Creating Modern Cocoa Apps

Session 227
Tony Parker
Software Engineer, Cocoa Frameworks

A Modern Cocoa App

A Modern Cocoa App

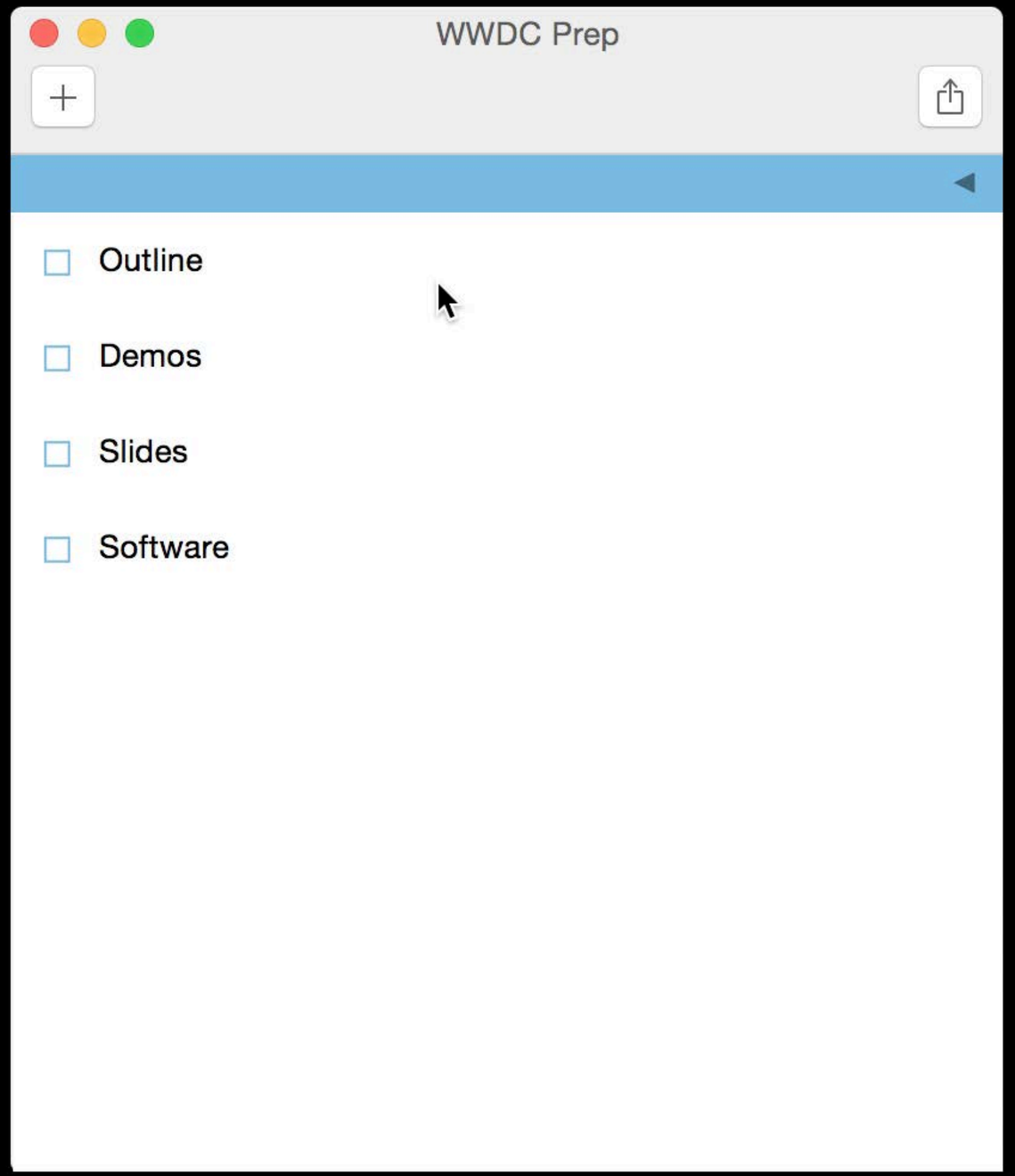
Introducing Lister

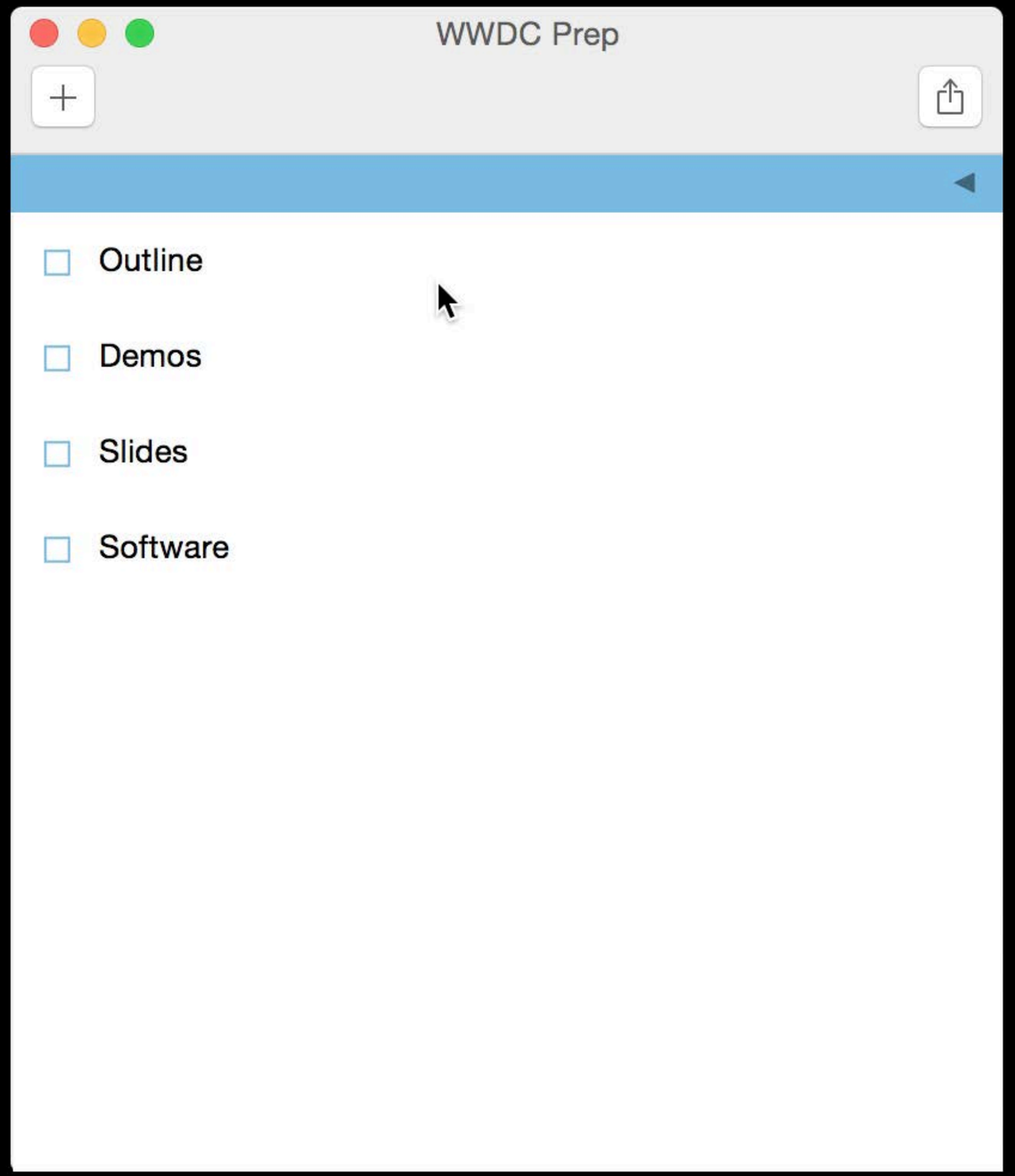
Built with

- Storyboards
- Auto Layout
- NSDocument

OS X and iOS

Objective-C and Swift


WWDC Prep
Outline
Demos
Slides
Software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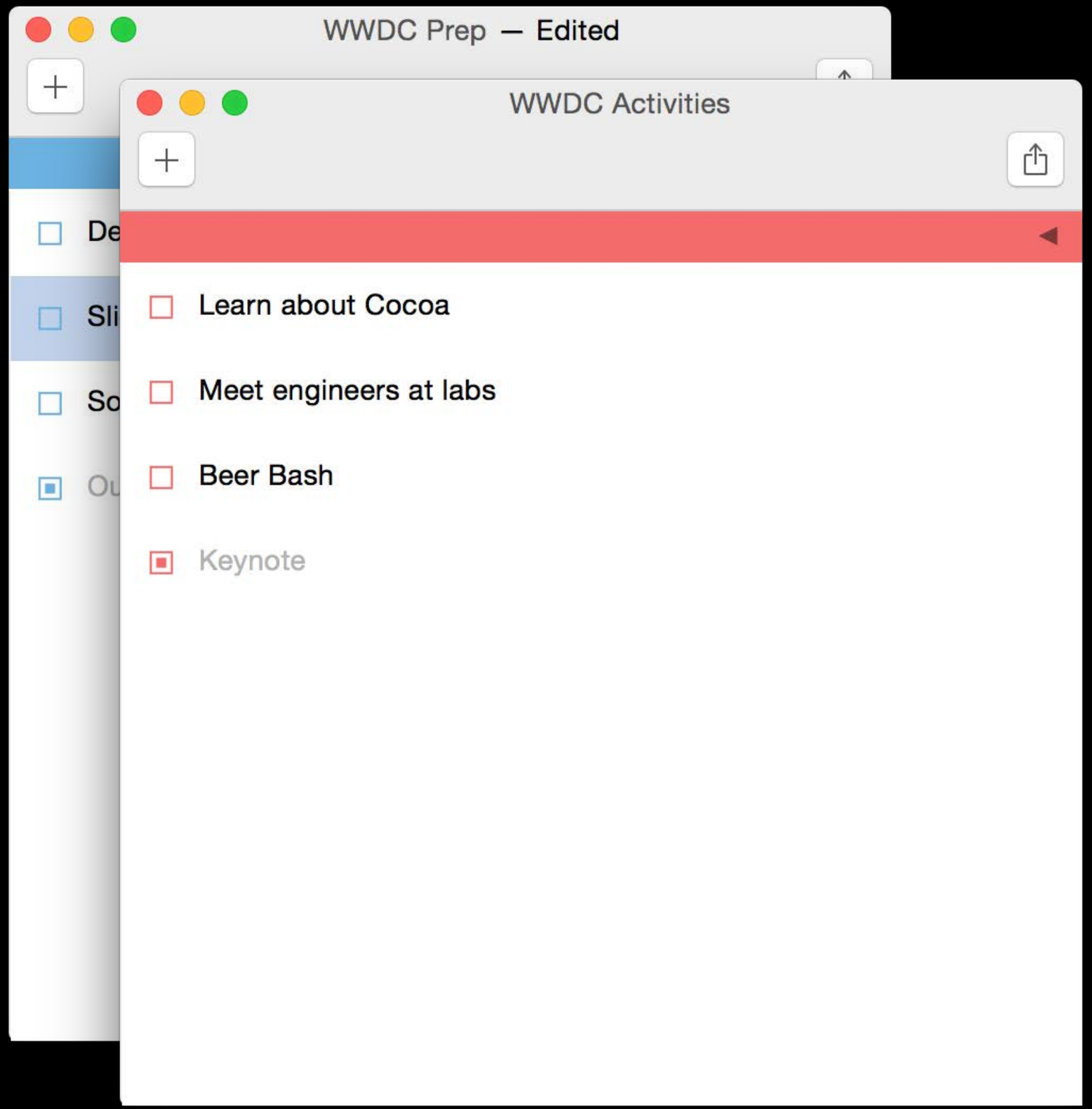
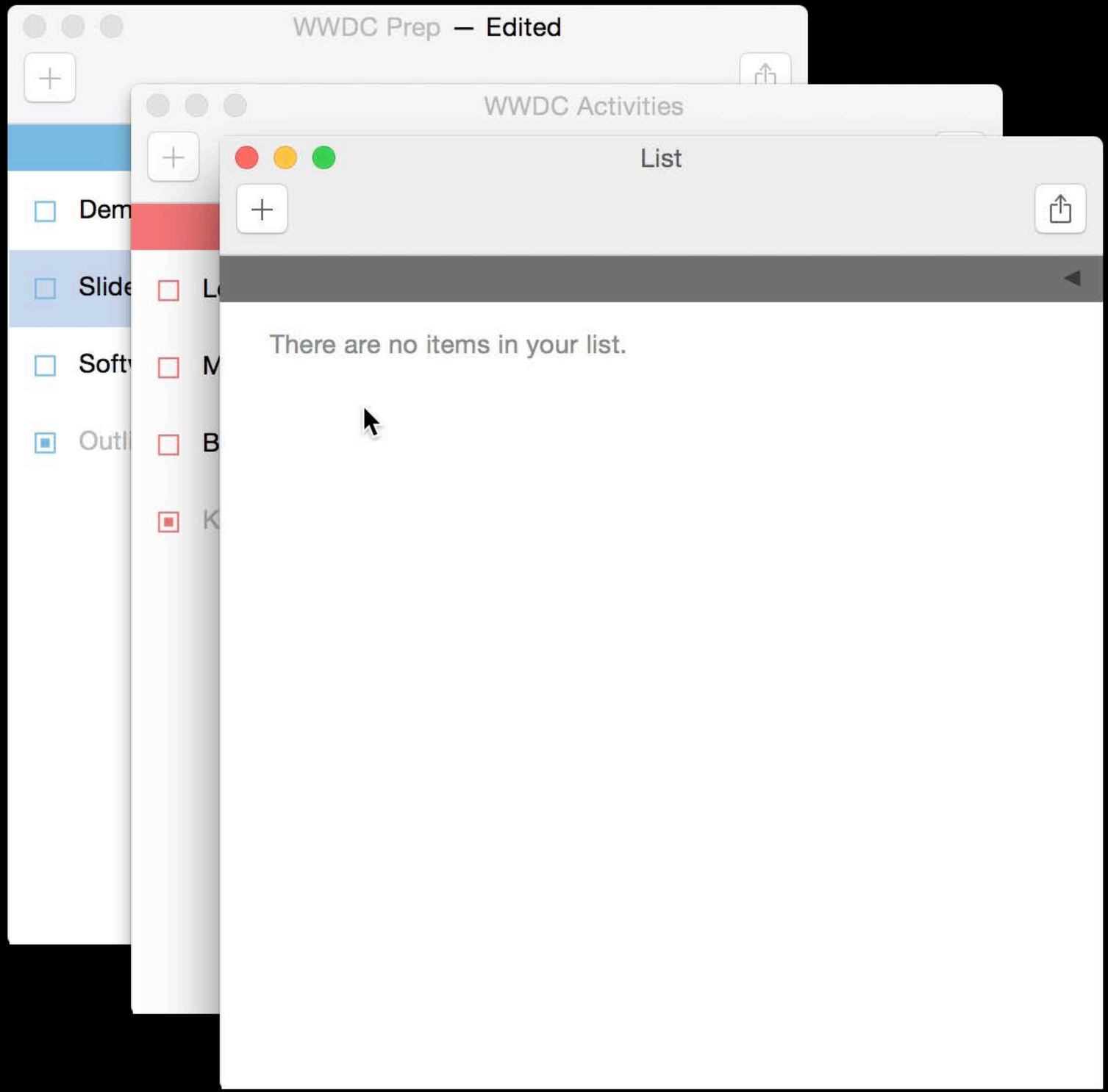
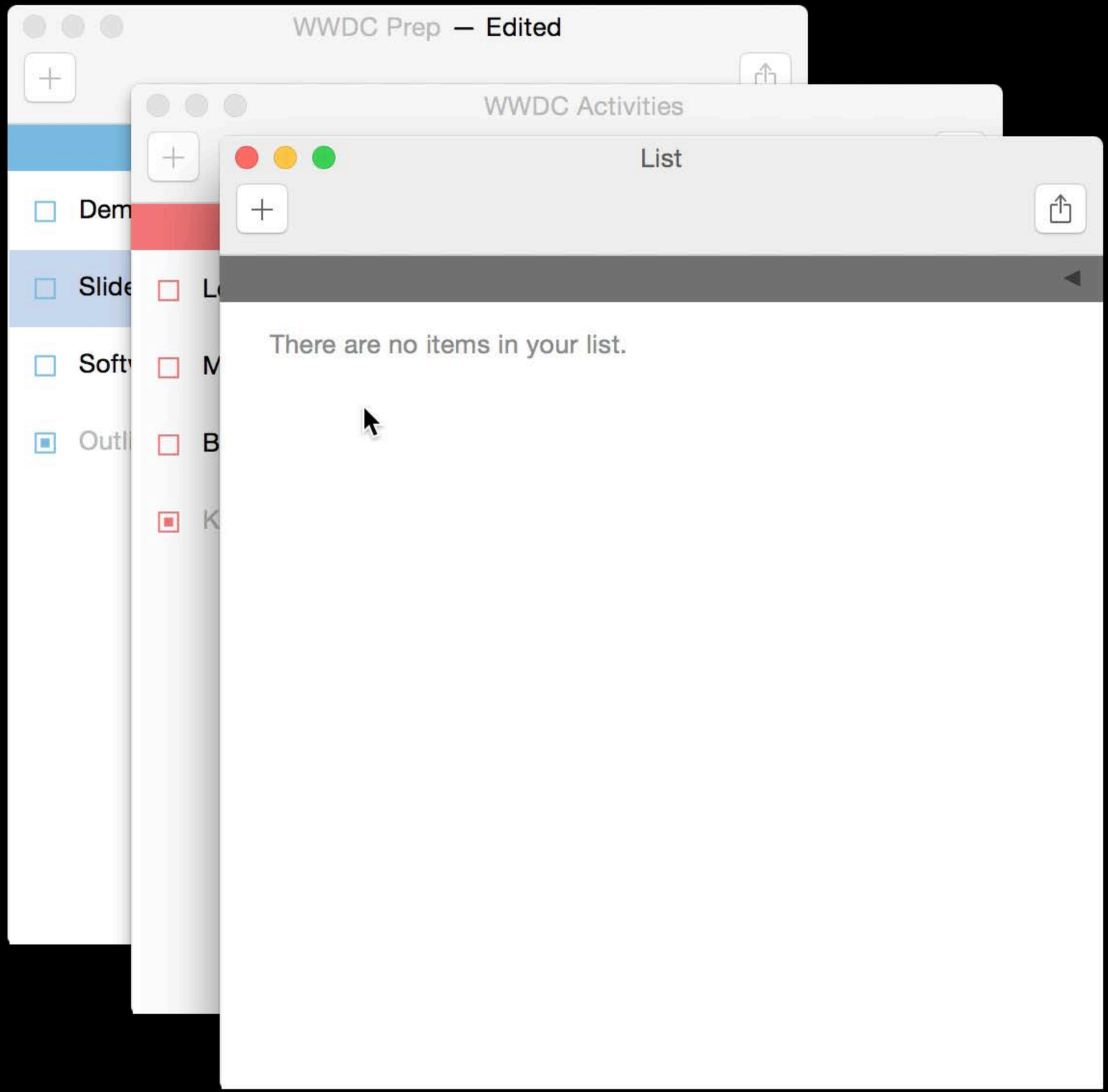

WWDC Prep — Edited
WWDC Activities
Learn about Cocoa
Meet engineers at labs
Beer Bash
Keynote


WWDC Prep — Edited
WWDC Activities
List
There are no items in your list.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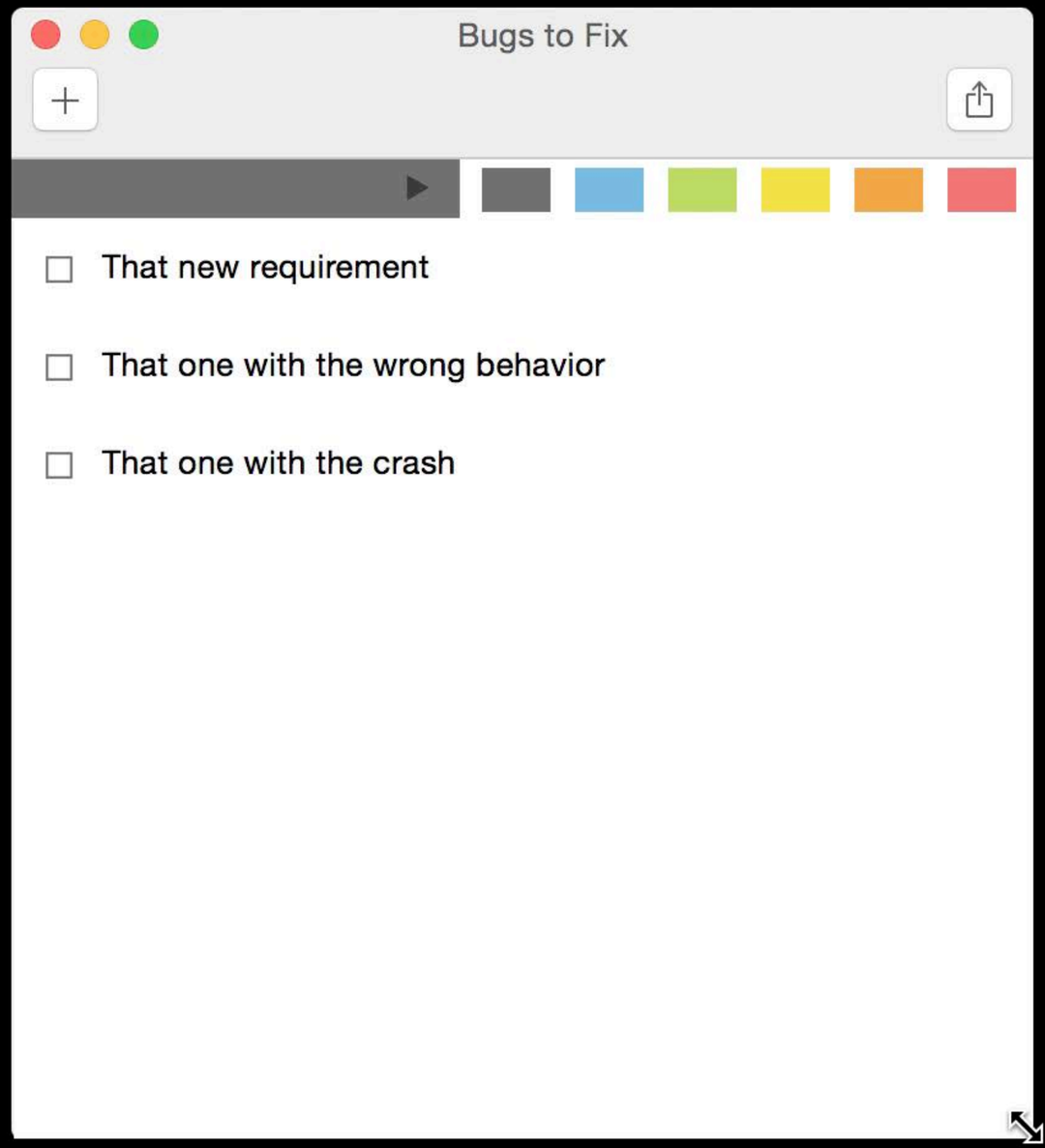
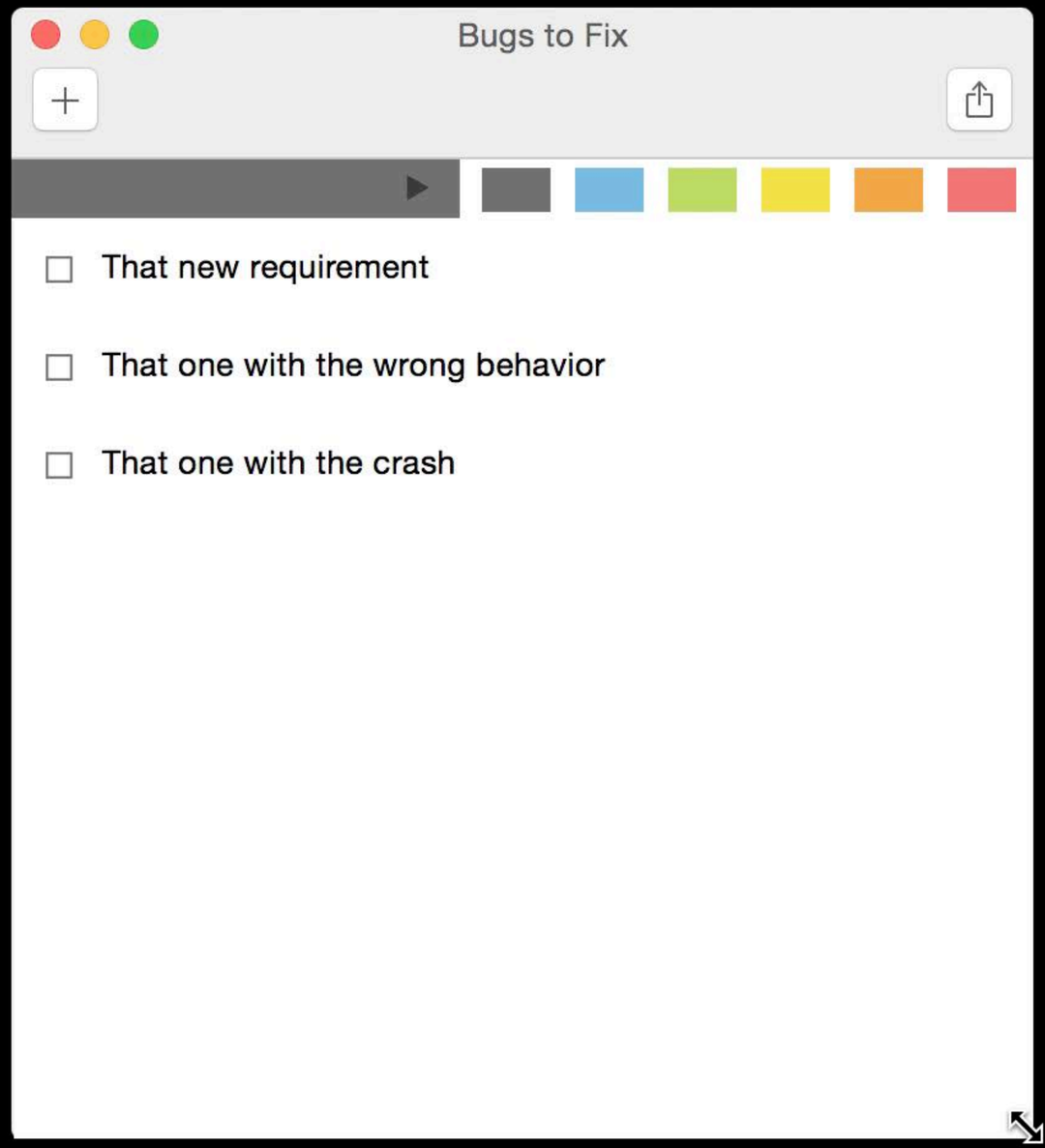

Bugs to Fix
That new requirement
That one with the wrong behavior
That one with the crash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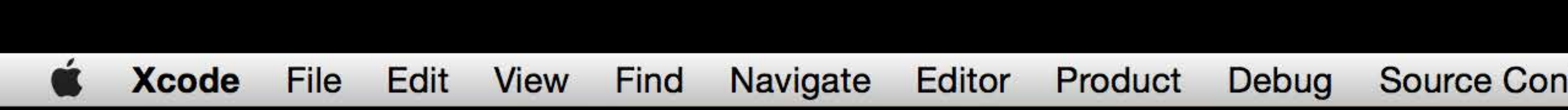

Xcode
File
Edit
View
Find
Navigate
Editor
Product
Debug
Source Con

Xcode File Edit View Find Navigate Editor Product Debug Source Con

New ▶

Add Files… ⌥⌘A

Open… ⌘O
Open Recent ▶
Open Quickly… ⇧⌘O

Close Window ⌘W
Close Tab
Close Document ^⌘W
Close Workspace ⌥⌘W

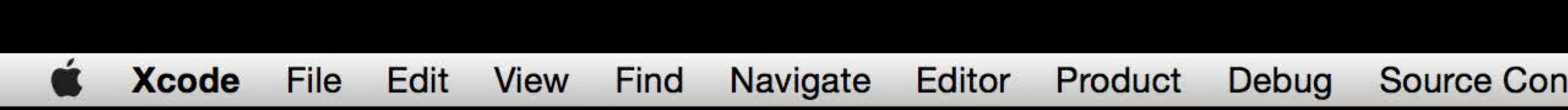
Save ⌘S
Duplicate… ⇧⌘S
Revert to Saved…
Unlock…
Export…

Show in Finder
Open with External Editor

Tab ⌘T
Window ⇧⌘T

File… ⌘N
Target…
Project… ⇧⌘N
Workspace… ^⌘N

Group ⌥⌘N
Group from Selection


Xcode
File
Edit
View
Find
Navigate
Editor
Product
Debug
Source Con

Loading

Choose a template for your new project:

- iOS
  - Application
  - Framework & Library
  - Other
  - Apple Internal
- OS X
  - Application
  - Framework & Library
  - System Plug-in
  - Other

Cocoa Application

Game

Command Line Tool

Cocoa Application

This template creates a Cocoa application for the OS X platform.

Cancel

Previous

Next

Loading

Choose options for your new project:

Product Name: ModernCocoaApp

Organization Name: My Company

Organization Identifier: com.mycompany

Bundle Identifier: com.mycompany.ModernCocoaApp

Language: Swift

Use Storyboards

Create Document-Based Application

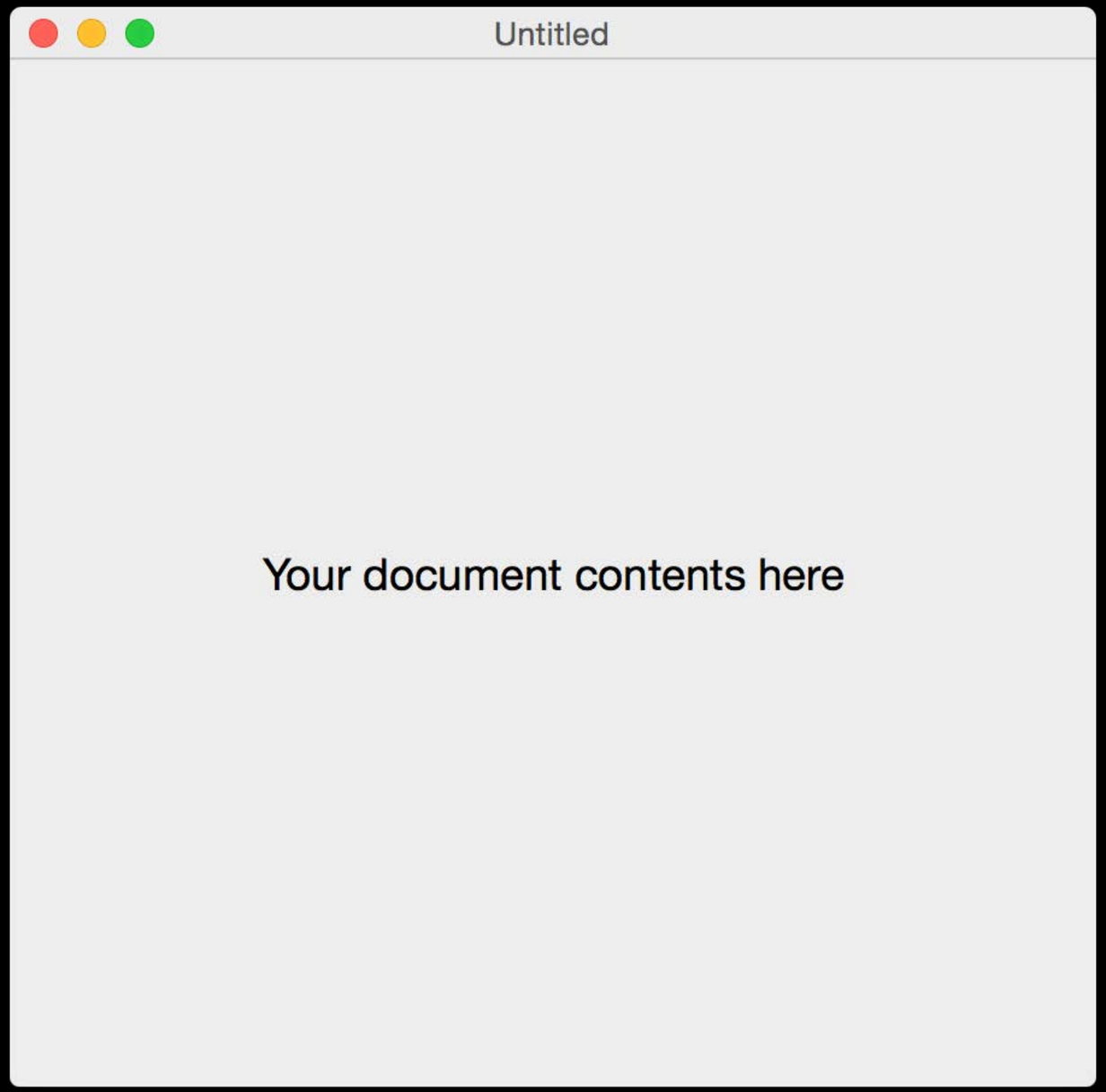
Document Extension: mydoc

Use Core Data

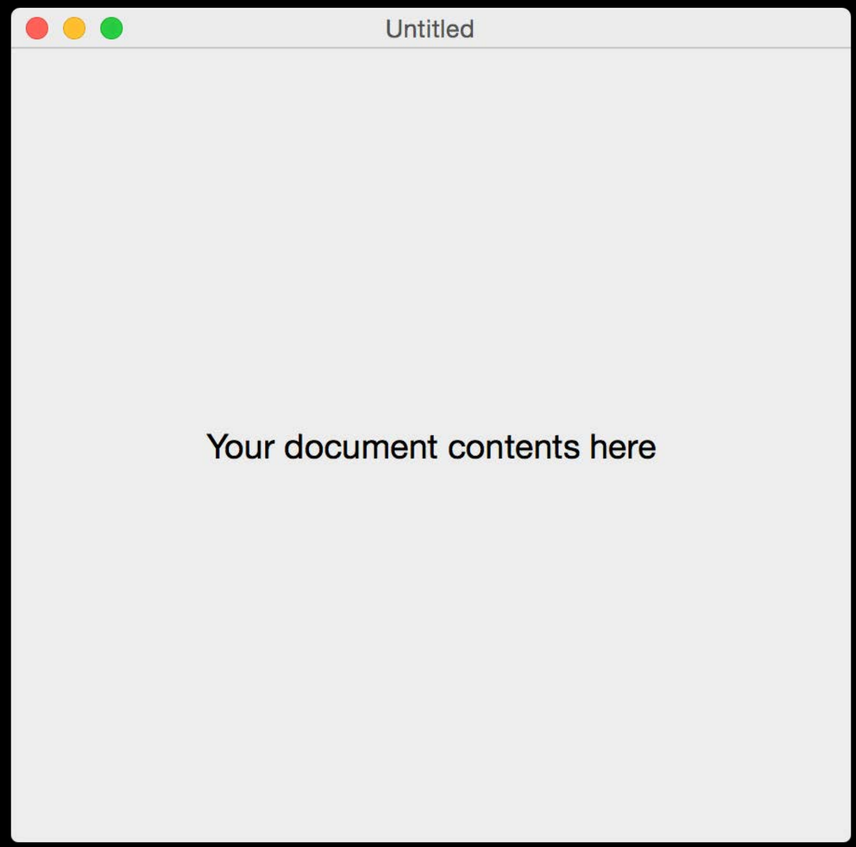
Cancel

Previous

Next

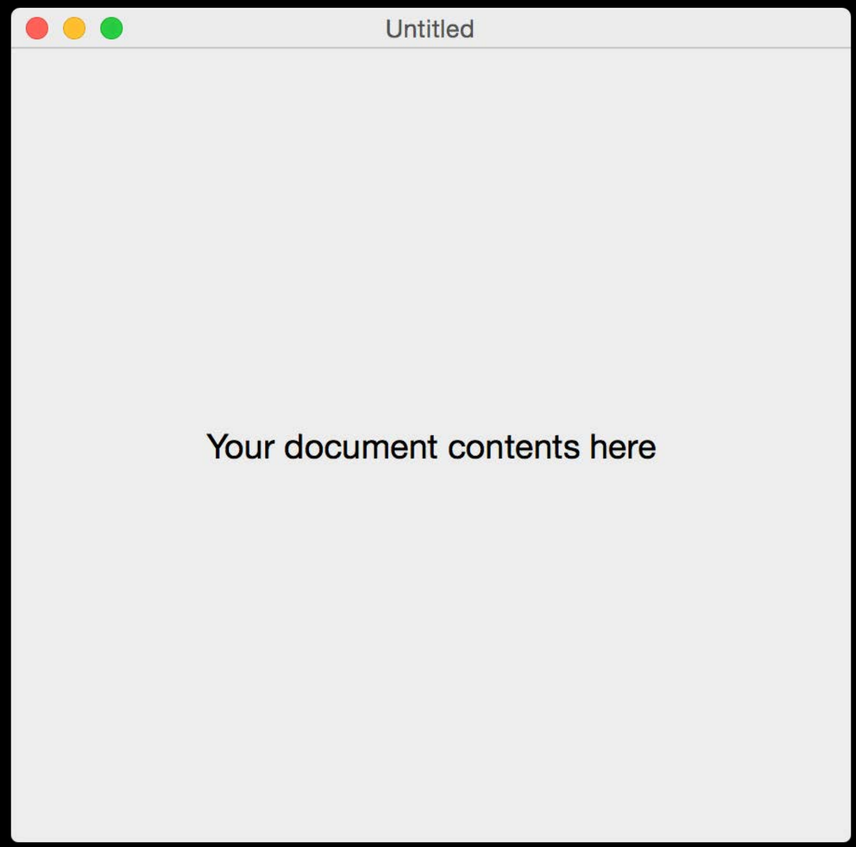

Untitled
Your document contents here

Agenda



Agenda

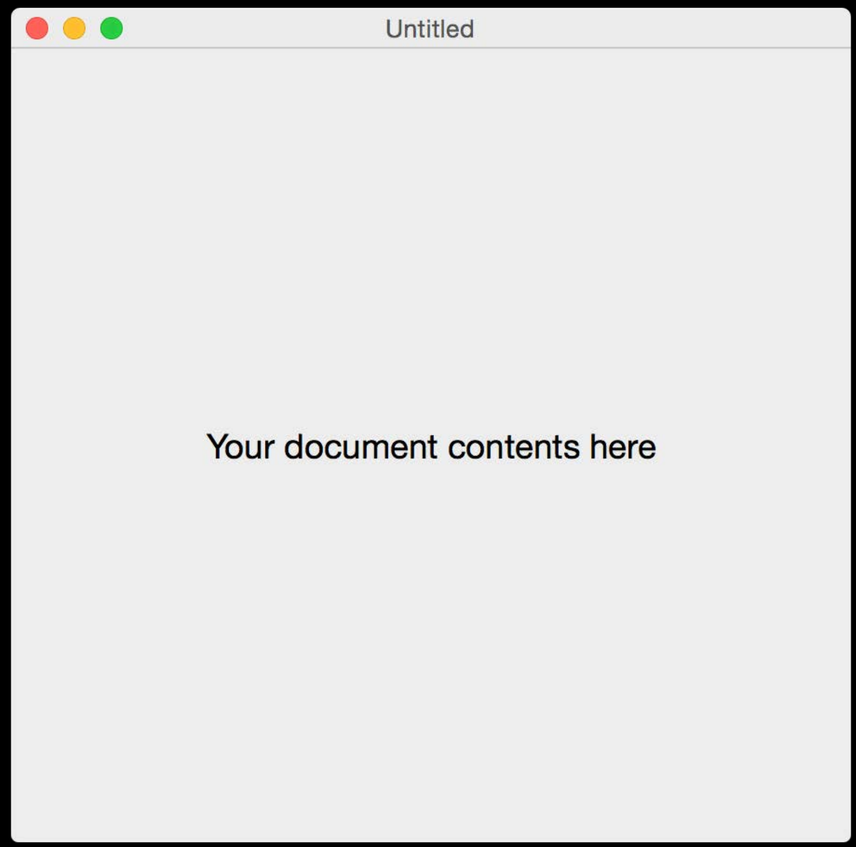
Getting started



Agenda

Getting started

Adding more features

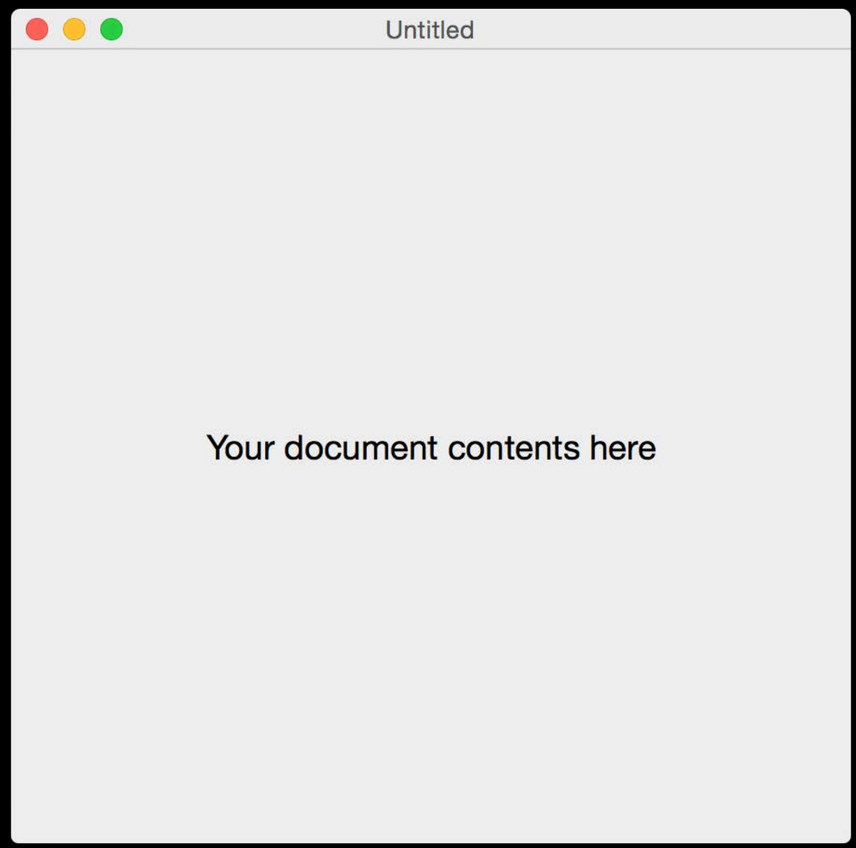


Agenda

Getting started

Adding more features

Where to go next



Getting Started

Model, View, Controller

Model, View, Controller

Model

Model, View, Controller

View

Model

Model, View, Controller

View

Controller

Model

Storyboards

Storyboards

Starting point for creating views and controllers

Storyboards

Starting point for creating views and controllers

Consist of two parts

Storyboards

Starting point for creating views and controllers

Consist of two parts

- Scenes
  - Part of your user interface

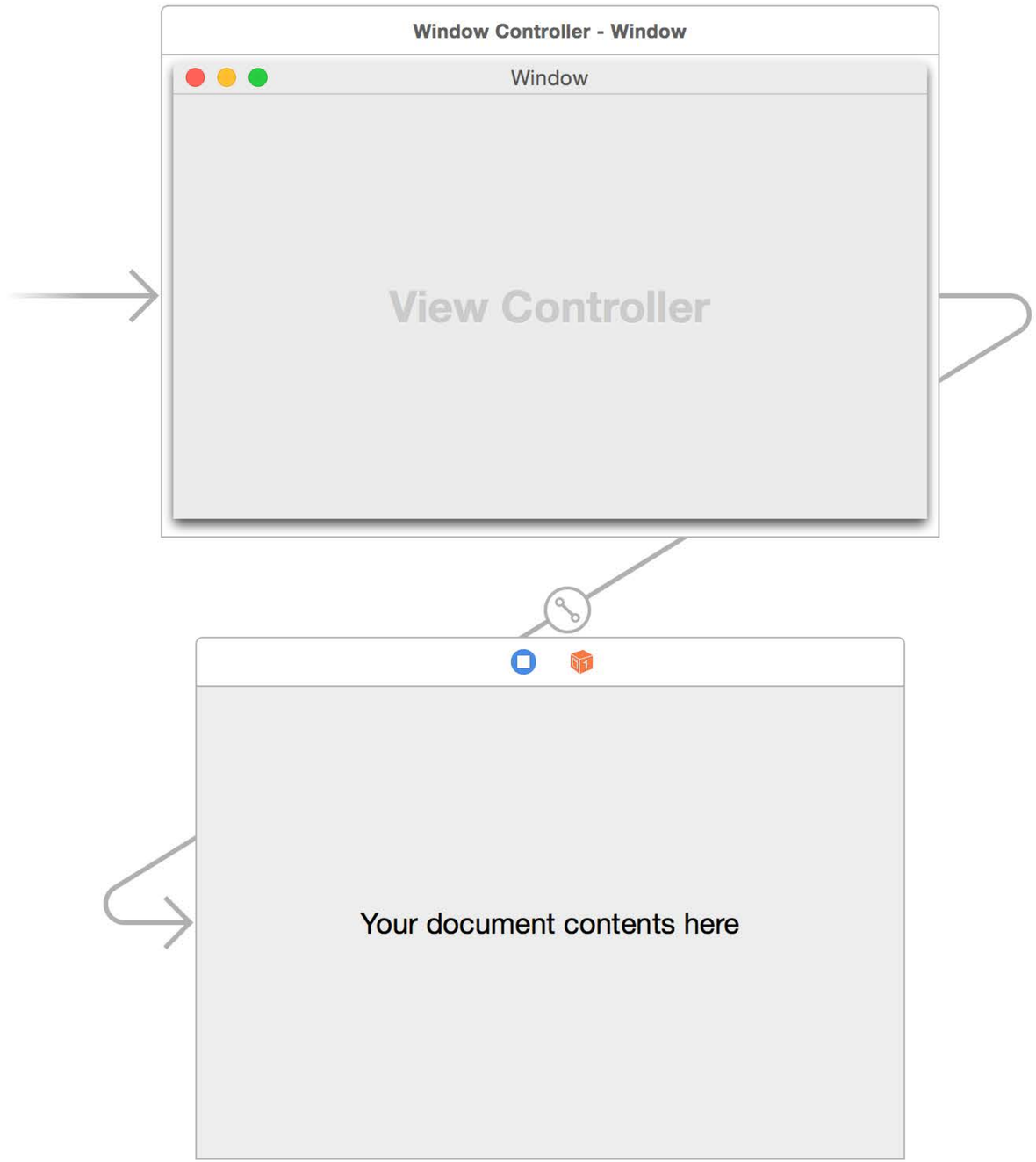
Storyboards

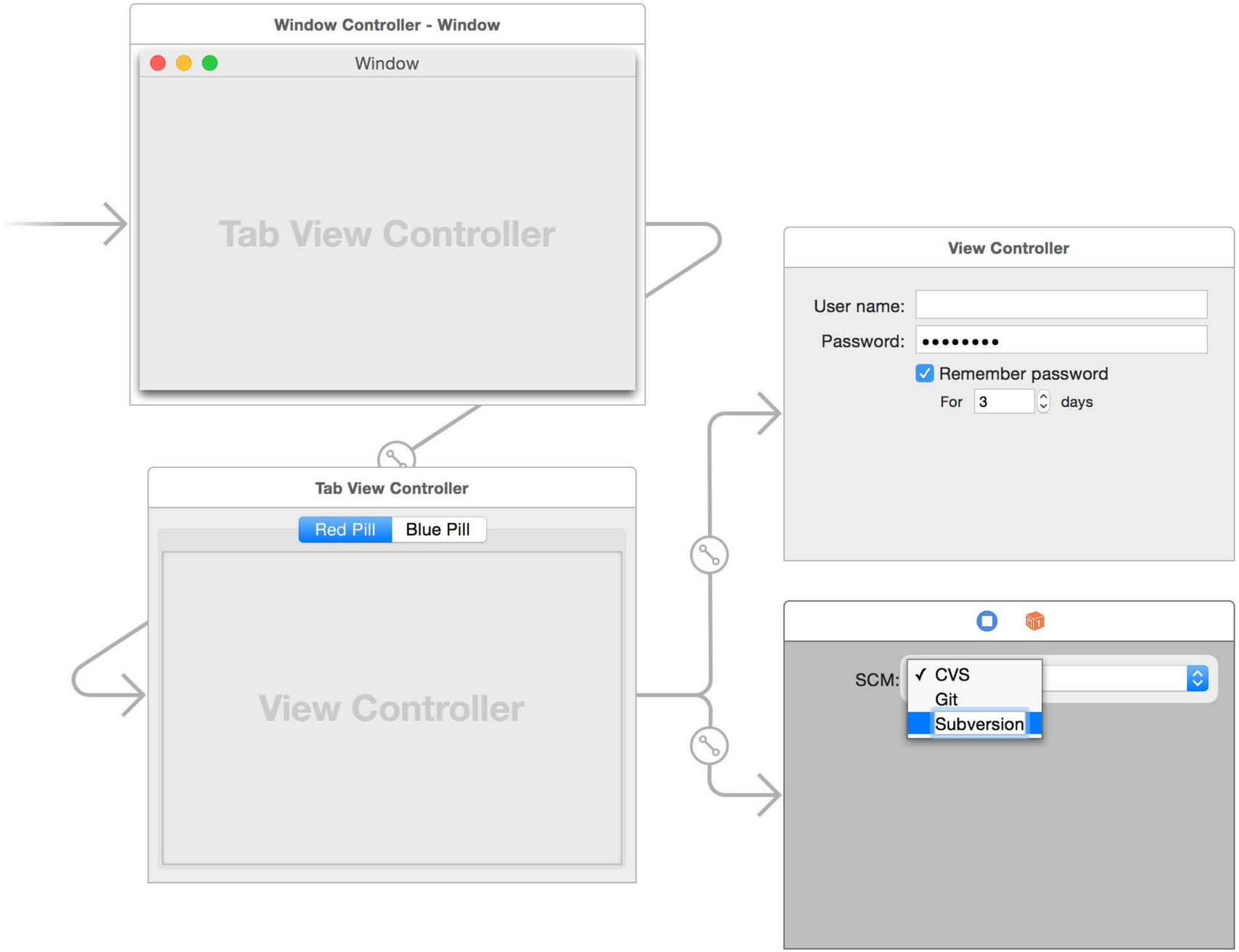
Starting point for creating views and controllers

Consist of two parts

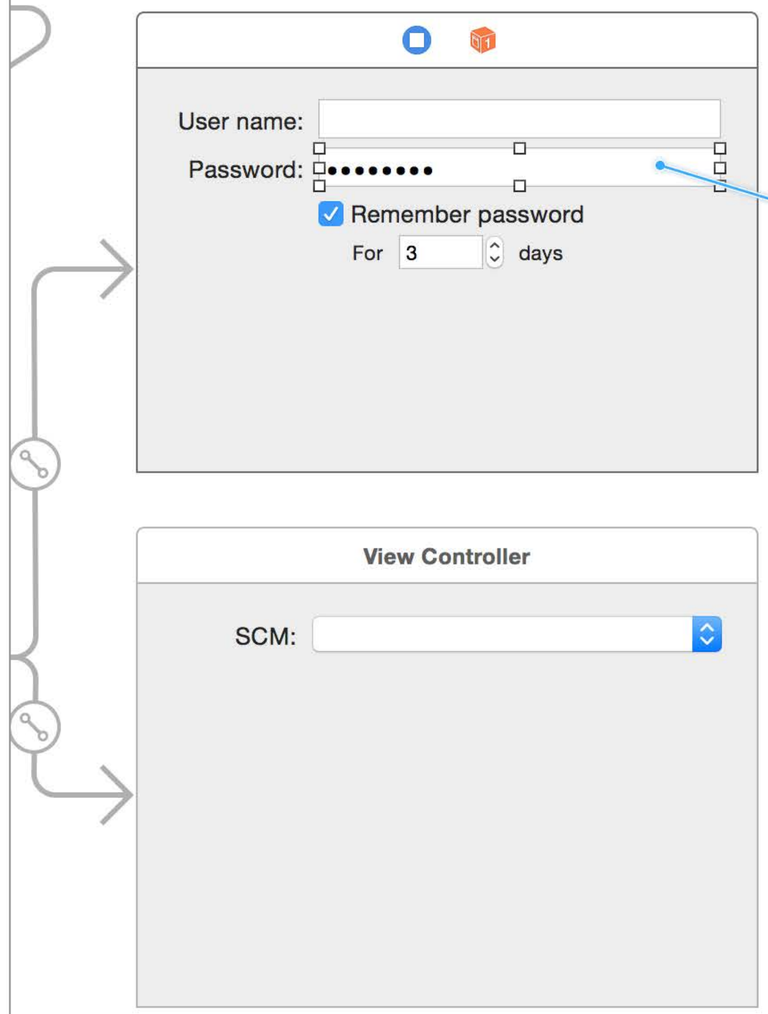
- Scenes
  - Part of your user interface
- Segues
  - Transition from one scene to next

- **Window Controller - Window Scene**
  - Window Controller - Window
    - Window - Window
      - View
    - First Responder
    - Relationship "window content" to View Co…
- **View Controller Scene**
  - View Controller
    - View
      - Text Field - Your document contents…
        - Text Field Cell - Your document c…
      - Constraints
    - First Responder





- View Controller Scene
- Window Controller -…
- TtC14 Modern Cocoa…
  - TtC14 Modern Coc…
    - View
      - Secure Text…
      - Text Field - U…
      - Text Field - P…
      - Text Field
      - Check Box -…
      - Text Field - For
      - Text Field - days
      - Text Field
      - Stepper
    - First Responder
- Tab View Controller…




```swift
//
//  LoginViewController.swift
//  ModernCocoaApp
//

import Cocoa

class LoginViewController: NSViewController {

    init(nibName nibNameOrNil: String?, bundle
     nibBundleOrNil: NSBundle) {
        super.init(nibName:nibNameOrNil, bundle:
       nibBundleOrNil)
    }


Insert Outlet or Action

}
```

Storyboards

Great for rapid prototyping

Storyboards

Great for rapid prototyping

Compose to form more complicated interfaces

Related Sessions

• Storyboards and Controllers for OS X	Pacific Heights	Tuesday 4:30PM

Auto Layout

Auto Layout

How views are placed in user interface

Auto Layout

How views are placed in user interface

Changes size and placement of views as content changes

Auto Layout

How views are placed in user interface

Changes size and placement of views as content changes

Specify relationships between views using constraints

Standard Hybrid Satellite

MONT. WASH. MINN. Portland ORE. IDAHO S.D. WIS. Montréal Toronto WYO. N.Y. IOWA Chicago NEB. PA. Denver UNITED STATES ILL. IND. OHIO NEV. UTAH COLO. KAN. MO. St. Louis W.VA. Washing KY. VA. CALIF. OKLA. TENN. N.C. ARK. ARIZ. N.M. Atlanta S.C. Los Angeles Dallas ALA. GA. San Diego Ciudad Juárez TEXAS LA. New Orleans Hermosillo San Antonio Houston FLA. Monterrey Culiacán Gulf of Mexico 3D Havana MEXICO Legal Guadalajara León Veracruz

Start: Beginning address End: Finishing address Start Route

Use bike route

Standard Hybrid Satellite

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Fixed Width

Start: Beginning address End: Finishing address Start Route

Use bike route

Fixed to Edges

Standard | Hybrid | Satellite

MONT. WASH. MINN. Portland IDAHO S.D. WIS. Montréal Toronto ORE. WYO. N.Y. IOWA Chicago NEB. PA. Denver UNITED STATES ILL. IND. OHIO NEV. UTAH COLO. KAN. MO. St. Louis W.VA. Washing KY. VA. CALIF. OKLA. TENN. N.C. ARK. ARIZ. N.M. Atlanta S.C. Los Angeles Dallas ALA. GA. San Diego Ciudad Juárez TEXAS LA. New Orleans Hermosillo San Antonio Houston FLA. Monterrey Culiacán Gulf of Mexi Havana MEXICO Legal Guadalajara León Veracruz

Fixed Width

Start: Beginning address End: Finishing address Start Route

Use bike route

Standard | Hybrid | Satellite

Fixed to Edges

Fixed Width

Fixed Width

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Legal

Start: Beginning address End: Finishing address Start Route

Use bike route

Standard Hybrid Satellite

Fixed to Edges

Fixed Width

Same Width

Fixed Width

MONT. WASH. Portland IDAHO ORE. WYO. S.D. MINN. WIS. Montréal Toronto N.Y. IOWA Chicago NEB. PA. Denver UNITED STATES ILL. IND. OHIO NEV. UTAH COLO. KAN. MO. St. Louis W.VA. Washing KY. VA. CALIF. OKLA. TENN. N.C. ARIZ. N.M. Atlanta S.C. ALA. GA. Ciudad Juárez New Orleans Hermosillo San Antonio Houston FLA. Monterrey Culiacan Gulf of Mexi Havana MEXICO Legal Guadalajara León Veracruz

Start: Beginning address End: Finishing address Start Route

Use bike route

Fixed to Edges

Fixed Width

Same Width

Left Aligned

Fixed Width

Standard Hybrid Satellite

MONT. WASH. Portland IDAHO WYO. S.D. MINN. WIS. Montréal Toronto N.Y. IOWA Chicago NEB. PA. Denver UNITED STATES ILL. IND. OHIO NEV. UTAH COLO. KAN. MO. St. Louis W.VA. Washing KY. VA. CALIF. OKLA. TENN. N.C. ARIZ. N.M Atlanta S.C. ALA. GA. Ciudad Juárez New Orleans Hermosillo San Antonio Houston FLA. Monterrey Culiacán Gulf of Mexi Havana MEXICO León Guadalajara Veracruz

Start: Beginning address End: Finishing address Start Route

Use bike route

Standard Hybrid Satellite

MONT. WASH. MINN. Portland ORE. IDAHO S.D. WIS. Montréal Toronto WYO. N.Y. IOWA Chicago NEB. PA. Denver UNITED STATES ILL. IND. OHIO NEV. UTAH COLO. KAN. MO. St. Louis W.VA. Washing KY. VA. CALIF. OKLA. TENN. N.C. ARK. ARIZ. N.M. Atlanta S.C. Los Angeles Dallas ALA. GA. San Diego Ciudad Juárez TEXAS LA. New Orleans Hermosillo San Antonio Houston FLA. Monterrey Culiacán Gulf of Mexico 3D Havana MEXICO Legal Guadalajara León Veracruz

Start: Beginning address End: Finishing address Start Route

Use bike route

Auto Layout

Allows flexibility as design changes

Auto Layout

Allows flexibility as design changes

Simplifies localization

Auto Layout

Allows flexibility as design changes

Simplifies localization

Xcode has rich interface for working with Auto Layout

- Adding new constraints
- Understanding how constraints interact
- Previewing results
- Debugging issues

Related Sessions

- Taking Control of Auto Layout in Xcode 5 — WWDC 2013

Documents and Data

Documents and Data

The reason to use your app

Documents and Data

The reason to use your app

Deciding how to store data will drive design

Documents and Data

The reason to use your app

Deciding how to store data will drive design

Two major kinds of data storage in a Cocoa app

- Shoebox
- Document-based

Shoebox Apps

Shoebox Apps

Store data in library or container

- Usually hidden from user

Shoebox Apps

Store data in library or container

- Usually hidden from user

Presents data in single window

Shoebox Apps

Store data in library or container

- Usually hidden from user

Presents data in single window

Great for mix and match of data

Shoebox Apps

Store data in library or container

- Usually hidden from user

Presents data in single window

Great for mix and match of data

Cocoa provides Core Data

Core Data

Core Data

Generalized object graph and persistence framework

Core Data

Generalized object graph and persistence framework

Efficient performance

Core Data

Generalized object graph and persistence framework

Efficient performance

Change tracking and undo

Core Data

Generalized object graph and persistence framework

Efficient performance

Change tracking and undo

Relationship maintenance

Core Data

Generalized object graph and persistence framework

Efficient performance

Change tracking and undo

Relationship maintenance

Schema migration

Core Data

Generalized object graph and persistence framework

Efficient performance

Change tracking and undo

Relationship maintenance

Schema migration

Query compilation

Related Sessions

• What's New in Core Data	Pacific Heights	Thursday 9:00AM

Document-Based Apps

Document-Based Apps

Stores user data in named file container

Document-Based Apps

Stores user data in named file container

Documents may be local or in iCloud

Document-Based Apps

Stores user data in named file container

Documents may be local or in iCloud

Documents are not generally related to each other

Document-Based Apps

Stores user data in named file container

Documents may be local or in iCloud

Documents are not generally related to each other

Users are interested in a few at a time

Document-Based Apps

Stores user data in named file container

Documents may be local or in iCloud

Documents are not generally related to each other

Users are interested in a few at a time

Cocoa provides a document architecture

Cocoa Document Architecture

Cocoa Document Architecture

Provides core features with little or no additional code

- Auto Save and Versions
- iCloud
- Asynchronous reading and writing
- Undo

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Customizable to your app's needs

Cocoa Document Architecture

Provides core features with little or no additional code

- Auto Save and Versions
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- Undo

Customizable to your app's needs

Start by subclassing NSDocument

- Creates, presents, and stores document data

NSDocument

Subclass and enable iCloud, Auto Save, and Versions

NSDocument

Subclass and enable iCloud, Auto Save, and Versions

```
class ListDocument : NSDocument {
```

NSDocument

Subclass and enable iCloud, Auto Save, and Versions

```
class ListDocument : NSDocument {
  // Default is an empty list
  var list = List()
```

NSDocument

Subclass and enable iCloud, Auto Save, and Versions

```
class ListDocument : NSDocument {
  // Default is an empty list
  var list = List()

  override class func autosavesInPlace() -> Bool {
    return true
  }
```

NSDocument

Provide data to be stored on disk

```
override func dataOfType(typeName: String,
                         error outError: NSErrorPointer) -> NSData? {

}
```

NSDocument

Provide data to be stored on disk

```
override func dataOfType(typeName: String,
                         error outError: NSErrorPointer) -> NSData? {
    if let data = NSKeyedArchiver.archivedDataWithRootObject(list) {
        return data
    }

}
```

NSDocument

Provide data to be stored on disk

```
override func dataOfType(typeName: String,
                         error outError: NSErrorPointer) -> NSData? {
    if let data = NSKeyedArchiver.archivedDataWithRootObject(list) {
        return data
    }
    // Set error here
    return nil;
}
```

NSDocument

Create document from data on disk

```
override func readFromData(data: NSData,
                           ofType typeName: String,
                           error outError: NSErrorPointer) -> Bool {

}
```

NSDocument

Create document from data on disk

```
override func readFromData(data: NSData,
                           ofType typeName: String,
                           error outError: NSErrorPointer) -> Bool {
  if let deserializedList =
    NSKeyedUnarchiver.unarchiveObjectWithData(data) as? List
  {

  } else {

  }
}
```

NSDocument

Create document from data on disk

```
override func readFromData(data: NSData,
                           ofType typeName: String,
                           error outError: NSErrorPointer) -> Bool {
  if let deserializedList =
    NSKeyedUnarchiver.unarchiveObjectWithData(data) as? List
  {
      list = deserializedList
      return true
    } else {


    }
}
```

NSDocument

Create document from data on disk

```
override func readFromData(data: NSData,
                           ofType typeName: String,
                           error outError: NSErrorPointer) -> Bool {
  if let deserializedList =
    NSKeyedUnarchiver.unarchiveObjectWithData(data) as? List
  {
    list = deserializedList
    return true
  } else {
    // Set error here
    return false
  }
}
```

Related Sessions

• Auto Save and Versions in Mac OS X 10.7 Lion	WWDC 2011

Other User Data

Other User Data

Preferences—NSUserDefaults

- Application preferences
- System preferences
  - Language
  - Locale

Other User Data

Preferences—NSUserDefaults

- Application preferences
- System preferences
  - Language
  - Locale

Network—NSURLSession

Other User Data

Preferences—NSUserDefaults

- Application preferences
- System preferences
  - Language
  - Locale

Network—NSURLSession

iCloud key-value store—NSUbiquitousKeyValueStore

- Small amounts of data, available on all iCloud devices

Other User Data

NEW

Preferences—NSUserDefaults

- Application preferences
- System preferences
  - Language
  - Locale

Network—NSURLSession

iCloud key-value store—NSUbiquitousKeyValueStore

- Small amounts of data, available on all iCloud devices

CloudKit

Demo

Getting started in Lister

Alex Migicovsky
Developer Publications Engineer

Adding More Features

Auto Localization

Auto Localization

Built on top of Auto Layout

Auto Localization

Built on top of Auto Layout

Shares the same UI design but replaces the strings

Auto Localization

Built on top of Auto Layout

Shares the same UI design but replaces the strings

Resizes views appropriately when words are different lengths

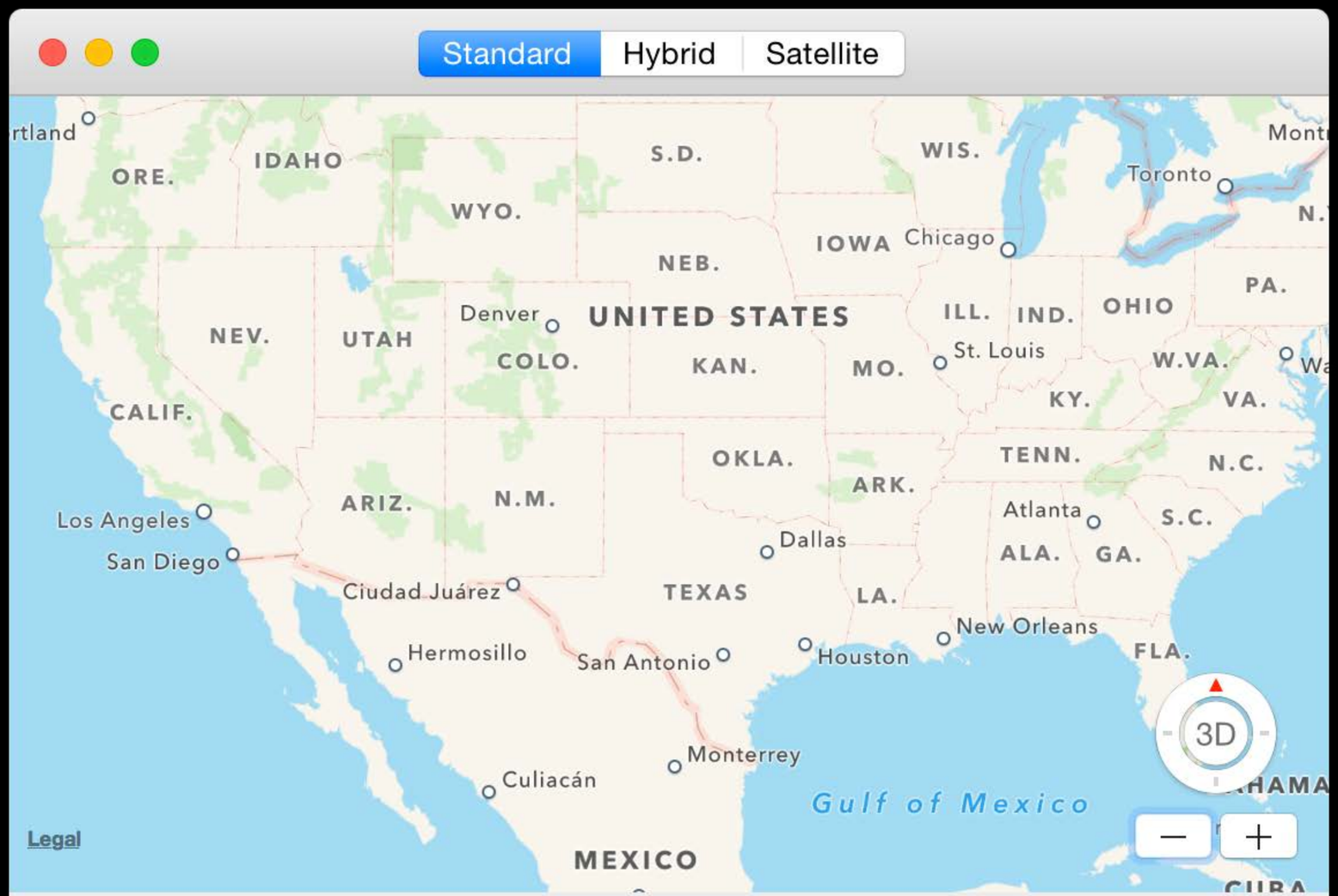
Auto Localization

Built on top of Auto Layout

Shares the same UI design but replaces the strings

Resizes views appropriately when words are different lengths

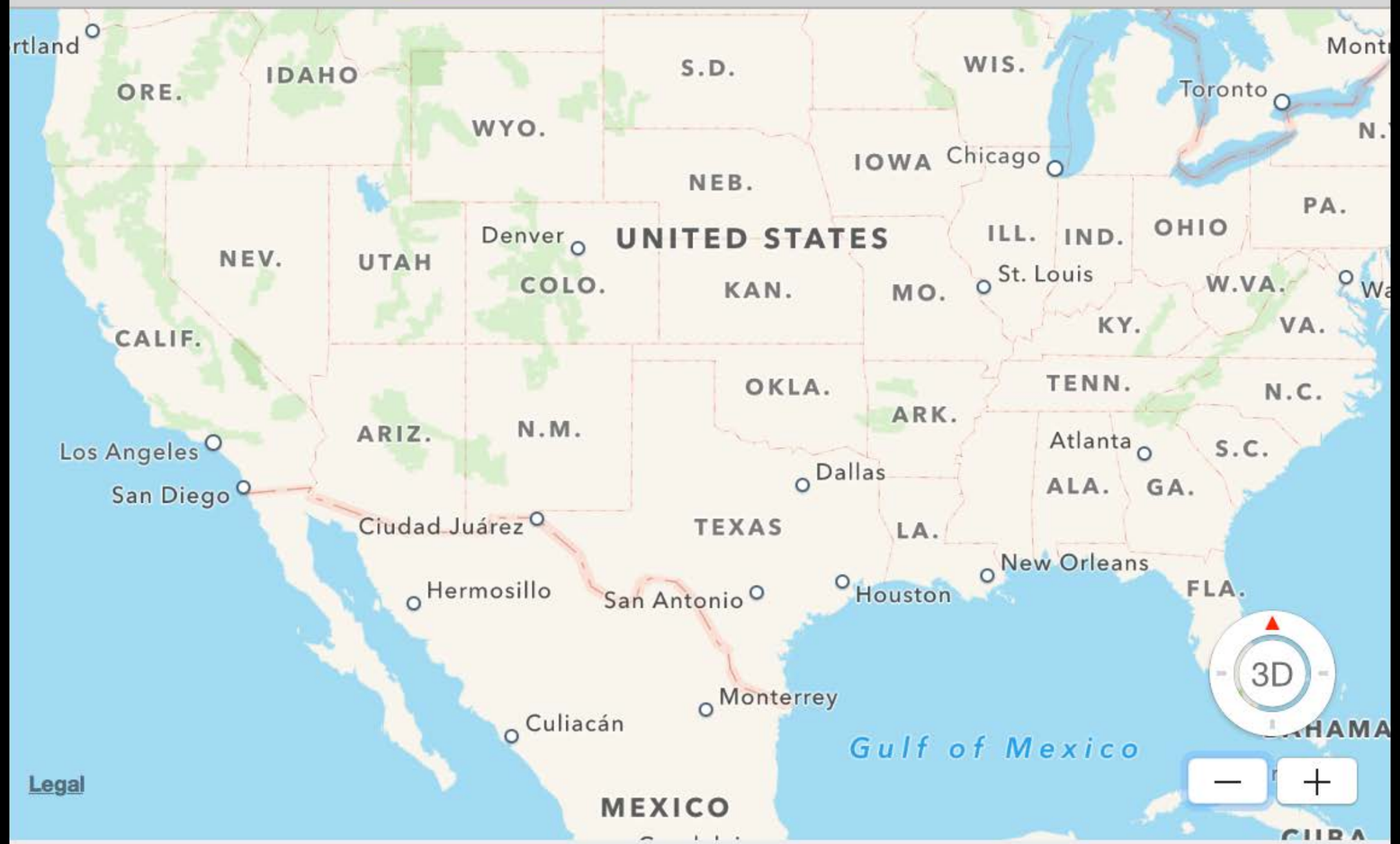
Support both left to right and right to left



Start: Beginning address End: Finishing address Start Route

Use bike route

Andardstay | Ybridhay | Atellitesay



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☑ Useway ikebay outeray

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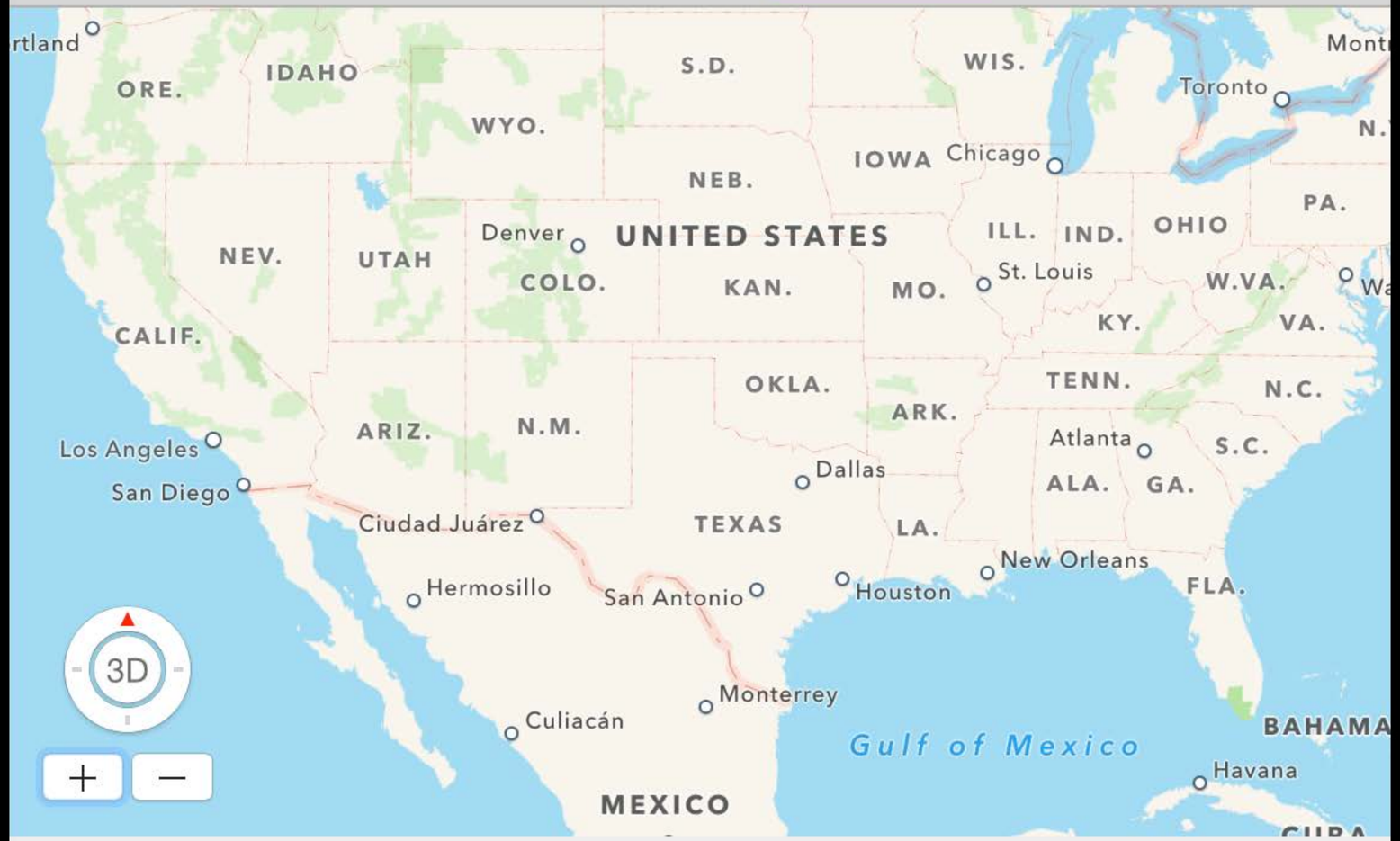


yaretuO yatstrA | wsserdda yafgnihsinI :yawdnE | sserdda yabgninnigE :yatstrA

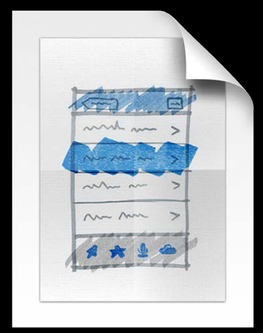
yaretuo yabeki yawesU ☑

Application Bundle Layout

```
Lister.app/
  Contents/
    Resources/
```

Application Bundle Layout

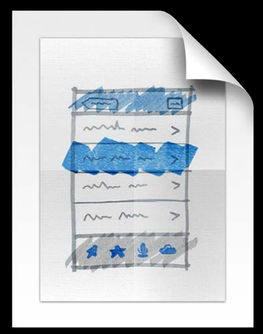
```
Lister.app/
  Contents/
    Resources/
```



```
Base.lproj/
  Main.storyboardc          UI, development language
```

Application Bundle Layout

```
Lister.app/
  Contents/
    Resources/
```



```
Base.lproj/
  Main.storyboardc          UI, development language
```


```
es.lproj/
  Main.strings              Spanish strings
```

Strings File

```
"key" = "value";
```

Strings File

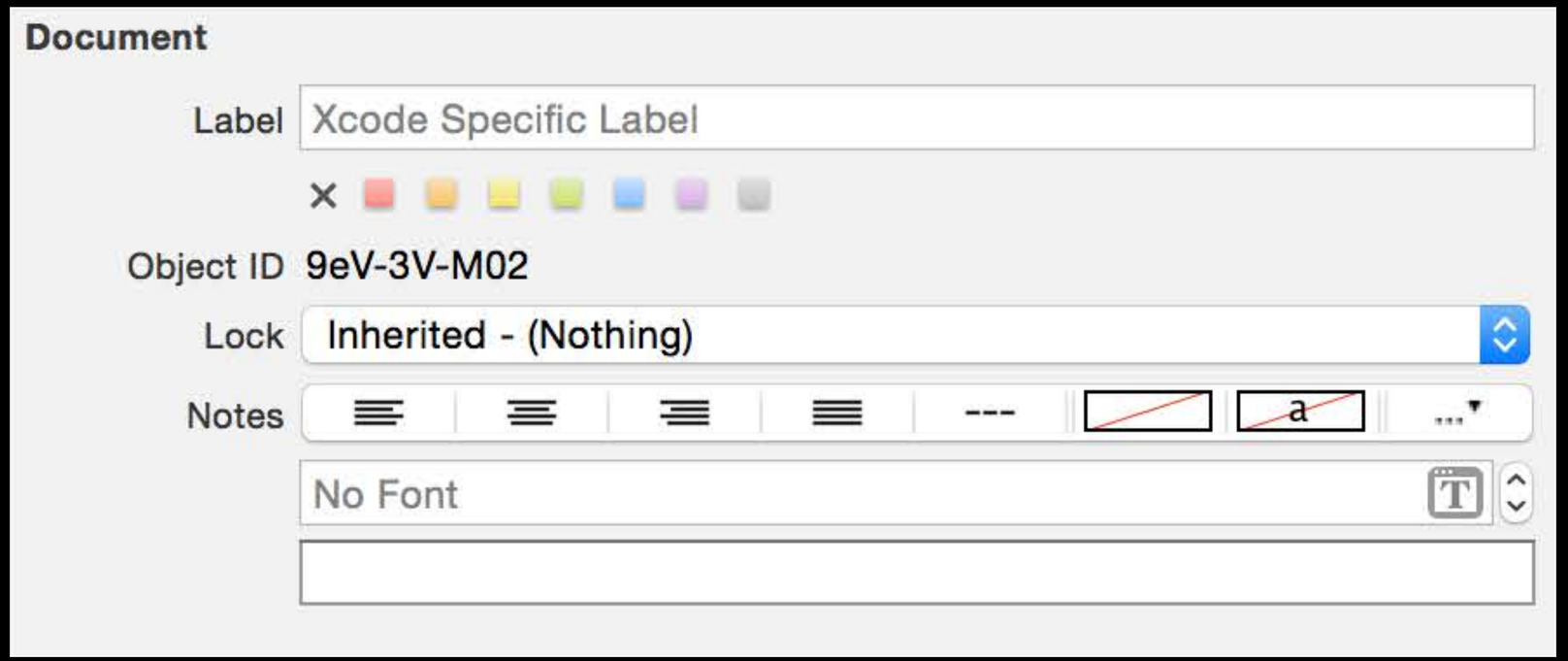
```
"9eV-3V-M02.title" = "Artstay:";
```

Strings File

```
"9eV-3V-M02.title" = "Artstay:";
```

Strings File

```
"9eV-3V-M02.title" = "Artstay:";
```



Strings File

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"9eV-3V-M02.title" = "Artstay:";
```

Strings File

```
"9eV-3V-M02.title" = "Artstay:";

"P3b-i2-9LW.title" = "Endway:";
```

Handoff

NEW

Start working on one device and continue on another

Handoff

Start working on one device and continue on another

Support is built in to NSDocument and UIDocument

Handoff

Start working on one device and continue on another

Support is built in to NSDocument and UIDocument

Requires only a small amount of code to enable

Info.plist

Key	Type	Value
▼ Information Property List	Dictionary	(19 items)
Localization native development region	String	en
▼ NSUserActivityTypes	Array	(1 item)
Item 0	String	com.example.apple-samplecode.Lister
▼ Document types	Array	(1 item)
▼ Item 0 (list)	Dictionary	(8 items)
Handler rank	String	Owner
Role	String	Editor
Icon File Name	String	ListerDocumentIcon
Document Type Name	String	list
▶ Document Content Type UTIs	Array	(1 item)
Cocoa NSDocument Class	String	ListerOSX.ListDocument
Document is a package or bundle	Boolean	NO
NSUbiquitousDocumentUserActivityType	String	com.example.apple-samplecode.Lister

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Handoff

Lower-level API—NSUserActivity

- Native app to web app
- Web app to native app
- Provide additional state beyond document content
- Send custom data using streams

Related Sessions

• Adopting Handoff on iOS and OS X	Mission	Wednesday 2:00PM

Sharing

Provide a way to share with social networks

- Twitter
- Facebook
- …and more

- Single sign-on

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- Twitter
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- Single sign-on

Integration with extensions from other applications

Joke Beginnings

- [ ] What do you call 1000 Apple engineers at a conference?
- [ ] There once was a man from Cupertino...
- [ ] An engineer and a mathematician walk into a bar...

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NSSharingServicePicker

NSSharingServicePicker

Shares NSImage, NSURL, NSString, NSAttributedString

NSSharingServicePicker

Shares NSImage, NSURL, NSString, NSAttributedString

Two steps to sharing

- Put a share button in your app
- Present the picker and specify the data to share

NSSharingServicePicker

```
- (IBAction)shareIt:(NSButton *)sender {

}
```

NSSharingServicePicker

```
- (IBAction)shareIt:(NSButton *)sender {

    NSString *greeting = @"Hello, world!";

}
```

NSSharingServicePicker

```
- (IBAction)shareIt:(NSButton *)sender {

    NSString *greeting = @"Hello, world!";

    NSSharingServicePicker *picker =
        [[NSSharingServicePicker alloc] initWithItems:@[greeting]];



}
```

NSSharingServicePicker

```
- (IBAction)shareIt:(NSButton *)sender {

    NSString *greeting = @"Hello, world!";

    NSSharingServicePicker *picker =
        [[NSSharingServicePicker alloc] initWithItems:@[greeting]];

    [picker showRelativeToRect:NSZeroRect
                        ofView:sender
                 preferredEdge:NSMinYEdge];

}
```

More About Sharing

Your app can provide extensions too

- Action
- Finder
- Sharing
- Today

Related Sessions

• Creating Extensions for iOS and OS X, Part 1	Mission	Tuesday 2:00PM
• Creating Extensions for iOS and OS X, Part 2	Mission	Wednesday 11:30AM
• Integrating with Facebook, Twitter, and Sina Weibo		WWDC 2012

Demo

Sharing in Lister

Alex Migicovsky
Developer Publications Engineer

What to Do Next

Adding More Features

Feature	Cocoa Class

Adding More Features

Feature	Cocoa Class
Undo	NSUndoManager

Adding More Features

Feature	Cocoa Class
Undo	NSUndoManager
Drag & Drop, Copy & Paste	NSPasteboard

Adding More Features

Feature	Cocoa Class
Undo	NSUndoManager
Drag & Drop, Copy & Paste	NSPasteboard
Printing	NSPrinting

Adding More Features

Energy efficiency

Adding More Features

Energy efficiency

Three key rules for better battery life

- Stay idle as long as possible
- Avoid unnecessary work
- Return to idle as quickly as possible

Related Sessions

• Writing Energy Efficient Code, Part 1	Russian Hill	Wednesday 10:15AM

Adding More Features

Feature	Cocoa Class

Adding More Features

Feature	Cocoa Class
Full screen	NSWindow

Adding More Features

Feature	Cocoa Class
Full screen	NSWindow
Resume	NSWindowRestoration

Adding More Features

Feature	Cocoa Class
Full screen	NSWindow
Resume	NSWindowRestoration
Progress reporting	NSProgress

Adding More Features

Feature	Cocoa Class
Full screen	NSWindow
Resume	NSWindowRestoration
Progress reporting	NSProgress
Gestures	NSGestureRecognizer

Adding More Features

Feature	Cocoa Class
Full screen	NSWindow
Resume	NSWindowRestoration
Progress reporting	NSProgress
Gestures	NSGestureRecognizer
Accessibility	NSAccessibility

Summary

Summary

Get started with a great foundation

Summary

Get started with a great foundation

Take advantage of the features the frameworks provide

Summary

Get started with a great foundation

Take advantage of the features the frameworks provide

Your app will be in great shape for the future

More Information

Jake Behrens
App Frameworks Evangelist
behrens@apple.com

Documentation
Start Developing Mac Apps Today
http://developer.apple.com

Lister
https://developer.apple.com/library/ios/lister_objc
https://developer.apple.com/library/ios/lister_swift
https://developer.apple.com/library/mac/lister_objc
https://developer.apple.com/library/mac/lister_swift

Apple Developer Forums
http://devforums.apple.com

Related Sessions

• Accessibility on OS X	Russian Hill	Tuesday 2:00PM
• Full Screen and Aqua Changes		WWDC 2011
• Resume and Automatic Termination in Lion		WWDC 2011

Labs

• View Controllers and Cocoa Lab	Frameworks Lab B	Thursday 11:30AM
• Extensions Lab	Frameworks Lab B	Thursday 2:00PM
• Cocoa Lab	Frameworks Lab B	Thursday 4:30PM

WWDC14