Swing Concepts

- Object < JComponent < JContainer < JFrame
  - The component/container pair illustrates Composite pattern: Container has Components, including other Containers
    - Understanding Z-order, painting hierarchy is important in complex applications, see Core Java/Java Tutorial/O'Reilly
  - Containers have layout managers that control how widgets are added and appear
    - BorderLayout is versatile, FlowLayout is simple,
    - GridBagLayout is the kitchen sink, GridLayout could be useful in OOGA
- JPanel is the simplest container, use for holding widgets
  - Defaults to FlowLayout, add widgets and other panels, ...

Swing continued

- JFrame is a top-level window which is a container
  - Widgets added to a frame's content pain, retrieved via getContentPane(), different from AWT
  - LayoutManager used in default getContentPane() is BorderLayout
    - Use BorderLayout.NORTH, not “North” (some books)
- Layout managers illustrates the Strategy Design Pattern
  - Encapsulates algorithm/behavior as a class, pluggable
  - Users of strategy delegate responses/use to the the strategy
  - Put a new layout in every container you use (can't hurt?)

Listeners

- Events propagate in a Java GUI as part of the event thread
  - Don’t manipulate GUI components directly, use the event thread
  - Listeners/widgets register themselves as interested in particular events
    - Events go only to registered listeners, can be forwarded/consumed
  - ActionListener, KeyListener, ItemListener, MouseListener, MouseMotionListener, ..., see java.awt.event.*
    - Isolate listeners as separate classes, mediators between GUI, Controller, Application
    - Anonymous classes can help here too

Painting

- How to paint/render a widget
  - Eventually paintComponent() will be called, this does the painting
  - Don’t call paintComponent, don’t call paint, call repaint
    - Schedules repainting as part of event-handling thread
  - See java.awt.Graphics, Graphics2D, Image
    - Different drawing and image manipulation is possible
    - Relative to GUI, not to screen (not absolute coordinates)