

## ATLS 4120/5120: Mobile Application Development

### Week 1: Intro to iOS App Development

What do you think are some differences that you have to consider when developing mobile apps?

- Limited screen size
- Each app has one window
- Limited system resources
  - Apps need to start and quit quickly
- Might not always have Internet access
- Could be interrupted
- No physical keyboard and mouse for interaction

iOS devices <http://iosdesign.ivomyntinen.com>

#### SDK Components

- Xcode
  - Integrated Development Environment (IDE) to create and manage development projects
  - Interface Builder
    - Tool to build your application user interfaces
- Frameworks
  - Software libraries that provide specific functionality
- Simulator
  - Simulates running your apps on your Mac
  - Enables you to run, test, and debug iPhone and iPad apps on your Mac
  - Recreates most of the physical behavior of an actual device. Except:
  - No phone, camera, GPS, Accelerometer, iPod, bluetooth
  - Doesn't emulate memory usage
- Instruments
  - Gather and analyze data on your apps behavior

#### App development flow

- Start with an Xcode template
  - Enables you to easily create different types of apps
  - Single View app
    - Good for apps with a single view
    - Views are the basic building blocks of all UI elements on the iPhone/iPad
    - A view is a rectangular portion of the screen that draws content
- Design the user interface (UI)
- Hook up the UI and the code
- Write the code using the frameworks
- Build and run your app (iteratively)
  - Compiles your files creating a single library
- Test and debug until you're done

#### Xcode

Use Spotlight to search for Xcode

You should get a welcome screen with a choice to create a new project.

Or menu: File | New | Project

## First app

(helloworld)

iOS Application: Single View Application template

Product name: helloworld

Team: None

Organization name: Your name

This will be used in a copyright notice that Xcode automatically creates.

Organization identifier: ATLAS or something else

xCode will combine the product name and organization identifier to create a unique bundle identifier for your app.

Language: Swift

Device: iPhone

Leave Use Core Data, Include Unit Tests, and Include UI Tests all unchecked.

Next

Choose a folder for all your iOS projects.

Leave create local git repository unchecked.

Create.

xCode automatically creates the projects and files needed for helloworld.

## Xcode Tour

[https://developer.apple.com/library/content/referencelibrary/GettingStarted/DevelopiOSAppsSwift/BUILDABasicUI.html#/apple\\_ref/doc/uid/TP40015214-CH5-SW1](https://developer.apple.com/library/content/referencelibrary/GettingStarted/DevelopiOSAppsSwift/BUILDABasicUI.html#/apple_ref/doc/uid/TP40015214-CH5-SW1) (image)

### Toolbar

Lets you perform tasks to build and run your project

Left drop down lets you choose how you want to build and run your project

In the middle is the activity view which shows what's going on at any given time

### Editor

- Standard editor-single pane to edit a file
- Assistant editor-2 panes to see related files
- Version editor-compare versions

View lets you show or hide the navigator, debug, and utilities pane.

Organizer shows related information including the documentation.

### Jump Bar

Lets you quickly jump to different elements in your project.

- Popup menu
- Forward/back files
- Segmented popup arranged as the hierarchy of your project

### Navigator

Let's you view all the files that make up your project.

Organized in Xcode but it does not relate to where the files are really organized on your hard drive.

Project view:

- Project files – the files that make up your project
- Supporting files – all other files including images
- Frameworks – the iOS libraries your project uses
- Products – the application binary

### Symbols

### Search

Issues – errors or warnings  
Debug  
Breakpoint  
Log

### Utility Pane

Provides context-sensitive information.

- File inspector
- Quick help

### **Interface Builder Tour**

Click on the Main.storyboard file to see the view created which right now will be blank.

Interface Builder lets you visually build your interface

- What your layout will look like
- How your interface behaves and interacts

The storyboard defines the interface and relationships of your views

Right now your storyboard has one view. Click it.

### Hierarchy view

Click the little button in the lower-left corner of the editing area to bring up the hierarchy view.

This shows the content of the storyboard, split up into scenes and content.

We have just one scene, called View Controller Scene that has a View Controller, which in turn has a View (along with some other things you'll learn about later).

View is the object with the area that a user can see and interact with. It was created when we selected the Single View Application template.

All gui objects will go in the view.

This will be a useful way to see everything in your storyboards.

First Responder is the object that the user is currently interacting with.

Exit will be useful when we have multiple views.

You can also see these by clicking on the top bar of the view.

### Utility View

Information for the currently selected objects. This is where you set various properties.

File inspector

Quick Help

Identity inspector

Attributes inspector

Size inspector

Connections inspector

### Library

File templates

Code Snippets

Objects(square in a circle): Contains all the UI objects you can use in your user interface by simply dragging and dropping them onto your view.

Media library

Search field at the bottom of the library.

## Building Hello World

Click on Main.storyboard

You'll notice that the default view is for an iPhone7. If you click on View as: down below you can change this. You can leave it, doesn't matter for now.

Go into the Object library (square with a circle)

Scroll or search for label

Drag a Label from the library into the View window.

Put it anywhere you like. You might see dotted blue lines that help center it.

Double click the label and type Hello World! in it.

You can use the handles to stretch the label to see the whole text.

Up in the toolbar you will see the name of your project. If you click on it you can chose a simulator.

Pick iPhone7 (or other, it doesn't really matter)

Build & Run to compile it and run it in the Simulator.

You can play around with your text by going into the attributes inspector and changing its color, font, shadow, background color, etc.

## Interactivity

Now let's make it interactive so our app does something.

Now drag a button into the view.

Place it below the label.

Double click the button and add some text like "Say hello"(this changes the title in the button attributes)

Double click the label and remove the text so it's blank (or change it in attributes)

To still see the outline of the label Editor | Canvas | Show Bounds Rectangles

Note where the label and button got added in the view hierarchy.

You can run it again in the simulator but you can preview the layout even quicker.

Show the Assistant Editor(middle editor button, 2 circles) and then on the right side click on the jump bar and choose Preview. This will show the layout on an iPhone. Using the '+' on the bottom left of that pane you can add as many devices as you want to preview.

If you run it in the Simulator you'll see that it doesn't do anything yet.

Xcode created a file called ViewController.swift

This view controller will control our view.

// are comments

`import UIKit` imports the UIKit framework which is the foundation of all iOS UI (import is like include in C)

`class ViewController: UIViewController` defines our class ViewController.

`UIViewController` is the superclass (which is in UIKit which is why we imported that)

All the code for this class will be in the curly braces.

Now we have to connect the interface and the code.

Go back into your storyboard.

We also need to see the swift file so open up the assistant editor. Go to Automatic if your Swift file doesn't open.

Click on the button in your storyboard and then hold down the control key.

Then click and drag from the button over to the swift file.

Notice the blue fishing line being drawn between these two. This is how we'll connect them.

Move your cursor between the curly braces for the class.

When you see a grey box appear release the mouse button.

This window lets you set up the connection between the button and your code.

Connection: Action

Name: buttonPressed

Type: UIButton

Event: Touch Up Inside is the standard event to use for buttons.

Arguments: Sender

Now hit Connect.

You should now see in the swift file

```
@IBAction func buttonPressed(_ sender: UIButton) { }
```

This is a method called buttonPressed that will be called when the user taps the button.

Before we implement buttonPressed we have to connect our label.

Instead of hunting for that empty label you can click on label in the object hierarchy.

(use the button on the bottom left to expand the hierarchy if you can't see it)

(Editor | Canvas | Show Bounds Rectangles to see UI element borders)

Control-click from the label to the swift file.

Connection: Outlet

Name: messageText

Type: UILabel

Leave storage as weak.

Connect

Notice this created in the swift file

```
@IBOutlet weak var messageText: UILabel!
```

If you named either of these differently, don't change them, it will break it, just go with what you have.

Now we're ready to implement the method for the button. Go into the swift file

```
@IBAction func buttonPressed(sender: UIButton) {  
    messageText.text="Hello World!"  
}
```

This assigns the string "Hello World" as the text of label when that action occurs (the user clicks the button).

Notice the autocomplete. Autocomplete is your friend. Get used to hitting return or tab to accept a choice. It makes the typing easier, guards against typos, and helps signal when something is wrong.

Build and Run. Preview is just to see the layout, you must use the Simulator to actually run the app.

### Finishing Touches

In the simulator hit the home button to go back to the home screen. (Hardware | Home)

We need an icon!

In the Project Navigator click on the Assets.xcassets folder.

Click on AppIcon

You'll notice 4 spots, for notification, settings, spotlight, and app.

Let's just add the app icon for the home screen, you can do the others later.

60 pt is points, not pixels. Depending on the resolution there is a different ratio between points and pixels. On early iPhones 1 pt=1 px but On most of the later devices with a Retina display, a single point is actually a 2 × 2 pixel square. On the iPhone 6 Plus 1 point is a 3 × 3-pixel square.

We will need a 120x120 pixel image for the 2x icon, and a 180x180 pixel image for the 3x icon. They MUST be png files.

PNG is the best format to use as Xcode optimizes them to make them the most efficient to use in iOS apps

iOS will automatically add a mask to make it look like the others.

Drag the 120x120 png file into the app 2x space.

Drag the 180x180 png file into the app 3x space.

Now run it and go to the home screen (Hardware | Home) to see your app icon!

### Launch screen

Apps have a launch screen storyboard too.

Click on LaunchScreen.storyboard and for now just add a label with some text and center it both horizontally and vertically. We'll learn how to use images soon.