

# G54MDP

# Mobile Device Programming

Module Introduction / Schedule

# Who am I?

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- C2, Computer Science
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# Module Overview

- 10 credits
- Education aims
  - To teach the principles of program design, and to give experience of designing and developing programs.
- Learning outcomes
  - Knowledge and Understanding:
    - Understanding of the theory and practice of programming in the context of a mobile device.
  - Intellectual Skills:
    - Understand and logically evaluate program requirements and specifications.
    - Understand the complex ideas of programming solutions and relate them to particular problems.
  - Professional Skills:
    - The ability to write programs.
    - The ability to transfer programming skills between classes of devices.
  - Transferable Skills:
    - The ability to solve problems using programming including mathematical problems, to schedule and present their work and to retrieve additional learning material.

# Lectures and Labs

- Lectures
  - Mondays 15:00-16:00 C3 Exchange
  - Wednesdays 11:00-12:00 LT1 Exchange
- Labs (not this week)
  - Thursdays 17:00-18:00 A32 CS

# Assessment

- 1 hour exam (50%)
- 2 lab exercises (50%)
- More on this later...

# Module Overview

- Developing software for mobile devices
  - Mobile hardware
  - Android
  - Principles of iOS
  - Cross-platform development
  - The mobile device ecosystem
- Examining mobile devices from a computer science perspective, and understanding how their particular features impact software development

# Prerequisites

- G51CSA Computer Systems Architecture
- G51PRG Introduction to Programming
- G51OOP Introduction to Object-Oriented Programming
- Or equivalent knowledge and experience of programming and basic computer architecture.

# Prerequisites

- This module is not an introduction to programming
- You should be comfortable with
  - Classes, Instances
  - Messages, Methods
  - Instance Variables
  - Inheritance, Super-classes, Sub-classes
  - Iterative development and debugging
- Plus have some understanding of basic computer architecture



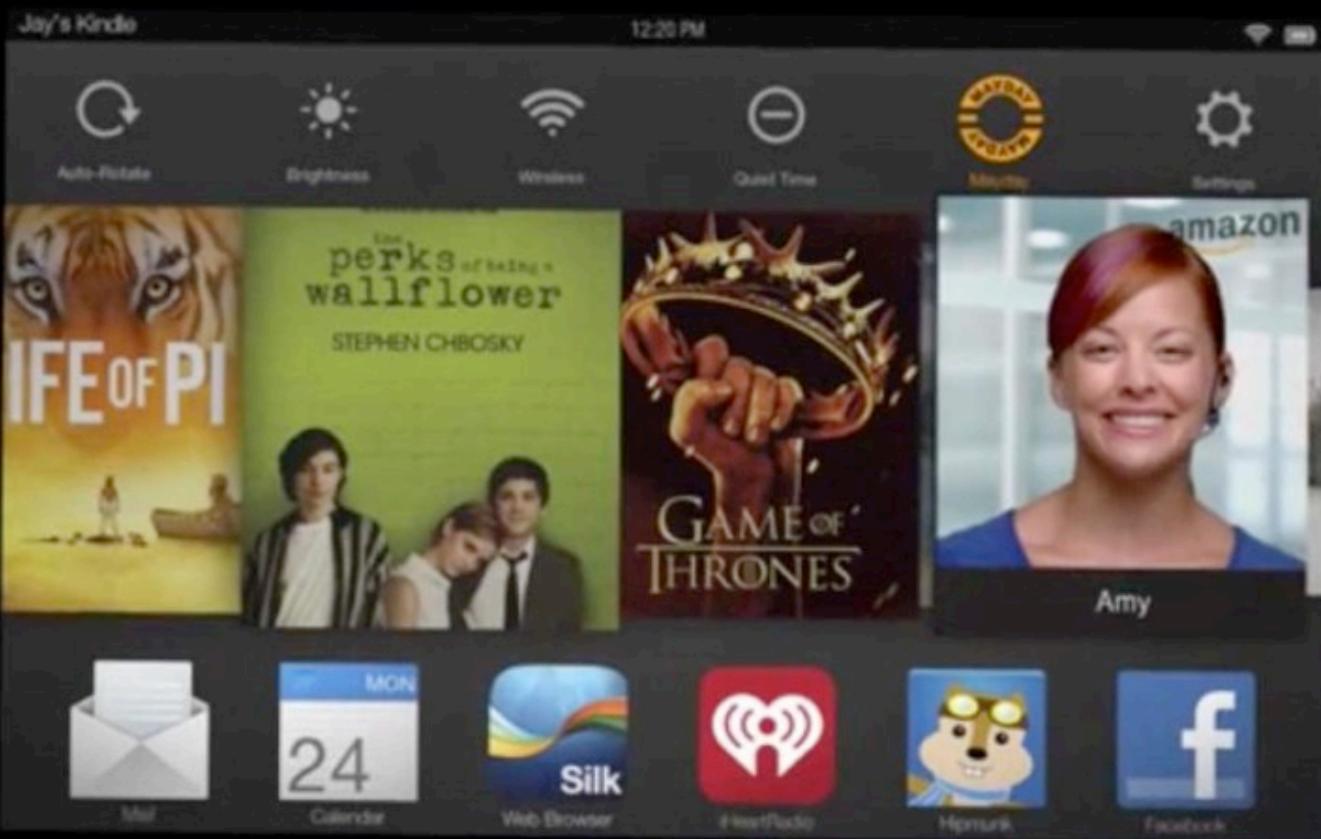
My Cell Phone History



# IPHONE 5: QUEUE HYSTERIA IN LONDON

WORK.  
BUY.-  
CONSUME.  
DIE.

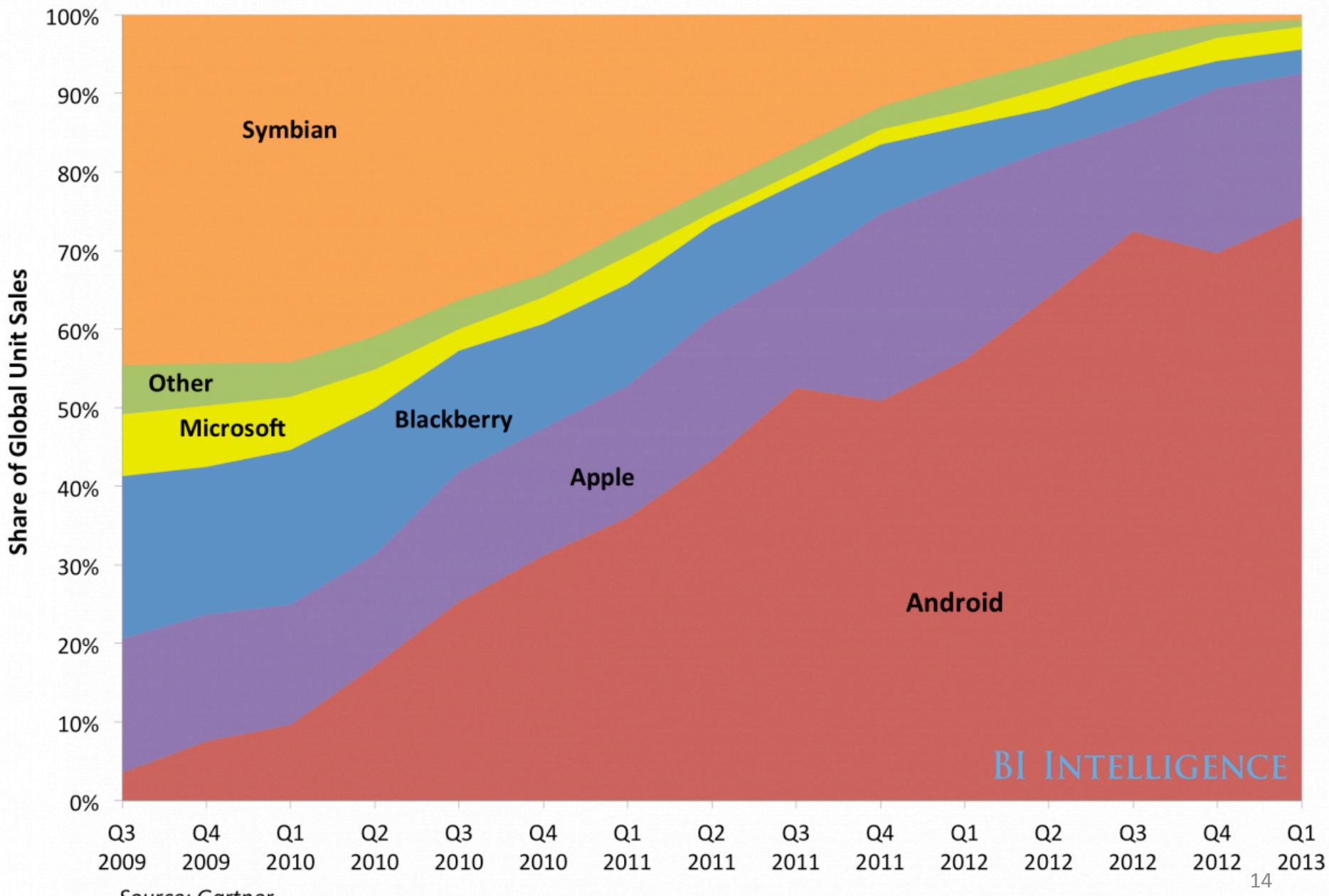




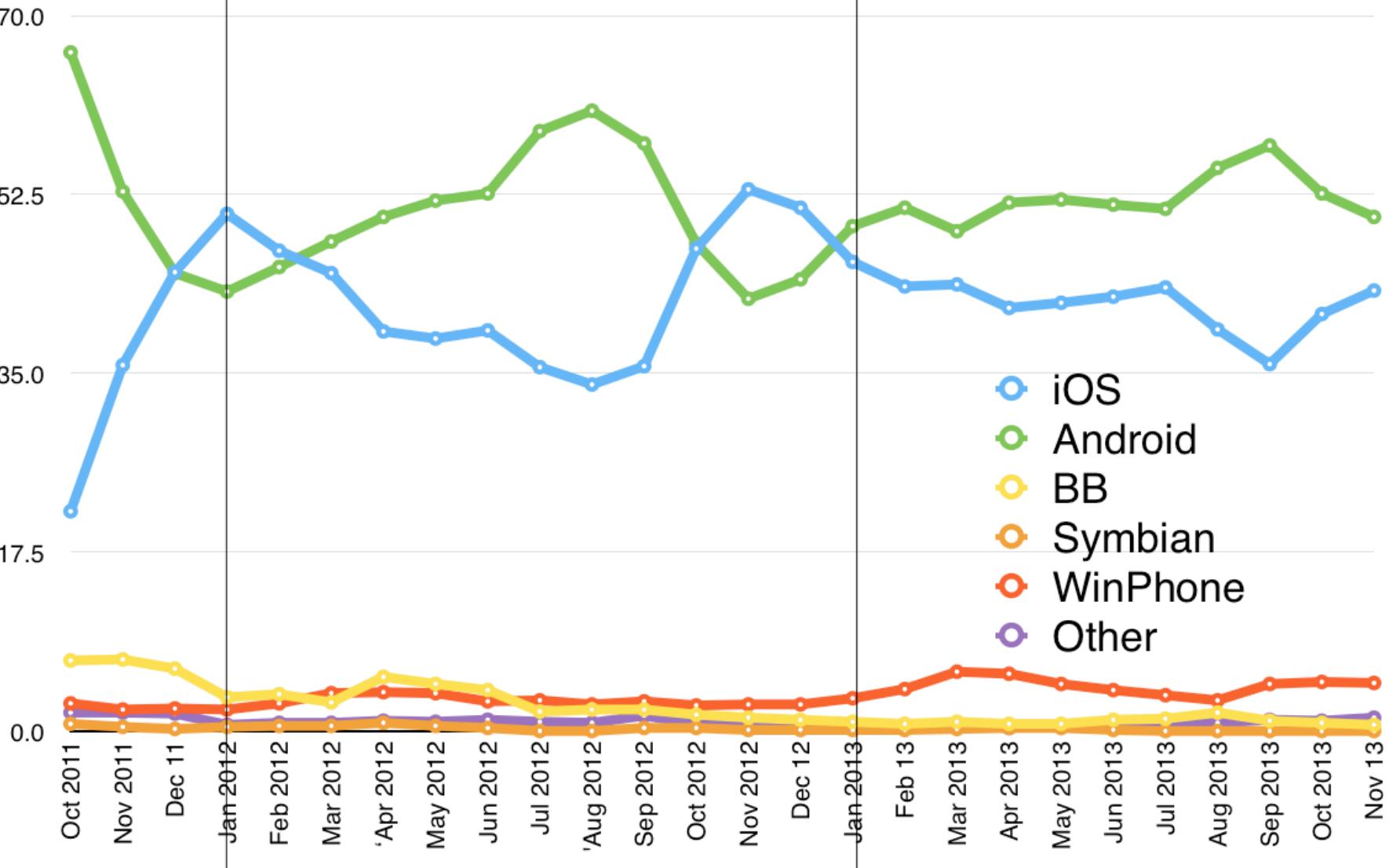
# Why Mobile Devices?

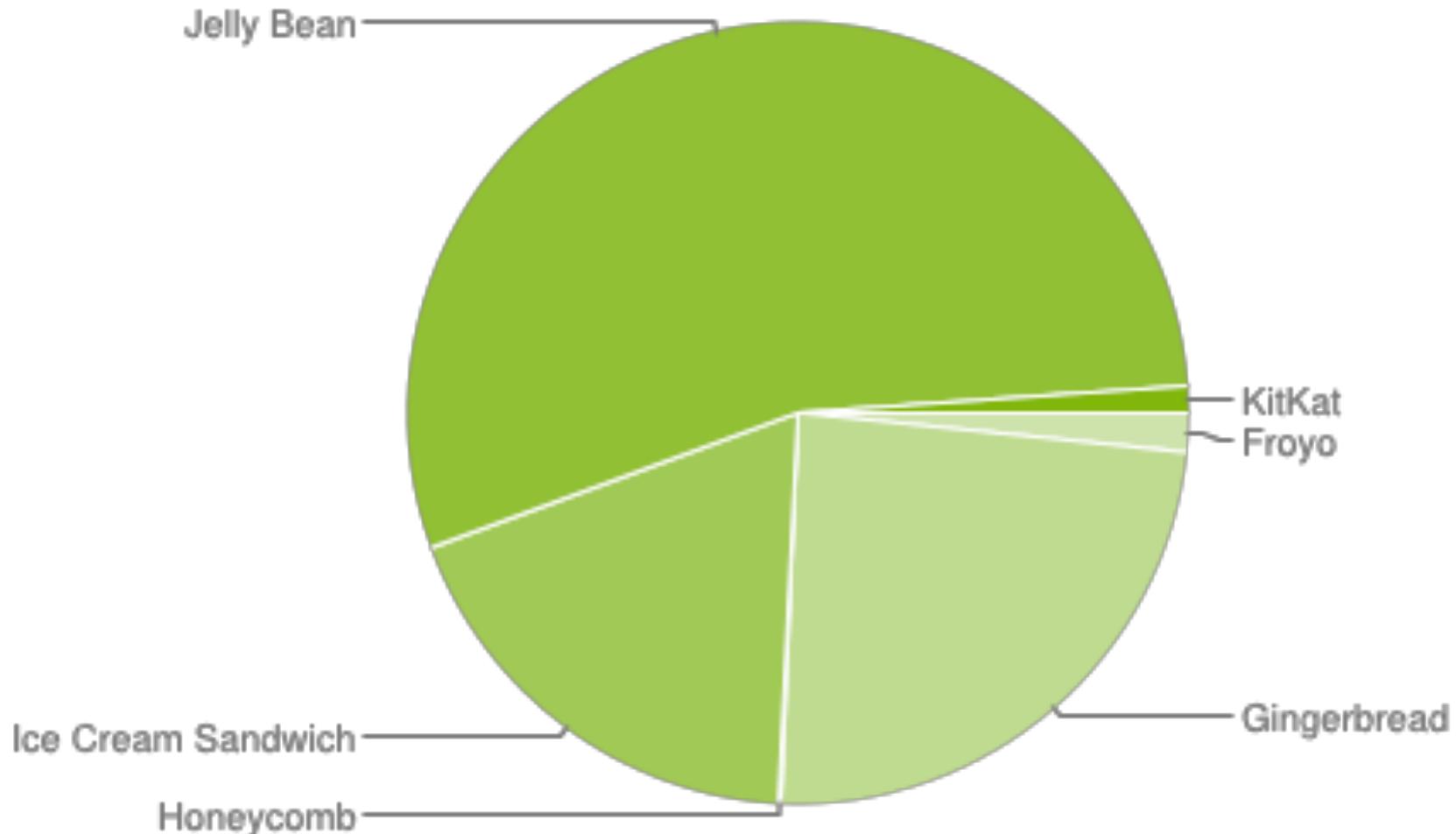
- 31 million iPhones shipped last quarter
- 177 million Android phones
- 102 billion apps downloaded from Apple App Store
- 225 million smart phones last quarter
  - Up 45% in one year
- 5 million Kindle Fires
  - Amazon won't say

# Global Smartphone Market Share By Platform



# US smartphone sales market share, Oct 2011-Nov 2013







Target: 17980



Moves:  
15

Score:  
0



3G 12:00 PM



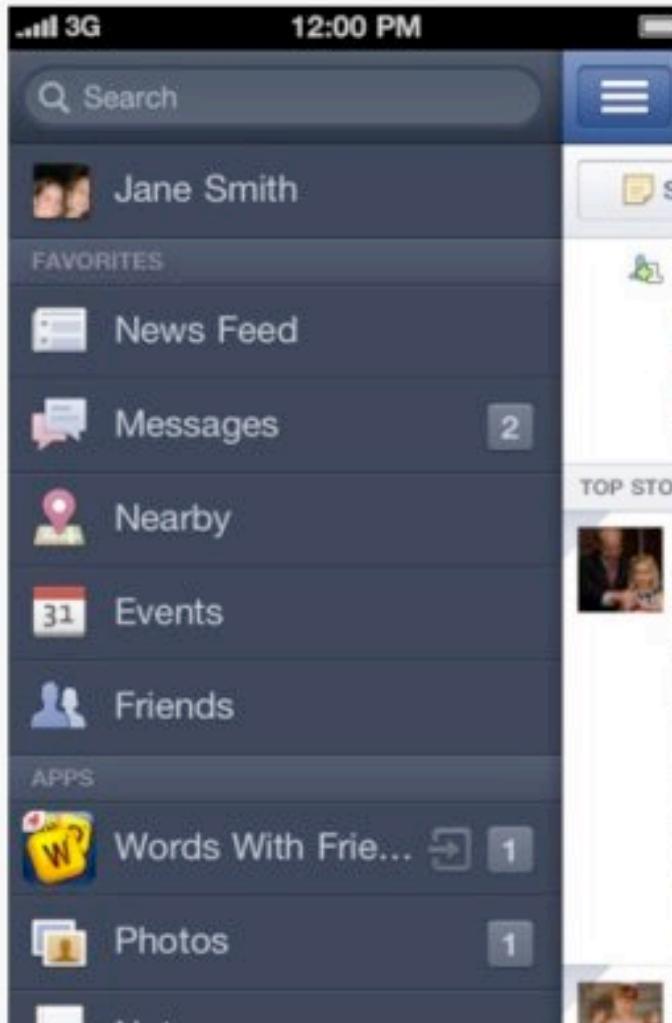
Francis Luu

Product Designer at Facebook  
Studied Design at University of Washington  
Lives in San Francisco, California

About Photos Friends

Status Photo Check In

3G 12:00 PM



Search

Jane Smith

FAVORITES

News Feed

Messages 2

Nearby

Events 31

Friends

TOP STORIES

Words With Friends 1

Photos 1

Notes

# Why Mobile Devices?

- Many differences to computers
  - We need to understand these differences
  - To be able to design software appropriately
- Generally not just a question of learning a new language or API

# Module Overview

- Mobile device characteristics
- Fundamentals of mobile hardware
- Android
  - Applications and activities
  - Threads and services
  - Data storage
  - Content and media
  - Events and broadcasts
  - Sensors and sensing
  - Security and permissions
  - Native code and JNI

# Module Overview

- Touch
  - Gestures
  - Hardware
- Batteries
  - Power management
  - Speed, optimisation and the tyranny of battery life
- Mobile networks
  - Data
  - Telephony (hey, you can still speak to people on a phone)
- iOS overview
- Cross-platform development
  - HTML5, is Flash really dead?
- Deployment
  - App stores, markets

# Lectures

- Mostly “standard” lectures
- Some discussion oriented sessions
- Some demonstration sessions
- I will be away for some lecture slots ☹
  - We will have ~17 of 22 lectures

# Expectations

- The SDK for Android (and iOS) is very large
  - Can't hope / don't want to cover it all in lectures
  - Generally cover principles rather than just reading out the API
  - Some self-directed learning is expected
- You are expected to attend lectures and take notes
  - Lecture slides are not sufficient on their own
  - Recording devices are permitted

# Assessment

- 1 hour exam (50%)
- Lab exercises (50%)
- ~~Group project (50%)~~

# Exam

- 1 hour
- 50% of the module mark
- Covers the background material
  - E.g. hardware design, principles of mobile application programming, characteristics of mobile devices, optimisation etc...

# Labs and Coursework

- You will be set a number of lab exercises
- You will create small Android applications that make use of the material covered in lectures
  - NB you do not need an Android phone
- Labs are not compulsory, but are your opportunity to get help and feedback
- 2 of these exercises will be assessed
  - Not every week, will have ~4 weeks to complete them
- Worth 50% of the module mark

# Why not iOS?

- We don't have a Mac lab.
- Android SDK is free and cross-platform.

# Questions on course structure?

# Brainstorming

- Pick a mobile device (perhaps one that you own)
- Think about what the characteristics and specifications of that device are
  - CPU speed, display type, size, shape, network connectivity, battery life etc
  - Operating system, mode of interaction / UI
- How might these affect how we program for it?