Developing Applications for iOS

Lecture 5:
View Controllers and Storyboarding

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Content

- MVCs Working Together
- Segues
- Navigation Controllers
- View Controllers
- Tab Bar Controller

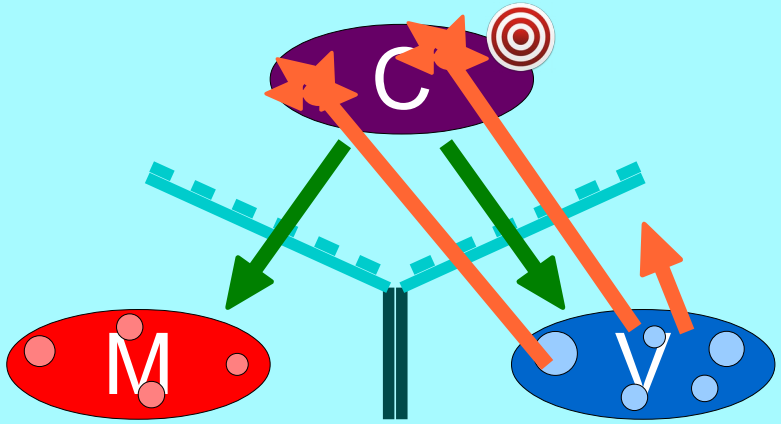
View Controller

- 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 link between that View and the Model (which is UI-independent).

So how do we grow our application to use multiple MVCs?

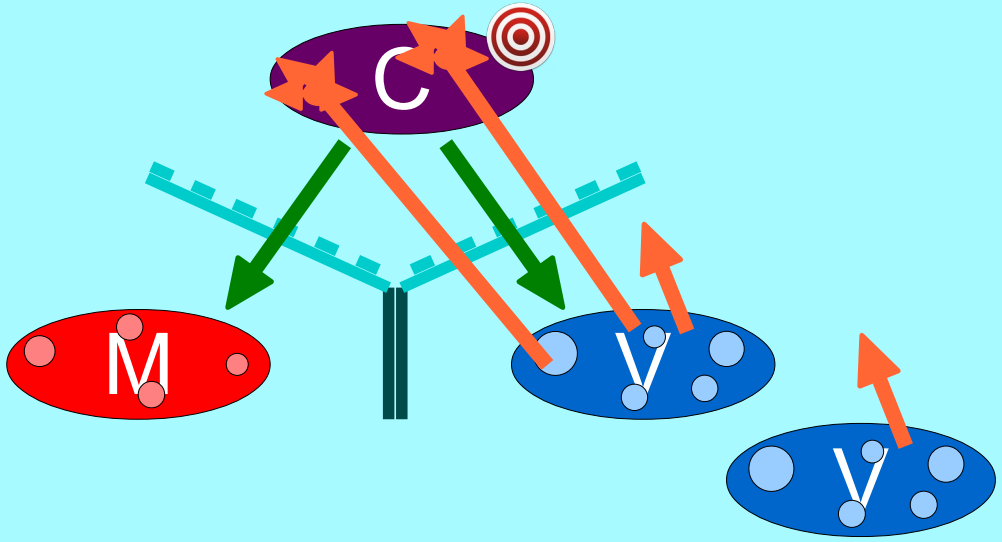
- We need infrastructure to manage them all.
- That's what storyboards and "controllers of controllers" are all about.

MVCs Working Together



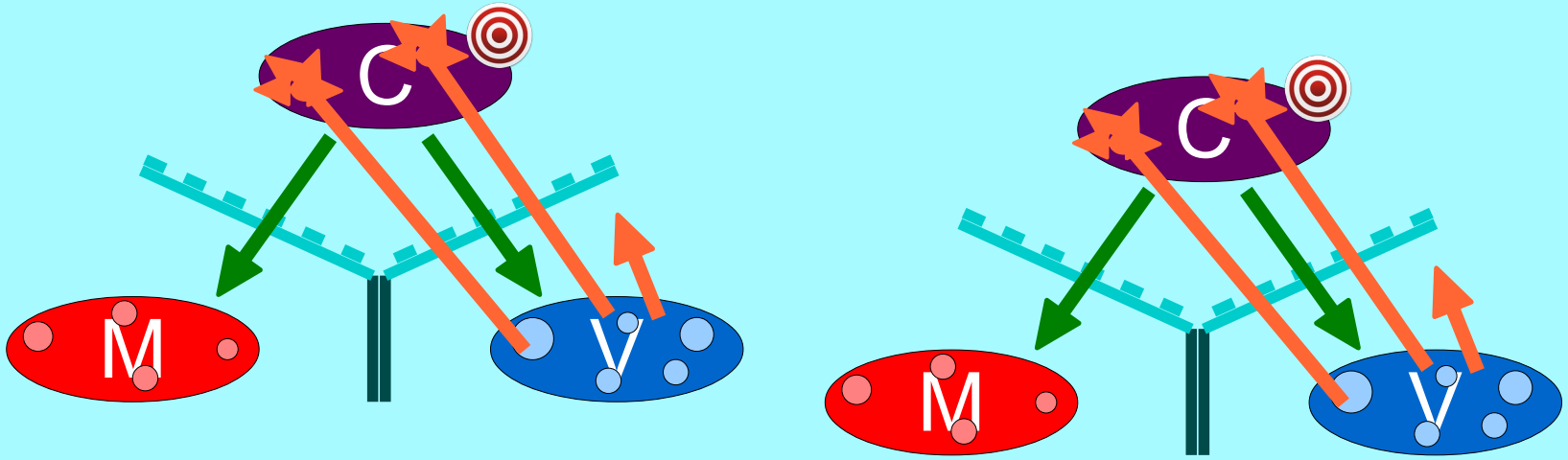
- What happens when your application gets more features?

MVCs Working Together



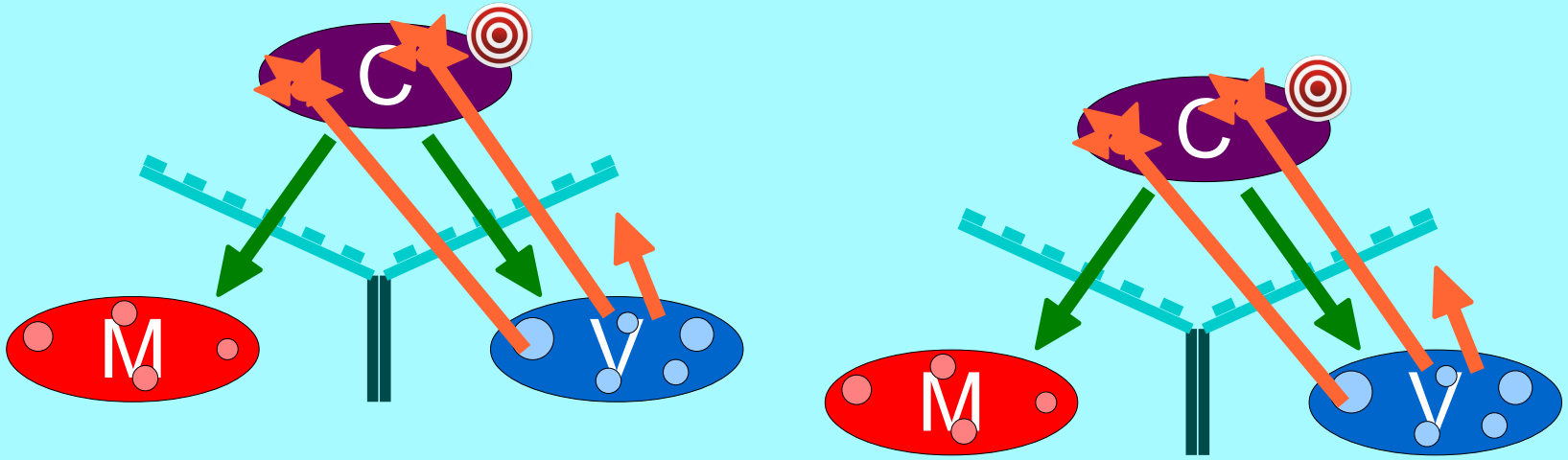
- What happens when your application gets more features?
- We have to add more Views. Now all of your UI can’t fit in one MVC’s view.

MVCs Working Together



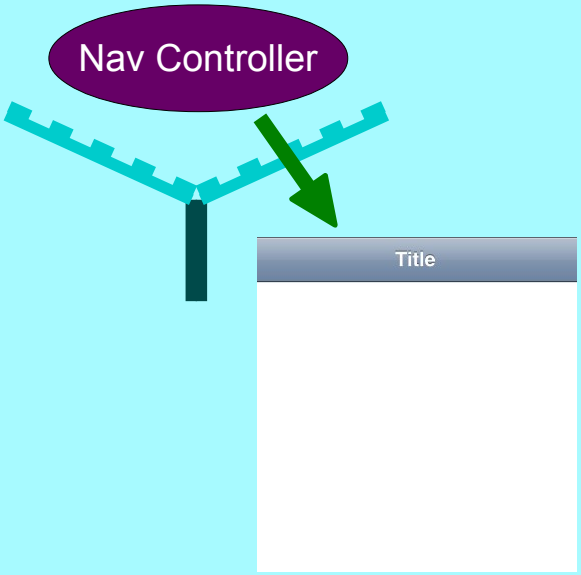
- What happens when your application gets more features?
- We never have an MVC's view span across screens. So we'll have to create a new MVC for these new features.

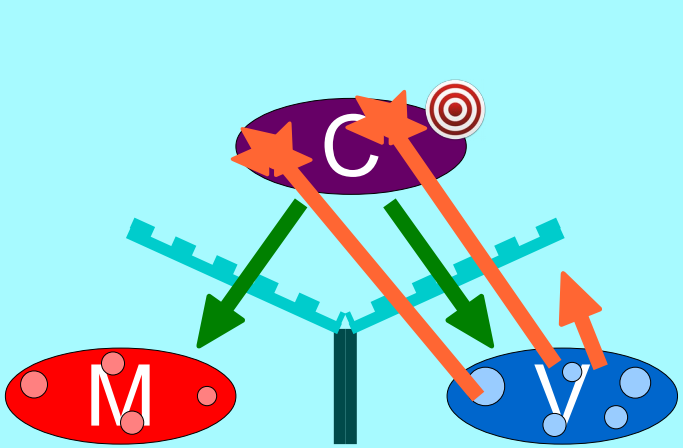
MVCs Working Together

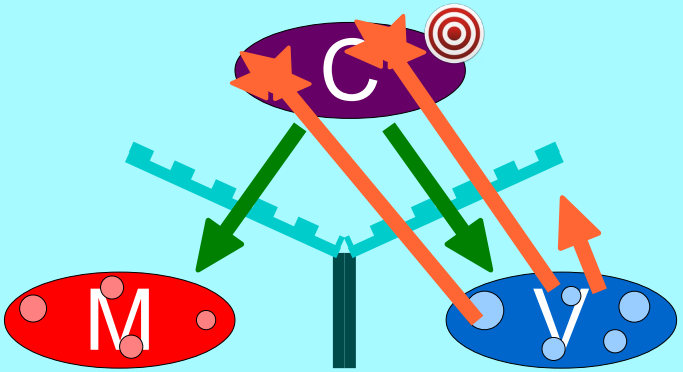


- So how do we switch the screen to show this other MVC?

MVCs Working Together

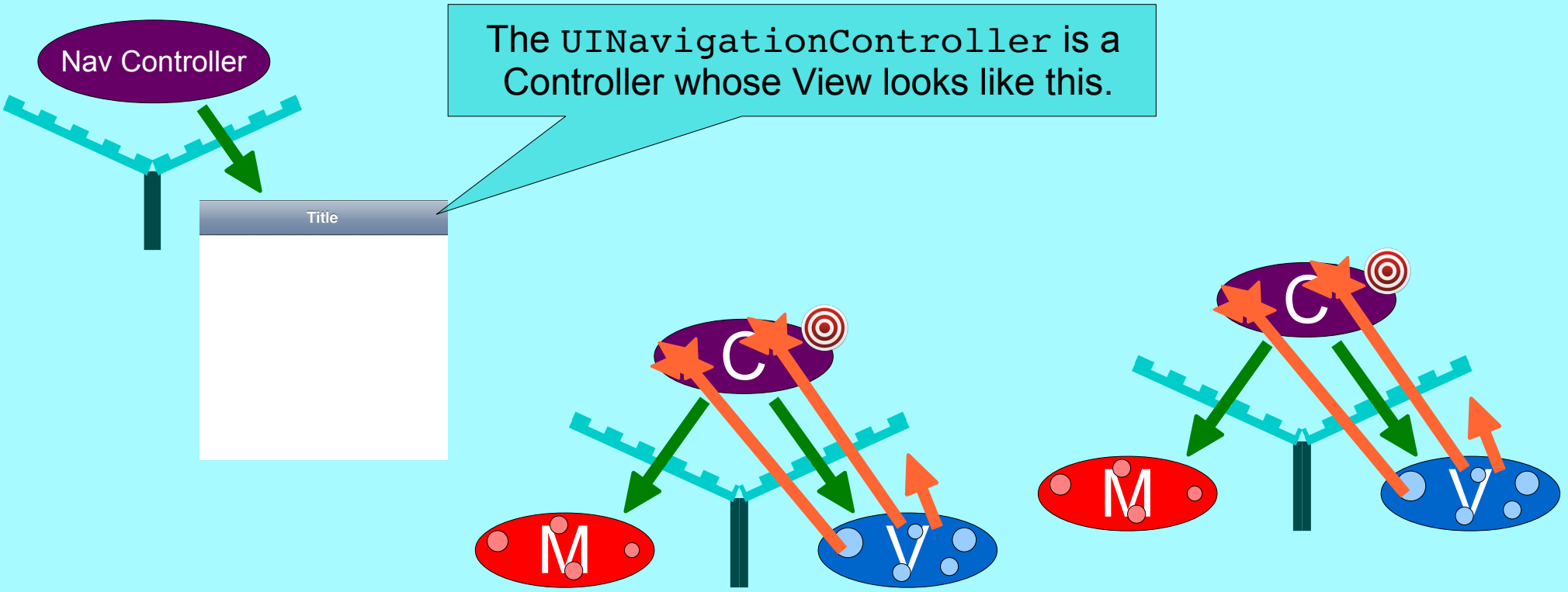




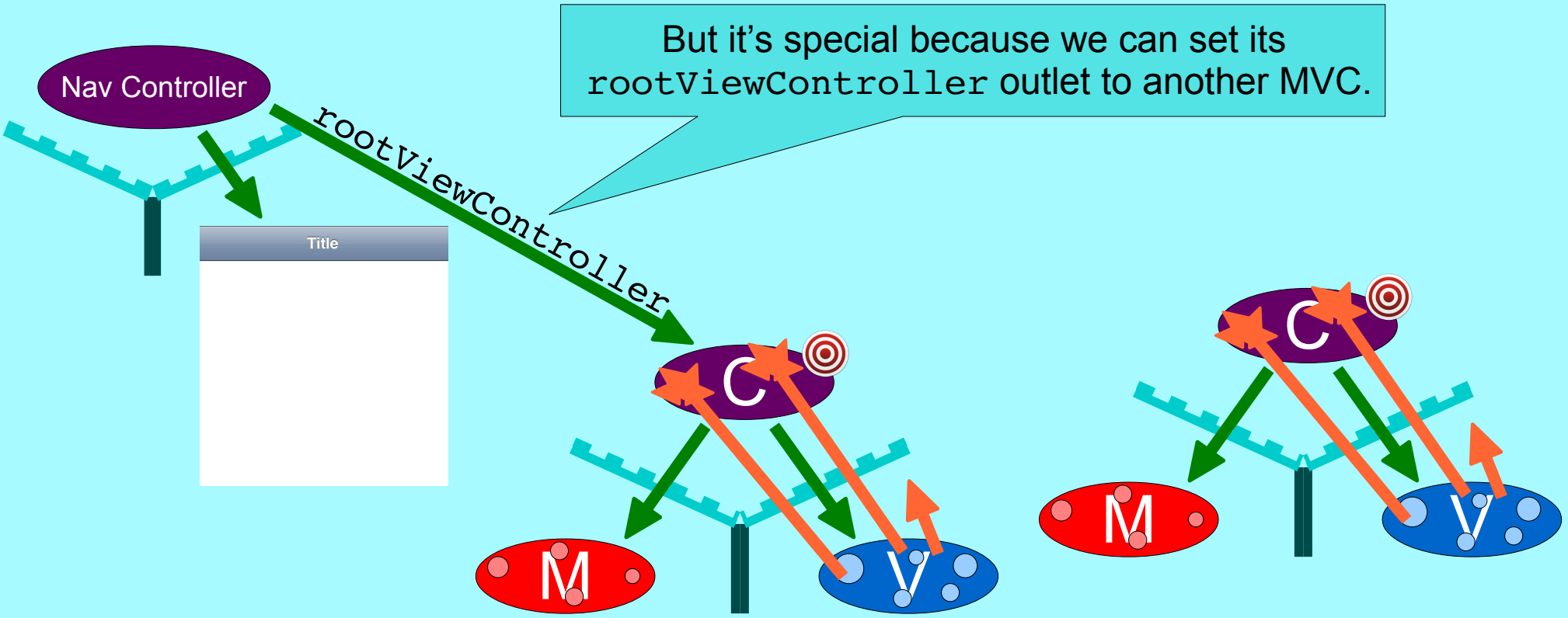


- So how do we switch the screen to show this other MVC?
- We use a “controller of controllers” to do that. For example, a `UINavigationController`.

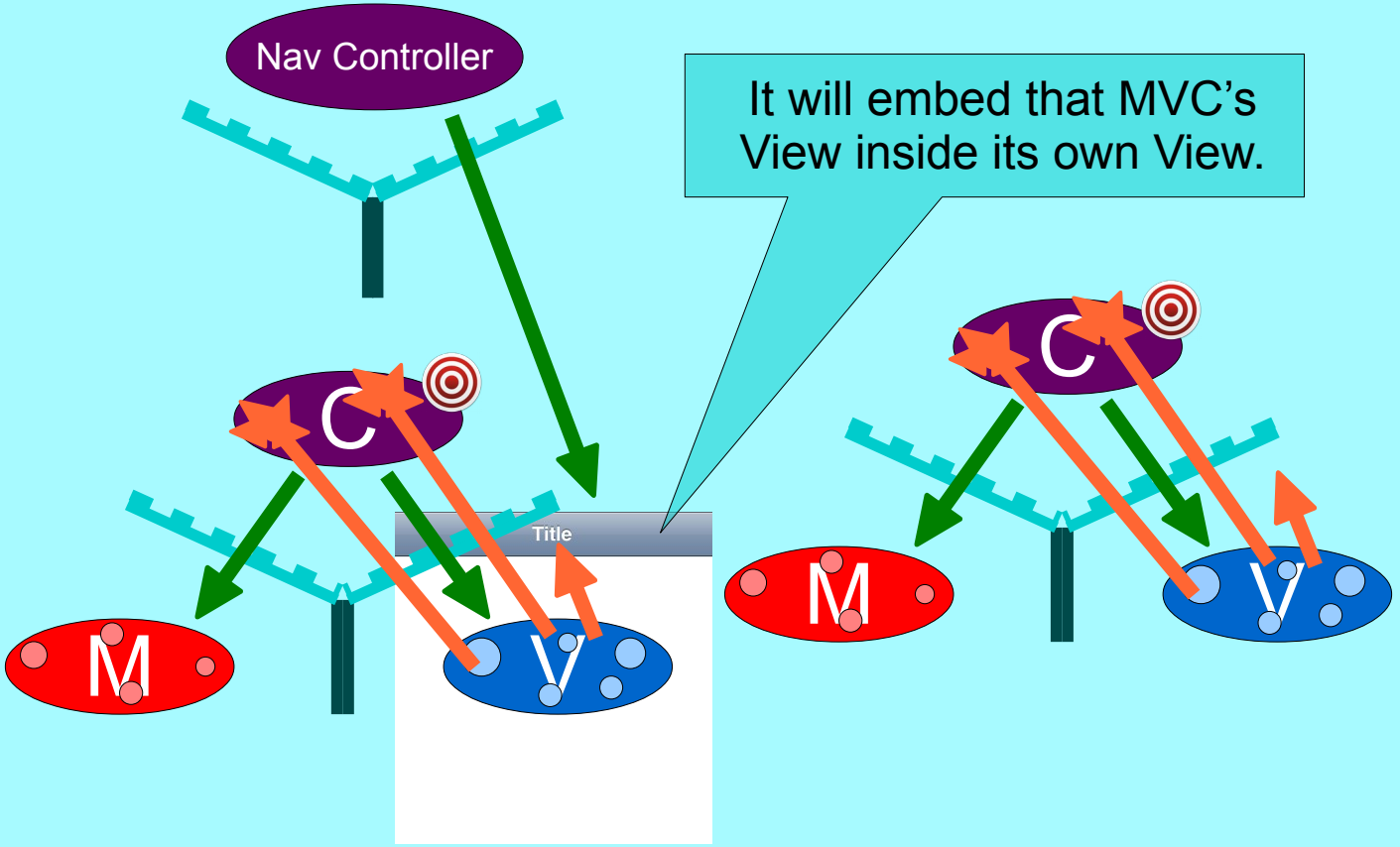
MVCs Working Together



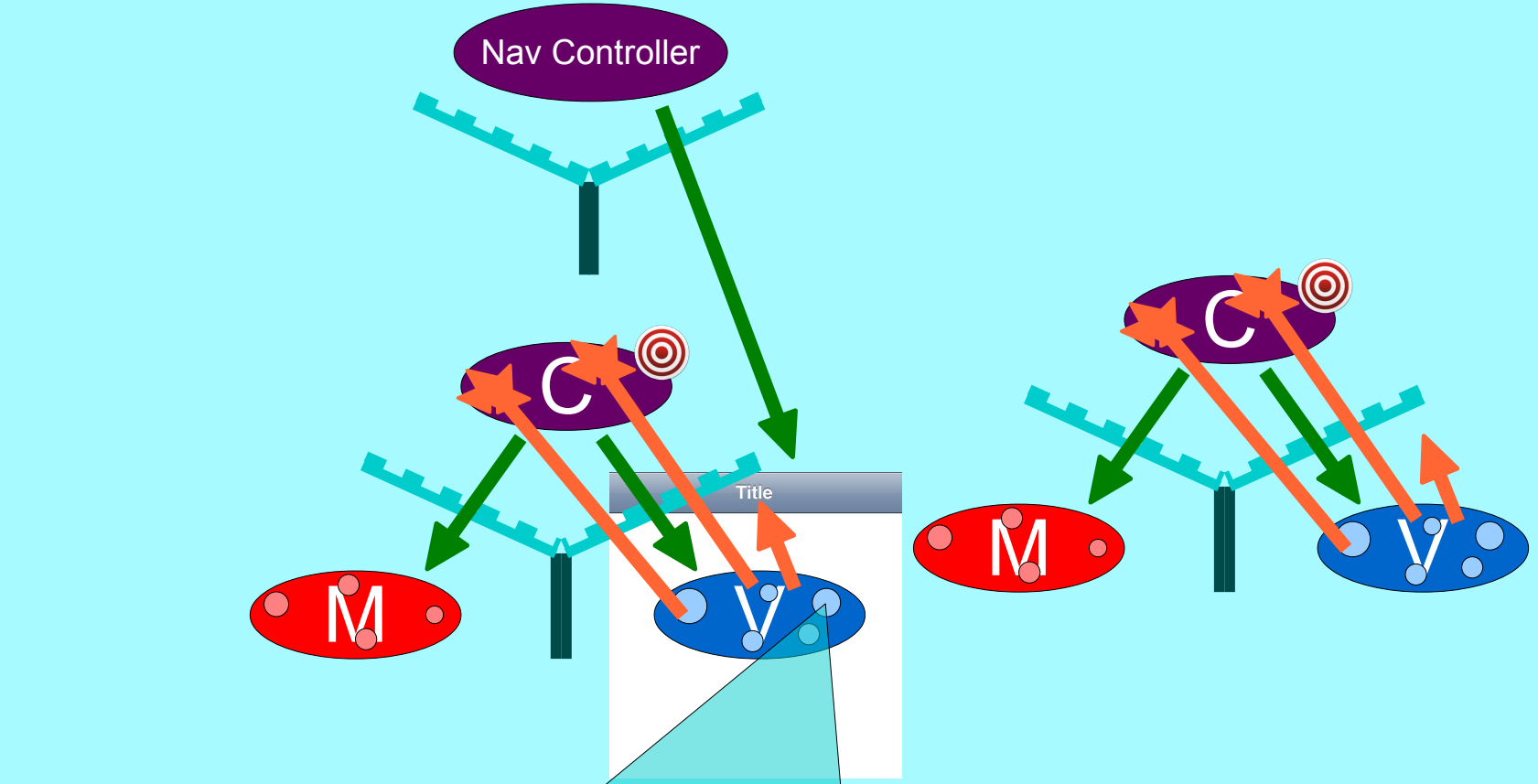
MVCs Working Together



MVCs Working Together

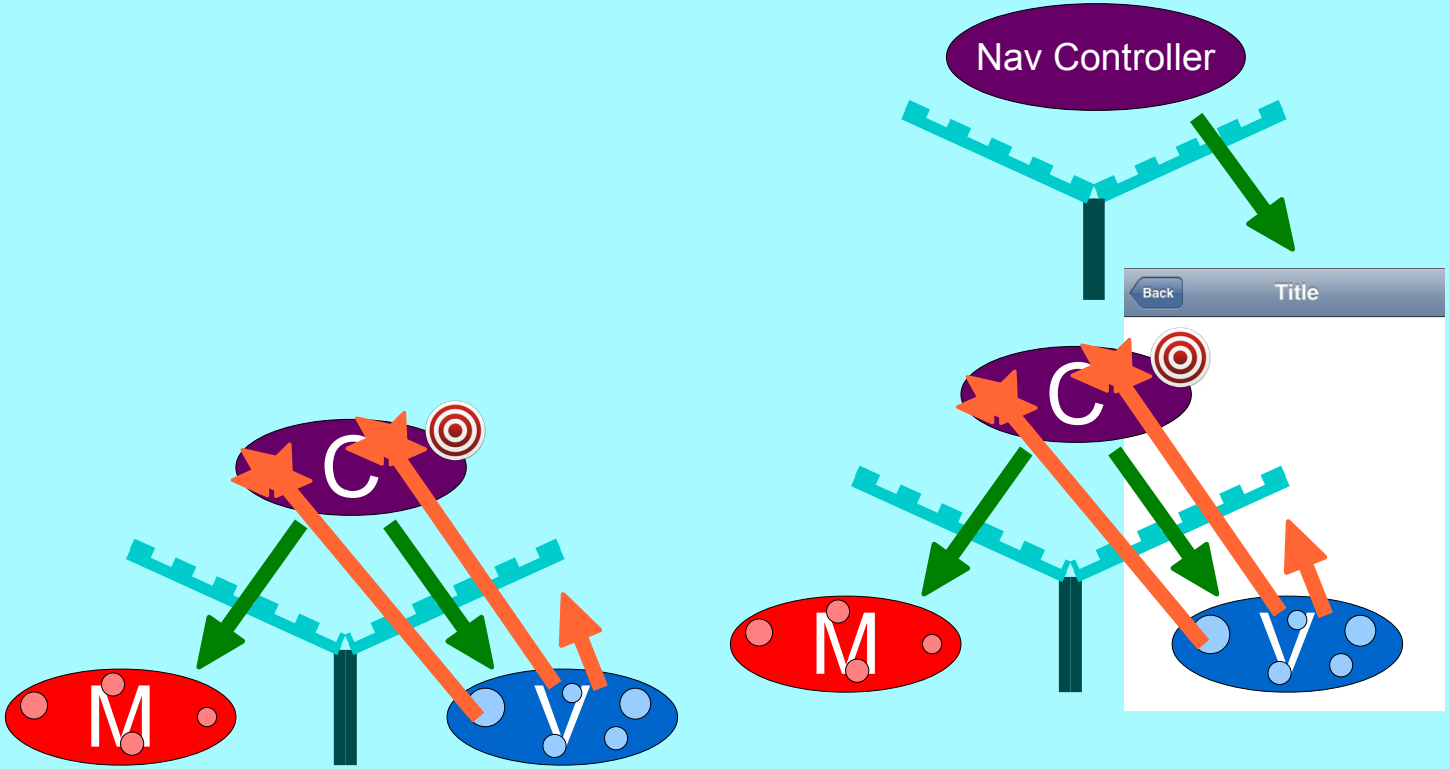


MVCs Working Together

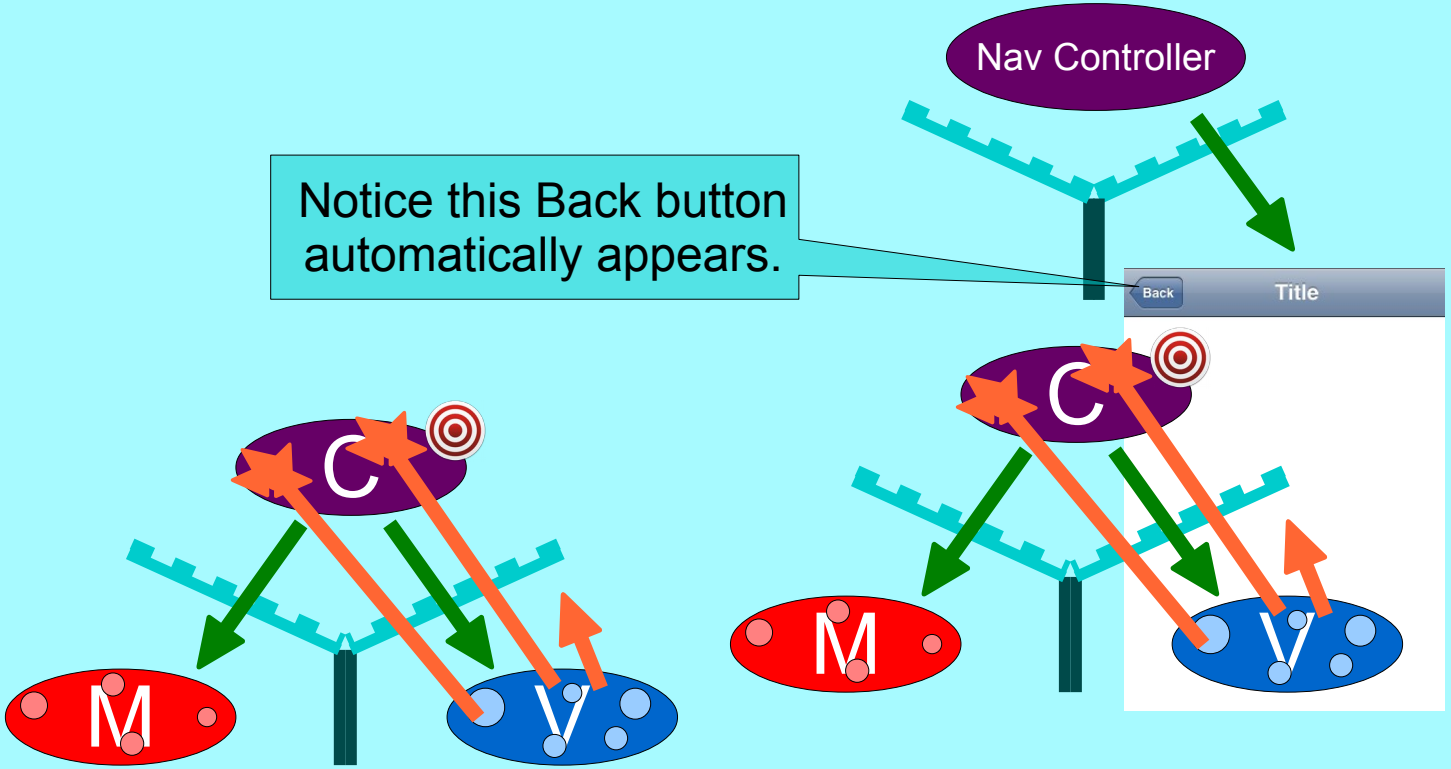


Then a UI element in this View (e.g. a `UIButton`) can **segue** to the other MVC and its View will now appear in the `UINavigationController`.

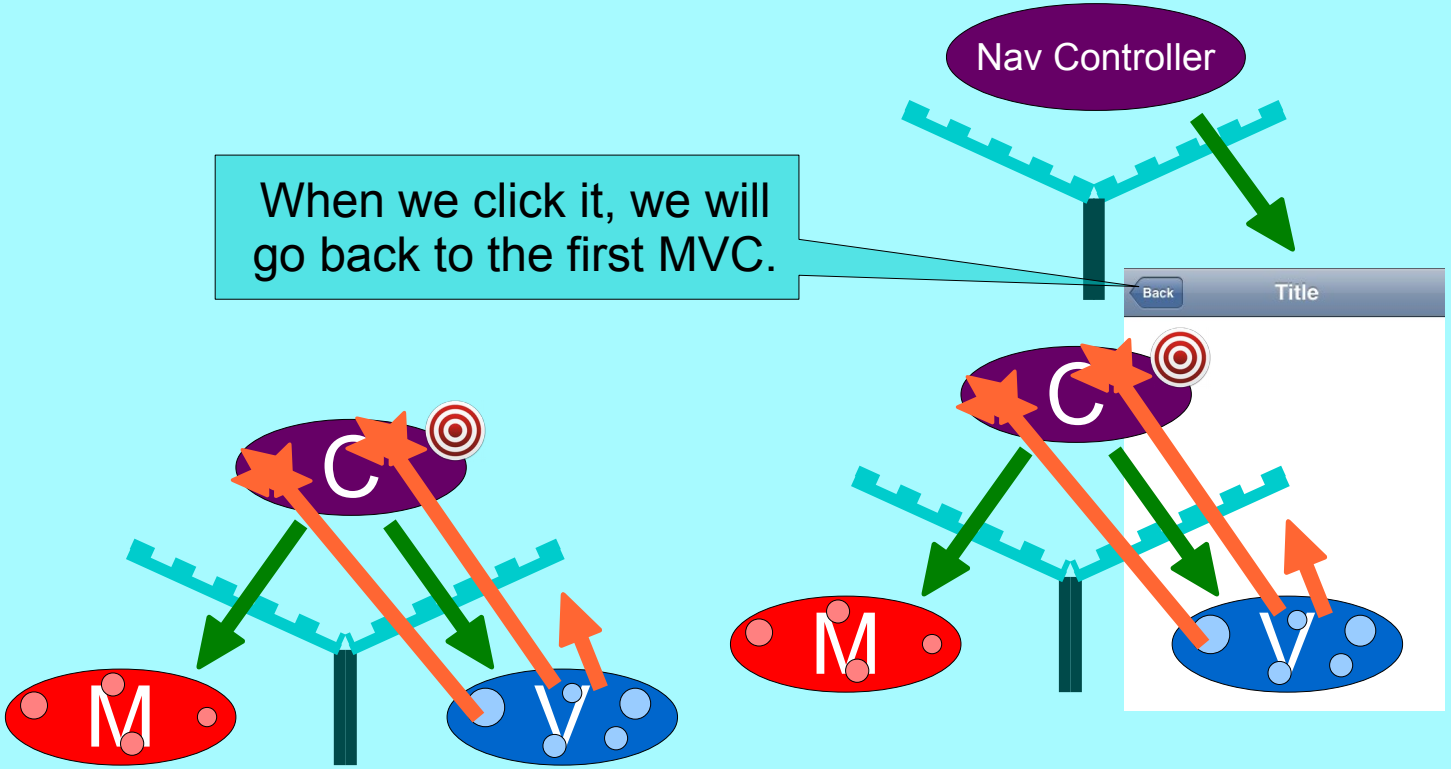
MVCs Working Together



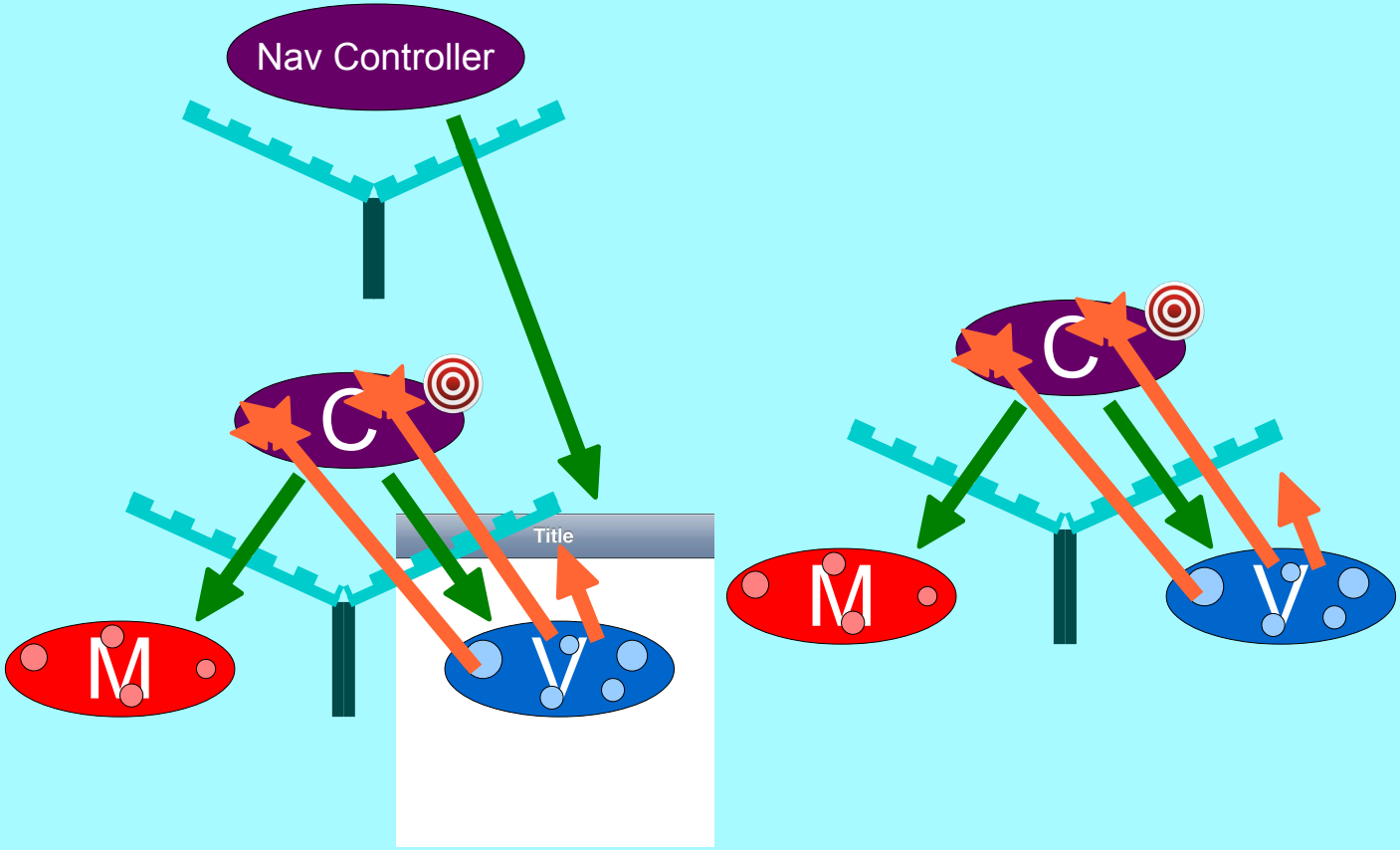
MVCs Working Together



MVCs Working Together



MVCs Working Together



Segues

Demo

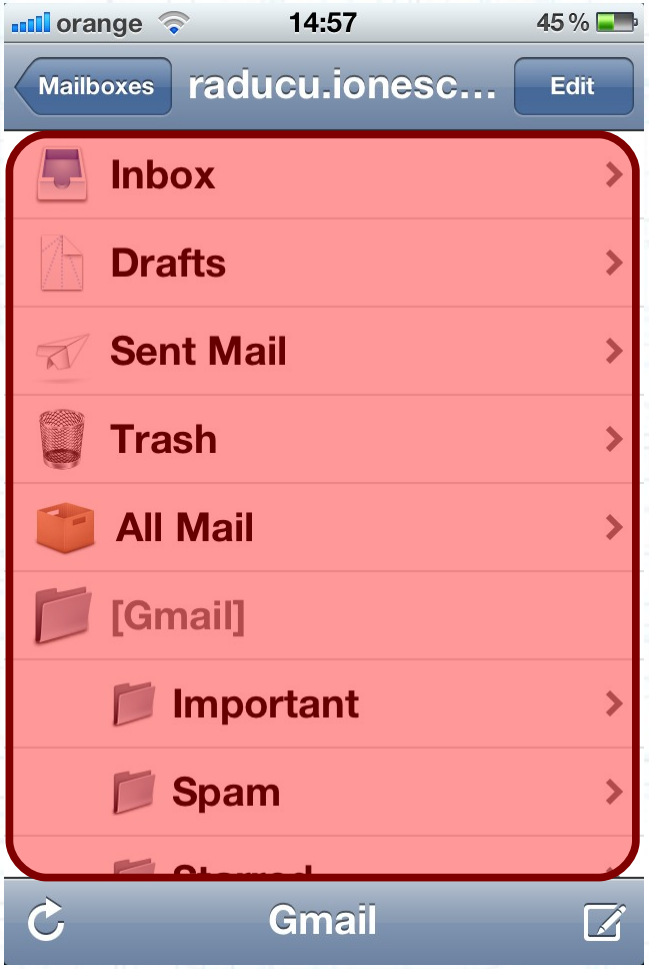
- Let’s talk about how the segue gets set up first.
- Then we’ll look at how we create a `UINavigationController` in our storyboard.

Segues

Demo

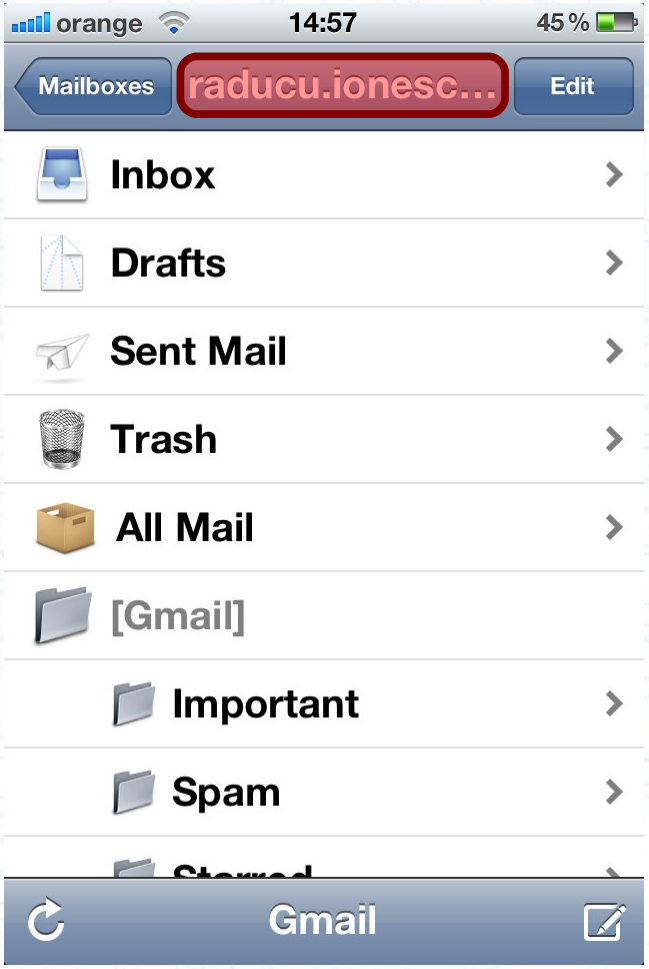
- You use the segue identifier in `prepareForSegue:sender:` to figure out which segue is happening.
- Or you can use it to programmatically force a segue with `performSegueWithIdentifier:sender:`.
- You can embed a View Controller in a `UINavigationController` from the Editor menu.

UINavigationController



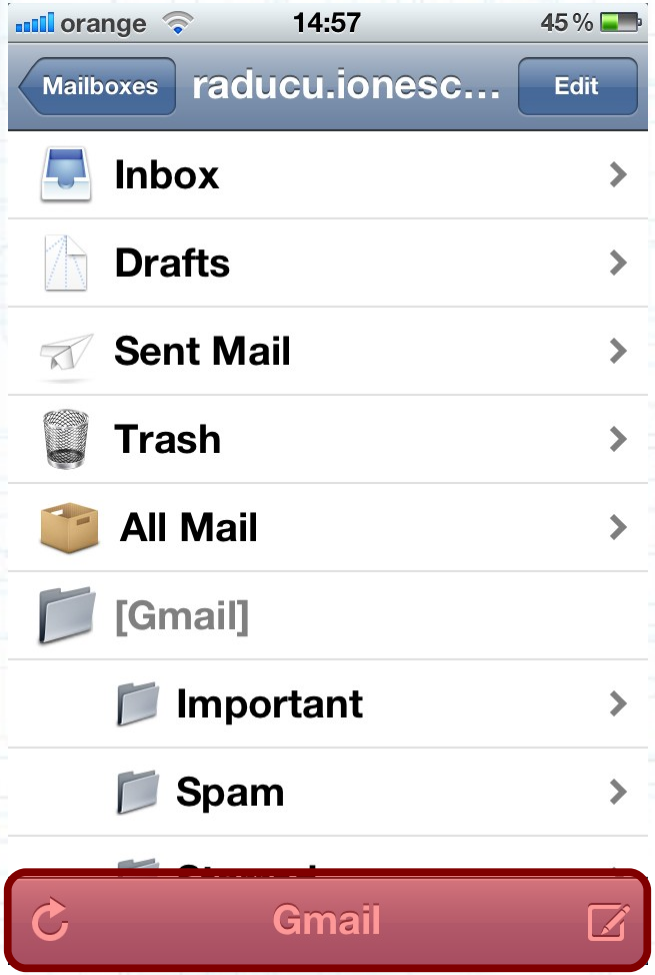
- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root).

UINavigationController



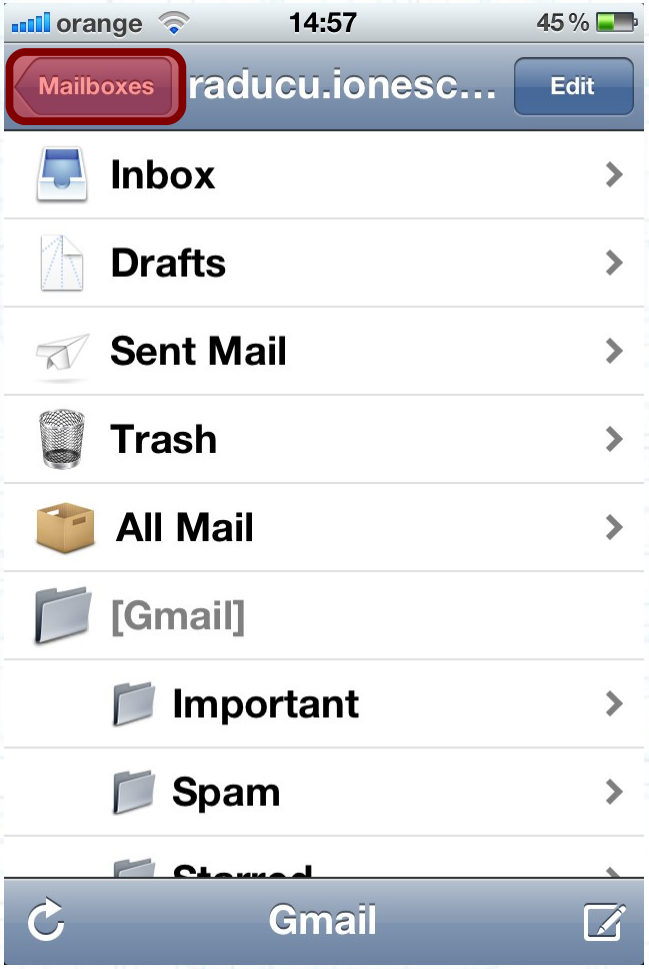
- `UIView` obtained from the `view` property of the `UIViewController` most recently pushed (or root).
- `NSString` obtained from the `title` property of the `UIViewController` most recently pushed (or root).

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.

UINavigationController

Example

- Let's say we push an MVC which displays a database record and has a delete button with 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
[self.navigationController popViewControllerAnimated:YES];
}
```

- 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

- Modal

  Puts the view controller up in a way that blocks the app until it is dismissed.

  People often use Modal UIs as a shortcut, so we don't want to go to that too early. We'll talk about Modal in detail later.

- Replace

  Replaces the right-hand side of a `UISplitViewController` (iPad only).

- Popover

  Puts the view controller on the screen in a popover (iPad only).

- Custom

  You can create your own subclasses of `UIStoryboardSegue`.

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 (we've seen how to do this during the Demo).
- The `sender` is the initiator of the segue (a `UIButton` or yourself (a `UIViewController`) usually).

View Controller

Firing off a segue from code

- Here is an example:

```
- (IBAction)bookHotelRoom
{
    if (self.desiredRoom == DoubleRoom)
    {
        [self performSegueWithIdentifier:@“AskAboutDouble”
                                  sender:self];
    }
    else
    {
        [self performSegueWithIdentifier:@“AskAboutSingle”
                                  sender:self];
    }
}
```

Segues

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

- The segue offers the source View Controller the opportunity to "prepare" the new View Controller to come on screen.
- This method is sent to the View Controller 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. */
    }
}
```

Segues

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

- You should pass data the new View Controller needs in `prepareForSegue:sender:` and “let it run”.
- Think of the new View Controller as part of the View of the Controller that initiates the segue.
- It must play by the same rules as a View in a MVC.
- For example, it should not talk back to you except through delegation.
- So, for complicated MVC relationships, you might well set the new View Controller’s delegate to self here.

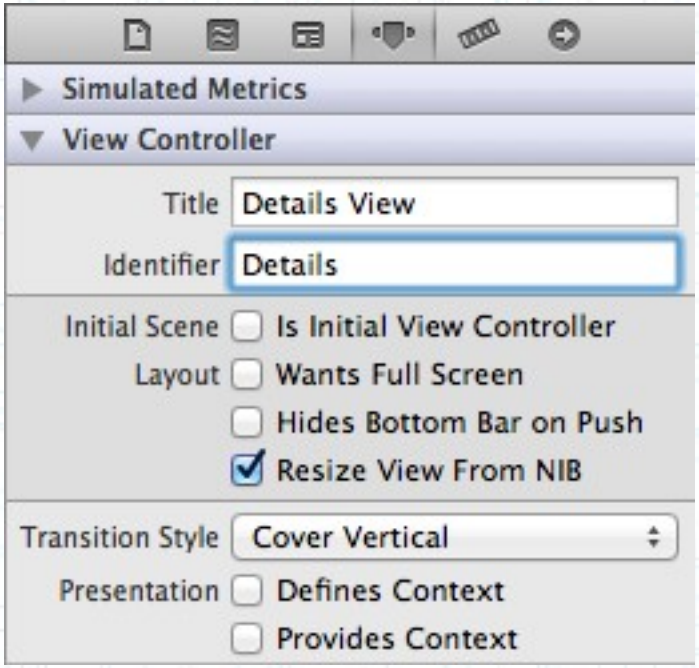
View Controller

Instantiating a `UIViewController` by name from a storyboard

- Sometimes you might want to put a View Controller on screen yourself (without using 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 Interface Builder to identify a `UIViewController` there.



View Controller

Instantiating a `UIViewController` by name from a storyboard

- Example: Creating a `UIViewController` in a target/action method. Lay out the View for a `DetailsViewController` in the storyboard and name it “Details”.

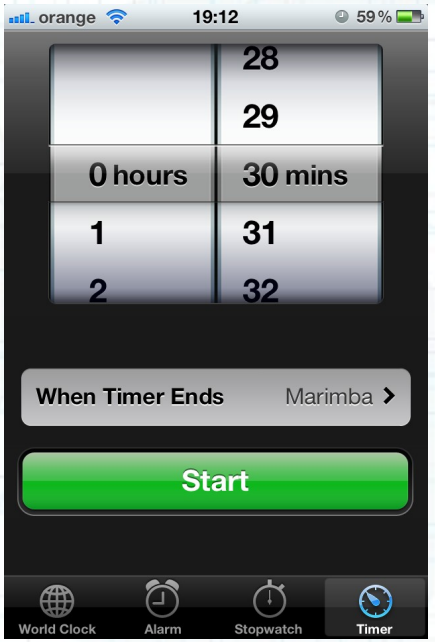
```
- (IBAction)showDetails
{
    DetailsViewController *details = [self.storyboard
        instantiateViewControllerWithIdentifier:@”Details”];
    details.infoDetailsNeeds = self.info;
    [self.navigationController  pushViewController:details
                                                animated:YES];
}
```

- Note use of `self.navigationController` again when we push the new View Controller.

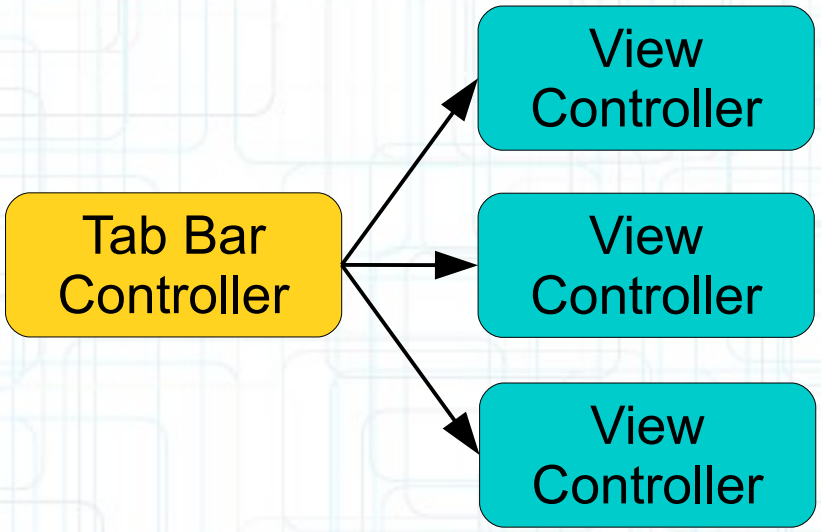
UITabBarController

Another “controller of controllers”

- Mostly set up with CTRL-drag just like navigation controller.



UITabBarController

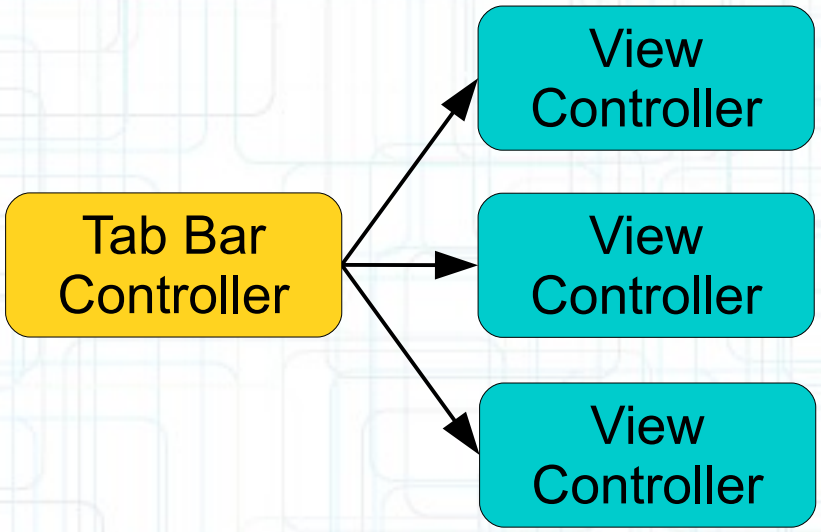


- You CTRL-drag to create these connections in Interface Builder.
- Doing so is setting the

```
@property (nonatomic, strong) NSArray *viewControllers;
```

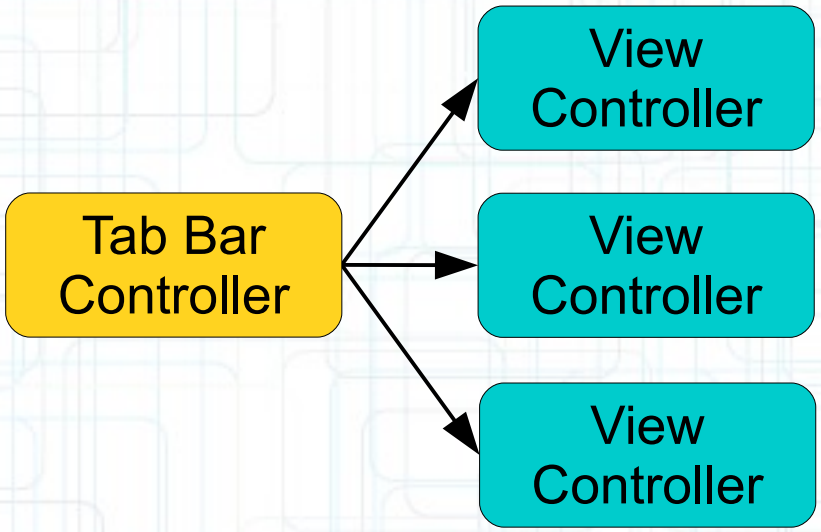
inside your `UITabBarController`.

UITabBarController



By default this is the `UIViewController`'s `title` property (and no image). But usually you set both of these in your storyboard in Interface Builder.

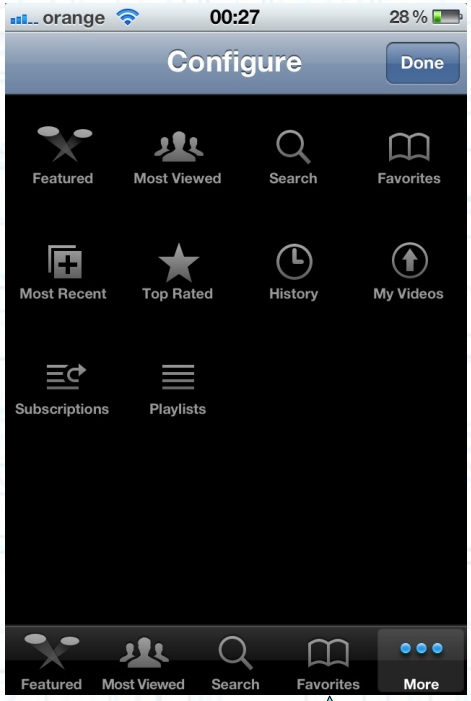
UITabBarController



- `UIViewController`'s `tabBarItem` property can be used to set attributes for that View Controller's tab.
- Example:

```
- (void)somethingHappenedToShowABadgeValue
{
        self.tabBarItem.badgeValue = @"-";
}
```

UITabBarController



What if there are more than 5 View Controllers?

Tab Bar Controller

- View Controller
- View Controller
- View Controller
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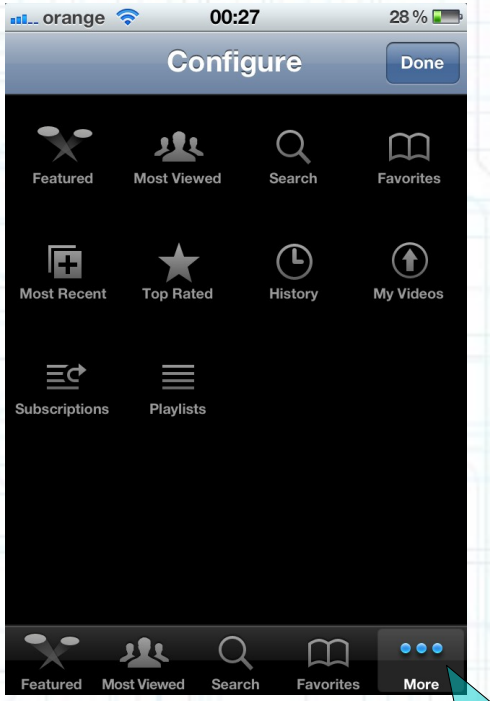
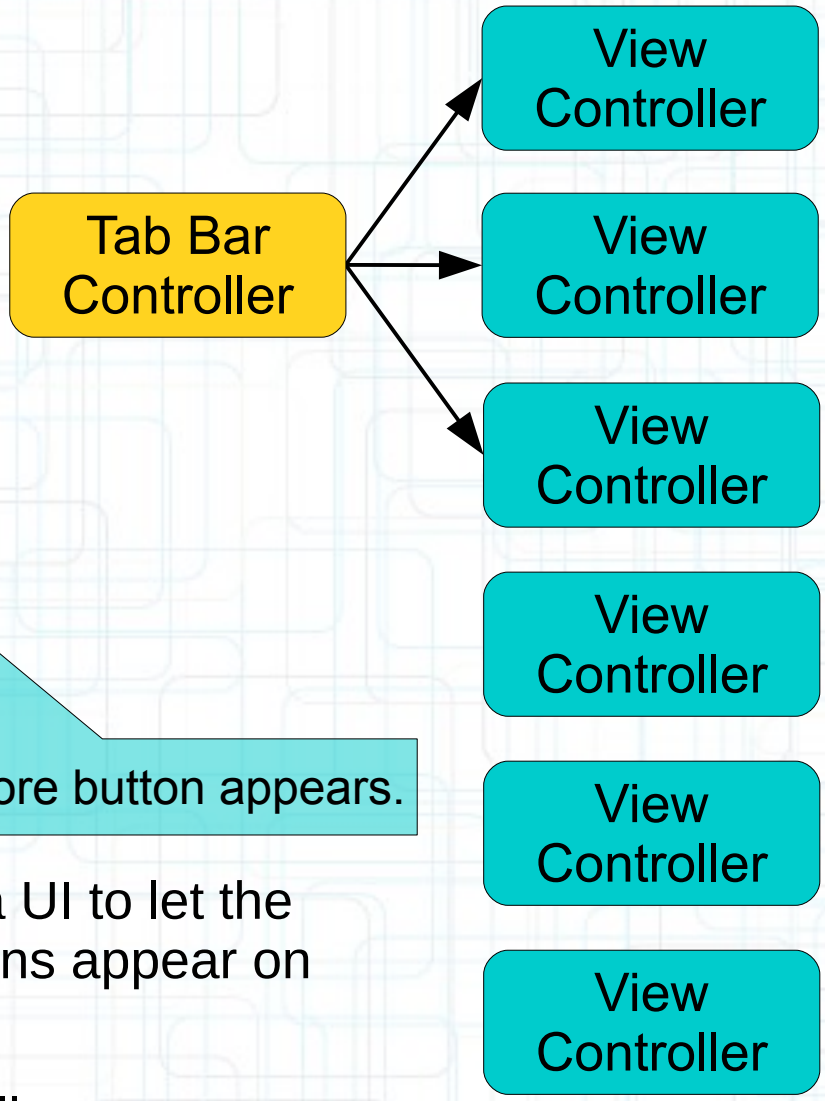
- View Controller

UITabBarController





- More button brings up a UI to let the user edit which buttons appear on bottom row.
- All happens automatically.

Combine

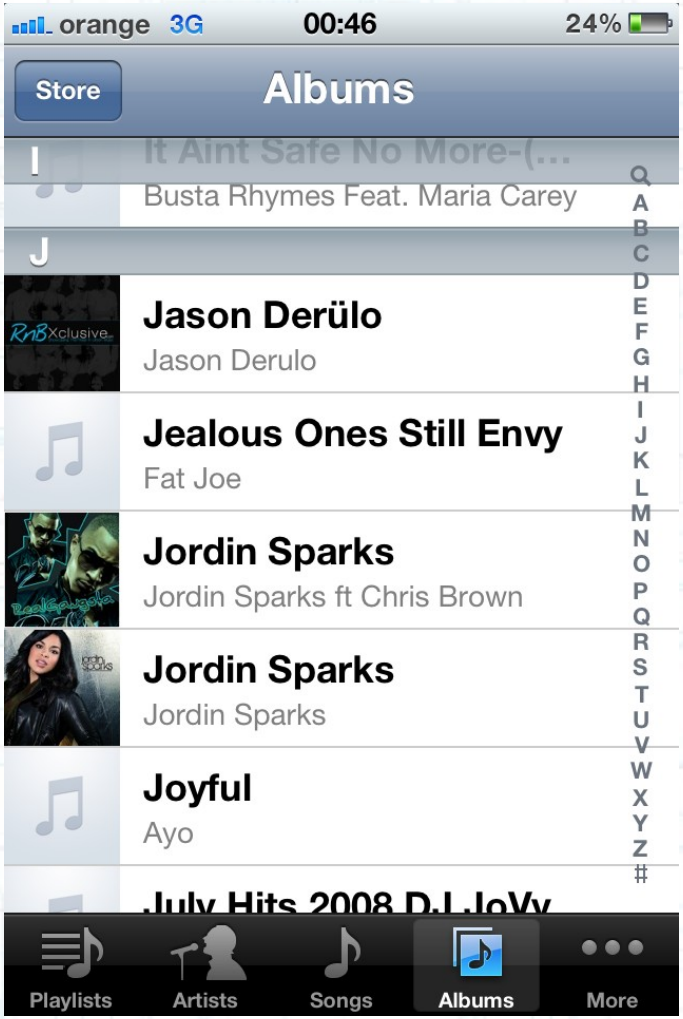
Is it possible to combine `UINavigationController` and `UITabBarController`?

- Certainly. Quite common.
- The `UINavigationController` always goes “inside” the `UITabBarController`.
- Never the other way around.

Demo (continued)

- How to combine the two “controller of controllers”.

Combine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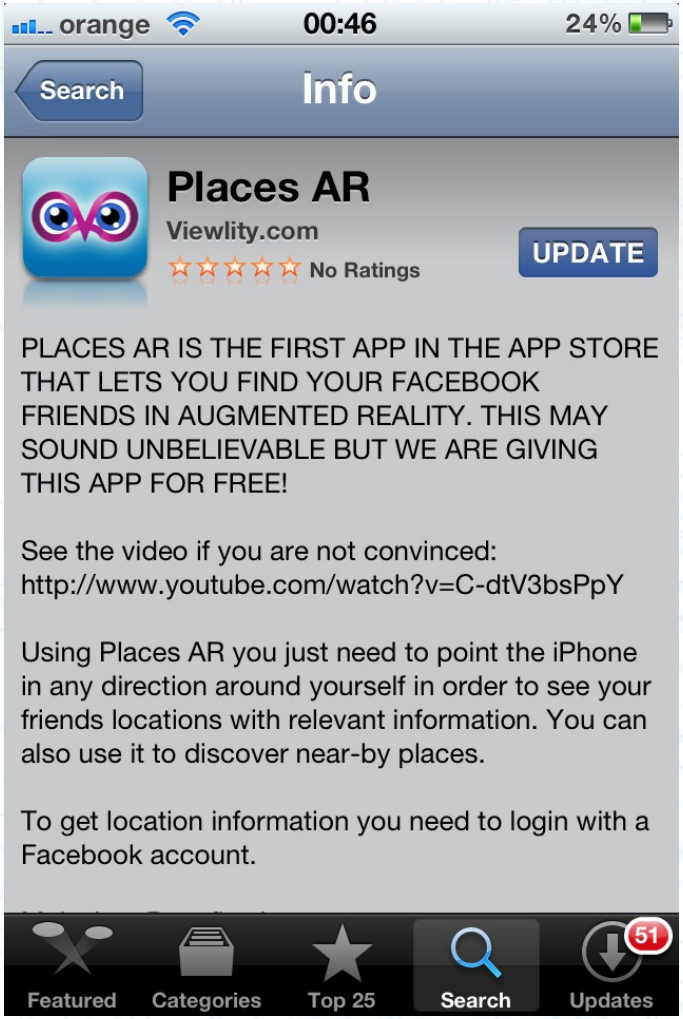
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UPDATE
PLACES AR IS THE FIRST APP IN THE APP STORE THAT LETS YOU FIND YOUR FACEBOOK FRIENDS IN AUGMENTED REALITY. THIS MAY SOUND UNBELIEVABLE BUT WE ARE GIVING THIS APP FOR FREE!
See the video if you are not convinced:
http://www.youtube.com/watch?v=C-dtV3bsPpY
Using Places AR you just need to point the iPhone in any direction around yourself in order to see your friends locations with relevant information. You can also use it to discover near-by places.
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UINavigationController

Modifying buttons and toolbar items in a navigation controller

- You can set most of this up in Xcode by dragging items into your scene.
- But you may want to add buttons or change buttons at run time too. Use `UIViewController`'s `navigationItem` property:

```
@property (nonatomic, strong)
                        UINavigationItem *navigationItem;
```

UINavigationController

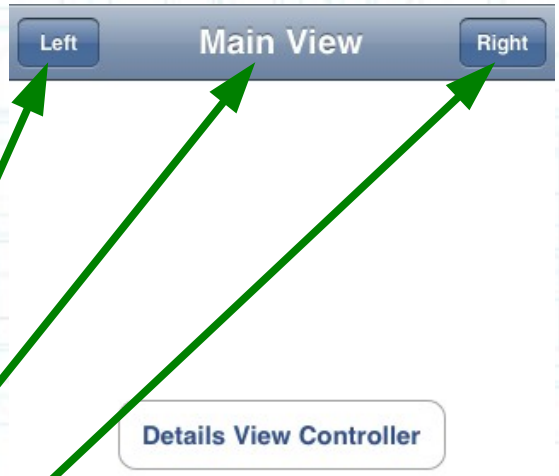
Modifying buttons and toolbar items in a navigation controller

- Think of `navigationItem` as a holder for things `UINavigationController` will need when that `UIViewController` appears on screen.

```
@property (nonatomic, copy)
          NSArray *leftBarButtonItems;

@property (nonatomic, strong)
                    UIView *titleView;

@property (nonatomic, copy)
          NSArray *rightBarButtonItems;
```



- When this `UIViewController` is not on the top of the Navigation Controller stack:

```
@property (nonatomic, copy)
       UIBarButtonItem *backButtonItem;
```

These bar button items are not set via the `navigationItem`
They are set via the `toolbarItems` property in `UIViewController`.

Next Time

Table Views:

- `UITableView`
- Creating Table View MVCs
- `UITableViewDataSource`
- `UITableViewDelegate`