

G53MDP / G54MDP

Mobile Device Programming

Module Introduction / Schedule

Who am I?

- Dr. Martin Flintham
- martin.flintham@nottingham.ac.uk
- C2, Computer Science
- <http://moodle.nottingham.ac.uk>
- Self enrolment available
- G54MDP or G53MDP?

Lectures and Labs

- Lectures
 - Mondays 12:00-13:00 C33 Exchange
 - Tuesday 12:00-13:00 LT2 Exchange (**starting next week**)
- Labs (**starting next week**)
 - Thursdays 13:00-14:00 A32 CS
 - Fridays 10:00-11:00 A32 CS

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.

Assessment

- 1 hour exam (50%)
- 1 practical coursework (50%)
- More on this later...

Module Overview

- Developing software for mobile devices
 - Mobile hardware
 - The Android operating system
 - App development using Android
 - Overview of iOS and 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 in Java
- 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



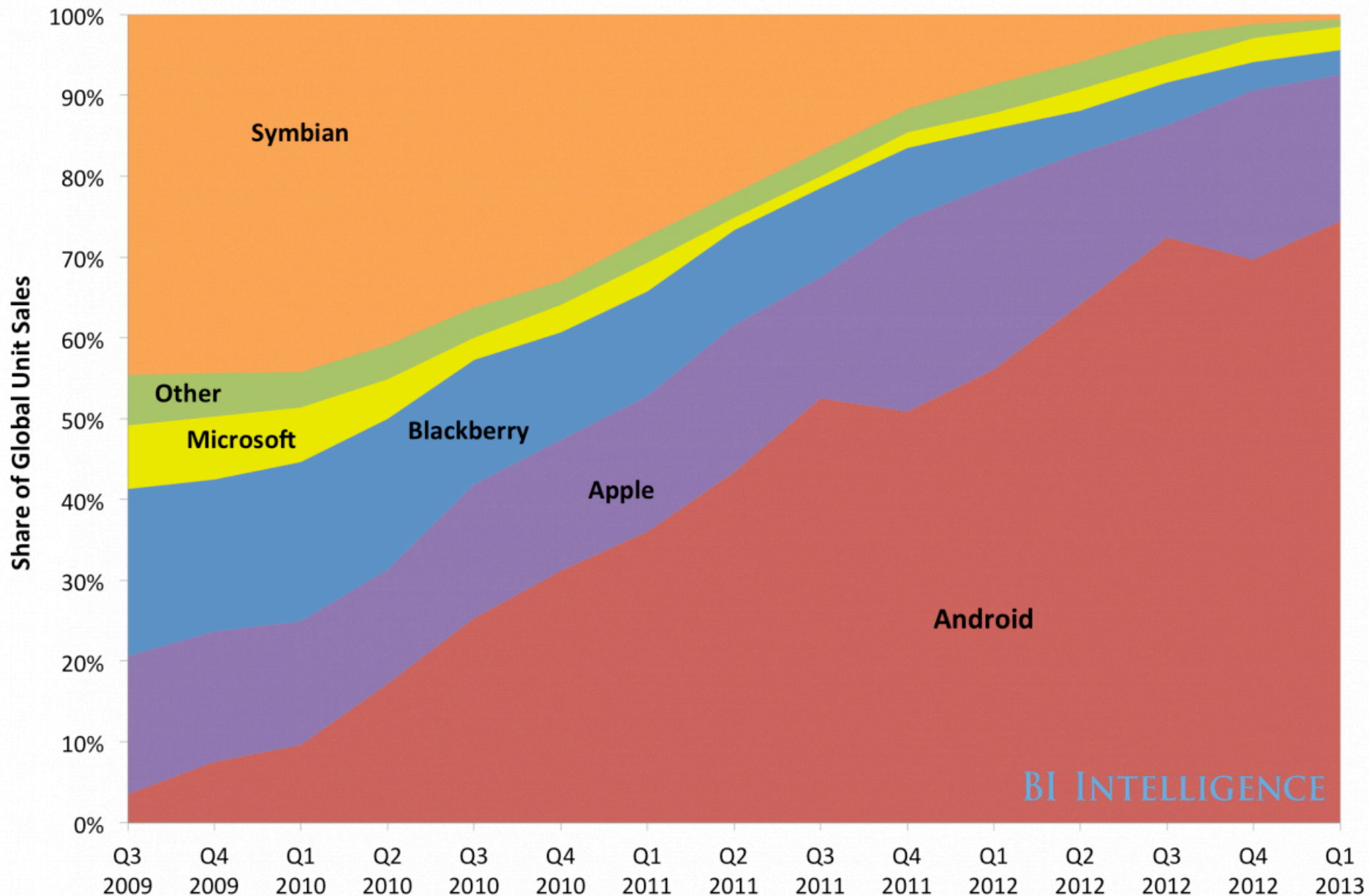
**IPHONE 5:
QUEUE HYSTERIA
IN LONDON**

**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

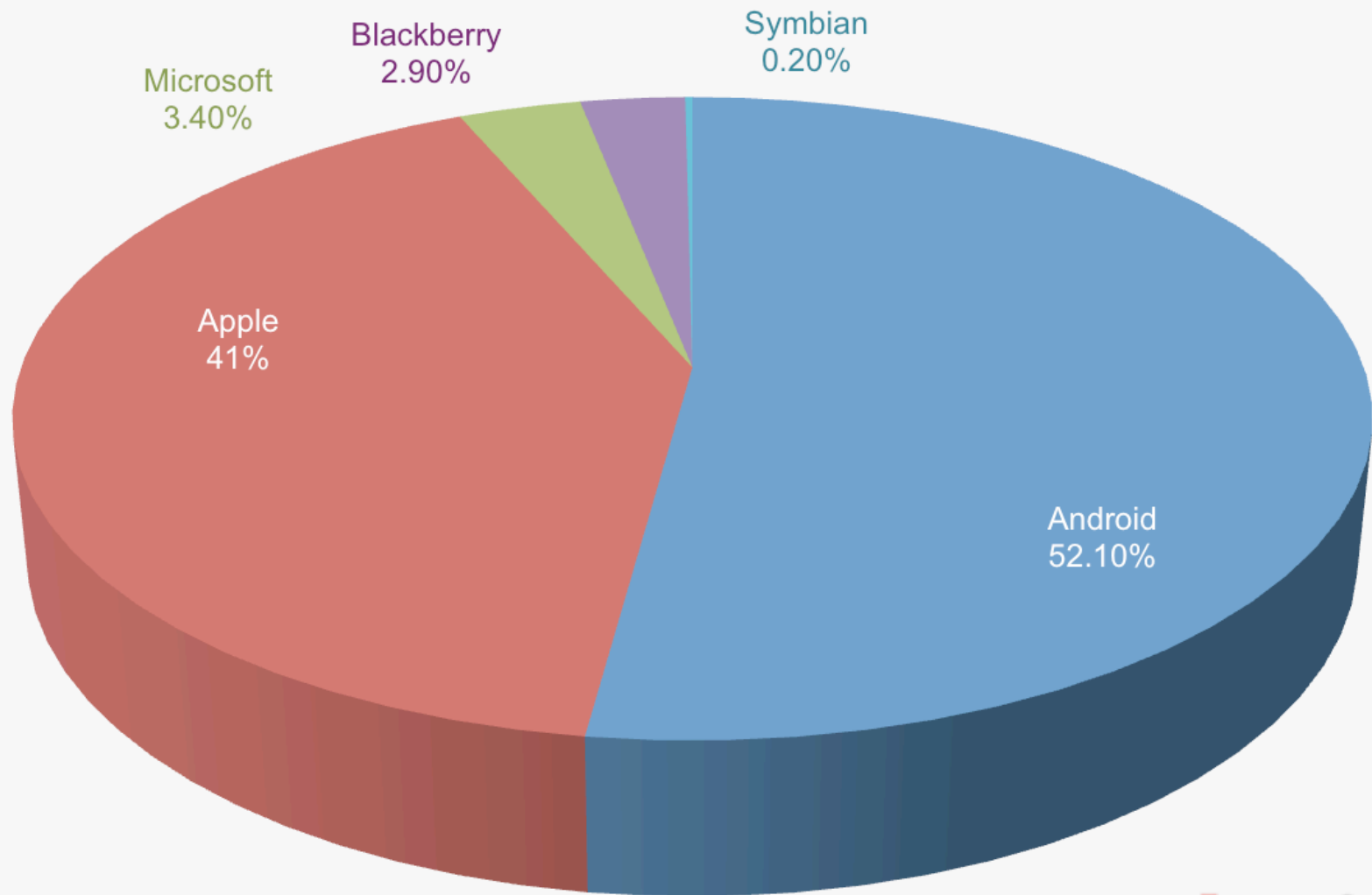


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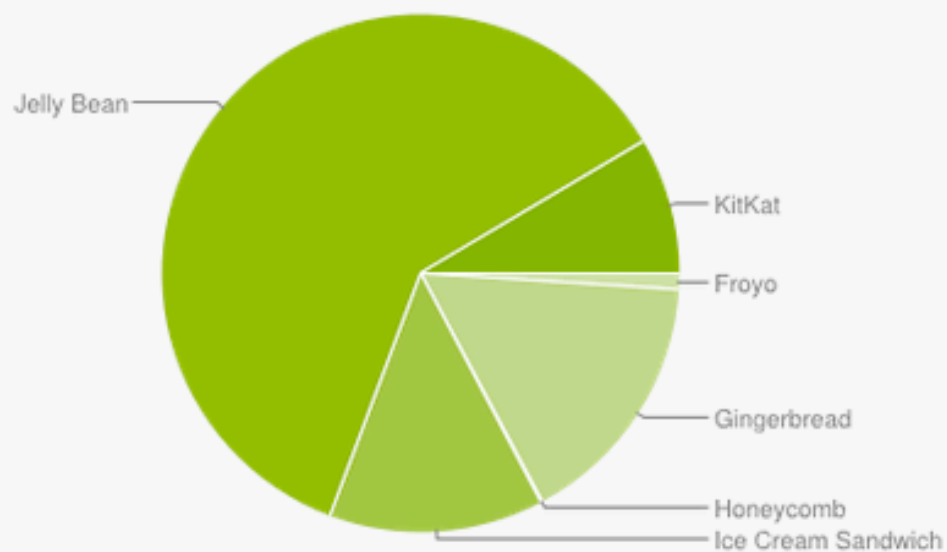
BI INTELLIGENCE

Top Smartphone OSs In The U.S.

3 months, ending February 2014



Version	Codename	API	Distribution
2.2	Froyo	8	1.0%
2.3.3 - 2.3.7	Gingerbread	10	16.2%
3.2	Honeycomb	13	0.1%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	13.4%
4.1.x	Jelly Bean	16	33.5%
4.2.x		17	18.8%
4.3		18	8.5%
4.4		19	8.5%
	KitKat		



Data collected during a 7-day period ending on May 1, 2014.
Any versions with less than 0.1% distribution are not shown.



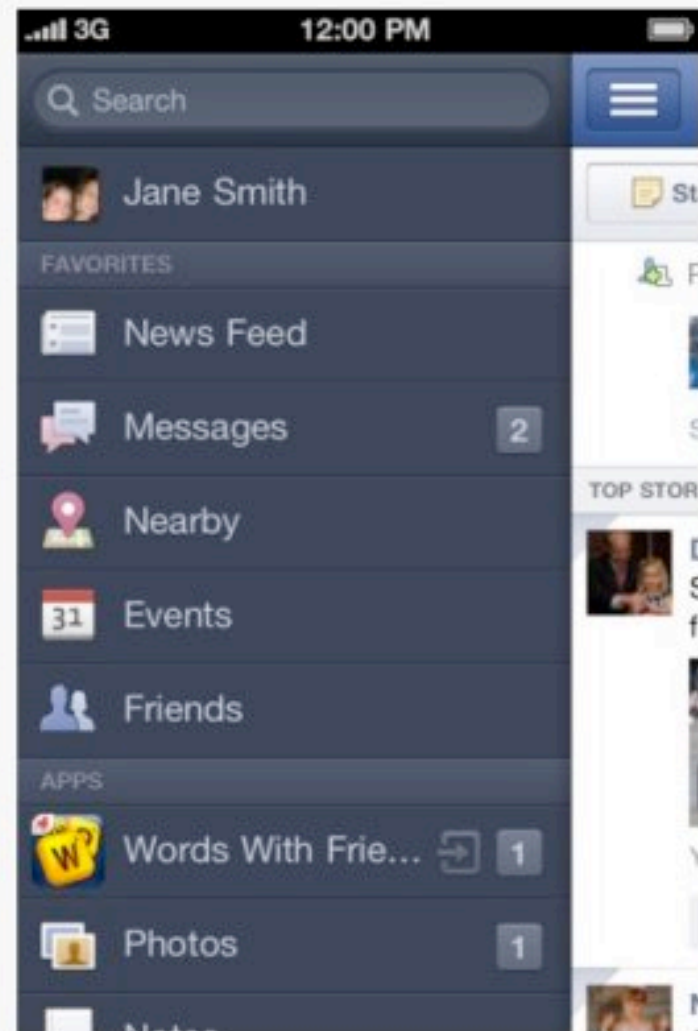
Target: 17980



Moves:
15

Score:
0





Why Mobile Devices?

- Many differences to PCs
 - 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
 - Security and permissions
 - Kernels and the operating system
 - Interprocess communication
 - Native code and JNI

Module Overview

- Touch
 - Gestures
 - Hardware
- Batteries
 - Power management
 - Speed, optimisation and the tyranny of battery life
- Mobile Networks and Sensors
 - Location services
 - Data
 - Telephony (hey, you can still speak to people on a phone)
- iOS overview, Cross-platform development
 - HTML5 (Flash is finally 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 ~18 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%)
- App development coursework (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
- 1 assessed application development
 - Worth 50% of the module mark
 - Intermediate progress checkpoint

Why Android and not iOS?

- We don't have a Mac lab.
- Android SDK and tools are free and cross-platform
 - Android studio
 - <http://developer.android.com/tools/studio/index.html>
 - Android emulator

Questions on course structure?

Brainstorming

- Pick a mobile device (perhaps one that you own)
- Think about what you use it for
- Think about what the characteristics and specifications of that device are

Brainstorming

- Pick a mobile device (perhaps one that you own)
- Think about what you use it for
- Think about what the characteristics and specifications of that device are
 - CPU speed, storage, display type, size, shape, network connectivity, sensors, battery life etc
 - Operating system, mode of interaction / UI

No lecture tomorrow!