# Developing for Android

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# Who am I?

- Jack Deslippe  (jdeslip@gmail.com)

- Ph.D. Candidate at UC Berkeley (Computational Physics)

- Acting Sys-admin for Scientific research group

- Ubuntu California Team Member and app Developer

- Android App Developer:
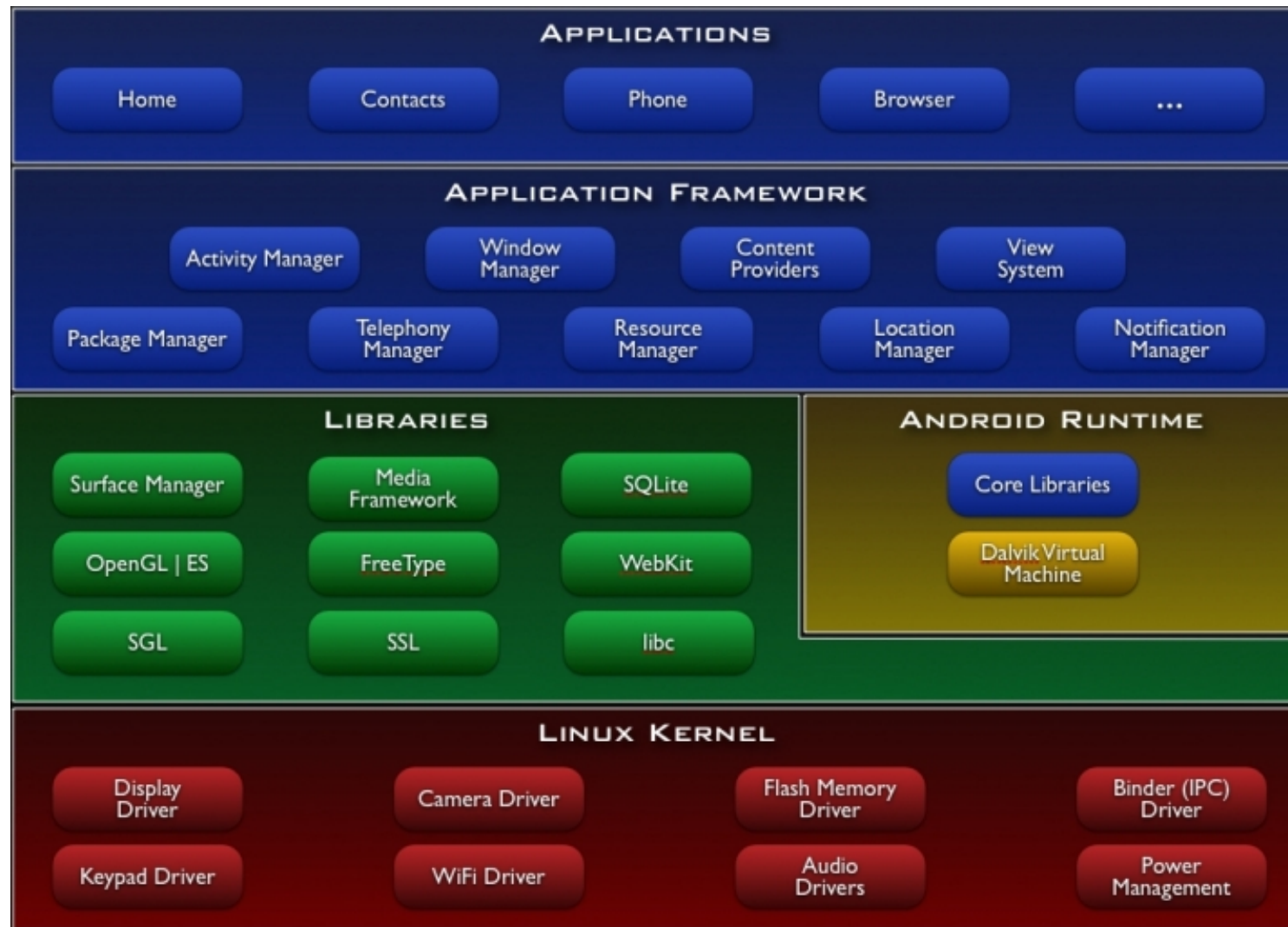    Drodian eMusic
    arXiv droid
    SquirrelCam

# Roadmap

**·Introduction to Android**

·Why develop for Android

·Creating your first App

·Myths, pitfalls and good practices.

·Publishing your apps.

# Introduction to Android



http://developer.android.com/guide/basics/what-is-android.html

# Introduction to Android

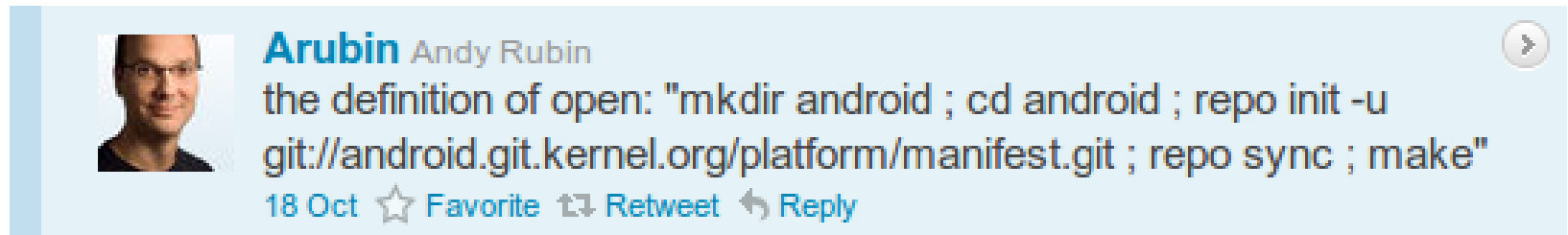SDK – A robust set of tools that lets you create and compile code for the Dalvik VM from JAVA source.

NDK – Tools to let you create performance critical elements of your code that run natively.

Scripting Languages for Android (SL4A) -
http://code.google.com/p/android-scripting/ - write python code for Android

# Android **IS** Open-Source

**Most of Android code is Open Source:**



Arubin Andy Rubin
the definition of open: "mkdir android ; cd android ; repo init -u
git://android.git.kernel.org/platform/manifest.git ; repo sync ; make"
18 Oct ☆ Favorite ↨ Retweet ↩ Reply

The Kernel, Dalvik, UI and many core apps are open source.

**What is not open?** – Specific Google apps that sit on top of the Stack – GMail,  Maps, Market – all are replaceable.  Some device drivers.

Development branches are not public – but contributions from AOSP can make their way in.

Android handsets vary from the unlockable-by-design Nexus series to devices harder to unlock/brick.  **This choice is good.**

# Android **IS** Open-Source

**The proof is in the pudding:**

amazon appstore
DEVELOPER PORTAL BETA

**Third party app stores.**

**Android phones released with Bing replacing Google – techfresh.net**

**Devices shipping without any Google services, help or approval – barnesandnoble.com**

# Is Android Linux?

-The Android Kernel is derived from the Linux Kernel.  (2.3 uses version 2.6.35)

-The Android team tweaked the Kernel, and changes have not all made it into the mainline kernel tree (mainline didn't like/want it).  Not that dissimilar from RedHat etc...

-Does it even Matter?

"the Nexus One is a winner" - Linus Torvalds

"I am very happy about Android obviously. I use Android, and it's actually made cellphones very usable." - Linus Torvalds (2011)

**THE LINUX FOUNDATION**

**The Linux Foundation Announces Android Builder Summit**

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# Why Develop for Android?

• Because you are sitting in this room...

• To fulfill your own needs

• Unlike iOS, the entry barrier is very low

• To make money!

  • Angry birds - $1 million off Android per month
  • Car Locator - $600 a day
  • Advanced Task Manger - $100,000+
  • Many many more....

# Developing for Android is Fun

•Mobile devices are quickly becoming the primary computing devices for a lot of people.

•If you have one, you know they can be fun and useful devices.

•You have access to a lot of great APIs that do not exist on desktop computers: GPS, Compass, Audio/Media, Accelerometer/Gyroscope, Cameras etc...

•Easily share info/object between apps



**Android Market: Where**

# Developing for Android is Easy

- The Tools/APIs make it really easy to design nice looking apps.

- Utilizing built-in libraries etc... makes apps significantly simpler.

- Can have a fully functional app in a weekend.
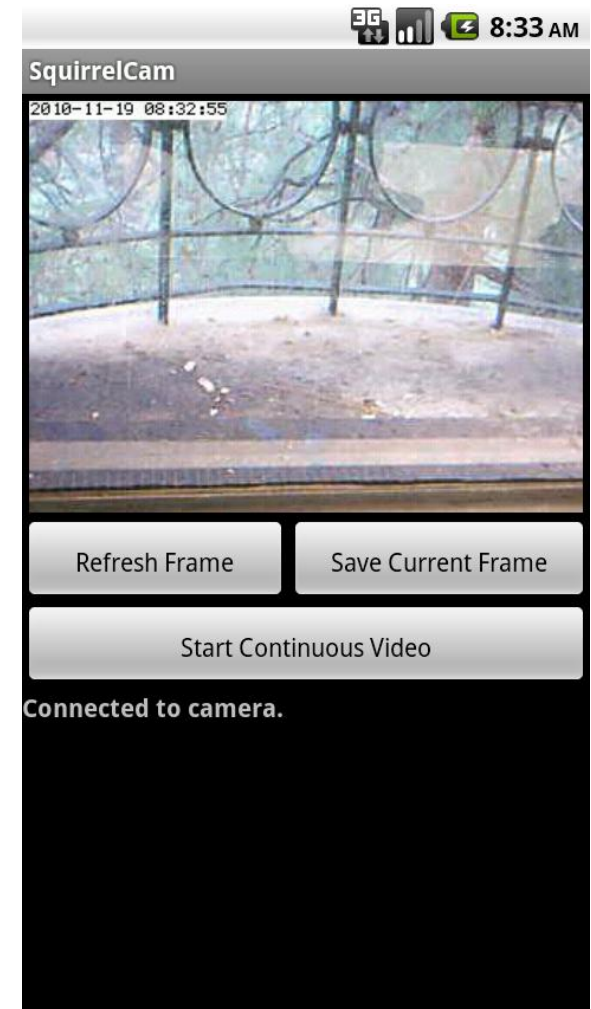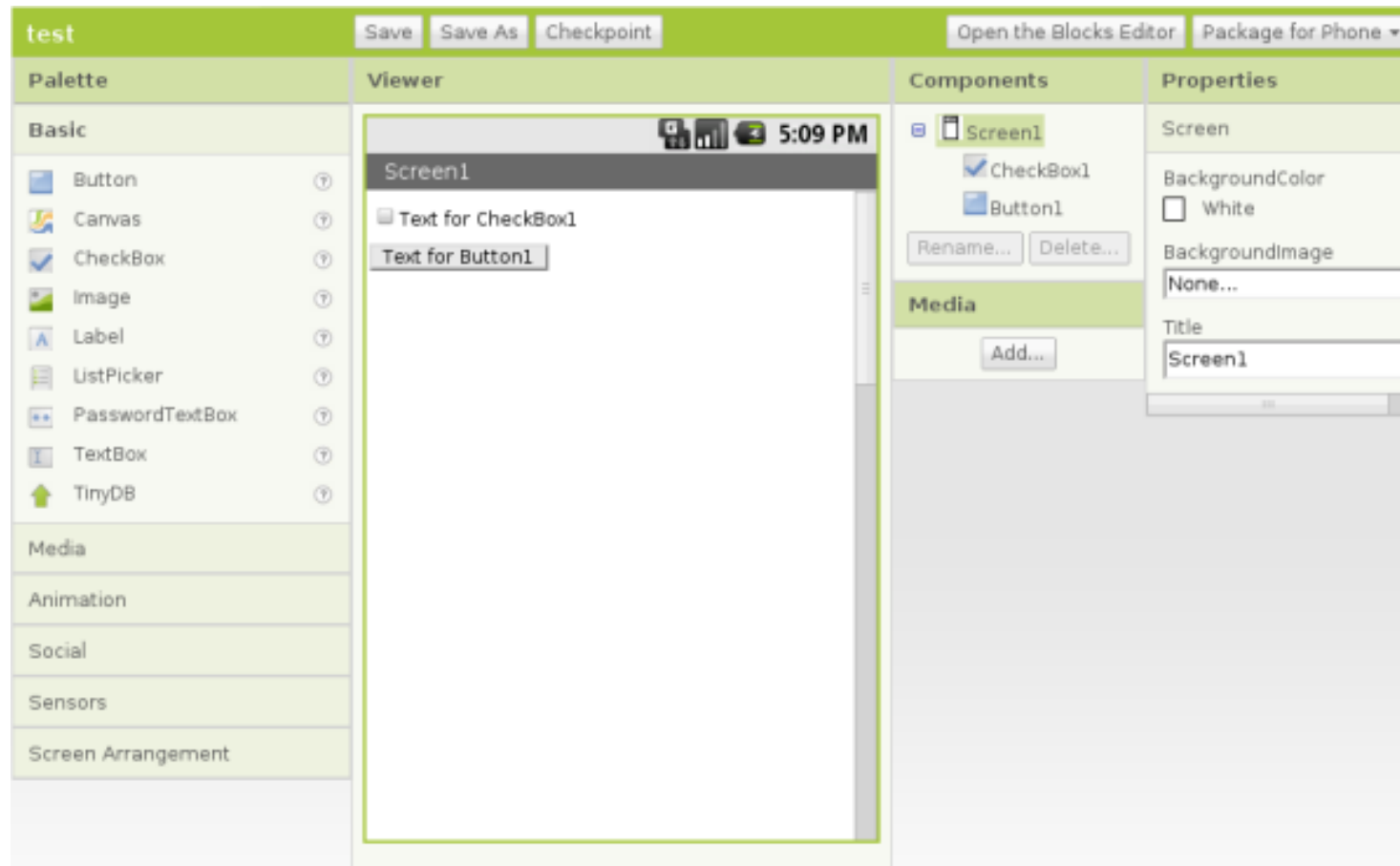
**Android Market: SquirrelCam**

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·Introduction to Android

·Why develop for Android

·**Creating your first App**

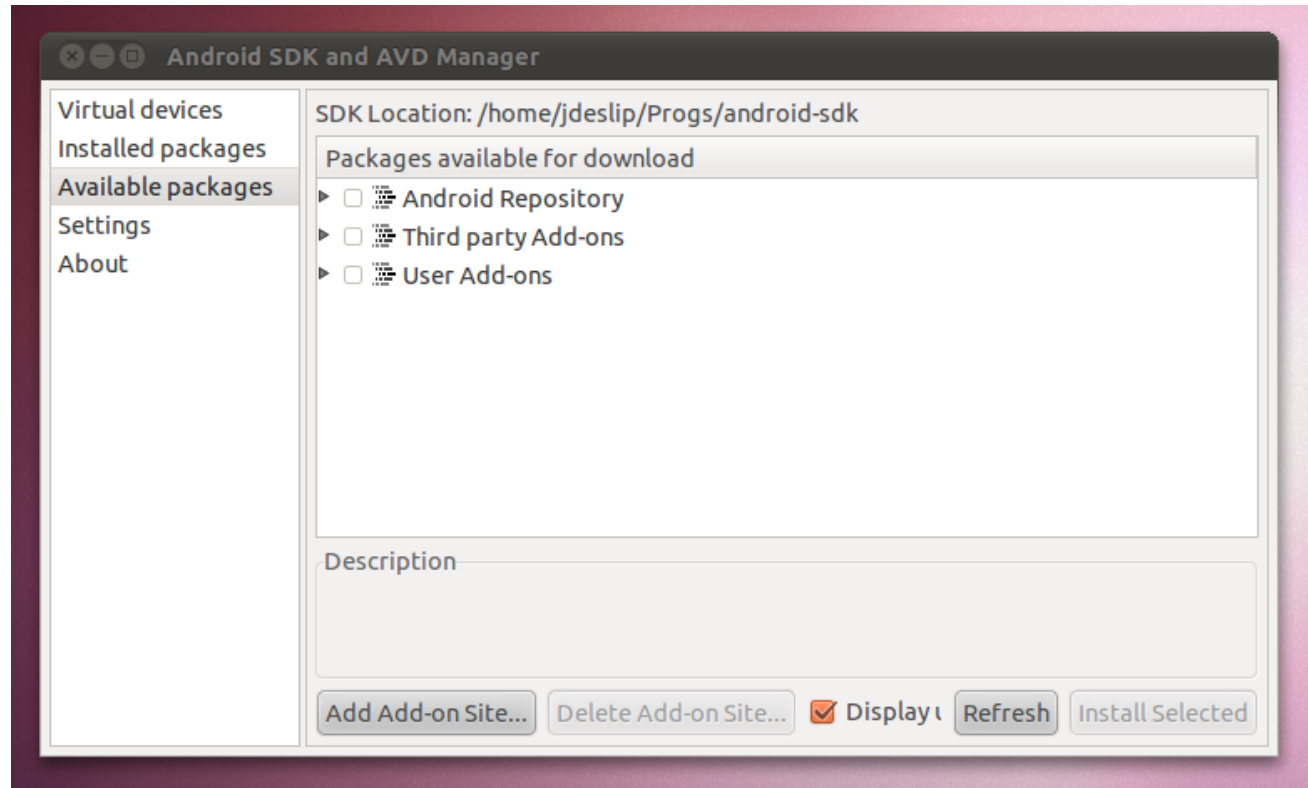·Myths, pitfalls and good practices.

·Publishing your apps.

# App Inventor



- Browser based app creator.  Simple, fast, easy… but a bit limiting. (appinventor.googlelabs.com)

# Getting Started

- Check-Out – developer.android.com

- Download the SDK (it's free!)

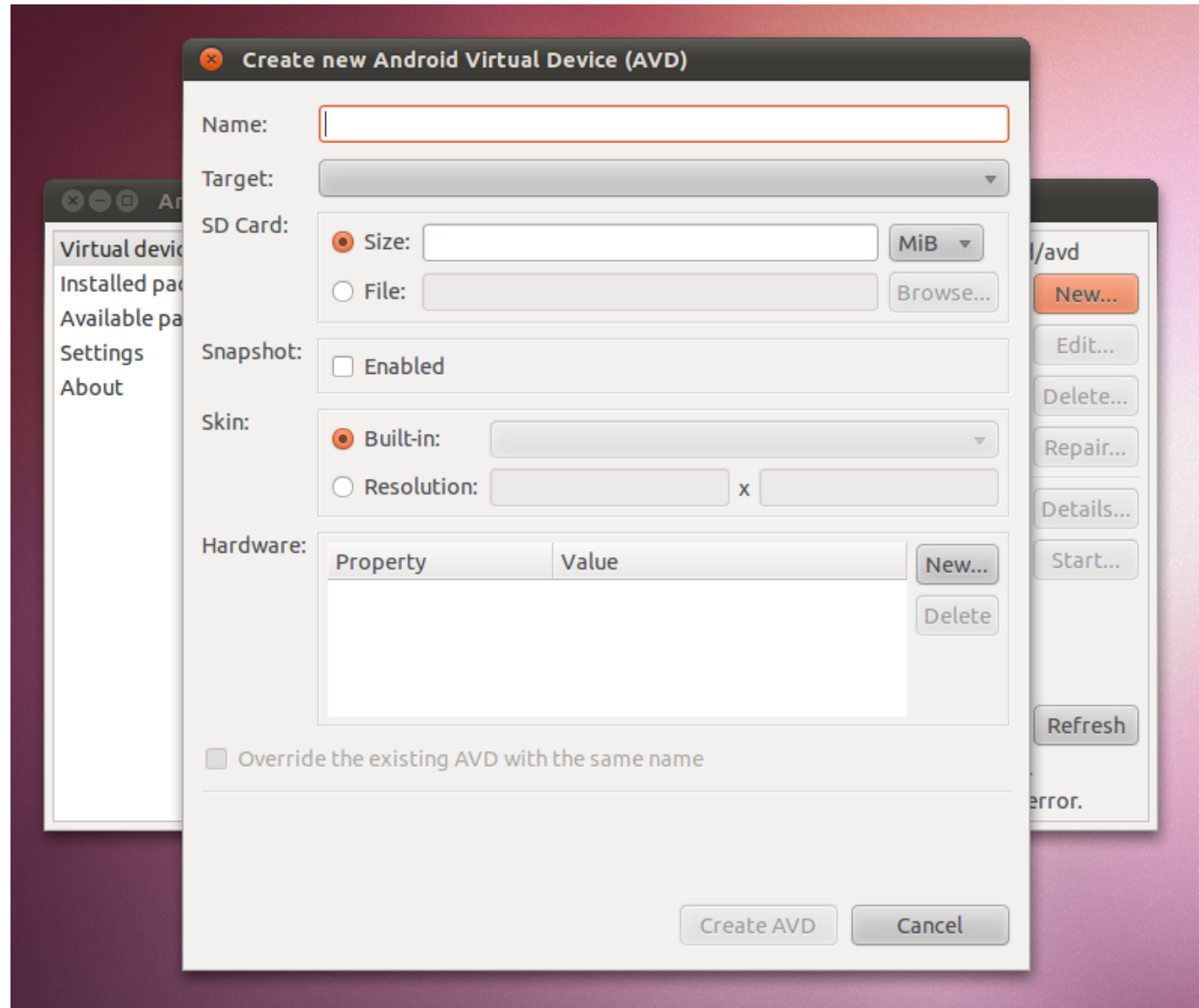- Unpack the .tgz and enter the tools directory

- Run ./android

# Detour 1

# The Emulator

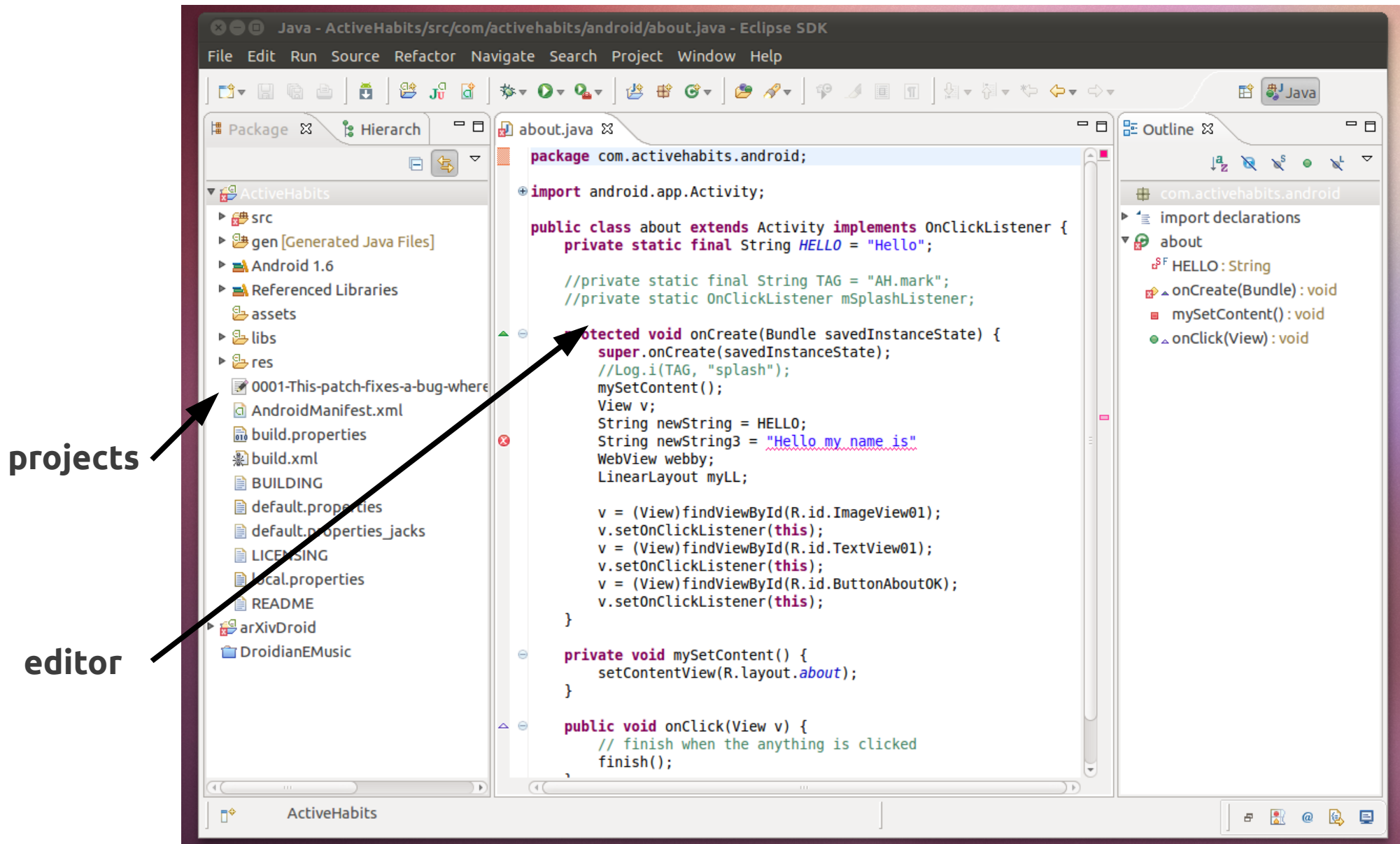Install an available package then create a device.

Then run it!

# Eclipse

- sudo apt-get install eclipse

- Install the Android plugin:
http://developer.android.com/sdk/eclipse-adt.html

- Why use eclipse?
  - Great refactoring/debugging tools.
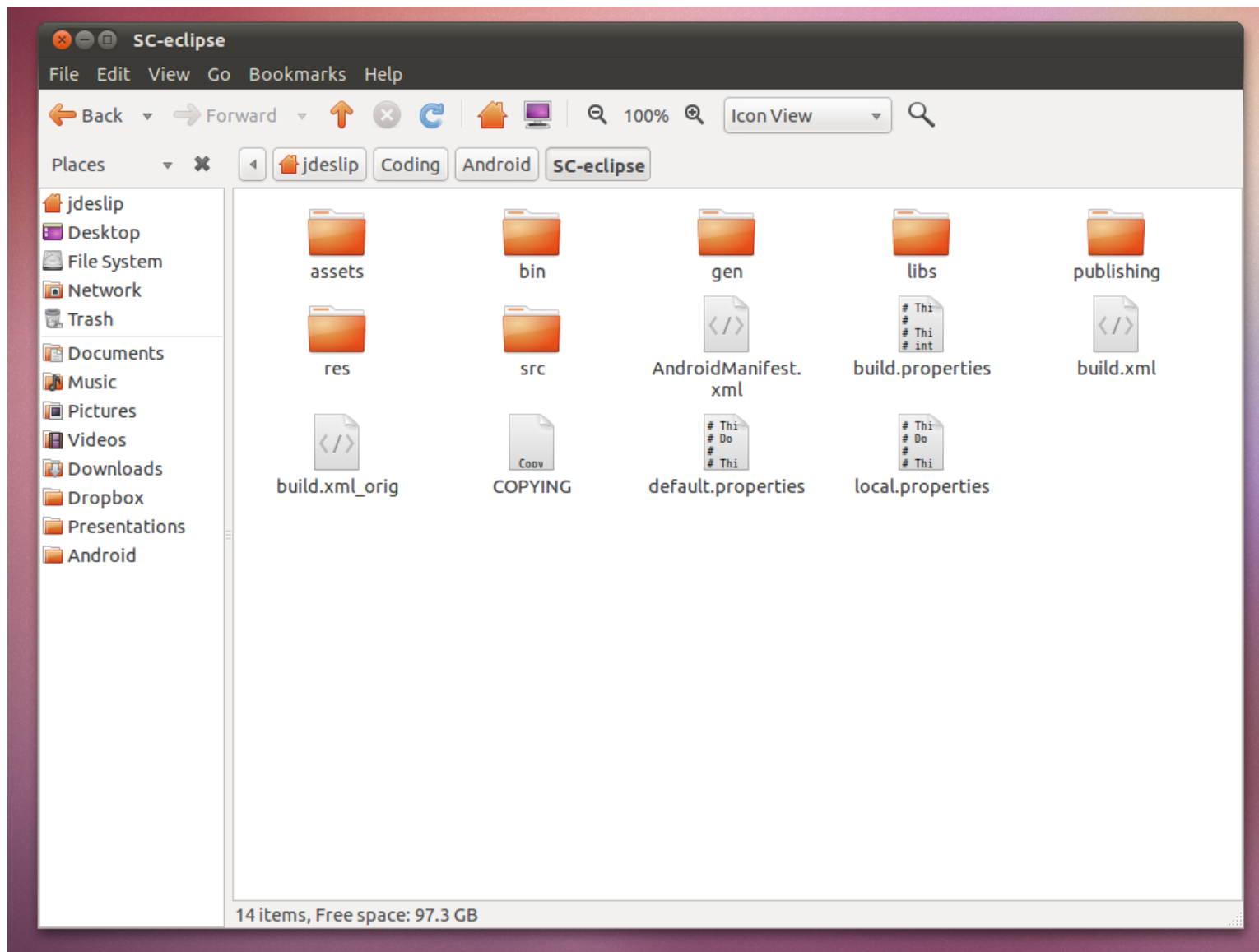  - Automatic import statements and Android documentation.

# Eclipse

# Detour 2

# Project layout?

# AndroidManifest

```xml
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.commonsware.android.arXiv"
    android:icon="@drawable/icon"
    android:installLocation="auto"
    android:versionCode="80"
    android:versionName="2.0.0-RC4"
    >

    <uses-sdk android:minSdkVersion="4" android:targetSdkVersion="11" />

    <uses-permission android:name="android.permission.INTERNET" />
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />

    <uses-feature android:name="android.hardware.touchscreen"
            android:required="false"/>
    <uses-feature android:name="android.hardware.wifi"
            android:required="false"/>
    <uses-feature android:name="android.hardware.sensor.accelerometer"
            android:required="false"/>

    <supports-screens android:smallScreens="true"
            android:normalScreens="true"
            android:largeScreens="true"
            android:anyDensity="true"
    />
```
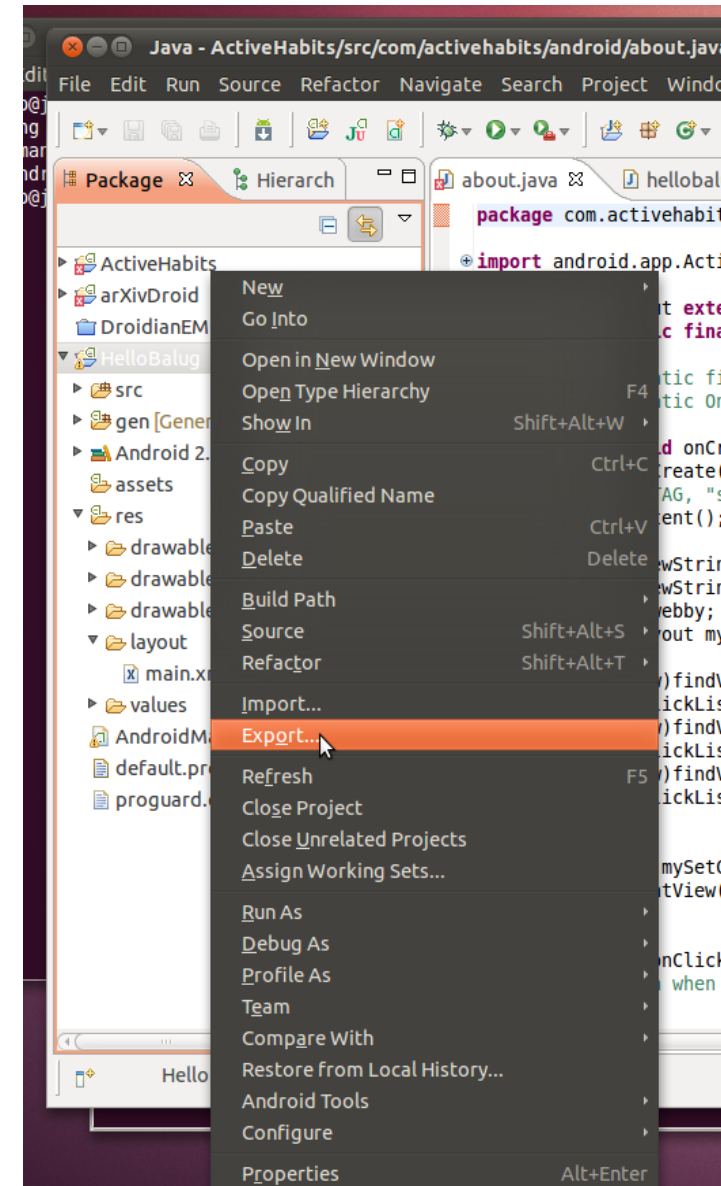
# Detour 3

# Creating an .apk

- An .apk is kinda like .deb or .rpm

- Export in eclipse or run the command ant release in your project directory
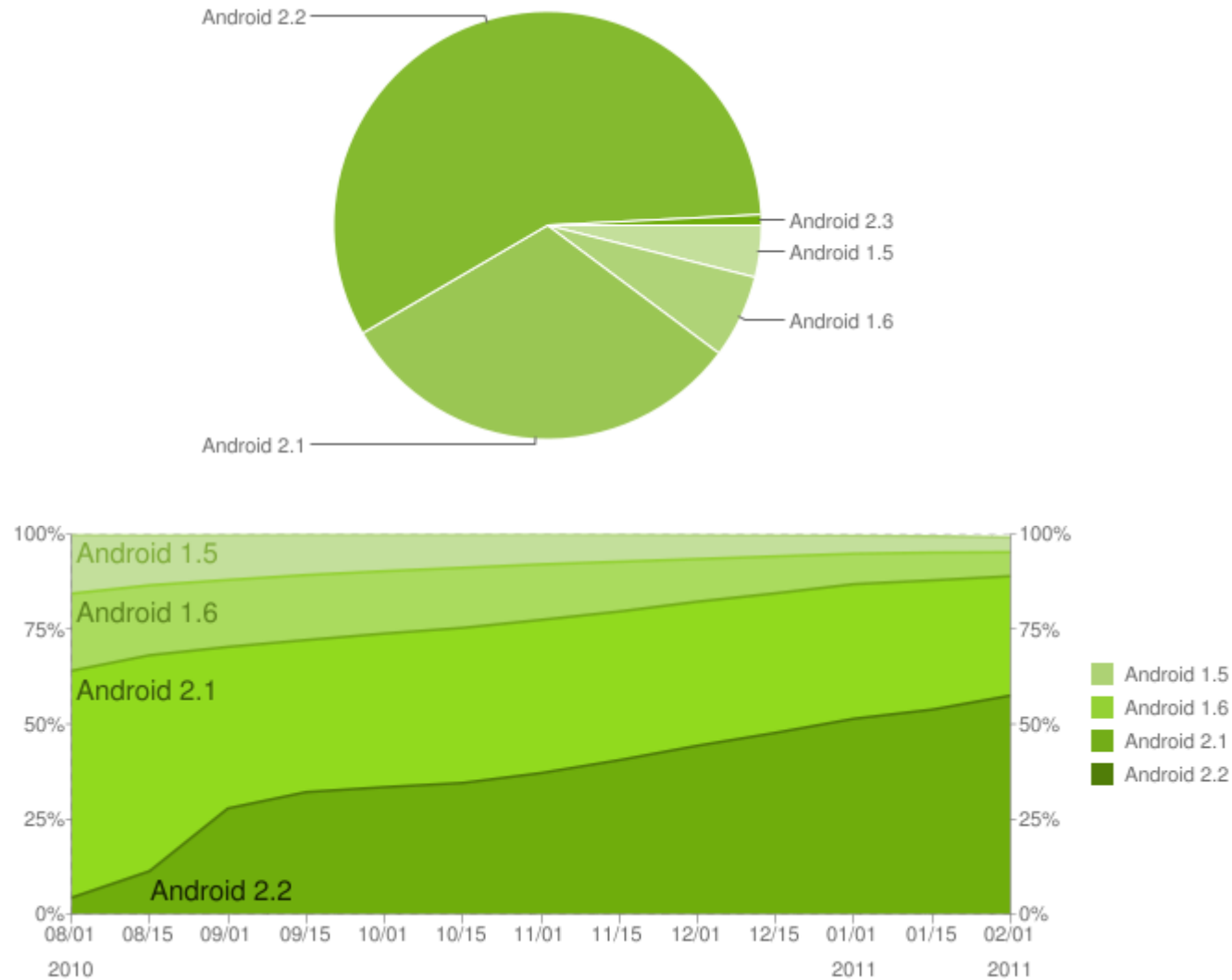
- For public use - need to sign with key.

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· Creating your first App

· **Myths, pitfalls and good practices.**

· Publishing your apps.

# Myths: Fragementation Makes it Impossible to Develop Apps

# Fragmentation?

Unless you are game developer using openGL libraries etc...
Testing the app on the SDK and a couple devices is sufficient.

**In my 3 apps, I was affected by fragmentation twice.**

1. HTC-Incredible didn't ship with an SDCARD.  My app assumed that "/mnt/sdcard" existed.  Solution use API to get storage directory.

2. HTC-Incredible firmware shipped with a WebView bug.  They fixed it in at update and provided a work-around.

# Fragmentation?

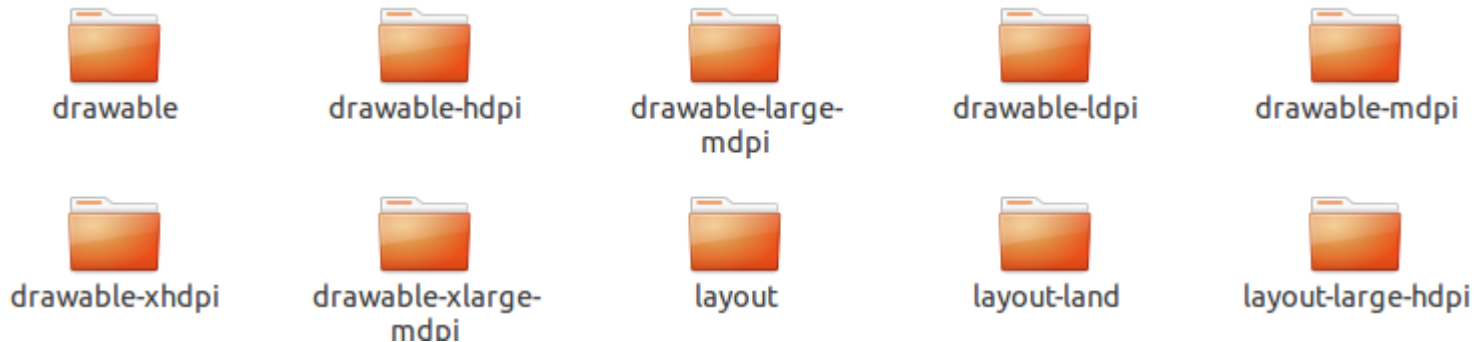Design for multiple/flexible screen-sizes from the start.

-Never use absolute sizes in pixels.
android:layout_width="fill_parent"
android:layout_height="wrap_content"
android:layout_height="240sp"

-Provide multiple asset sizes for bitmap images etc..

# Ooops...

-Steve Jobs said there are only 100 Android tablet apps.

-Realty – Many android apps were written with multiple screen-sizes/orientations from the beginning and look great on tablets.

# Important Issues

- Properly controlling the UI requires the use of threads (i.e. heavy tasks need to be run in a separate thread)

```
Thread t2 = new Thread() {

    @Override

    public void run() {
```

- Impact on battery life must always be considered.  But particularly when deciding what to kill when user leaves the app.

# Intents



- Take advantage of other awesome apps on the user's phone.
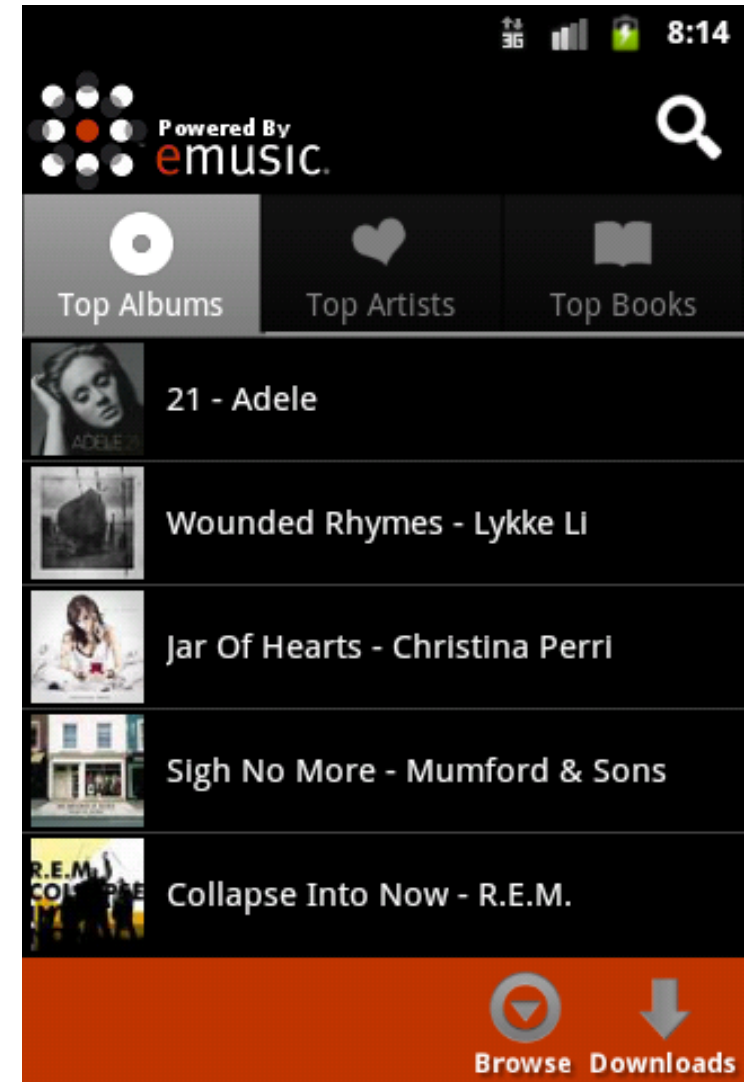
```
Intent i = new
Intent(android.content.Intent.ACTION_SEND);

i.setType("text/plain");

i.putExtra(Intent.EXTRA_SUBJECT, "arXiv
Article");

i.putExtra(Intent.EXTRA_TEXT, title + " " + link);

startActivity(Intent.createChooser(i,"Share"));
```
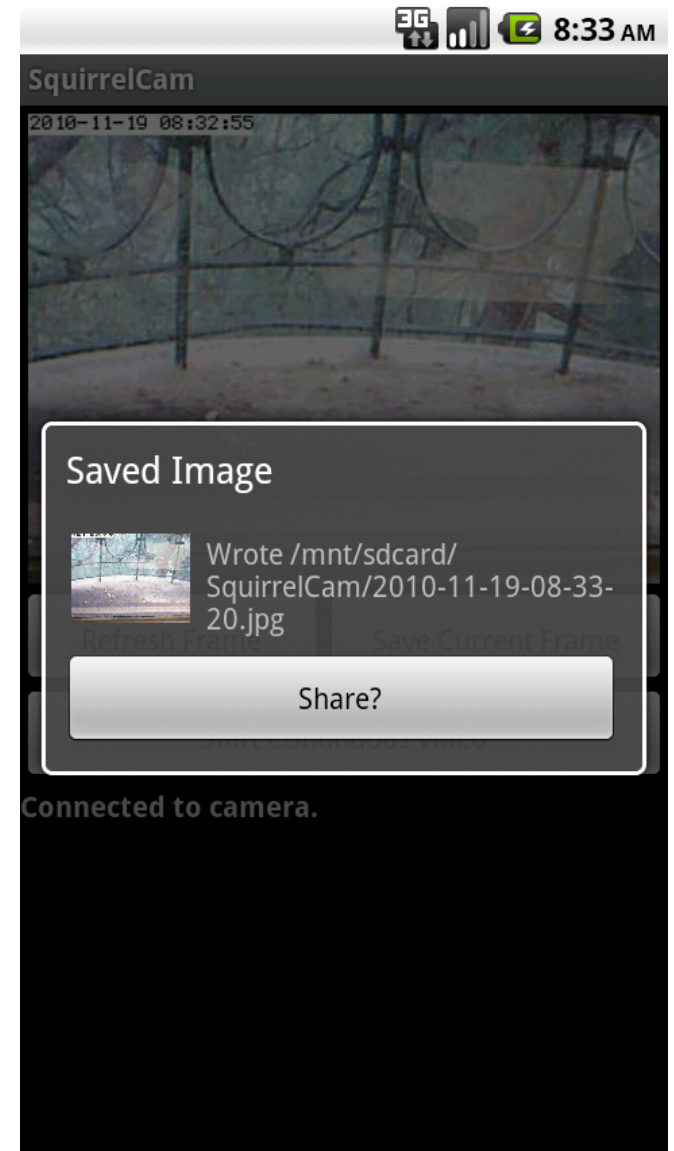
# Parsing XML

- Java libraries included in Android handle this

- SAXParser

  XMLReader xr = sp.getXMLReader();

  xr.parse(new InputSource(url.openStream()));

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·**Publishing your apps.**

# Publishing to the Market

- $25 fee for first app ($0 thereafter)

- Payments currently done through Google Checkout

- In app payments coming any day now.

# Publishing to the Market

- Developer consule gives you stack-traces for errors, reviews, download numbers etc...



- Can get a lot of detailed info about bugs automatically reported by users.
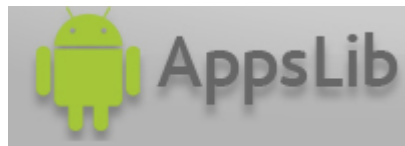
# Other Markets

**None are nearly as important as publishing to the Android Market.**

Amazon store seems like it could have momentum on devices that don't support the Google store.



*Nook devices



*archos tablets

*current favorite appstore
of 3rd party ROMS

# Other Sites

- http://developer.android.com/index.html
- http://stackoverflow.com/
- Android Developers Google Group