

Mobile App Development: Android or iOS? An Experience Report from Teaching Both Platforms

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Mobile App Development

The Demand for MAD Courses

Mobile App Development (MAD) has received a copious amount of attention in recent years
Student interest:

- CNN Money naming Mobile App Developer the “Best Job in America” in 2017 [1]
- Almost all students have an iPhone or Android phone

Demand for jobs:

- PayScale reporting a 19% 10-year job grown for MAD, placing it at #9 in the list of fastest-growing jobs in America [2].
- High starting salaries

Barriers to Offering MAD Courses

Limited expertise:

- Faculty often have not taken a MAD course themselves
- Need to learn... but how to find the time!?
- May need to hire an adjunct from industry

Limited resources:

- Requires a Mac lab or students to have Macs for iOS development
- Phones, tablets, smart watches, etc. may be desired for projects

Student Pre-requisite Knowledge

MAD requires students be comfortable with:

- An object-oriented programming language
- Debugging/reading stack traces

MAD prefers students have exposure to:

- Graphical user interface (GUI) programming
- Event-drive programming
- Design patterns
- APIs and frameworks
- Integrated development environments (IDEs)

Who Wants to Take a MAD Course?

A diverse group of students, including:

- Primarily CS Majors and CS Minors
- Some business students
- Some science students

Native vs. Hybrid vs. Web

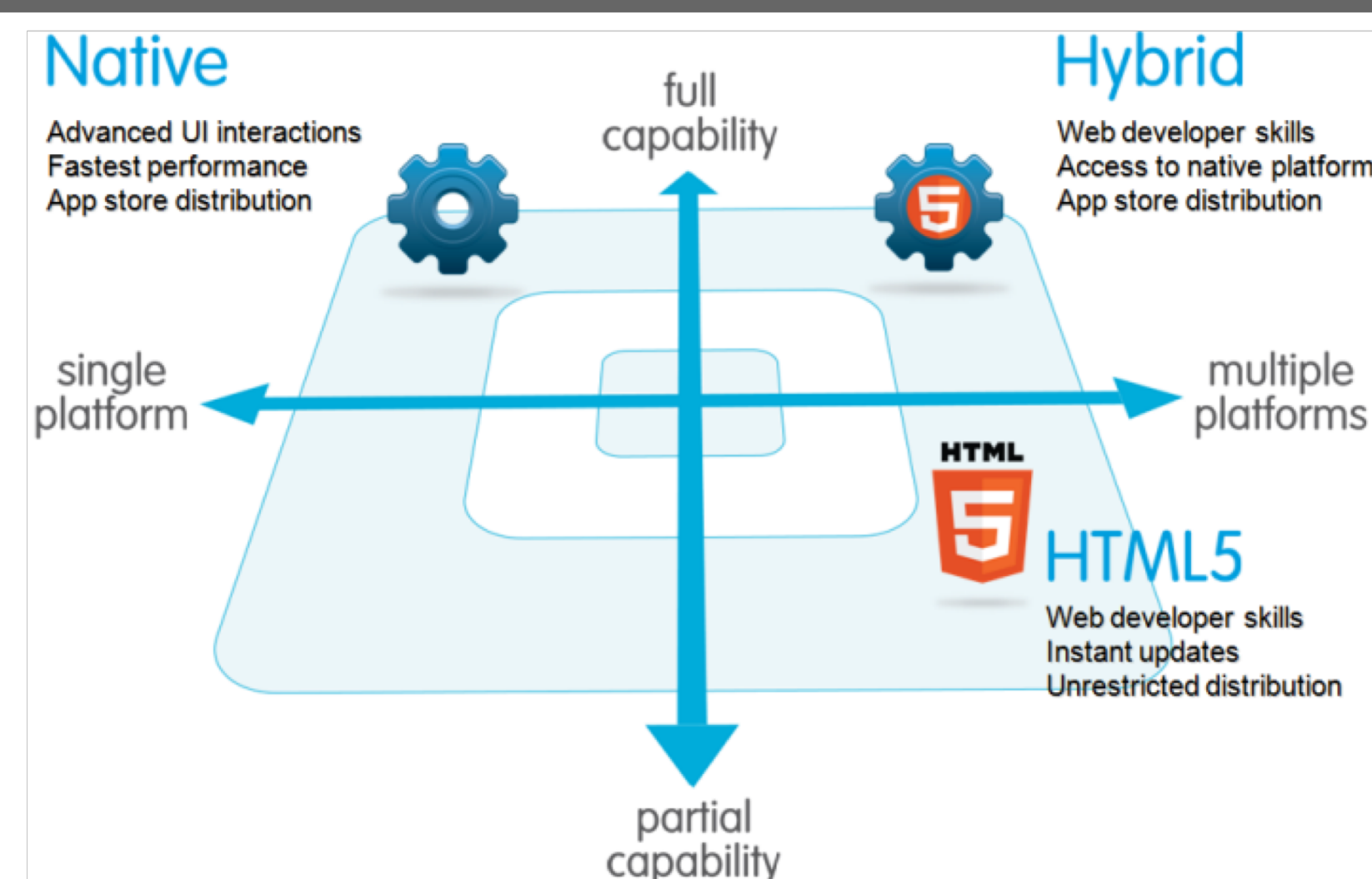


Image from [3]

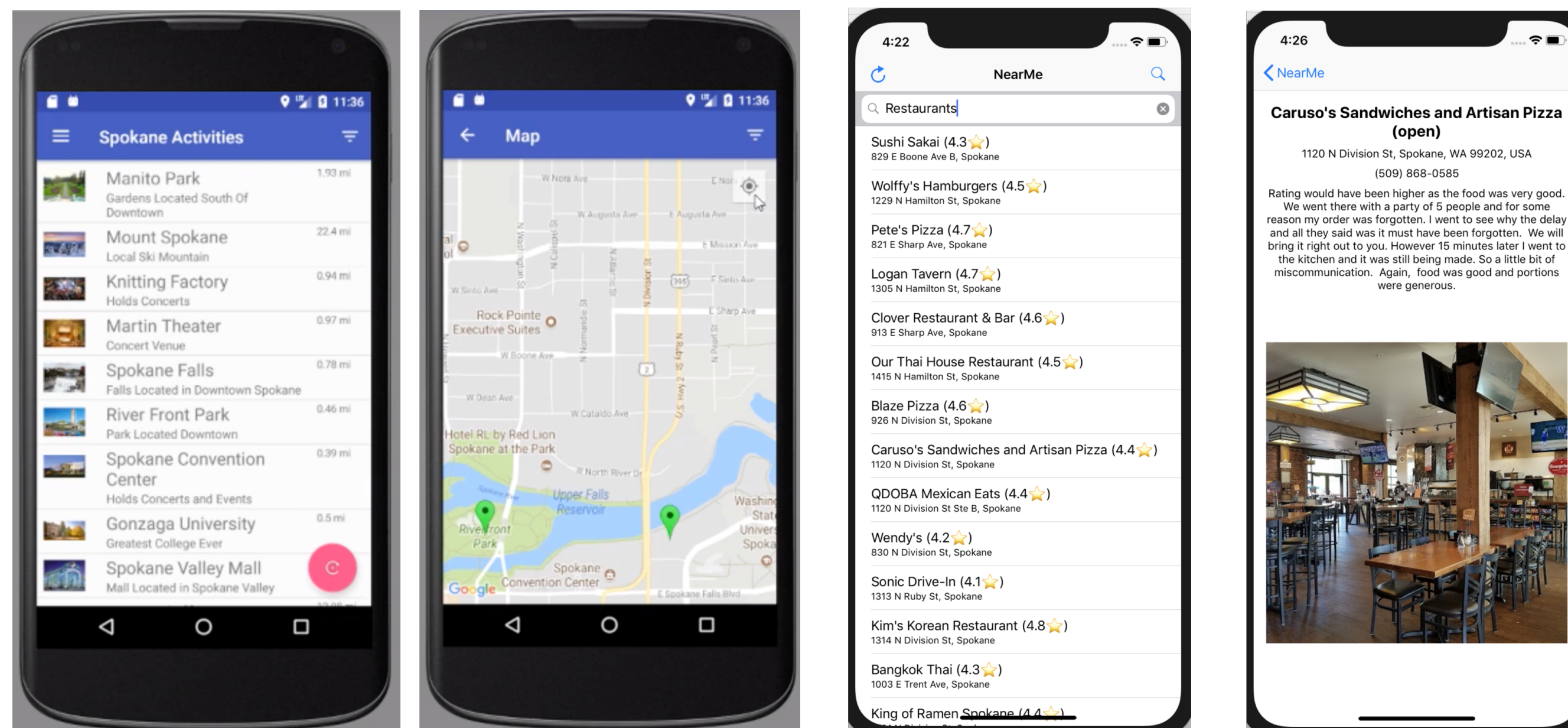
References

- [1] <https://adtmag.com/articles/2017/01/06/best-job-in-america.aspx>
- [2] <https://money.cnn.com/gallery/pf/2017/01/05/fastest-growing-jobs-2017/9.html>
- [3] https://developer.salesforce.com/page/Native,_HTML5,_or_Hybrid
- [4] <https://developer.android.com/guide>

Course Assignments/Projects

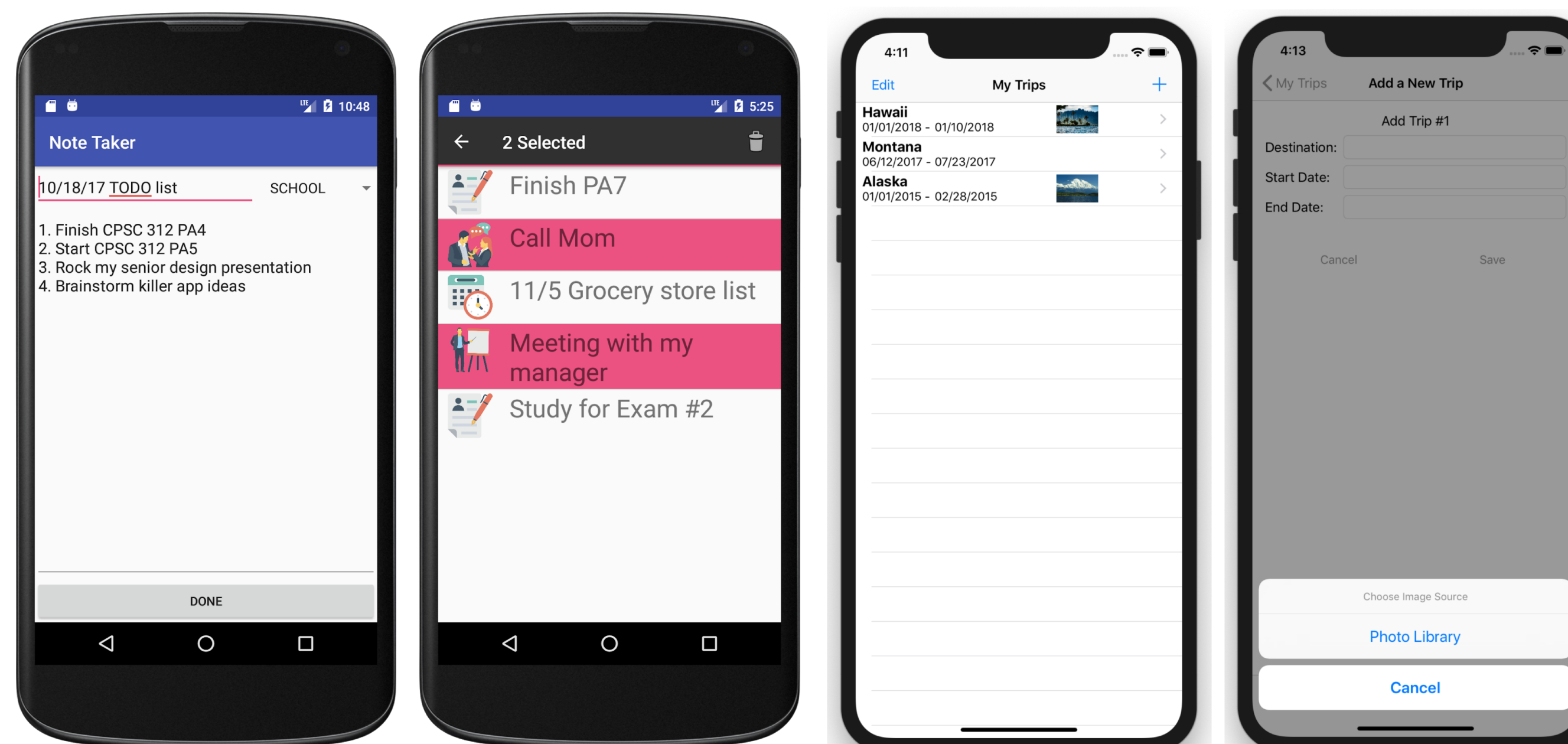
Example Assignment #1: Application Programming Interfaces (APIs)

- Android: Google Maps SDK, location services, menus, app permissions
- iOS: Google Maps Places web API, Core Location, threading, searching



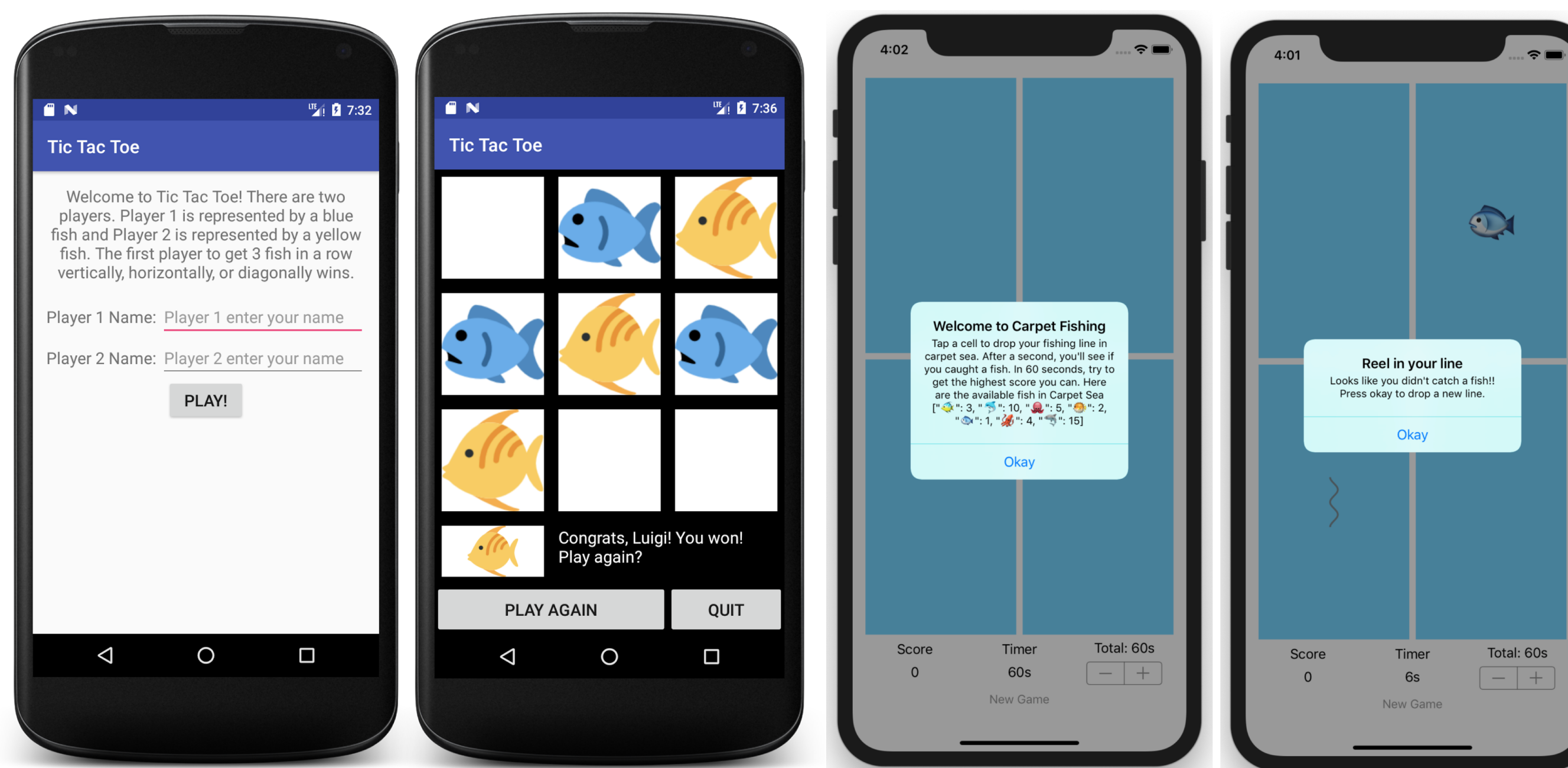
Example Assignment #2: Persistent Storage

- Android: ListViews, SQLite databases, contextual action mode, navigation
- iOS: TableViews, Core Data, camera, image picker, navigation controller

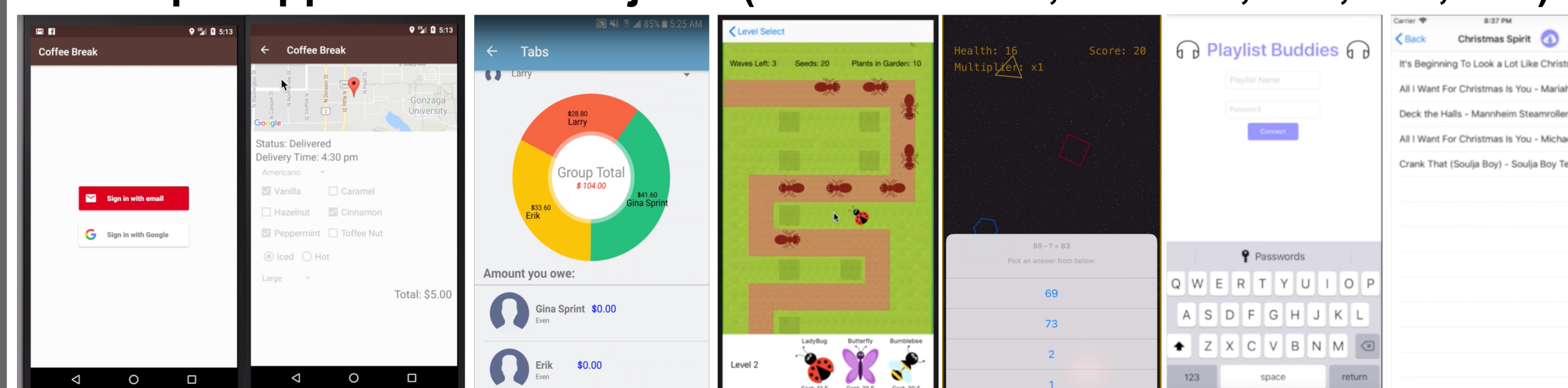


Example Assignment #3: Layouts

- Android: Grid layout, multi-screen apps, working with images, toasts
- iOS: Auto layout, linear layout, timers, working with emoji, alert dialogs



Example Apps: Student Projects (L->R: Android, Android, iOS, iOS, iOS)



Android vs. iOS

Programming Language

Recommended for Android: Java (primary, older)
OR Kotlin (secondary, newer)

Java-specific topics:

- Interfaces, functional interfaces
- Anonymous classes
- Lambda expressions

Recommended for iOS: Swift (primary, newer)
OR Objective-C (secondary, older)

Swift-specific topics:

- Optionals, protocols
- Closures, functions as value types

IDE

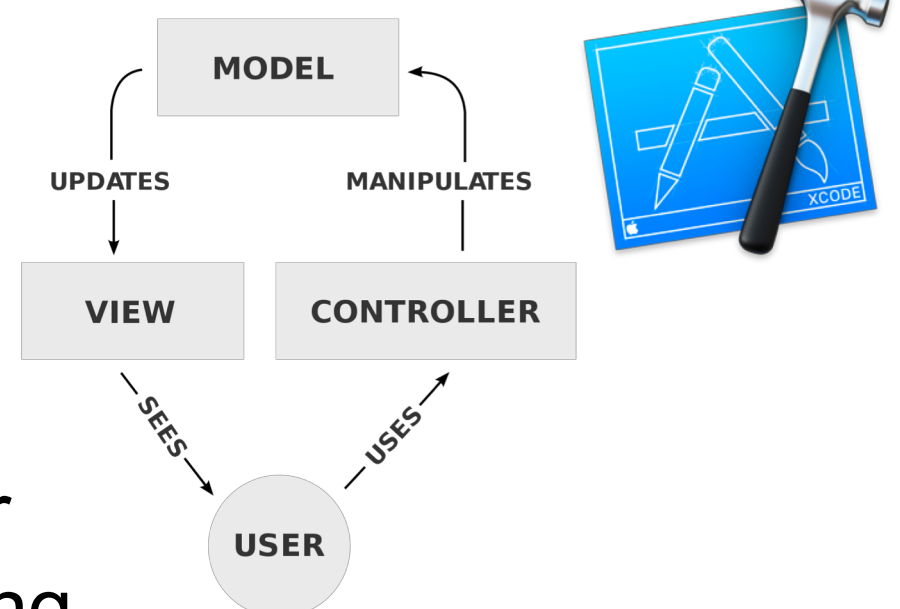
Android: Android Studio (based on the IntelliJ platform, cross-platform)

iOS: Xcode (for Mac only)

- Emulator (a little slower)
- Simulator (a little faster)

Fun/Relevant Topics

- Model, View, Controller
- Callbacks/event handling
- Delegation and data source patterns (iOS)
- Lifecycle methods and threading
- SpriteKit 2D games (iOS)
- Working with APIs
- Material design (Android)
- CocoaPods dependency manager (iOS)



Teaching Mobile App Dev

Teach a MAD Course, it's Fun!!

But Android or iOS?

Android...probably. Android is cross-platform (you don't have to purchase/require Macs), uses Java so you can start writing apps quicker (don't need to teach a new language, can rely on Java/C++ pre-requisite knowledge), and is open-source. However, build issues across versions/libraries are common and the majority of students would rather learn iOS because they (generally) have iPhones. It is quicker for a faculty member to learn Android development, but Apple does have a nice iOS book I recommend.

Resources to Learn

My MAD course content (notes, programming assignments, etc.) is publicly available online:

Android:

- Materials: <https://goo.gl/9X1HA1>
- Code: <https://github.com/GonzagaCPSC312>

iOS:

- Materials: <http://goo.gl/QPE8FA>
- Code: <https://github.com/GonzagaCPSC315>

Great online learning resources:

- Android Developer Guide [4]
- Apple's Swift Programming Language book
- Apple's App Development with Swift book
- Online courses like Udemy, Treehouse, etc.