Social Media Apps Programming

Introduction to Android / iOS Apps Programming

1051SMAP02
TLMXM1A (8648) (M2143) (Fall 2016)
(MIS MBA) (2 Credits, Elective) [Full English Course]
Wed 8,9 (15:10-17:00) B310

Min-Yuh Day, Ph.D.
Assistant Professor
Department of Information Management
Tamkang University

http://mail.tku.edu.tw/myday

2016-09-21
## Course Schedule (1/3)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2016/09/14</td>
<td>Course Orientation and Introduction to Social Media and Mobile Apps Programming</td>
</tr>
<tr>
<td>2</td>
<td>2016/09/21</td>
<td>Introduction to Android / iOS Apps Programming</td>
</tr>
<tr>
<td>3</td>
<td>2016/09/28</td>
<td>Developing Android Native Apps with Java (Eclipse) (MIT App Inventor)</td>
</tr>
<tr>
<td>4</td>
<td>2016/10/05</td>
<td>Developing iPhone / iPad Native Apps with Swift (XCode)</td>
</tr>
<tr>
<td>5</td>
<td>2016/10/12</td>
<td>Mobile Apps using HTML5/CSS3/JavaScript</td>
</tr>
<tr>
<td>6</td>
<td>2016/10/19</td>
<td>jQuery Mobile</td>
</tr>
</tbody>
</table>
## Course Schedule (2/3)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2016/10/26</td>
<td>Create Hybrid Apps with Phonegap</td>
</tr>
<tr>
<td>8</td>
<td>2016/11/02</td>
<td>jQuery Mobile/Phonegap</td>
</tr>
<tr>
<td>9</td>
<td>2016/11/09</td>
<td>jQuery Mobile/Phonegap</td>
</tr>
<tr>
<td>10</td>
<td>2016/11/16</td>
<td>Midterm Exam Week (Midterm Project Report)</td>
</tr>
<tr>
<td>11</td>
<td>2016/11/23</td>
<td>Case Study on Social Media Apps Programming and Marketing in Google Play and App Store</td>
</tr>
<tr>
<td>12</td>
<td>2016/11/30</td>
<td>Invited Speaker: Prof. Yoshinobu Kano, Associate Professor, Faculty of Informatics, Shizuoka University</td>
</tr>
</tbody>
</table>
# Course Schedule (3/3)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>2016/12/07</td>
<td>Google Cloud Platform</td>
</tr>
<tr>
<td>14</td>
<td>2016/12/14</td>
<td>Google App Engine and Google Map API</td>
</tr>
<tr>
<td>15</td>
<td>2016/12/21</td>
<td>Facebook API (Facebook JavaScript SDK) (Integrate Facebook with iOS/Android Apps)</td>
</tr>
<tr>
<td>16</td>
<td>2016/12/28</td>
<td>Twitter API</td>
</tr>
<tr>
<td>17</td>
<td>2017/01/04</td>
<td>Final Project Presentation</td>
</tr>
<tr>
<td>18</td>
<td>2017/01/11</td>
<td>Final Exam Week (Final Project Presentation)</td>
</tr>
</tbody>
</table>
Android /iOS Apps Programming

Native Apps

Hybrid Apps

Mobile Web Apps
Android / iOS Apps Programming

• Native Apps
• Mobile Apps (Web Apps)
• Hybrid Apps
App Development Comparison

<table>
<thead>
<tr>
<th></th>
<th>Device Access</th>
<th>Speed</th>
<th>Development Cost</th>
<th>App Store</th>
<th>Approval Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Apps</td>
<td>Full</td>
<td>Very Fast</td>
<td>Expensive</td>
<td>Available</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Hybrid Apps</td>
<td>Full</td>
<td>Native Speed as Necessary</td>
<td>Reasonable</td>
<td>Available</td>
<td>Low Overhead</td>
</tr>
<tr>
<td>Web Apps</td>
<td>Partial</td>
<td>Fast</td>
<td>Reasonable</td>
<td>Not Available</td>
<td>None</td>
</tr>
</tbody>
</table>

Hybrid Apps
Mobile Apps, Native Apps

HTML5 vs. Hybrid vs. Native Apps

36% Mobile web apps
32% Hybrid apps
15% Native apps

39% spend time developing the same app/feature for multiple platforms

HTML5 is #1 choice for building apps for multiple mobile platforms

Source: http://techcrunch.com/2013/02/26/survey-most-developers-now-prefer-html5-for-cross-platform-development/
Native Mobile app
Hybrid Mobile App
Responsive Web

Source: http://srishta.com/blog_hybrid.html
Native Apps vs. Hybrid Apps

Mobile Apps

• Mobile Website
  – Classic Website

• Mobile Apps
  – Web Apps

• Responsive Web Design (RWD)

Source: Scott Preston, Learn HTML5 and JavaScript for iOS: Web Standards-based Apps for iPhone, iPad, and iPod touch, Apress, 2012
Mobile Website
Classic Website

http://grandviewave.com/
Mobile Apps (Web Apps)

http://grandviewave.com/
Responsive Web Design (RWD)

http://grandviewave.com/m/
Mobile Web App

HTML

CSS

JavaScript

Templates

Phone Data

External Data

Mobile frameworks and Libraries

Source: Scott Preston, Learn HTML5 and JavaScript for iOS: Web Standards-based Apps for iPhone, iPad, and iPod touch, Apress, 2012
Hybrid App Examples

Examples of Purely-Native Mobile Apps

Chris Adamson and Janie Clayton,
**iOS 9 SDK Development: Creating iPhone and iPad Apps with Swift,**
Pragmatic Bookshelf, 2016

Source: [https://www.amazon.com/iOS-SDK-Development-Creating-iPhone/dp/1680501321](https://www.amazon.com/iOS-SDK-Development-Creating-iPhone/dp/1680501321)
Building Android Apps with HTML, CSS, and JavaScript: Making Native Apps with Standards-Based Web Tools, Jonathan Stark & Brian Jepson, O’reilly, 2012

Building iPhone Apps with HTML, CSS, and JavaScript: Making App Store Apps Without Objective-C or Cocoa,

Jonathan Stark, O’reilly, 2010

Source: http://www.amazon.com/Building-iPhone-Apps-HTML-JavaScript/dp/0596805780
Jon Reid, **jQuery Mobile**, O’reilly, 2012


Responsive Design
HTML5/CSS3/JavaScript

Source: http://www.ihealthspot.com/ResponsiveWebsiteDesign.aspx
jQuery Mobile

http://jquerymobile.com/

A Touch-Optimized Web Framework

jQuery Mobile is a HTML5-based user interface system designed to make responsive web sites and apps that are accessible on all smartphone, tablet and desktop devices.

Seriously cross-platform with HTML5

jQuery Mobile framework takes the "write less, do more" mantra to the next level: Instead of writing unique applications for each mobile device or OS, the jQuery mobile framework allows you to design a single highly-branded responsive web site or application that will work on all popular smartphone, tablet, and desktop platforms.

Developer Links

- Source Code (GitHub)
- jQuery Mobile Git (WIP Build)
  - JavaScript
  - CSS
- Report an issue
- Browser Support
- Overview
Bootstrap

http://getbootstrap.com/

Aww yeah, Bootstrap 4 is coming!

Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web.

Download Bootstrap

Currently v3.3.7

Speed up your design workflow with over 175 templates and 500 polished UI elements
ads via Carbon
PhoneGap
http://phonegap.com/

Adobe PhoneGap

Build amazing mobile apps powered by open web tech.

START NOW LEARN MORE

Create your app with PhoneGap
Reuse existing web development skills to quickly make hybrid applications built with HTML, CSS and JavaScript. Create experiences for multiple platforms with a single codebase so you can reach your audience no matter where they are.

Package your app in the cloud
PhoneGap Build takes the pain out of compiling PhoneGap apps. Get app-store ready apps without the headache of maintaining native SDKs. Our PhoneGap Build service does the work for you by compiling in the cloud.
Submit Your Apps

Download Xcode 8, test your apps, and submit them to the App Store.
Swift 3

The powerful programming language that is also easy to learn.

Swift is a powerful and intuitive programming language for macOS, iOS, watchOS and tvOS. Writing Swift code is interactive and fun, the syntax is concise yet expressive, and Swift includes modern features developers love. Swift code is safe by design, yet also produces software that runs lightning-fast.

Source: https://developer.apple.com/swift/
Android 7.0 Nougat!

Android 7.0 Nougat is here! Get your apps ready for the latest version of Android, with new system behaviors to save battery and memory. Extend your apps with multi-window UI, direct reply notifications and more.

› Learn more
Connect on a global scale.
Build, grow and monetize your apps with Facebook

https://developers.facebook.com/
Integrate Facebook with your native iOS apps

https://developers.facebook.com/
Integrate Facebook with your native Android apps.

https://developers.facebook.com/
Facebook SDK for Android

Helps you build engaging social apps and get more installs.

Download the SDK

Includes Audience Network, and Facebook packages. Requires Android API 15.

v4.5.0. See Change Log or Upgrade Guide.

Get Started
Basic guide for Android

SDK Reference Docs
Reference Docs and sample code

In Android SDK

Source: https://developers.facebook.com/docs/android
Google Cloud Platform

Build What's Next
Better software. Faster.

- Use Google's core infrastructure, data analytics and machine learning.
- Secure and fully featured for all enterprises.
- Committed to open source and industry leading price-performance.

https://cloud.google.com/
Google App Engine

APP ENGINE
A powerful platform to build web and mobile apps that scale automatically

TRY IT FREE

Build Apps, Scale Automatically

Google App Engine is a platform for building scalable web applications and mobile backends. App Engine provides you with built-in services and APIs such as NoSQL datastores, memcache, and a user authentication API, common to most applications.

https://cloud.google.com/appengine/
Cloud Datastore is a highly-scalable NoSQL database for your web and mobile applications.

Highly Scalable NoSQL Database

Cloud Datastore is a highly-scalable NoSQL database for your applications. Cloud Datastore automatically handles sharding and replication, providing you with a highly available and durable database that scales automatically to handle your applications' load. Cloud Datastore provides a myriad of capabilities such as ACID transactions, SQL-like queries, indexes and much more.

https://cloud.google.com/datastore/
Google Cloud Endpoints

https://developers.google.com/appengine/docs/java/endpoints/
Gephi: Social Network Analysis and Visualization: https://gephi.org/

The Open Graph Viz Platform

Gephi is an interactive visualization and exploration platform for all kinds of networks and complex systems, dynamic and hierarchical graphs.

Runs on Windows, Linux and Mac OS X. Gephi is open-source and free.

Support us! We are non-profit. Help us to innovate and empower the community by donating only 8€:

APPLICATIONS

✓ Exploratory Data Analysis: intuition-oriented analysis by networks manipulations in real time.

✓ Link Analysis: revealing the underlying structures of associations between objects, in particular in scale-free networks.

“Like Photoshop™ for graphs.” — the Community

PAPERS

LATEST NEWS

April 8, 2013
Characteristics of a Purely-Native Mobile App

• A binary “executable image”, that is explicitly downloaded and stored on the file system of the mobile device

• Distributed through the popular app store or marketplace of the device, or via an enterprise distribution mechanism

• Executed directly by the operating system
  – Launched from the home screen
  – Does not require another “container app” to run it

• Makes explicit use of operating-system APIs

Native App Development

iOS - Native App Development

Swift

Objective-C, C++, C

Rotor Code

Application Source Code

Resources (e.g. images)

SDK Tools

Compiler, Linker

Executable (Binary)

Packager

Xcode

.ipa

Distributable Package

.app

App Stores

Swift Language

• Swift is a new object-oriented programming language for iOS and OS X development.

• Swift is modern, powerful, expressive, and easy to use.

Source: https://developer.apple.com/swift/
Swift Language

• Unified
  A complete replacement for both the C and Objective-C languages.
  – Swift provides full object-oriented features, and includes low-level language primitives such as types, flow control, and operators.

• Fast
• Complete platform
• Safe by design
• Modern
• Interactive

Source: https://developer.apple.com/swift/
Android - Native App Development

Native App – Interaction with Mobile Device

Web App – Interaction with Mobile Device

Hybrid App – Interaction with Mobile Device

Hybrid App Development

Hybrid App Examples

Native App – High-level APIs and Built-in Apps

GUI Toolkit Provides App With “Native” Look

Downloaded Apps

Built-in Apps

Mobile Web Apps and Mobile Browsing

Mobile Browsing and Mobile Web Apps

Google, Wikipedia: Mobile-optimized websites

Dremel: Launch using QR-Codes

YouTube: Web App

2B: Web App

Mobile Browsing vs. Mobile Web Apps

Pure Mobile Web Sites
• Visited by browsing
• Static, navigational UI
• Generic look & feel
• Server-side rendering
• Require connectivity

... Gray Area ...

Pure Mobile Web Apps
• Installed and launched
• Interactive UI
• Touch optimized
• Client-side rendering
• Available offline

Characteristics of Mobile Web Apps

- Entirely written using web technologies
  - HTML, CSS and JavaScript
- Code is executed by the browser, not by the OS
- Various launch mechanisms
  - Typing URL, clicking hyperlink, scanning QR Code or clicking home-screen shortcut
- Installation is optional
- Combine cross-platform HTML5 and device-specific features optimize apps
  - Touch-optimized look & feel
  - No address bar
  - Suggestion to pin to home screen
  - Offline availability

HTML5 and related technologies

• Main HTML5/CSS3 features on mobile
  – Bitmapped and vector graphics, including animations
  – Offline support and data URLs
  – Geolocation
  – Video and Audio
  – Continuous communications with the server
  – More...

Characteristics of Hybrid Apps

• A Hybrid App is a native app with embedded HTML

• It has all the benefits of native apps: full access to APIs, app-store presence, etc.

• Selected portions of the app are written using web technologies

• The web portions of the app can either be downloaded from the web or packaged within the app

Native Apps vs. Hybrid HTML5 Apps

Source: Porting your Apple iOS and Android Apps to HTML5, [https://www.youtube.com/watch?v=-k43St4LCe0](https://www.youtube.com/watch?v=-k43St4LCe0)
HTML5, JavaScript, CSS3
jQuery Mobile

http://jquerymobile.com/

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PhoneGap: [http://phonegap.com/](http://phonegap.com/)

Easily create apps using the web technologies you know and love: **HTML, CSS, and JavaScript**

PhoneGap is a free and open source framework that allows you to create mobile apps using standardized web APIs for the platforms you care about.

- Install PhoneGap ➤
- Getting Started Guides ➤

Wrap your app with PhoneGap ➤

Deploy to mobile platforms ➤
Adobe PhoneGap Build: Package mobile apps in the cloud

https://build.phonegap.com/
Demo

CompileOnline: Try jQueryMobile Online

http://www.compileonline.com/try_jquerymobile_online.php
CompileOnline: Try jQueryMobile Online

How it works?

Just follow the following simple steps to compile and execute any of your favorites programming languages online using your favorite browser and without having any setup on your local machine.

Step - 1 Select your favorite language which you want to execute.

Step - 2 Type your source using available text editor.

Step - 3 Finally click ① button [Ctrl+E on Windows & Command+E on Mac ] to see the result.

NOTE: If you do not get result, then kindly try clicking ① button once again.

Advanced Functionality

- If you are willing to provide input to your program then use input.txt to give input to your program. Internally you will need to read this input.

- If you know how to use multiple files to implement packages, modules etc. in your favorite language then you can enable multi-file support using available checkbox.

- If you are willing to provide command line arguments to your program then use below mentioned input box to specify your command line arguments.

Tutorials

http://www.compileonline.com/try_jquerymobile_online.php
<!DOCTYPE html>
<html>
  <head>
    <title>Page Title</title>
    <meta name="viewport" content="width=device-width, initial-scale=1" />
    <script src="http://code.jquery.com/jquery-1.9.1.min.js"></script>
    <link type="text/css" rel="stylesheet" href="http://code.jquery.com/mobile/latest/jquery.mobile.min.css" />
    <script type="text/javascript" src="http://code.jquery.com/mobile/latest/jquery.mobile.min.js"></script>
  </head>

  <body data-role="page" id="first" data-theme="a">
    <div data-role="header">
      <h1>Page Title1</h1>
    </div>
    <div data-role="content">
      Page content goes here.
    </div>
    <div data-role="footer">
      Page Footer1
    </div>
  </body>

  <div data-role="page" id="second" data-back-btn="true" data-theme="b">
    <div data-role="header">
      <h1>Page Title2</h1>
    </div>
    <div data-role="content">
      Page content goes here.
    </div>
    <div data-role="footer">
      Page Footer2
    </div>
  </div>

http://www.compileonline.com/try_jquerymobile_online.php
```html
1. <!DOCTYPE html>
2. <html>
3.   <head>
4.     <title>Page Title</title>
5.     <meta name="viewport" content="width=device-width, initial-scale=1" />
6.     <script src="http://code.jquery.com/jquery-1.9.1.min.js"></script>
7.     <link type="text/css" href="http://code.jquery.com/mobile/latest/jquery.mobile.min.css" rel="stylesheet" />
8.     <script type="text/javascript" src="http://code.jquery.com/mobile/latest/jquery.mobile.min.js"></script>
9.   </head>
10. <body data-role="page" id="first" data-theme="a">
11.   <div data-role="header">
12.     <h1>Page Title</h1>
13.   </div>
14.   <div data-role="content">
15.     <p>Page content goes here. Hello World Myday!</p>
16.   </div>
17.   <div data-role="footer">
18.     <h4>Page Footer1</h4>
19.   </div>
20. </body>
21. <body data-role="page" id="second" data-add-back-btn="true" data-theme="b">
22.   <div data-role="header">
23.     <h1>Page Title2</h1>
24.   </div>
25.   <div data-role="content">
26.     <p>Page content goes here.</p>
27.   </div>
28.   <div data-role="footer">
29.     <h4>Page Footer2</h4>
30.   </div>
31. </body>
```

http://www.compileonline.com/try_jquerymobile_online.php
Page content goes here. Hello World Myday

Go to second page
<!DOCTYPE html>
<html>
  <head>
    <title>Page Title</title>
    <meta name="viewport" content="width=device-width, initial-scale=1" />
    <script src="http://code.jquery.com/jquery-1.9.1.min.js"></script>
    <link type="text/css" href="http://code.jquery.com/mobile/latest/jquery.mobile.min.css" rel="stylesheet" />
    <script type="text/javascript" src="http://code.jquery.com/mobile/latest/jquery.mobile.min.js"></script>
  </head>
  <body>
    <div data-role="page" id="first" data-theme="a">
      <div data-role="header">
        <h1>Page Title1</h1>
      </div><!-- /header -->
      <div data-role="content">
        <p>Page content goes here. Hello World Myday</p>
        <a href="#second">Go to second page</a>
      </div><!-- /content -->
      <div data-role="footer">
        <h4>Page Footer1</h4>
      </div><!-- /footer -->
    </div><!-- /page -->
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http://www.compileonline.com/try_jquerymobile_online.php
Accelerate Mobile Innovation in the Enterprise
The only cloud-based platform with visual development tools and integrated backend services

Try Our Free Plan

http://appery.io/
http://appery.io/
Summary

• Native Apps
• Mobile Apps (Web Apps)
• Hybrid Apps
References

• Building Android Apps with HTML, CSS, and JavaScript: Making Native Apps with Standards-Based Web Tools, Jonathan Stark & Brian Jepson, O’reilly, 2012
• Building iPhone Apps with HTML, CSS, and JavaScript: Making App Store Apps Without Objective-C or Cocoa, Jonathan Stark, O’reilly, 2010
• Chris Adamson and Janie Clayton, iOS 9 SDK Development: Creating iPhone and iPad Apps with Swift, Pragmatic Bookshelf, 2016
• Native, Web or Hybrid Mobile Apps?, https://www.youtube.com/watch?v=Ns-JS4amlTc
• Swift, https://developer.apple.com/swift/
• Porting your Apple iOS and Android Apps to HTML5, https://www.youtube.com/watch?v=-k43St4LCe0
• jQuery Mobil: http://jquerymobile.com/
• PhoneGap: http://phonegap.com/
• Adobe PhoneGap Build: Package mobile apps in the cloud, https://build.phonegap.com/
• Try jQueryMobile Online: http://www.compileonline.com/try_jquerymobile_online.php
• Online Editor jsbin: http://jsbin.com/
• appery.io: http://appery.io/