Introduction to Android App Development

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OVERVIEW

- Background
  - What is an app?
  - State of the world

- Developing Apps
  - How to start developing?

- Android Fundamentals
  - Android OS

Background

WHAT IS A MOBILE APP?

- An app is not something new!
  - An "app" is simply a small applications
  - With a specific purpose and can easily be downloaded and installed by the users
- Typically on smartphones
  - iPhone, Android, etc.
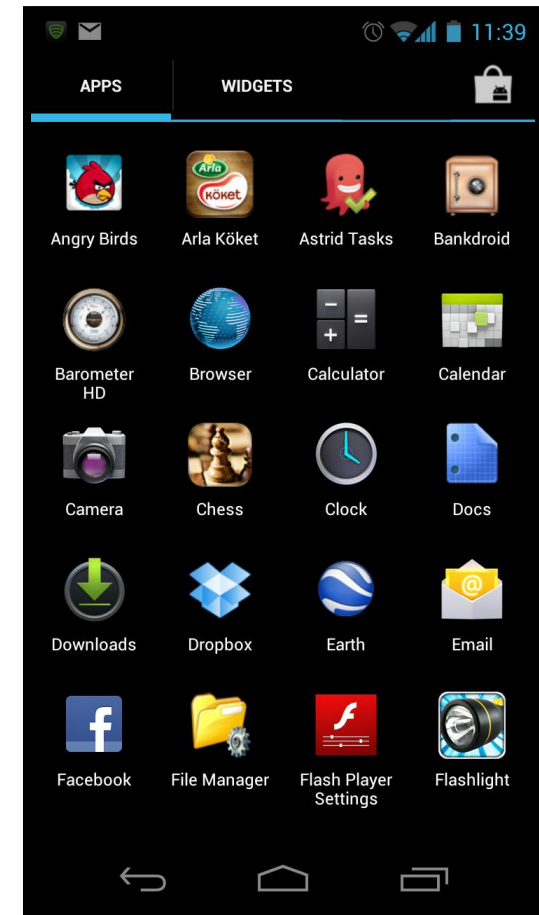
WHERE DO I GET APPS?

- Apps exists for many different platforms
  - Facebook, Google+, iOS, Android, etc.

- App Store
  - For: iPhone, iPad, Apple TV

- Google Play
  - For: Android-phones, android-tablets, Google TV

- Facebook Apps
  - For: Web browser

- Windows Marketplace, Xbox Marketplace, etc.
  - For: Windows phone, Xbox, PC

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BACKGROUND

- Benefits of using apps
  - An app can use more of the phone's functions
    - Address book, position, camera, sensors, etc.
  - Simple distribution and profit trough a single marketplace
  - An app can work even without Internet connectivity
  - Apps usually have better end user experience

- Drawbacks of apps
  - Web based solutions use web browsers and is truly platform independent
  - Web based solution work directly, without any downloading
  - An app is updated by the users, a web solution is updated by the provider
  - Hybrid solutions should be perfect, but they are still not very seamless and has very poor user experience

STATE OF THE WORLD

- The Apple vs Android war
  - Even Steve Jobs talked publicly on his hate for Android

- "Fanboys" on both sides
  - Clear bashing of each other
    - Forums, blogs, comments, etc.
    - No clear "winner"

- What is the best?
  - Hard to find reliable data
  - But there exists some…
    - Available apps
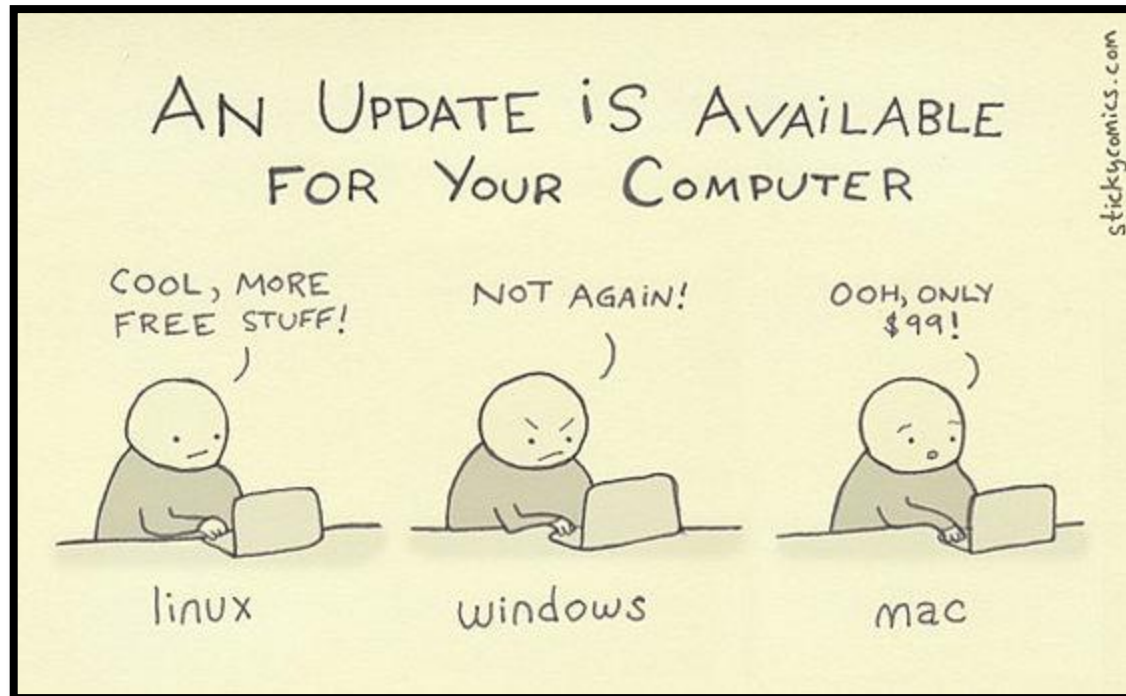   - Number of phones
    - Etc.
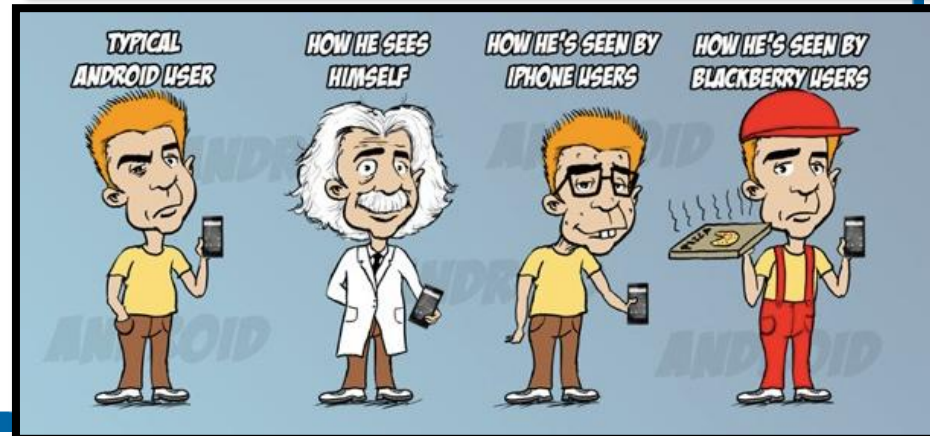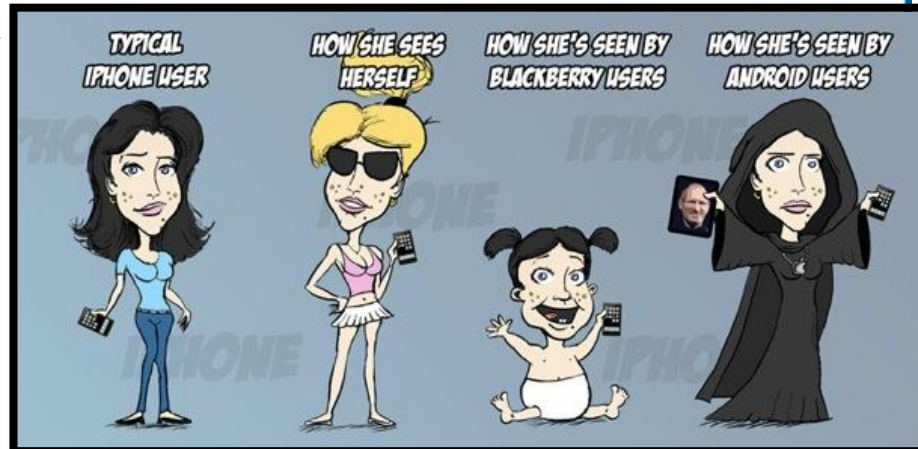
STATE OF THE WORLD

- Available Apps
  – Changes very often, but only sparse information from the actual sources
- Apple
  – 650 000 apps (June 2012)
- Android
  – 500 000 apps (June 2012)
- Windows Phone Marketplace
  – 100 000 apps (June 2012)

STATE OF THE WORLD

- Profit
  - Apple makes most money of their phones and apps
    - Apple sold 93 million iPhones 2011
  - Apple's stock is worth over 620 billion dollars
    - Which is more than Google and Microsoft together
    - Or more than twice the value of Samsung, Nokia, Motorola Mobility, HTC, RIM, Sony, and LG together
  - But Apple and Samsung sells about equal amount of phones…
- In 2011 there was more smartphones sold than PCs
    - 488 million phones compared to 415 PC
- Android rise in popularity
  - Each day over 1 million units with android is activated (June 2012)
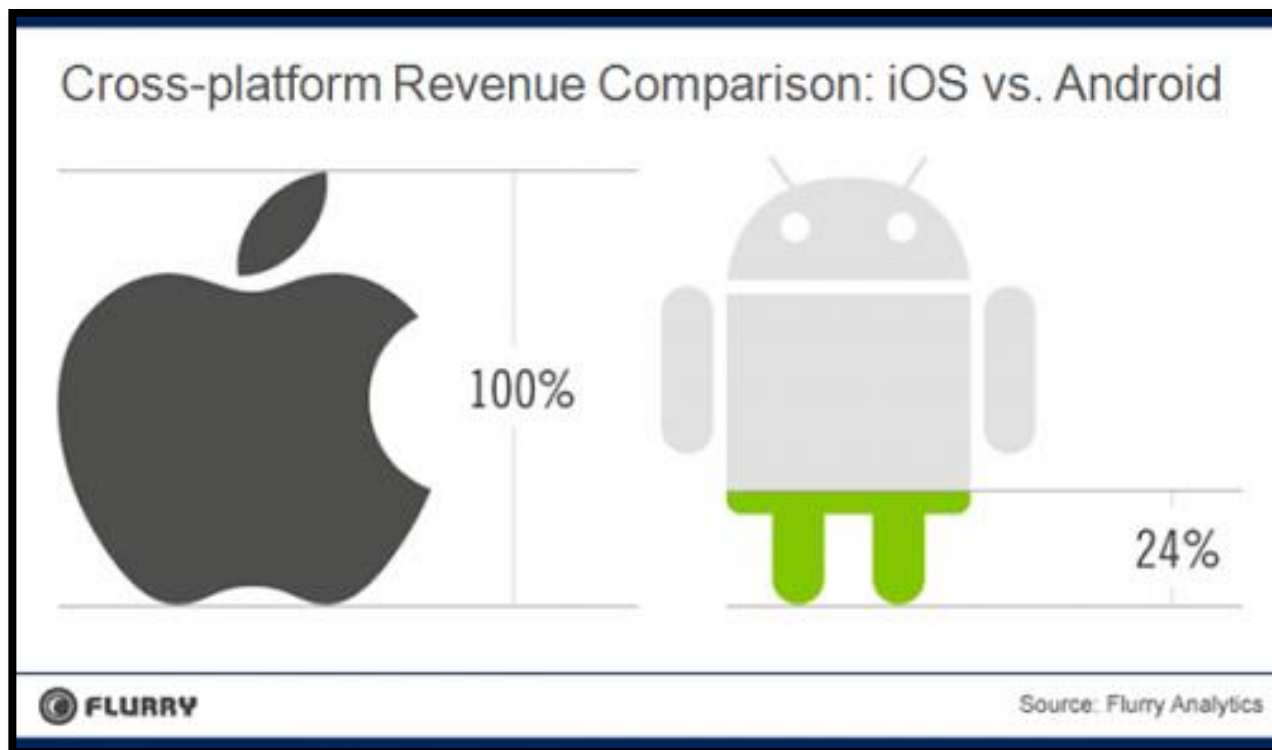 - As of June 2012, a total of 400 million Android devices have been activated

STATE OF THE WORLD

- How can Apple make so much money?
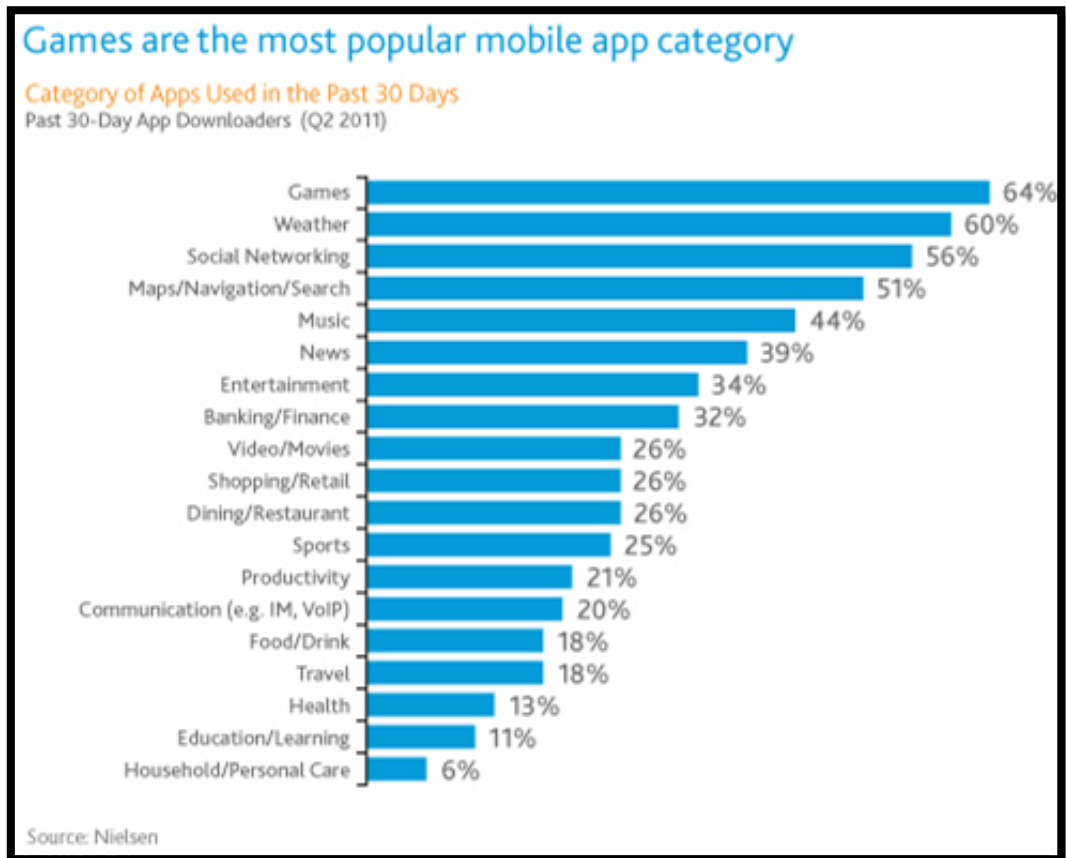 - Apple users are more prone to spend money

STATE OF THE WORLD

- Comparable apps generates less money on Android

Cross-platform Revenue Comparison: iOS vs. Android

100%

24%

FLURRY

Source: Flurry Analytics

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STATE OF THE WORLD

- Popular apps
  1. Angry Birds
  2. Facebook
  3. Skype
  4. Angry Birds Rio
  5. Google Maps
  6. iBooks
  7. Angry Birds Seasons
  8. Fruit Nilja
  9. Talking Tom
  10. Twitter

Games are the most popular mobile app category

Category of Apps Used in the Past 30 Days
Past 30-Day App Downloaders (Q2 2011)

Category	%
Games	64%
Weather	60%
Social Networking	56%
Maps/Navigation/Search	51%
Music	44%
News	39%
Entertainment	34%
Banking/Finance	32%
Video/Movies	26%
Shopping/Retail	26%
Dining/Restaurant	26%
Sports	25%
Productivity	21%
Communication (e.g. IM, VoIP)	20%
Food/Drink	18%
Travel	18%
Health	13%
Education/Learning	11%
Household/Personal Care	6%

Source: Nielsen

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Developing Apps

PUBLISHING PROCESS

- Apple
  – Control all apps that will be published to their App Store.
  – Stop unwanted apps before they are published
  – Even filter out morally borderline apps by denying them to be published

- Google
  – Tests all apps when published in their market for malware, spyware, virus, and other suspicious behavior
  – Relies on user reviews for all apps
  – Lets the user know what an app does and lets the user decide if he wants to accept this or not
  – Apps can be remotely deleted by Google after installation

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HOW TO START DEVELOPING?

- Apple
  - Register as developer ($99/year)
  - Download all tools
  - Start developing
  - Publish on iTunes
  - Apple take 30% of each app sale

- iOS SDK
  - Language: Objective-C
  - IDE: Xcode

- Google
  - Download all tools
  - Develop your app
  - Register as developer ($25)
  - Publish on Google Play
  - Google take 30% of each app sale

- Android SDK
  - Language: Java
  - IDE: Eclipse

Android Fundamentals

THE ANDROID ROBOT

- The robot is licensed by Google
  – Creative commons attribution license

- "Copyleft"
  – Copyrights equivalent to Open Source
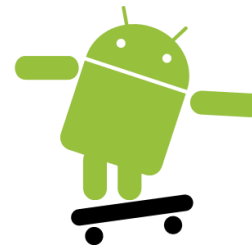
WHY CHOOSE ANDROID?

- The basics are the same for all different platforms
  - So if you know Android, the change to iOS, Windows Phone, etc. is simple

- But I would choose Android
  - It's the most widespread!
  - It's free!
  - It's Java! Which we teach our students
  - It's open source! Which makes sense for research projects

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ANDROID OS

- Open source (AOSP)
  - Apache license (but not everything…)
    - Maps, Gmail, Music, Play, Navigation, etc. is not open source
- Based on a branch of the Linux kernel
- Aimed for Smartphones, but not exclusively
  - Tablets, TV's, Sensor motes, Gaming consoles, etc.
- Language
  - C (Kernel)
  - C/C++ (Native)
  - Java (Applications)

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ANDROID OS

- The operating system is in ongoing development
    – Even the manufacturers themselves have problems keeping up!

- Many different versions
    – Named after desserts

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ANDROID OS

- Version 1.5 (April 2009)
  - Cupcake

- Notable phone: HTC Hero

- Features
  - First "commercial" version
  - Software keyboard with autocomplete
  - Bluetooth etc.

ANDROID OS

- Version 1.6 (September 2009)
  - Donut

- Notable phone: Xperia X10

- Features
  - Expanded Search Framework
  - Virtual Private Networks (VPN's)
  - Text-to-speech
  - Updated market

ANDROID OS

- Version 2.1 (January 2010)
  - Eclair

- Notable phone: Nexus One, HTC Desire

- Features
  - Small changes in GUI
  - Faster

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ANDROID OS

- Version 2.2 (May 2010)
  - FroYo (Frozen Yoghurt)

- Notable phone: HTC Desire HD

- Features
  - Just In Time compilation (some cases, 5x faster!)
  - Flash 10.1
  - OpenGL ES 2

ANDROID OS

- Version 2.3 (December 2010)
  – Gingerbread

- Notable phone: Nexus S

- Features
  – Faster GUI
  – SIP calling
  – NFC and RFID tags

- 2.3.X Extended NFC support, Video calling, etc.

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ANDROID OS

- Version 3.0
  - Honeycomb
  - A branch of 2.2 aimed for tablet
- Notable tablet: Motorola Xoom
- Features
  - Tablet GUI
  - Multiple CPU cores
  - Tablet optimized widgets
  - Better media streaming
- 3.1 and 3.2
  - USB and Gamepad API's
  - Better UI
  - Better Audio/Video streaming support

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ANDROID OS

- Version 4.0
  - Ice Cream Sandwich

- Notable phone: Samsung Galaxy Next

- Features
  - New lock screen, with "Face Unlock"
  - Better Notifications
  - Screen capture
  - Better "Text-To-Speech" and "Speech-To-Text"
  - GPU accelerated graphical interface
 - And all honeycomb goodness, but on a phone

ANDROID OS

- Version 4.1
  - Jelly Bean

- Notable device: Nexus 7

- Features
  - Smoother performance (Project Butter)
  - Expandable notifications
  - Ability to turn off notifications on an per app basis
  - Improved voice search and offline voice dictation
  - Google Now (Context Awareness)

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ANDROID OS

- Statistics
  – Android versions
  – August 1, 2012
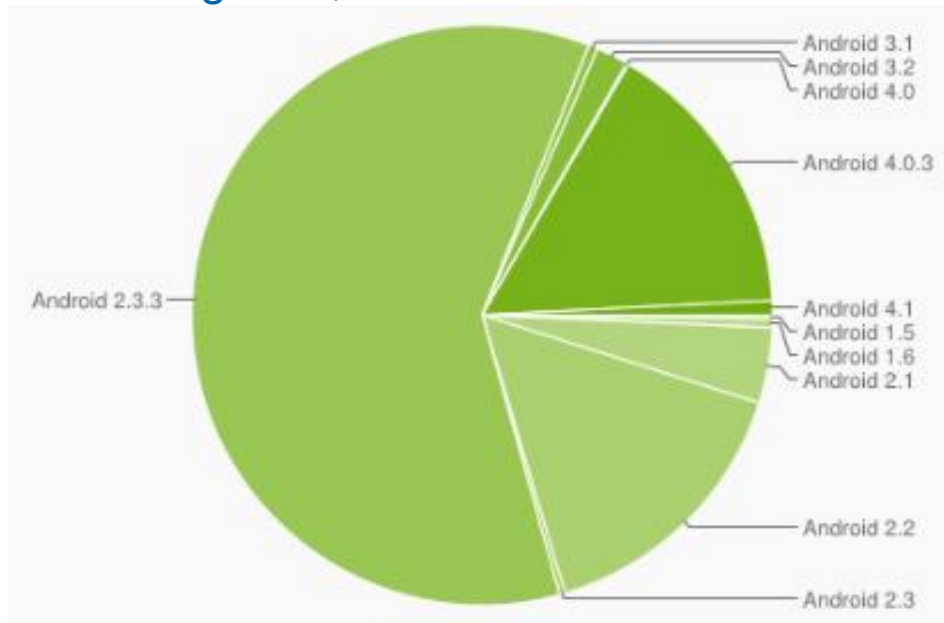
Version	Codename	API Level	Distribution
1.5	Cupcake	3	0.2%
1.6	Donut	4	0.5%
2.1	Eclair	7	4.2%
2.2	Froyo	8	15.5%
2.3 - 2.3.2	Gingerbread	9	0.3%
2.3.3 - 2.3.7		10	60.3%
3.1	Honeycomb	12	0.5%
3.2		13	1.8%
4.0 - 4.0.2	Ice Cream Sandwich	14	0.1%
4.0.3 - 4.0.4		15	15.8%
4.1	Jelly Bean	16	0.8%

A WORD OF ADVICE FOR THE FUTURE

Learn to code Java!
It will probably the best spent time in your career

It does not really matter how you do it
As long as you prepare yourself

For example
Read beginners books, try out tutorials, see youtube movies, etc.

www.CodingBat.com
Java exercises and problem solving

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