Kyle Crawshaw

Kyle is an IT Systems Administrator at Circle, a consumer finance startup shaking up the global economy by making money simple.

Circle uses open internet standards and protocols, including the blockchain. Kyle is responsible for managing Circle's laptops, identity services and cloud infrastructure for Circle's global employees.

He has a strong interest in programming, specifically focused on automating IT systems with code.

MACTECH PRO EVENTS

Swiftly Scripting the Command Line

Agenda

- The Current Automation Landscape
- A Recent History
- Why Swift?
- Examples
- Getting Started

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JavaScript

exec

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PyObjC

Objective-C

Python

Cocoa

Python Modules

macOS

PyObjC

```
-- OBJECTIVE-C --

result = [someObject someMethod:firstArg
withFoo:foo andBar:bar];


-- PYTHON --

result =
someObject.someMethod_withFoo_andBar_(firstArg,
foo, bar)
```

PyObjC

AutoPkgr

make-profile-pkg

No Maintenance for Python 2.7 past January 1, 2020

python.org

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?

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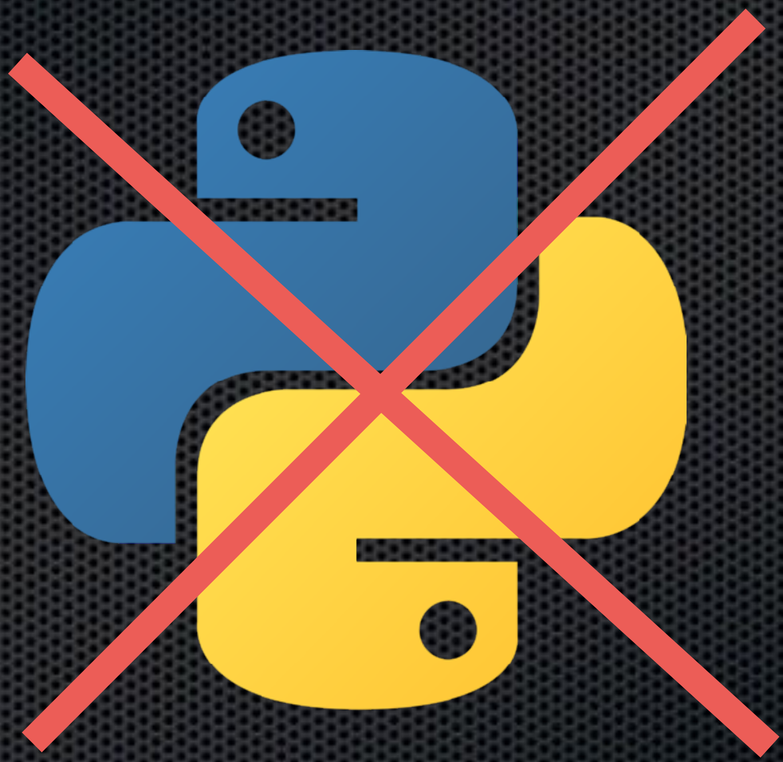

MACTECH PRO EVENTS

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exec

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Swift Applications

- macOS apps
- iOS/watchOS/tvOS apps
- Libraries & Frameworks
- Server side web apps
- Scripting/automation

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A Brief Swift History

- Modern successor to Objective-C
- Derives ideas from
  - Objective-C
  - Rust
  - Haskell
  - Ruby
  - Python
  - C#
  - CLU
  - and more…

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A Brief Swift History

- July 2010 by Chris Lattner at Apple

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A Brief Swift History

- https://www.swiftcommunitypodcast.org

A Swift History

2010 Development starts by Chris Lattner (Apple)

2014 Announced at WWDC

Reached 1.0 with Xcode 6.0

2015 Open Sourced swift.org

1.2

2.0 with Xcode 7.0 (El Capitan)

2016 3.0 with Xcode 8.0 (Sierra)

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A Swift History

2016 3.0 with Xcode 8.0 (Sierra)

2017 4.0 with Xcode 9.0 (High Sierra)

2018 4.2 with Xcode 10.0 (Mojave)

2019 5.0 🙏🏾

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A Swift History

2014 1.0

```
(1.0 != 4.2)
```

2018 4.2

2019 5.0 🙏🏾

A Swift History

2014 1.0

2018 4.2

2019 5.0 🙏 **ABI Stability**

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Why Swift?

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Apple's Goals with Swift

- Fast
- Modern
- Safe
- Interactive

MACTECH PRO EVENTS

Apple's Goals with Swift

- Fast
- Modern
- Safe
- Interactive

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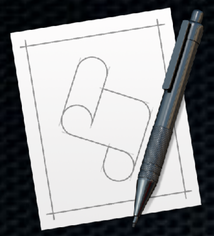

Interpreted vs. Compiled

- Bash
- Python
- JavaScript
- AppleScript

- C
- C++
- Objective-C
- Swift

Apple's Goals with Swift

- Fast
- Modern
- Safe
- Interactive

MACTECH PRO EVENTS

Modern Language Features

Objective-C

```
NSString * str = @"hello, ";
```

Swift

```
var str = "hello, "
```

Modern Language Features

Objective-C

```
NSString * str = @"hello, ";
```

Swift

```
var str = "hello, "
```

Modern Language Features

Objective-C

```
NSString * str = @"hello, ";
```

Swift

```
var str = "hello, "
```

MACTECH PRO EVENTS

Modern Language Features

Objective-C

```
NSString * str = @"hello, ";
str = [str stringByAppendingString:@"world"];;
```

Swift

```
var str = "hello, "
str += " world"
```

Modern Language Features

Objective-C

```
NSString * str = @"hello, ";
str = [str stringByAppendingString:@"world"];;
```

Swift

```
var str = "hello, "
str += "world"
```

Custom operator

Modern Language Features

- 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
- Powerful error handling built-in
- Advanced control flow with do, guard, defer, and repeat
- Enums
- String interpolation (v5)

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Swift-ObjC

Objective-C

Swift

Cocoa

Swift Libraries

macOS

Swift-ObjC

Objective-C

```
UITableView *myTableView = [[UITableView
alloc] initWithFrame:CGRectZero
style:UITableViewStyleGrouped];
```

Swift

```
let myTableView = UITableView(frame: .zero,
  style: .grouped)
```

MACTECH PRO EVENTS

Apple's Goals with Swift

- Fast
- Modern
- Safe
- Interactive

“Objective-C without the C”

–Craig Federighi

Apple's Goals with Swift

- Fast
- Modern
- Safe
- Interactive

MACTECH PRO EVENTS

REPL

(Read Eval Print Loop)

```
Welcome to Apple Swift version 4.
Type :help for assistance.
  1> print("Hello, World!")
Hello, World!
```

MACTECH PRO EVENTS

REPL

(Read Eval Print Loop)

```
Welcome to Apple Swift version 4.
Type :help for assistance.
  1> print("Hello, World!")
Hello, World!
  2> :script
Python Interactive Interpreter. T
>>>
```

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Swift Playgrounds

Learn serious code on your iPad.
In a seriously fun way.

Download the new Swift Playgrounds free

Script Mode

MyScript.py

```
#!/usr/bin/python
print("Hello, World!")
```

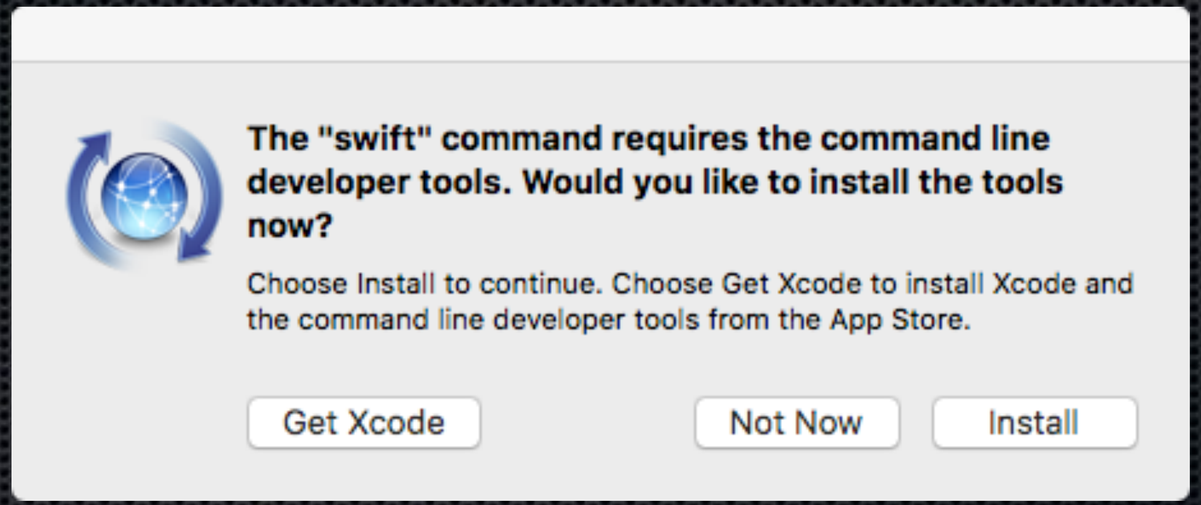
Script Mode

MyScript.swift

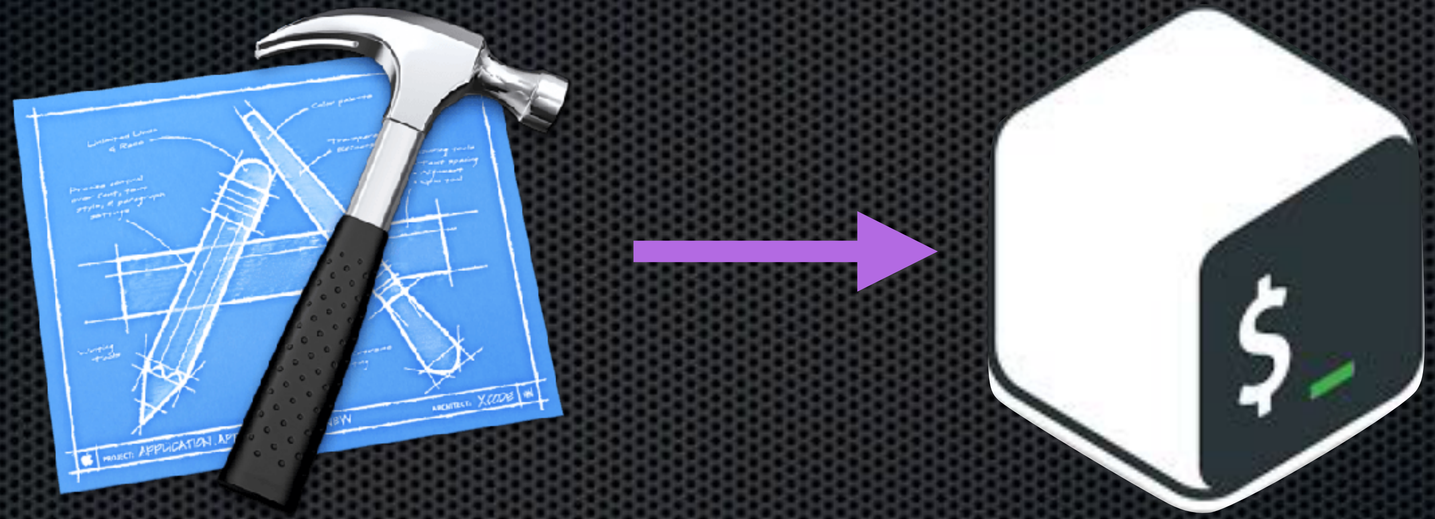
```
#!/usr/bin/swift
print("Hello, World!")
```

Script Mode

MyScript.swift



Command Line Tools



Mac GUI Application

macOS System Frameworks

Cocoa Application - Application User Interface Responds to User Events, Manages App Behavior

App Kit | Notification Center | Game Center | Sharing | Full Screen Mode | Cocoa Autolayout | Popovers | Software Configuration | Accessibility | Apple Script | Spotlight

Media Plays , records, editing audiovisual media, Rendering 2D and 3D graphics

AV Foundation	Core Animation	Core Audio	Core Image	Core Text	Open AL	Open GL	Quartz
Audio Playback, editing, Analysis & Recording	2D rendering & Animation 3D Transformations	Audio Services for recording, playback and synchronization	Fast Image Processing Uses GPU Based acceleration	Handles Unicode Fonts & texts	Delivers 3D Audio High performance positional playbacks in games	Portable 3D graphics apps & Games Imaging functions & Effects	OSX Graphics, Rendering support for 2D content Event Routing & Cursor Management

Core Services - Fundamental Services for low level network communication, Automatic Reference Counting, Data Formatting, String Manipulation

Address Book	Core Foundation	Quick Look	Security	Core Data	Foundation	Social	Webkit
Centralized Database for contacts & groups	declares C based programmatic interfaces Data Types & Data Management	Enables Spotlight & finder to display thumbnail images	User Authentication, Certificates & keys, Authorization, Keychain Services etc	Data Model Management & Storage, Undo/Redo, Validation of property values	Objective C Framework for Object Behavior, Internationalization, Data Types & Data Management	Supports integration with Social Networking services	Display HTML Content in apps, contains WebCore and JavaScript Core

Core OS - Related to hardware and networking, Interfaces for running high-performance computation tasks on CPU or GPU

Accelerate	Directory Services	Disk Arbitration	Open CL	System Configuration
Accelerate complex operations, improve performance using vector unit, Supports data parallelism, 3d Graphic imaging, image processing	Provides access to collected information about users, groups, computers, printers in a networked environment	Notifies when local or remote volumes are mounted and unmounted	Makes the high-performance parallel processing power of GPUs available to general purpose computing	Provides access to current network configuration information. Determines reachability of remote hosts. Notifies about change in network

Kernel & Device Drivers - Device drivers & BSD Libraries , low level components. Support for file system security, interprocess communications, device drivers

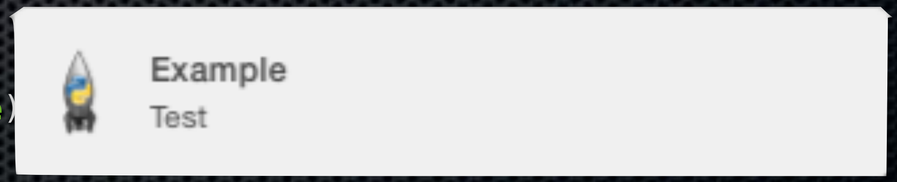
BSD	File System	Mach	Networking
Provides basis for file systems and networking facilities, POSIX Thread support, BSD Sockets	Supports multiple volume formats (NTFC, ExFAT, FAT etc) & File Protocols (AFP, NFS etc)	Protected Memory, Preemptive multitasking Advanced Virtual Memory, Real Time Support	Supports network kernel extensions (NKEs). Create network modules, Configure protocol stacks, Monitor and modify network traffic

Command Line Tools

macOS System Frameworks

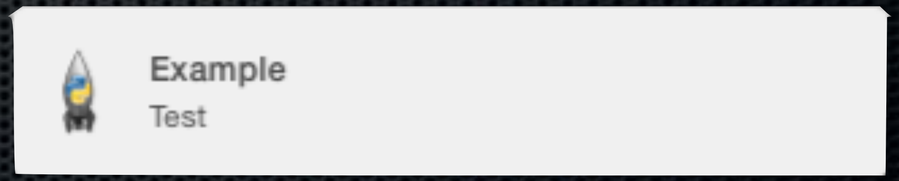
Python Notification Alert

```
#!/usr/bin/env python
from Foundation import NSUserNotification
from Foundation import NSUserNotificationCenter
from Foundation import NSUserNotificationDefaultSoundName
from optparse import OptionParser


def NotificationAlert(strTitle = 'Alert Title',strMessage = 'Message',bSound = True):
    notification = NSUserNotification.alloc().init()
    notification.setTitle_(strTitle)
    notification.setInformativeText_(strMessage)
    notification.
    if bSound:
        notification.setSoundName_(NSUserNotificationDefaultSoundName)

    center = NSUserNotificationCenter.defaultUserNotificationCenter()
    center.deliverNotification_(notification)


def main():
    NotificationAlert('Example','Test',True)

if __name__ == '__main__':
    main()
```



Swift Notification Alert

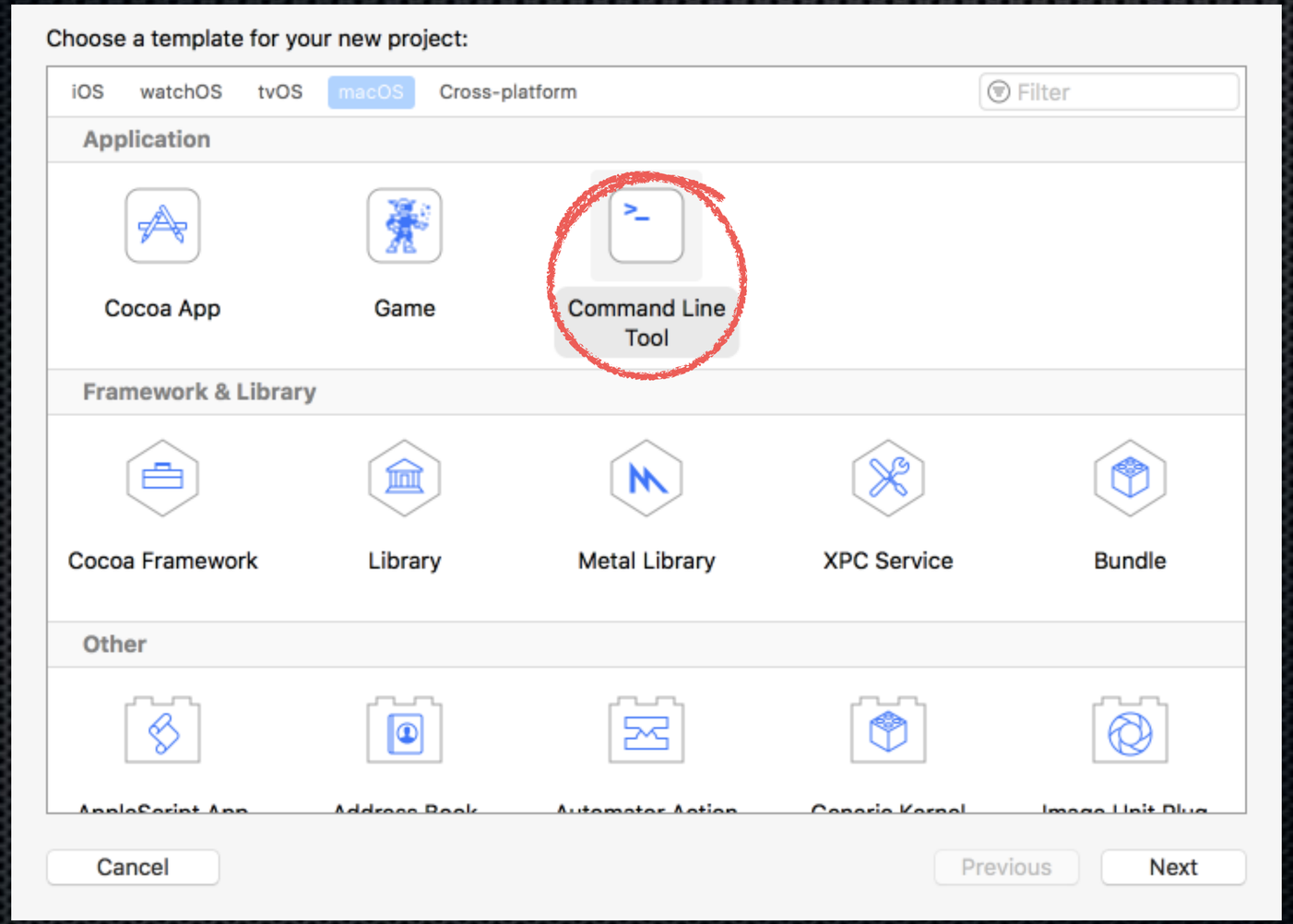
```
import Foundation

func createNotification(title: String, name: String) {
    let notification = NSUserNotification()
    notification.title = title
    notification.subtitle = name
    NSUserNotificationCenter.default.scheduleNotification(notification)
}

createNotification(title:"Example", name:"Test")
```



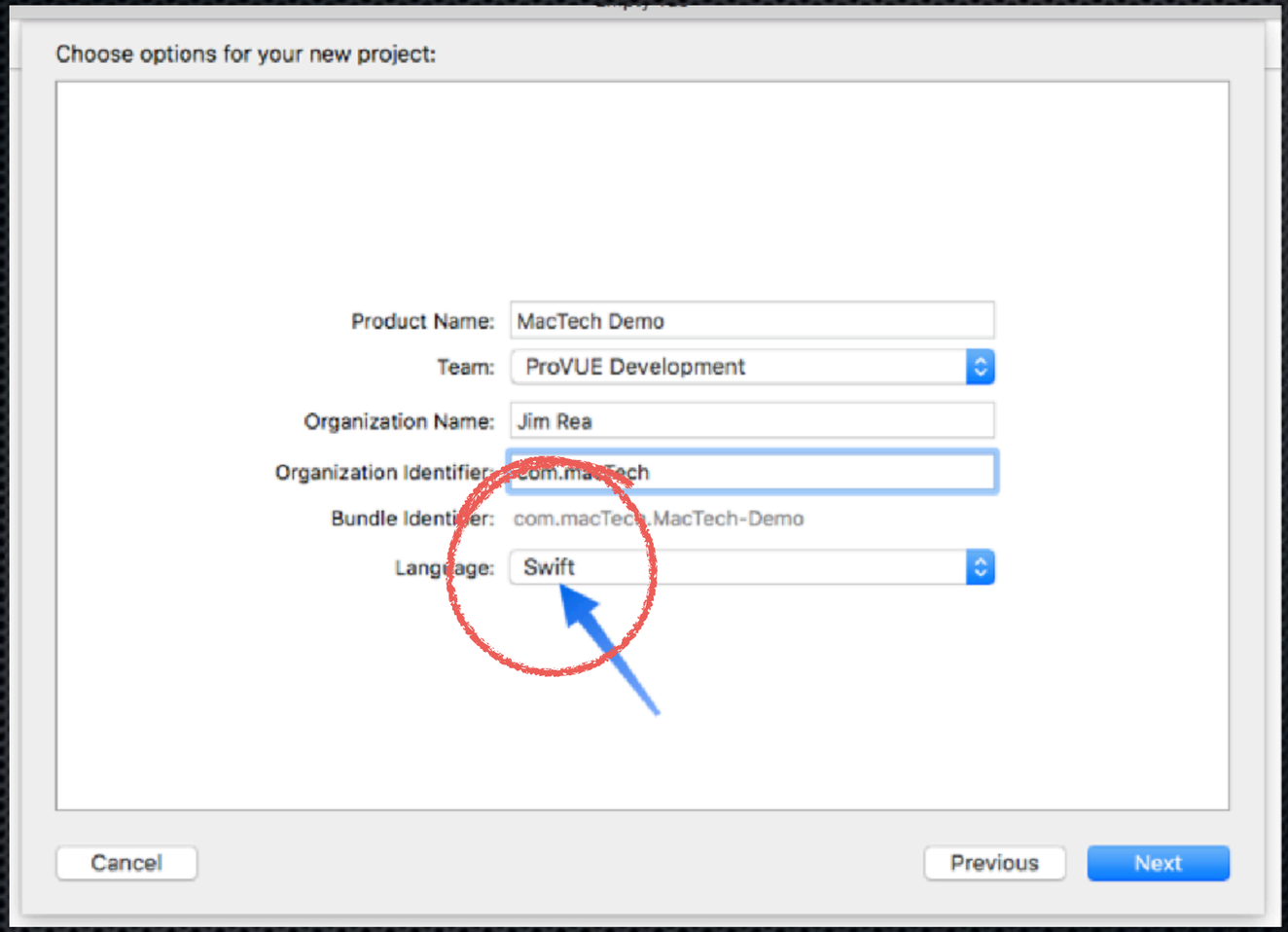
Xcode Advantages

- Excellent editor with interactive syntax checking and auto-completion
- Built in debugger
- Built in Git support
- Documentation included
- Private source code
- Code signing and notarization

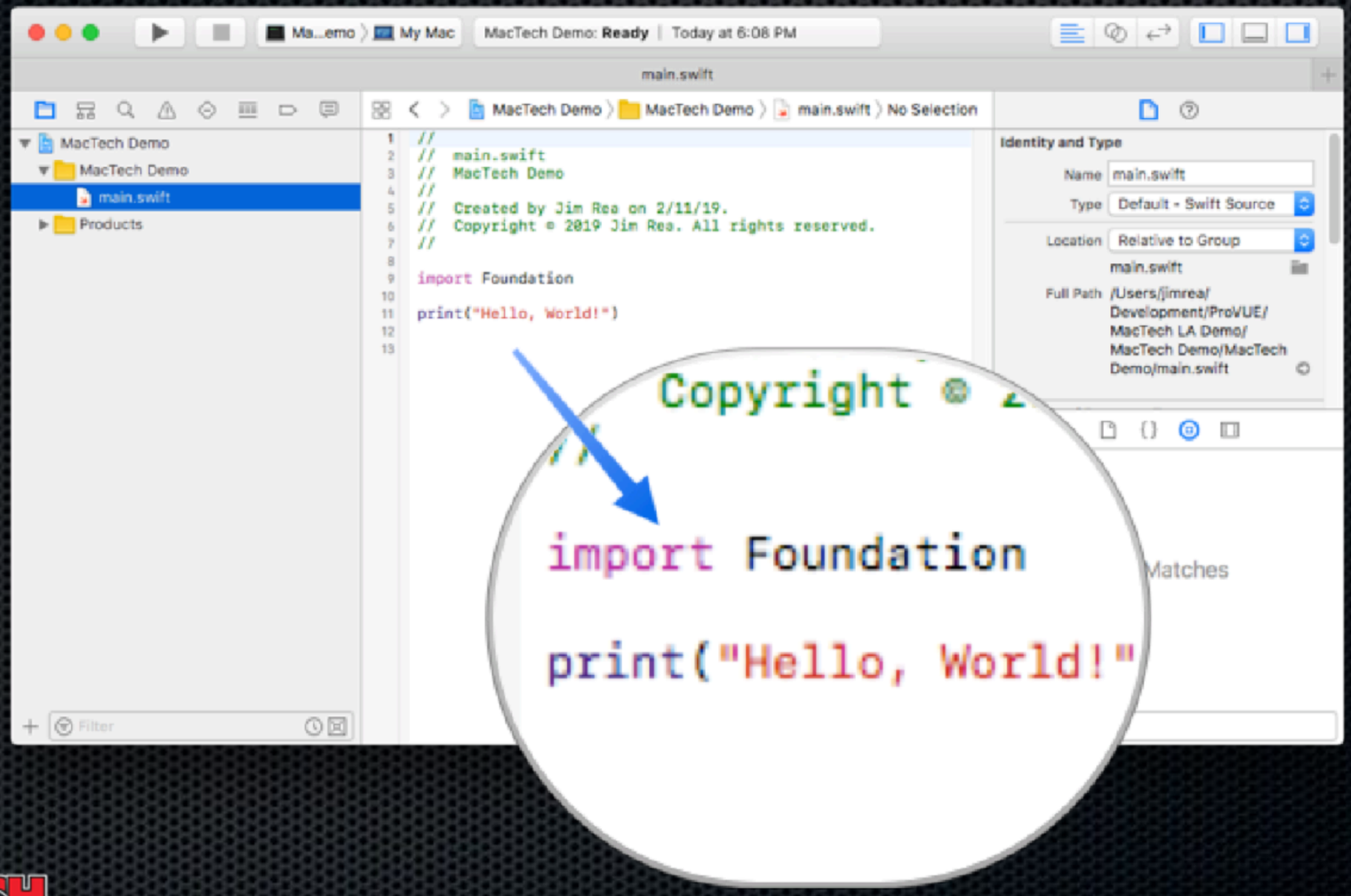
Command Line Tools



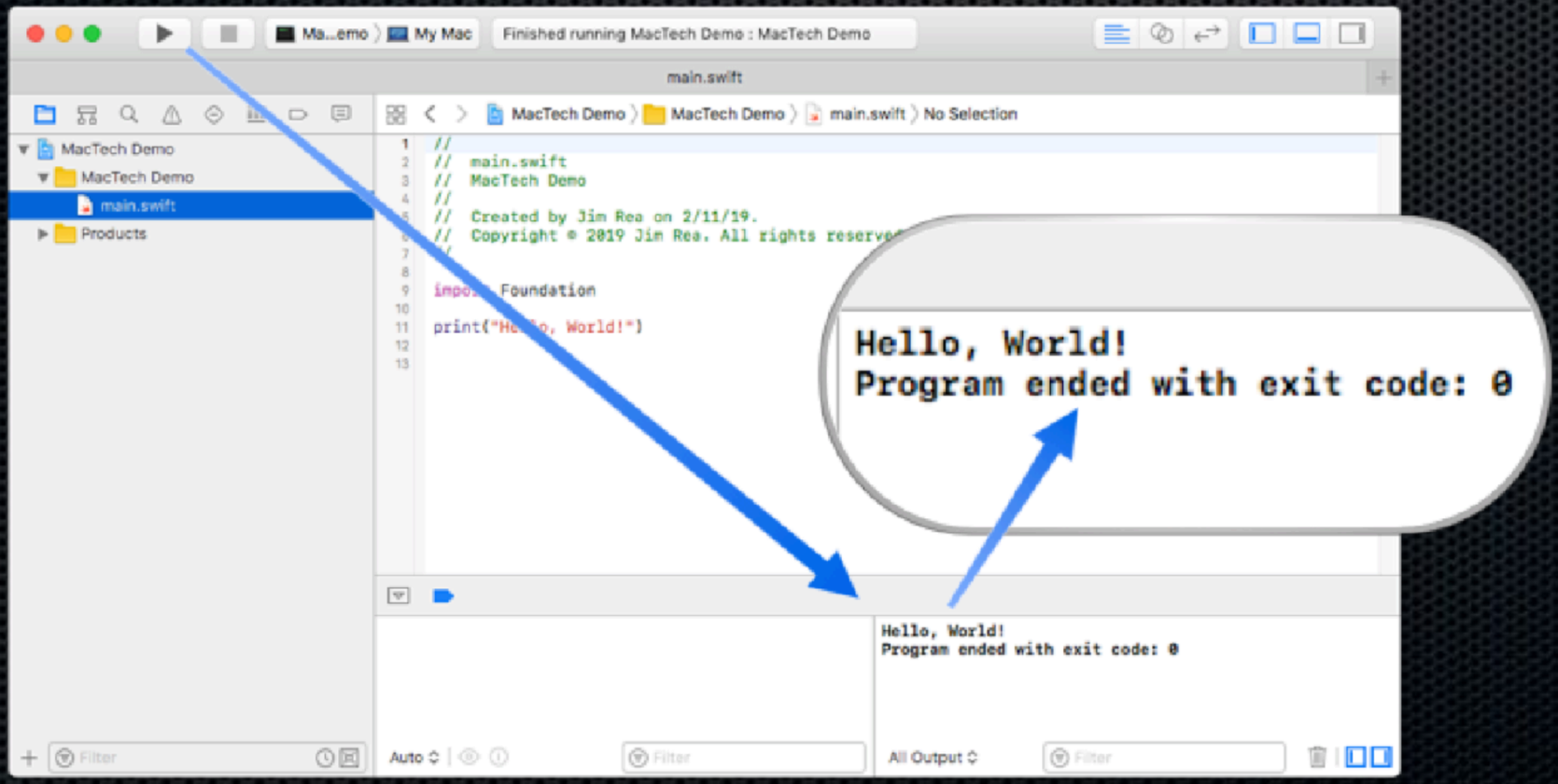
Command Line Tools



Command Line Tools

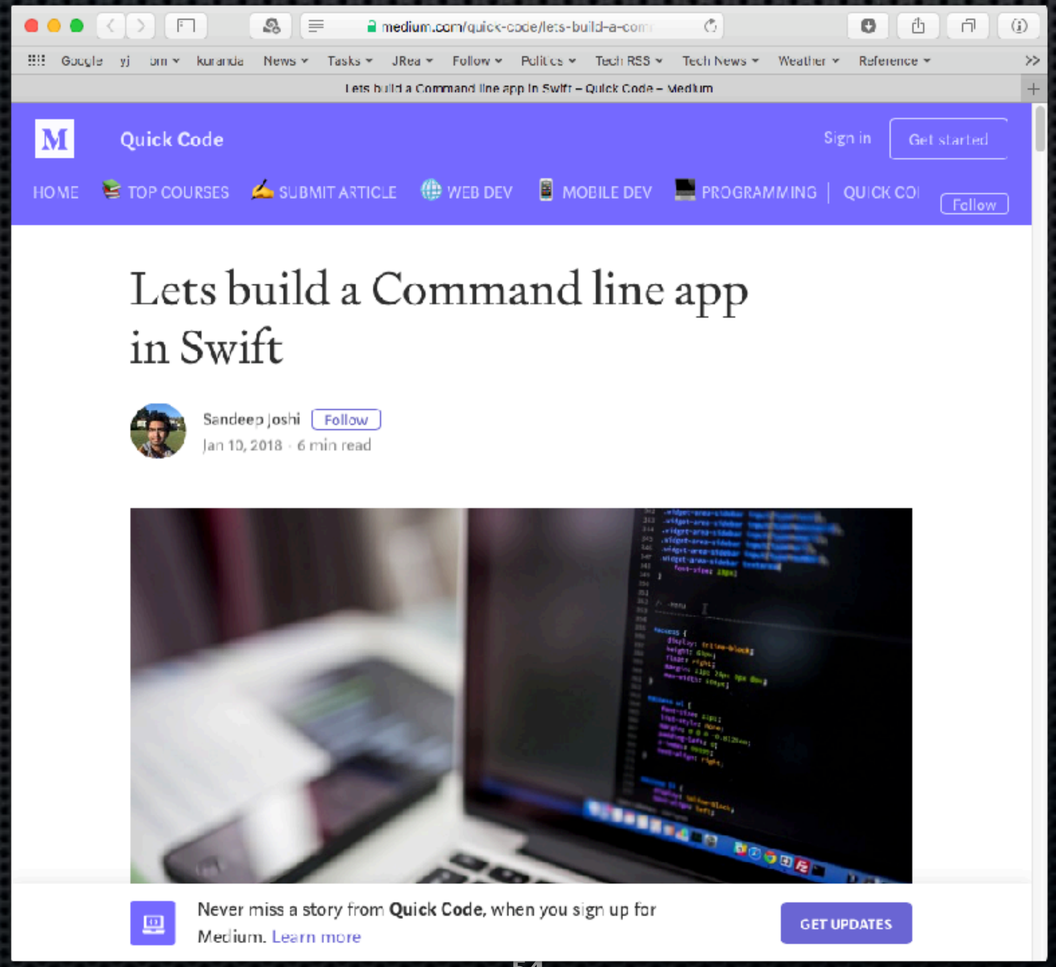


Command Line Tools



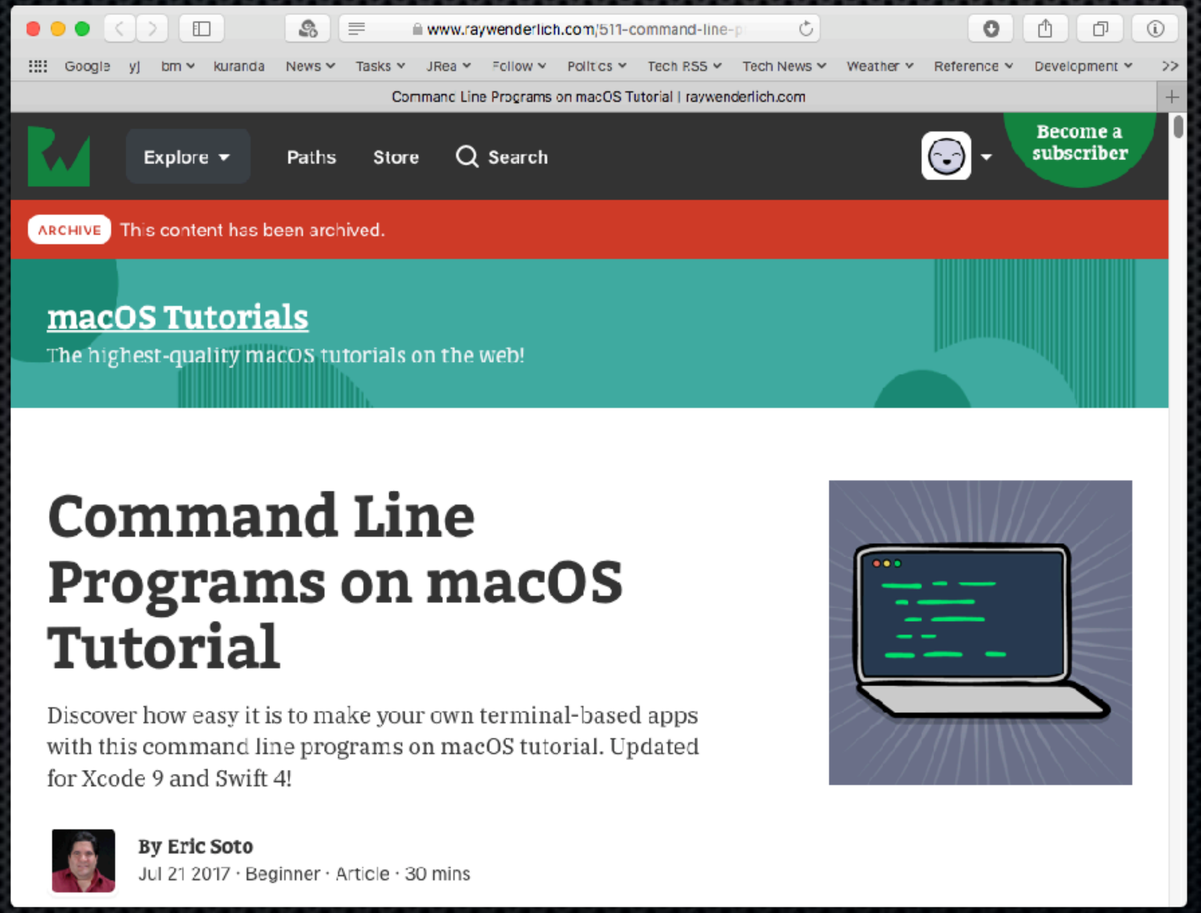
Command Line Tools

https://medium.com/quick-code/lets-build-a-command-line-app-in-swift-328ce274f1cc



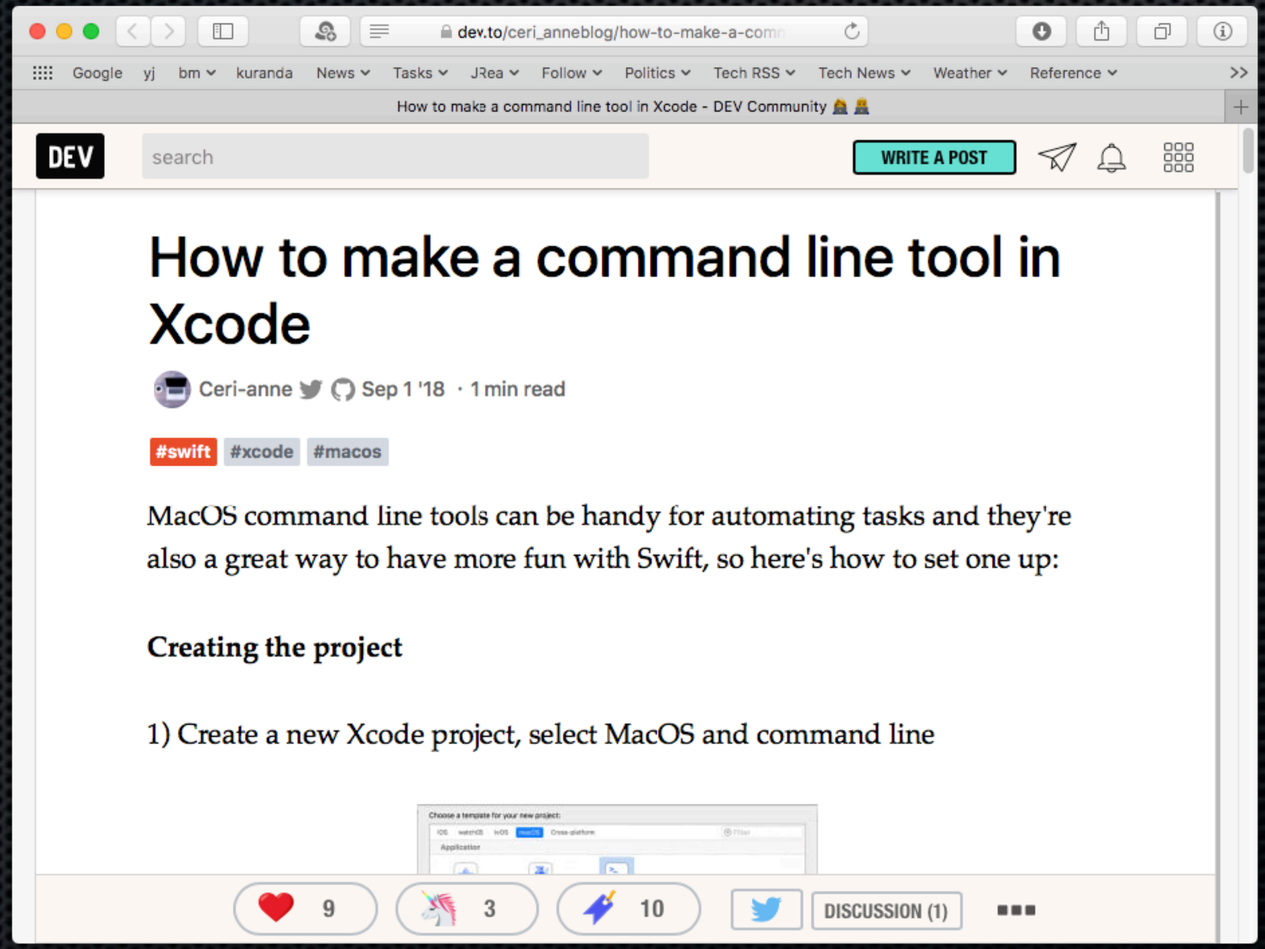
Command Line Tools

https://www.raywenderlich.com/511-command-line-programs-on-macos-tutorial



Command Line Tools

https://dev.to/ceri_anneblog/how-to-make-a-command-line-tool-in-xcode-2f81



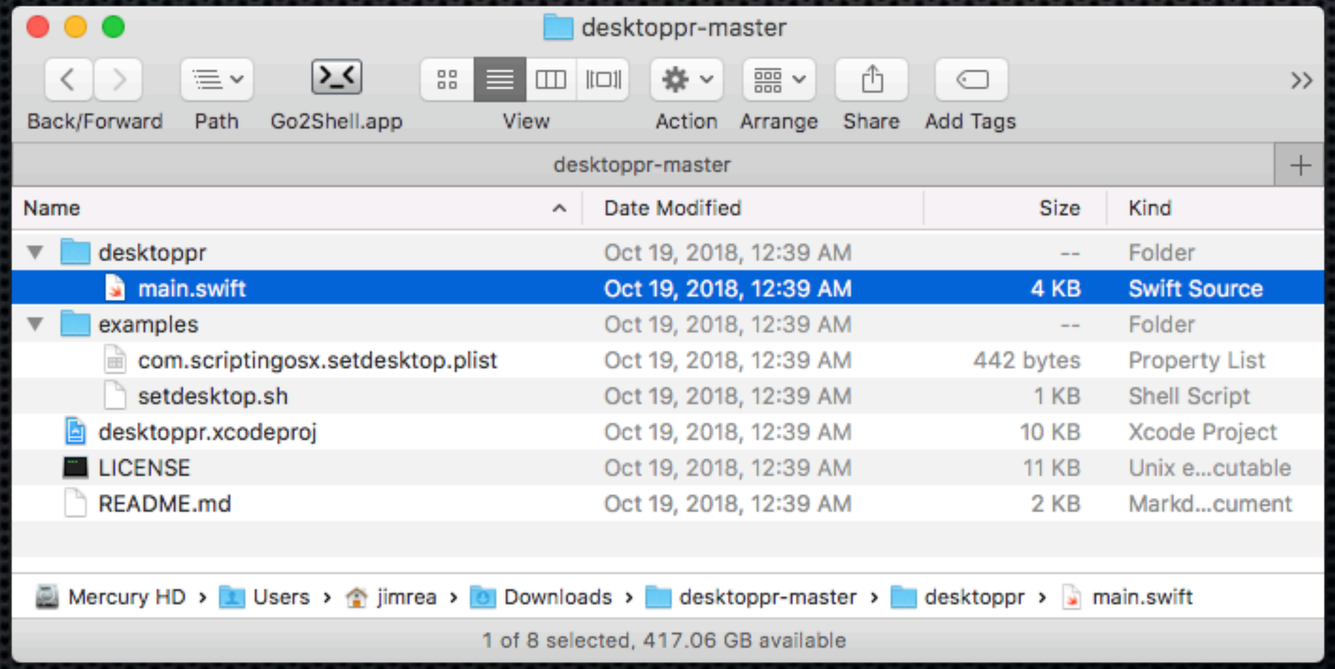
Swift Open Source Projects

- desktoppr
- DEPNotify
- SplashBuddy
- NoMAD & NoMADLogin-AD
- ProfileCreator
- replay
- SwiftAutomation

Swift Projects

desktoppr - command line tool to manage the desktop image

https://scriptingosx.com/2018/09/managing-the-desktop-picture-on-macos/



Swift Projects

DEPNotify - lightweight notification of DEP enrollment status

https://gitlab.com/Mactroll/DEPNotify

Swift Projects

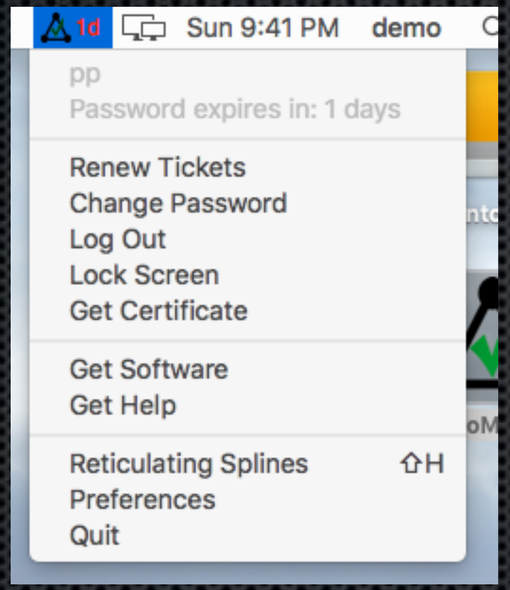
SplashBuddy - onboarding splash screen for Jamf Pro

https://github.com/Shufflepuck/SplashBuddy

Swift Projects

NoMAD & NoMADLogin-AD - Active Directory enhancements

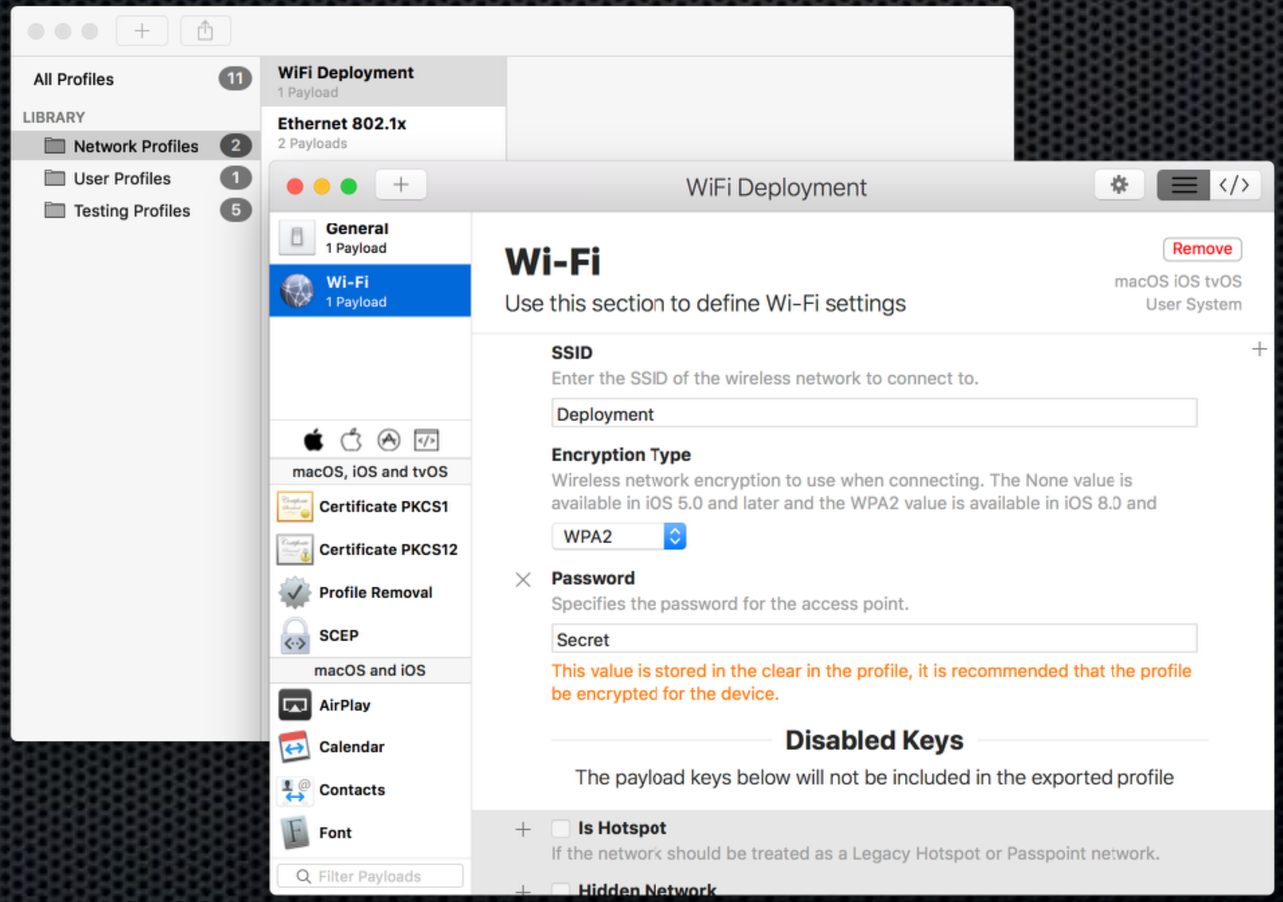
https://gitlab.com/Mactroll/NoMAD
https://gitlab.com/orchardandgrove-oss/NoMADLogin-AD



Swift Projects

Profile Creator - Creates configuration profiles

https://github.com/erikberglund/ProfileCreator



Swift Projects

replay - converts AppleTV into a video kiosk

https://github.com/vmware/replay-app-for-tvos

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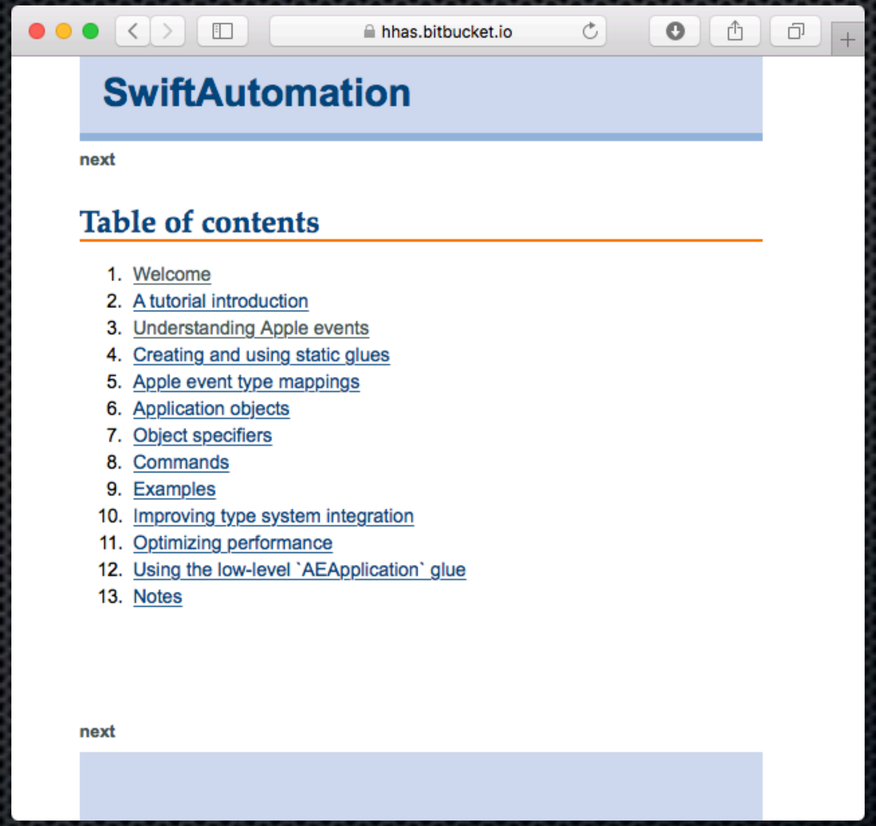
SwiftAutomation

Swift & AppleEvents - A marriage made in heaven!

https://hhas.bitbucket.io



Getting Started

macOS 10.14 Mojave

Xcode 10

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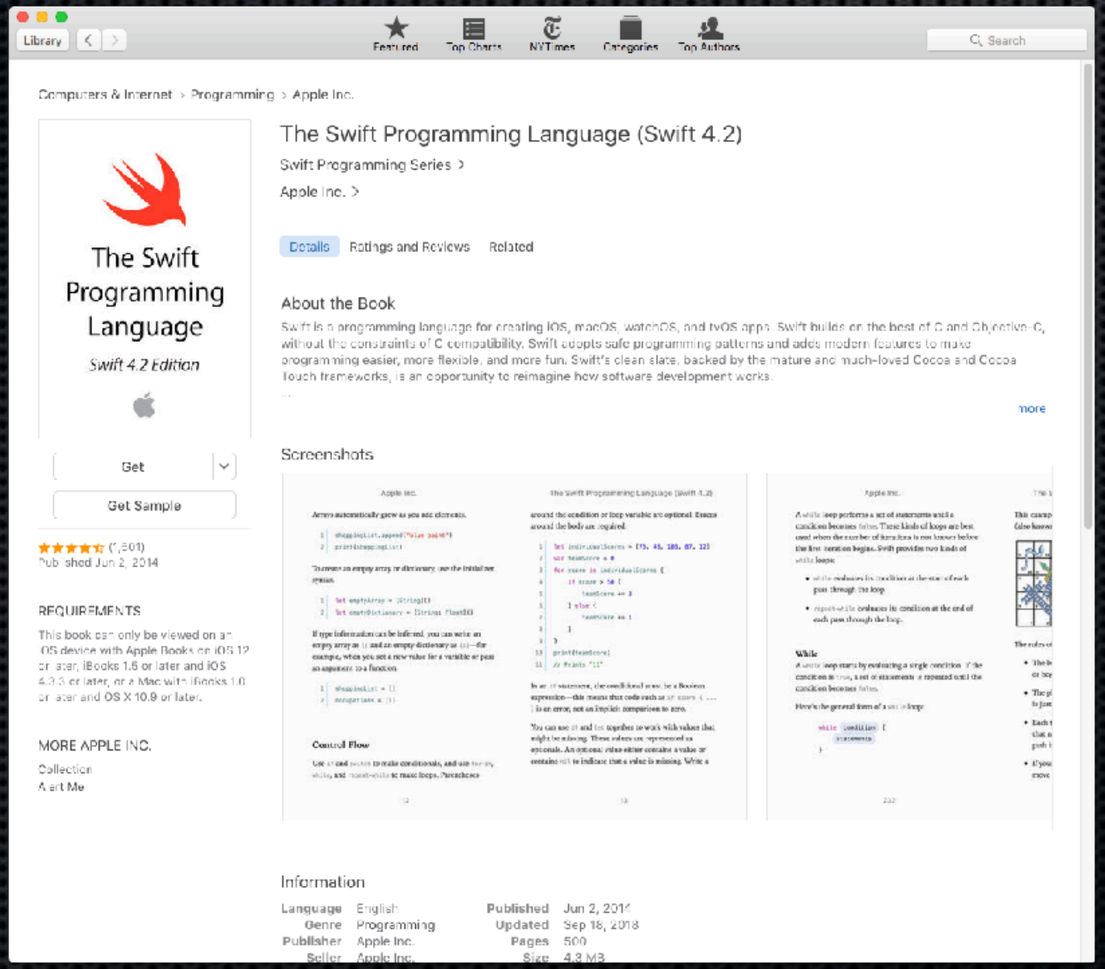
Getting Started



Getting Started

- Every
  https://www.a veryone-can-code/
- Stanford's Swift Course
  https://itunes.apple.com/us/course/developing-ios-11-apps-with-swift/id1309275316

Everyone Can Code

Questions?