Putting it all Together
In the News Today

Facebook Files for IPO:

http://dealbook.nytimes.com/2012/02/01/facebook-files-for-an-i-p-o/?hp
Assignment 3 Demo
Breakout!

- Due next Friday, February 10.
- YEAH hours tonight, 7-8PM in Herrin T175.
- **Start Early!**
  - There is a nice breakdown of the required tasks suggested in the handout.
  - This program is not as hard to write as it may seem.
- **Have Fun!**
  - There are a lot of fun extensions you can add onto the basic functionality.
  - We love giving extra credit on this one. ^_^
Review From Last Time
Responding to Mouse Events

- To respond to events, your program must
  - Indicate that it wants to receive events, and
  - Write methods to handle those events.
- Call the `addMouseListener()` method to have your program receive mouse events.
- Write appropriate methods to process the mouse events.
Methods for Handling Events

- Define any or all of the following mouse event handlers to respond to the mouse:
  - `public void mouseMoved(MouseEvent e)`
  - `public void mouseDragged(MouseEvent e)`
  - `public void mousePressed(MouseEvent e)`
  - `public void mouseReleased(MouseEvent e)`
  - `public void mouseClicked(MouseEvent e)`
  - `public void mouseEntered(MouseEvent e)`
  - `public void mouseExited(MouseEvent e)`

- You must also `import java.awt.event.*;` for the `MouseEvent` class.
A Friendly Circle
Combining Animation and Events
A Snowfall Simulation
Let it Snow!
Accessing the Canvas

- It is possible to determine what, if anything, is at the canvas at a particular point.
- The method
  
  GObject getElementAt(double x, double y);

  returns which object is at the given location on the canvas.

- The return type is GObject, since we don't know what specific type (GRect, GOval, etc.) is really there.

- If no object is present, the special value null is returned.

![Diagram of GObject hierarchy]

- GObject
  - GLabel
  - GRect
  - GOval
  - GLine
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A Simple Collision Detector

\[(x, y)\]

\[(x + 2r, y + 2r)\]
A Simple Collision Detector

\[(x, y)\]

\[(x + r, y + 2r)\]

\[(x + 2r, y + 2r)\]
What Went Wrong?
A Simple Collision Detector

\[(x, y)\]

\[(x + r, y + 2r)\]

\[(x + 2r, y + 2r)\]
Reordering Objects

- Each GObject can have its **z-order** adjusted.
- The method `object.sendToBack();` moves the object to the back of the z-order.
- `getElementAt` will return the topmost object where it hits.
The Importance of Style

- General rule of thumb: **Don't make a variable an instance variable unless you have to.**
- Use local variables for temporary information.
- Use parameters to communicate data into a method.
- Use return values to communicate data out of a method.
The Chaos Game

• Pick any three points.
• Starting at any of the points:
  • Choose one of the three points randomly.
  • Move halfway from your current location to the chosen point.
  • Draw a dot at your current location.
  • Repeat.
Sierpinski Triangle