

# Stanford CS193p

## Developing Applications for iOS

### Fall 2013-14



# Today

- ⌚ Finish Animation Demo

Less tippy, guided drops.

- ⌚ Autolayout

How to make device autorotation easy(er).

And make your View Controller work in different environments (i.e. with different bounds).

- ⌚ Autolayout Demo

Making Attributor autorotate properly.

# Autolayout

- Setting UIView frames using rules rather than numbers

Why? Because many things affect the size of the area available to put views ...

Rotation

4 inch versus 3.5 inch iPhone

Embedding Controller's Views inside other Controllers (tab bars, navigation controllers, etc.)

We need these rules to put the views in their place no matter what bounds are available.

We call these rules "constraints".

There is a very powerful API (NSLayoutConstraint) for doing this, but ...

- We almost always set up these rules in Xcode 5 graphically

So this is all best shown with some screen shots ...

Thing 1

Thing 2

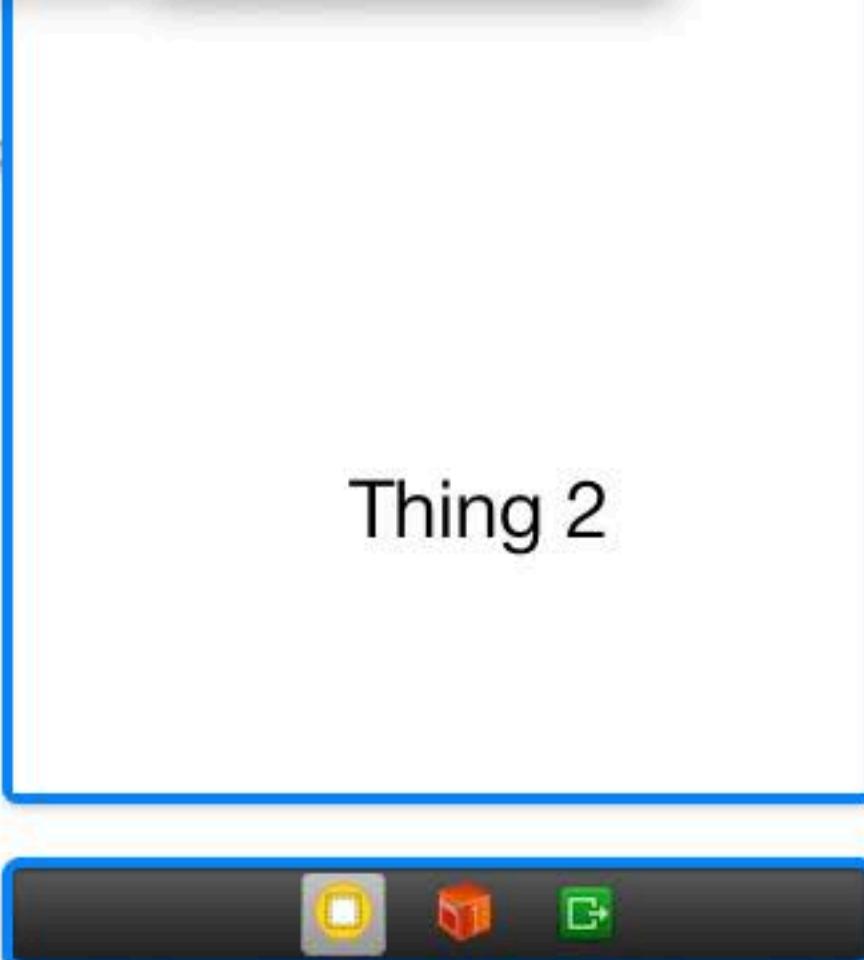
Let's start with two objects,  
Thing 1 and Thing 2.  
They are UILabels,  
but they could be any UIView.

They have been dragged  
out here without using  
the blue guidelines.

Recent Files  
Automatic (2)  
Top Level Objects (2)  
Sent Actions  
Outlets  
Referencing Outlets  
Class (2)  
Localizations

Preview (1) ► Main.storyboard (Preview)

Thing 1



It'd be great to get a Preview of what this will look like when we run in various autorotations!

Turns out you can do exactly that in Xcode 5 using its Preview feature.

Think of Preview as just another “document” in your project.

You can open it up and put it wherever you want (Assistant, main editing window, separate window, etc.).

Recent Files

Automatic (2)

Top Level Objects (2)

Sent Actions

Outlets

Referencing Outlets

Class (2)

Localizations

Preview (1)

Thing 1

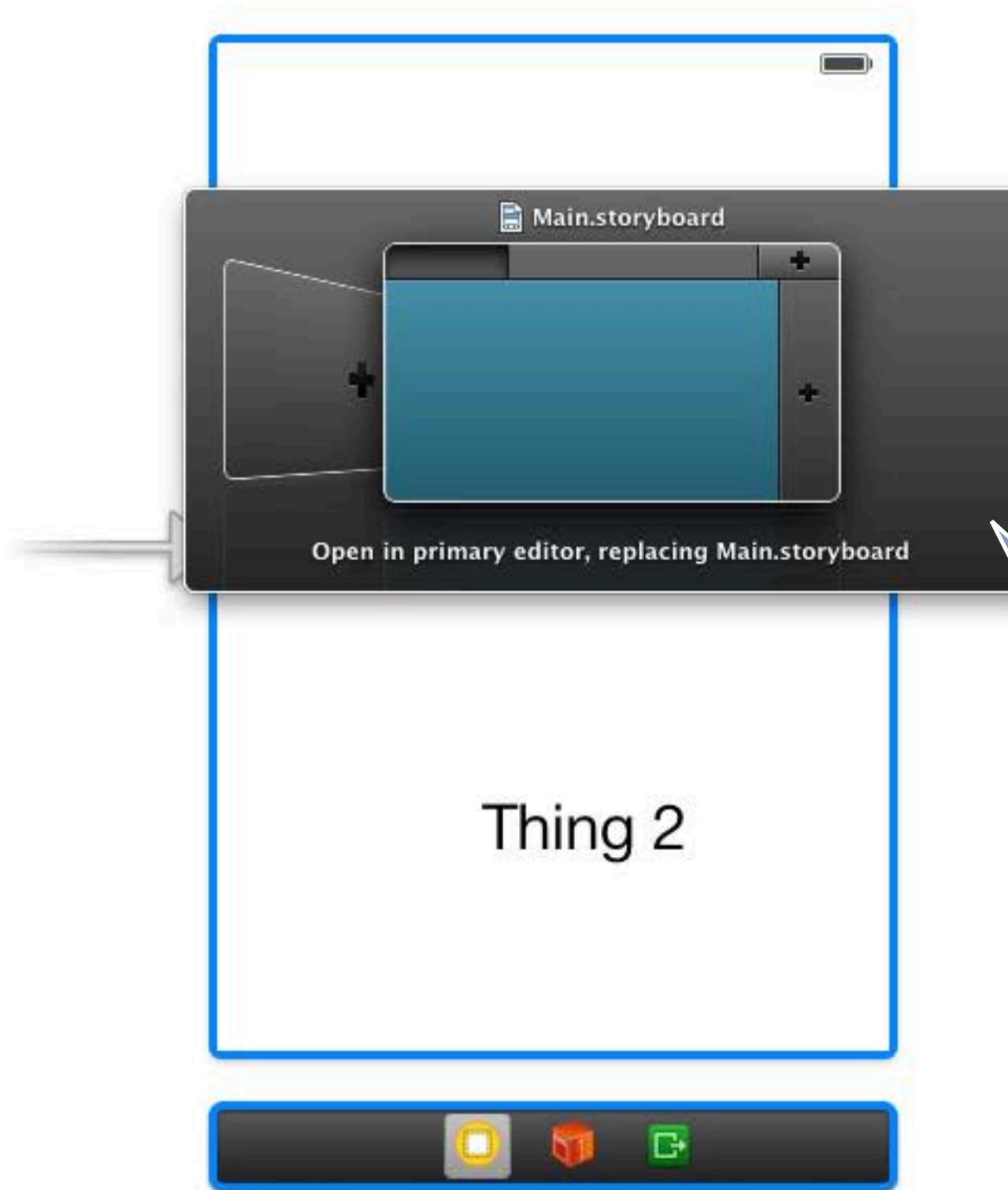
Main.storyboard (Preview)

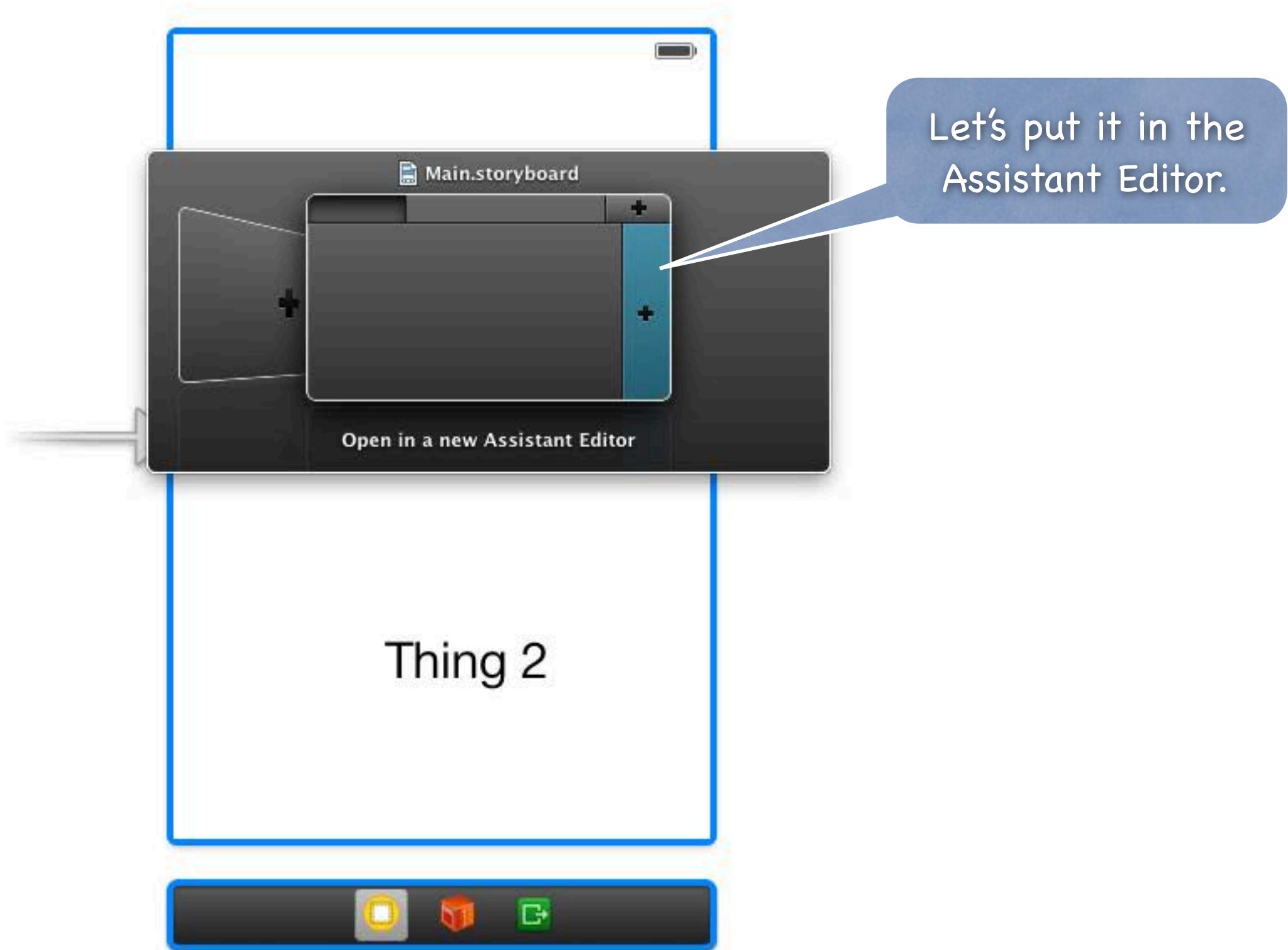
Click here to bring up a  
mini-navigator menu.

A cool trick is to hold down  
CTRL and SHIFT while  
clicking on a file to open ...

Thing 2









Thing 1

Assistant Editor  
with Preview.

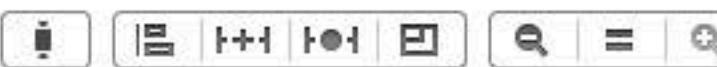
Thing 2

Thing 1

Thing 2



View Controller



Thing 1

Thing 2



Thing 1

Thing 2

Preview lets you pick  
the orientation ...

View Controller

Stanfor CS193p  
Fall 2013

Apply Landscape Orientation

iOS 7.0 and Later 

Thing 1

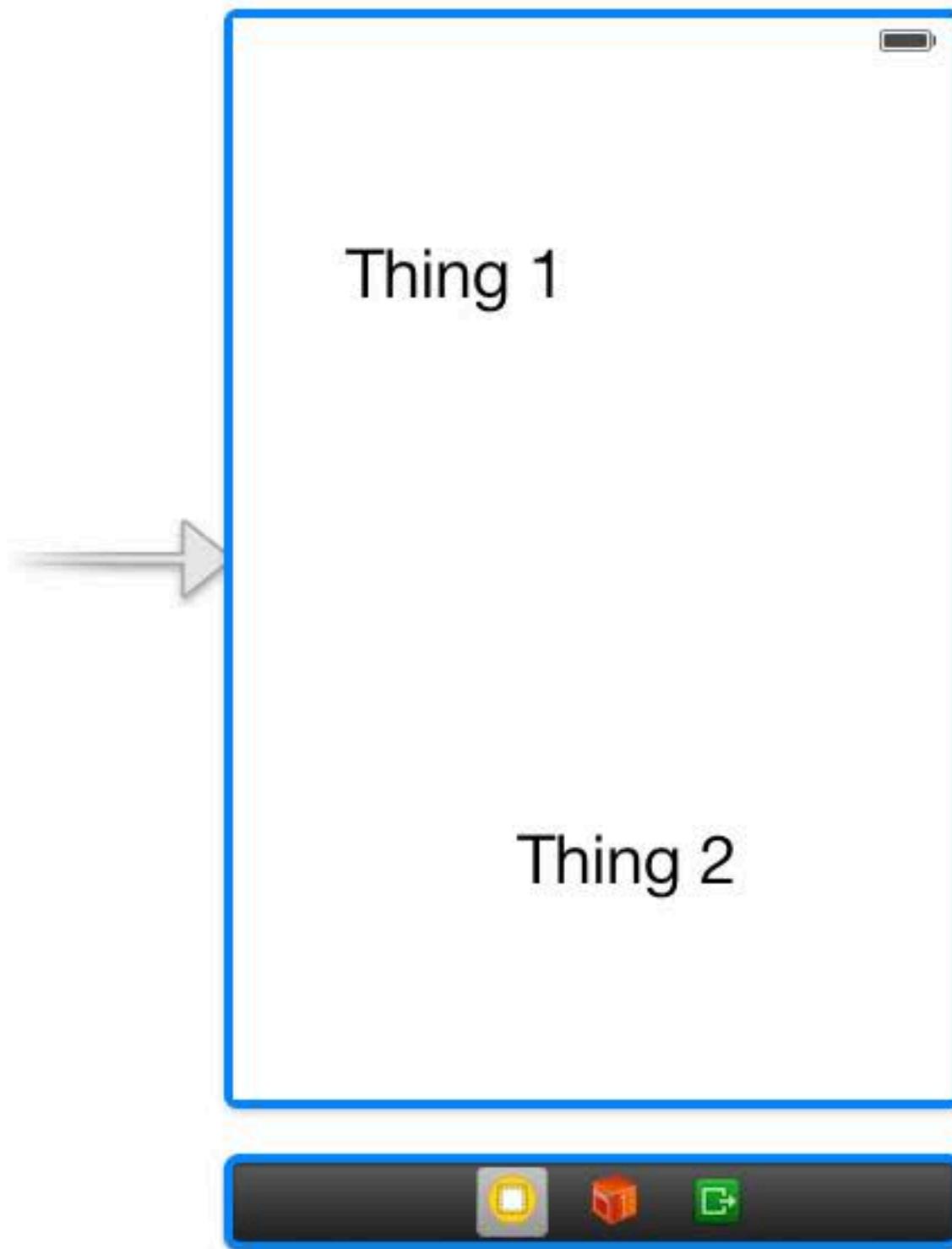
Thing 2

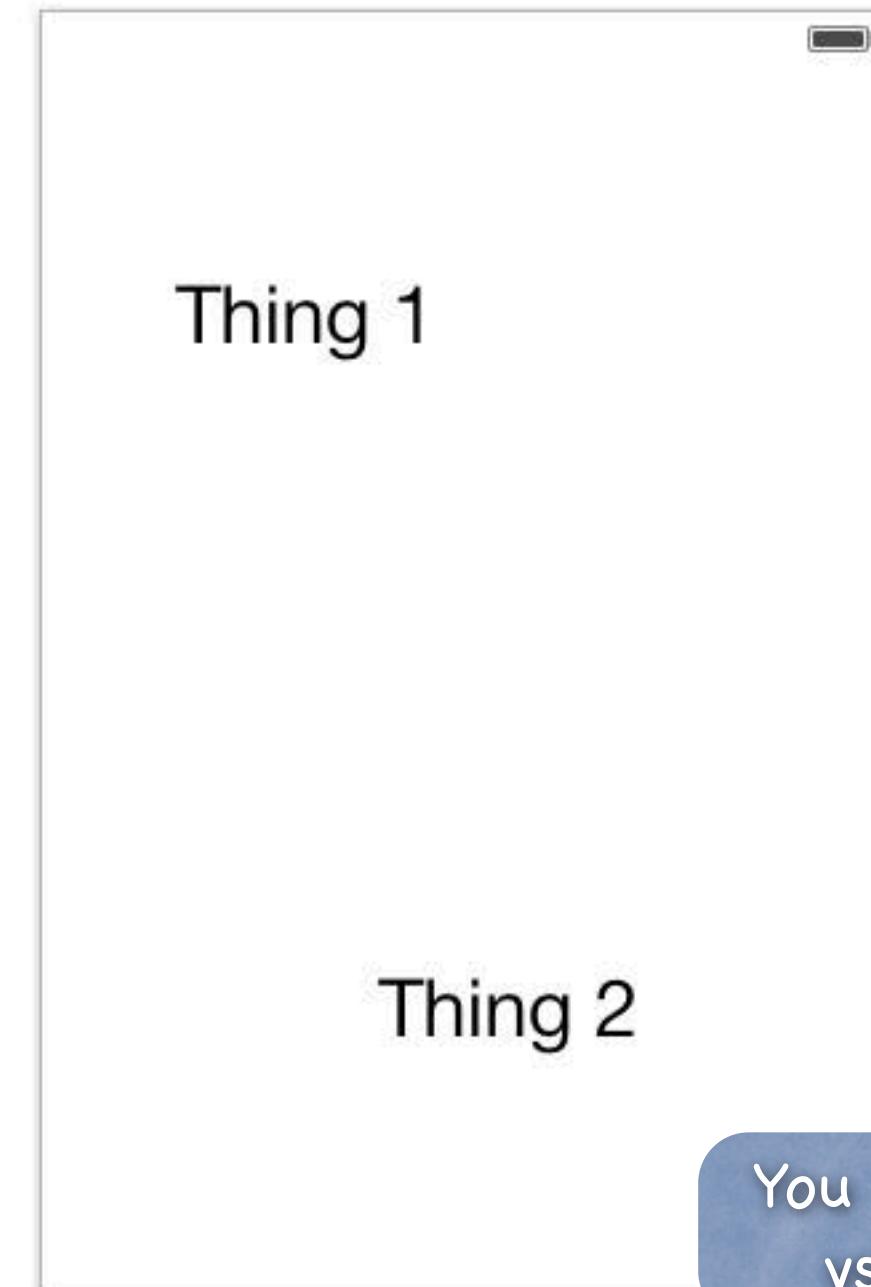
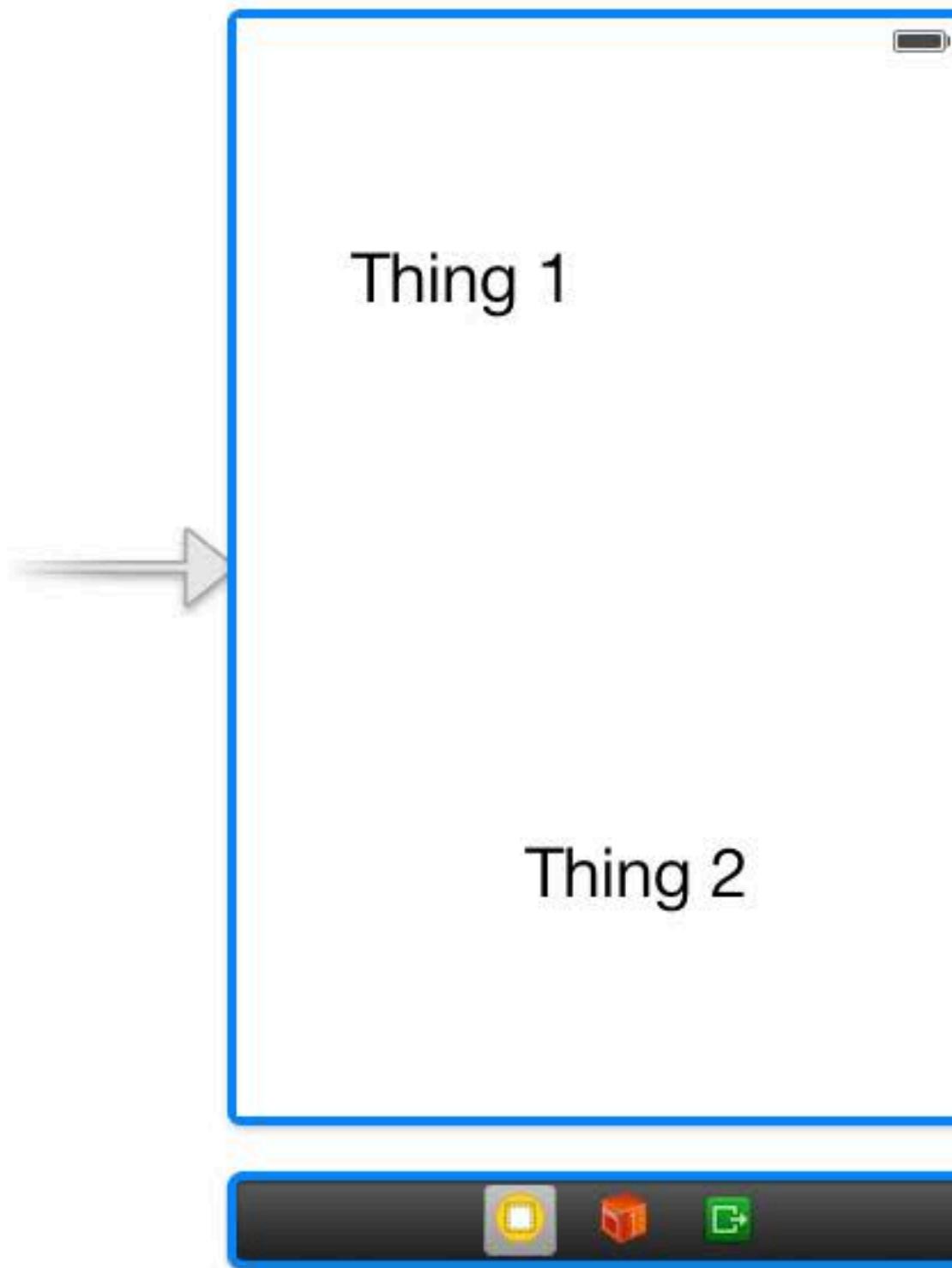


Thing 1

View Controller

Uh oh!  
No Thing 2!



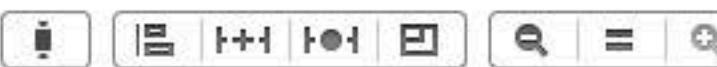


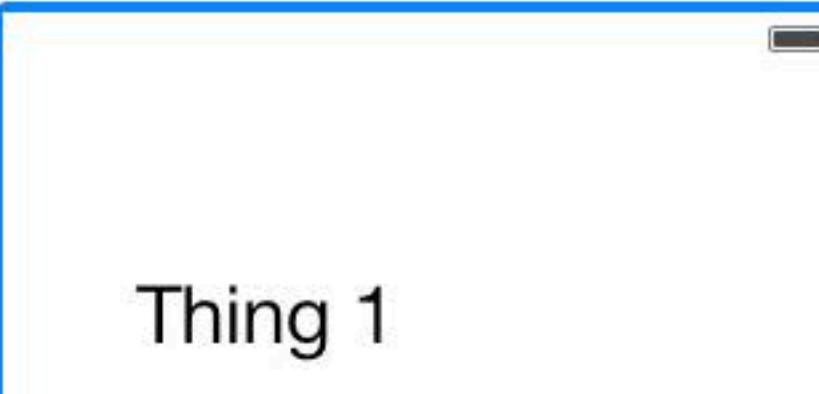
You can also pick tall  
vs. short iPhone.

View Controller

Stanford CS 13p  
Fall 2013

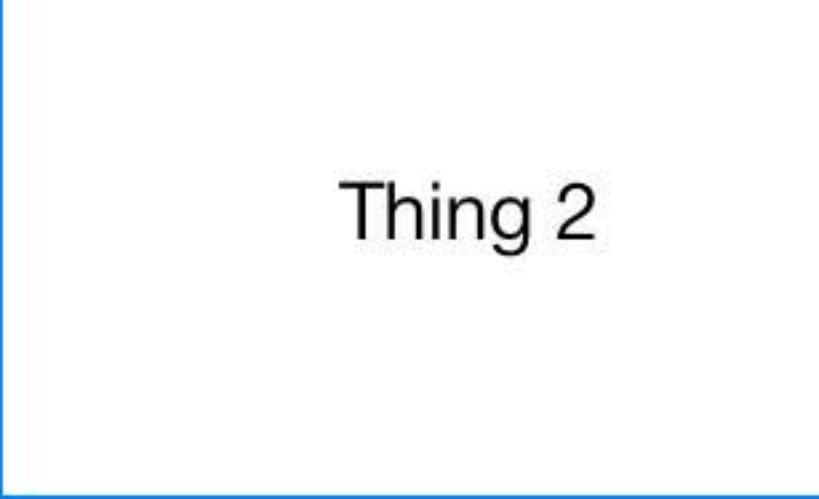
Apply Retina 4-inch Form Factor





Thing 1

Thing 1 and Thing 2 are both staying stuck to the origin (upper left) and not adapting to the changes in size of their superview.



Thing 2



Thing 1

Thing 2





Thing 1

Thing 2

Thing 1

Thing 2



View Controller



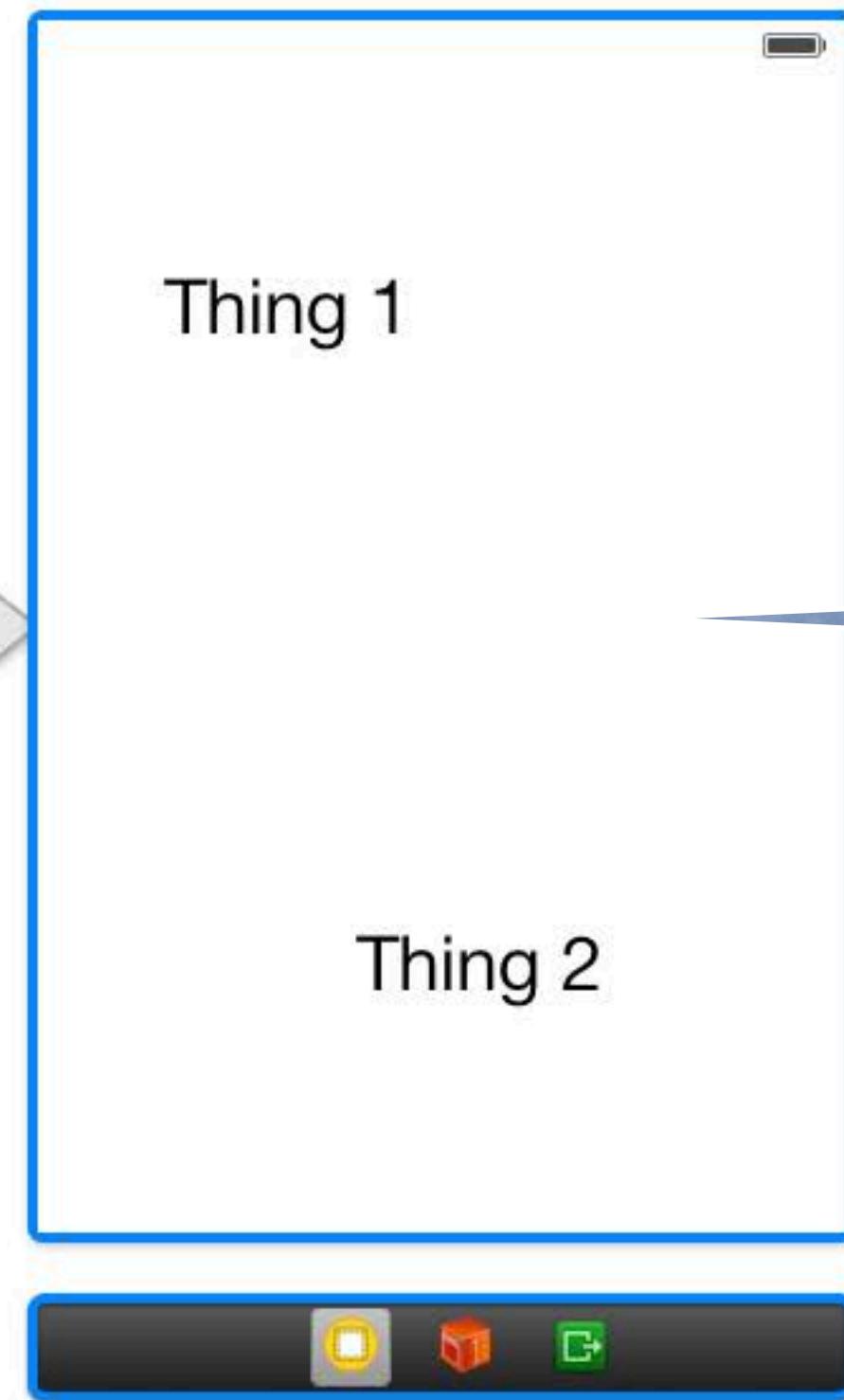


Close Assistant Editor.

Thing 1

Thing 2





It is also possible to preview Landscape mode in Xcode while editing.  
It's not exactly the same layout as running it, but it's pretty close.

Just select a scene ...

#### Simulated Metrics

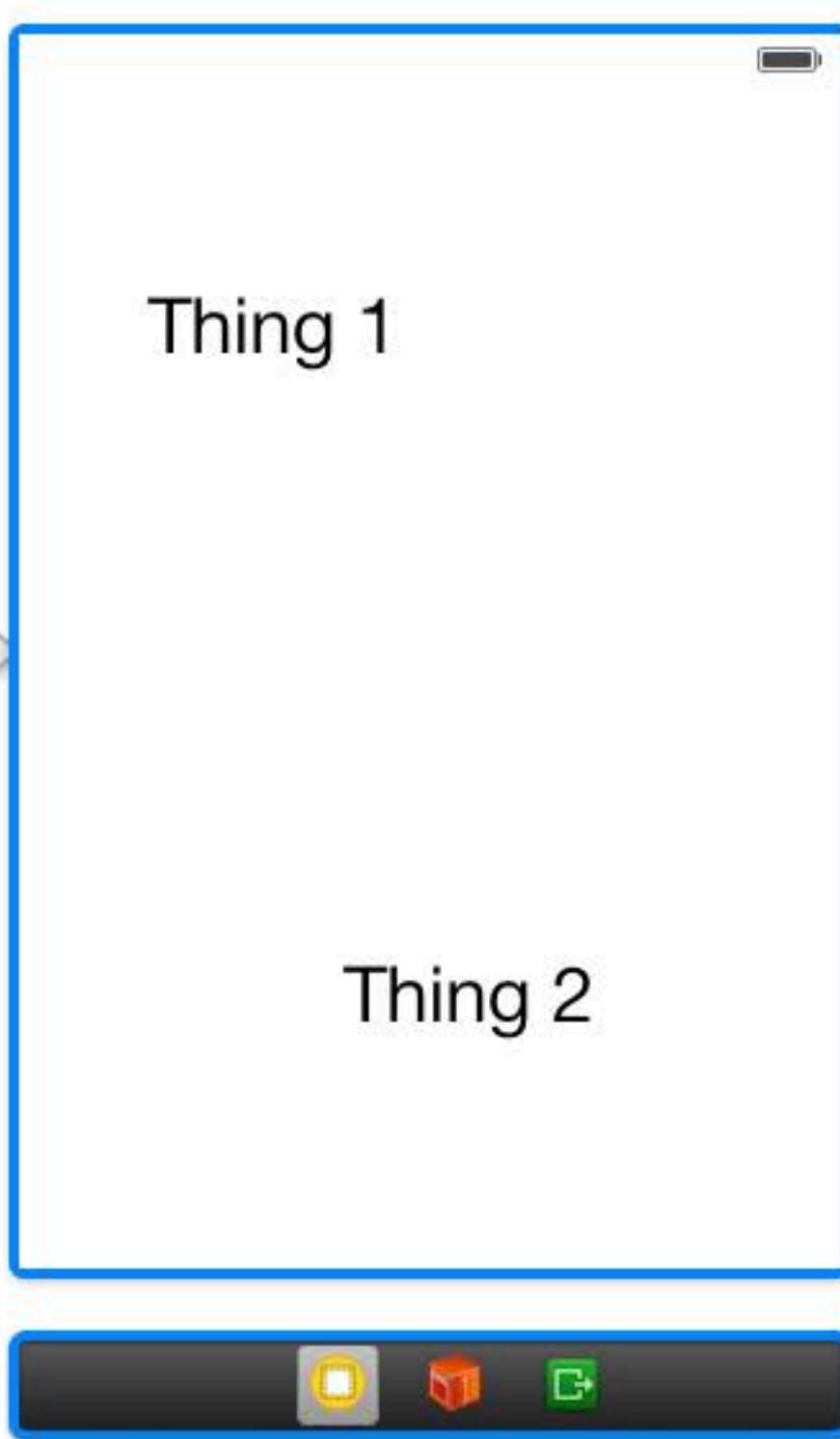
Size	Inferred
Orientation	Inferred
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

#### View Controller

Title	<input type="text"/>
Initial Scene	<input checked="" type="checkbox"/> Is Initial View Controller
Layout	<input checked="" type="checkbox"/> Adjust Scroll View Insets <input type="checkbox"/> Hide Bottom Bar on Push <input checked="" type="checkbox"/> Resize View From NIB <input type="checkbox"/> Use Full Screen (Deprecated)
Extend Edges	<input checked="" type="checkbox"/> Under Top Bars <input checked="" type="checkbox"/> Under Bottom Bars <input type="checkbox"/> Under Opaque Bars
Transition Style	Cover Vertical
Presentation	<input type="checkbox"/> Defines Context <input type="checkbox"/> Provides Context

#### Key Commands

<input type="button" value="+"/>	<input type="button" value="-"/>



... then, in its Attributes Inspector,  
choose Orientation Landscape.

**Simulated Metrics**

Size	Inferred
Orientation	Inferred
Status Bar	Portrait
Top Bar	Landscape
Bottom Bar	Inferred

**Controller**

Title: [empty]

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)

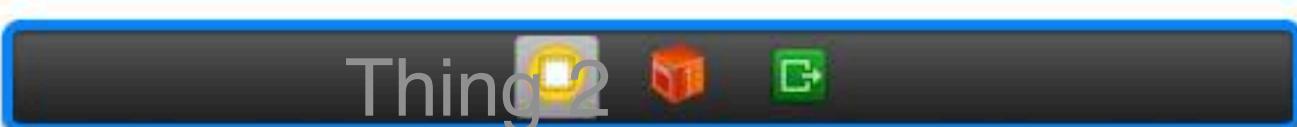
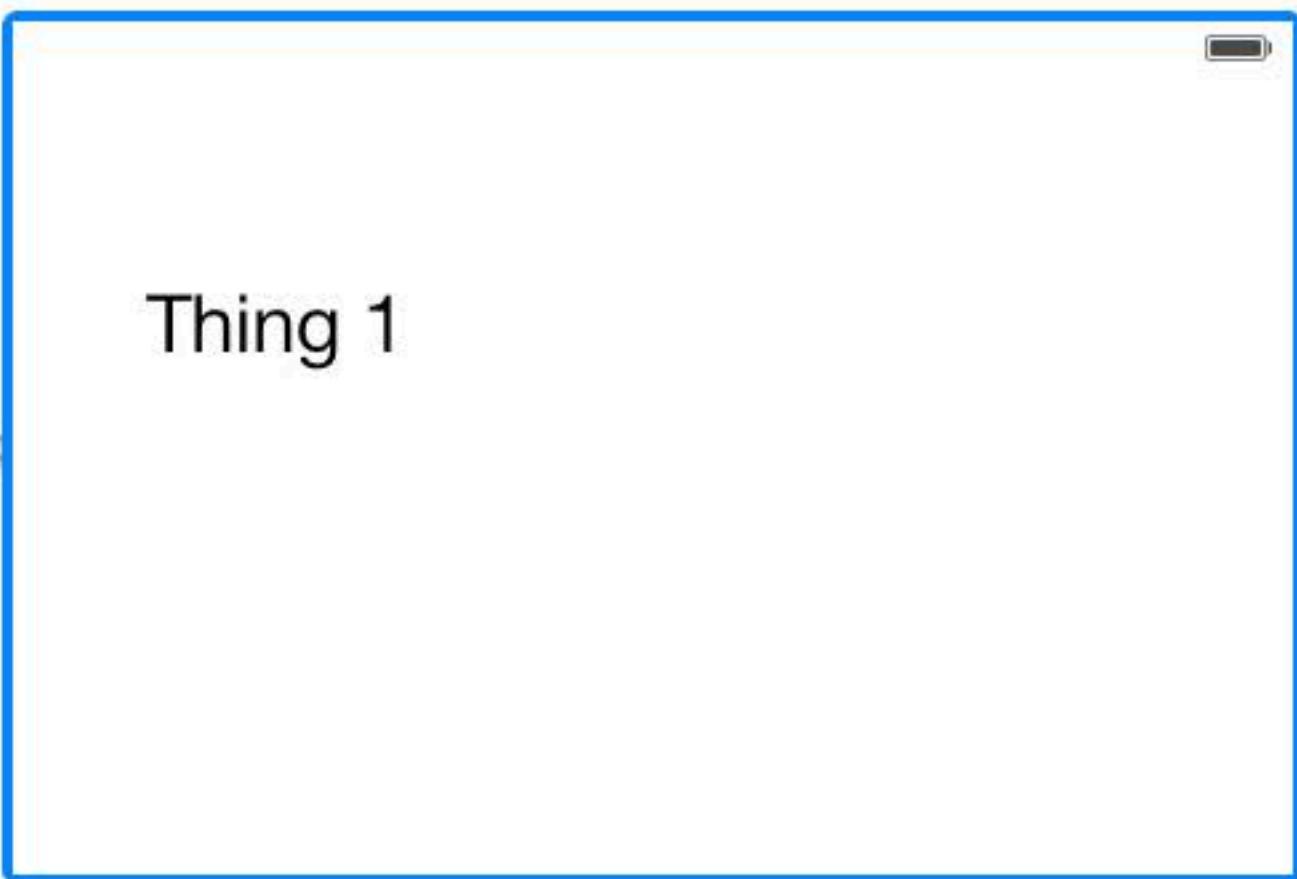
Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars

Transition Style: Cover Vertical

Presentation:  Defines Context  
 Provides Context

Key Commands:

[empty]	
[empty]	
[empty]	
+	-



Thing 2 is exactly where it was before  
(relative to the upper left origin).  
But that's now off-screen.

**Simulated Metrics**

Size Inferred  
Orientation Landscape  
Status Bar Inferred  
Top Bar Inferred  
Bottom Bar Inferred

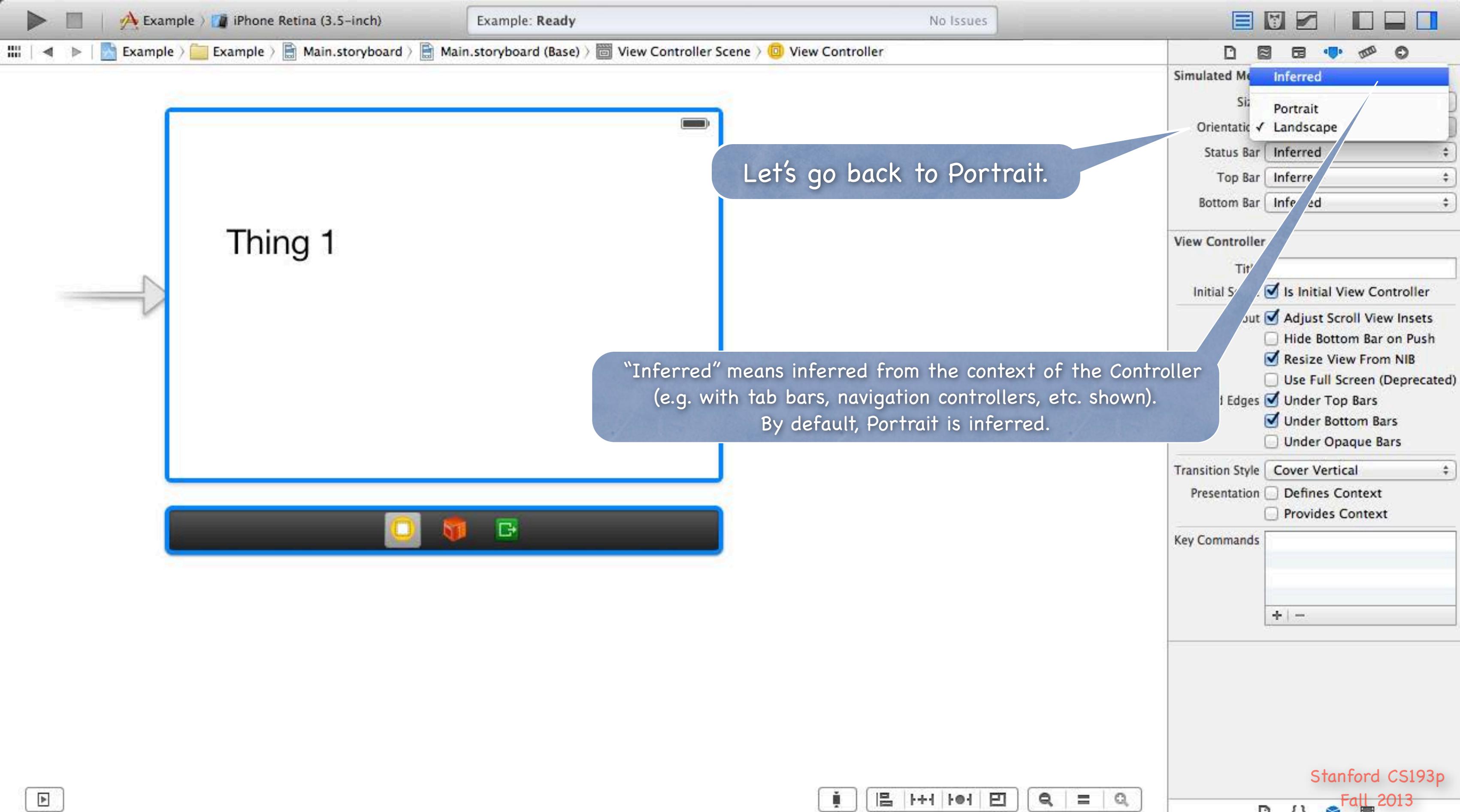
**View Controller**

Title   
Initial Scene  Is Initial View Controller  
Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)  
Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars

Transition Style Cover Vertical  
Presentation  Defines Context  
 Provides Context

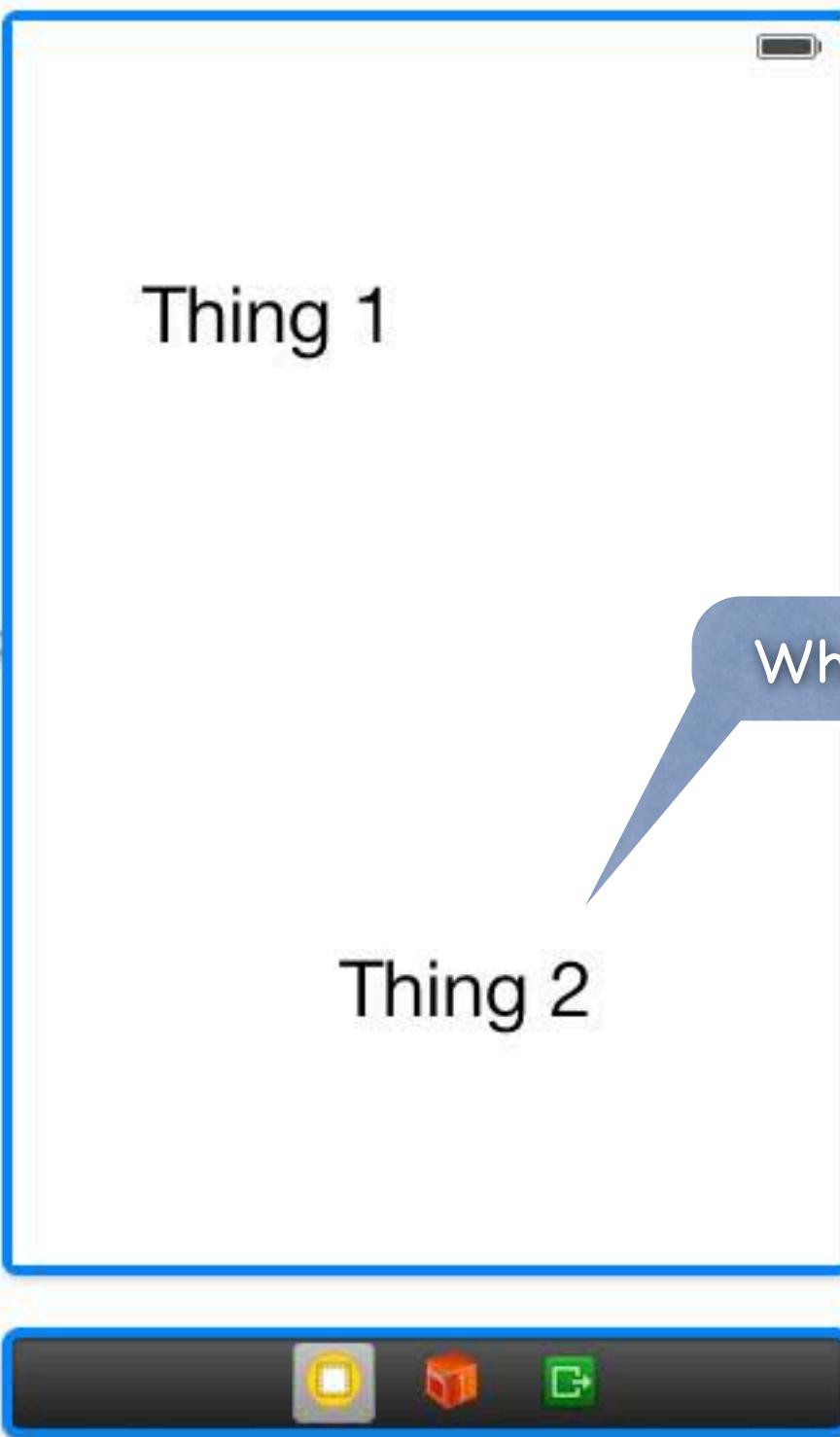
**Key Commands**

+ | -



# Let's go back to Portrait.

“Inferred” means inferred from the context of the Controller  
(e.g. with tab bars, navigation controllers, etc. shown).  
By default, Portrait is inferred.



Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Inferred

Top Bar Inferred

Bottom Bar Inferred

**View Controller**

Title

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets

Hide Bottom Bar on Push

Resize View From NIB

Use Full Screen (Deprecated)

Extend Edges  Under Top Bars

Under Bottom Bars

Under Opaque Bars

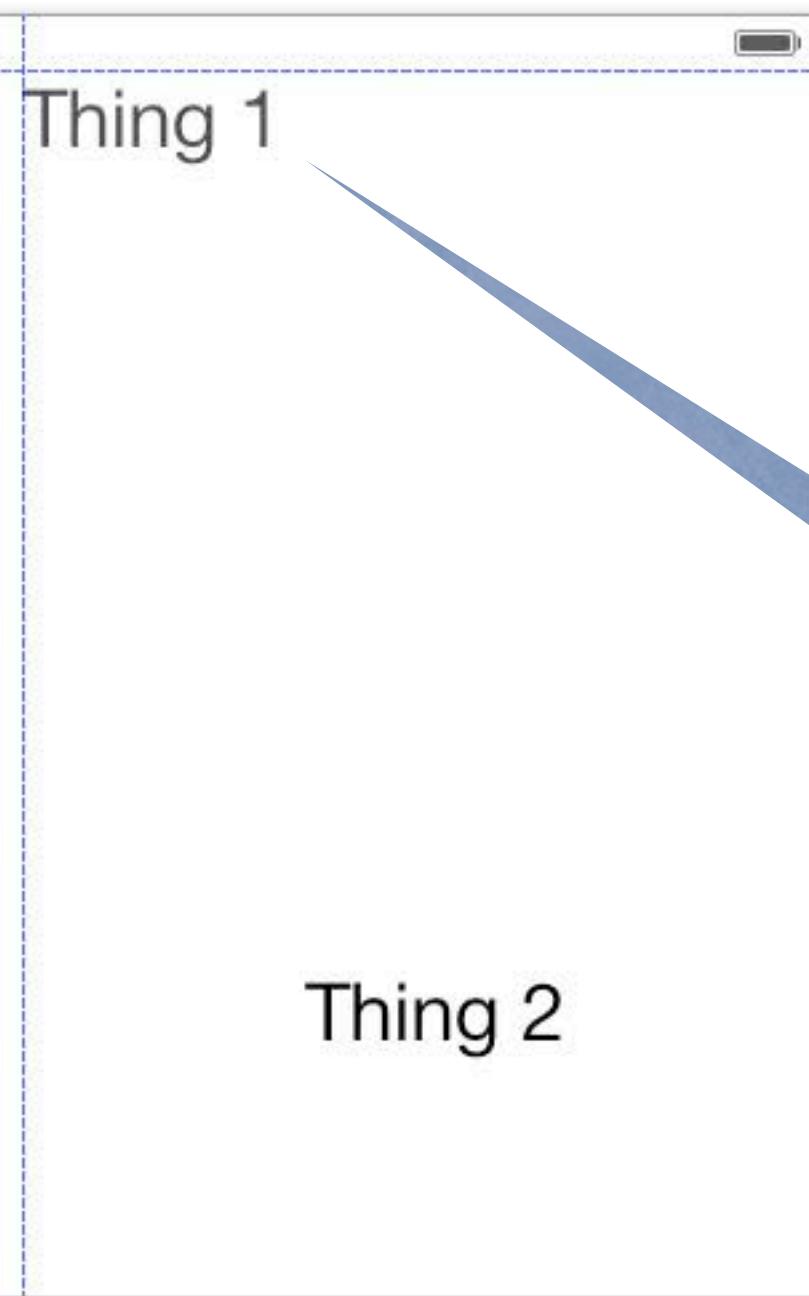
Transition Style Cover Vertical

Presentation  Defines Context

Provides Context

Key Commands

+ | -



Let's say we want Thing 1 and Thing 2 to stick to their nearby corner  
(i.e. to stick to that corner no matter where the corner moves to).

We can communicate that to Xcode by dragging to that corner and letting the blue guidelines appear.

**View**

Mode  Scale To Fill

Tag 0

Interaction  User Interaction Enabled  
 Multiple Touch

Alpha 1

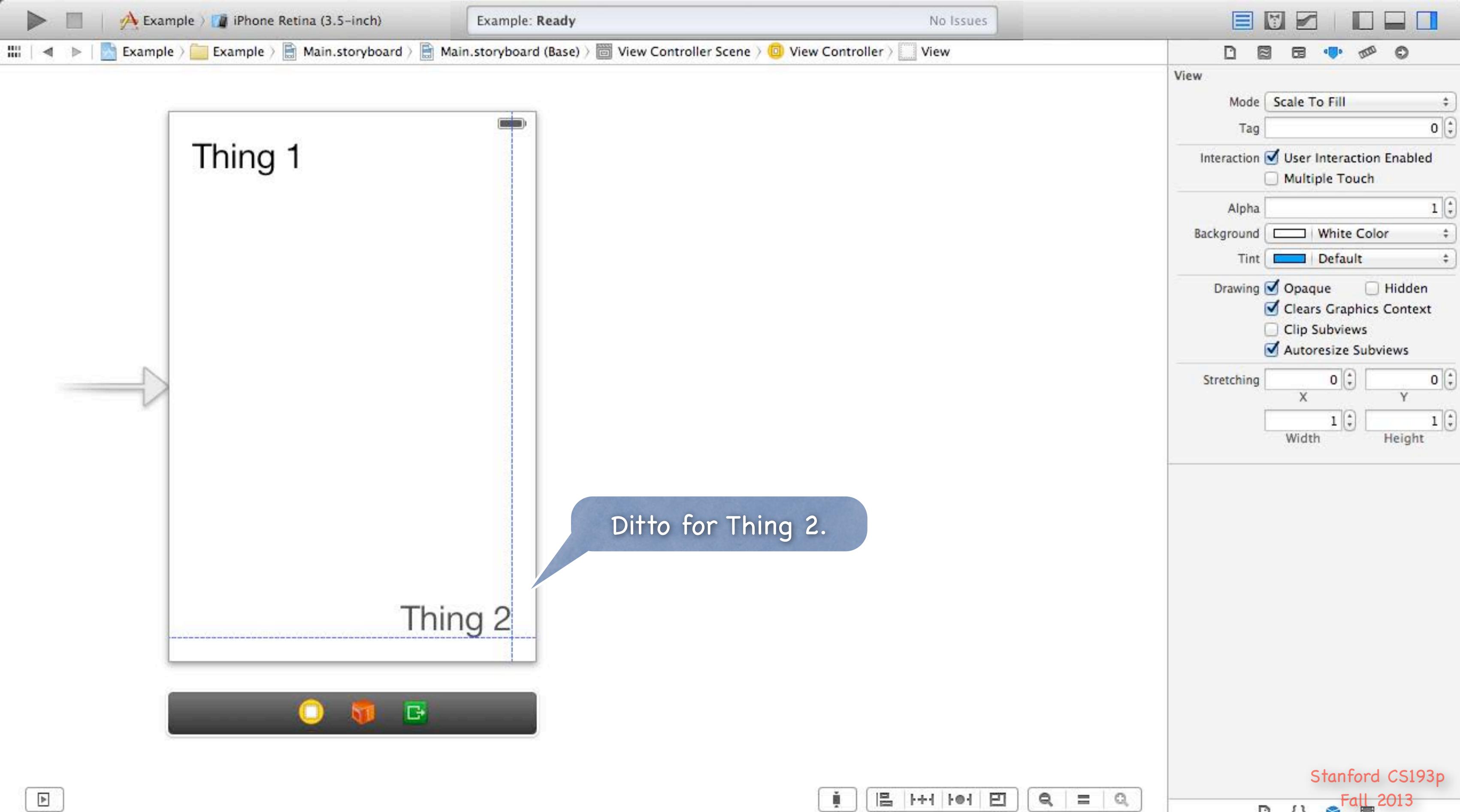
Background  White Color

Tint  Default

Drawing  Opaque  Hidden  
 Clears Graphics Context  
 Clip Subviews  
 Autoresize Subviews

Stretching 0 0  
X 1 Y 1  
Width Height





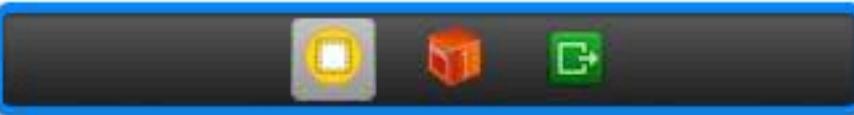
tanford CS193p

fall 2013



Thing 1

Thing 2



Now let's try Landscape again.

## Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Portrait

Top Bar Landscape

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

Presentation  Defines Context Provides Context

## Key Commands





Thing 1



Still doesn't work because the blue guidelines are not enough.  
We have to tell iOS that we want the blue guidelines to be used  
to create some "constraints" on our layout.

#### Simulated Metrics

Size	Inferred
Orientation	Landscape
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

#### View Controller

Title	<input type="text"/>
Initial Scene	<input checked="" type="checkbox"/> Is Initial View Controller
Layout	<input checked="" type="checkbox"/> Adjust Scroll View Insets
	<input type="checkbox"/> Hide Bottom Bar on Push
	<input checked="" type="checkbox"/> Resize View From NIB
	<input type="checkbox"/> Use Full Screen (Deprecated)
Extend Edges	<input checked="" type="checkbox"/> Under Top Bars
	<input checked="" type="checkbox"/> Under Bottom Bars
	<input type="checkbox"/> Under Opaque Bars
Transition Style	Cover Vertical
Presentation	<input type="checkbox"/> Defines Context
	<input type="checkbox"/> Provides Context

#### Key Commands

<input type="button" value="+"/>	<input type="button" value="-"/>
----------------------------------	----------------------------------





Thing 1

Back to Portrait.

Simulated Metrics	Inferred
Size	Portrait
Orientation	Landscape
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

View Controller

Title

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)

Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars

Transition Style

Presentation  Defines Context  
 Provides Context

Key Commands

+	-
---	---

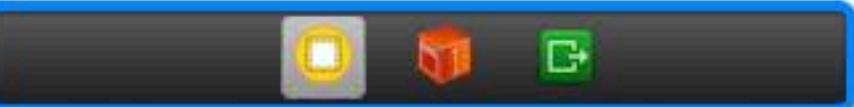


Thing 1

How do we tell Xcode to  
invent these constraints  
which will keep our views  
in the spots implied by the  
blue guidelines?

Thing 2

Using this little  
button here ...



#### Simulated Metrics

Size	Inferred
Orientation	Inferred
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

#### View Controller

Title	<input type="text"/>
Initial Scene	<input checked="" type="checkbox"/> Is Initial View Controller
Layout	<input checked="" type="checkbox"/> Adjust Scroll View Insets <input type="checkbox"/> Hide Bottom Bar on Push <input checked="" type="checkbox"/> Resize View From NIB <input type="checkbox"/> Use Full Screen (Deprecated)
Extend Edges	<input checked="" type="checkbox"/> Under Top Bars <input checked="" type="checkbox"/> Under Bottom Bars <input type="checkbox"/> Under Opaque Bars
Transition Style	<input type="button" value="Cover Vertical"/>
Presentation	<input type="checkbox"/> Defines Context <input type="checkbox"/> Provides Context

#### Key Commands

<input type="button" value="+"/>	<input type="button" value="-"/>
----------------------------------	----------------------------------



# Thing 1

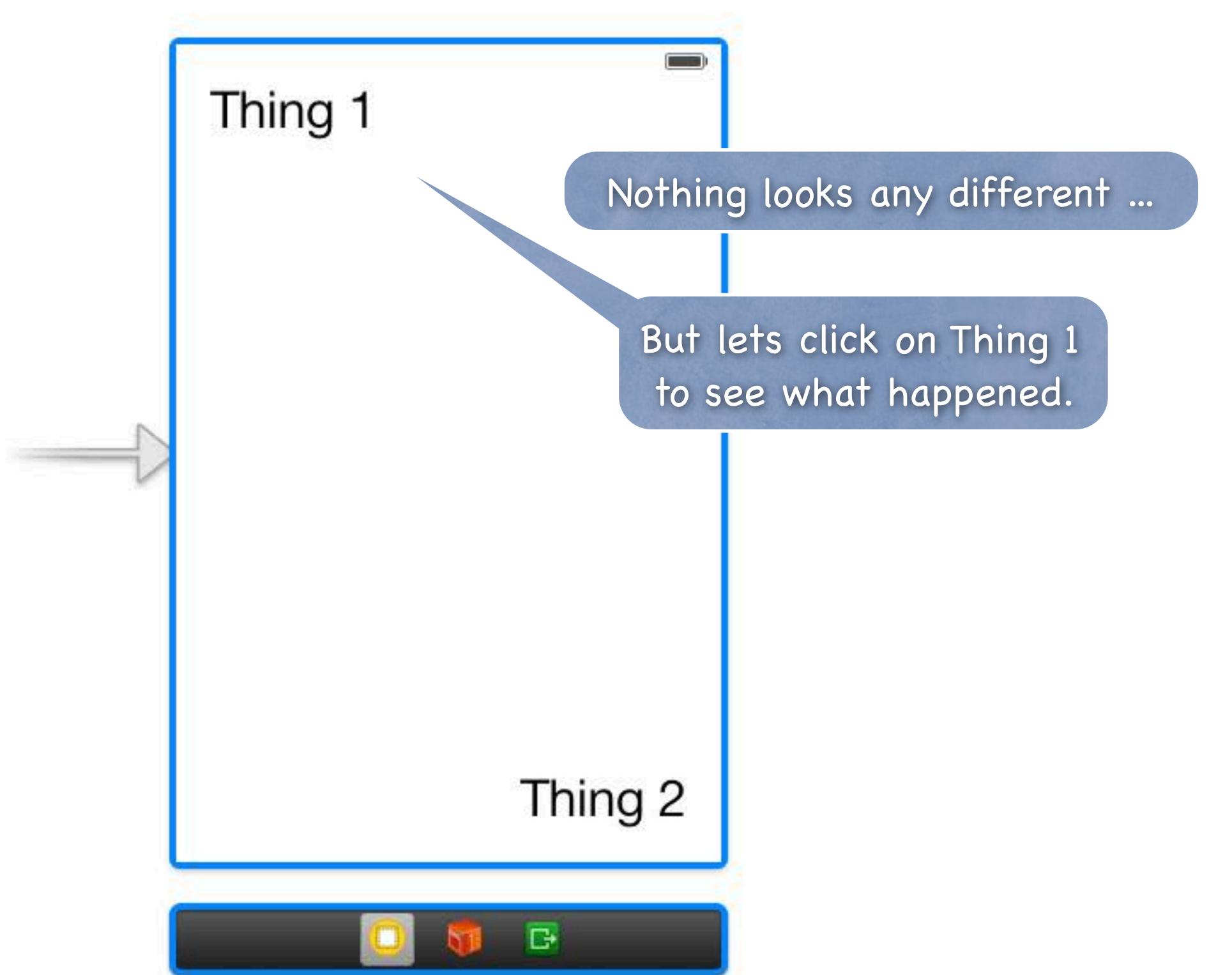
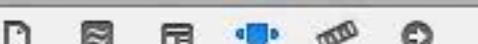
... to ask Xcode 5 to suggest constraints.

The “Suggested” constraints are usually very good as long as you use blue guidelines. Always think twice before varying from the Suggested guidelines (maybe even go back and redo blue guidelines?).

The top part of this menu works on an individual view whereas the bottom half works on all the views in the Controller's View.

Commands

- Update Frames
- Update Constraints
- Add Missing Constraints
- Reset to Suggested Constraints
- Clear Constraints
  
- Update All Frames in View Controller
- Update All Constraints in View Controller
- Add Missing Constraints in View Controller
- Reset to Suggested Constraints in View Controller**
- Clear All Constraints in View Controller



**Simulated Metrics**

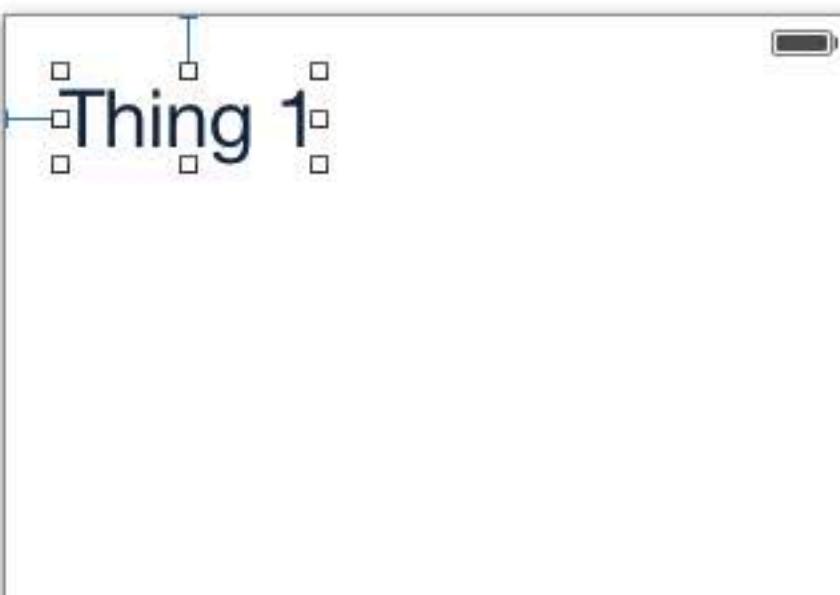
Size Inferred  
Orientation Inferred  
Status Bar Inferred  
Top Bar Inferred  
Bottom Bar Inferred

**View Controller**

Title   
Initial Scene  Is Initial View Controller  
Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)  
Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars  
Transition Style Cover Vertical  
Presentation  Defines Context  
 Provides Context

**Key Commands**

+ | -

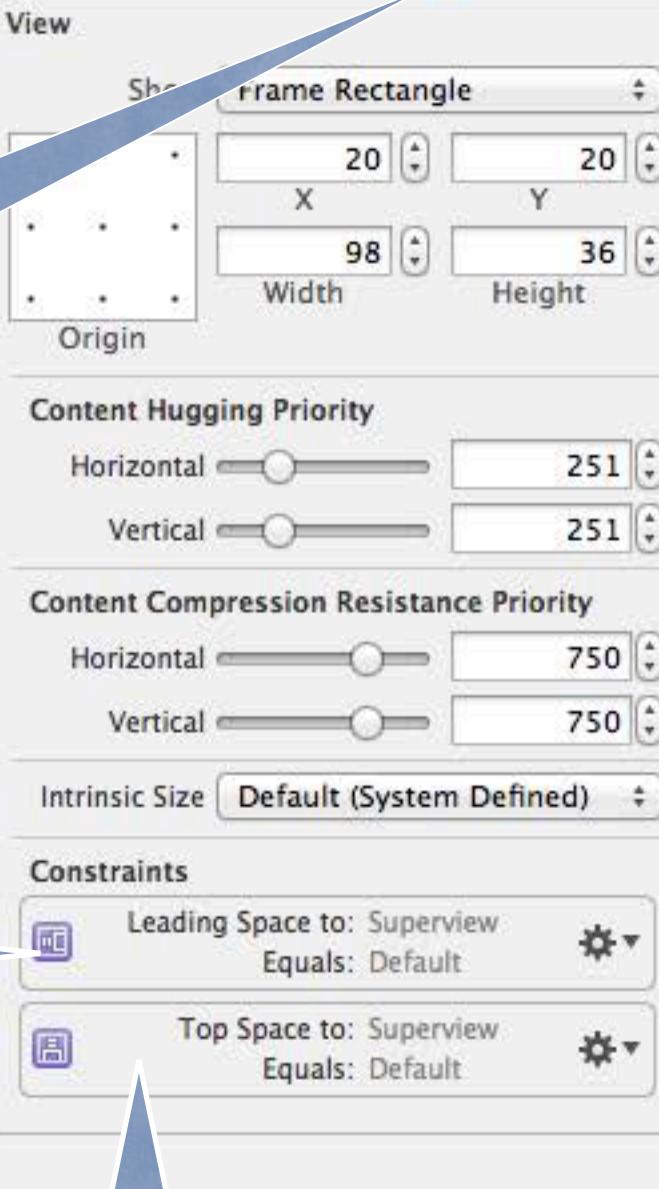


This first constraint constrains Thing 1's left (leading) edge to its superview's leading edge (separated by the "default" distance).

Thing 2

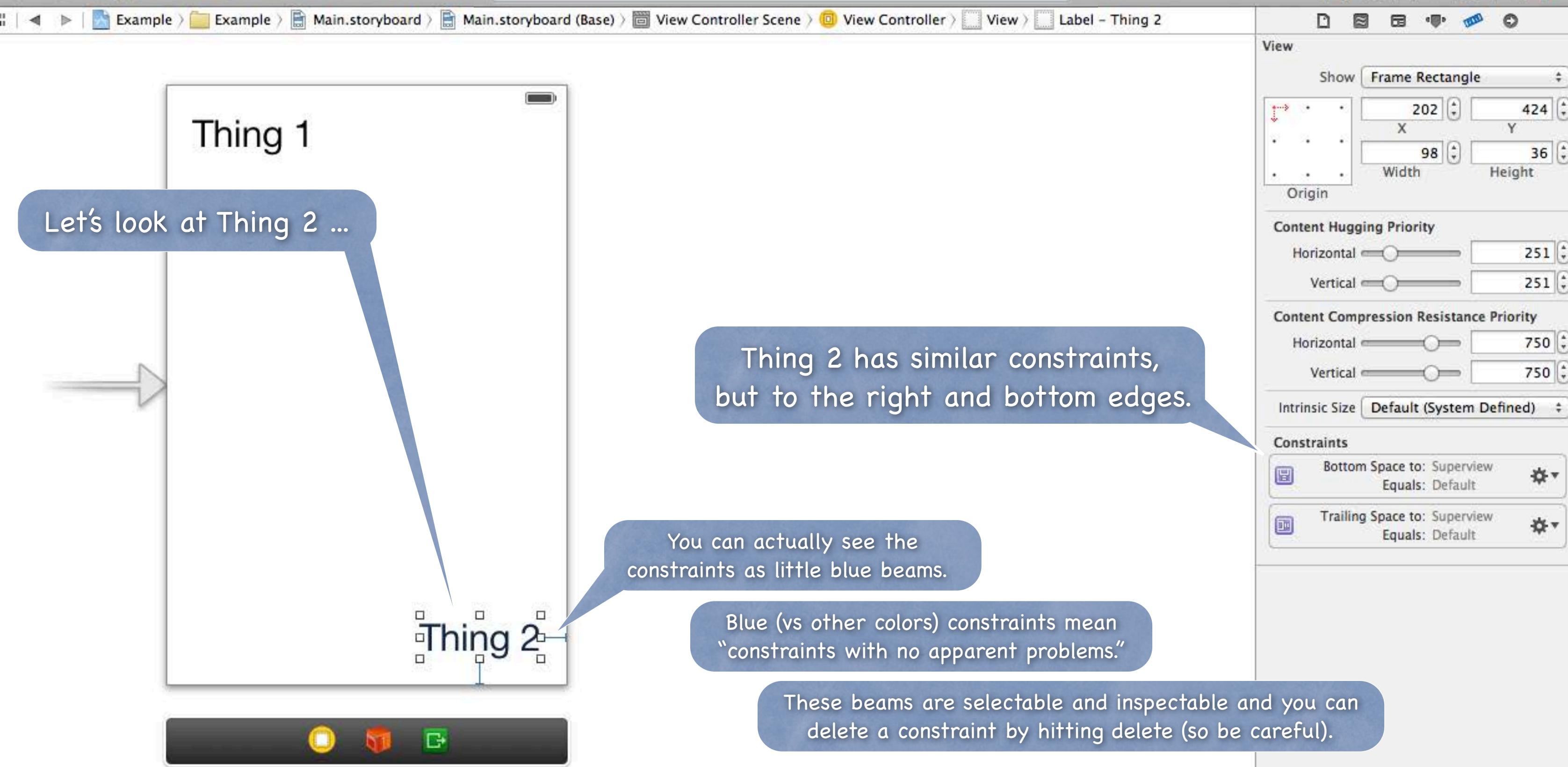


And also click on the Size Inspector. That's where all constraints are shown for a view.



This second constraint constrains it to the default distance from the top of its superview.

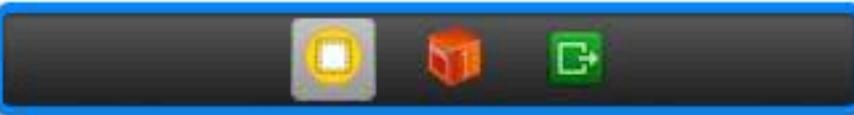
Xcode knew to add these particular constraints because we used the blue guidelines!





Thing 1

Thing 2



Let's check out Landscape ...

## Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Portrait

Top Bar Landscape

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

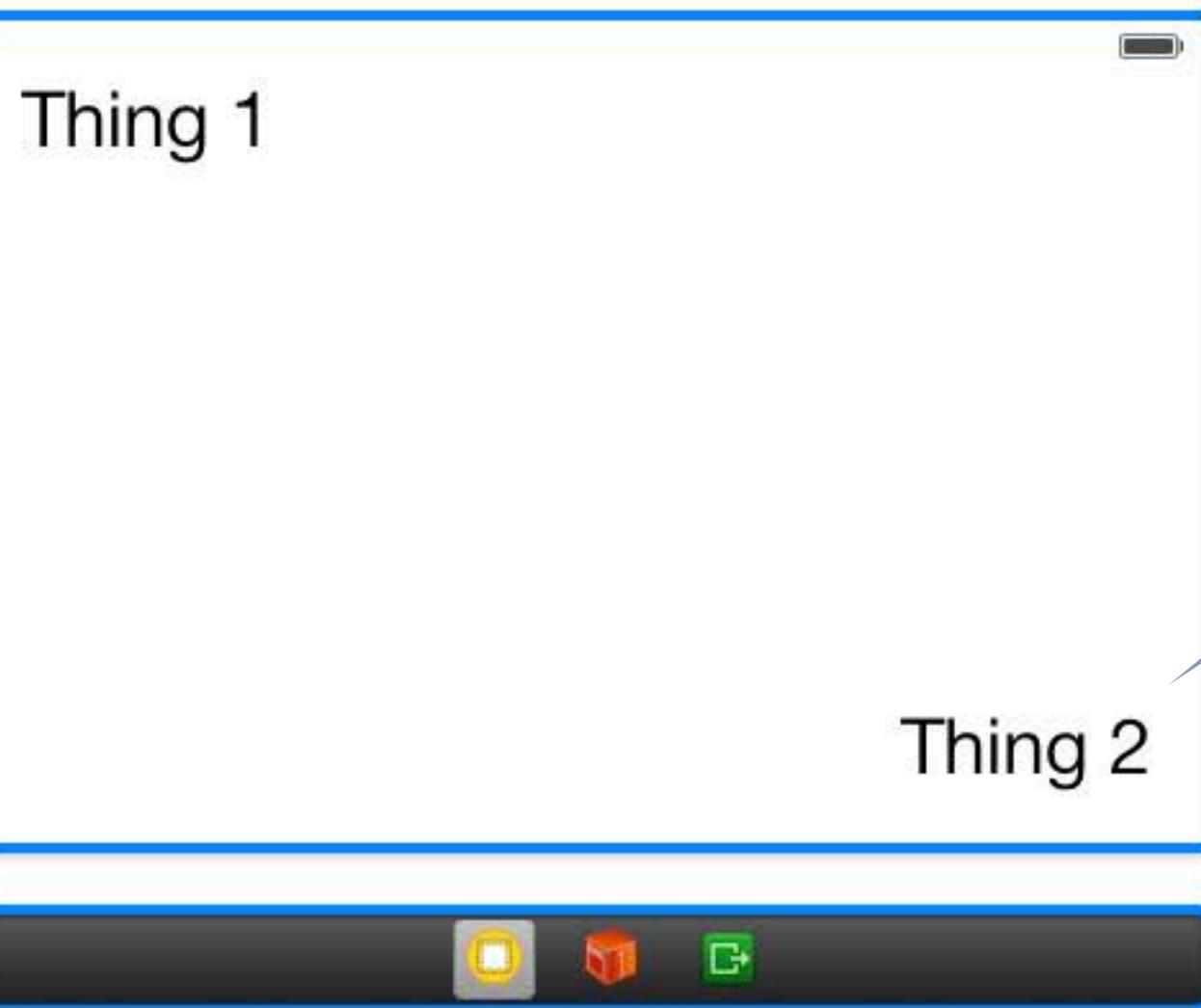
 Defines Context Provides Context

## Key Commands





Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller



**Simulated Metrics**

Size  Orientation  Status Bar  Top Bar  Bottom Bar

**View Controller**

Title

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets  Hide Bottom Bar on Push  Resize View From NIB  Use Full Screen (Deprecated)

Extend Edges  Under Top Bars  Under Bottom Bars  Under Opaque Bars

Transition Style  Presentation  Defines Context  Provides Context

**Key Commands**

+ | -



Thing 1

Thing 2

Back to Portrait ...

Simulated Metrics	Inferred
Size	Portrait
Orientation	Landscape
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

View Controller

Title

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)

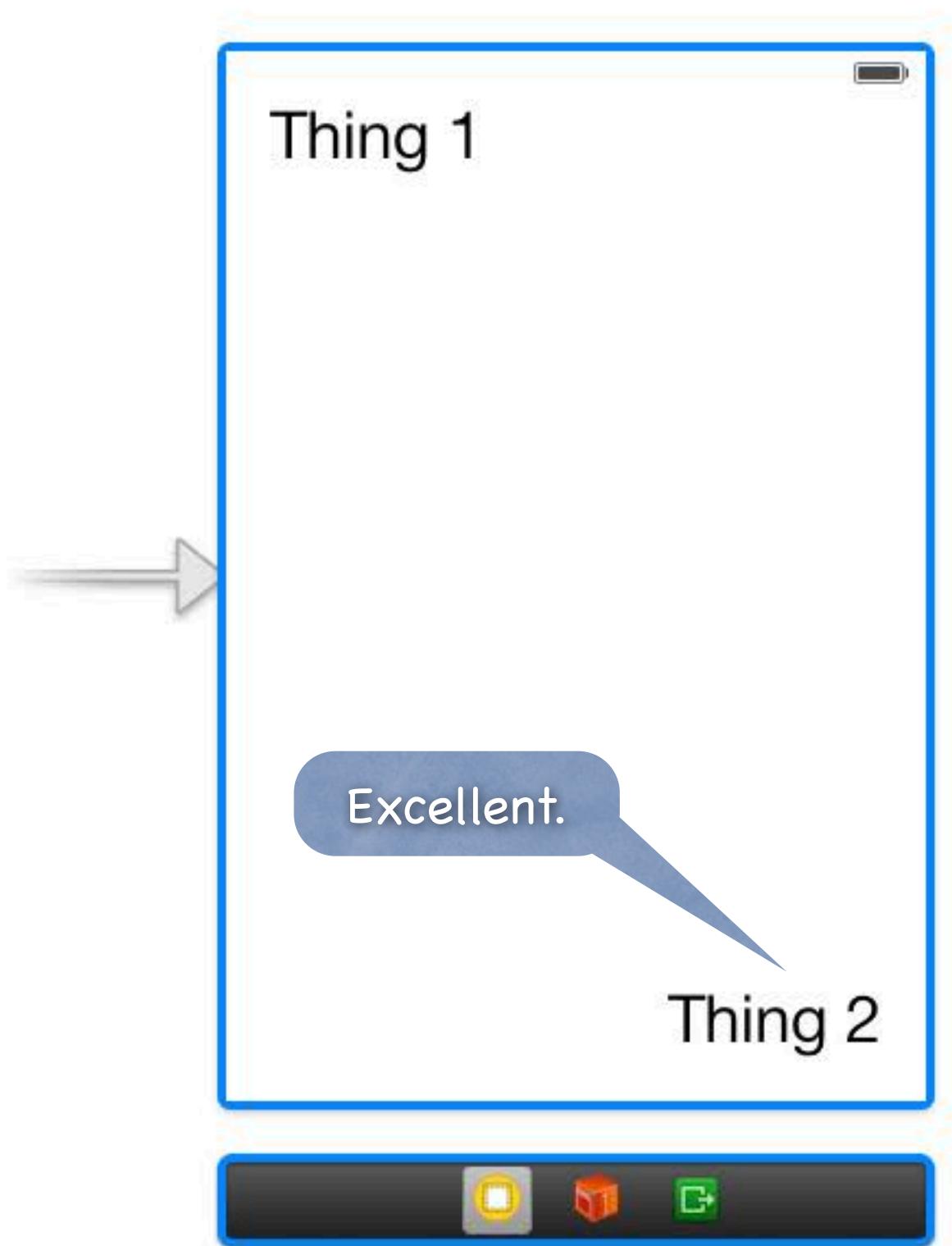
Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars

Transition Style

Presentation  Defines Context  
 Provides Context

Key Commands

+	-
---	---



Let's see what happens if we  
don't use blue guidelines ...

#### Simulated Metrics

Size	Inferred
Orientation	Inferred
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

#### View Controller

Title	<input type="text"/>
Initial Scene	<input checked="" type="checkbox"/> Is Initial View Controller
Layout	<input checked="" type="checkbox"/> Adjust Scroll View Insets <input type="checkbox"/> Hide Bottom Bar on Push <input checked="" type="checkbox"/> Resize View From NIB <input type="checkbox"/> Use Full Screen (Deprecated)
Extend Edges	<input checked="" type="checkbox"/> Under Top Bars <input checked="" type="checkbox"/> Under Bottom Bars <input type="checkbox"/> Under Opaque Bars
Transition Style	Cover Vertical
Presentation	<input type="checkbox"/> Defines Context <input type="checkbox"/> Provides Context

#### Key Commands

<input type="button" value="+"/>	<input type="button" value="-"/>
----------------------------------	----------------------------------





Thing 1

Bad Thing

Thing 2

Here's a "Bad Thing" that was  
dragged out and sized  
without the blue guidelines.

It's supposed to be in the middle of the View but, again,  
no blue guidelines were used, so it's a little off.

### View

Show Frame Rectangle

Origin
X 89
Y 198
Width 163

X

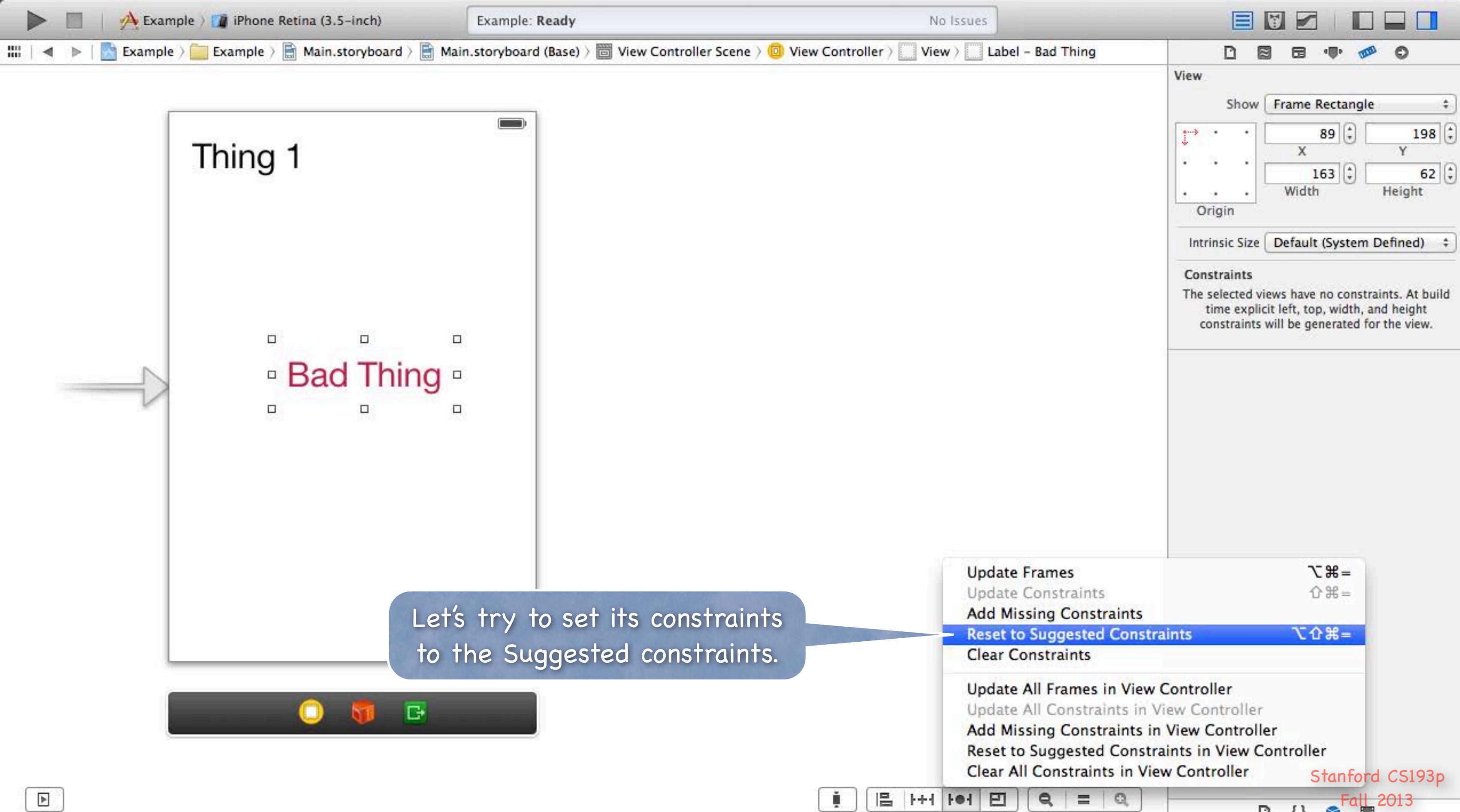
Y

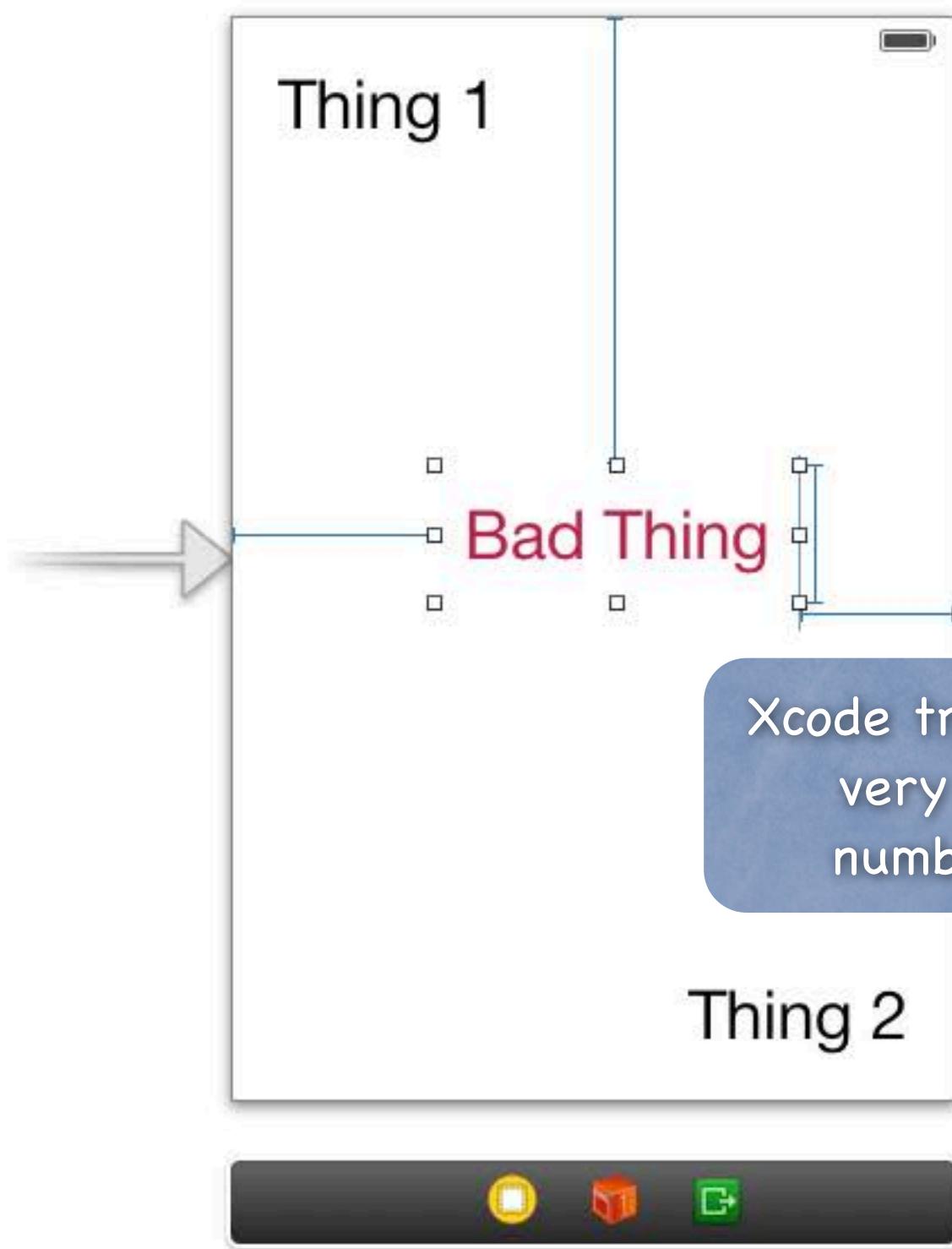
Height 62

Intrinsic Size Default (System Defined)

### Constraints

The selected views have no constraints. At build time explicit left, top, width, and height are generated for the view.





Xcode tried its best, but these constraints are very bad because they all have “magic numbers” in them (e.g. 62, 89, 68, 198).

It is usually the wrong thing to have a constraint with a magic number in it.

Especially if text is involved.

## View

The screenshot shows a 'Frame Rectangle' property panel. On the left, there's a small preview window with a red dashed border and three black dots. To its right are four input fields: X (89), Y (198), Width (163), and Height (62). Each field has up and down arrows for adjustment.

#### **Content Hugging Priority**

Horizontal	<input type="range" value="251"/>
Vertical	<input type="range" value="251"/>

### **Content Compression Resistance Priority**

Horizontal	<input type="range" value="750"/>	750
Vertical	<input type="range" value="750"/>	750

Intrinsic Size Default (System Defined)

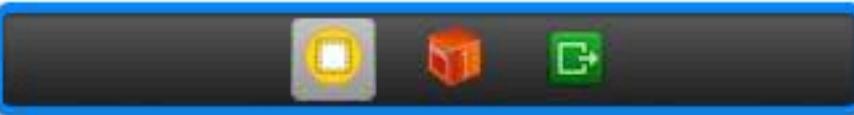
Constraints		
	Height Equals: 62	
	Leading Space to: Superview Equals: 89	
	Trailing Space to: Superview Equals: 68	
	Top Space to: Superview Equals: 198	



Thing 1

Bad Thing

Thing 2



Also, if we try Landscape ...

## Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Portrait

Top Bar Landscape

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

Presentation  Defines Context Provides Context

## Key Commands

+	-
---	---



... the Bad Thing will not stay anywhere near the “center”.

Simulated Metrics	
Size	Inferred
Orientation	Landscape
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

**View Controller**

Title

Initial Scene  Is Initial View Controller

Layout  Adjust Scroll View Insets  
 Hide Bottom Bar on Push  
 Resize View From NIB  
 Use Full Screen (Deprecated)

Extend Edges  Under Top Bars  
 Under Bottom Bars  
 Under Opaque Bars

Transition Style

Presentation  Defines Context  
 Provides Context

Key Commands

<input type="button" value="+"/>	<input type="button" value="-"/>
----------------------------------	----------------------------------



Thing 1

Bad Thing

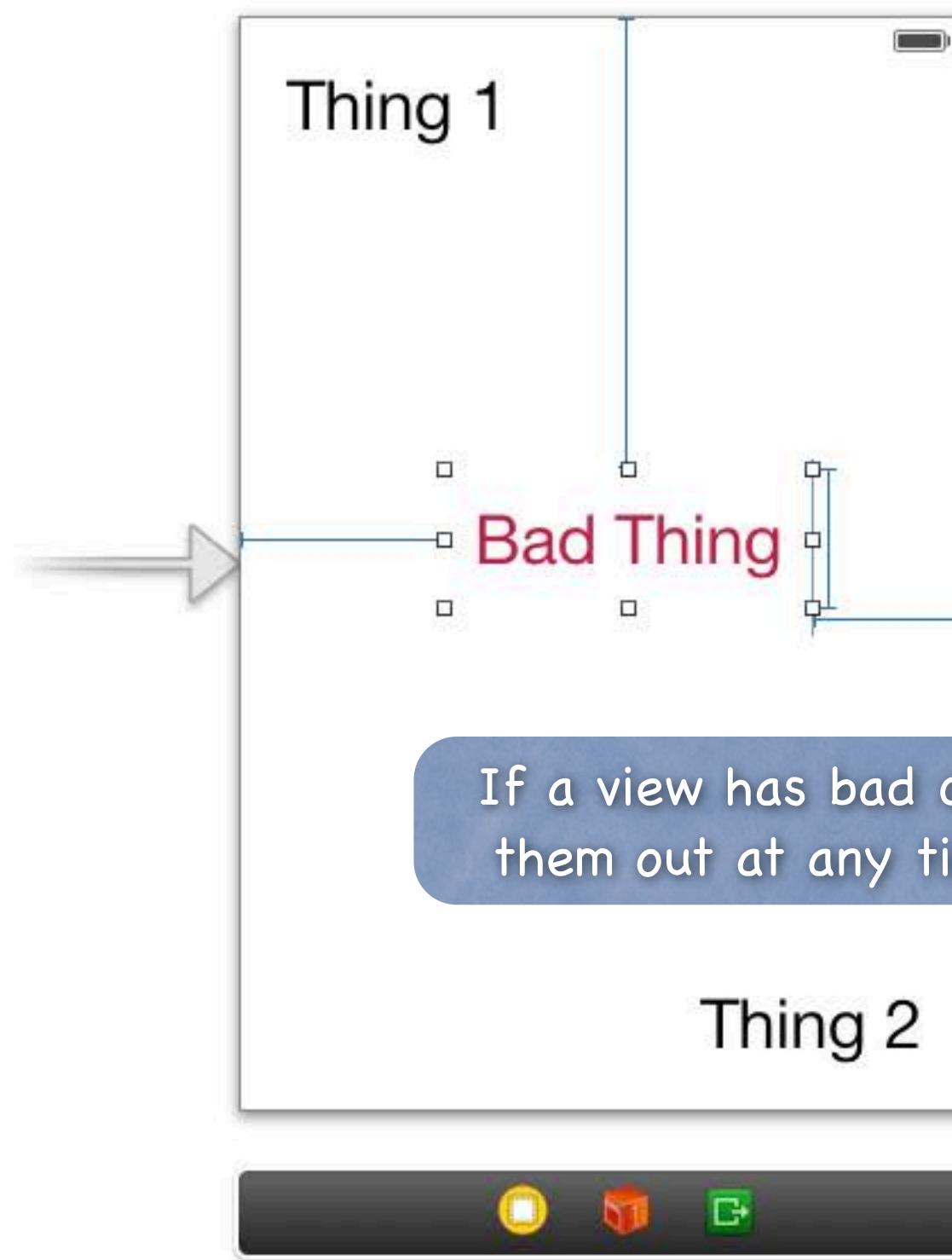
Thing 2

Okay, back to Portrait.

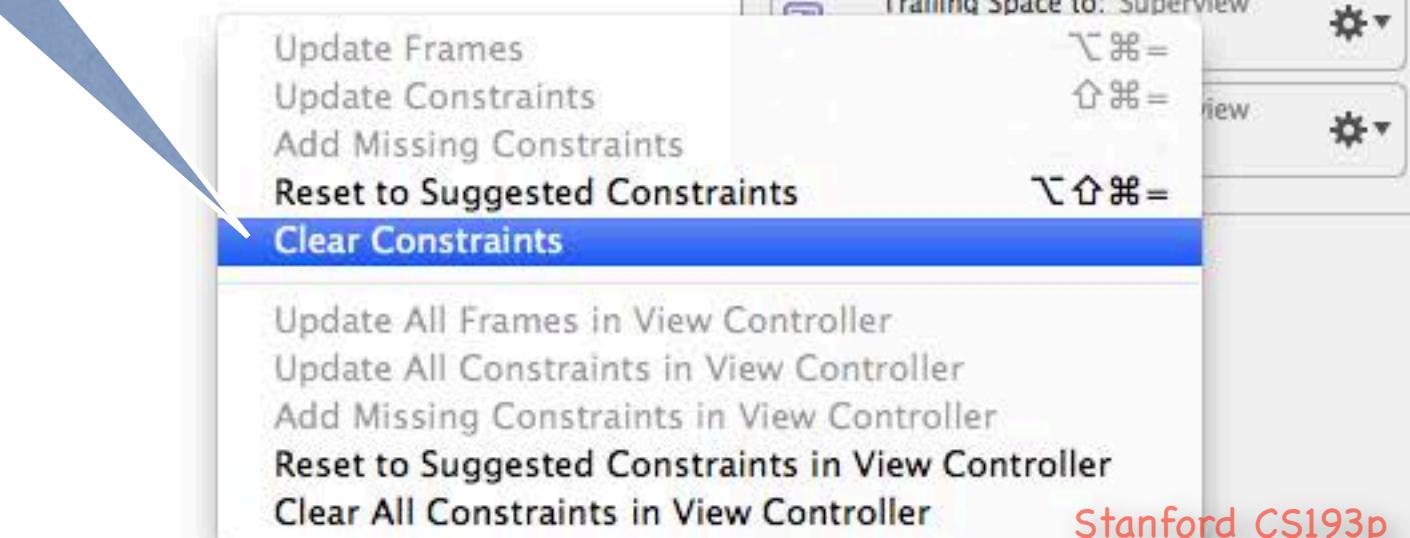
Simulated Metrics	Inferred
Size	Portrait
Orientation	Landscape
Status Bar	Inferred
Top Bar	Inferred
Bottom Bar	Inferred

View Controller	
Title	
Initial Scene	<input checked="" type="checkbox"/> Is Initial View Controller
Layout	<input checked="" type="checkbox"/> Adjust Scroll View Insets <input type="checkbox"/> Hide Bottom Bar on Push <input checked="" type="checkbox"/> Resize View From NIB <input type="checkbox"/> Use Full Screen (Deprecated)
Extend Edges	<input checked="" type="checkbox"/> Under Top Bars <input checked="" type="checkbox"/> Under Bottom Bars <input type="checkbox"/> Under Opaque Bars
Transition Style	Cover Vertical
Presentation	<input type="checkbox"/> Defines Context <input type="checkbox"/> Provides Context

Key Commands	
	+   -



If a view has bad constraints, you can clear them out at any time using this menu item.





Thing 1

Let's add some constraints to Bad Thing in a different way  
(i.e. not using blue guidelines and Suggested constraints).

□ □ □  
□ Bad Thing □  
□ □ □

Thing 2



One way to do that is with  
this button which is used to  
line up a view with other  
views or with its superview.



View

Show Frame Rectangle

Origin	X: 89	Y: 198
	Width: 163	Height: 62

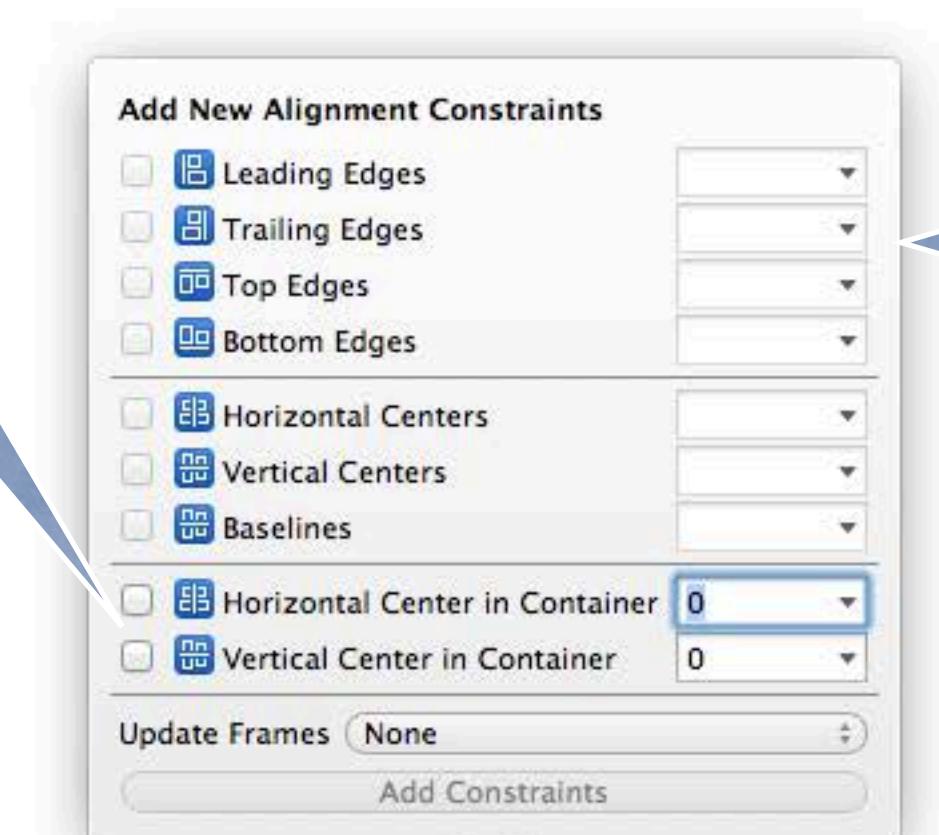
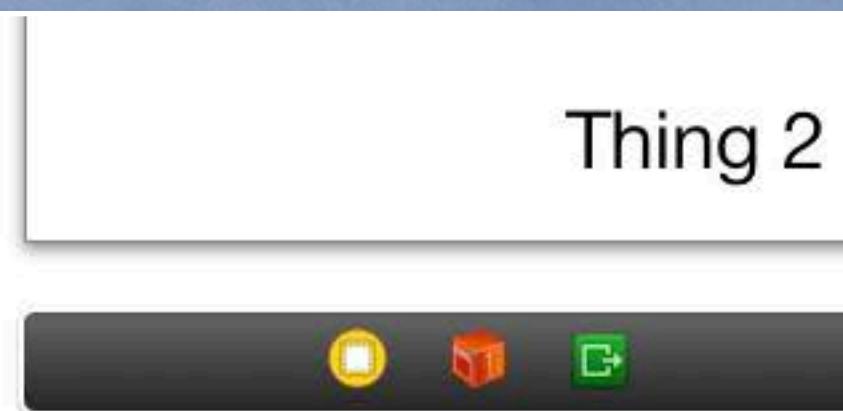
Intrinsic Size Default (System Defined)

Constraints

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.



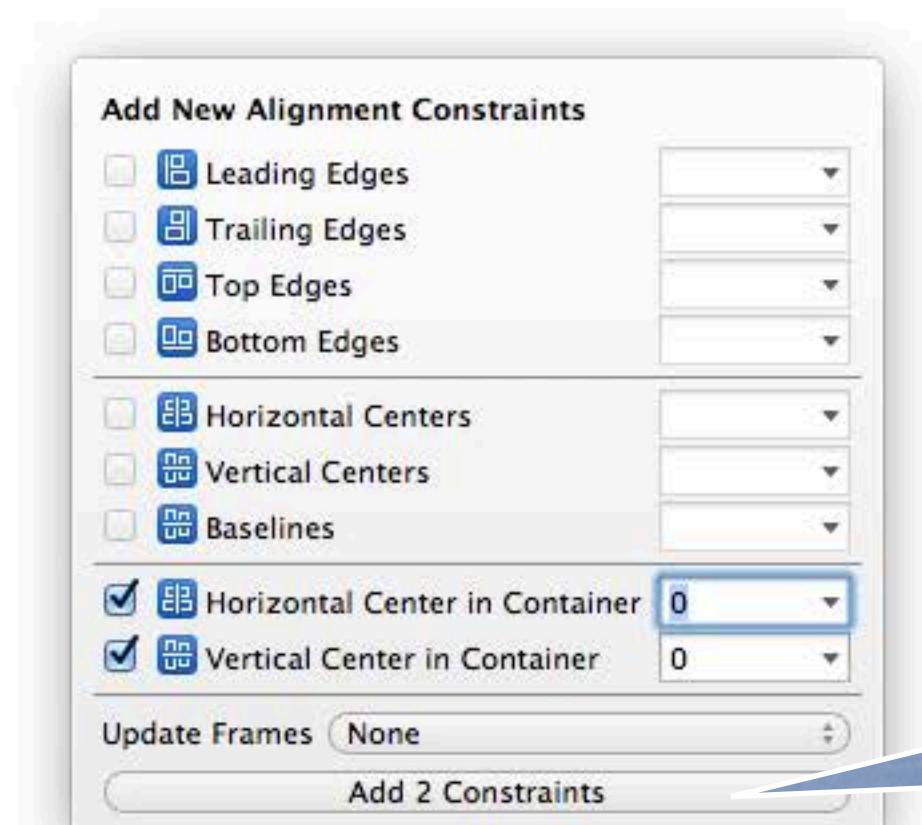
We're going to pick both the Horizontal and Vertical Centering options ("in Container" means in our superview).



If you pick 2 (or more) views at once (using shift-click), you can also align them in all these ways.



Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller &gt; View &gt; Label - Bad Thing



Clicking here adds the  
2 new constraints.



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

View Controller Scene > View Controller > View > Label - Bad Thing

It added them!

Notice that they are drawn in yellow. This is because they don't match what is currently showing in the scene.

View

Show Frame Rectangle

Origin	X: 89	Y: 198
	Width: 163	Height: 62

Content Hugging Priority

Horizontal: 251

Vertical: 251

Content Compression Resistance Priority

Horizontal: 750

Vertical: 750

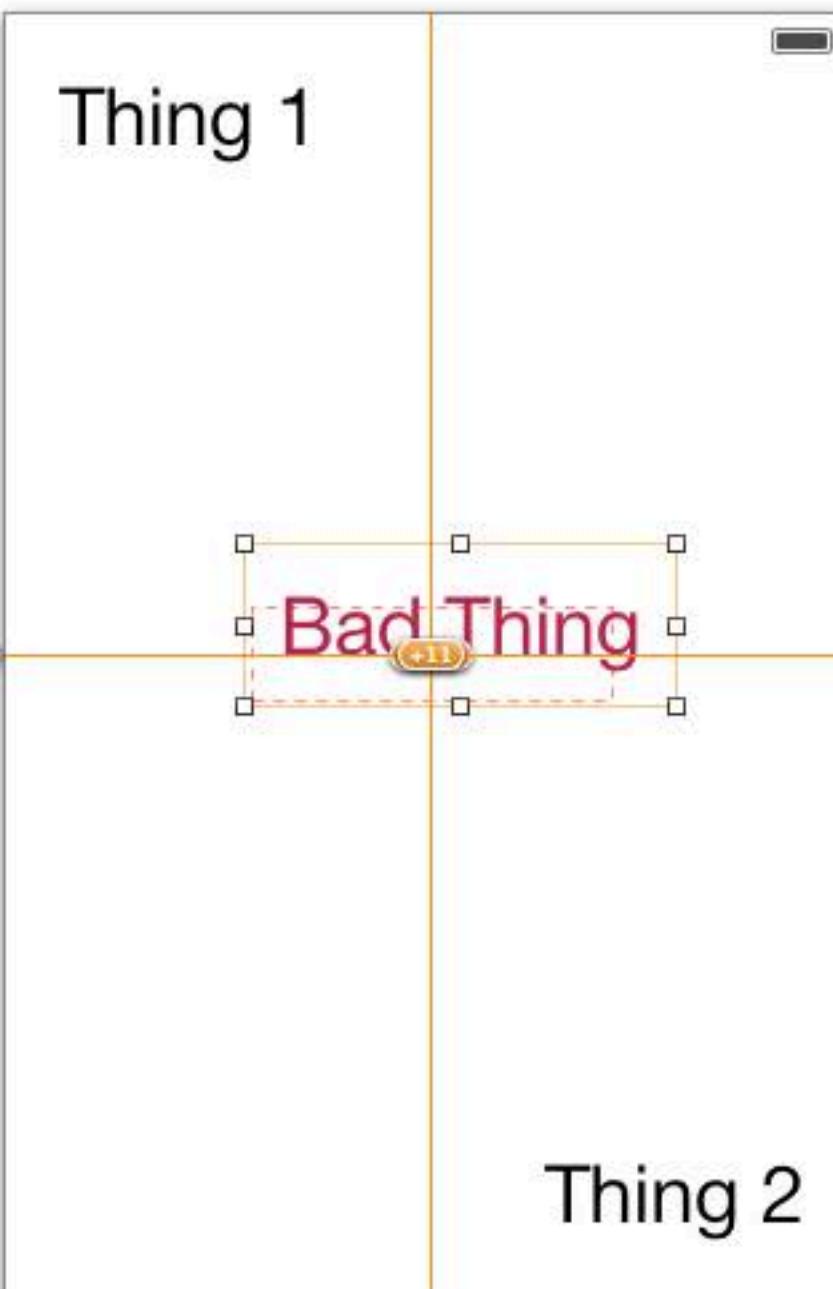
Intrinsic Size Default (System Defined)

Constraints

- Align Center X to: Superview
- Align Center Y to: Superview



✓ ⚠ Frame for "Label - Bad Thing" will be different at run time.



That fact is also reported here ...

Show **Frame Rectangle**

Origin	X: 89	Y: 198
	Width: 163	Height: 62

**Content Hugging Priority**

Horizontal	251
Vertical	251

**Content Compression Resistance Priority**

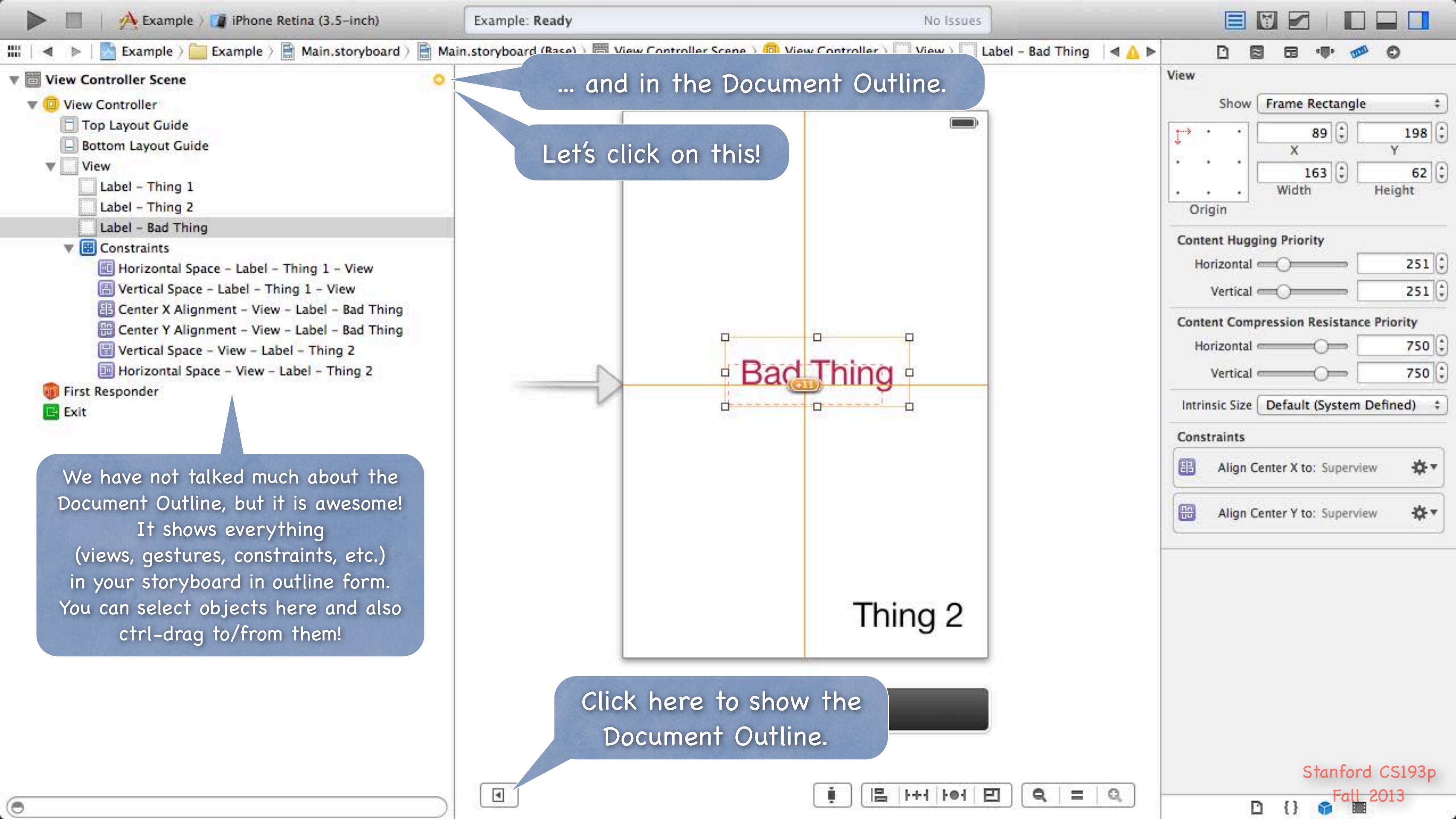
Horizontal	750
Vertical	750

**Intrinsic Size** Default (System Defined)

**Constraints**

- Align Center X to: Superview
- Align Center Y to: Superview





We have not talked much about the Document Outline, but it is awesome  
It shows everything (views, gestures, constraints, etc.) in your storyboard in outline form.  
You can select objects here and also ctrl-drag to/from them!

**Click here to show the Document Outline.**

□ Bad Thing □

## hing 2

  <b>Content Hugging Priority</b> Horizontal:  251 Vertical:  251	<span>Show</span> <span>Frame Rectangle</span> <span>▼</span> <input type="text" value="89"/> <span>X</span> <span>Y</span> <input type="text" value="163"/> <span>Width</span> <span>Height</span> <input type="text" value="62"/>
<b>Content Compression Resistance Priority</b> Horizontal:  750 Vertical:  750	
<b>Intrinsic Size</b> <span>Default (System Defined)</span> <span>▼</span>	
<b>Constraints</b> <ul style="list-style-type: none"> <li> Align Center X to: Superview <span>⚙️ ▾</span></li> <li> Align Center Y to: Superview <span>⚙️ ▾</span></li> </ul>	

# Stanford CS193p

## Fall 2013



Structure View Controller

Misplaced Views

Label - Bad Thing  
Expected: x=92, y=222, width=136, height=36  
Actual: x=89, y=198, width=163, height=62

View Controller Scene View Controller View Label - Bad Thing

View

Show Frame Rectangle

Frame Rectangle

Origin X: 89 Y: 198 Width: 163 Height: 62

Content Hugging Priority

Horizontal: 251 Vertical: 251

Content Compression Resistance Priority

Horizontal: 750 Vertical: 750

Intrinsic Size Default (System Defined)

Align Center X to: Superview

Align Center Y to: Superview

Stanford CS193p Fall 2013

Yellow problems are generally mismatches between what's showing in the scene and what the constraints would do.

Click on the yellow triangle to resolve a problem.

The dashed yellow line shows what the constraints think this view's frame should be.

Thing 1

Bad Thing +11

Thing 2

iPhone Retina (3.5-inch) Main.storyboard (Base) View Controller Scene View Controller View Label - Bad Thing

Example > iPhone Retina (3.5-inch)

Example: Ready

No Issues

Structure View Controller

Misplaced Views

Label - Bad Thing  
Expected: x=92, y=222, width=136, height=36  
Actual: x=89, y=198, width=163, height=62

Update Frame  
Set the frame in the canvas to match the constraints.

Update Constraints  
Sets the constant for each constraint attached to the view to match the current value in the canvas.

Reset to Suggested Constraints  
Removes each constraint attached to the view and adds suggested constraints based upon the frame in the canvas.

Apply to all views in container

Cancel Fix Misplacement

Bad Thing +11

Thing 2

Since we're happy with our constraints ...

... we'll choose to Update Frame to change the storyboard to match the constraints.

View Rectangle  
X: 89 Y: 198 Width: 163 Height: 62 Origin

Content Hugging Priority  
Horizontal: 251 Vertical: 251

Compression Resistance Priority  
Horizontal: 750 Vertical: 750

Intrinsic Size Default (System Defined)

Constraints  
Align Center X to: Superview  
Align Center Y to: Superview

Stanford CS193p Fall 2013

The screenshot shows the Xcode interface with a storyboard file open. A 'Misplaced Views' alert is displayed, listing three options: 'Update Frame', 'Update Constraints', and 'Reset to Suggested Constraints'. The 'Update Frame' option is selected. A blue callout bubble on the left points to this option with the text 'Here are the choices to resolve the mismatch.'. Another blue callout bubble on the right points to the 'Fix Misplacement' button in the alert with the text 'Since we're happy with our constraints ...' and '... we'll choose to Update Frame to change the storyboard to match the constraints.'. The storyboard canvas shows a label with the text 'Bad Thing' and a constraint error of '+11'. The right panel shows the label's frame rectangle (X: 89, Y: 198, Width: 163, Height: 62) and its constraints: 'Align Center X to: Superview' and 'Align Center Y to: Superview'. The bottom right corner of the slide has the text 'Stanford CS193p Fall 2013'.



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

Structure

View Controller

Thing 1

Bad Thing

Thing 2

Bingo!

No Auto Layout Issues

No more yellow constraints.

Click here to go back to showing outline.



View

Show Frame Rectangle

Origin

X 92

Y 222

Width 136

Height 36

Content Hugging Priority

Horizontal 251

Vertical 251

Content Compression Resistance Priority

Horizontal 750

Vertical 750

Intrinsic Size Default (System Defined)

Constraints

Align Center X to: Superview

Align Center Y to: Superview

Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
  - View
    - Label - Thing 1
    - Label - Thing 2
    - Label - Bad Thing**
  - Constraints
    - Horizontal Space - Label - Thing 1 - View
    - Vertical Space - Label - Thing 1 - View
    - Center X Alignment - View - Label - Bad Thing
    - Center Y Alignment - View - Label - Bad Thing
    - Vertical Space - View - Label - Thing 2
    - Horizontal Space - View - Label - Thing 2
- First Responder
- Exit

The storyboard shows a single view controller scene. The view contains three labels: "Thing 1" at the top left, "Thing 2" at the bottom right, and a red "Bad Thing" label centered below "Thing 1". A blue arrow points from the left towards the "Bad Thing" label.

**View**

Show **Frame Rectangle**

Origin	X: 92	Y: 222
	Width: 136	Height: 36

**Content Hugging Priority**

Horizontal	251
Vertical	251

**Content Compression Resistance Priority**

Horizontal	750
Vertical	750

**Intrinsic Size** Default (System Defined)

**Constraints**

- Align Center X to: Superview
- Align Center Y to: Superview

Stanford CS193p Fall 2013



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
  - View**
    - Label - Thing 1
    - Label - Thing 2
    - Label - Bad Thing
  - Constraints
    - Horizontal Space - Label - Thing 1 - View
    - Vertical Space - Label - Thing 1 - View
    - Center X Alignment - Label - Bad Thing - View
    - Center Y Alignment - Label - Bad Thing - View
    - Vertical Space - View - Label - Thing 2
    - Horizontal Space - View - Label - Thing 2
- First Responder
- Exit

The storyboard displays a single view controller scene. The view contains three labels: "Thing 1" at the top left, "Bad Thing" in the center, and "Thing 2" at the bottom right. A blue callout bubble points from the text "Okay, Landscape again." to the "Top Bar" section of the Simulated Metrics sidebar, which is set to "Landscape".

**Simulated Metrics**

- Size Inferred
- Orientations ✓ Inferred
- Status Bar Portrait
- Top Bar **Landscape**
- Bottom Bar Inferred

**View Controller**

- Title
- Initial Scene  Is Initial View Controller
- Layout  Adjust Scroll View Insets
  - Hide Bottom Bar on Push
  - Resize View From NIB
  - Use Full Screen (Deprecated)
- Extend Edges  Under Top Bars
  - Under Bottom Bars
  - Under Opaque Bars
- Transition Style Cover Vertical
- Presentation
  - Defines Context
  - Provides Context

**Key Commands**

Stanford CS193p Fall 2013



Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center X Alignment - Label - Bad Thing - View
  - Center Y Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2
- First Responder**
- Exit**



**Simulated Metrics**

- Size Inferred
- Orientation Landscape
- Status Bar Inferred
- Top Bar Inferred
- Bottom Bar Inferred

**View Controller**

- Title
- Initial Scene  Is Initial View Controller
- Layout  Adjust Scroll View Insets
- Hide Bottom Bar on Push
- Resize View From NIB
- Use Full Screen (Deprecated)
- Extend Edges  Under Top Bars
- Under Bottom Bars
- Under Opaque Bars

Transition Style Cover Vertical

Presentation  Defines Context  
 Provides Context

**Key Commands**

+	-
---	---



View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center X Alignment - Label - Bad Thing - View
  - Center Y Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Main.storyboard (Base) > View Controller Scene > View Controller

Simulated Metrics

- Inferred
- Portrait
- Landscape

Orientation

Status Bar

Top Bar

Bottom Bar

View Controller

- Title
- Initial Scene  Is Initial View Controller
- Layout  Adjust Scroll View Insets
- Hide Bottom Bar on Push
- Resize View From NIB
- Use Full Screen (Deprecated)
- Extend Edges  Under Top Bars
- Under Bottom Bars
- Under Opaque Bars

Transition Style Cover Vertical

Presentation  Defines Context

Provides Context

Key Commands

+

-

Thing 1

Bad Thing

And back.

Thing 2

Stanford CS193p Fall 2013



Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller

## View Controller Scene

## View Controller

Top Layout Guide

Bottom Layout Guide

## View

Label - Thing 1

Label - Thing 2

Label - Bad Thing

## Constraints

Horizontal Space - Label - Thing 1 - View

Vertical Space - Label - Thing 1 - View

Center X Alignment - Label - Bad Thing - View

Center Y Alignment - Label - Bad Thing - View

Vertical Space - View - Label - Thing 2

Horizontal Space - View - Label - Thing 2

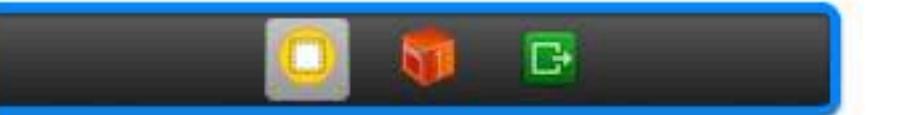
First Responder

Exit

Thing 1

Bad Thing

Thing 2



## Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Inferred

Top Bar Inferred

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

 Defines Context Provides Context

## Key Commands





Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing**
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center X Alignment - Label - Bad Thing - View
  - Center Y Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2
- First Responder
- Exit

**Label**

Text: Plain  
Text: Bad Thing  
Color: Red  
Font: System 30.0  
Alignment: Center  
Lines: 1  
Behavior: Enabled  
Baseline: Align Baselines  
Line Breaks: Truncate Tail  
Autoshrink: Fixed Font Size  
Shadow: Default  
Shadow Offset: 0, -1  
Highlighted: Default  
Shadow: Default  
Shadow Offset: 0, -1

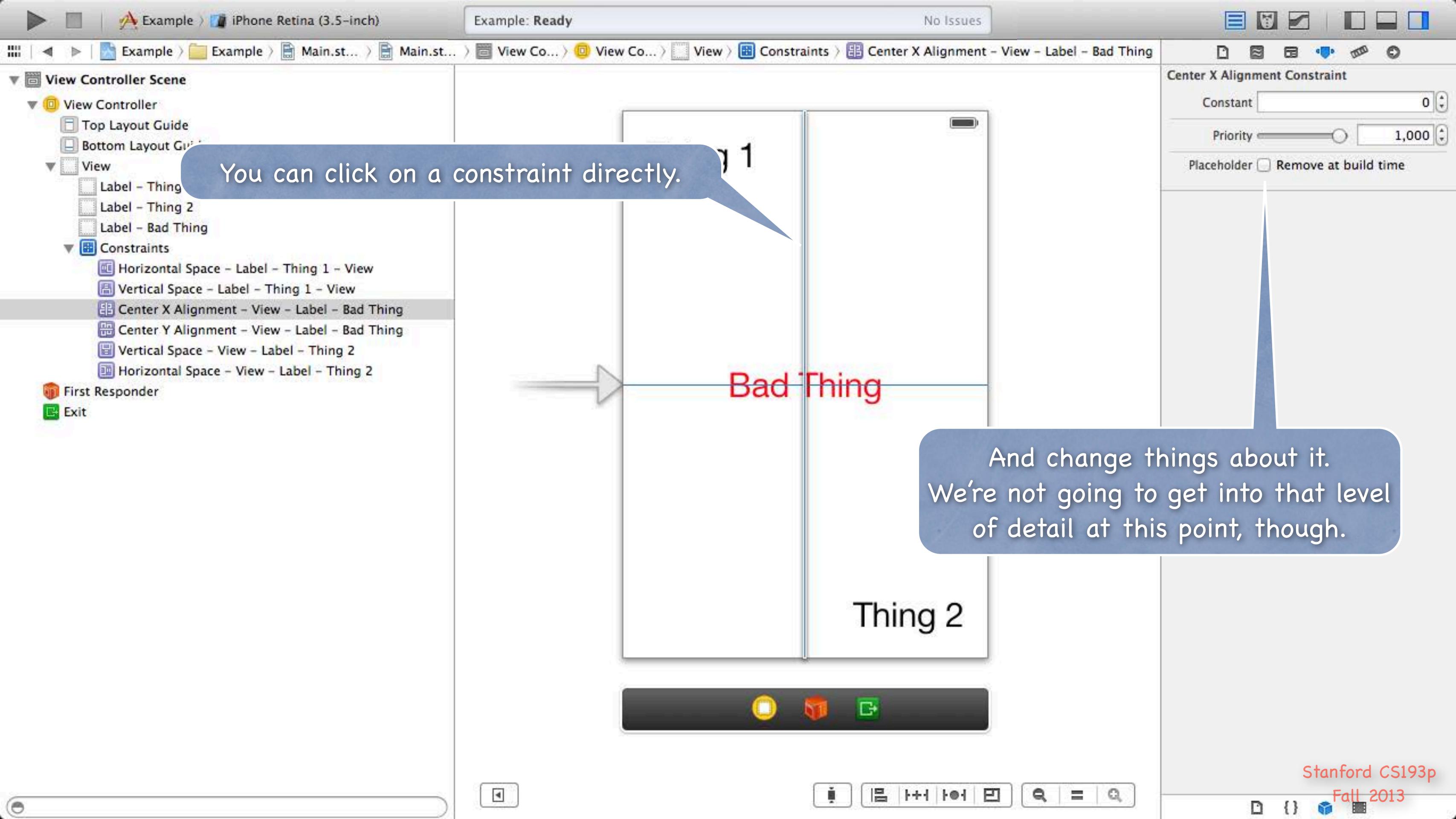
**View**

Mode: Left  
Tag: 0  
Interaction: User Interaction Enabled, Multiple Touch  
Alpha: 1  
Background: Red  
Tint: Blue  
Drawing: Opaque, Hidden, Clears Graphics Context, Clip Subviews, AutoresizesSubviews  
Drawing: Opaque, Hidden, Clears Graphics Context, Clip Subviews, AutoresizesSubviews

**Bad Thing**

Thing 1

Thing 2



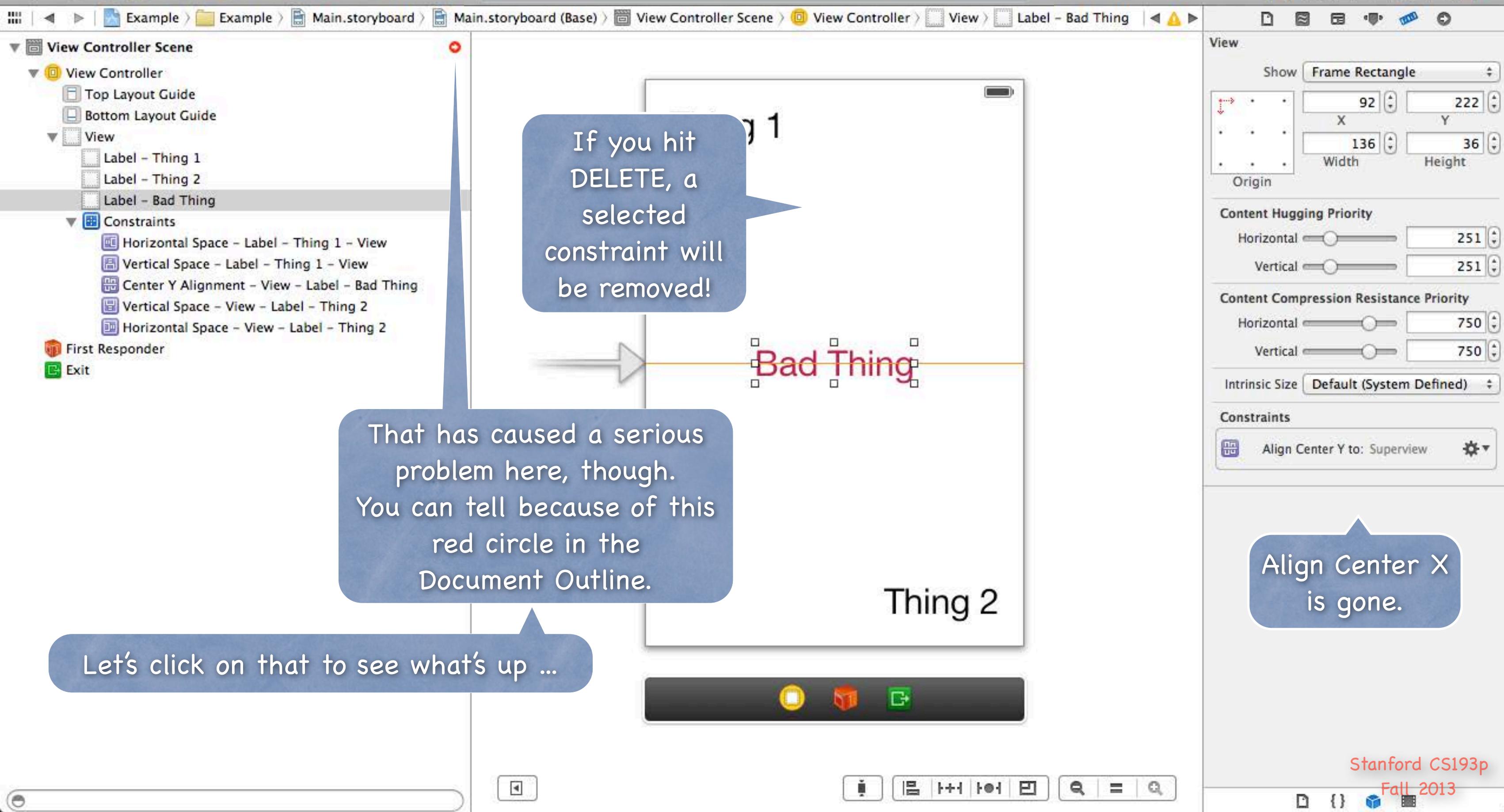
You can click on a constraint directly.

1

# Bad Thing

## Thing 2

And change things about it.  
We're not going to get into that level  
of detail at this point, though.



Stanford CS193p

Fall 2013



Structure View Controller

Missing Constraints

Label - Bad Thing  
Need constraints for: X position

View

Show Frame Rectangle

Origin	X: 92	Y: 222
	Width: 136	Height: 36

Content Hugging Priority

Horizontal: 251

Vertical: 251

Content Compression Resistance Priority

Horizontal: 750

Vertical: 750

Intrinsic Size Default (System Defined)

Constraints

Align Center Y to: Superview

Need constraints for: X position

Bad Thing

Indeed, there is no way for the autolayout system to know where to put Bad Thing horizontally now.

Stanford CS193p Fall 2013



Structure

## Missing Constraints

Label -  
Need co

Add missing constraints for "Label - Bad Thing"? This will add enough constraints to resolve the ambiguity.

Cancel

Add Missing Constraints

Luckily, we can just click on this red circle ...

Thing 1

... and Xcode will offer to fix it for us!

Bad Thing

Thing 2



## View

Show Frame Rectangle

Origin	X	92	Y	222
	Width	136	Height	36

## Content Hugging Priority

Horizontal 251

Vertical 251

## Content Compression Resistance Priority

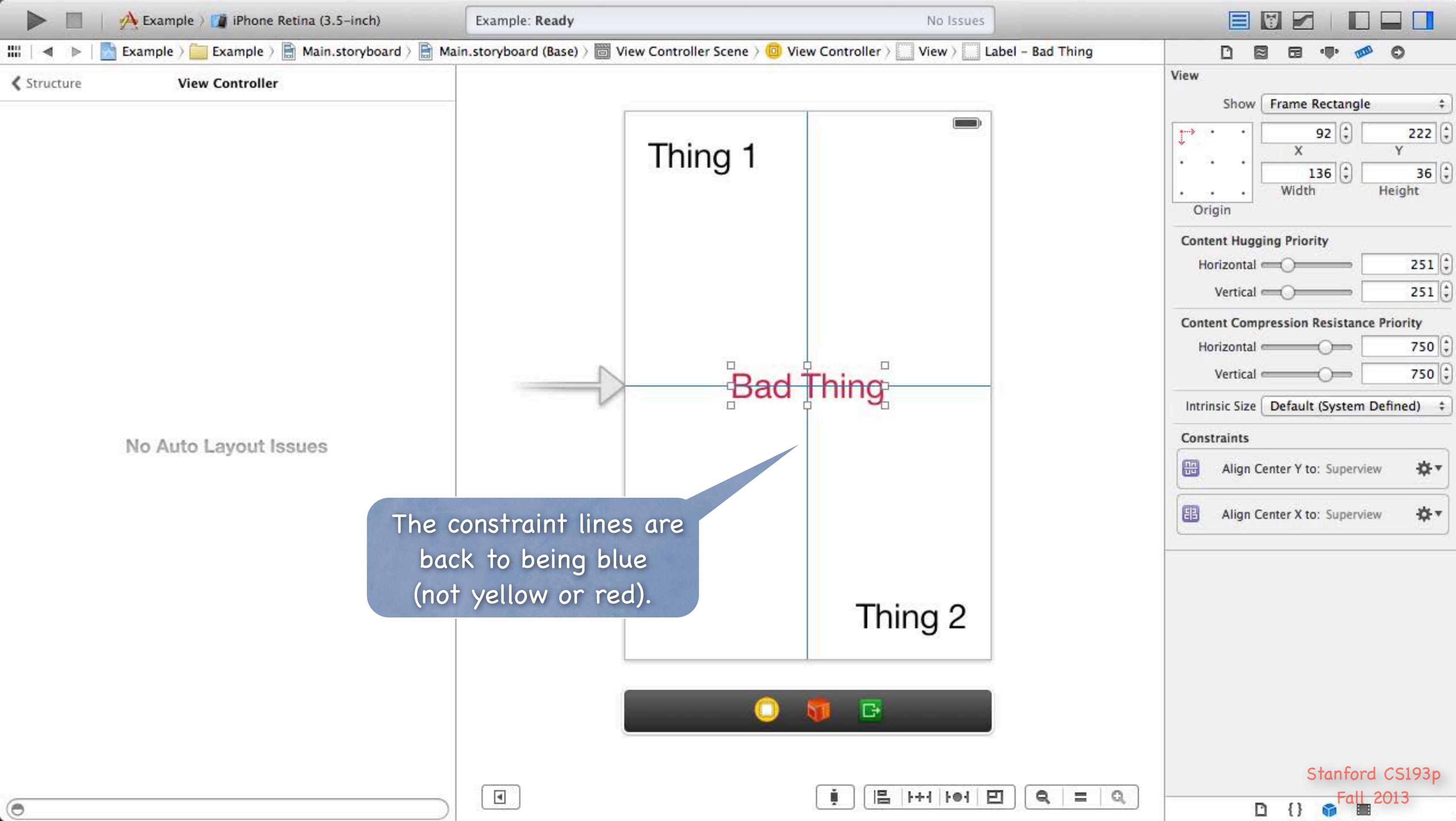
Horizontal 750

Vertical 750

## Intrinsic Size Default (System Defined)

## Constraints

Align Center Y to: Superview	
------------------------------	--



Stanford CS193p

Fall 2013



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
  - View**
    - Label - Thing 1
    - Label - Thing 2
    - Label - Bad Thing**
  - Constraints
    - Horizontal Space - Label - Thing 1 - View
    - Vertical Space - Label - Thing 1 - View
    - Center Y Alignment - View - Label - Bad Thing
    - Center X Alignment - Label - Bad Thing - View
    - Vertical Space - View - Label - Thing 2
    - Horizontal Space - View - Label - Thing 2
- First Responder
- Exit

The storyboard view shows a single view controller scene. Inside, there is a view containing three labels: "Thing 1" at the top left, "Thing 2" at the bottom right, and a red "Bad Thing" label centered below them. A blue arrow points from the left towards the "Bad Thing" label.

**View**

Show: Frame Rectangle

Origin	X: 92	Y: 222
	Width: 136	Height: 36

**Content Hugging Priority**

Horizontal	251
Vertical	251

**Content Compression Resistance Priority**

Horizontal	750
Vertical	750

**Intrinsic Size**: Default (System Defined)

**Constraints**

- Align Center Y to: Superview
- Align Center X to: Superview

**Stanford CS193p Fall 2013**



View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center Y Alignment - View - Label - Bad Thing
  - Center X Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

What if we change our minds and want Bad Thing to sit on top of Thing 2?

We can just pick it up and drag it to where we want with blue guidelines.

View

Show Frame Rectangle

Origin	X: 0	Y: 0
	Width: 320	Height: 480

Content Hugging Priority

Horizontal: 250

Vertical: 250

Content Compression Resistance Priority

Horizontal: 750

Vertical: 750

Intrinsic Size Default (System Defined)

Constraints

- Leading Space to: Label - Thi... Equals: Default
- Top Space to: Label - Thi... Equals: Default
- Align Center Y to: Label - Bad... Equals: Default
- Align Center X to: Label - Bad... Equals: Default
- Bottom Space to: Label - Thi... Equals: Default
- Trailing Space to: Label - Thi... Equals: Default



View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center Y Alignment - View - Label - Bad Thing
  - Center X Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing

Thing 2

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal	251
Vertical	251

Content Compression Resistance Priority

Horizontal	750
Vertical	750

Intrinsic Size Default (System Defined)

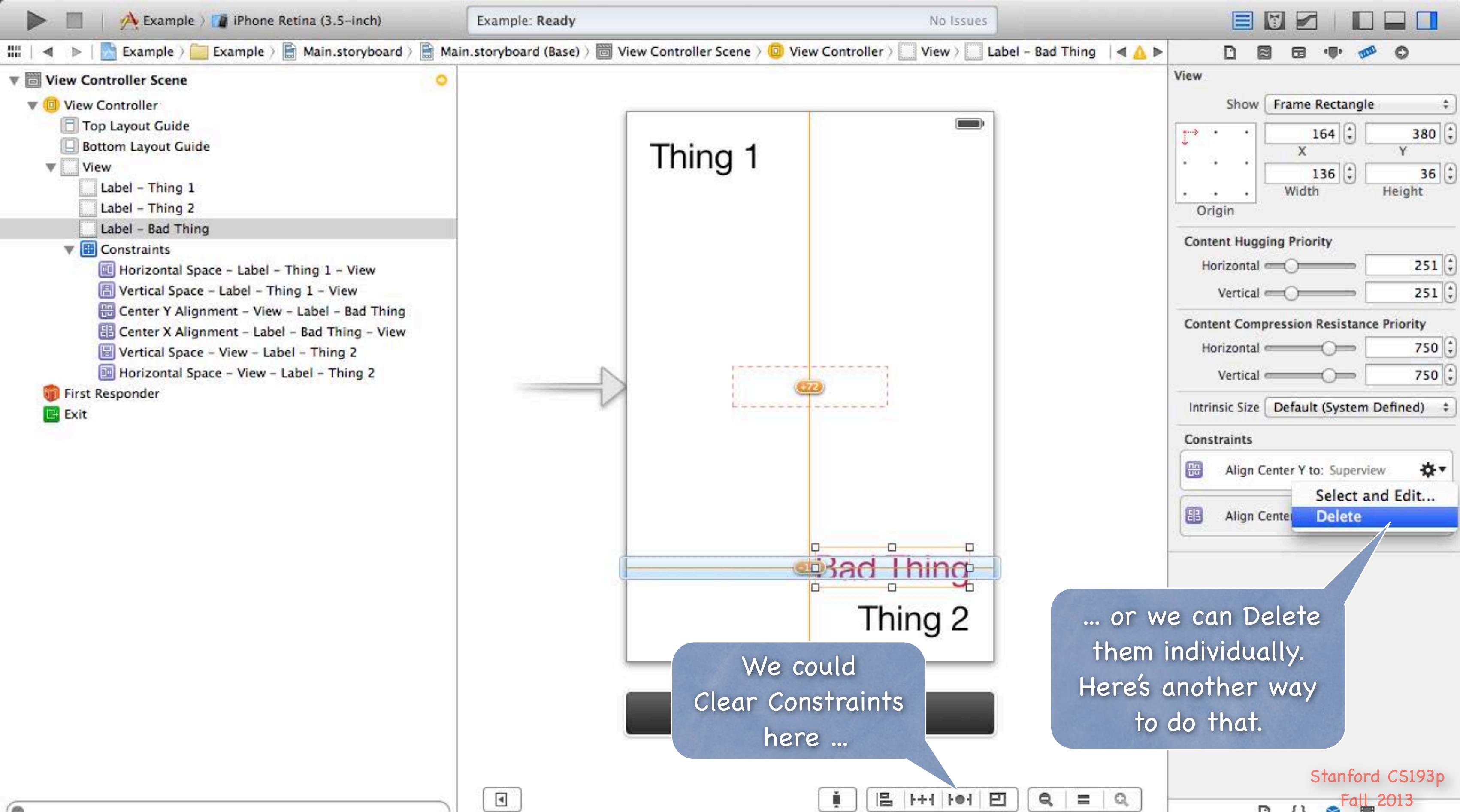
Constraints

- Align Center Y to: Superview
- Align Center X to: Superview

However, this will NOT change the constraints.

Constraints unchanged.

Stanford CS193p Fall 2013



We could  
Clear Constraints  
here ...

... or we can Delete them individually.  
Here's another way to do that.



View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Center X Alignment - Label - Bad Thing - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal	251
Vertical	251

Content Compression Resistance Priority

Horizontal	750
Vertical	750

Intrinsic Size Default (System Defined)

Constraints

Align Center X to: Superview

Select and Edit...

Delete

Stanford CS193p Fall 2013



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

**First Responder**

**Exit**

**View**

Show **Frame Rectangle**

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Intrinsic Size **Default (System Defined)**

**Constraints**

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.

**Thing 1**

Now we want to constraint Bad Thing to stay on top of Thing 2.

**Bad Thing**

Thing 2

Let's do that yet a third way (i.e. not with blue guidelines/Suggested and not with a menu at the bottom).

Stanford CS193p Fall 2013



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing**
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

**First Responder**

**Exit**

**View**

Show **Frame Rectangle**

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Intrinsic Size **Default (System Defined)**

**Constraints**

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.

If you want a view to be constrained by another view's size or position, just ctrl-drag between them.

Stanford CS193p  
Fall 2013

Example > iPhone Retina (3.5-inch) Example: Ready No Issues

Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing**
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder Exit

Thing 1

Bad Thing

Thing

Vertical Spacing

- Left
- Center X
- Right

Equal Widths  
Equal Heights

Hold Shift to select multiple then click away or hit return

**View**

Show **Frame Rectangle**

Origin	X	164	Y	380
		136		36
Width			Height	

Intrinsic Size Default (System Defined)

Constraints

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.

You will then be asked how you want them constrained.  
You can pick multiple ways.

Stanford CS193p Fall 2013

Example > iPhone Retina (3.5-inch) Example: Ready No Issues

Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder Exit

Thing 1

Bad Thing

Thing

✓ Vertical Spacing

Left Center X Right

Equal Widths Equal Heights

Hold Shift to select multiple then click away or hit return

View

Show Frame Rectangle

Origin	X	164	Y	380
		136		36
Width			Height	

Intrinsic Size Default (System Defined)

Constraints

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.

Here we'll keep the two views a fixed distance apart (constrained Vertical Spacing), and ...

Stanford CS193p Fall 2013

Example > iPhone Retina (3.5-inch) Example: Ready No Issues

Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
- View**
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints**
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing

Thing

Vertical Spacing  
Left  
Center X  
**Right**  
Equal Widths  
Equal Heights  
Hold Shift to select multiple then click away or hit return

Frame Rectangle

Origin	X	164	Y	380
		136		36
	Width		Height	

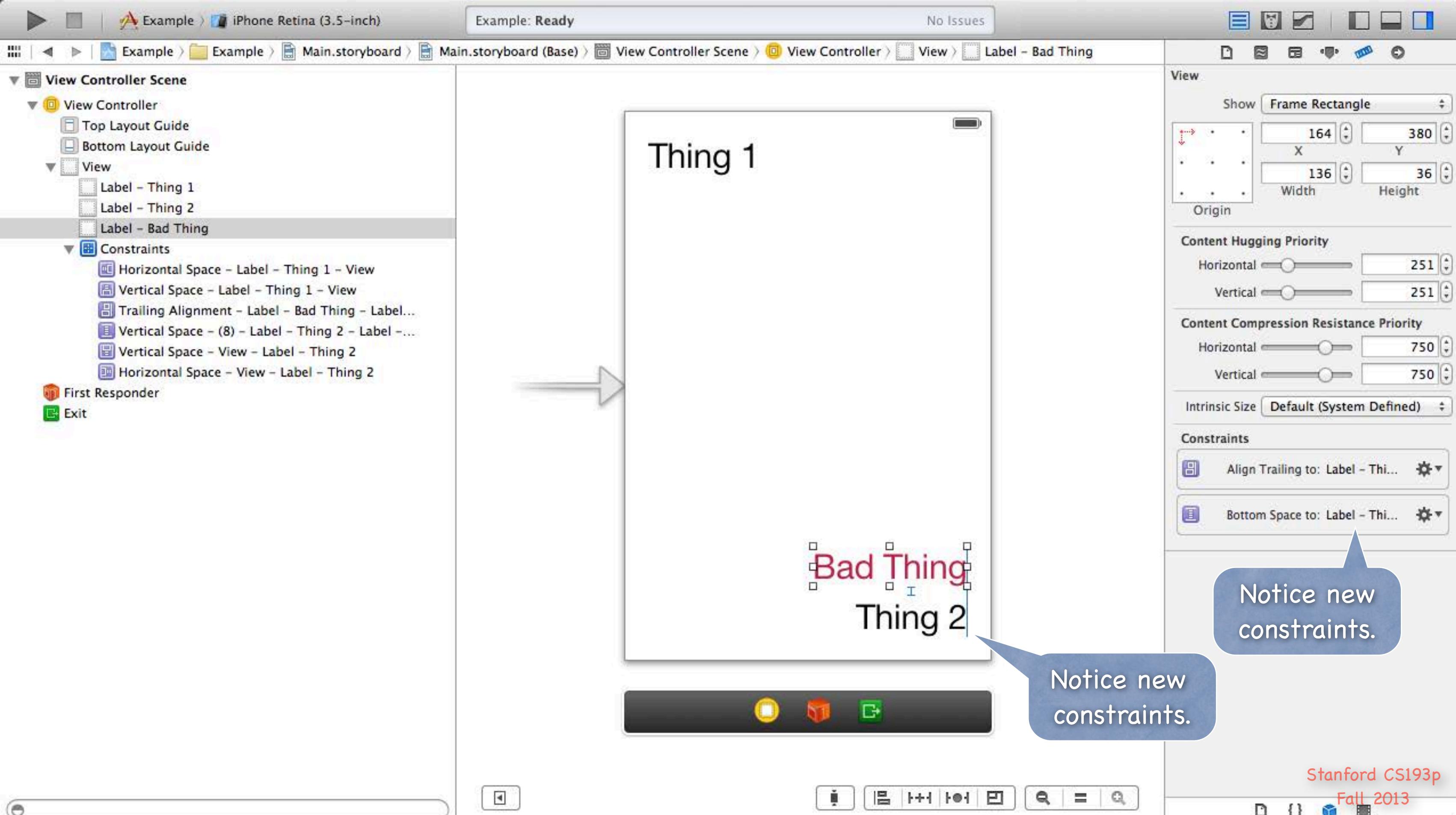
Intrinsic Size Default (System Defined)

Constraints

The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.

Keep their right edges aligned at all times.

Stanford CS193p Fall 2013



Stanford CS193p  
Fall 2013



Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller

**View Controller Scene**

- View Controller**
  - Top Layout Guide
  - Bottom Layout Guide
  - View**
    - Label - Thing 1
    - Label - Thing 2
    - Label - Bad Thing
  - Constraints**
    - Horizontal Space - Label - Thing 1 - View
    - Vertical Space - Label - Thing 1 - View
    - Trailing Alignment - Label - Bad Thing - Label...
    - Vertical Space - (8) - Label - Thing 2 - Label -...
    - Vertical Space - View - Label - Thing 2
    - Horizontal Space - View - Label - Thing 2
- First Responder
- Exit

The storyboard displays a single view controller scene. The view contains three labels: "Thing 1" at the top left, "Bad Thing" in the center, and "Thing 2" at the bottom right. A blue callout bubble points from the text "Let's try Landscape now ..." towards the "Top Bar" setting in the Simulated Metrics panel.

**Simulated Metrics**

- Size: Inferred
- Orientations: ✓ Inferred
- Status Bar: Portrait
- Top Bar: **Landscape**
- Bottom Bar: Inferred

**View Controller**

- Title: [empty]
- Initial Scene:  Is Initial View Controller
- Layout:
  - Adjust Scroll View Insets
  - Hide Bottom Bar on Push
  - Resize View From NIB
  - Use Full Screen (Deprecated)
- Extend Edges:
  - Under Top Bars
  - Under Bottom Bars
  - Under Opaque Bars
- Transition Style: Cover Vertical
- Presentation:
  - Defines Context
  - Provides Context
- Key Commands:

**Stanford CS193p Fall 2013**



Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller

## View Controller Scene

## View Controller

Top Layout Guide

Bottom Layout Guide

## View

Label - Thing 1

Label - Thing 2

Label - Bad Thing

## Constraints

Horizontal Space - Label - Thing 1 - View

Vertical Space - Label - Thing 1 - View

Trailing Alignment - Label - Bad Thing - Label...

Vertical Space - (8) - Label - Thing 2 - Label -...

Vertical Space - View - Label - Thing 2

Horizontal Space - View - Label - Thing 2

## First Responder

## Exit



## Simulated Metrics

Size Inferred

Orientation Landscape

Status Bar Inferred

Top Bar Inferred

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

 Defines Context Provides Context

## Key Commands

+	-
---	---



View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide

View

- Label - Thing 1
- Label - Thing 2
- Label - Bad Thing

Constraints

- Horizontal Space - Label - Thing 1 - View
- Vertical Space - Label - Thing 1 - View
- Trailing Alignment - Label - Bad Thing - Label...
- Vertical Space - (8) - Label - Thing 2 - Label -...
- Vertical Space - View - Label - Thing 2
- Horizontal Space - View - Label - Thing 2

First Responder

Exit

Main.storyboard (Base) > View Controller Scene > View Controller

Simulated Metrics

- Inferred
- Portrait
- Landscape

Orientation

- Status Bar Inferred
- Top Bar Inferred
- Bottom Bar Inferred

View Controller

- Title
- Initial Scene  Is Initial View Controller
- Layout  Adjust Scroll View Insets
- Hide Bottom Bar on Push
- Resize View From NIB
- Use Full Screen (Deprecated)
- Extend Edges  Under Top Bars
- Under Bottom Bars
- Under Opaque Bars

Transition Style Cover Vertical

Presentation  Defines Context

Provides Context

Key Commands

+

-

Thing 1

Bad Thing

Thing 2

... and back.

Stanford CS193p  
Fall 2013



Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller

## View Controller Scene

## View Controller

Top Layout Guide

Bottom Layout Guide

## View

Label - Thing 1

Label - Thing 2

Label - Bad Thing

## Constraints

Horizontal Space - Label - Thing 1 - View

Vertical Space - Label - Thing 1 - View

Trailing Alignment - Label - Bad Thing - Label...

Vertical Space - (8) - Label - Thing 2 - Label -...

Vertical Space - View - Label - Thing 2

Horizontal Space - View - Label - Thing 2

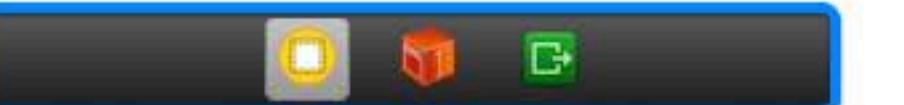
## First Responder

## Exit

Thing 1

Bad Thing

Thing 2



## Simulated Metrics

Size Inferred

Orientation Inferred

Status Bar Inferred

Top Bar Inferred

Bottom Bar Inferred

## View Controller

Title

Initial Scene  Is Initial View ControllerLayout  Adjust Scroll View Insets Hide Bottom Bar on Push Resize View From NIB Use Full Screen (Deprecated)Extend Edges  Under Top Bars Under Bottom Bars Under Opaque Bars

Transition Style Cover Vertical

 Defines Context Provides Context

## Key Commands





Example > Example > Main.storyboard > Main.storyboard (Base) > View Controller Scene > View Controller > View > Label - Bad Thing

View Controller Scene

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Trailing Alignment - Label - Bad Thing - Label...
  - Vertical Space - (8) - Label - Thing 2 - Label -...
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing

Thing 2

In addition to ctrl-dragging between two views, you can ctrl-drag from a view to its superview ...

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal	251
Vertical	251

Content Compression Resistance Priority

Horizontal	750
Vertical	750

Intrinsic Size Default (System Defined)

Constraints

- Align Trailing to: Label - Thi...
- Bottom Space to: Label - Thi...

View Controller Scene

View Controller

- Top Layout Guide
- Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Trailing Alignment - Label - Bad Thing - Label...
  - Vertical Space - (8) - Label - Thing 2 - Label -...
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing

Thing 2

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal	251
Vertical	251

Content Compression Resistance Priority

Horizontal	750
Vertical	750

Intrinsic Size Default (System Defined)

Constraints

- Align Trailing to: Label - Thi...
- Bottom Space to: Label - Thi...

Stanford CS193p Fall 2013

Leading Space to Container  
Top Space to Top Layout Guide  
Center Horizontally In Container  
Center Vertically In Container

Hold Shift to select multiple then click away or hit return

Example &gt; Example &gt; Main.storyboard &gt; Main.storyboard (Base) &gt; View Controller Scene &gt; View Controller &gt; View &gt; Label - Bad Thing

## View Controller Scene

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Trailing Alignment - Label - Bad Thing - Label...
  - Vertical Space - (8) - Label - Thing 2 - Label -...
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing  
Label - Bad Thing  
Thing 2

Or even a view to itself  
(if you want to constrain its width or height, for example).

View Controller Scene

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Trailing Alignment - Label - Bad Thing - Label...
  - Vertical Space - (8) - Label - Thing 2 - Label -...
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

Bad Thing

Width

Trailing Space to Container

Hold Shift to select multiple then click away or hit return

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal	251
Vertical	251

Content Compression Resistance Priority

Horizontal	750
Vertical	750

Intrinsic Size Default (System Defined)

Constraints

- Align Trailing to: Label - Thi...
- Bottom Space to: Label - Thi...

Stanford CS193p Fall 2013



View Controller Scene

- View Controller
  - Top Layout Guide
  - Bottom Layout Guide
- View
  - Label - Thing 1
  - Label - Thing 2
  - Label - Bad Thing
- Constraints
  - Horizontal Space - Label - Thing 1 - View
  - Vertical Space - Label - Thing 1 - View
  - Trailing Alignment - Label - Bad Thing - Label...
  - Vertical Space - (8) - Label - Thing 2 - Label -...
  - Vertical Space - View - Label - Thing 2
  - Horizontal Space - View - Label - Thing 2

First Responder

Exit

Thing 1

This is all just the tip of the iceberg for Autolayout, but hopefully it will get you started!

And we've definitely covered everything you should need for your homework.

Bad Thing

Thing 2

View

Show Frame Rectangle

Origin	X: 164	Y: 380
	Width: 136	Height: 36

Content Hugging Priority

Horizontal: 251

Vertical: 251

Content Compression Resistance Priority

Horizontal: 750

Vertical: 750

Intrinsic Size: Default (System Defined)

Constraints

- Align Trailing to: Label - Thi...
- Bottom Space to: Label - Thi...

Stanford CS193p Fall 2013