Introduction to Android Development
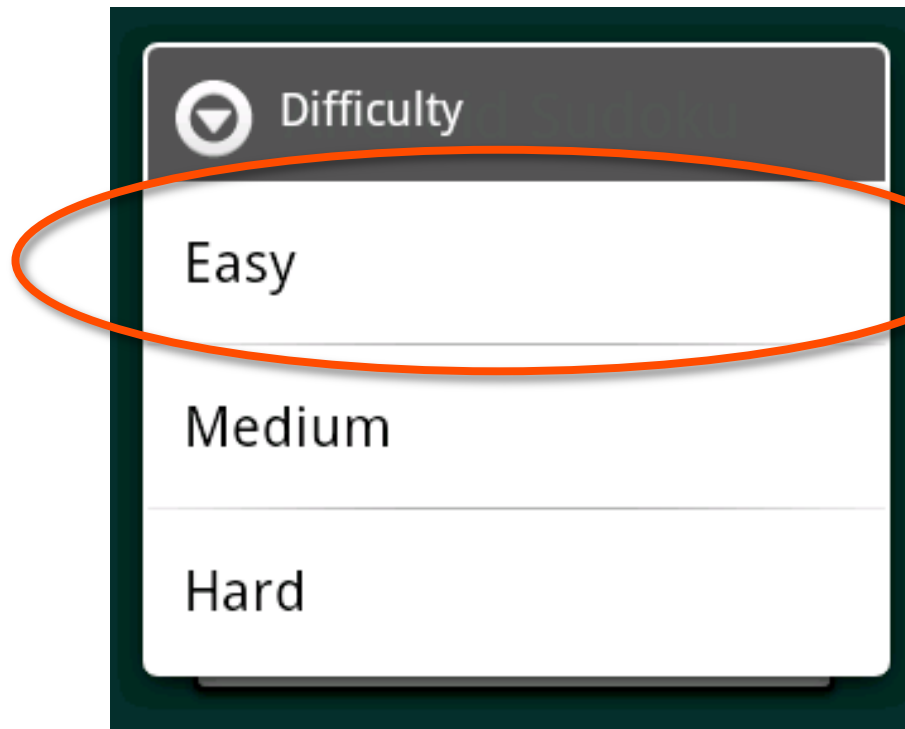
Ed Burnette
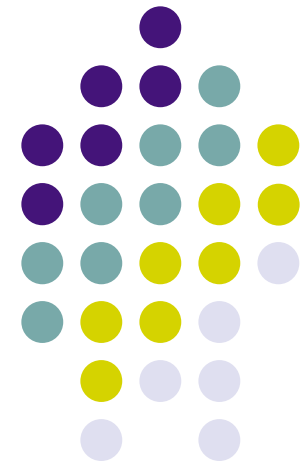
Developing for Android is...

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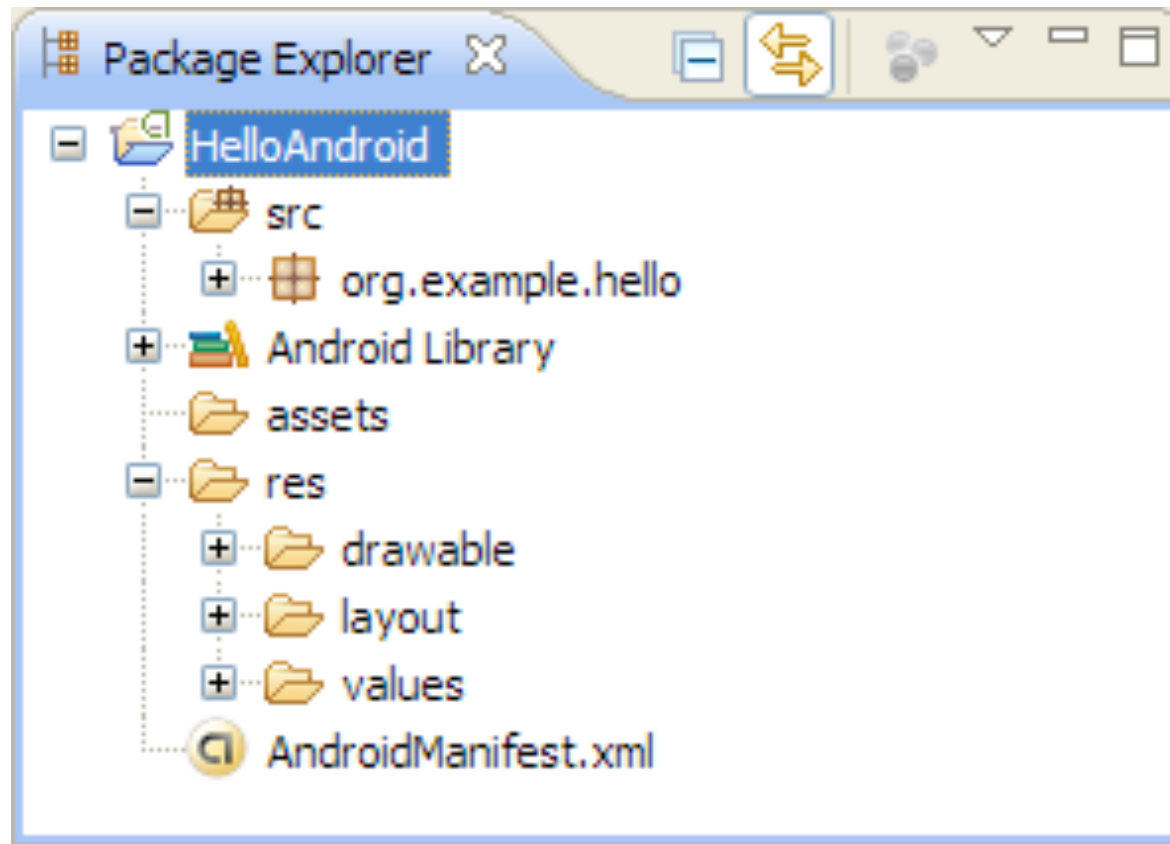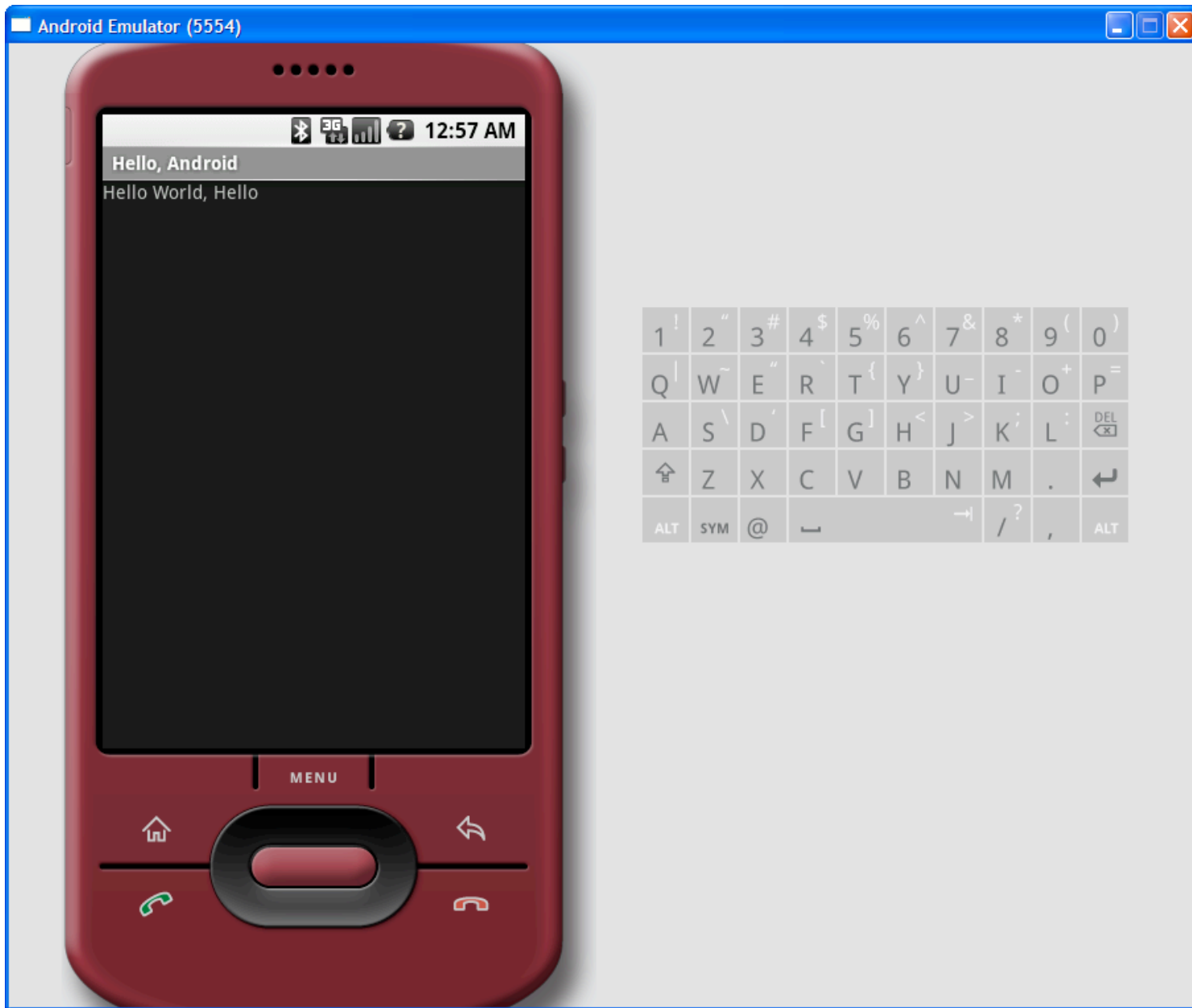
Android architecture

Standard

- Linux
- Java
- OpenGL
- SQLite
- Networking
- HTML (WebKit)

Non-standard

- Lifecycle
- Dalvik
- Views and graphics
- Preferences
- Power management
- Google Maps

Applications

Home	Contacts	Phone	Browser	Your App Here

Application Framework

Activity Manager	Window Manager	Content Providers	View System	Notification Manager
Package Manager	Telephony Manager	Resource	Location Manager	Sensor Manager

Libraries

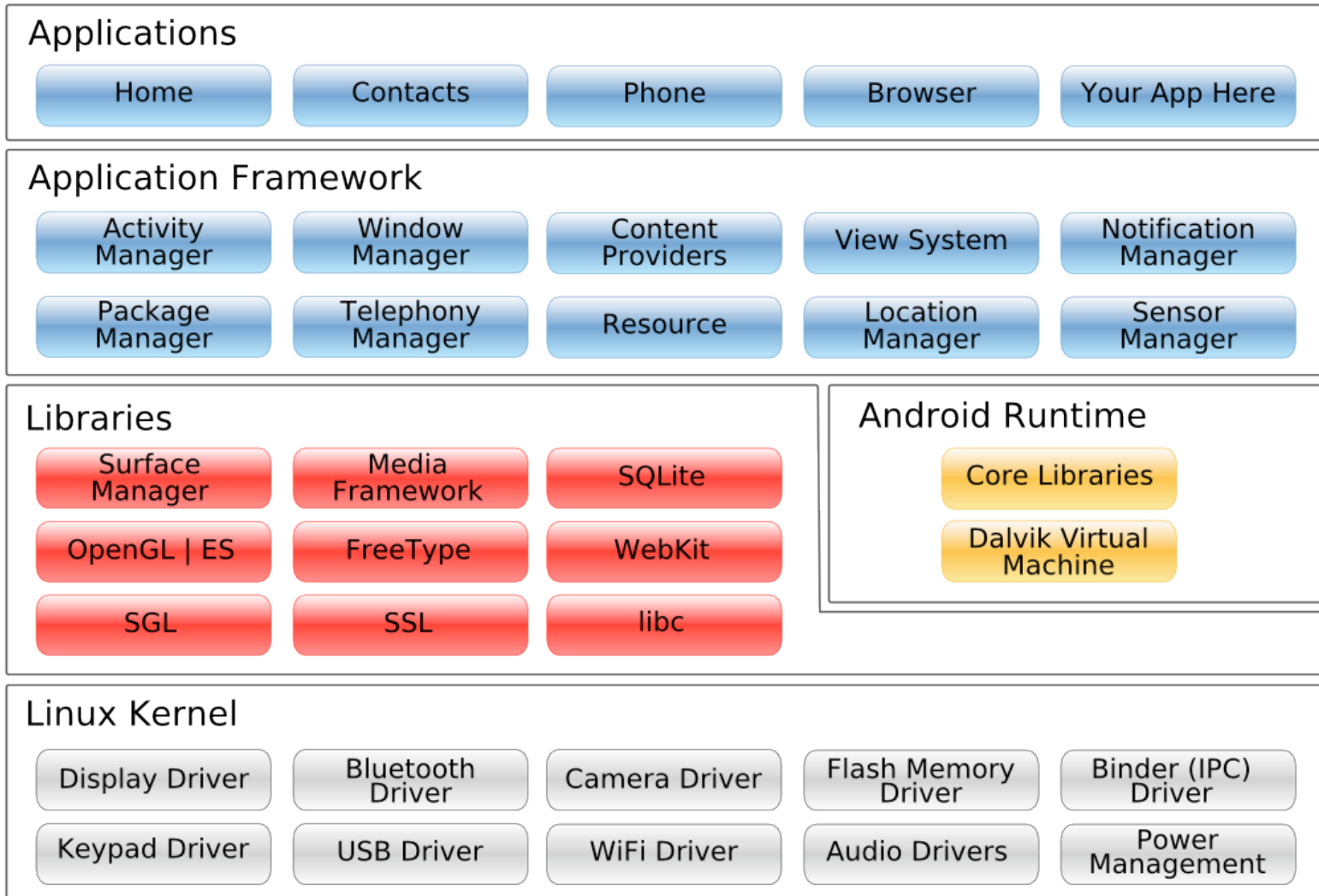| Surface Manager	Media Framework	SQLite
OpenGL	ES	FreeType	WebKit
SGL	SSL	libc

Android Runtime

Core Libraries

Dalvik Virtual Machine

Linux Kernel

Display Driver	Bluetooth Driver	Camera Driver	Flash Memory Driver	Binder (IPC) Driver
Keypad Driver	USB Driver	WiFi Driver	Audio Drivers	Power Management

Starting

(1) onCreate()
(2) onStart()
(3) *onRestoreInstanceState()**
(4) onResume()

Running

(1) *onSaveInstanceState()**
(2) onPause()

(3) onResume()
(2) onRestart()
(1) onStart()

onResume()

Stopped

(1) *onSaveInstanceState()**
(2) onStop()

Paused

onDestroy()
or
<Process killed>

<Process killed>

Destroyed

* (optional)

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3	6							
		4	2	3		8		
					4	2		
	7		4	6				3
8	2						1	4
5				1	3		2	
		1	9					
		7		4	8	3		
							4	5

7:26 PM

Now is the time for all good men to come to the aid of their country.

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LocalBrowser

WebView

Display JavaScript alert

Call Android from JavaScript

Hello from Android

TextView

Call JavaScript from Android

Hello from Browser

Alert from JavaScript
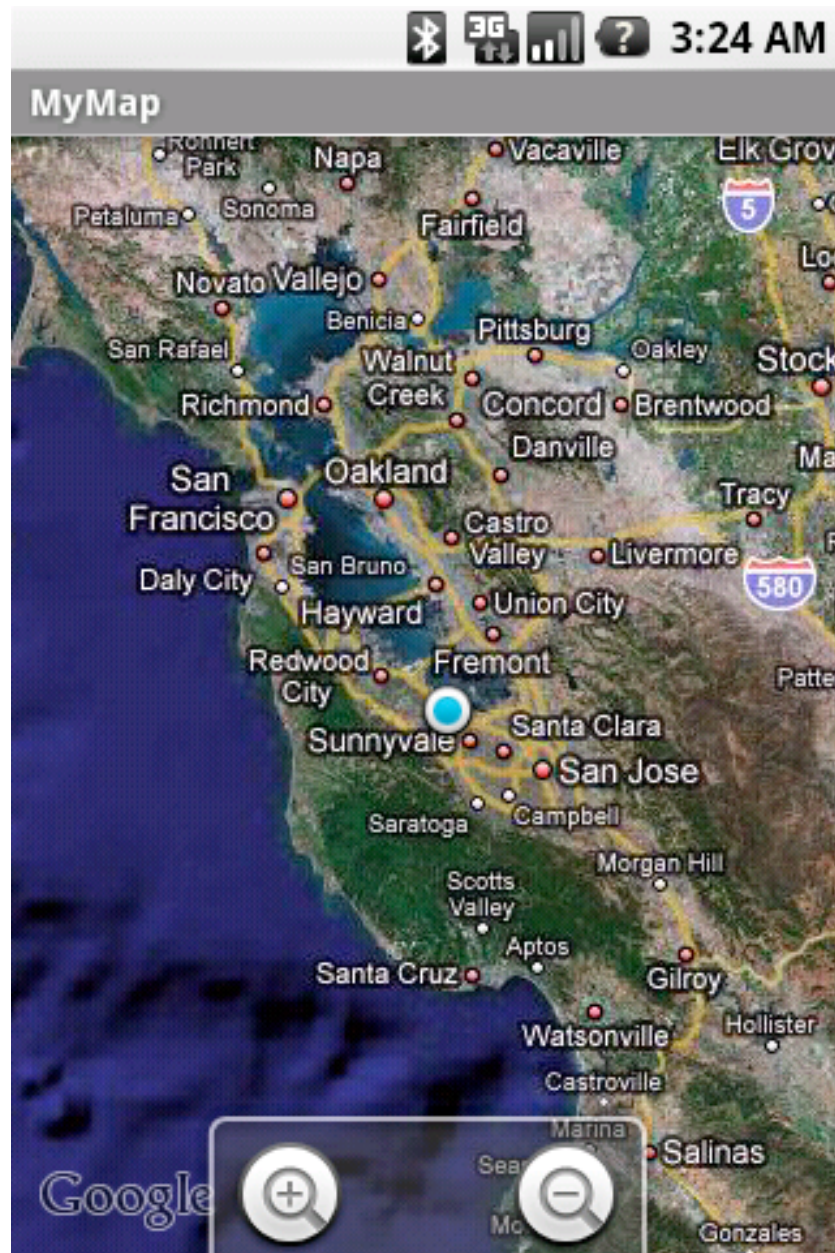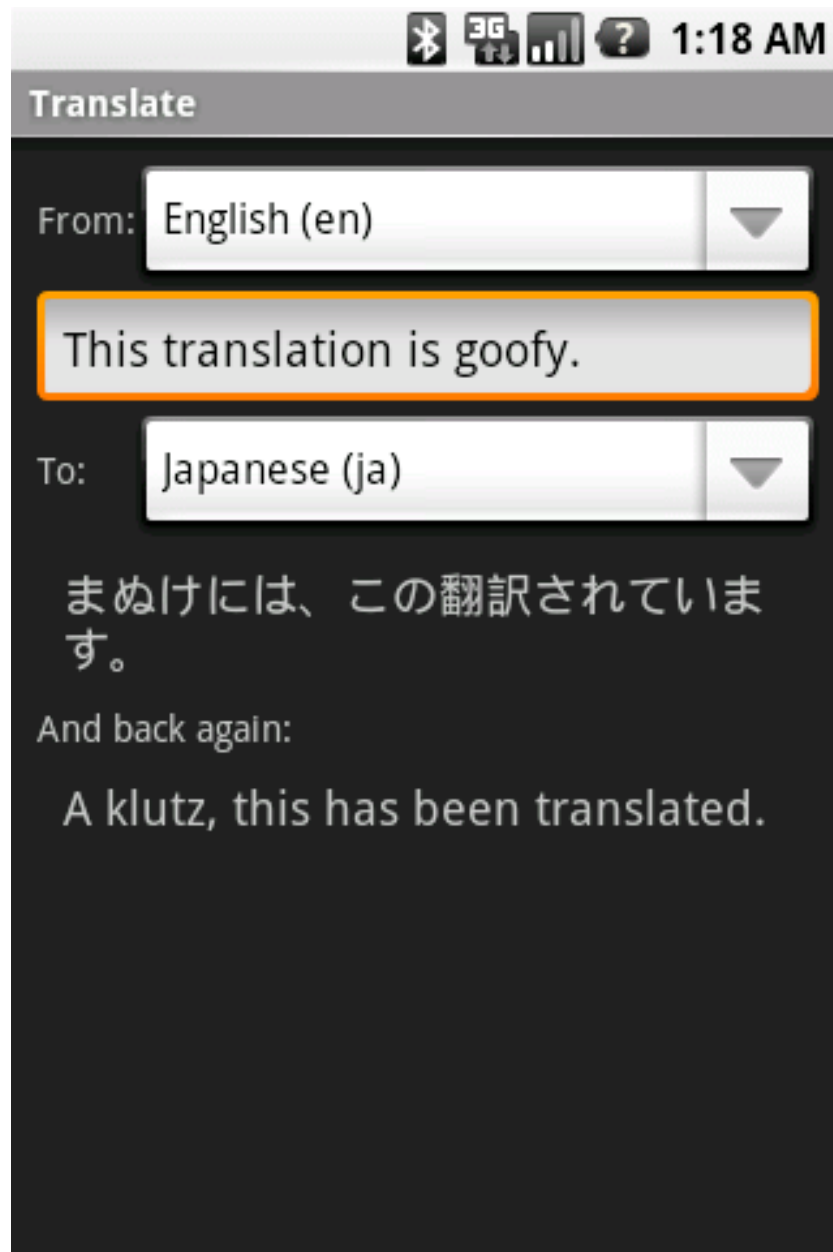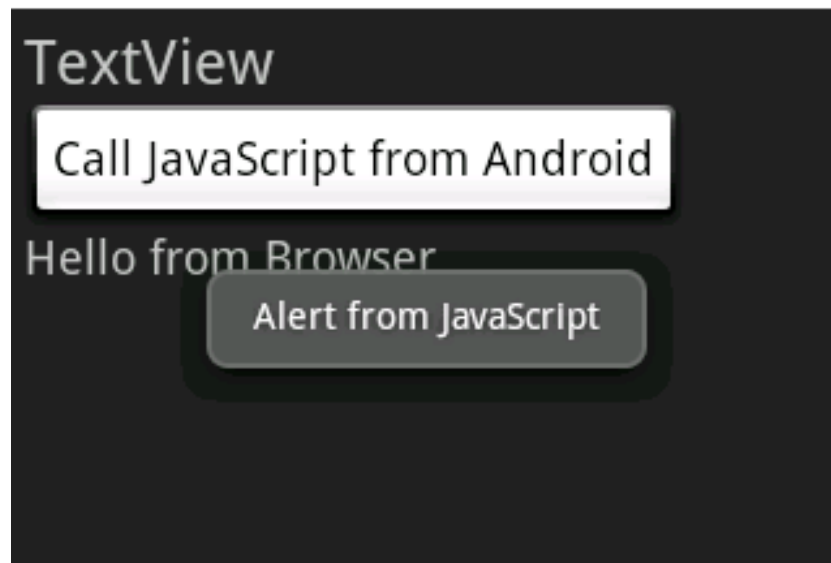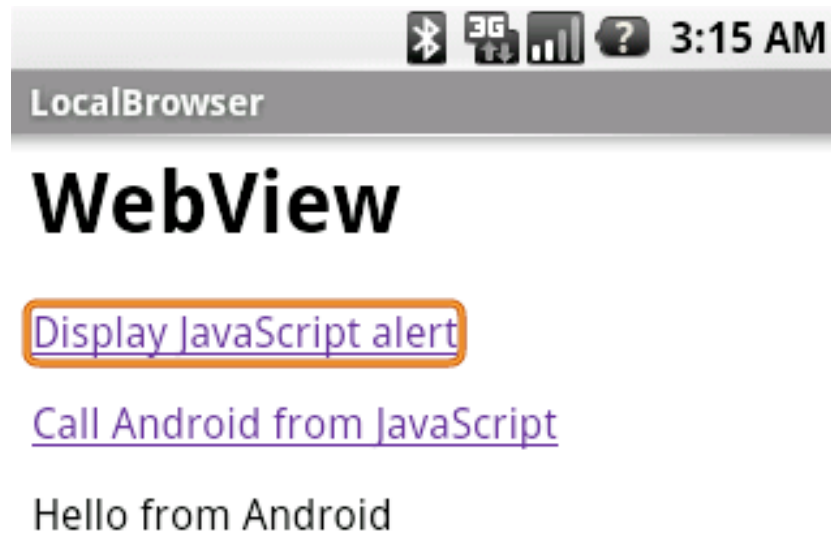
...And more

(see the Android Market for lots of examples)

VS.

Hardware capability

Android	iPhone
ARM @ 528MHz *	ARM @ 412MHz
192MB RAM *	128MB RAM
1GB or more SD card *	8-16GB (not removable)*
~70MB free for apps *	~7GB free for apps *
480x320 24-bit *	Same
3D acceleration *	None
(Floating point (not on G1)) *	Standard

* will vary according to model

Input methods

Android	iPhone
Single-touch screen*	Multi-touch (up to 5)
Real keyboard *	No
(Keypad) *	Nope
(D-pad) *	Nada
Trackball *	No way
Back button	No how
Menu button	Forget about it

* will vary according to model

Sensors at maximum

Android	iPhone
6-axis accelerometer *	Standard
(Proximity sensor) *	Standard
(Light sensor) *	Standard
Compass *	None
GPS *	Standard on 3G *

* will vary according to model

iPhone's compass

Put your iPhone in a horizontal position. Point your finger at right angles to the center of the compass in the screen. Then turn the iPhone horizontally as the shadow of your finger over-laps the shadow in the screen. Now the "N" on the screen indicates North.

Note: Daylight savings time (summer time) is not supported. In the southern hemisphere, the "N" indicates South.
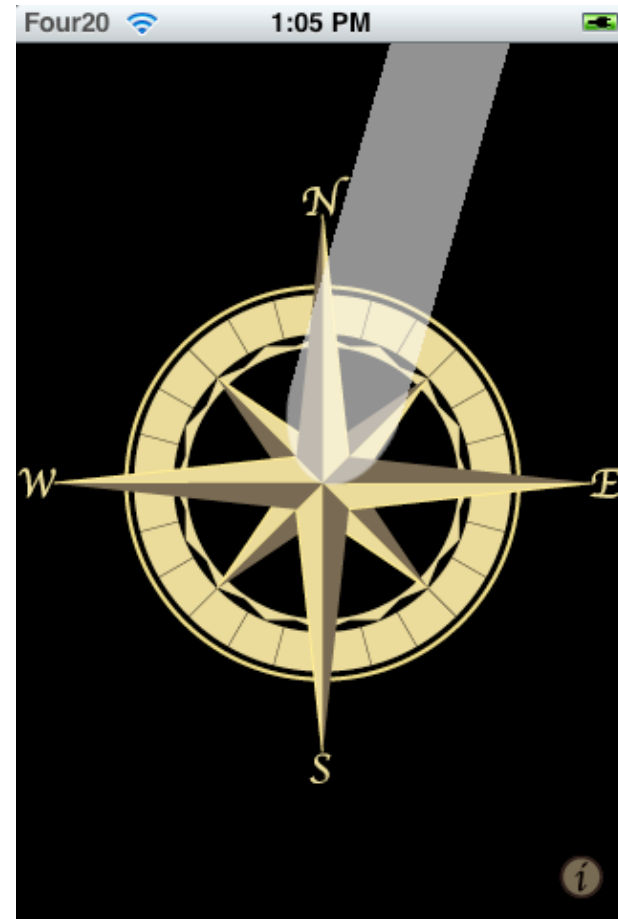
Software development

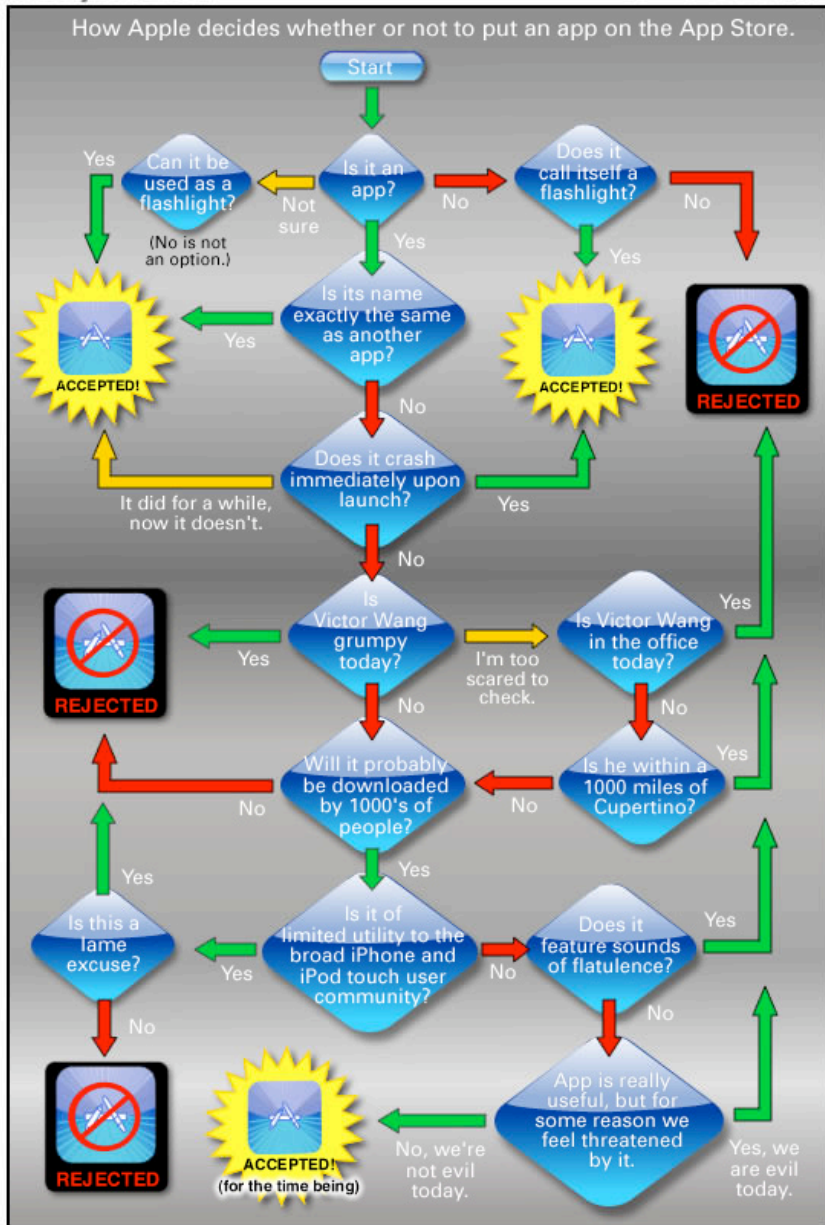| Android	iPhone
Develop on PC, Mac, Linux	Develop on Mac only
Linux on device	MacOS derivative
Process isolation	Application sandbox
Enumerated permissions	Unlimited
Java	Objective C and C
Managed/Interpreted	Native/Compiled
Garbage collection	Pools, ref counts
Background processes	Not unless you're Apple

The connected world

Android	iPhone
TCP/IP Sockets	Same
Web services (REST, JSON)	Same
I/O in threads	Same
GMail, Pop3	Exchange, Pop3
SMS/GTalk	Pushed notifications

Getting into the Market

Android	iPhone
$25 one time	$99 per year
Self signed	Certs from Apple
Publish on demand	Submit for approval and wait
Download from web	Only download from store
Google takes 30%	Apple takes 30%

The Joy of Tech™ — by Nitrozac & Snaggy

How Apple decides whether or not to put an app on the App Store.

Android playing catch-up

Android	iPhone
1 million devices Mar'09	30 million devices Mar'09
350 apps	25,000 apps
Top seller: $50K	Top seller: >$1Mil

Jobs trendline

1st Qtr 2007 - 4th Qtr 2008

Android '08 • iPhone '08
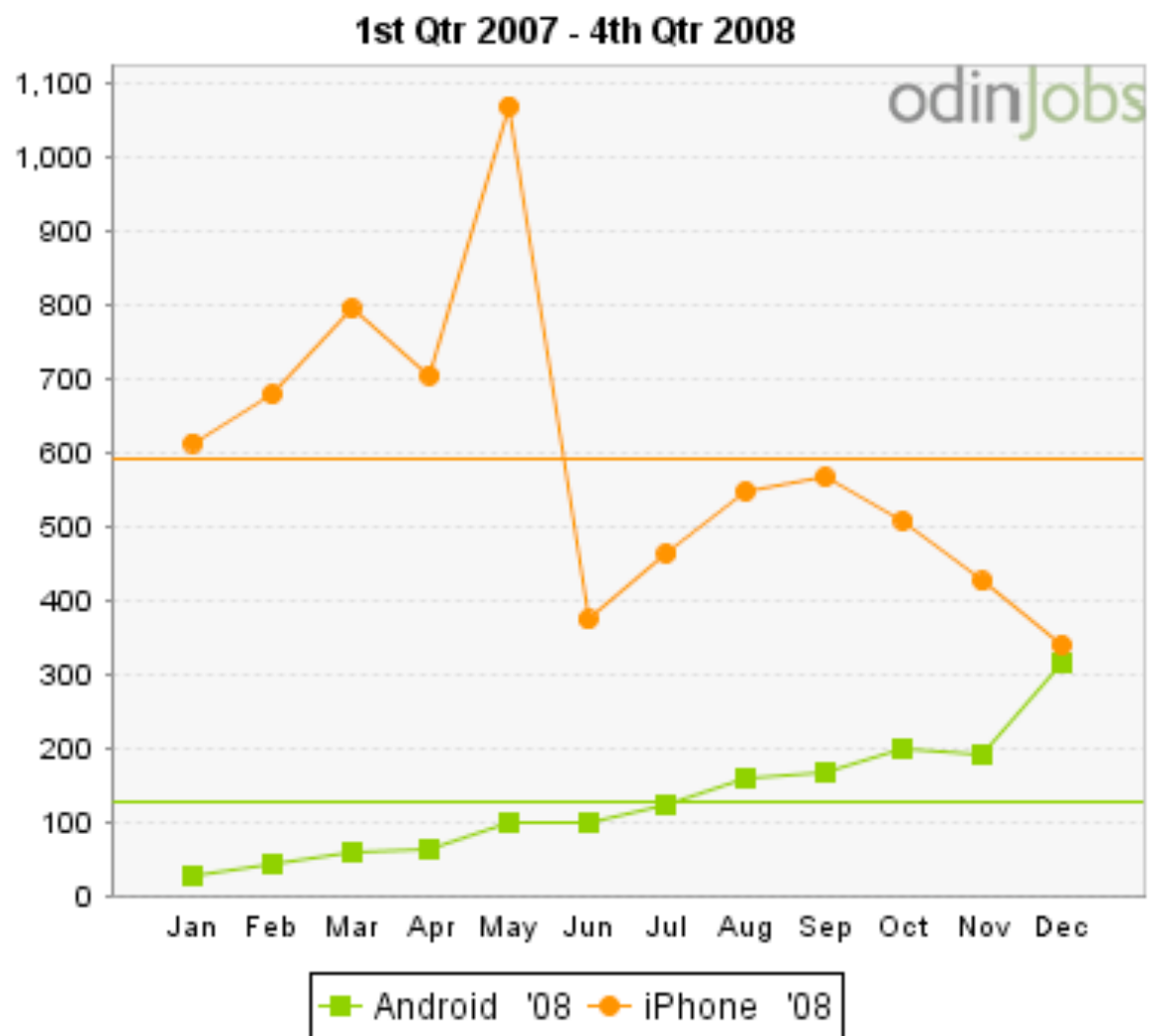
3/26/2009

Median Salary

1st Qtr 2007 - 4th Qtr 2008

odinJobs

■ $102.0K, Android   ■ $81.13K, iPhone
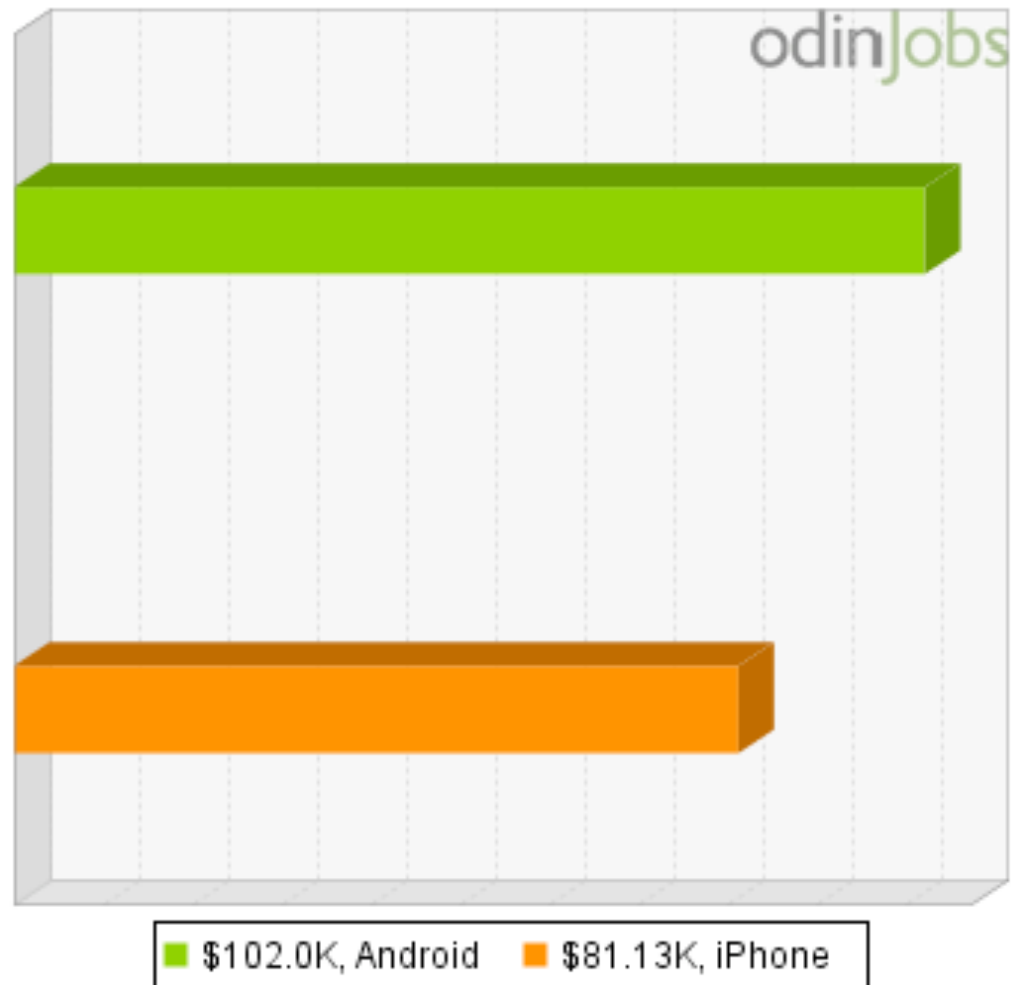
3/26/2009

And the winner is....

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Creating your first application

- Demo!

Publishing on the Market

- Demo!

Resources

http://developer.android.com
- Home page for Android development and documentation

http://groups.google.com/group/android-beginners
- Forum for development questions (beginner)

http://groups.google.com/group/android-developers
- Forum for development questions (advanced)

http://groups.google.com/group/android-discuss
- Forum for user and other questions

http://www.planetandroid.com
- Blogs and news from around the Android community

http://blogs.zdnet.com/Burnette
- ZDNet's Dev Connection

http://blogs.zdnet.com/Burnette/index.php?cat=39
- iPhone vs. Android development series

Books

http://pragprog.com/titles/eband

- Hello, Android: Introducing Google's Mobile Development Platform

http://www.oreilly.com/catalog/eclipsepg

- Eclipse IDE Pocket Guide

http://www.manning.com/gallardo

- Eclipse in Action

Questions?