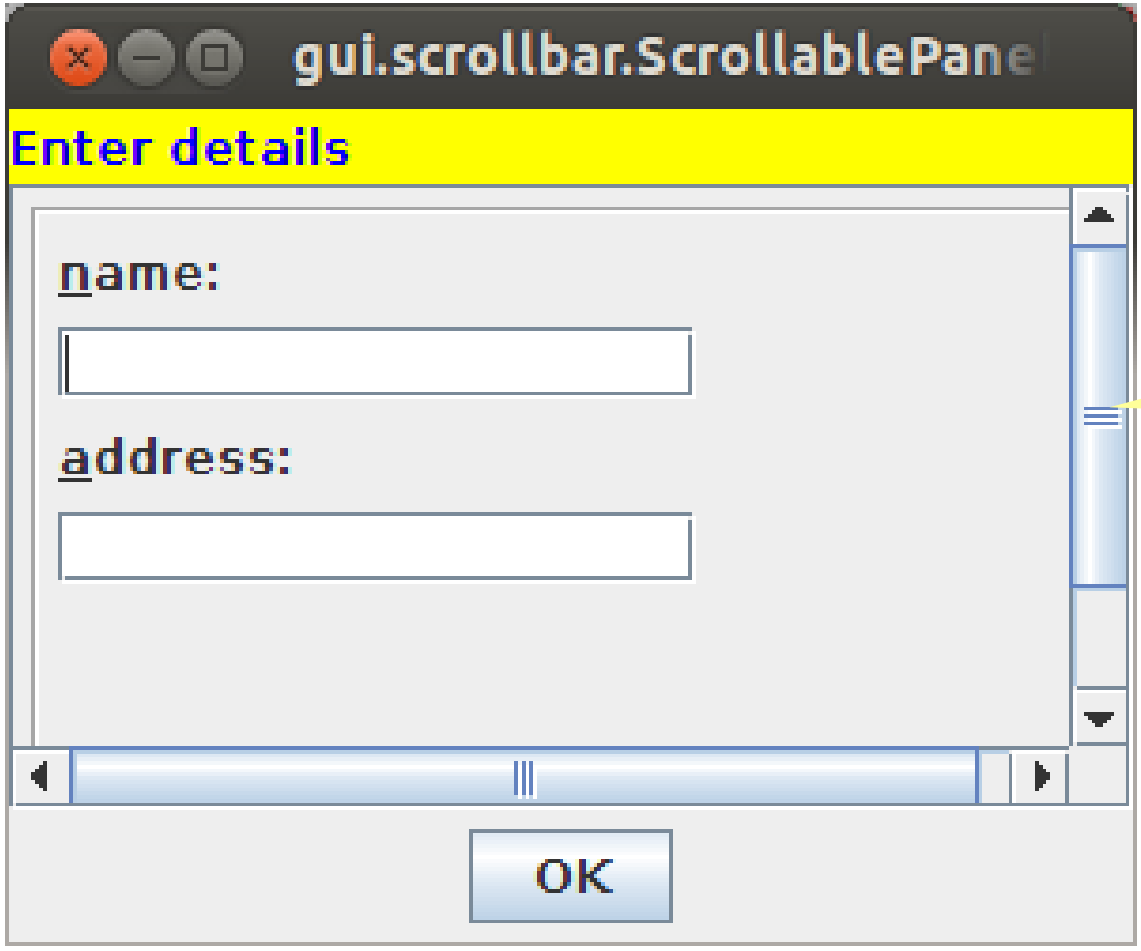
Scroll bar

- Class: `JScrollPane`
- Represents a fixed, sliding view of a display component
- Create a `JScrollPane` object using the component as input
- Add the `JScrollPane` object to the window
- Examples:
  - scrollable panel
  - scrollable text field
  - scrollable table (later)

DEMO

Scrollable panel

`lect08.scrollbar.ScrollablePanelDemo`



Scroll bar
for a panel