ECS 189E: Android and iOS fundamentals

Format:
Lecture: 3 hours
Laboratory: 1 hour

Prerequisite: ECS 150 (Operating Systems)

Instructor: Sam King

Course Registration:
Lecture: MWF 9-9:50am
Discussion: F 10-10:50am
CRN: 42480

Units: 4

Summary
This course will teach you how to write apps for both Android and iOS. We will focus on how these systems work behind the scenes, and discuss *why* they do things the way they do. At the end, students will be able to write moderately complex iOS and Android apps.

The course will focus on OS-level fundamentals and will include intensive programming assignments. Android and iOS both push the envelope in terms of the abstractions that they expect programmers to work with, and we will approach it from both a theoretical perspective by understanding the underlying principles as well as from a pragmatic perspective where students will write a lot of software.

Description
The first part of the class is an introduction to the low-level primitives available on iOS and Android. It will consist of a combination of lectures and videos designed to get students comfortable with the basics. The second part of the course will focus on a group project where you will write an app, applying the lessons learned from the first part of the class. The third part of the class will include presenting your app to your peers, shipping it to the App or Play store, and measuring how people use it. The ideal project will be a minimum viable product (MVP) that could be used to start a company!

The picture was copied from http://www.ibexmag.com/featured/android-and-ios-dominates-99-of-the-smartphone-market/

Tentative summary of course content:
- Mobile development basics
- Swift basics
- UI basics
- The process abstraction vs the app abstraction
- Security, identity, and privacy
- Storage
- Power management
- Automatic reference counting and garbage collection
- Inter-process communication
- Threads
- Smartphones and ethics
- Background execution and notifications
- Push vs pull and networking
- The cloud, libraries, frameworks, and APIs
- The App Store and the Play Store
- Tracking metrics and testing
- Pitching and selling your app

Learning outcomes:

By the end of the course, students will be able to:
- Write moderately complex Android and iOS apps
- Submit their apps to the app store and monitor them once deployed
- Explain to other people why their apps are great

About the instructor:

Prior to joining UC Davis, Professor King worked in industry for four years as a startup founder, and on the Product Security and Fraud teams at Twitter and Lyft. He owned the Twitter Android password reset flow and wrote key parts of the Lyft iOS signup and login process. He also has recent experience with shipping software to hundreds of millions of users. He sold his startup to Twitter, and is excited about fostering an entrepreneurial spirit at UC Davis.

Professor King is an expert in security and operating systems, and believes that to be an elite Android or iOS programmer, engineers must know how these systems work behind the scenes.