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Professor Petcaugh Web Applications – CIS 431

1.4 Web Application Research

Java for Android:

The official language for android development is the Java language. Large parts of Android are written in Java and its API’s are designed to be called primarily from Java (Hook, 2016). Java has many versatile environments and uses as it does not compile to native processor code but rather it relies on a “virtual machine” or VMs (Hook, 2016). This machine understands an intermediate format called Java bytecode (Hook, 2016). The job of these virtual machines is to interpret the bytecode, which is really just a set of instructions similar to the machine code found in CPUs and execute the program on the processor. The VMs use a variety of technologies including just-in-time compilation (JIT) and ahead-of-time compilation (AOT) to speed up the processes(Hook, 2016).

This means that you can develop Android apps on Windows, Linux or OS X and the Java compiler converts the source code into bytecode (Hook, 2016). This in turn is executed on the VM built-in to Android. This is different to the model used by iOS which uses a native compiler to turn Objective-C into ARM machine code (Hook, 2016).

Java Features:

* It’s easy to learn and understand
* It’s designed to be platform-independent and secure, using

virtual machines

* It’s object-oriented
* Libraries

(Learn Java for Android Development, 2010)

Kotlin for Android:

Android appears to work highly and very well with the Kotlin language. On the Android webpage (<https://developer.android.com/kotlin/>), Kotlin is advertised as expressive, concise, and powerful. The website also says that it is interoperable with the Java programming language (Kotlin and Android, 2018). Kotlin contains safety features for nullability and immutability and states that less boilerplate code will have to be written (Kotlin and Android, 2018). They also promote the use of Lambdas which is helpful in writing less complex code. The reduction of the number of overloaded functions through the use of default arguments is a feature that would make the code easier to read and understand (Kotlin and Android, 2018). With Kotlin you can extend functionality without inheritance also making code more readable (Kotlin and Android, 2018). Kotlin is also an open source project so it may evolve over time but may prove to be extremely useful.

Swift for iPhone:

The newest version of Swift is Swift4. Swift is a programming language for macOS, iOS, watchOS, and tvOS. Swift4 improvements include additions to the standard library, adding features like smart key paths and serialization, and shortened build times with the reduction in size of app binaries (Apple Inc , 2018). Users can also learn to use Swift through using an iPad, through Swift Playground. It provides interactive lessons in which you can see exactly what each line of code does as you are going along (Apple Inc, 2018). Hardware accessories can also be used in Swift Playground. Swift4 was developed on Swift.org, as an open source project (Apple Inc, 2018).

New Features in Swift 4:

* Faster, easier to use Strings that retain Unicode correctness and add support for creating, using and managing substrings
* Smart key paths for type-safe, efficient, extensible key value coding for Swift types
* Enhancements to creating and manipulating Dictionary and Set types
* Extends support of archival and serialization to struct and enum types and enables type-safety for serializing to external formats such as JSON and plist
* Enforced exclusive access to memory

(Apple Inc, 2018)

Swift has many features to make your code more expressive:

* Closures unified with function pointers
* Tuples and multiple return values
* Generics
* Fast and concise iteration over a range or collection
* Structs that support methods, extensions, and protocols
* Functional programming patterns, e.g., map and filter
* Native error handling using try / catch / throw

(Apple Inc, 2018)

Summary:

I know that for our group project we are developing and Android App, so although Swift and Swift Playground looks very inviting I believe that Kotlin and Java are the better options for our project. Kotlin looks and seems inviting and may possibly be more comprehensible than Java by itself. Kotlin is more straight forward than Java and I would be interested in trying to use it.

Work Cited

Apple Inc. “Swift - Apple Developer.” *Purchase and Activation - Support - Apple Developer*, 2018, developer.apple.com/swift/.

Conder, Shane, and Lauren Darcey. “Learn Java for Android Development: Introduction to Java.” Code Envato Tuts+, 13 Sept. 2010, code.tutsplus.com/tutorials/learn-java-for

-android-development-introduction-to-java--mobile-2604.

Hook, Tariq. “I Want to Develop Android Apps – What Languages Should I Learn?” *I WANT TO DEVELOP ANDROID APPS – WHAT LANGUAGES SHOULD I LEARN?*, Zipcode Wilmington, 2016, www.zipcodewilmington.com/blog/i-want-to-

develop-android-apps-what-languages-should-i-learn.

“Kotlin and Android | Android Developers.” *Kotlin and Android Developers*, Android Developers, 2018, developer.android.com/kotlin/.