## Administrivia

- Quiz 4 moved to next Thursday.

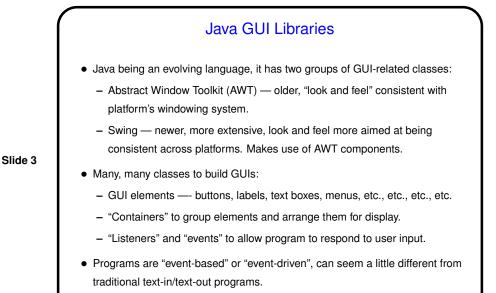- Reminder: Homework 4 design due today. Code due Thursday.

**Slide 1**

## Homework 4 Objectives / Hints

- Writing entities — similar to player, except they don't implement the `Player` interface. For this assignment, they don't have to move, but at least one should interact with your player in some way.

- Figuring out how to lay out your game (screens / blocks / entities) — either use screen editor tool, or figure out how to include code to do this yourself. Most likely place is in your game setup class.

- Writing a replacement for `GameEntityList`. Can be generic, but doesn't need to be. I recommend a class with two nested classes (classes-within-classes), one for "nodes" (items in the linked structure — these are the little boxes we drew in class earlier), one for iterators (as in the example we did in class).

  Let's write some code to work with the "little boxes" . . .

**Slide 2**

## Java GUI Libraries

- Java being an evolving language, it has two groups of GUI-related classes:
  - Abstract Window Toolkit (AWT) — older, "look and feel" consistent with platform's windowing system.
  - Swing — newer, more extensive, look and feel more aimed at being consistent across platforms. Makes use of AWT components.

- Many, many classes to build GUIs:
  - GUI elements —-- buttons, labels, text boxes, menus, etc., etc., etc., etc.
  - "Containers" to group elements and arrange them for display.
  - "Listeners" and "events" to allow program to respond to user input.

- Programs are "event-based" or "event-driven", can seem a little different from traditional text-in/text-out programs.

- Let's write a very simple "Hello world" program . . .

**Slide 3**

## Minute Essay

- The game framework will allow you to add panels to any or all four sides of your game. You can display info (text is easiest) or include GUI components for additional user input (e.g., click a button to speed up the player). You can also add to the menu bar.

  How might this be helpful for your game?

**Slide 4**