An Introduction to Android

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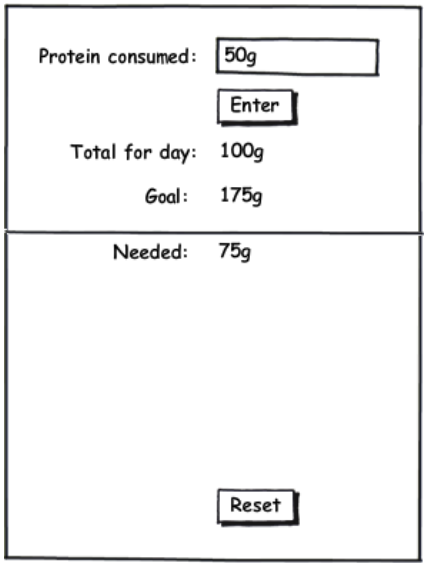
Course Overview

- **What we will cover**
  - What is Android?
  - Setting up development environment
  - Project structure
  - Activity
  - UI and layouts
  - Preferences
  - Menus
  - Dialogs
  - Deployment

Course Overview

- **After this course you will be able to**
  - Create a simple Android application
  - Publish that application to the Android Market
- **We will create a real application during this course**



Introduction

- Android Background
- Android Architecture
- Android Applications
- Application Lifecycle
- APIs
- Security and Permissions
- The Android Market
- Summary

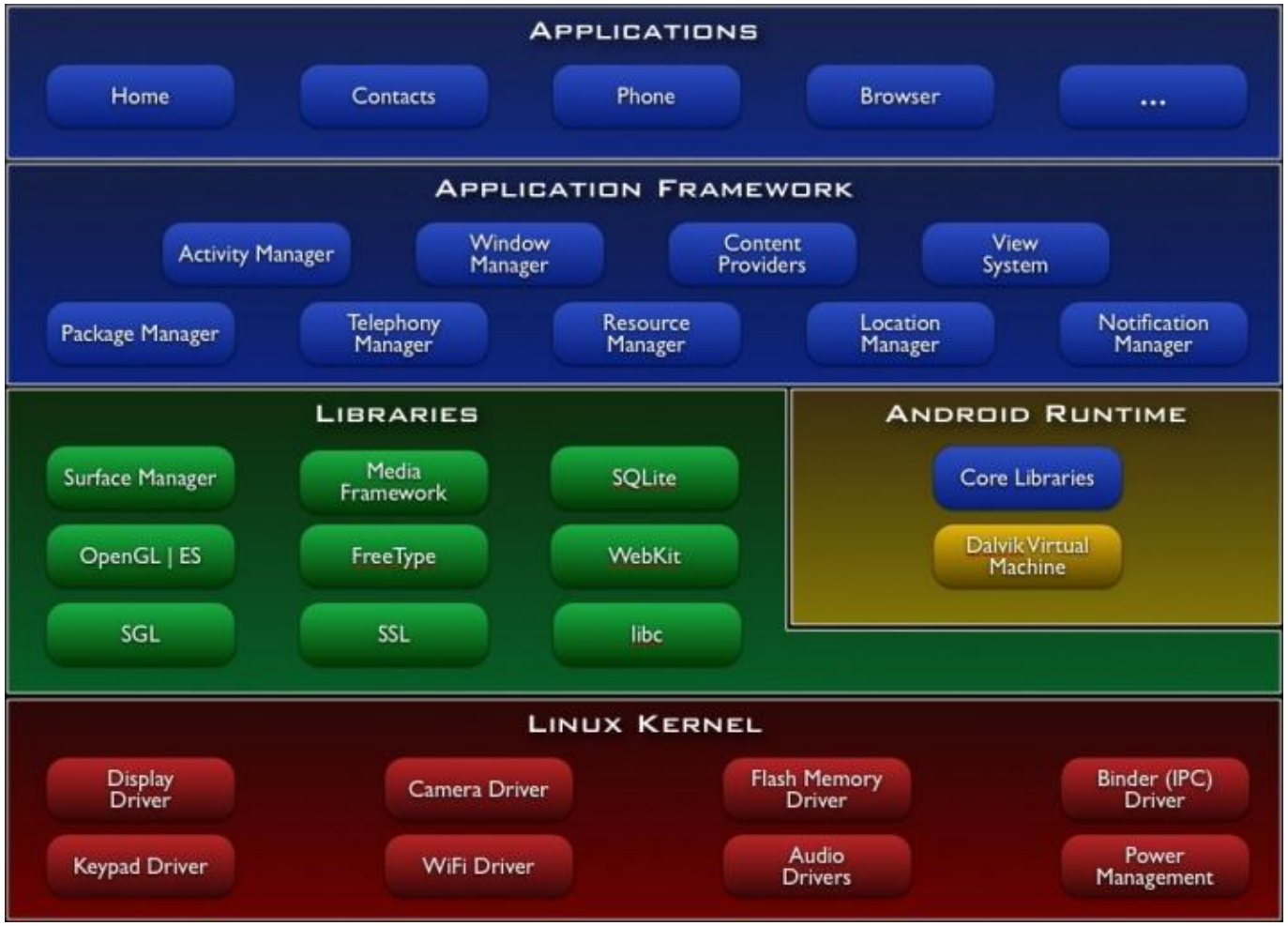
Android Background

- **Mobile operating system developed by Android Inc**
  - Google bought it in 2005
- **Based in the Linux kernel**
- **Open source**
- **Big! (About 12 million lines of code)**
- **Application layer is Java**
- **Has a built in Google Market for application distribution**
- **Built on the idea of being "Open"**
  - All applications are equal
  - Everything is swappable

Android Background

- Supports a multitude of different devices
- Android 3.0 (Honeycomb) will be for tablet devices

Android Architecture



Android Architecture

- **Linux kernel**
  - Basic hardware abstraction layer

Android Architecture

- **Libraries**
  - Standard C library
  - Media libraries
  - Surface managers
  - LibWebCore
  - SGL
  - 3D Libraries
  - FreeType
  - SQLLite

Android Architecture

- **Android Runtime**
  - Core libraries that make up most of the standard Java libraries
  - Doesn't use a JVM, uses a Dalvik VM
    - Runs .dex files
    - Each app runs in its own VM

Android Architecture

- **Application Framework**
  - Full set of services built in Java
  - Views and windows
  - Resources, content providers
  - Phone services and APIs
  - Notifications
  - Application life-cycle management
  - All applications directly interact with this layer

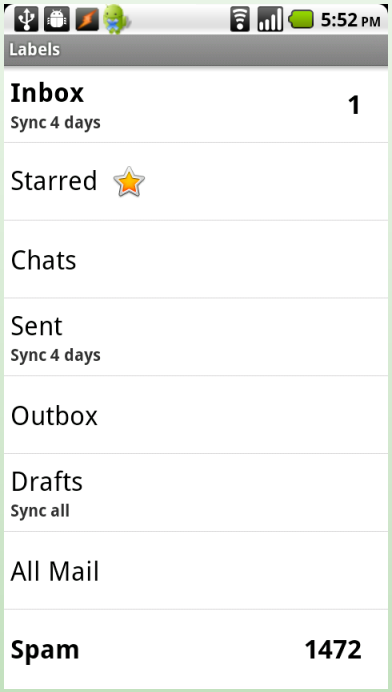
Android Architecture

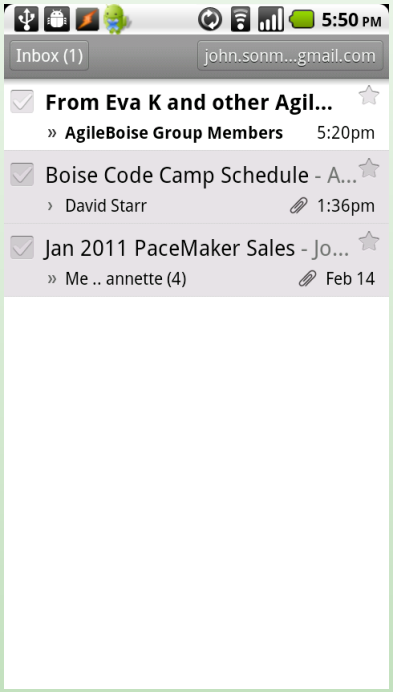
- **Applications**
  - Base system applications are built off the same APIs all developers have access to
  - Homescreen, Contacts, Phone, Browser can all be replaced by user versions
  - All written in Java

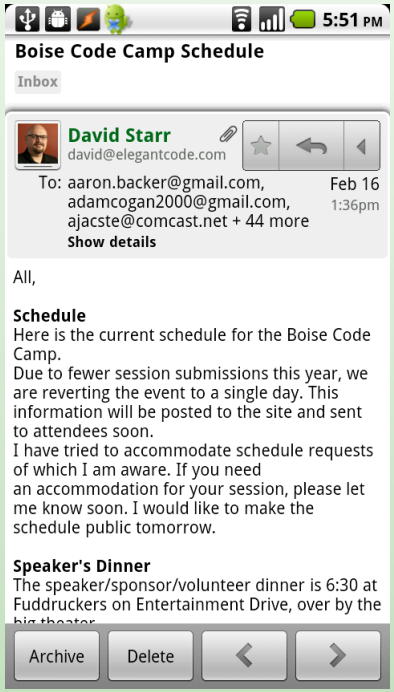
Android Applications

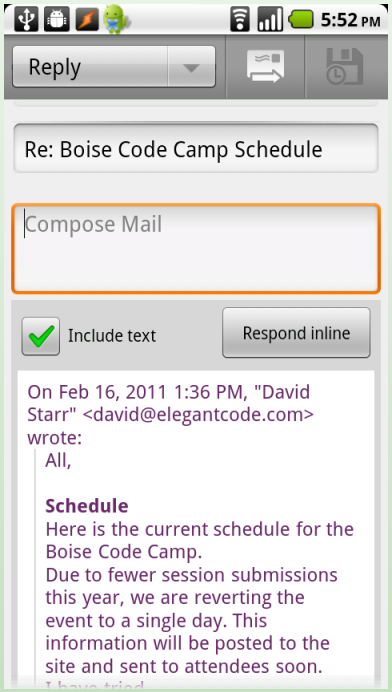
- **What are they?**
  - Loosely coupled set of services
  - Consist of one or more
    - Activities
    - Services
    - Broadcast receivers
    - Content providers
  - Can use code from other applications without directly linking to them
  - Most applications are composed of a series of screens or Activites

Gmail Example





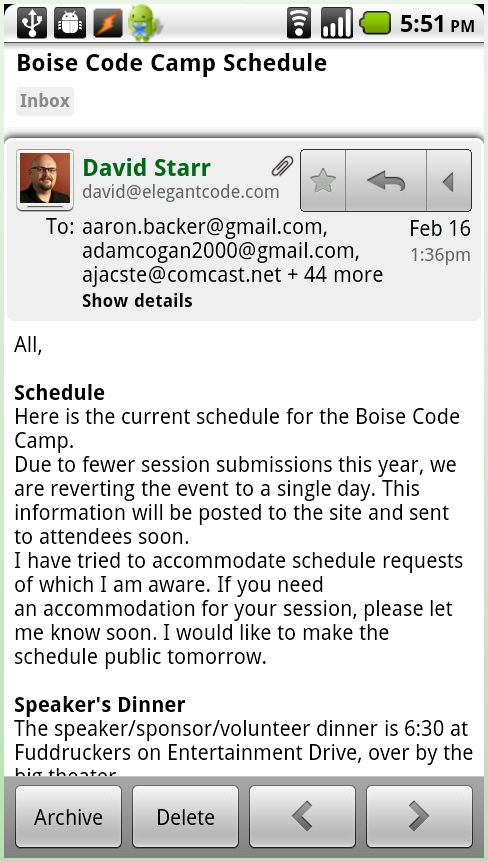


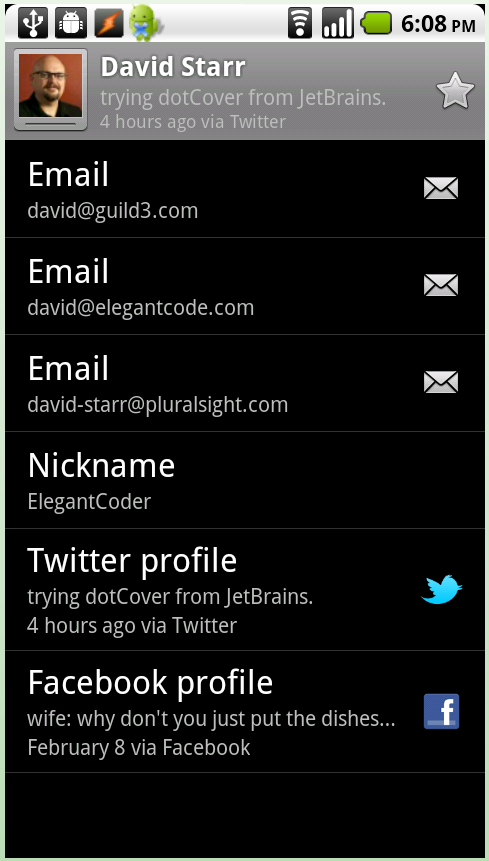


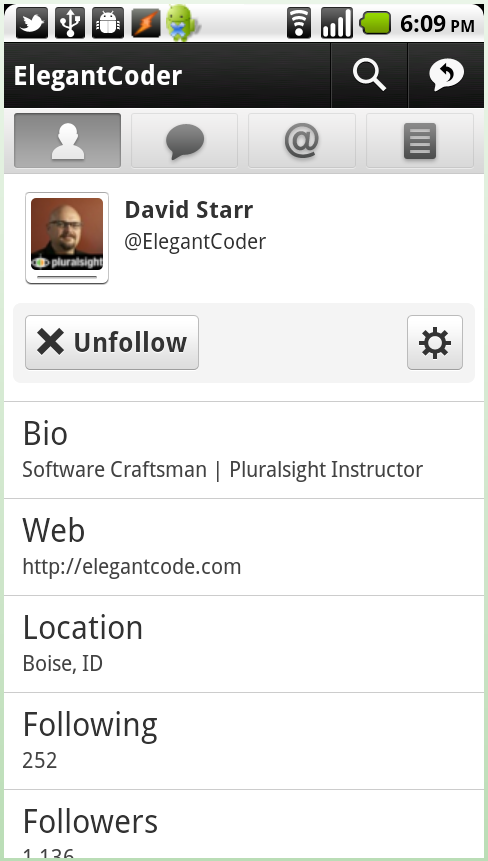
Application Lifecycle

- **Controlled by Tasks**
  - A task is a set of Activities arranged in a stack
  - Example: going to the Gmail application and selecting a contact
- **Launching an application makes it the root of a task**
  - New activities get pushed on the task stack
  - Only the default behavior
- **All applications are run in their own process**
- **Android manages memory by prioritizing processes and killing least important ones**
- **Activities on a task stack can belong to processes that are killed (uh oh)**
  - Need to be able to restore state

Task Stack Example







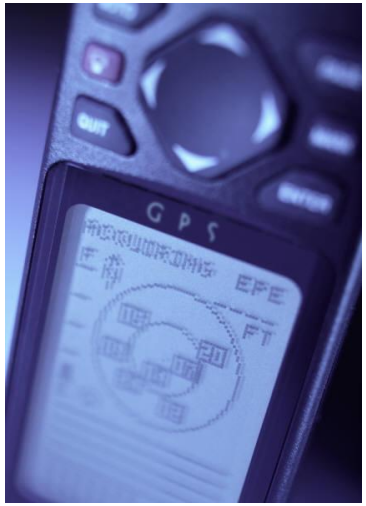
APIs

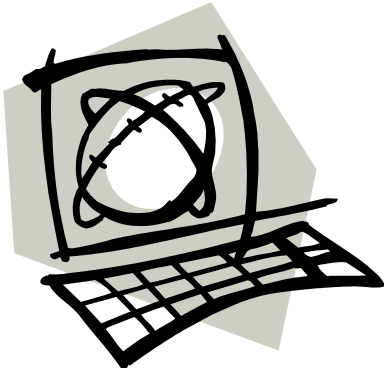
- Basic Android API levels correspond with the version of the Android OS.
- Typically forward compatible

Platform Version	API Level
Android 2.3.3	10
Android 2.3	9
Android 2.2	8
Android 2.1	7
Android 2.0.1	6
Android 2.0	5
Android 1.6	4
Android 1.5	3
Android 1.1	2
Android 1.0	1

APIs

- **Other kinds of APIs**
  - Location services
  - Telephony services
  - Audio and video
  - Web browser
  - Google maps





Security and Permissions

- **Each application runs with its own Linux user ID**
- **All applications are sandboxed by default**
- **Permissions**
  - Applications use to declare what they need access to
  - Declared in the Android manifest file
  - Users are prompted at install time to allow app permissions
- **Applications are signed locally (APK files)**

The Android Market

- **Easy way to publish and find applications**
- **Directly accessible from phone and now from web**
- **Open**
  - Not policed
  - No approval process
- **You don't have to distribute through Google's Android Market**
- **Licensing service**
- **Costs**
  - One time $25 fee to become an Android developer
  - 30% fee for applications sold

Summary

- What Android is and what it is about
- Basic architecture of the platform
- Applications and their lifecycles
- APIs
- Security and permissions
- The Android Market

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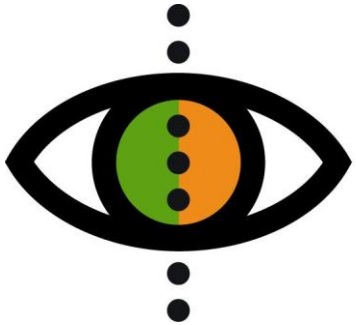

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