Android Apps with Java

CS 50, Fall 2009

Preliminaries

- Install the Android SDK, available from http://developer.android.com/sdk/index.html

- Install Eclipse (http://www.eclipse.org/)

- Install ADT for Eclipse (http://developer.android.com/sdk/eclipse-adt.html)

- Create an Android Virtual Device (AVD)
  - android create avd --target 2 --name my_avd

Android App Vocabulary
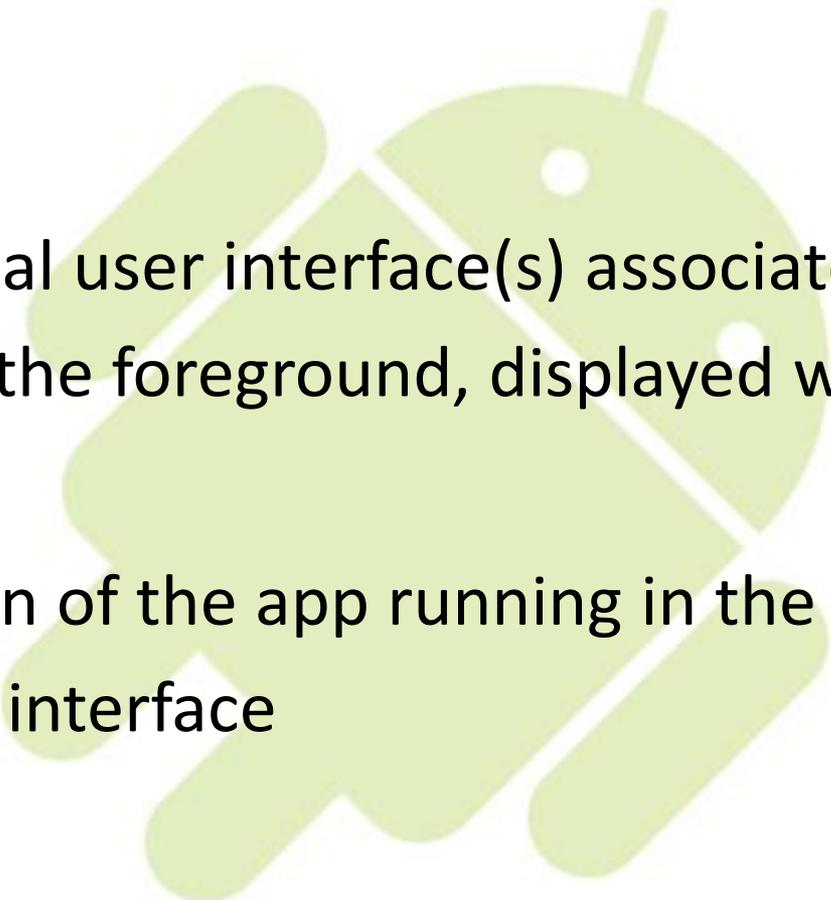
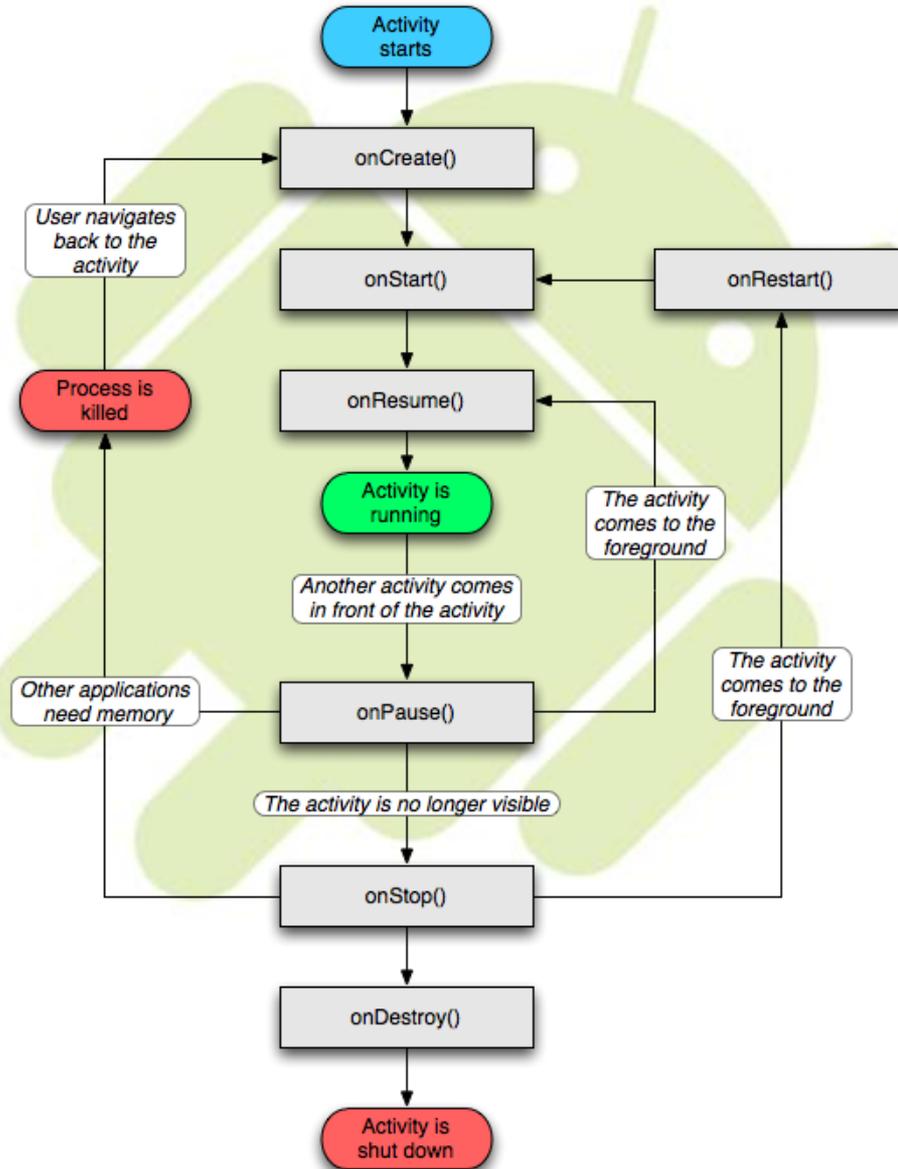- Activities
  - The visual user interface(s) associated with an app
  - Runs in the foreground, displayed with a View
- Services
  - A portion of the app running in the background
  - No user interface
- Events
  - Things to which an application can respond
 - Includes taps, button/keyboard presses, etc.

Activities

- Presents and manages the user interface for one task
- Only one activity can be in the foreground at a time, and only FG activities can do work
- Activities can spawn other activities to handle different tasks (selecting a recipient vs. writing a message, for example)
- The "activity lifecycle" defines how activities behave as different processes come to the foreground

The Activity Lifecycle

Views

- Hierarchical organizations of UI elements
- ViewGroups are collections of View objects that can organize them in different ways (linearly, in a grid, etc.)
- Activities define the view they want to use, then the view is drawn from the top down
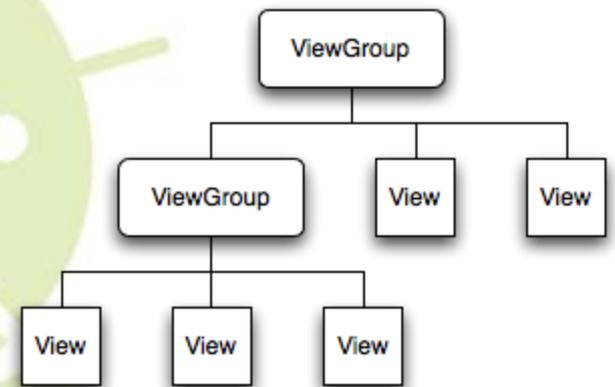
Services

- Processes that do work in the background without the help of a UI

- Counterpart to activities

- Services can run independently of applications, or applications can "bind" to services to interact with them

- Services won't be automatically killed by the OS the way activities are

Event Handling
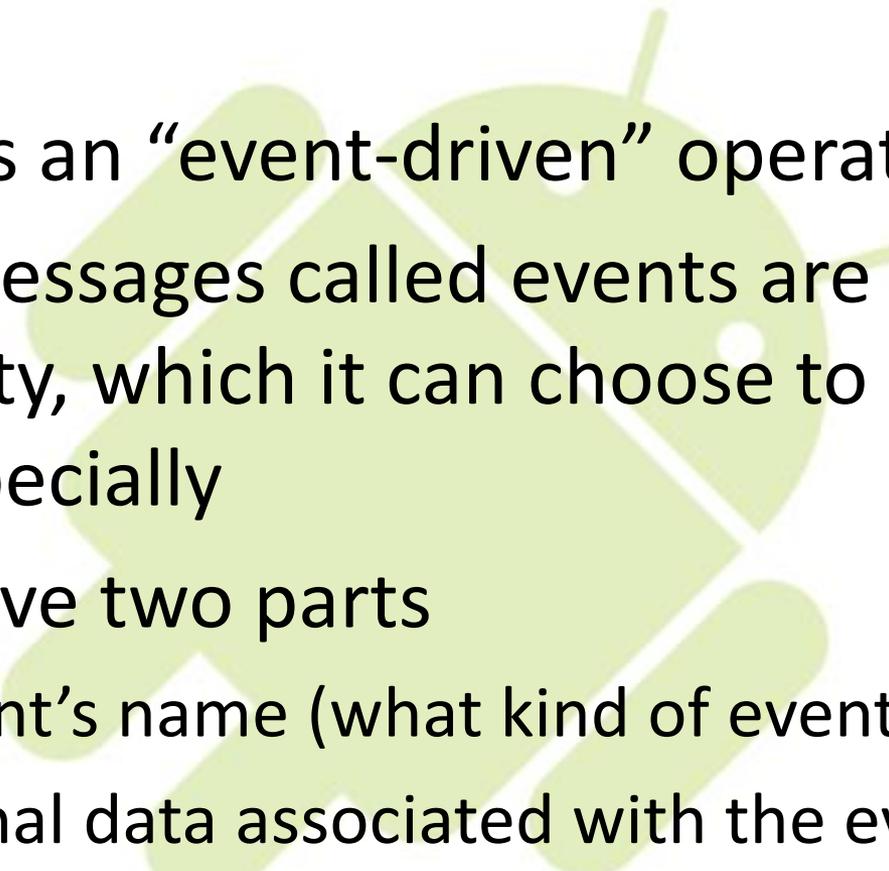
- Android is an "event-driven" operating system

- Special messages called events are passed to the activity, which it can choose to ignore or handle specially

- Events have two parts
  - The event's name (what kind of event it is)
  - Additional data associated with the event (if the event was a keyboard keypress, which key was it?)

Saving and Restoring State

- The onCreate method can have a "bundle," specified by a unique string from the resources

- Bundles are map objects, which can store various types of data

- By using onCreate and onResume to check/modify the bundle, state can be saved for the next invocation when your activity is paused or killed

Debugging
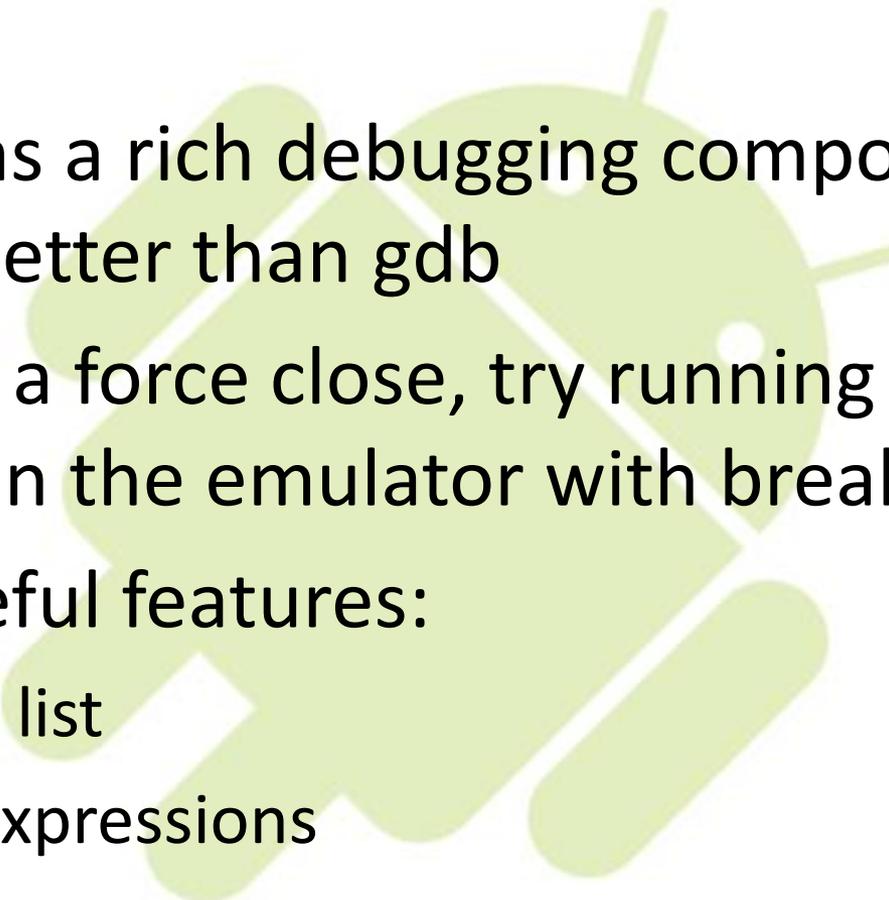
- Eclipse has a rich debugging component as good or better than gdb
- If you get a force close, try running your program in the emulator with breakpoints set
- Other useful features:
  - Variable list
  - Watch expressions