Graphics, Events, and ArrayLists

CS 62 - Spring 2016
Michael Bannister

Quiz Friday!!

Lab today

- Silver Dollar game

- Come prepared

  - ArrayList

  - graphics

Lab Stuff

- toString returns String

  - Does not print anything!

- See definition of interface List<E> on-line

  - You will be using ArrayList (see next example) rather than an array (*mainly just to get used to it!*)

PostItStdApplication

- Sophisticated

  - JFrame contains two JPanels

  - JFrame uses BorderLayout, so add controls to JPanel in SOUTH, canvas in CENTER of contentPane of JFrame

    - See GUI cheat sheet for details

  - DrawingCanvas extends JPanel -- contains paint method

PostIt class

- Represents the rectangles being dragged:

  - Contains accessor and mutator methods to allow it to be manipulated by drawing program.

  - Could add features (title bar, go-away box) without affecting PostItApplication code.

PostItApplication

- PostItApplication class responsible for

  - setting up the GUI

  - Responding to button pressed and menu selections

  - Sets up ArrayList of items on canvas.

- Class has 3 *inner* classes

  - DrawingCanvas

  - DrawingMouseListener

  - DrawingMouseMotionListener

  - *Inner classes have access to private features of containing class*

Inner classes

- DrawingPanel extends JPanel

  - Associates listeners for mouse actions on the panel

  - Responsible for repainting the screen

- DrawingMouseListener and DrawingMouseMotionListener

  - Responsible for responding to mouse actions by changing the items in the ArrayList.

Event-Driven Programming

Handling Mouse Events

- If want program to react to mouse press, click, or release on a component

  - send addMouseListener(mlo) to component (usually in the constructor of the component)

  - See PostItApplication.java

  - For motion or drag, send addMouseMotionListener(mlo)

- When user presses mouse on a component

  - Computer looks for registered "MouseListener" for component or its containers.

  - If found, sends mousePressed(evt) to listener

Listener

- object designated as mouse listener must

  - implement MouseListener (& implement mousePressed, mouseReleased, & mouseClicked) *or*

  - extend MouseAdapter (which has default implementations of all 3)

- Second is easier unless class already extends another. *Can only extend one class in Java*

- Similarly, for mouse motion listener

  - implement MouseMotionListener or

  - extend MouseMotionAdapter

GUI Objects & Events

- Similar to handling mouse events, but must also install components in a container.

- See GUI cheat sheet in Documentation & Handouts.

Listeners in PostItApplication

- Main class (this) is listener for button and choice. Set up when GUI items constructed

- Special listener objects for mouse actions. Set up by DrawingCanvas since listening for actions on that object.

List Operations

- Review list operations from library interface List<E> in Java 8 documentation.

  - Bailey's List<E> is slightly different.

- Think about how implement with array.