



Workshops

Mobile Application Programming by Bryce Johnson

Presented by the Society of Black Scientists and Engineers



Overview

1. TreeHacks
2. Mobile Application Software Overview
3. Intro to iOS Programming
4. Demo Creation Walkthrough
5. Questions

*I will try and periodically stop for questions so make sure to put them in the chat!



TreeHacks



Get Involved!

TreeHacks 2021: **February 12 - 14** (Presidents' Day Weekend)

- **Hacker:** come to the event, pick up a new skill or two, build cool projects, meet people from all around the world, grab swag, and win prizes!
- **Volunteer:** hack at the event, help plan logistics and workshops with corporate partners, grab even more swag



Mobile Application Software Overview



Different Softwares

- Cross-Platform
 - React Native
 - Flutter
 - Unity
- iOS
 - XCode in Swift or Objective-C
- Android
 - Android Studio in Java and XML



Flutter





Intro to iOS Programming



Swift

(very similar to Java or Python in 106a and 106b)

camelCase!
Optional Values!

Values

```
1 var myInt = 42
2 var myString = "This is a string"
3
4 let myConstant = "This shouldn't change"
```

Heavily Typed!

Functions

```
1 func beNice(person: String, day: String) -> (greet: String, close: String) {
2     let greeting = "Hello, " + person + " today is " + day
3     let closing = "Goodbye " + person
4     return (greeting, closing)
5 }
13 let nice = beNice(person: "Bryce", day: "Wednesday")
14 print(nice.greet)
```

```
○ @IBOutlet weak var myButton: UIButton!
16 private var myOptionalString: String? // Could have a value or could not
17 private var myRequiredString: String! // Needs to have a value or will crash if it doesn't
18 private var myNormalString: String = "" // Will always have a variable
```

No Semicolons!

Data Structures

```
1 var listOfLanguages = ["java", "c++", "c#"]
2
3 var dictionaryofLanguages = [
4     "java": "Created in 1991",
5     "c++": "Created in 1985",
6     "c#": "Created in 2000"
7 ]
14 listOfLanguages.append("python")
15 listOfLanguages.remove(at: 1)
16 print(listOfLanguages)
17
18 dictionaryofLanguages["python"] = "Created in 1991"
19 dictionaryofLanguages.removeValue(forKey: "c++")
20 print(dictionaryofLanguages)
```

Control Flow

```
4     if something <= anotherThing {} else {}
5
6     for item in list {}
7     for i in 1...5 {}
8     for (key, value) in dictionary {}
9
10    while i < max {}
```




*Can be downloaded from
AppStore on mac or from
developer website

1. Start Screen



Welcome to Xcode

Version 11.5 (11E608c)



Get started with a playground
Explore new ideas quickly and easily.



Create a new Xcode project
Create an app for iPhone, iPad, Mac, Apple Watch, or Apple TV.



Clone an existing project
Start working on something from a Git repository.



XCode

2. Creating Your Project

Choose a template for your new project:

iOS watchOS tvOS macOS Cross-platform

Application

1 Single View App Game Augmented Reality App Document Based App Master-Detail App

Tabbed App Sticker Pack App iMessage App

Framework & Library

Framework Static Library Metal Library

Cancel Previous Next

Choose options for your new project:

Product Name:

Team:

Organization Name:

Organization Identifier:

Bundle Identifier:

Language:

User Interface:

☐ Use Core Data

☐ Use CloudKit

☐ Include Unit Tests

☐ Include UI Tests

Cancel Previous Next

Issues

Simulator

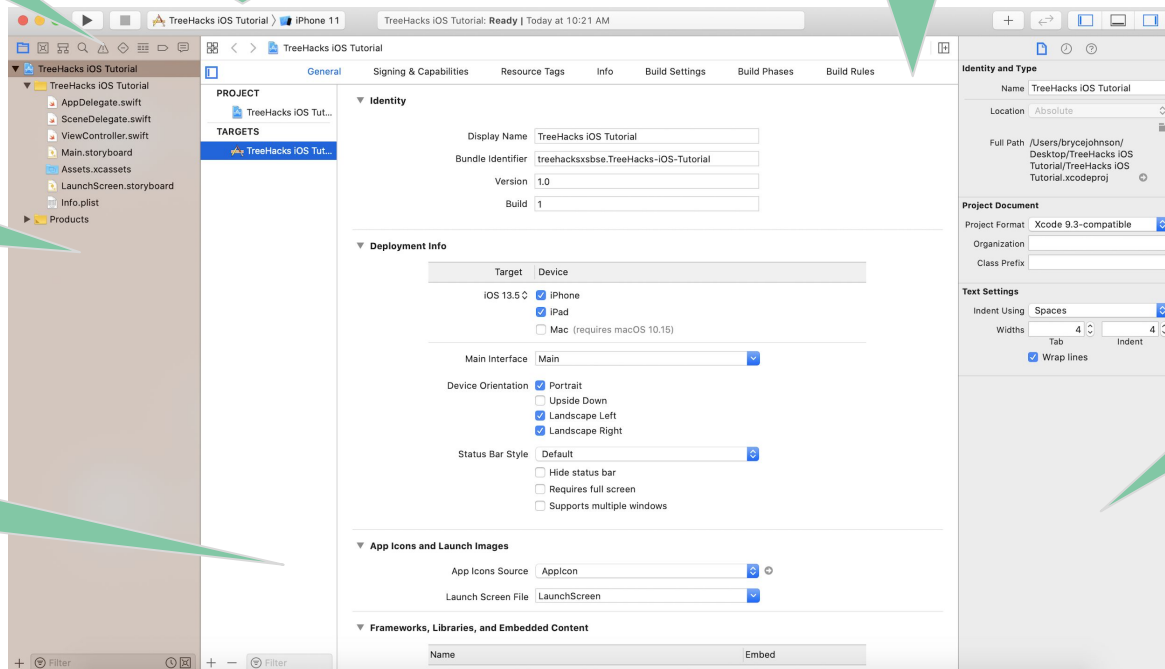
3. Layout

Main
Screen

File
Explorer

Overview of
Objects on
Main Screen

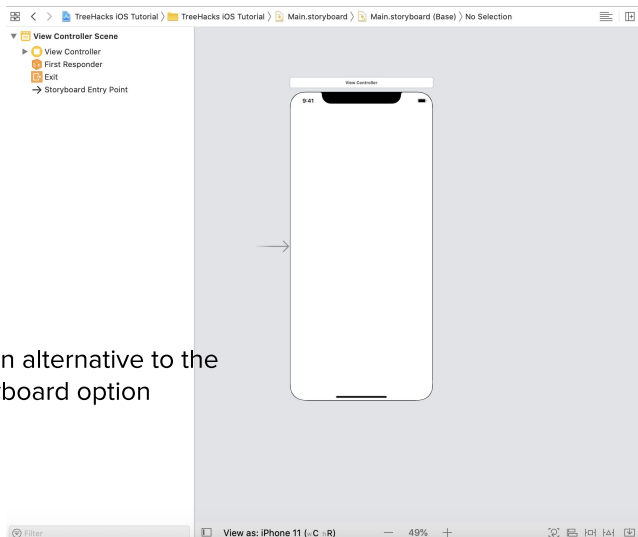
Specific Editable
Information Based
on Main Screen



4. Key Files

Main.storyboard

Where UI/UX takes place



* SwiftUI is an alternative to the classic Storyboard option

ViewController.swift

Where the code for each of the views on the storyboard goes

```
1 //  
2 // ViewController.swift  
3 // TreeHacks iOS Tutorial  
4 //  
5 // Created by Bryce Johnson on M/DD/YY.  
6 //  
7  
8 import UIKit  
9  
10 class ViewController: UIViewController {  
11  
12     override func viewDidLoad() {  
13         super.viewDidLoad()  
14         // Do any additional setup after loading the view.  
15     }  
16  
17 }  
18  
19  
20 |
```

* You can programatically code UI/UX effects in the View Controller instead of Storyboard



XCode

4. Key Files

AppDelegate.swift

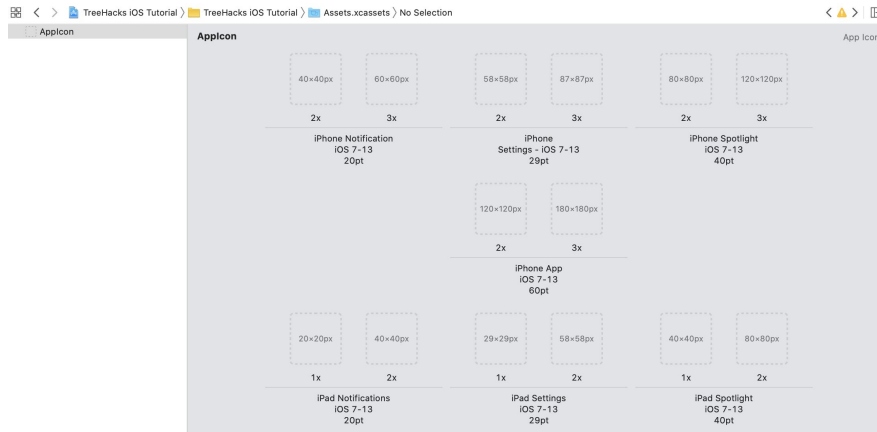
Where global code takes place

```
1 //
2 // AppDelegate.swift
3 // TreeHacks iOS Tutorial
4 //
5 // Created by Bryce Johnson on M/DD/YY.
6 //
7
8 import UIKit
9
10 @UIApplicationMain
11 class AppDelegate: UIResponder, UIApplicationDelegate {
12
13
14
15     func application(_ application: UIApplication, didFinishLaunchingWithOptions launchOptions:
16         [UIApplication.LaunchOptionsKey: Any]?) -> Bool {
17         // Override point for customization after application launch.
18         return true
19     }
20
21     // MARK: UISceneSession Lifecycle
22
23     func application(_ application: UIApplication, configurationForConnecting connectingSceneSession:
24         UISceneSession, options: UIScene.ConnectionOptions) -> UISceneConfiguration {
25         // Called when a new scene session is being created.
26         // Use this method to select a configuration to create the new scene with.
27         return UISceneConfiguration(name: "Default Configuration", sessionRole: connectingSceneSession.role)
28     }
29
30     func application(_ application: UIApplication, didDiscardSceneSessions sceneSessions: Set<UISceneSession>) {
31         // Called when the user discards a scene session.
32         // If any sessions were discarded while the application was not running, this will be called shortly after
33         // application:didFinishLaunchingWithOptions.
34         // Use this method to release any resources that were specific to the discarded scenes, as they will not
35         // return.
36     }
37 }
```

* There is also a SceneDelegate.swift
but we will not be using it

Assets.xcassets

Where images are stored



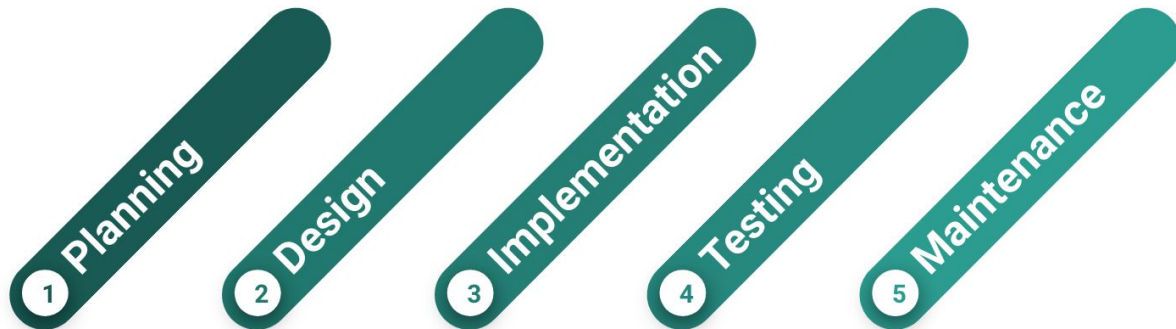


Demo Creation Walkthrough



Steps in Creating a Hackathon Project

Usual Building

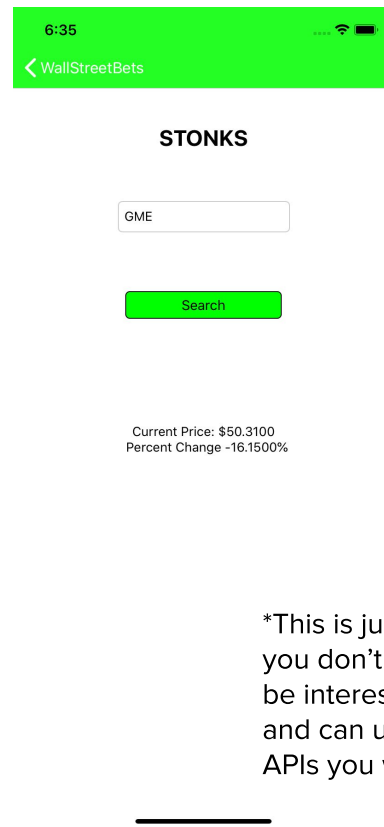
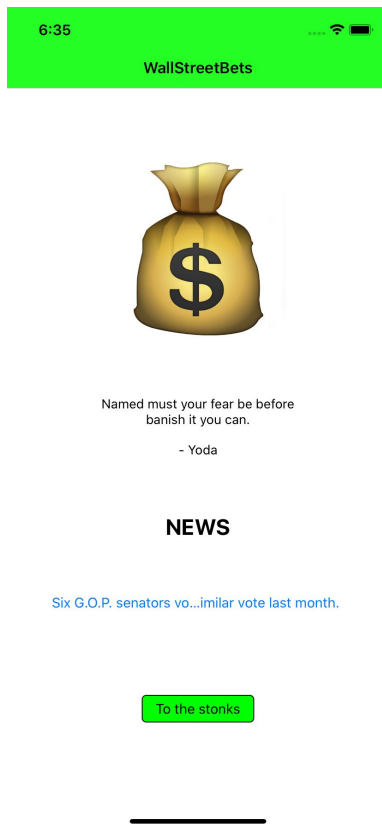
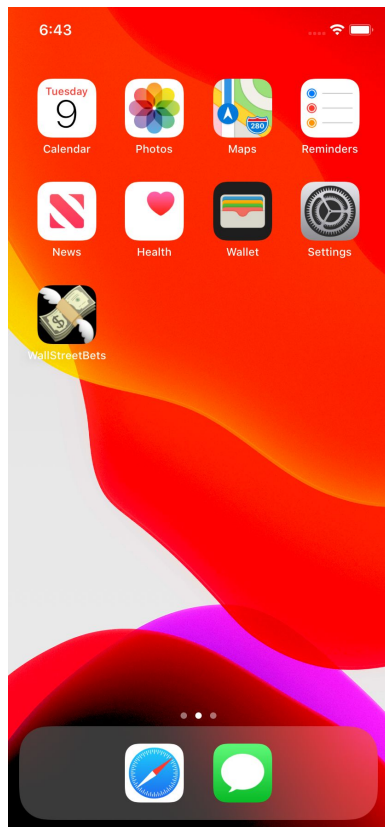


Hackathon Building





Demo Screens



*This is just a demo so you don't really need to be interested in finance and can use whatever APIs you want :)



XCode Elements Used

- UITextView
- UITextField
- View Controllers
- Buttons
- Labels
- UIImageView
- Navigation Controller
- APIs
- Segues

DEMO



What We Have Learned

1. **TreeHacks is Feb 12-14th**
2. **Different Mobile Application Softwares**
3. **iOS Programming Structure**
4. **How to Create a Working Prototype (XCode Elements, APIs, Simulator, etc.)**

*I require a 5% stake in all of
your billion dollar startups now



Questions?

Drop them in the chat or

feel free to email me @ brycej@stanford.edu

Link to repo: <https://github.com/BryceJawnsen/TreeHacks2020iOSDemo>



What will you build?

treehacks