# LO 1 Background

Swift is a general purpose programming language intended to replace C, C++ and Objective C. Previously Objective C was required to develop iOS apps, now you can develop iOS apps with Swift.

The goal of the swift language is to create best available language for systems programming, mobile and desktop apps. Swift is safe, fast and expressive. (developers state the syntax is a joy to use!)

Swift is designed to be safer than the C based languages. Eliminates entire classes of unsafe code, variables must be initialized before use, arrays and integers are checked for overflow, memory is managed automatically, objects can never be nil – trying to make use of a nil object will be a compile error so no runtime crashes. Objects not being nil forces safety with nil objects.

Swift is designed to work with the Cocoa and Cocoa Touch frameworks – for developing GUI based applications. Unfortunately can only do this on a Max machine right now. Swift or Objective C are the only options for iOS development right now.

First version of swift was release in 2014, 2.0 was release in 2015 and 3.0 was release in 2016. Swift was made open source on December 3, 2015. Swift continues to rise in popularity while Objective C is dropping. Swift 4 Fall 2017, mainly additive changes - String no longer uses array of characters.

Swift combines some of the best features of Objective-C, Object oriented programming languages like Java, C#, Python and functional programming languages like Lisp, Scheme and Scala.

Swift is up to 2.6 times faster than Objective C and up to 8.4 times faster than python. (http://www.apple.com/ca/swift/?cid=wwa-ca-kwg-features-com)

## Swift and Objective C

Swift provides seamless compatibility with Objective C. You can use Swift APIs in Objective C. You can use Objective C APIs with Swift.

You can create mixed language apps that uses Swift and Objective C classes.

A few reasons Swift is better than Objective C:

* Swift is easier to read. For example to call a method:

Objective C:

output = [object methodWithInputAndOutput:input];

Swift:

output = methodWithInputAndOutput( input )

* Swift is safer. Objective C handles pointers in a weird manner – if the pointer is null the line of code becomes a non operation rather than crashing the code. But this is a big source of bugs. Swift instead has optional types forcing code to be written to deal correctly with null pointers at compile time.
* Swift requires less code. Objective C can be very verbose at times.

## The Basics

You can create Swift code in a text file with .swift as the extension. This file can be compiled and then run. You can have any number of classes or code in this one file.

With a program of any reasonable size it makes sense to have multiple swift files to separate functionality logically. You can create a package and put all the Swift files in a Sources folder. You must have one file called main.swift – this is the starting point for the program. After that code can be in any file – in classes or not. And names of files do not need to match class name.

Key things: no semicolons needed, no import statements, execution starts at main.swift

# Swift Development

Can create a project or can use an interactive coding environment (playground or REPL).

Playground – interactive coding environment, allows you to play around with Swift. Playground is available with XCode.

An REPL (read-eval-print-loop) is an interactive coding environment that evaluates each statement and displays results as updates are made. Can access by just typing swift at prompt in linux(with swift installed). IBM also has a website based on REPL that is easier to use: <https://swift.sandbox.bluemix.net/#/repl> (NOTE: you must be on linux)

A project must be compiled and run. We can compile and run an individual swift file but if we want to have multiple swift files that we use for one program then we must use a package.

Use XCode on Mac for development. You can also install a Swift compiler on a Linux machine. However, the GUI frameworks are currently only accessible using XCode on a Mac.

# API Reference

<https://developer.apple.com/reference/swift>