

Chapter 17:

Autorotation, Popover Controllers, and Modal View Controllers

- Autorotation
- Rotation Notification
- UIPopoverController
- More Modal View Controllers
- Thread-Safe Singletons

Quick Review

- So far we have examined four ways in which a view controller can displays its view:
 - Setting it as a root view for a window as in the `table` view of our homeowner app.
 - Pushing it on the stack of a `UINavigationController` such as the details view of item (Chapter 10).
 - Adding it as a tabed view of `UITabBarController` as we saw in the `HypnoTime` app.
 - Presenting it modally as we did in the image picker in the homeowner app.

More Changes to homeowner

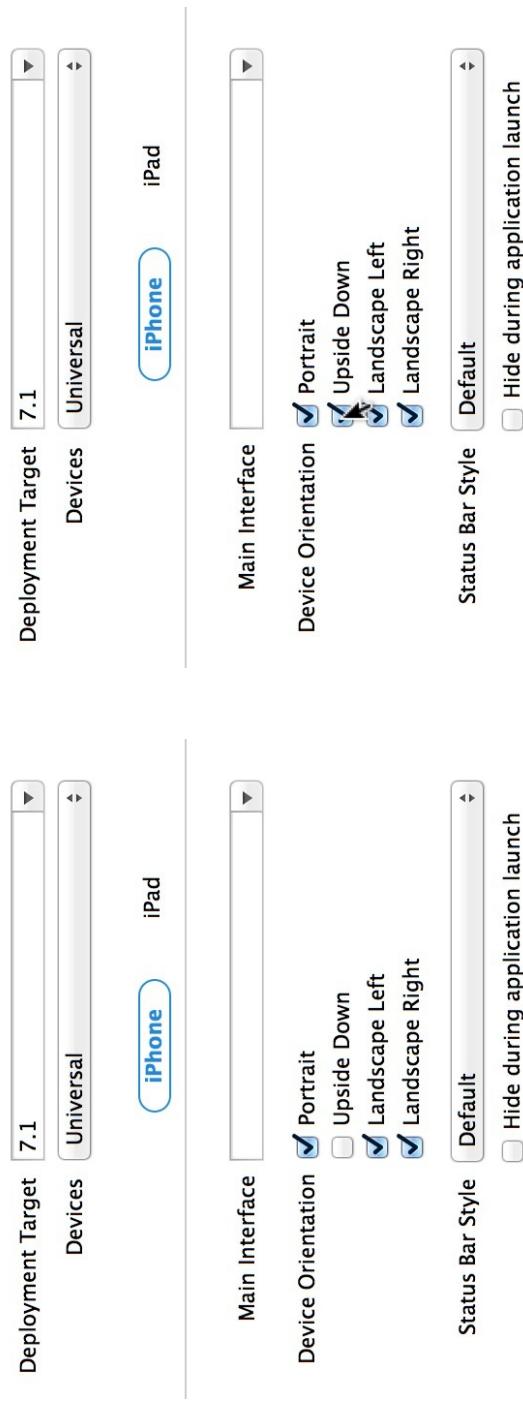
- When designing a universal application, we often need the application to behave differently depending on the type of device being used.
 - The different devices have different idioms that users expect, so identical behavior or features on every device would feel foreign at times.
- In this chapter, we are going to make four changes to Homeowner's behavior that will tailor the app's behavior to whatever device it is running on.
 - On iPads only, allow the interface to rotate when the device is upside down.
 - On iPads only, show the image picker in a popover controller when the user presses the camera button.
- On iPads only, present the detail interface modally when the user creates a new item.
- On iPhones only, disable the camera button in the detail interface when the device is in landscape orientation.
- We are going to learn how to test for the type of the device and write device-specific code.
- We will also learn about rotation, popover controllers, and more about modal view controllers.

Autorotation

- There are two distinct orientations in iOS:
 - device orientation and
 - interface orientation.
- The device orientation represents the physical orientation of the device, whether it is right-side up, upside down, rotated left, rotated right, on its face, or on its back.
- We can access the device orientation through the `UIDevice` class's orientation property.
- The interface orientation is a property of the running application.
- Possible interface orientations:
 - `UIInterfaceOrientationPortrait` (The Home button is below the screen).
 - `UIInterfaceOrientationPortraitUpsideDown` (The Home button is above the screen).
 - `UIInterfaceOrientationLandscapeLeft` (The device is on its side and the Home button is to the right of the screen).
 - `UIInterfaceOrientationLandscapeRight` (The device is on its side and the Home button is to the left of the screen).

Allowable Device Orientation

- An iPad application can rotate to all four orientations
- An iPhone application can rotate in any orientation other than upside down.
- In addition to the application choosing which interface orientations are acceptable, the view controller that is occupying the screen also gets a say
- Each view controller implements a method that returns all of the interface orientations it supports.
- For the interface orientation to change, both the rootViewController of the application and the application itself must agree that the new orientation is OK.



Supported Orientations

- If you would like to change the supported orientations for a view controller, you must override the method:
supportedInterfaceOrientations:
- The default implementation is:

```
57 - (NSUInteger) supportedInterfaceOrientations
58 {
59     if ([UIDevice currentDevice].userInterfaceIdiom == UIUserInterfaceIdiomPad) {
60         return UIInterfaceOrientationMaskAll;
61     } else {
62         return UIInterfaceOrientationMaskAllButUpsideDown;
63     }
64 }
65 }
```

UIInterfaceOrientationMask

These constants are mask bits for specifying a view controller's supported interface orientations.

```
typedef enum : NSUInteger {
    UIInterfaceOrientationMaskPortrait = (1 << UIInterfaceOrientationPortrait),
    UIInterfaceOrientationMaskLandscapeLeft = (1 << UIInterfaceOrientationOrientationLandscapeLeft),
    UIInterfaceOrientationMaskLandscapeRight = (1 << UIInterfaceOrientationOrientationLandscapeRight),
    UIInterfaceOrientationMaskPortraitUpsideDown = (1 << UIInterfaceOrientationOrientationPortraitUpsideDown),
    UIInterfaceOrientationMaskLandscape =
        (UIInterfaceOrientationMaskLandscapeLeft | UIInterfaceOrientationMaskLandscapeRight),
    UIInterfaceOrientationMaskAll =
        (UIInterfaceOrientationMaskPortrait | UIInterfaceOrientationMaskLandscapeLeft |
        UIInterfaceOrientationMaskLandscapeRight | UIInterfaceOrientationMaskPortraitUpsideDown),
    UIInterfaceOrientationMaskAllButUpsideDown =
        (UIInterfaceOrientationMaskPortrait | UIInterfaceOrientationMaskLandscapeLeft |
        UIInterfaceOrientationMaskLandscapeRight),
} UIInterfaceOrientationMask;
```

Overriding Supported Orientation

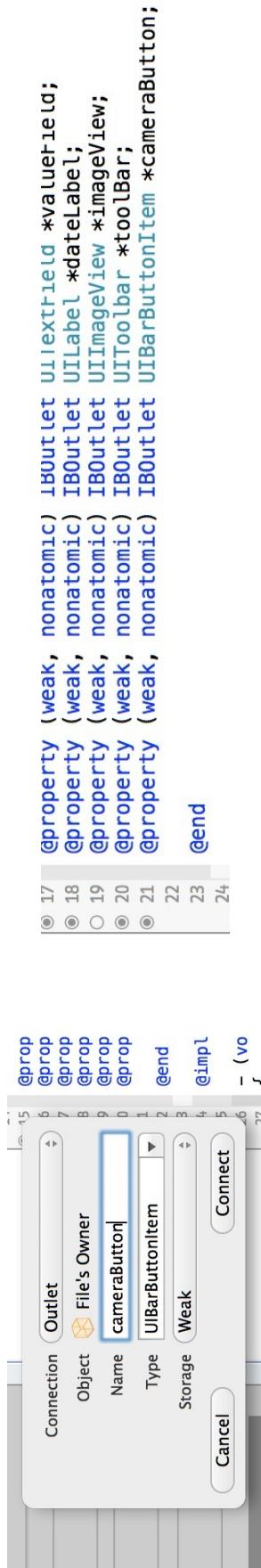
- In many apps, the screen is occupied by a UINavigationController or a UITabBarController.
- UINavigationController uses the *supportedInterfaceOrientations* inherited from UIViewController.
 - If you want the view controller being displayed by the UINavigationController to determine the autorotation mask, subclass UINavigationController and override *supportedInterfaceOrientations*
- UITabViewController asks the view controller for each of its tabs for its supported interface orientations and returns the intersection.
- UITabViewController only supports an orientation if all its tabs support it.

Rotation Notification

- There are times when we want to do something special in a view controller when the device orientation changes.
- In Homeowner, one issue is that on an iPhone, the UIImageView on the INIDetailViewController becomes too small in landscape orientation.
- It would make more sense to limit the user to taking and viewing the picture in portrait orientation. To make this happen, you need to hide the image view and disable the camera button when the application is in landscape orientation.
- I need a pointer to the camera button so that I can hide it.

Camera Button Outlet

Name	
Serial	
Value	
Label	



Hiding the Image and Camera Button

```
177 -void) prepareViewsForOrientation:(UIInterfaceOrientation) orientation  
178 {  
179     // Is it an iPad? No preparation necessary  
180     if ([UIDevice currentDevice].userInterfaceIdiom == UIUserInterfaceIdiomPad) {  
181         return;  
182     }  
183     // Is it landscape?  
184     if (UIInterfaceOrientationIsLandscape(orientation)) {  
185         self.imageView.hidden = YES;  
186         self.cameraButton.enabled = NO;  
187     } else {  
188         self.imageView.hidden = NO;  
189         self.cameraButton.enabled = YES;  
190     }  
191 }
```

<https://developer.apple.com/library/ios/featuredarticles/ViewController/RespondingtoDeviceOrientationChanges.html>

```
193 - (void) willAnimateRotationToInterfaceOrientation:(UIInterfaceOrientation) toInterfaceOrientation duration:(NSTimeInterval) duration
194 {
195     [self prepareViewForOrientation: toInterfaceOrientation];
196 }
197 }
198 |
```

The code above is part of a method implementation. It contains a call to `[self prepareViewForOrientation: toInterfaceOrientation];`. This step is crucial in the rotation process. If your layout code needs to know the current orientation of the device, it can read the app object's `statusBarOrientation` property to determine the current orientation.

```
- (void) viewWillDisappear:(BOOL) animated  
{  
    [super viewWillDisappear: animated];  
  
    UIInterfaceOrientation io = [[UIApplication sharedApplication] statusBarOrientation];  
    [self prepareViewsForOrientation: io];
```

```
INIIItem *item = self.item;
self.nameField.text = item.itemName;
```

UIPopoverController

- A popover controller displays another view controller's view in a bordered window that floats above the rest of the application's interface.
- It is only available on iPads.
- When you create a UIPopoverController, you set this other view controller as the popover controller's contentViewController.
- Popover controllers are useful when giving the user a list of choices (like picking a photo out of the photo library) or some extra information about something that is summarized on the screen.
- For example, a form may have some buttons next to some of the fields. Tapping on the button would reveal a popover whose contentViewController explains the intended use of that field.

UIPopoverController

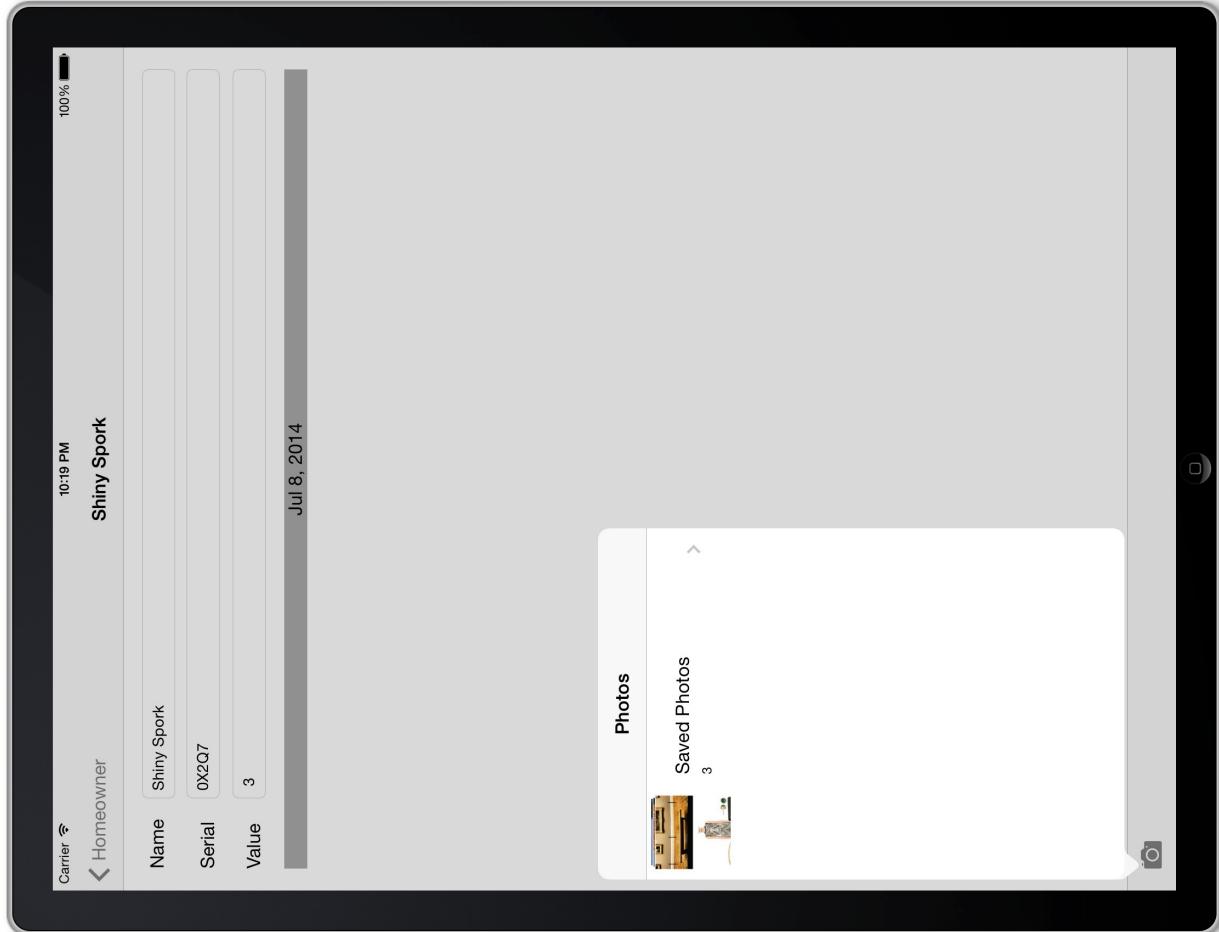
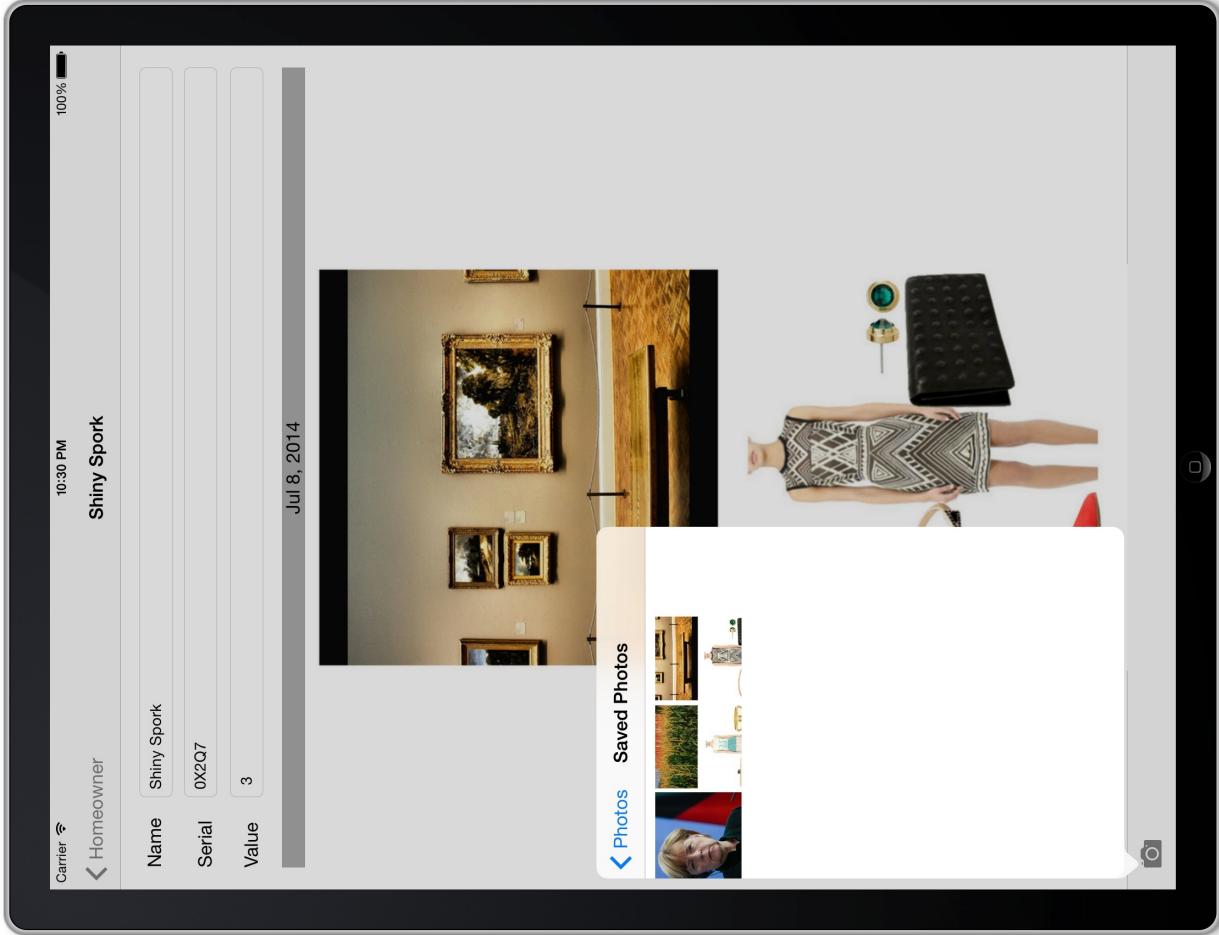
```
#import "ViewController.h"
12 @interface INIDetailViewController () < UINavigationControllerDelegate,
13     UIImagePickerControllerDelegate,
14     UITextFieldDelegate,
15     UIPopoverControllerDelegate>
16
17 @private (weak, nonatomic) IBOutlet UITextField *nameField;
18
19 @property (weak, nonatomic) IBOutlet UILabel *dateLabel;
20 @property (weak, nonatomic) IBOutlet UIImageView *imageView;
21 @property (weak, nonatomic) IBOutlet UIToolbar *toolBar;
22 @property (weak, nonatomic) IBOutlet UIBarButtonItem *cameraButton;
23 @property (weak, nonatomic) IBOutlet UIBarButtonItem *imagePickerPopover;
24 @property (strong, nonatomic) UIPopoverController *imagePickerController;
25
26 @end
27
```

In the class extension
in `INIDetailViewController`
declare that it conforms to the
`UIPopoverControllerDelegate`
protocol.

add a property to hold the
popover controller.

Modify `takePicture:`

```
58
59     imagePickerController.delegate = self;
60
61     //Place image picker on the screen
62     //Check for iPad device before instantiating the popover controller
63
64     if ([UIDevice currentDevice].userInterfaceIdiom == UIUserInterfaceIdiomPad) {
65
66         //Create a new popover controller that will display the imagePicker
67
68         self.imagePickerController = [[UIPopoverController alloc] initWithContentViewController: imagePickerController];
69         self.imagePickerController.delegate = self;
70
71         //Display the popover controller; sender
72         //is the camera bar button item
73         [self.imagePickerController presentPopoverFromBarButtonItem: sender permittedArrowDirections: UIPopoverArrowDirectionAny animated: YES];
74
75     } else {
76         [self presentViewController: imagePickerController animated: YES completion: NULL];
77     }
78 }
```



Dismissing UIPopoverController

- Popover view will pop up but will not retract after you select the picture.
- Dismiss the popover by tapping anywhere on the screen. When a popover is dismissed in this way, it sends the message `popoverControllerDidDismissPopover:` to its delegate. You must implement this method to set `imagePickerControllerPopover` to nil to destroy the popover. A new popover will be created each time the camera button is tapped.

```
- (void) popoverControllerDidDismissPopover:(UIPopoverController *)popoverController
{
    NSLog(@"User dismissed popover");
    self.imagePickerControllerPopover = nil;
}
```

Dismiss popover after selecting image.

```
- (void) imagePickerController:(UIImagePickerController *) picker didFinishPickingMediaWithInfo:(NSDictionary *) info
{
    // Get picked image from info dictionary
    UIImage *image = info[UIImagePickerControllerOriginalImage];

    //Store the image in the INIImageStore for this key
    [[INIImageStore sharedStore] setImage: image forKey: self.item.itemKey];

    // Put that image onto the screen in our image view
    self.imageView.image = image;

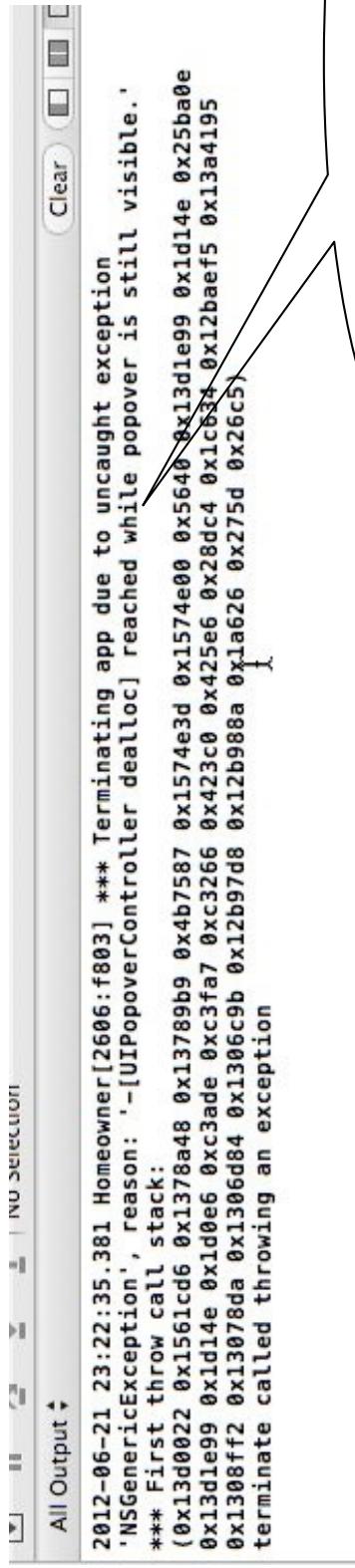
    // Take image picker off the screen -
    // you must call this dismiss method

    // Do I have a popover?
    if (self.imagePickerController) {
        // Dismiss it
        [self.imagePickerController dismissPopoverAnimated: YES];
        self.imagePickerController = nil;
    } else {
        // Dismiss the modal image picker
        [self dismissViewControllerAnimated: YES completion: NULL];
    }
}
```

Dismiss popover after
selecting image.

X

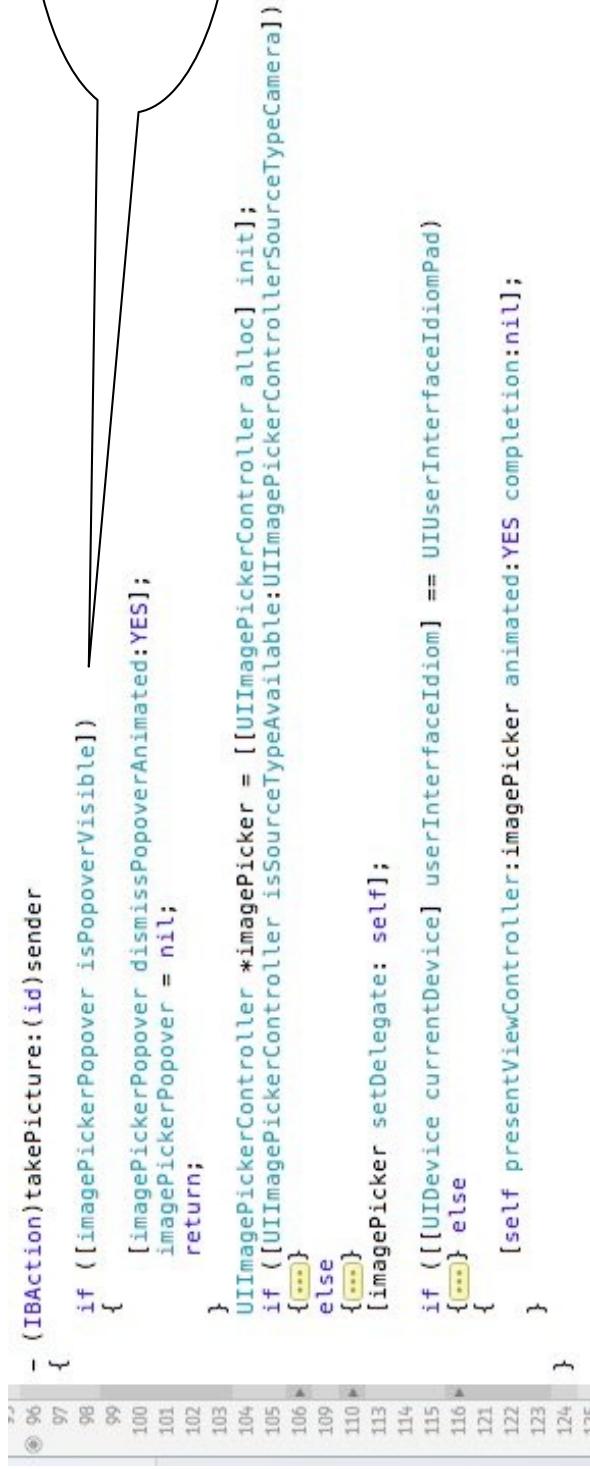
Preventing crashing the app



The screenshot shows the Xcode interface with the 'Output' tab selected. The log output is as follows:

```
2012-06-21 23:22:35.381 Homeowner[2606:f803] *** Terminating app due to uncaught exception
'NSGenericException', reason: '-[UIPopoverController dealloc] reached while popover is still visible.'
*** First throw call stack:
(0x13d022 0x1561cd6 0x1378a48 0x13789b9 0x4b7587 0x1574e3d 0x1574e00 0x13d1e99 0x13d14e 0x25ba0e
0x13d1e99 0x1d14e 0x1d0e6 0xc3ade 0xc3fa7 0xc3266 0x423c0 0x425e6 0x28dc4 0x1c534 0x12baef5 0x13a4195
0x1308ff2 0x13078da 0x1306d84 0x1306c9b 0x1306c9b 0x12b97d8 0x12b988a 0x1a626 0x275d 0x26c5)
terminate called throwing an exception
```

Pushing the camera button twice in a row caused this



```
⑥ 96 - (IBAction)takePicture:(id)sender
97 {
98     if ([imagePickerController isPopoverVisible])
99     {
100         [imagePickerController dismissPopoverAnimated:YES];
101         imagePickerController = nil;
102         return;
103     }
104     UIImagePickerController *imagePickerController = [[UIImagePickerController alloc] init];
105     if ([UIImagePickerController isSourceTypeAvailable:UIImagePickerControllerSourceTypeCamera])
106     {
107     }
108     else
109     {
110     }
111     [imagePickerController setDelegate: self];
112
113     if ([[UIDevice currentDevice] userInterfaceIdiom] == UIUserInterfaceIdiomPad)
114     {
115     }
116     else
117     {
118         [self presentViewController:imagePickerController animated:YES completion:nil];
119     }
120 }
```

This will fix it

More Modal View Controller

- Recall: A modal view is a child view that requires user's interaction before the user can access other views.
 - Homeowner will be updated so that:
 - When the user adds a new item the detailed view will be presented modally to the user in order to make any changes needed up front before saving the item in the item store.
- OR
- When the user edits an item the detailed view will be pushed on the stack of the navigation controller (We already have that).

Implementing Dual Usage in INIDetailViewController

Introduce a new initializer

```
23 @property (nonatomic, strong) BNRItem *item;
24
25 - (id)initForNewItem:(BOOL) isNew;
26 - (IBAction)takePicture:(id)sender;
27
28 @end
29
30
31 -(instancetype) initForNewItem:(BOOL) isNew
32 {
33     self = [super initWithNibName: nil bundle: nil];
34     if (self) {
35         if (isNew) {
36             UIBarButtonItem *doneItem = [[UIBarButtonItem alloc] initWithTitle:@"Done" style:UIBarButtonItemStylePlain target:self action:@selector(save:)];
37             self.navigationItem.rightBarButtonItem = doneItem;
38             UIBarButtonItem *cancelItem = [[UIBarButtonItem alloc] initWithTitle:@"Cancel" style:UIBarButtonItemStylePlain target:self action:@selector(cancel:)];
39             self.navigationItem.leftBarButtonItem = cancelItem;
40             self.navigationItem.rightBarButtonItem = doneItem;
41             self.navigationItem.rightBarButtonItem = cancelItem;
42             self.navigationItem.rightBarButtonItem = doneItem;
43             self.navigationItem.rightBarButtonItem = cancelItem;
44         }
45     }
46     return self;
47 }
48
49 -(instancetype) initWithNibName:(NSString *) nibNameOrNil bundle:(NSBundle *) nibBundleOrNil
50 {
51     [NSException raise:@"Wrong initializer" format:@"Use initForNewItem:"];
52     return nil;
53 }
54 }
```

2014-07-09 12:18:47.948 Homeowner[688:60b] *** Terminating app due to uncaught exception 'Wrong initializer', reason: 'Use initForNewItem.'

*** First throw call stack:

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( 0 CoreFoundation
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```

```
2014-07-09 12:18:47.948 Homeowner [688:60b] *** Terminating app due to uncaught exception 'Wrong initializer', reason: 'Use initForNewItem:  
*** First throw call stack:  
( 0x000000000101954495 exceptionPreprocess + 165  
 0x0000000001016b399c objc_exception_throw + 43  
 1 CoreFoundation  
 1 libobjc.A.dylib
```

Changes to INIDetailViewController

```
5 - (void)tableView:(UITableView *)tableView didSelectRowAtIndexPath:(NSIndexPath *)indexPath
6 {
7     INIDetailViewController *detailViewController = [[INIDetailViewController alloc] initForNewItem:NO];
8
9     NSArray *items = [[INIDetailStore sharedStore] allItems];
10    INIItem *selectedItem = items[indexPath.row];
11    // Give detail view controller a pointer to the item object in row
12    detailViewController.item = selectedItem;
13    // Push it onto the top of the navigation controller's stack
14    [self.navigationController pushViewController:detailViewController animated: YES];
15 }
16
17 - (void) addNewItem:(id) sender
18 {
19     // NSInteger lastRow = [[self tableView] numberOfRowsInSection: 0]; // This will crash the app
20     // Create a new BNRItem and add it to the store
21
22     INIItem *newItem = [[INIDetailStore sharedStore] createItem];
23     INIDetailViewController *detailViewController = [[INIDetailViewController alloc] initForNewItem: YES];
24     detailViewController.item = newItem;
25     UINavigationController *navController = [[UINavigationController alloc] initWithRootViewController: detailViewController];
26     [self presentViewController: navController animated: YES completion: NULL];
27 }
```

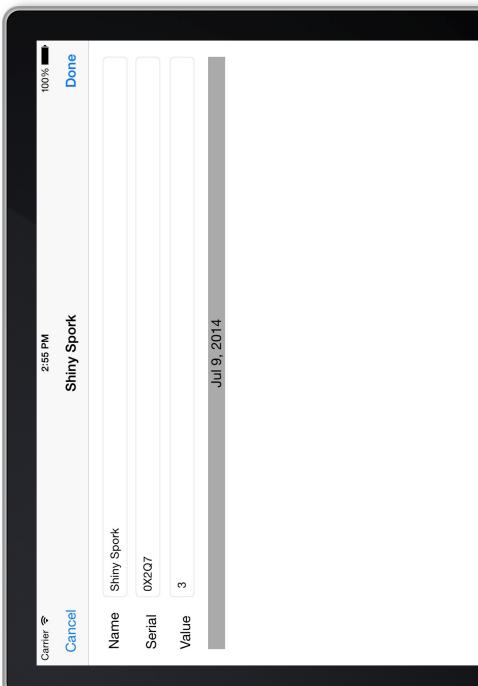
Modify
itemsViewController to
use the correct
initializer

Modify
itemsViewController to
use the correct
initializer

Dismissing the modal view controller

- The action messages `save`: and `cancel`: are sent to the `INIDetailViewController`, but it is the responsibility of the `INILItemsViewController` to do the dismissing.
- The `INIDetailViewController` needs a way to tell the view controller that presented it, “Hey, I’m done, you can dismiss me now.”
 - Fortunately, every `UIViewController` has a `presentingViewController` property that points to the view controller that presented it.
 - The `INIDetailViewController` will grab a pointer to its `presentingViewController` and send it the message `dismissViewControllerAnimated:completion:`

Dismissing the modal view controller



I still need to do the saving here

```
49
50 - (void) cancel:(id)sender
51 {
52     NSLog(@"%@", self.presentingViewController);
53     [self.presentingViewController dismissViewControllerAnimated: YES completion: NULL];
54 }
55
56 - (void) save:(id)sender
57 {
58     NSLog(@"%@", self.presentingViewController);
59     [self.presentingViewController dismissViewControllerAnimated: YES completion: NULL];
60 }
61
```

Notice the presenting view of the modal detailed view is the navigation controller that has the items view on its stack.

2014-07-09 14:53:47.570 Homeowner[1127:60b] <UINavigationController: 0x10935cd80>

Final save: and cancel:

```
51 - (void) cancel:(id) sender
52 {
53     // If the user cancelled, then remove the INIItem from the store
54     [[INIItemStore sharedStore] removeItem: self.item];
55     [self.presentingViewController dismissViewControllerAnimated: YES completion: NULL];
56 }
57 - (void) save:(id) sender
58 {
59     [self.presentingViewController dismissViewControllerAnimated: YES completion: NULL];
60 }
61 }
```

Modal View controller styles

- On the iPhone or iPod touch, a modal view controller takes over the entire screen.
- On the iPad there are two styles in which a modal view can be presented:
 - UIModalPresentationFormSheet
 - UIModalPresentationPageSheet
- You can change the presentation of the modal view controller by setting its `modalPresentationStyle` property to `UIModalPresentationFormSheet` or `UIModalPresentationPageSheet`.

UIModalPresentationFormSheet

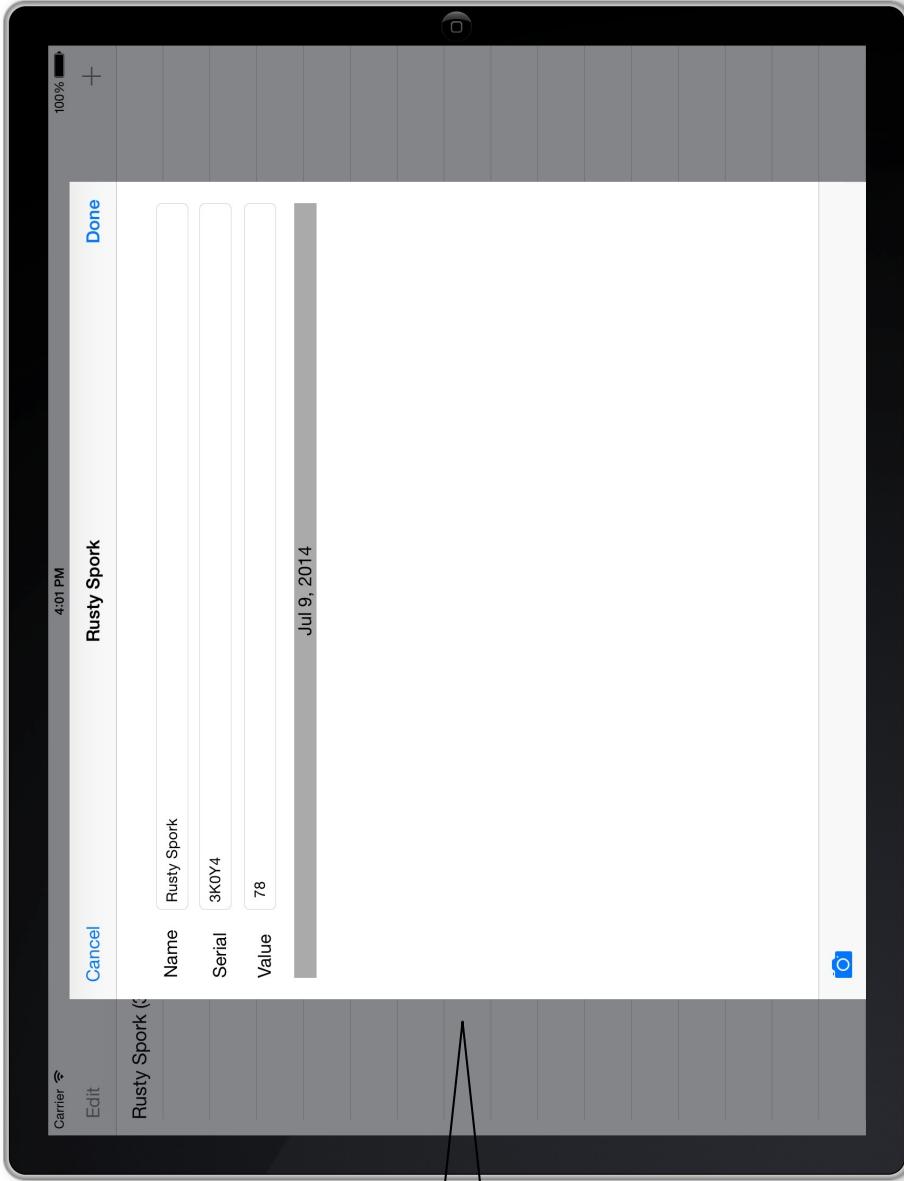
```
73 - (void) addNewItem:(id) sender
74 {
75     // NSInteger lastRow = [[self tableView] numberOfRowsInSection: 0]; // This will crash the app
76     // Create a new BNRIItem and add it to the store
77
78     INIItem *newItem = [[INIItemStore sharedStore] createItem];
79     INIDetailViewController *detailViewController = [[INIDetailViewController alloc] initForNewItem: YES];
80     detailViewController.item = newItem;
81     UINavigationController *navController = [[UINavigationController alloc] initWithRootViewController: detailViewController];
82
83     navController.modalPresentationStyle = UIModalPresentationFormSheet;
84     [self presentViewController: navController animated: YES completion: NULL];
85 }
```



Notice that we modify the presentation style of the navigation controller and not the items view controller

UIModalPresentationPageSheet

```
73 - (void) addNewItem:(id) sender
74 {
75     // NSInteger lastRow = [[self tableView] numberOfRowsInSection: 0]; // This will crash the app
76     // Create a new BNRItem and add it to the store
77
78     INIItem *newItem = [[INIItemStore sharedStore] createItem];
79     INIDetailViewController *detailViewController = [[INIDetailViewController alloc] initForNewItem: YES];
80     detailViewController.item = newItem;
81
82     UINavigationControllerController *navController = [[UINavigationControllerController alloc] initWithRootViewController: detailViewController];
83
84     navController.modalPresentationStyle = UIModalPresentationPageSheet;
85     [self presentViewController: navController animated: YES completion: NULL];
86 }
```



PageSheet style in landscape mode

Completion Blocks

- When a modal view controller takes up the entire screen (as in the iPhone case) the view under it will completely disappear.
- When the modal view gets dismissed the originally underlaying view will be sent the messages `viewWillAppear` and `viewDidAppear` which in our case made the items view reload the table.
- This is not the case with the iPad since the underlaying view gets dimmed but will not disappear.
- In the message `dismissViewControllerAnimated:completion:` the argument for `completion:` is a code block which will allow us to provide the code necessary to reload the items' table.
 - `(void)dismissViewControllerAnimated:(BOOL)flag completion:(void (^)(void))completion`

Code Blocks

- A code block is a snippet of code that behaves like a function and as a variable at the same time.
- In our case we declare a code block that returns a type void and takes no arguments called dismissBlock by:

```
@property (nonatomic, copy) void (^ dismissBlock)( void);
```
- We will be able to pass dismissBlock as a variable everywhere we are expected to use codeBlock
- We will create dismissBlock in INIItemsViewController since it is the object that knows how to reload the table but we will use it as a variable in INIDetailViewController

dismissBlock implementation

```
@interface INIDetailViewController : UIViewController
```

```
- (instancetype) initForNewItem:(BOOL) isNew;
@property (nonatomic, strong) INIItem *item;
@property (nonatomic, copy) void(^dismissBlock)(void);

@end
```

```
1 - (void) cancel:(id) sender
2 {
3     // If the user cancelled, then remove the INIItem from the store
4     [[INIItemStore sharedStore] removeItem: self.item];
5     [self.presentingViewController dismissViewControllerAnimated: YES completion: _dismissBlock];
6 }
7
8 - (void) save:(id) sender
9 {
10    [self.presentingViewController dismissViewControllerAnimated: YES completion: _dismissBlock];
11 }
12
13 - (void) addNewItem:(id) self
14 {
15     // NSInteger lastRow = [[self tableView] numberOfRowsInSection];
16     // Create a new BNItem and add it to the store
17
18     INIItem *newItem = [[INIItemStore sharedStore] createItem];
19     INIDetailViewController *detailViewController = [[INIDetailViewController alloc] init];
20     detailViewController.item = newItem;
21
22     detailViewController.dismissBlock = ^{
23         [self.tableView reloadData];
24     };
25
26     UINavigationController *navController = [[UINavigationController alloc] init];
27     navController.modalPresentationStyle = UIModalPresentationCurrentContext;
28     [self presentViewController: navController animated: YES completion: nil];
29 }
```

dismissBlock declared in DetailedViewController

called in DetailedViewController

Define dismissBlock in itemsViewController

Modal view controller transition

```
2 detailViewController.dismissBlock = ^{
3     [self.tableView reloadData];
4 };
5 
6 UINavigationController *navController = [[UINavigationController alloc] initWithRootViewController
7 navController.modalPresentationStyle = UIModalPresentationPageSheet;
8 navController.modalTransitionStyle = UIModalTransitionStyleFlipHorizontal;
9 
10 [self presentViewController: navController animated: YES completion: NULL];
11 }
```

Presentation Transition Styles

Transition styles available when presenting view controllers.

```
typedef enum {
    UIModalTransitionStyleCoverVertical = 0,
    UIModalTransitionStyleFlipHorizontal,
    UIModalTransitionStyleCrossDissolve,
    UIModalTransitionStylePartialCurl,
} UIModalTransitionStyle;
```

Thread- Safe Singletons

- Recall:
 - A single-threaded app only uses one core and is executing only one function at a time.
 - Multithreaded apps can execute multiple functions simultaneously on different cores.
 - We have only talked about single- threaded apps
 - The singleton technique we used in chapter 11 is sufficient in a single- threaded app.
 - For multithreaded apps, we could end up creating two instances of `INImageStore` or we might return an instance for use before it gets properly initialized.
 - We can create a singleton that is `thread-safe` by using the function `dispatch_once` to ensure that code is run exactly once.

Make our image store thread safe

```
16
17 @implementation INIImageStore
18
19 + (instancetype) sharedStore
20 {
21     static INIImageStore *sharedStore;
22
23     if (!sharedStore) {
24         sharedStore = [[self alloc] initPrivate];
25     }
26
27     static dispatch_once_t onceToken;
28     dispatch_once(&onceToken, ^{
29         sharedStore = [[self alloc] initPrivate];
30     });
31
32     return sharedStore;
33 }
34
```