CS 65: Smartphone Programming

Sergey Bratus, Fall 2017
Lectures: Time slot **12**, 100 Life Sciences Center.
X-Hour will only be used when previously announced in class or by email.
My office is Sudikoff 065, office hours by appointment.

Objective: Learn the basics of Android architecture and application development. Understand design patterns used in Android programming and their challenges; understand what motivates new development languages such as Kotlin. Get a general idea of Android internals below the Java virtual machine layer, and of security challenges of Android applications and the underlying OS.

Pre-requisites: Fluency in Java, CS10. There will be a lot of programming assignments in this class; you need to be fluent in Java and Object-oriented programming concepts to hit the ground running.

Software and hardware: Android Studio. We will lend you a Nexus 6P phone for this class. Although you will have an option of using your own Android phone if you like, your debugging mileage may vary, because Android API tend to differ between platforms and API versions.

We may have guest lectures on iPhone programming and ecosystem, but will not address these topics in depth in class. Special projects may be possible.

Programming languages: Java, optionally Kotlin (officially supported as of Android Studio 3.0). We will discuss some functional programming concepts using Kotlin as an example. You will also have the option to use Kotlin in your programming assignments, but you will need to talk to me first.

Course directory: `http://www.cs.dartmouth.edu/~sergey/cs65/` Lecture notes and other reading materials will be posted in the course directory after each class, and links emailed to the class list.

Grades: 70% homework programming assignments, 30% final project.

Programming assignments: There will be a series of *weekly* programming assignments. You will need to submit your solutions through a source control system; they will be graded to comprise the 70% of your grade.

Final project: For the final project, you will propose and implement an Android app that uses some advanced functionality. Group projects will be allowed, but will be expected to deliver results commensurate with the size of the group.

Textbooks: Since the Android ecosystem is a moving target, we will use the Android online documentation and other free online resources. Depending on your learning style, however, I recommend the following additional reading:

- *The Busy Coder's Guide to Android Development*, `https://commonsware.com/Android/`. Online subscription ($20) gives you this e-book in PDF[1] and several other formats, as well as the code for many sample projects. You can also buy the paper copy of the book online, and two other books about Android.

  This book is huge and has many examples; you can also use it as a reference on many Android and Android Studio topics outside of this course. Being an electronic book, it's easy to search.

- *Android Programming: The Big Nerd Ranch Guide* (3rd Edition), by Bill Phillips, Chris Stewart, Kristin Marsicano. `https://www.amazon.com/Android-Programming-Ranch-Guide-Guides/dp/0134706056/`

  This book follows a step-by-step approach, through creation of simple applications. Its writing style is more verbose, and it covers a lot of ground.

- *Beginning Android Programming with Android Studio* (4th Edition), by Jerome DiMarzio. `https://www.amazon.com/Beginning-Android-Programming-Studio-Guides/dp/1118705599/`

  This book is a bit dated but concise, with just a few points highlighted in each of its code examples. Unlike the books above, its code examples are minimalistic for each given feature. **Caution:** some projects provided

[1] The PDF will be generated by the publisher's portal and will include the name you enter as you pay for your subscription at the bottom of every page.

with the book[2] no longer build in the newer Android Studio, and require manually creating projects and pasting the code in to work.

Last but not least, whenever in doubt about a feature, google for StackOverflow questions about it. It may save you hours of frustration.

[2]Download from `http://www.wrox.com/WileyCDA/WroxTitle/Beginning-Android-Programming-with-Android-Studio-4th-Edition.productCd-1118705599,descCd-DOWNLOAD.html`