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.

Demo

- More Dropit
  - Less tippy!
  - Guiding the fall of drops.
  - If time permits, gridding using collision delegate (if not, will post code).
- What to look for today …
  - `UIDynamicItemBehavior` (basically physics configuration)
  - `UIAttachmentBehavior`
  - Adding an `action` block to a behavior
  - Observing the behavior of items (elapsed animation time, linear velocity, etc.)
  - `UICollisionBehavior`'s `collisionDelegate`

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.)

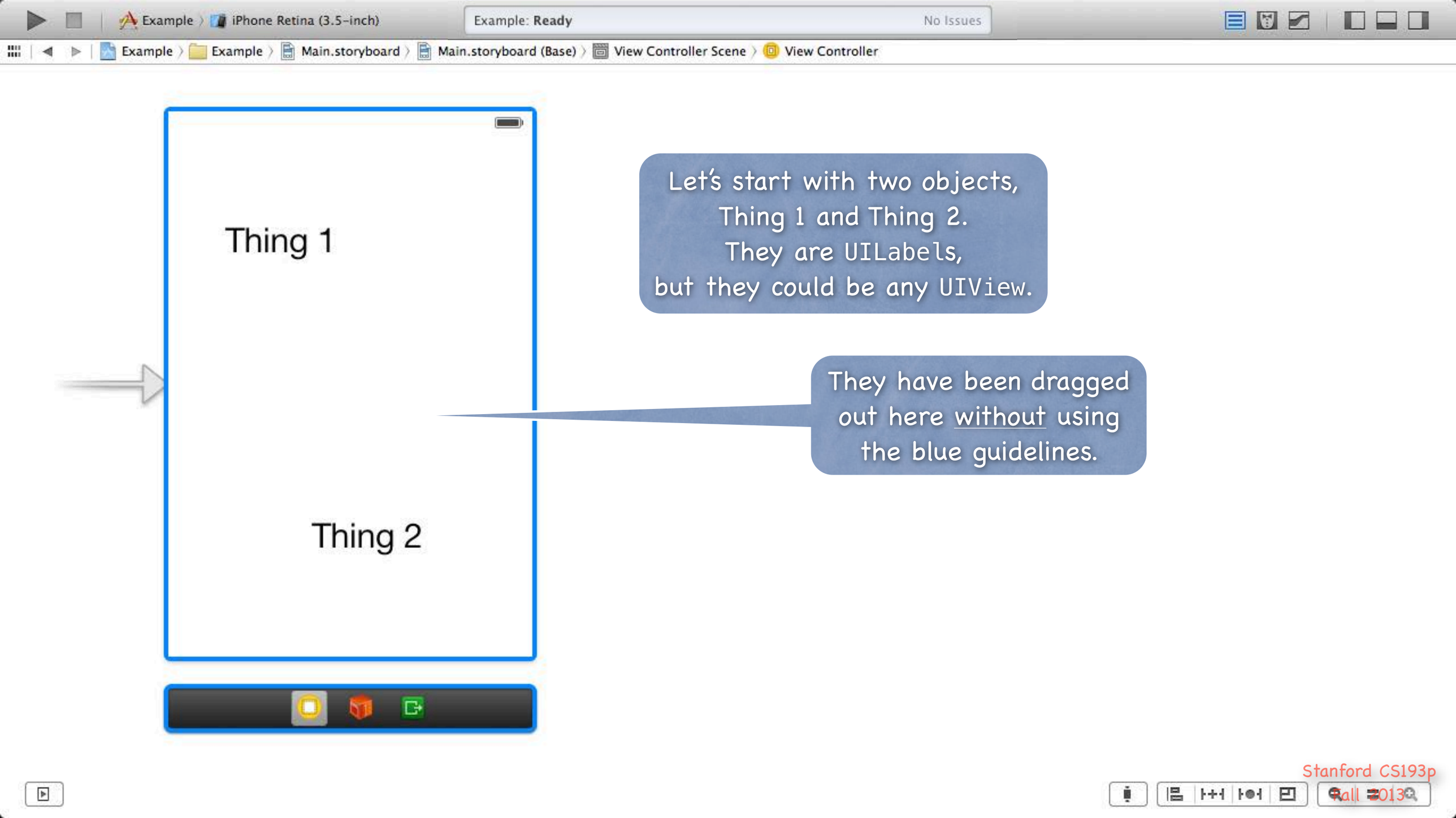
  We need these rules to put the views in their place no matter what bounds are available.

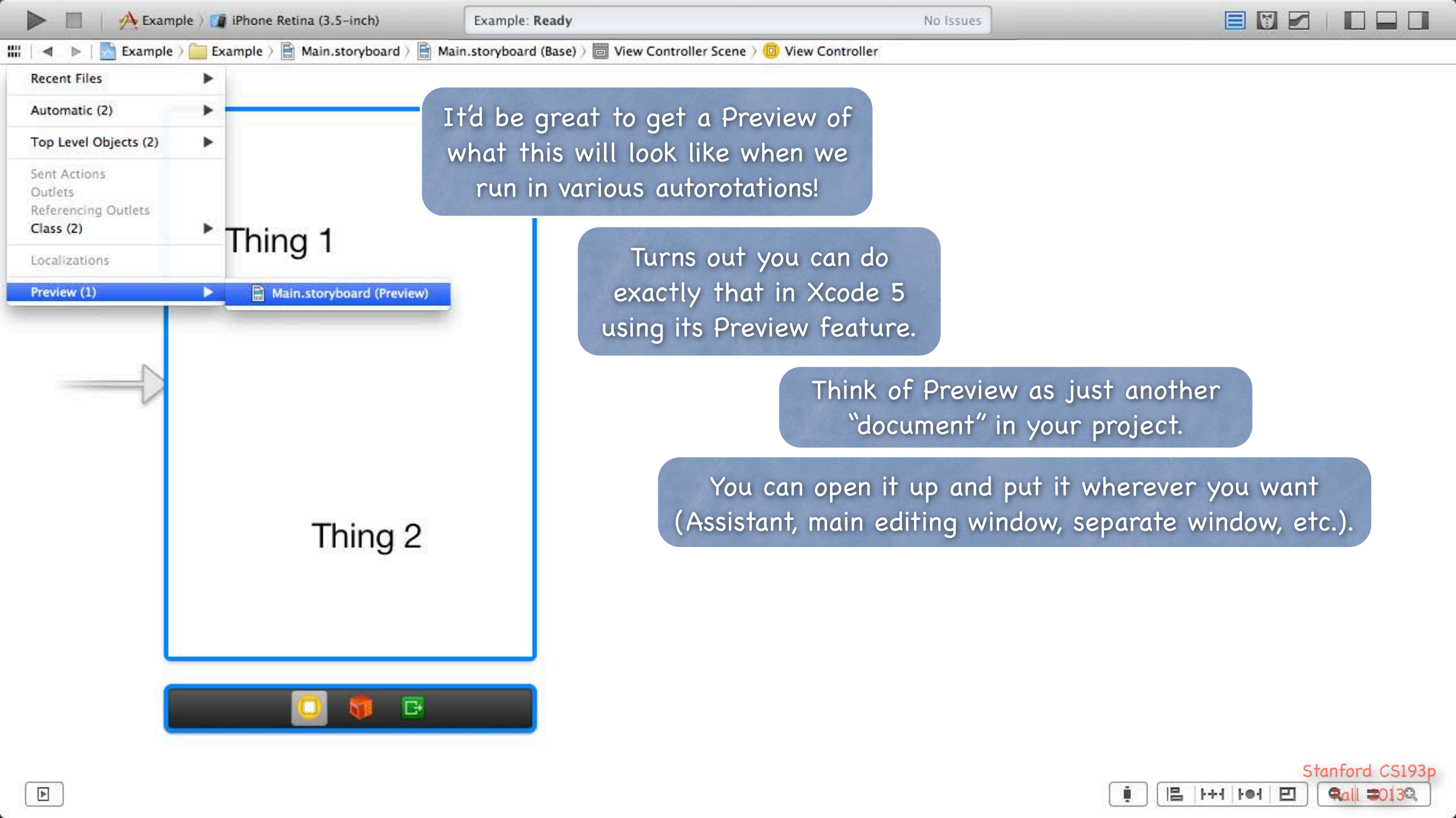
  We call these rules "constraints".

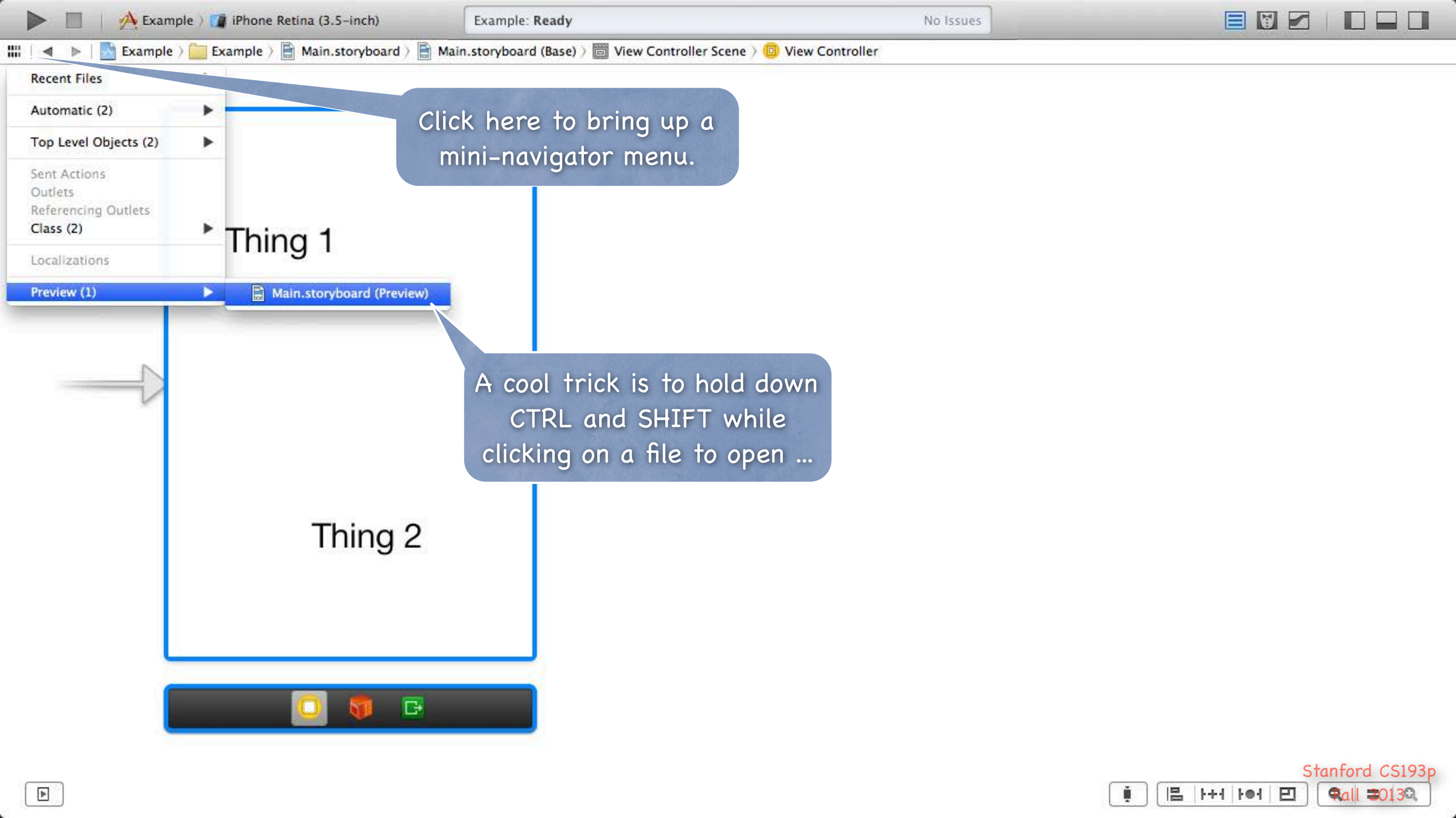
  There is a very powerful API (`NSLayoutConstraint`) for doing this, but …

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

  So this is all best shown with some screen shots …


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
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.


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Recent Files
Automatic (2)
Top Level Objects (2)
Sent Actions
Outlets
Referencing Outlets
Class (2)
Localizations
Preview (1)
Main.storyboard (Preview)
Thing 1
Thing 2
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.).


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Recent Files
Automatic (2)
Top Level Objects (2)
Sent Actions
Outlets
Referencing Outlets
Class (2)
Localizations
Preview (1)
Main.storyboard (Preview)
Click here to bring up a mini-navigator menu.
Thing 1
A cool trick is to hold down CTRL and SHIFT while clicking on a file to open ...
Thing 2
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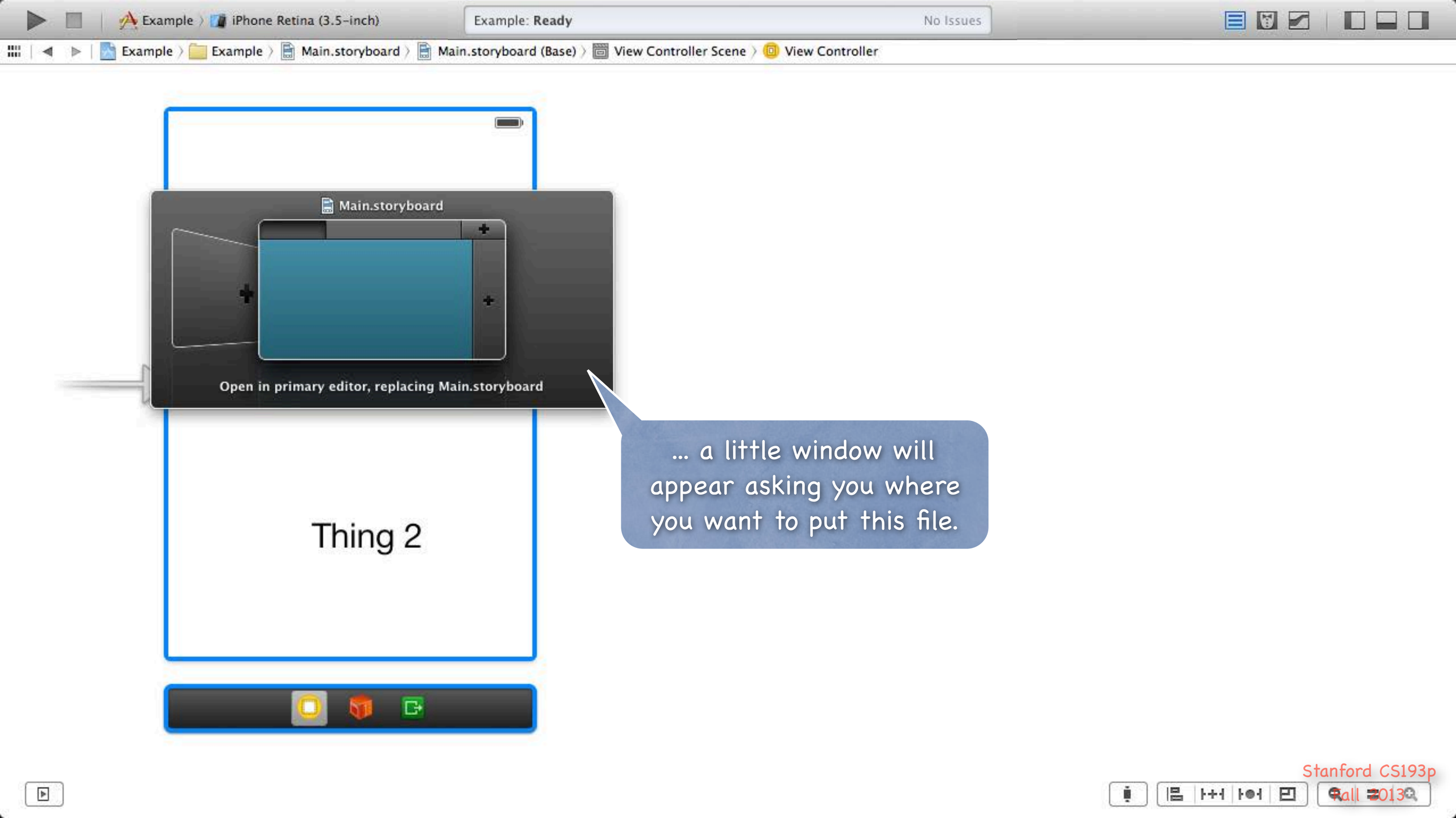
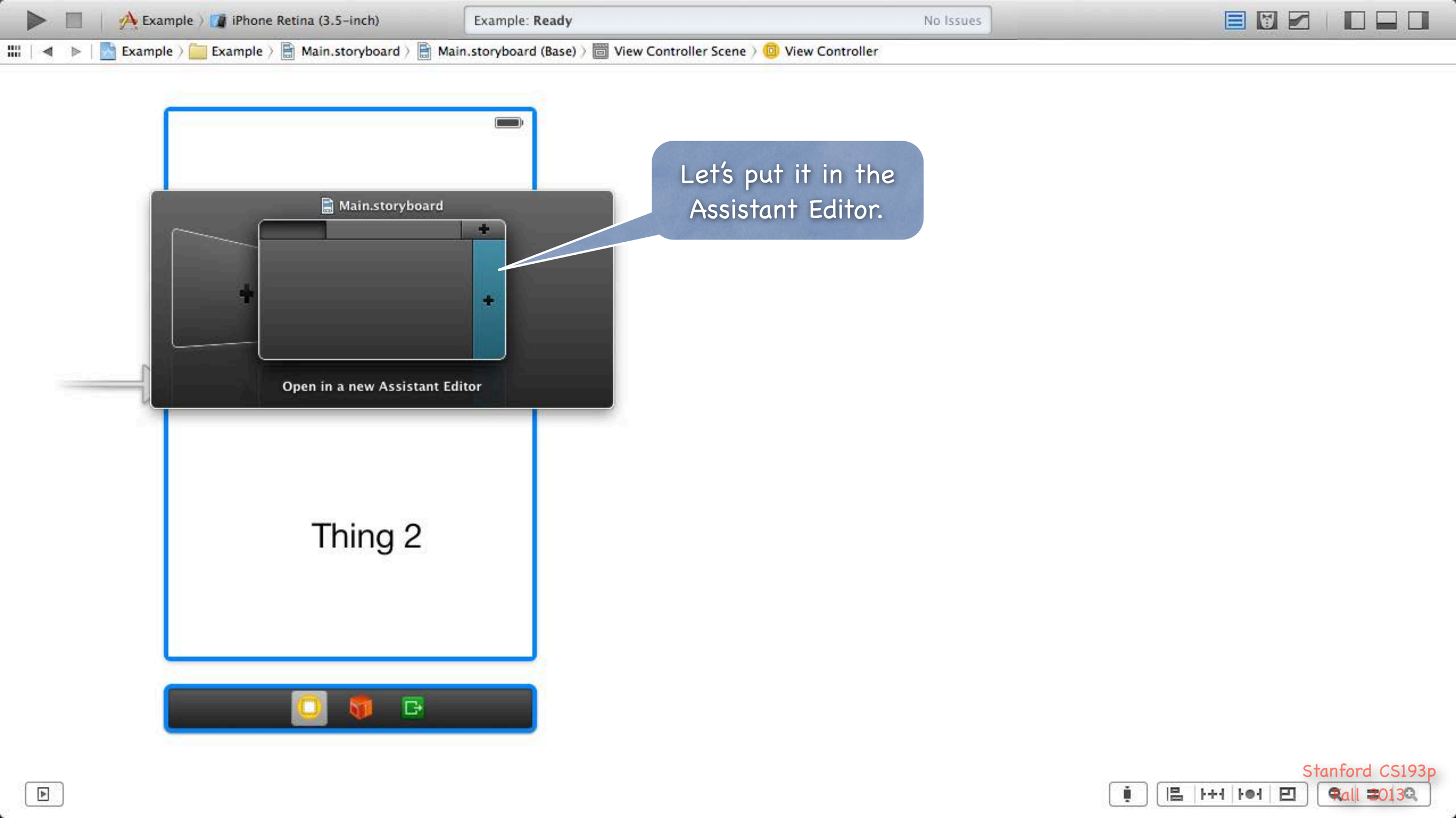

Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Main.storyboard
Open in primary editor, replacing Main.storyboard
Thing 2
... a little window will appear asking you where you want to put this file.


Example 〉 iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example 〉 Example 〉 Main.storyboard 〉 Main.storyboard (Base) 〉 View Controller Scene 〉 View Controller
Main.storyboard
Open in a new Assistant Editor
Let's put it in the Assistant Editor.
Thing 2
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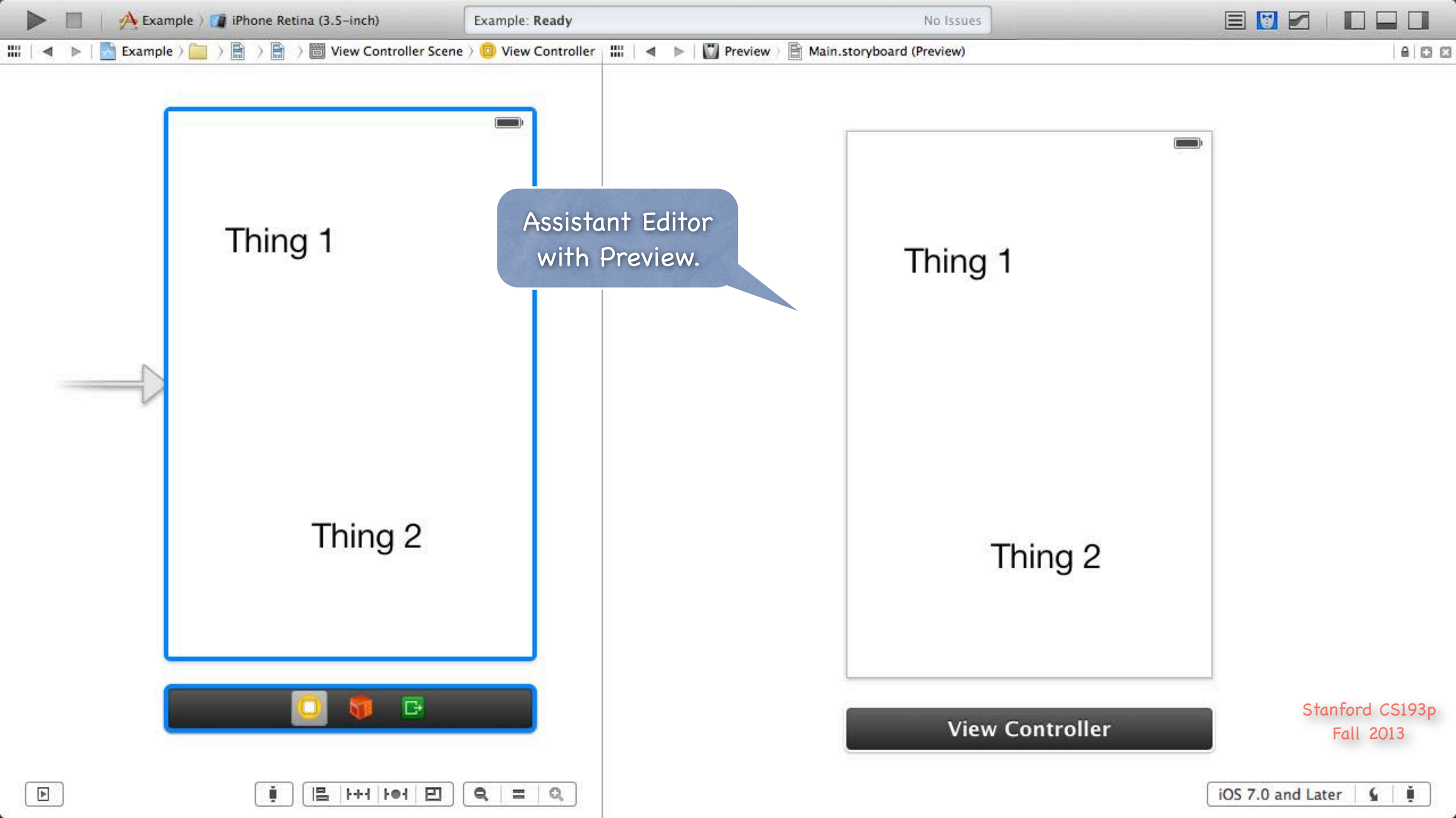
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Assistant Editor with Preview.
Thing 1
Thing 2
View Controller
iOS 7.0 and Later
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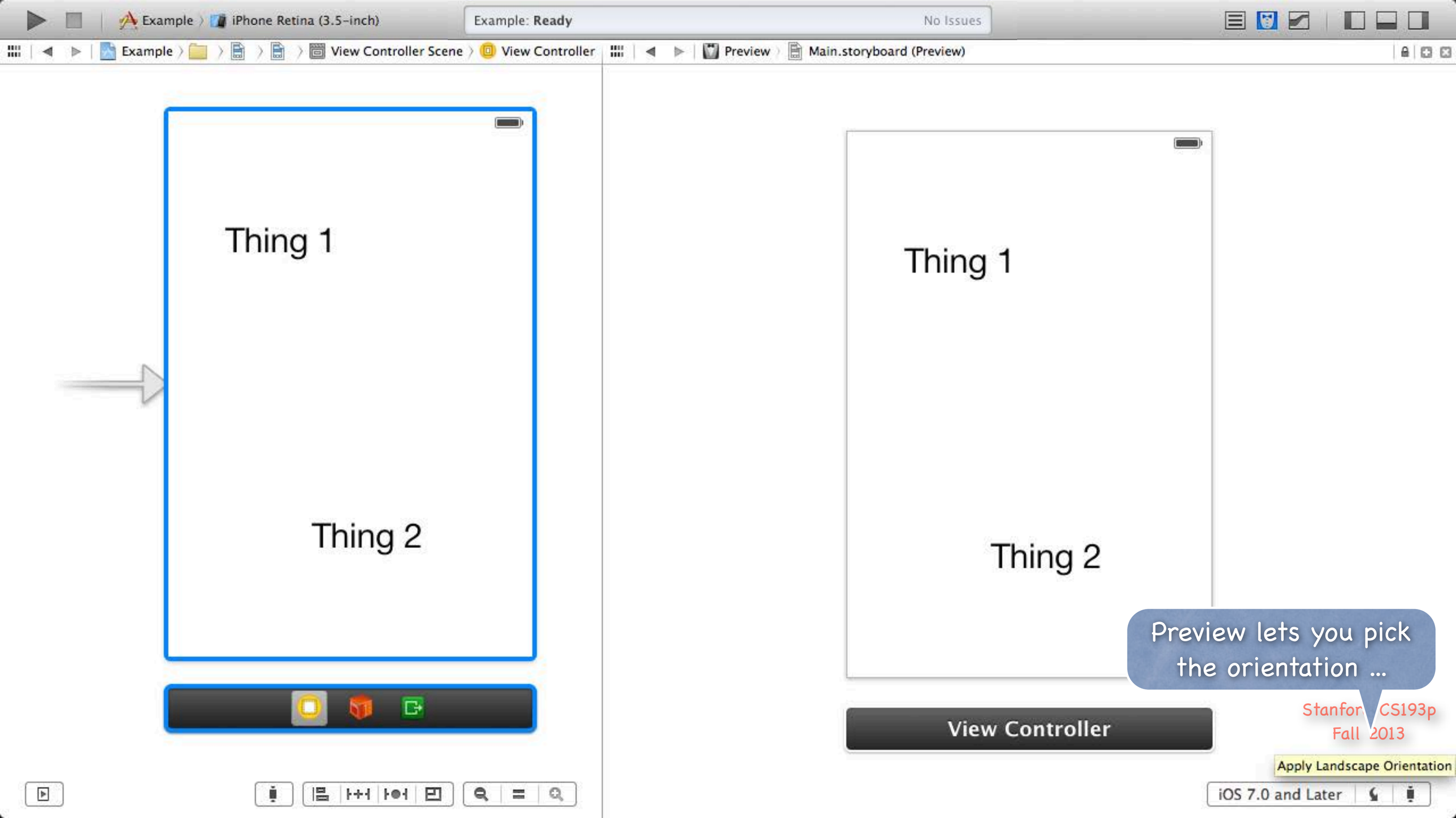
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Thing 1
Thing 2
View Controller
Preview lets you pick the orientation ...
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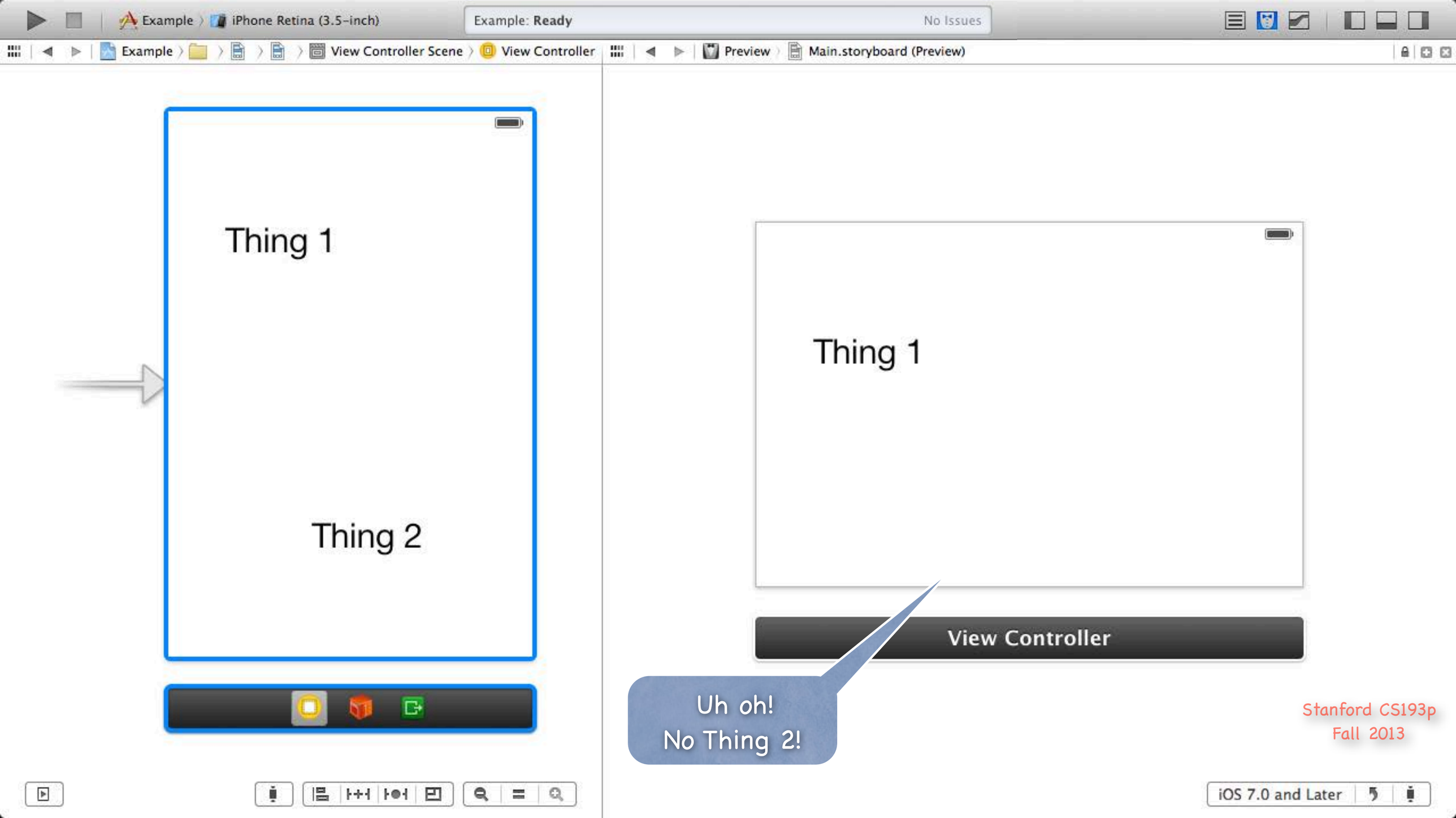
Apply Landscape Orientation
iOS 7.0 and Later


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Thing 1
View Controller
Uh oh!
No Thing 2!
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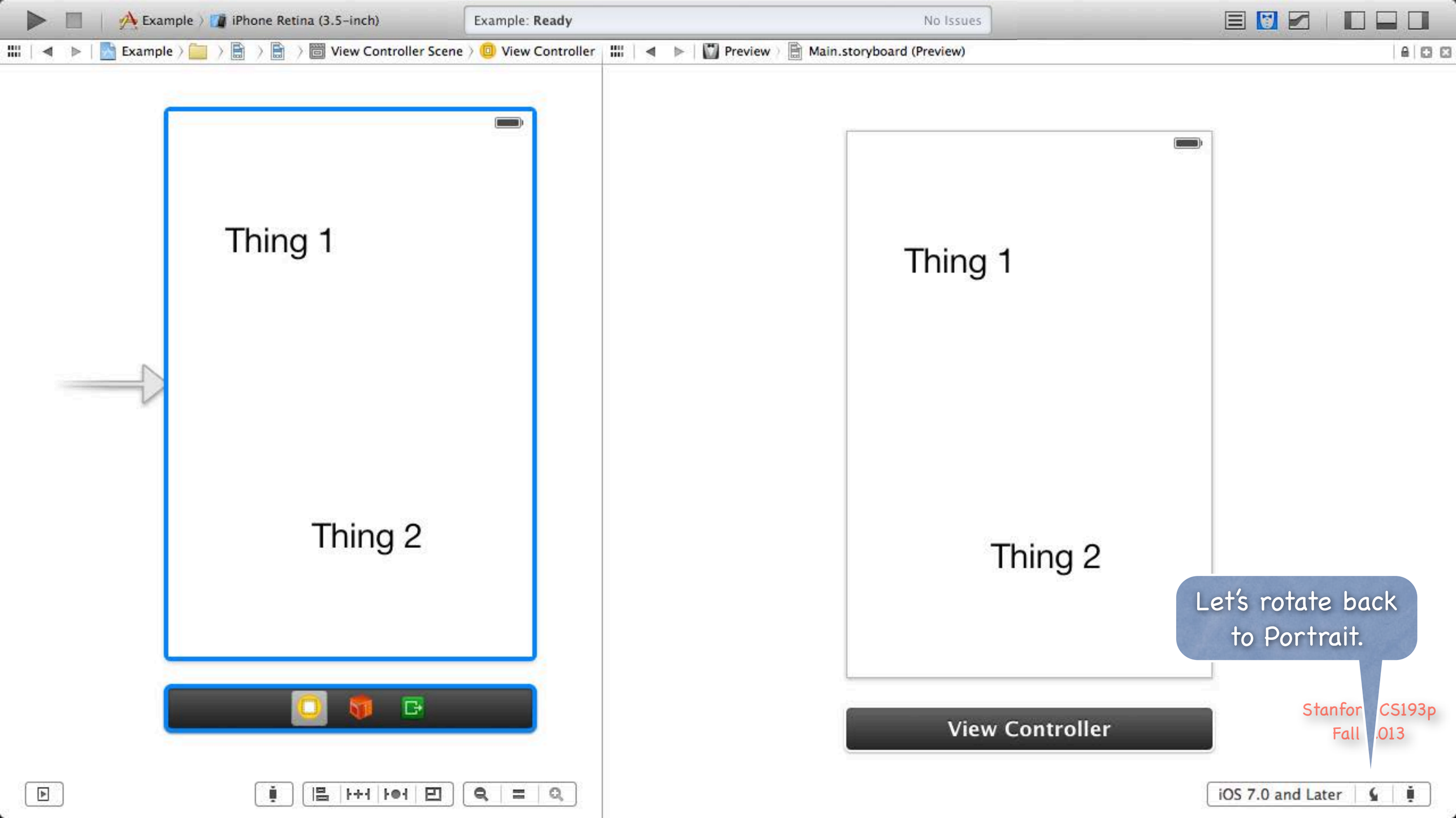
iOS 7.0 and Later


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Thing 1
Thing 2
View Controller
Let's rotate back to Portrait.
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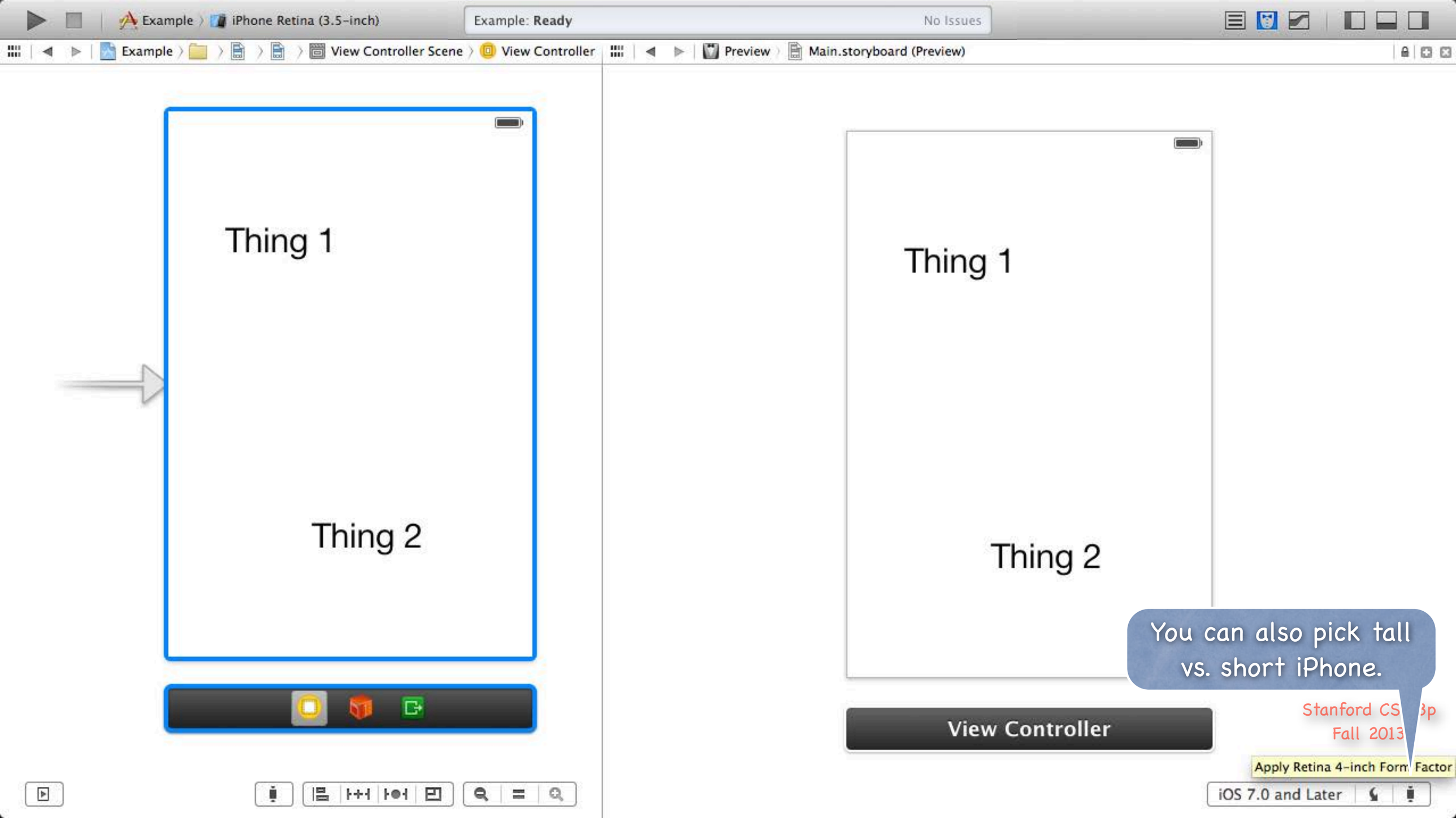
iOS 7.0 and Later


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Thing 1
Thing 2
View Controller
You can also pick tall vs. short iPhone.
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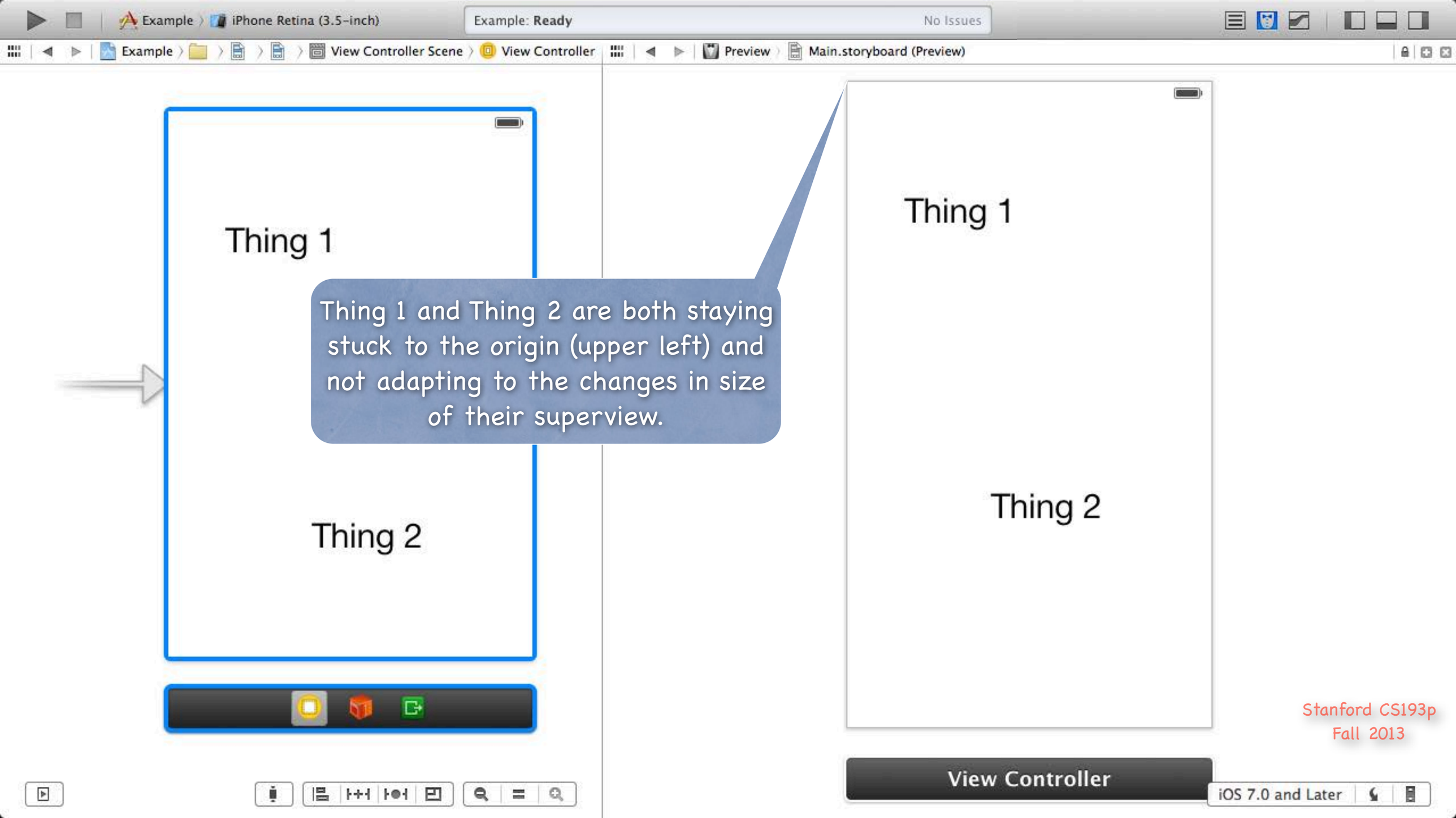
Apply Retina 4-inch Form Factor
iOS 7.0 and Later


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
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 1
Thing 2
View Controller
iOS 7.0 and Later
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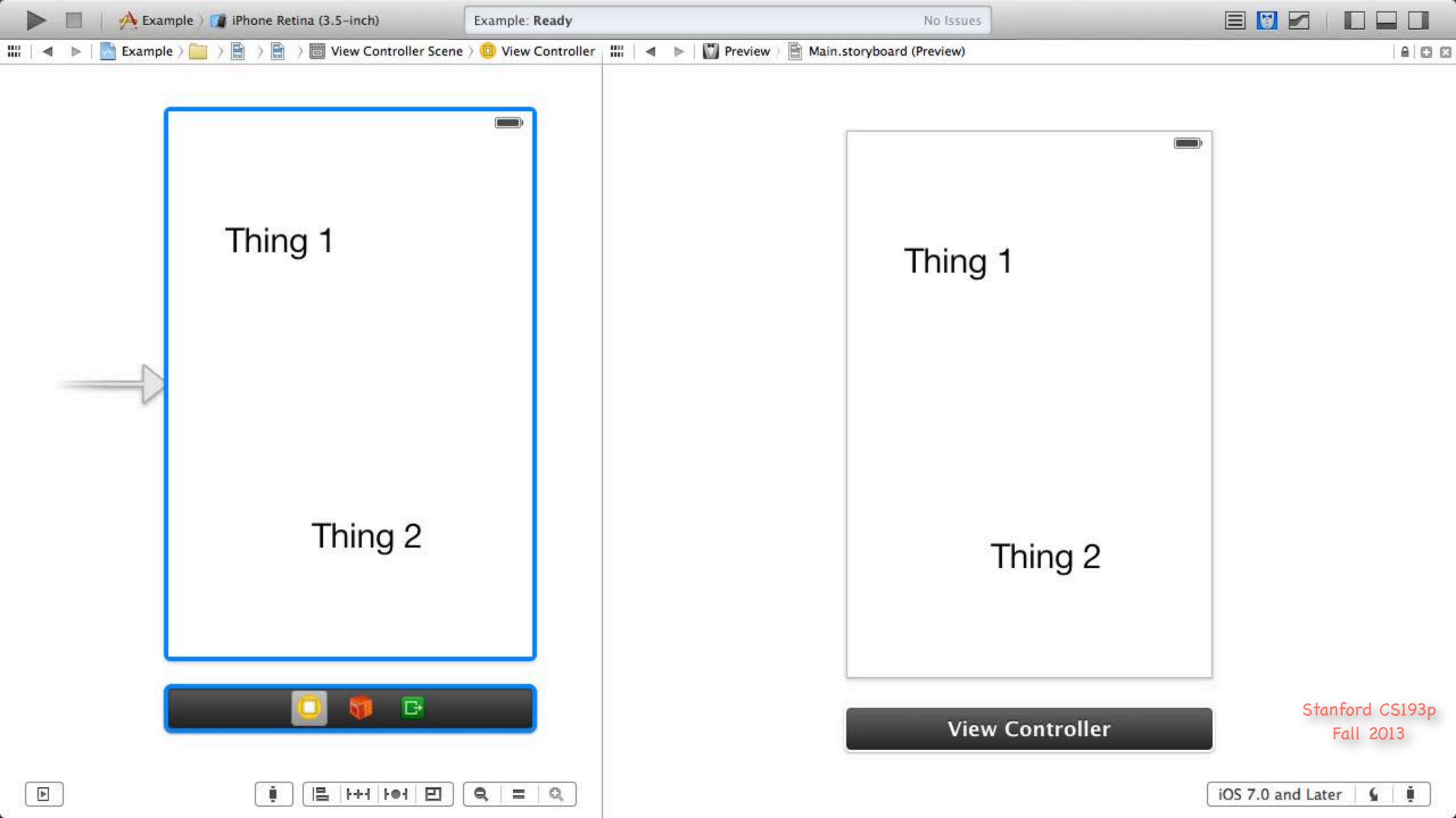
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
View Controller Scene
View Controller
Preview
Main.storyboard (Preview)
Thing 1
Thing 2
Thing 1
Thing 2
View Controller
iOS 7.0 and Later
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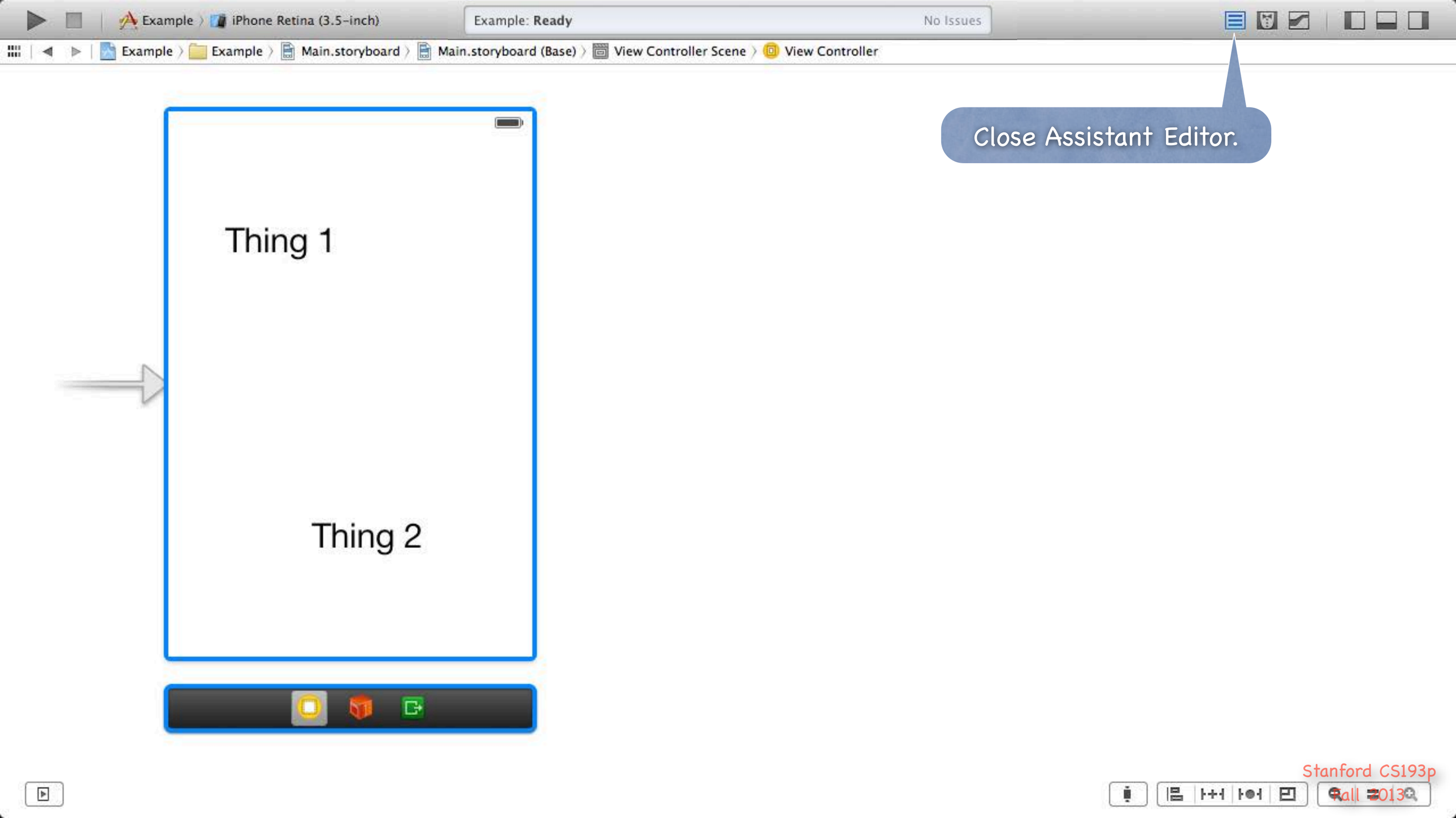
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Close Assistant Editor.
Thing 1
Thing 2
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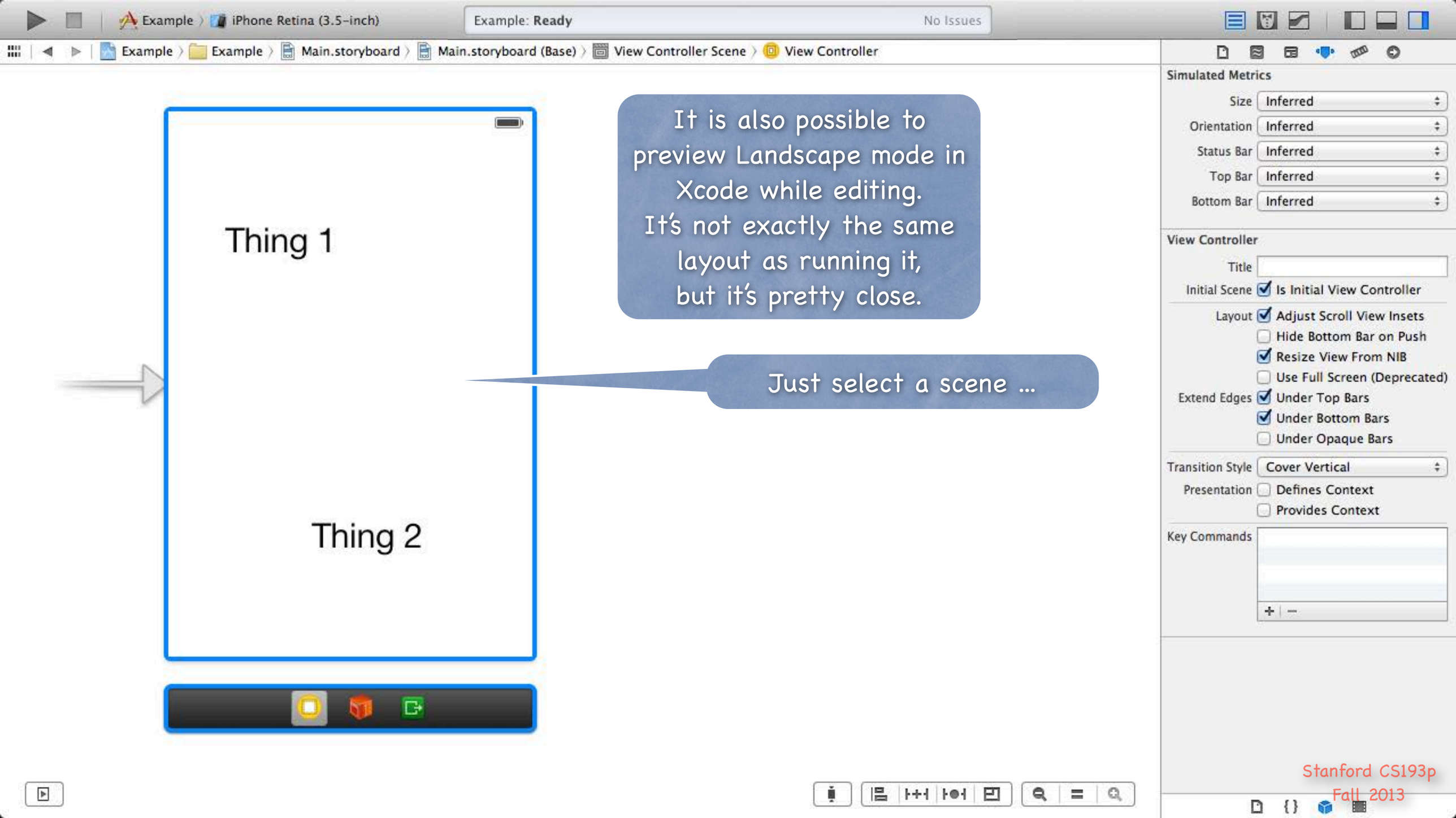
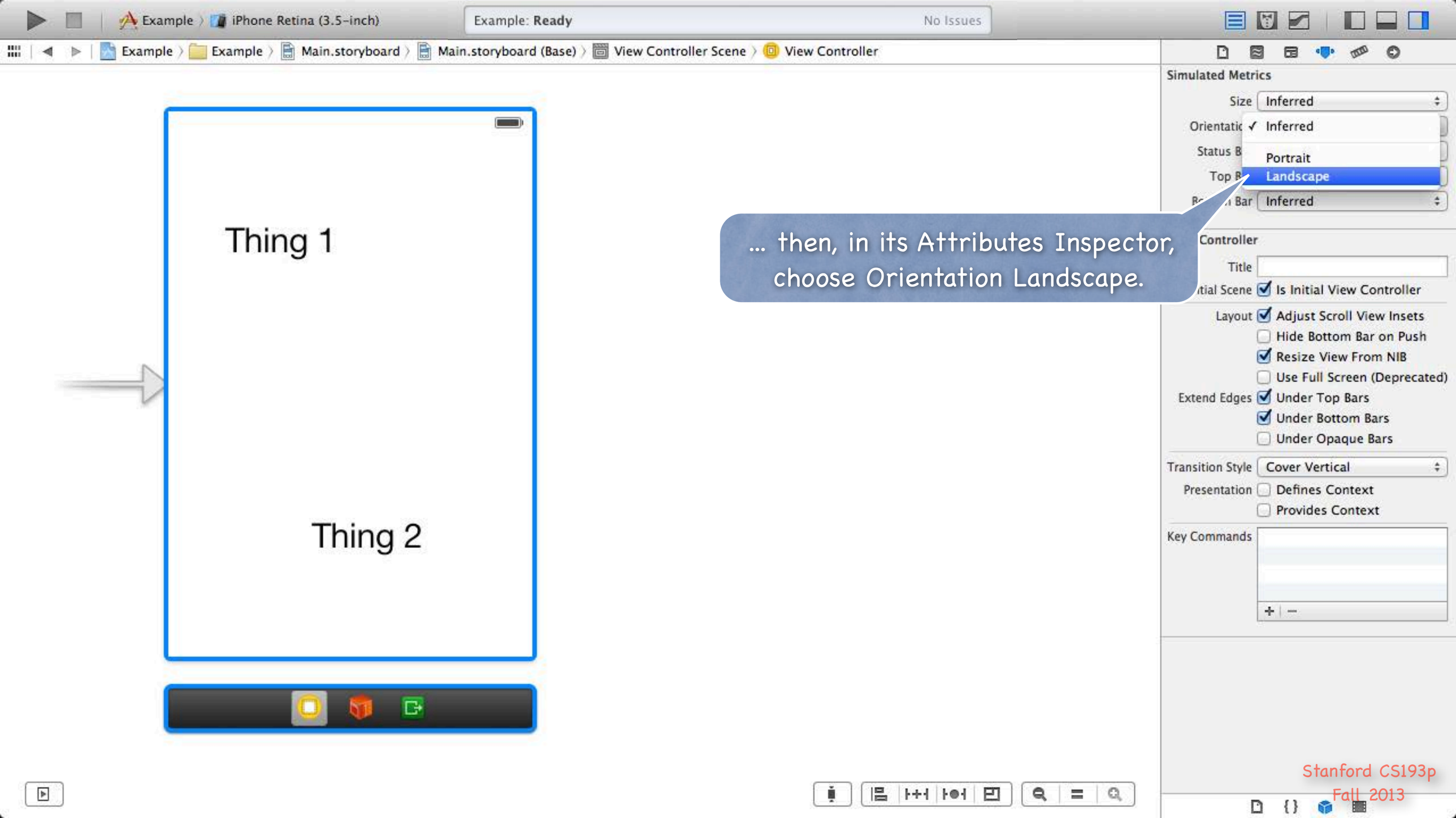

Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
It is also possible to preview Landscape mode in Xcode while editing. It's not exactly the same layout as running it, but 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
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


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Thing 2
Simulated Metrics
Size
Inferred
Orientation
Inferred
Portrait
Landscape
Status Bar
Inferred
Controller
Title
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
... then, in its Attributes Inspector, choose Orientation Landscape.
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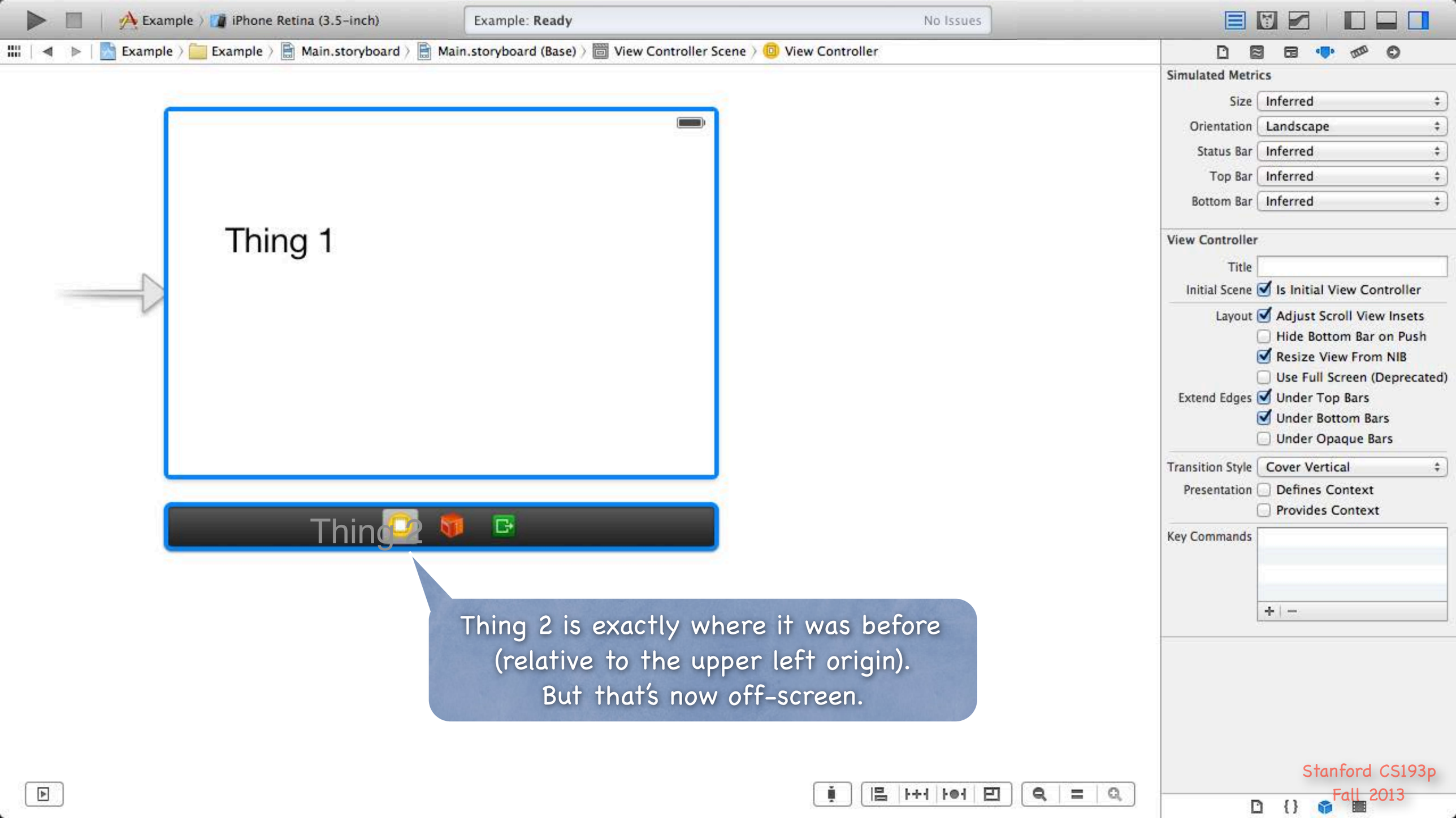
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
Thing 2 is exactly where it was before
(relative to the upper left origin).
But that's now off-screen.
Simulated Metrics
Size 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
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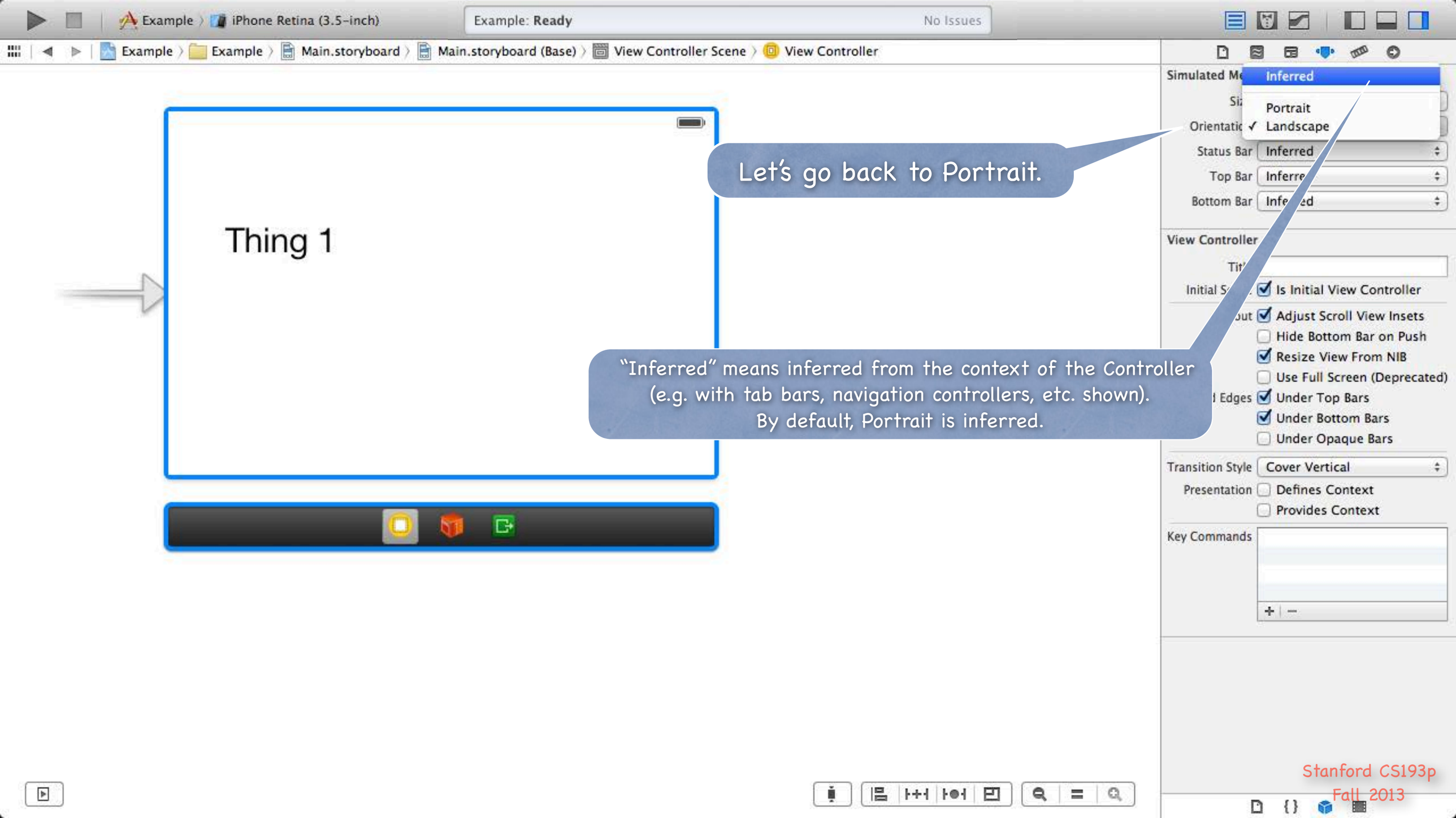
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Let's go back to Portrait.
"Inferred" means inferred from the context of the Controller
(e.g. with tab bars, navigation controllers, etc. shown).
By default, Portrait is inferred.
Simulated Me
Inferred
Portrait
Landscape
Orientatic
Status Bar
Inferred
Top Bar
Bottom Bar
View Controller
Initial S
Is Initial View Controller
Adjust Scroll View Insets
Hide Bottom Bar on Push
Resize View From NIB
Use Full Screen (Deprecated)
Edges
Under Top Bars
Under Bottom Bars
Under Opaque Bars
Transition Style
Cover Vertical
Presentation
Defines Context
Provides Context
Key Commands
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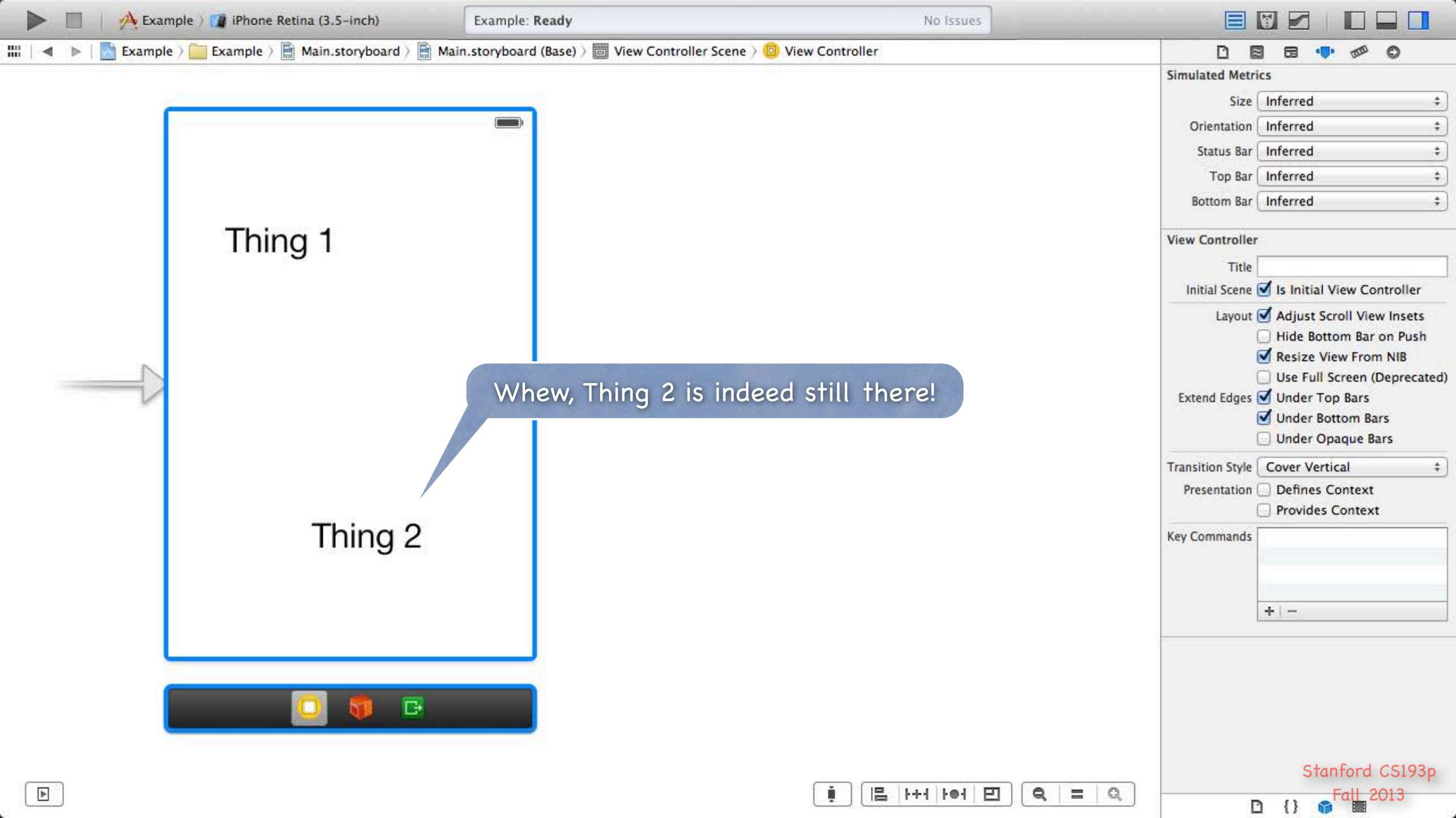
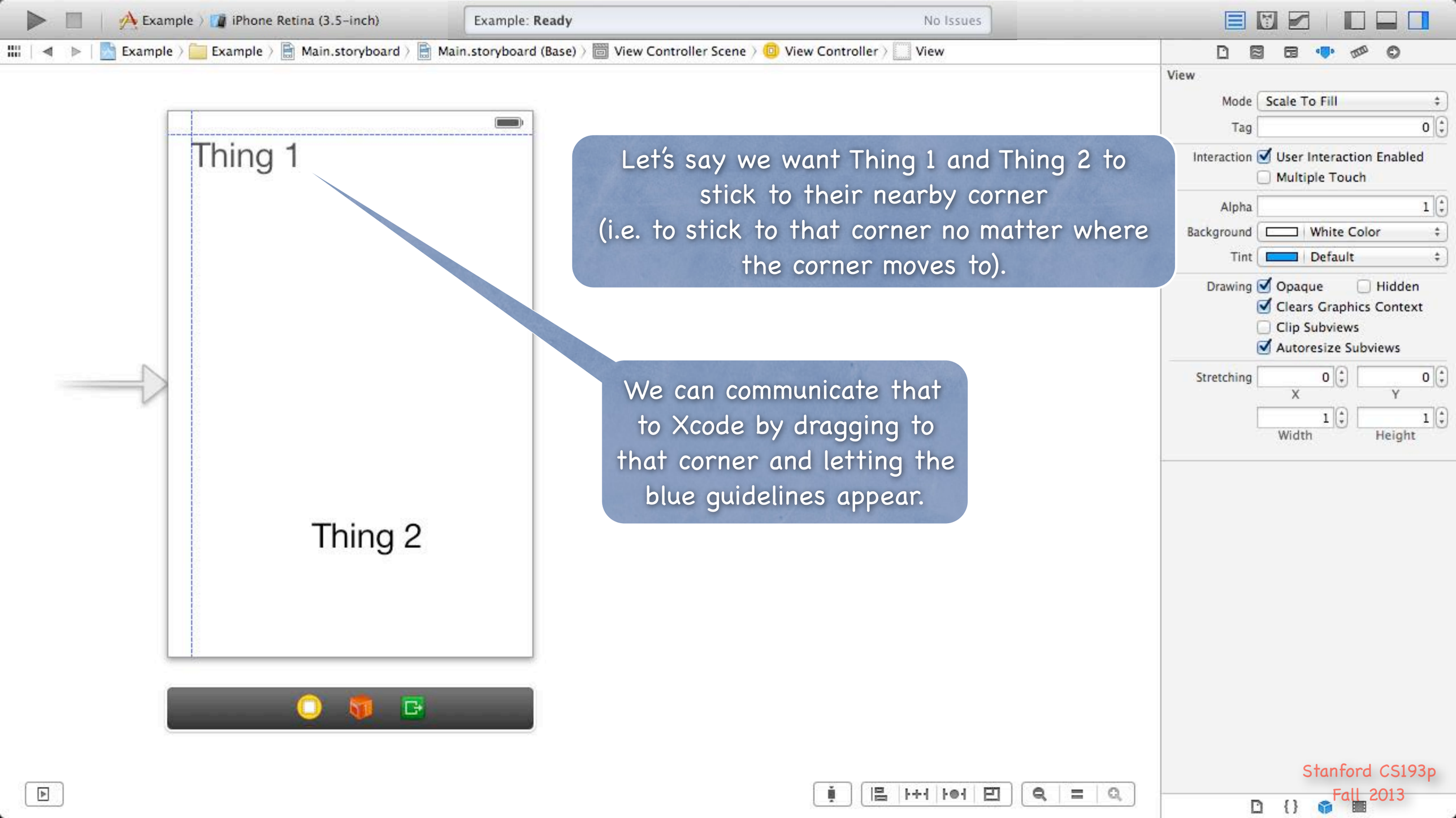

Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Thing 2
Whew, Thing 2 is indeed still there!
Simulated Metrics
Size
Inferred
Orientation
Inferred
Status Bar
Inferred
Top Bar
Inferred
Bottom 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


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View
Thing 1
Thing 2
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
X
0
Y
1
Width
1
Height
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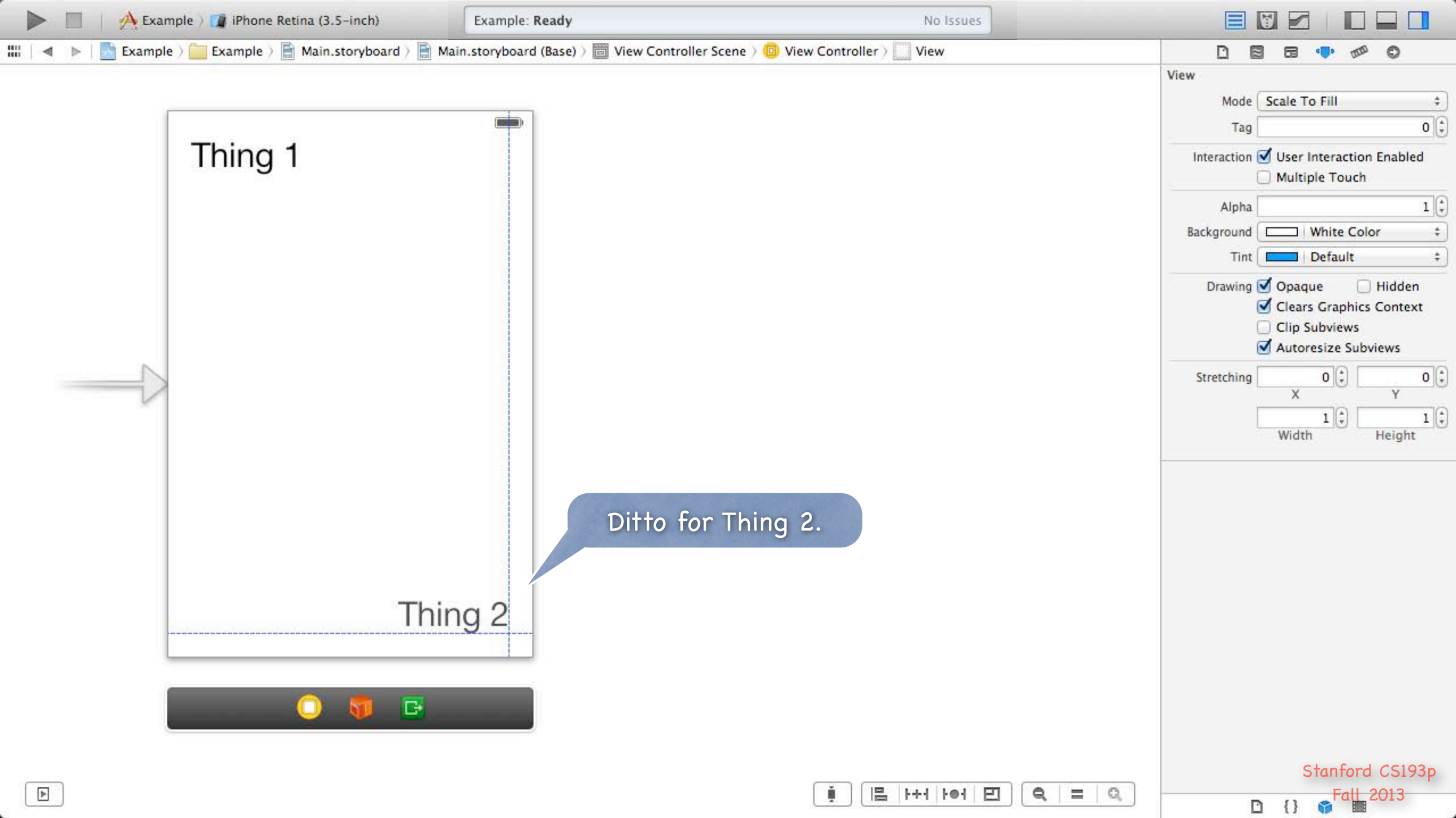
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View
Thing 1
Thing 2
Ditto for Thing 2.
View
Mode
Scale To Fill
Tag
0
Interaction
User Interaction Enabled
Multiple Touch
Alpha
1
Background
White Color
Tint
Default
Drawing
Opaque
Hidden
Clears Graphics Context
Clip Subviews
Autoresize Subviews
Stretching
0
0
X
Y
1
1
Width
Height
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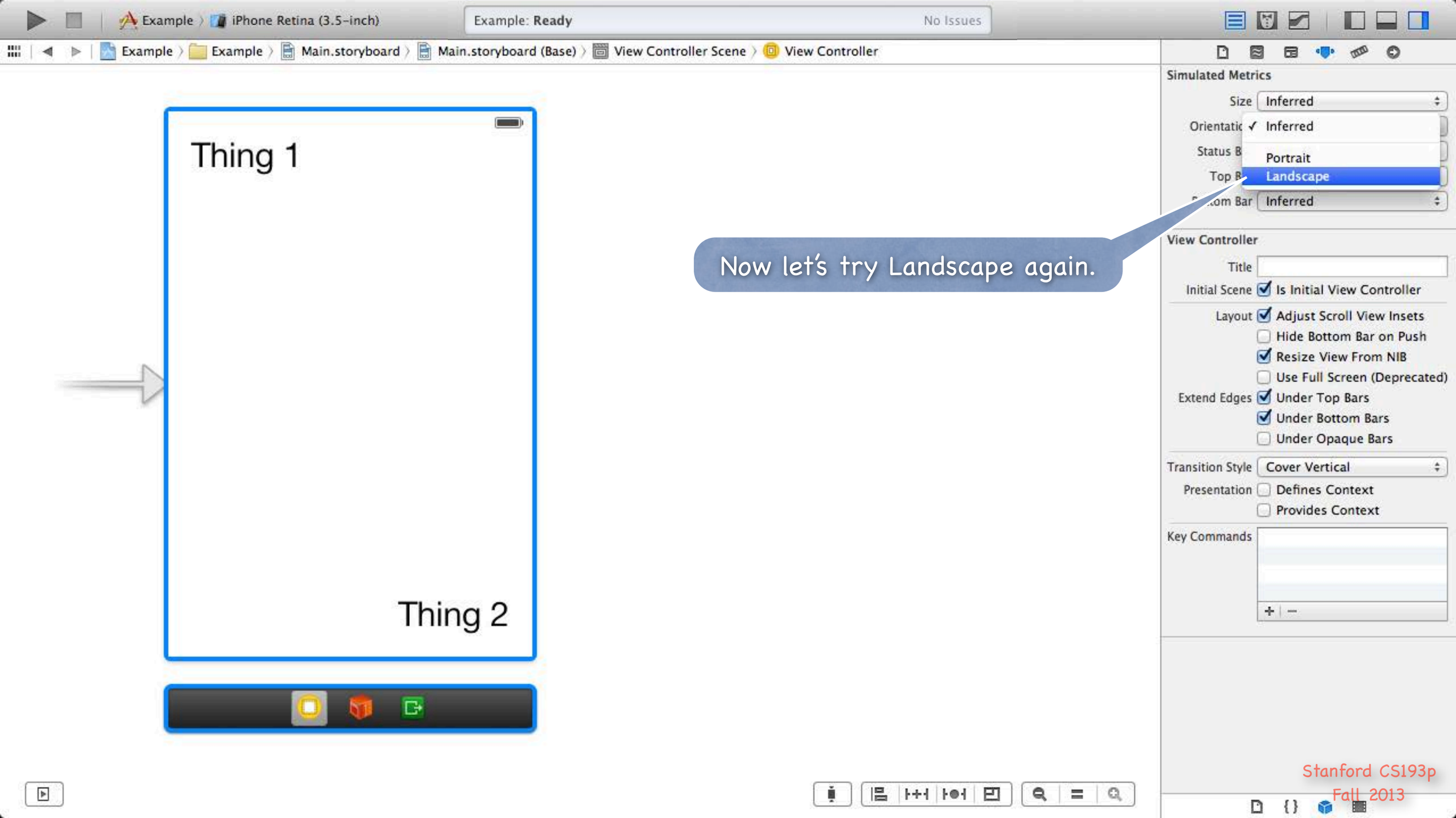
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
Now let's try Landscape again.
Simulated Metrics
Size
Inferred
Orientation
Inferred
Portrait
Landscape
Status Bar
Top Bar
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
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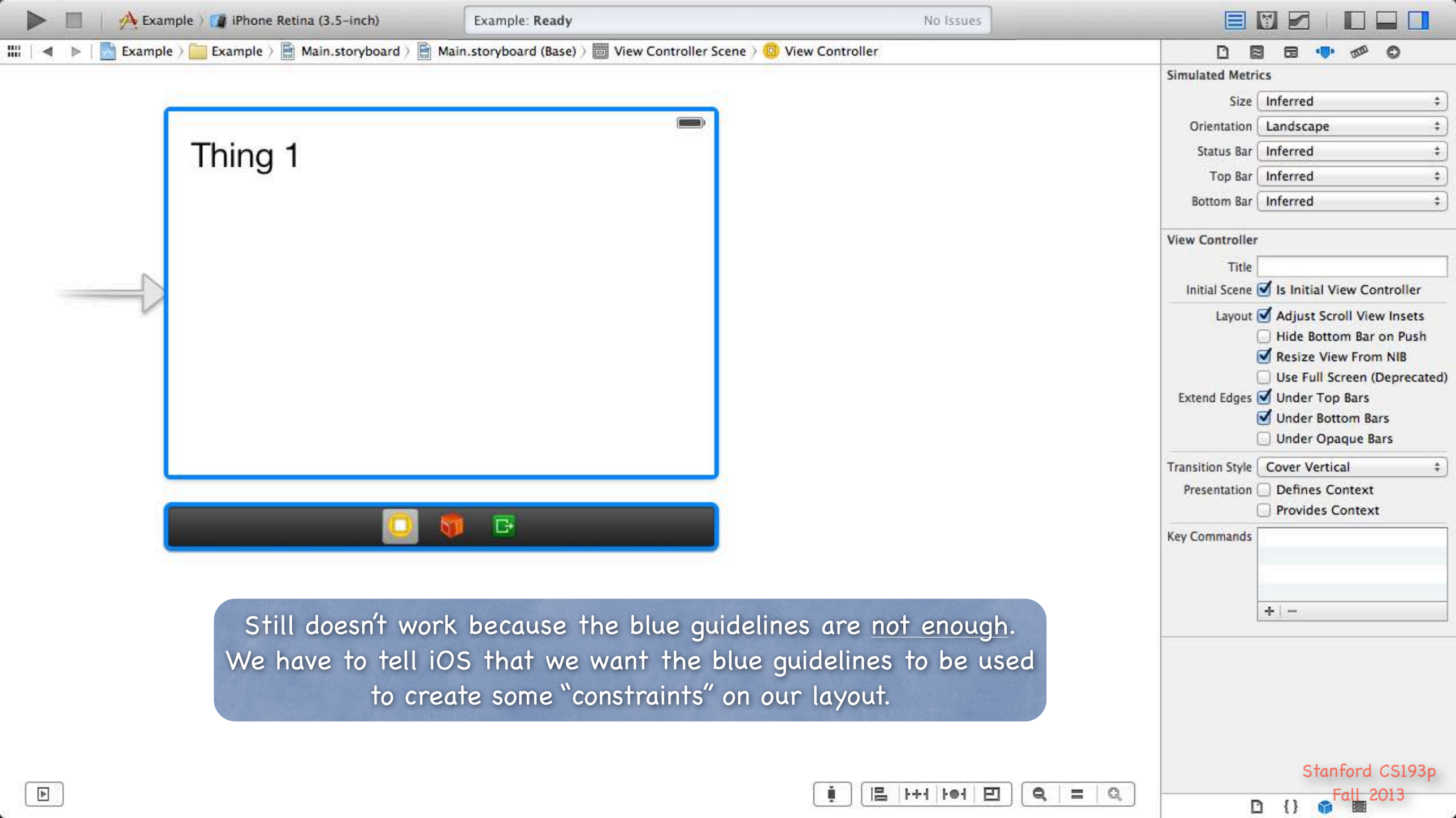
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Simulated Metrics
Size
Inferred
Orientation
Landscape
Status Bar
Inferred
Top Bar
Inferred
Bottom Bar
Inferred
View Controller
Title
Initial Scene
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
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.
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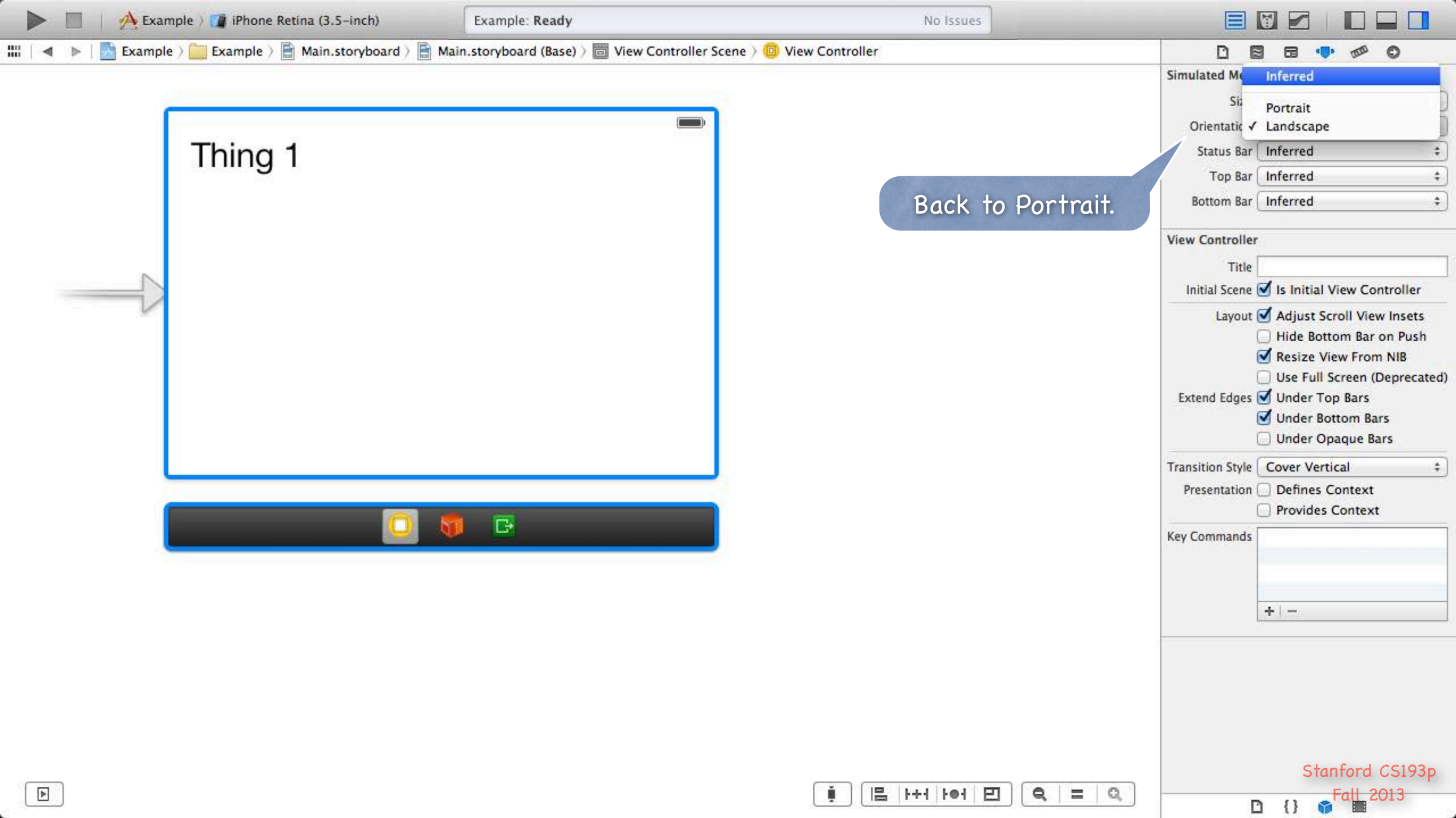
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Back to Portrait.
Simulated Me
Inferred
Portrait
Landscape
Orientatic
Status Bar
Inferred
Top Bar
Inferred
Bottom Bar
Inferred
View Controller
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
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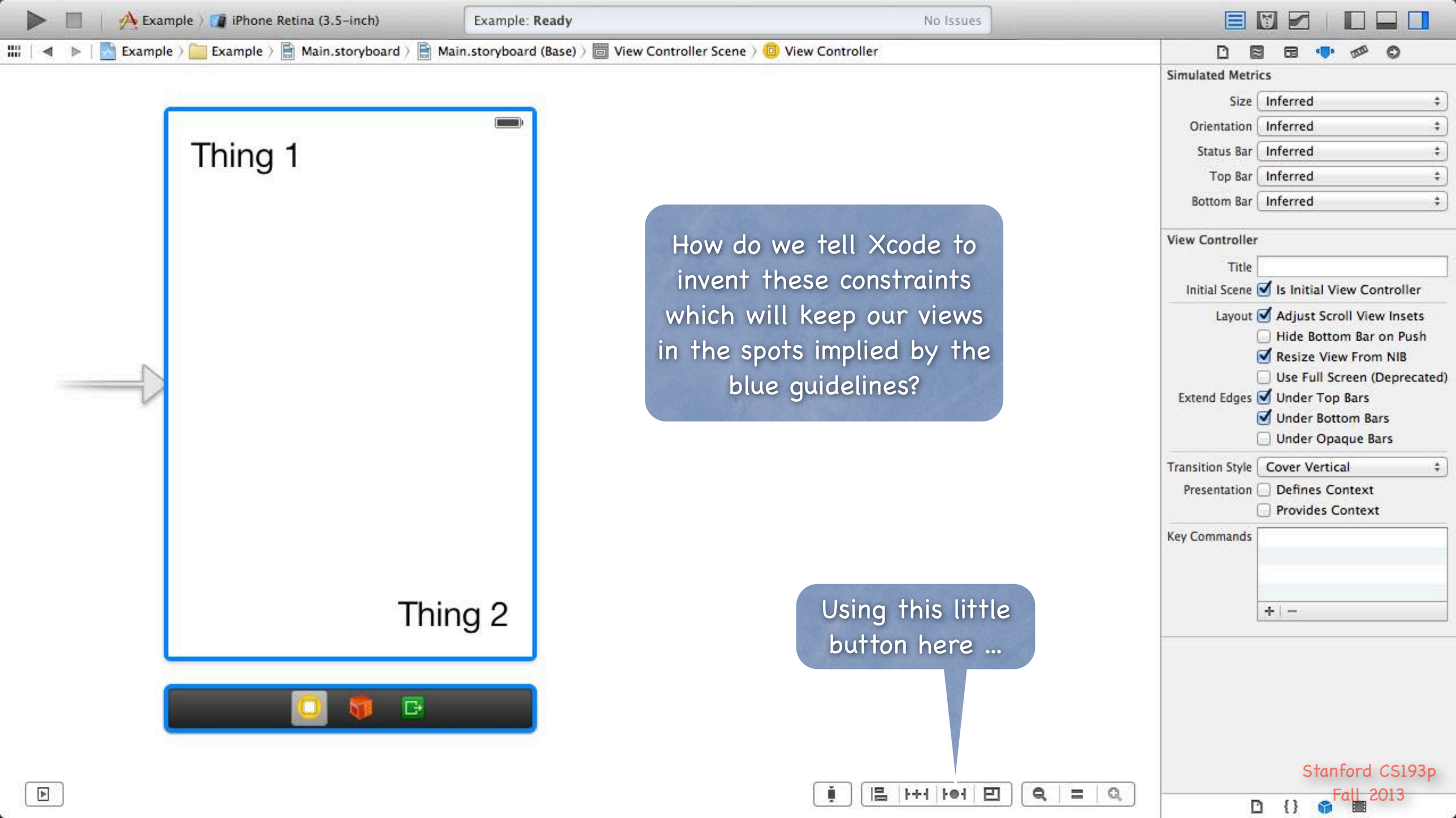
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
How do we tell Xcode to invent these constraints which will keep our views in the spots implied by the blue guidelines?
Using this little button here ...
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
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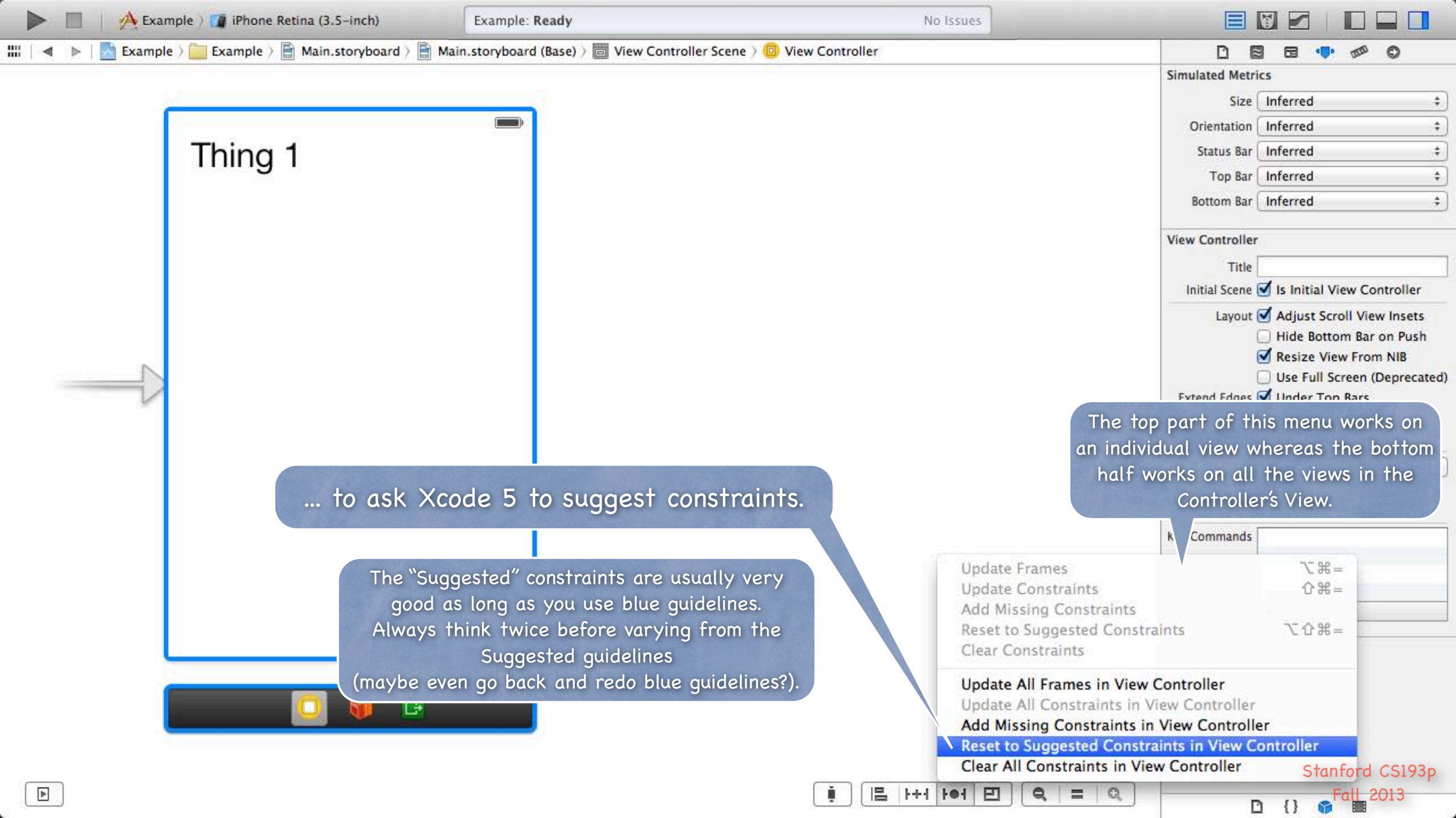
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
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
... to ask Xcode 5 to suggest constraints.
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.
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?).
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
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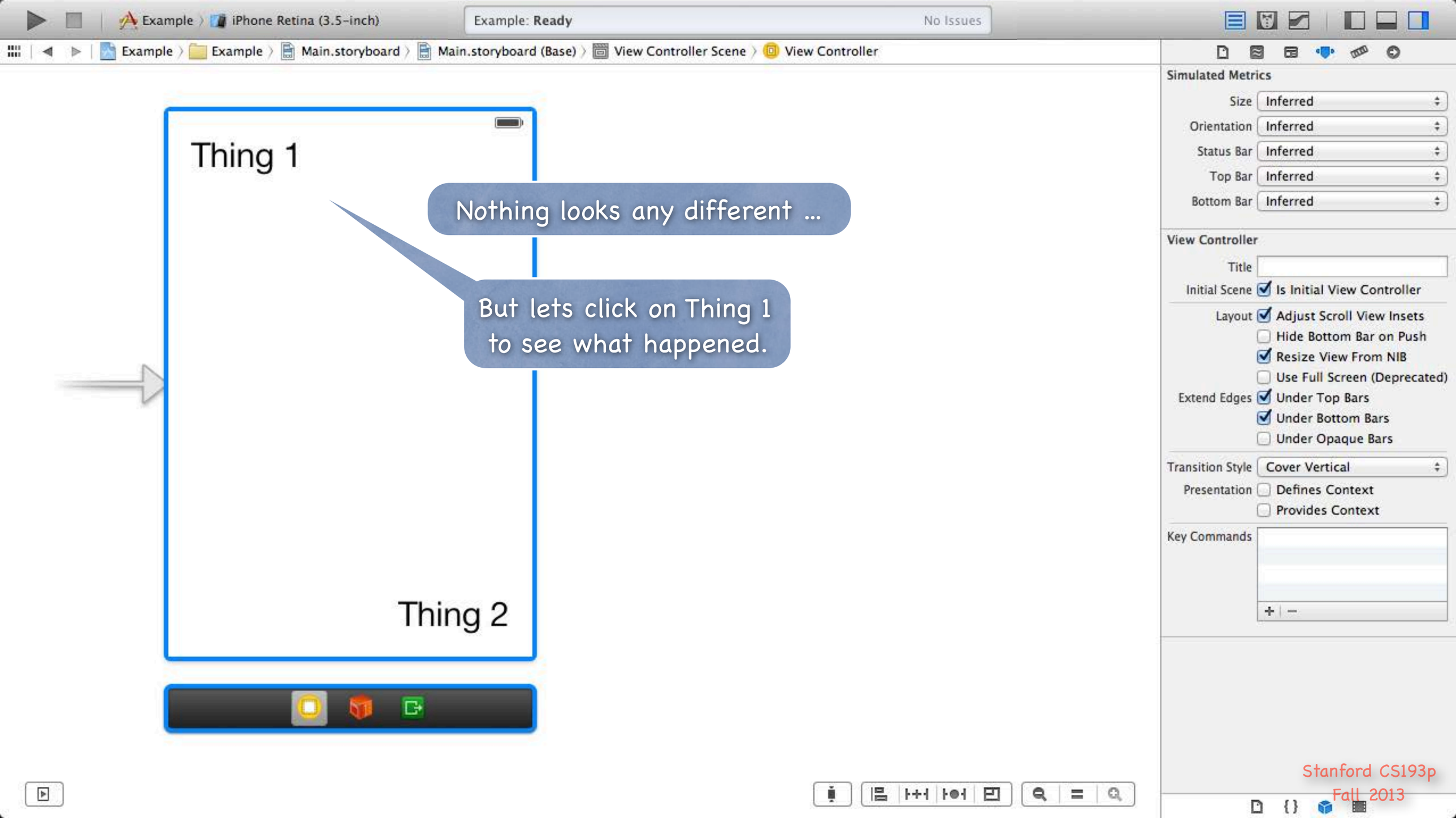
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
Nothing looks any different ...
But lets click on Thing 1 to see what happened.
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
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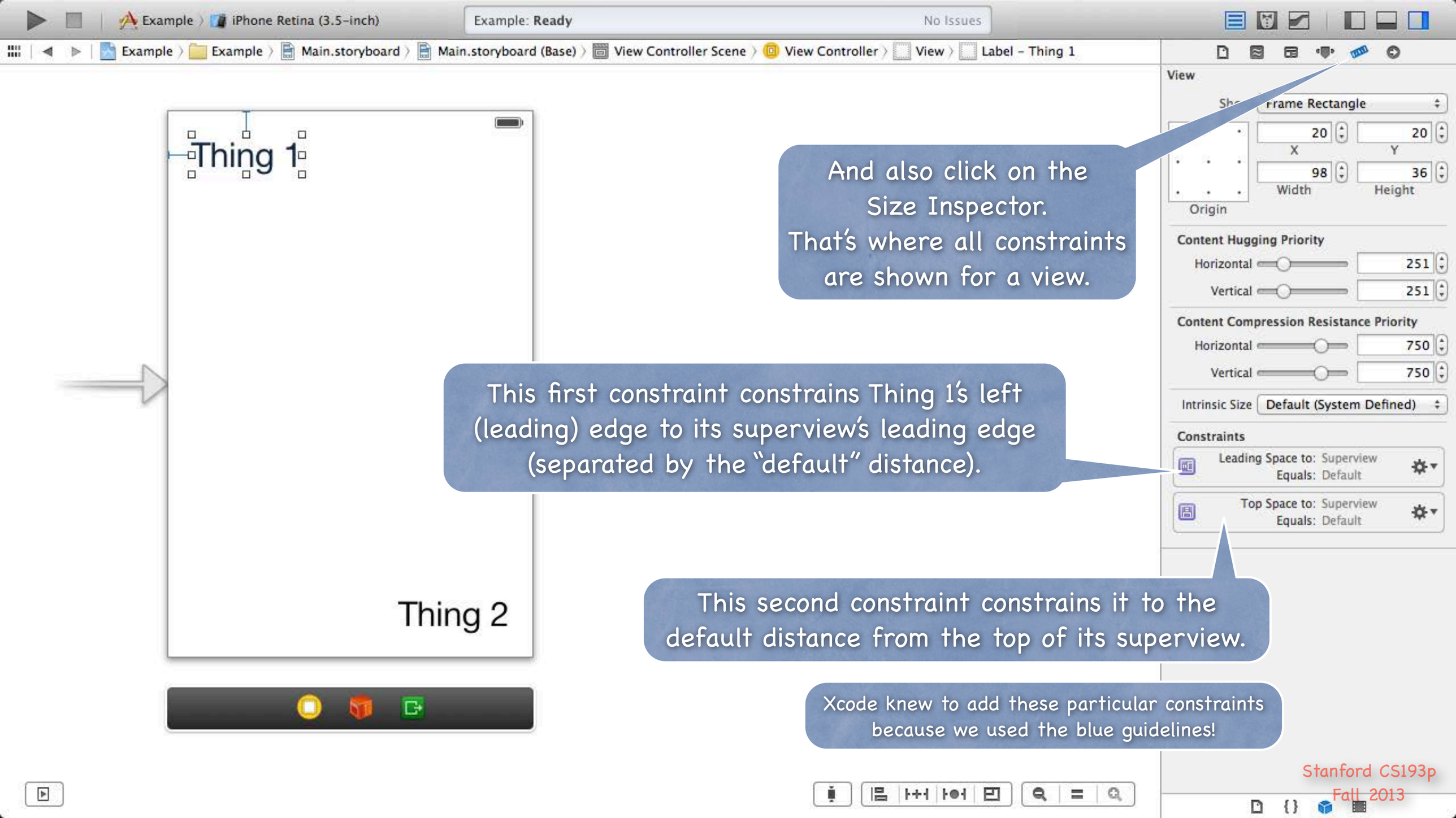
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Thing 1
Thing 1
Thing 2
View
Frame Rectangle
20
20
X
Y
98
36
Width
Height
Origin
Content Hugging Priority
Horizontal
251
Vertical
251
Content Compression Resistance Priority
Horizontal
750
Vertical
750
Intrinsic Size
Default (System Defined)
Constraints
Leading Space to: Superview
Equals: Default
Top Space to: Superview
Equals: Default
And also click on the Size Inspector. That's where all constraints are shown for a view.
This first constraint constrains Thing 1's left (leading) edge to its superview's leading edge (separated by the "default" distance).
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!
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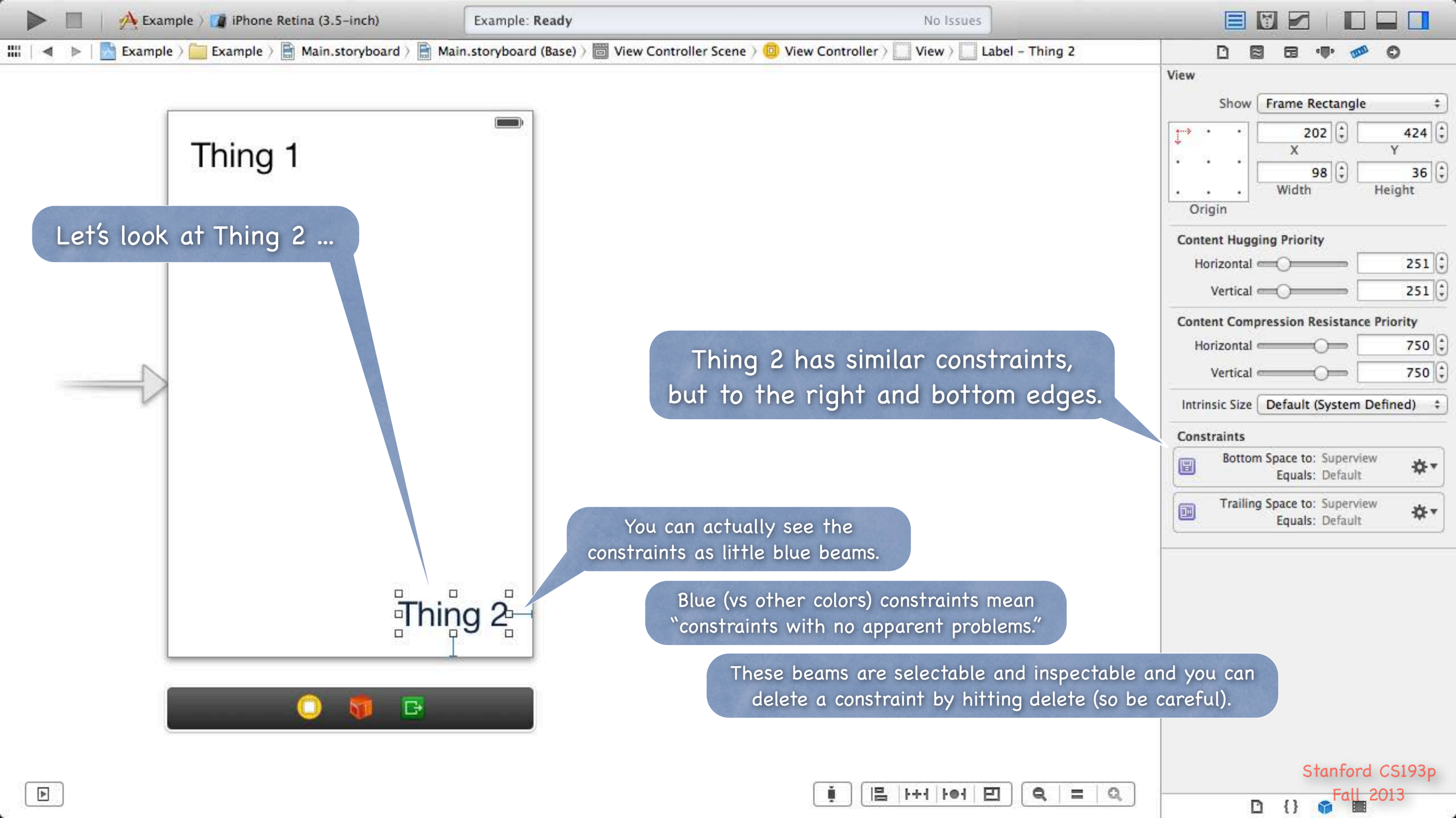
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Thing 2
Thing 1
Let's look at Thing 2 ...
Thing 2
Thing 2 has similar constraints, but to the right and bottom edges.
You can actually see the constraints as little blue beams.
Blue (vs other colors) constraints mean "constraints with no apparent problems."
These beams are selectable and inspectable and you can delete a constraint by hitting delete (so be careful).
View
Show Frame Rectangle
202 X
424 Y
98 Width
36 Height
Origin
Content Hugging Priority
Horizontal 251
Vertical 251
Content Compression Resistance Priority
Horizontal 750
Vertical 750
Intrinsic Size Default (System Defined)
Constraints
Bottom Space to: Superview
Equals: Default
Trailing Space to: Superview
Equals: Default
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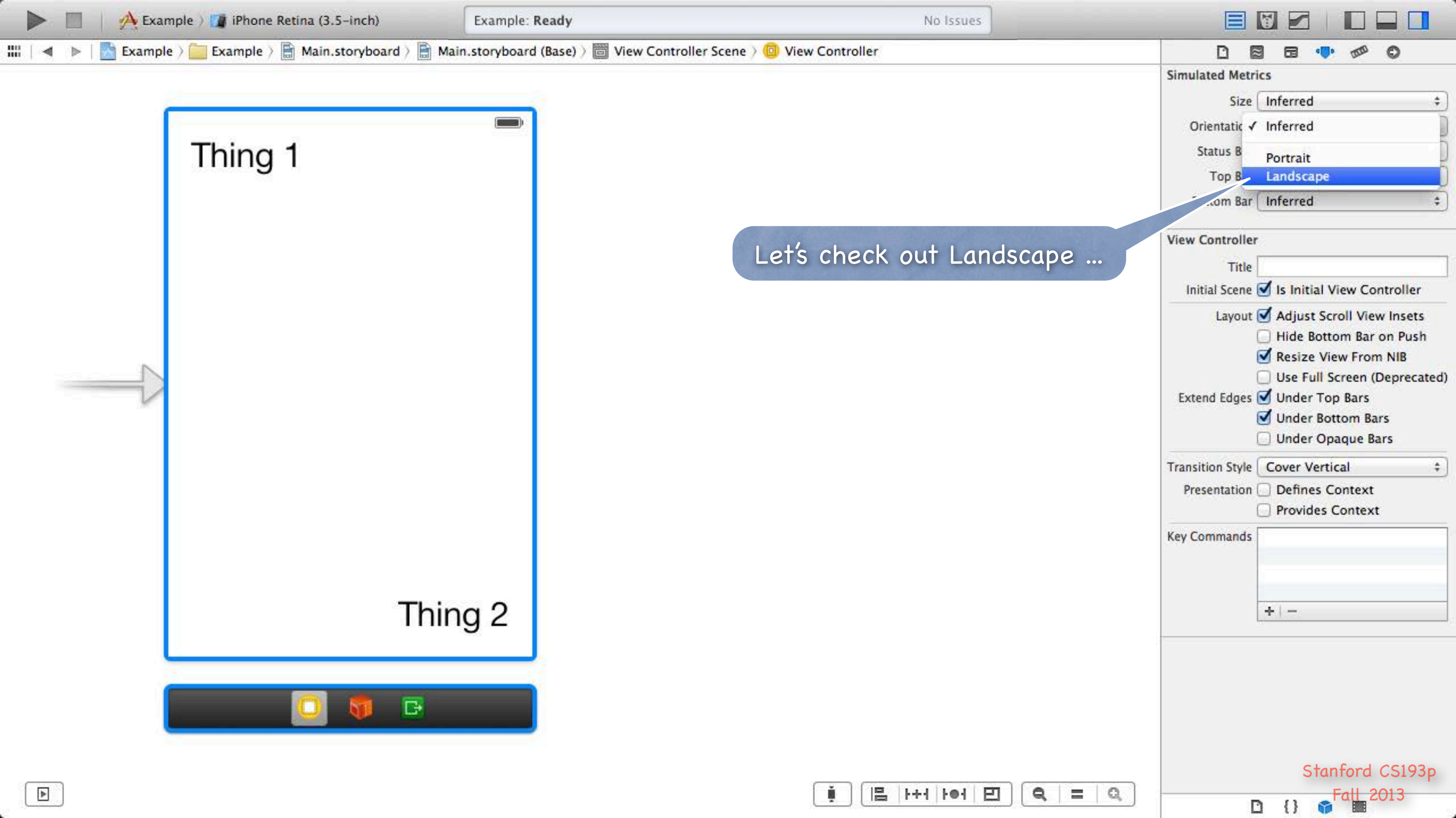
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
Let's check out Landscape ...
Simulated Metrics
Size
Inferred
Orientation
Inferred
Portrait
Landscape
Status Bar
Top Bar
Bottom 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
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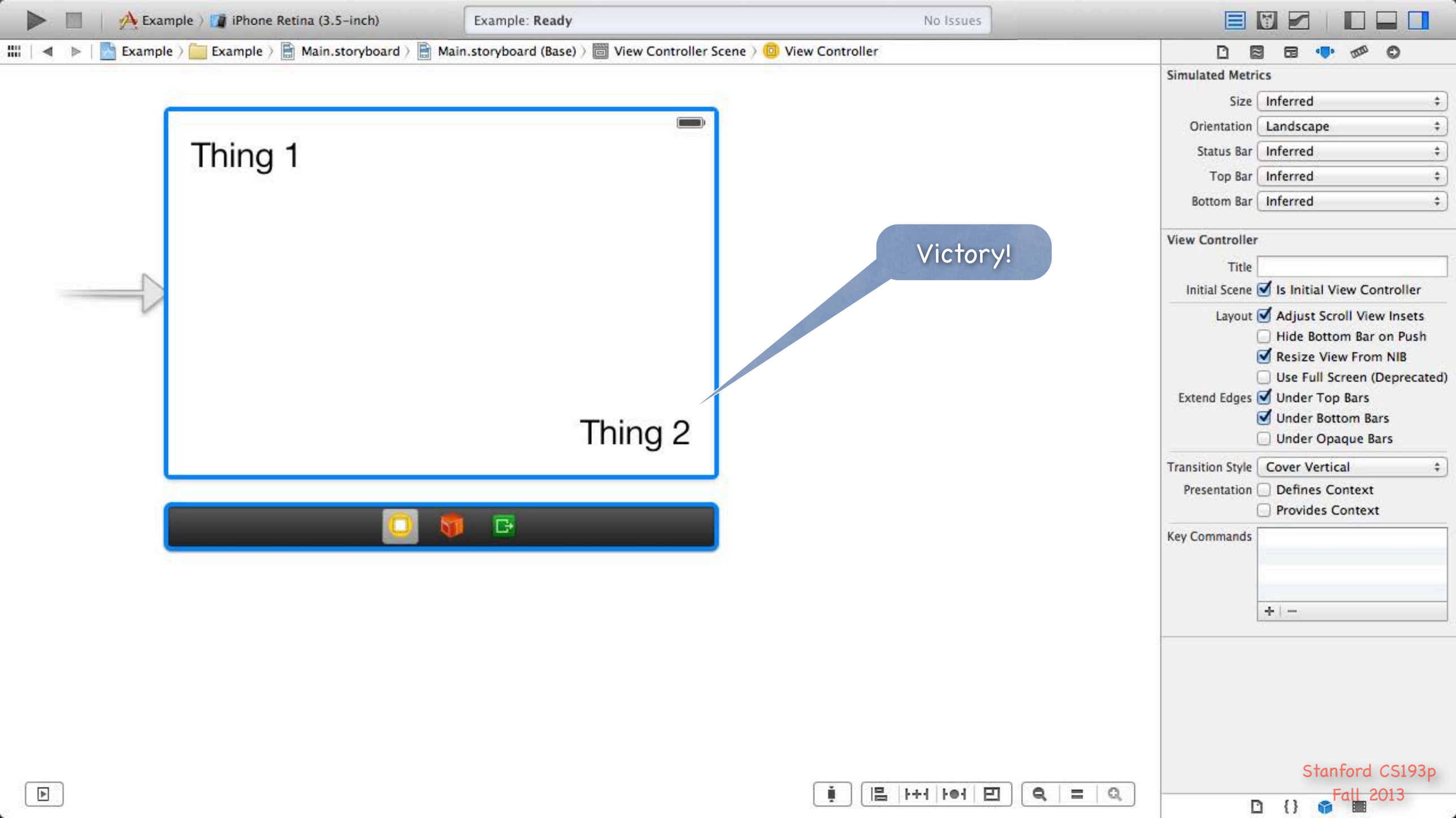
Fall 2013


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Thing 2
Victory!
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
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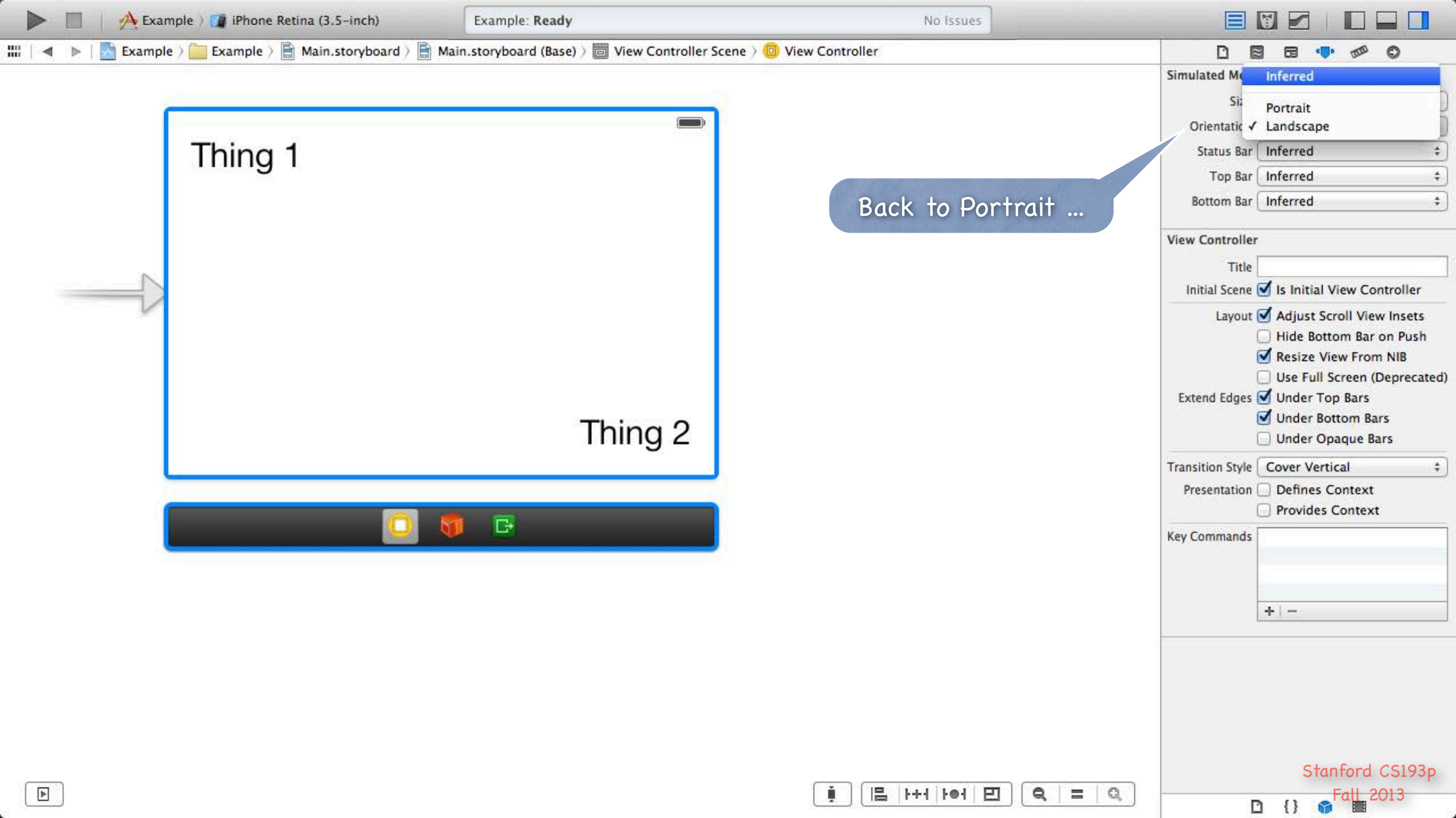
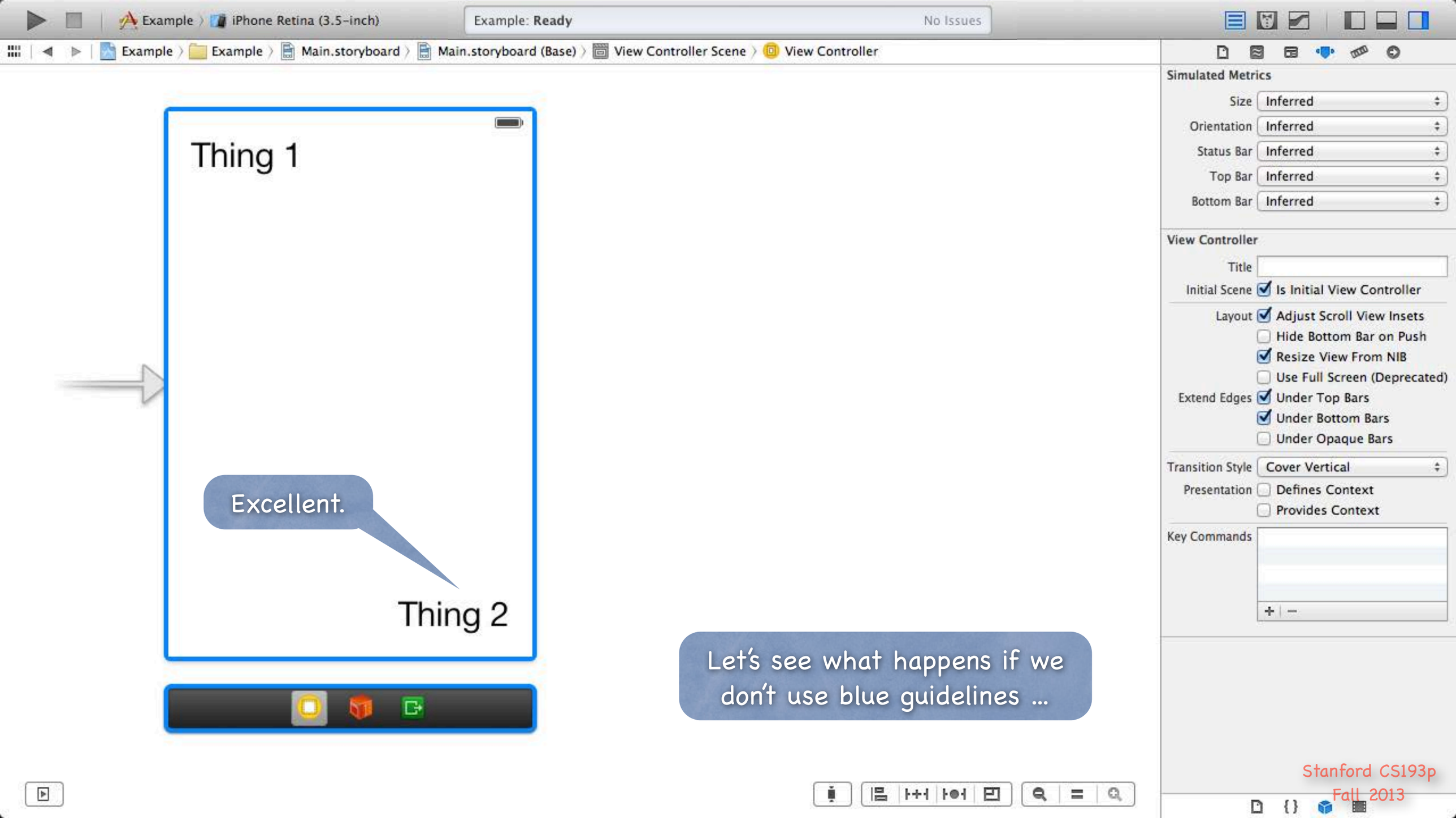

Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Thing 2
Back to Portrait …
Simulated Me
Inferred
Portrait
Landscape
Orientatic
Status Bar
Inferred
Top Bar
Inferred
Bottom Bar
Inferred
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
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
Thing 1
Excellent.
Thing 2
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
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
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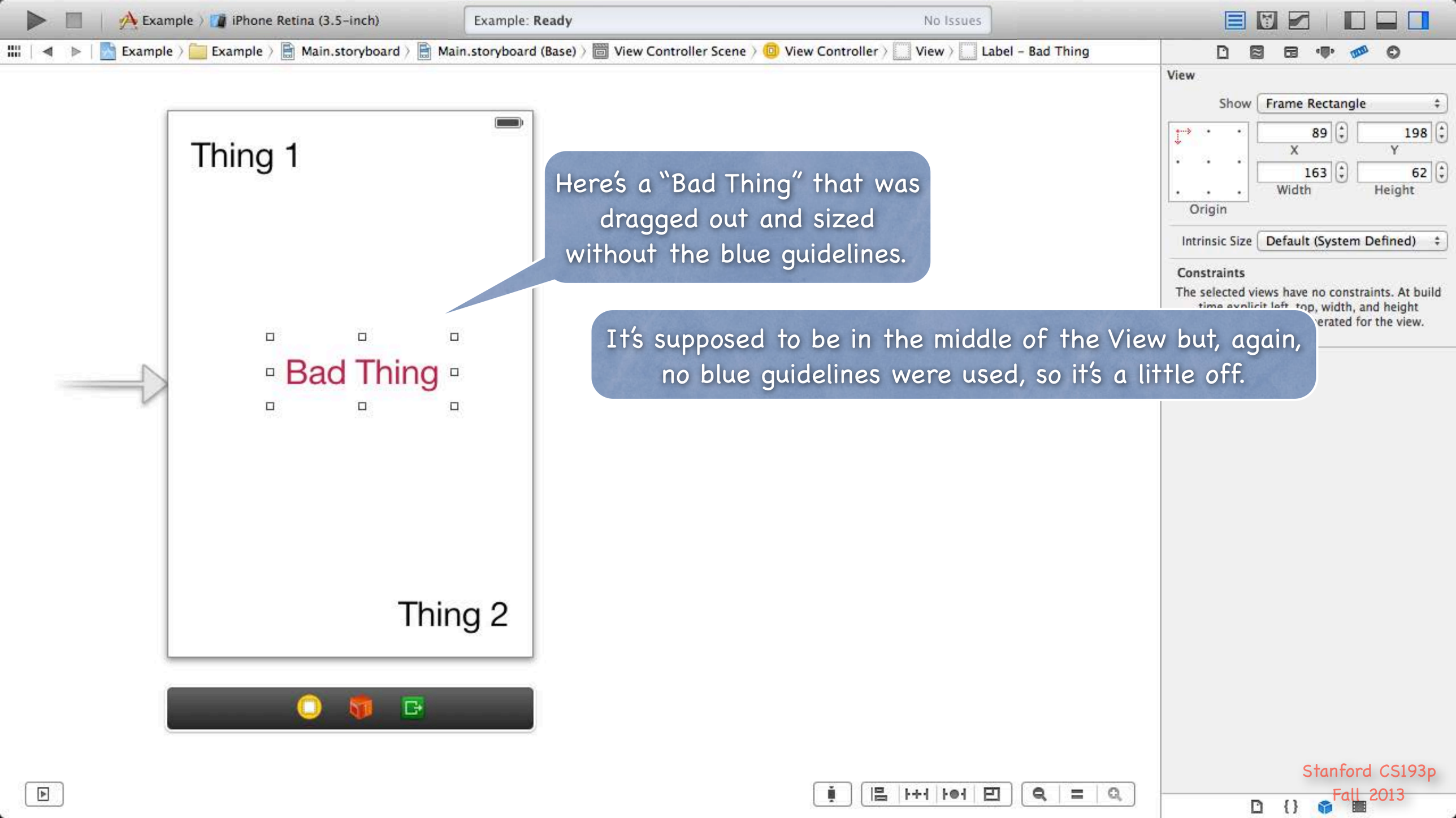
Fall 2013


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
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
89
198
X
Y
163
62
Width
Height
Origin
Intrinsic Size
Default (System Defined)
Constraints
The selected views have no constraints. At build
erated for the view.
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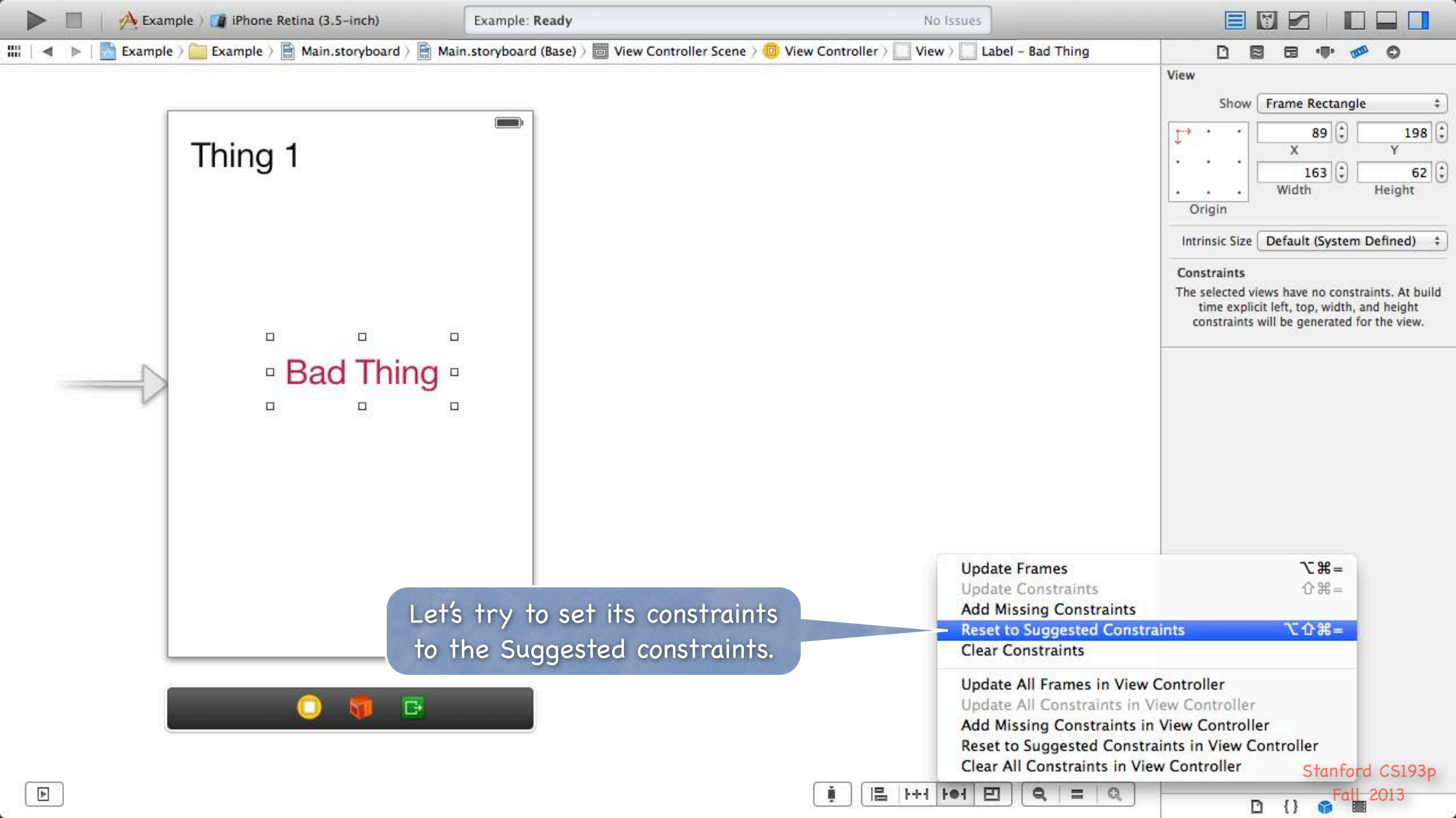
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
Intrinsic Size
Default (System Defined)
Constraints
The selected views have no constraints. At build time explicit left, top, width, and height constraints will be generated for the view.
Let's try to set its constraints to the Suggested constraints.
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
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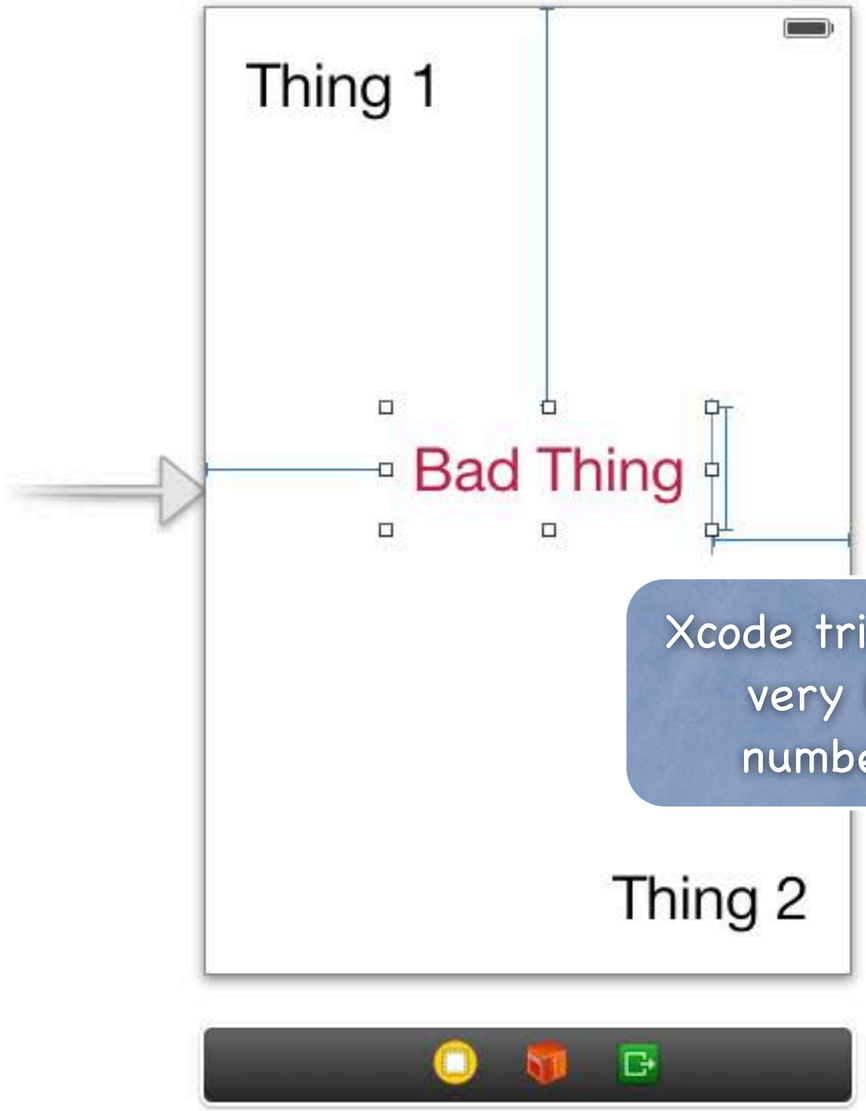
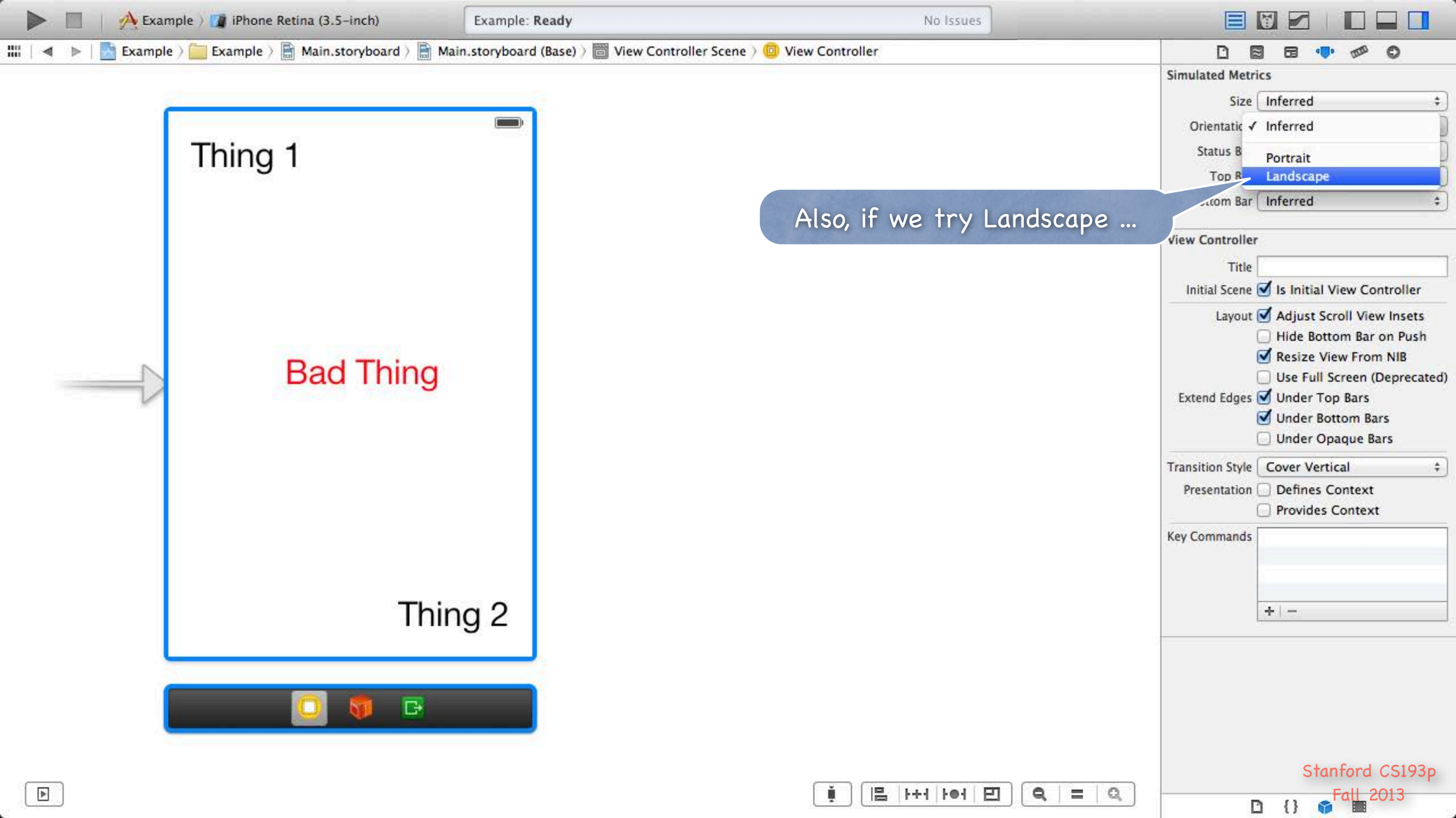
Fall 2013



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.


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Bad Thing
Thing 2
Also, if we try Landscape ...
Simulated Metrics
Size
Inferred
Orientatic
Inferred
Portrait
Landscape
Status B
Top R
tom 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
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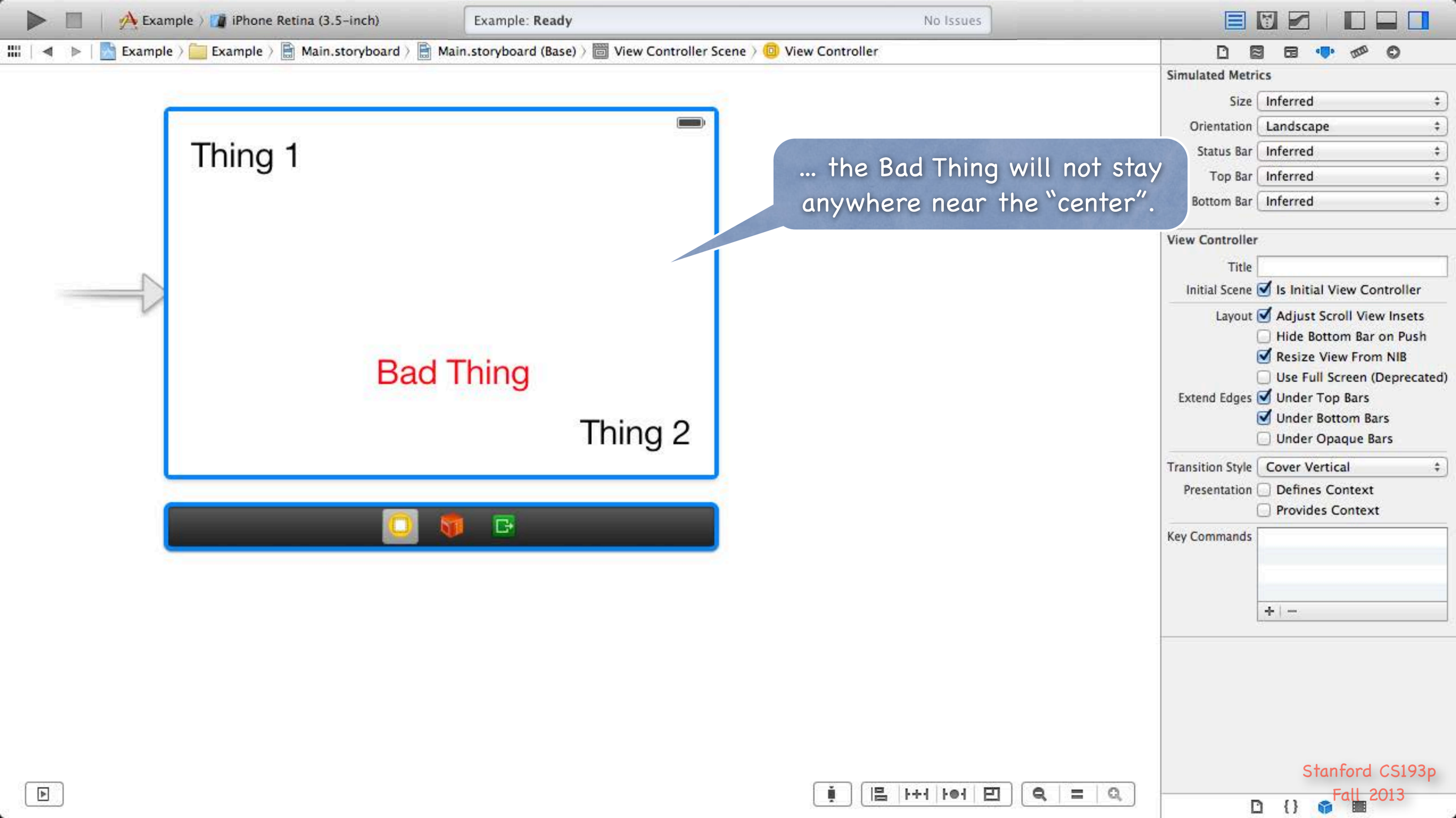
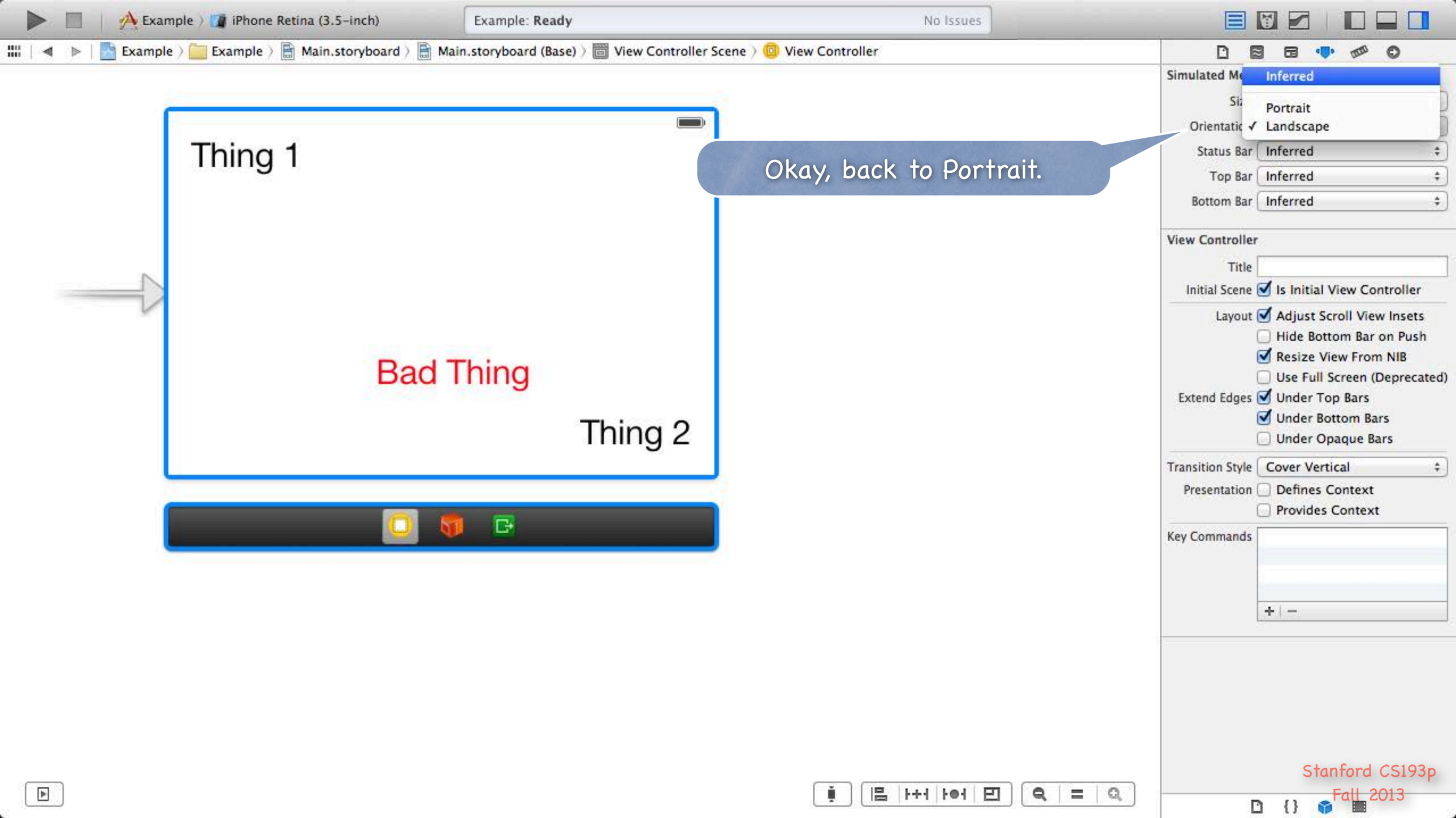
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
Thing 1
Bad Thing
Thing 2
… 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 Cover Vertical
Presentation Defines Context
Provides Context
Key Commands


Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
Thing 1
Bad Thing
Thing 2
Okay, back to Portrait.
Simulated Me
Inferred
Portrait
Landscape
Orientatic
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
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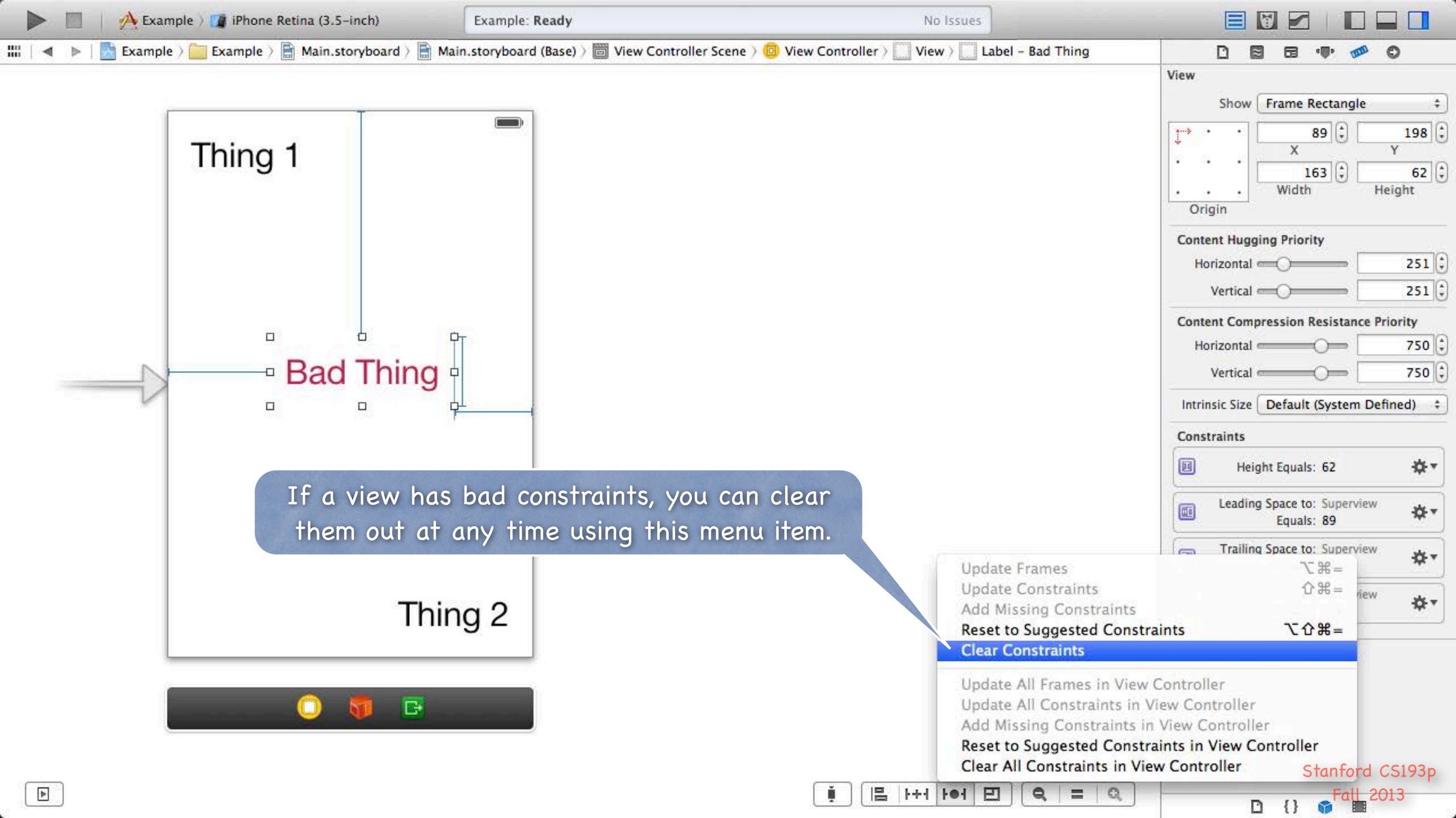
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
Thing 2
If a view has bad constraints, you can clear them out at any time using this menu item.
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
Content Hugging Priority
Horizontal
251
Vertical
251
Content Compression Resistance Priority
Horizontal
750
Vertical
750
Intrinsic Size
Default (System Defined)
Constraints
Height Equals: 62
Leading Space to: Superview
Equals: 89
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
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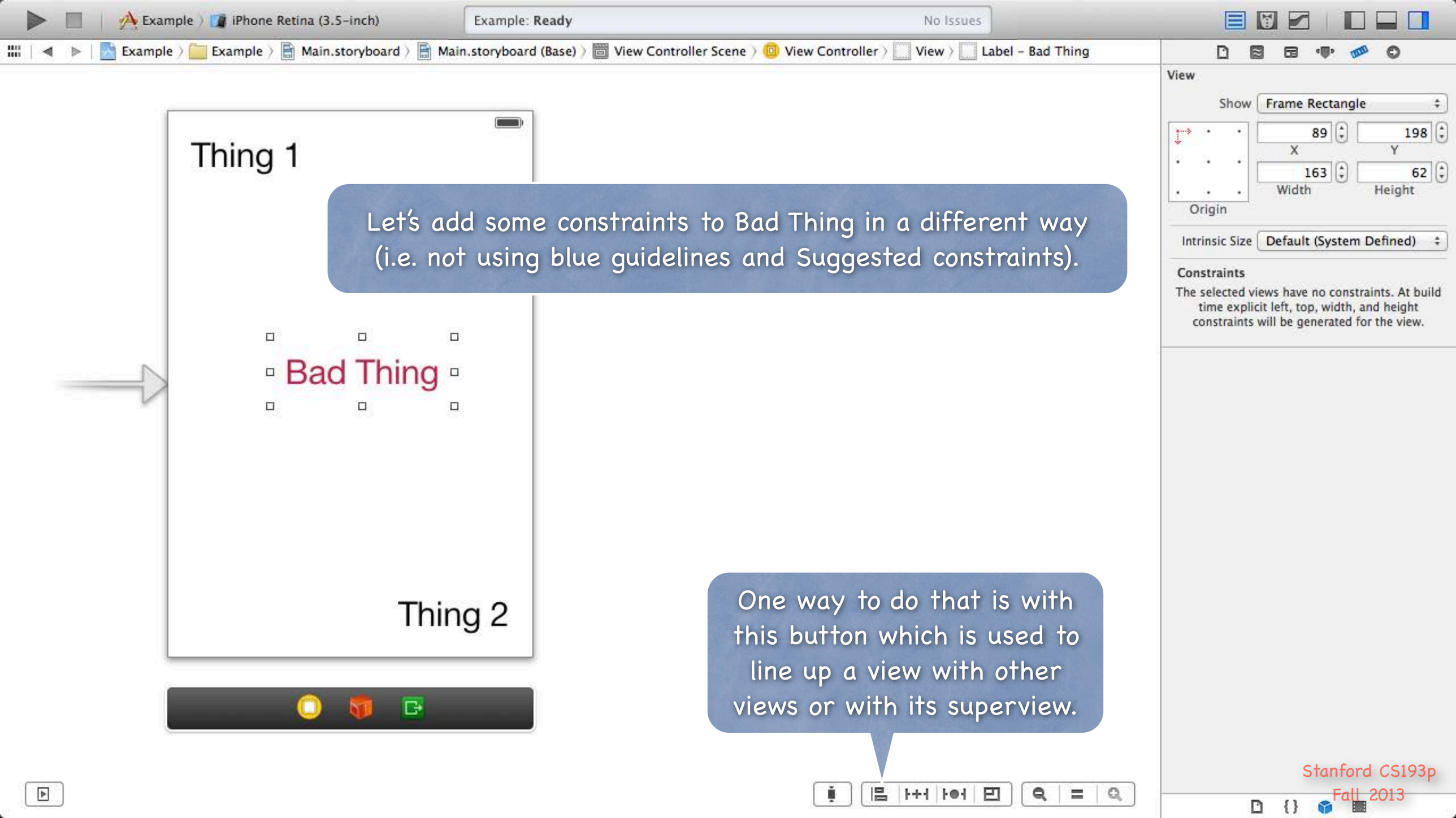
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
Thing 2
Let's add some constraints to Bad Thing in a different way (i.e. not using blue guidelines and Suggested constraints).
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
89
198
X
Y
163
62
Width
Height
Origin
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.
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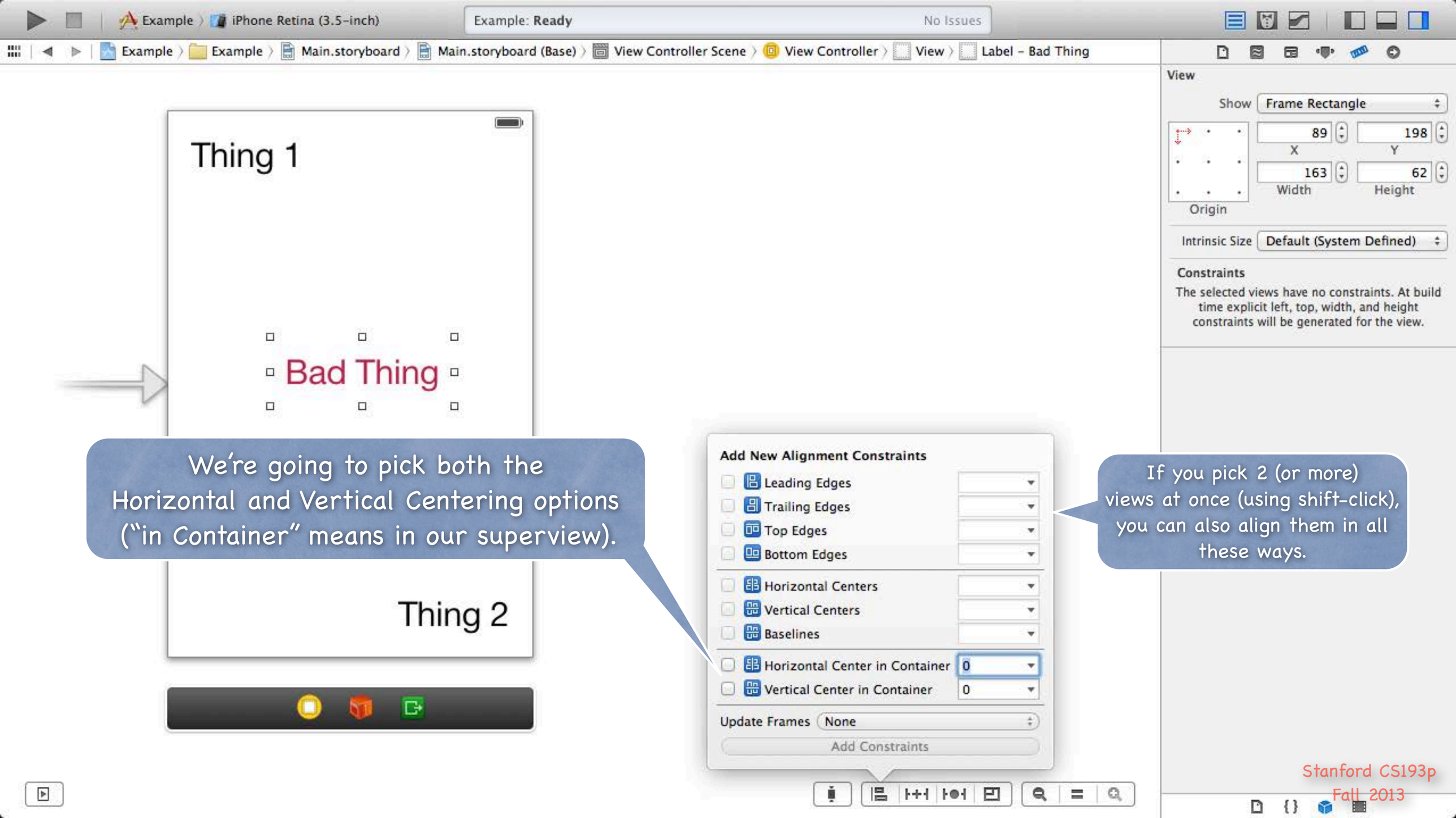
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
Thing 2
We're going to pick both the Horizontal and Vertical Centering options ("in Container" means in our superview).
Add New Alignment Constraints
Leading Edges
Trailing Edges
Top Edges
Bottom Edges
Horizontal Centers
Vertical Centers
Baselines
Horizontal Center in Container
Vertical Center in Container
Update Frames
None
Add Constraints
If you pick 2 (or more) views at once (using shift-click), you can also align them in all these ways.
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
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.
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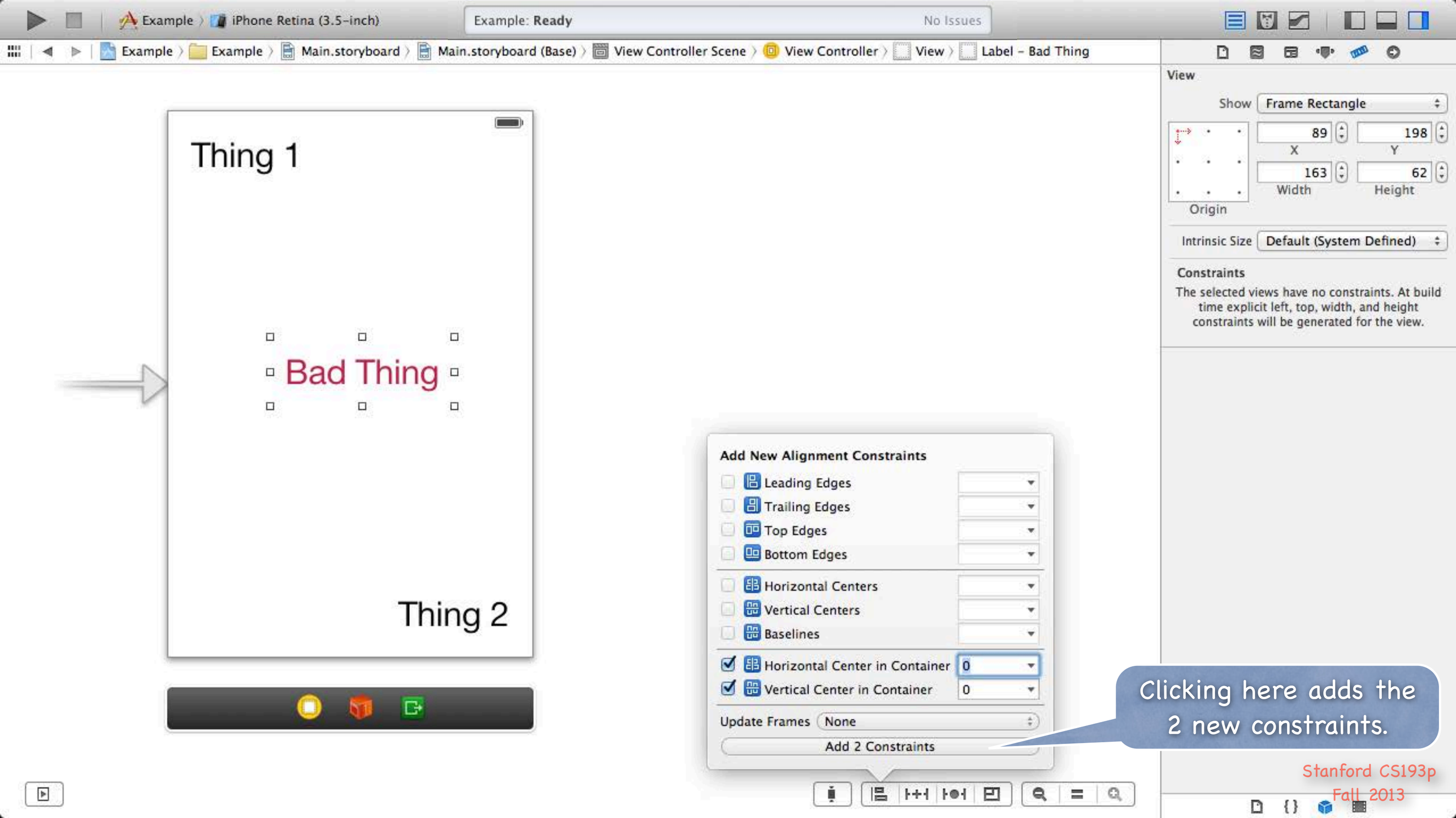
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
Thing 2
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
Intrinsic Size
Default (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.
Add New Alignment Constraints
Leading Edges
Trailing Edges
Top Edges
Bottom Edges
Horizontal Centers
Vertical Centers
Baselines
Horizontal Center in Container
0
Vertical Center in Container
0
Update Frames
None
Add 2 Constraints
Clicking here adds the 2 new constraints.
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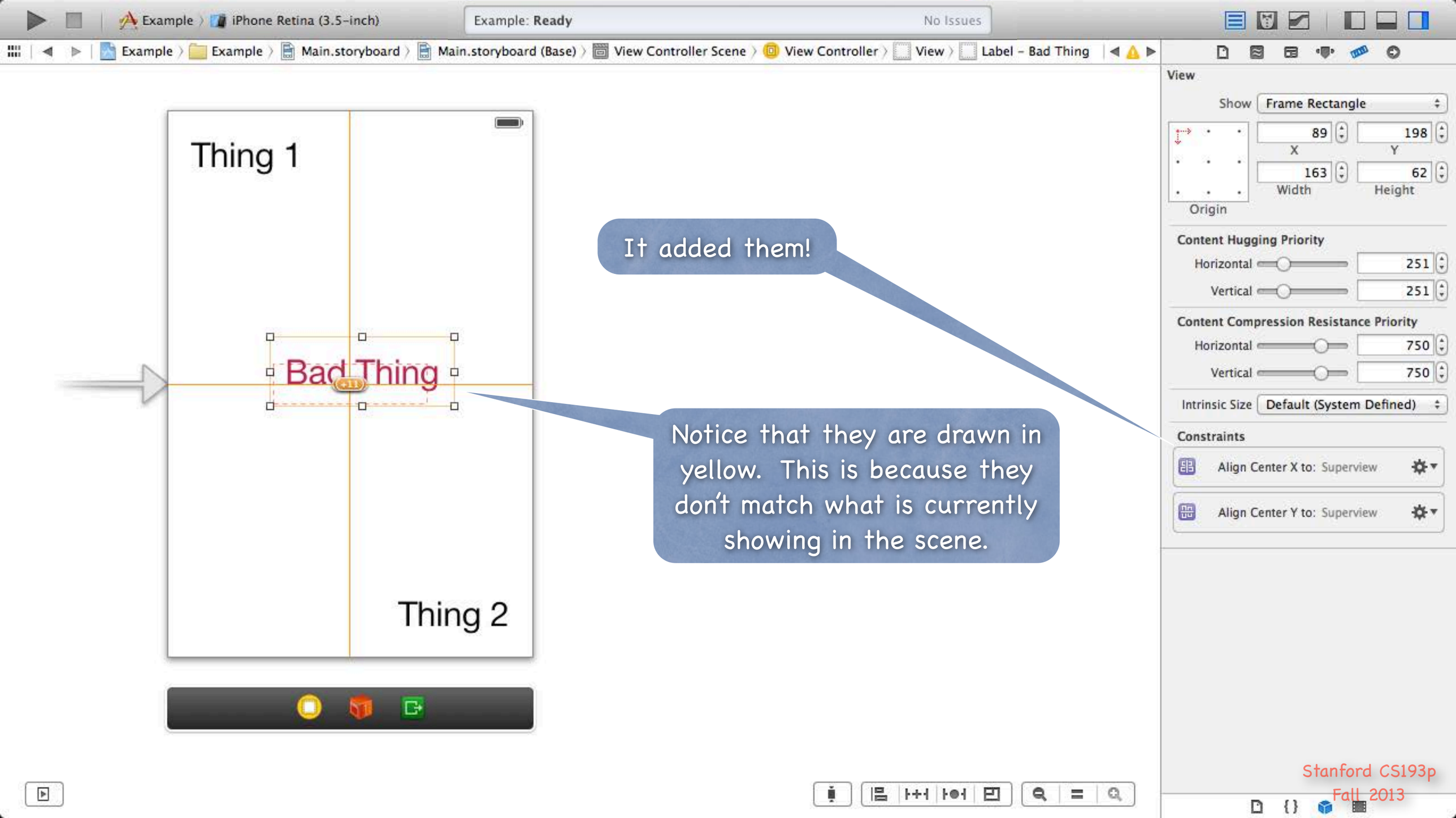
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Thing 1
Bad Thing
Thing 2
It added them!
Notice that they are drawn in yellow. This is because they don't match what is currently showing in the scene.
View
Show
Frame Rectangle
89
X
198
Y
163
Width
62
Height
Origin
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
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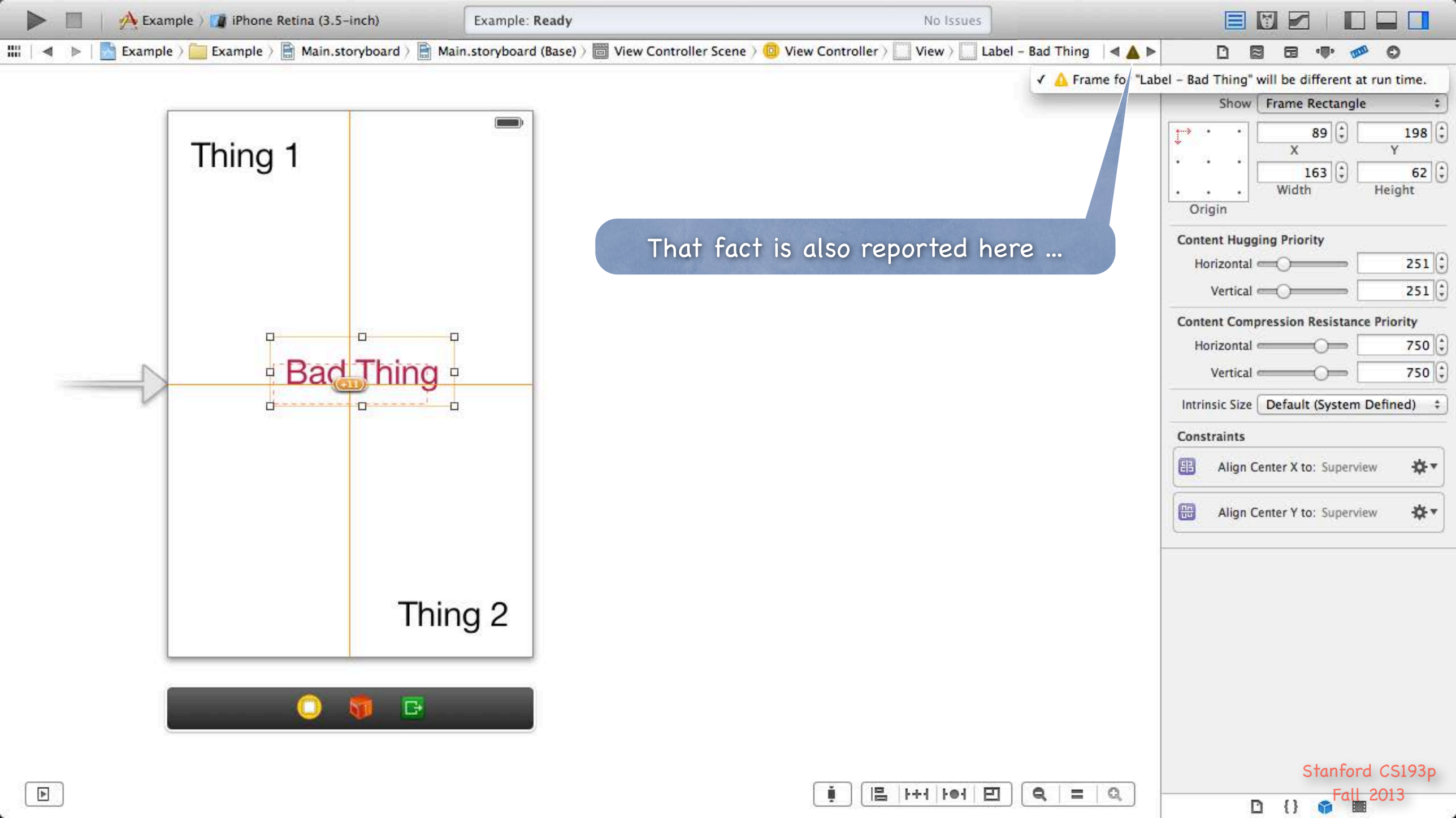
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Frame fo "Label – Bad Thing" will be different at run time.
Show Frame Rectangle
89 X
198 Y
163 Width
62 Height
Origin
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
Thing 1
Bad Thing
Thing 2
That fact is also reported here ...
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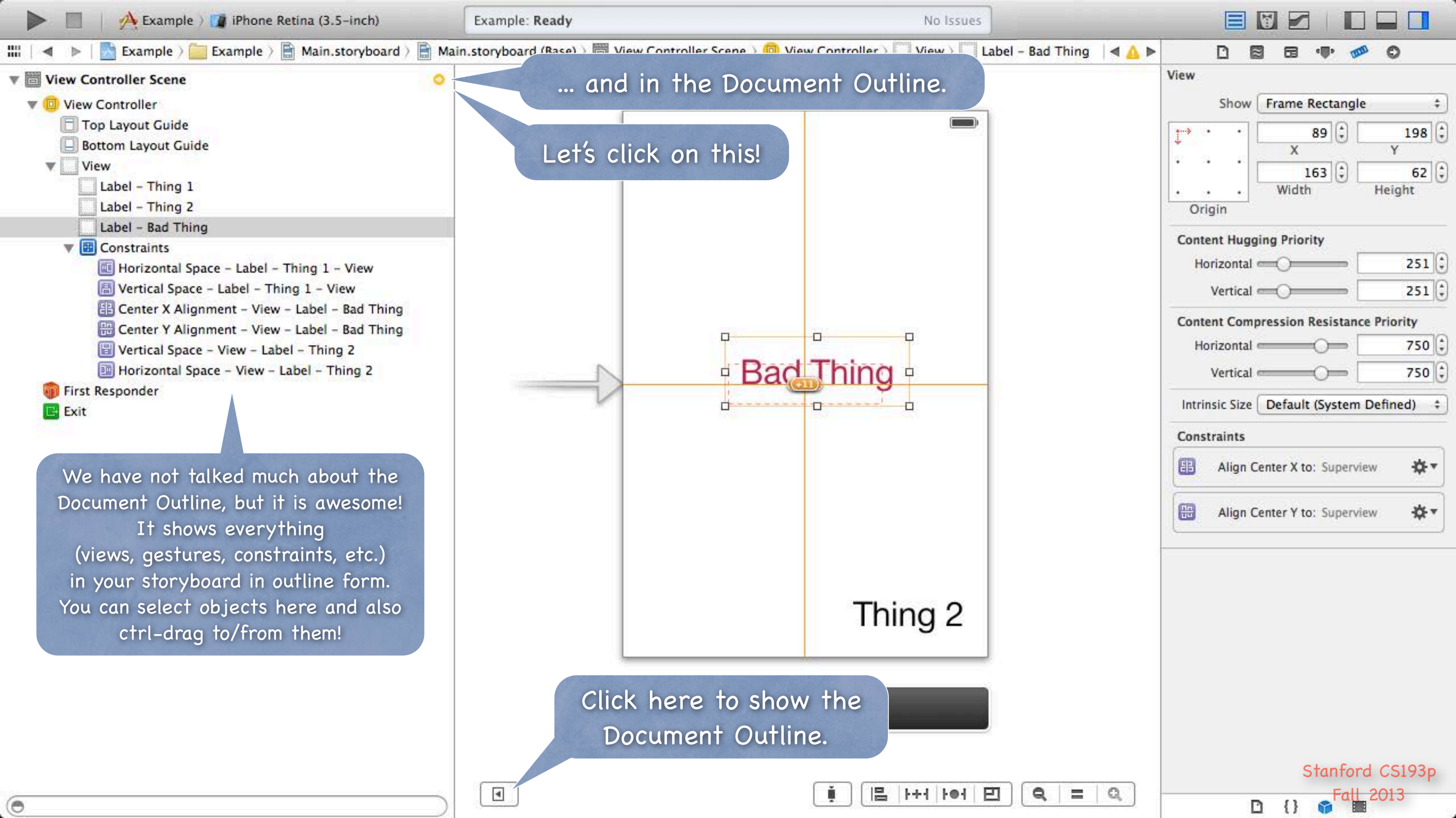
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – Label – Thing 1 – View
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
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!
... and in the Document Outline.
Let's click on this!
Bad Thing
Thing 2
Click here to show the Document Outline.
View
Show
Frame Rectangle
89
X
198
Y
163
Width
62
Height
Origin
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
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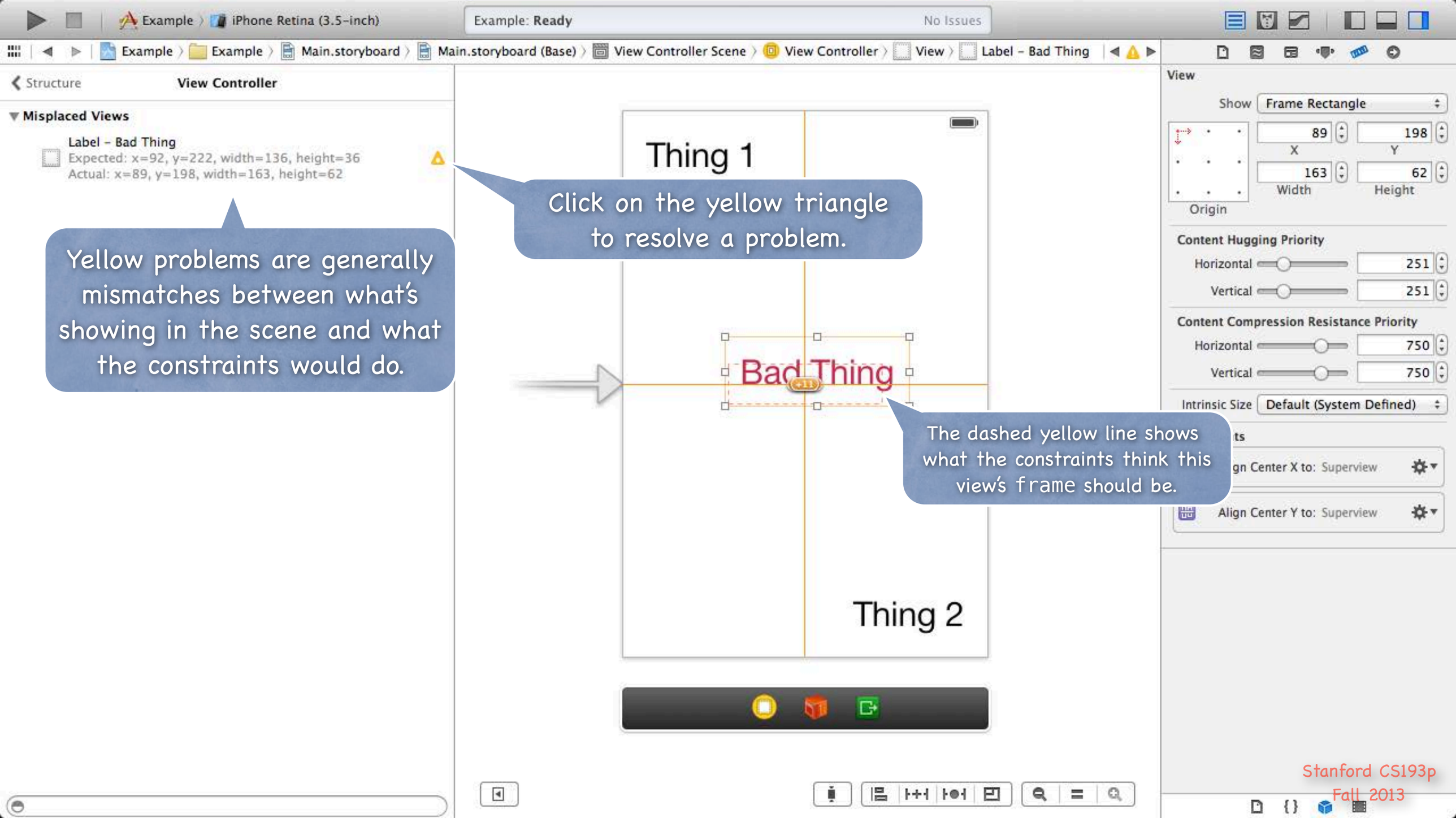
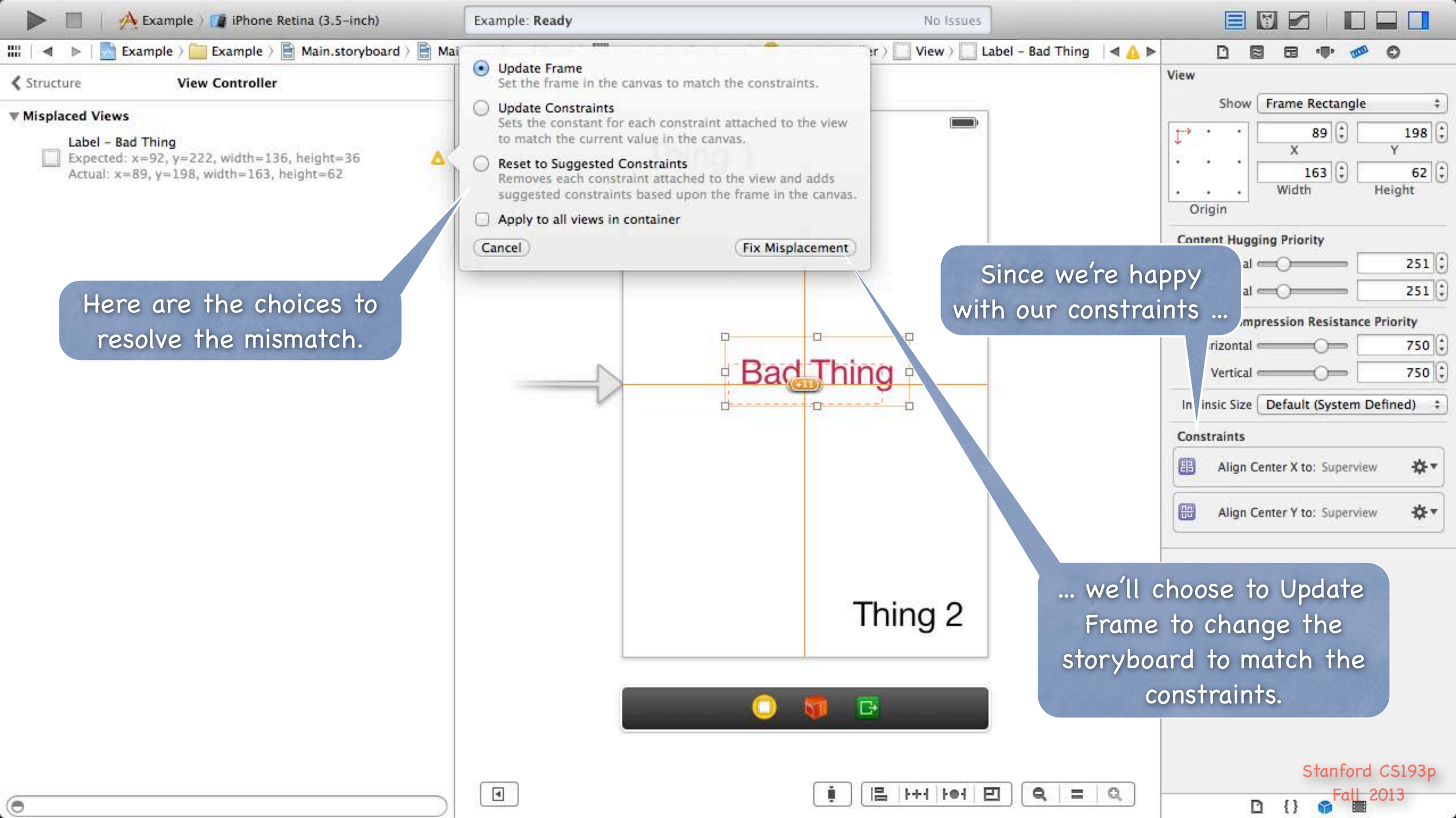

Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
Structure
View Controller
Misplaced Views
Label – Bad Thing
Expected: x=92, y=222, width=136, height=36
Actual: x=89, y=198, width=163, height=62
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.
Thing 1
Bad Thing
Thing 2
The dashed yellow line shows what the constraints think this view's frame should be.
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
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


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › View › Label – Bad Thing
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
Here are the choices to resolve the mismatch.
Since we're happy with our constraints ...
... we'll choose to Update Frame to change the storyboard to match the constraints.
Bad Thing
Thing 2
View
Show
Frame Rectangle
89
198
X
Y
163
62
Width
Height
Origin
Content Hugging Priority
251
251
Compression Resistance Priority
750
750
Vertical
Intrinsic Size
Default (System Defined)
Constraints
Align Center X to: Superview
Align Center Y to: Superview
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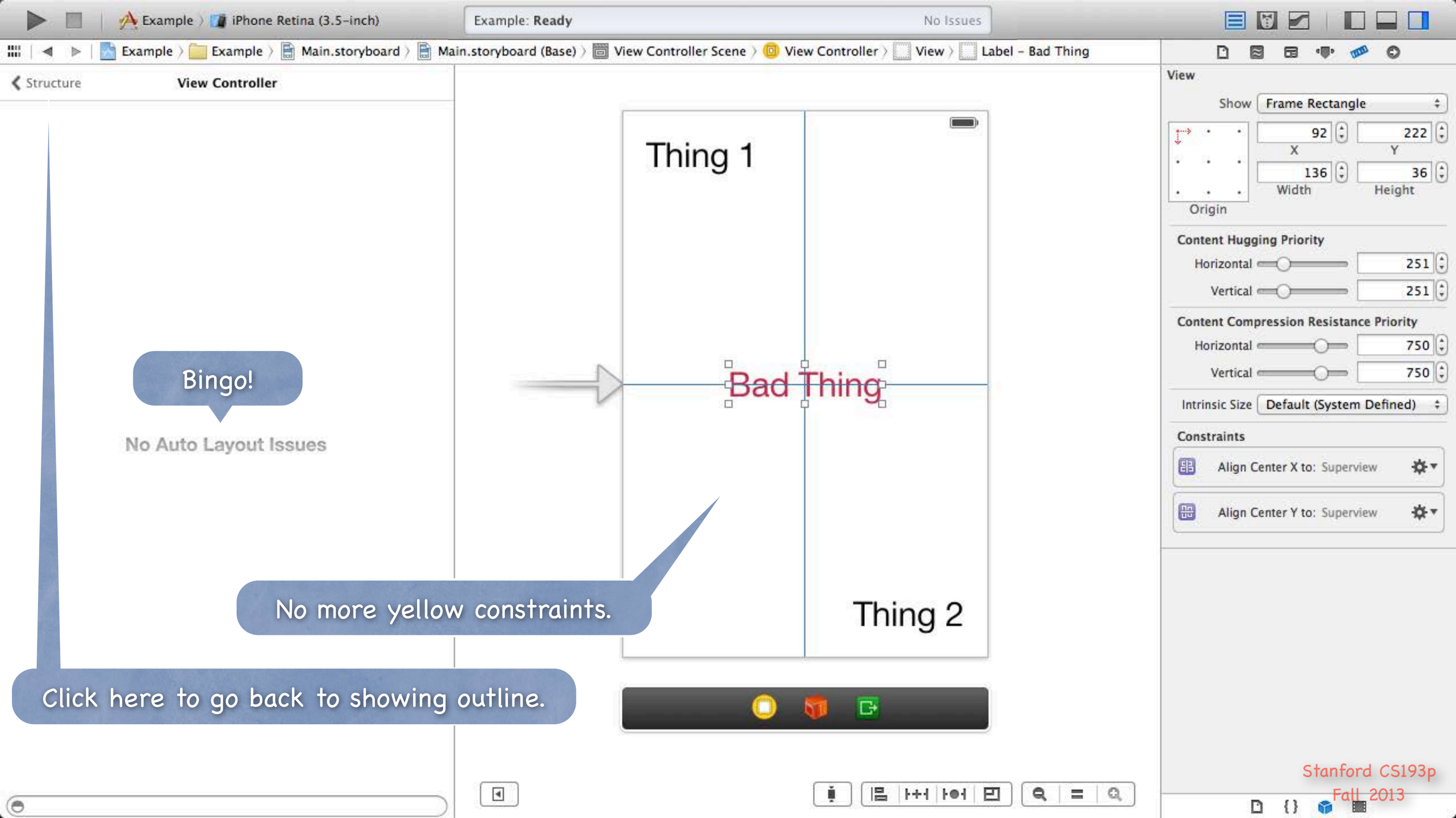
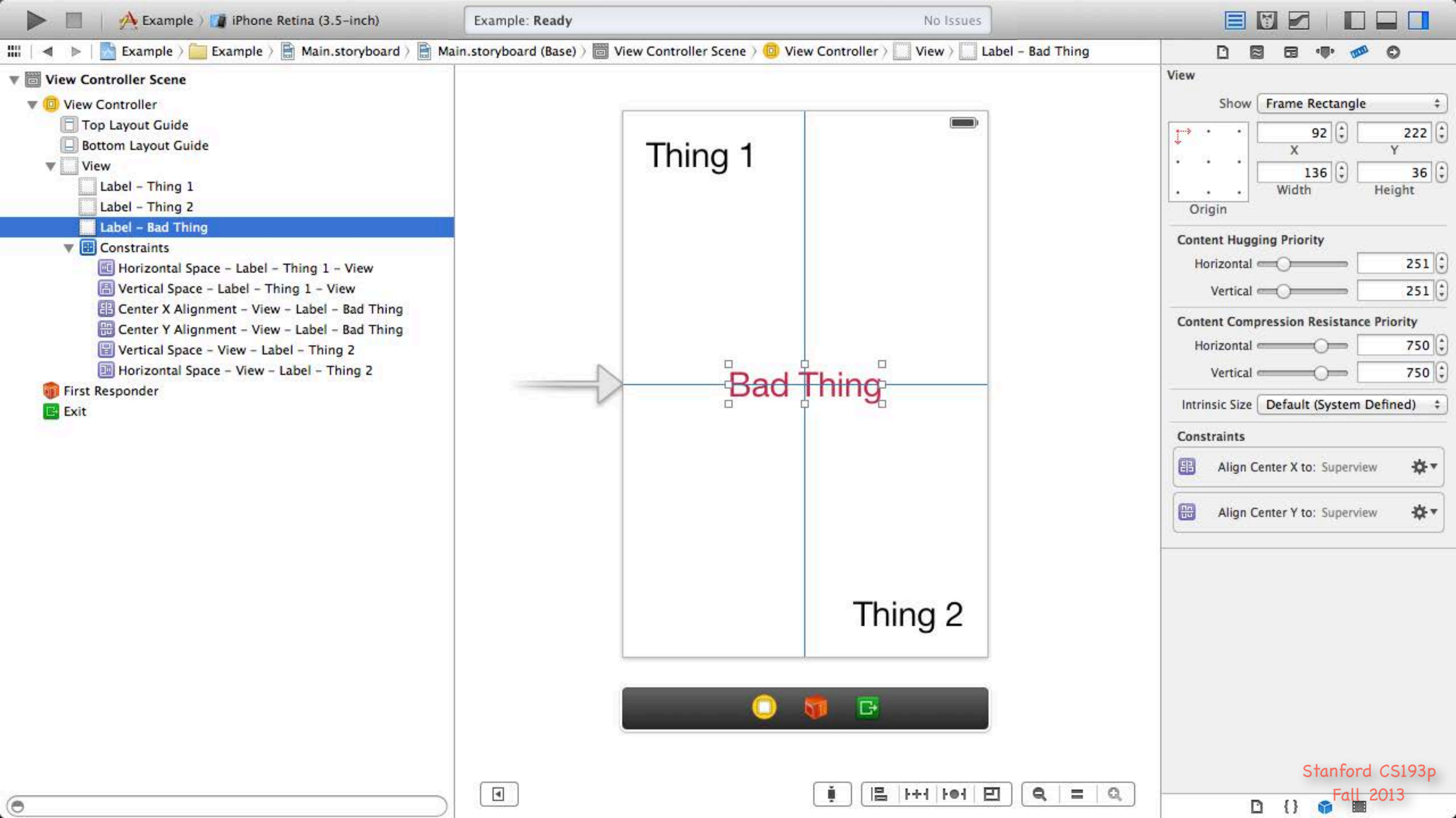
Fall 2013


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
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
92
X
222
Y
136
Width
36
Height
Origin
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 › 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
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
Thing 1
Bad Thing
Thing 2
View
Show
Frame Rectangle
92
X
222
Y
136
Width
36
Height
Origin
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
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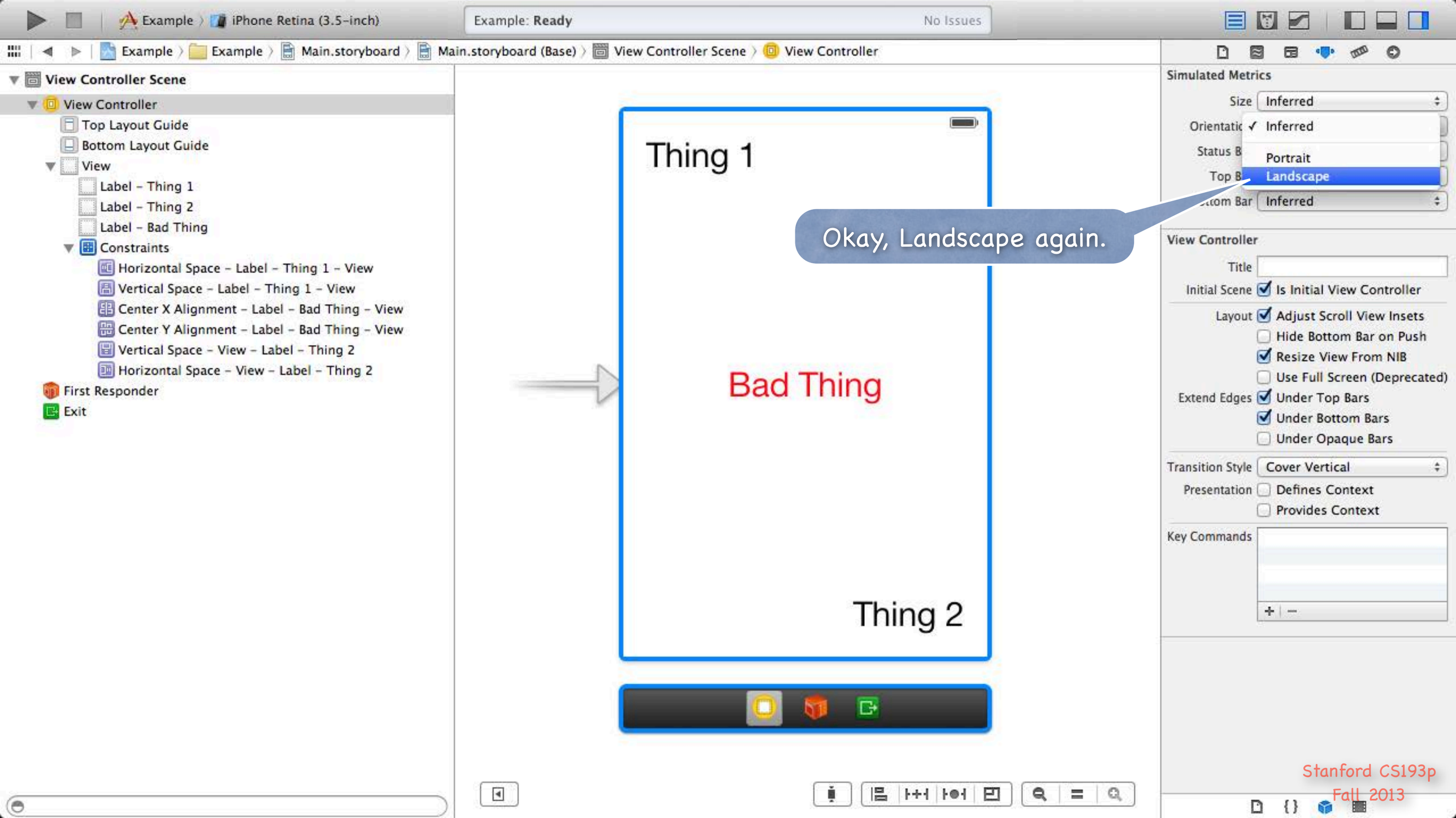
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
View 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
Okay, Landscape again.
Simulated Metrics
Size
Inferred
Orientatic
Inferred
Portrait
Landscape
Status B
Top B
tom 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

Example › iPhone Retina (3.5-inch)

Example: **Ready** No Issues

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

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

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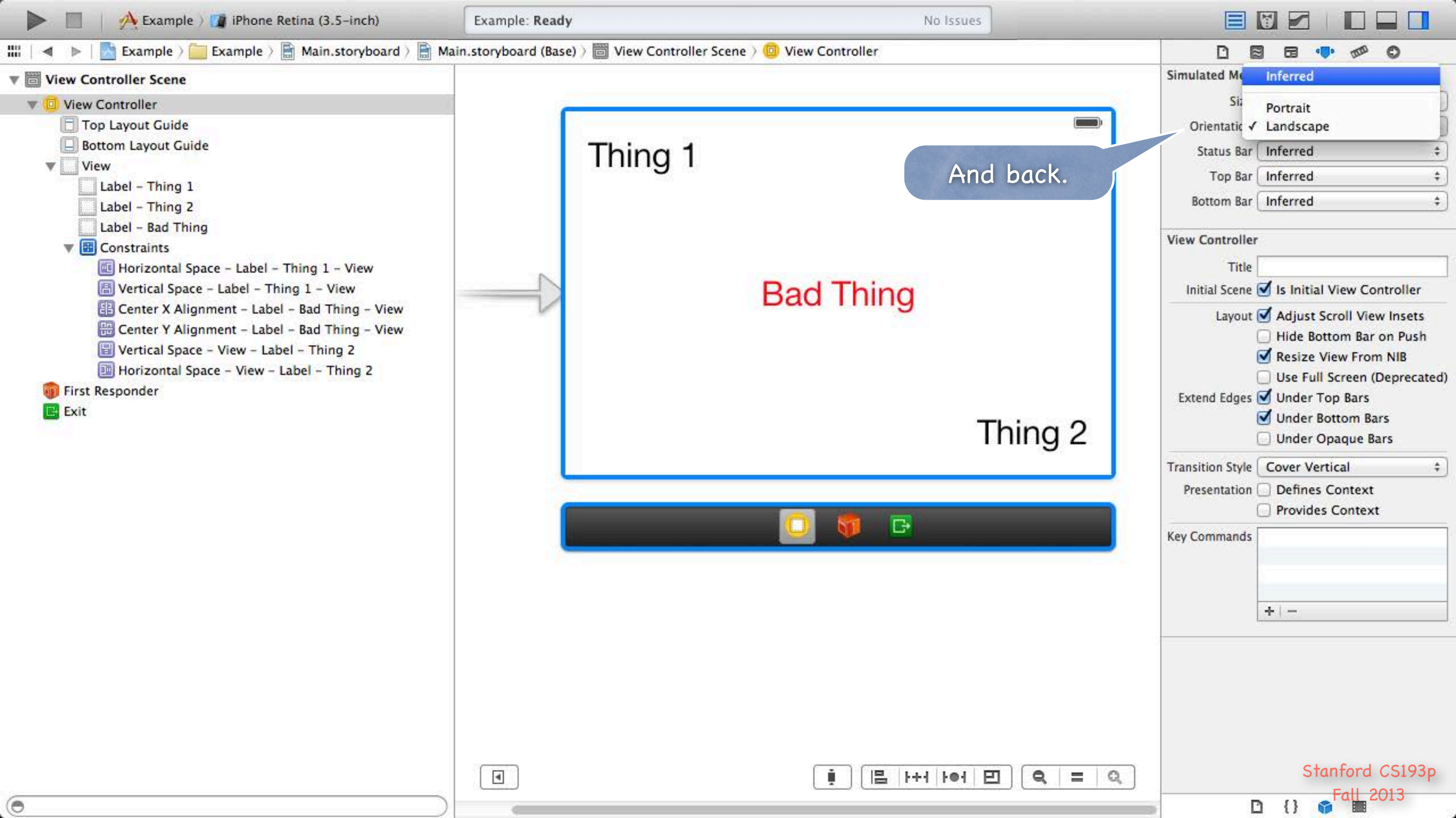
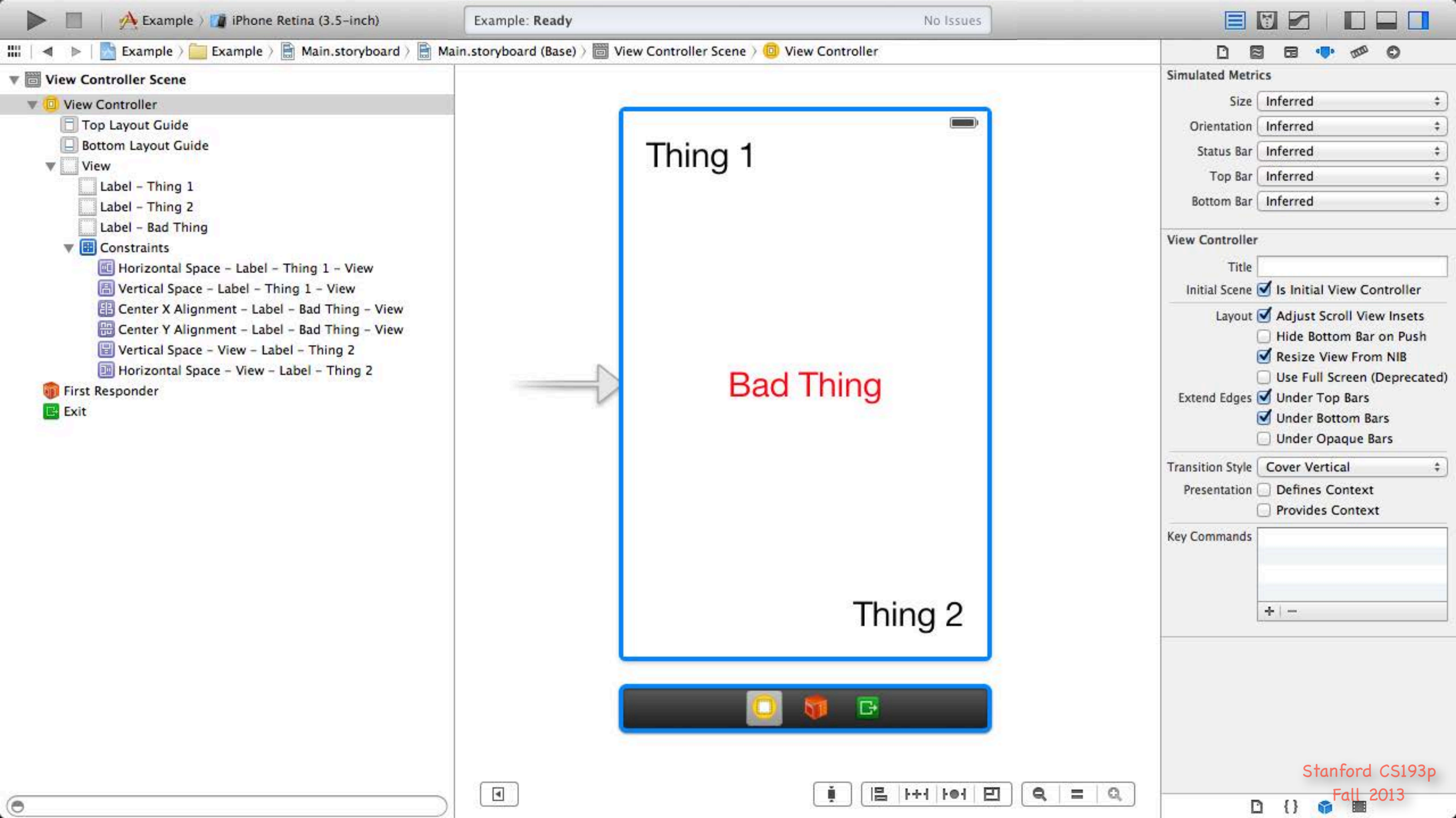
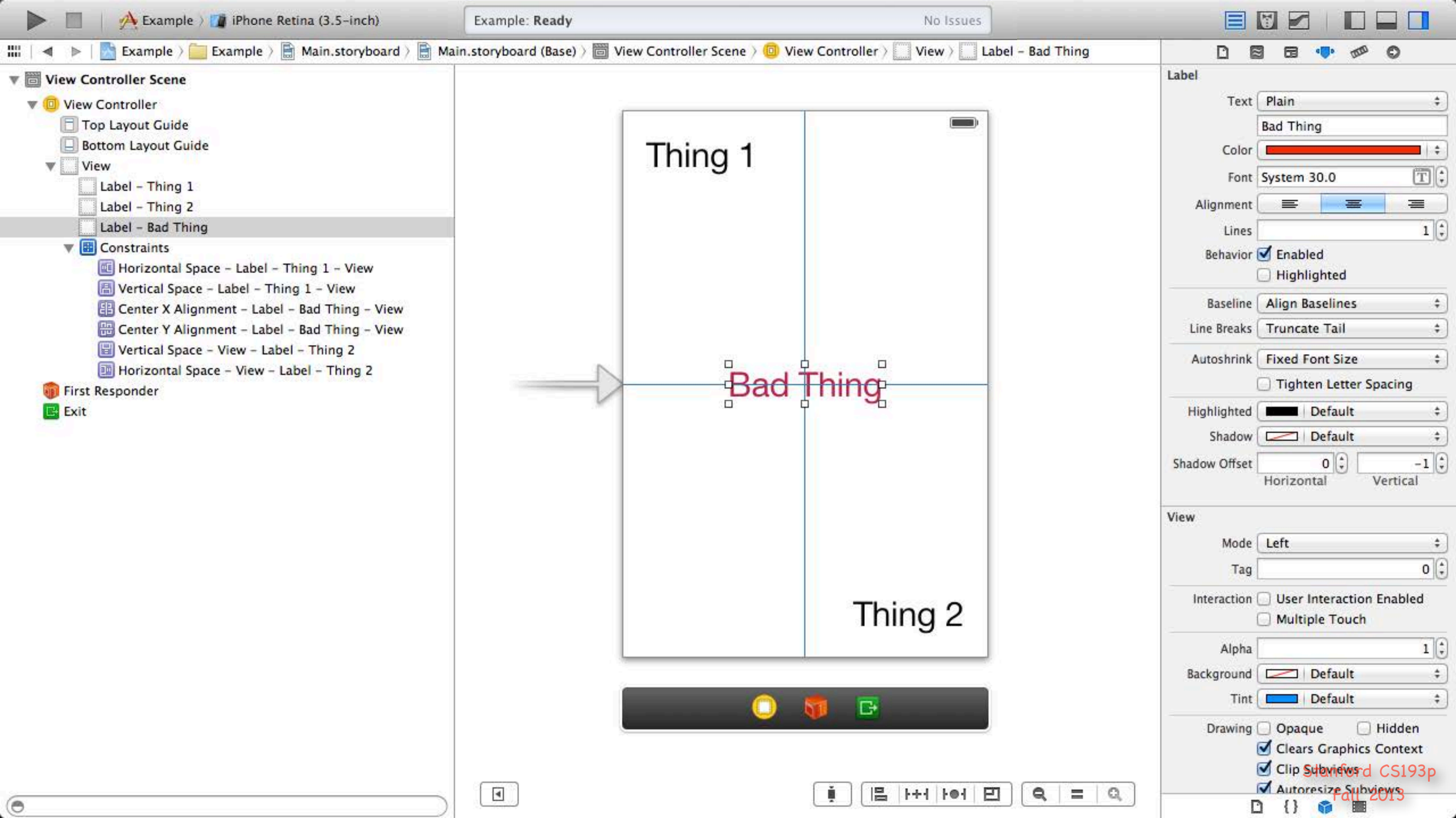
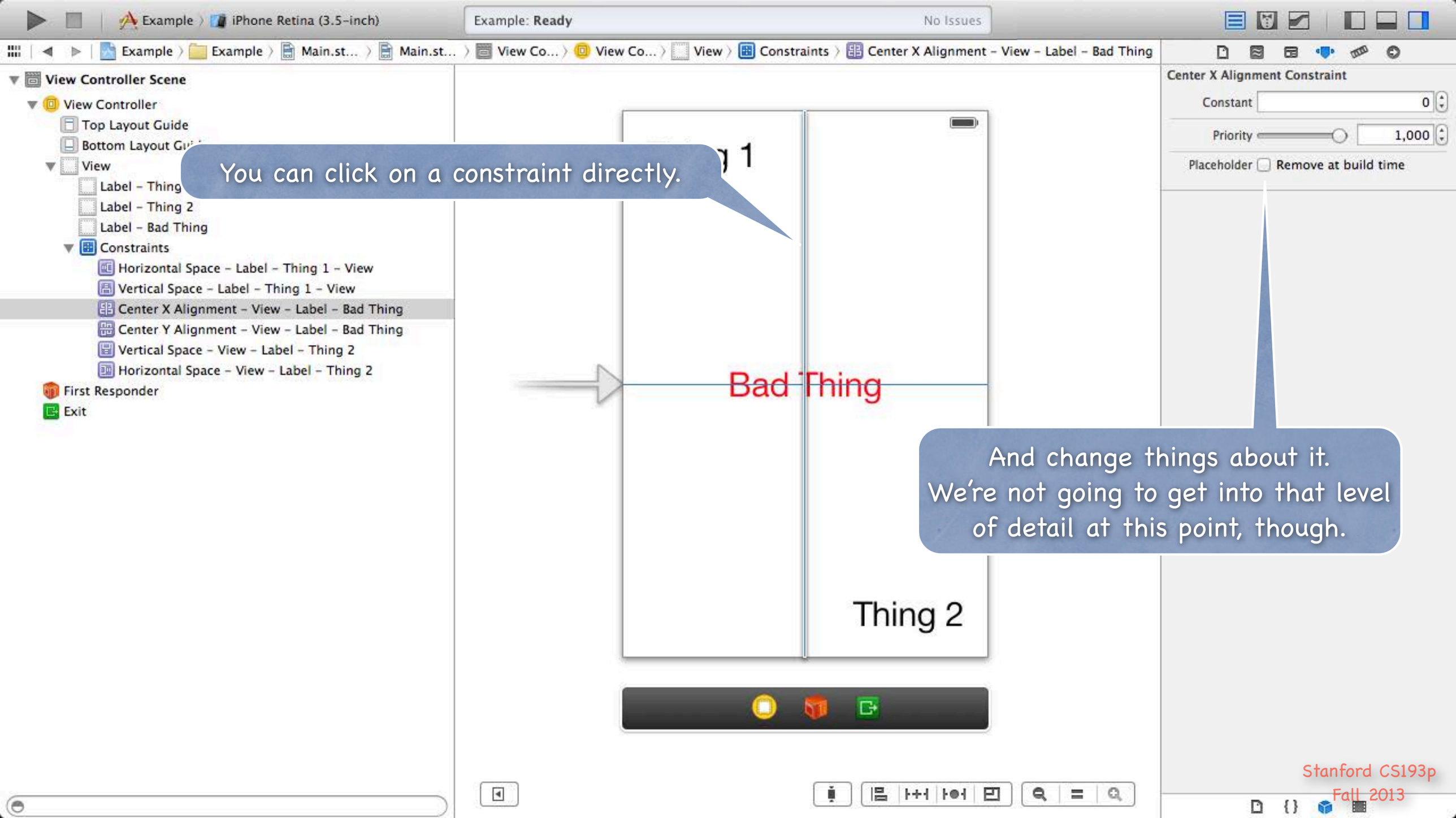
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
View 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
And back.
Simulated Me
Inferred
Portrait
Landscape
Orientatic
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
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 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 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 › 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
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
Label
Text Plain
Bad Thing
Color
Font System 30.0
Alignment
Lines 1
Behavior Enabled
Highlighted
Baseline Align Baselines
Line Breaks Truncate Tail
Autoshrink Fixed Font Size
Tighten Letter Spacing
Highlighted Default
Shadow Default
Shadow Offset 0 -1
Horizontal
Vertical
View
Mode Left
Tag 0
Interaction User Interaction Enabled
Multiple Touch
Alpha 1
Background Default
Tint Default
Drawing Opaque Hidden
Clears Graphics Context
Clip Subviews
Autoresize Subviews
Stanford CS193p
Fall 2013


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.st... › Main.st... › View Co... › View Co... › View › Constraints › Center X Alignment – View – Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Gui
View
Label – Thing
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
You can click on a constraint directly.
Bad Thing
Thing 2
Center X Alignment Constraint
Constant
0
Priority
1,000
Placeholder
Remove at build time
And change things about it.
We're not going to get into that level of detail at this point, though.
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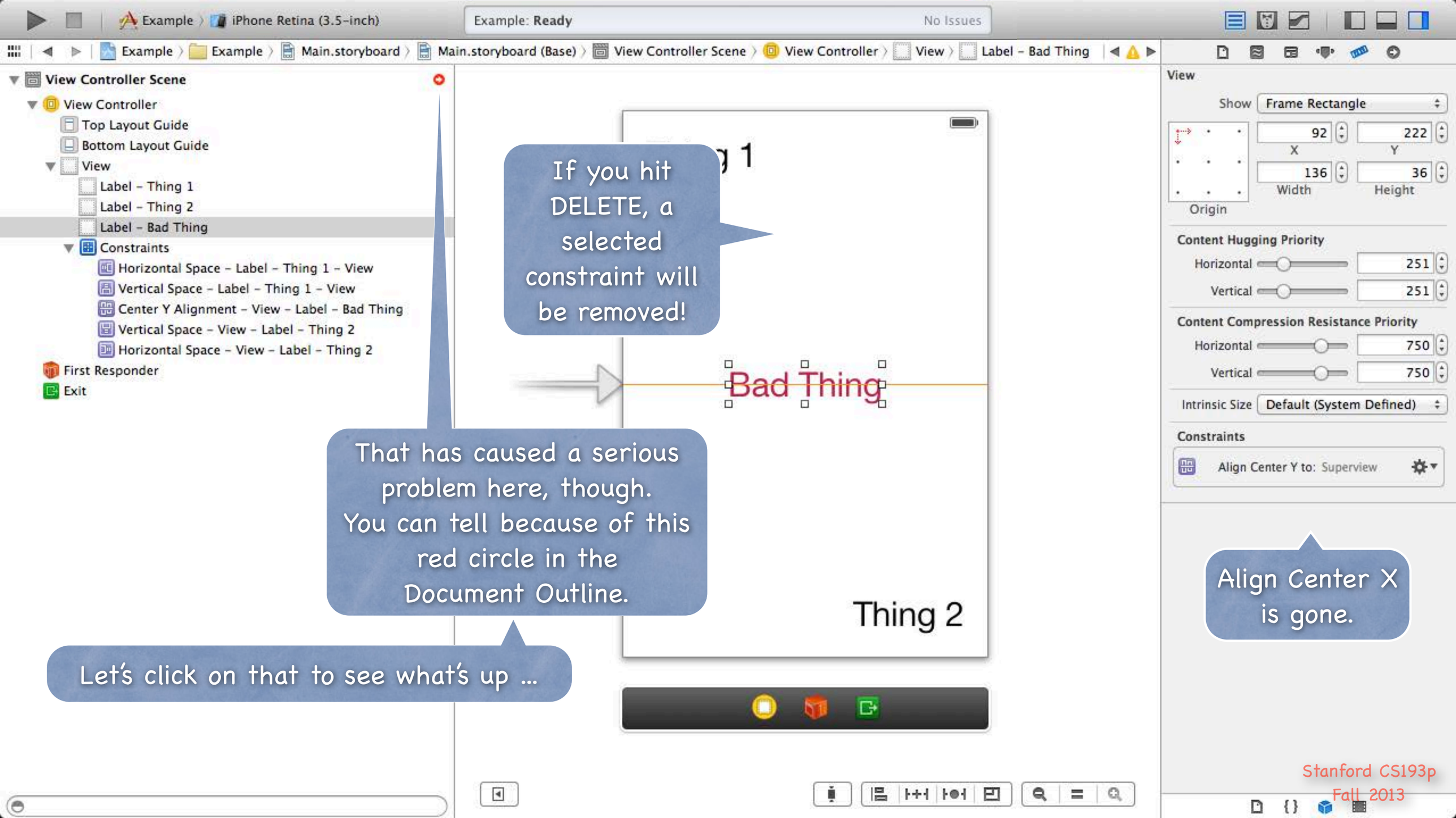
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – Label – Thing 1 – View
Center Y Alignment – View – Label – Bad Thing
Vertical Space – View – Label – Thing 2
Horizontal Space – View – Label – Thing 2
First Responder
Exit
If you hit DELETE, a selected constraint will be removed!
Bad Thing
Thing 2
That has caused a serious problem here, though. You can tell because of this red circle in the Document Outline.
Let's click on that to see what's up ...
View
Show
Frame Rectangle
92
X
222
Y
136
Width
36
Height
Origin
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 is gone.
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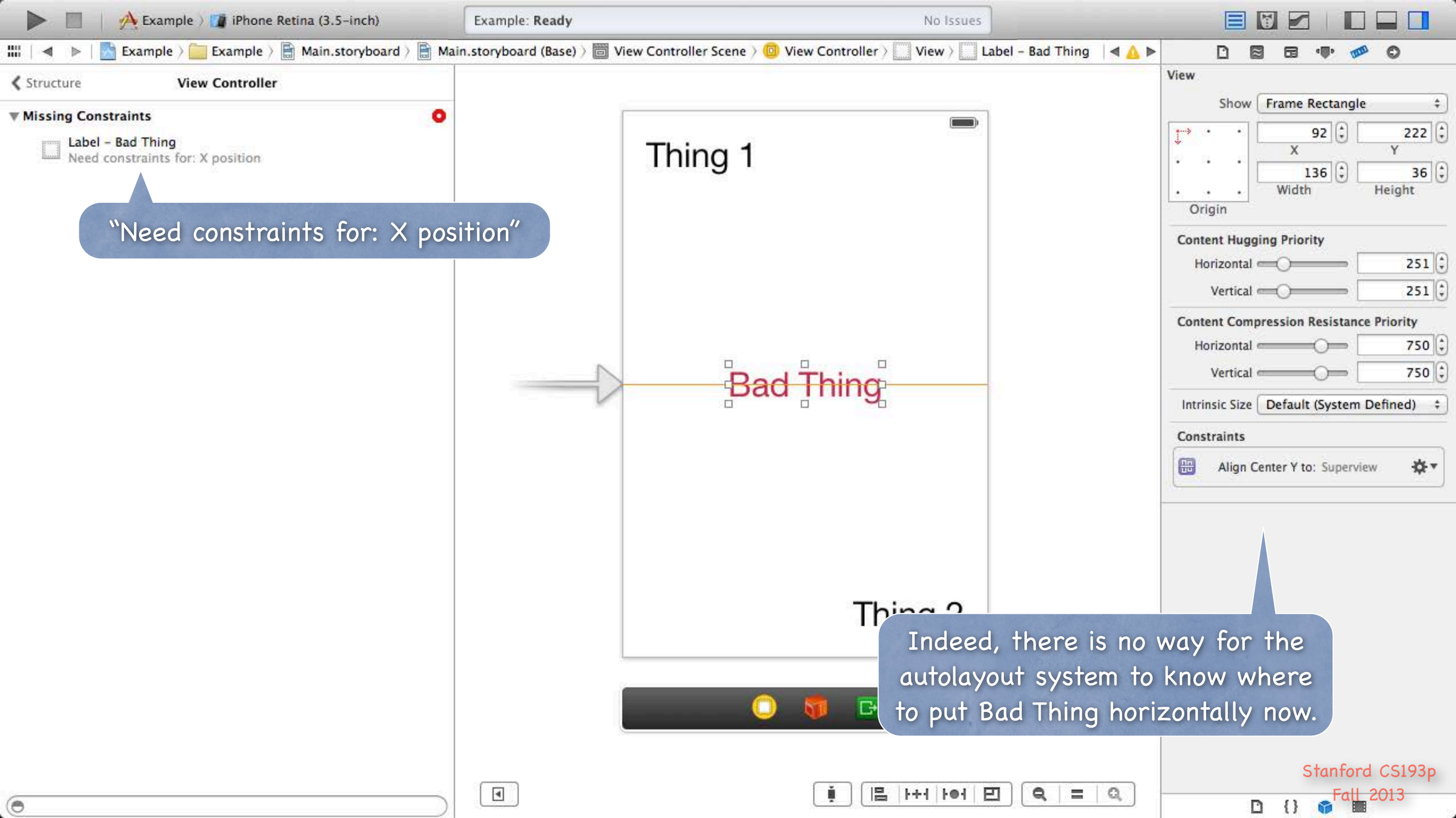
Fall 2013


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
Structure
View Controller
Missing Constraints
Label – Bad Thing
Need constraints for: X position
"Need constraints for: X position"
Thing 1
Bad Thing
Thing 2
Indeed, there is no way for the autolayout system to know where to put Bad Thing horizontally now.
View
Show
Frame Rectangle
92
X
222
Y
136
Width
36
Height
Origin
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
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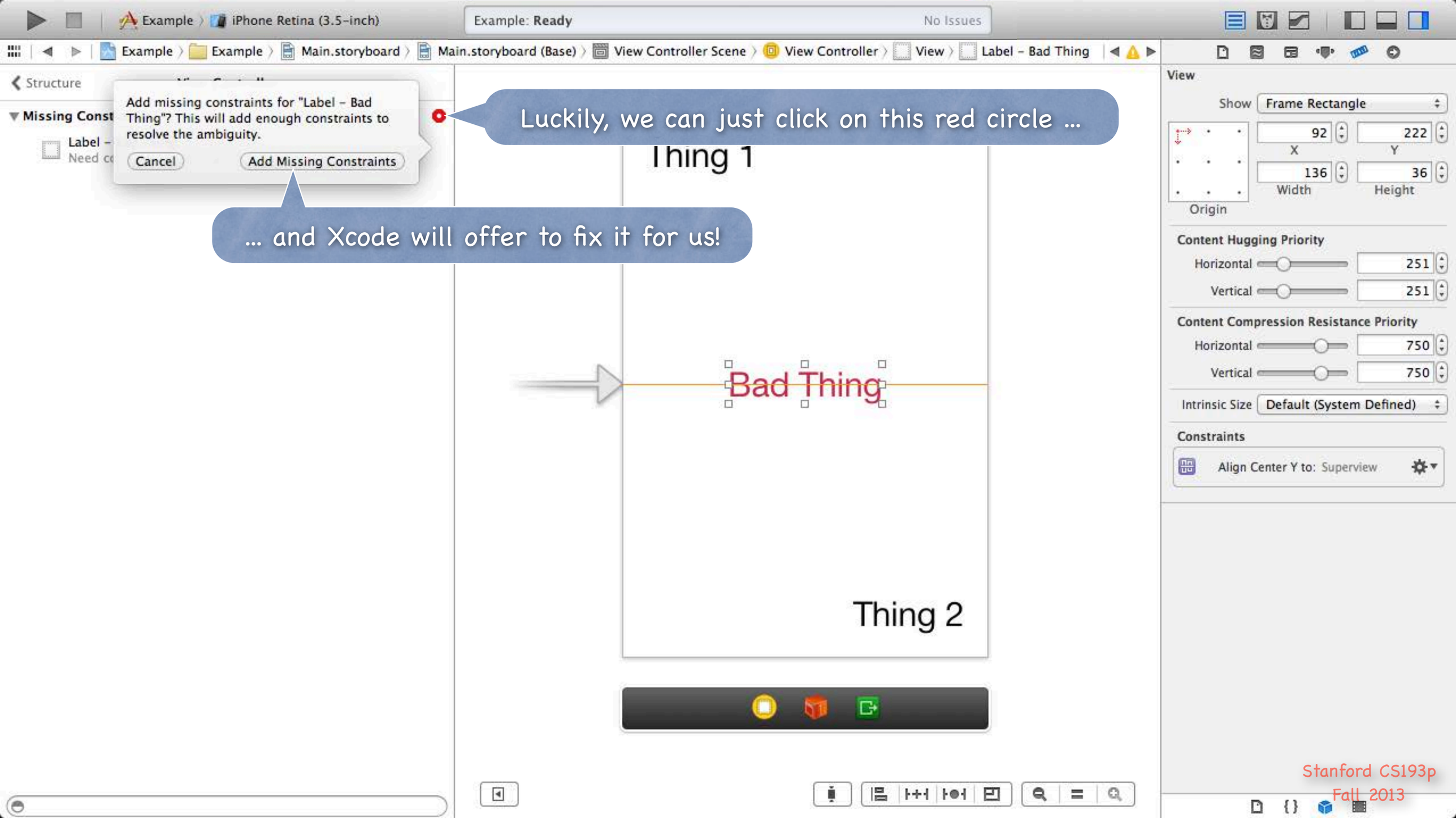
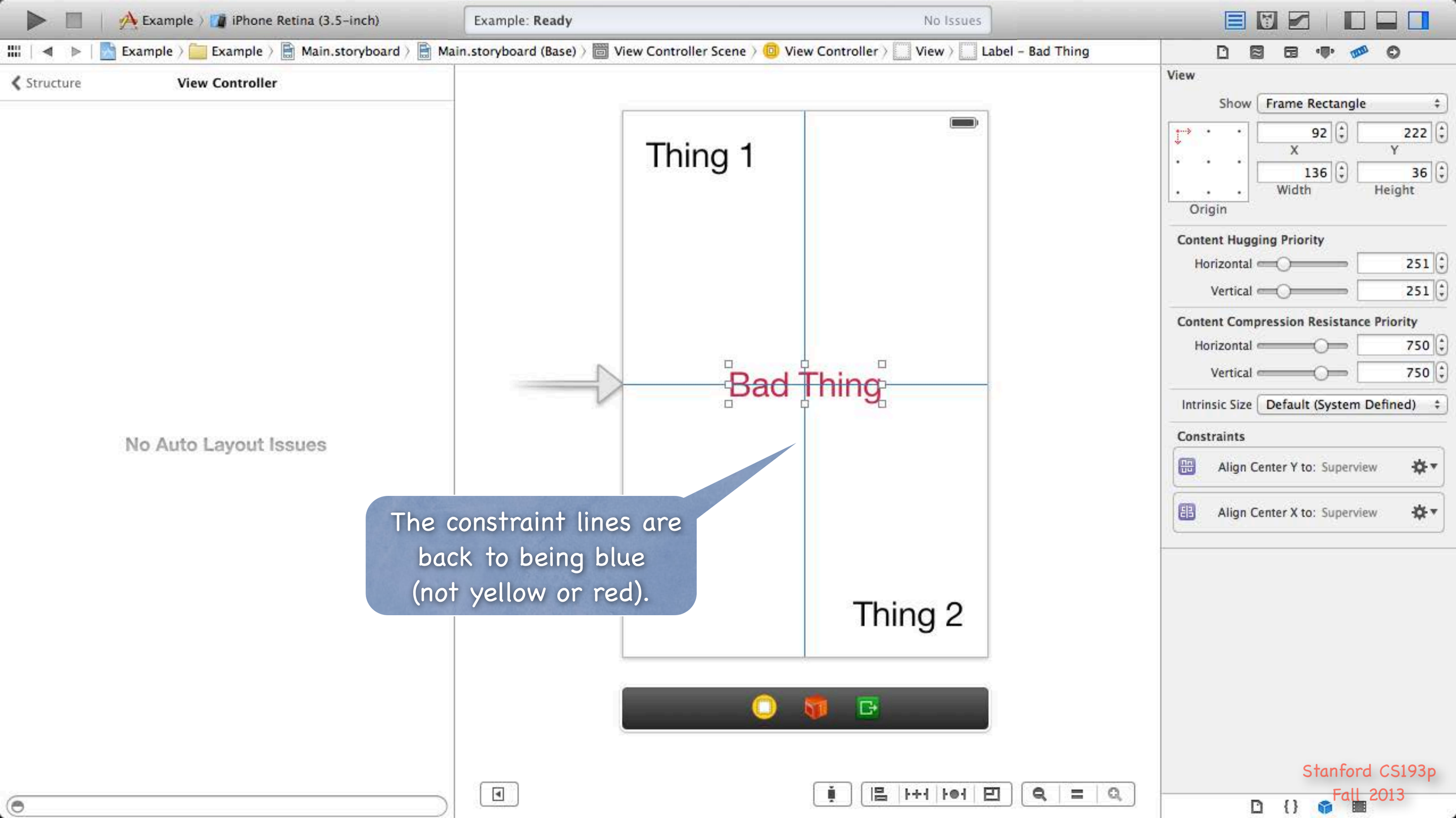
Fall 2013


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
Structure
Missing Const
Label –
Need c
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 ...
... and Xcode will offer to fix it for us!
Thing 1
Bad Thing
Thing 2
View
Show
Frame Rectangle
92
X
222
Y
136
Width
36
Height
Origin
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 › 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
Structure
View Controller
No Auto Layout Issues
Thing 1
Bad Thing
Thing 2
The constraint lines are back to being blue (not yellow or red).
View
Show
Frame Rectangle
92
X
222
Y
136
Width
36
Height
Origin
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
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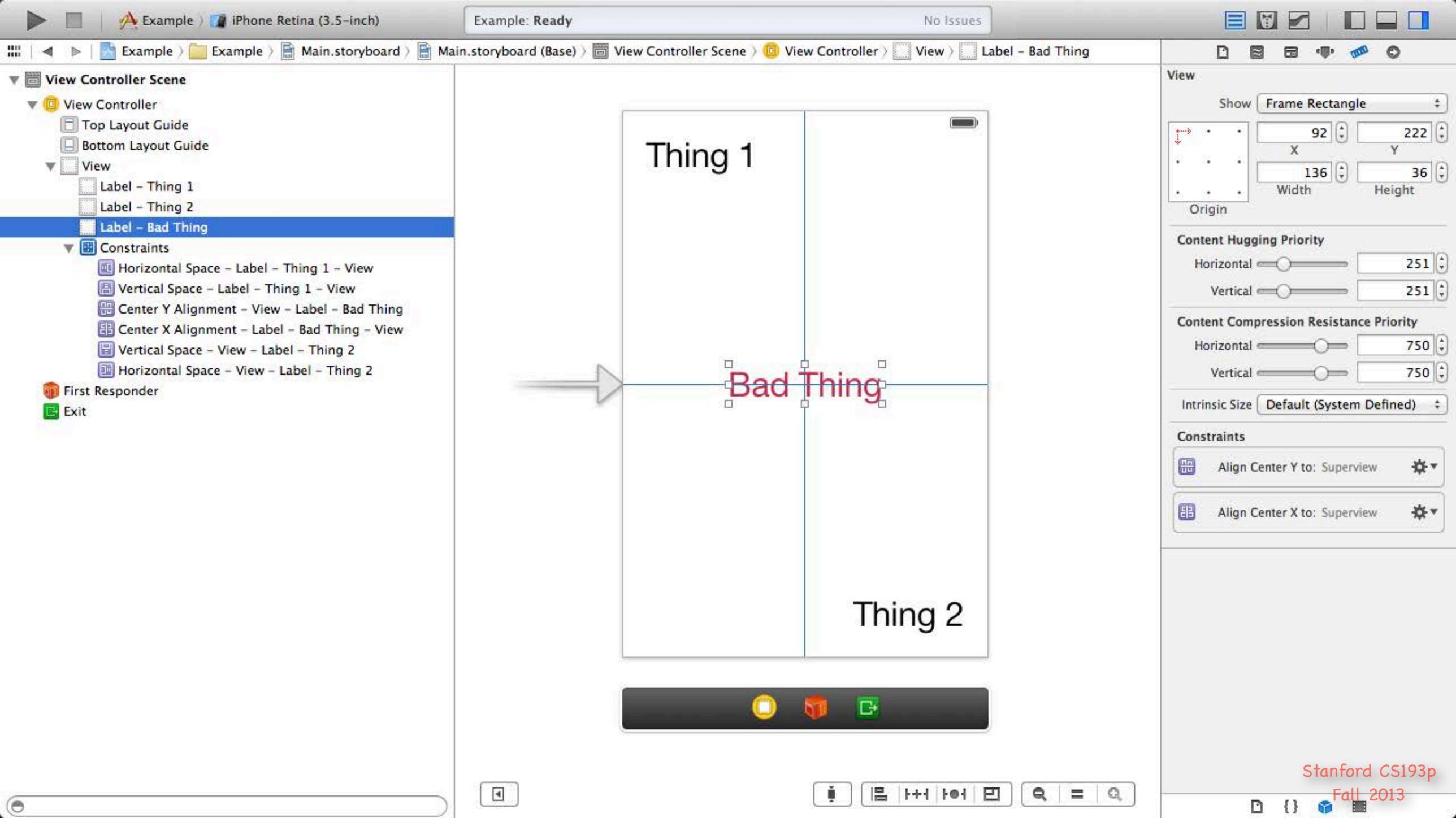
Fall 2013


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
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
92
X
222
Y
136
Width
36
Height
Origin
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
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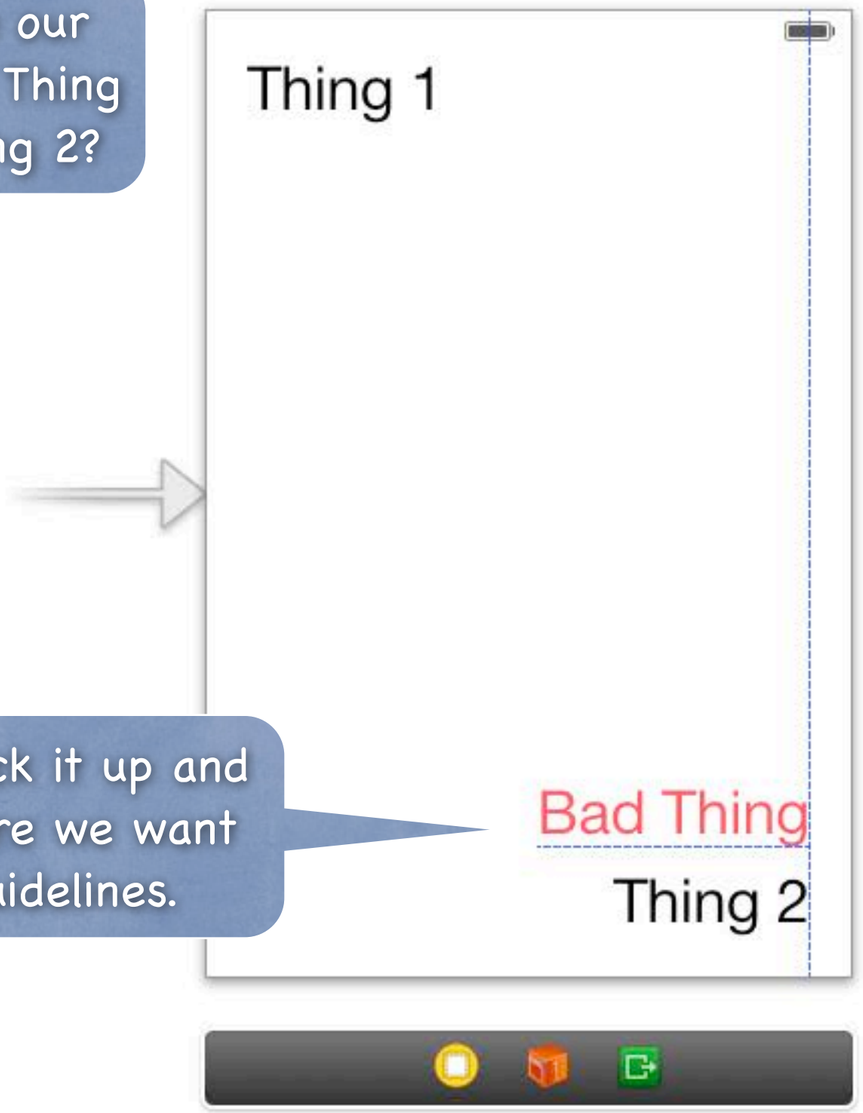
Fall 2013

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

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

- 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

X: 0 Y: 0

Width: 320 Height: 480

Origin

Content Hugging Priority

Horizontal: 250

Vertical: 250

Content Compression Resistance Priority

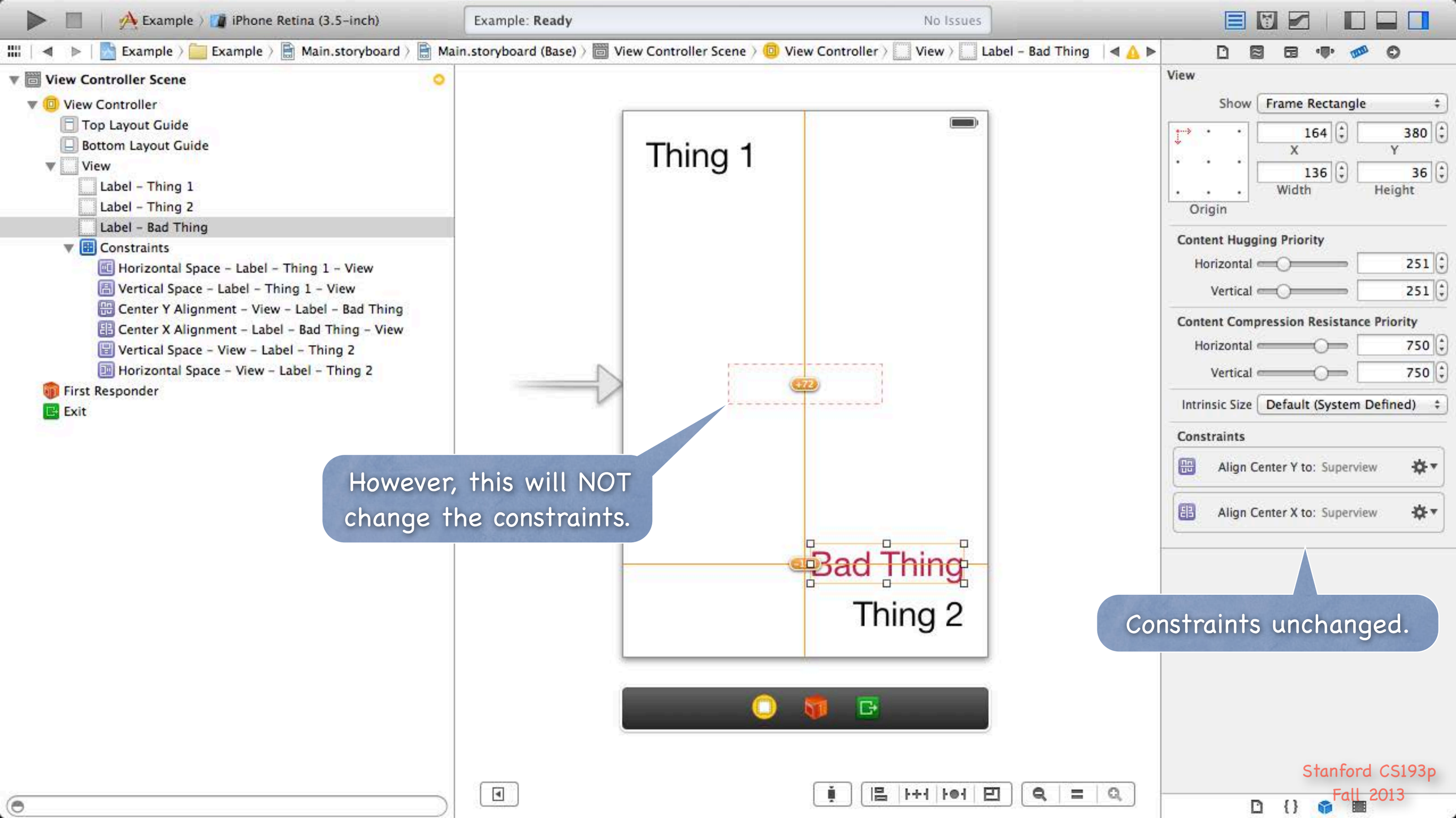
Horizontal: 750

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...
- Align Center X to: Label – Bad...
- Bottom Space to: Label – Thi... Equals: Default
- Trailing Space to: Label – Thi... Equals: Default


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
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
However, this will NOT change the constraints.
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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
Constraints unchanged.
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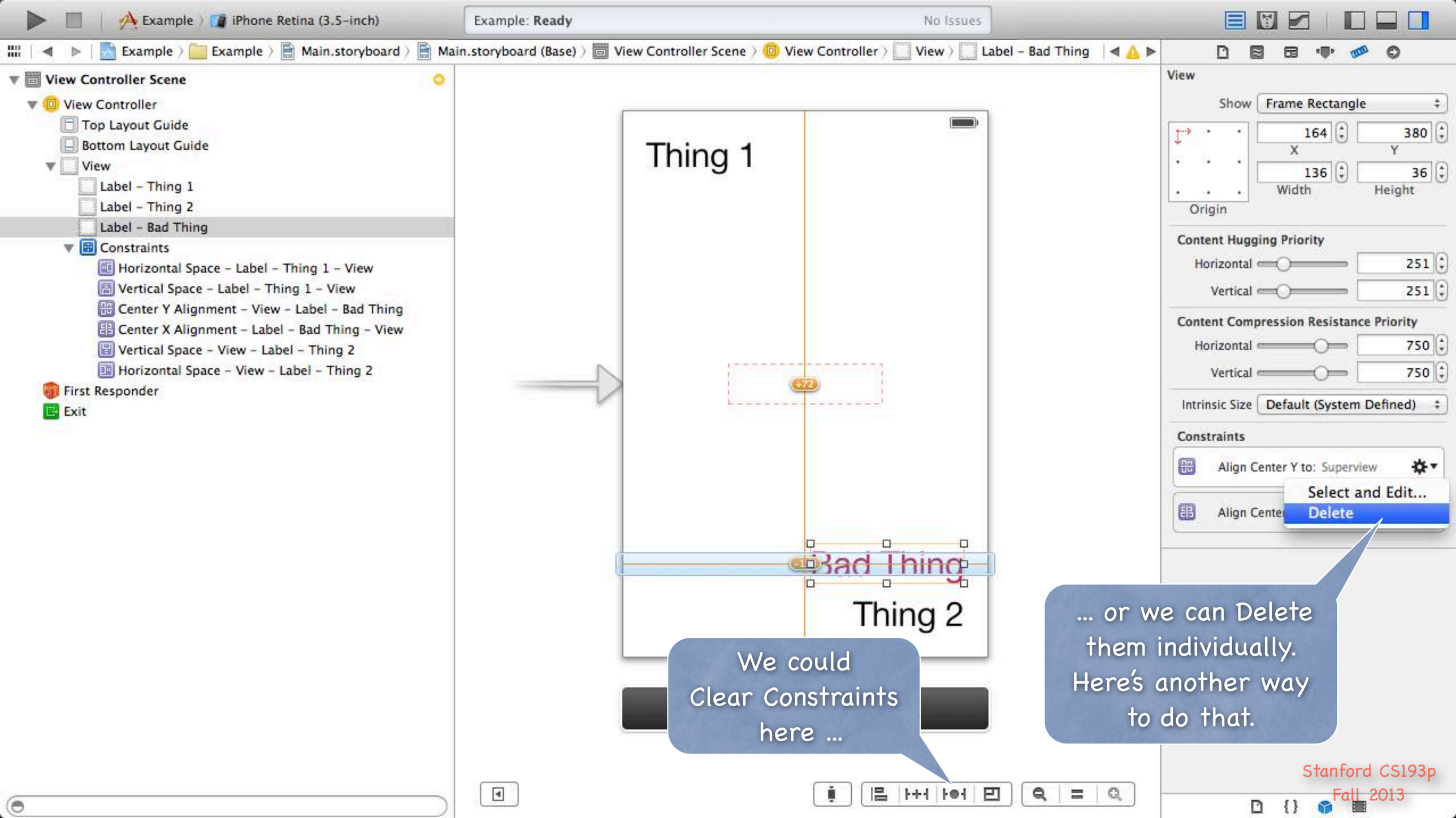
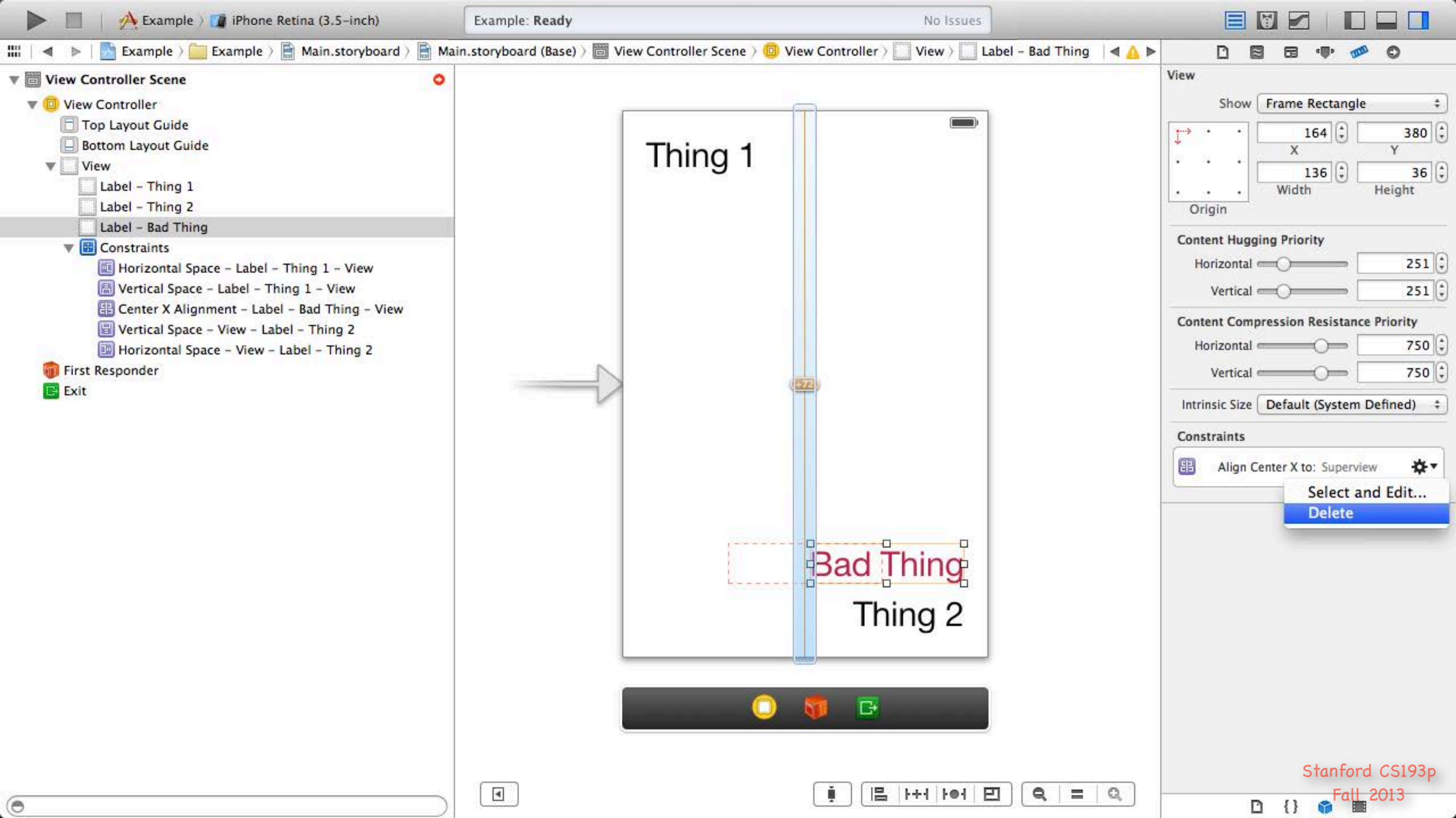
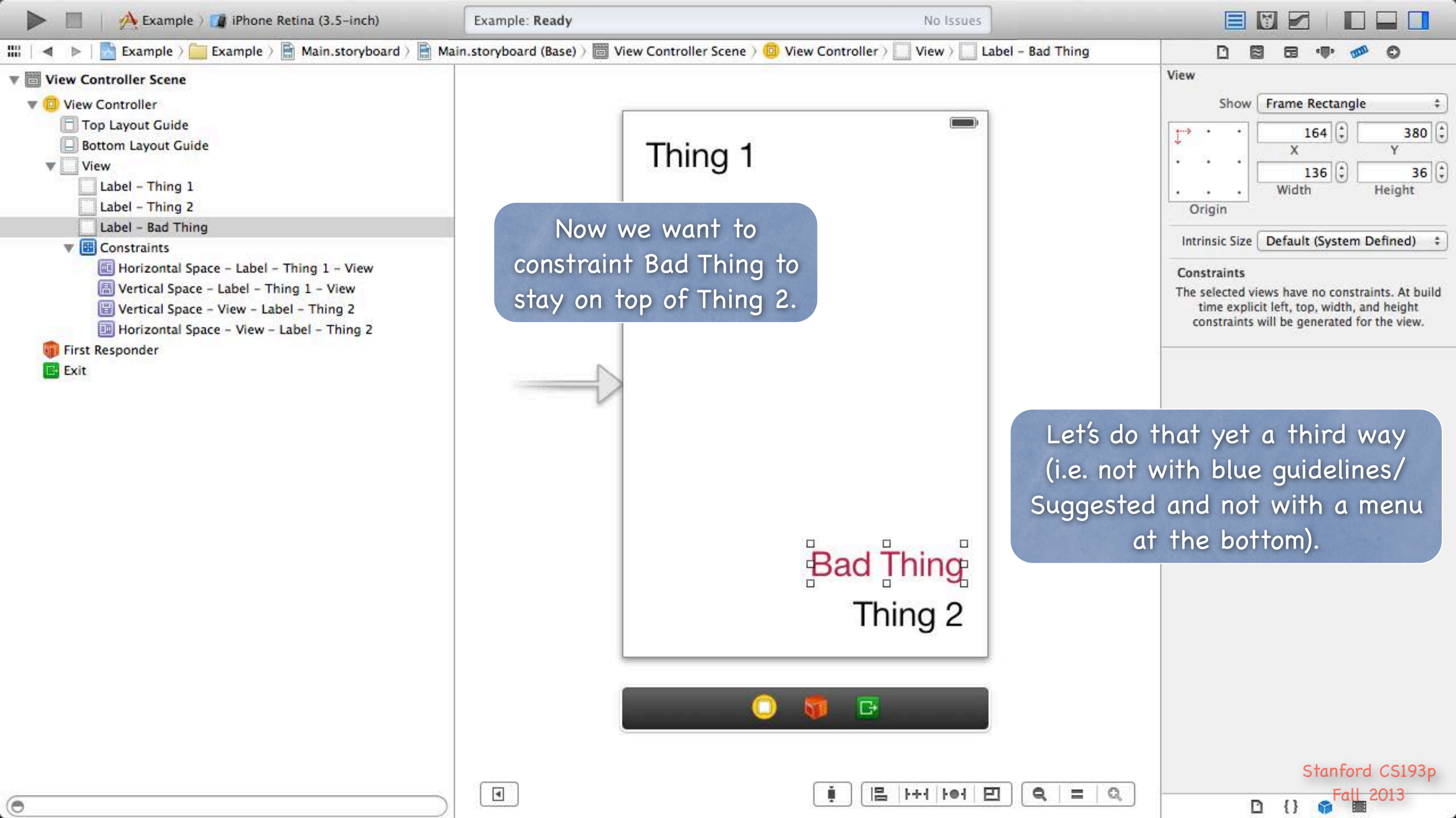
Fall 2013


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
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
We could Clear Constraints here …
… or we can Delete them individually. Here's another way to do that.
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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
Select and Edit...
Delete
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
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
164
X
380
Y
136
Width
36
Height
Origin
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 › 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
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).
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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.
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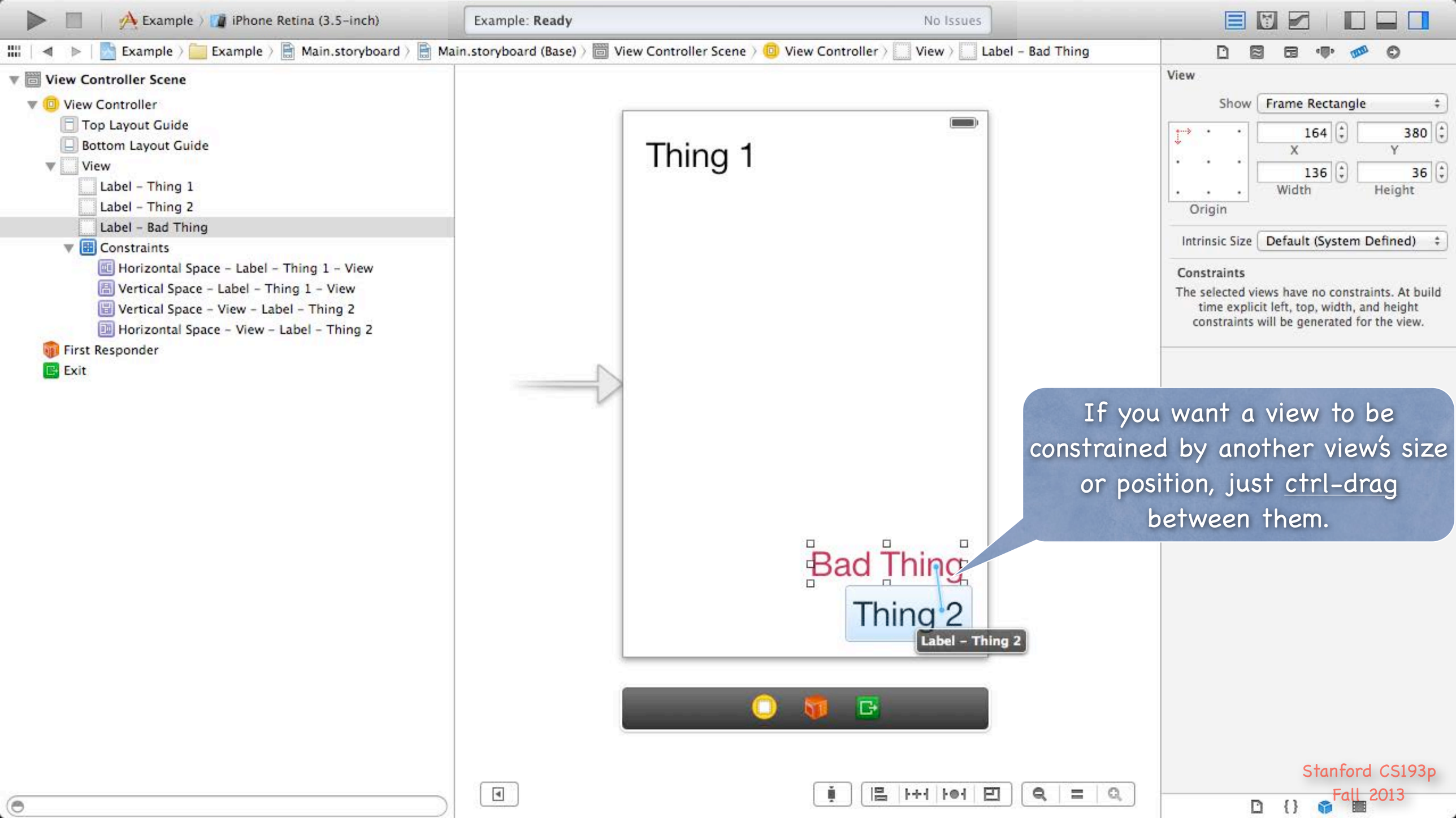
Fall 2013


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 2
Label – Thing 2
If you want a view to be constrained by another view's size or position, just ctrl-drag between them.
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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.
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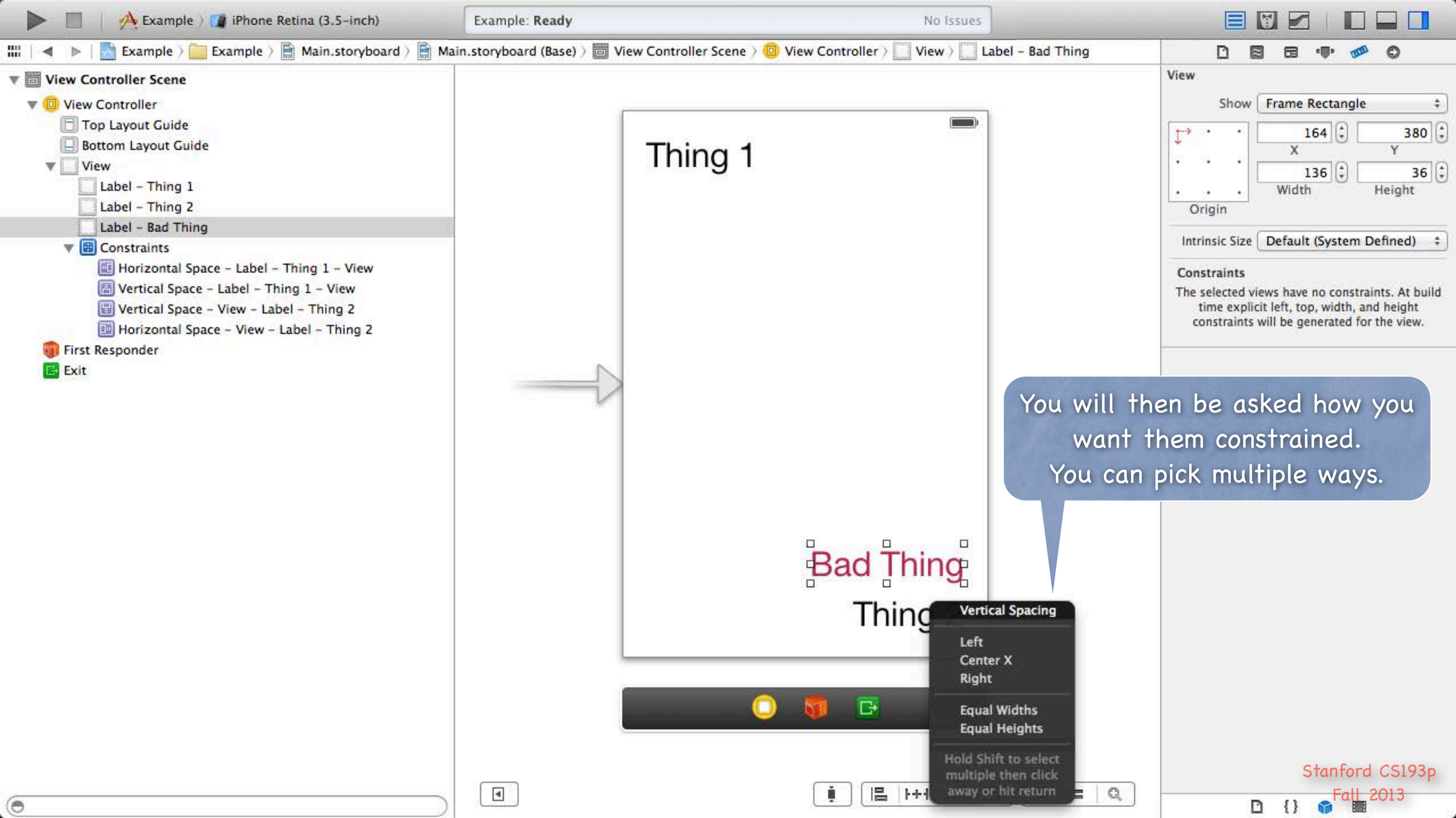
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
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
164
X
380
Y
136
Width
36
Height
Origin
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.
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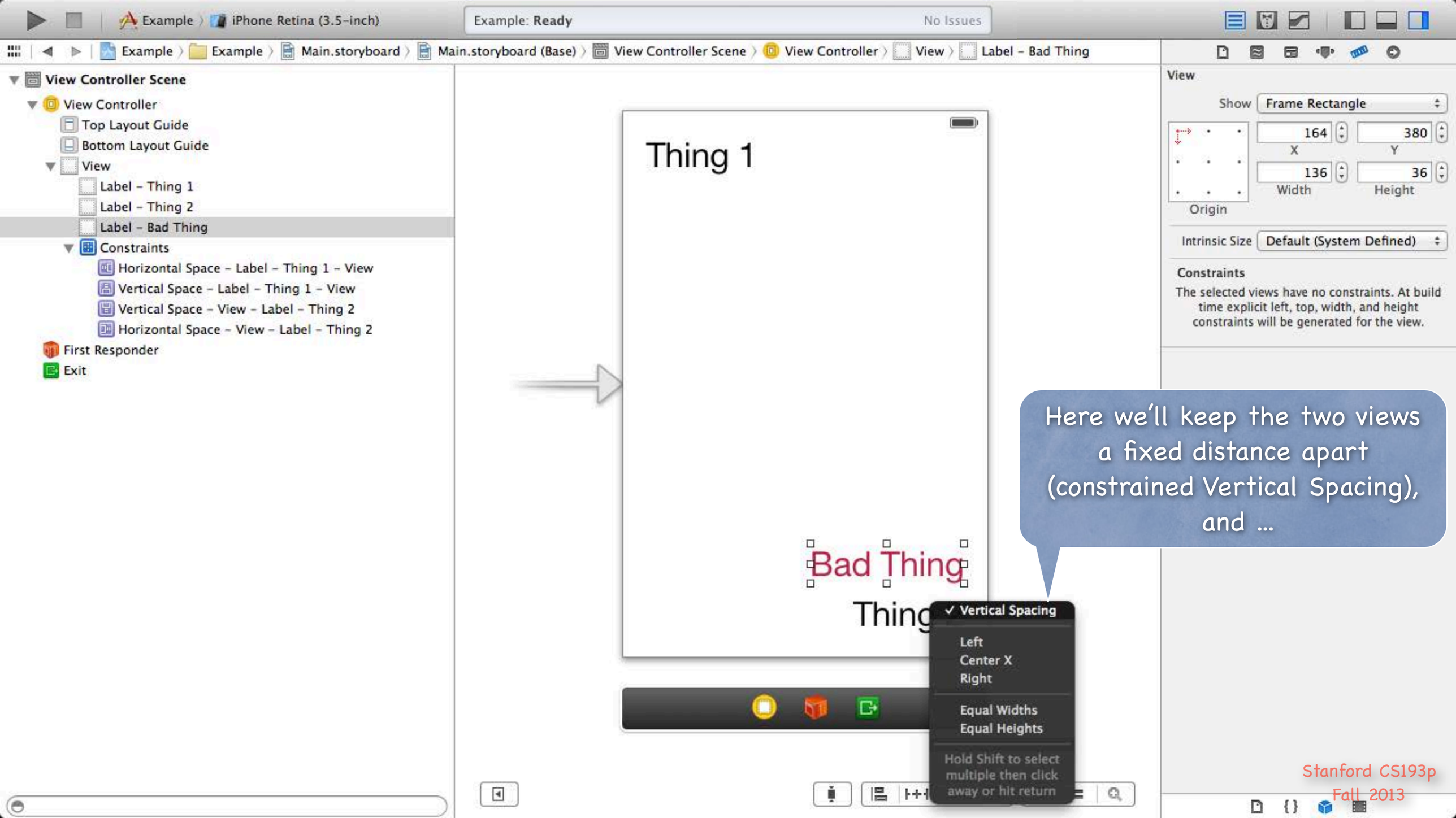
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
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
164
X
380
Y
136
Width
36
Height
Origin
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 ...
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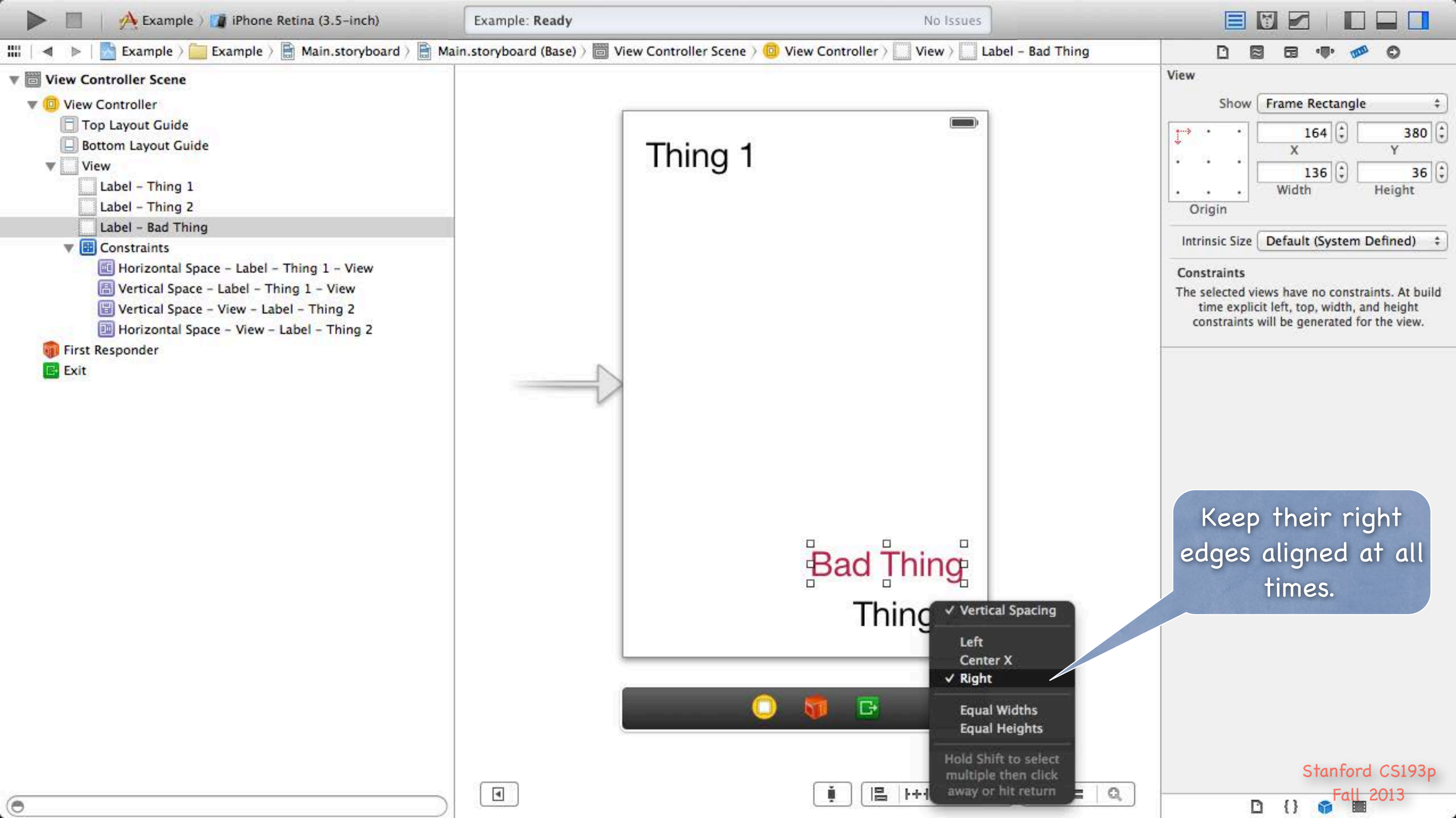
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
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
164
X
380
Y
136
Width
36
Height
Origin
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.
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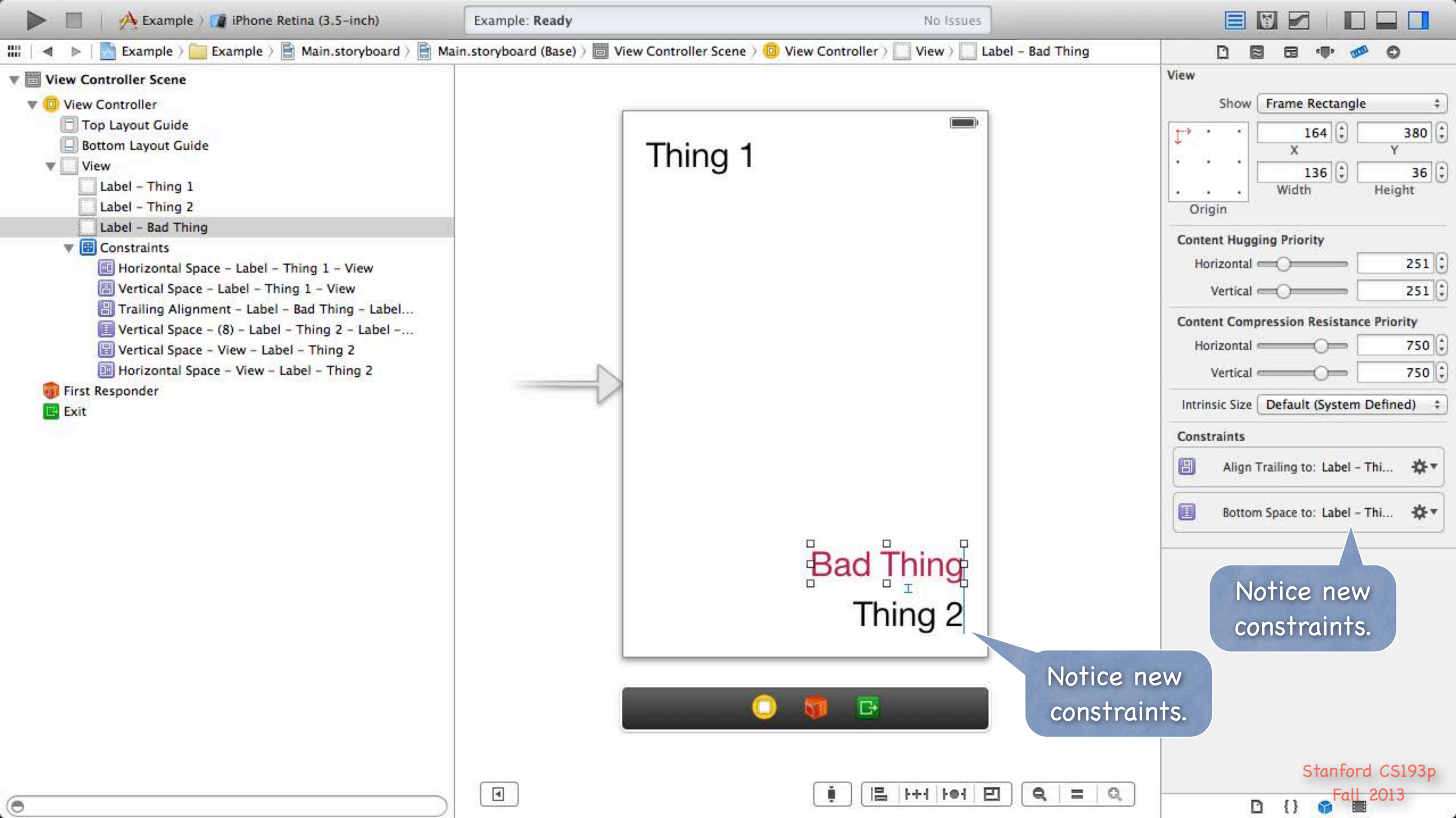
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller › View › Label – Bad Thing
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – Label – Thing 1 – View
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
Notice new constraints.
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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...
Notice new constraints.
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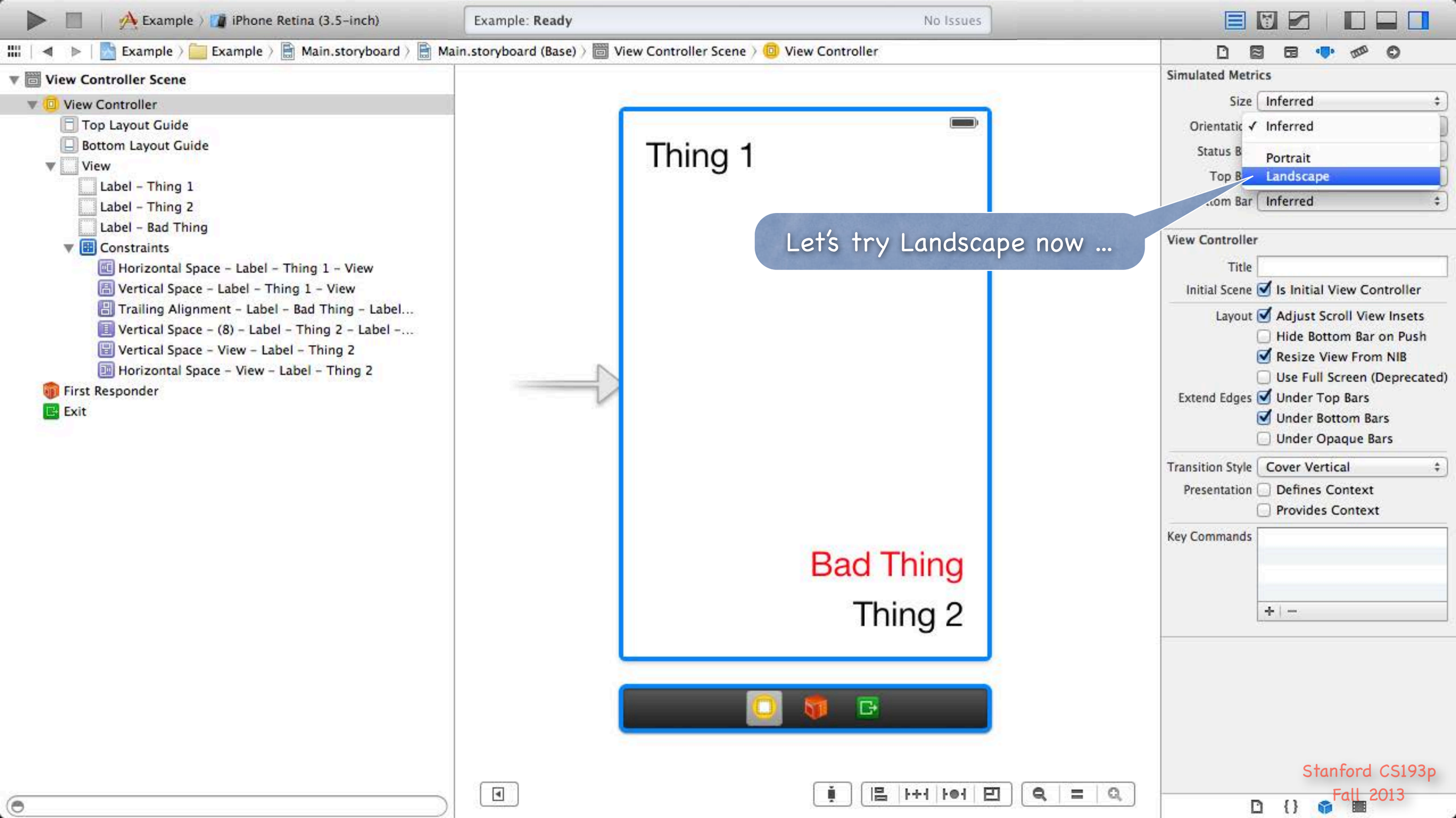
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example › Example › Main.storyboard › Main.storyboard (Base) › View Controller Scene › View Controller
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
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
Thing 1
Bad Thing
Thing 2
Let's try Landscape now ...
Simulated Metrics
Size
Inferred
Orientatic
Inferred
Portrait
Landscape
Status B
Top B
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
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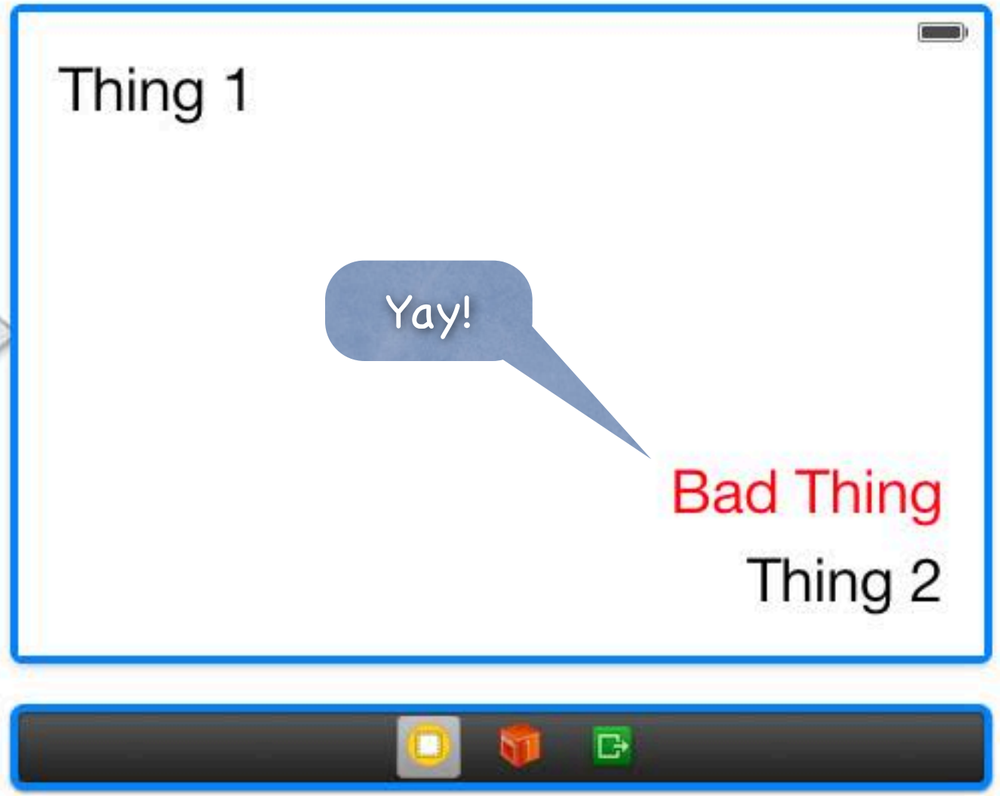
Fall 2013

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

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

- View 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

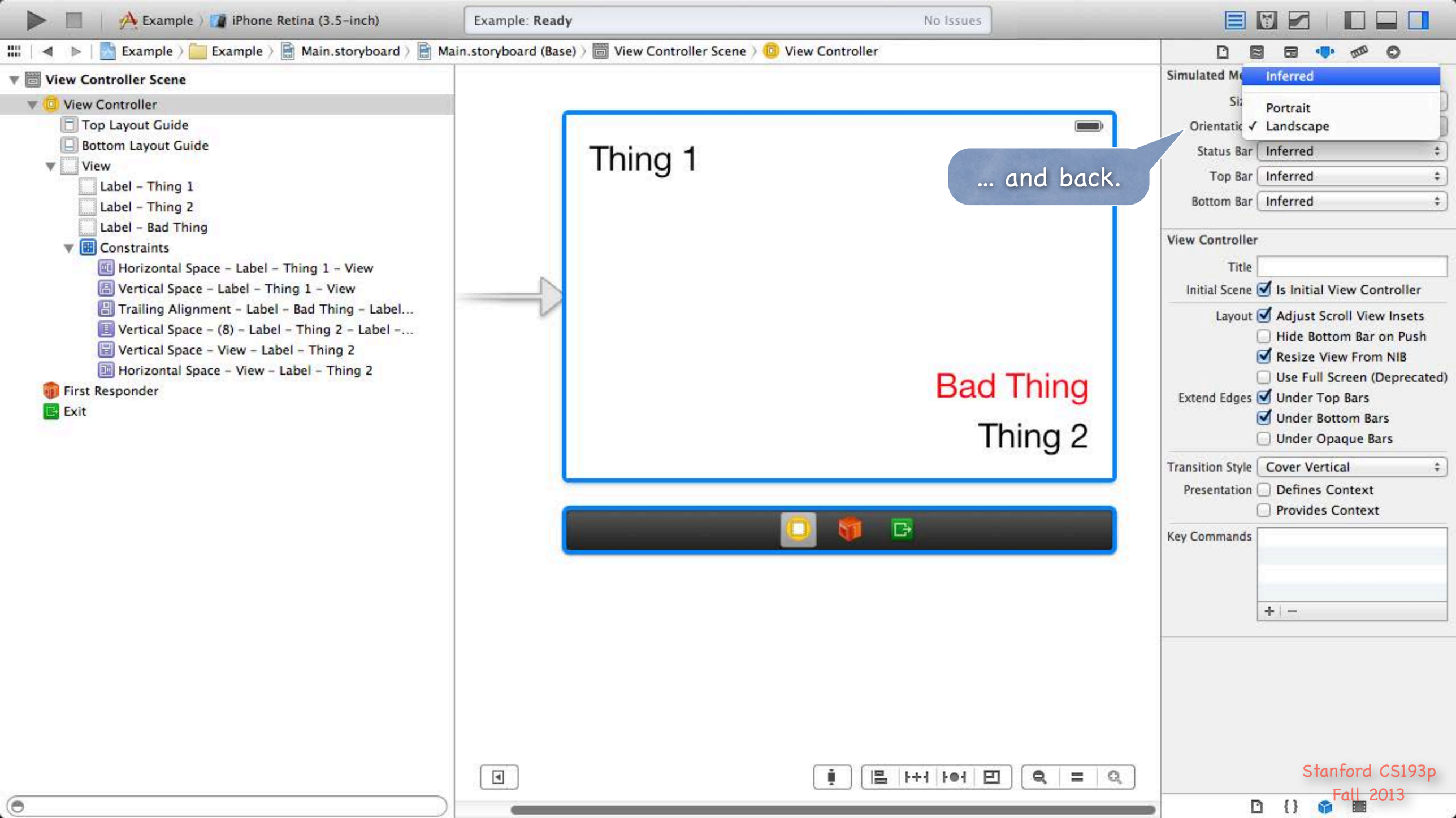


Simulated Metrics

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

View Controller

Title	
Initial Scene	☑ Is Initial View 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	


Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
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
Thing 1
... and back.
Bad Thing
Thing 2
Simulated Me
Inferred
Portrait
Landscape
Orientatic
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
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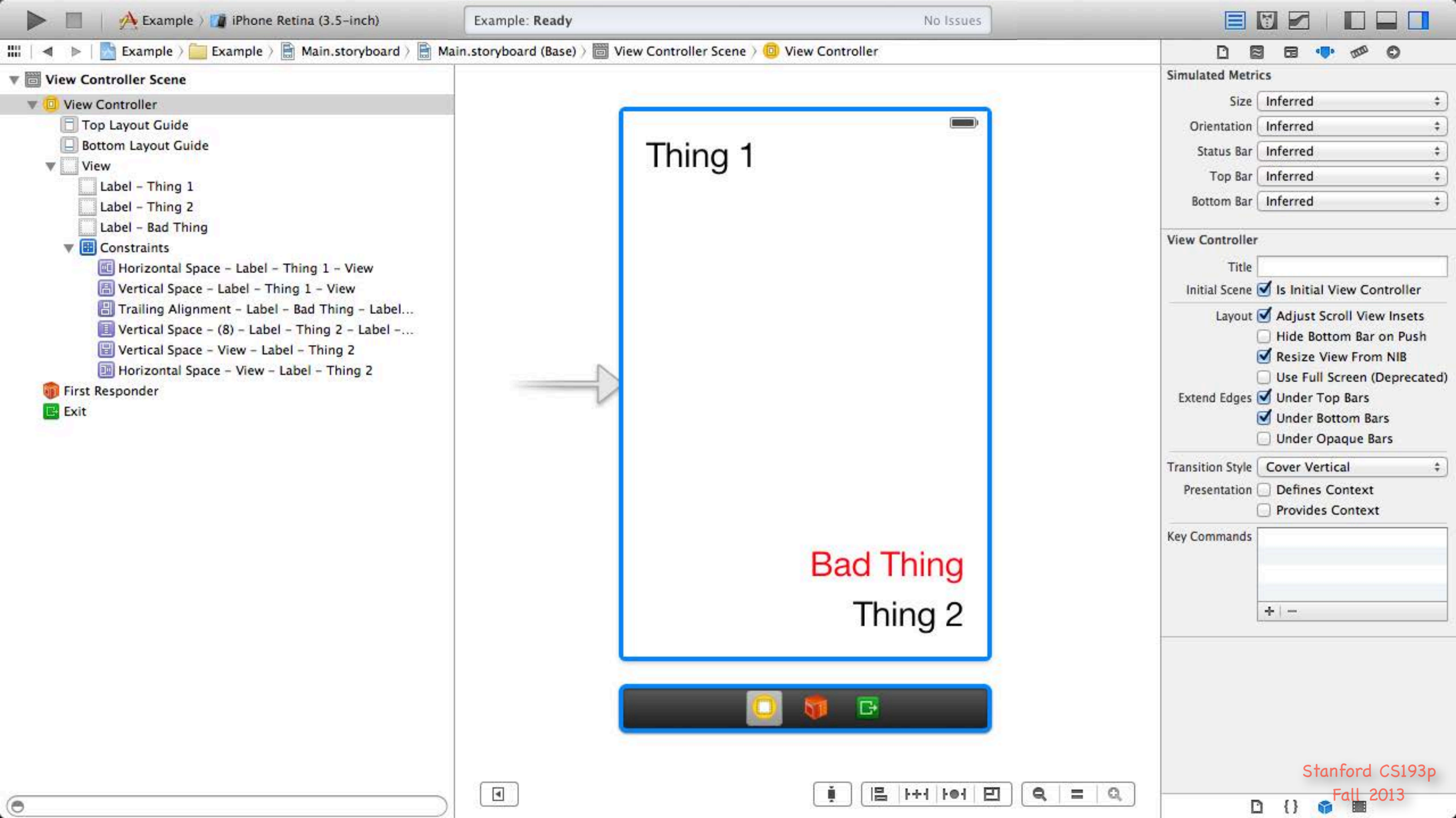
Example
iPhone Retina (3.5-inch)
Example: Ready
No Issues
Example
Example
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal 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
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 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
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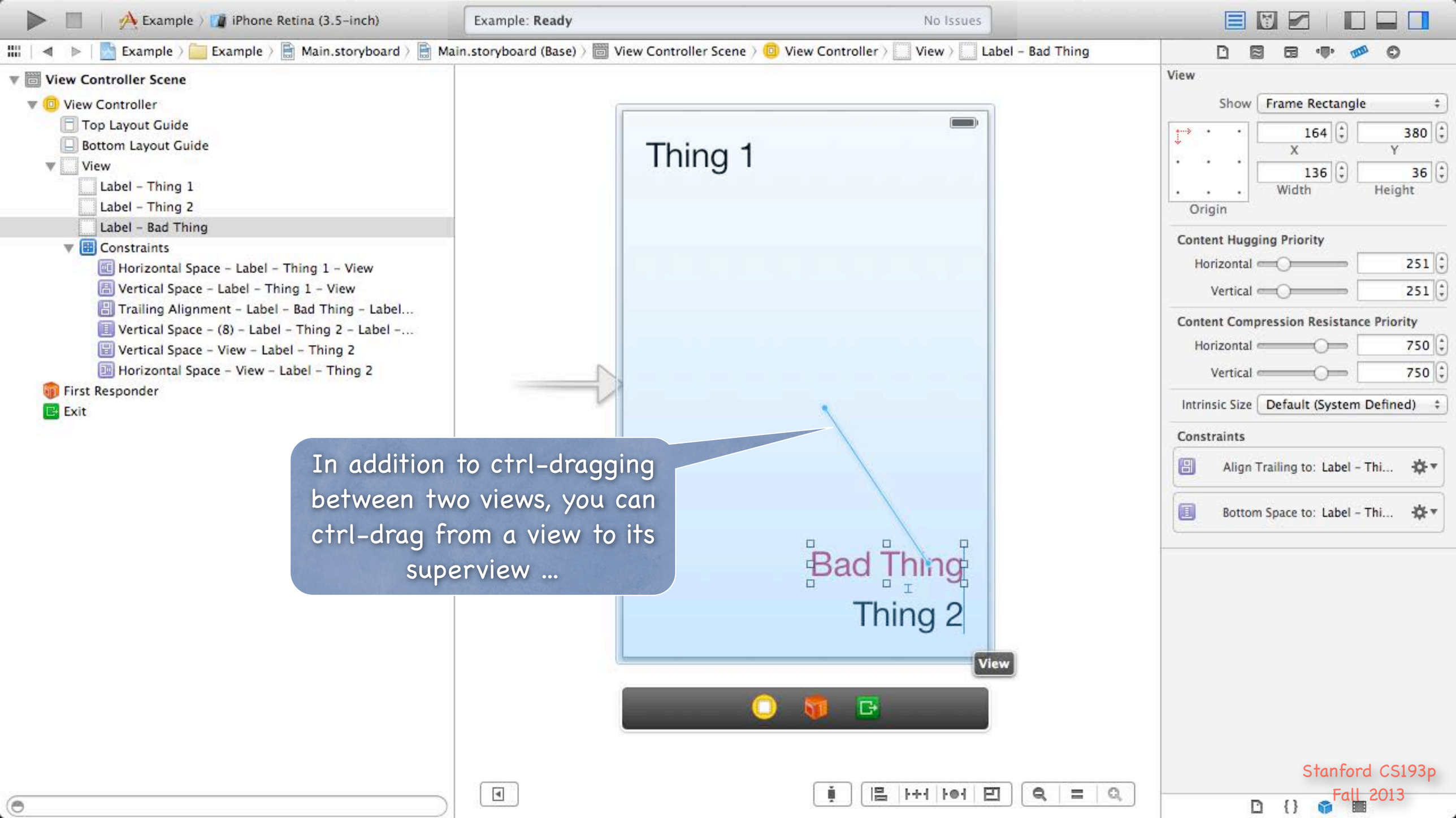
Example › iPhone Retina (3.5-inch)
Example: Ready
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View Controller Scene
View Controller
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Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – 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
In addition to ctrl-dragging between two views, you can ctrl-drag from a view to its superview ...
Thing 1
Bad Thing
Thing 2
View
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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...
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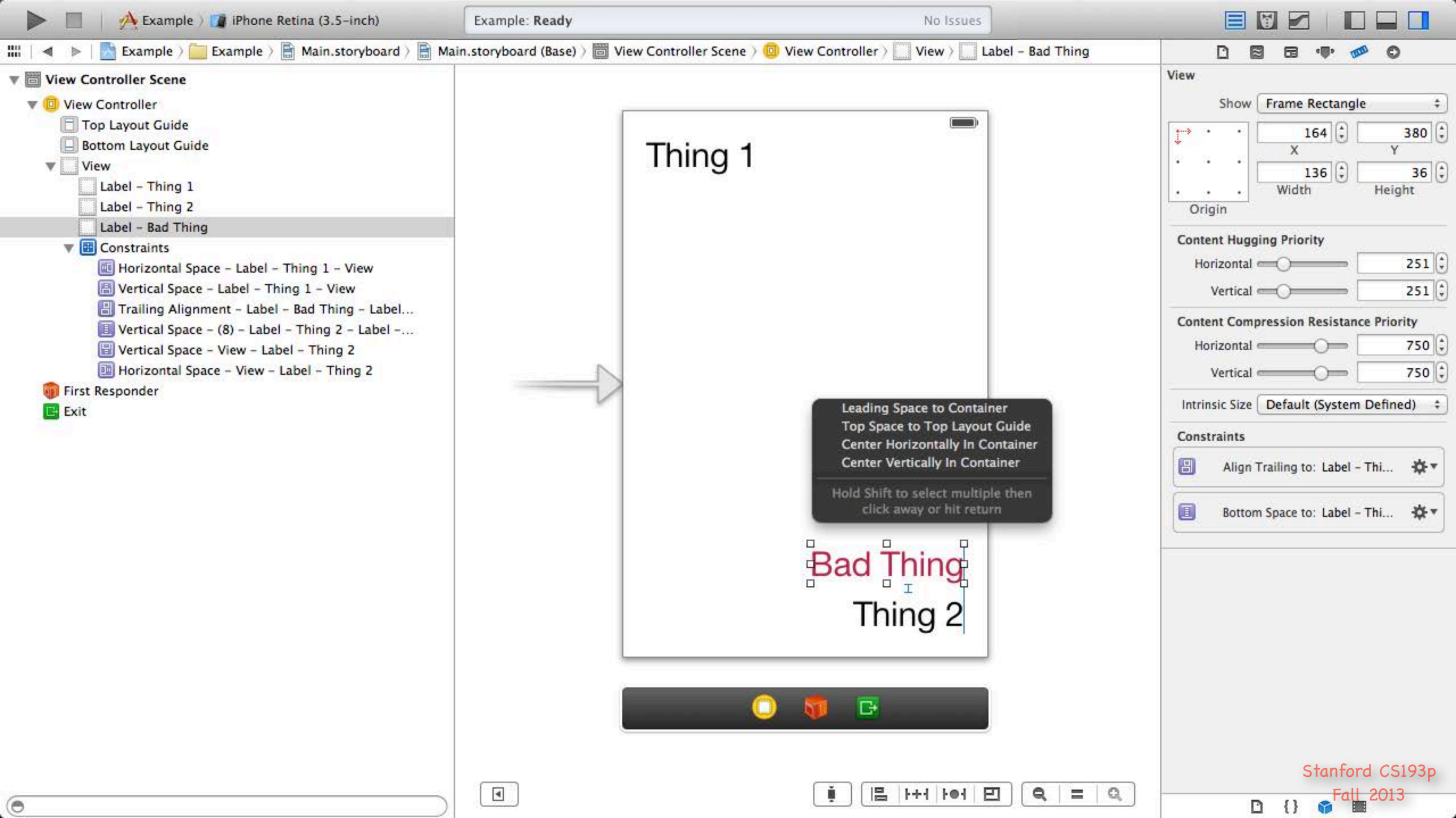
Example › iPhone Retina (3.5-inch)
Example: Ready
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View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – 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
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
Bad Thing
Thing 2
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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...
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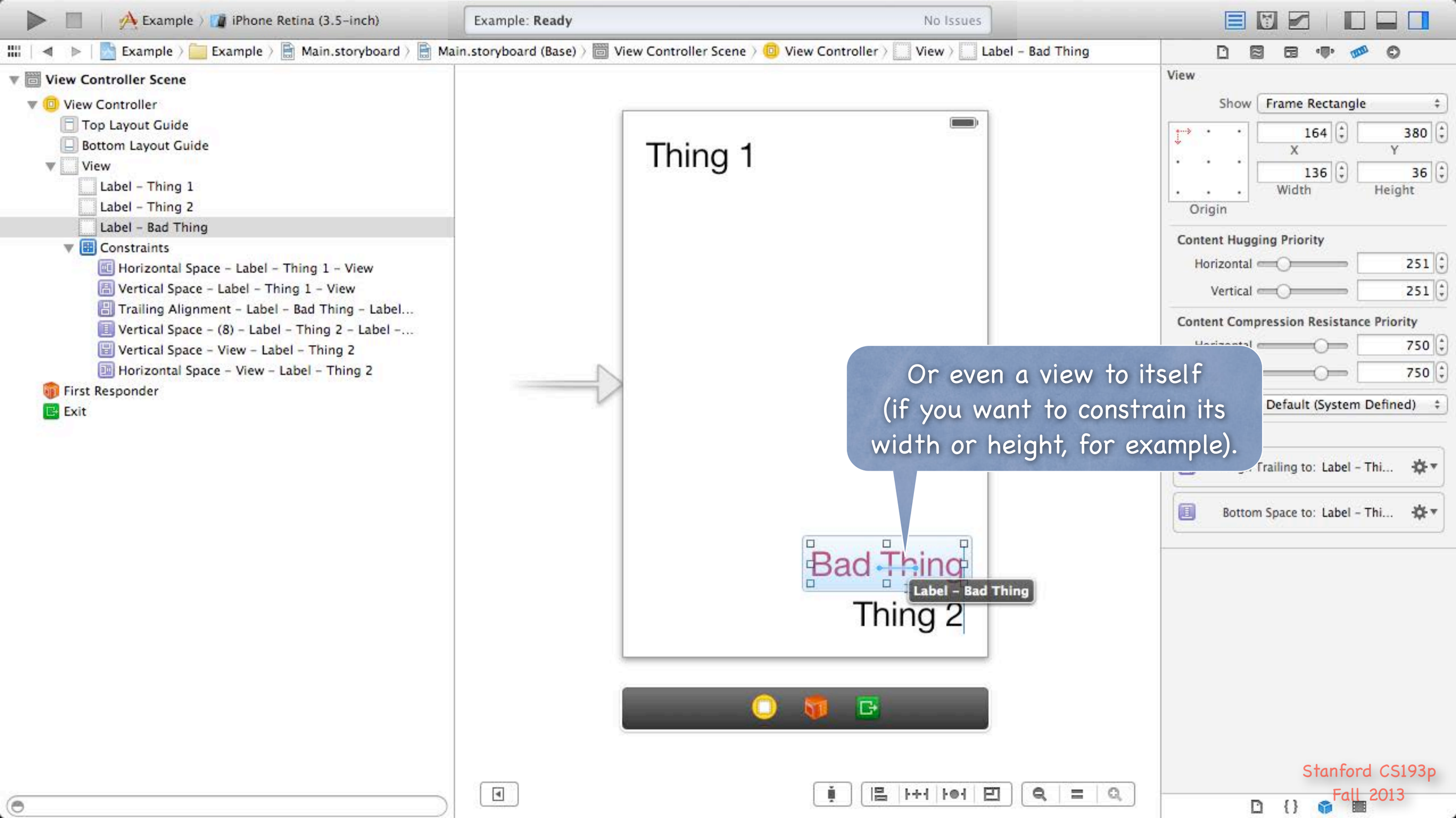
Example › iPhone Retina (3.5-inch)
Example: Ready
No Issues
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View Controller
Top Layout Guide
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – Label – Thing 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
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
Content Hugging Priority
Horizontal
251
Vertical
251
Content Compression Resistance Priority
750
750
Default (System Defined)
Trailing to: Label – Thi...
Bottom Space to: Label – Thi...
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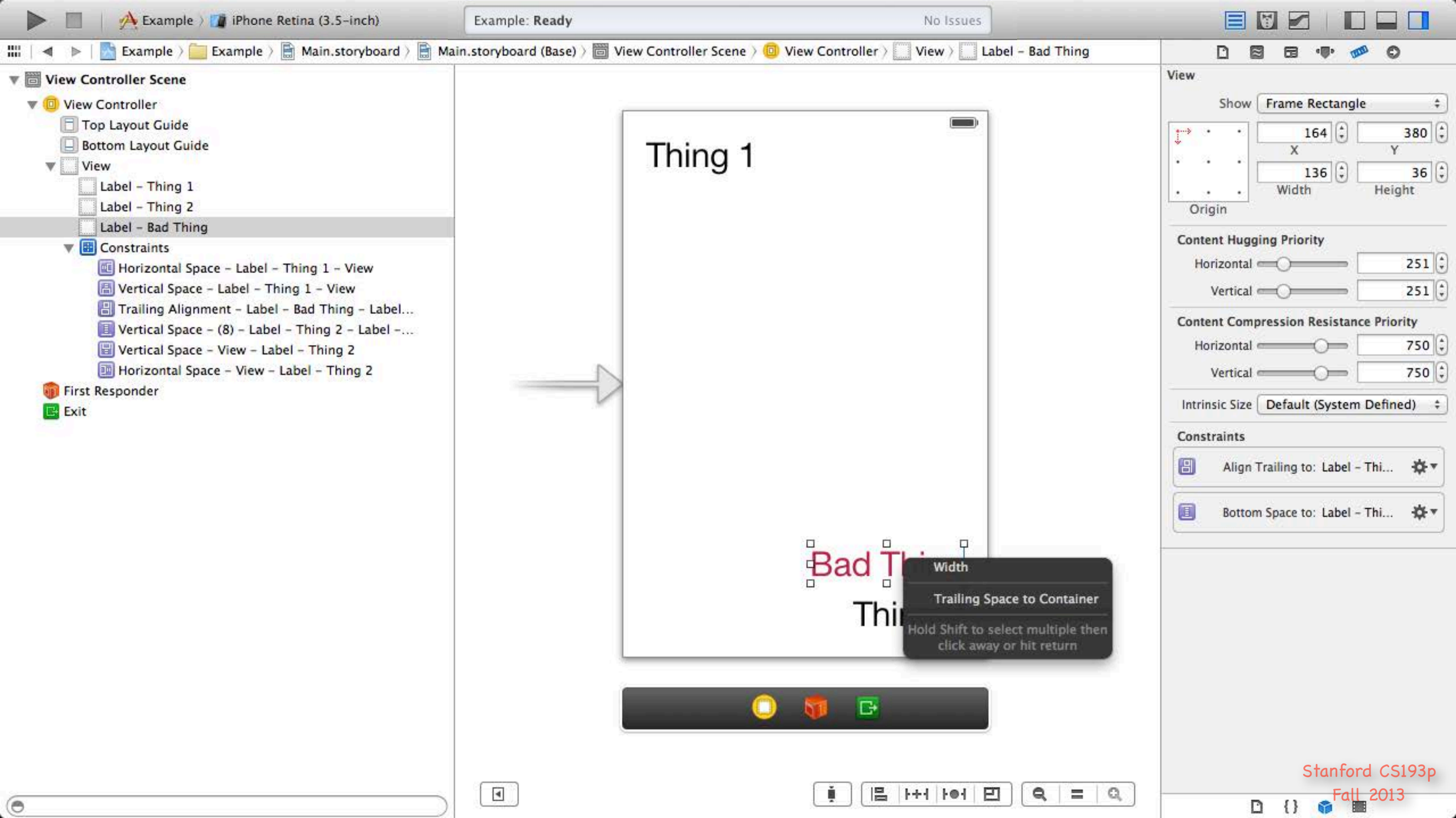
Fall 2013


Example › iPhone Retina (3.5-inch)
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View Controller
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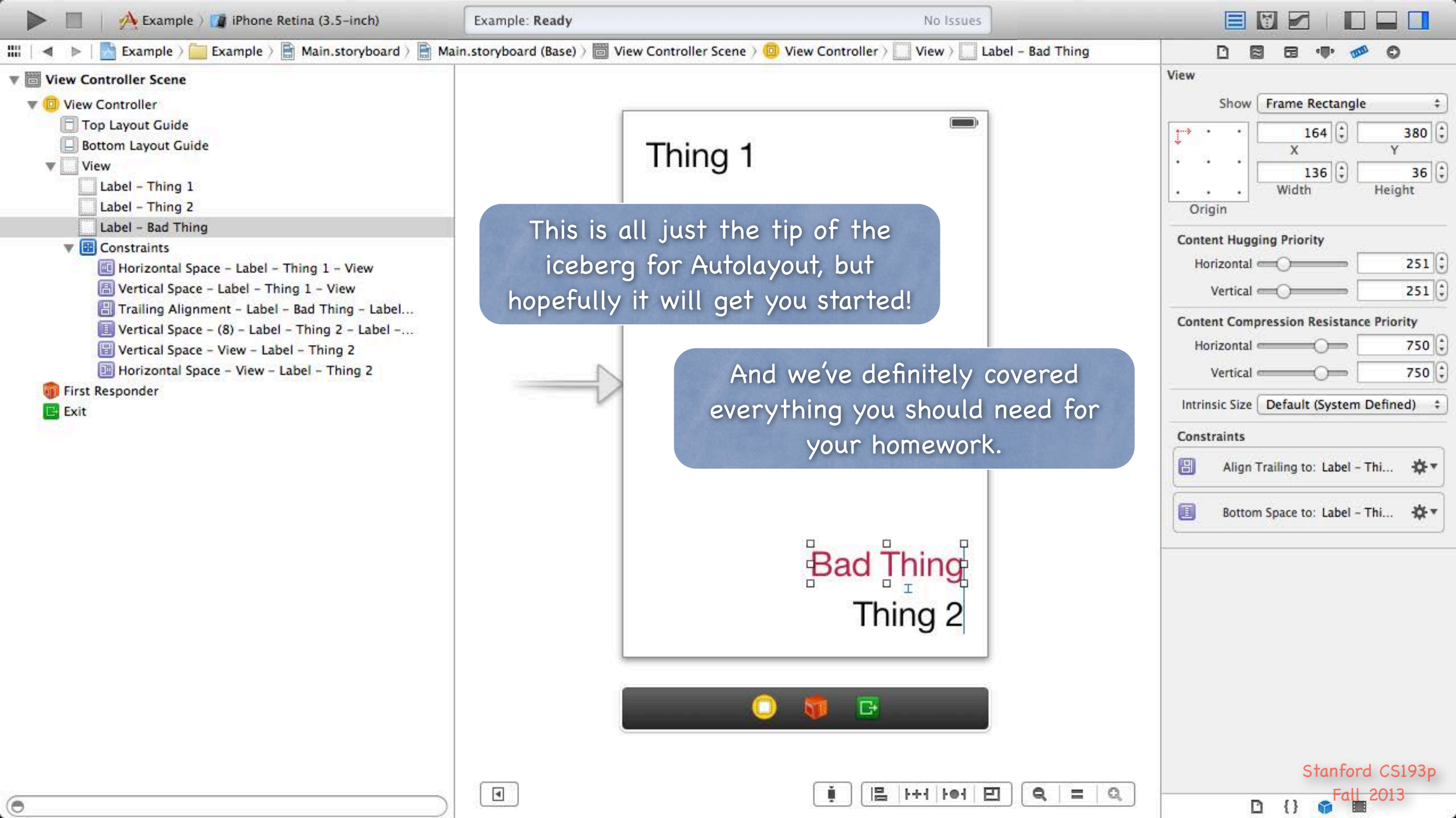
Bottom Layout Guide
View
Label – Thing 1
Label – Thing 2
Label – Bad Thing
Constraints
Horizontal Space – Label – Thing 1 – View
Vertical Space – Label – Thing 1 – View
Trailing Alignment – Label – Bad Thing – Label...
Vertical Space – (8) – Label – Thing 2 – Label –...
Vertical Space – View – Label – Thing 2
Horizontal Space – View – Label – Thing 2
First Responder
Exit
Thing 1
Width
Trailing Space to Container
Hold Shift to select multiple then click away or hit return
View
Show
Frame Rectangle
164
X
380
Y
136
Width
36
Height
Origin
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


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
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
164
X
380
Y
136
Width
36
Height
Origin
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...
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Demo

- Attributor Autorotation

  Since we dragged to blue guidelines, it's mostly going to be automatic.
  But there are a couple of things to fix up.
  And we'll make a couple of changes too.

Coming Up

- **Friday**
  Still hoping to get University Developer Program up and running!
- **Homework**
  Due on Monday
- **Next Week**
  Scroll View
  Table View
  Collection View