Stanford CS193p

Developing Applications for iOS
Fall 2011

Today

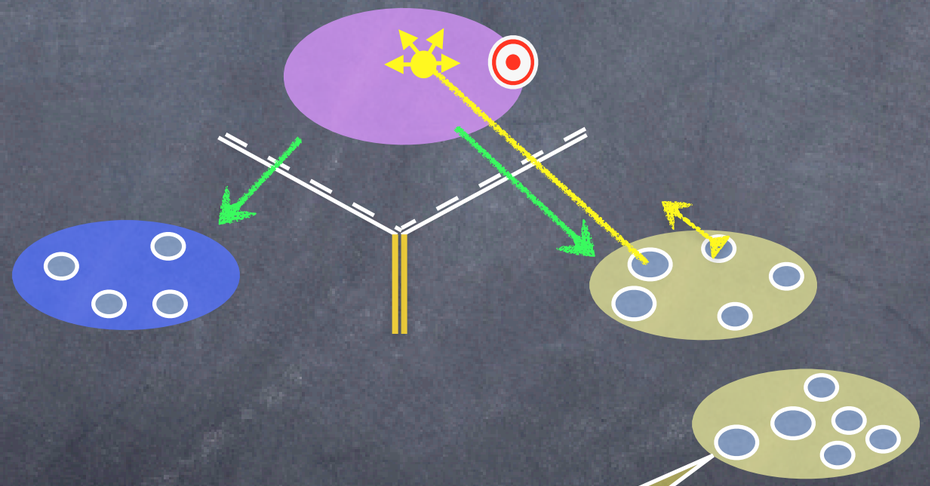
- Demo continuation
  Delegating the View's data (its smileyness)
  Adding a gesture recognizer to the View (and handled by the Controller) that modifies the Model
- View Controllers
  Multiple MVCs
  Segues
  `UINavigationController`
  Demo
- Friday
  Getting your application running on a device

View Controller

- Hopefully you've got a pretty good handle on the basics of this!
  Your Controller in an MVC grouping is always a subclass of `UIViewController`.
  It manages a View (made up of subviews that you usually have some outlets/actions to/from).
  It is the liaison between that View and the Model (which is UI-independent).
- So how do we grow our application to use multiple MVCs?
  We need infrastructure to manage them all.
  That's what storyboards and "controllers of controllers" are all about.

MVCs working together

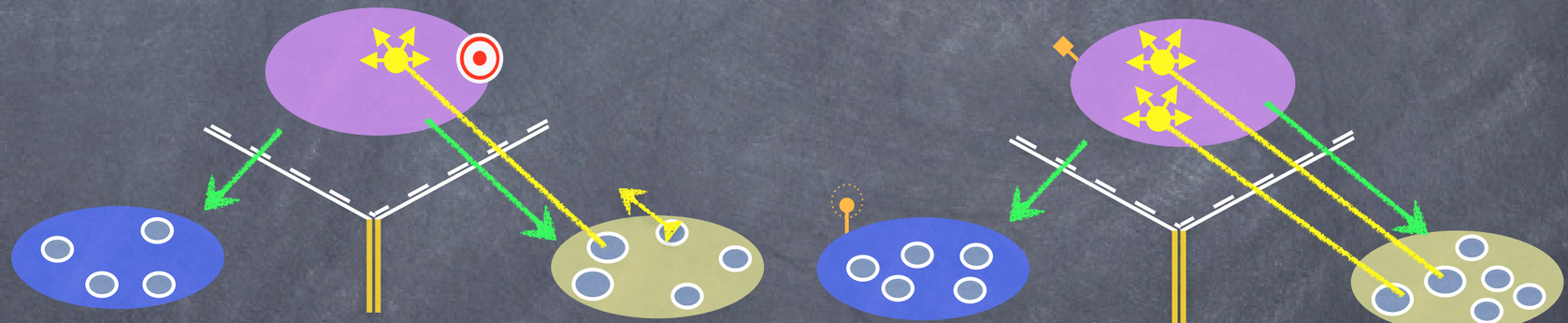
What happens when your application gets more features?



Now all of your UI can't fit in one MVC's view.

MVCs working together

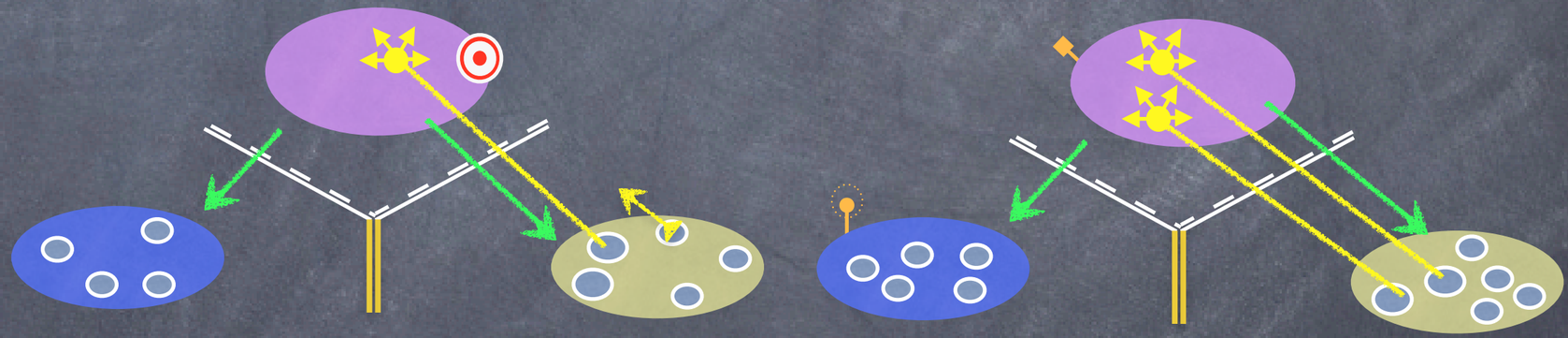
What happens when your application gets more features?



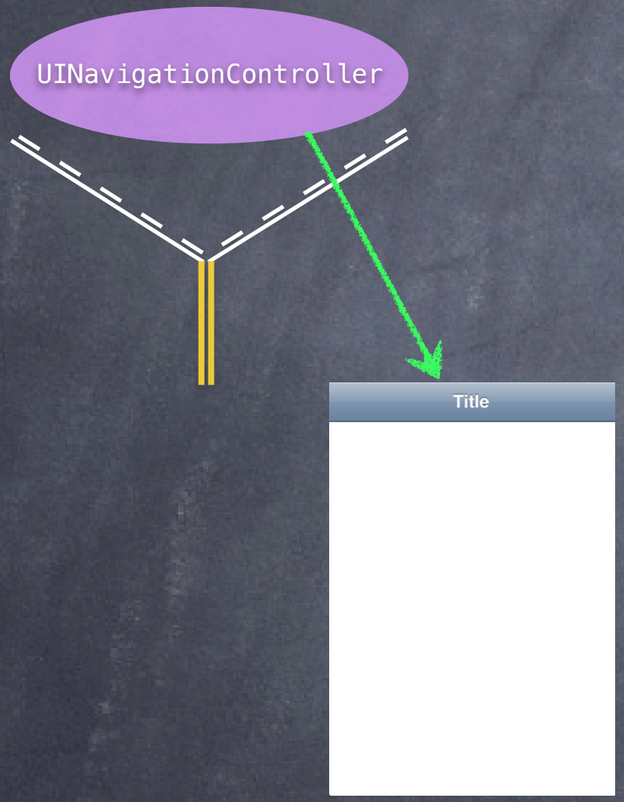
We never have an MVC's view span across screens.
So we'll have to create a new MVC for these new features.

MVCs working together

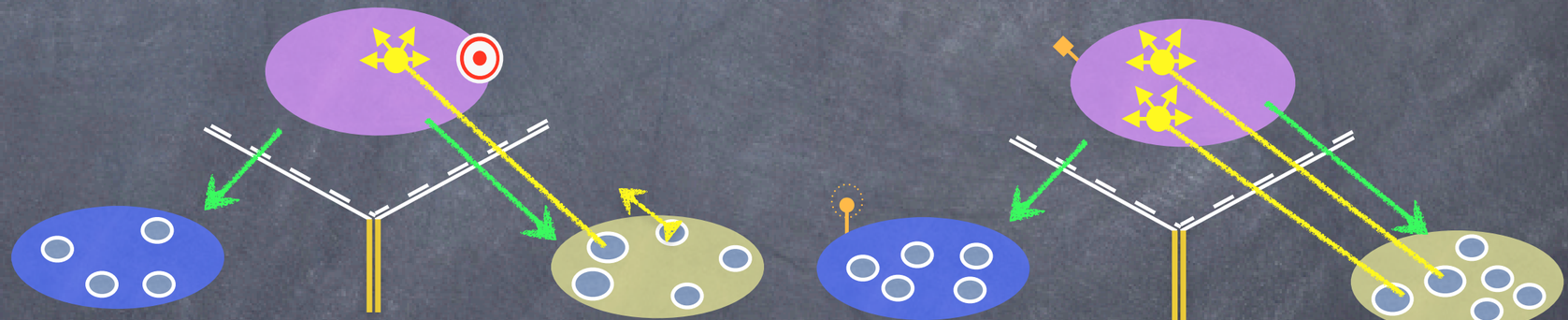
So how do we switch the screen to show this other MVC?



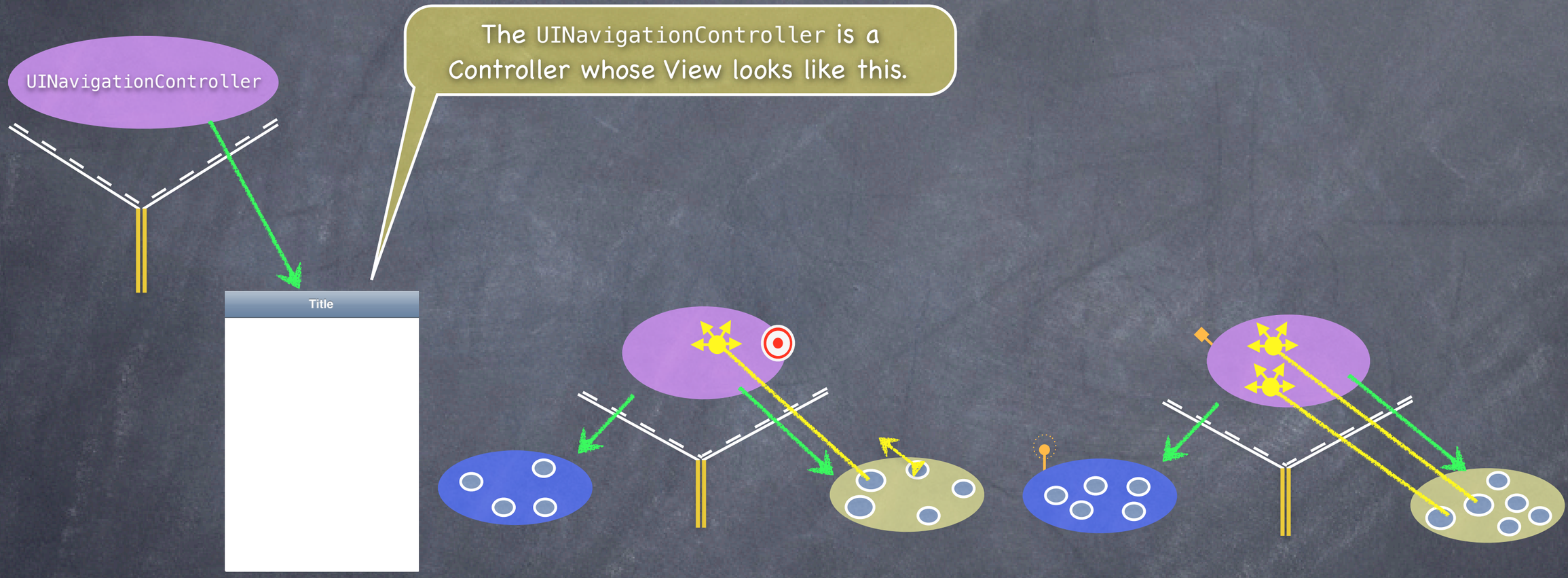
MVCs working together



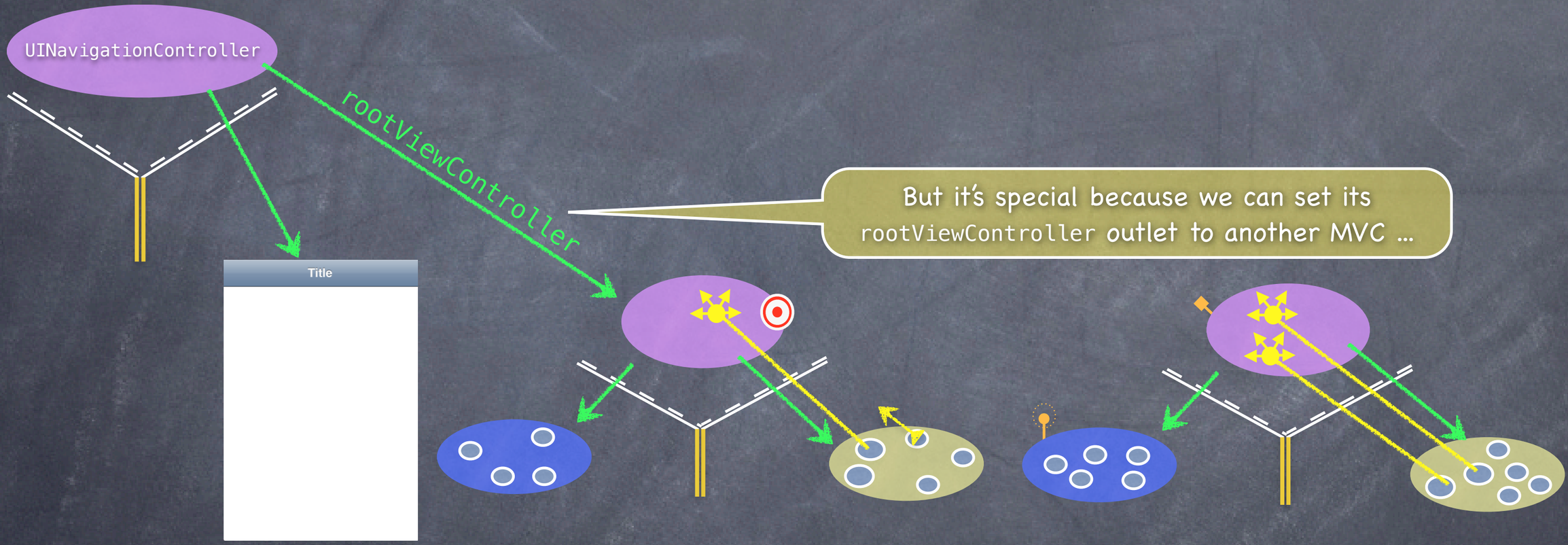
We use a "controller of controllers" to do that.
For example, a `UINavigationController`.



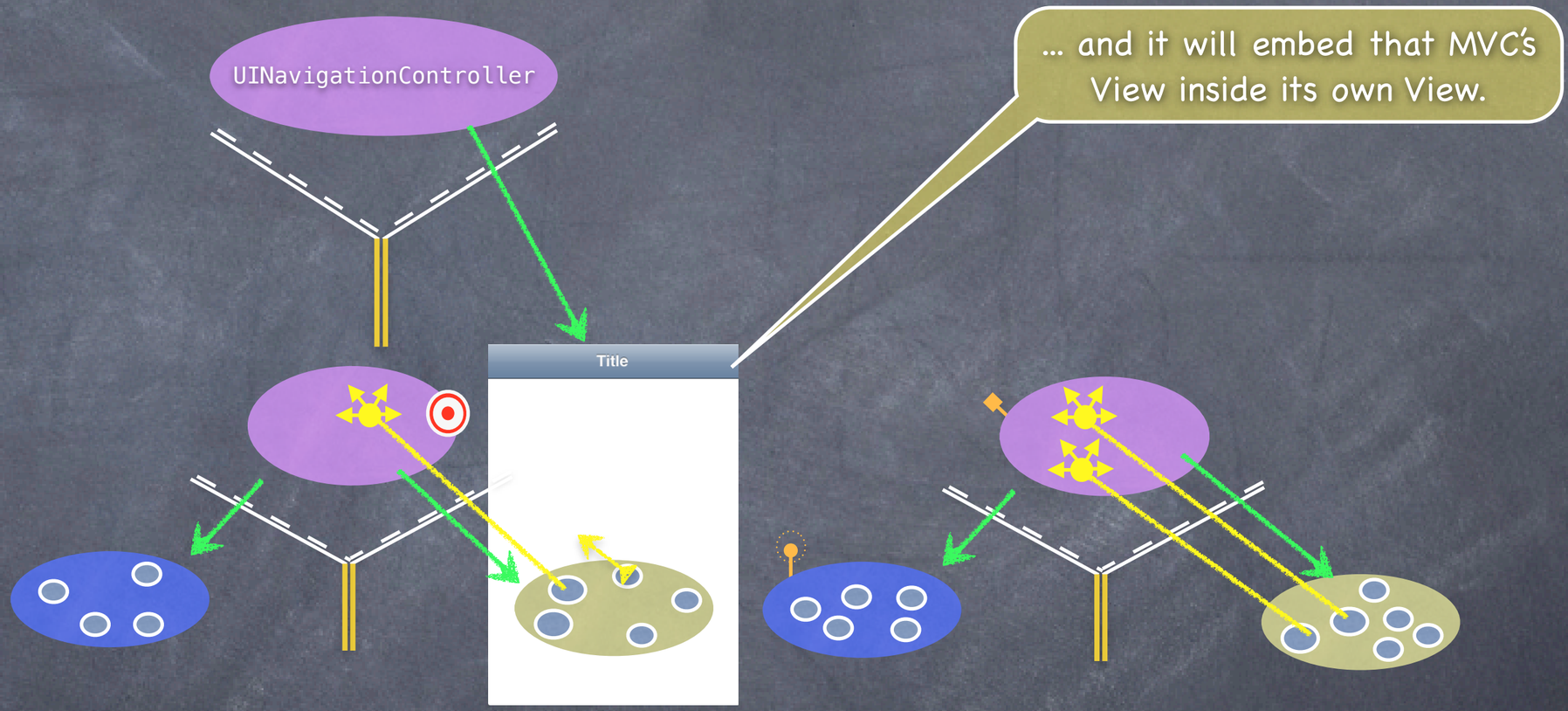
MVCs working together



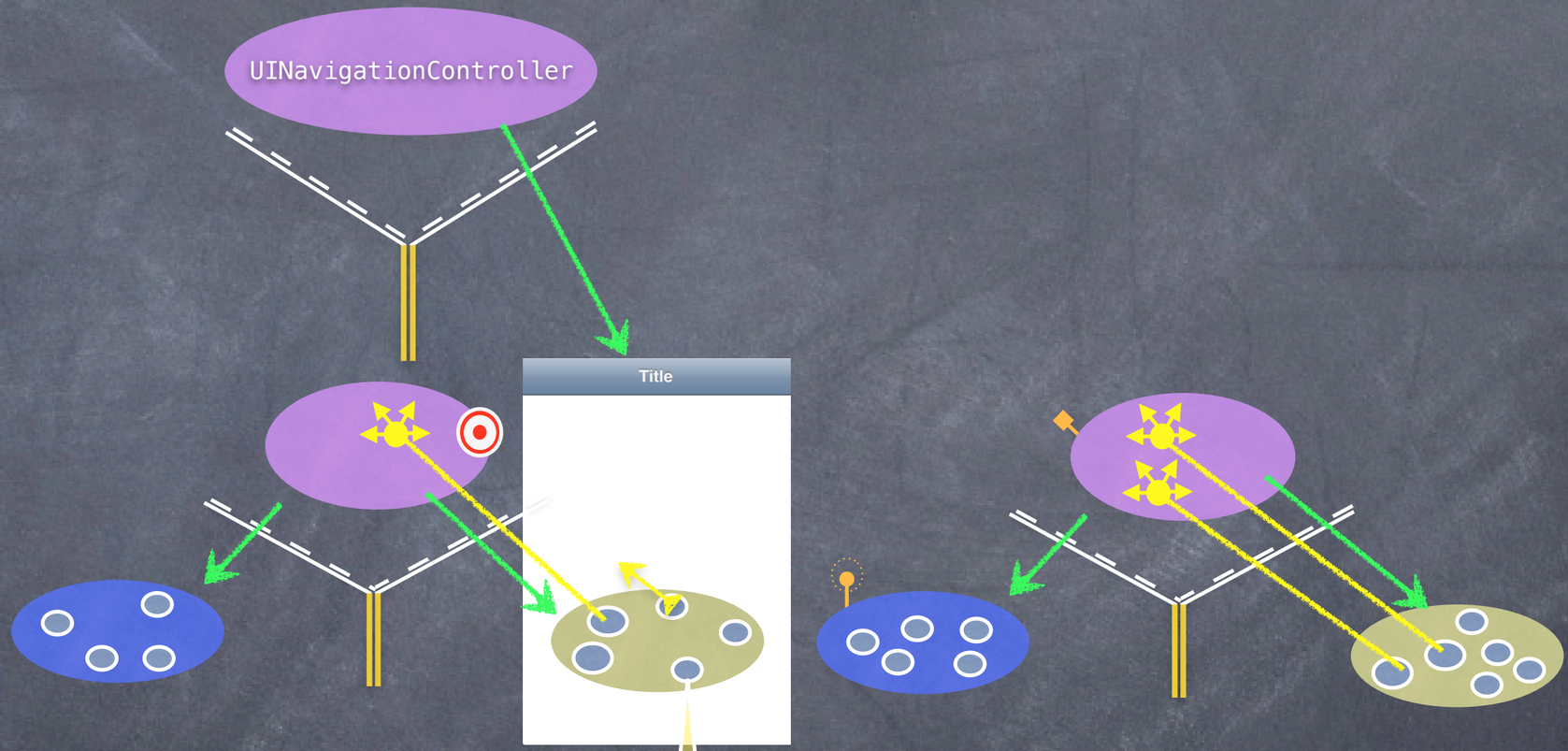
MVCs working together



MVCs working together

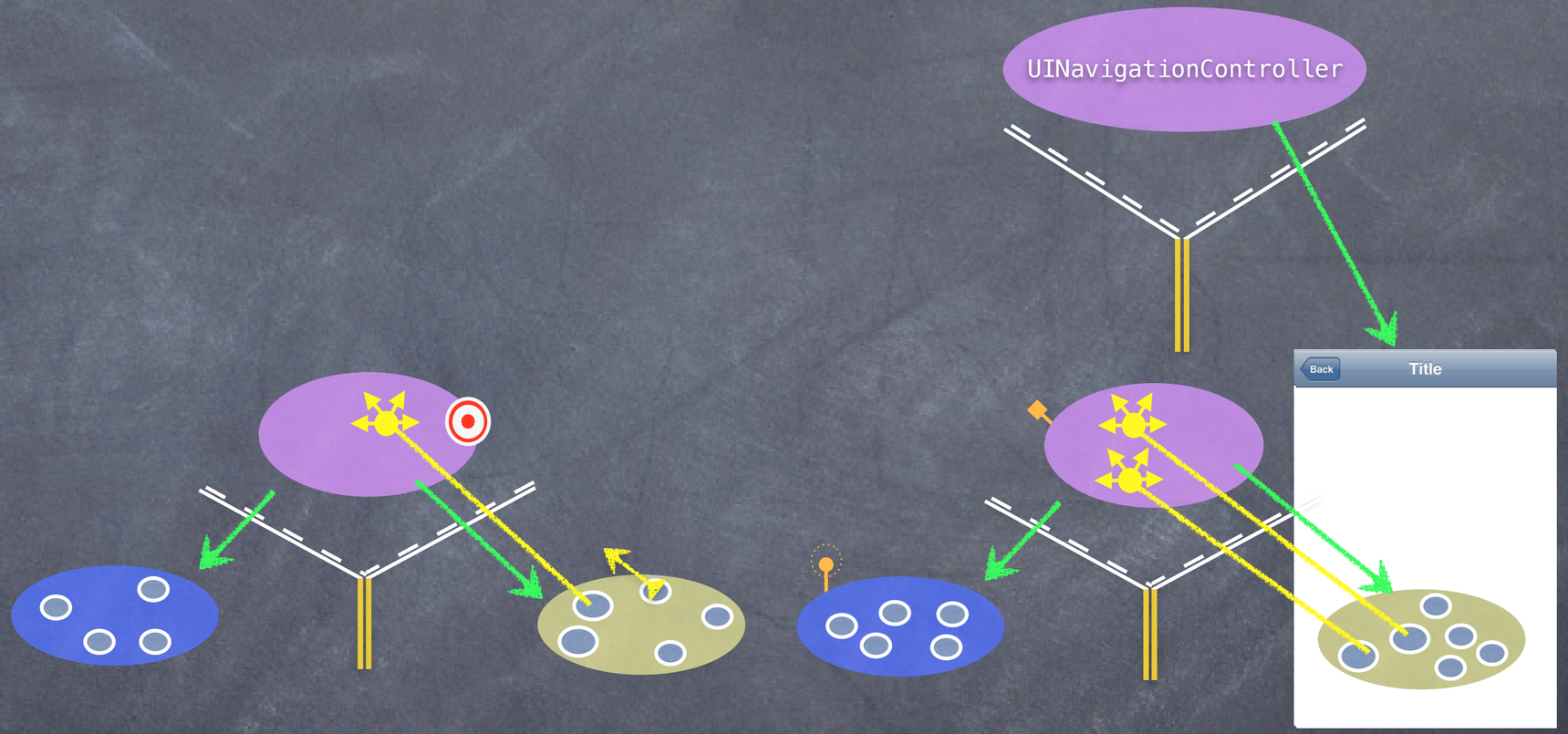


MVCs working together

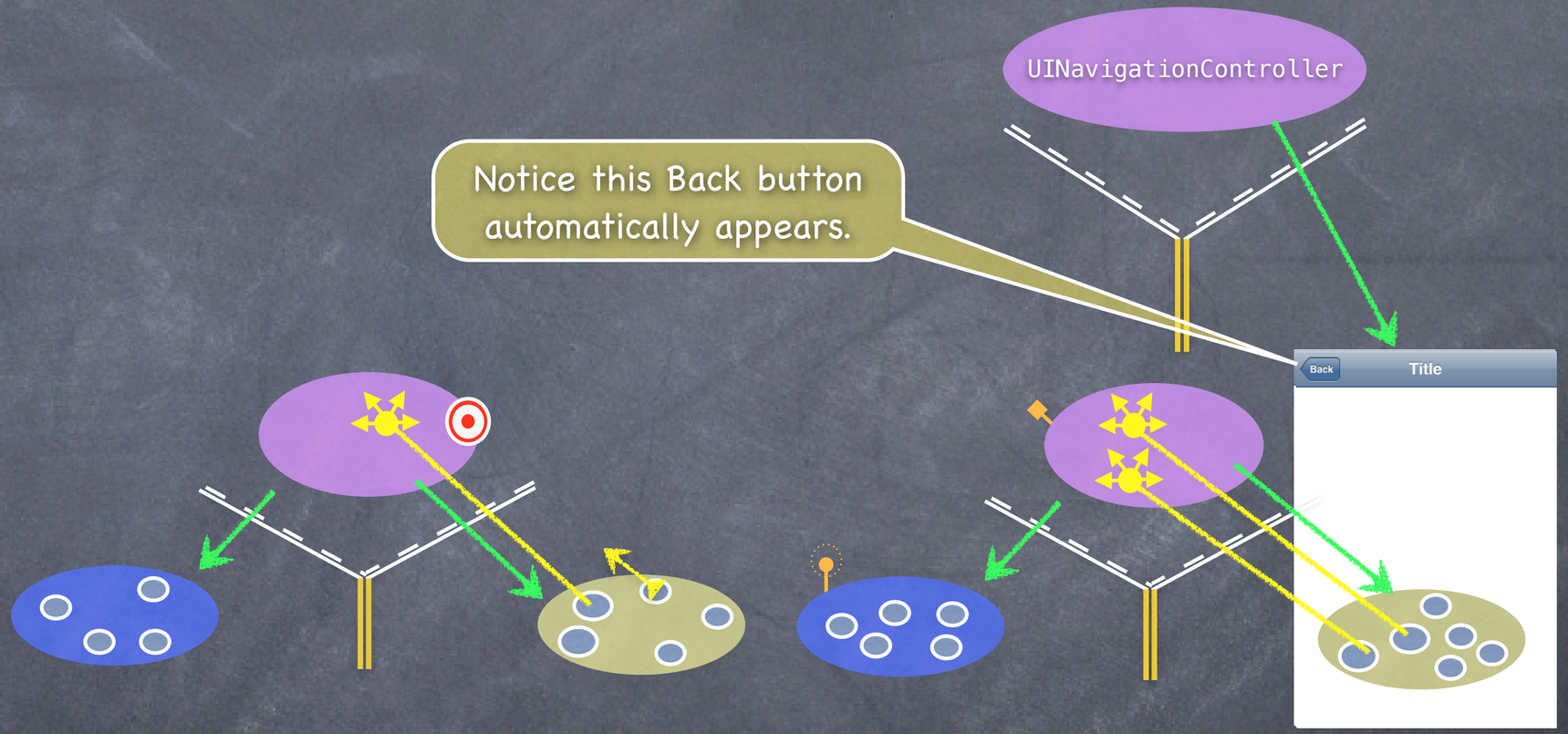


Then a UI element in this View (e.g. a `UIButton`) can segue to the other MVC and its View will now appear in the `UINavigationController`.

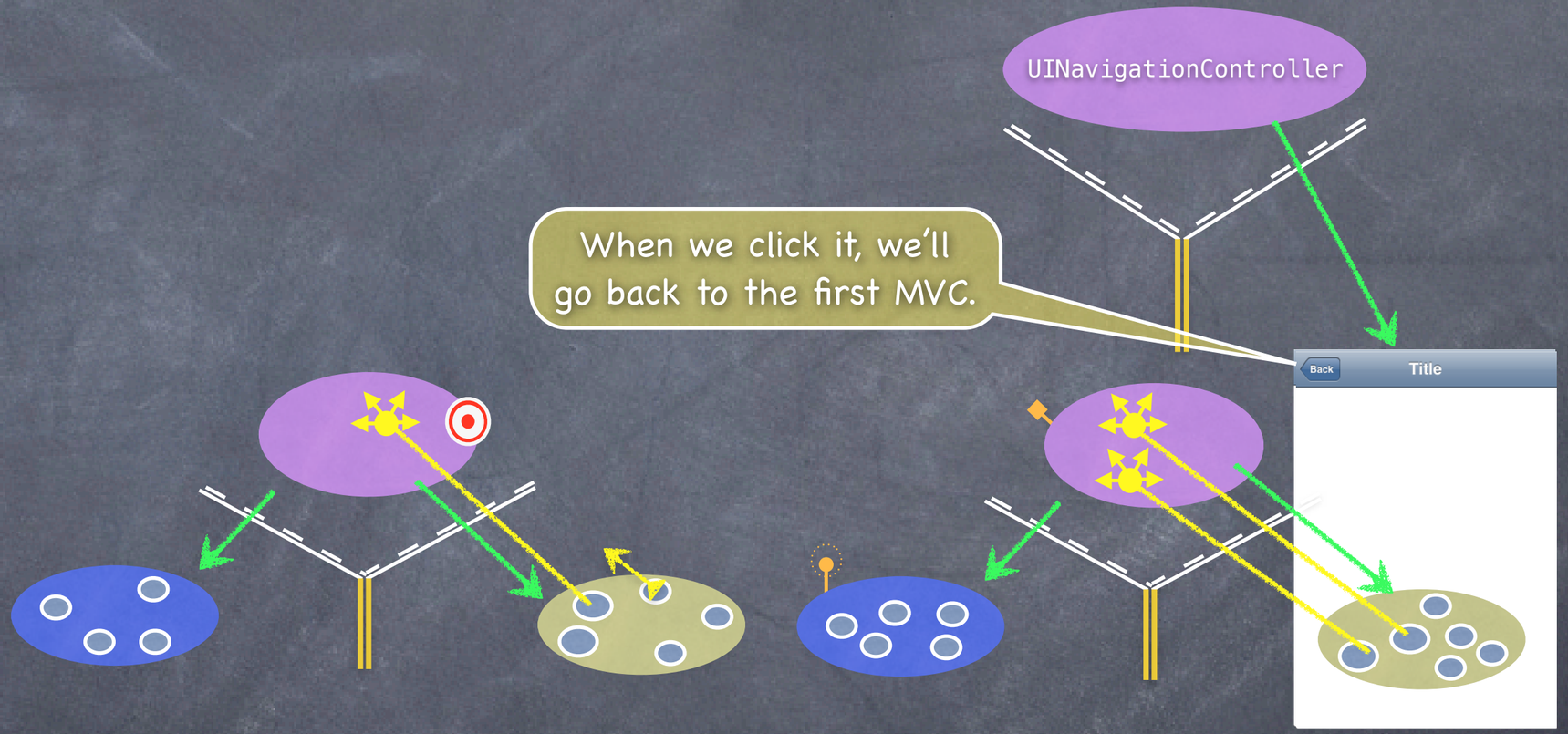
MVCs working together



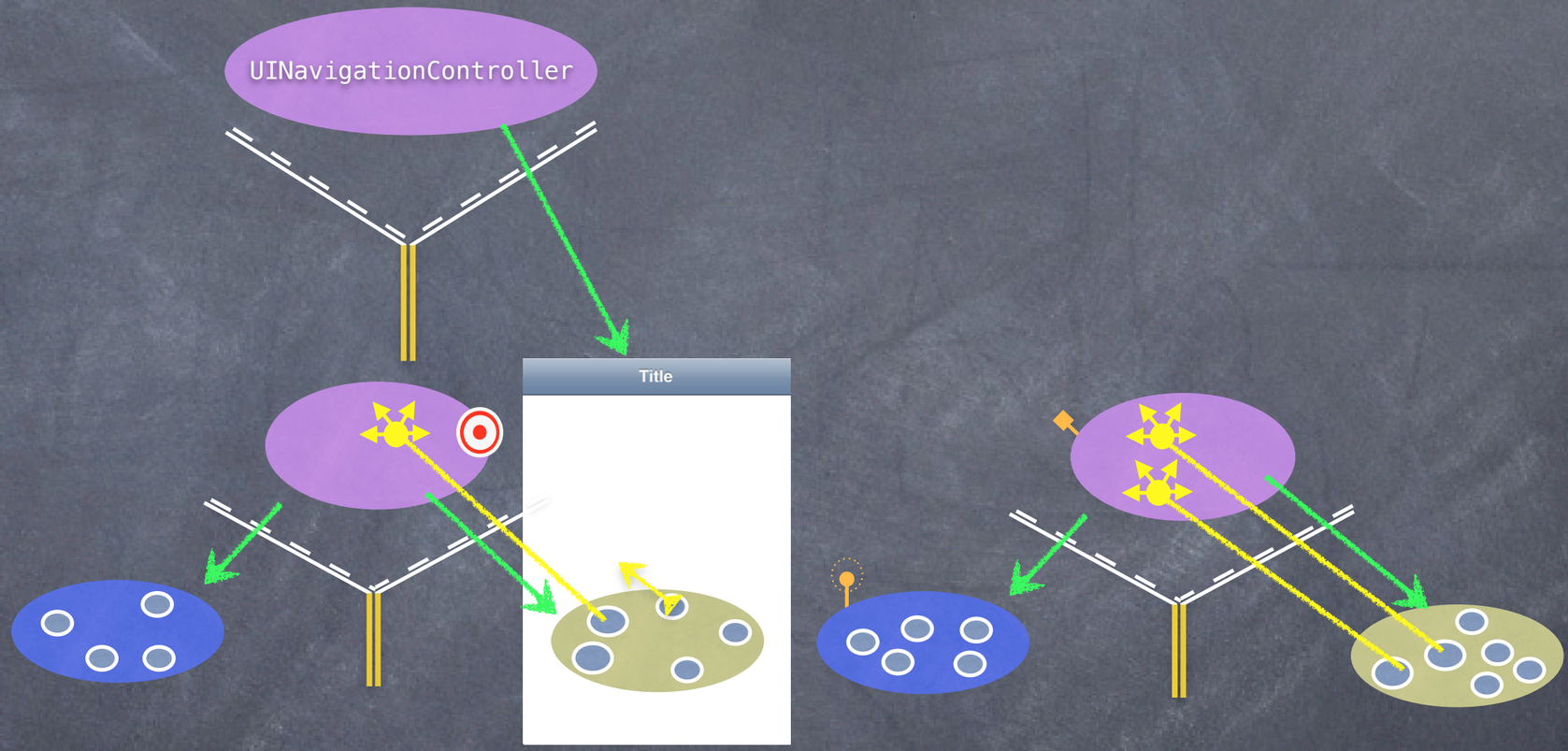
MVCs working together



MVCs working together

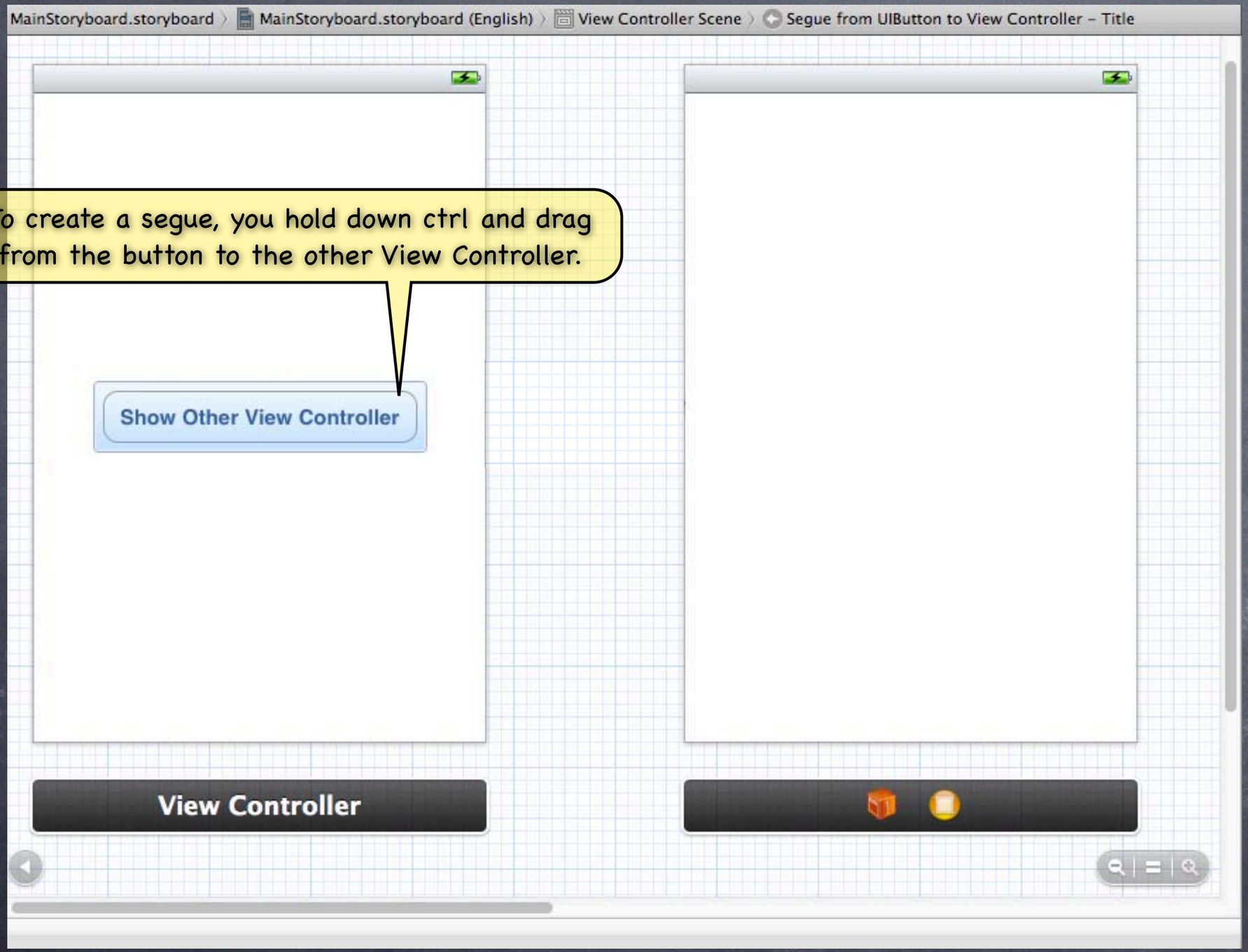


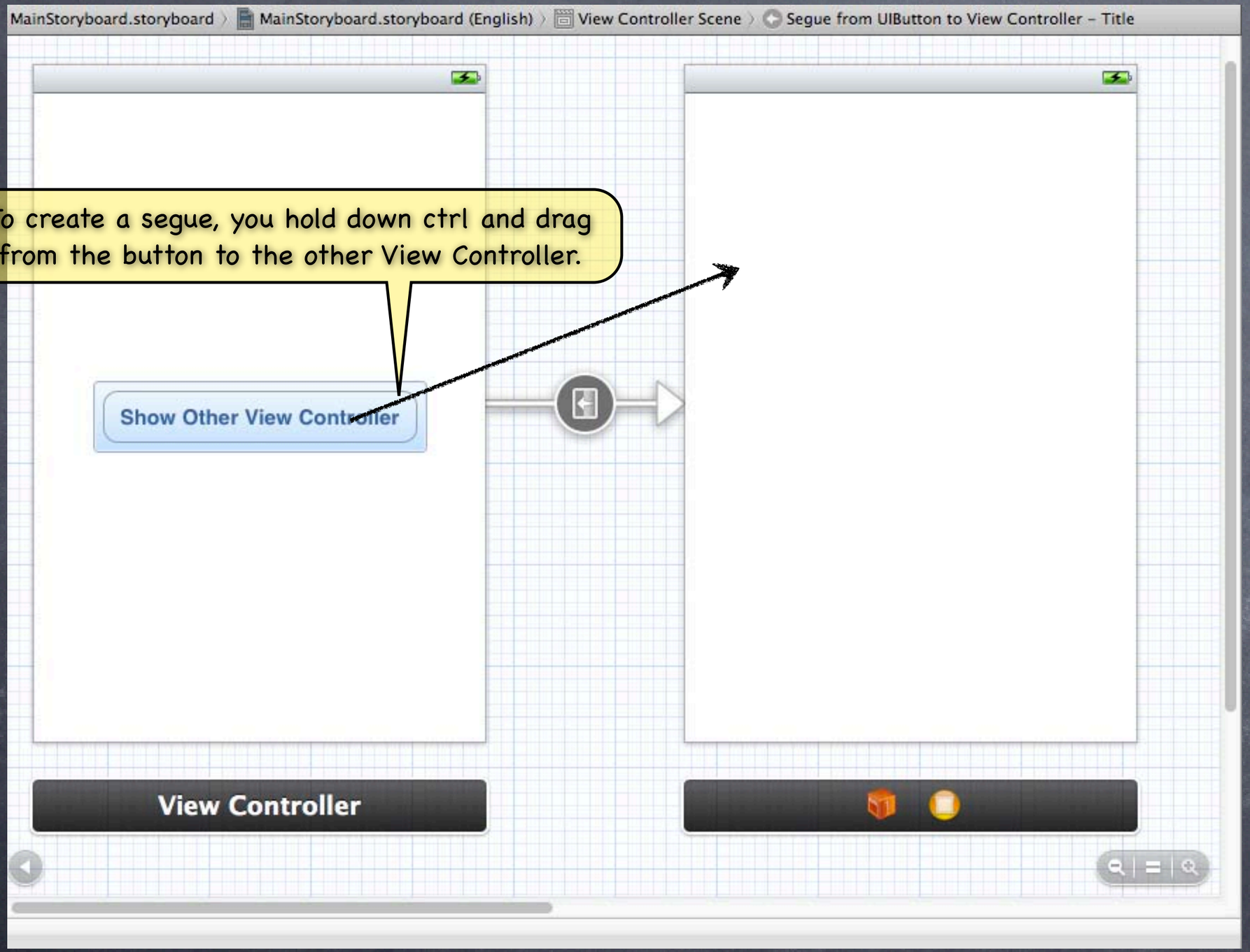
MVCs working together



Segues

- Let's talk about how the segue gets set up first
  Then we'll look at how we create a `UINavigationController` in our storyboard.


MainStoryboard.storyboard
MainStoryboard.storyboard (English)
View Controller Scene
Segue from UIButton to View Controller – Title
To create a segue, you hold down ctrl and drag from the button to the other View Controller.
Show Other View Controller
View Controller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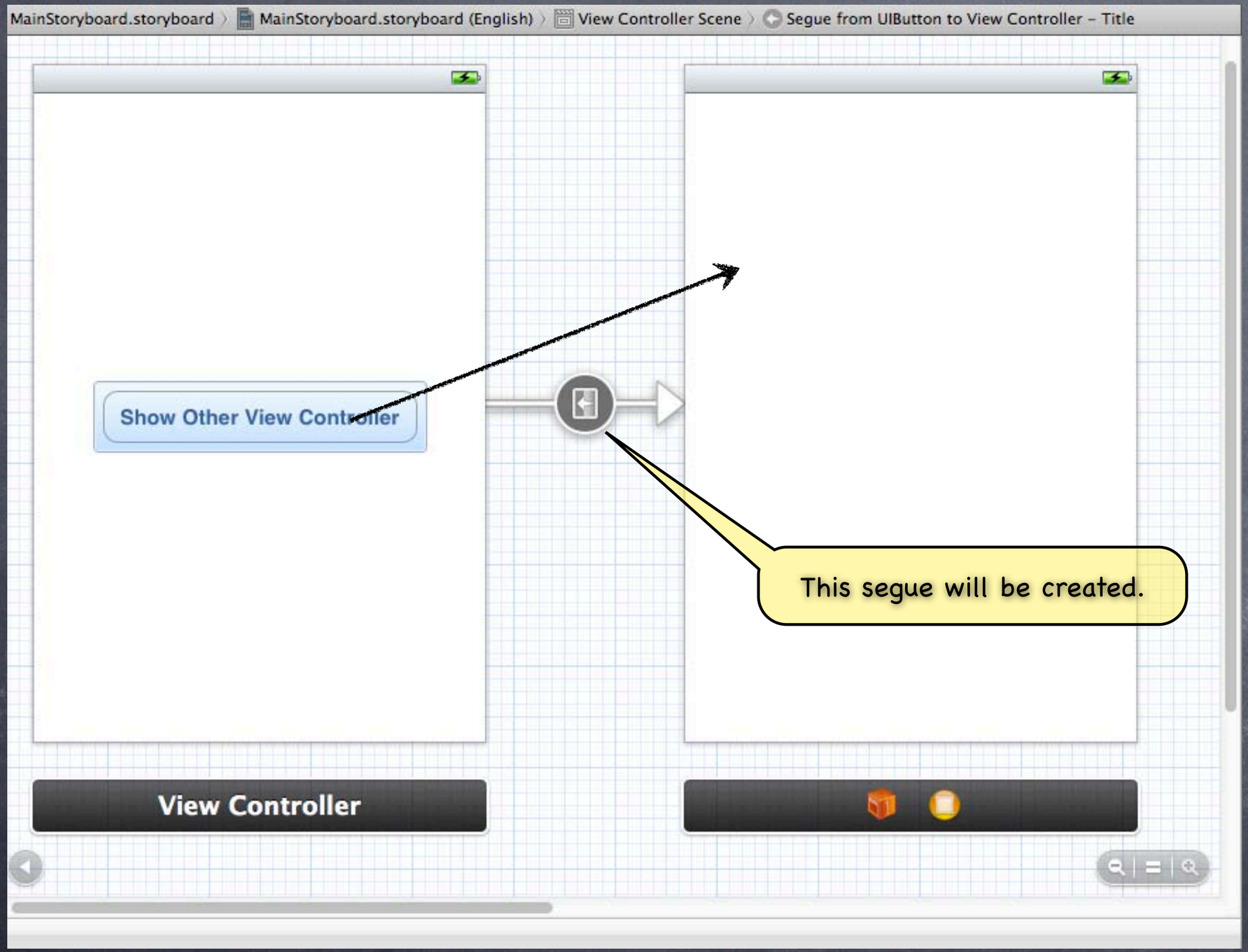
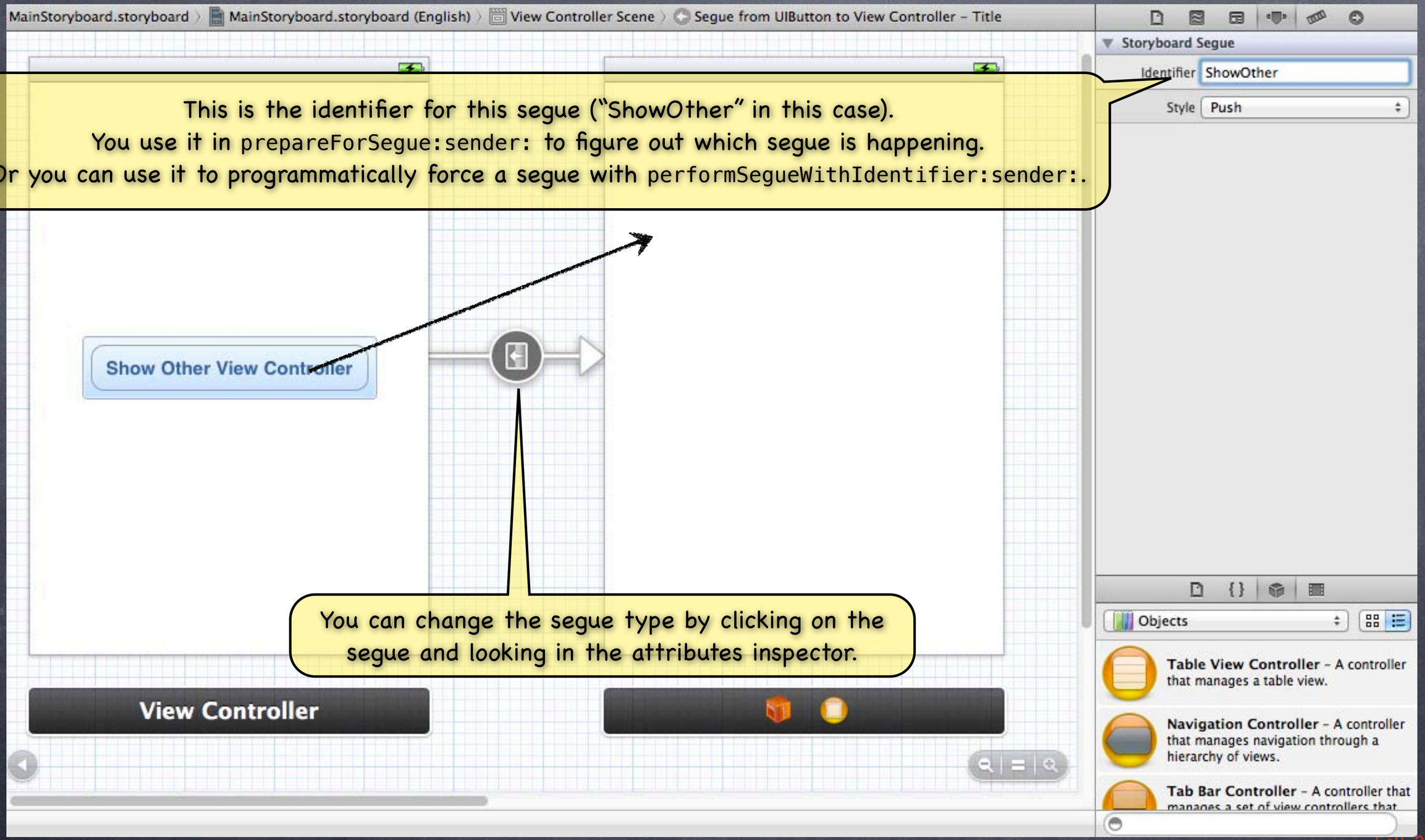
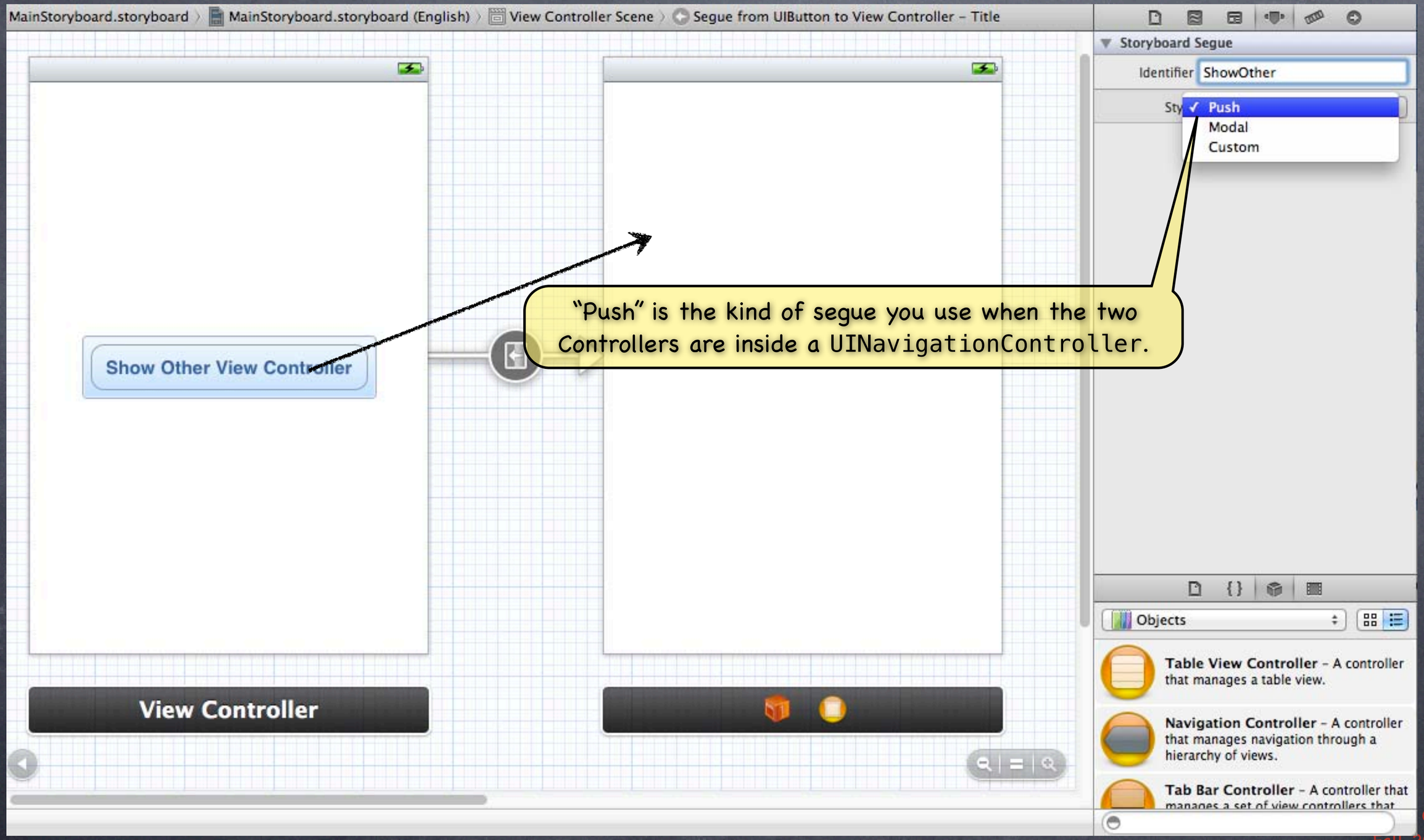
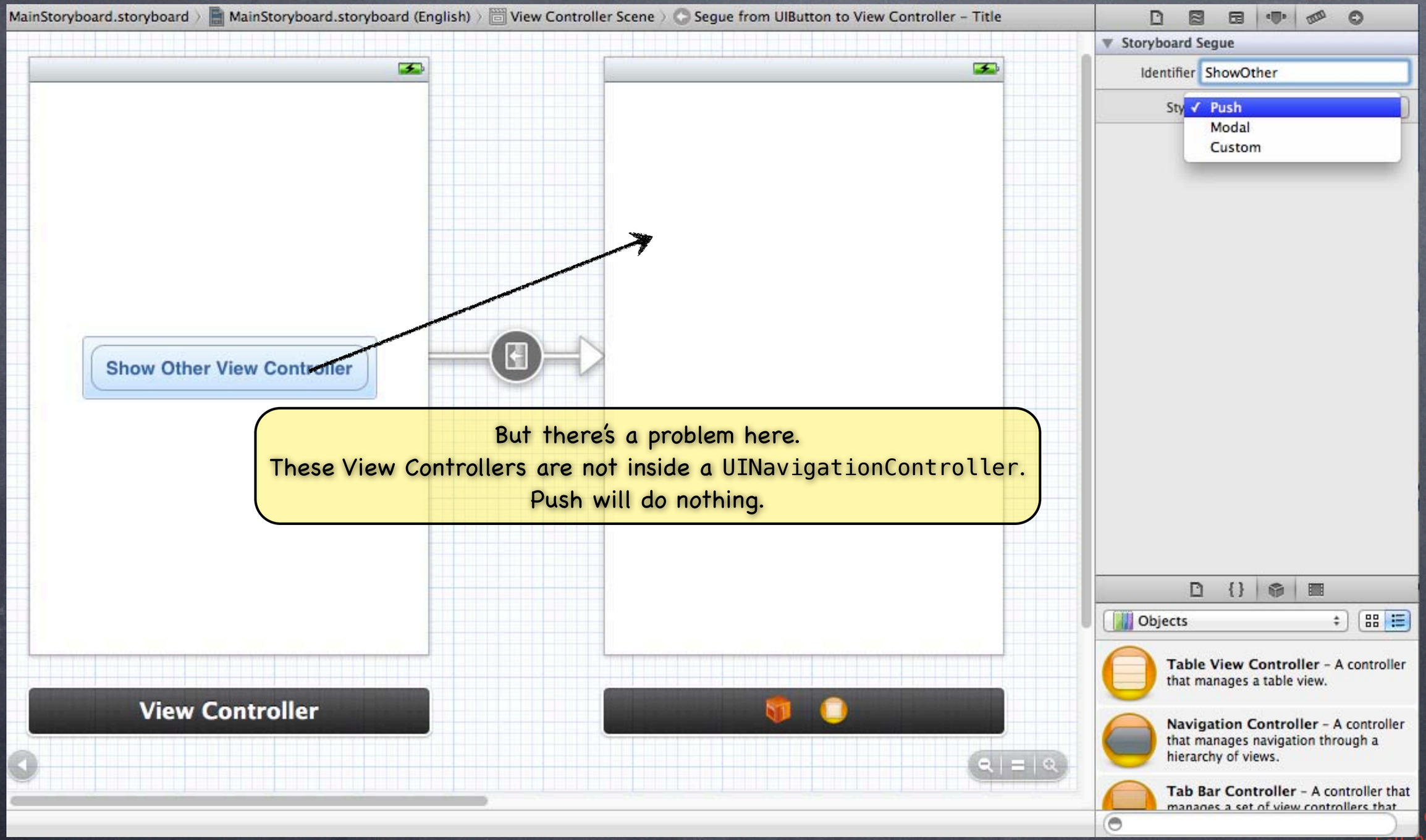
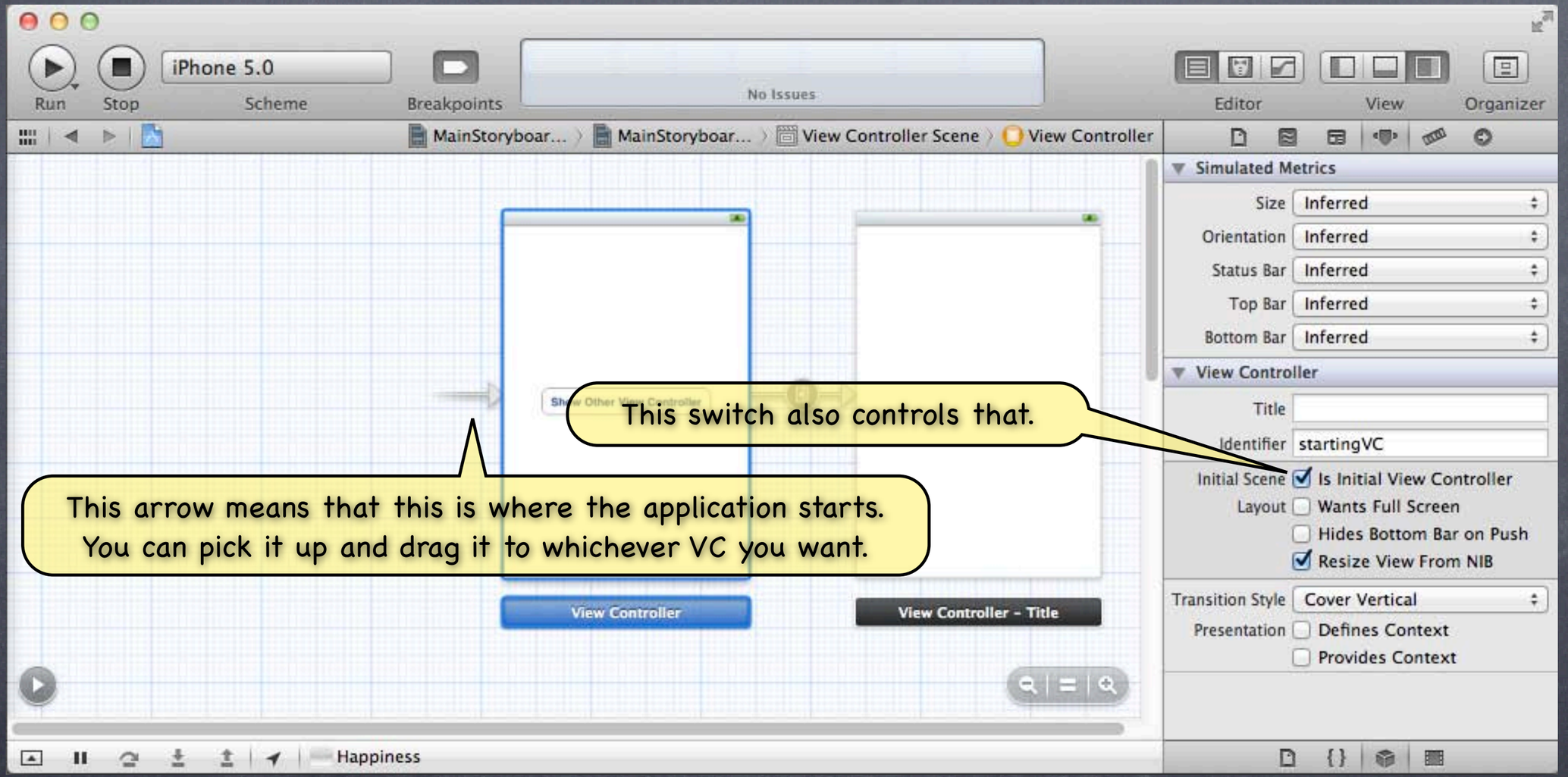
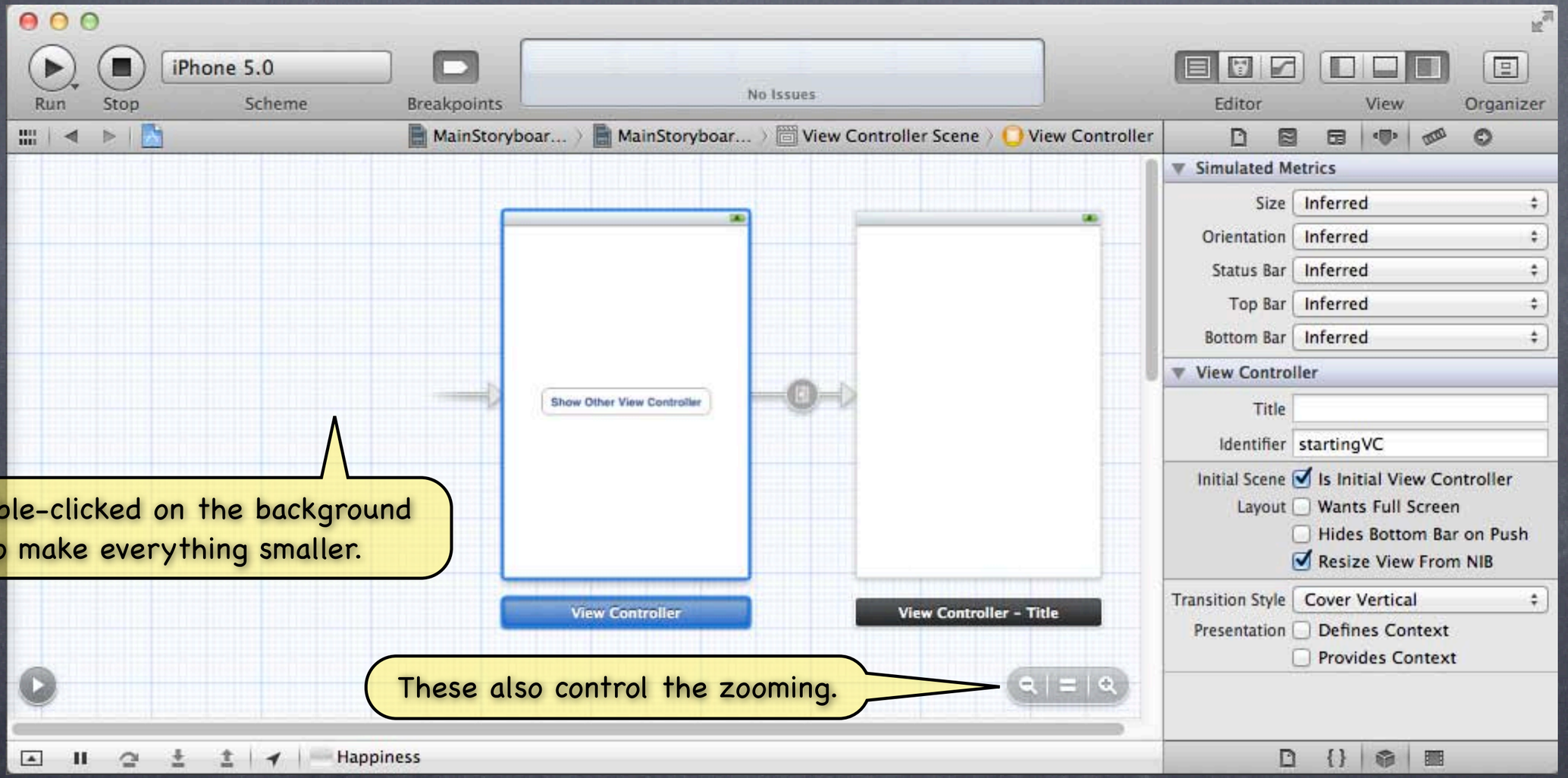

MainStoryboard.storyboard
MainStoryboard.storyboard (English)
View Controller Scene
Segue from UIButton to View Controller – Title
Show Other View Controller
This segue will be created.
View Controller


MainStoryboard.storyboard
MainStoryboard.storyboard (English)
View Controller Scene
Segue from UIButton to View Controller – Title
Storyboard Segue
Identifier ShowOther
Style Push
This is the identifier for this segue ("ShowOther" in this case).
You use it in prepareForSegue:sender: to figure out which segue is happening.
Or you can use it to programmatically force a segue with performSegueWithIdentifier:sender:.
Show Other View Controller
You can change the segue type by clicking on the segue and looking in the attributes inspector.
View Controller
Objects
Table View Controller – A controller that manages a table view.
Navigation Controller – A controller that manages navigation through a hierarchy of views.
Tab Bar Controller – A controller that


MainStoryboard.storyboard
MainStoryboard.storyboard (English)
View Controller Scene
Segue from UIButton to View Controller – Title
Storyboard Segue
Identifier
ShowOther
Push
Modal
Custom
Show Other View Controller
"Push" is the kind of segue you use when the two Controllers are inside a UINavigationController.
View Controller
Objects
Table View Controller – A controller that manages a table view.
Navigation Controller – A controller that manages navigation through a hierarchy of views.
Tab Bar Controller – A controller that


MainStoryboard.storyboard
MainStoryboard.storyboard (English)
View Controller Scene
Segue from UIButton to View Controller – Title
Storyboard Segue
Identifier
ShowOther
Push
Modal
Custom
Show Other View Controller
But there's a problem here.
These View Controllers are not inside a UINavigationController.
Push will do nothing.
View Controller
Objects
Table View Controller – A controller that manages a table view.
Navigation Controller – A controller that manages navigation through a hierarchy of views.
Tab Bar Controller – A controller that


Run
Stop
iPhone 5.0
Scheme
Breakpoints
No Issues
Editor
View
Organizer
MainStoryboar...
MainStoryboar...
View Controller Scene
View Controller
Simulated Metrics
Size
Inferred
Orientation
Inferred
Status Bar
Inferred
Top Bar
Inferred
Bottom Bar
Inferred
View Controller
Title
Identifier
startingVC
Initial Scene
Is Initial View Controller
Layout
Wants Full Screen
Hides Bottom Bar on Push
Resize View From NIB
Transition Style
Cover Vertical
Presentation
Defines Context
Provides Context
This switch also controls that.
This arrow means that this is where the application starts.
You can pick it up and drag it to whichever VC you want.
View Controller
View Controller - Title
Happiness


iPhone 5.0
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View Controller Scene
View Controller
Simulated Metrics
Size
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View Controller
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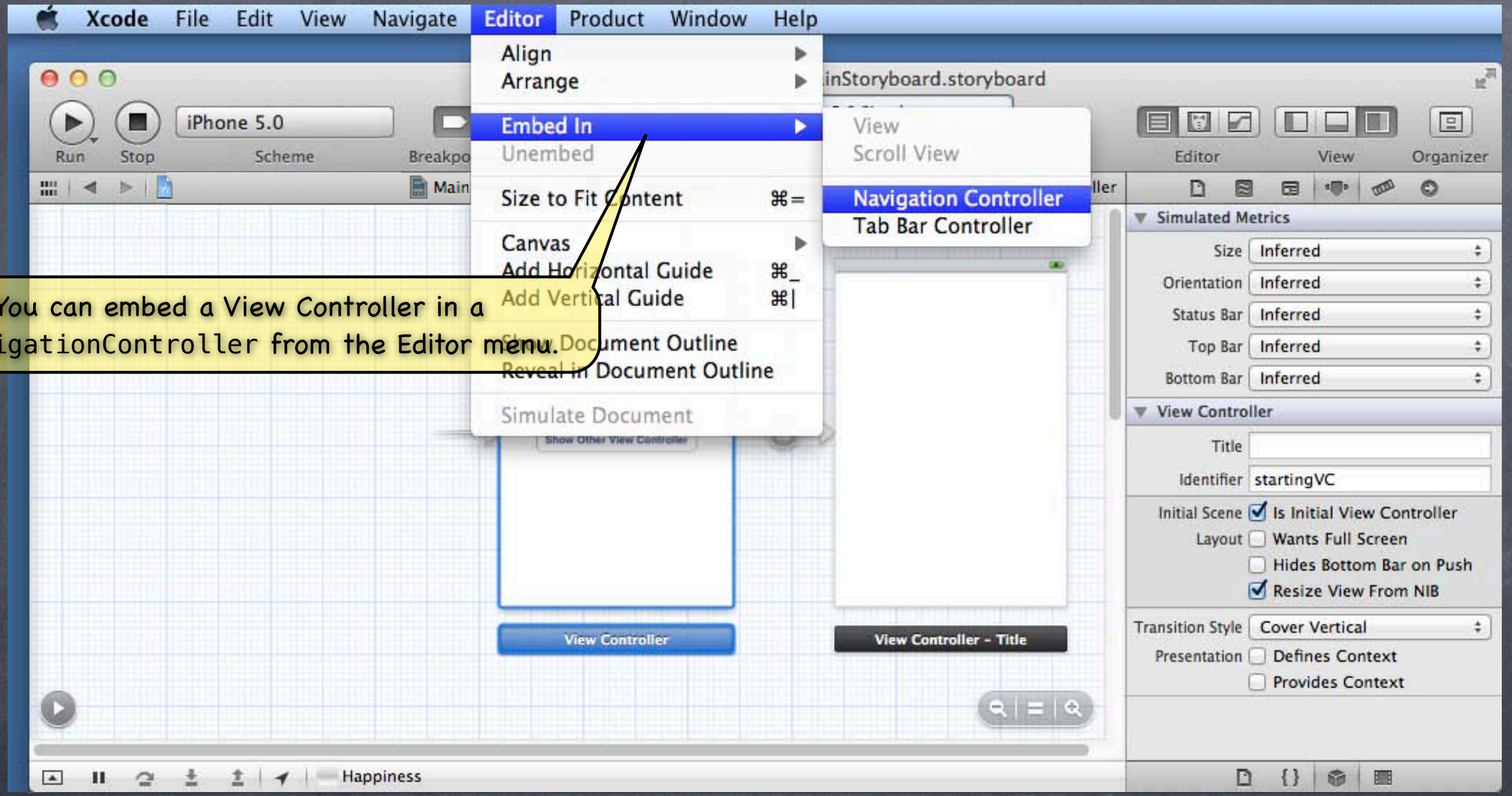
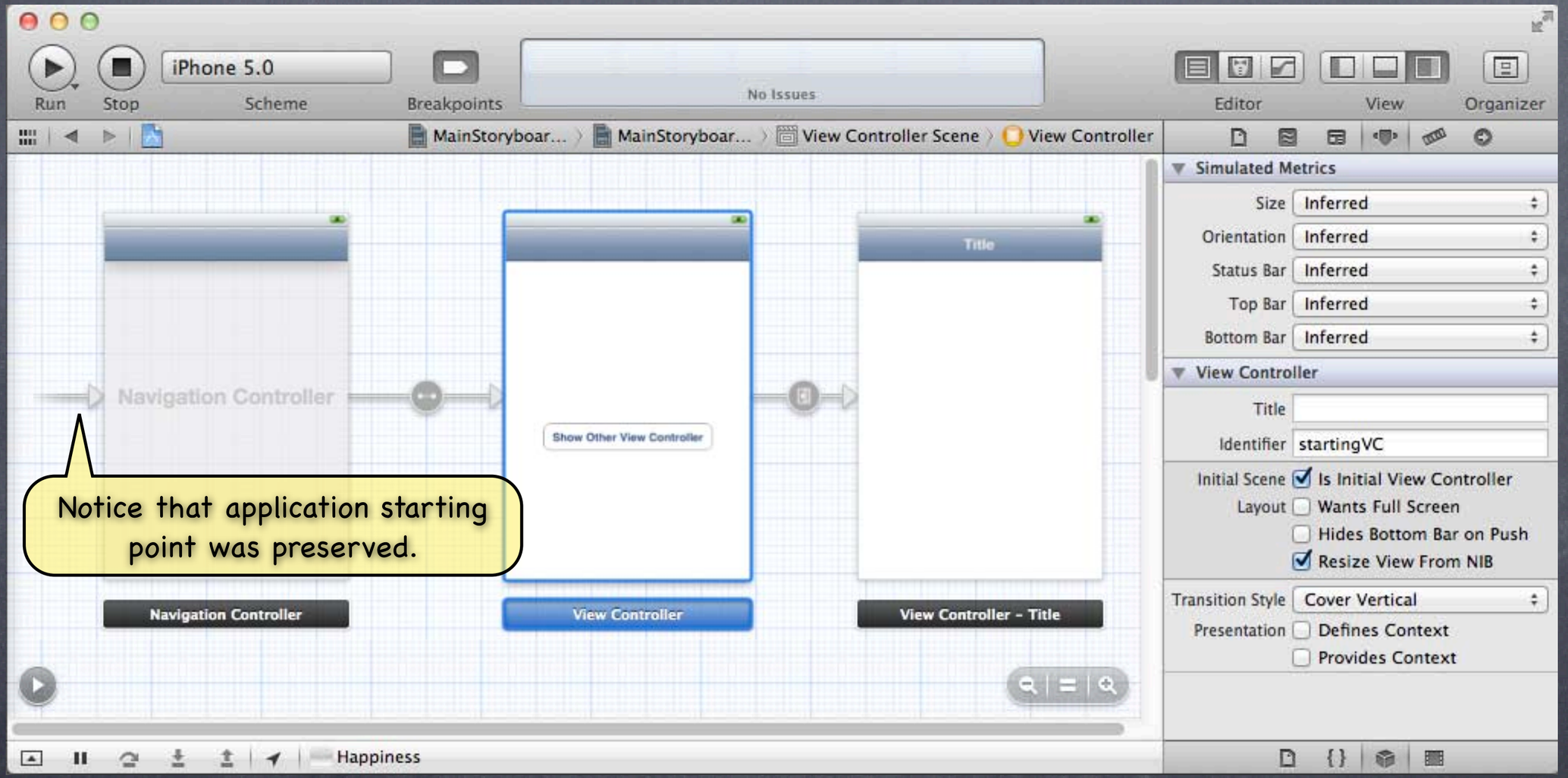
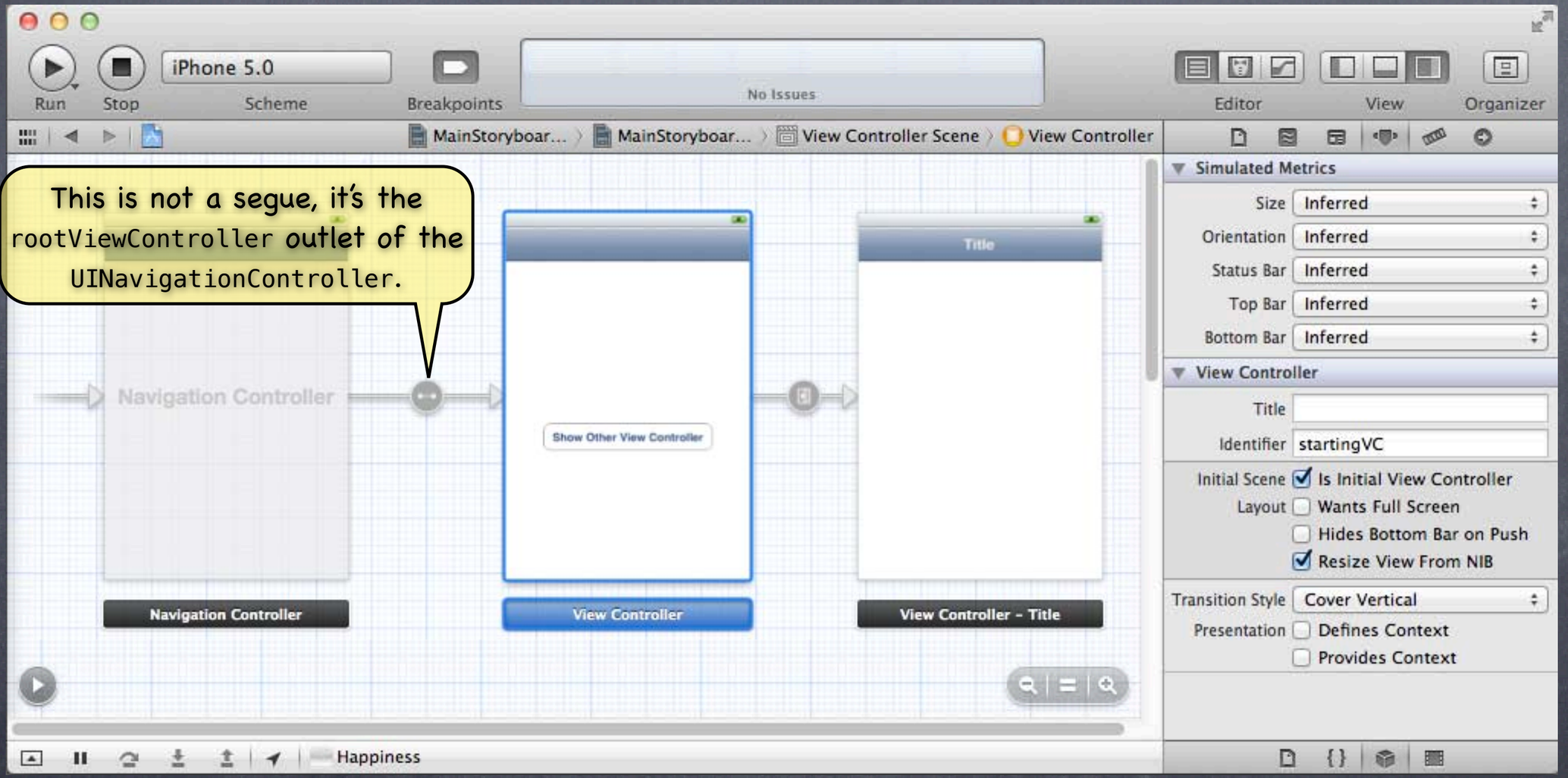
Layout
Wants Full Screen
Hides Bottom Bar on Push
Resize View From NIB
Transition Style
Cover Vertical
Presentation
Defines Context
Provides Context
Show Other View Controller
View Controller
View Controller - Title
We've double-clicked on the background here to make everything smaller.
These also control the zooming.
Happiness

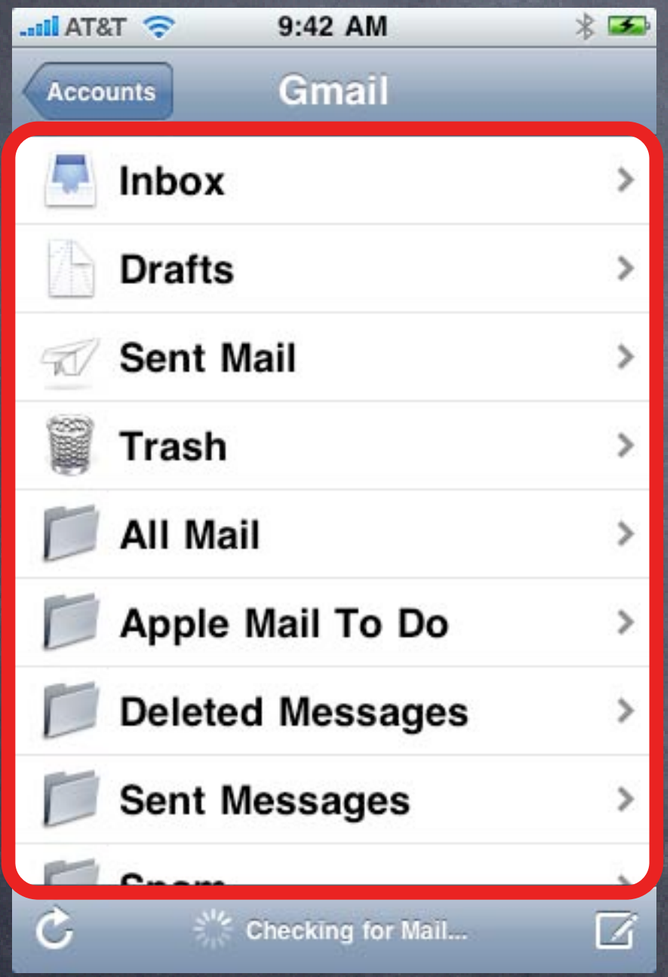


You can embed a View Controller in a UINavigationController from the Editor menu.


Run
Stop
iPhone 5.0
Scheme
Breakpoints
No Issues
Editor
View
Organizer
MainStoryboar...
MainStoryboar...
View Controller Scene
View Controller
Simulated Metrics
Size
Inferred
Orientation
Inferred
Status Bar
Inferred
Top Bar
Inferred
Bottom Bar
Inferred
View Controller
Title
Identifier
startingVC
Initial Scene
Is Initial View Controller
Layout
Wants Full Screen
Hides Bottom Bar on Push
Resize View From NIB
Transition Style
Cover Vertical
Presentation
Defines Context
Provides Context
Navigation Controller
Show Other View Controller
Title
Notice that application starting point was preserved.
Navigation Controller
View Controller
View Controller - Title
Happiness

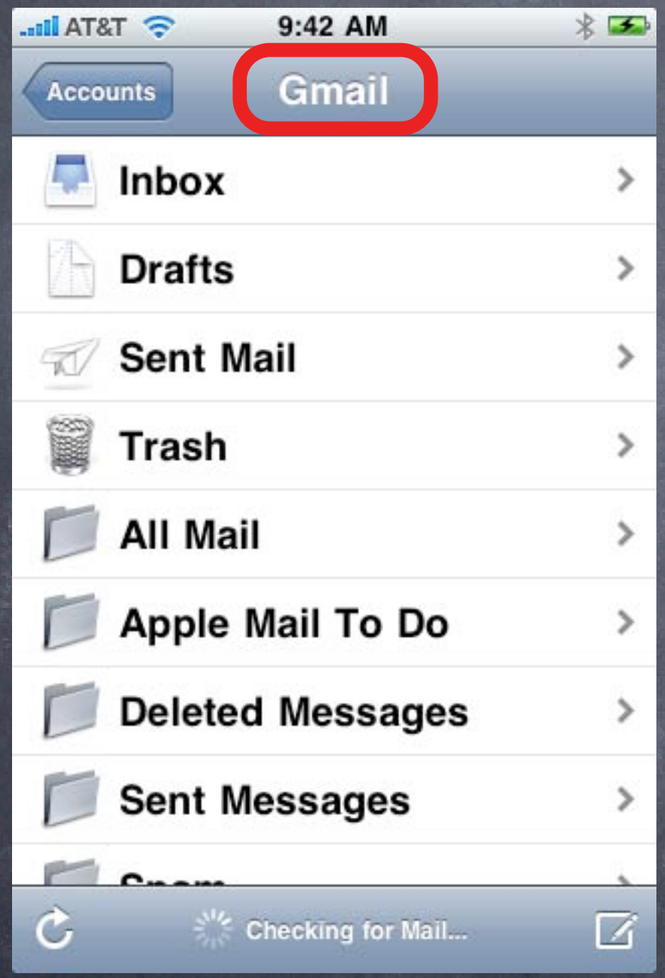

This is not a segue, it's the rootViewController outlet of the UINavigationController.
Run
Stop
iPhone 5.0
Scheme
Breakpoints
No Issues
Editor
View
Organizer
MainStoryboar...
MainStoryboar...
View Controller Scene
View Controller
Navigation Controller
Show Other View Controller
Title
Navigation Controller
View Controller
View Controller - Title
Simulated Metrics
Size Inferred
Orientation Inferred
Status Bar Inferred
Top Bar Inferred
Bottom Bar Inferred
View Controller
Title
Identifier startingVC
Initial Scene Is Initial View Controller
Layout Wants Full Screen
Hides Bottom Bar on Push
Resize View From NIB
Transition Style Cover Vertical
Presentation Defines Context
Provides Context
Happiness

UINavigationController



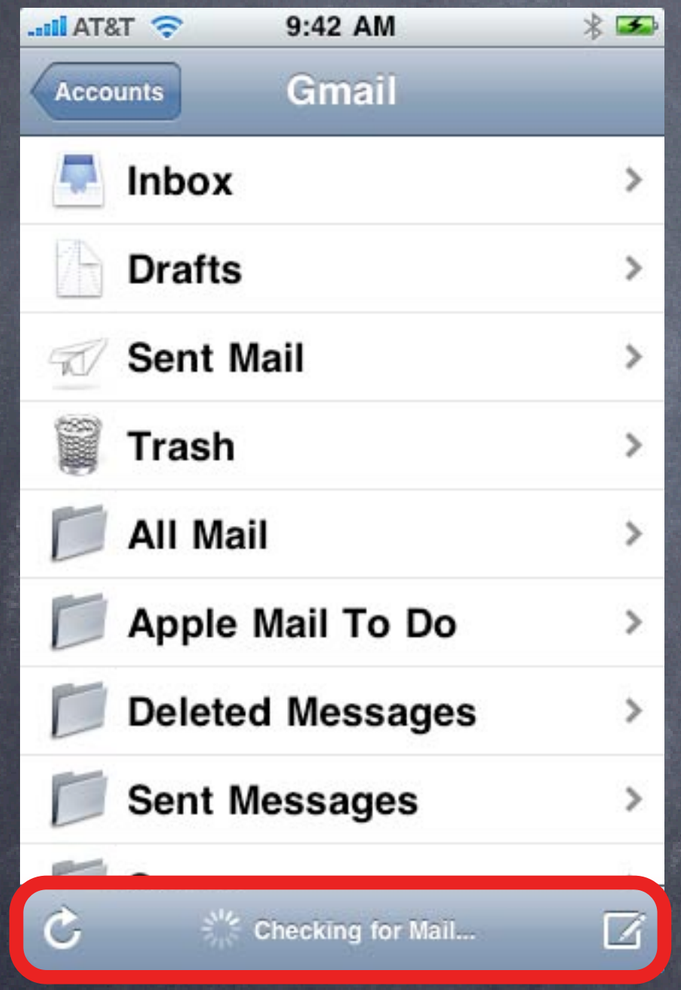
- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root)

UINavigationController



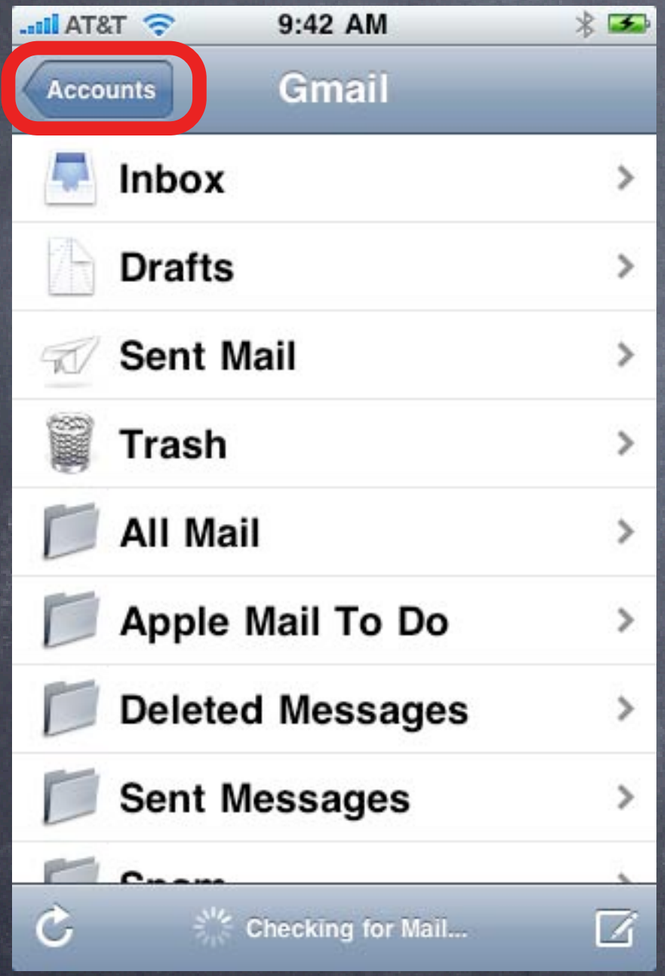
- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root)
- `NSString` obtained from the `title` property of the `UIViewController` most recently pushed (or root)

UINavigationController



- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root)
- `NSString` obtained from the `title` property of the `UIViewController` most recently pushed (or root)
- An `NSArray` of `UIBarButtonItems` obtained from the `toolbarItems` property of the `UIViewController` most recently pushed (or root)

UINavigationController



- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root)
- `NSString` obtained from the `title` property of the `UIViewController` most recently pushed (or root)
- An `NSArray` of `UIBarButtonItems` obtained from the `toolbarItems` property of the `UIViewController` most recently pushed (or root)
- A UIBarButton item whose title is an `NSString` obtained from the `title` property of the previous `UIViewController` that was pushed. It is being displayed on a button provided by the navigation controller which, when touched, will cause the previous `UIViewController` to reappear. This is a "back" button.

UINavigationController

- When does a pushed MVC pop off?

  Usually because the user presses the "back" button (shown on the previous slide).

  But it can happen programmatically as well with this `UINavigationController` instance method

  `- (void)popViewControllerAnimated:(BOOL)animated;`

  This does the same thing as clicking the back button.

  Somewhat rare to call this method. Usually we want the user in control of navigating the stack.

  But you might do it if some action the user takes in a view makes it irrelevant to be on screen.

- Example

  Let's say we push an MVC which displays a database record and has a delete button w/this action:

```
- (IBAction)deleteCurrentRecord:(UIButton *)sender
{
    // delete the record we are displaying
    // we just deleted the record we are displaying!
    // so it does not make sense to be on screen anymore, so pop
    [self.navigationController popViewControllerAnimated:YES];
}
```

Notice that all `UIViewControllers` know the `UINavigationController` they are in. This is `nil` if they are not in one.

View Controller

- Other kinds of segues besides Push
  Replace - Replaces the right-hand side of a `UISplitViewController` (iPad only)
  Popover - Puts the view controller on the screen in a popover (iPad only)
  Modal - Puts the view controller up in a way that blocks the app until it is dismissed
  Custom - You can create your own subclasses of `UIStoryboardSegue`
- We'll talk about iPad-related segues on Tuesday
  Replace & Popover
- We'll talk about Modal later in the quarter
  People often use Modal UIs as a crutch, so we don't want to go to that too early

View Controller

- Firing off a segue from code

  Sometimes it makes sense to segue directly when a button is touched, but not always.

  For example, what if you want to conditionally segue?

  You can programmatically invoke segues using this method in `UIViewController`:

```
- (void)performSegueWithIdentifier:(NSString *)segueId sender:(id)sender;
```

  The `segueId` is set in the attributes inspector in Xcode (seen on previous slide).

  The `sender` is the initiator of the segue (a `UIButton` or yourself (`UIViewController`) usually).

```
- (IBAction)rentEquipment
{
    if (self.snowTraversingTalent == Skiing) {
        [self performSegueWithIdentifier:@“AskAboutSkis” sender:self];
    } else {
        [self performSegueWithIdentifier:@“AskAboutSnowboard” sender:self];
    }
}
```

Segues

- When a segue happens, what goes on in my code?

The segue offers the source VC the opportunity to "prepare" the new VC to come on screen.

This method is sent to the VC that contains the button that initiated the segue:

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender
{
    if ([segue.identifier isEqualToString:@"DoAParticularThing"]) {
        UIViewController *newController = segue.destinationViewController;
        // send messages to newController to prepare it to appear on screen
        // the segue will do the work of putting the new controller on screen
    }
}
```

You should pass data the new VC needs here and "let it run."

Think of the new VC as part of the View of the Controller that initiates the segue.

It must play by the same rules as a View.

For example, it should not talk back to you except through delegation.

So, for complicated MVC relationships, you might well set the new VC's delegate to `self` here.

View Controller

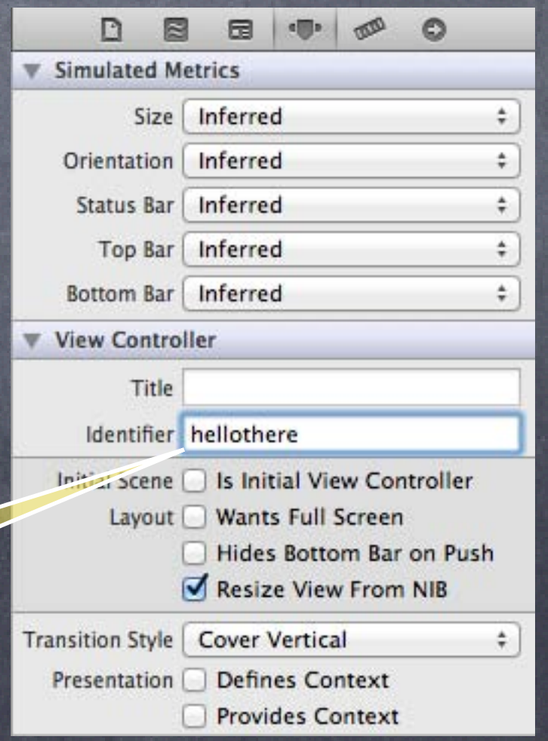
- Instantiating a `UIViewController` by name from a storyboard

  Sometimes (very rarely) you might want to put a VC on screen yourself (i.e., not use a segue).

```
NSString *vcid = @"something";
UIViewController *controller = [storyboard instantiateViewControllerWithIdentifier:vcid];
```

  Usually you get the `storyboard` above from `self.storyboard` in an existing `UIViewController`.

  The identifier `vcid` must match a string you set in Xcode to identify a `UIViewController` there.



This `UIViewController` in the storyboard can be instantiated using the identifier "`hellothere`".

View Controller

- Instantiating a UIViewController by name from a storyboard

  Sometimes (very rarely) you might want to put a VC on screen yourself (i.e., not use a segue).

```
NSString *vcid = @"something";
UIViewController *controller = [storyboard instantiateViewControllerWithIdentifier:vcid];
```

  Usually you get the storyboard above from self.storyboard in an existing UIViewController.

  The identifier vcid must match a string you set in Xcode to identify a UIViewController there.

- Example: creating a UIViewController in a target/action method

  Lay out the View for a DoitViewController in your storyboard and name it "doit1".

```
- (IBAction)doit
{
    DoitViewController *doit =
        [self.storyboard instantiateViewControllerWithIdentifier:@"doit1"];
    doit.infoDoitNeeds = self.info;
    [self.navigationController pushViewController:doit animated:YES];
}
```

Note use of self.navigationController again.

Demo

- New application: Psychologist

  Our psychologist will make a diagnosis and use the Happiness MVC to communicate it.

  Psychologist really has no Model (perhaps its "diagnosis", but it doesn't store it anywhere).

  Some MVCs are just for presenting user-interface (e.g. `UINavigationController`).

- Watch for ...

  Reusing the Happiness MVC.

  Creating a segue between our new MVC and a Happiness MVC.

  Embedding our view controllers in a `UINavigationController`.

Coming Up

- Next Lecture
  iPad
- Friday
  Getting your application running on a device