iPhone Application Programming
Lecture 4: User Interface Design

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Media Computing Group
RWTH Aachen University

Winter Semester 2013/2014

http://hci.rwth-aachen.de/iphone

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View Concepts

- SDK provide many types of Views to show your content
- At run-time Views are organized as a tree
- Use Interface Builder to design your UI and connect it to code
- Geometry of Views are determined by constraints

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Carrier 7:31 AM

Cancel **Add Event** Done

Title

Location

All-day

Starts November 12, 2013 7:00 AM

Sat Nov 9	4	57	
Sun Nov 10	5	58	
Mon Nov 11	6	59	
Today	**7**	**00**	**AM**
Wed Nov 13	8	01	PM
Thu Nov 14	9	02	
Fri Nov 15	10	03	

Carrier 7:31 AM

Cancel | Add Event | Done

Title

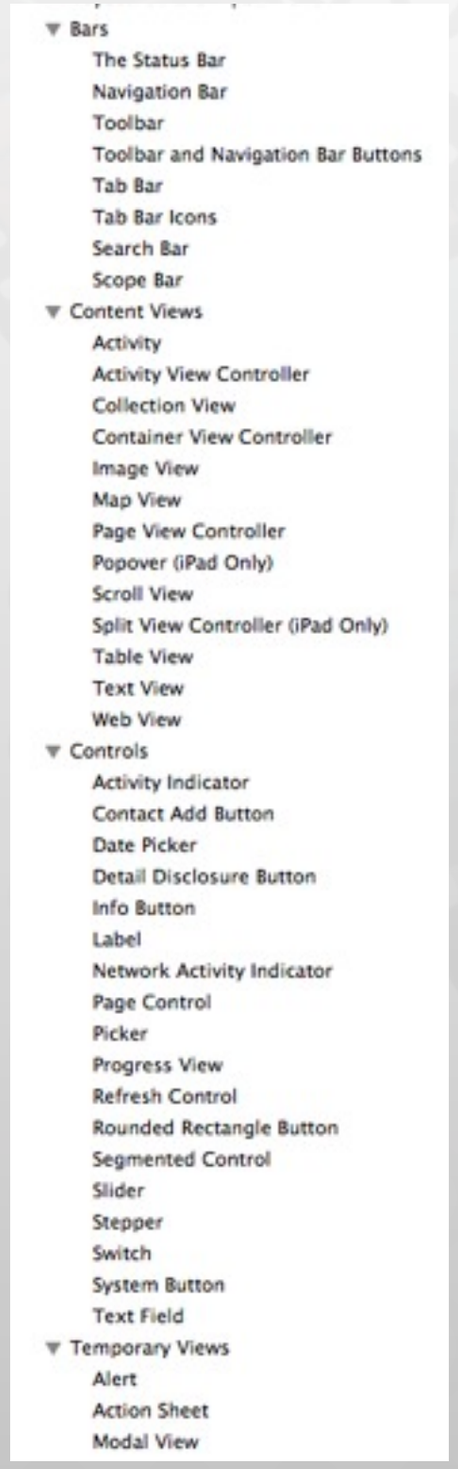
Location

All-day

Starts November 12, 2013 7:00 AM

Sat Nov 9 4 57
Sun Nov 10 5 58
Mon Nov 11 6 59
Today 7 00 AM
Wed Nov 13 8 01 PM
Thu Nov 14 9 02
Fri Nov 15 10 03

Finding the Right View



Label

A **label** displays static text.

Create a stream or join one to share your best shots and enjoy friends' comments and contributions right in the iOS photos app.

API NOTE

To learn more about defining labels in your code, see *UILabel Class Reference*.

A label:

- Displays any amount of static text
- Doesn't allow user interaction except, potentially, to copy the text

Use a label to name or describe parts of your UI or to provide short messages to the user. A label is best suited for displaying a relatively small amount of text.

Take care to make your labels legible. It's best to support Dynamic Type and use the `UIFont` method `preferredFontForTextStyle` to get the text for display in a label. If you choose to use custom fonts, don't sacrifice clarity for fancy lettering or showy colors. (For guidelines about using text in an app, see Color and Typography; to learn more about Dynamic Type, see "Text Styles" in *Text Programming Guide for iOS*.)

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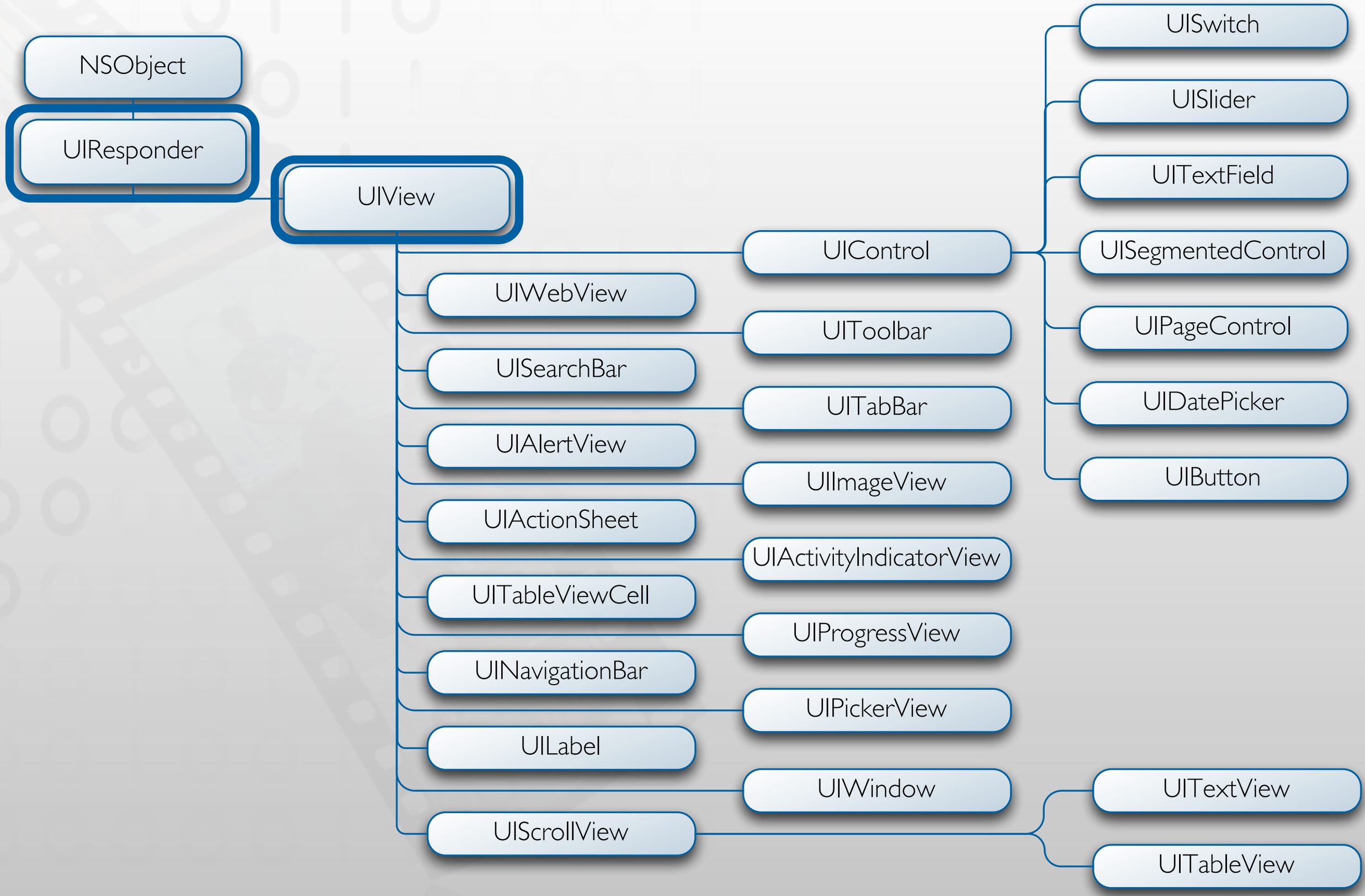

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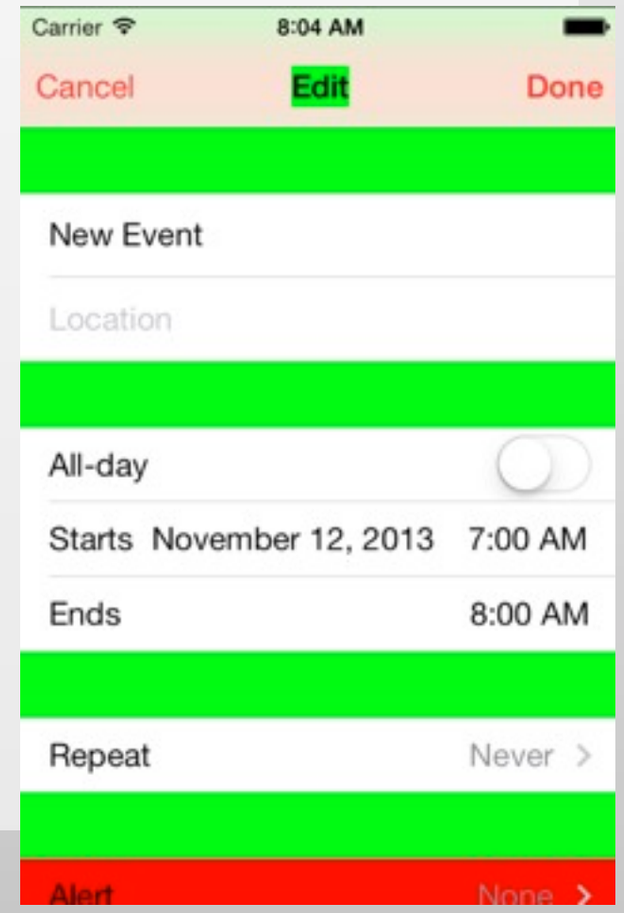
Demo: Hacking Calendar

```
(lldb) po [[UIWindow keyWindow] recursiveDescription]
<UIWindow
   | <UILayoutContainerView
   |    | <UINavigationTransitionView
   |    |    | <UIViewControllerWrapperView
   |    |    |    | <EKCalendarItemEditorTableView: 0xf870200; baseClass = UITableView;
   |    |    |    |    | <UITableViewWrapperView
   |    |    |    |    |    | <UITableViewCell: 0xb19ad90
   |    |    |
   |    |    |    ...
   |    |    |
   |    | <UINavigationBar
   |    |    |
   |    |    |    ...
   |    |    |
   |    |    | <UINavigationItemView
   |    |    |    | <UILabel
   |    |    | <UINavigationButton
   |    |    |    ...

(lldb) expr ((UIView *)0xb19ad90).backgroundColor = [UIColor redColor]
(lldb) expr ((UIView *)0xf870200).backgroundColor = [UIColor greenColor]
```



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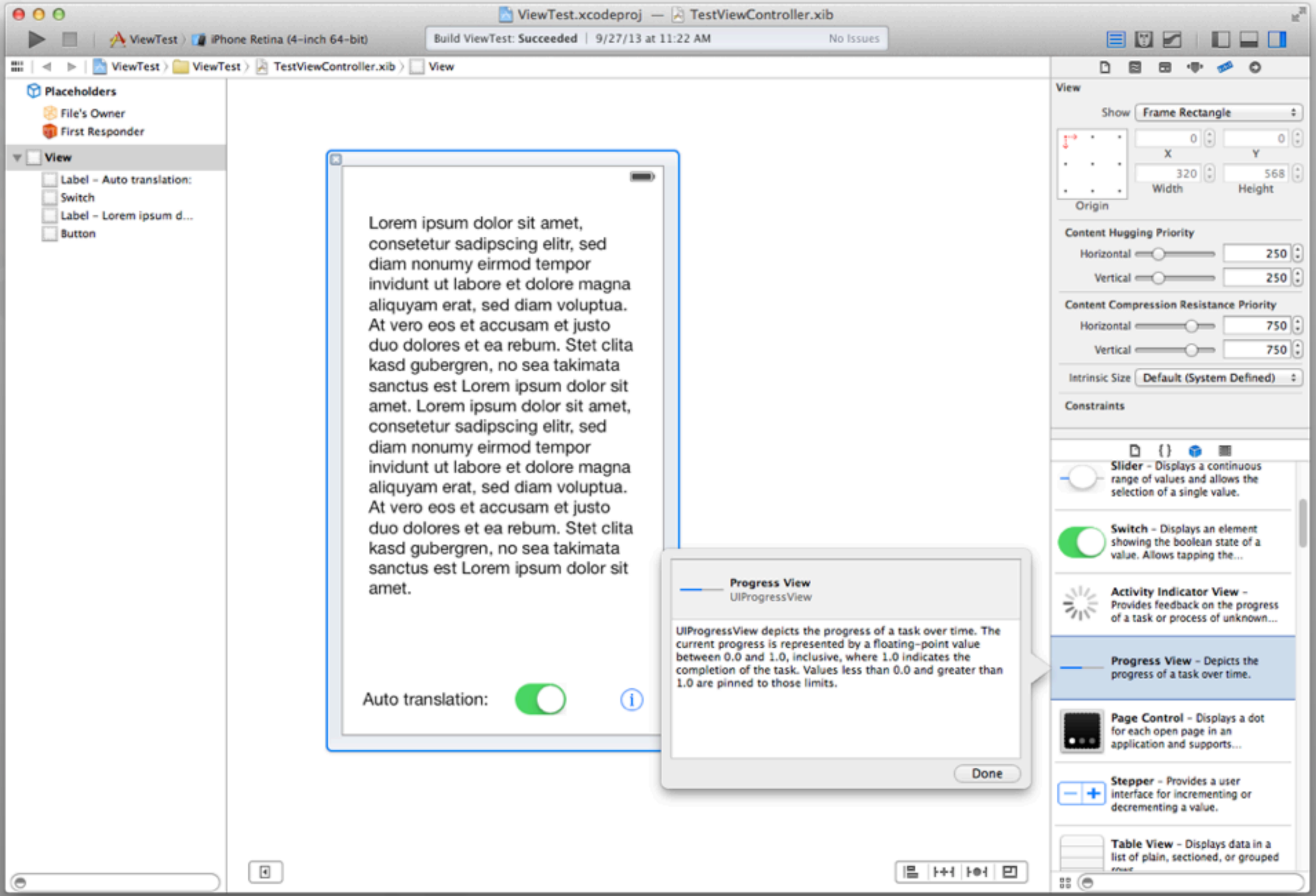
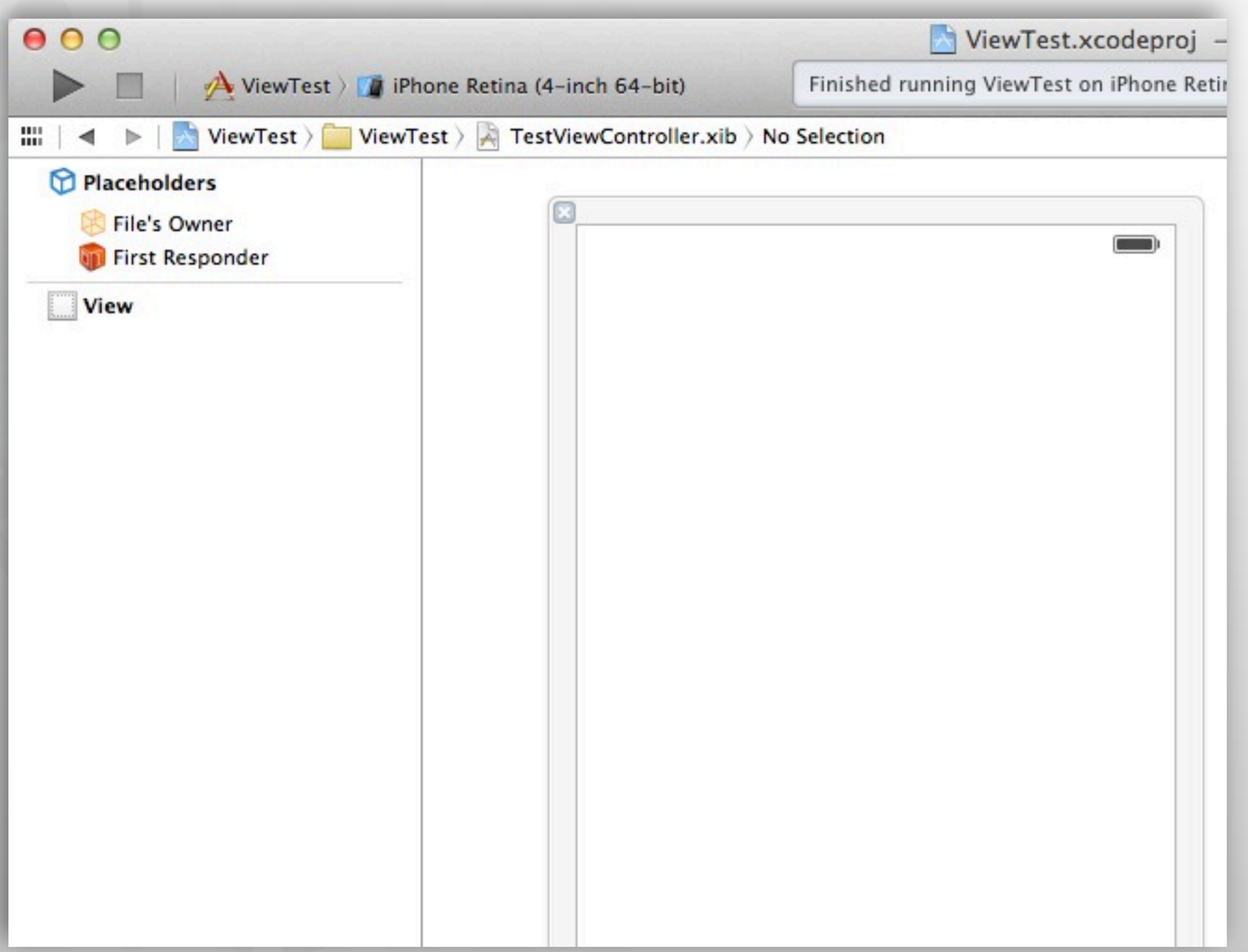

ViewTest.xcodeproj — TestViewController.xib
ViewTest › iPhone Retina (4-inch 64-bit)
Build ViewTest: Succeeded | 9/27/13 at 11:22 AM
No Issues
ViewTest › ViewTest › TestViewController.xib › View
Placeholders
File's Owner
First Responder
View
Label – Auto translation:
Switch
Label – Lorem ipsum d...
Button
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.
Auto translation:
Progress View
UIProgressView
UIProgressView depicts the progress of a task over time. The current progress is represented by a floating-point value between 0.0 and 1.0, inclusive, where 1.0 indicates the completion of the task. Values less than 0.0 and greater than 1.0 are pinned to those limits.
Done
View
Show Frame Rectangle
X
Y
Width
Height
Origin
Content Hugging Priority
Horizontal
Vertical
Content Compression Resistance Priority
Intrinsic Size Default (System Defined)
Constraints
Slider – Displays a continuous range of values and allows the selection of a single value.
Switch – Displays an element showing the boolean state of a value. Allows tapping the...
Activity Indicator View – Provides feedback on the progress of a task or process of unknown...
Progress View – Depicts the progress of a task over time.
Page Control – Displays a dot for each open page in an application and supports...
Stepper – Provides a user interface for incrementing or decrementing a value.
Table View – Displays data in a list of plain, sectioned, or grouped

Interface Builder

- Graphical tool to layout user interfaces
- Create the widget hierarchy
- Set attributes of widgets
- Set up connections between the widgets
- Store these informations in nib files

The Anatomy of a xib File



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The Source of a xib

```
<?xml version="1.0" encoding="UTF-8"?>
<archive type="com.apple.InterfaceBuilder3.CocoaTouch.XIB" version="8.00">
    <data>
        <int key="IBDocument.SystemTarget">1280</int>
        <string key="IBDocument.SystemVersion">11C74</string>
        <string key="IBDocument.InterfaceBuilderVersion">1938</string>
        <string key="IBDocument.AppKitVersion">1138.23</string>
        <string key="IBDocument.HIToolboxVersion">567.00</string>
        <object class="NSMutableDictionary" key="IBDocument.PluginVersions">
            <string key="NS.key.0">com.apple.InterfaceBuilder.IBCocoaTouchPlugin</string>
            <string key="NS.object.0">933</string>
        </object>
        <array key="IBDocument.IntegratedClassDependencies">
            <string>IBUITextView</string>
            <string>IBUISwitch</string>
            <string>IBUIButton</string>
            <string>IBUIView</string>
            <string>IBUILabel</string>
            <string>IBProxyObject</string>
        </array>
        <array key="IBDocument.PluginDependencies">
            <string>com.apple.InterfaceBuilder.IBCocoaTouchPlugin</string>
        </array>
        <object class="NSMutableDictionary" key="IBDocument.Metadata">
            <string key="NS.key.0">PluginDependencyRecalculationVersion</string>
            <integer value="1" key="NS.object.0"/>
        </object>
        <array class="NSMutableArray" key="IBDocument.RootObjects" id="1000">
            <object class="IBProxyObject" id="841351856">
                <string key="IBProxiedObjectIdentifier">IBFilesOwner</string>
                <string key="targetRuntimeIdentifier">IBCocoaTouchFramework</string>
            </object>
            <object class="IBProxyObject" id="371349661">
                <string key="IBProxiedObjectIdentifier">IBFirstResponder</string>
                <string key="targetRuntimeIdentifier">IBCocoaTouchFramework</string>
            </object>
            <object class="IBUIView" id="474857037">
                <reference key="NSNextResponder"/>
                <int key="NSvFlags">292</int>
                <array class="NSMutableArray" key="NSSubviews">
                    <object class="IBUITextView" id="694905917">
                        <reference key="NSNextResponder" ref="474857037"/>
                        <int key="NSvFlags">274</int>
                        <string key="NSFrame">{{20, 20}, {280, 385}}</string>
                        <reference key="NSSuperview" ref="474857037"/>
```


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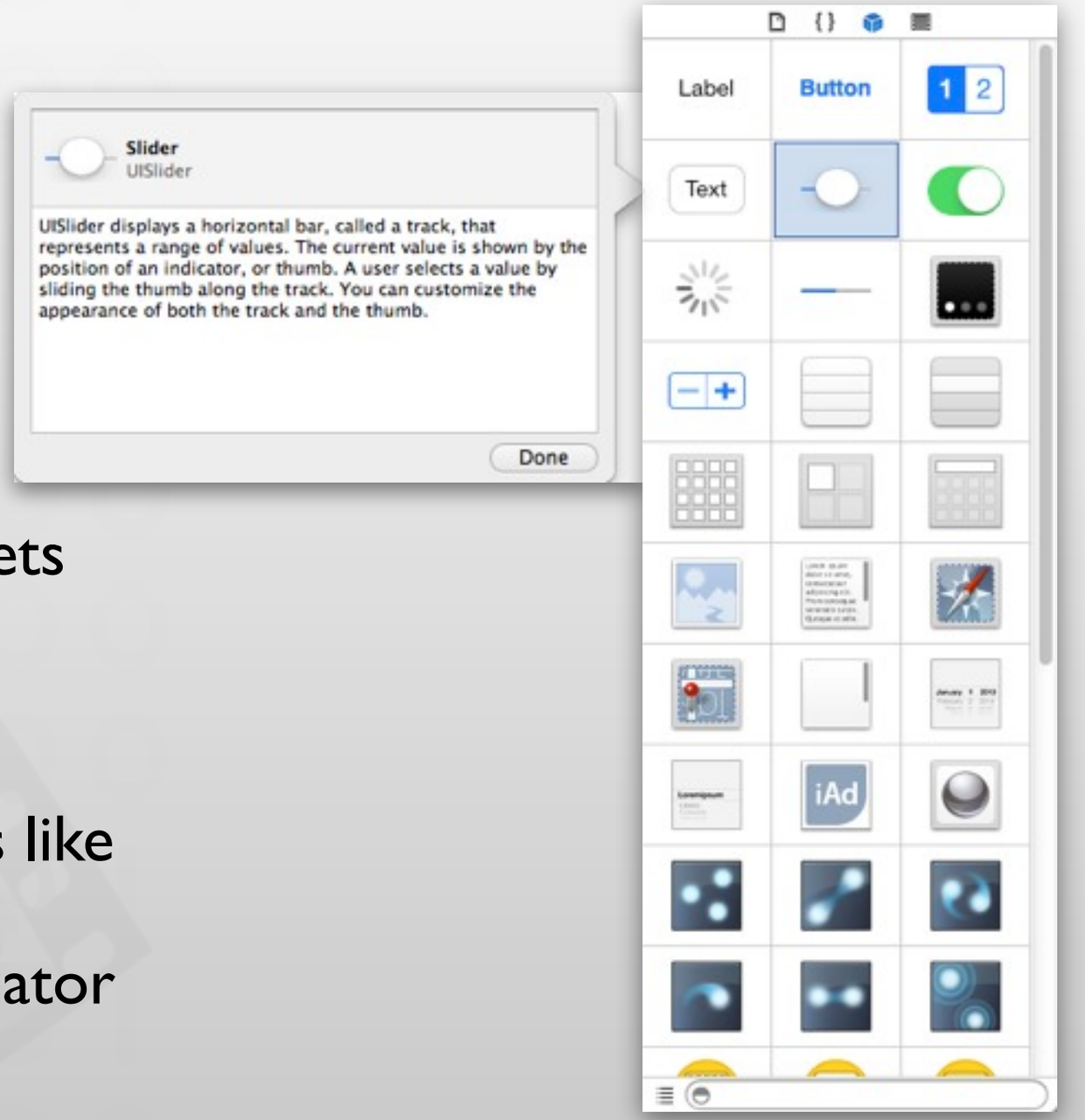
Laying out the User Interface



- The library contains all UI Widgets
- Drag them to your view
- See instantly what your UI looks like
- Test your UI in the iPhone Simulator

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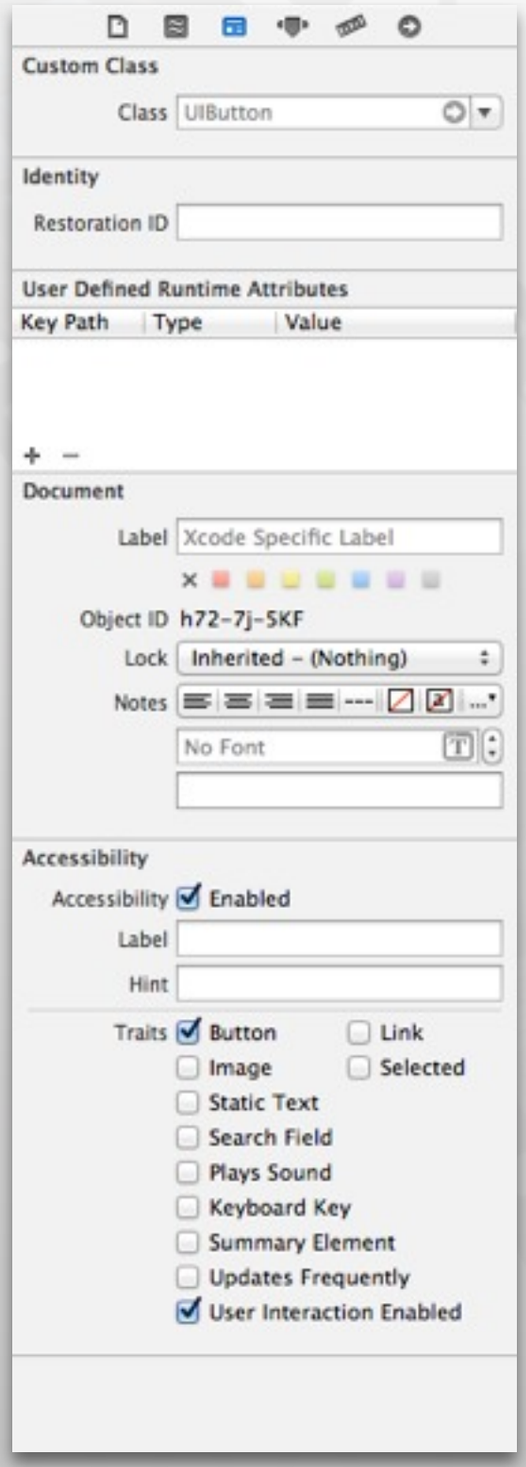
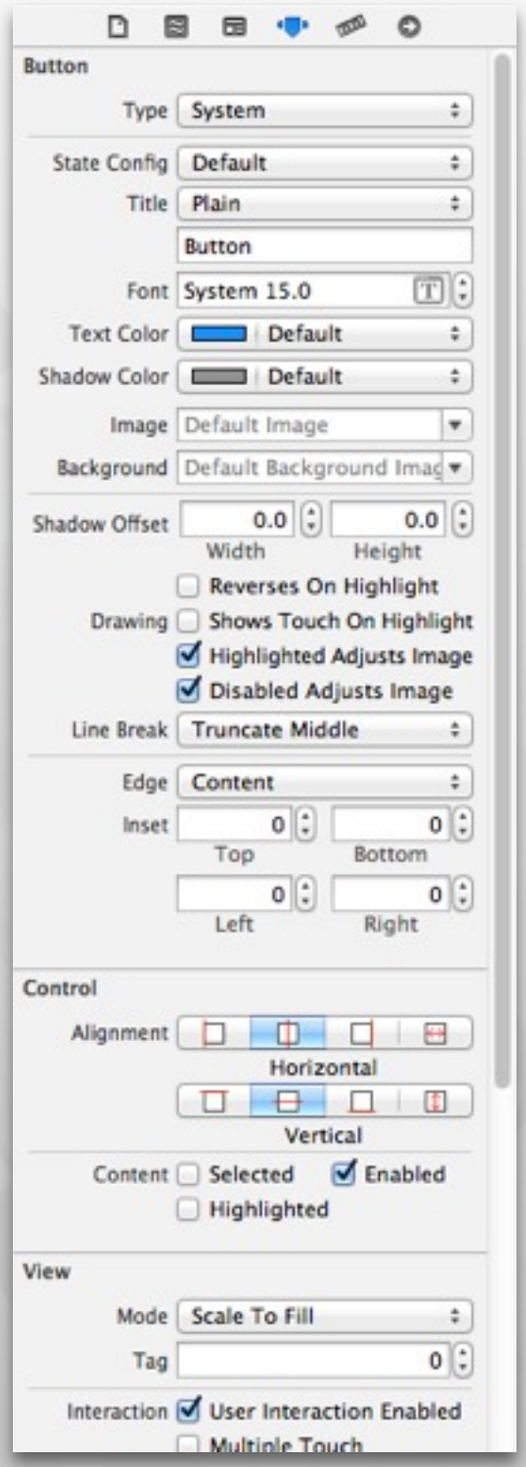
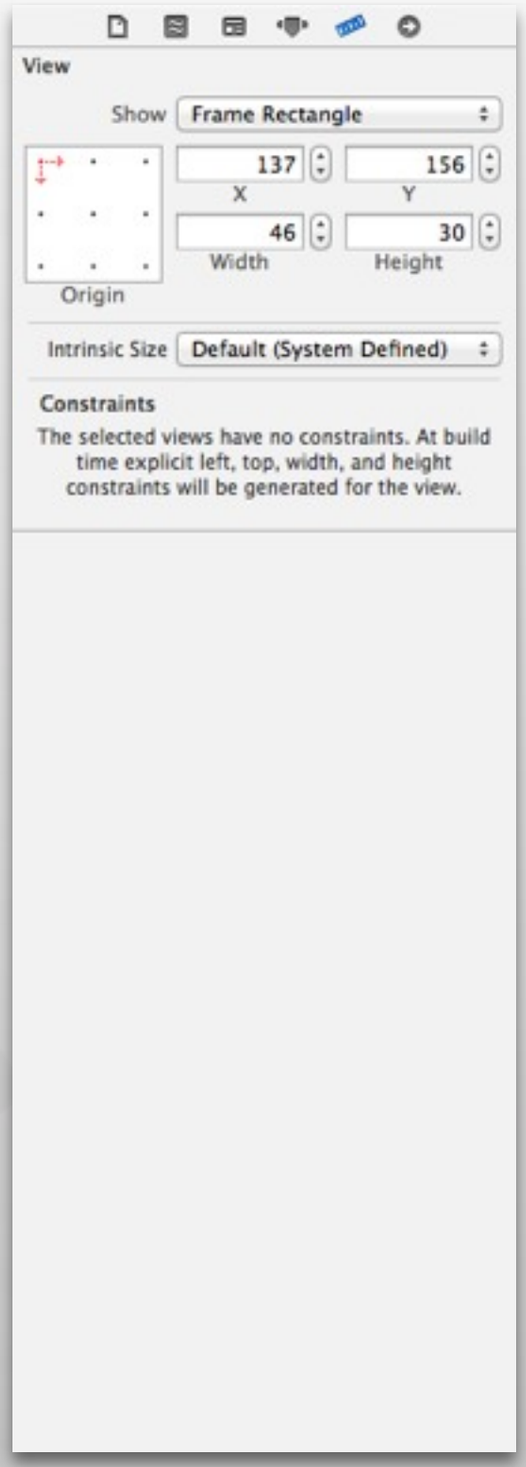
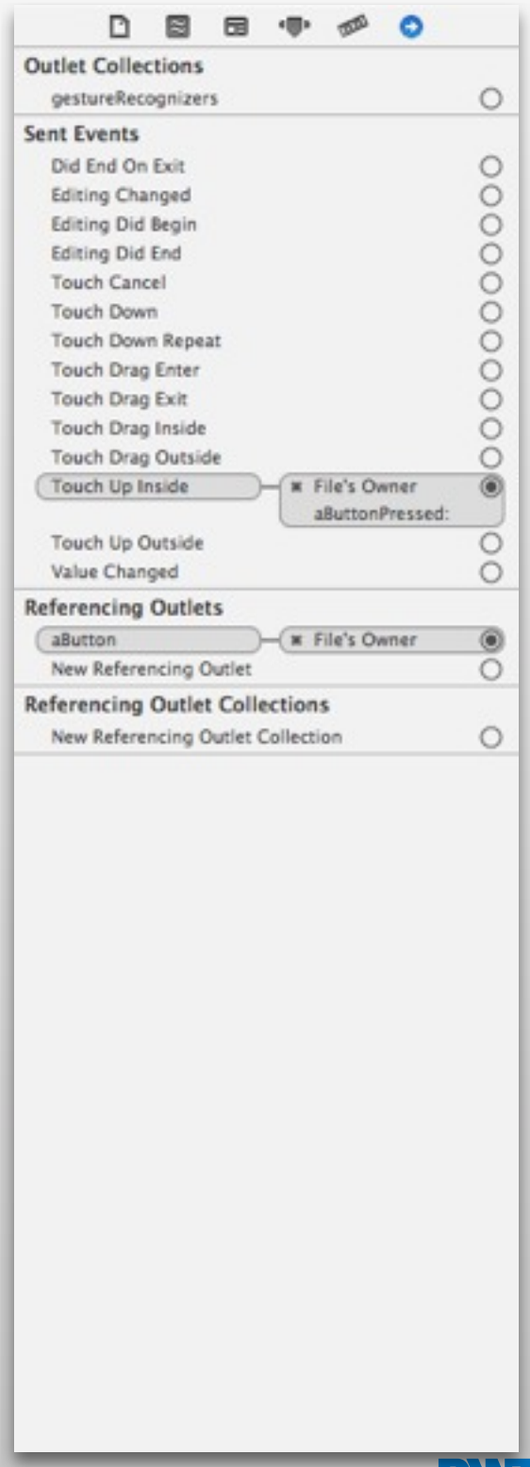
Set Widget Attributes









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Connecting Widgets and Code

- IBActions
  - Tags a method as a target for an interface action
- IBOutlets
- IBOutletCollection
  - Variables to populate with objects from a nib file

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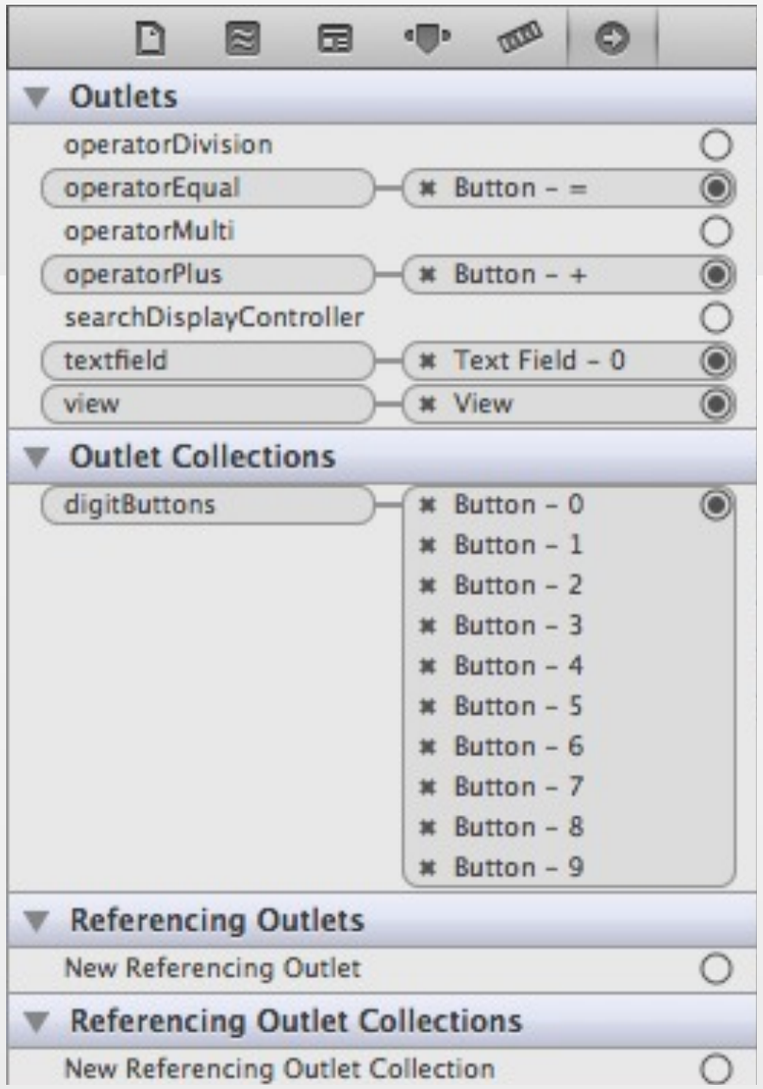
Connecting Widgets and Code

```
@interface iCalcView: UIView {

}

- (IBAction)addDigit:(id)sender;
- (IBAction)calculateResult:(id)sender;


//declared properties
//textfield
@property (nonatomic,weak) IBOutlet UITextField *textfield;
//operators: + =
@property (nonatomic,weak) IBOutlet UIButton *operatorPlus
@property (nonatomic,weak) IBOutlet UIButton *operatorEqual;
//digits
@property (nonatomic,weak) IBOutletCollection (UIButton) NSArray* digitButtons;
```



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Interface Builder Demo

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Auto Layout

- Preferred layout management
- Allows you to create views that work both in portrait and landscape mode
- Available in iOS 6 and higher
- Spatial relationships expressed by constraints

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Auto Layout Constraints

- Constraints are mathematical expressions
  - <=, ==, =>
- Constraints have a priority level
- The runtime tries to solve the system of equations

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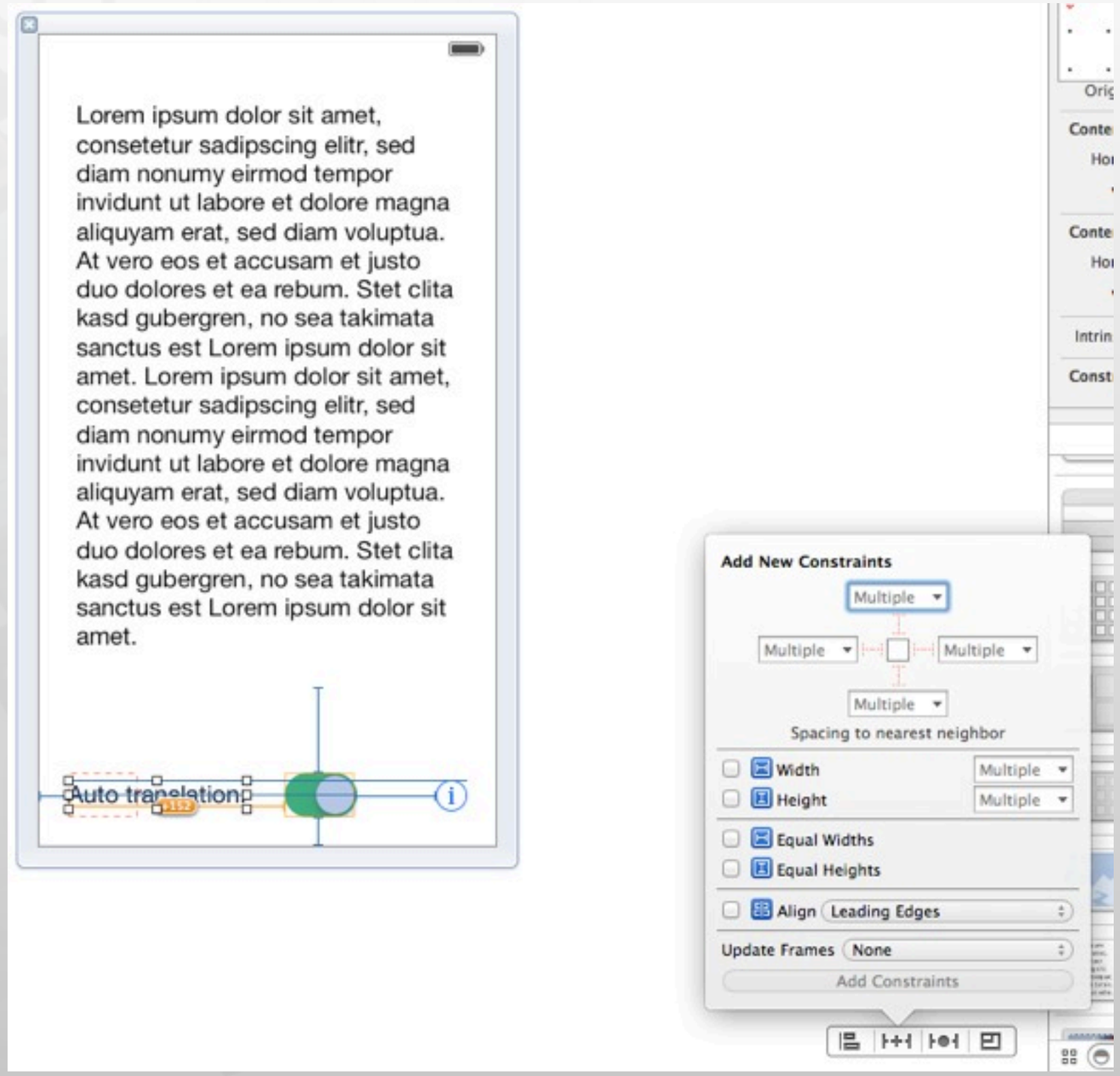
Adding Constraints



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UIView

- Defines a rectangular area on the screen
- Two responsibilities
  - Render content
  - React to user input
  - Manage subviews
- Layout as view hierarchy

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iPad 17:44 Not Charging

THE TIMES

Samstag, 6 November, 2010

Clarke to shut six prisons to save cash

Move as 'hellish' conditions attacked by jails watchdog

Richard Ford, Rachel Sylvester

Six prisons are facing closure under government plans to send thousands fewer criminals to jail, *The Times* has learnt.

About 5,000 cells and 10,000 jobs will be lost in England and Wales as Kenneth Clarke prepares to enact a huge budget reduction at the Ministry of Justice. Officials are drawing up a Green Paper to overhaul sentencing, aimed at reducing the number of offenders behind bars.

The move, a reversal of the

Flight from Fire Mountain. Villagers flee from deadly volcanic ash cloud

IN THE NEWS

Woolas ousted over election slurs
A Labour frontbencher was stripped of his seat and suspended from the party yesterday after two judges found that he knowingly

Hacked off with haka? War cry meets its match
England's rugby players will today carry out the time-honoured tradition of huddling together like fey lemons as the world's best

Video shows soldiers abusing detainee
Damning footage of British soldiers mistreating an Iraqi man at a secret detention facility was released yesterday as lawyers

Eight hurt as cement mixer falls on train
Several people were injured yesterday when a cement mixer fell from a bridge on to a train in Surrey. The lorry appeared to

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England's rugby players will today carry out the time-honoured tradition of huddling together like fey lemons as the world's best team rages about life, death and the hairy man.

Damning footage of British soldiers mistreating an Iraqi man at a secret detention facility was released yesterday as lawyers urged the High Court to grant a sweeping

Several people were injured yesterday when a cement mixer fell from a bridge on to a train in Surrey. The lorry appeared to have crashed through the brick wall above the Guildford to

The Times

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iPad 17:47 100%

THE TIMES

News

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Former Immigration Minister suspended for lying about Lib Dem

Russell Jenkins, Sam Coates

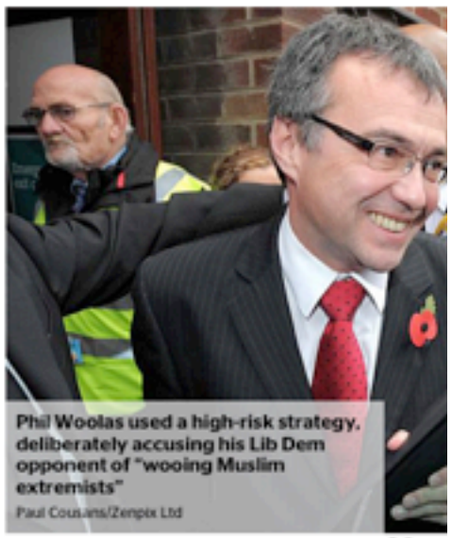
A Labour frontbencher was stripped of his seat and suspended from the party yesterday after two judges found that he knowingly lied about his opponent in campaign leaflets.

Phil Woolas, the former Immigration Minister who was appointed to the shadow home affairs team by Ed Miliband last month, wrongly and deliberately accused his Lib Dem opponent of "wooing Muslim extremists". He also issued leaflets days before the election suggesting his rival "reneged on his promise to live in the constituency".

The influential Labour figure was barred yesterday from voting in general and local elections or standing for any elected public office for three years, in the first such ruling for 99 years.

Woolas was also ordered to pay costs, which are likely to be substantial, to his Lib Dem opponent. He confirmed yesterday that he would seek a judicial review, although he will not be allowed to stand in a by-election while this is pending.

The coalition is all but certain to face the first by-election test since its formation, in one of the most marginal seats in the country, where all three parties have a viable chance of winning. The House of Commons Speaker, John Bercow, will announce on Monday whether to press ahead with the by-election immediately in the Greater Manchester constituency of Oldham East & Saddleworth, which Mr Woolas won in May by a margin of 103.



Phil Woolas used a high-risk strategy, deliberately accusing his Lib Dem opponent of "wooing Muslim extremists"

Paul Cousans/Zenpix Ltd

Harriet Harman, Labour's deputy leader, announced Woolas's suspension, saying it was "not part of Labour's politics to try to win elections by telling lies" and said that the party would not support an appeal. The ruling is likely to influence what is considered acceptable in future election literature. Woolas's solicitor, Gerald Shamash, insisted it was an infringement on the rights of free speech.

"It is vital to our democracy that those who make statements about the political character and conduct of election candidates are

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the successful use of election courts to remain rare.

The judges at a specially convened election court were told that Woolas and his team became so convinced that they would lose at the polls that they devised a high-risk strategy, which they themselves described as "s**t or bust", to galvanise the white, tabloid-reading voters. T
ethnically-mixed constitu
suffered race riots in 2001.

iPad 17:47 100%

THE TIMES

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"It is vital to our democracy that those who make statements about the political character and conduct of election candidates are not deterred from speaking freely for fear that they may be found to have breached electoral laws," he said. "This decision will inevitably chill political speech."

However Lord Rennard, the Lib Dem campaign expert, said that the decision could have a

The Times

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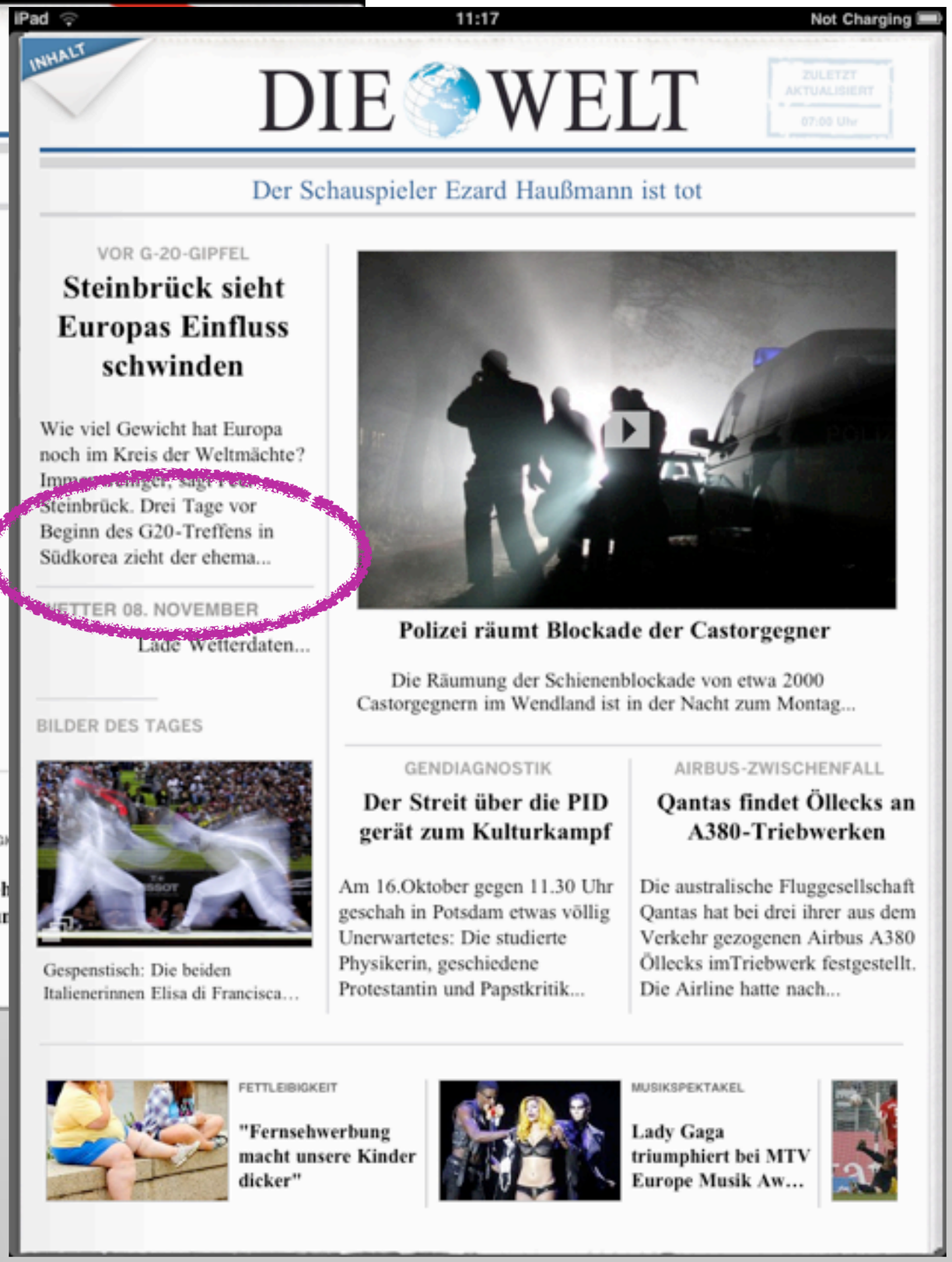

Die Welt HD

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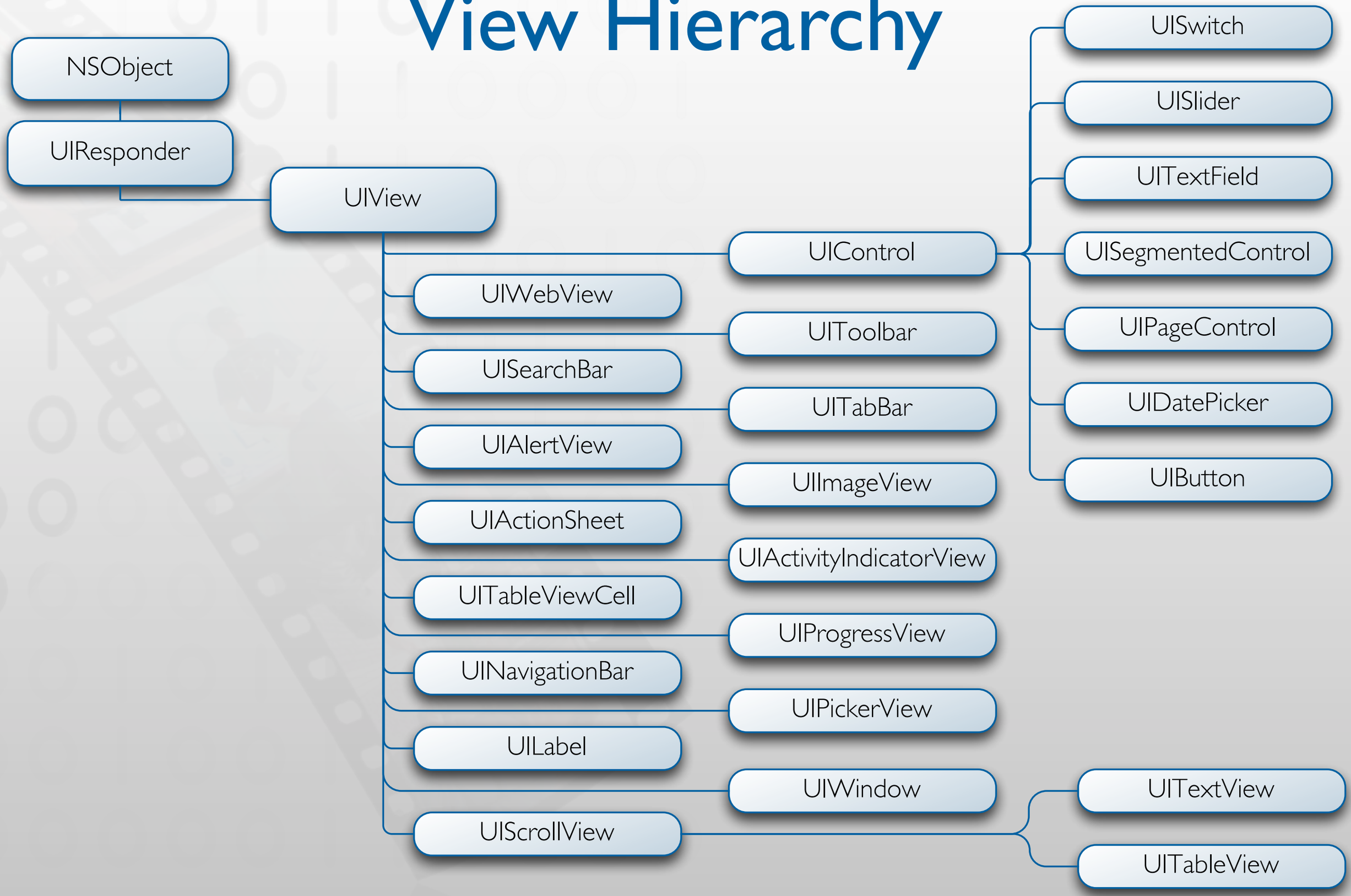
View Hierarchy



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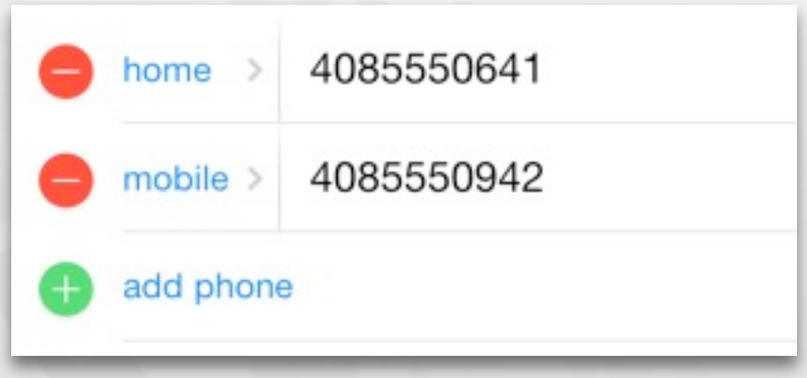
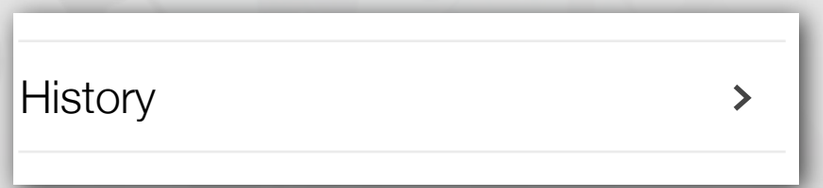
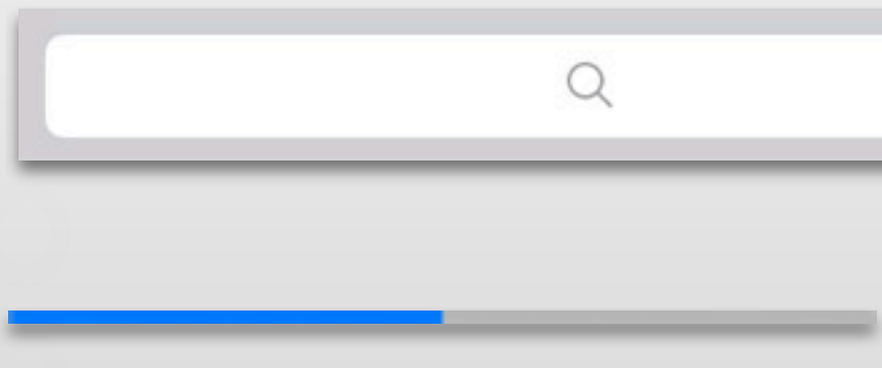
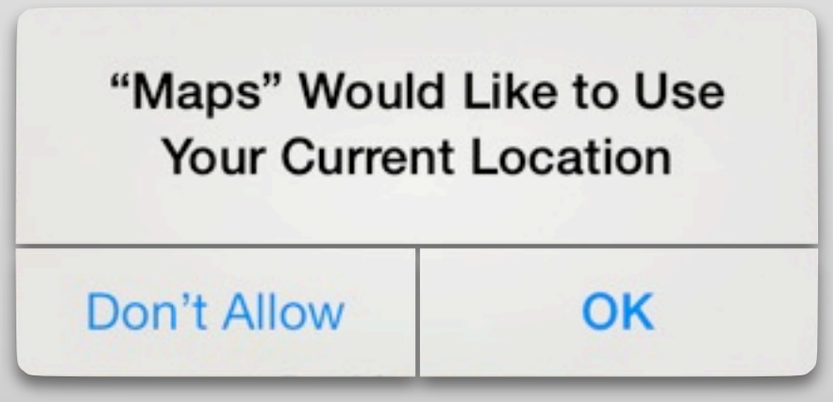
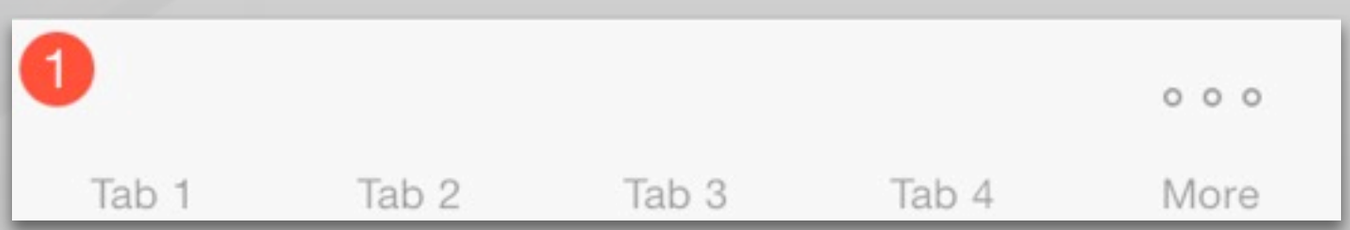
UI Widgets











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Control Widgets

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View Categories: Examples

- Containers: UIScrollView
- Controls: UIButton
- Display views: UIImageView
- Text and web views: UITextView
- Alert views: UIAlertView
- Navigation views: UITabBar
- UIWindow

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UIViewController

- Manages typically one screen
- Flushes the view on low-memory situations
- Resizes the view on orientation change
- Creates modal views on top of the current view