



CIS470 – Fall 2013 - Messages:

Change of Room. Beginning on Tu. Set. 10th we will meet at **LB243** (Law Building Corridor)

Syllabus. [Click here for a printable \(pdf\) version of the Syllabus](#)

XML Sample1. [Click here for a zipped file containing XML sample1 files](#)

XML Sample2. [Click here for a zipped file containing XML sample2 files](#)

Schedule-Talks. [Click here for the FALL 2013 schedule \(Independent Research Projects\)](#)

Final Grades. [Click here for FALL 2013 final grades](#)



Download Lecture Notes:

Developing Mobile Applications for the Android Operating System
by Victor Matos. 2013

Slides: [Chapters01-05](#), [Chapters06-10](#), [Chapters11-15](#), [Chapters16-20](#), [Chapters21-25](#), [Chapters26-30](#)

Code: [Chapters01-05](#), [Chapters06-10](#), [Chapters11-15](#), [Chapters16-20](#), [Chapters21-25](#), [Chapters26-30](#)

Images: [Find original pictures in your Window's Users/.../Documents/My Pictures/ folder](#)

How to submit your homework.

- Copy/paste your *nicely documented* Java code and Console output into a single MS-Word (or equivalent) file. Save it as .pdf (Acrobat format). Your Android code is found in the Java-Eclipse *workspace* you defined in your computer, by default it is at c:\Users\your_user_name\workspace.
- Name the file as follows: **HWxyz_FirstName_LastName** (where *xyz* is the current homework number).
- Each report must begin with the sections: Date, Author, Project Description/Goals, enhancements. Make sure this section contains a clear answer to the following questions: (1) what does my Android app accomplish? (2) how does it work?
- Print the code, XML layouts, and screen shots produced by your application (Use DDMS screen-capture tool). Bring the printout to your professor. Save a copy of the document (and programming resources) for your final portfolio.

Current Assignments

Homework1. [Basic UI Design. Implementing a simple Flashlight application.](#) (Due Th. Sep-20)

Homework2. [Simple Widgets. Implementing a Pizza ordering Android App.](#) (Due Oct-10)

Homework3. [Using the ActionBar Control. Vehicle Shopping App.](#) (Due Oct-24)

Homework4. [Using Fragments to create an app that works on multiple devices.](#) (Due Oct-31).

Homework5. [Intents - Using Built-In Actions – City Tour.](#) (Due Nov-26)

Homework6. [Multithreading – Investment Game.](#) (Now)

~~**Homework7.** [RSS Feeds – SQL Databases.](#)~~

~~**Homework8.** [Geo-Location – Building a Golf Rangefinder.](#)~~

Independent. Any interesting/challenging idea is welcome.

Project. Discuss project with your instructor to get it approved.



CIS 470 - Mobile Application Development (4 Credits)

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Schedule – Office Hours

Room: BU207 Tu. & Th. 1:00 - 2:50pm
Office Hours: Tu. & Th. 12:00-1:00 & 4:00-6:00pm (or by appointment)

Course Description

The course provides an in-depth review of concepts, design strategies, tools and APIs needed to create, test and deploy advanced applications for mobile phones and occasionally connected mobile devices. Topics include: design of mobile user interfaces, application life-cycle, multi-threading, inter-process communication, data persistency, content providers, background services, geo-location and mapping, networking and web services, telephony, messaging, graphics and animation, multimedia, peer-to-peer communication, performance, security. The target computing environment changes overtime; currently the course explores the Android Operating System and its supporting SDK.

Student Outcomes

At the end of the course the student will be able to (1) engineer effective software systems for cell phones and other occasionally connected mobile devices based on the selected operating system, (2) understand the life-cycle mechanism of mobile software, (3) construct rich multi-threaded graphical interfaces sensitive to tactile, oral, and positional interactions, (4) manage advanced mobile data-stores, (5) integrate multimedia objects in their solutions, (6) develop location-aware applications.

Class Format

The class will be based on the instructor's recitation of material, study of tutorials, weekly lab assignments, and final project.

Final Portfolio

Students will prepare a final portfolio including all the programming assignments and projects. Material should be operational, complete, well organized and documented. Include code, screen snapshots. Print and present in a document binder (it will be returned to you). Transfer all of this material to a CD or DVD (to be retained by the instructor).

Pre-requisites

CIS345/545. This class is offered as a senior elective course.

Textbooks - References

- Lecture Notes – V. Matos (available from this page below)
- The Busy Coder's Guide to Android Development by Mark L. Murphy. CommonsWare Pub, Digital Edition, ISBN: 978-0-9816780-0-9 (available at: <http://commonsware.com/Android/index.html>).
- Android Developer's Guides – available at: <http://developer.android.com/>
- Unlocking Android - A Developer's Guide. W. Frank Abelson, Charlie Collins, and Robi Sen. Manning Pub. April, 2009, ISBN: 1933988673 (the attached reading list is based on this book).

Software/Hardware Requirements

Developing applications for Android may be done from the Windows XP/Vista environment, a Mac OS X (Intel only) environment or a Linux environment. Students could (for free) download the Google Android SDK, and the Eclipse environment along with the Android Developer Tools plug-in for Eclipse. ***It is not necessary to own an Android device as almost all the features to be used could be tested on the Android's simulator.***

Reading List - Tentative Android Topics

Topics covered in this class are delivered in a one-semester course based on traditional lecturing and a number of individual and team oriented lab experiences. The following is a list of possible topics(*)

1 Targeting Android – The Big Picture.

Background and positioning of the Android platform, including comparisons to other popular platforms such as BlackBerry, iPhone, and Windows Mobile. After an introduction to the platform, the balance of the first chapter introduces the high-level architecture of Android applications and the operating system environment.

Download lecture notes 1: Android Intro <http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter01-Intro.pdf>

2 Development environment.

Step-by-step development exercise teaching you the essence of using the Android development environment, including the key tools and concepts for building an application.

- 2.1 The Android SDK
- 2.2 Fitting the pieces together
- 2.3 Building an Android application in Eclipse
- 2.4 The Android Emulator
- 2.5 Debugging
- 2.6 Summary

Lecture notes 2: Android Setup: SDK & Emulator

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter02-Setup1-SDK.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter02-Setup2-Emulator.pdf>

3 User interfaces.

covers the fundamental Android UI components, including View and Layout. Introduces basic concepts such as handling external resources, dealing with events, and the lifecycle of an Android application.

- 3.1 Activity Life Cycle
- 3.2 Creating the Activity
- 3.2 An Overview of User Interfaces
- 3.3 Using XML Layouts
- 3.3 Selection Widgets
- 3.4 Date and Time Tabs
- 3.5 Hardware & Software Keyboards
- 3.6 Using Menus
- 3.7 Using Fonts
- 3.8 The WebView and the WebKit Browser
- 3.9 Dialog Boxes: AlertDialog & Toast
- 3.3 Using resources

Lecture notes 3-11: Life Cycle – User Interfaces

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter03-Life-Cycle.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter04-User-Interfaces.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter05-XML-Layouts.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter06-Selection-Widgets.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter07A-Fancy-Date-Time-Tabs.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter07B-Hard-Soft-Keyboard-IMF.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter08-Menus.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter09-Fonts.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter10-WebKit.pdf>

<http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter11-DialogBoxes.pdf>

4 Intents and services.

Expands on the concepts learned in chapter 3 and delves into the Android Intent concept to demonstrate interaction between screens, activities, and entire applications. Also we introduce and utilize the Service, which brings the notion of *background process* into discussion.

<ul style="list-style-type: none"> 4.1 Working with Intent classes 4.2 Listening in with broadcast receivers 4.3 Building a Service 4.4 Performing Inter-Process Communication 4.5 Summary 	<p><i>Lecture notes 12, 13, 19: Intents & Intent-Filters & Multi-threading</i></p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter12-Intents-1.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter12-Intents-2.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter13-MultiThreading.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter19-Intent-Filters.pdf</p> <p><i>Lecture Notes 22. Services</i></p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter22-Services.pdf</p>
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5 Storing and retrieving data.

Incorporates methods and strategies for storing and retrieving data locally. We examine the use of the filesystem, databases, the SD card, and Android specific entities such as the SharedPreferences and ContentProvider classes. At this point we begin combining fundamental concepts with more real-world details, such as handling application state, using a database for persistent storage, and working with SQL.

<ul style="list-style-type: none"> 5.1 Using preferences 5.2 Using the filesystem 5.3 Persisting data to a database 5.4 Working with ContentProvider classes 5.5 Summary 	<p><i>Lecture Notes 13-17. Resources, Preferences, Files, Databases.</i></p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter14-Preferences.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter15-Files.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter16-Resources.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter17-SQL-Databases.pdf</p>
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6 Networking and web services.

This section deals with storing and retrieving data over the network. Here we include a networking primer before delving into using raw networking concepts such as sockets on Android. From there we progress to using HTTP, and exploring web services (such as REST and SOAP).

<ul style="list-style-type: none"> 6.1 An overview of networking 6.2 Checking the network status 6.3 Communicating with a server socket 6.4 Working with HTTP 6.5 Web services 6.6 Summary 	<p><i>Lecture Notes 18. Networking – Web Services</i></p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter18A-Reading-XML-Data.pdf</p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter18-Internet-Feeders.pdf</p>
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7 Telephony.

Covers telephony on the Android platform. We touch on basics such as originating and receiving phone calls, as well as more involved topics such as working with SMS (text-messages). We also cover telephony properties and helper classes.

<ul style="list-style-type: none"> 7.1 Telephony background and terms 7.2 Accessing telephony information 7.3 Interacting with the phone 7.4 Working with messaging: SMS 7.5 Summary 	
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8 Notifications and alarms.

In this section we look at how to notify users of various events such as receiving a SMS message as well as how to manage and set alarms.

<ul style="list-style-type: none"> 8.1 Introducing Toast 8.2 Introducing notifications 8.3 Alarms 8.4 Summary 	<p><i>Lecture Notes 23. Notifications</i></p> <p>http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter23-Notifications.pdf</p>
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9 Graphics and animation.

Introduces Androids Graphics API as well as more advanced concepts such as working with the OpenGL ES library for creating sophisticated 2D and 3D graphics. We will also touch upon animation.

<ul style="list-style-type: none"> 9.1 Drawing graphics in Android 9.2 Animations 9.3 Summary 	
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10 Multimedia.

Reviews Androids support for multimedia. Subjects include both playing multimedia as well as using the camera and microphone to record our own multimedia files.

10.1 Introduction to multimedia and OpenCORE 10.2 Playing audio 10.3 Playing video 10.4 Capturing media 10.5 Summary	
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11 Location Services.

Introduces Location-based services. Here we learn about using the mapping APIs on Android, including different location providers and properties that are available, how to build and manipulate map related screens, and how to work with location related concepts within the emulator.

11.1 Simulating your location within the emulator 11.2 Using LocationManager and LocationProvider 11.3 Working with maps 11.4 Converting places and addresses with Geocoder 11.5 Summary	<p><i>Lecture Notes 24. Location Services</i> http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter24-LocationServices.pdf</p> <p><i>Lecture Notes 25. Working with MapViews</i> http://grail.cba.csuohio.edu/~matos/notes/cis-493/lecture-notes/Android-Chapter25-MapView.zip</p>
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Additional Resources

Visit Android’s web site at <http://www.android.com/>

Visit Eclipse’s web site at www.eclipse.org

Videos on Android at <http://www.youtube.com/user/androiddevelopers>

Android Development Community <http://www.anddev.org>

Official Android Market <http://www.android.com/market>

CSU Official Calendar Please consult the page <http://www.csuohio.edu/enrollmentservices/registrar/calendar/index.html>

Final exam: T. Dec 10th 1:00 – 3:00 PM

Important Dates	
Priority Registration Begins	March 25, 2013
Open Enrollment Begins	April 29, 2013
Term Begins (Saturday)	August 24, 2013

First Weekday Class	August 26, 2013
Last Day to Join a Course Waitlist	August 30, 2013
Last Day to Drop with Full Refund	August 30, 2013
Last Day to Add (CampusNet Registration)	September 1, 2013
Last Day to Drop	September 6, 2013
Course Withdrawal Period Begins - 'W' Grade Assigned	September 7, 2013
Last Day to Withdraw from Courses	November 1, 2013
Midterm Grades	October 14-21, 2013
Last Day of Classes	December 6, 2013
Final Exams	December 9-14, 2013
Commencement (Sunday)	December 15, 2013
Fall Semester Student Incomplete Work Deadline	May 2, 2014
Labor Day (University Holiday)	September 2, 2013
Columbus Day (University Holiday)	October 14, 2013
Veterans Day (Tuesday no classes - offices open)	November 12, 2013
Thanksgiving Recess (no classes on Saturday)	November 28-December 1, 2013