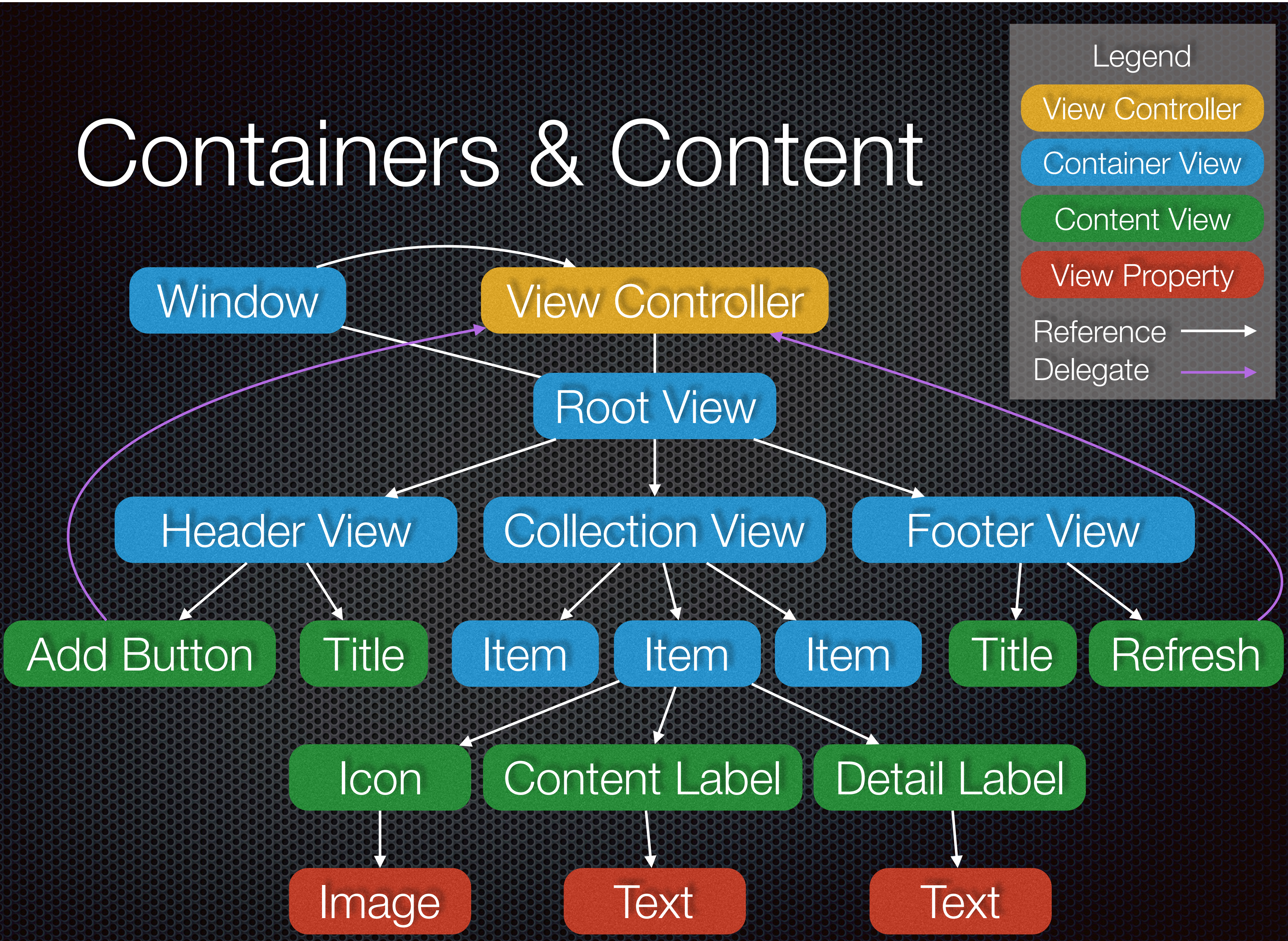
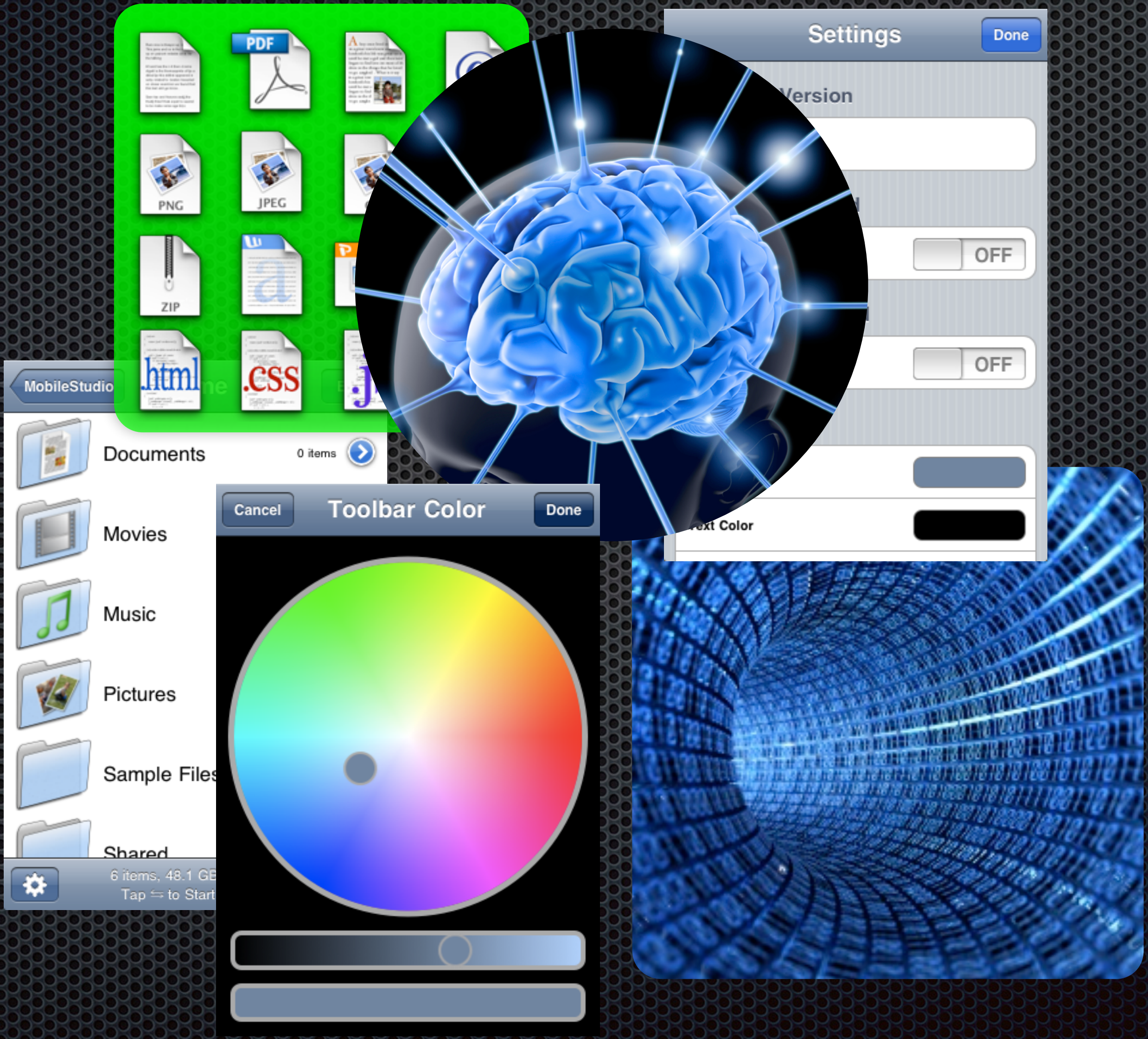
Mobile Application Programming

View Controllers

Containers & Content

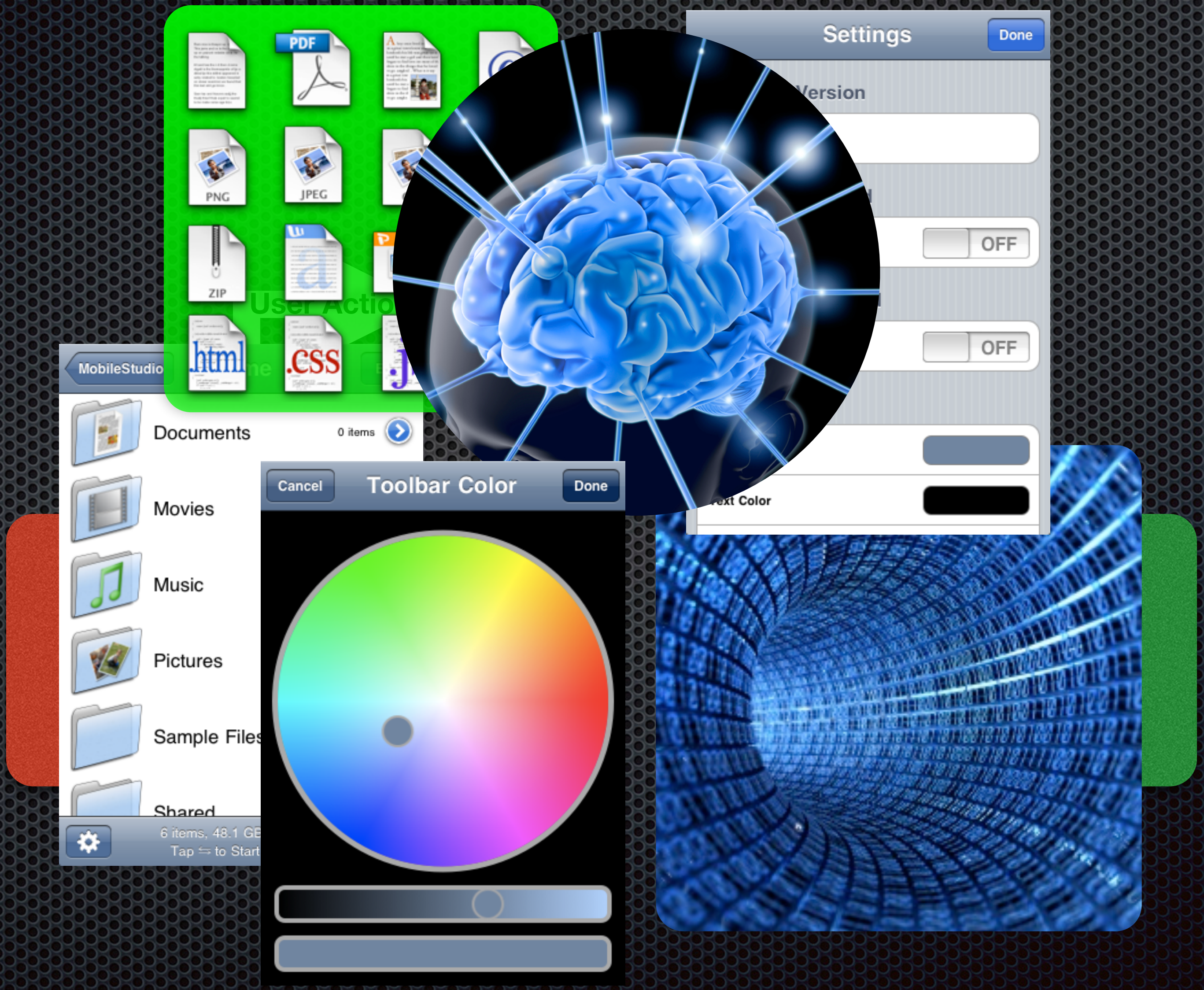


Application

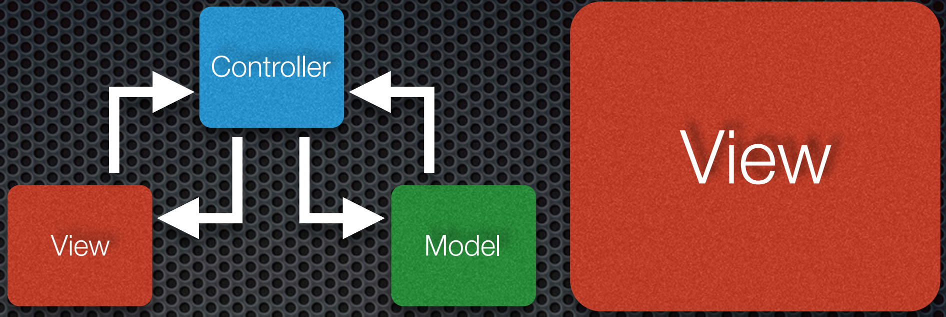


Application

Model View Controller (MVC)

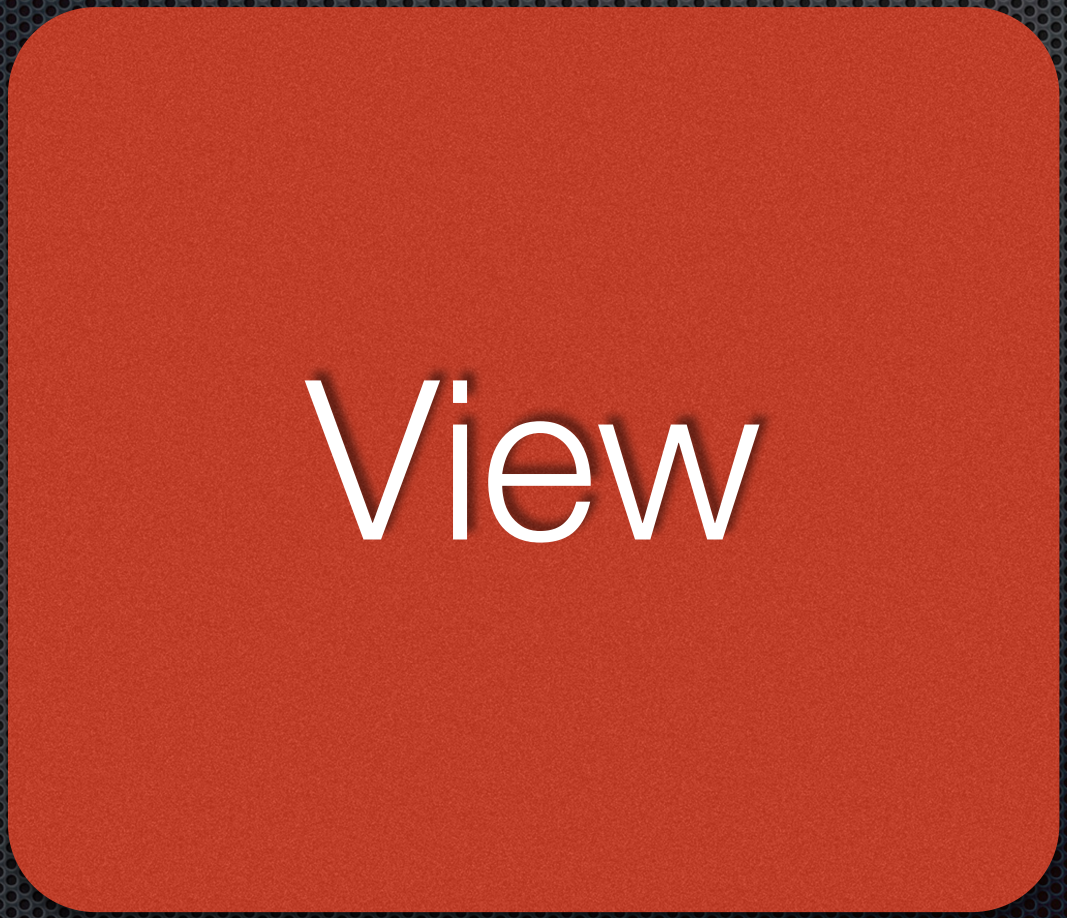


The View

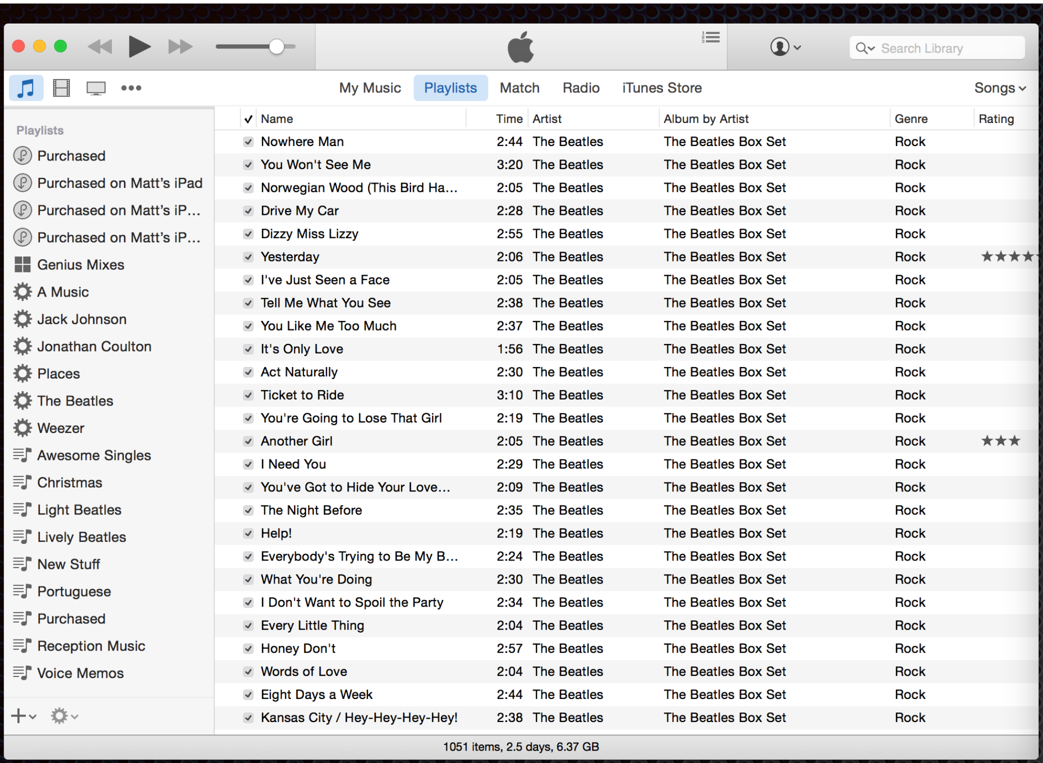


- Built how we’ve been building them since the beginning of class
- Concerned mainly with presentation of data and receiving input from the user
- Data is generally passed to views through accessor methods to simple data types
  - Booleans, Integers, Floating Point Numbers, Strings
- User input events are sent to the controller through the view’s delegate

Why Separate Views?

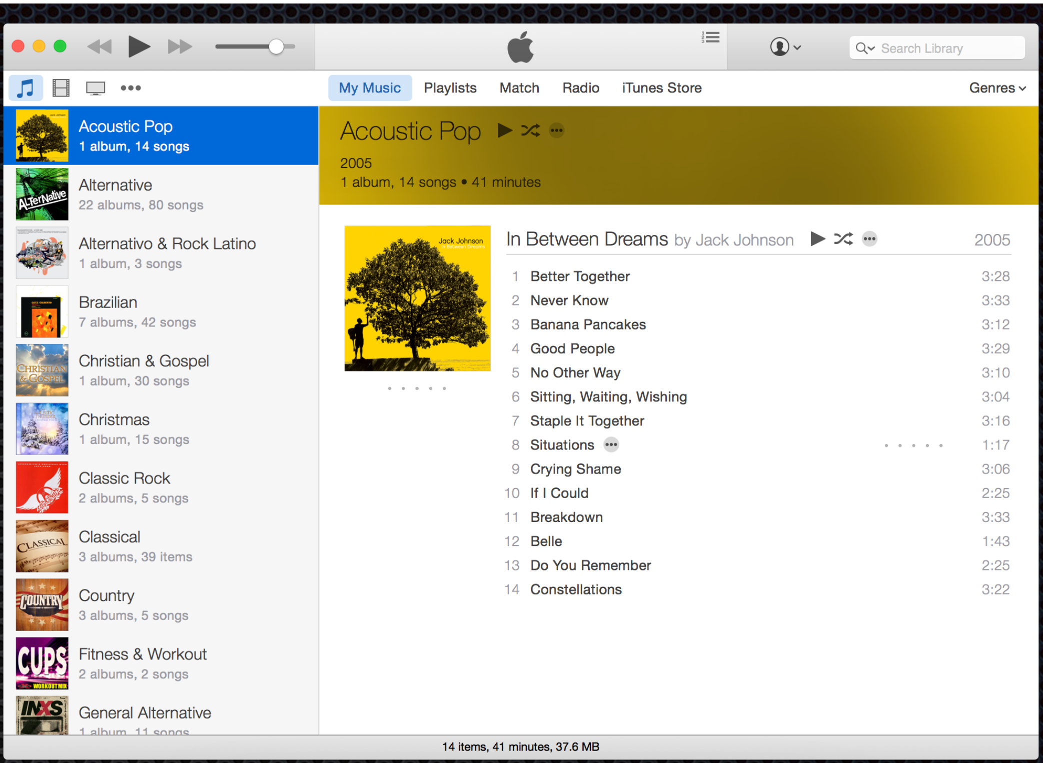


View



✓	Name	Time	Artist	Album by Artist	Genre	Rating
✓	Nowhere Man	2:44	The Beatles	The Beatles Box Set	Rock	
✓	You Won't See Me	3:20	The Beatles	The Beatles Box Set	Rock	
✓	Norwegian Wood (This Bird Ha…	2:05	The Beatles	The Beatles Box Set	Rock	
✓	Drive My Car	2:28	The Beatles	The Beatles Box Set	Rock	
✓	Dizzy Miss Lizzy	2:55	The Beatles	The Beatles Box Set	Rock	
✓	Yesterday	2:06	The Beatles	The Beatles Box Set	Rock	★★★★
✓	I've Just Seen a Face	2:05	The Beatles	The Beatles Box Set	Rock	
✓	Tell Me What You See	2:38	The Beatles	The Beatles Box Set	Rock	
✓	You Like Me Too Much	2:37	The Beatles	The Beatles Box Set	Rock	
✓	It's Only Love	1:56	The Beatles	The Beatles Box Set	Rock	
✓	Act Naturally	2:30	The Beatles	The Beatles Box Set	Rock	
✓	Ticket to Ride	3:10	The Beatles	The Beatles Box Set	Rock	
✓	You're Going to Lose That Girl	2:19	The Beatles	The Beatles Box Set	Rock	
✓	Another Girl	2:05	The Beatles	The Beatles Box Set	Rock	★★★
✓	I Need You	2:29	The Beatles	The Beatles Box Set	Rock	
✓	You've Got to Hide Your Love…	2:09	The Beatles	The Beatles Box Set	Rock	
✓	The Night Before	2:35	The Beatles	The Beatles Box Set	Rock	
✓	Help!	2:19	The Beatles	The Beatles Box Set	Rock	
✓	Everybody's Trying to Be My B…	2:24	The Beatles	The Beatles Box Set	Rock	
✓	What You're Doing	2:30	The Beatles	The Beatles Box Set	Rock	
✓	I Don't Want to Spoil the Party	2:34	The Beatles	The Beatles Box Set	Rock	
✓	Every Little Thing	2:04	The Beatles	The Beatles Box Set	Rock	
✓	Honey Don't	2:57	The Beatles	The Beatles Box Set	Rock	
✓	Words of Love	2:04	The Beatles	The Beatles Box Set	Rock	
✓	Eight Days a Week	2:44	The Beatles	The Beatles Box Set	Rock	
✓	Kansas City / Hey-Hey-Hey-Hey!	2:38	The Beatles	The Beatles Box Set	Rock	

1051 items, 2.5 days, 6.37 GB



Acoustic Pop
1 album, 14 songs

Alternative
22 albums, 80 songs

Alternativo & Rock Latino
1 album, 3 songs

Brazilian
7 albums, 42 songs

Christian & Gospel
1 album, 30 songs

Christmas
1 album, 15 songs

Classic Rock
2 albums, 5 songs

Classical
3 albums, 39 items

Country
3 albums, 5 songs

Fitness & Workout
2 albums, 2 songs

General Alternative
1 album, 11 songs

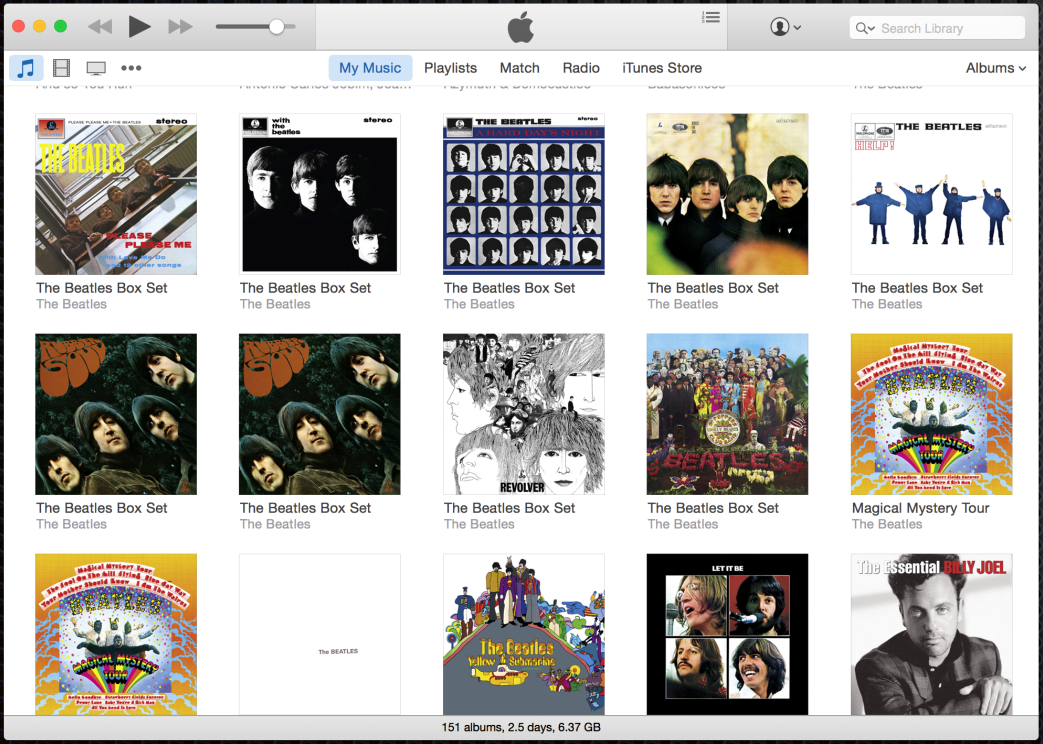
Acoustic Pop

2005
1 album, 14 songs • 41 minutes

In Between Dreams by Jack Johnson 2005

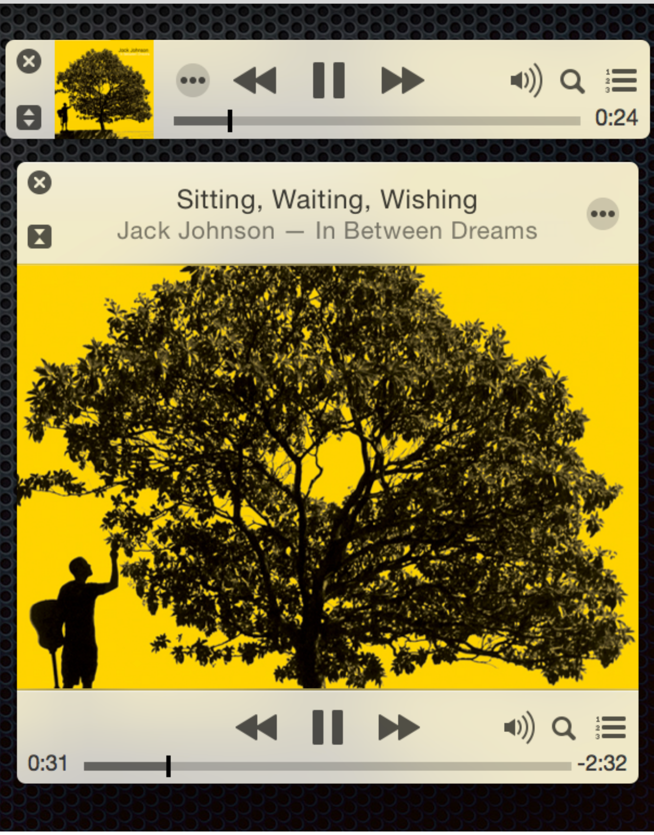
1	Better Together	3:28
2	Never Know	3:33
3	Banana Pancakes	3:12
4	Good People	3:29
5	No Other Way	3:10
6	Sitting, Waiting, Wishing	3:04
7	Staple It Together	3:16
8	Situations	1:17
9	Crying Shame	3:06
10	If I Could	2:25
11	Breakdown	3:33
12	Belle	1:43
13	Do You Remember	2:25
14	Constellations	3:22

14 items, 41 minutes, 37.6 MB



The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	The Beatles Box Set The Beatles
The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	The Beatles Box Set The Beatles	Magical Mystery Tour The Beatles

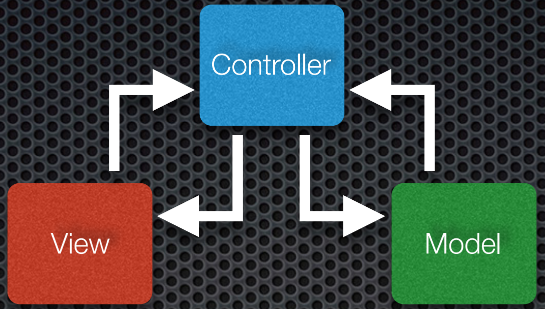
151 albums, 2.5 days, 6.37 GB


0:24

Sitting, Waiting, Wishing
Jack Johnson — In Between Dreams

0:31 -2:32

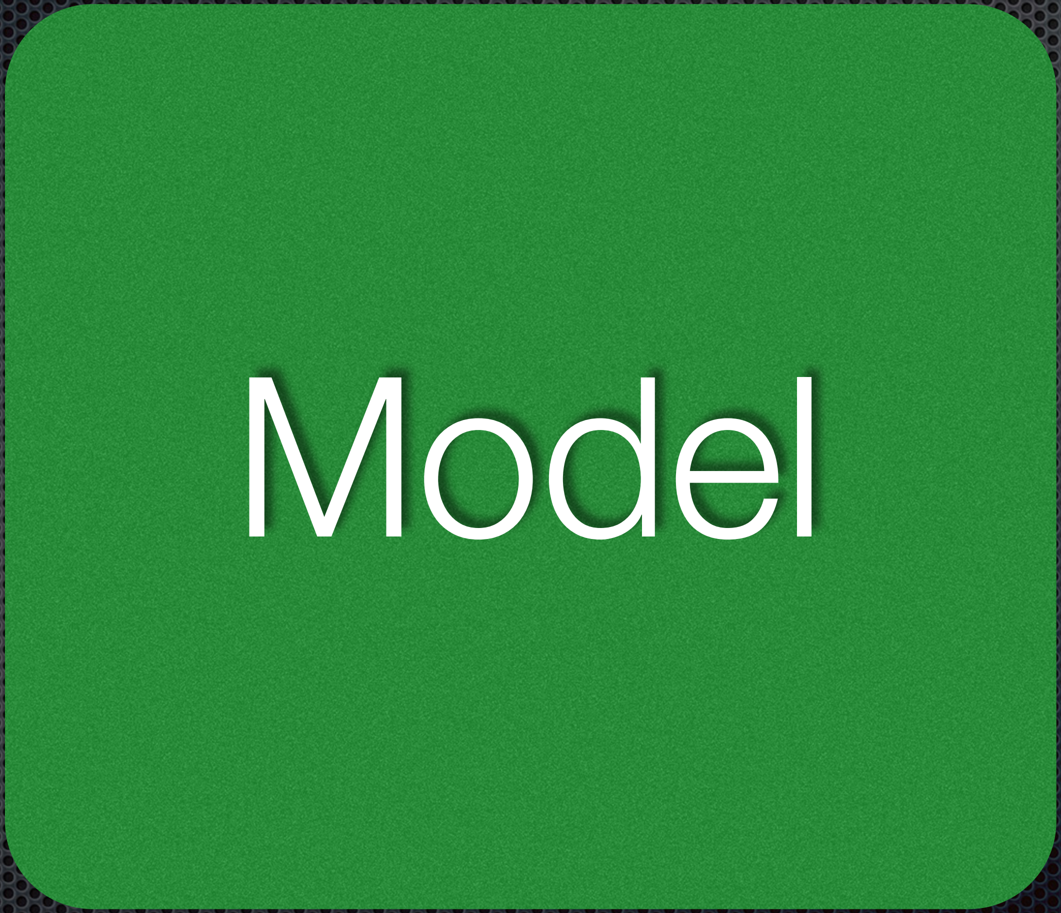
The Model



Model

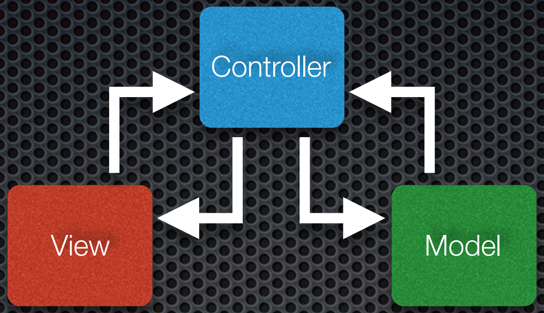
- Source of data for the application
- Contains all or nearly all of the program's state
- Should be thought of as persistent, that is, it stays the same over separate runs of the program
- Could be specifics of a running simulation, network and caching code for interfacing with a server, interface into a database running on the phone itself, or a simple object that saves the state of the app to file

Why Separate Models?



Model

The Controller



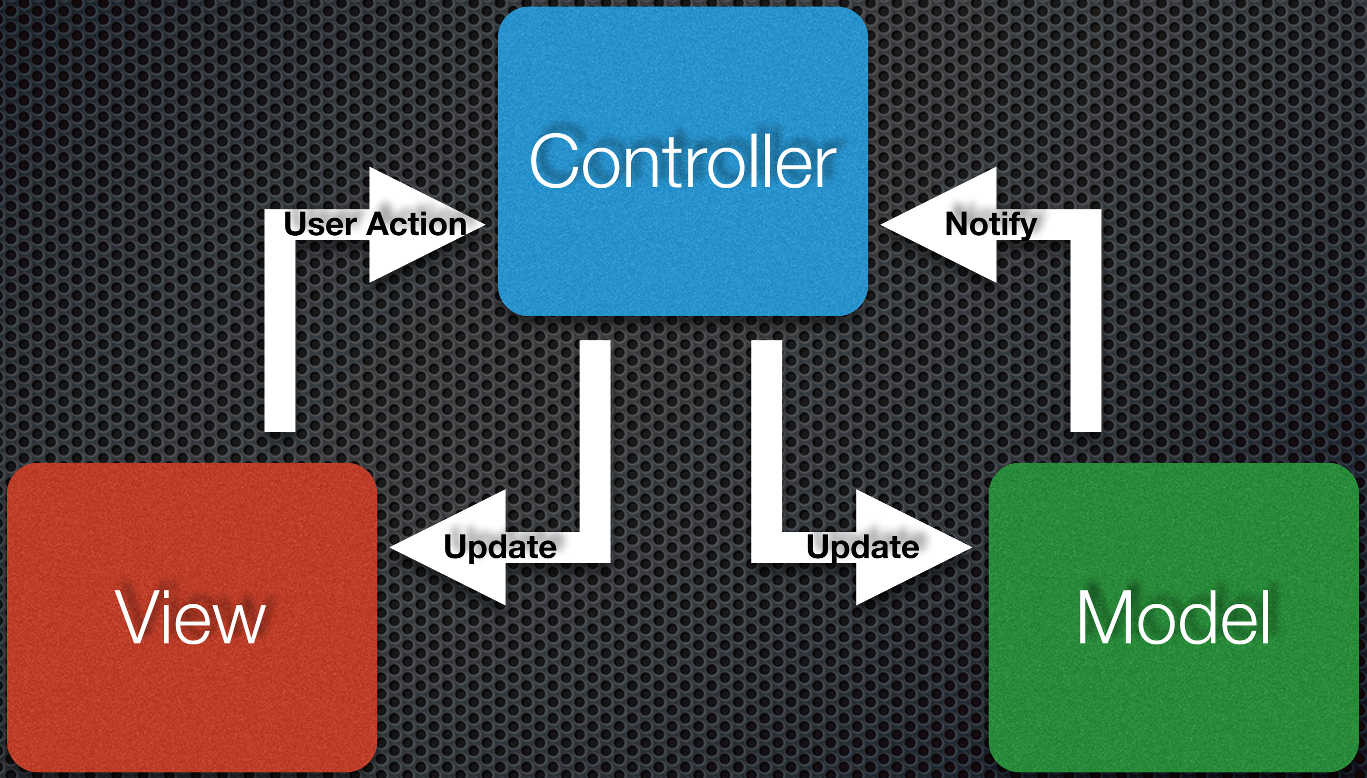
Controller

- Acts as an adapter between model and view
- Keeps the model in sync with changes in the view (user interaction), and the view in sync with changes to the model (network access, sensor changes, etc.)
- Is the least portable part of the program

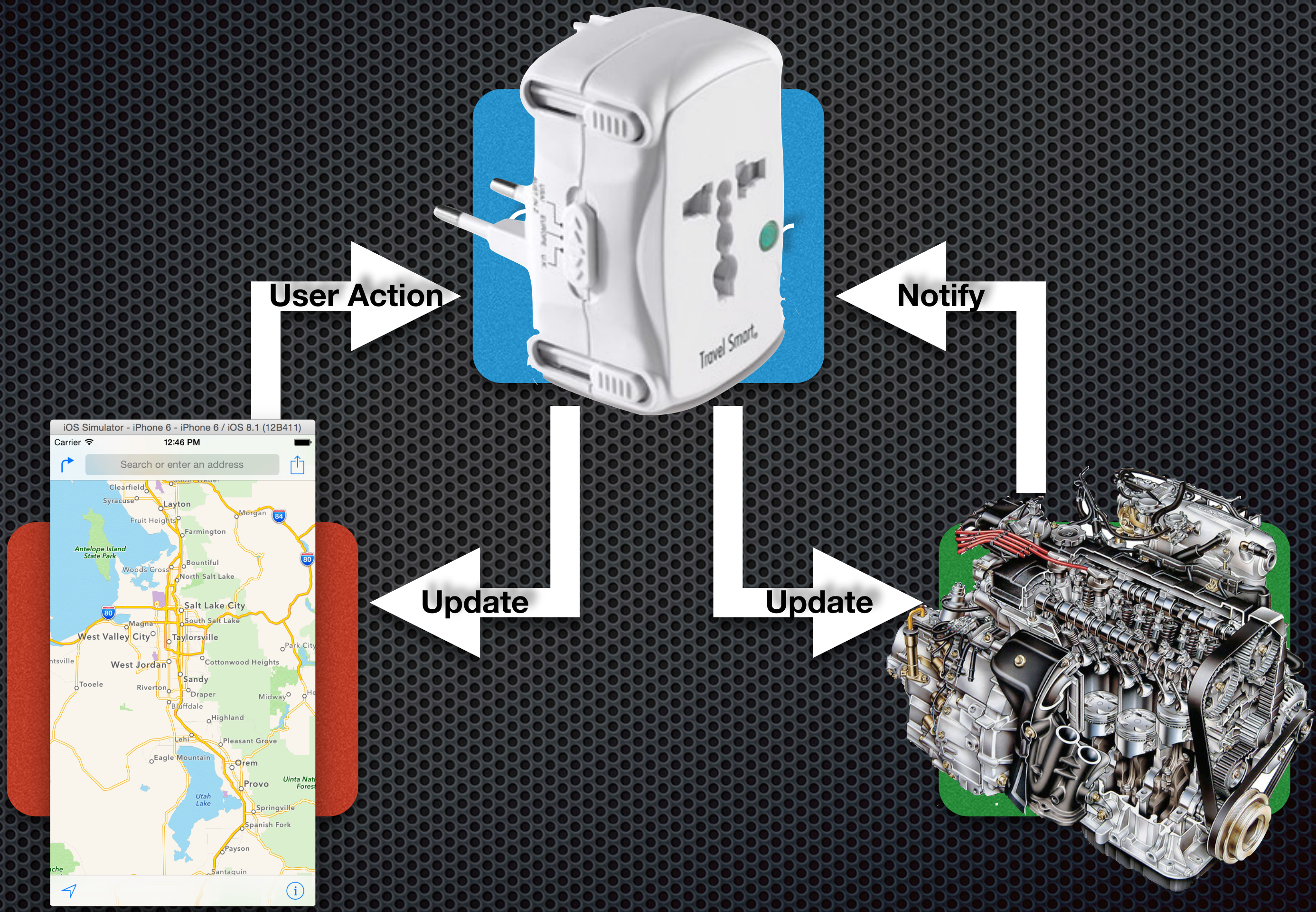
Why Link with Controllers?

Controller

Why Link with Controllers?



Why Link with Controllers?



User Action

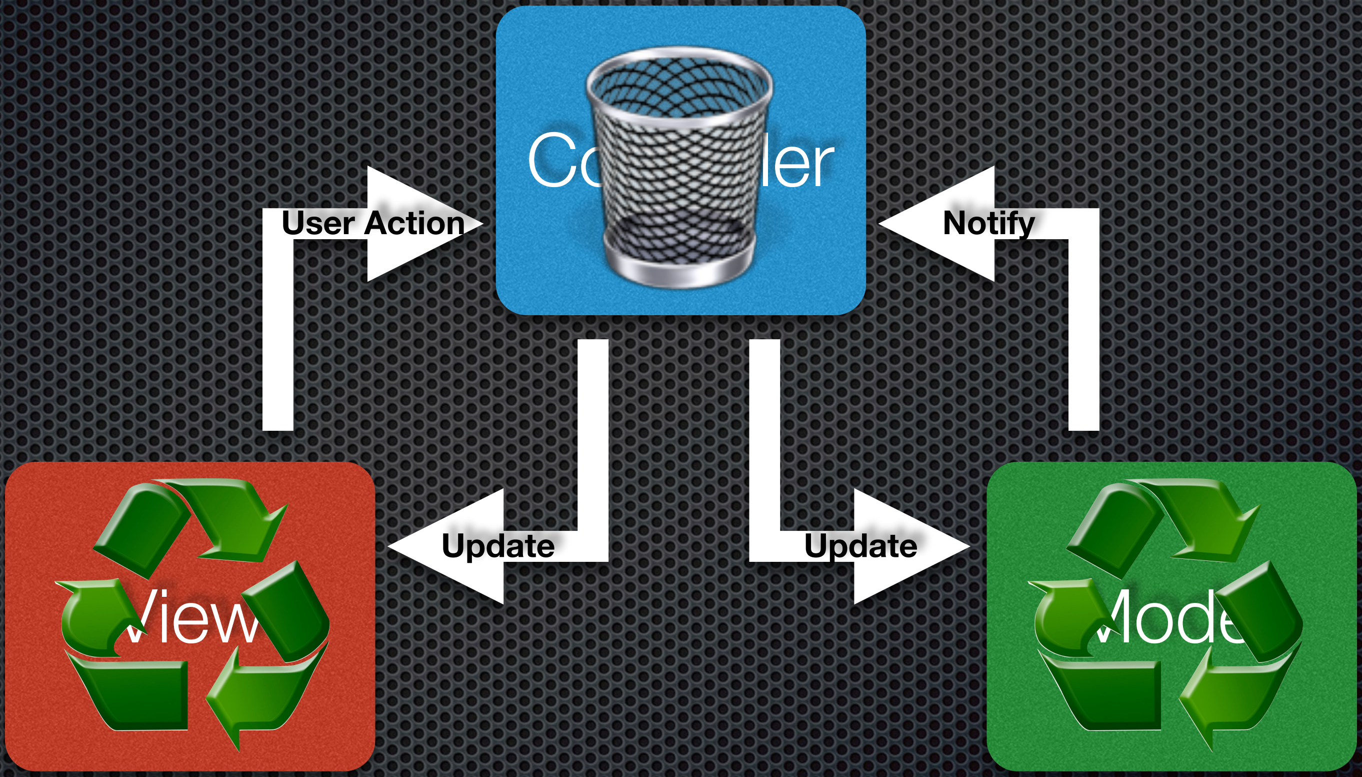
Notify

Update

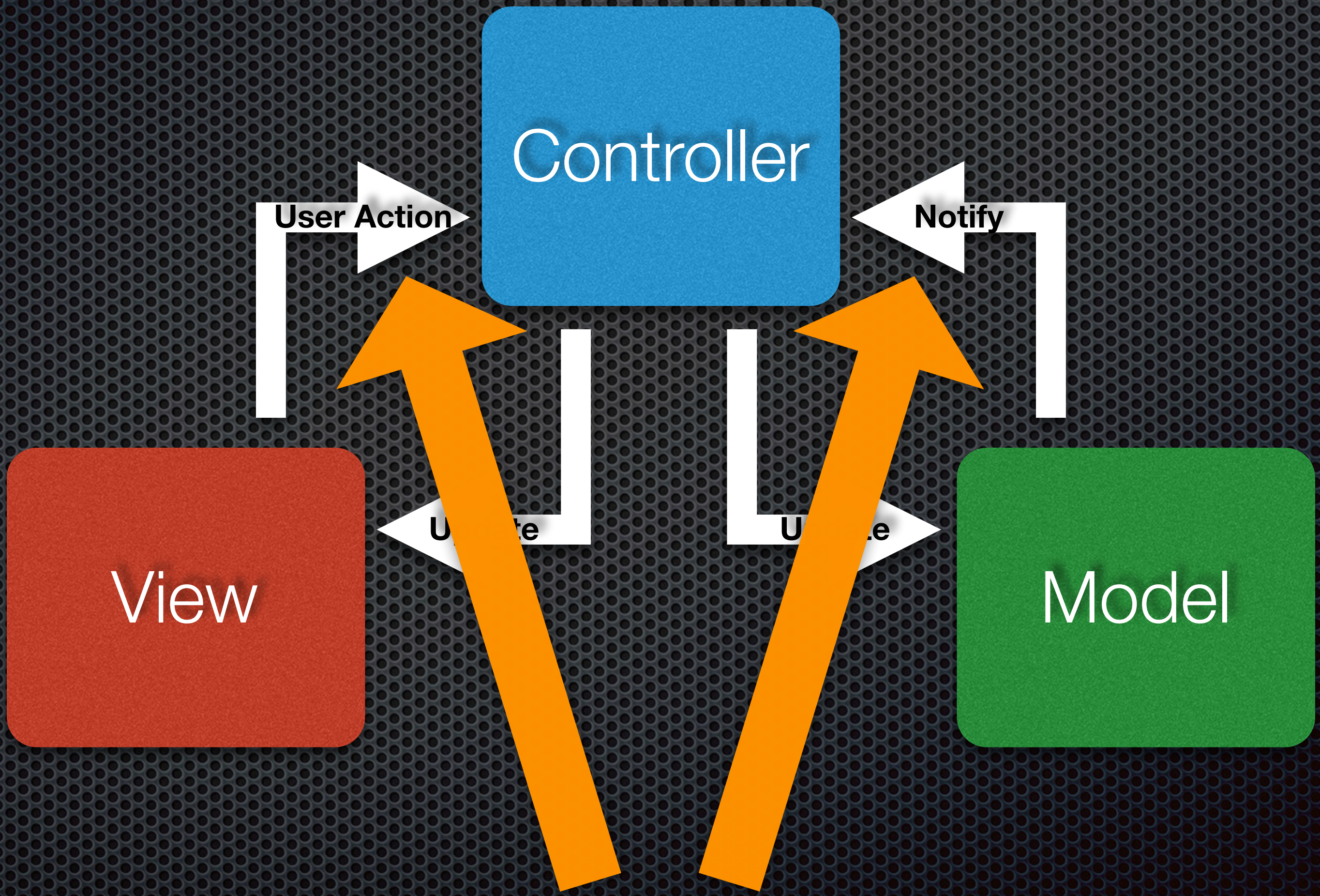
Update

iOS Simulator - iPhone 6 - iPhone 6 / iOS 8.1 (12B411)
Carrier
12:46 PM
Search or enter an address
Salt Lake City
West Valley City
West Jordan
Provo
Orem
Travel Smart

Why Link with Controllers?

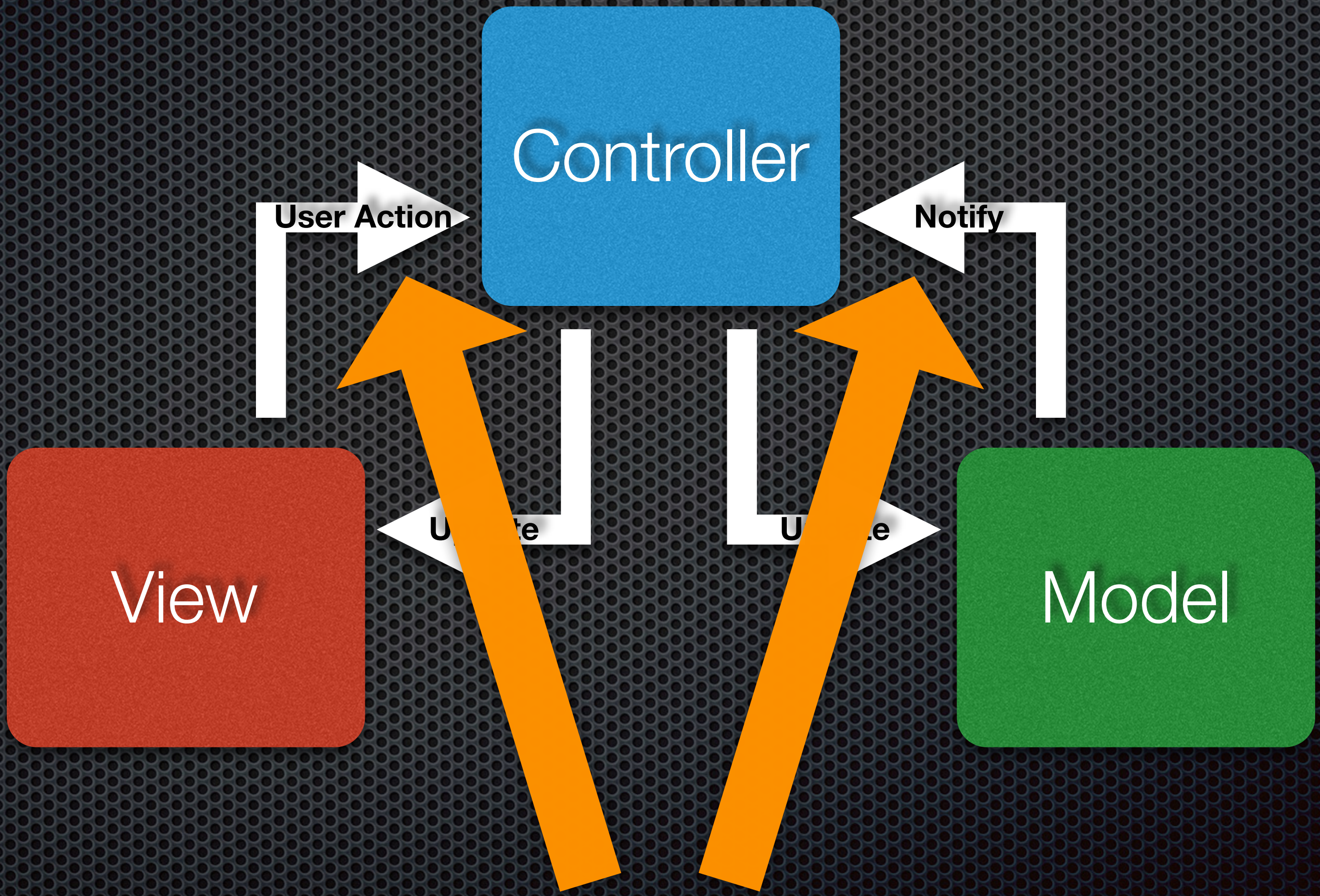


Notification



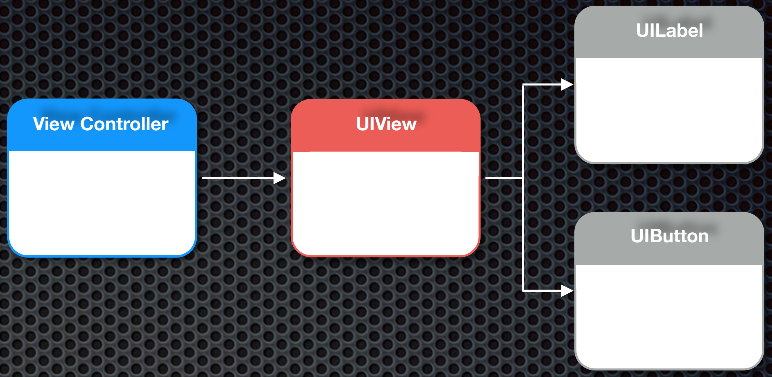
How do these happen?

Notification



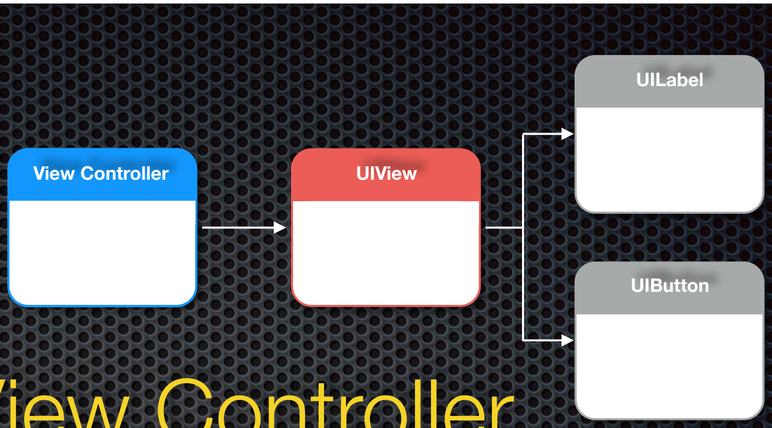
How do these happen? Target:Action and Delegates!

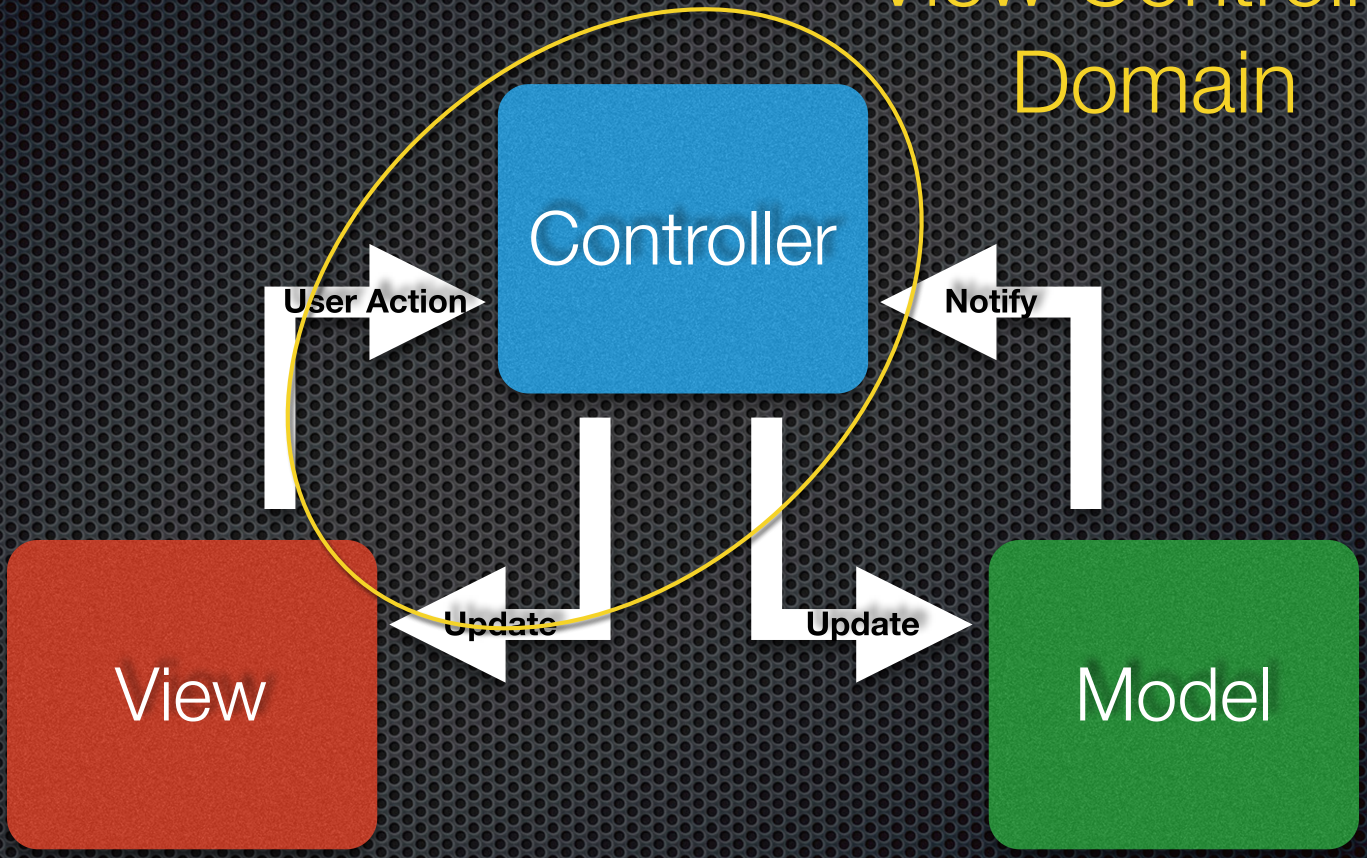
View Controllers



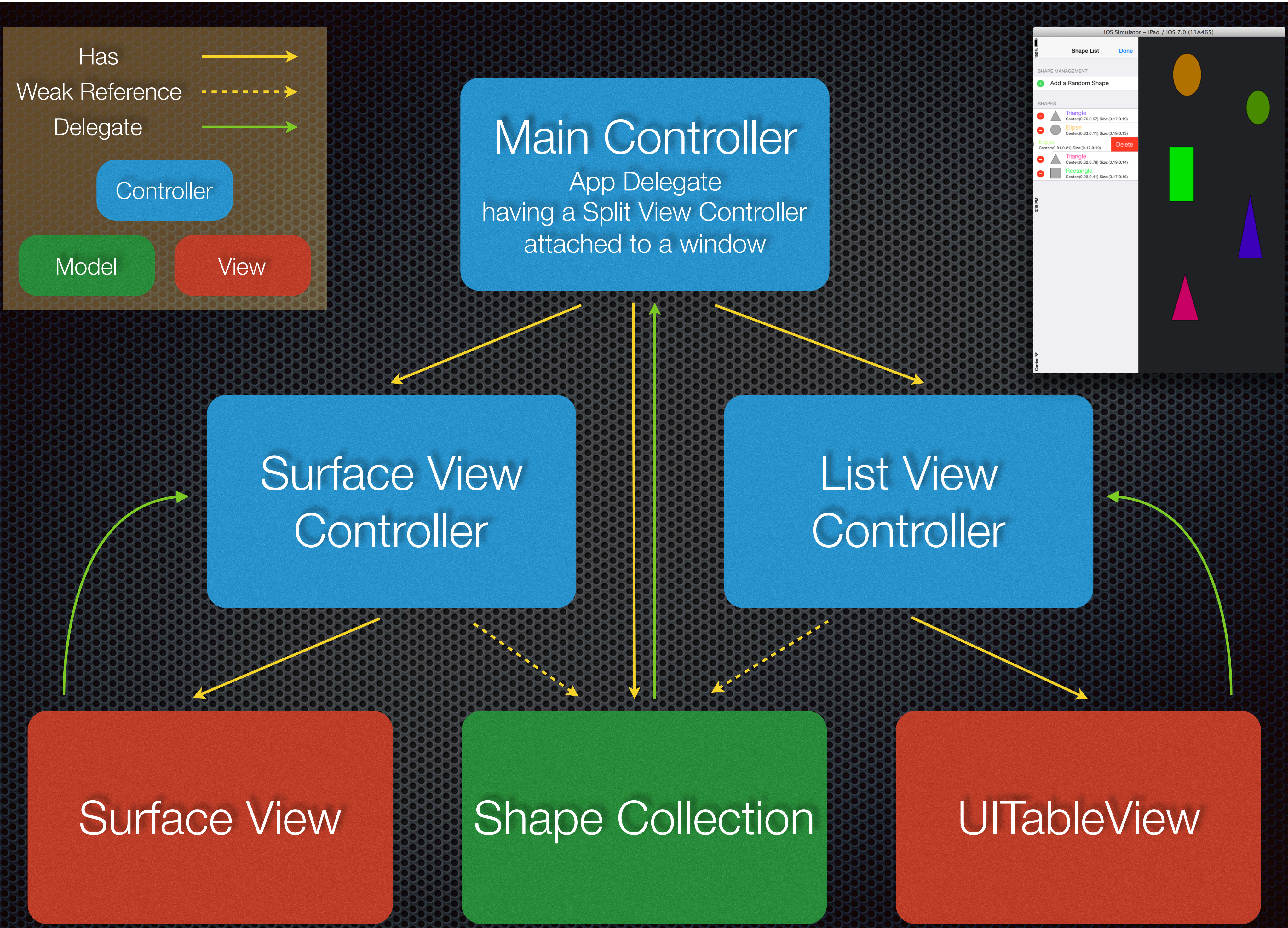
- Act as controllers in the MVC object relationship
  - They are not the only kind of controllers in an app
  - Typically occupy the location just above views in an application’s object hierarchy
- Manage a view hierarchy by way of a single view
- Responds to view events using the target-action mechanism and delegate relationships
- Effect changes in model objects either directly or by communicating with other controller objects

View Controllers





View Controller Domain



iOS Simulator – iPad / iOS 7.0 (11A465)

100%

Shape List Done

SHAPE MANAGEMENT

Add a Random Shape

SHAPES

Triangle
Center:(0.76,0.57) Size:(0.17,0.19)

Ellipse
Center:(0.33,0.11) Size:(0.19,0.13)

Ellipse
Center:(0.81,0.21) Size:(0.17,0.10) Delete

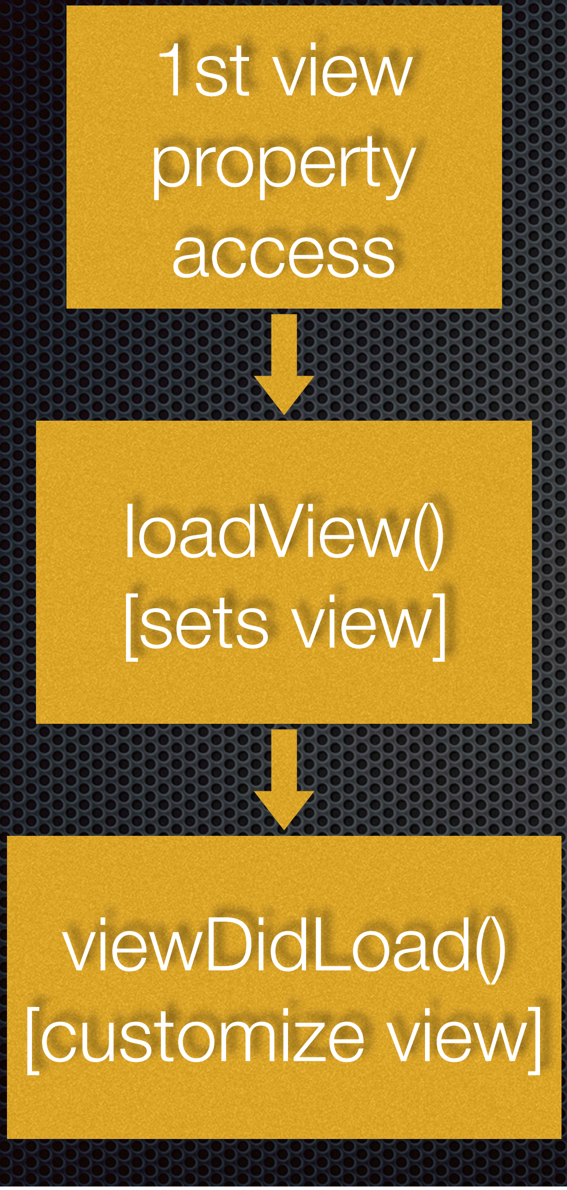
Triangle
Center:(0.32,0.78) Size:(0.19,0.14)

Rectangle
Center:(0.29,0.41) Size:(0.17,0.16)

3:19 PM

Carrier

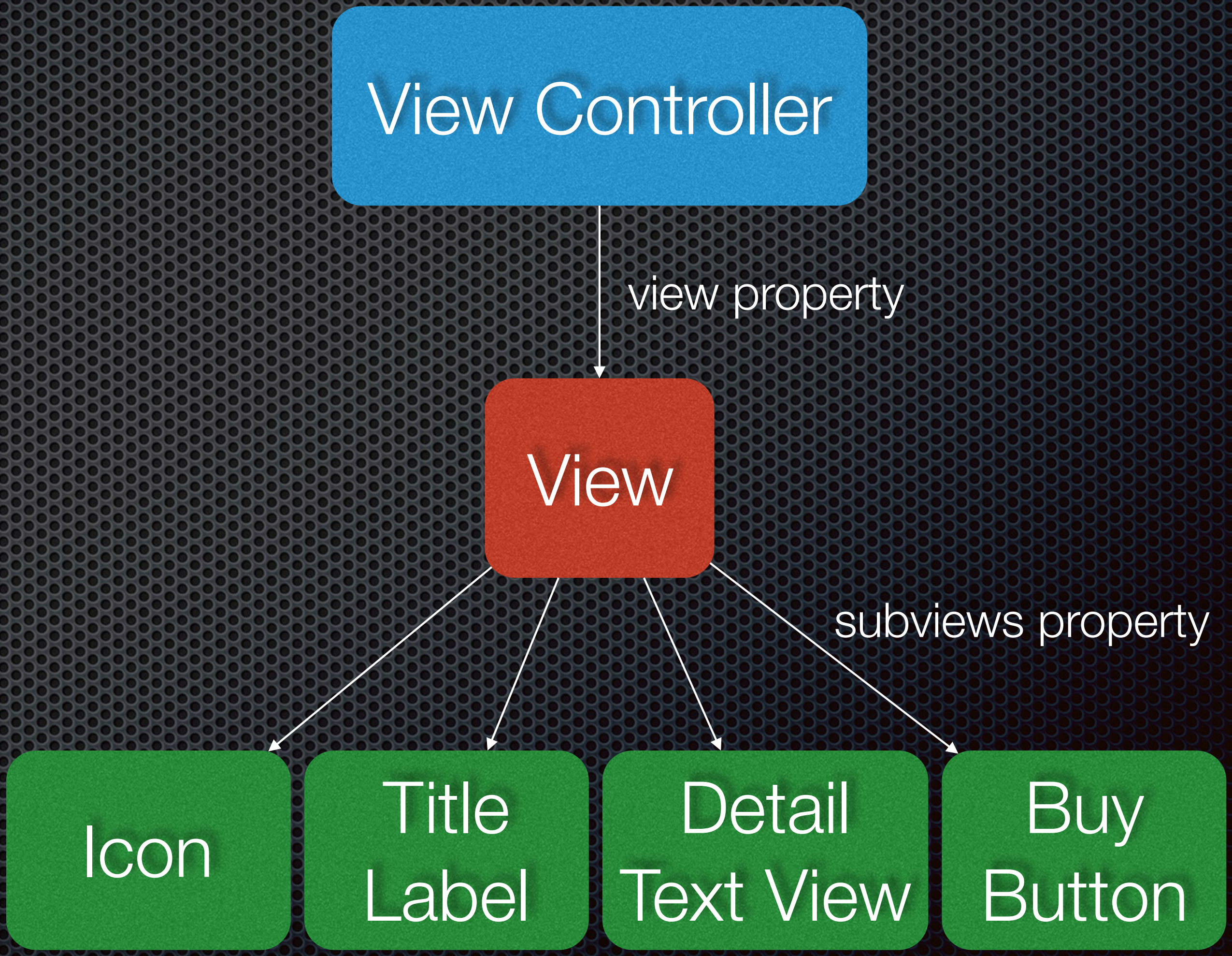
View Hierarchy Management



1st view property access

loadView() [sets view]

viewDidLoad() [customize view]



View Controller

view property

View

subviews property

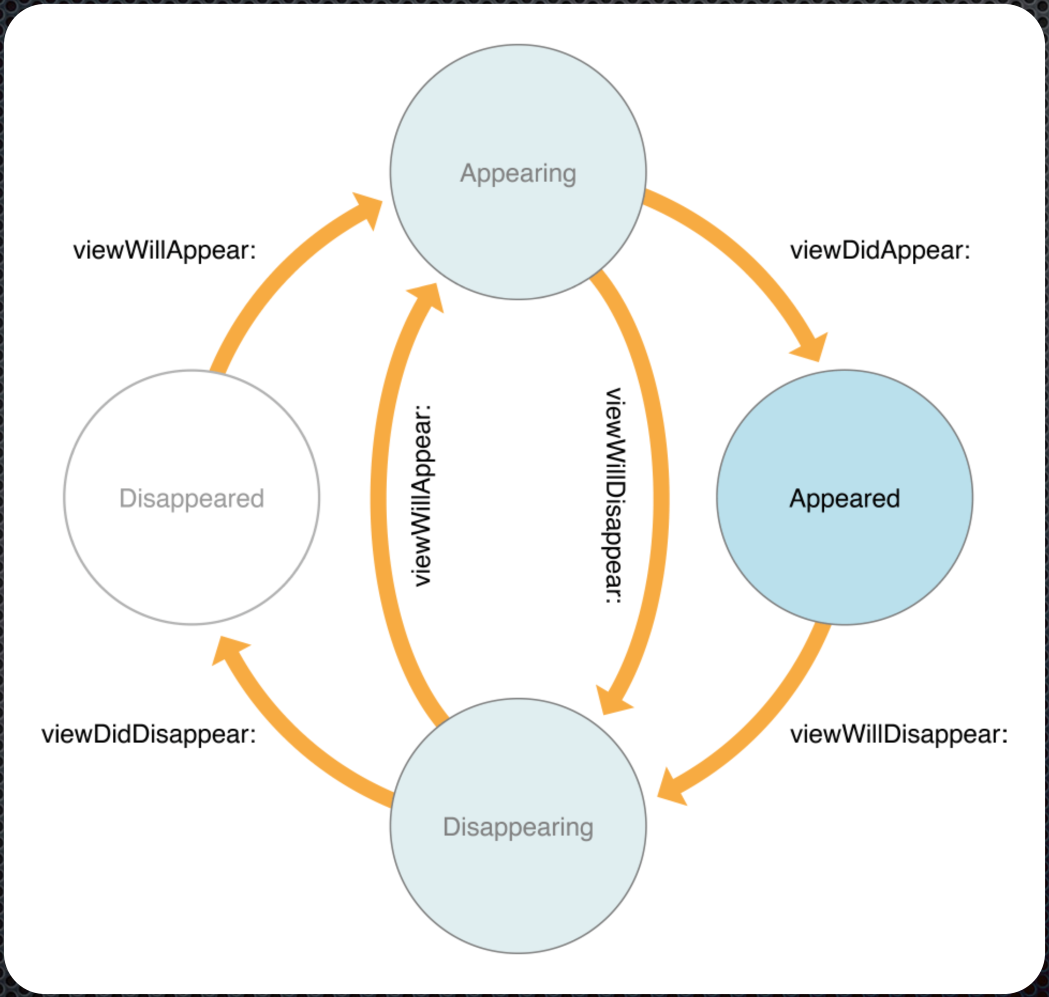
Icon

Title Label

Detail Text View

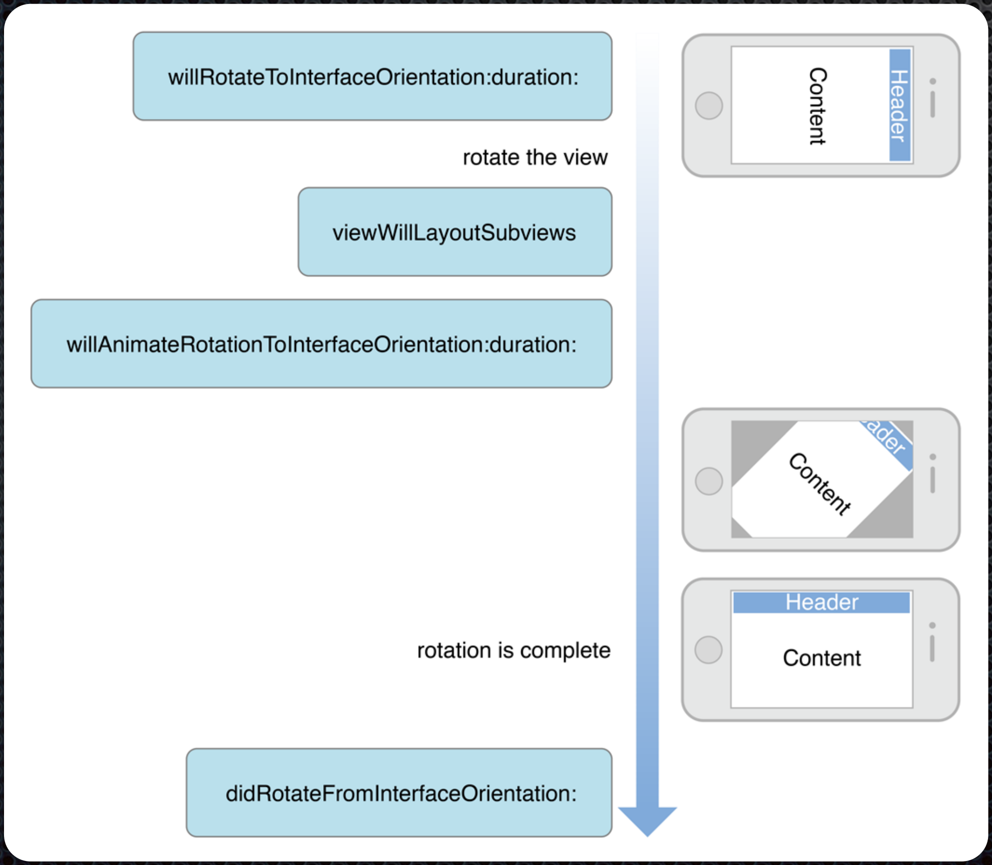
Buy Button

View Appearance Events



Rotation Support

```
override var supportedInterfaceOrientations: UIInterfaceOrientationMask
{
    return [UIInterfaceOrientationMask.Portrait,
        UIInterfaceOrientationMask.LandscapeLeft,
        UIInterfaceOrientationMask.LandscapeRight]
}
```



willRotateToInterfaceOrientation:duration:

rotate the view

viewWillLayoutSubviews

willAnimateRotationToInterfaceOrientation:duration:

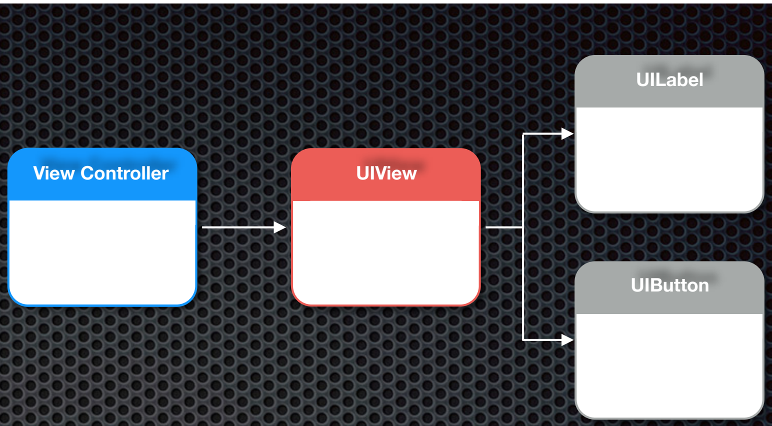
rotation is complete

didRotateFromInterfaceOrientation:

Also See

UITraitCollection

View Controllers



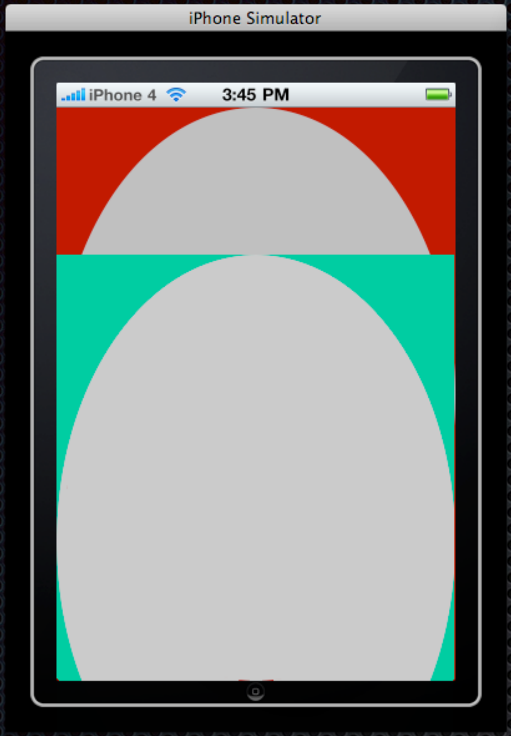
Usage

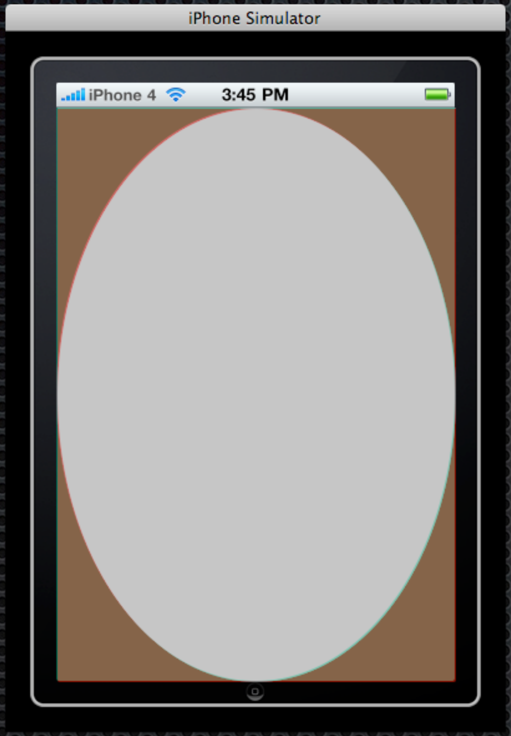
Control one screen-full of data for the user

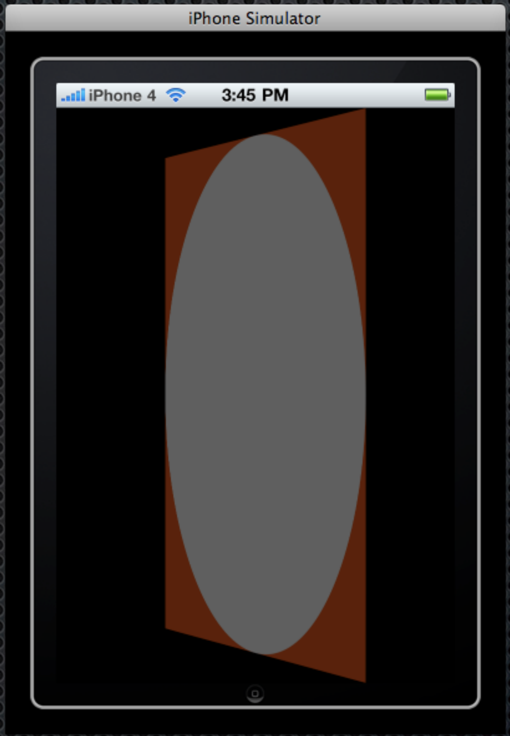
Switching Screens

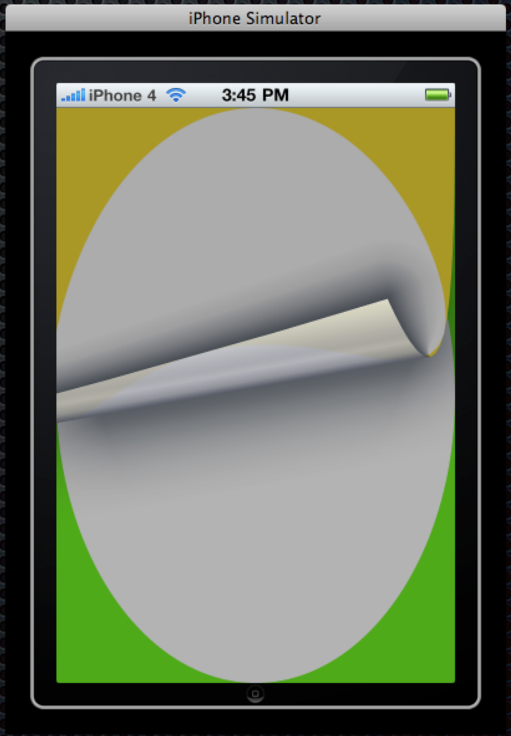
Do **NOT** change the view property of the current view controller to switch screens! Instead, present another view controller's view using a presentation method

Simple Presentation



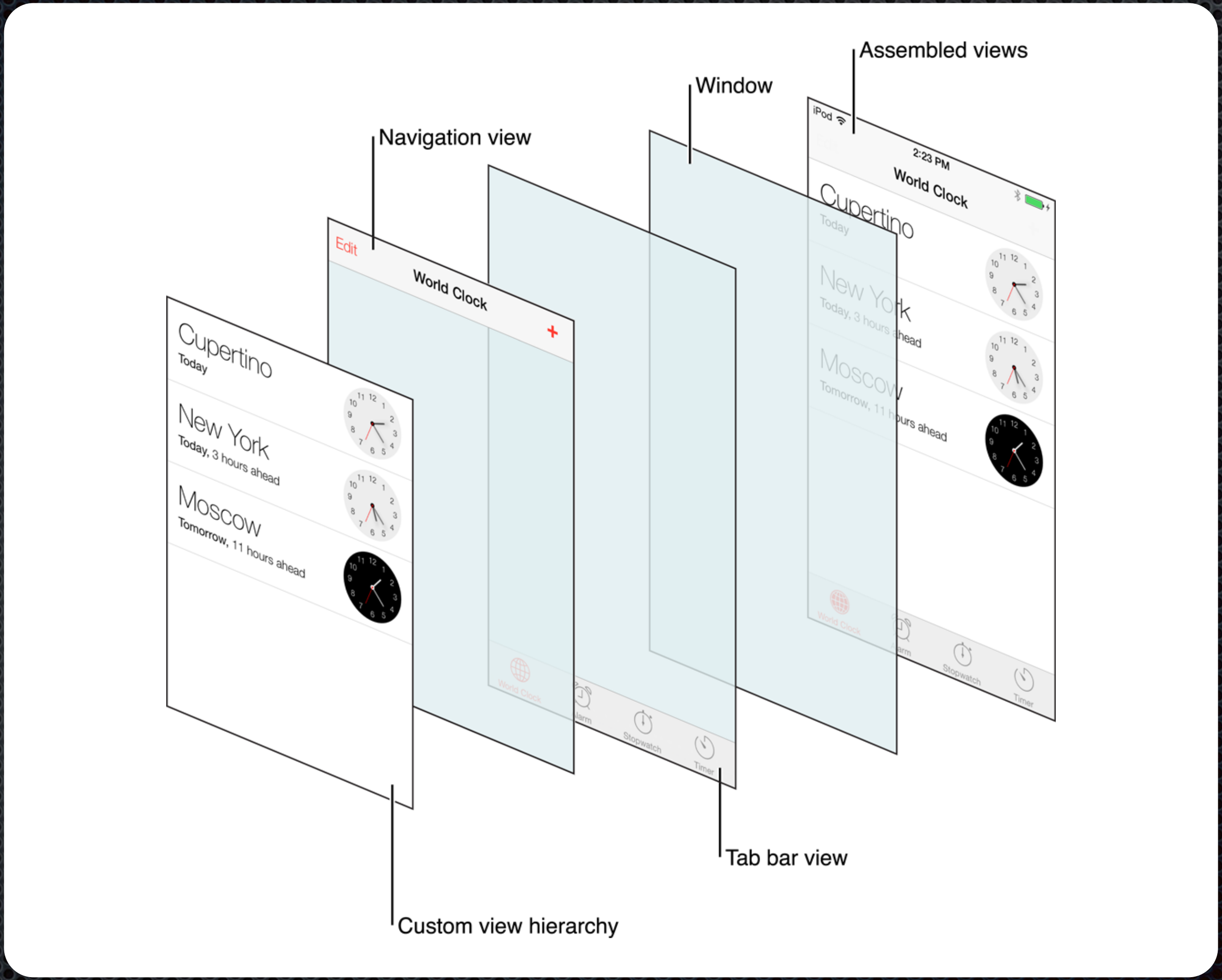






```
presentViewController(_, animated:, completion:)
dismissViewControllerAnimated(_, completion:)
```

Navigation Controllers

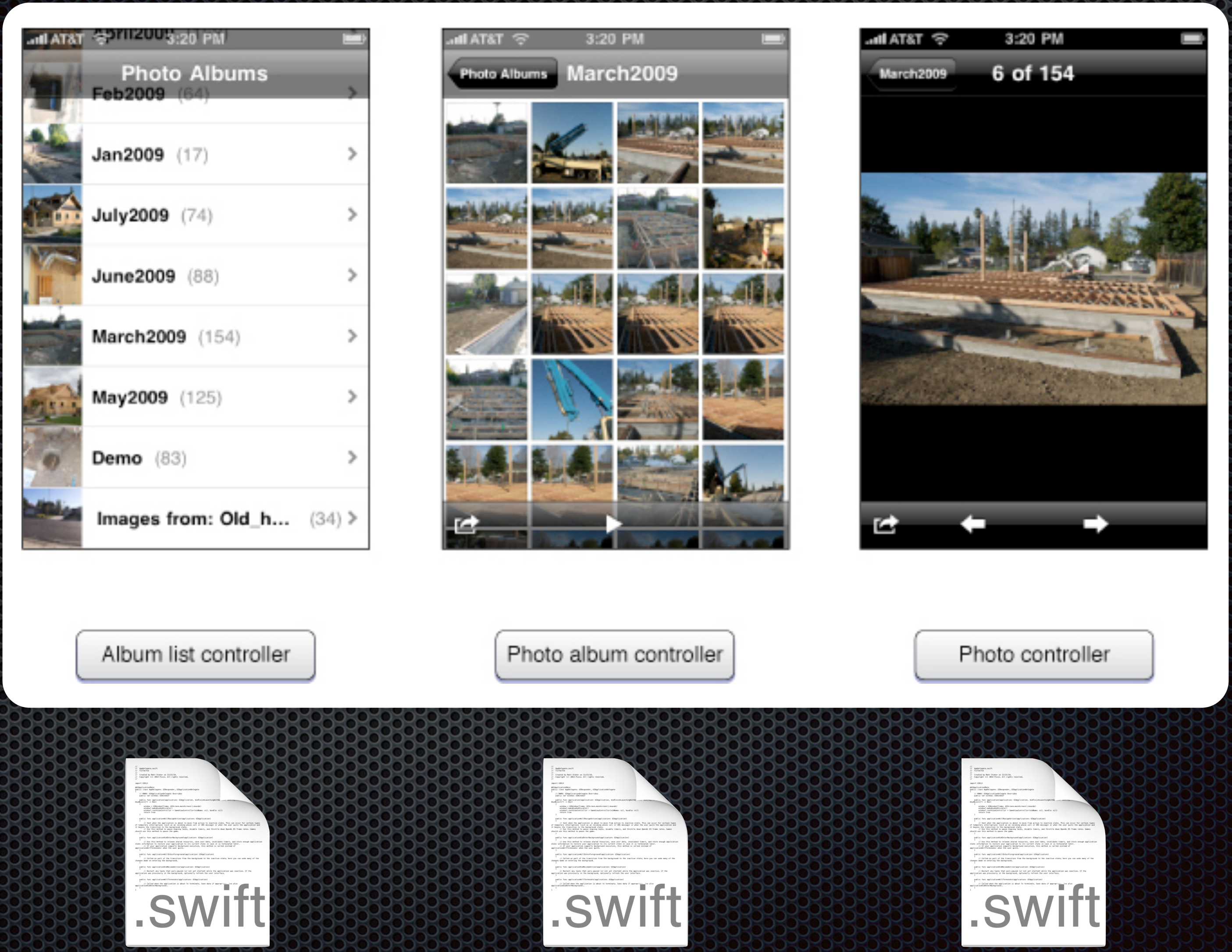


Navigation Controllers

- A navigation controller is a great starting point for many applications
- Tapping an element in a custom view or a row in a table view pushes a new view controller onto the navigation controller's stack
- This involves creating a new view controller for each unique screen of views. That is, another view controller .swift file for each novel screen

```
//
//  AppDelegate.swift
//  TicTacToe
//
//  Created by Matt Stoker on 11/21/14.
//  Copyright (c) 2014 Pixio. All rights reserved.
//

import UIKit

@UIApplicationMain
public class AppDelegate: UIResponder, UIApplicationDelegate
{
    // MARK: UIApplicationDelegate Overrides
    public var window: UIWindow?

    public func application(application: UIApplication, didFinishLaunchingWithOp
AnyObject]?) -> Bool
    {
        window = UIWindow(frame: UIScreen.mainScreen().bounds)
        window?.makeKeyAndVisible()
        window?.rootViewController = GameViewController(nibName: nil, bundle: nil)
        return true
    }

    public func applicationWillResignActive(application: UIApplication)
    {
        // Sent when the application is about to move from active to inactive state. This can occur for certain types
of temporary interruptions (such as an incoming phone call or SMS message) or when the user quits the application and
it begins the transition to the background state.
        // Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games
should use this method to pause the game.
    }

    public func applicationDidEnterBackground(application: UIApplication)
    {
        // Use this method to release shared resources, save user data, invalidate timers, and store enough application
state information to restore your application to its current state in case it is terminated later.
        // If your application supports background execution, this method is called instead of
applicationWillTerminate: when the user quits.
    }

    public func applicationWillEnterForeground(application: UIApplication)
    {
        // Called as part of the transition from the background to the inactive state; here you can undo many of the
changes made on entering the background.
    }

    public func applicationDidBecomeActive(application: UIApplication)
    {
        // Restart any tasks that were paused (or not yet started) while the application was inactive. If the
application was previously in the background, optionally refresh the user interface.
    }

    public func applicationWillTerminate(application: UIApplication)
    {
        // Called when the application is about to terminate. Save data if appropriate. See also
applicationDidEnterBackground:.
    }
}
```

Navigation Controllers



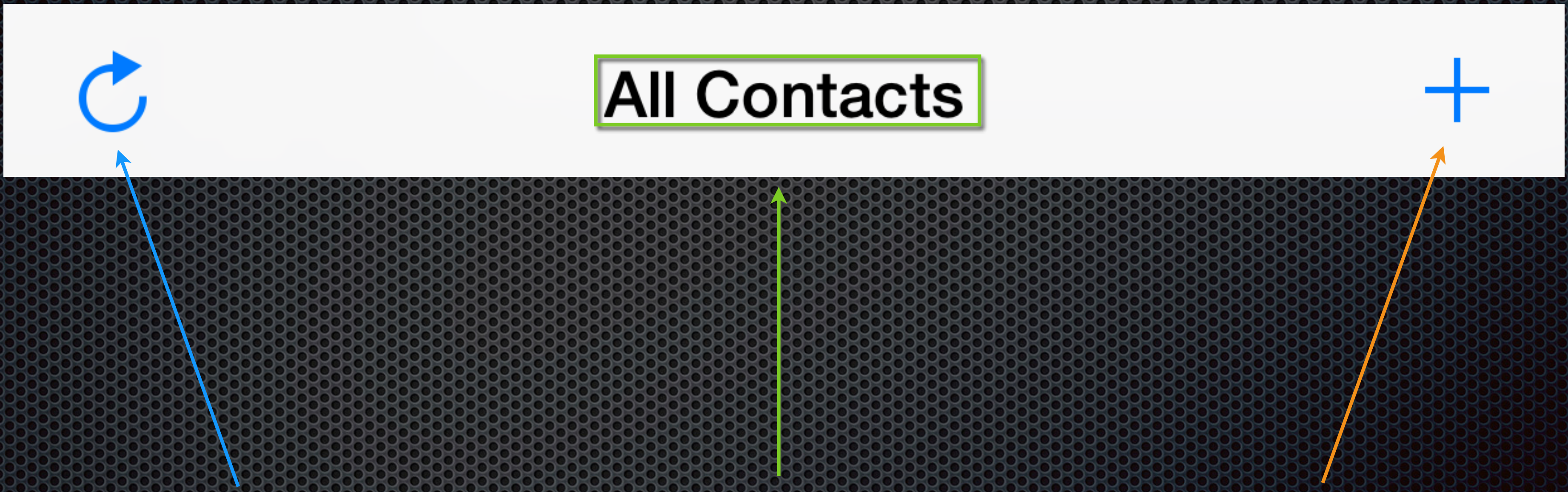
Navigation Controllers

- For example, a view controller containing a table view could create another view controller containing a detail view and push it onto the navigation controller's stack

```swift
// Somewhere executed before the user can touch the table view:
tableView.delegate = self

func tableView(_ tableView: UITableView, didSelectRowAtIndexPath indexPath: NSIndexPath)
{
    // Obtain row data item
    let item: String = itemForRowAtIndexPath(indexPath)

    // Open detail view controller for item
    var detailViewController: DetailViewController = DetailViewController()
    detailViewController.label.text = item
    navigationController?.pushViewController(detailViewController, animated: true)
}
```

Navigation Item

UIBarButtonItem



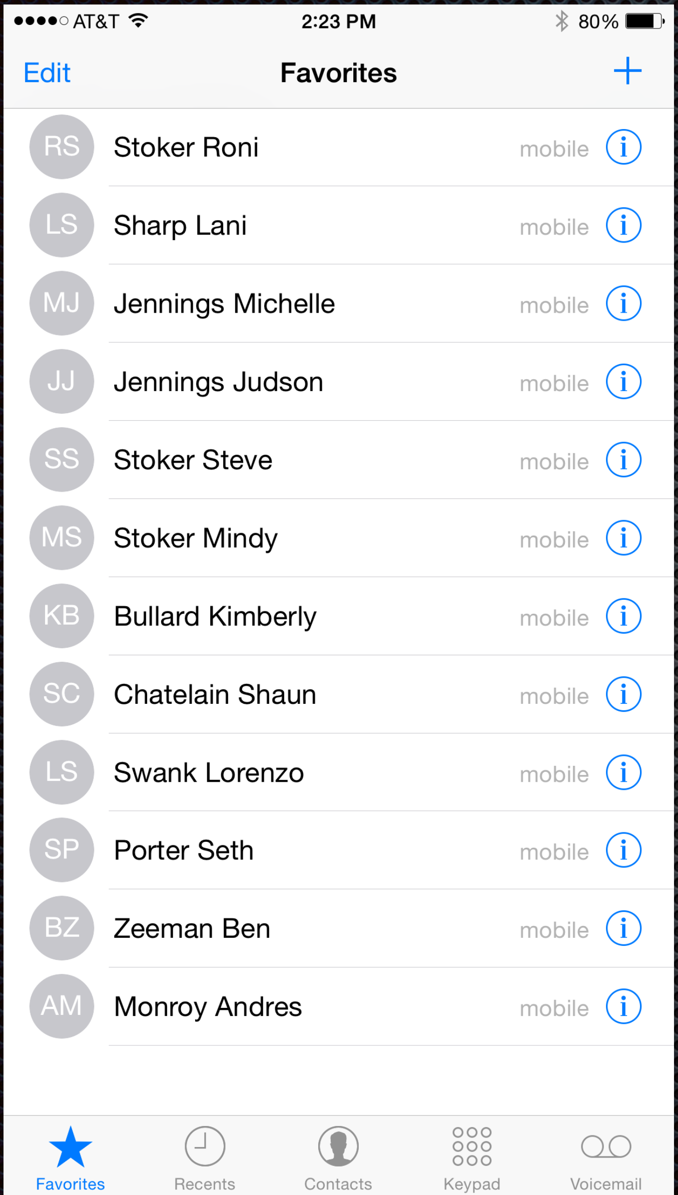
leftBarButtonItem(s)

title

rightBarButtonItem(s)

See leftItemsSupplimentBackButton

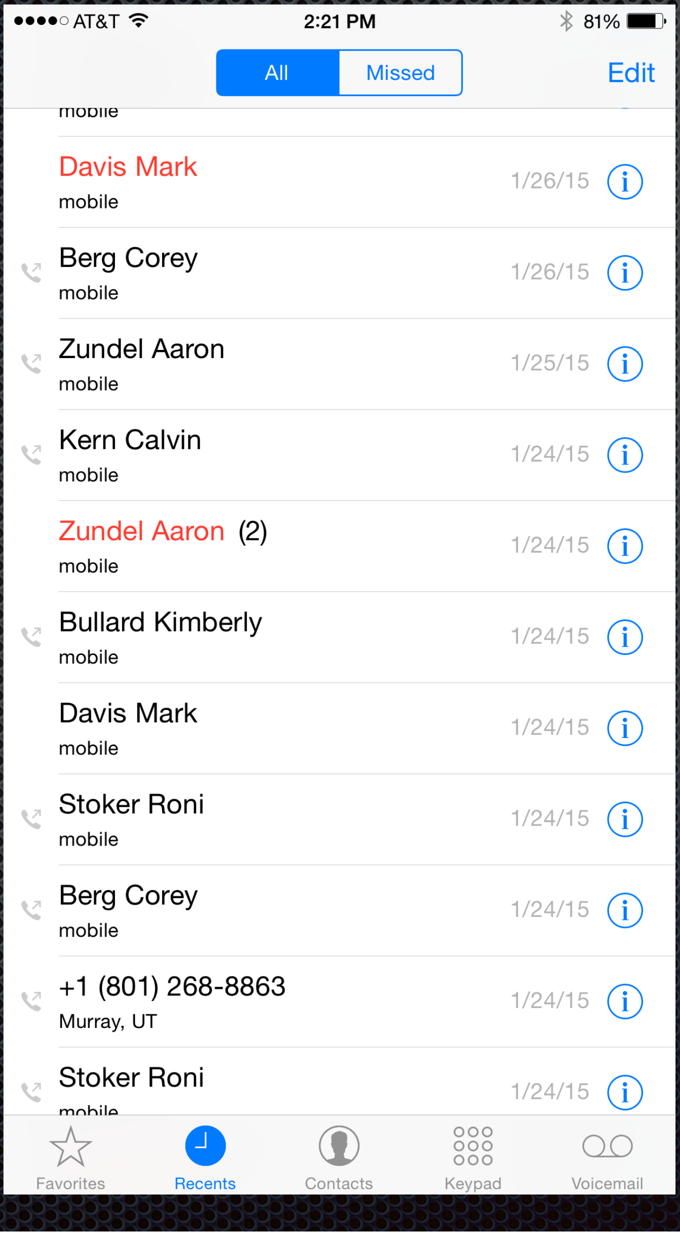
Tab Bar Controllers



●●●●○ AT&T 2:23 PM 80%

Edit **Favorites** +

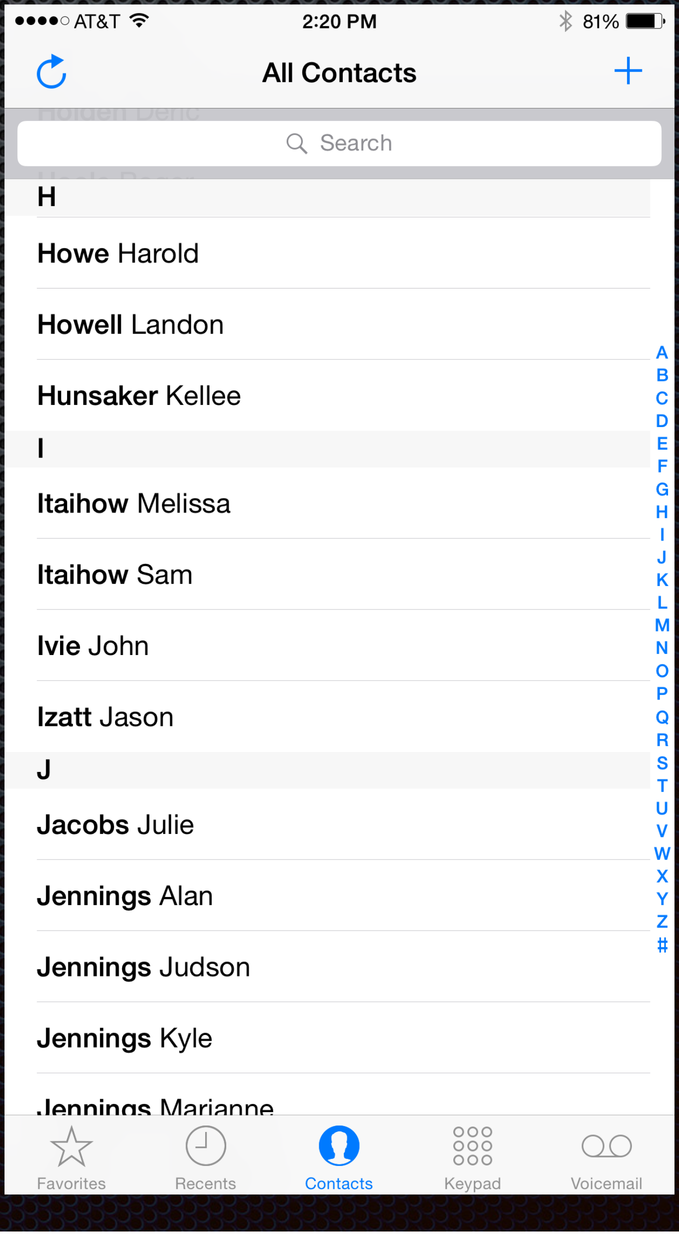
RS	Stoker Roni	mobile ⓘ
LS	Sharp Lani	mobile ⓘ
MJ	Jennings Michelle	mobile ⓘ
JJ	Jennings Judson	mobile ⓘ
SS	Stoker Steve	mobile ⓘ
MS	Stoker Mindy	mobile ⓘ
KB	Bullard Kimberly	mobile ⓘ
SC	Chatelain Shaun	mobile ⓘ
LS	Swank Lorenzo	mobile ⓘ
SP	Porter Seth	mobile ⓘ
BZ	Zeeman Ben	mobile ⓘ
AM	Monroy Andres	mobile ⓘ



●●●●○ AT&T 2:21 PM 81%

All | Missed Edit

mobile		
Davis Mark	mobile	1/26/15 ⓘ
Berg Corey	mobile	1/26/15 ⓘ
Zundel Aaron	mobile	1/25/15 ⓘ
Kern Calvin	mobile	1/24/15 ⓘ
Zundel Aaron (2)	mobile	1/24/15 ⓘ
Bullard Kimberly	mobile	1/24/15 ⓘ
Davis Mark	mobile	1/24/15 ⓘ
Stoker Roni	mobile	1/24/15 ⓘ
Berg Corey	mobile	1/24/15 ⓘ
+1 (801) 268-8863	Murray, UT	1/24/15 ⓘ
Stoker Roni	mobile	1/24/15 ⓘ



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All Contacts +

Search

H

Howe Harold

Howell Landon

Hunsaker Kellee

I

Itaihow Melissa

Itaihow Sam

Ivie John

Izatt Jason

J

Jacobs Julie

Jennings Alan

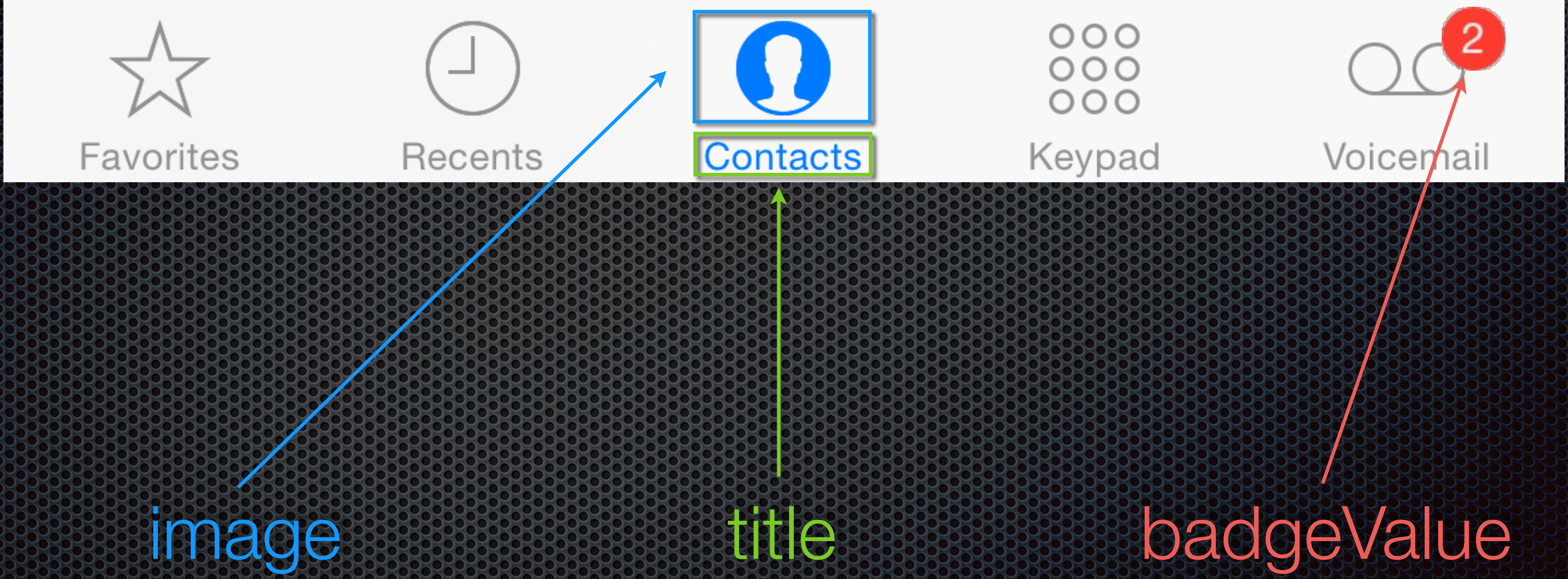
Jennings Judson

Jennings Kyle

Jennings Marianne

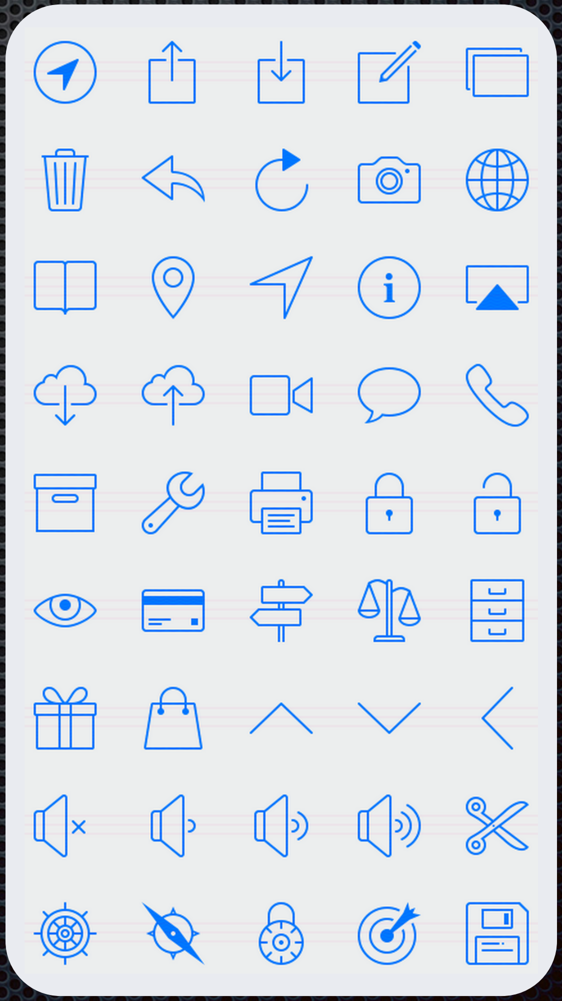
Tab Bar Items

UITabBarItem



Tab Bar Item Icons

- Normal and Selected images are built from the input image
- Uses the alpha component of a pixel to build the image
- Ignores the color components of a pixel entirely!

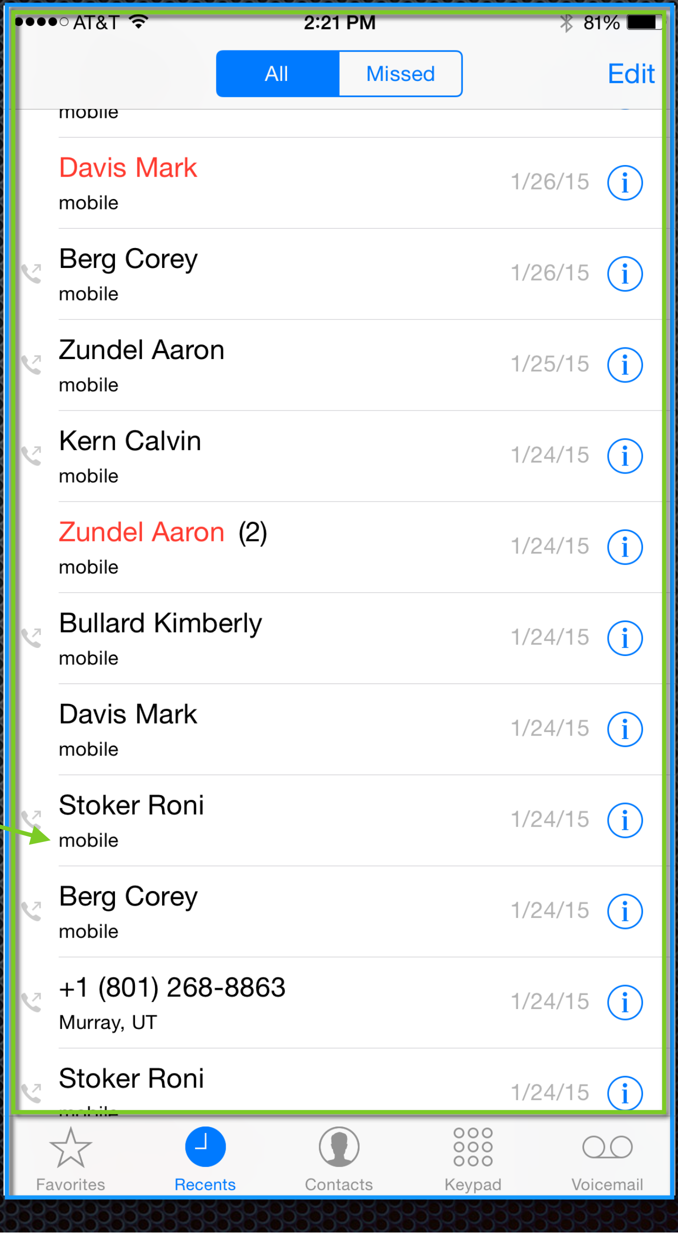


http://glyphish.com/

Tab & Navigation Controllers

Tab Bar Controller's View

Navigation Controller's View



●●●●○ AT&T 2:21 PM 81%

All | Missed | Edit

mobile

Davis Mark 1/26/15 ⓘ
mobile

Berg Corey 1/26/15 ⓘ
mobile

Zundel Aaron 1/25/15 ⓘ
mobile

Kern Calvin 1/24/15 ⓘ
mobile

Zundel Aaron (2) 1/24/15 ⓘ
mobile

Bullard Kimberly 1/24/15 ⓘ
mobile

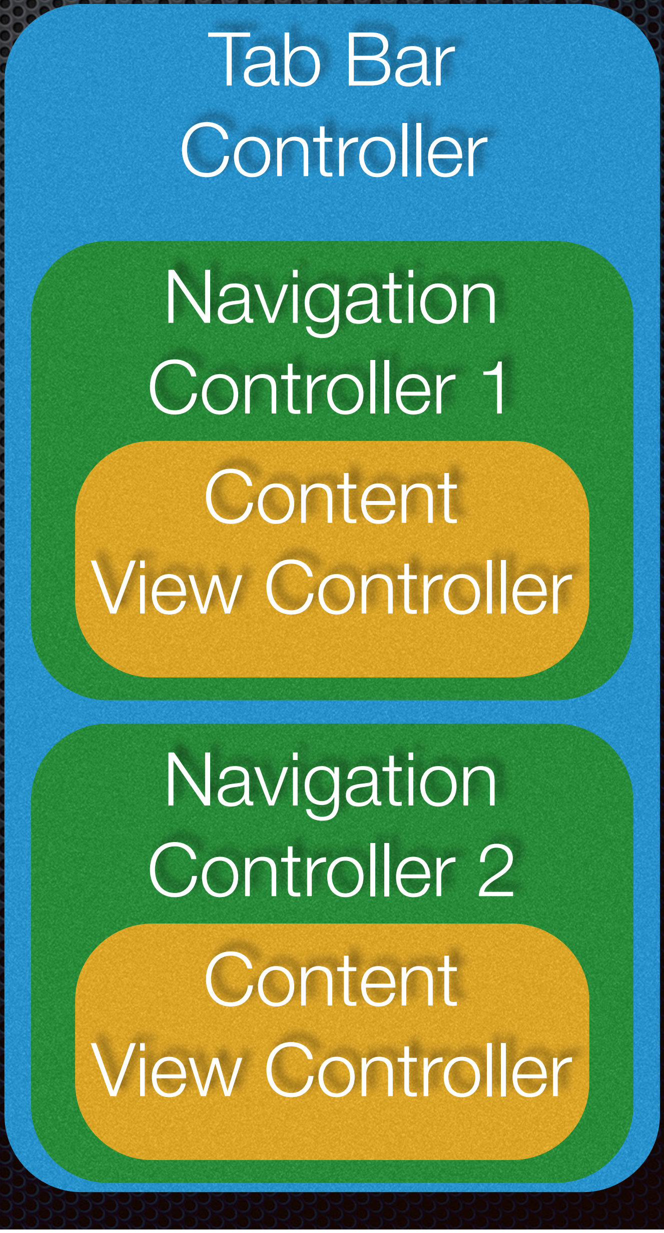
Davis Mark 1/24/15 ⓘ
mobile

Stoker Roni 1/24/15 ⓘ
mobile

Berg Corey 1/24/15 ⓘ
mobile

+1 (801) 268-8863 1/24/15 ⓘ
Murray, UT

Stoker Roni 1/24/15 ⓘ



Tab Bar Controller

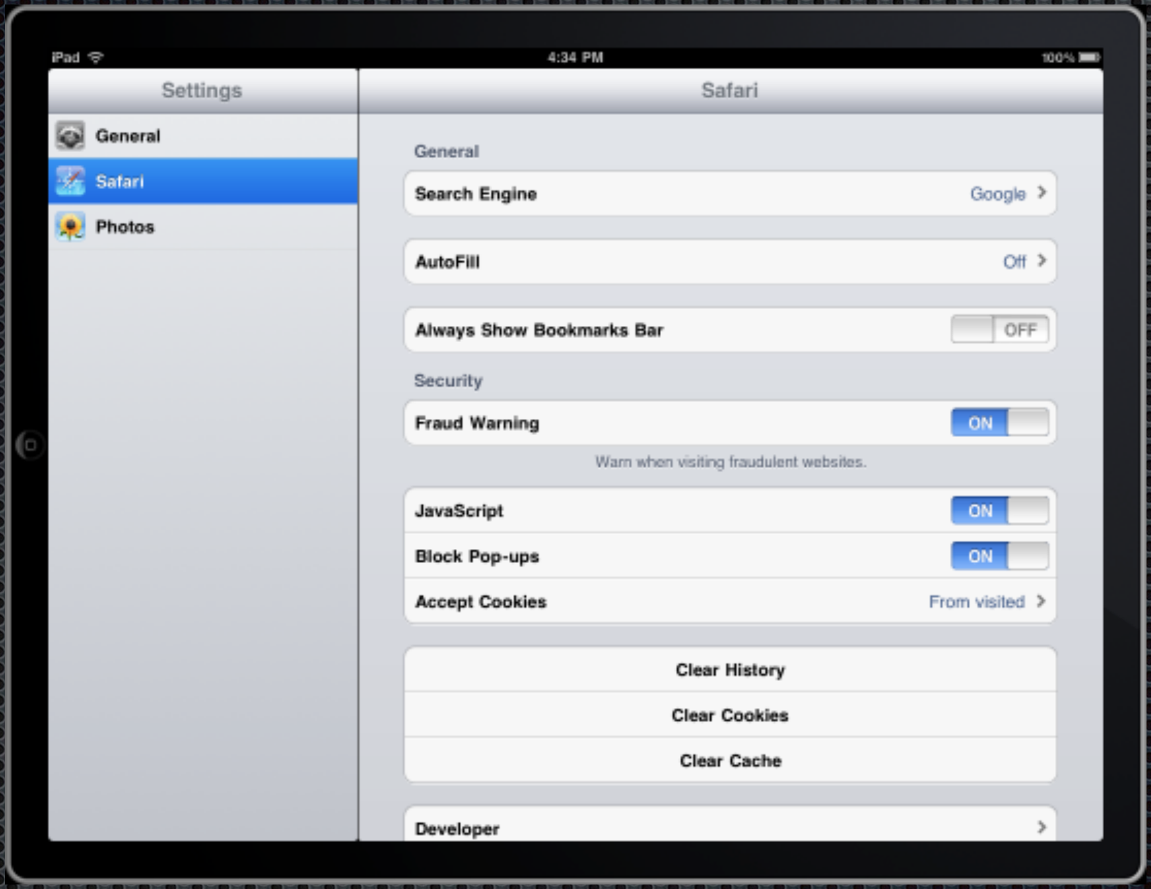
Navigation Controller 1

Content View Controller

Navigation Controller 2

Content View Controller

Split-View Controllers



General

Search Engine Google

AutoFill Off

Always Show Bookmarks Bar OFF

Security

Fraud Warning ON

Warn when visiting fraudulent websites.

JavaScript ON

Block Pop-ups ON

Accept Cookies From visited

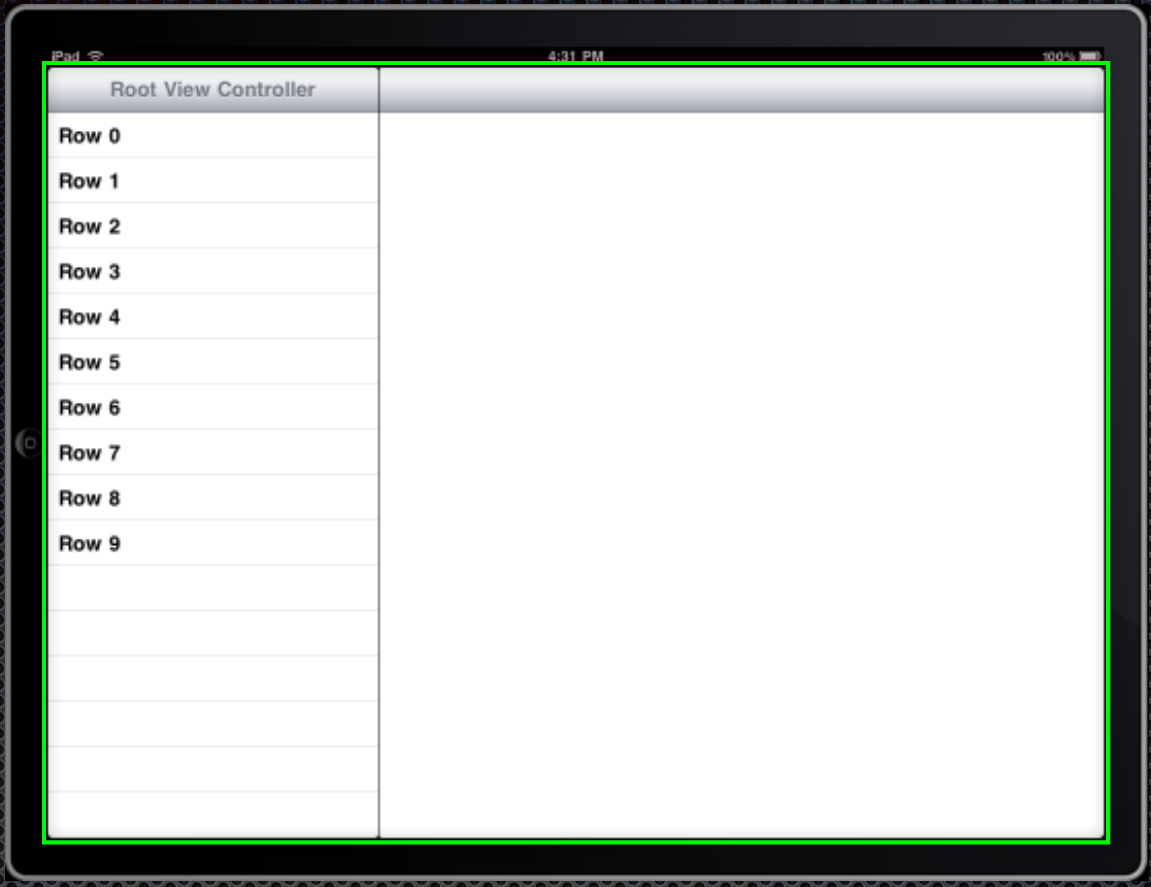
Clear History

Clear Cookies

Clear Cache

Developer

iPad
4:31 PM
100%



Root View Controller

Row 0

Row 1

Row 2

Row 3

Row 4

Row 5

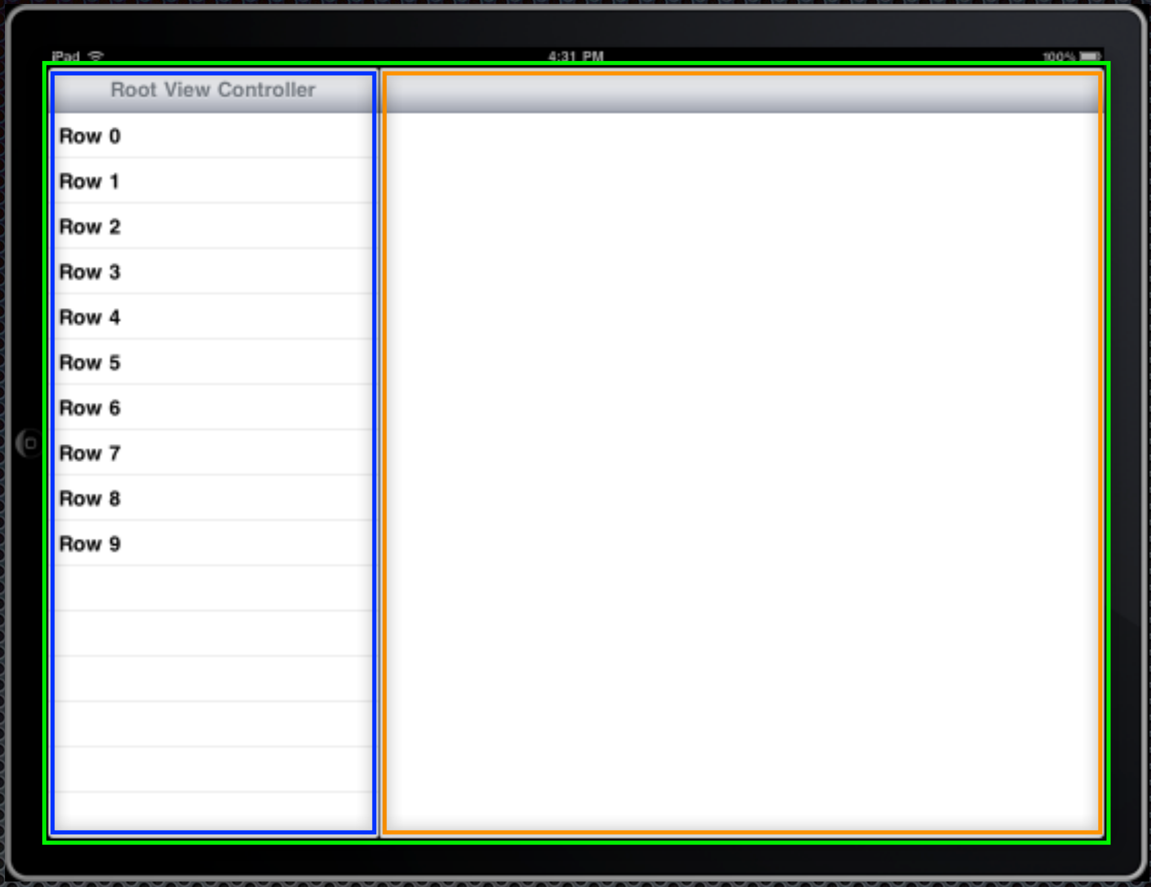
Row 6

Row 7

Row 8

Row 9

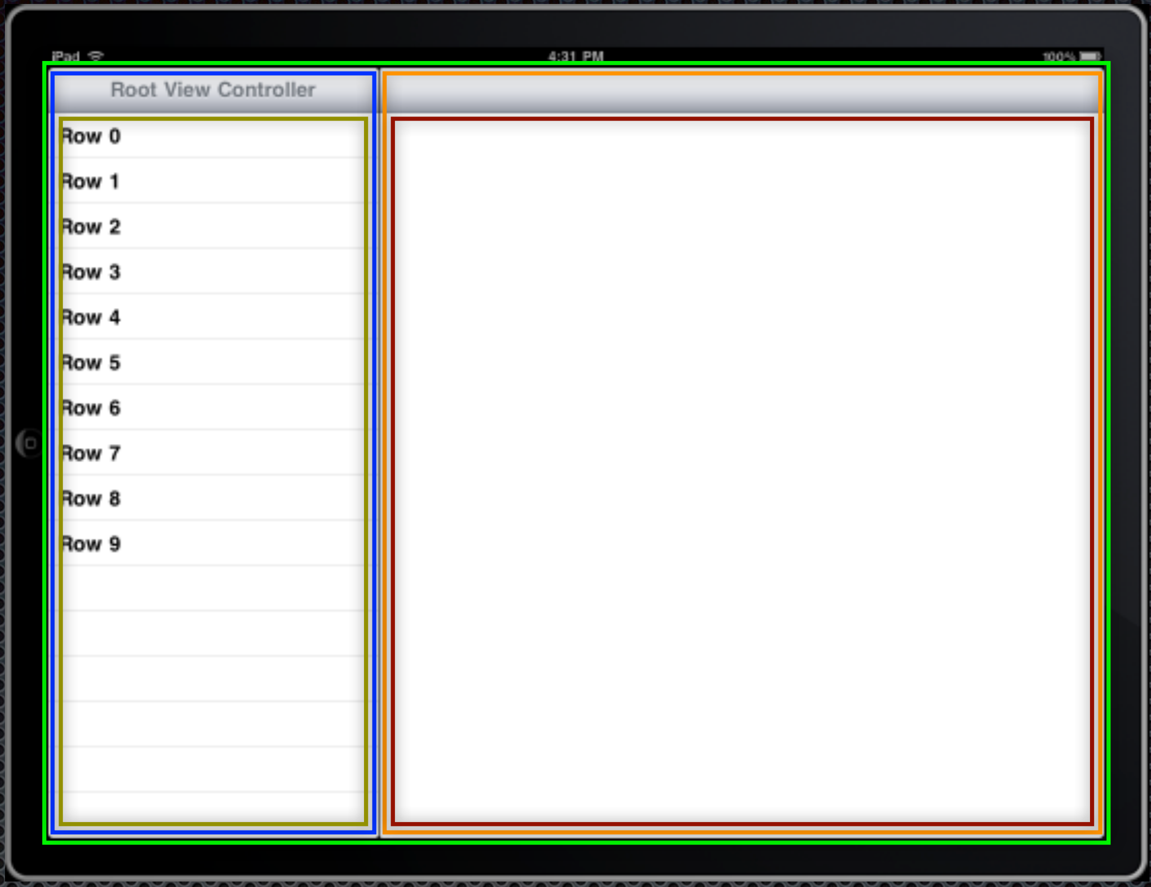
Split-View Controller



🟩 Split-View Controller

🟦 Master Navigation Controller

🟧 Detail Navigation Controller



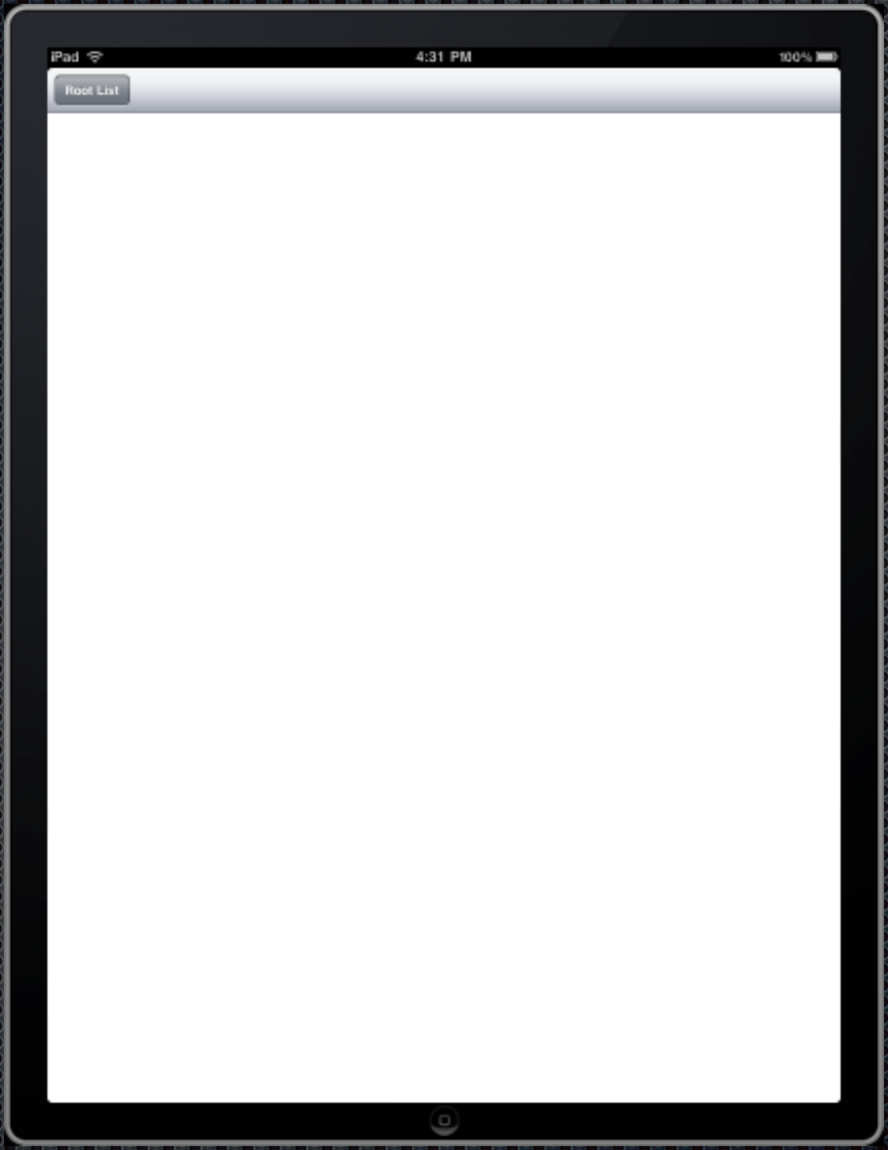
🟩 Split-View Controller

🟦 Master Navigation Controller

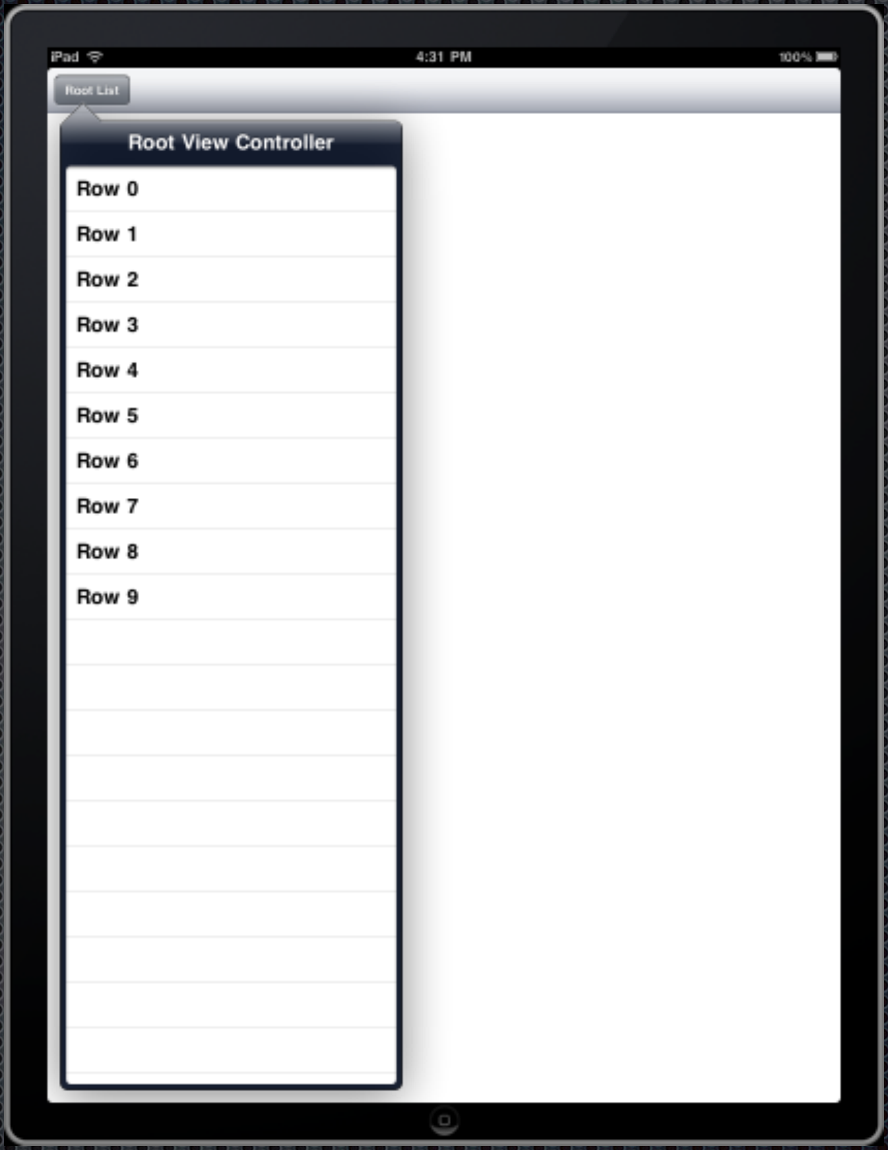
🟧 Detail Navigation Controller

🟨 Master View Controller

🟥 Detail View Controller



iPad
4:31 PM
100%
Root List



Root View Controller

Row 0

Row 1

Row 2

Row 3

Row 4

Row 5

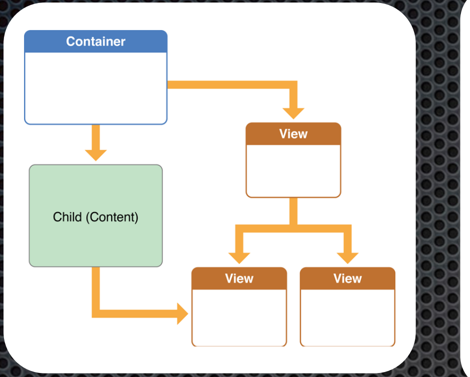
Row 6

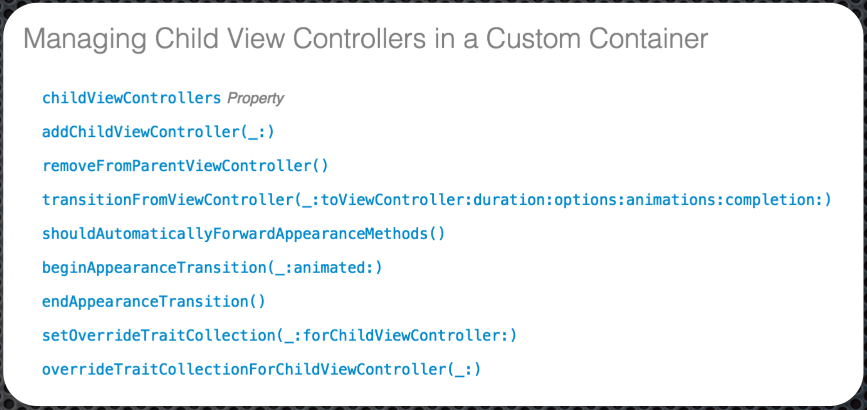
Row 7

Row 8

Row 9

Custom Container View Controllers





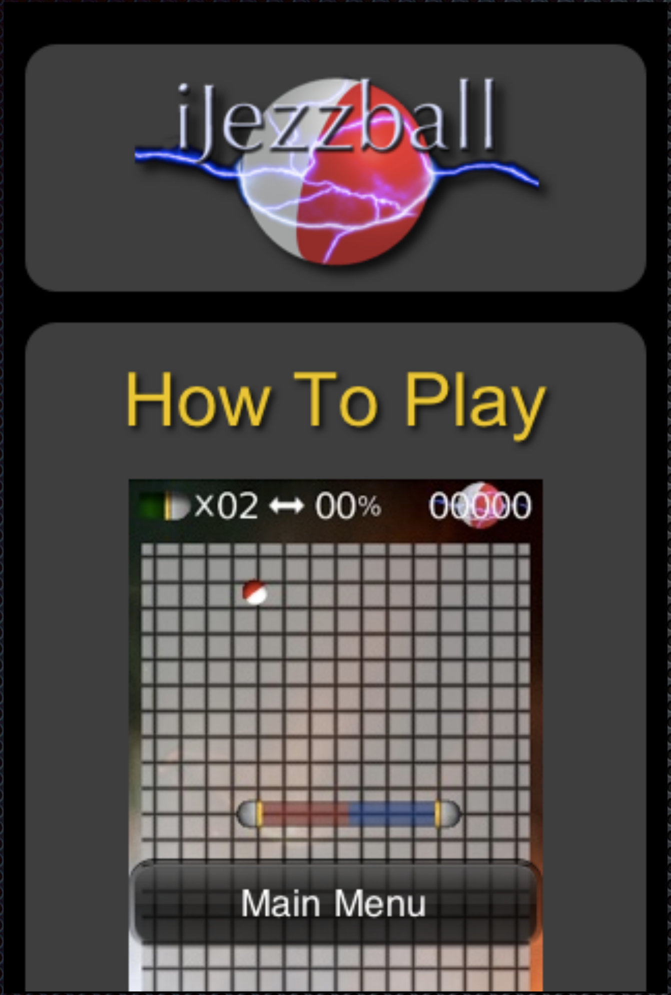
Managing Child View Controllers in a Custom Container

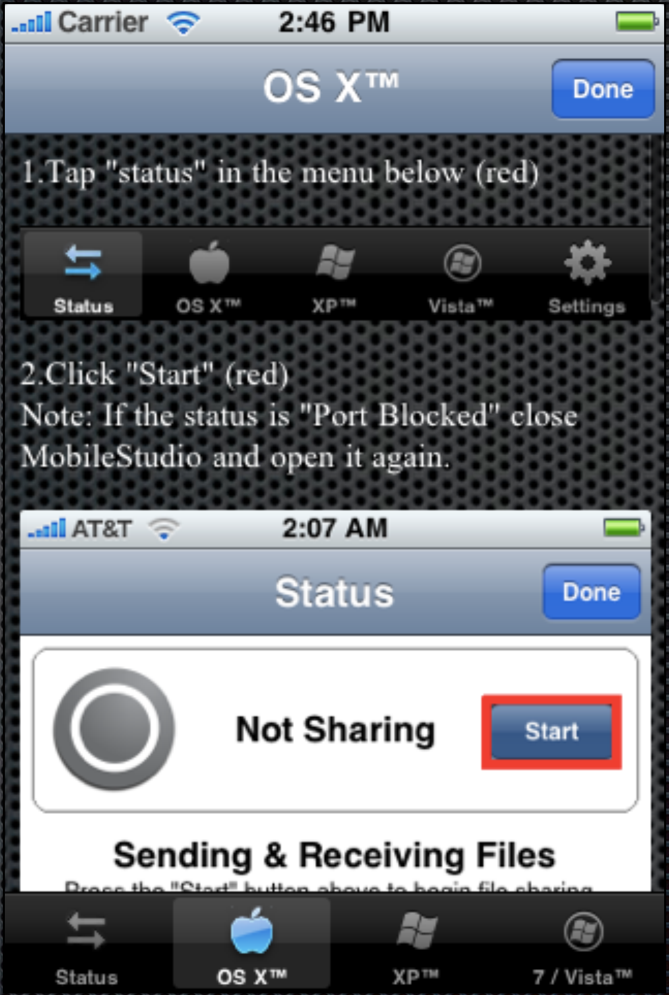
- `childViewControllers` *Property*
- `addChildViewController(_:)`
- `removeFromParentViewController()`
- `transitionFromViewController(_:toViewController:duration:options:animations:completion:)`
- `shouldAutomaticallyForwardAppearanceMethods()`
- `beginAppearanceTransition(_:animated:)`
- `endAppearanceTransition()`
- `setOverrideTraitCollection(_:forChildViewController:)`
- `overrideTraitCollectionForChildViewController(_:)`

```
func displayContentController(content: UIViewController)
{
   addChildViewController(content) // Signal start of transition, calls willMoveToParentViewController
   content.view.frame = someRectangle // Set the frame of the content view controller's view before adding
   view.addSubview(content.view) // Add the content view controller's view to the hierarchy
   content.didMoveToParentViewController(self) // Signal that the transition has completed
}

func removeContentController(content: UIViewController)
{
   content.willMoveToParentViewController(nil) // Signal start of remove transition
   content.view.removeFromSuperview() // Remove view controller's view from hierarchy
   content.removeFromParentViewController() // Signal end of remove transition
}
```

Web Views



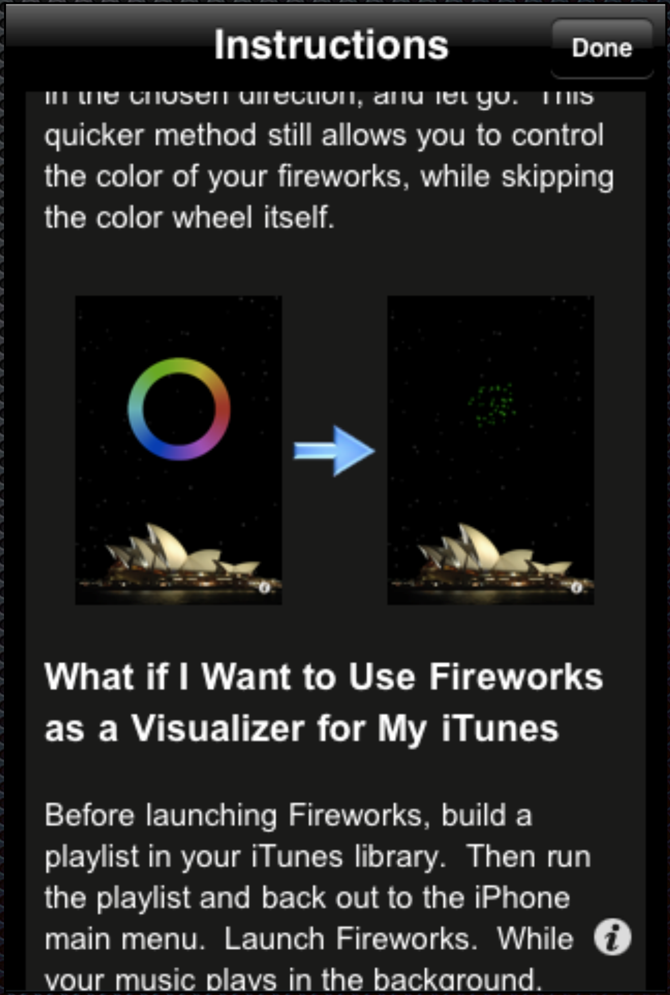


1.Tap "status" in the menu below (red)

2.Click "Start" (red)
Note: If the status is "Port Blocked" close MobileStudio and open it again.

Sending & Receiving Files

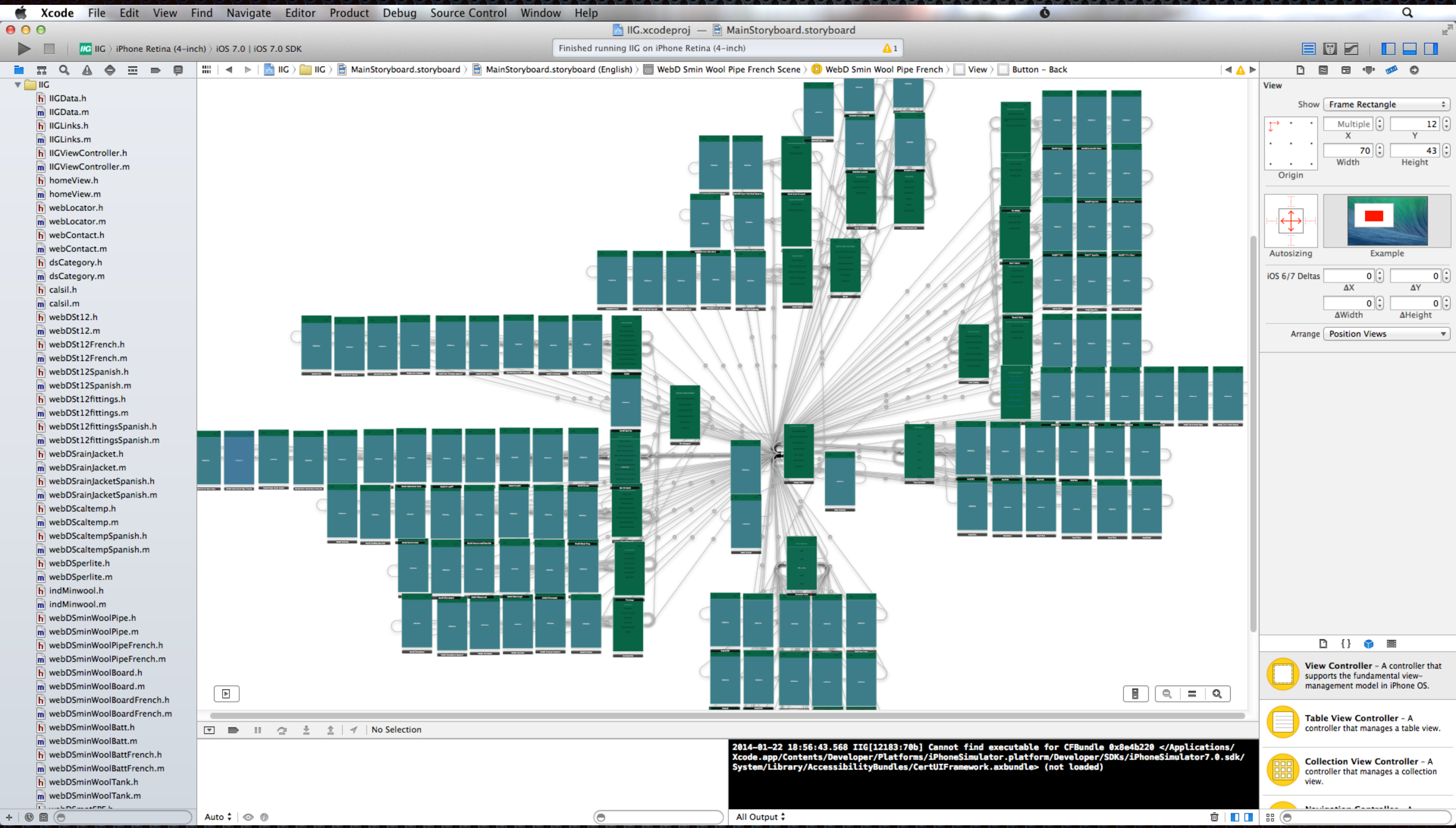
Press the "Start" button above to begin file sharing



in the chosen direction, and let go. This quicker method still allows you to control the color of your fireworks, while skipping the color wheel itself.

What if I Want to Use Fireworks as a Visualizer for My iTunes

Before launching Fireworks, build a playlist in your iTunes library. Then run the playlist and back out to the iPhone main menu. Launch Fireworks. While your music plays in the background.



Finished running IIG on iPhone Retina (4-inch) ⚠ 1

View

Show: Frame Rectangle

X: Multiple
Y: 12
Width: 70
Height: 43

iOS 6/7 Deltas
ΔX: 0
ΔY: 0
ΔWidth: 0
ΔHeight: 0

Arrange: Position Views

No Selection

```
2014-01-22 18:56:43.568 IIG[12183:70b] Cannot find executable for CFBundle 0x8e4b220 </Applications/
Xcode.app/Contents/Developer/Platforms/iPhoneSimulator.platform/Developer/SDKs/iPhoneSimulator7.0.sdk/
System/Library/AccessibilityBundles/CertUIFramework.axbundle> (not loaded)
```

View Controller – A controller that supports the fundamental view-management model in iPhone OS.

Table View Controller – A controller that manages a table view.

Collection View Controller – A controller that manages a collection view.