



Computing & Information Sciences
FLORIDA INTERNATIONAL UNIVERSITY

Mobile Application Development

lecture1

Fall 2011 - COP 4655 U1

T/R 5:00 - 6:15pm – ECS 135

Steve Luis

Agenda

- Mobile Application Development Intro
- Development Platform
- Syllabus Review

Mobile Application Development

- Design and develop software for mobile devices like a phone or tablet.
- Understand how mobile apps are different from conventional desktop apps.
- Learn how to use the language, OS, IDE and frameworks to effectively create mobile applications.
- Realize the full potential of your app by utilizing the capabilities of mobile device.

Mobile Devices: A brief history



<http://www.livbit.com/article/2009/08/18/evolution-of-mobile-phones-in-matryoshka-style/>

Mobile Devices: A brief history

- Cellular Phones
 - 1980s – early 1990s
 - 1G Analog
 - Dial tone
 - alphanumeric LED display
 - Device specific OS
 - Manufacturer software only



Mobile Devices: A brief history

- Feature Phones
 - 1990s to mid 2000s
 - 2G Digital
 - full featured telephony
 - addressable screens
 - Embedded reusable OS
 - simple applications
 - calendar/SMS/games
 - Limited 3rd party apps



Mobile Devices: A brief history

- Smart Phone
 - mid 2000s to ???
 - 3G Multi-Network
 - Integrated telephony
 - high-res screens
 - Sensing devices
 - full OS/software stack
 - 3rd party - media rich applications



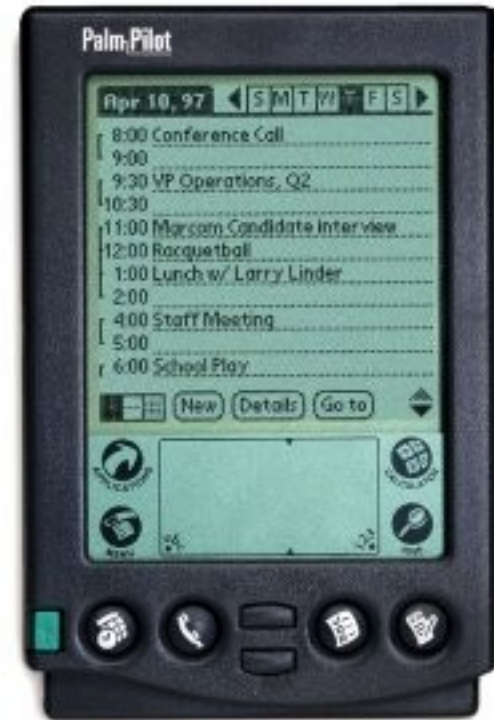
Mobile Devices: A brief history

- Portable Computers
- Laptops
- Netbooks



Mobile Devices: A brief history

- PDAs



Mobile Devices: A brief history

- Tablet



What makes mobile development different?



What makes mobile development different?

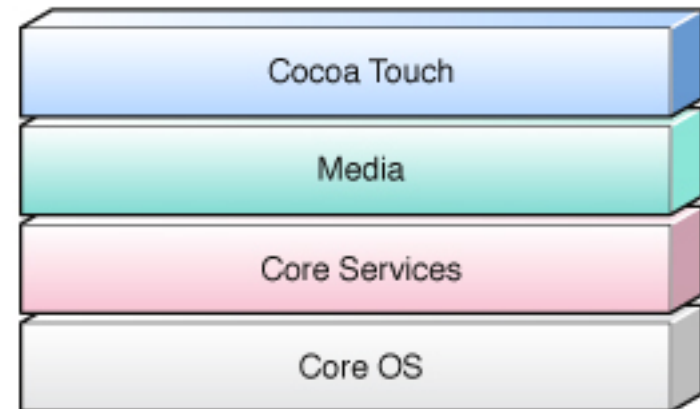
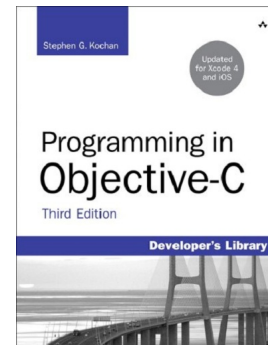
- Desktop = large screen, mouse, stationary
- Laptop = smaller desktop UX, keyboard
- Mobile =
 - Hand-held, small, hi res, screen
 - Multi-touch: Gesture
 - Anywhere: not just sitting
 - Aware: sensors
 - Always on and connected

Special Development Considerations

- Limited operating memory
- Small screen
- Real-time application constraints
- Application response time
- Suspend/Resume
- System and application reliability

Mobile Development Platform

- Apple iMac
- Apple iPhone and iPad
- Apple iOS 4.3
- Apple iOS Frameworks
- Objective – C 3.0
- Xcode 4.02

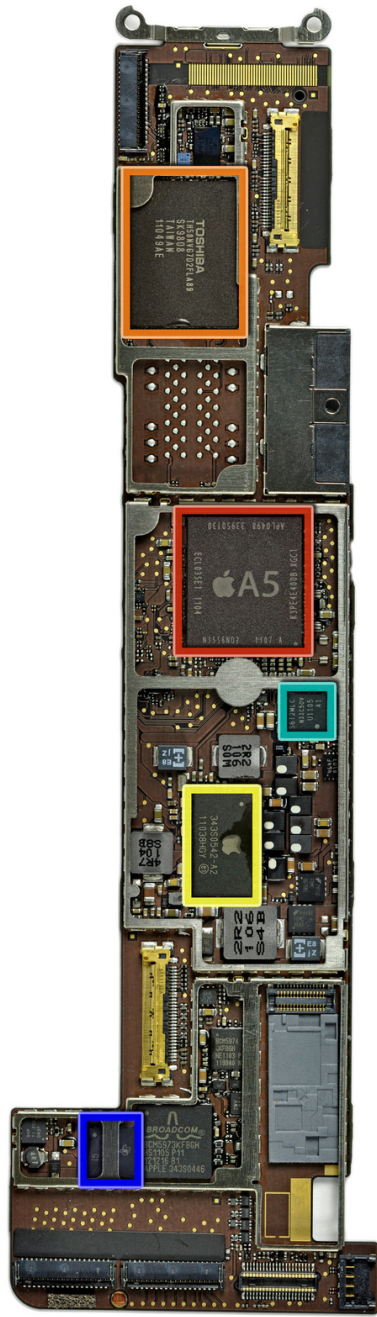


iPhone & iPad

iPhone 3GS	iPhone 4	iPad (original)	iPad 2
In Production	In Production	January 27, 2010 ^[27]	March 2, 2011 ^[86]
CD, 3:2 aspect ratio ^[84]		April 3, 2010 ^[3]	March 11, 2011 ^[87]
	960 × 640 px at 326 ppi	March 2, 2011 ^[citation needed]	In production
8, 16, or 32 GB	16 or 32 GB	9.7 inches (25 cm) multitouch display at a resolution of 1024 × 768 pixels with LED backlighting and a fingerprint and scratch-resistant coating ^[12]	
833 MHz (underclocked to 600 MHz) ARM Cortex-A8 ^{[86][87]}	1 GHz (underclocked to 800 MHz) ^[88] Apple A4 ^[89]	1 GHz Apple A4 system-on-a-chip ^[13]	1 GHz (dynamically clocked) dual-core Apple A5 system on a chip
256 MB DRAM ^{[86][87]}	512 MB DRAM ^[91]	256 MB DDR RAM built into Apple A4 package ^[14]	512 MB DDR2 (1066 Mbps data rate) RAM built into Apple A5 package ^[15]
In addition to previous: voice control, digital compass, Nike+, includes earphones with remote and microphone	In addition to previous: 3-axis gyroscope, Dual-microphone noise suppression, microSIM	16, 32, or 64 GB ^[12]	
3.0 MP 30 frame/s VGA video	Rear 5.0 MP Front 0.3 MP (VGA) Rear 30 frame/s 720p HD video Front 30 frame/s 480p VGA video	Wi-Fi (802.11a/b/g/n), Bluetooth 2.1+EDR ^[12]	
(white not available for 8 GB models)	Black or white aluminosilicate glass and stainless steel	3G cellular HSDPA, 2G cellular EDGE on 3G models ^[12]	
lithium-ion polymer battery ^{[92][93][94]}		Wi-Fi, ^[12] Apple location databases ^[88]	
		Assisted GPS, Apple databases, ^[88] Cellular network ^[12]	
		Accelerometer, ambient light sensor, magnetometer ^[12]	Additionally: gyroscope
		iOS 4.3.5 ^[89]	
		Built-in lithium-ion polymer battery; (10 hours video, ^[12] 140 hours audio, ^[90] 1 month standby ^[91])	
		Wi-Fi model: 680 g (1.5 lb) 3G model: 730 g (1.6 lb)	Wi-Fi model: 601 g (1.32 lb) GSM 3G (AT&T) model: 613 g (1.35 lb) CDMA 3G (Verizon) model: 607 g (1.34 lb)
		9.56×7.47×.528 in (243×190×13.4 mm) ^{[12][92]}	9.5×7.31×.346 in (240×186×8.8 mm) ^[92]
16 and 32 GB: June 19, 2009 Black 8 GB: June 24, 2010	GSM (Black): June 24, 2010 CDMA (Black): February 10, 2011 GSM and CDMA (White): April 28, 2011	Home, sleep, volume rocker, variable function switch (originally screen rotation lock, mute in iOS 4.2, either in 4.3) ^[12]	
16 and 32 GB: June 24, 2010 Black 8 GB: In production	In production	N/A	720 p HD still and video camera 30fps and 5x digital zoom
		N/A	VGA-quality still camera



ifixit



- Apple 1GHz A5 dual-core Processor with a 200MHz bus and 512 MB of Samsung manufactured RAM.
- Toshiba TH58NVG7D2FLA89 16GB NAND Flash
- Apple 343S0542 - this looks like the Dialog Semi power management chip found in last year's iPad - all of those inductors and capacitors surrounding it are a clue.
- Texas Instruments CD3240B0 11AZ4JT G1 touchscreen line driver, working with the Broadcom BCM5973 and BCM5974 chips shown above.
- S6T2MLC N33C50V Power Management IC
- The A5 processor has manufacture dates of late January and mid-February 2011. Production was clearly ramping up through the last minute. It looks like the A5 processor is the APL0498, replacing the A4/APL0398 seen in the iPad 1 and iPhones.
- Apple-branded 338S0940 A0BZ1101 SGP. This looks like the Cirrus audio codec [Chipworks](#) found in the Verizon iPhone,

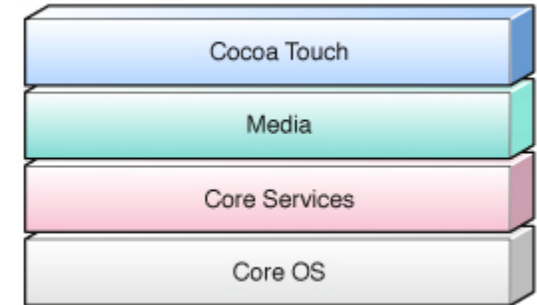
Apple iOS

- Unix based Mach Kernel and BSD interfaces
- Same as Mac OS X with some variations
- Virtual Memory wo/ paging
- Background applications

iOS App Runtime Environment

- Designed for fast and secure execution
- Multi-tasking environment
- Save state
- Constrained memory → Purge app
- Restore state

iOS SDK 4.3



Cocoa Touch

Multi-touch events and controls
Accelerometer support
View hierarchy
Camera support

Media

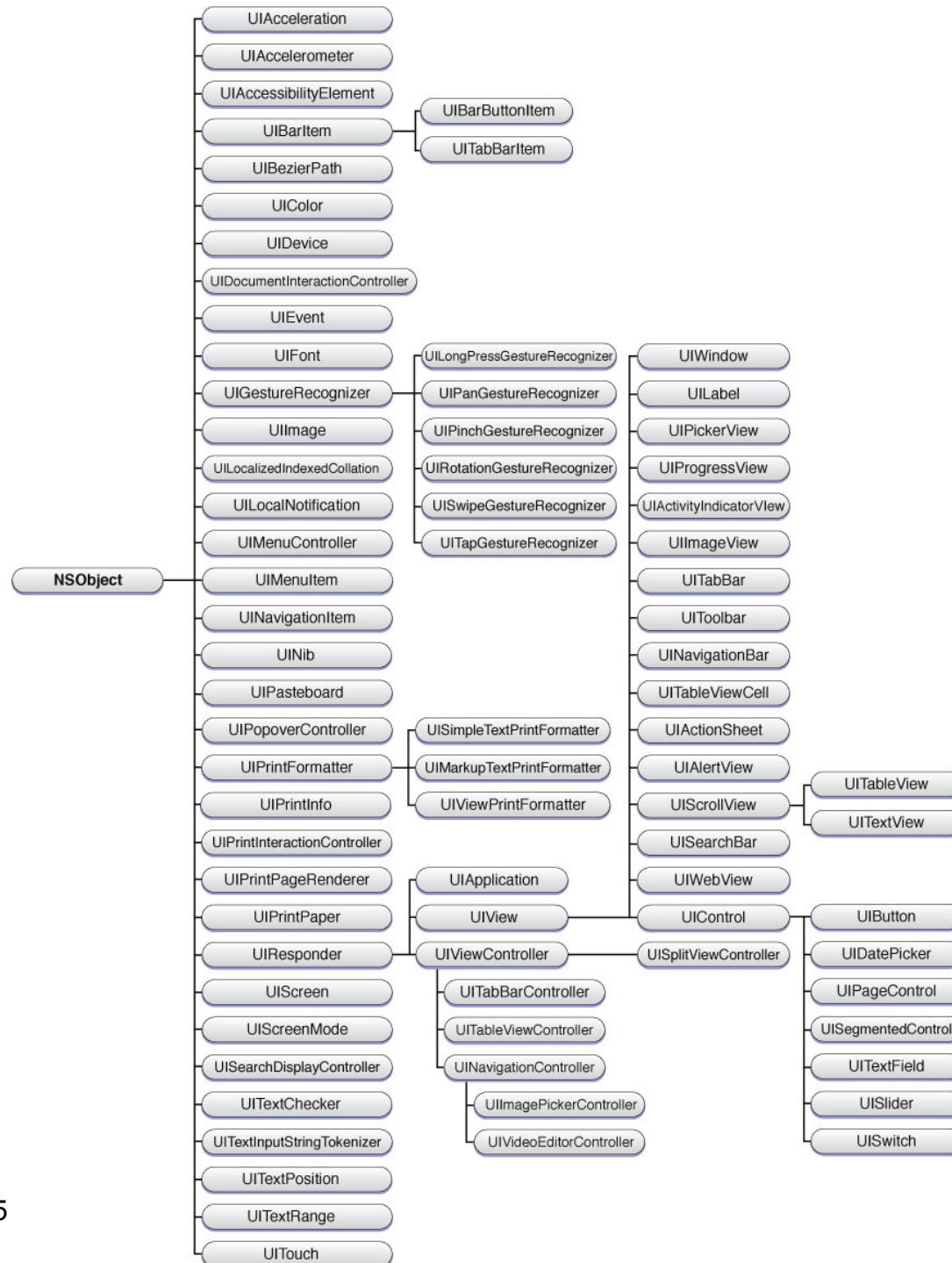
OpenAL
audio mixing and recording
Video playback
Image file formats
Quartz
Core Animation
OpenGL ES

Core Services

Networking
Embedded SQLite database
Core Location
Threads
CoreMotion

Core OS

TCP/IP
Sockets
Power management
File system
Security



Demo: UINavigationController



Required Apple Developer Registration

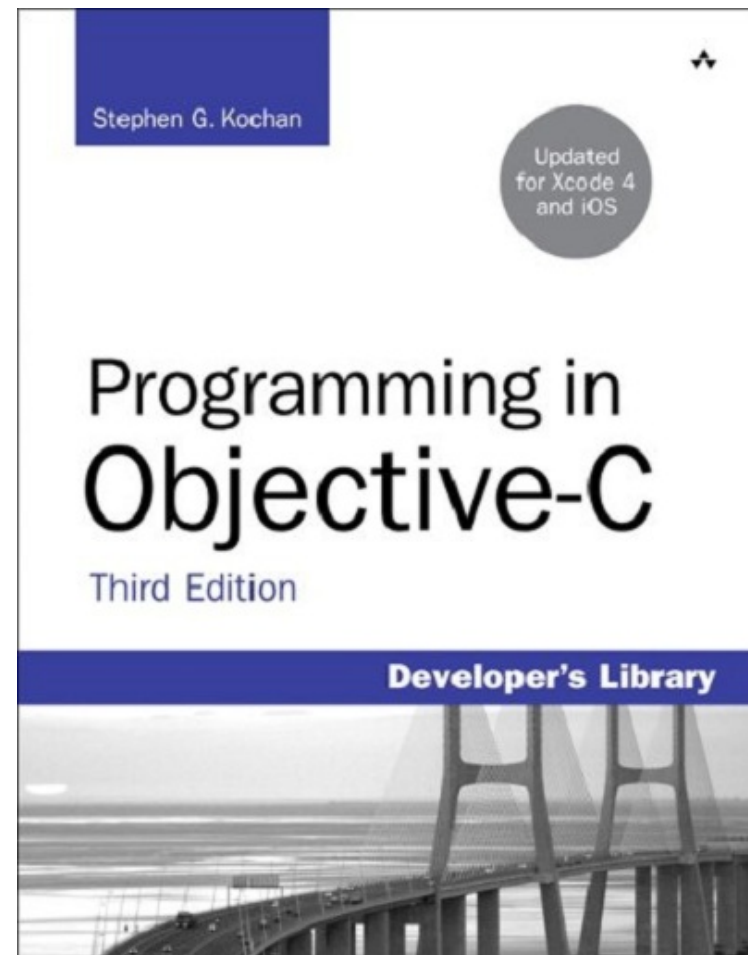
- Software, Documentation, Tutorials, Videos, Sample Code, Support Forum
- Free Apple Developer Account at: developer.apple.com
- Use your FIU student email account as ID
- Provide your ID to me next class

Buy the class textbook

Study assignment:

Review the Glossary: Appendix A

Begin reading Chapter 21



Syllabus Review