

IS 543 Fall 2023

Mobile Platform Development

iOS 17
Swift 5.9
Xcode 15

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Today

- Class logistics & overview
- Hands-on demo of Xcode & SwiftUI (whirlwind variety)
- Brief iOS overview
- A little Swift

Introducing Your Instructor

- Programming since age 14
On a computer my dad and I built (Heathkit H-89)
I love a good coding frenzy!
PhD in computer science (BYU 1995)
- Entrepreneur since age 16 until BYU
- Have done lots of web and mobile development
Scripture Citation Index web site, 2004 (<https://scriptures.byu.edu>)
Android and iOS apps, 2009; Windows Phone app, 2013 (ha!)



What will I learn in this course?

- How to build cool apps

 - Easy to build even very complex applications

 - Result lives in your pocket or backpack or even on your wrist

 - Very easy to distribute your application through the App Store

 - Vibrant developer community

- Real-life object-oriented and functional programming

 - The heart of Cocoa Touch is object-oriented

 - Application of the MVC and MVVM design models + a new approach: SwiftUI for declarative UI

 - Many development concepts in a commercial platform:

 - Databases, graphics, multimedia, multithreading, animation, networking, & much more

What will I learn in this course?

Learn The art of developing quality mobile apps

Do Create your own apps

Become

A talented technologist who knows when
and how to use mobile platforms to improve your organizations
and **MAKE A DIFFERENCE** in the world

What will I learn in this course?

At the BYU Marriott School of Business (a professional school)
we want students to become...

Difference-Makers

who transform the world as

Christlike Leaders

Mission of the University

The mission of Brigham Young University — founded, supported, and guided by The Church of Jesus Christ of Latter-day Saints — is to assist individuals in their quest for perfection and eternal life. That assistance should provide a period of intensive learning in a stimulating setting where a commitment to excellence is expected and the full realization of human potential is pursued.

aims.byu.edu

Aims of a BYU Education

BYU seeks to develop students of faith, intellect, and character who have the skills and the desire to continue learning and to serve others throughout their lives. These are the common aims of all education at BYU. Both those who teach in the classroom and those who direct activities outside the classroom are responsible for contributing to this complete educational vision. A BYU education should be:

- Spiritually Strengthening
- Intellectually Enlarging
- Character Building
- Leading to Lifelong Learning and Service

<http://aims.byu.edu>

BYU Marriott Vision/Mission/Values

- Vision: We aspire to transform the world through Christlike leadership
- Mission: We develop leaders of faith, intellect, and character
- Values:
 - Faith in Christ
 - Integrity in Action
 - Respect for All
 - Excellence
- Guiding principle: Centered on Students

Updated Honor Code

- What are your thoughts on the updated CES Honor Code and the updated Dress and Grooming Principles and Expectations?

Roles

- What is my role as an instructor in all this?
- What is your role as a student?

Habits of Learning: D&C 88

118 *And as all have not faith, seek ye diligently and teach one another words of wisdom; yea, seek ye out of the best books words of wisdom; seek learning, even by study and also by faith.*

119 *Organize yourselves; prepare every needful thing; and establish a house, even a house of prayer, a house of fasting, a house of faith, a house of learning, a house of glory, a house of order, a house of God; ...*

121 *Therefore, cease from all your light speeches, from all laughter, from all your lustful desires, from all your pride and light-mindedness, and from all your wicked doings.*

122 *Appoint among yourselves a teacher, and let not all be spokesmen at once; but let one speak at a time and let all listen unto his sayings, that when all have spoken that all may be edified of all, and that every man may have an equal privilege.*

123 *See that ye love one another; cease to be covetous; learn to impart one to another as the gospel requires.*

124 *Cease to be idle; cease to be unclean; cease to find fault one with another; cease to sleep longer than is needful; retire to thy bed early, that ye may not be weary; arise early, that your bodies and your minds may be invigorated.*

125 *And above all things, clothe yourselves with the bond of charity, as with a mantle, which is the bond of perfectness and peace.*

126 *Pray always, that ye may not faint, until I come. Behold, and lo, I will come quickly, and receive you unto myself. Amen.*

Habits of Learning

- What do the following habits have to do with “seek[ing] learning, even by study and also by faith”?

Arising early and retiring early

(I.e. establishing a schedule more like a missionary than like a typical college student)

Daily scripture study

Daily personal prayer

Weekly attendance at and participation in BYU devotionals

Weekly observing the Sabbath

Regularly attending the temple as opportunity permits

Striving to be aligned with priesthood keys the way the Son was perfectly aligned with the Father

Striving to be one with Christ as He is one with the Father (John 17:21)

Course Learning Objectives

- Know features and trends of mobile platforms
So you can develop a credible and convincing mobile strategy for your company or user base
- Understand human interface guidelines for mobile platform
Mobile platforms generally, iOS specifically; working knowledge of issues and principles
- Be familiar with iOS development tools
Xcode and related tools
Developer documentation, StackOverflow, blogs, etc.
- Be able to develop robust application
Learn best practices for use of standard UI widgets, iOS APIs

Course Management

- Use [LearningSuite.byu.edu](https://learningSuite.byu.edu) for most course resources
 - Syllabus
 - Schedule
 - Announcements
 - Assignments
 - We will turn in homework online
- Use IS 543 Slack channel for Q&A
 - Sign up at https://bit.ly/slack_is543_f23
- When needed, my Zoom meeting link is <https://bit.ly/liddlezoom>

Prerequisites

- IS 413: Enterprise Application Development

This is the most important prerequisite; I will assume you are a competent coder

- Object-oriented concepts

Class (template for instantiating objects)

Instance (an object created according to the recipe given by a class)

Message (sent to an object to make it act)

Method (code invoked by a message)

Instance variable (object-specific storage)

Superclass/subclass (a.k.a. "inheritance")

You should know these terms! If you're not comfortable with all of them, this might not be the class for you.

- Programming experience

We'll be doing a lot of programming, coordinating and choreographing a lot of moving parts

Hardware Prerequisites

• Do you need a Mac? In a word: Yes

A laptop is best, a Mini or iMac would work

I have 2-3 laptops to loan out; I have 9 Mac Mini's for the lab that you can also access remotely — let's talk

Maybe you can rent one — MacInCloud might work decently well

Maybe you can borrow one

Please don't steal one ;-)

The "Hackintosh" approach is not allowed under Apple's license agreement

• Do you need an iOS device?

Well, strictly speaking, no

But, if you're looking for a reason to acquire, this class is a great one

E.g. I can send home a note to your "significant other" testifying to the usefulness of an iPad
Using an iOS device will help you get some intuition as a user that will help you be a better designer and developer

iTunes U Stanford Course

- In the past I have paralleled Paul Hegarty's iTunes U course in places
See <https://cs193p.sites.stanford.edu/>
It's another place you can go for more insight, additional resources, extended learning
I will liberally reuse Paul's slides in places, but customized to our IS context
He assumes CS prerequisites and C/C++ background

Syllabus

- Apple will make some announcements during our semester, and those announcements might affect the syllabus

- In the meantime, here are the important items:

Materials for the course come from Apple's developer site and the web

Swift programming language book (The Swift Programming Language, Swift 5.9)

Apple's iOS Human Interface Guidelines

Swift.org API Design Guidelines

Expect homework/project assignments most class periods (mixture of readings, programming)

Expect two or three larger programming assignments

Midterm will be the week of Nov. 6–11

Closed-book, some notes

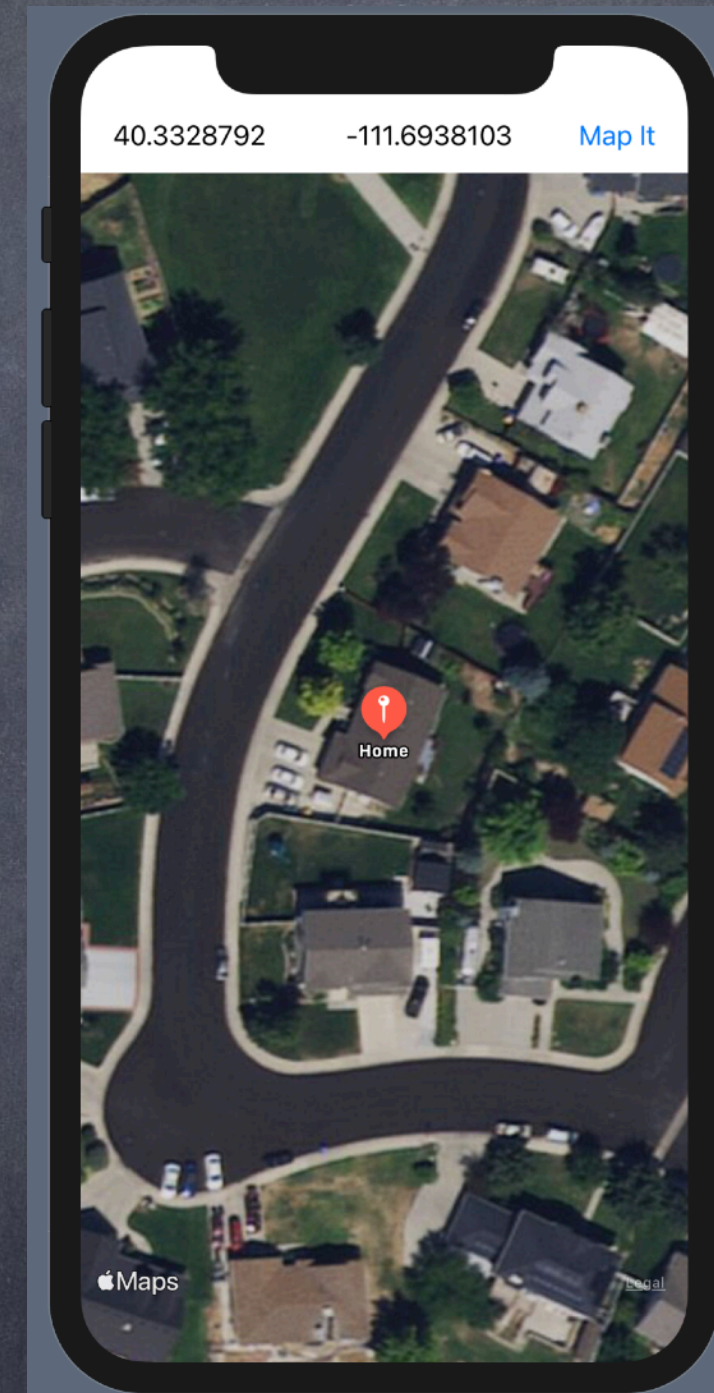
Final exam is 7am, Thursday, Dec. 21

Plan on a three-hour in-class final

Open-book, programming-heavy

Hands-On Demo

- Let's make a simple app in iOS — Map It



Platform Components

- Tools



Xcode

- Language

```
[display setTextColor:[UIColor blackColor]];  
let  $\pi$  = 3.14159
```

- Frameworks



Foundation

Core Data

Map Kit



UIKit & SwiftUI

Core Motion

- Design strategies

MVC Declarative UI
MVVM

Homework 1

• Due by Thursday, Sep. 7 before class

Get Xcode installed on your machine

This semester we'll use the latest version of Xcode 15, which currently is in beta

Sign up for a free Apple Developer account so you can download the Xcode 15 beta

Register at <https://developer.apple.com> (the free account lets you do everything except post your app to the App Store)

I expect Xcode 15 to come to the App Store in September (the update often ships about the the third week of September, but we'll see)

Find Apple's Swift book and read the first section (the tour), working through the many examples they give and "playing computer" to see how those examples work (on paper/in your mind)

You can download their Playground to experience the Swift tour in Xcode

Sign up for the IS 543 Slack workspace (https://bit.ly/slack_is543_f23)

Post a message saying "I did HW 1, and here are some things I learned... And here are some things I struggled with..."

Feel free to comment on other students' posts and discuss whatever you'd like