ANDROID PROGRAMMING: INTRODUCTION

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

OUTLINE

Approaches to develop mobile applications

- Browser Based
- Mobile Framework based
- Hybrid of above

Major OS’s

- Android
- iPhone

BROWSER BASED

- Pro
  - Universal access – just need browser
  - Always up to date - Content controlled by server
  - Many tools and technologies(advantage and disadvantage)
  - APIs for gaming which open up many app types (AR, training, etc)
- Con
  - Weak GUI widget set
  - Can’t interact with many local resources (accelerometer, gps, etc) or other devices
  - Can’t receive system notifications
  - Optimized for large screen and mouse – will work on smartphone but not well

MOBILE FRAMEWORK BASED - PRO

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
    - Animated games

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.

MOBILE FRAMEWORK BASED - PRO

Efficient communication

- Can use any networking protocols you want

Easier (?) to write

- Requires knowledge of one language only
  - Java for Android
  - Swift and Objective C for iPhone

Designed for small displays with touch screen

- So, many apps and GUI controls are optimized for this environment

MOBILE FRAMEWORK BASED - CON

No universal access

- Apps must be manually installed on each device
- An Android app cannot run on iPhone, Blackberry, PC, Mac, or Linux box

Difficult to manage updates

- User must intervene to get latest versions

MUST DEVELOP SAME APP FOR EVERY OS

at least 2 dev environments (android, IOS) ,

multiple codebases to maintain

HYBRID

Most of functionality hosted in web pages on web server

Build minimal native apps that host web browser views

Have minimal native code to create for each platform

Web pages are updated instantly

This really eases multiplatform dev cycle.

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), are often ill-suited to small screens, require learning many technologies
- Native apps can access local resources, are optimized for small screens, have richer GUIs, but are not cross platform so require multiple solution codebases. Also difficult to update
- Hybrids are good compromise if you need multiplatform support, simplifies and reduces development cycle. Get auto updates for web based portion.

- I think we will head to hybrid model if not outright HTML5+

ANDROID APPS VS. IPHONE APPS

INSTALLING APPS

General apps

- iOs and Android have similar number apps (>1,000,000 in *iOS App Store and Google Play*)
- More importantly, apps have similar quality ratings

In-house-developed corporate apps

- iPhone apps can be installed through
  - App Store or iTunes (Apple must approve which could take weeks)
  - Via provisional profiles (development option)
  - Other ?
- Android apps can be installed through
  - Google App Store
  - Amazon App Store
  - USB connection from PC
  - Email
  - Corporate Web site

LANGUAGES FOR APPS

iPhone

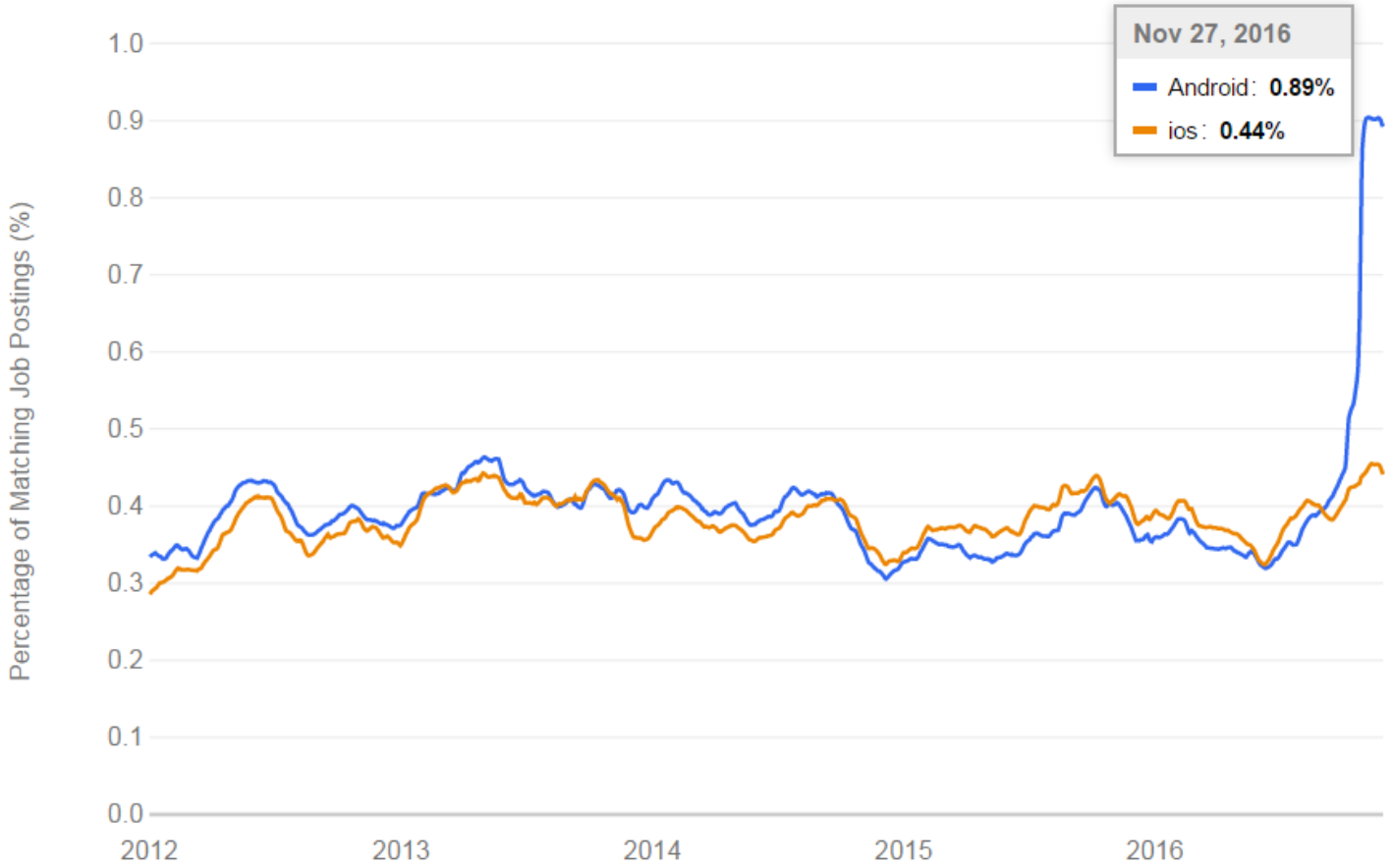
- Swift (latest,greatest)
- Objective-C
  - Similar to, but not exactly the same as, C++
- Virtually no corporate presence for Swift or Objective-C, other than for mobile apps

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

Go to tiobe to show language popularity

PROGRAMMING JOBS: ANDROID VS. IPHONE



See https://www.indeed.com/jobtrends/q-Android-q-ios.html?relative=1

MARKET PRESENCE

Period	Android	iOS	Windows Phone	Others
2015Q4	79.6%	18.7%	1.2%	0.5%
2016Q1	83.5%	15.4%	0.8%	0.4%
2016Q2	87.6%	11.7%	0.4%	0.3%
2016Q3	86.8%	12.5%	0.3%	0.4%

OTHER ISSUES

Phone features, quality of apps, loyalty, and 'coolness' factors

- Matter of opinion
- Latest version of Android however is very slick

From Randall Munroe and xkcd.com

BOTTOM LINE: IPHONE VS. ANDROID

Which to use personally

- iPhone cooler interface (?), and more loyal users
- Android more open and growing very rapidly, more choices than iOS, cheaper(?)
- Bottom line: no clear winner, personal preferences prevail, but iPhone has edge in loyalty (eroding with price increases though)

Which to use for in-house corporate apps

- iPhone apps harder to install than Android
- iPhone uses Objective C or Swift, Android uses Java
- Android has larger user base
- Bottom line: Android is clear winner

NEXT TIME

- **Install android (different steps for linux, Mac, Windows)**

  (https://developer.android.com/studio/install.html)
- **Bring mobile device and usb cable**
- **We are going over using the IDE and writing a simple mobile app and deploying to emulator and device**