

CS 344 Mobile App Development

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This Semester: iOS Projects



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Main Course Goals

1. From May 1 forward, when you find yourself thinking:
It would be really cool if there was an app that did ...
that you can actually create that app.
2. To further develop your software engineering skills.

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We Assume

- No experience with iOS
- Significant experience with OO programming and command of material in CS 102
- Familiarity with C very helpful (e.g., CS 271)
- An ability to pick up a new programming language and framework on the fly
- The ability to design and develop a substantial piece of software
- Independence, schedule discipline

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Today

- Introductions and Course Administration
- Overview of iOS App Development
- A Tour of Xcode and a couple of simple apps

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Course Home Page

<http://www.cs.bc.edu/~muller/teaching/cs344/s12/>

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Course Work

- Four problem sets
- A midterm exam
- Five-minute check-in meetings every 2 weeks
- Project

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Course Work

- Class attendance recommended but not required.
- Several classes will take the form of labs
- Class attendance is definitely required for guest speakers

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Projects

- A significant iOS app of your choosing
- If you don't have a project in mind, see me, I have a few
- You should talk to me about your project idea ASAP!

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Project Schedule

- Project proposal (1-2 pages) due by **Friday February 3, 2012**
- Progress report: **Friday March 2, 2012**
- **Project due: Friday March 30, 2012**
- Project Presentations: **4/24, 4/26, 5/1, 5/3.**
- Five-minute check-in meetings with me every 2 weeks
- Best App Prize

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[iOS Features](#) available for Projects

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Apple's [iOS Development Center](#)





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Apple's Developer University Program

- Registration to get IDE (free)
- Certification & Provisioning required to deploy apps on actual iOS devices
- Submitting Apps to iTunes



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- Language Objective-C and Runtime
- Tools  Xcode  Interface Builder
- Frameworks  Foundation  UIKit

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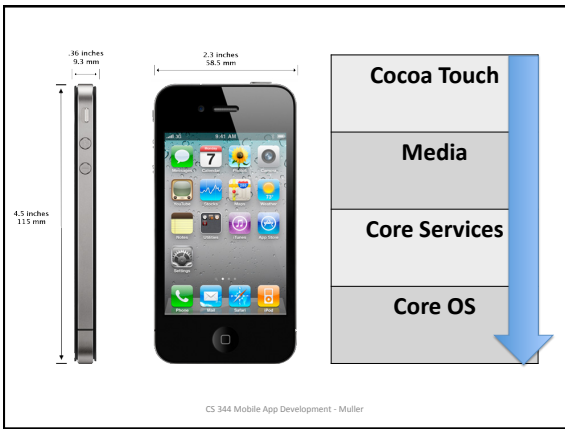
Xcode IDE

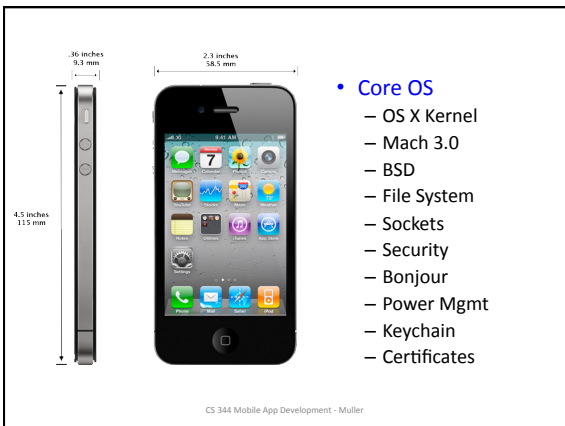
- (IDE = Integrated Development Environment)
- Xcode + Interface Builder + Simulator
- Editor, Compiler, Linker, Debugger, Revision Control System

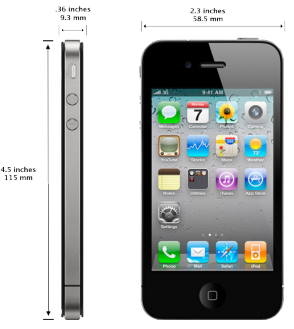
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Overview of iOS

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- **Core Services**
 - File Access
 - SQL Lite
 - Collections
 - Address Book
 - Threading
 - Core Location
 - Networking
 - Preferences
 - URL Utilities

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- **Media**
 - Core Audio
 - JPG, PNG, TIFF
 - PDF
 - Quartz 2D
 - Open GL ES
 - Audio Recording
 - Audio Mixing
 - Video Playback
 - Core Animation
 - PDF

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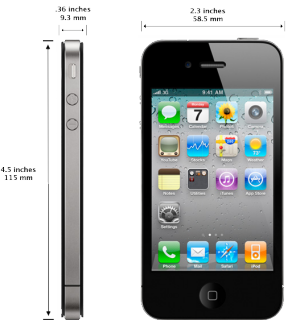


- **Cocoa Touch**
 - Foundation Classes
 - UIKit
 - Multi-touch Events
 - Multi-touch Controls
 - Core Motion
 - Map Kit
 - Localization
 - Alerts
 - Image Picker
 - Camera
 - Controllers
 - Web Views
 - View Hierarchy

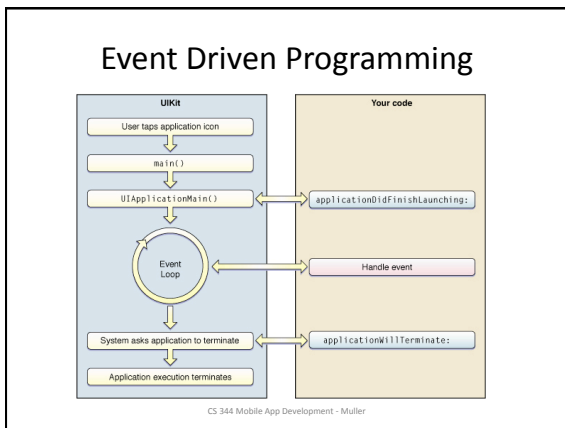
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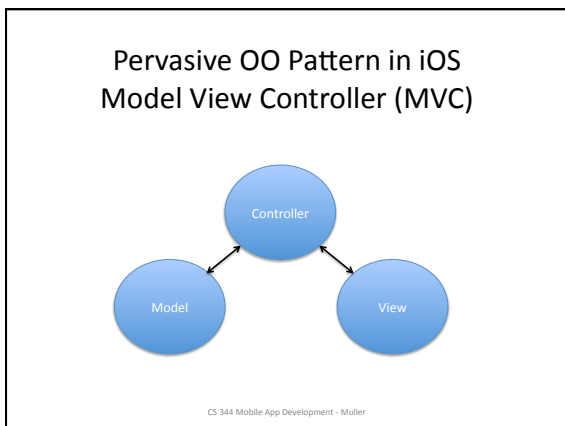
• Constraints

- Screen Size:
 - 640 x 960 pixels
 - 320 x 480 (older models)
 - 1024 x 768 (iPad)
- RAM
 - 512MB



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Objective-C

- A superset of C, a marriage of C and Smalltalk-80 (language of choice at NextStep)
- Message passing syntax with keyword arguments, ala Smalltalk-80
`[self.view setBackgroundColor:[UIColor redColor]];`
- Dynamic method dispatch, highly optimized with CLANG/LLVM compiler

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Objective-C

- Explicit pointer syntax: `FooBar *f`; ala C
- Method names & keyword arguments:

```
- (BOOL) drone:(Drone *)drone didLandAt:(Location *)loc
{
...
}
```
- Method names include all of the keywords: `drone:didLandAt:`

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Objective-C

- Tight integration with IDE (name completion, documentation, etc...)
- Macros (syntactic forms that are rewritten at compile-time)
`@property (strong, nonatomic) IBOutlet (UITextField *)myText;`

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Objective-C

- Public specifications (interfaces) in header files (file.h)
- Implementations in source files (file.m)
- Memory Managed using (Automatic) Reference Counting ARC rather than Garbage Collection

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Example.h

```
#import <UIKit/UIKit.h>

@interface CalculatorViewController :
    UIViewController

@property (weak, nonatomic) IBOutlet
    UILabel *display;

@end
```

Example.m

```
#import "CalculatorViewController.h"
#import "Model.h"

@implementation CalculatorViewController

@synthesize display = _display;

- (IBAction)digitPressed:(UIButton *)sender
    NSString *digit = [sender currentTitle];

...

@end
```

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Properties

- @property declares an instance variable and its setter and getter methods

E.g., @property Foo *myFoo;

Gives rise (roughly speaking) to declarations:

```
Foo *myFoo;
- Foo *myFoo; // the getter method
- void setFoo:(Foo *)v; // the setter method
```

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Properties

- @synthesize generates an implementation of the variable and the setter and getter methods.

E.g., @synthesize myFoo; gives rise (roughly speaking) to:

```
Foo *myFoo;  
- Foo *myFoo {return Foo; } // the getter  
- void setFoo:(Foo *)v // the setter method  
{  
    myFoo = v;  
}
```

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Tour of Xcode

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Next Time

- A demo of an RPN Calculator App (from Stanford CS193P)
- Pick a lab partner or see me if you can't find one
- Accept my email invitation to join the "team"
- If you have an iOS device, find it's ID number (in iTunes) and send it to me.

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