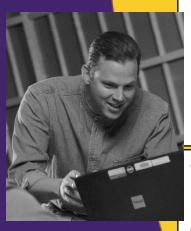
Android Programming: Overview

Originals of Slides and Source Code for Examples:
http://www.coreservlets.com/android-tutorial/

For live Android training, please see courses at http://courses.coreservlets.com/.



Taught by the author of *Core Servlets and JSP*, *More Servlets and JSP*, and this Android tutorial. Available at public venues, or customized versions can be held on-site at your organization.

- Courses developed and taught by Marty Hall
  - Android development, JSF 2, servlets/JSP, Ajax, jQuery, Java 6 programming, custom mix of topics
  - Ajax courses can concentrate on 1 library (jQuery, Prototype/Scriptaculous, Ext-JS, Dojo, etc.) or survey several
- Courses developed and taught by coreservlets.com experts (edited by Marty)
  - Spring, Hibernate/JPA, EJB3, GWT, RESTful and SOAP-based Web Services

Contact hall@coreservlets.com for details

Topics in This Section

- **Motivation**
  - Web Apps vs. Mobile Apps
  - iPhone Apps vs. Android Apps
- **Books and references**

Web Apps vs. Android Apps

Advantages of Web Apps

- **Universal access**
  - Browsers are everywhere
  - Any device on the network can access content
    - PCs, Macs, Linux, Android, iPhone, Blackberry, etc.
- **Automatic "updates"**
  - Content comes from server, so is never out of date
- **Well-established tools and methodologies**
  - In multiple languages
    - Java, PHP, .NET, Ruby/Rails, CGI, etc.

Disadvantages of Web Apps

- **Few and weak GUI controls**
  - Textfield, text area, button, checkbox, radio, list box, combo box. That's it! No direct drawing (except for HTML5 Canvas)
- **Cannot interact with local resources**
  - Cannot read files, call programs, or access devices on the user's machine
- **Inefficient communication**
  - HTTP is weak protocol
- **Hard to write**
  - Requires knowledge of many technologies
    - Java, HTML, HTTP, CSS, JavaScript, XML
- **Designed for large displays with mouse**
  - So harder to use on small phone displays with touch screen

Advantages of Mobile Apps

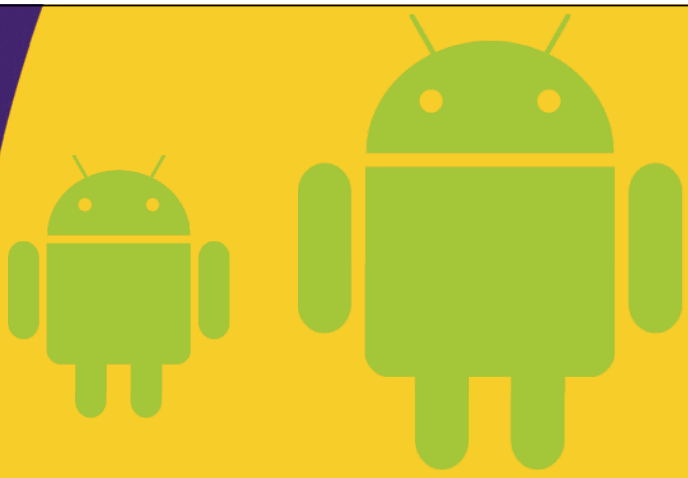
- **Many GUI controls**
  - Textfield, text area, button, checkbox, radio, list box, combo box, clock, calendar, date picker, dialog box, image gallery, etc.
    - Comparable to options in desktop programming
  - Supports direct drawing
    - So animated games ala Angry Birds possible
- **Can interact with local resources**
  - Can read files (e.g., contacts list), have local database, access GPS, initiate phone calls, get input from microphone, create voice output, read screen orientation, etc.

Advantages of Mobile Apps (Continued)

- **Efficient communication**
  - Can use any networking protocols you want
- **Easier (?) to write**
  - Requires knowledge of one language only
    - Java for Android
    - Objective C for iPhone
- **Designed for small displays with touch screen**
  - So, many apps and GUI controls are optimized for this environment

Disadvantages of Mobile Apps

- **No universal access**
  - Apps must be installed one at a time on each phone
  - An Android app cannot run on iPhone, Blackberry, PC, Mac, or Linux box
- **Difficult to manage updates**
  - User must intervene to get latest versions
- **Newer (esp. Android)**
  - So, fewer established tools and methodologies
    - On the other hand, Android programming is similar to desktop Java programming, and there are plenty of established approaches there



Android Apps vs. iPhone Apps

Installing Apps

- **Generic apps**
  - iPhone has larger selection
  - Android trying to catch up
- **In-house-developed corporate apps**
  - iPhone apps can only be installed via the App Store
    - iPhone requires you to submit app to the Apple App Store and get approval, even for apps from your own company
      - Unless you jailbreak your phone
  - Android apps can be installed through
    - Google App Store
    - Amazon App Store
    - USB connection from PC
    - Email
    - Corporate Web site

Languages for Apps

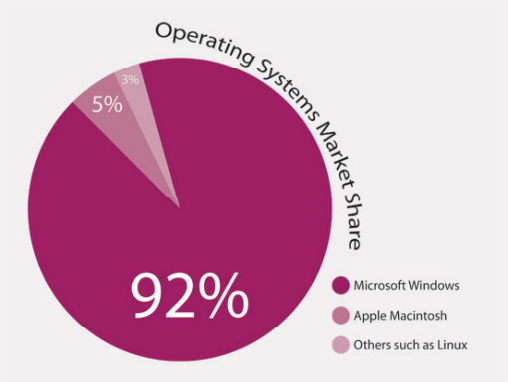
- **iPhone**
  - Objective-C
    - Similar to, but not exactly the same as, C++
    - Virtually no corporate presence for Objective-C, other than for mobile apps
- **Android**
  - Java
    - The single most widely used language inside corporations
  - C/C++
    - Can call native apps (with some difficulty) via an approach similar to JNI for desktop Java

The *real* reason Android runs Java

From Randall Munroe and xkcd.com

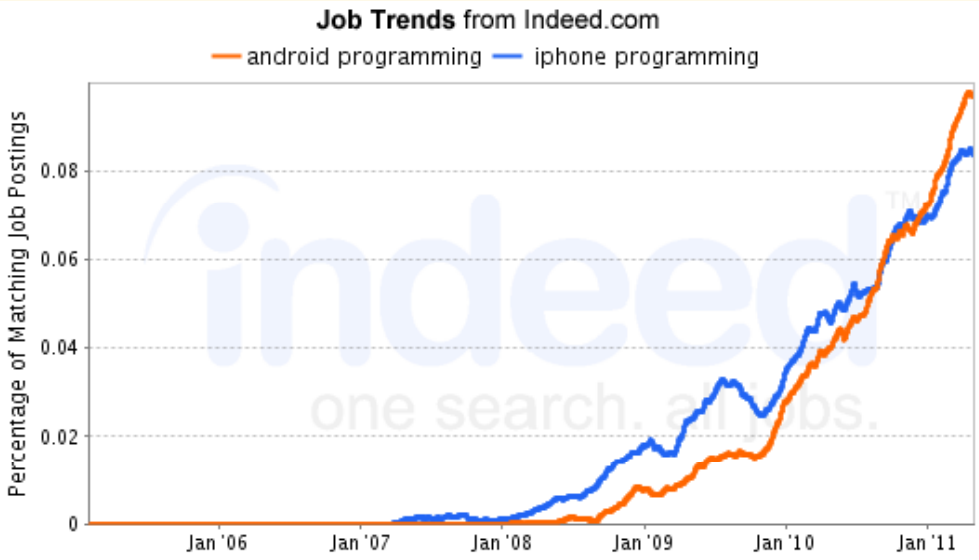
Operating Systems for Developing Apps

- **iPhone**
  - Macs
- **Android**
  - Anything with Java and Eclipse
    - Macs
    - PCs
    - Linux
    - Solaris
- **Issue**
  - Not so much which is cooler and which you personally prefer, but rather which is *already* installed in corporate environments.



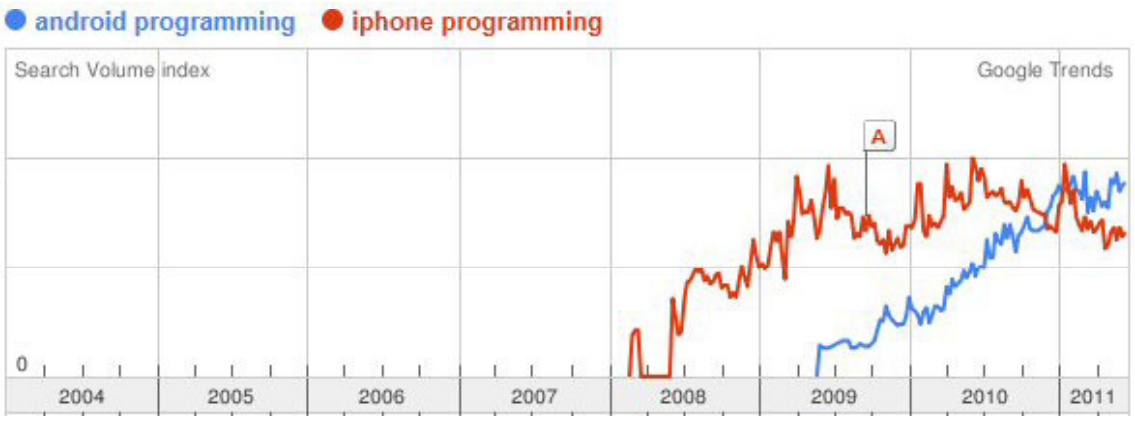
From http://www.hongkiat.com/blog/mac-vs-pc-myth-busting-consumer-guide/

Programming Jobs: Android vs. iPhone



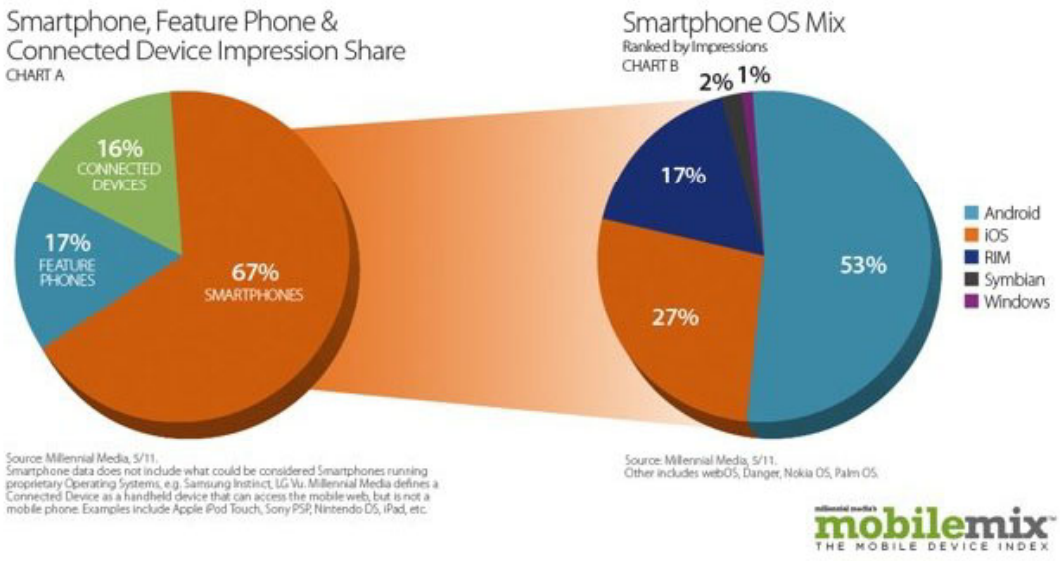
- Caveat: Indeed.com shows rough trends only
  - Job postings with both words anywhere in posting
  - Biased by the job sites it samples

Google Search Trends: Android vs. iPhone Programming



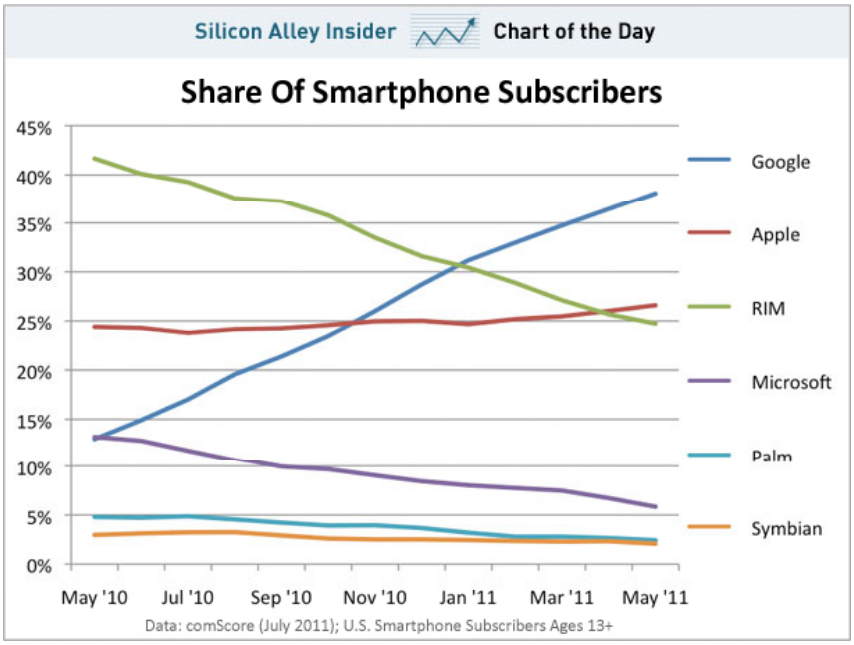
- Caveat: search volume shows rough trends only
  - For example, one of Android or iPhone might have clearer documentation, and require less searching

Advertising Revenue: Android (53%) vs. iPhone (27%)



- Caveats: advertising does not equate to market volume, biased by who Millennial Media works with

Market Presence

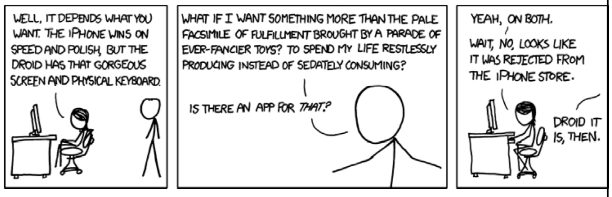


– Caveat: based on survey, not sales data

Raw data at http://www.comscore.com/Press_Events/Press_Releases/2011/7/comScore_Reports_May_2011_U.S._Mobile_Subscriber_Market_Share

Other Issues

- **Market presence based on sales data**
  - Blackberry & iPhone used to dominate smart phone market
  - 2nd quarter 2010 smart phone sales (source: Nielsen)
    - Blackberry: 33%
    - Android: 27%
      - Caveats: these are sum of all Android devices. And, many Android phones given away for free with carrier subscriptions. Also, these numbers partially contradict graph on previous slide.
    - iPhone: 23%
- **Phone features, quality of apps, and coolness factors**
  - Matter of opinion, but iPhone very strong here



From Randall Munroe and xkcd.com

Bottom Line: iPhone vs. Android

- **Which to use personally**
  - iPhone has larger market share, bigger app store, and more loyal users
  - Android more open and growing more rapidly
  - Bottom line: no clear winner, personal preferences prevail, but iPhone has edge
- **Which to use for in-house apps**
  - iPhone apps very hard to install, Android simple
  - iPhone uses Objective C, Android uses Java
  - Bottom line: Android is clear winner

Wrap-Up

References

- **Books (in rough order of preference)**
  - *Android Developer's Cookbook* (Steele & To)
  - *Busy Coder's Guide to Android Development* (Murphy)
    - Online only: http://commonsware.com/Android/
  - *Android in Action, 2nd Edition* (Ableson, Sen, & King)
  - *Android Application Development for Dummies* (Felker)
- **Online references**
  - http://developer.android.com/
    - By far the most important single reference.
  - Android forum on StackOverflow
    - http://stackoverflow.com/questions/tagged/android
  - Android widget gallery
    - http://www.droiddraw.org/widgetguide.html

Summary

- **Web apps vs. Android apps**
  - Web apps can run on Android, iPhone, Blackberry and regular computers. But, they have weaker GUIs, cannot use local resources (files, databases, GPS, camera), and are better on big screens
  - Android apps can local resources, are optimized for small screens, have richer GUIs, but cannot be accessed on other phone types or on regular computers
- **iPhone vs. Android**
  - For personal use, situation is very unclear
  - For building corporate apps, Android is clear winner

Questions?