

INTRO TO IOS DEVELOPMENT

CS 462 - CAPSTONE
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IOS DEVELOPMENT

- Controlled environment means more provided API functionality than typical OS.
- Cross compilation for ARM processor.
- Resource limited platform (memory, speed, power).
- Applications are extremely focused.



OUTLINE

- **Objective-C** [isn't as scary as you think!]
- Interface Builder & Instruments
- Xcode Sample Projects
- Provisioning

OBJECTIVE-C

- Wrapper over C, minor syntactical changes.
- Source files end in .m
- You can use C & C++ in an Obj-C file! This means you can use many std libraries.*
- Not all Cocoa NS prefix APIs are available on the iPhone. iOS specific APIs use UI prefix.

*Some not available on iOS, only under Mac OS

OBJ-C TO C SYNTAX

- `#import => #include`
- `-(void)didReceiveMemoryWarning {}`
`=> void didReceiveMemoryWarning {}`
- `[self release]; => delete this;`

OBJ-C TO C SYNTAX

- `@interface {...} AND @end`
`=> class {...};`
- `@private => private: SAME FOR PUBLIC`
- `@implementation AND @end WRAP ALL`
`FUNCTIONS IN THE .M FILE (BUT NOT #importS).`

OBJECTIVE-C TYPES

- id - 'Untyped type', can be pointer or value
- BOOL - boolean values YES and NO (or TRUE and FALSE)
- int, float, double, char - same as C
- NULL - same as C
- NSString - Must be initialized with @-sign: @""
- NSLog(@"printf %f\n", f_val);

↑
Differentiates from C-String (char* str)

QUICK FUNCTION CONSTRUCTION

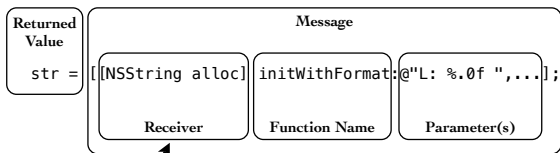
- @property (...) UILabel *statusInd;
 - readonly, assign, retain, nonatomic
- @synthesize statusInd;
- Getters & Setters for free!

<http://developer.apple.com/iphone/library/documentation/Cocoa/Conceptual/ObjectiveC/Articles/ocProperties.html>

OBJ-C FUNCTIONS

MESSAGE PASSING

```
str = [NSString alloc] initWithFormat:@"L: %.0f ",...];
```



What does message passing mean?

CALLING FUNCTIONS

```
IBOutlet UILabel *DR0x; // In header file (.h)
```

```
1 // In implementation file (.m):
2 - (void)myFunc {
3     NSString *_drox;
4
5     _drox = [NSString alloc] initWithFormat:@"L: %.0f",left];
6
7     [[self DR0x] setText:_drox];
8 }
9
10 @synthesize DR0x; // Makes setText function (and getText)
```

- You can use parameters in any order
- [NSString alloc] => NSString()
- [[self DR0x] setText:_drox]; => DR0x.setText(_drox);

DEALING WITH (MULTI-)TOUCHES

```
- (void)touchesBegan:(NSSet *)touches withEvent:(UIEvent *)event;
- (void)touchesMoved:(NSSet *)touches withEvent:(UIEvent *)event;
- (void)touchesEnded:(NSSet *)touches withEvent:(UIEvent *)event;
```

Iterator

```
1 NSEnumerator *enumerator = [touches objectEnumerator];
2 id value;
3 CGPoint pt;
4
5 while ((value = [enumerator nextObject])) {
6     pt = [[touches member:value] locationInView:self];
7     // Deal with each touch here...
```

DEALING WITH (MULTI-)TOUCHES

- You don't need these functions for dealing with UI-elements.
- Similar functions for the accelerometer
- Works just like a mouse callback! (Nothing new here).

http://developer.apple.com/iPhone/library/documentation/UIKit/Reference/UIResponder_Class/Reference/Reference.html

CLASS REFERENCE

- NSString http://developer.apple.com/iphone/library/documentation/Cocoa/Reference/Foundation/Classes/NSString_Class/Reference/NSString.html
- UILabel http://developer.apple.com/iphone/library/documentation/UIKit/Reference/UILabel_Class/Reference/UILabel.html
- UIImage http://developer.apple.com/iphone/library/documentation/UIKit/Reference/UIImage_Class/Reference/Reference.html
- NSSet http://developer.apple.com/iphone/library/documentation/Cocoa/Reference/Foundation/Classes/NSSet_Class/Reference/Reference.html

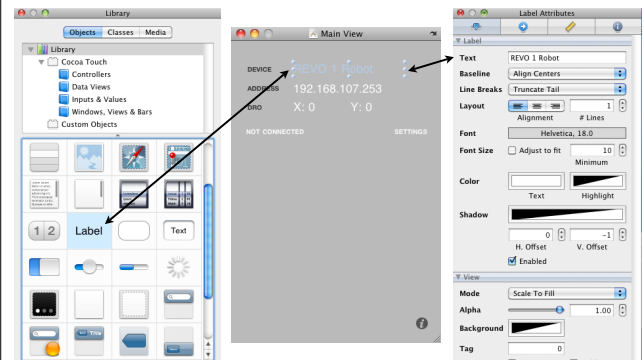
OUTLINE

- Objective-C
- **Interface Builder & Instruments**
- Xcode Sample Projects
- Provisioning

INTERFACE BUILDER

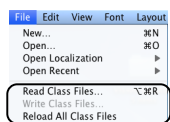
- Creates .xib files which contain serialized objects
- Drag & drop ease for interface object placement
- Initialized before runtime to speed up apps & streamlines development process!
- Initialization is done by developer...

INTERFACE BUILDER



INTERFACE BUILDER

- Interface Builder can generate files or it can link with your code:



- Can reload classes to find new connections.
- Must use IB to do linking between code & GUI elements!

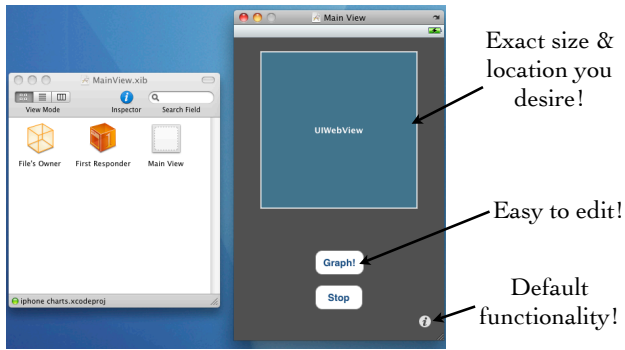
SIMPLE EXAMPLE

- Connect to buttons with Interface Builder
- Load dynamic data over http
- Connect UIWebView functionality to a button?



Goal

STEP 1: DESIGN UI



STEP 2: OUTLETS

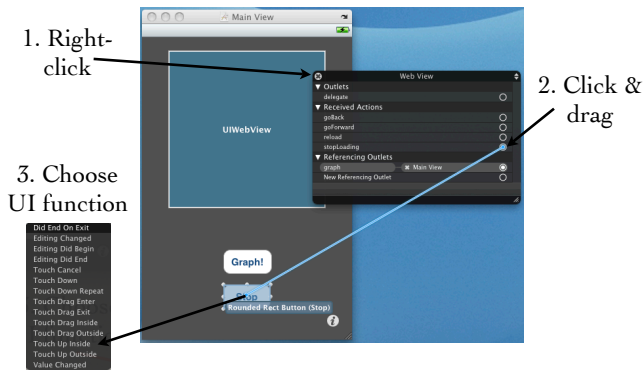
```
@interface MainView : UIView
{
    IBOutlet UIView *graph; ← Pointer linked by IB
}

@property(readwrite, assign) UIView *graph;

-(IBAction)onGraphClick; ← Callback function linked to by IB

@end
```

STEP 3: CREATE LINKS



STEP 4: CODE

• Implement your callback and done!

```
@synthesize graph;

-(IBAction) onGraphClick
{
    NSString *html = @"...";
    NSURL *url = [NSURL URLWithString:@""];
    [graph loadHTMLString:html baseURL:url];
}
```

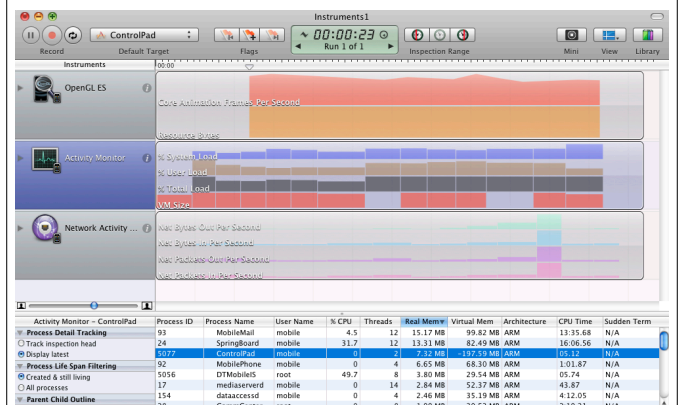
INSTRUMENTS

- Code profiling
- Record & replay events
- Create custom analysis
- Monitor system usage (especially important for embedded apps)

<http://developer.apple.com/iphone/library/documentation/DeveloperTools/Conceptual/InstrumentsUserGuide/Introduction/Introduction.html>



INSTRUMENTS



OUTLINE

- Objective-C
- Interface Builder & Instruments
- **Xcode Sample Projects** [ALWAYS START HERE!]
- Provisioning

SAMPLE PROJECTS

Design. Code. Build. Innovate.
Here's where it all happens for Apple developers.

1. iOS Dev Center

Submit Your i

<http://developer.apple.com>

2. Click on getting started documents

(Get Xcode here)

SAMPLE PROJECTS

Sample Code

- Free!
- Easy!
- Fast!
- USE IT!

Examples for virtually every major API functionality!!

OUTLINE

- Objective-C
- Interface Builder & Instruments
- Xcode Sample Projects
- Provisioning

RUNNING ON A DEVICE

- Code has to be signed for authenticity
- Development devices need to be “provisioned” to run developer code

iOS Provisioning Portal

CERTIFICATES

Provisioning Portal

- Home
- Certificates
- Devices
- App IDs
- Provisioning
- Distribution

- Need a developer certificate - Apple will issue you one to any email address you want.
- Need the “WWDR intermediate certificate”
- Installs into keychain

Name	Provisioning Profiles	Expiration Date	Status	Action
Ben Tribelhorn	Team Provisioning Profile: *	Oct 18, 2012	Issued	Download Revoke

*If you do not have the WWDR intermediate certificate installed, [click here to download now.](#)

CERTIFICATES @ OSU

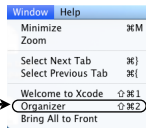
If you run into trouble...

- Open “Keychain Access” (in /Application/Utilities)
- By default certificates want to be System-level.
- Install manually - Drag files into your “login” keychain



DEVELOPMENT ON A DEVICE

- Can be found in Xcode
- Will need to click “Use for Development”
- Add your UDID to the provisioning portal



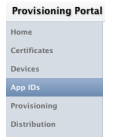
Provisioning Portal

- Home
- Certificates
- Devices
- App IDs
- Provisioning
- Distribution



APP ID

- What is this?
- Each application has its own ID.
- WHY?
 - Share keychains/iCloud docs between apps
 - Push Notifications
 - In App Purchases



PROVISIONING

- Select all the certificates and devices for app
- Xcode will install the profile (view it in the Organizer)

(Must be admin to create these.)

Create iOS Development Provisioning Profile

Generate provisioning profiles here. All fields are required unless otherwise noted. To learn more, visit the [How To](#) section.

Profile Name:

Certificates: [Select All](#)

Ben Tribelhorn Ray Anderson

App ID: [Select an App ID](#)

Devices: [Select All](#)

Aaron Moore's iPhone Andrew Moore's iPad

Ben Tribelhorn's iPhone Ben's iPhone

Ray's iPhone

PROVISIONING DETAILS

- Provisioning profiles expire. Will need to renew online periodically.
- There is such thing as a “Team profile”
- Xcode organizer can automatically download profiles relevant to your device.
- Distribution requires a different set of signing actions.

CODE SIGN IN XCODE

- ⌘ Under the project “Build Settings”
- ⌘ Must sign code to run on device. Strange errors usually imply this hasn’t been set.
- ⌘ Certificate must be in Keychain to be found



USEFUL LINKS

- ⌘ <http://developer.apple.com/ios>
- ⌘ <http://www.cocos2d-iphone.org> - Popular 3rd Party API for developing 2D games & graphical/interactive apps.

Multiple Platform Development:

- ⌘ <http://www.appcelerator.com> - Javascript
- ⌘ <http://phonegap.com> - HTML5

Questions?