Introduction to Android / iOS Apps Programming

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## Course Schedule (1/2)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2017/09/22</td>
<td>Course Orientation and Introduction to Social Media and Mobile Apps Programming</td>
</tr>
<tr>
<td>2</td>
<td>2017/09/29</td>
<td>Introduction to Android / iOS Apps Programming</td>
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<tr>
<td>3</td>
<td>2017/10/06</td>
<td>Developing Android Native Apps with Java (Android Studio)</td>
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<td>4</td>
<td>2017/10/13</td>
<td>Developing iPhone / iPad Native Apps with Swift (XCode)</td>
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<tr>
<td>5</td>
<td>2017/10/20</td>
<td>Mobile Apps using HTML5/CSS3/JavaScript</td>
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<td>6</td>
<td>2017/10/27</td>
<td>jQuery Mobile</td>
</tr>
<tr>
<td>7</td>
<td>2017/11/03</td>
<td>Create Hybrid Apps with Phonegap</td>
</tr>
<tr>
<td>8</td>
<td>2017/11/10</td>
<td>jQuery Mobile/Phonegap</td>
</tr>
<tr>
<td>9</td>
<td>2017/11/17</td>
<td>jQuery Mobile/Phonegap</td>
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<tr>
<td>10</td>
<td>2017/11/24</td>
<td>Midterm Project Report</td>
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<td>11</td>
<td>2017/12/01</td>
<td>Case Study on Social Media Apps Programming and Marketing in Google Play and App Store</td>
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<td>12</td>
<td>2017/12/08</td>
<td>Google Cloud Platform</td>
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<td>13</td>
<td>2017/12/15</td>
<td>Google App Engine</td>
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<tr>
<td>14</td>
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<td>Google Map API</td>
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<tr>
<td>15</td>
<td>2017/12/29</td>
<td>Facebook API (Facebook JavaScript SDK) (Integrate Facebook with iOS/Android Apps)</td>
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<tr>
<td>16</td>
<td>2018/01/05</td>
<td>Twitter API</td>
</tr>
<tr>
<td>17</td>
<td>2018/01/12</td>
<td>Final Project Presentation</td>
</tr>
<tr>
<td>18</td>
<td>2018/01/19</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

Native Apps
- Device Access: Full
- Speed: Very Fast
- Development Cost: Expensive
- App Store: Available
- Approval Process: Mandatory

Hybrid Apps
- Device Access: Full
- Speed: Native Speed as Necessary
- Development Cost: Reasonable
- App Store: Available
- Approval Process: Low Overhead

Web Apps
- Device Access: Partial
- Speed: Fast
- Development Cost: Reasonable
- App Store: Not Available
- Approval Process: None

Hybrid Apps
Mobile Apps, Native Apps

HTML5 vs. Hybrid vs. Native Apps

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 App
Progressive Web App (PWA)

Source: http://srishta.com/blog_hybrid.html

Source: http://www.ihealthspot.com/ResponsiveWebsiteDesign.aspx
Native Apps vs. Hybrid Apps

Enterprise Apps (Hybrid HTML5) in 2016

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 10 SDK Development: Creating iPhone and iPad Apps with Swift,
Pragmatic Bookshelf, 2017

Source: https://www.amazon.com/iOS-10-SDK-Development-Creating/dp/1680502107/
Building Android Apps with HTML, CSS, and JavaScript: Making Native Apps with Standards-Based Web Tools,
Jonathan Stark & Brian Jepson, O’reilly, 2012

Jon Reid, *jQuery Mobile*, O’reilley, 2012


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
Adobe PhoneGap

Build amazing mobile apps powered by open web tech.

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 what device they use.

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.

http://phonegap.com/
PhoneGap: 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.
Adobe PhoneGap Build: Package mobile apps in the cloud

https://build.phonegap.com/
Apple Developer

https://developer.apple.com/

iPhone X

Get your apps ready ➔
Swift 4

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 8.0 Oreo

Smarter, faster, and more powerful than ever. The world's favorite cookie is your new favorite Android release.

› Learn more
Facebook Developers

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/
Facebook SDK for iOS

Helps you build engaging social apps and get more installs.

Download the SDK

Includes Bolts, Audience Network, and Facebook frameworks. Requires iOS 7.

v4.6.0. See Change Log or Upgrade Guide.

Read our iOS 9 guide

Get Started on iOS
Basics for iOS

SDK Reference Docs
API Reference Docs

In iOS SDK

Share
People on your app can share, send a message, or like content in your app. They can also share

Login
People can sign in to your app with their Facebook Login.

https://developers.facebook.com/docs/ios/
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

Login
People can easily sign in to your app with their

Share
People using your app can share or send a

Source: https://developers.facebook.com/docs/android
#HelloWorld

Learn how to build with the Twitter Platform

View Event Locations
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/
APP ENGINE
A powerful platform to build web and mobile apps that scale automatically

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/
Mobile App Backend Services

Source: https://cloud.google.com/solutions/mobile/mobile-app-backend-services
iOS App Development Process

Apps Development Life Cycle

Documentation

Interface

Test/Debug

Ship

Register

Develop

Technologies

Language

Source: https://developer.apple.com/library/ios/referencelibrary/GettingStarted/RoadMapiOS/WhereToGoFromHere.html
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 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

Mobile Web Apps and Mobile Browsing

Mobile Browsing and Mobile Web Apps

Mobile Browsing vs. Mobile Web Apps

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

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

• 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
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.

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

2. Type your source using available text editor.

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

**NOTE:** If you do not get result, then kindly try clicking ✗ 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
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>
11.   <div data-role="page" id="first" data-theme="a">
12.     <div data-role="header">
13.       <h1>Page Title1</h1>
14.     </div>
15.     <div data-role="content">
16.       Page content goes here.
17.     </div>
18.     <div data-role="footer">
19.       Page Footer1
20.     </div>
21.   </div>
22.   <div data-role="page" id="second" data-add-back-btn="true" data-theme="b">
23.     <div data-role="header">
24.       <h1>Page Title2</h1>
25.     </div>
26.     <div data-role="content">
27.       Page content goes here.
28.     </div>
29.     <div data-role="footer">
30.       Page Footer2
31.     </div>
32.   </div>
33. </body>
34. </html>

http://www.compileonline.com/try_jquerymobile_online.php
<div data-role="page" id="first" data-theme="a">
  <div data-role="header">
    <h1>Page Title</h1>
  </div>
  <div data-role="content">
    Page content goes here. Hello World Myday</div>
  <div data-role="footer">
    Page Footer1</div>
</div>

<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>
```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" rel="stylesheet" href="http://code.jquery.com/mobile/latest/jquery.mobile.min.css">
8.     </head>
9. </html>
10. <body>
11.     <div data-role="page" id="first" data-theme="a">
12.         <div data-role="header">
13.             <h1>Page Title1</h1>
14.         </div>
15.     </div>
16.     <div data-role="content">
17.         Page content goes here. Hello World Myday!
18.     </div>
19.     <div data-role="footer">
20.         <h4>Page Footer1</h4>
21.     </div>
22. </body>
23. <div data-role="page" id="second" data-add-back-btn="true" data-theme="b">
24.     <div data-role="header">
25.         <h1>Page Title2</h1>
26.     </div>
27.     <div data-role="content">
28.         Page content goes here.!
29.     </div>
30.     <div data-role="footer">
31.         <h4>Page Footer2</h4>
32.     </div>
```
<!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>
  <div data-role="content">
    <p>Page content goes here. Hello World Myday</p>
    <a href="#second">Go to second page</a>
  </div>
  <div data-role="footer">
    <h4>Page Footer1</h4>
  </div>
</div>

<div data-role="page" id="second" data-add-back-btn="true" data-theme="b">
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  </div>
  <div data-role="content">
    <p>Page content goes here.</p>
  </div>
  <div data-role="footer">
    <h4>Page Footer2</h4>
  </div>
</div>
</body>
</html>
<!DOCTYPE html>
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    <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>
</html>
Page content goes here. Hello World Myday
Go to second page
<div data-role="page" id="second" data-add-back-btn="true" data-theme="b">
  <div data-role="header">
    <h1>Page Title2</h1>
  </div>
  <div data-role="content">
    <p>Page content goes here.</p>
  </div>
  <div data-role="footer">
    <h4>Page Footer2</h4>
  </div>
</div>
http://www.compileonline.com/try_jquerymobile_online.php
<html>
  <head>
    <title>Page Title</title>
  </head>
  <body>
    <div data-role="page" id="first" data-theme="a">
      <div data-role="header">
        <h1>Page Title 1</h1>
      </div>
      <div data-role="content">
        Page content goes here. Hello World Myday
        <a href="#second">Go to second page</a>
      </div>
      <div data-role="footer">
        <h1>Page Footer 1</h1>
      </div>
    </div>
    <div data-role="page" id="second" data-theme="b" data-add-back-btn="true">
      <div data-role="header">
        <h1>Page Title 2</h1>
      </div>
      <div data-role="content">
        Page content goes here.
      </div>
    </div>
  </body>
</html>
<!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>
    <script src="http://code.jquery.com/mobile/latest/jquery.mobile.min.js" 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>
      <div data-role="content">
        Page content goes here. Hello World Myday
      </div>
      <div data-role="footer">
        <p>Page Footer1</p>
      </div>
    </div>

    <div data-role="page" id="second" data-add-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">
        <p>Page Footer2</p>
      </div>
    </div>

  </body>
</html>

http://www.compileonline.com/try_jquerymobile_online.php
Online Editor: http://jsbin.com

http://jsbin.com/
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/
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’reilil, 2012
• Building iPhone Apps with HTML, CSS, and JavaScript: Making App Store Apps Without Objective-C or Cocoa, Jonathan Stark, O’reilil, 2010
• Chris Adamson and Janie Clayton, iOS 10 SDK Development: Creating iPhone and iPad Apps with Swift, Pragmatic Bookshelf, 2017
• 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://appyery.io/