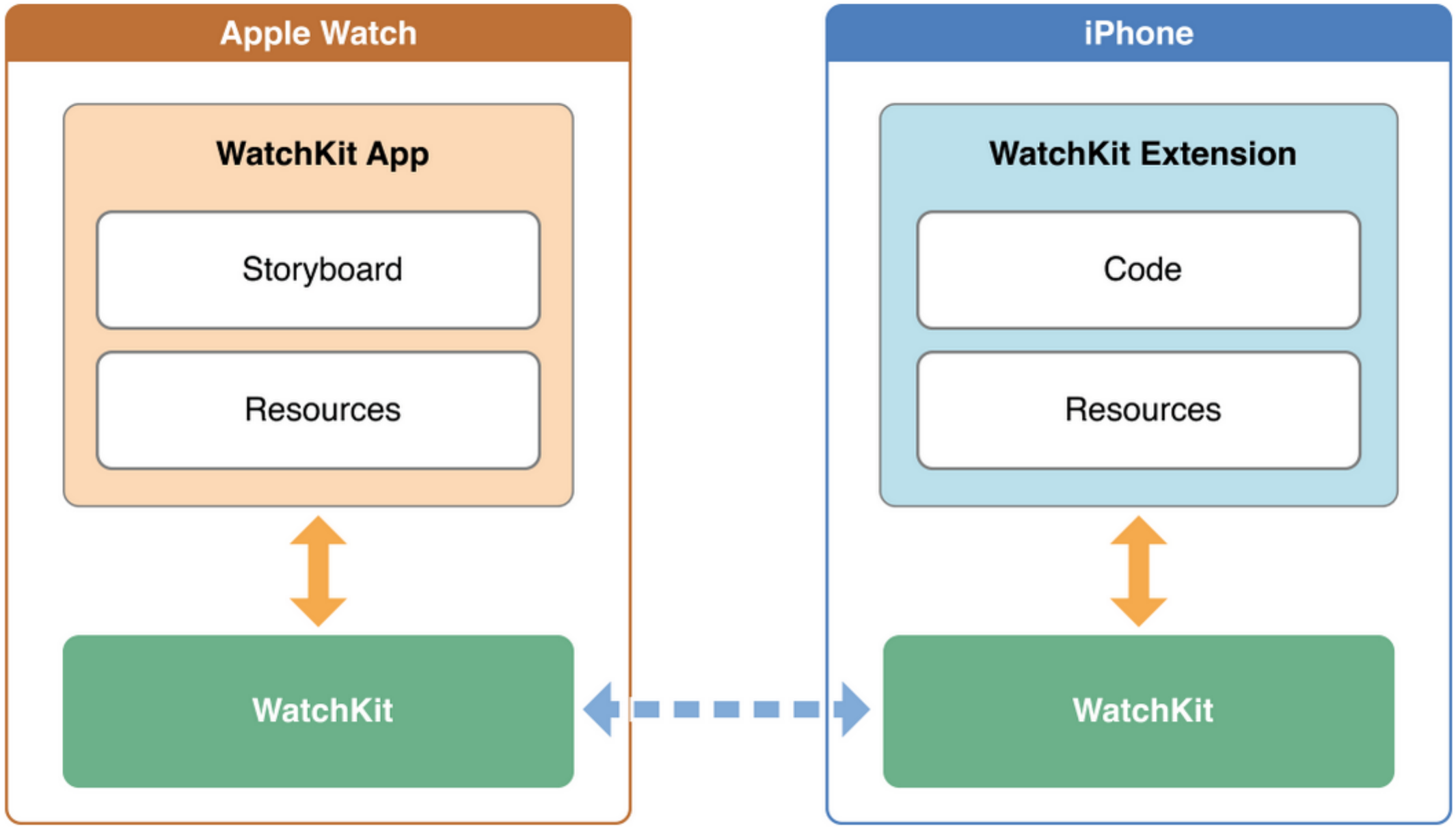
Architecting Your App for the WATCH

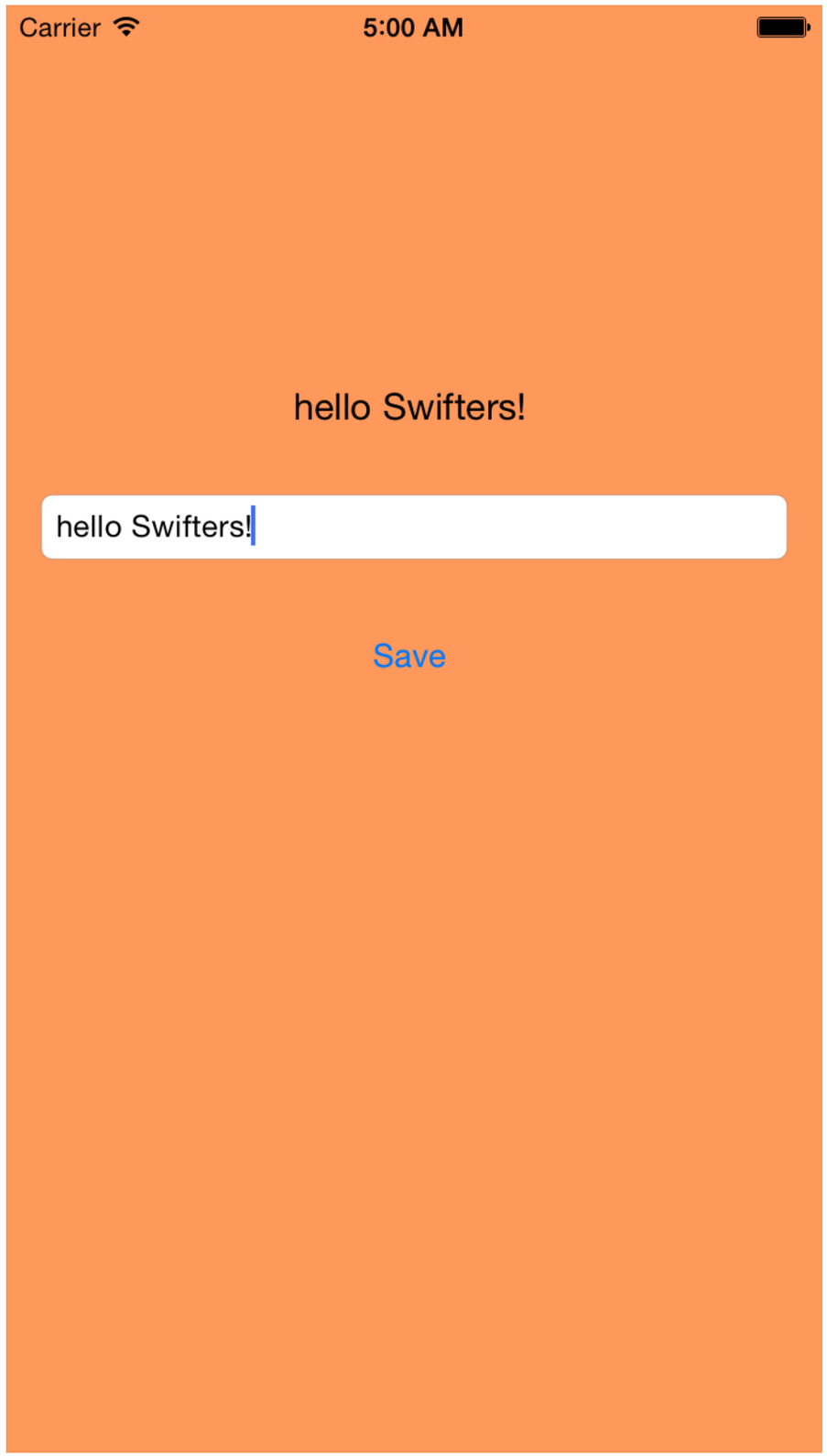
@NatashaTheRobot

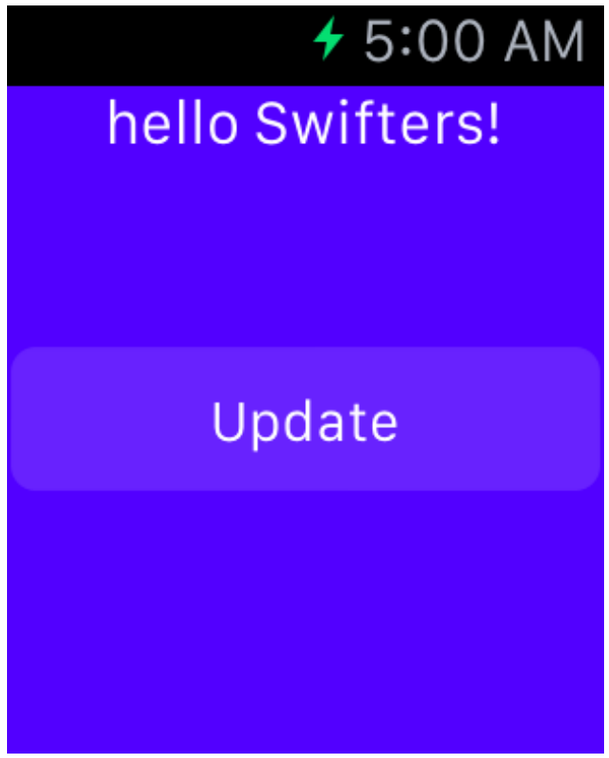
Figure 3-1 Communication between a WatchKit app and WatchKit extension



- Apple Watch Programming Guide

NSUserDefaults


Carrier
5:00 AM
hello Swifters!
hello Swifters!
Save


5:00 AM
hello Swifters!
Update

Xcode File Edit View Find Navigate Editor Product Debug Source Control Window Help Wed 4:50 AM

Sharing...Kit App › iPhone 6 | Running com.natashatherobot.SharingWithUserDefaults.watchkitextension on iPhone 6

SharingWithUserDefaults

SharingWithUserDefaults
4 targets, iOS SDK 8.2

- SharingWithUserDefaults
  - SharingWithUse...ults.entitlements
  - AppDelegate.swift
  - ViewController.swift
  - Main.storyboard
  - Images.xcassets
  - LaunchScreen.xib
  - Supporting Files
- SharingWithUserDefaultsTests
  - SharingWithUserDefaultsTests.swift
  - Supporting Files
- SharingWithUser...atchKit Extension
  - SharingWithUse...ion.entitlements
  - InterfaceController.swift
  - Images.xcassets
  - Supporting Files
- SharingWithUser...ults WatchKit App
  - Interface.storyboard
  - Images.xcassets
  - Supporting Files
- Products

PROJECT
SharingWithUserDefaults

TARGETS
SharingWithUserDefaults
SharingWithUserDefa...
SharingWithUserDefa...
SharingWithUserDefa...

General | Capabilities | Info | Build Settings | Build Phases | Build Rules

Apple Pay	OFF
In-App Purchase	OFF
Maps	OFF
Personal VPN	OFF
Inter-App Audio	OFF
Background Modes	OFF
Keychain Sharing	OFF
Associated Domains	OFF
App Groups	OFF
HomeKit	OFF
Data Protection	OFF
HealthKit	OFF
Wireless Accessory Configuration	OFF

com.natashatherobot.SharingWithUserDefaults.watchkitextension

Developer

Technologies Resources Programs Support Member Center

Search Developer

Certificates, Identifiers & Profiles

Natalya Murashev

iOS Apps

Certificates

- All
- Pending
- Development
- Production

Identifiers

- App IDs
- Pass Type IDs
- Website Push IDs
- iCloud Containers
- **App Groups**
- Merchant IDs

App Groups

1 App Groups Total

Name	ID
group com natashatherobot userdefaults	group.com.natashatherobot.userdefaults

```swift
class ViewController: UIViewController {

    @IBOutlet weak var textLabel: UILabel!
    @IBOutlet weak var textField: UITextField!

    let defaults = NSUserDefaults(suiteName: "group.com.natashatherobot.userdefaults")
    let key = "userInput"

    override func viewDidLoad() {
        super.viewDidLoad()

        textLabel.text = defaults?.stringForKey(key) ?? "Type Something..."
    }

    @IBAction func onSaveTap(sender: AnyObject) {

        let sharedText = textField.text

        textLabel.text = sharedText

        defaults?.setObject(sharedText, forKey: key)
        defaults?.synchronize()
    }

}
```

```
class InterfaceController: WKInterfaceController {

    @IBOutlet weak var textLabel: WKInterfaceLabel!

    let defaults = NSUserDefaults(suiteName:
        "group.com.natashatherobot.userdefaults")

    var userInput: String? {
        defaults?.synchronize()
        return defaults?.stringForKey("userInput")
    }

    override func awakeWithContext(context: AnyObject?) {
        super.awakeWithContext(context)

        textLabel.setText(userInput)
    }

    // MARK: IBActions

    @IBAction func onUpdateTap() {
        textLabel.setText(userInput)
    }

}
```

iOS Simulator - iPhone 6 - iPhone 6 / iO...

Carrier 5:49 AM

hello Swifters!

hello Swifters!

Save

Apple Watch 42mm

5:49 AM

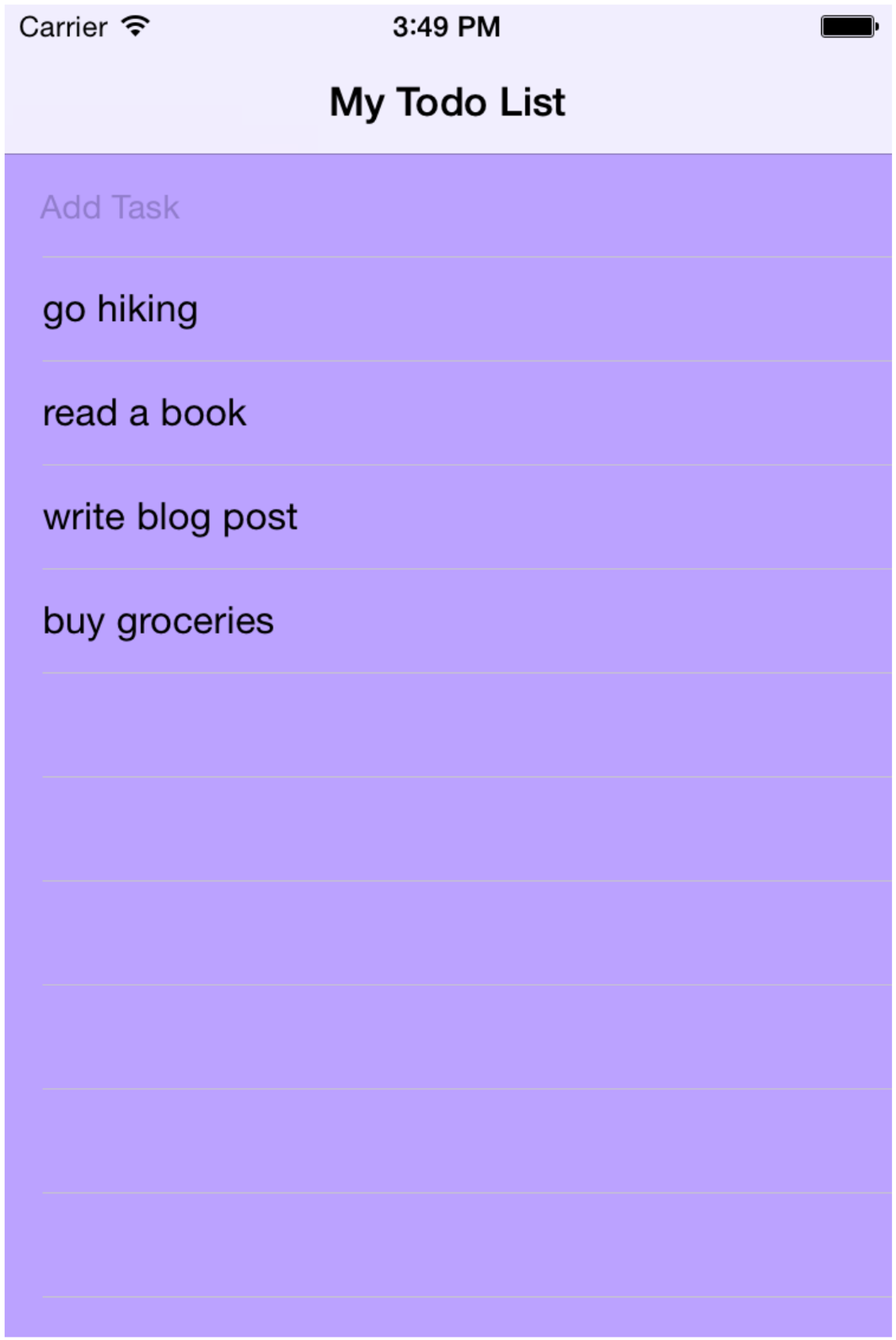
hello Swifters!

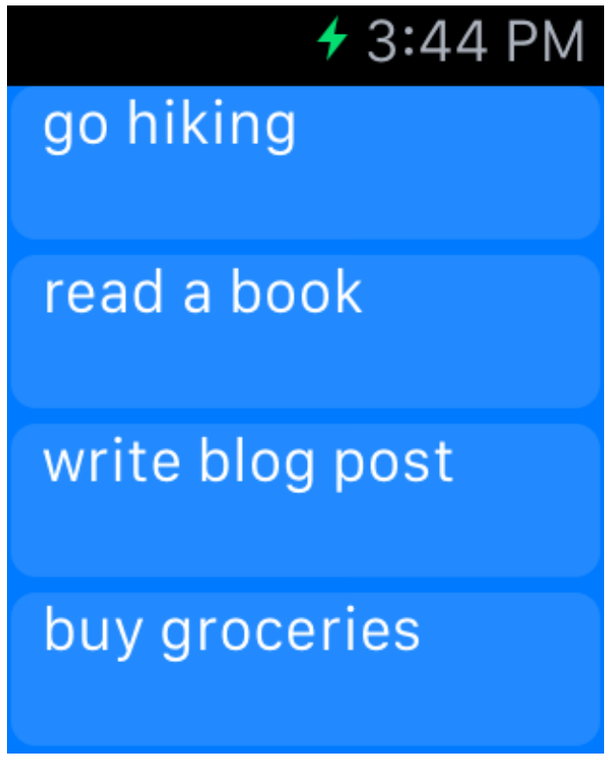
Update

NSUserDefaults Use Case

- small
- static

NSFileCoordinator


Carrier
3:49 PM
My Todo List
Add Task
go hiking
read a book
write blog post
buy groceries


3:44 PM
go hiking
read a book
write blog post
buy groceries

```swift
// MARK: NSFilePresenter Protocol

extension TodoListTableViewController: NSFilePresenter {

    var presentedItemURL: NSURL? {
        let groupURL = NSFileManager.defaultManager().containerURLForSecurityApplicationGroupIdentifier(
            "group.com.natashatherobot.watchlist")
        let fileURL = groupURL?.URLByAppendingPathComponent("todoItems.bin")
        return fileURL
    }

    var presentedItemOperationQueue: NSOperationQueue {
        return NSOperationQueue.mainQueue()
    }

}
```

```
// MARK: NSFilePresenter Protocol

extension InterfaceController: NSFilePresenter {

    var presentedItemURL: NSURL? {

        let groupURL = NSFileManager.defaultManager().
            containerURLForSecurityApplicationGroupIdentifier(
            "group.com.natashatherobot.watchlist")

        let fileURL = groupURL?.URLByAppendingPathComponent("todoItems.bin")
        return fileURL
    }

    var presentedItemOperationQueue: NSOperationQueue {
        return NSOperationQueue.mainQueue()
    }

    func presentedItemDidChange() {
        fetchTodoItems()
    }
}
```

TodoListTableViewController

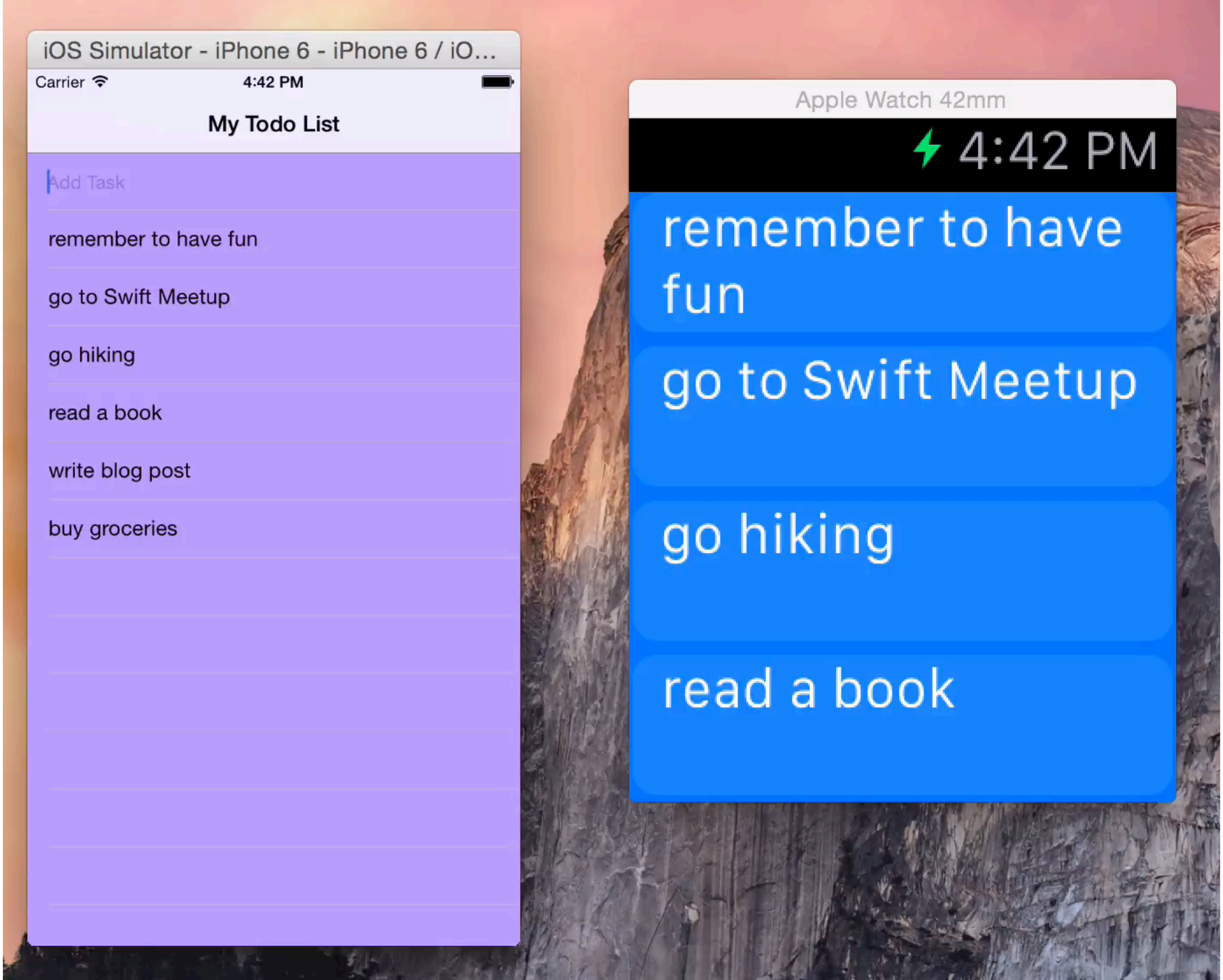
```
private func saveTodoItem(todoItem :String) {

    // write item into the todo items array
    if let presentedItemURL = presentedItemURL {

        fileCoordinator.coordinateWritingItemAtURL(presentedItemURL, options: nil, error: nil)
            { [unowned self] (newURL) -> Void in
                self.todoItems.insert(todoItem, atIndex: 0)

                let dataToSave = NSKeyedArchiver.archivedDataWithRootObject(self.todoItems)
                let success = dataToSave.writeToURL(newURL, atomically: true)
        }
    }
}
```

TodoListTableViewController

```
private func fetchTodoItems() {

    // get the todo items array
    if let presentedItemURL = presentedItemURL {
        fileCoordinator.coordinateReadingItemAtURL(presentedItemURL, options: nil, error: nil)
            { [unowned self] (newURL) -> Void in
                if let savedData = NSData(contentsOfURL: newURL) {
                    self.todoItems = NSKeyedUnarchiver.unarchiveObjectWithData(savedData) as [String]
                }
        }

    }
}
```

InterfaceController

```
private func fetchTodoItems() {
    let fileCoordinator = NSFileCoordinator()
    if let presentedItemURL = presentedItemURL {
        fileCoordinator.coordinateReadingItemAtURL(presentedItemURL, options: nil, error: nil)
            { [unowned self] (newURL) -> Void in

                if let savedData = NSData(contentsOfURL: newURL) {
                    self.todoItems = NSKeyedUnarchiver.unarchiveObjectWithData(savedData) as [String]
                    self.populateTableWithTodoItems(self.todoItems)
                }
        }
    }
}
```


iOS Simulator - iPhone 6 - iPhone 6 / iO...
Carrier
4:42 PM
My Todo List
Add Task
remember to have fun
go to Swift Meetup
go hiking
read a book
write blog post
buy groceries
Apple Watch 42mm
4:42 PM
remember to have fun
go to Swift Meetup
go hiking
read a book

NSFileCoordinator Use Case

- lists
- images (multiple files)
- other

Frameworks

“If the code appears more than once , it probably belongs in a framework”

– WWDC 2014, Building Modern Frameworks

Xcode File Edit View Find Navigate Editor Product Debug Source Control Window Help Thu 4:51 AM

Sharing...Kit App › iPhone 6 | SharingWithFramework: **Ready** | Today at 4:49 AM

SharingWithFramework

SharingWithFramework
4 targets, iOS SDK 8.2

- SharingWithFramework
  - AppDelegate.swift
  - ViewController.swift
  - Main.storyboard
  - Images.xcassets
  - LaunchScreen.xib
  - Supporting Files
- SharingWithFrameworkTests
- SharingWithFram...atchKit Extension
- SharingWithFramework WatchKit App
- Products

General | Capabilities | Info | Build Settings | Build Phases | Build Rules

PROJECT
SharingWithFramework

TARGETS
SharingWithFramework
SharingWithFramew...
SharingWithFramew...
SharingWithFramew...

Identity

Bundle Identifier: com.natashatherobot.SharingWithFra
Version: 1.0
Build: 1.0
Team: None

Embedded Binaries

Add embedded binaries here

Linked Frameworks and Libraries

Name | Status

Add frameworks & libraries here

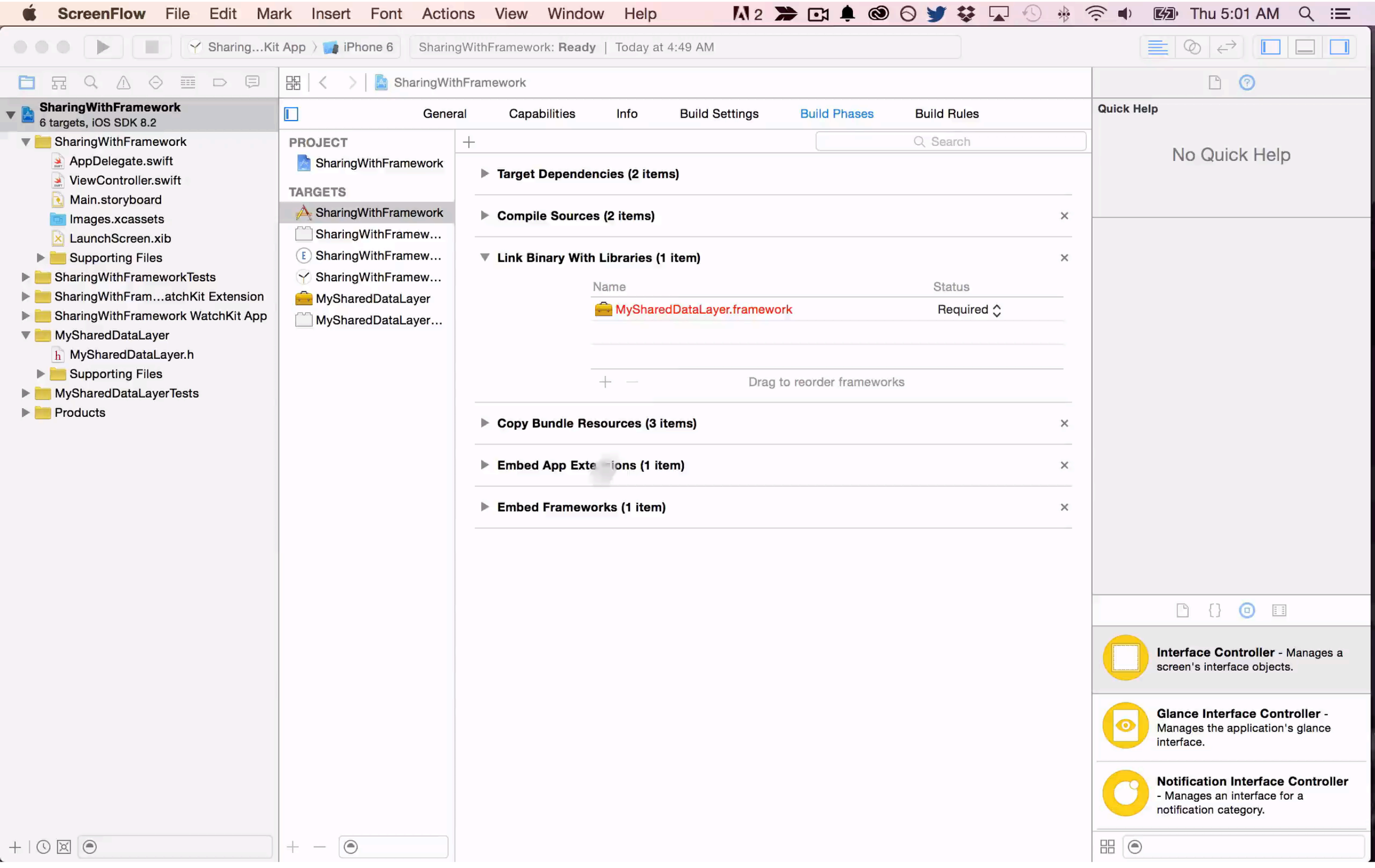
Quick Help

No Quick Help

Interface Controller - Manages a screen's interface objects.

Glance Interface Controller - Manages the application's glance interface.

Notification Interface Controller - Manages an interface for a notification category.


ScreenFlow File Edit Mark Insert Font Actions View Window Help
Thu 5:01 AM
Sharing...Kit App
iPhone 6
SharingWithFramework: Ready | Today at 4:49 AM
SharingWithFramework
SharingWithFramework
6 targets, iOS SDK 8.2
SharingWithFramework
AppDelegate.swift
ViewController.swift
Main.storyboard
Images.xcassets
LaunchScreen.xib
Supporting Files
SharingWithFrameworkTests
SharingWithFram...atchKit Extension
SharingWithFramework WatchKit App
MySharedDataLayer
MySharedDataLayer.h
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MySharedDataLayerTests
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Build Rules
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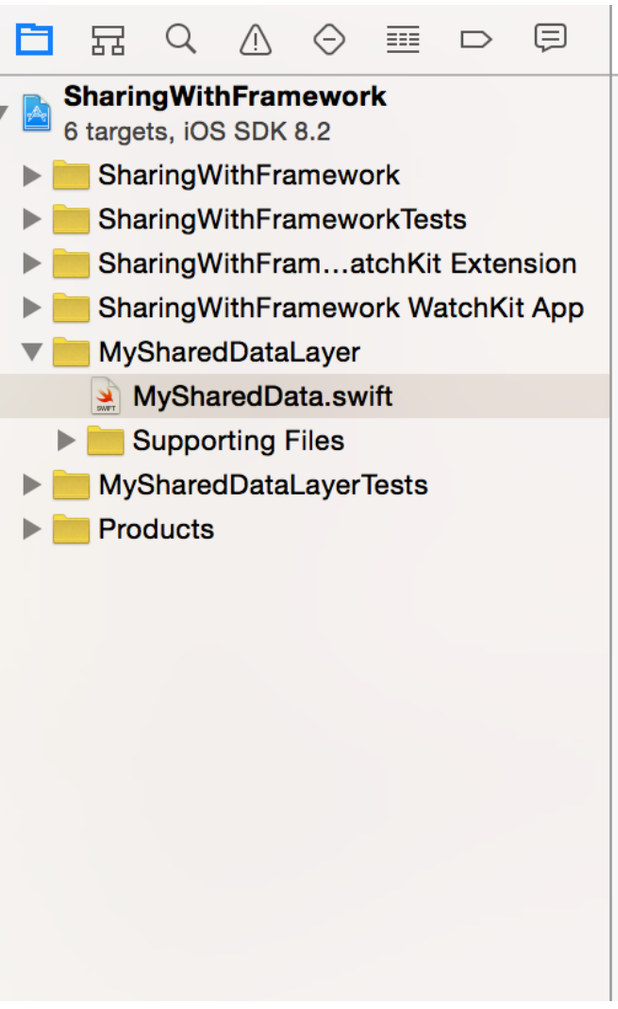
SharingWithFramew...
SharingWithFramew...
MySharedDataLayer
MySharedDataLayer...
Search
Target Dependencies (2 items)
Compile Sources (2 items)
Link Binary With Libraries (1 item)
Name
Status
MySharedDataLayer.framework
Required
Drag to reorder frameworks
Copy Bundle Resources (3 items)
Embed App Extensions (1 item)
Embed Frameworks (1 item)
Quick Help
No Quick Help
Interface Controller - Manages a screen's interface objects.
Glance Interface Controller - Manages the application's glance interface.
Notification Interface Controller - Manages an interface for a notification category.

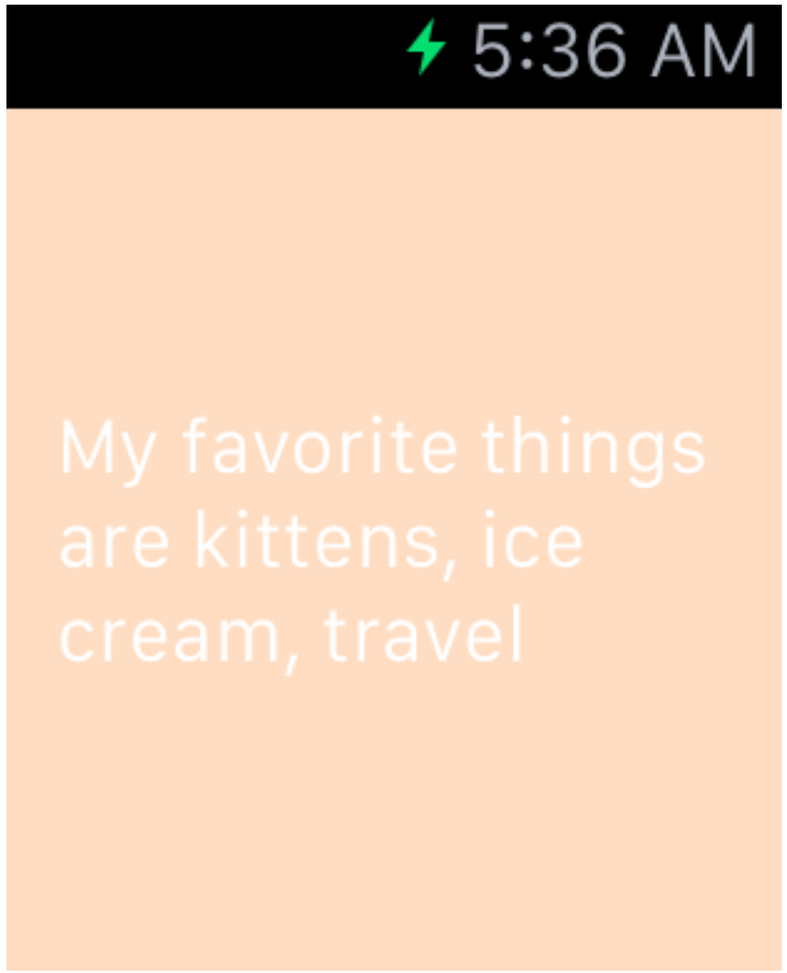

SharingWithFramework
6 targets, iOS SDK 8.2
SharingWithFramework
SharingWithFrameworkTests
SharingWithFram…atchKit Extension
SharingWithFramework WatchKit App
MySharedDataLayer
MySharedData.swift
Supporting Files
MySharedDataLayerTests
Products


SharingWithFramework
MySharedDataLayer
MySharedData.swift
init()
1 //
2 // MySharedData.swift
3 // SharingWithFramework
4 //
5 // Created by Natasha Murashev on 2/5/15.
6 // Copyright (c) 2015 NatashaTheRobot. All rights reserved.
7 //
8
9 public class MySharedData {
10
11 public let myFavoriteThings = ["kittens", "ice cream", "travel"]
12
13 public init() {
14
15 }
16
17 }
18

```
import UIKit
import MySharedDataLayer

class ViewController: UIViewController {

    @IBOutlet weak var favoriteThingsLabel: UILabel!

    override func viewDidLoad() {
        super.viewDidLoad()

        let myFavoriteThings = MySharedData().myFavoriteThings

        let favoriteThingsString = ", ".join(myFavoriteThings)
        favoriteThingsLabel.text = "My favorite things are \(favoriteThingsString)"
    }
}
```

```
import WatchKit
import MySharedDataLayer

class InterfaceController: WKInterfaceController {

    @IBOutlet weak var favoriteThingsLabel: WKInterfaceLabel!

    override func awakeWithContext(context: AnyObject?) {
        super.awakeWithContext(context)

        let myFavoriteThings = MySharedData().myFavoriteThings

        let favoriteThingsString = ", ".join(myFavoriteThings)
        favoriteThingsLabel.setText("My favorite things are \(favoriteThingsString)")
    }

}
```

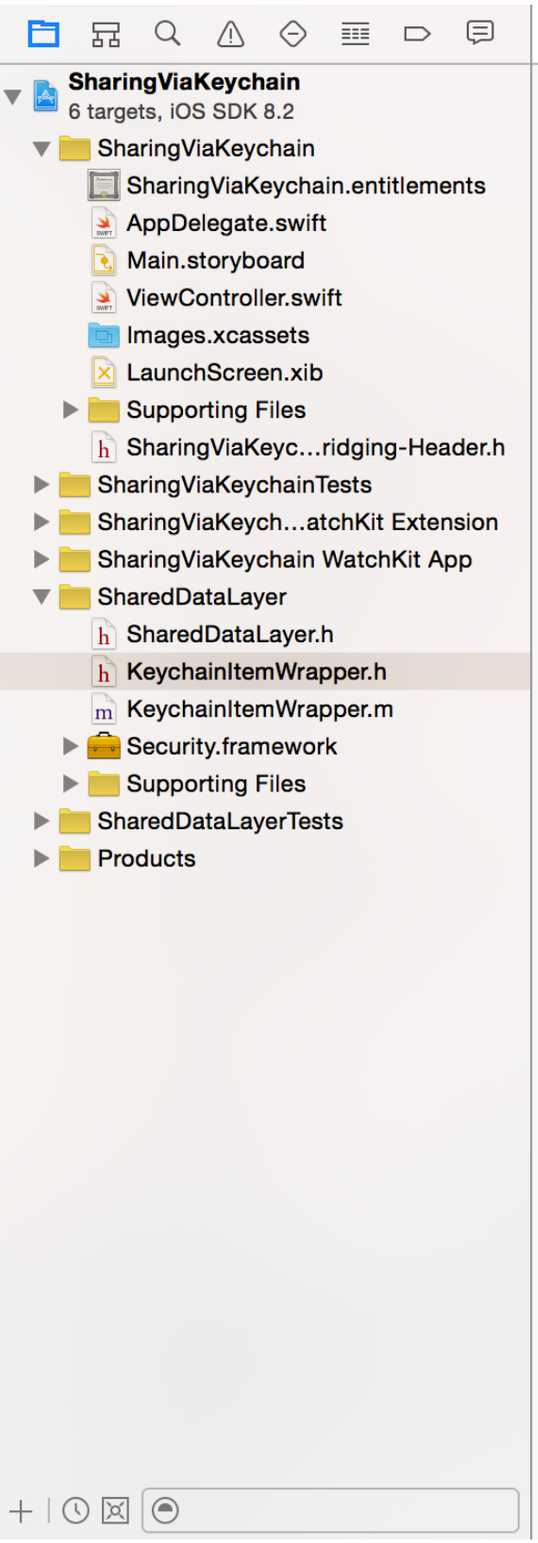

Carrier
5:36 AM
My favorite things are kittens, ice cream, travel

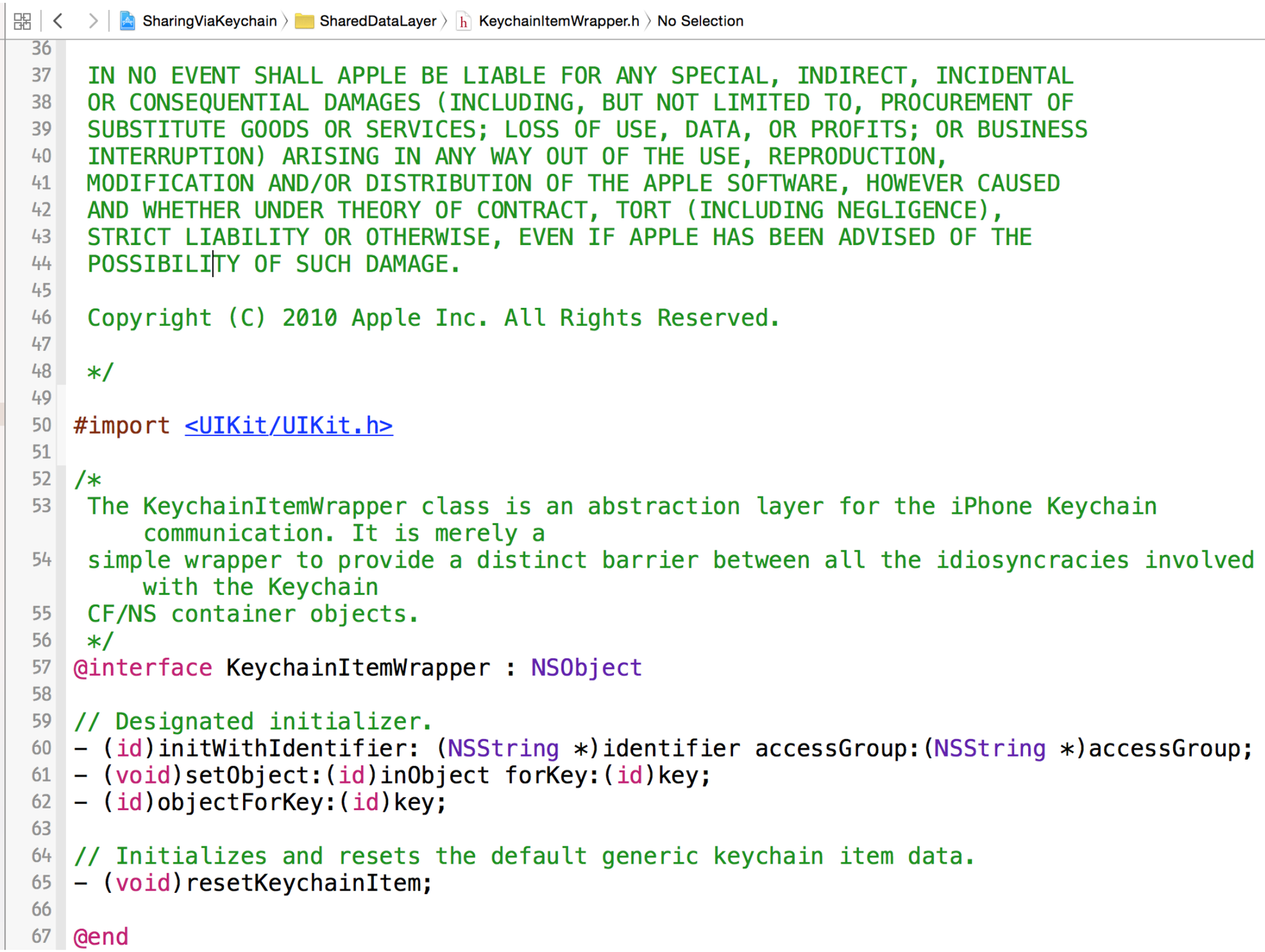

5:36 AM
My favorite things are kittens, ice cream, travel

Frameworks Use Case

- Business Logic
- Core Data
- Re-useable UI Components

Keychain Sharing





KeychainItemWrapper from Apple (ARCified version)

General | Capabilities | Info | Build Settings | Build Phases | Build Rules

PROJECT
- SharingViaKeychain

TARGETS
- SharingViaKeychain
- SharingViaKeychainTests
- SharingViaKeychain…
- SharingViaKeychain…
- SharedDataLayer
- SharedDataLayerTests

Maps — OFF

Personal VPN — OFF

Inter-App Audio — OFF

Background Modes — OFF

Keychain Sharing — ON

Keychain Groups: W6GNU64U6Q.com.natashatherobot.SharingViaKeychain

Steps:
- ✔ Add the "Keychain Sharing" entitlement to your entitlements file
- ✔ Add the "Keychain Sharing" entitlement to your App ID

General | Capabilities | Info | Build Settings | Build Phases | Build Rules

PROJECT
SharingViaKeychain

TARGETS
SharingViaKeychain
SharingViaKeychainTests
SharingViaKeychain…
SharingViaKeychain…
SharedDataLayer
SharedDataLayerTests

Apple Pay OFF

Maps OFF

Personal VPN OFF

Inter-App Audio OFF

Keychain Sharing ON

Keychain Groups: W6GNU64U6Q.com.natashatherobot.SharingViaKeychain

Steps:
✓ Add the "Keychain Sharing" entitlement to your entitlements file
✓ Add the "Keychain Sharing" entitlement to your App ID

SignInViewController

```
@IBAction func onSaveTap(sender: AnyObject) {

    let username = usernameTextField.text
    let password = passwordTextField.text

    let keychainItem = KeychainItemWrapper(identifier: "SharingViaKeychain",
        accessGroup: "W6GNU64U6Q.com.natashatherobot.SharingViaKeychain")

    keychainItem.setObject(username, forKey: kSecAttrAccount)
    keychainItem.setObject(password, forKey: kSecValueData)
}
```

```
import WatchKit
import SharedDataLayer

class InterfaceController: WKInterfaceController {

    @IBOutlet weak var usernameLabel: WKInterfaceLabel!
    @IBOutlet weak var passwordLabel: WKInterfaceLabel!


    override func awakeWithContext(context: AnyObject?) {
        super.awakeWithContext(context)

        let keychainItem = KeychainItemWrapper(identifier: "SharingViaKeychain",
            accessGroup: "W6GNU64U6Q.com.natashatherobot.SharingViaKeychain")


        let passwordData = keychainItem.objectForKey(kSecValueData) as NSData
        let password = NSString(data: passwordData, encoding: NSUTF8StringEncoding)

        let username = keychainItem.objectForKey(kSecAttrAccount) as? String

        switch (username, password) {
        case (.Some(let username), .Some(let password)):
            usernameLabel.setText(username)
            passwordLabel.setText(password)
        default:
            return
        }
    }
}
```

iOS Simulator File Edit Hardware Debug Window Help

Thu 11:53 AM

Sharing…eychain 〉 iPhone 6 | Running SharingViaKeychain on iPhone 6 | 1

iOS Simulator - iPhone 6 - iPhone 6 / iO…

Carrier 11:53 AM

username

password

Save

aringViaKeychain WatchKit Extension 〉 InterfaceController.swift 〉 No Selection

- SharingViaKeychain
  6 targets, iOS SDK 8.2
  - SharingViaKeychain
    - SharingViaKeychain.entitlements
    - AppDelegate.swift
    - Main.storyboard
    - ViewController.swift
    - Images.xcassets
    - LaunchScreen.xib
    - Supporting Files
    - SharingViaKeyc…ridging-Header.
  - SharingViaKeychainTests
  - SharingViaKeych…atchKit Extensio
    - SharingViaKeyc…ion.entitlements
    - InterfaceController.swift
    - Images.xcassets
    - Supporting Files
      - Info.plist
      - PushNotificationPayload.apns
    - SharingViaKeyc…ridging-Header.
  - SharingViaKeychain WatchKit App
  - SharedDataLayer
  - SharedDataLayerTests
  - Products

```
yer

roller: WKInterfaceController {

var usernameLabel: WKInterfaceLabel!
var passwordLabel: WKInterfaceLabel!


wakeWithContext(context: AnyObject?) {
WithContext(context)

nItem = KeychainItemWrapper(identifier: "SharingViaKeychain",
roup: "W6GNU64U6Q.com.natashatherobot.SharingViaKeychain")


dData = keychainItem.objectForKey(kSecValueData) as NSData
d = NSString(data: passwordData, encoding: NSUTF8StringEncoding)

e = keychainItem.objectForKey(kSecAttrAccount) as? String

rname, password) {
        case (.Some(let username), .Some(let password)):
            usernameLabel.setText(username)
            passwordLabel.setText(password)
        default:
            return
        }
    }
}
```

SharingViaKeychain

Keychain Sharing Use Case

- username / password
- API tokens
- other

Questions?

@NatashaTheRobot