iOS Development

Lecture 4
Scroll View, Table View, Collection View, Web View

Ing. Simone Cirani
email: simone.cirani@unipr.it
http://www.tlc.unipr.it/cirani

Lecture Summary

- Scroll views
- Table views and table view cells
- Collection views
- Web views
- DEMO

Scroll views

- **Scroll views** allow users to see content that is larger than the view's boundaries
- Vertical or horizontal scroll indicators show users that there is more content
- Scroll views are implemented in the `UIScrollView` class
- `UIScrollView` also enables users:
  - to scroll within that content by making swiping gestures
  - to zoom in and back from portions of the content by making pinching gestures
- A `UIScrollView` is a view whose origin is adjustable over the content view
- A scroll view clips the content to its frame
- The content of a scroll view is one or more views of any kind

Adding content to scroll views

- The steps to work with a scroll view are the following:

1. Add a view to a scroll view:

```
UIImageView *imageView = [[UIImageView alloc] initWithImage:image];

[scrollView addSubview:imageView];
```

2. Set the size of the scroll view's content:

```
scrollView.contentSize = CGSizeMake(3000, 3000);

// or ...

scrollView.contentSize = imageView.bounds.size;
```

Adding content to scroll views

- The **`contentOffset`** property returns the upper left corner of the currently portion of the view that is being displayed relatively to the scroll view

```
scrollView.contentOffset.x, scrollView.contentOffset.y
```

- The **`bounds`** property returns the rectangle which is currently visible

```
scrollView.bounds.origin.x, scrollView.bounds.origin.y

scrollView.bounds.size.width, scrollView.bounds.size.height
```

- The visible area in the subview's coordinates may be different from that returned by the bounds property because of scaling (zooming), different subview's frame origin

```
CGRect visibleRect = [scrollView convertRect:scrollView.bounds toView:subview];
```

Adding scroll views

- The recommended way to use scroll views is to add to a view by dragging it from the object palette and then add the subviews programmatically
- The scroll view can also be inserted in code with alloc/init
- It is also possible to embed an existing view from (Editor → Embed in... → Scroll View), but you should not use this option
- All the subviews added to a scroll view are automatically located at the origin (upper left corner) of the scroll view; to change the location, a new frame for the view should be set

```
subview.frame = CGRectMake(200, 200, 100, 100);
```

- It is essential to set the contentSize property of the scroll view, or it will not work!
- To have a scroll view to be of exactly of the same size of its subview

```
scrollView.contentSize = subview.bounds.size;
```

Working with scroll views

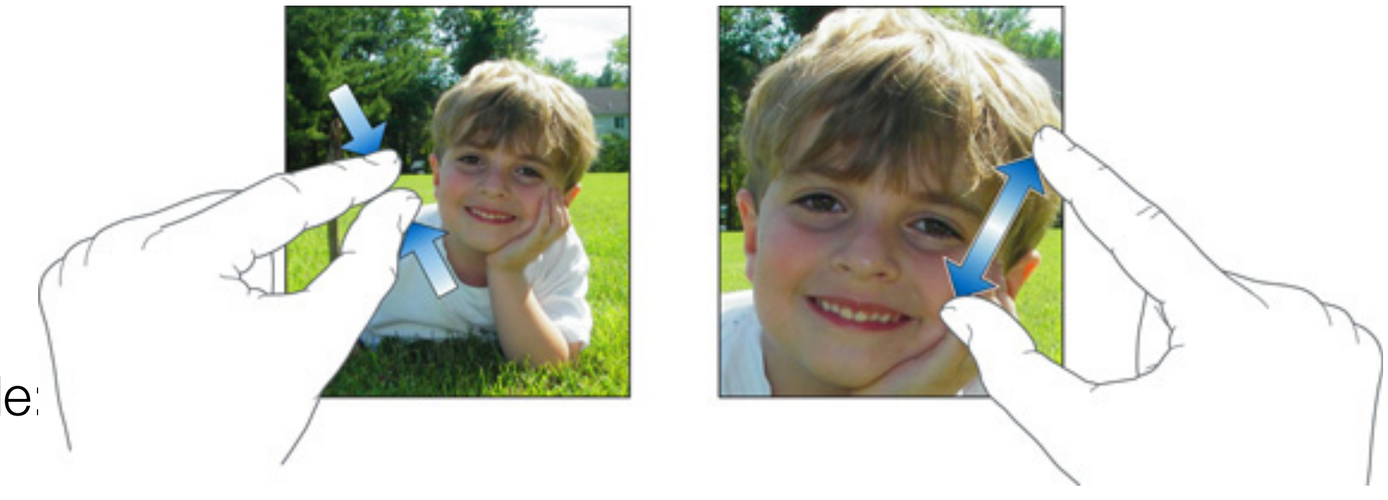
- Scroll views natively support the scrolling made by the user but it is also possible to scroll programmatically:

```
- (void)scrollRectToVisible:(CGRect)rect animated:(BOOL)animated
```

- It is possible to enable and disable scrolling using the `scrollEnabled` property
- The `directionalLockEnabled` property can be used to lock the scrolling direction to the user's first move (for the current drag)

Zooming in scroll views

- Scroll views support zooming of the content by pinching-in or pinching-out
- To enable zooming in a scroll view some preliminary actions must be taken:
  1. set the minimum and maximum zoom scale:



```
self.scrollView.minimumZoomScale = 0.5; // 50%
self.scrollView.maximumZoomScale = 3.0; // 300%
```

Zooming in scroll views

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1. set the minimum and maximum zoom scale:

```
self.scrollView.minimumZoomScale = 0.5; // 50%
self.scrollView.maximumZoomScale = 3.0; // 300%
```

2. declare the view controller as **`UIScrollViewDelegate`** and set it as **`delegate`** of the scroll view

```
@interface MyViewController : UIViewController<UIScrollViewDelegate>

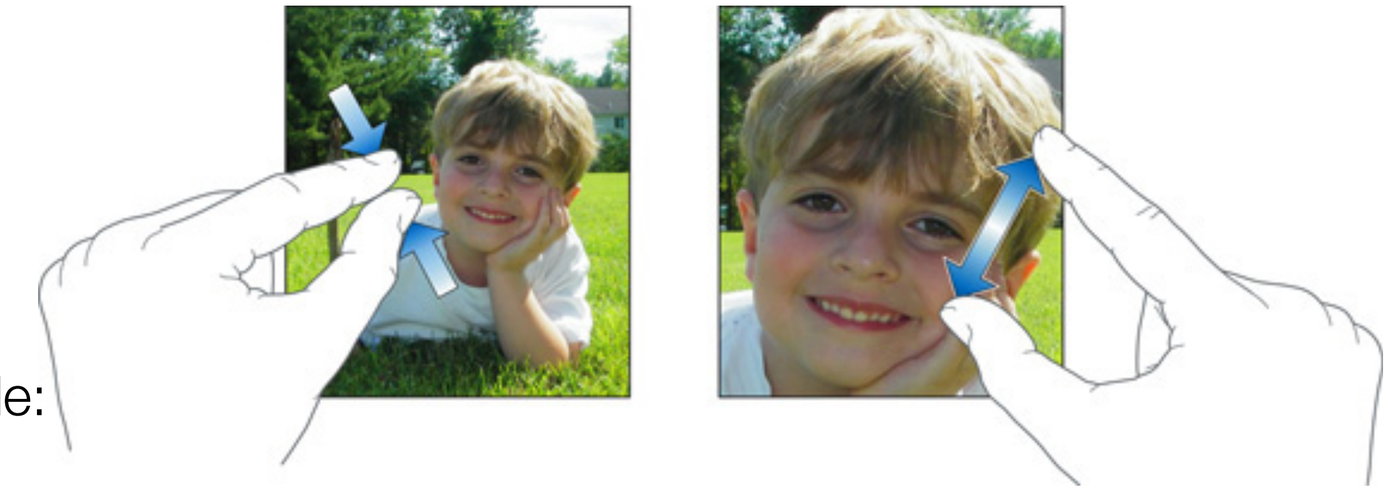
    // or ...

@interface MyViewController ()<UIScrollViewDelegate>

self.scrollView.delegate = self;
```

Zooming in scroll views

- Scroll views support zooming of the content by pinching-in or pinching-out
- To enable zooming in a scroll view some preliminary actions must be taken:



1. set the minimum and maximum zoom scale:

```
self.scrollView.minimumZoomScale = 0.5; // 50%
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```

2. declare the view controller as **`UIScrollViewDelegate`** and set it as **`delegate`** of the scroll view

```
@interface MyViewController : UIViewController<UIScrollViewDelegate>

    // or ...

@interface MyViewController ()<UIScrollViewDelegate>

self.scrollView.delegate = self;
```

3. implement the delegate method to specify the subview that must be zoomed:

```
- (UIView *)viewForZoomingInScrollView:(UIScrollView *)sender
```

UIScrollViewDelegate

- The **`UIScrollViewDelegate`** protocol provides several methods to handle scrolling, zooming, and dragging events in the scroll view:

```
- (void)scrollViewDidScroll:(UIScrollView *)scrollView

- (void)scrollViewDidZoom:(UIScrollView *)scrollView

- (void)scrollViewWillBeginZooming:(UIScrollView *)scrollView
                          withView:(UIView *)view

- (void)scrollViewDidEndZooming:(UIScrollView *)scrollView
                       withView:(UIView *)view
                        atScale:(CGFloat)scale

- (void)scrollViewWillBeginDragging:(UIScrollView *)scrollView

- (void)scrollViewDidEndDragging:(UIScrollView *)scrollView
                  willDecelerate:(BOOL)decelerate
```

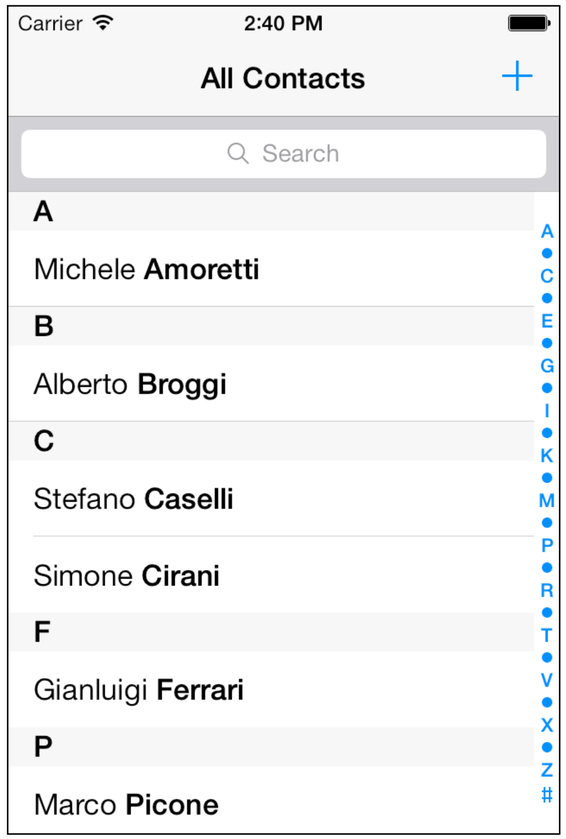
Table views

- **Table views** are used to display and edit hierarchical lists of information
- A table view displays a list of items in a single column (one dimensional: just rows, no columns)
- Multiple rows may be grouped into sections
- Multi-dimensional data are usually displayed combining table views into a navigation controller
- `UITableView` is the class that implements a table view
  - it is a subclass of `UIScrollView`
  - only vertical scrolling is permitted
- `UITableView` can efficiently handle large amounts of data

Table view styles

- A table view can have a plain style or a grouped style

`UITableViewStylePlain`



`UITableViewStyleGrouped`

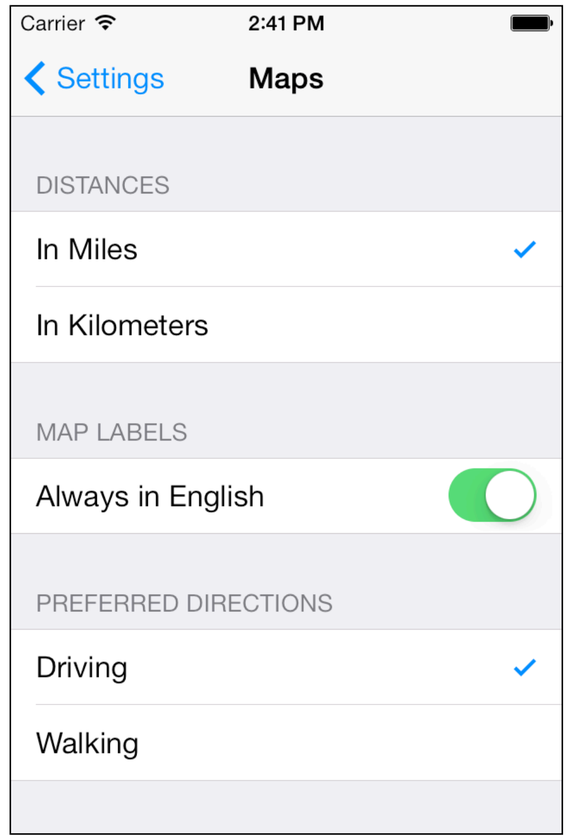


Table view styles

- A table view can be dynamic or static
- Dynamic table views have content that is mutable and unpredictable (e.g. database entries, RSS feeds, ...)
- Static table views have fixed content (defined by the developer), e.g. for settings

UITableView

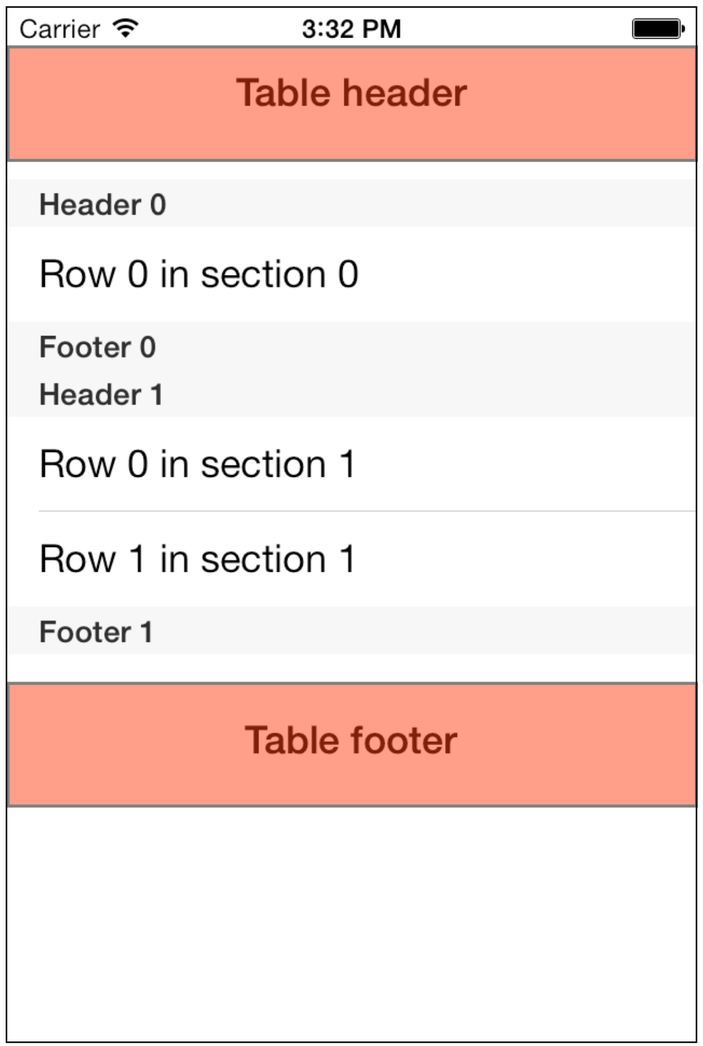
Table header

```
@property UIView *tableHeaderView;
```

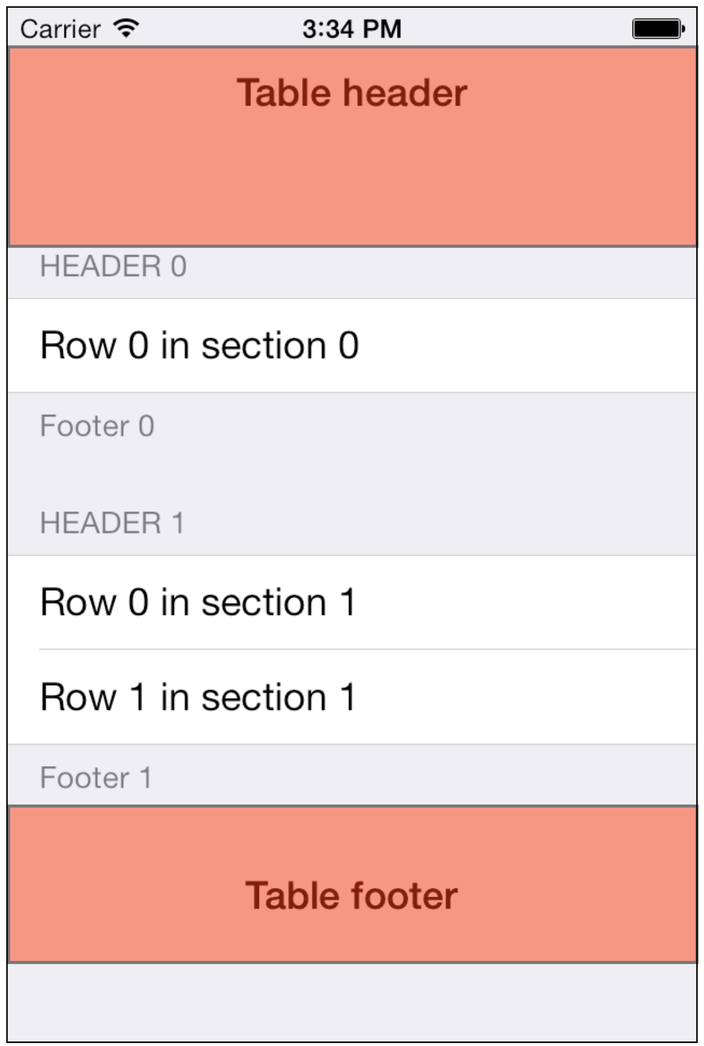
Table footer

```
@property UIView *tableFooterView;
```

UITableViewStylePlain

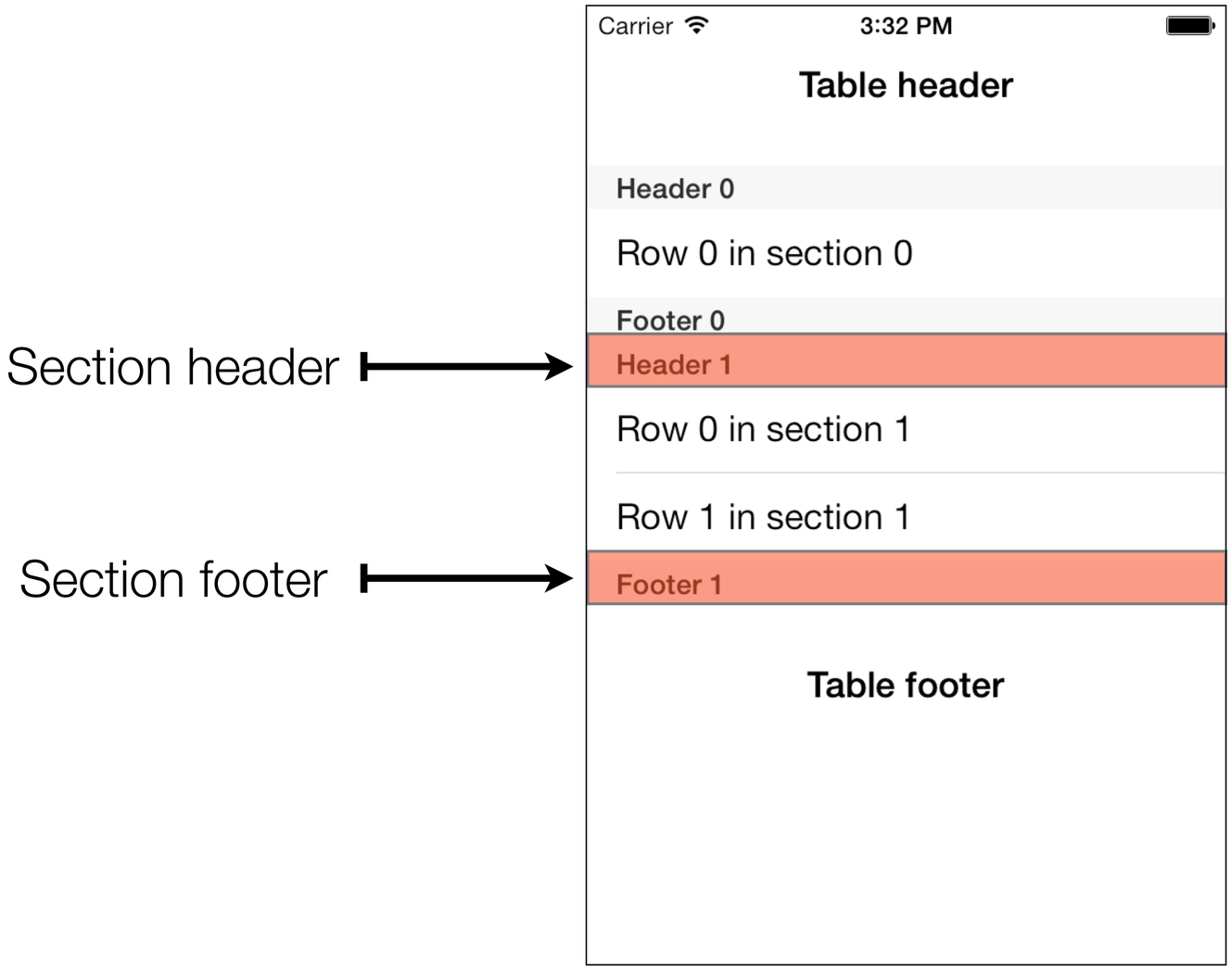


UITableViewStyleGrouped

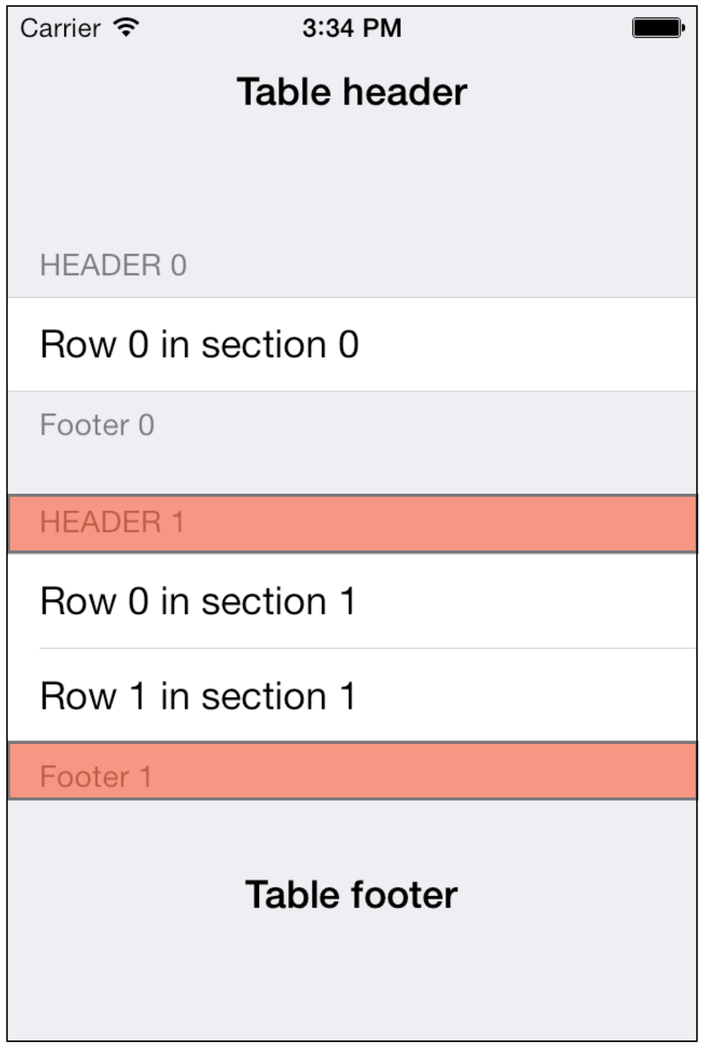


UITableView

`UITableViewStylePlain`



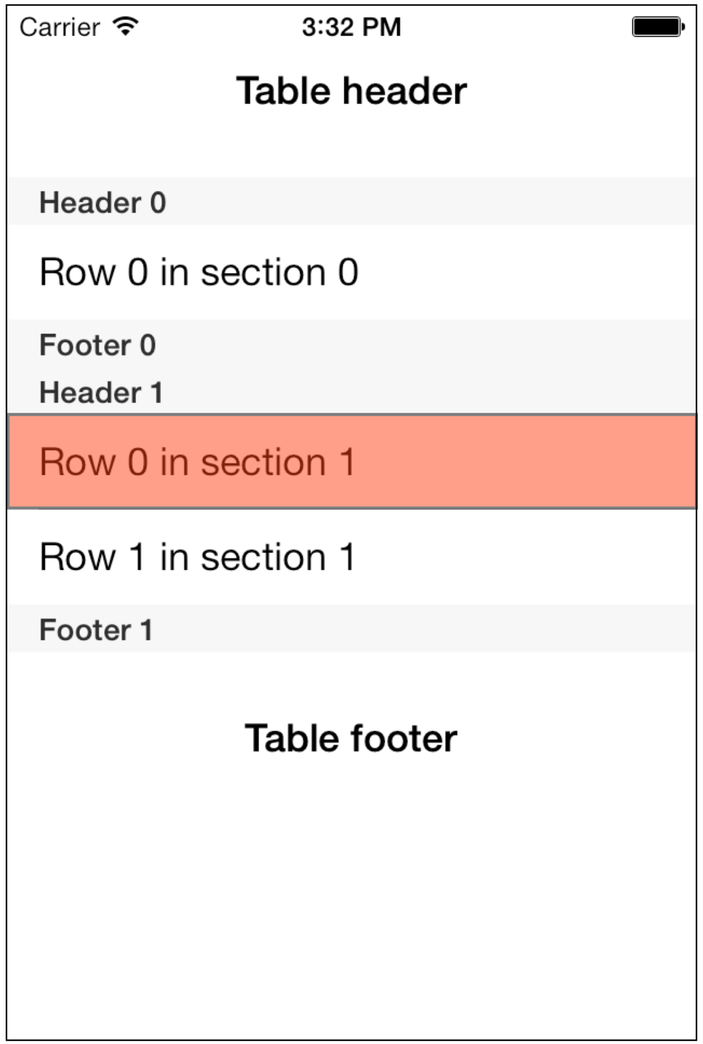
`UITableViewStyleGrouped`



UITableView

Table cell (`UITableViewCell`)

`UITableViewStylePlain`



`UITableViewStyleGrouped`

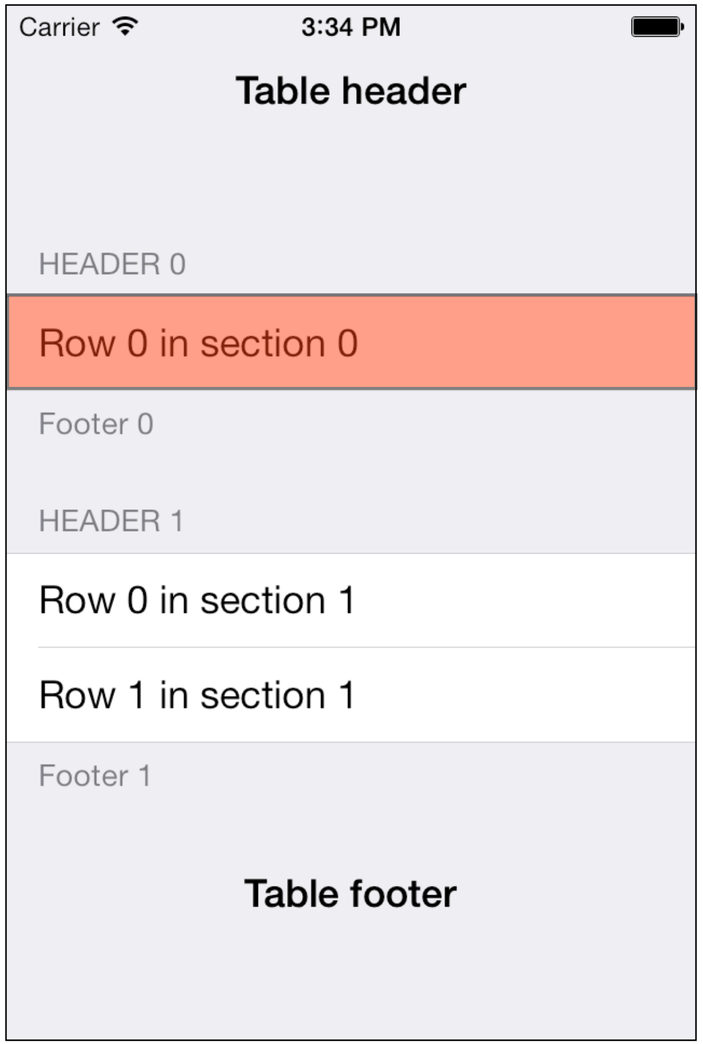
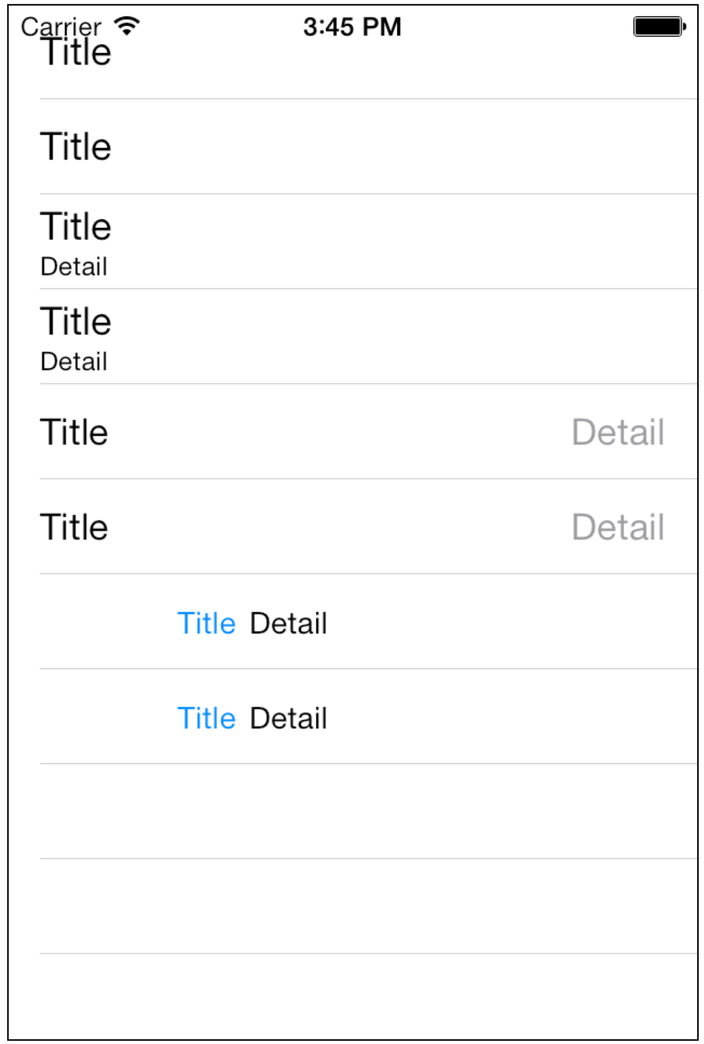


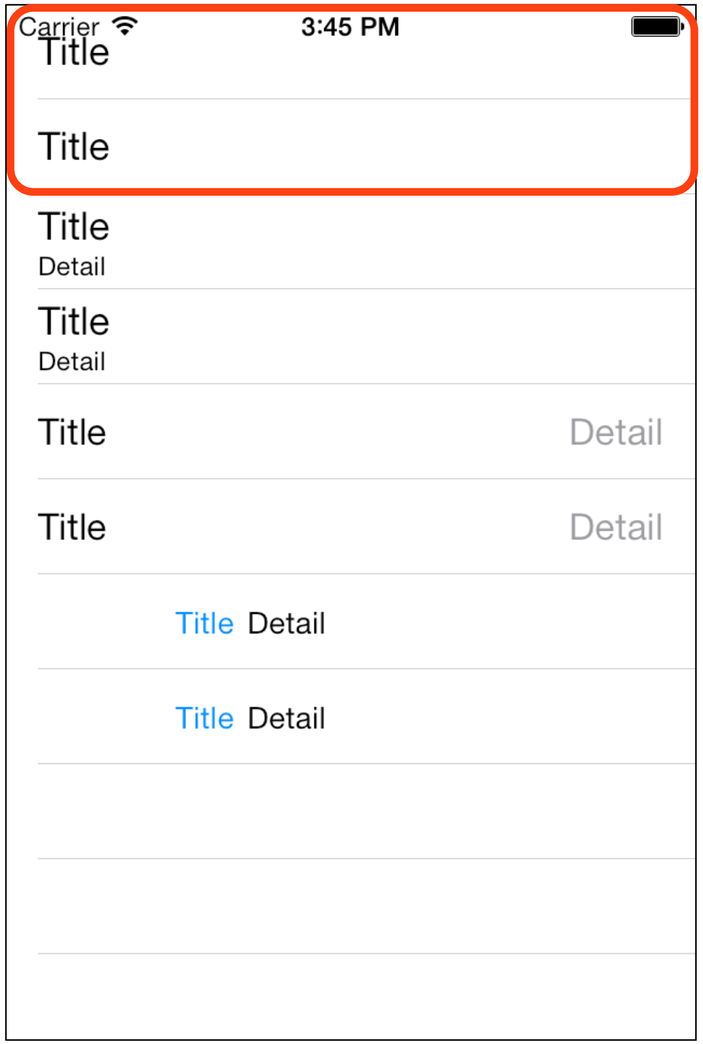
Table cell styles



System-defined table cells can have different styles, depending on which content they are intended to display.

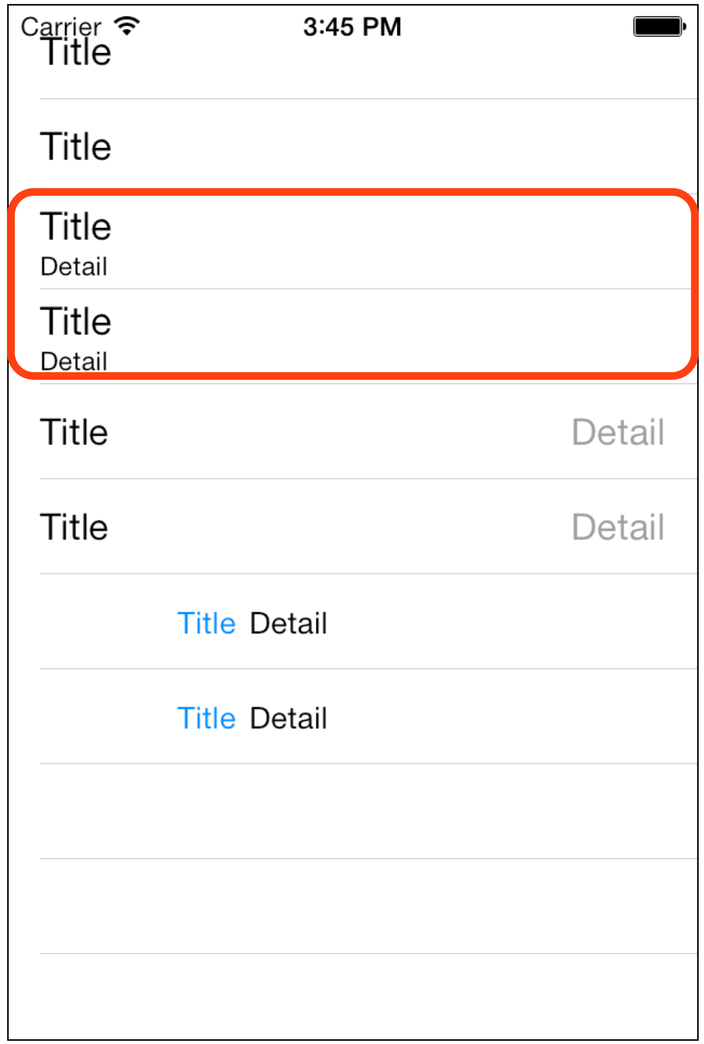
Table cells can be customized to have a different look in order to display custom content.

Table cell styles



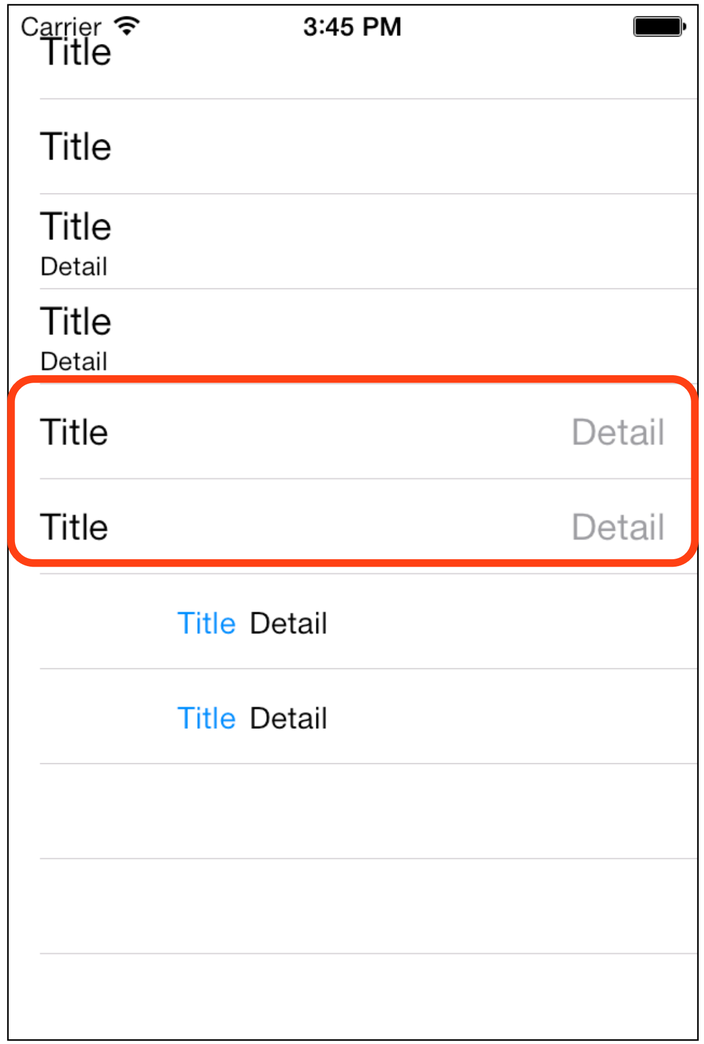
`UITableViewCellStyleDefault`

Table cell styles



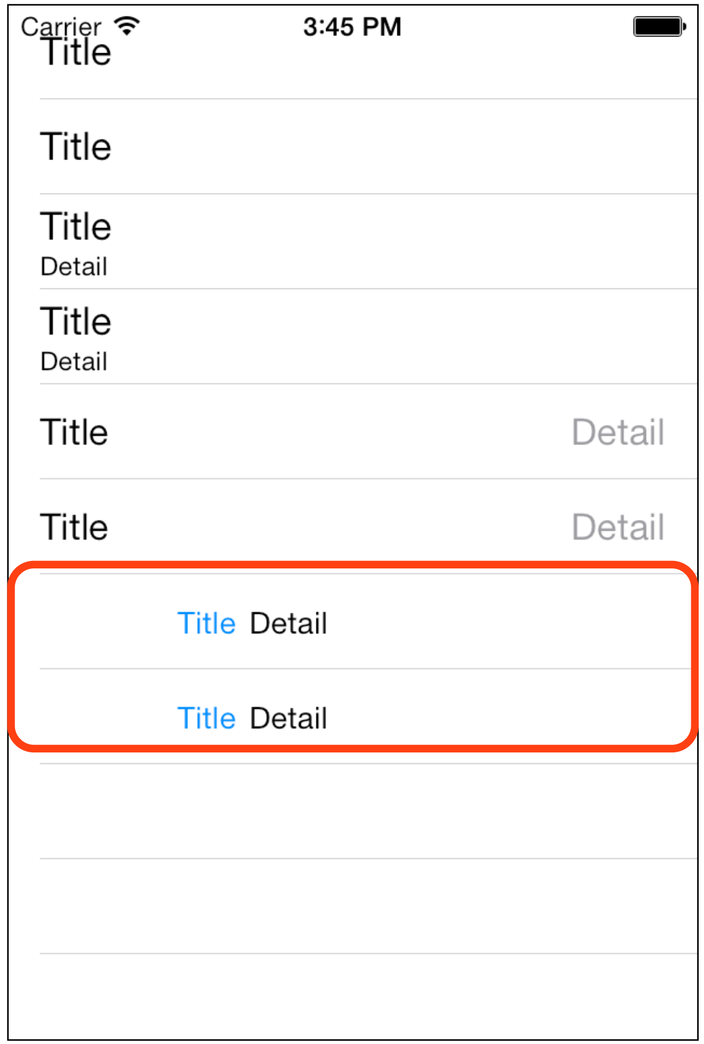
`UITableViewCellStyleSubtitle`

Table cell styles



`UITableViewCellStyleValue1`

Table cell styles

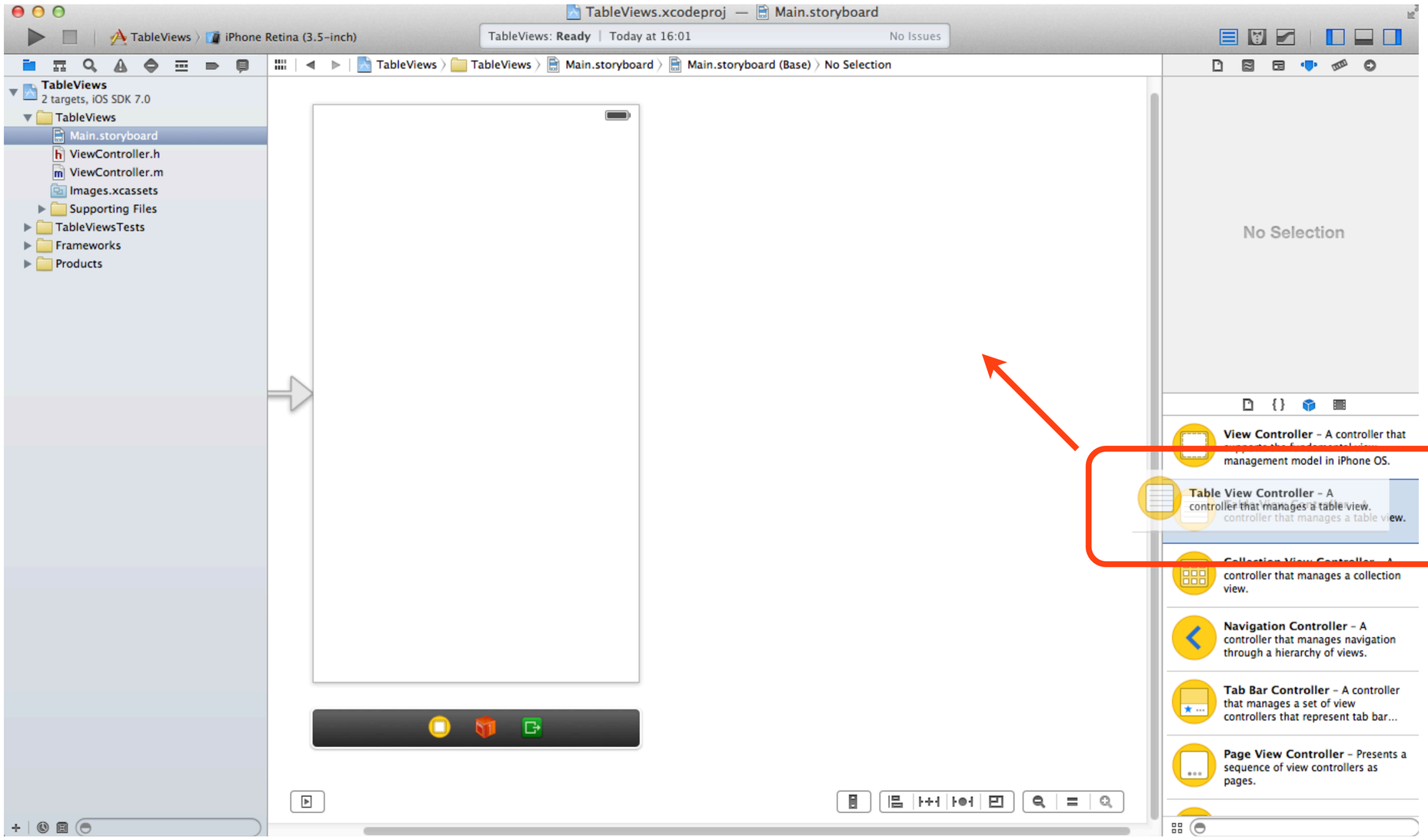


→ `UITableViewCellStyleValue2`

Table View Controller

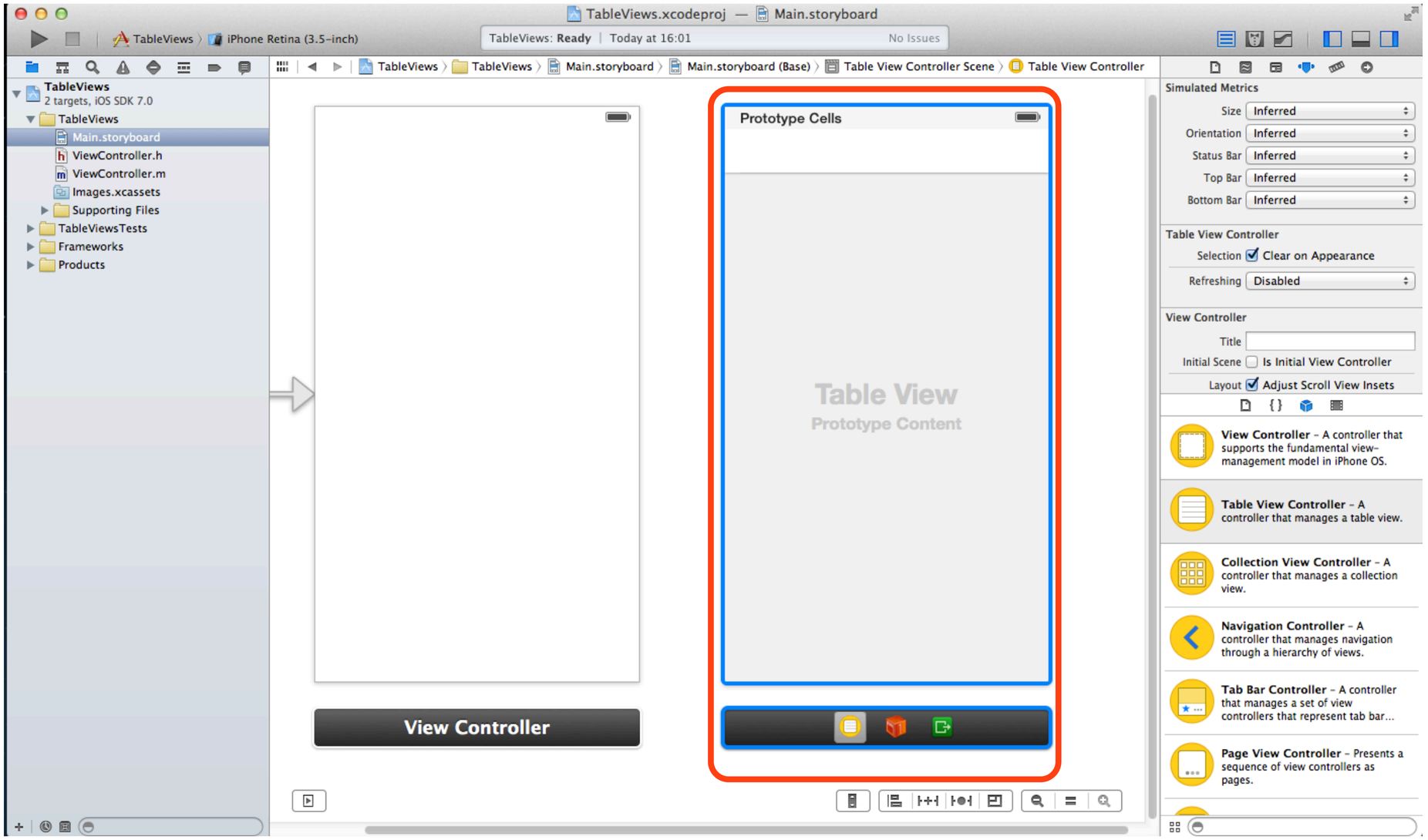
- A table view is usually controlled by a specialized view controller, called `UITableViewController`
- Table views normally take the whole view
- To add a table view controller to storyboard, just drag a Table View Controller item from the object palette
- When adding a Table View Controller, the controller is a subclass of `UITableViewController` and the view is a `UITableView`
- After a Table View Controller has been dragged, you need to create a new Objective-C class that is a subclass of `UITableViewController` and set it as the class of the view in the Identity inspector in Storyboard
- The table view can be configured to set its style (plain or grouped) and type of content (static or dynamic)

Table View Controller



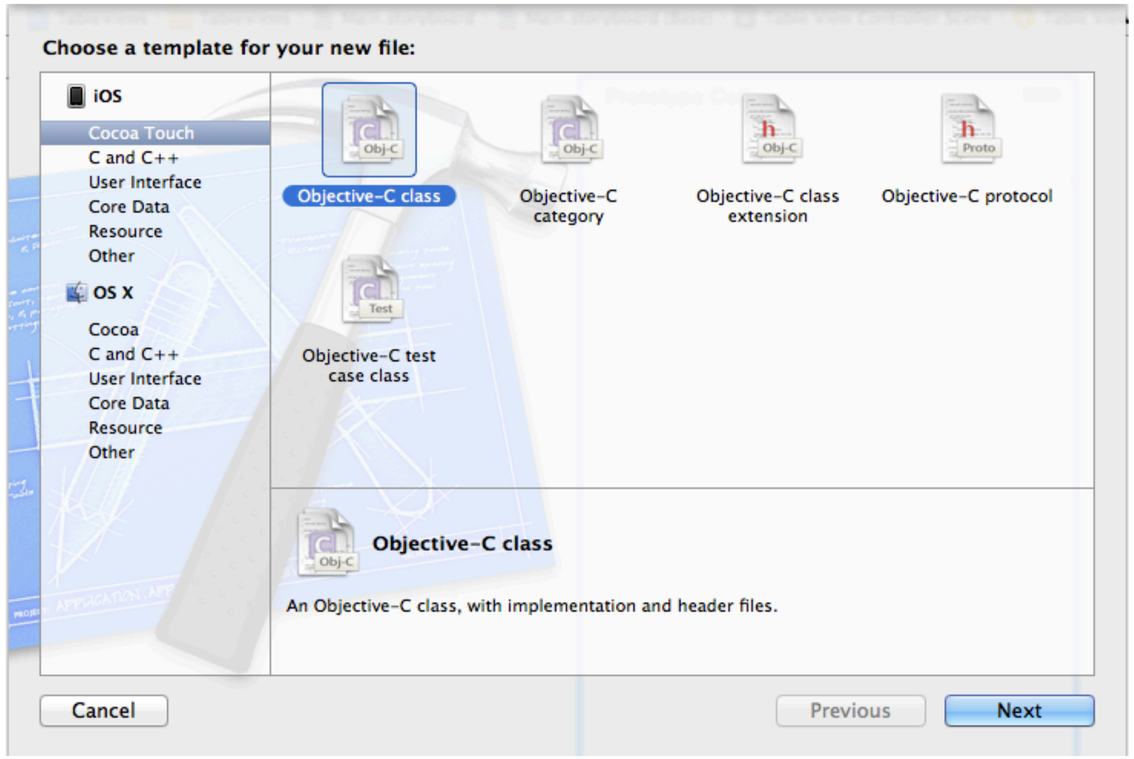
Drag a Table View Controller item from the object palette

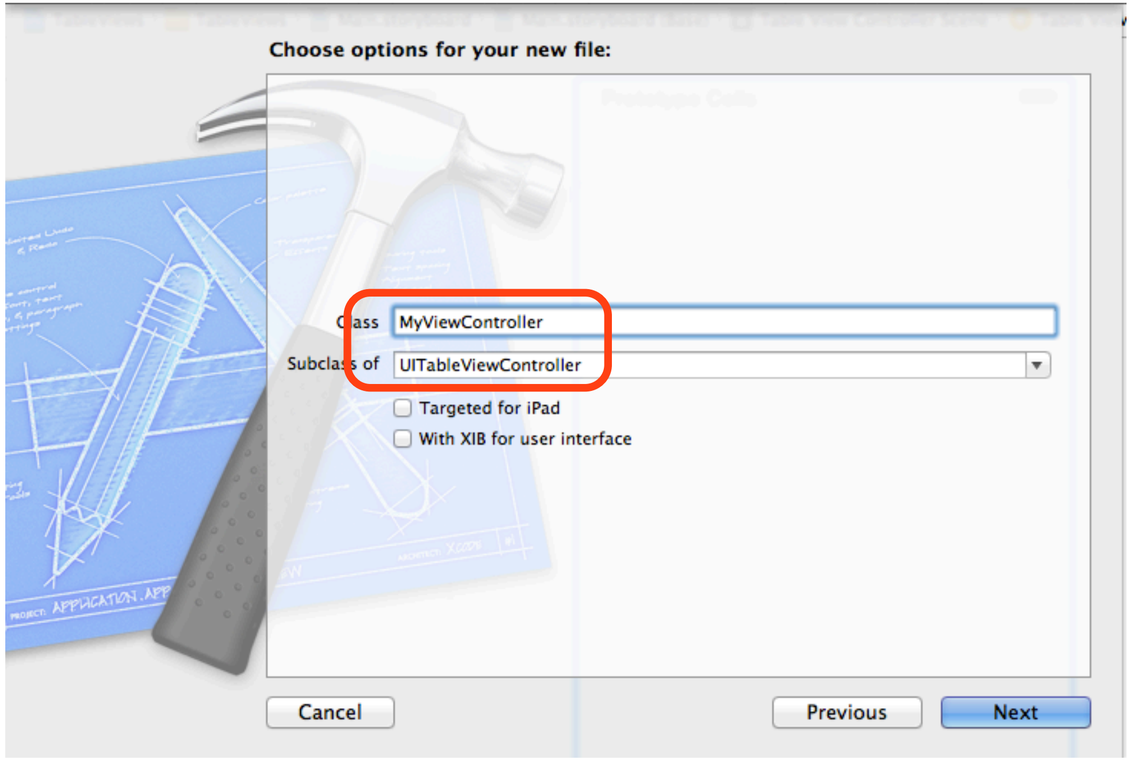
Table View Controller



Drag a Table View Controller item from the object palette

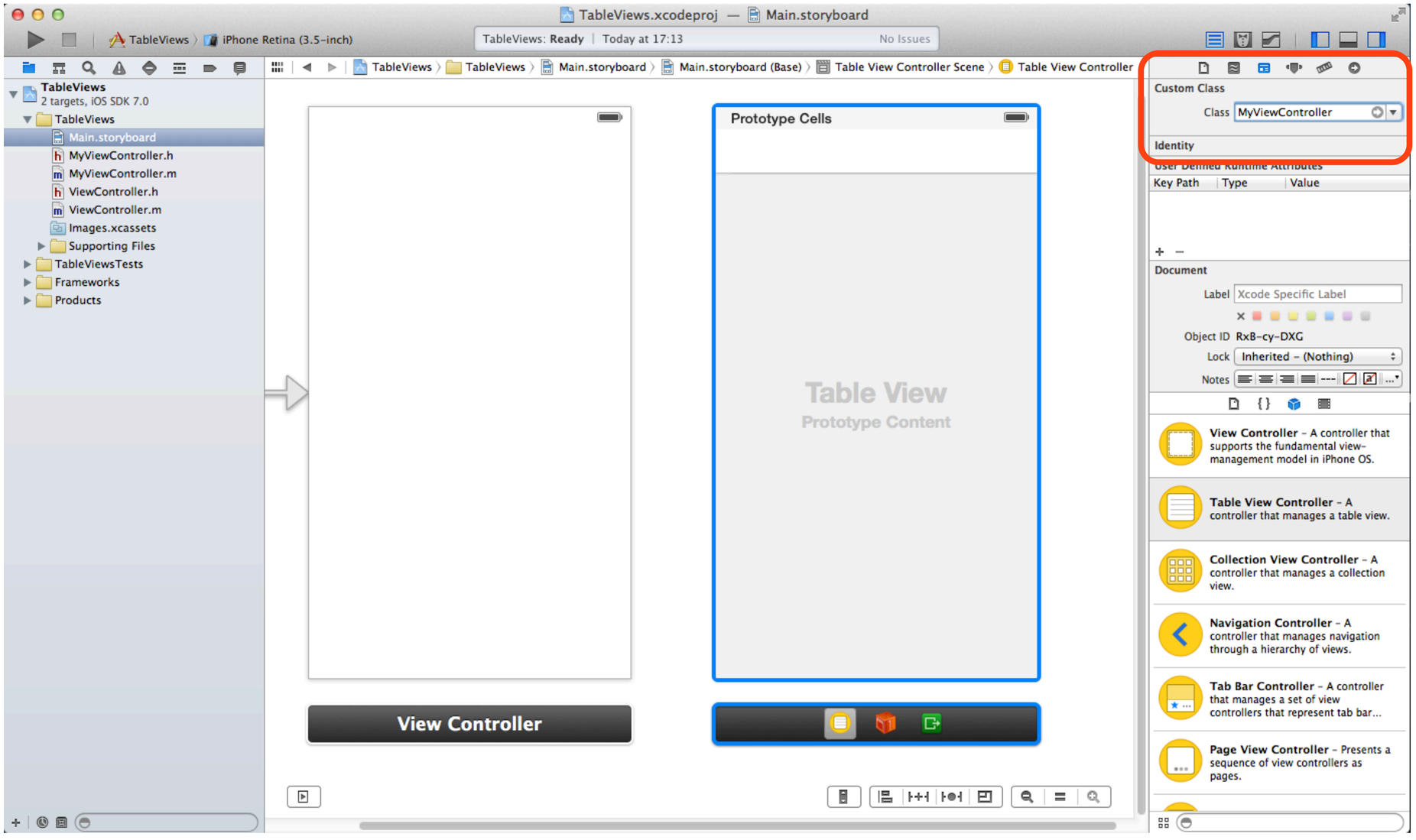
Table View Controller





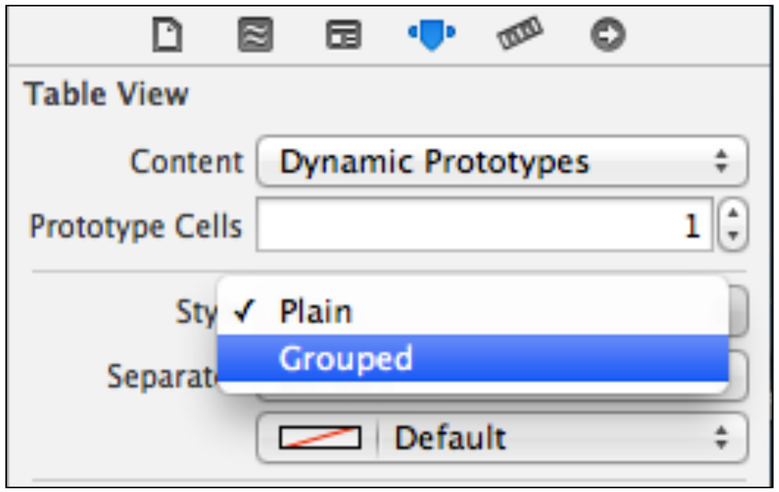
Create a new Objective-C class (⌘-N) that is a subclass of UITableViewController

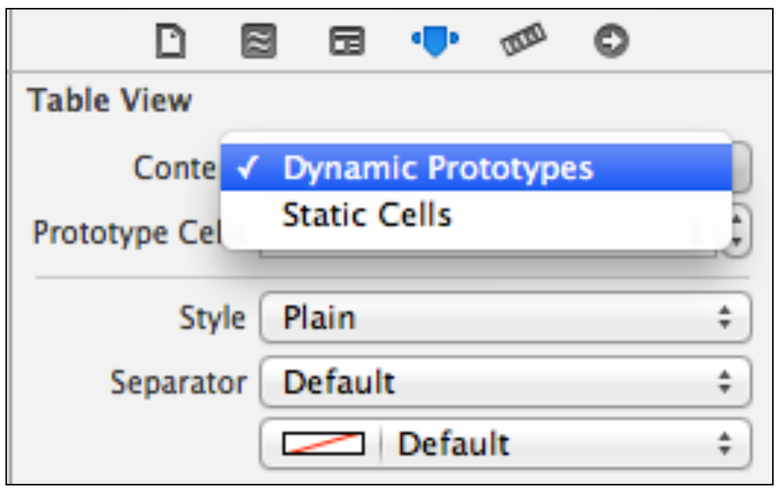
Table View Controller



Set the new class as the class of the view in the Identity inspector

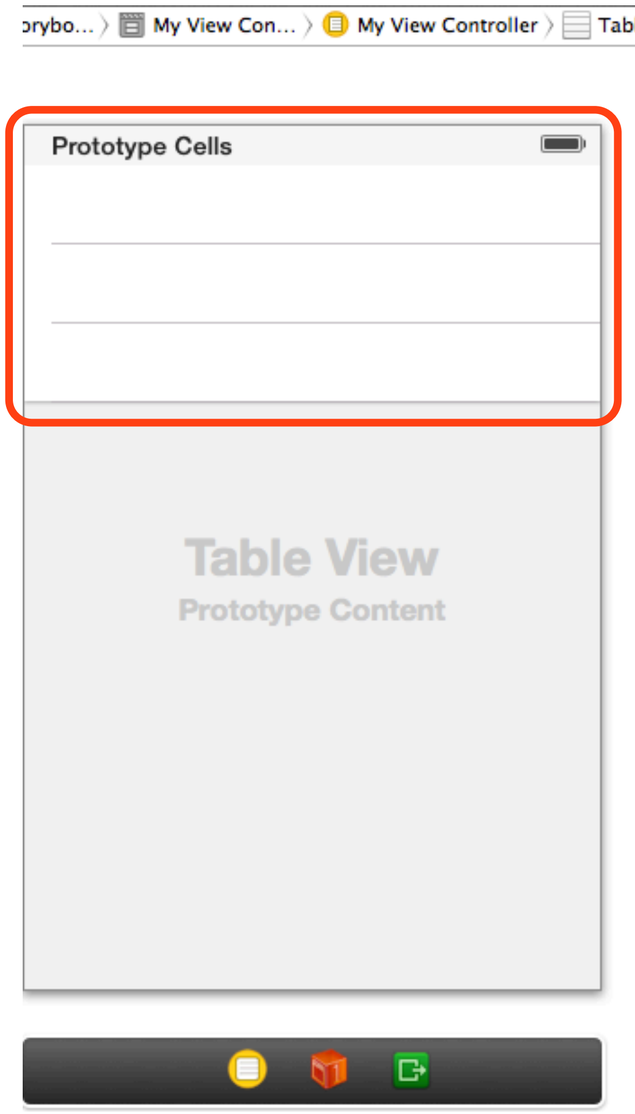
Table View Controller

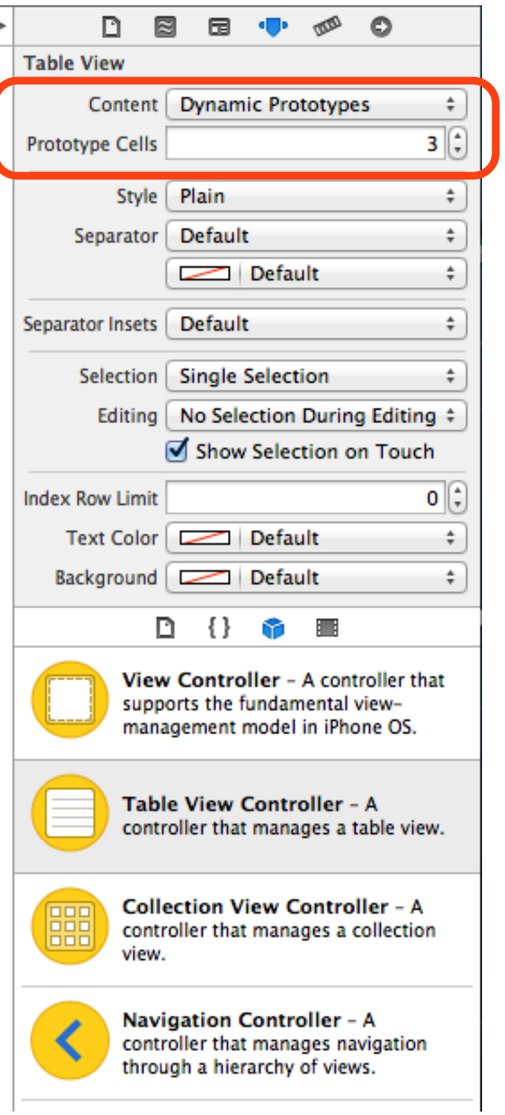




Configure style (plain or grouped) and type of content (dynamic or static) of the table view

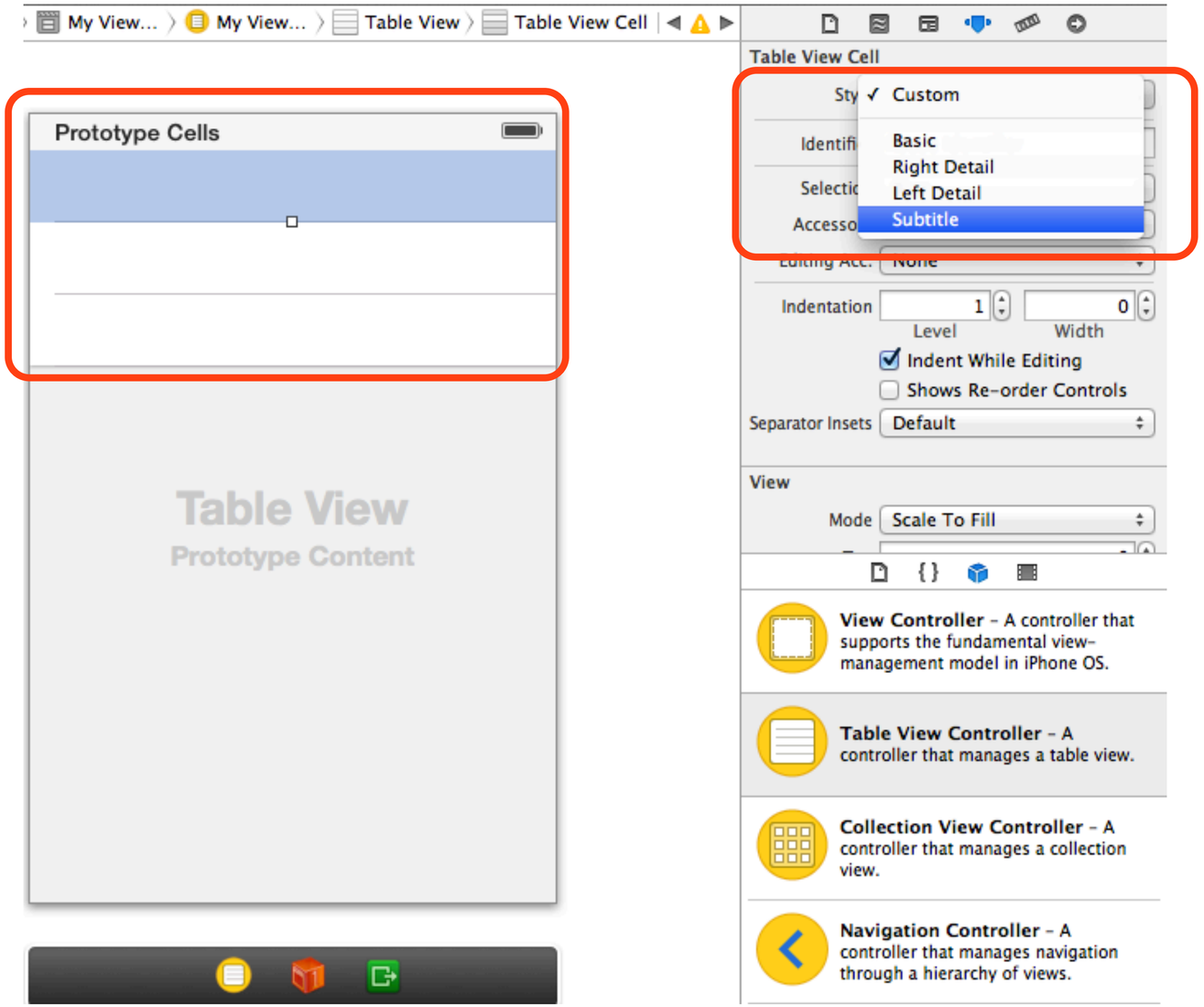
Table View Controller





When the dynamic prototypes option is selected, it is possible to define the prototypes (templates) for the table cells that will be displayed can be configured

Table View Controller



For each prototype cell, it is possible to set its style...

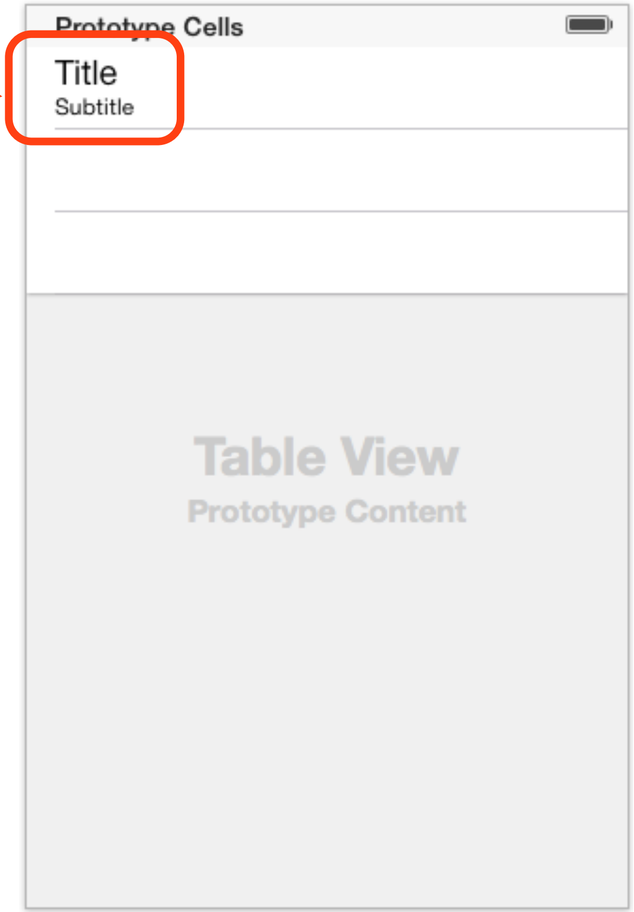
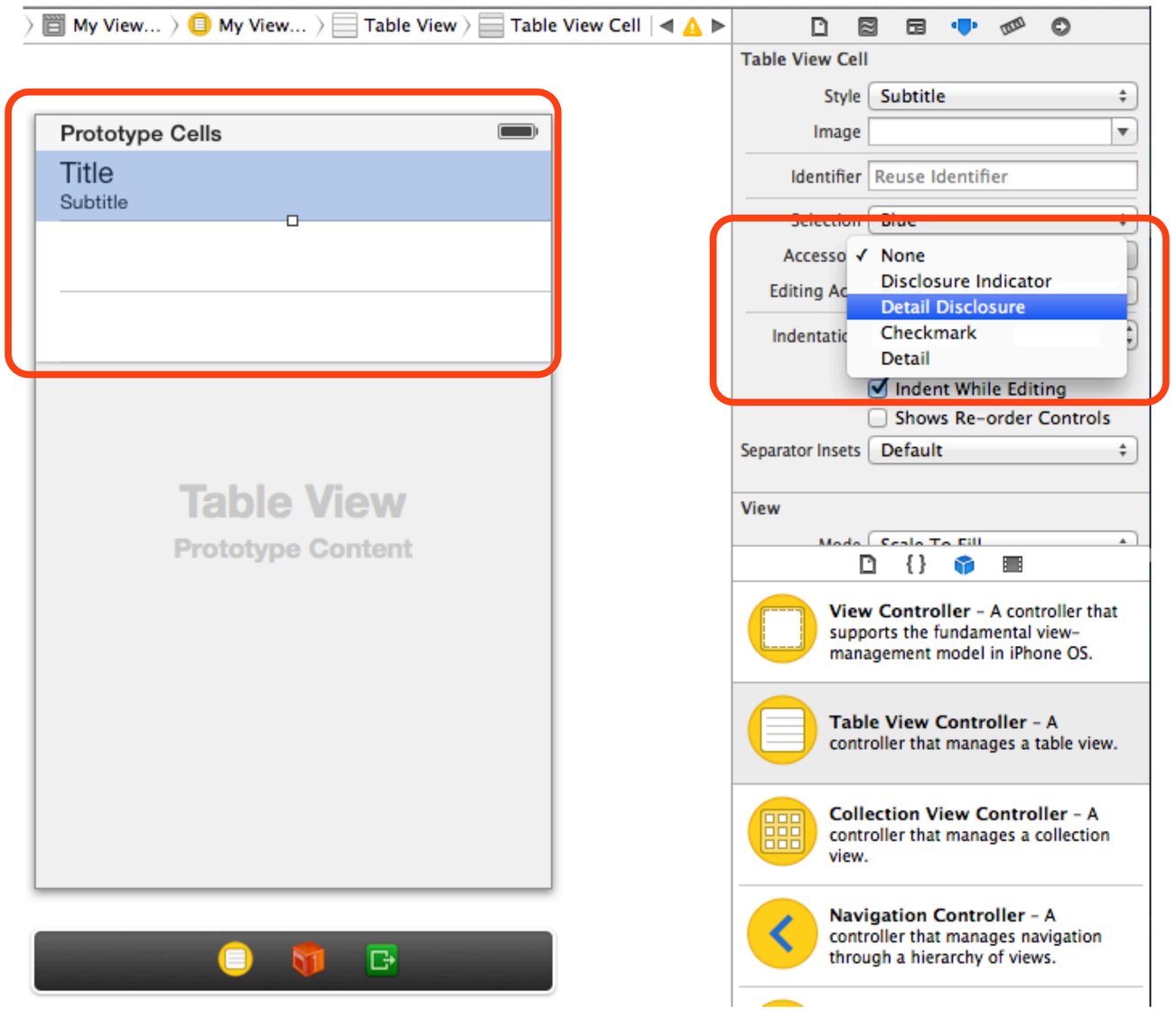


Table View Controller



... and accessories (which provide a hint of what will happen by selecting a row)

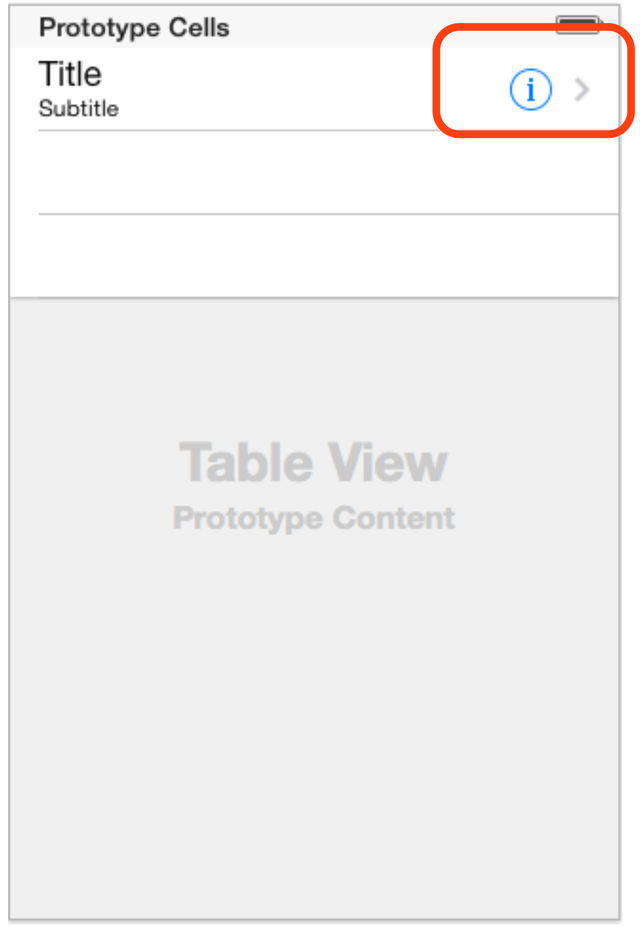
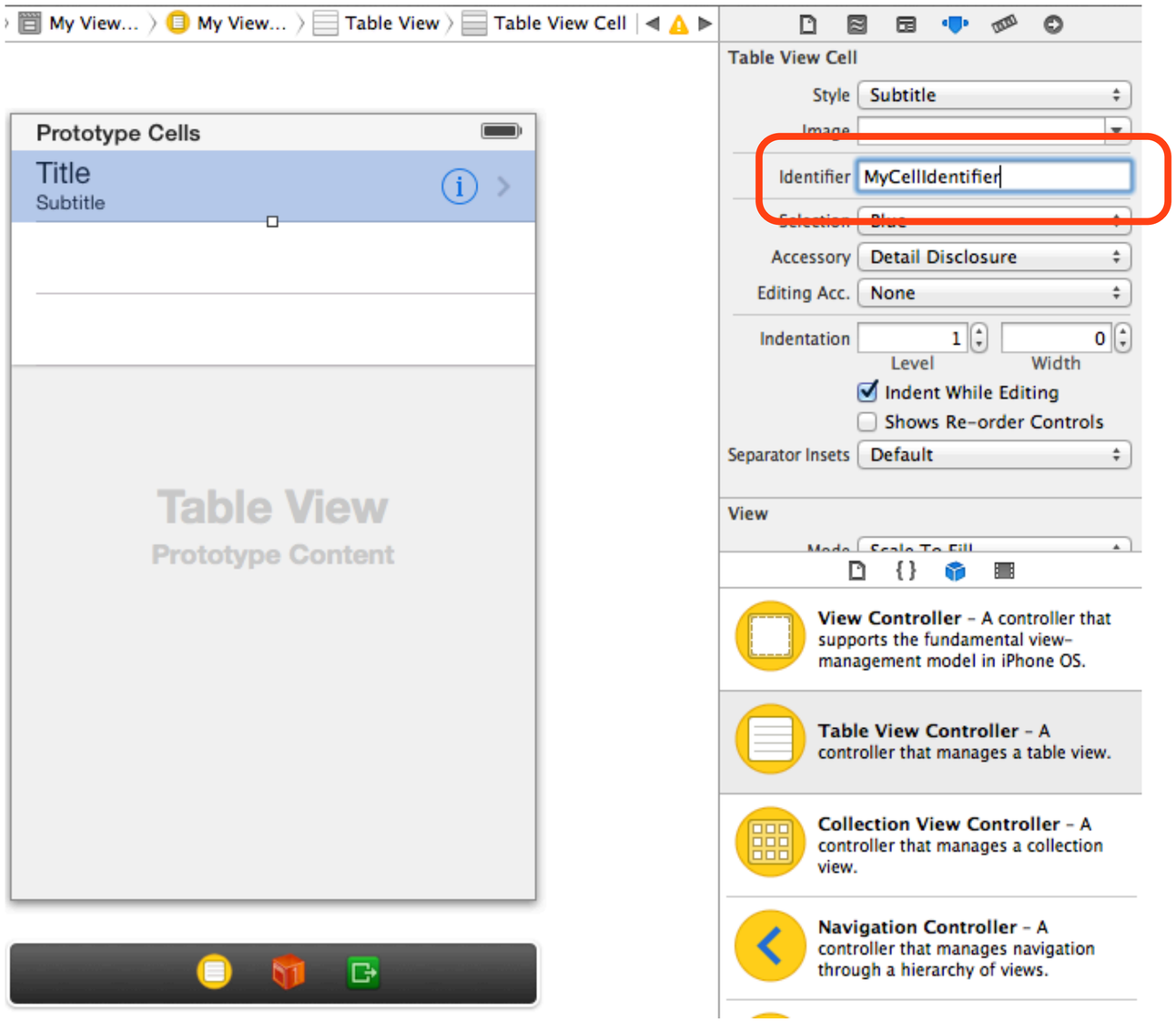
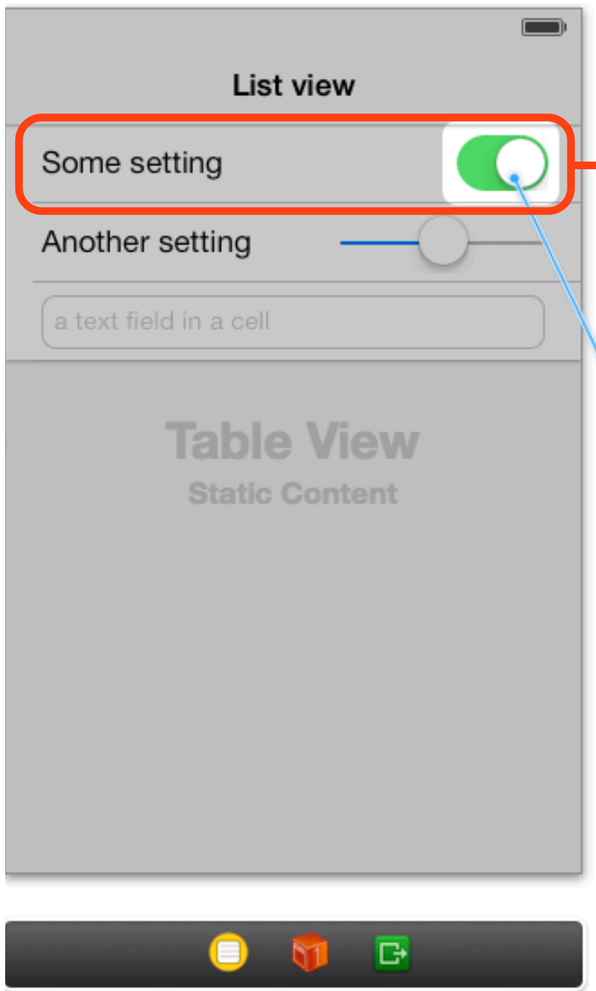


Table View Controller



An identifier for the cell must be specified so that it is possible to reference to the cell prototype in code (similar to the identifier of a segue)

Table View Controller




```
//  Copyright (c) 2013 Università degli Studi di Parma. Al
//

#import "MyViewController.h"

@interface MyViewController ()

@end

@implementation MyViewController

- (id)initWithStyle:(UITableViewStyle)style
{
    self = [super initWithStyle:style];
    if (self) {
        // Custom initialization
    }
    return self;
}

- (IBAction)refreshTableVIew:(UIRefreshControl *)sender {

    [sender beginRefreshing];

    // ... reload data
    [self.tableView reloadData];

    [sender endRefreshing];

}
```

Insert Action

```
- (void)viewDidLoad
{
    [super viewDidLoad];

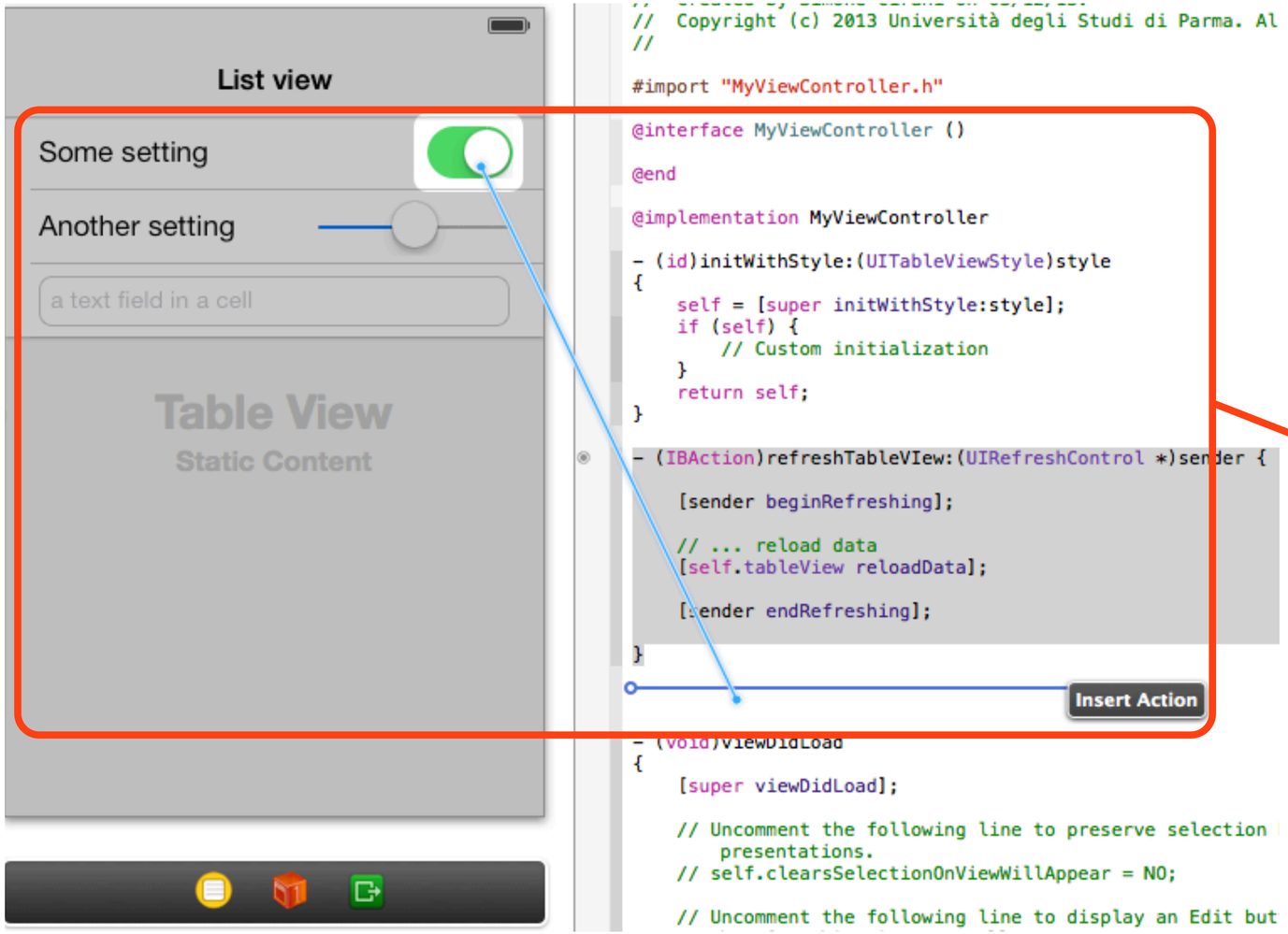
    // Uncomment the following line to preserve selection
        presentations.
    // self.clearsSelectionOnViewWillAppear = NO;

    // Uncomment the following line to display an Edit but
```

Static cells can be configured directly in storyboard

Views and controls (such as labels, switches, and sliders) can be added to the cells

Table View Controller



Target-actions can be added to the view controller by ctrl-dragging from the control to the implementation file

NSIndexPath

- The `NSIndexPath` class is used to represent the path to a specific node in a tree of nested array collections
- In iOS, UIKit adds some functionalities to `NSIndexPath` instances so that they can be used to refer to the position of a cell in a table view
- There are two properties that are used for this purpose:
  - `section`: an index number identifying a section in a table view (or collection view)
  - `row`: an index number identifying a row in a section of a table view
- An instance of `NSIndexPath` is passed in as argument to the methods that refer to a specific cell in the table view in order to identify the cell univocally

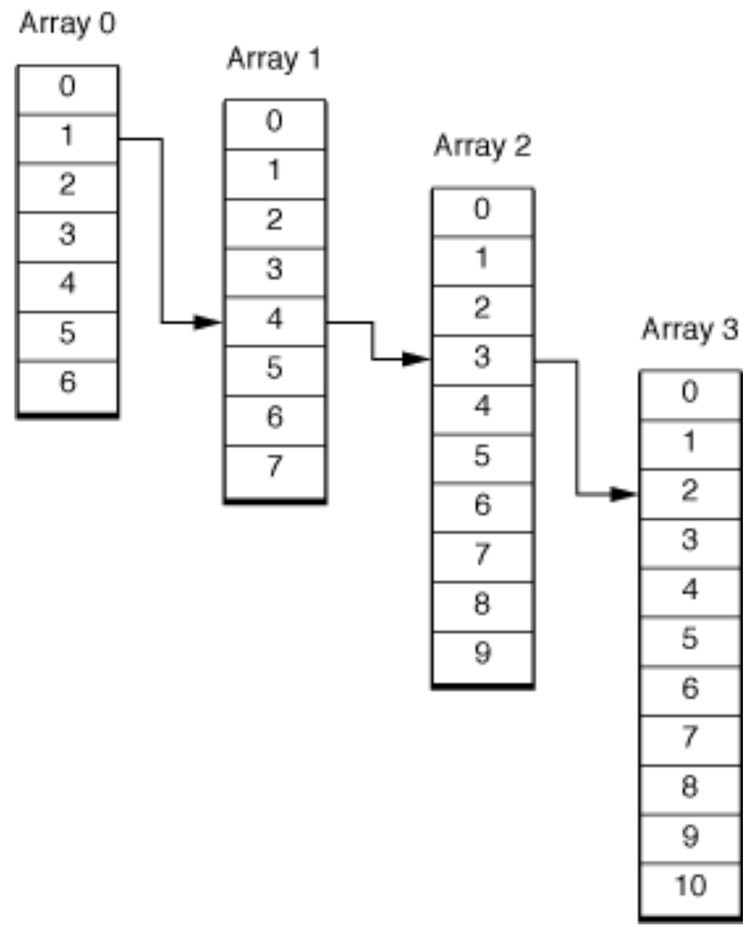


Table view content: UITableViewDataSource

- A table view relies on an external object to inject content into rows, called **data source**
- The data source stands between the model and the table view, so it is common (but not necessary) that the controller is the data source for a table view that it manages
- Typically a data source must provide content to the table by answering to the following questions:
  - How many sections will the table view have?
  - How many rows are there in section *i*?
  - What content (`UITableViewCell`) should be displayed in the cell at section *i* and row *j*?
  - Which title should be displayed for the header and footer of section *i*?
  - Is a table cell at section *i* and row *j* editable?
- A table view's data source must conform to the `UITableViewDataSource` protocol
- A data source must be provided for table views that display dynamic contents: it is the WHAT that you are displaying
- Static tables do not need to implement `UITableViewDataSource` protocol methods (all automatic)

UITableViewDataSource

- The **`UITableViewDataSource`** protocol defines the following methods, which must be implemented by a data source to give enough information to the UITableView to draw its content:

```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView

- (NSInteger)tableView:(UITableView *)tableView
 numberOfRowsInSection:(NSInteger)section

- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath

- (NSString *)tableView:(UITableView *)tableView
titleForHeaderInSection:(NSInteger)section

- (NSString *)tableView:(UITableView *)tableView
titleForFooterInSection:(NSInteger)section

- (BOOL)tableView:(UITableView *)tableView
canEditRowAtIndexPath:(NSIndexPath *)indexPath

- (void)tableView:(UITableView *)tableView
commitEditingStyle:(UITableViewCellEditingStyle)editingStyle
 forRowAtIndexPath:(NSIndexPath *)indexPath
```

UITableViewDataSource

```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
```

How many sections will the given table view have? (defaults to 1)

```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView{
    // Return the number of sections.
    return <NUMBER OF SECTIONS>;
}
```

UITableViewDataSource

```
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
```

How many rows will there be in the given section?

```
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section{
    // Return the number of rows in the section.
    return <NUMBER OF ROWS FOR SECTION section>;
}
```

UITableViewDataSource

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath
```

What content (`UITableViewCell`) should be displayed for the cell at the given index path?

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath{

    static NSString *CellIdentifier = @"MyCellIdentifier";
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier
                                                            forIndexPath:indexPath];

    // Configure the cell...

    return cell;
}
```

UITableViewDataSource

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- (UITableViewCell *)tableView:(UITableView *)tableView
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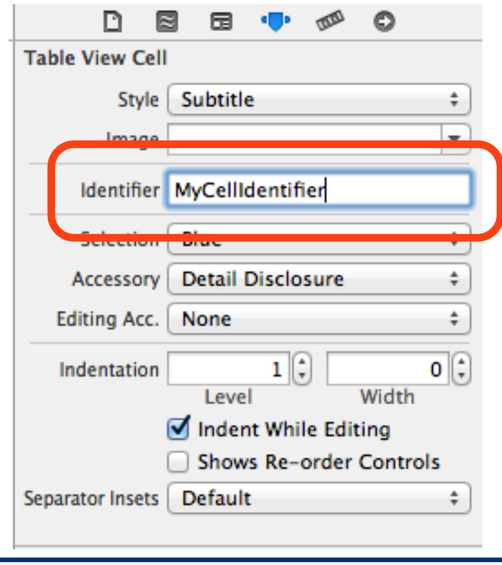
                                                            forIndexPath:indexPath];

    // Configure the cell...

    return cell;
}
```

Dynamic prototype identifier specified in the Attribute inspector in storyboard; very important to determine which prototype should be used if there are many



UITableViewDataSource

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath
```

What content (`UITableViewCell`) should be displayed for the cell at the given index path?

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath{

    static NSString *CellIdentifier = @"MyCellIdentifier";
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier
                                                            forIndexPath:indexPath];

    // Configure the cell...

    return cell;
}
```

A table view's data source should reuse cell objects for performance reasons (it would be extremely inefficient to always create new cells for each row in the table view: only those on screen should be kept in memory)

UITableViewDataSource

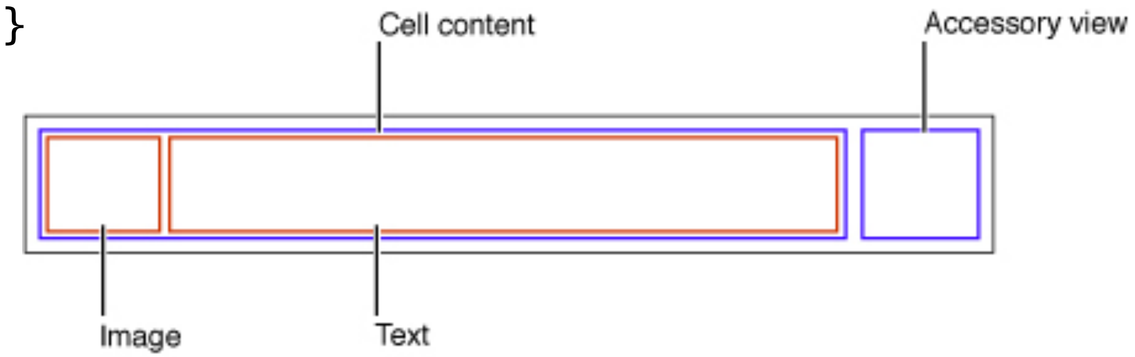
```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath
```

What content (`UITableViewCell`) should be displayed for the cell at the given index path?

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath{

    static NSString *CellIdentifier = @"MyCellIdentifier";
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier
                                                            forIndexPath:indexPath];

    // Configure the cell...
    cell.textLabel.text = [NSString stringWithFormat:@"cell at row [%d]", indexPath.row];
    return cell;
}
```



Here is where you can set the cell's `textLabel`, `detailLabel`, and `imageView` properties of the cell

UITableViewDataSource

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath
```

What content (`UITableViewCell`) should be displayed for the cell at the given index path?

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath{

    static NSString *CellIdentifier = @"MyCellIdentifier";
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier
                                                            forIndexPath:indexPath];

    // Configure the cell...
    cell.textLabel.text = [NSString stringWithFormat:@"cell at row [%d]", indexPath.row];
    return cell;
}
```

Custom table view cells can also be used to display special content that does not fit into the system-provided cell types

UITableViewDataSource

```
- (NSString *)tableView:(UITableView *)tableView titleForHeaderInSection:(NSInteger)section

- (NSString *)tableView:(UITableView *)tableView titleForFooterInSection:(NSInteger)section
```

What is the title for the given section's header/footer?

```
- (NSString *)tableView:(UITableView *)tableView titleForHeaderInSection:(NSInteger)section{
    return [NSString stringWithFormat:@"Header %d",section];
}

- (NSString *)tableView:(UITableView *)tableView titleForFooterInSection:(NSInteger)section{
    return [NSString stringWithFormat:@"Footer %d",section];
}
```

Table view behavior: UITableViewDelegate

- A table view relies on an external object to specify its appearance and behavior, called **delegate**
- The delegate is needed to manage selections, configure section headings and footers, help to delete and reorder cells
- It is common (but not necessary) that the controller is the delegate for a table view that it manages
- Typically a delegate must implement methods that answer to the following questions:
  - What should be done if a cell is about to be/was selected/deselected? (instead of just following a segue)
  - What should be done if a cell's accessory button was tapped? (a special behavior can be supplied)
  - Which height should a cell have?
  - Which view should be displayed for the header/footer of a given section?
- A table view's delegate must conform to the `UITableViewDelegate` protocol
- A delegate must be provided for table views that must manage selections and can have particular behavior and/or appearance: it is the HOW the table view is being displayed

UITableViewDelegate

```
- (NSIndexPath *)tableView:(UITableView *)tableView
  willSelectRowAtIndexPath:(NSIndexPath *)indexPath

- (NSIndexPath *)tableView:(UITableView *)tableView
   didSelectRowAtIndexPath:(NSIndexPath *)indexPath

- (NSIndexPath *)tableView:(UITableView *)tableView
willDeselectRowAtIndexPath:(NSIndexPath *)indexPath

- (NSIndexPath *)tableView:(UITableView *)tableView
 didDeselectRowAtIndexPath:(NSIndexPath *)indexPath

                - (void)tableView:(UITableView *)tableView
accessoryButtonTappedForRowWithIndexPath:(NSIndexPath *)indexPath

                 - (CGFloat)tableView:(UITableView *)tableView
               heightForRowAtIndexPath:(NSIndexPath *)indexPath

                - (UIView *)tableView:(UITableView *)tableView
              viewForHeaderInSection:(NSInteger)section

                - (UIView *)tableView:(UITableView *)tableView
              viewForFooterInSection:(NSInteger)section
```

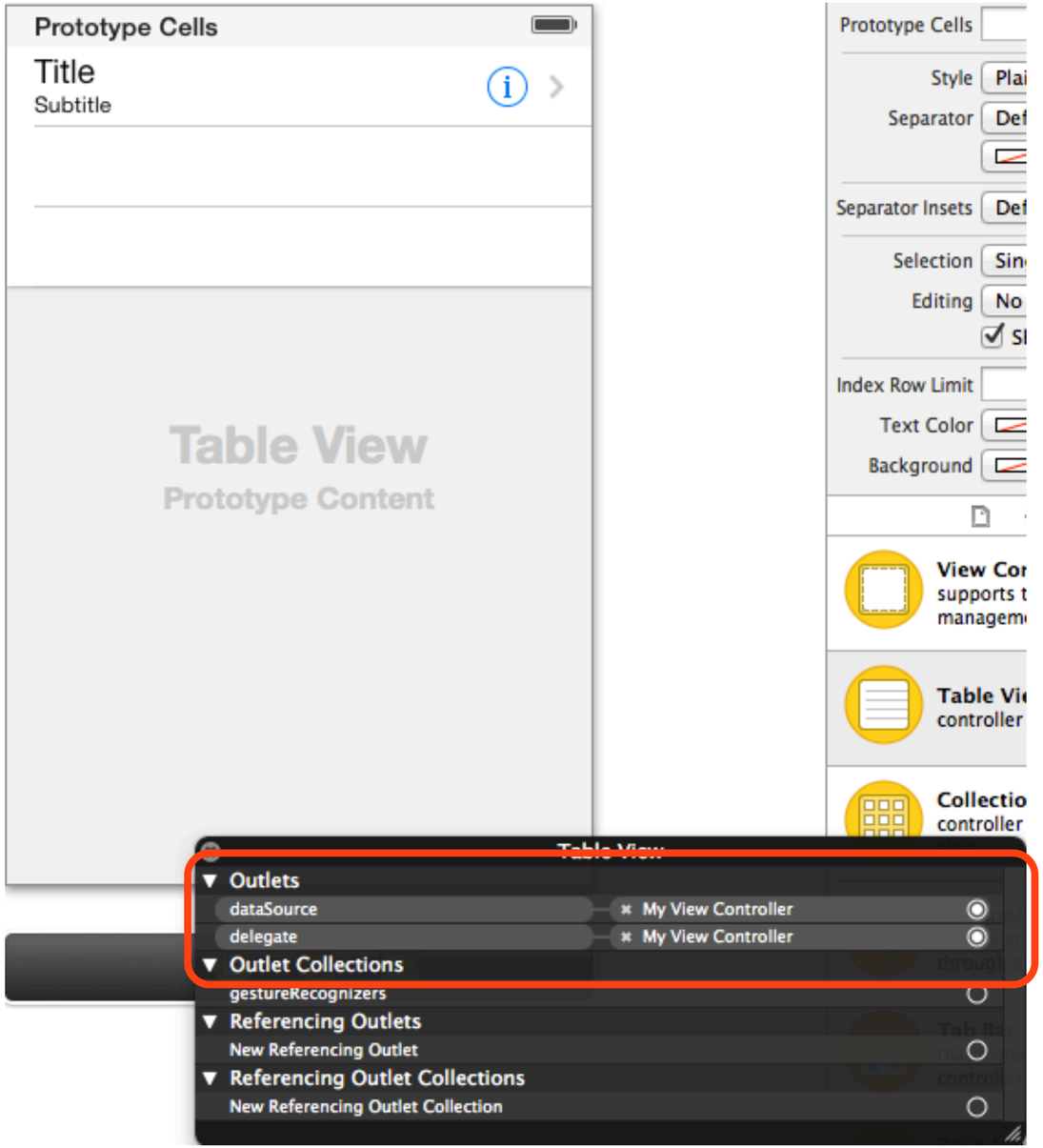
UITableViewController

- A `UITableViewController` sets itself as the data source and delegate for the table view it controls
- A `UITableViewController` has a `tableView` property which can be used to refer to the table view

```
@property UITableView *tableView;
```

- For a `UITableViewController` the following identity holds:

```
self.view == self.tableView;
```



UITableViewController

- When a subclass of **`UITableViewController`** is created, Xcode provides a skeleton implementation of the most important methods that must be implemented to conform to the **`UITableViewDataSource`** protocol

```
#pragma mark - Table view data source

- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView{
    // Return the number of sections.
    return 1;
}

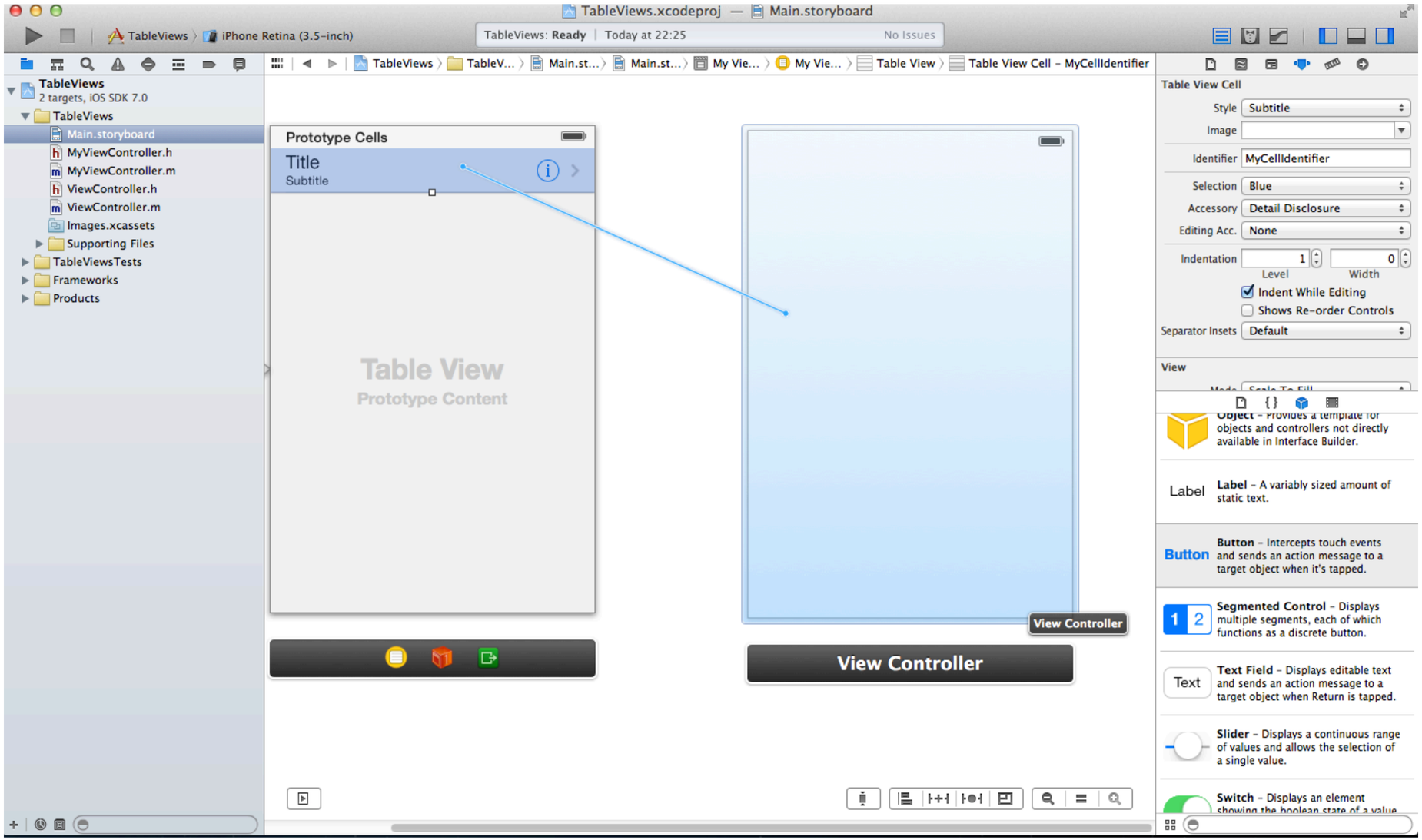
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section{
    // Return the number of rows in the section.
    return 0;
}

- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath *)indexPath{
    static NSString *CellIdentifier = @"MyCellIdentifier";
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier forIndexPath:indexPath];

    // Configure the cell...

    return cell;
}
```

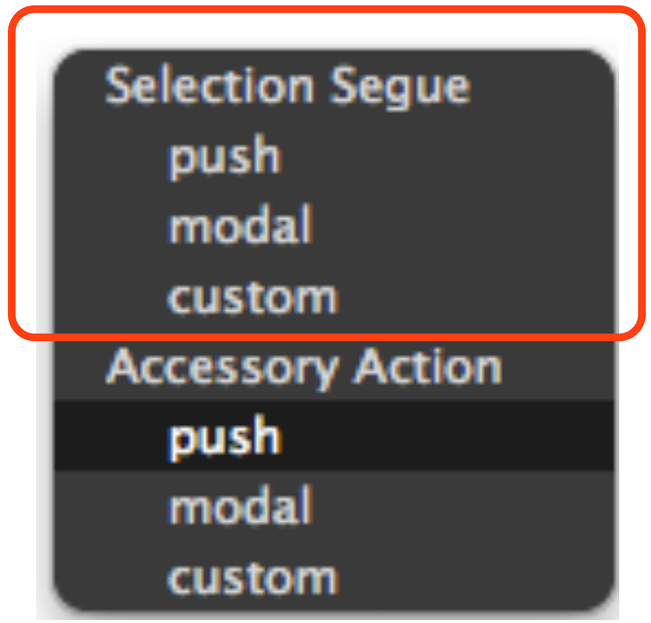
Segue from a UITableViewCell



Ctrl-drag from the cell prototype to the destination view controller

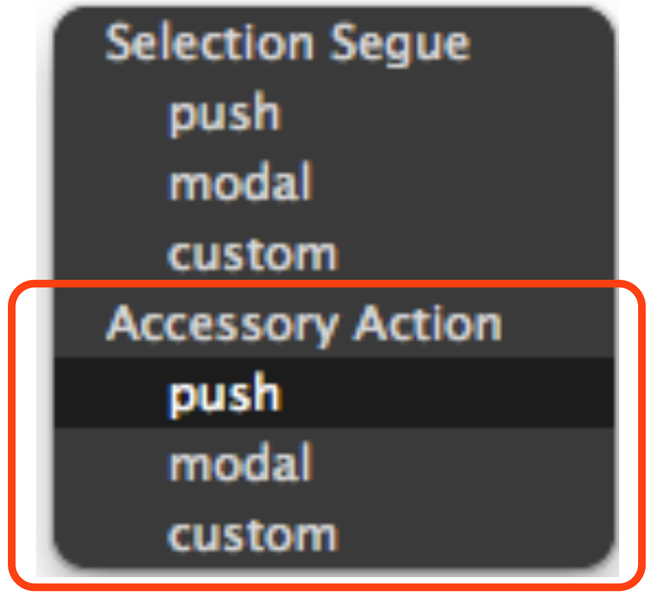
Segue from a UITableViewCell

A segue can be configured to start when the cell is selected...



Segue from a UITableViewCell

...or when the cell's accessory is tapped



Preparing for a segue from a UITableViewCell

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender{

    // Get the new view controller using [segue destinationViewController].
    // Pass the selected object to the new view controller.

    NSIndexPath *indexPath = [self.tableView indexPathForCell:sender];

    if([segue.destinationViewController isKindOfClass:[SomeViewController class]]){

        SomeViewController *vc = (SomeViewController *)segue.destinationViewController;
        vc.title = [NSString stringWithFormat:@"Detail %d",indexPath.row];

    }

}
```

Preparing for a segue from a UITableViewCell

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender{

    // Get the new view controller using [segue destinationViewController].
    // Pass the selected object to the new view controller.

    NSIndexPath *indexPath = [self.tableView indexPathForCell:sender];

    if([segue.destinationViewController isKindOfClass:[SomeViewController class]]){

        SomeViewController *vc = (SomeViewController *)segue.destinationViewController;
        vc.title = [NSString stringWithFormat:@"Detail %d",indexPath.row];

    }

}
```

The sender is the table view cell that was selected

Preparing for a segue from a UITableViewCell

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender{

    // Get the new view controller using [segue destinationViewController].
    // Pass the selected object to the new view controller.

    NSIndexPath *indexPath = [self.tableView indexPathForCell:sender];

    if([segue.destinationViewController isKindOfClass:[SomeViewController class]]){

        SomeViewController *vc = (SomeViewController *)segue.destinationViewController;
        vc.title = [NSString stringWithFormat:@"Detail %d",indexPath.row];

    }

}
```

The index path of the cell can be retrieved with the `UITableView` method `indexPathForCell:`

Preparing for a segue from a UITableViewCell

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender{

    // Get the new view controller using [segue destinationViewController].
    // Pass the selected object to the new view controller.

    NSIndexPath *indexPath = [self.tableView indexPathForCell:sender];

    if([segue.destinationViewController isKindOfClass:[SomeViewController class]]){

        SomeViewController *vc = (SomeViewController *)segue.destinationViewController;
        vc.title = [NSString stringWithFormat:@"Detail %d",indexPath.row];

    }

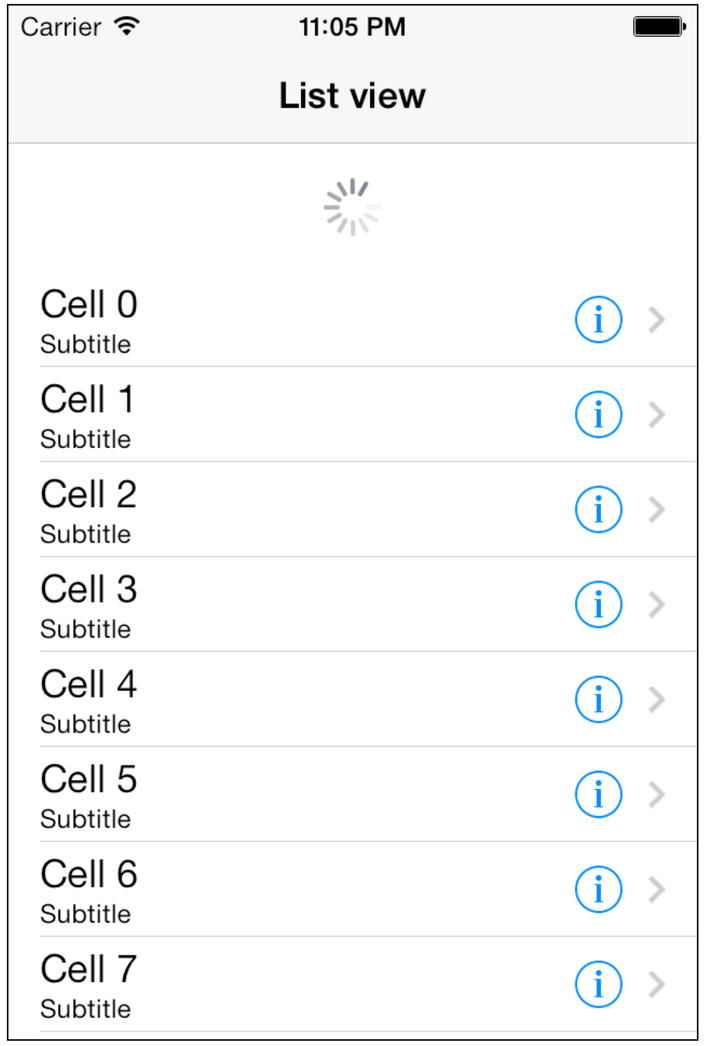
}
```

Pass data to the destination view controller

Pull to refresh

- All `UITableViewController` instances come with a built-in activity indicator that can be used to indicate that table view data are being reloaded
- If an action has been set for the refresh control, it will be triggered when the user pulls the table view down (usually referred to as “pull-to-refresh”)

```
@property UIRefreshControl *refreshControl;
```

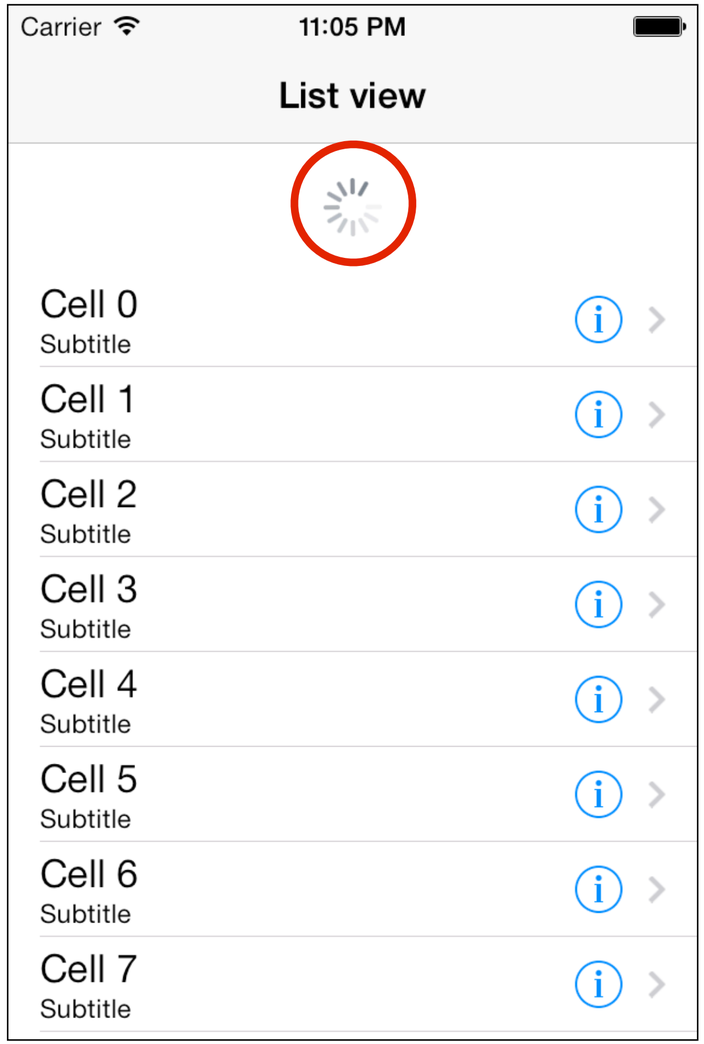


Pull to refresh

- All `UITableViewController` instances come with a built-in activity indicator that can be used to indicate that table view data are being reloaded

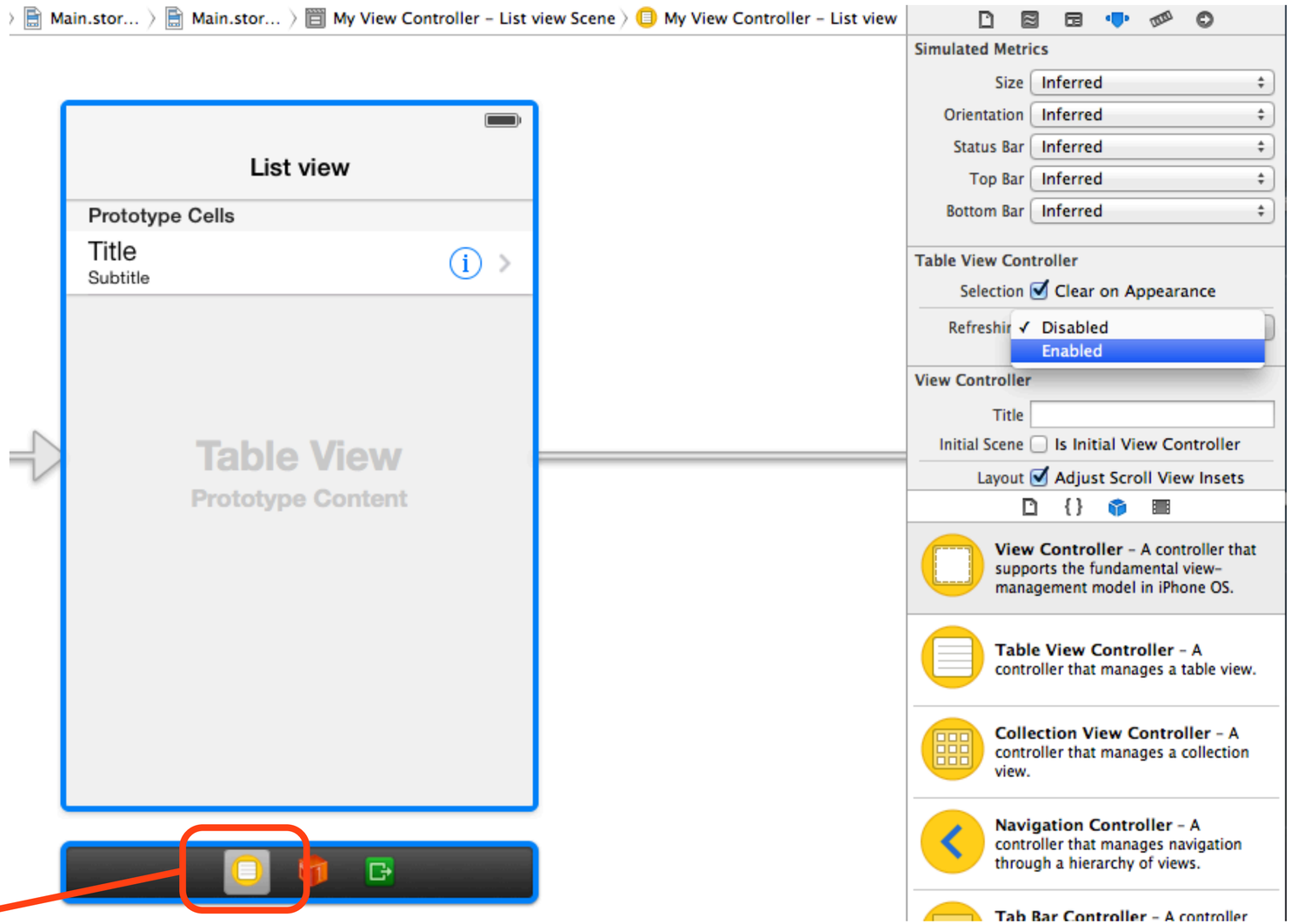
- If an action has been set for the refresh control, it will be triggered when the user pulls the table view down (usually referred to as “pull-to-refresh”)

```
@property UIRefreshControl *refreshControl;
```



Pull to refresh

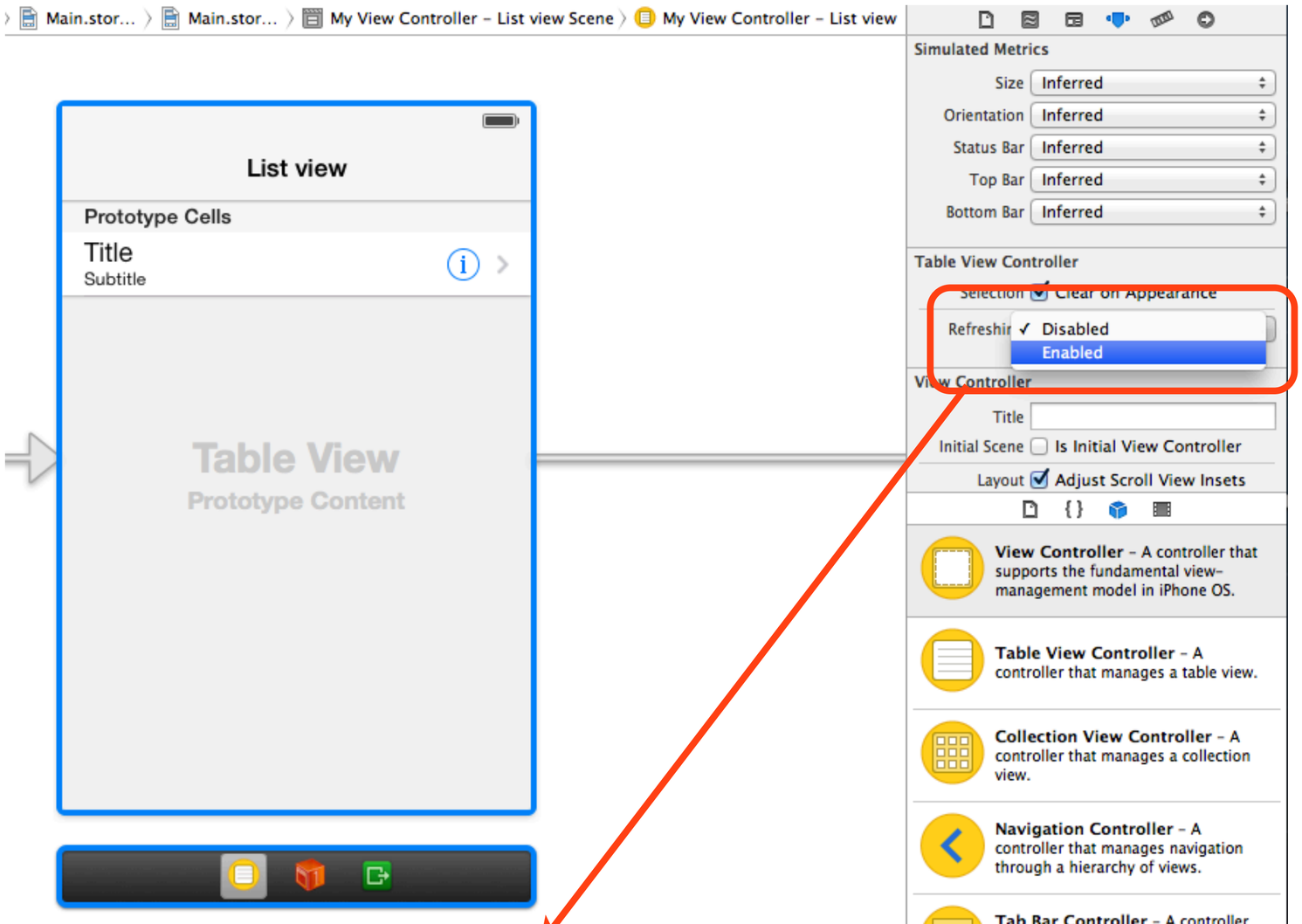
- The activity view is called refresh control and can be enabled in the Attribute inspector of the `UITableViewController`



Select the `UIViewController`

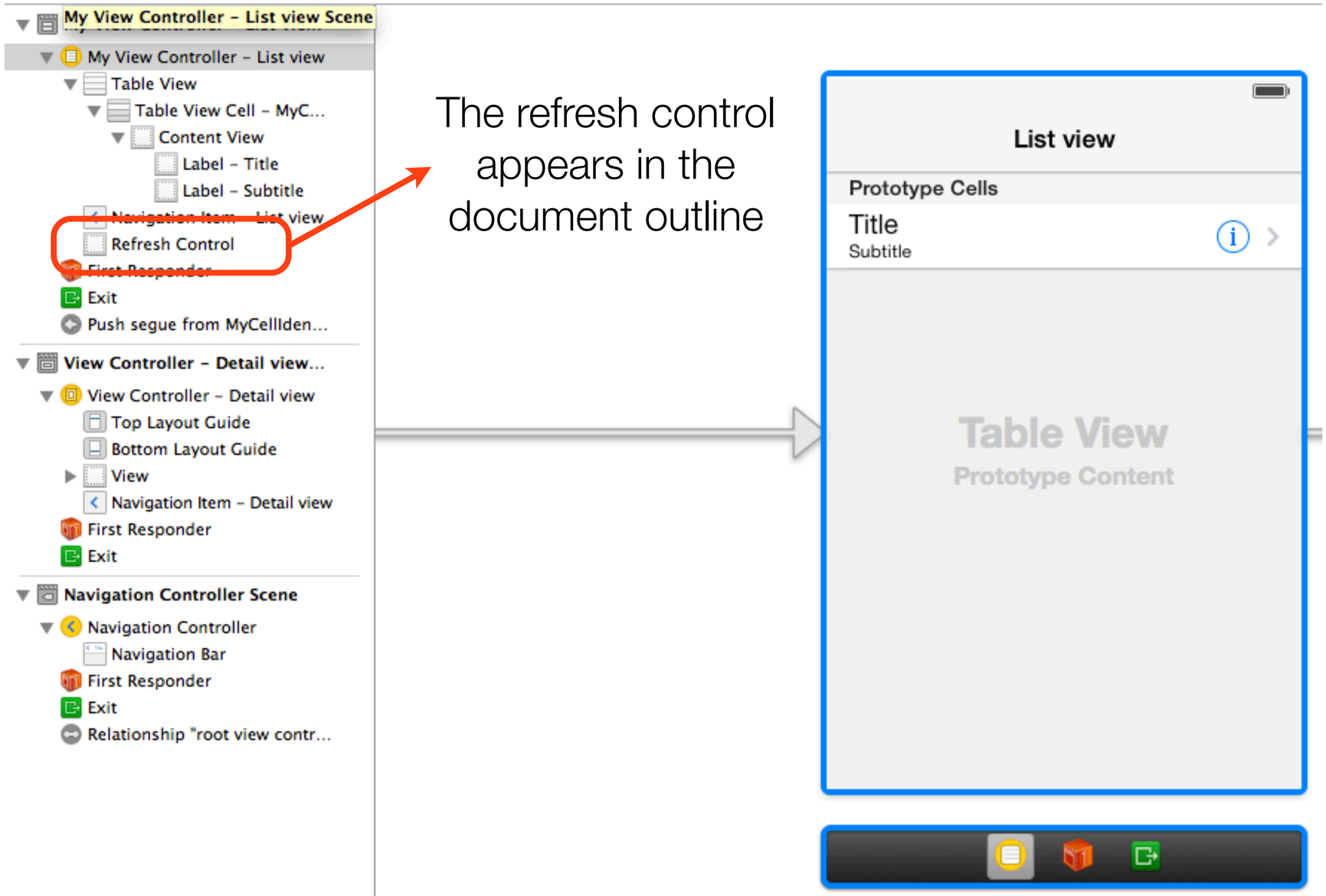
Pull to refresh

- The activity view is called refresh control and can be enabled in the Attribute inspector of the `UITableViewController`

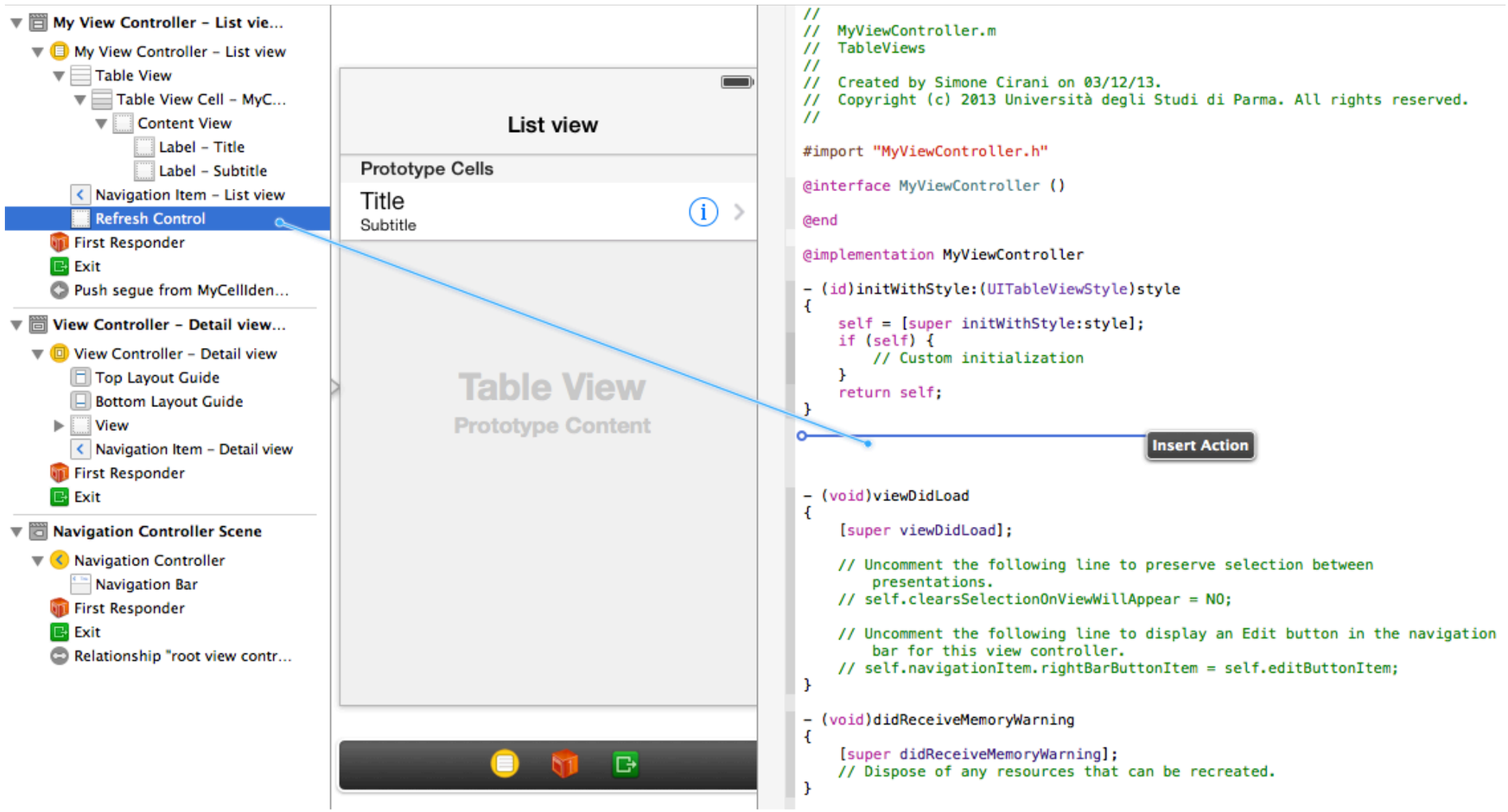


Enable the Refreshing option

Pull to refresh



Pull to refresh



Ctrl-drag from the refresh control to insert a target-action

Pull to refresh

```
- (IBAction)refreshTableView:(UIRefreshControl *)sender {
    [sender beginRefreshing];
    // ... reload data
    [self.tableView reloadData];
    [sender endRefreshing];
}
```

Pull to refresh

```
- (IBAction)refreshTableView:(UIRefreshControl *)sender {

    [sender beginRefreshing];

    // ... reload data

        [self.tableView reloadData];

        [sender endRefreshing];

}
```

Start the spinner

Pull to refresh

```
- (IBAction)refreshTableView:(UIRefreshControl *)sender {

    [sender beginRefreshing];

    // ... reload data

    [self.tableView reloadData];

    [sender endRefreshing];

}
```

Fetch fresh data in background queue

Pull to refresh

```
- (IBAction)refreshTableView:(UIRefreshControl *)sender {

    [sender beginRefreshing];

    // ... reload data

    [self.tableView reloadData];

    [sender endRefreshing];

}
```

Redraw the cells

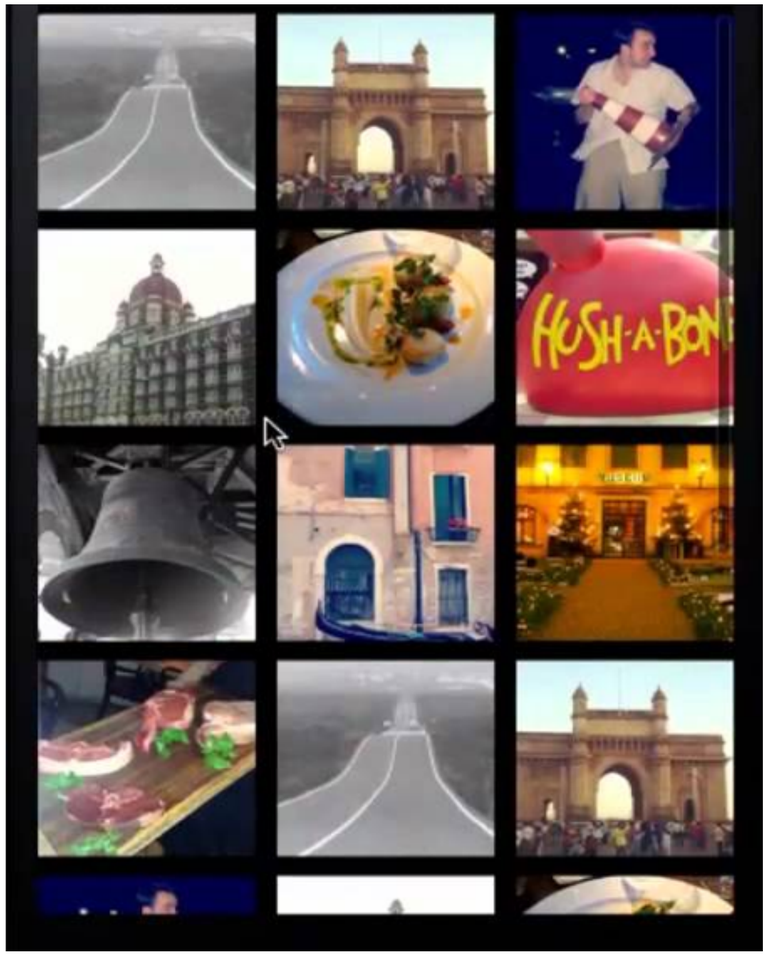
Pull to refresh

```
- (IBAction)refreshTableView:(UIRefreshControl *)sender {
    [sender beginRefreshing];
    // ... reload data
    [self.tableView reloadData];
    [sender endRefreshing];
}
```

Stop the spinner

UICollectionView

- A collection view displays an ordered collection of data items using standard or custom layouts
  - Typically, collection views present items in a grid-like arrangement
  - More complex layouts can be presented, such as stacks, circular layouts, dynamically changing layouts
- A collection view should be used to display nonhierarchical, ordered data items
- The `UICollectionView` class implements the collection view
- The content of collection views is presented in cells (`UICollectionViewCell`)
- Just like a `UITableView`, a `UICollectionView` requires a data source (`UICollectionViewDataSource`) to provide content and a delegate (`UICollectionViewDelegate`) to provide behavior
- The placement of cells, supplementary views, and decoration views inside the collection view is determined by a subclass of `UICollectionViewLayout`



UIWebView

- A web view is used to embed web content, loaded from a URL, into an application
- Web views support browsing and moving back and forward in the history
- The `UIWebView` class implements the web view
- A `UIWebView` object can be dragged into the view controller in storyboard or created programmatically and added to the view
- A `UIWebView` can then be linked as an outlet by ctrl-dragging from the UIWebView to the interface declaration of the view controller
- It is possible to configure the `UIWebView` to automatically scale web content to fit on the screen by setting the `scalesPagesToFit` property

UIWebView

- To load content into the web view, two methods can be used:
  - `loadRequest:`

```
NSURL *url = [NSURL URLWithString:@"http://mobdev.ce.unipr.it"];
NSURLRequest *request = [NSURLRequest requestWithURL:url];
[self.webView loadRequest:request];
```

  - `loadHTMLString:baseURL:`

```
NSString *html = @"<html><body>Hello, MobDev!</body></html>";
[self.webView loadHTMLString:html baseURL:url];
```

UIWebViewDelegate

- A web view can have a delegate that can be used to track the loading of web content
- The delegate object must conform to the **`UIWebViewDelegate`** protocol
- Set as web view delegate:

```
self.webView.delegate = self;
```

- A delegate's class must declare to conform to the **`UIWebViewDelegate`** protocol and implement the optional methods:

```
@interface WebViewViewController () <UIWebViewDelegate>
```

- If a delegate has been set for a web view, it must be set to nil before disposing the web view instance (e.g. in the dealloc method where the web view is released)

```
- (void)dealloc{
    self.webView.delegate = nil;
}
```

UIWebViewDelegate methods

```
- (BOOL)webView:(UIWebView *)webView
shouldStartLoadWithRequest:(NSURLRequest *)request
navigationType:(UIWebViewNavigationType)navigationType
```

- This method is called before a web view begins loading a frame and can be use to “trap” the loading
- If the method returns YES the content is loaded, otherwise the loading will not occur
- Arguments passed in:
  - `webView`: the web view that is about to load content
  - `request`: the URL loading request, which can be used to get the URL that is about to load
  - `navigationType`: the type of action (a link was clicked, a form submitted, a page was reloaded, ...)

UIWebViewDelegate methods

```
- (void)webViewDidStartLoad:(UIWebView *)webView
```

- This method is called after a web view has started loading a frame
- Arguments passed in:
  - `webView`: the web view that is loading content

UIWebViewDelegate methods

```
- (void)webViewDidFinishLoad:(UIWebView *)webView
```

- This method is called after a web view has finished loading a frame
- Arguments passed in:
  - `webView`: the web view that is loaded content

UIWebViewDelegate methods

```
- (void)webView:(UIWebView *)webView
didFailLoadWithError:(NSError *)error
```

- This method is called if a web view fails to load

- Arguments passed in:
  - `webView`: the web view that is about to load content
  - `error`: the error that occurred during the loading

iOS Development

Lecture 4
Scroll View, Table View, Collection View, Web View

Ing. Simone Cirani
email: simone.cirani@unipr.it
http://www.tlc.unipr.it/cirani