

Building Adaptive Apps with UIKit

Session 216

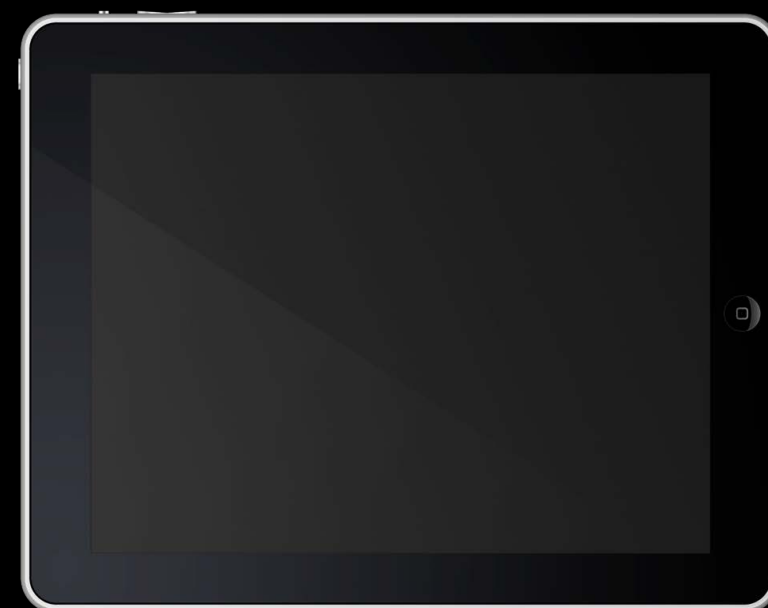
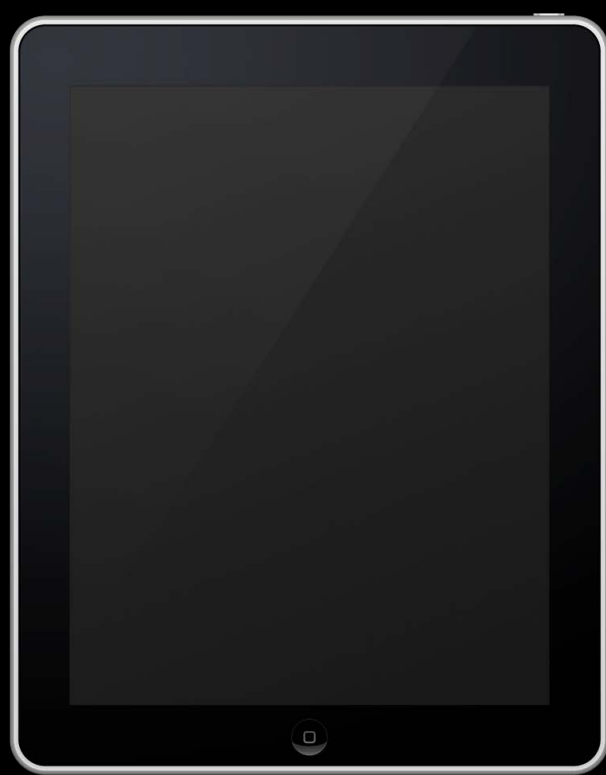
Jacob Xiao

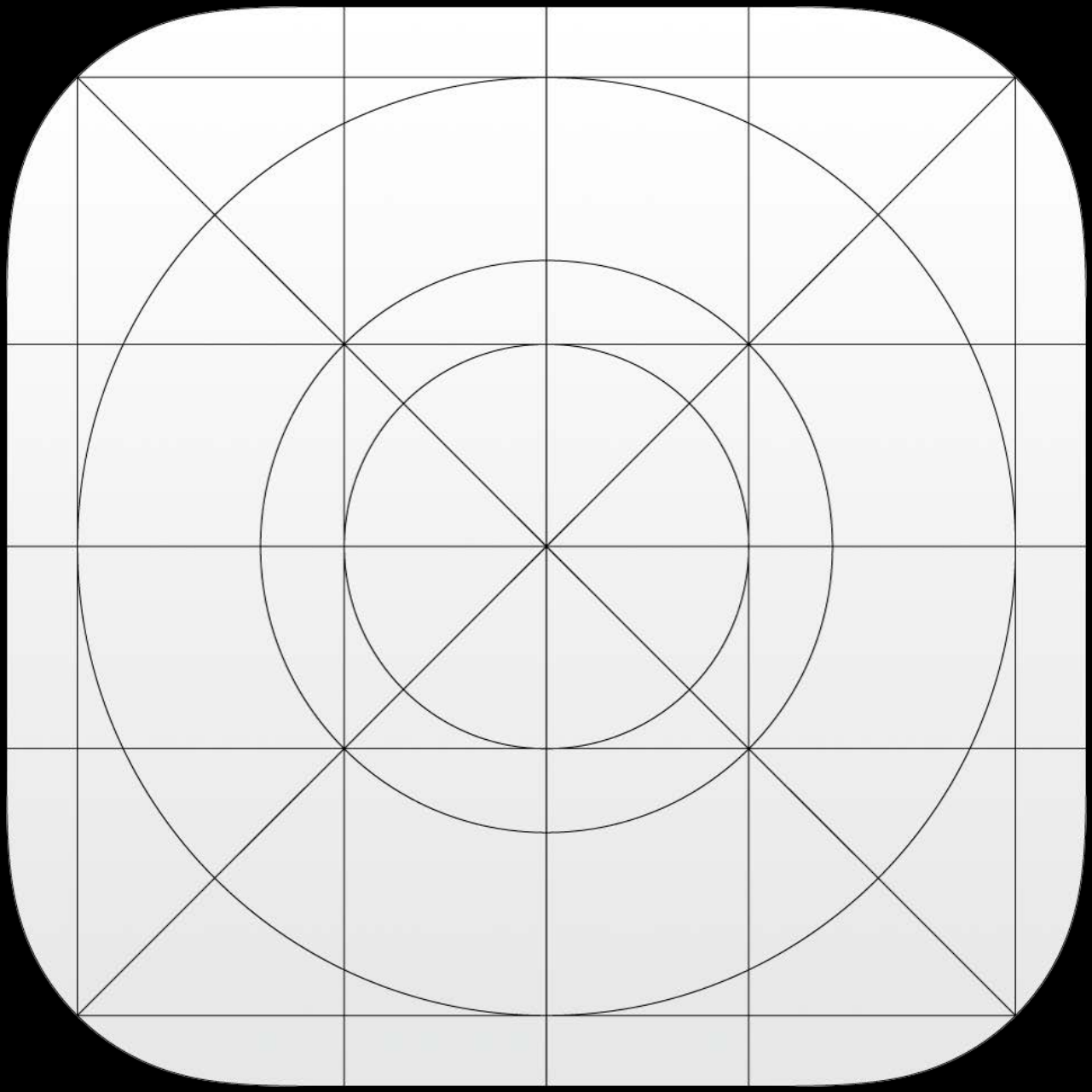
UIKit Engineer











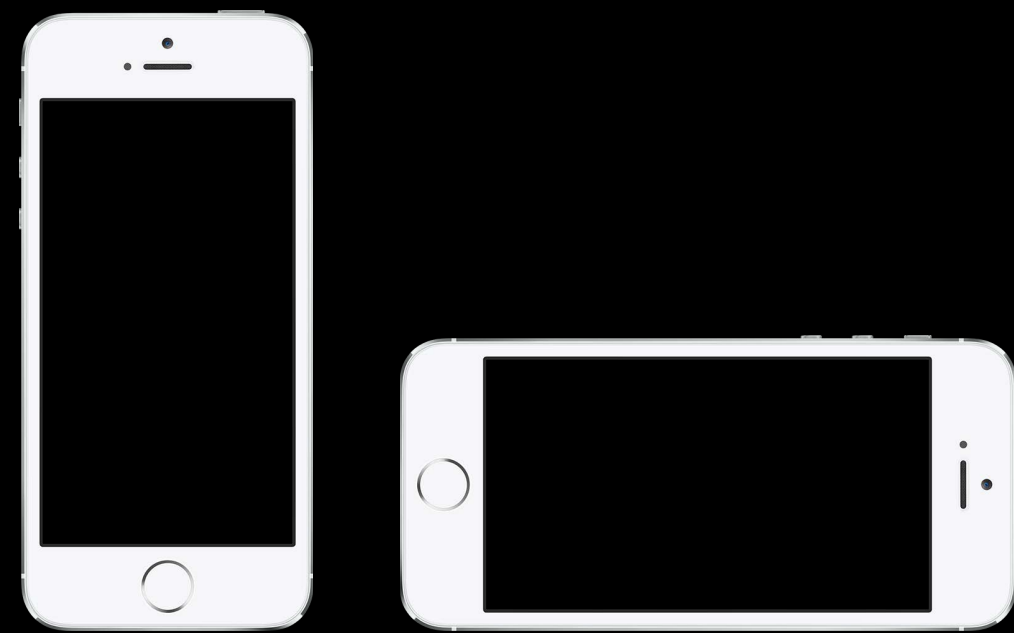
What You Will Learn

Adaptive Concepts

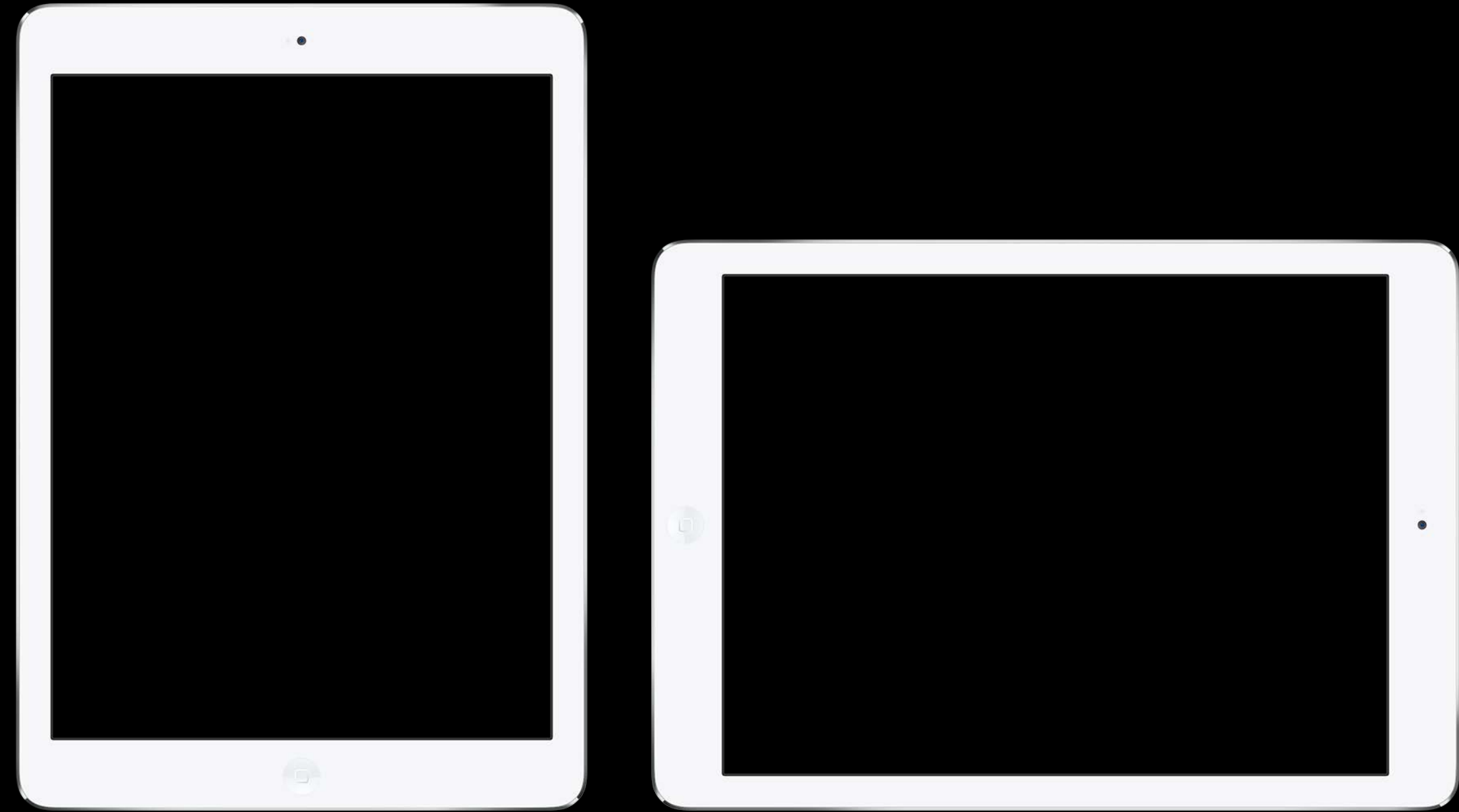
View Controllers

Interface Builder

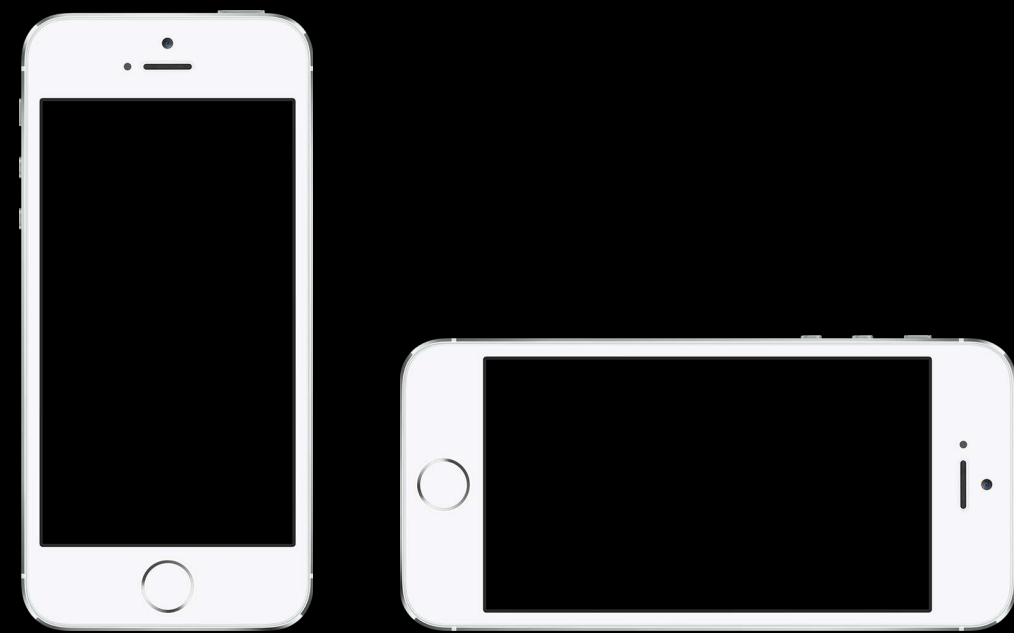
Size Classes



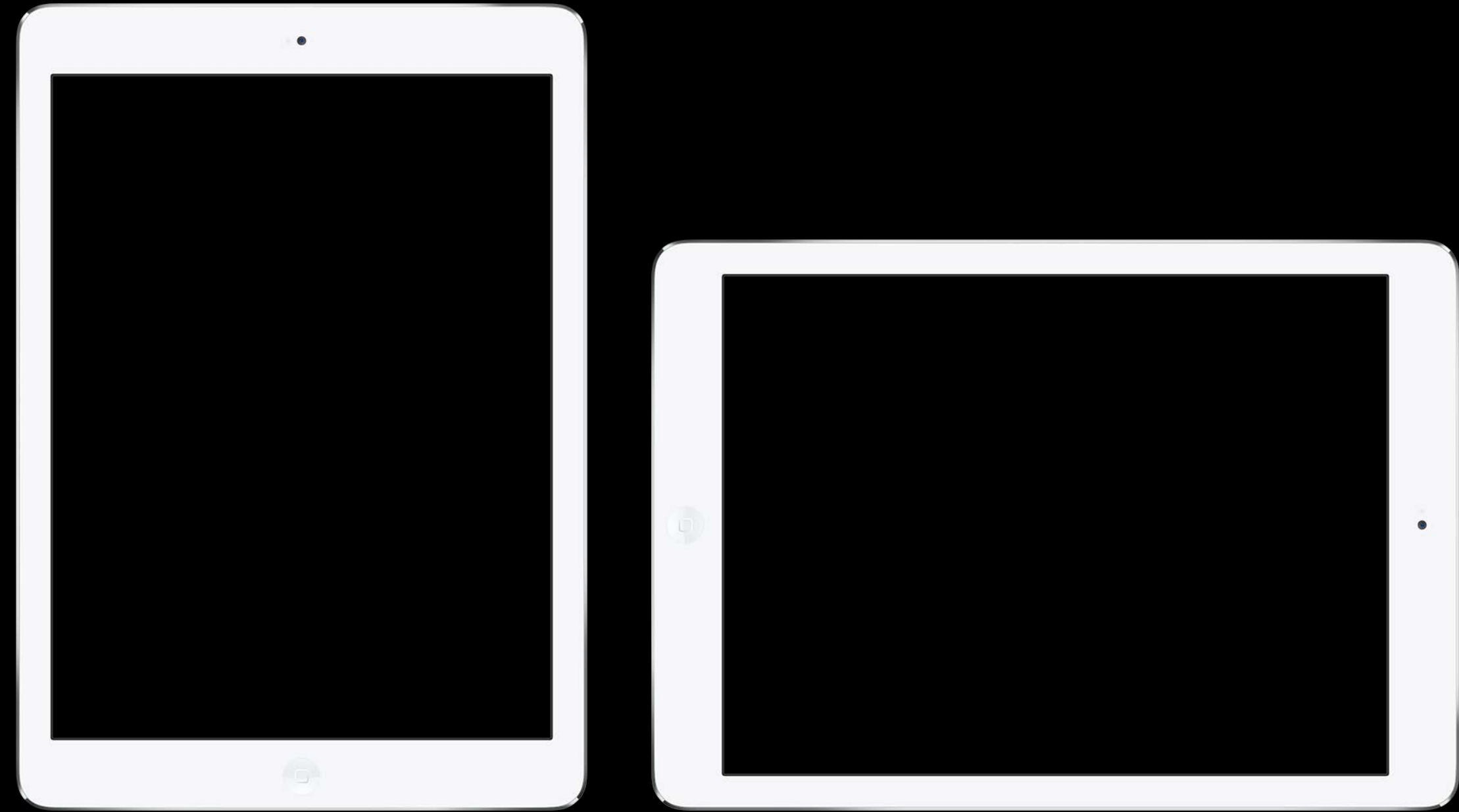
UIInterfaceOrientation



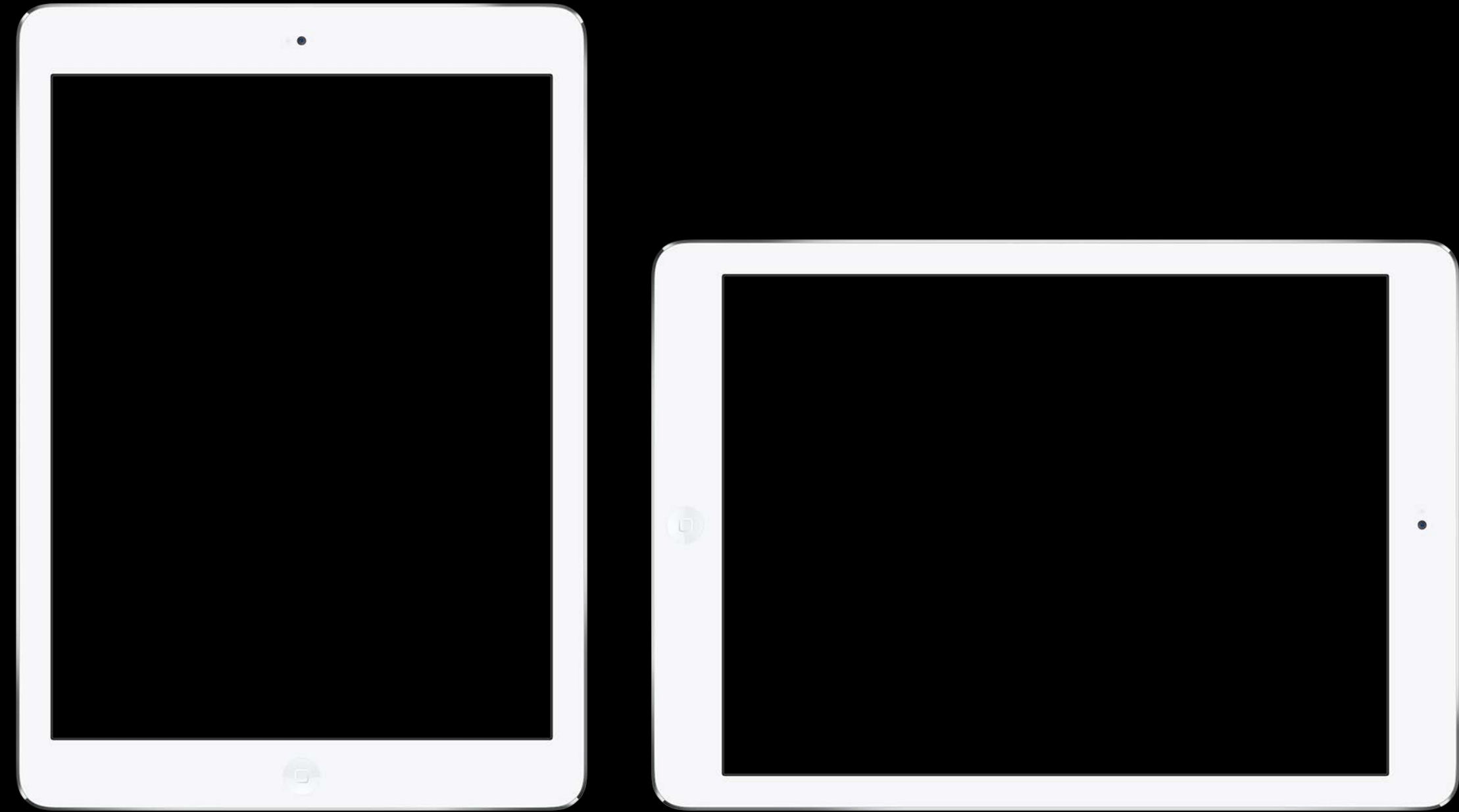
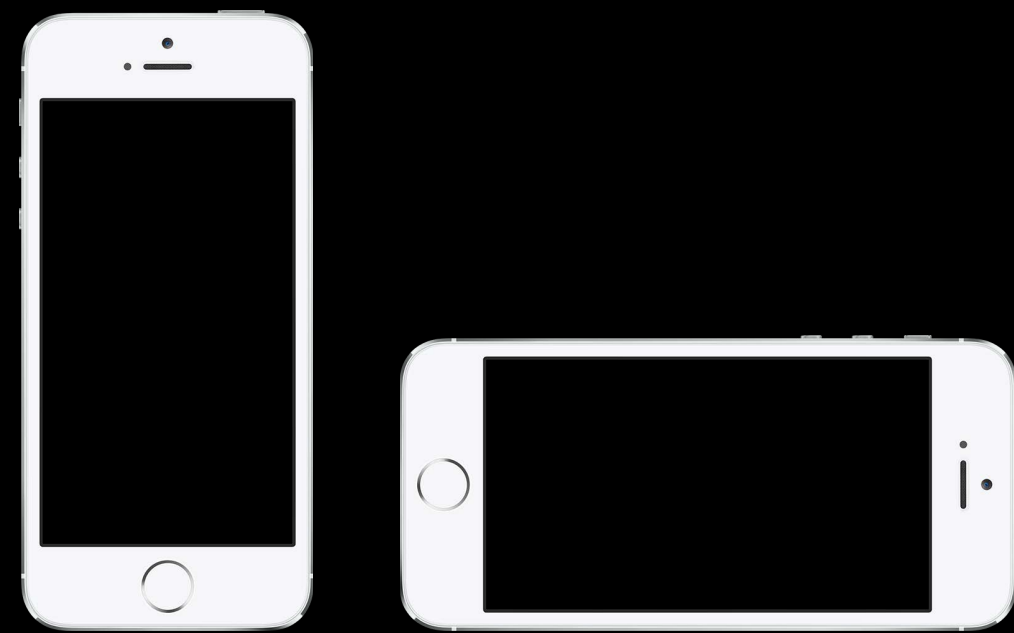
UIUserInterfaceIdiom



UIInterfaceOrientation

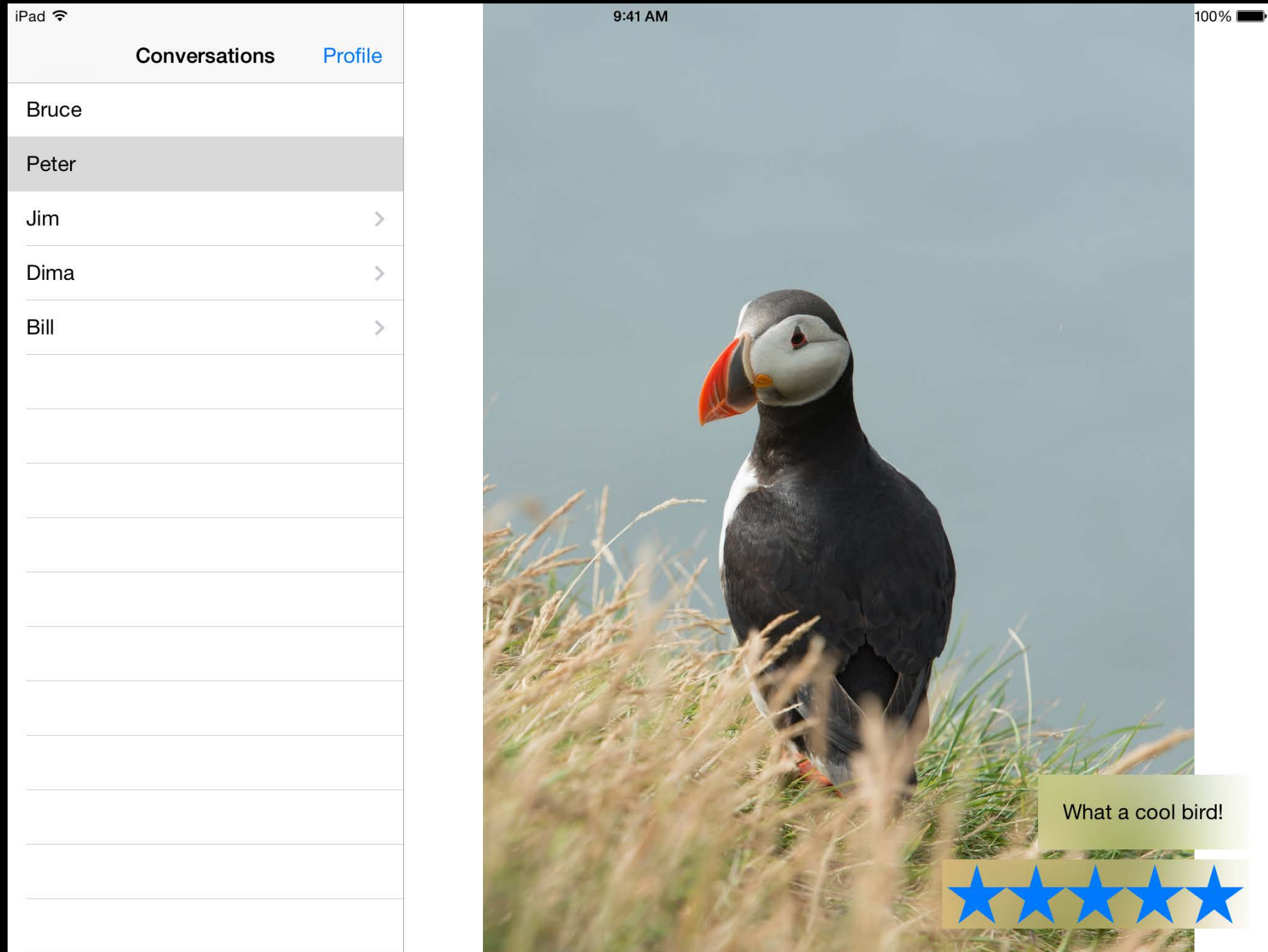


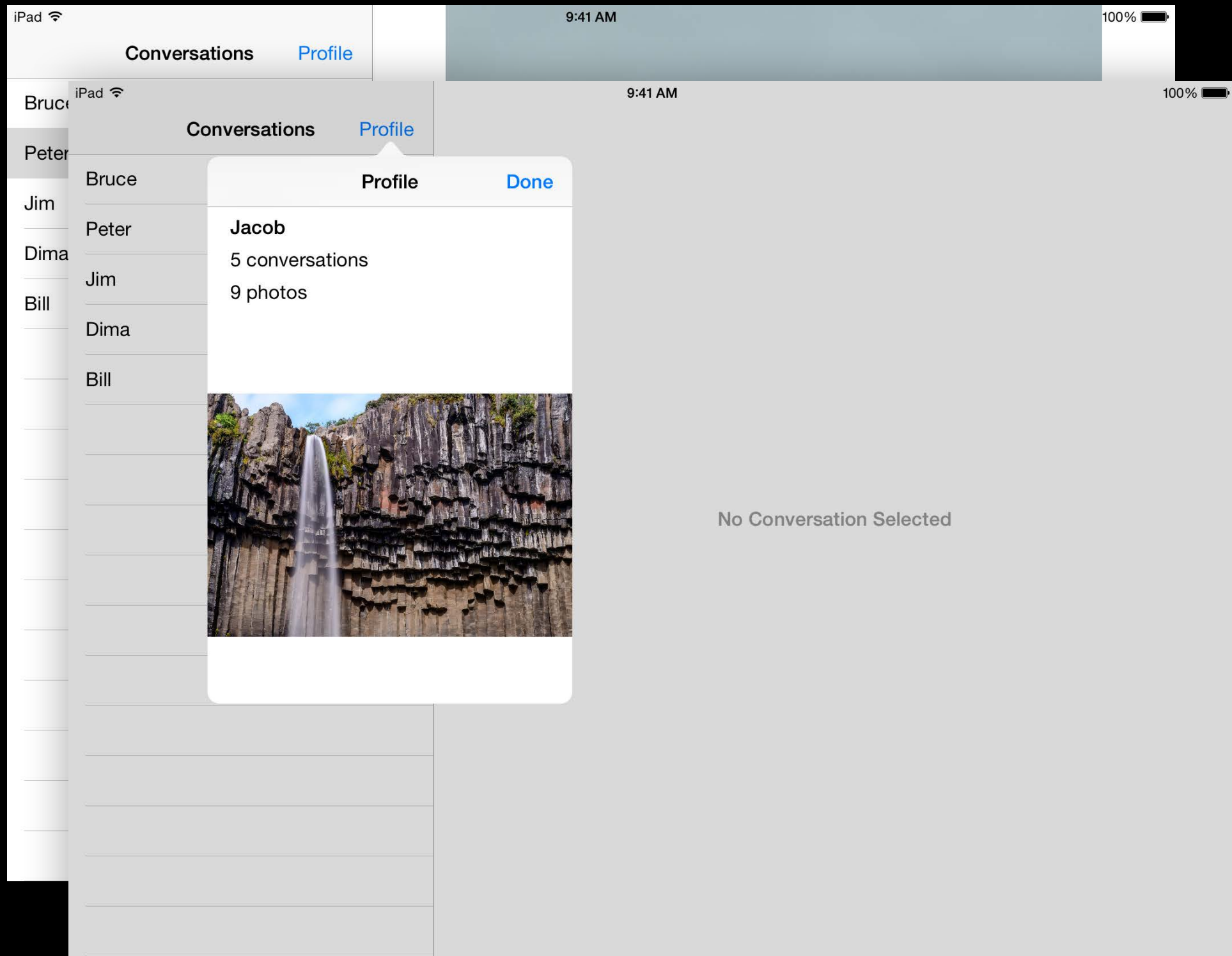
UIUserInterfaceIdiom

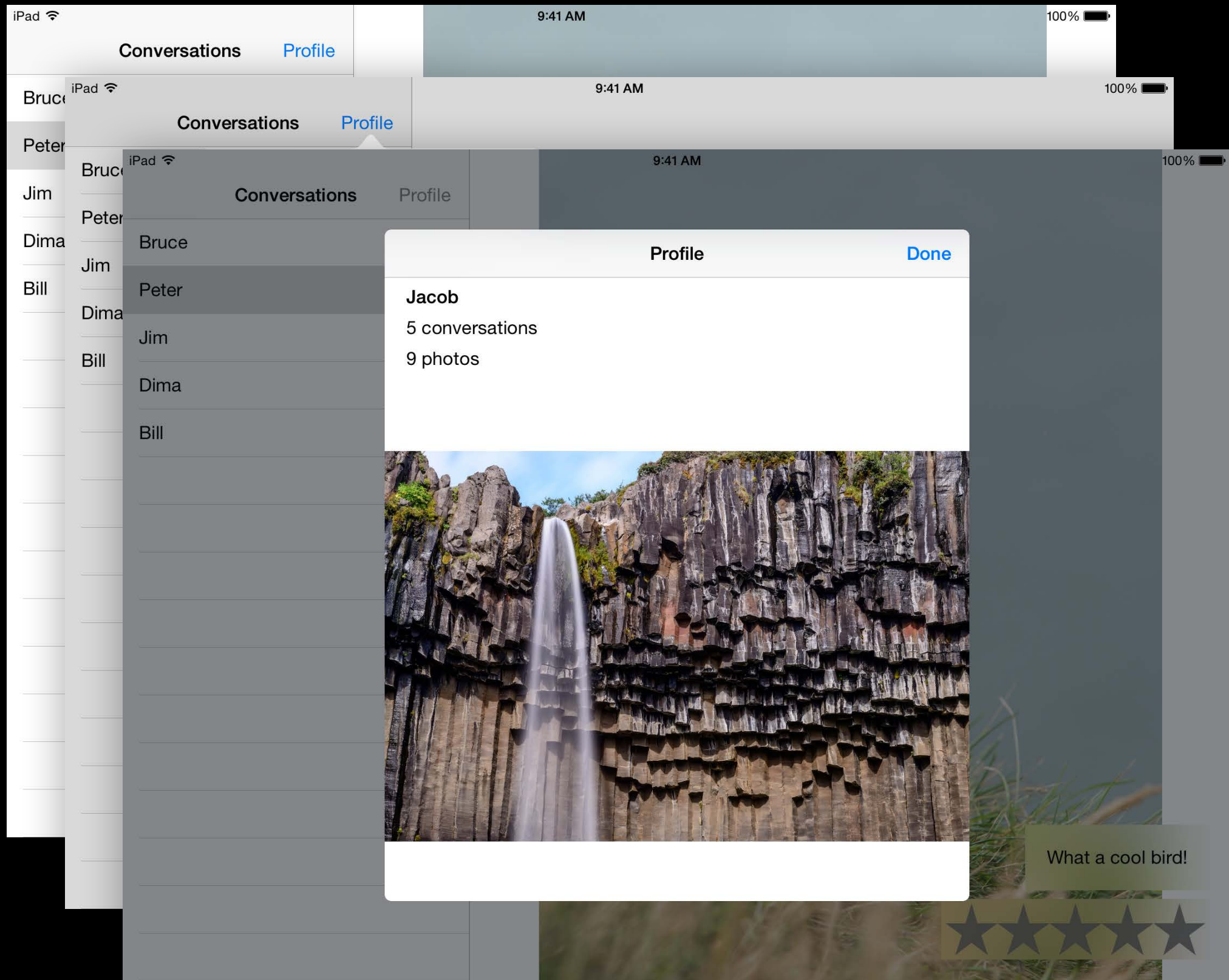


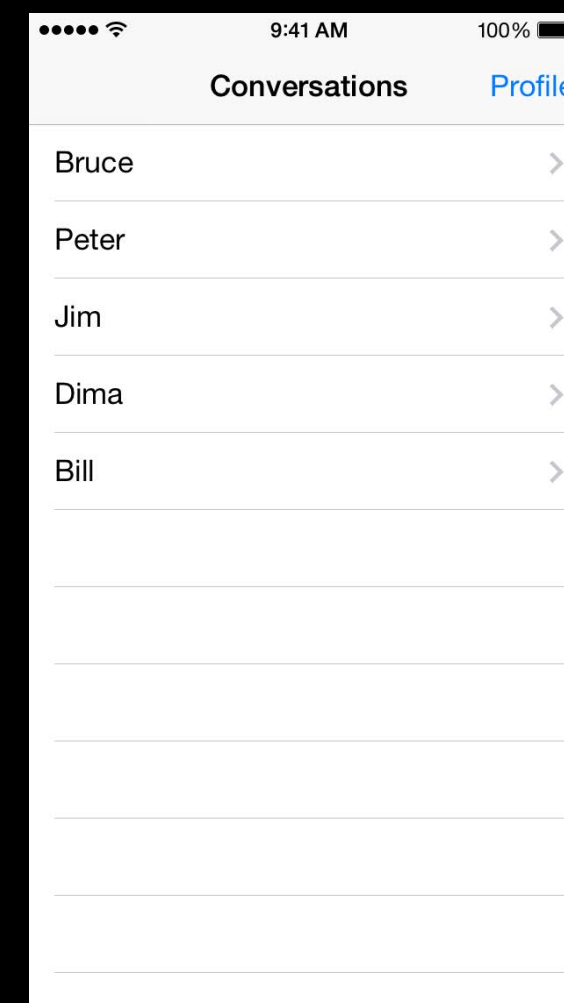
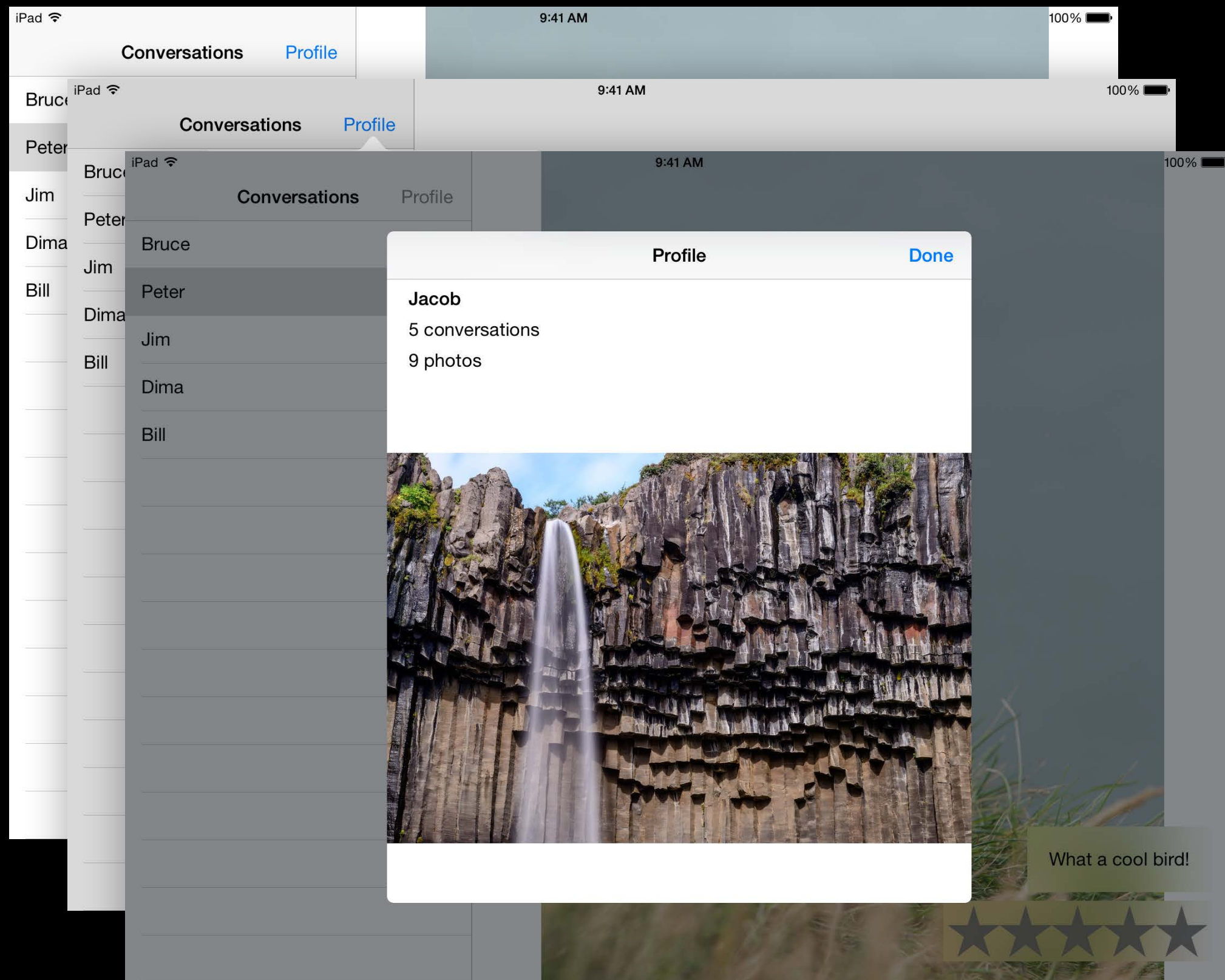
Size Classes

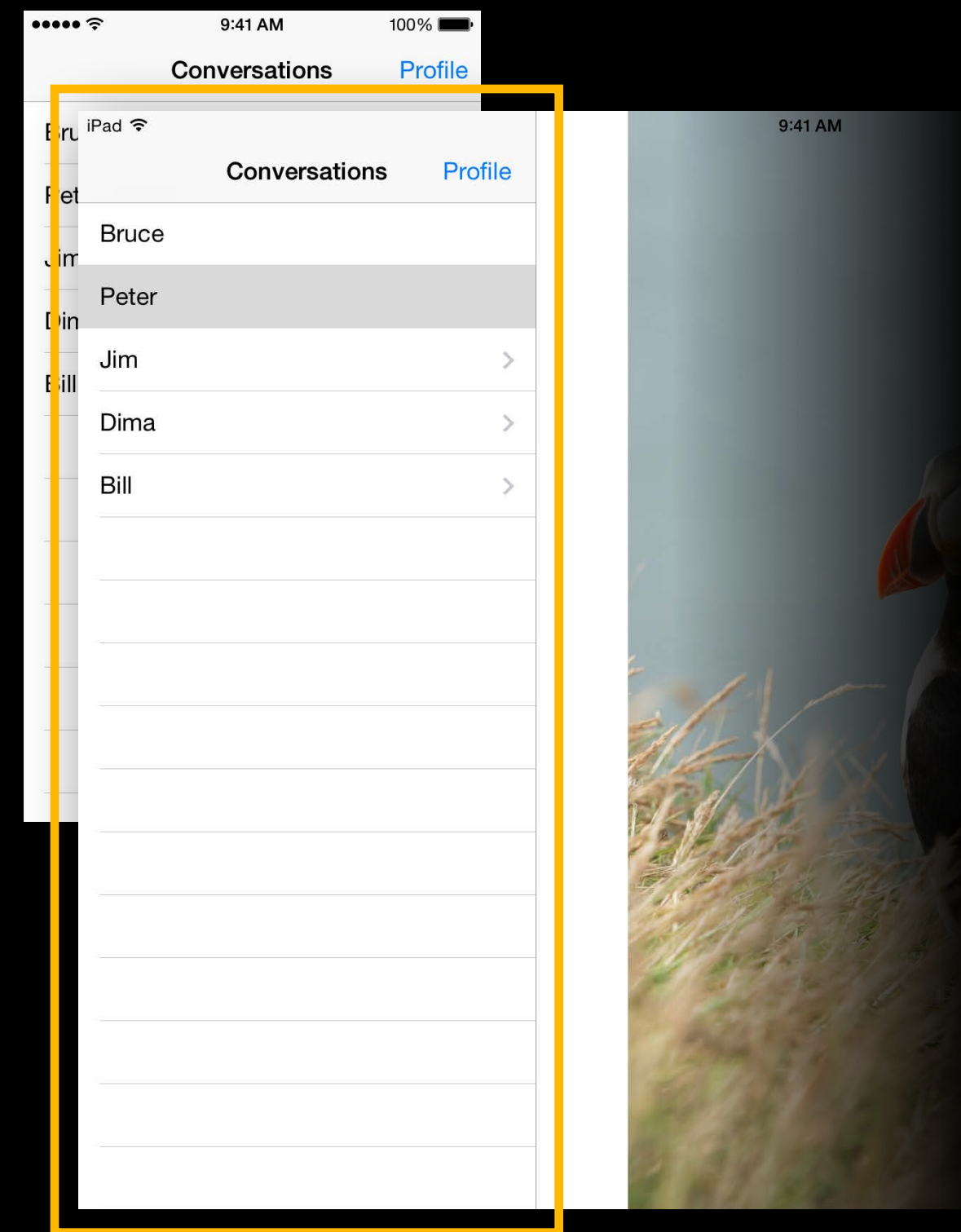
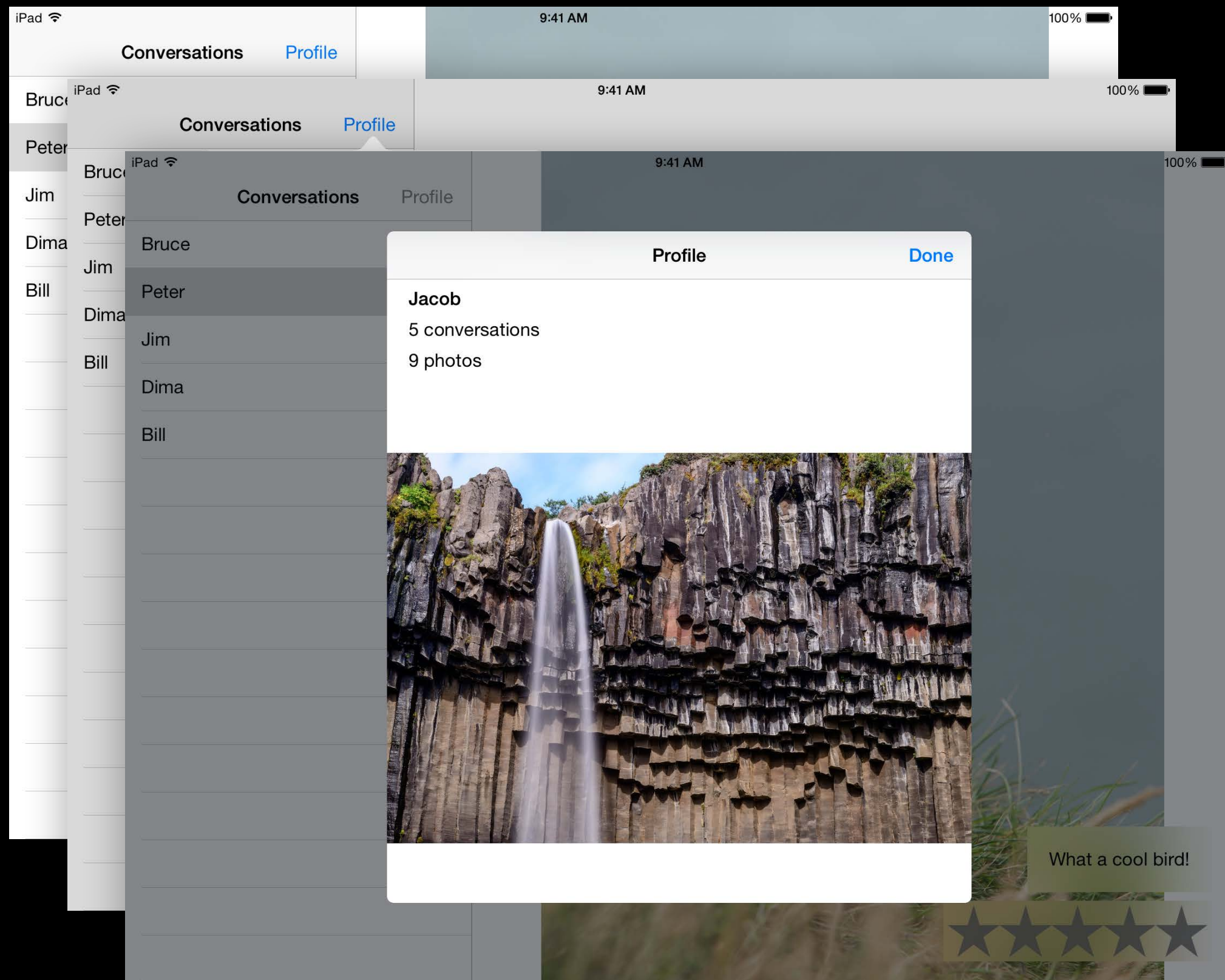


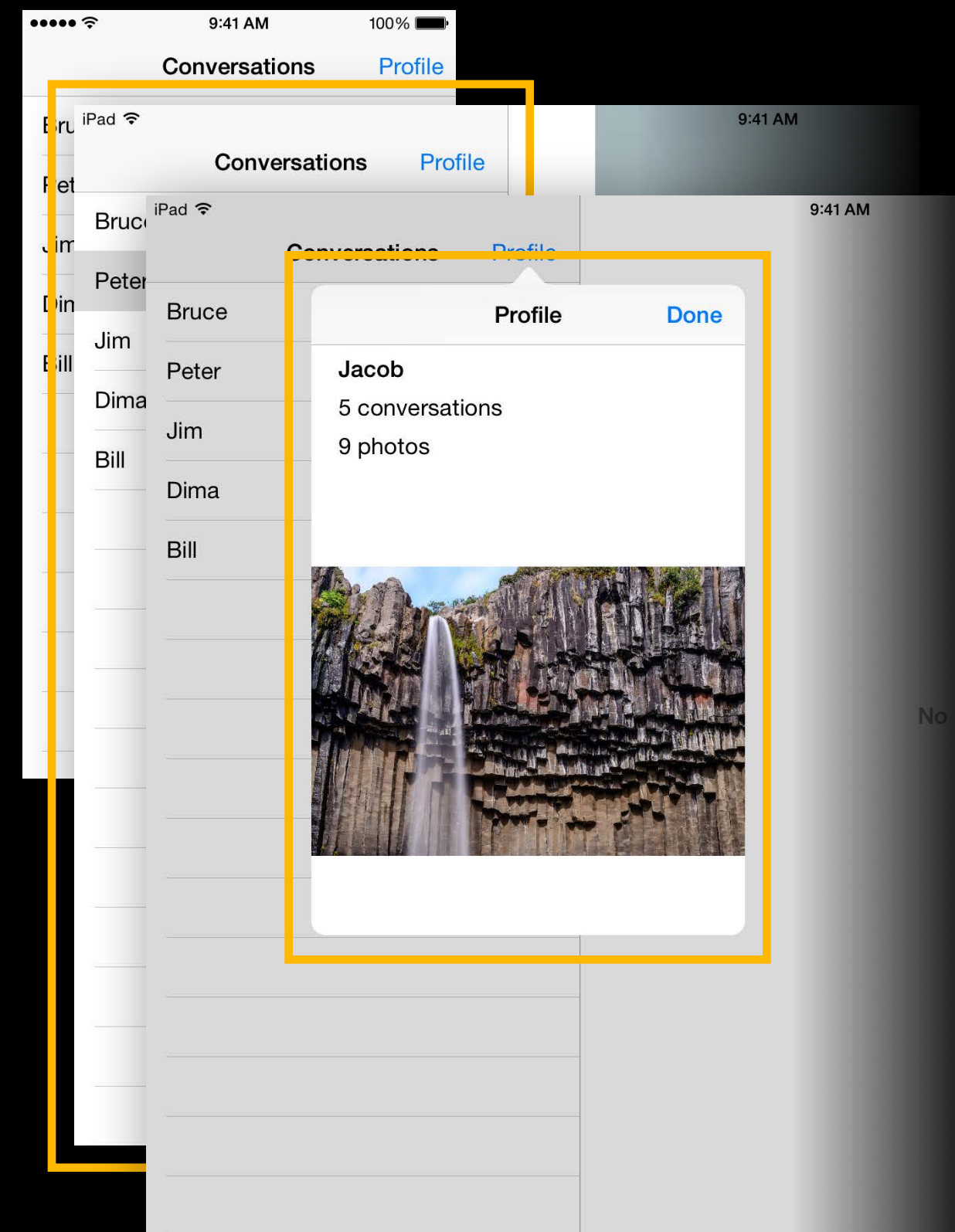
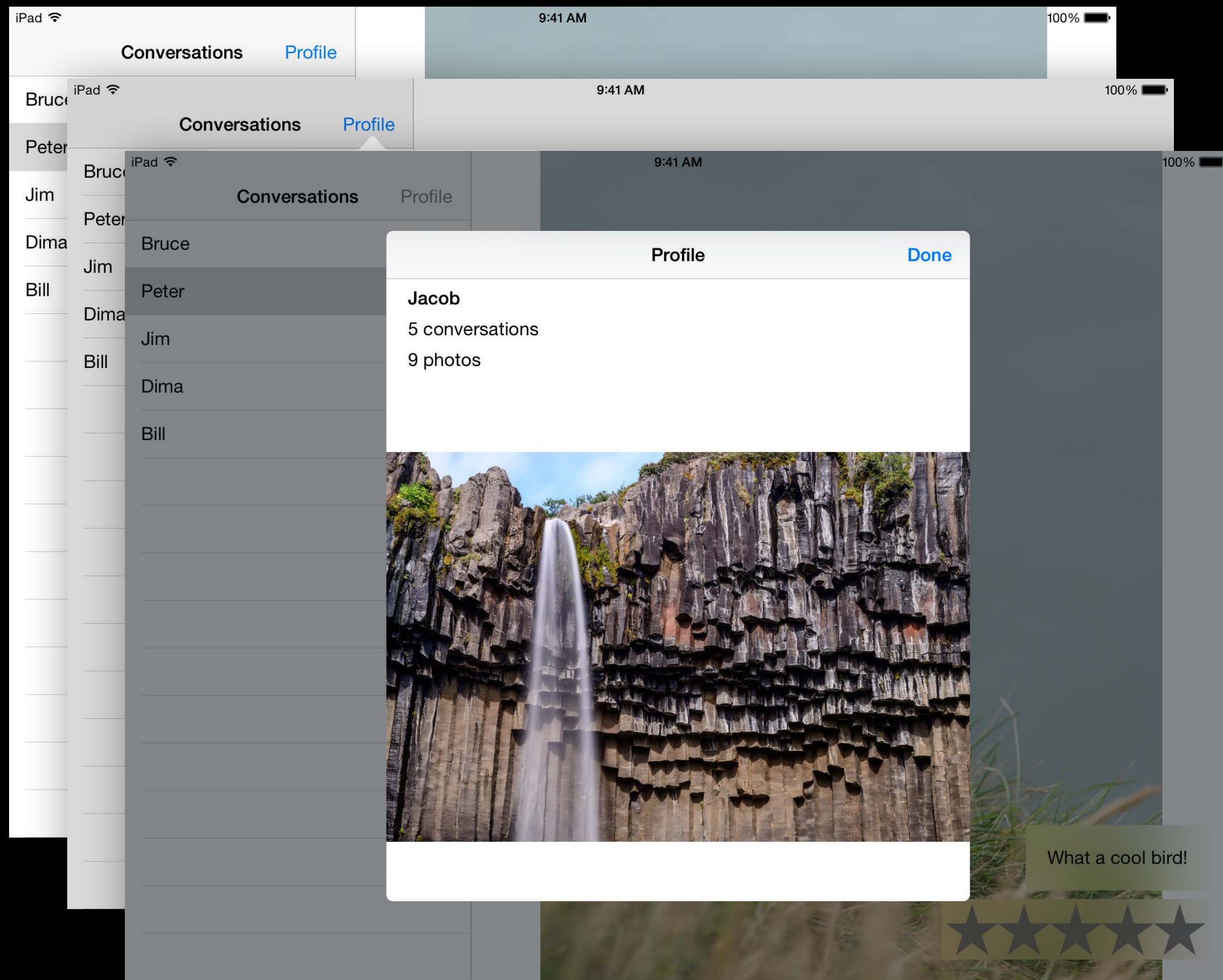




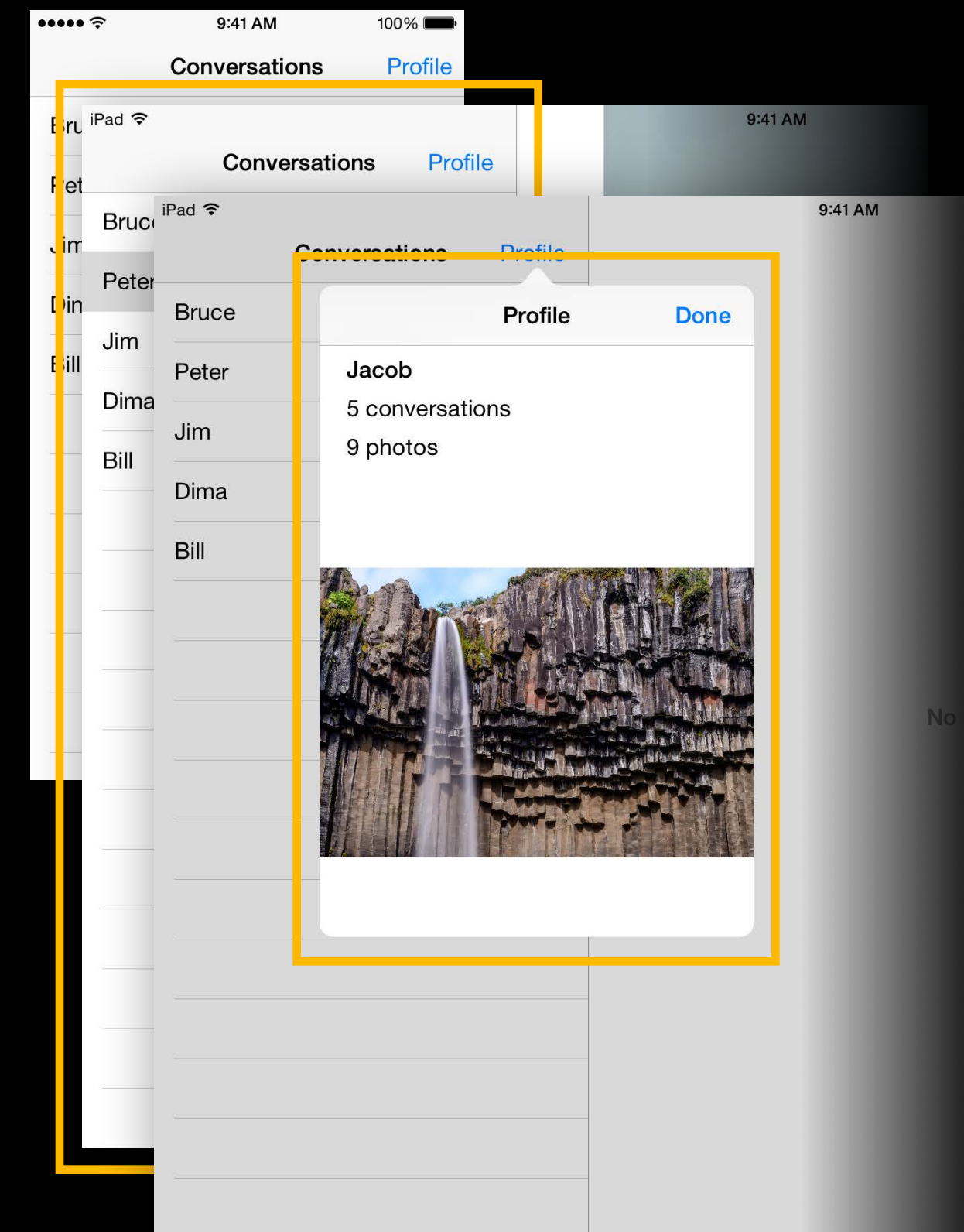
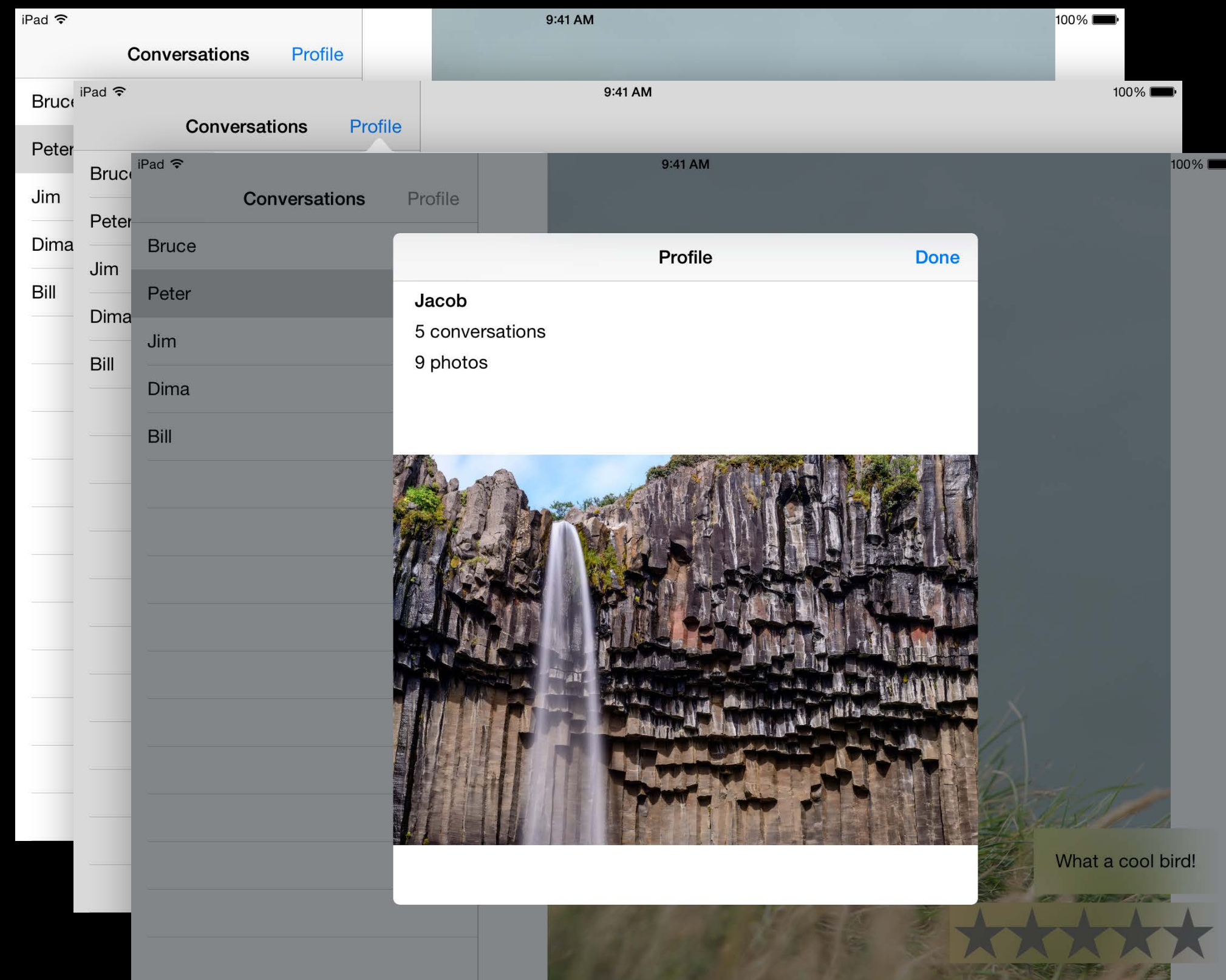




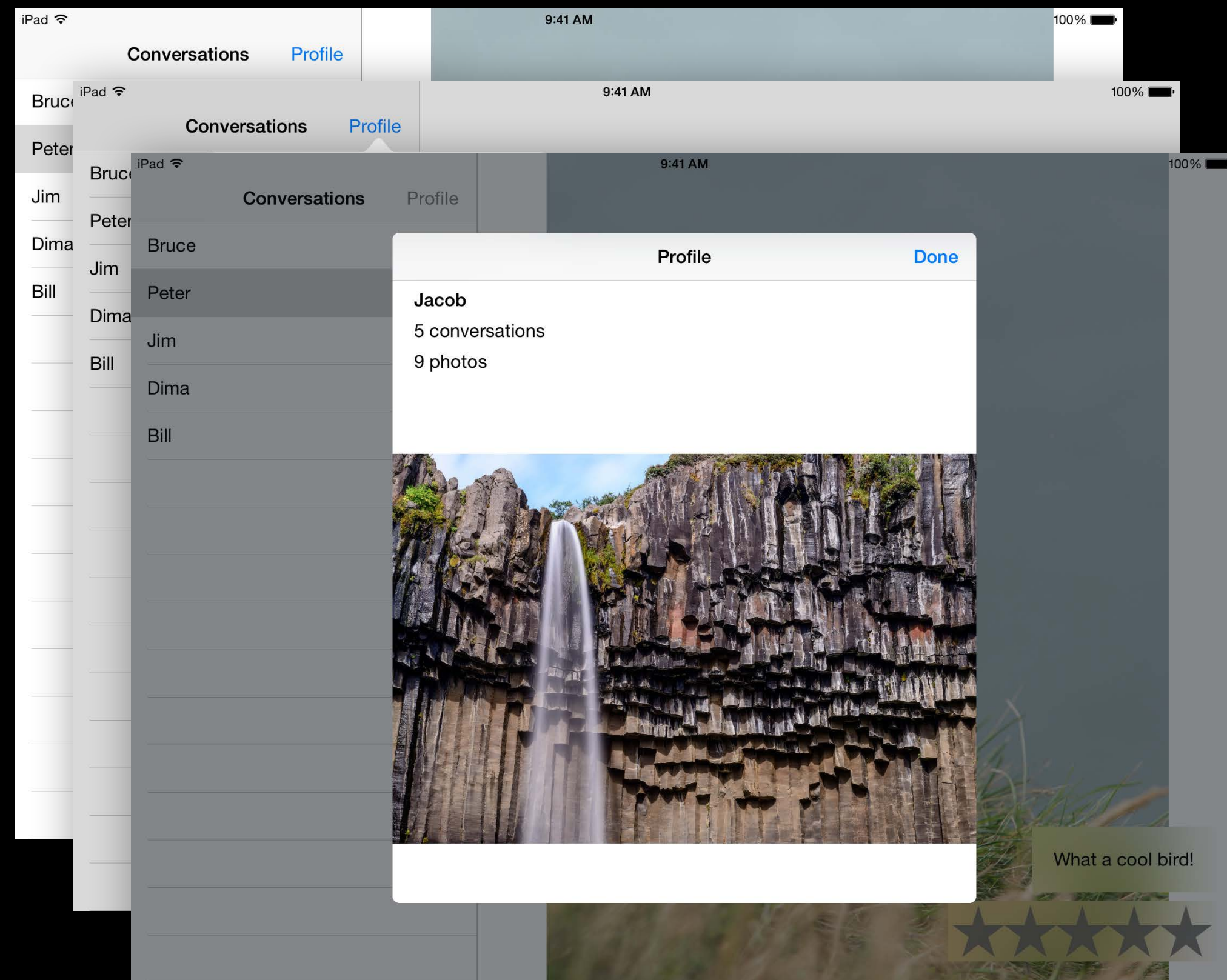




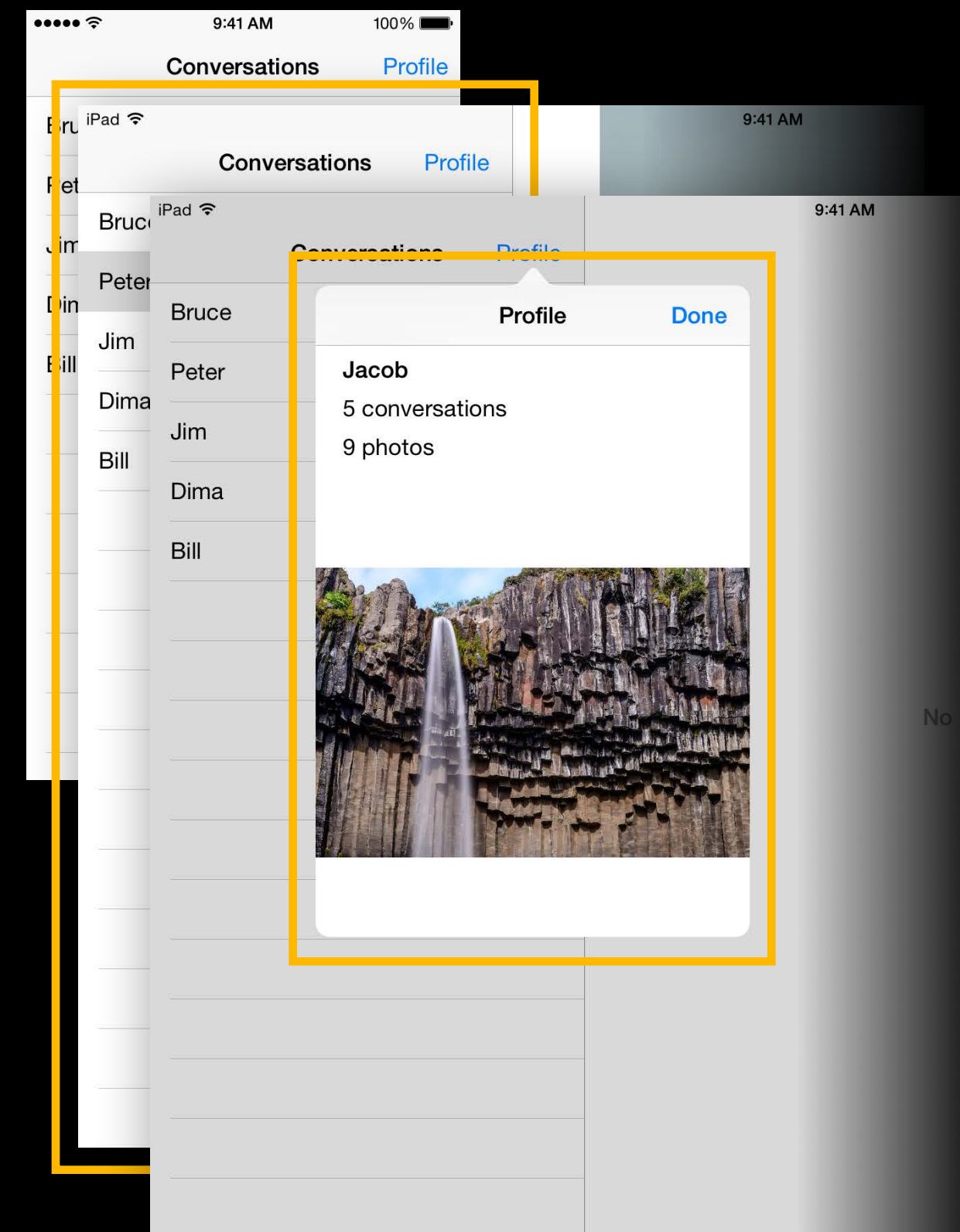
Regular



Regular

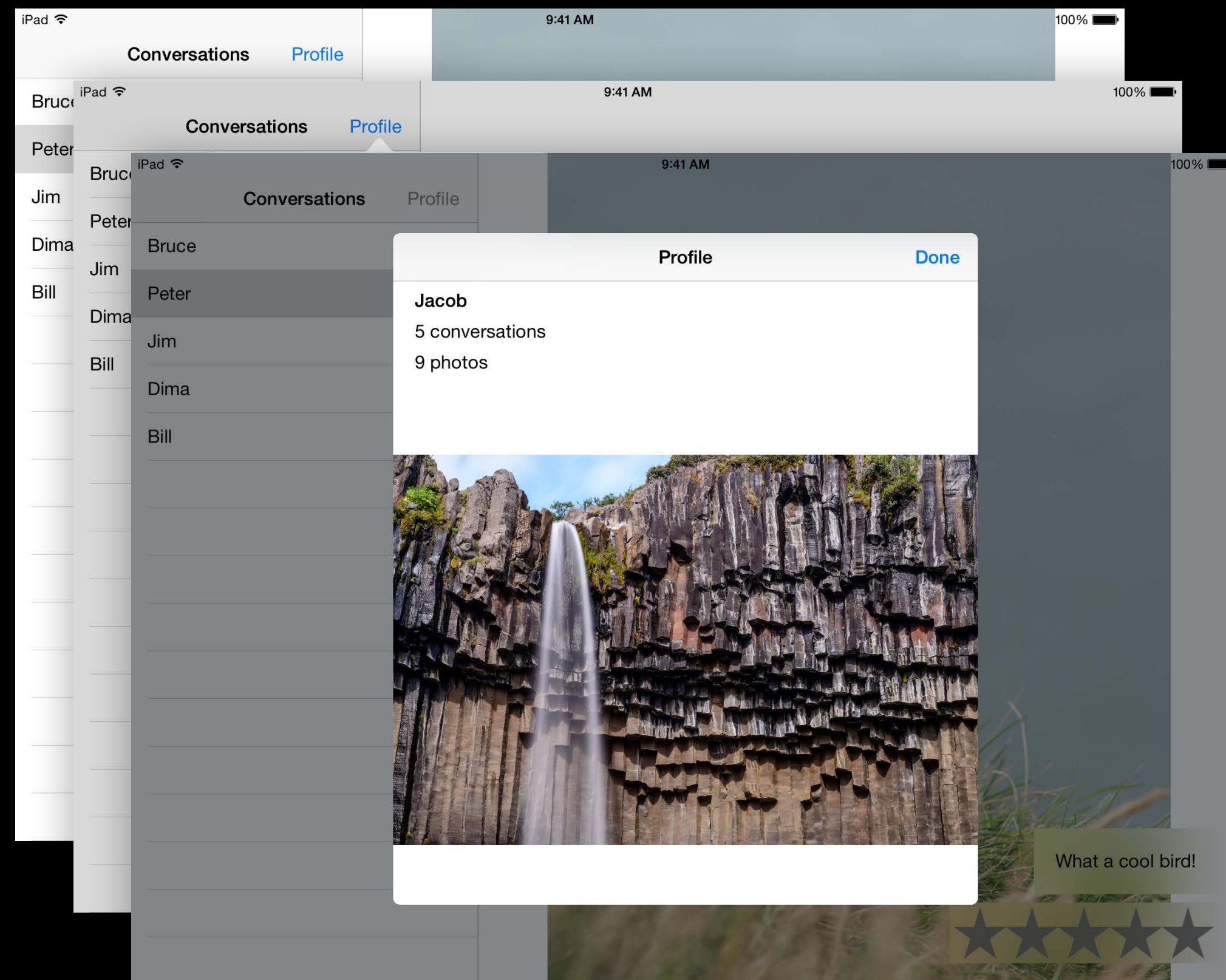


Compact

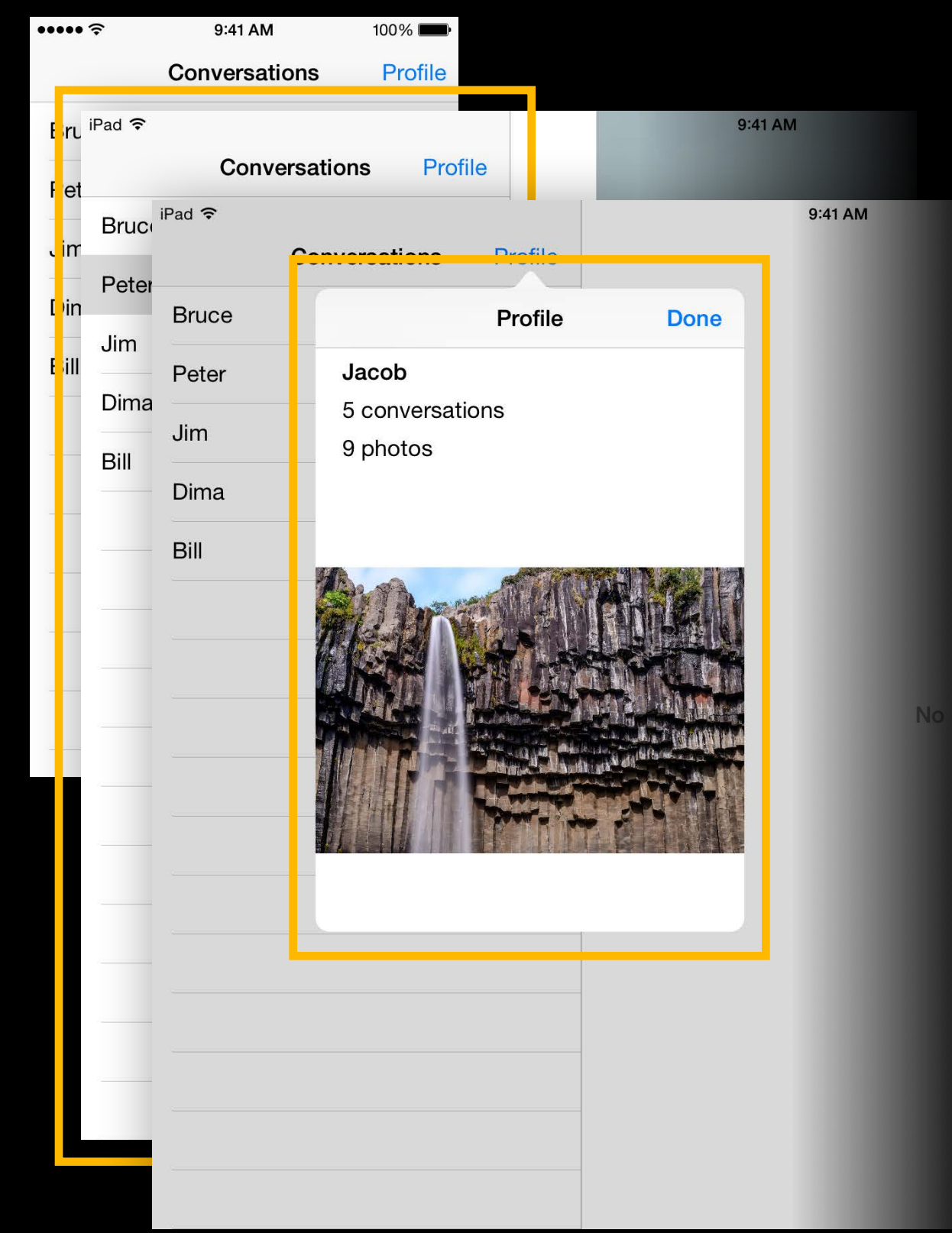


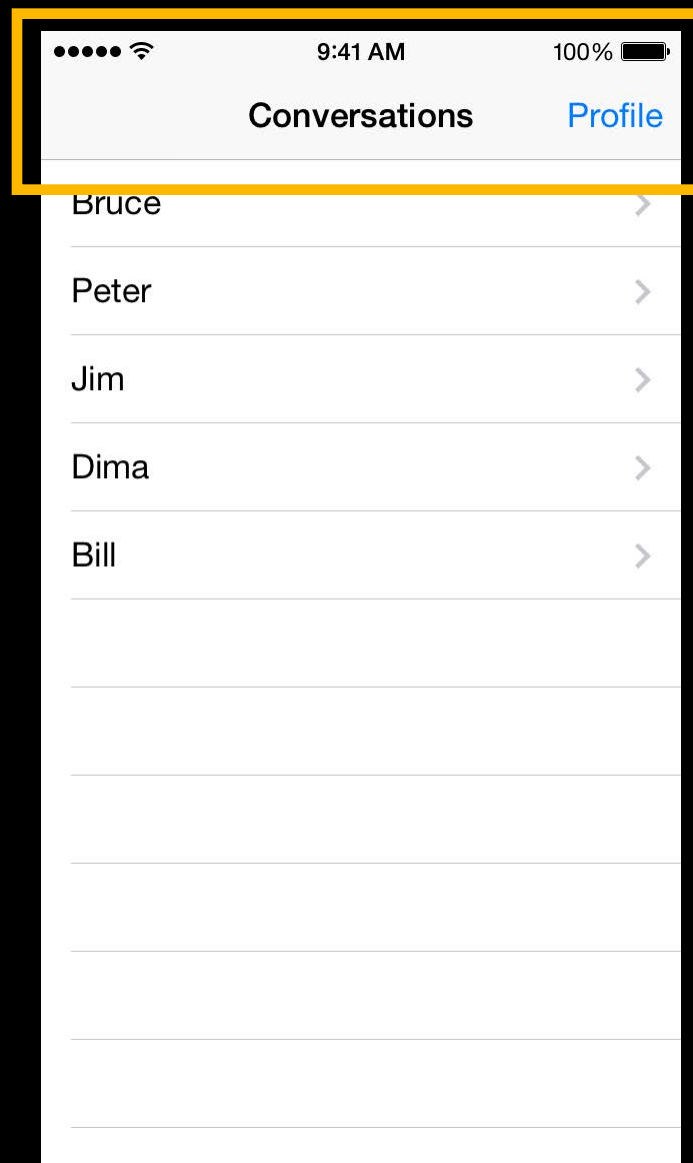
Horizontal Size Class

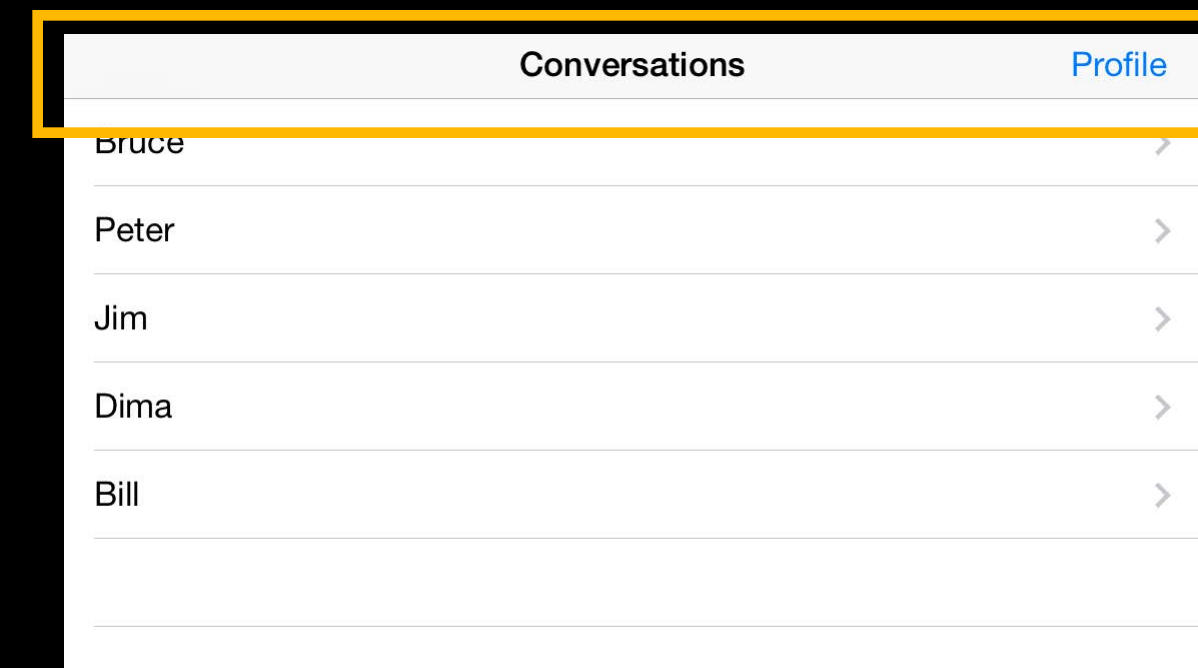
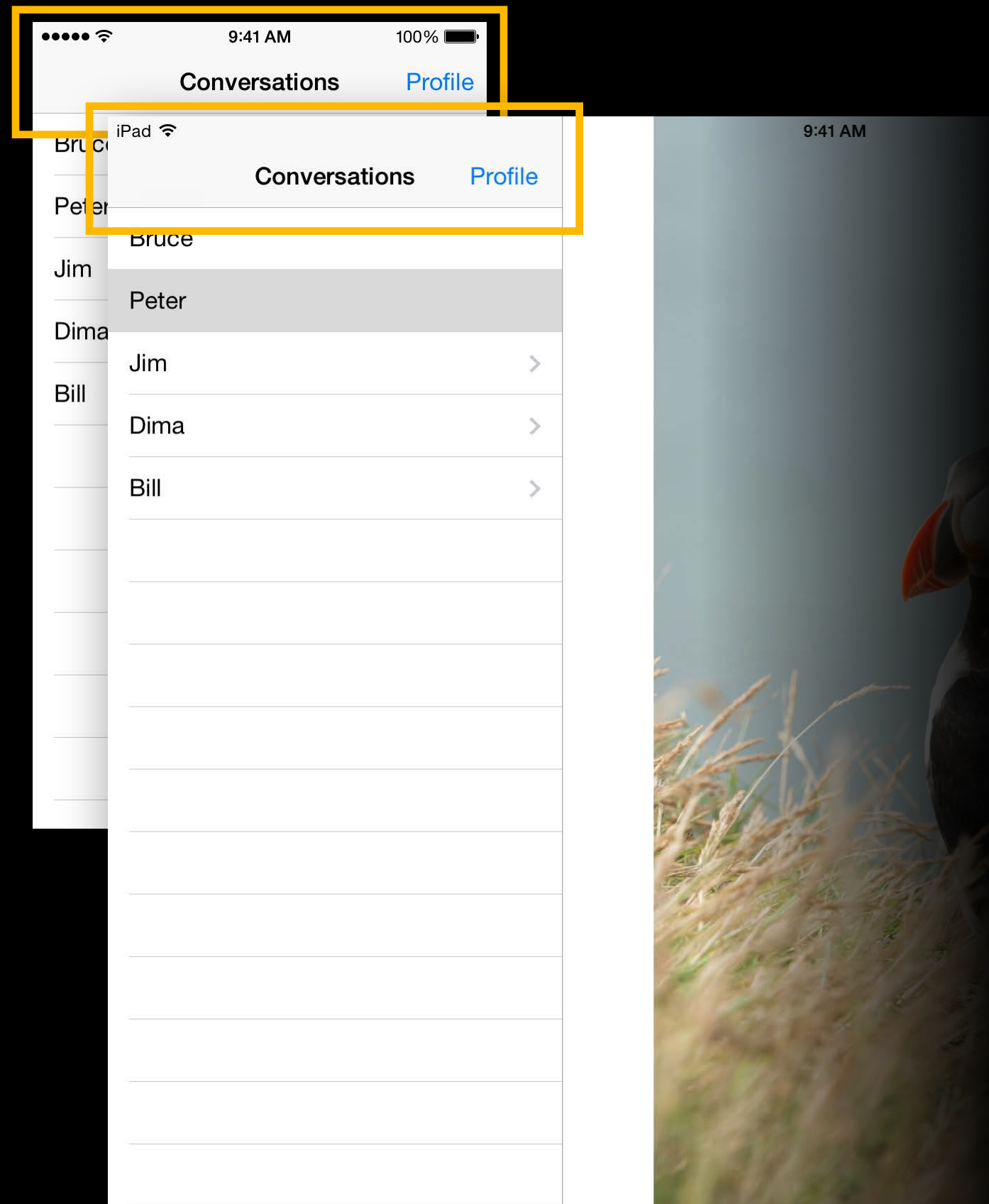
Regular



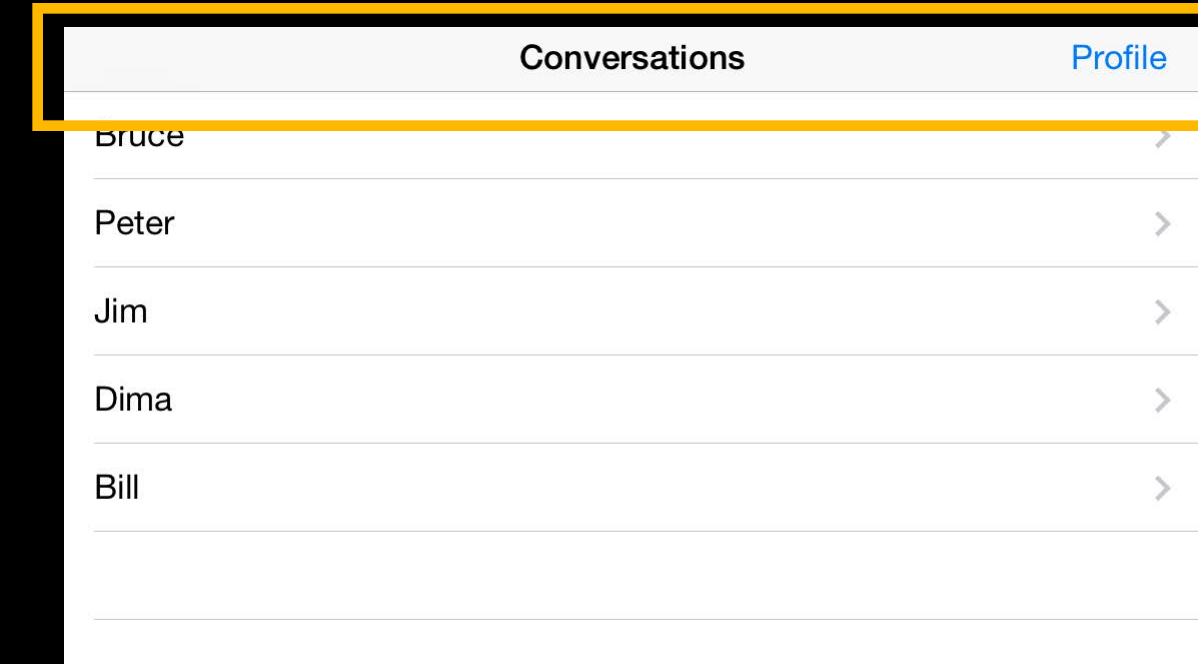
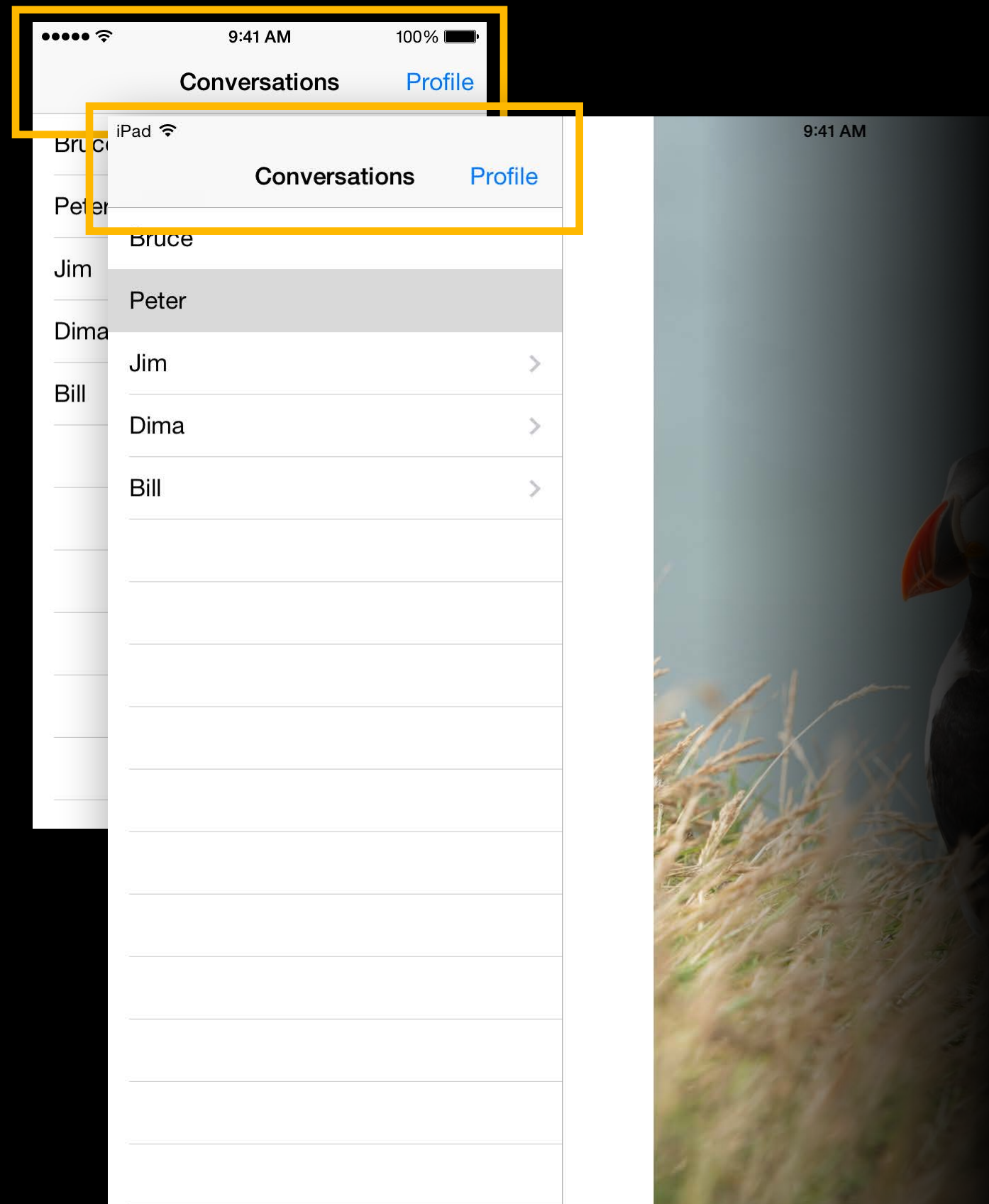
Compact



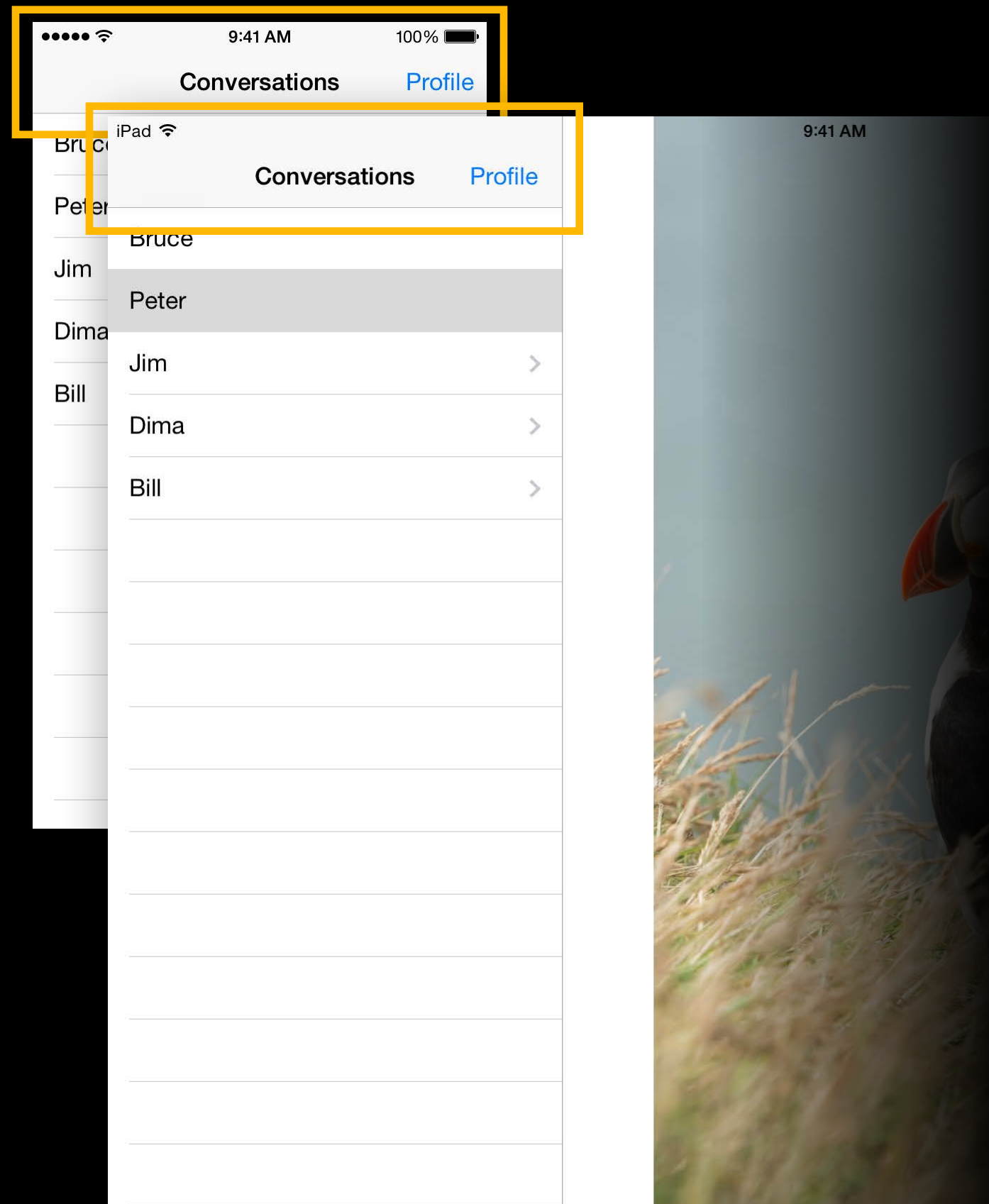




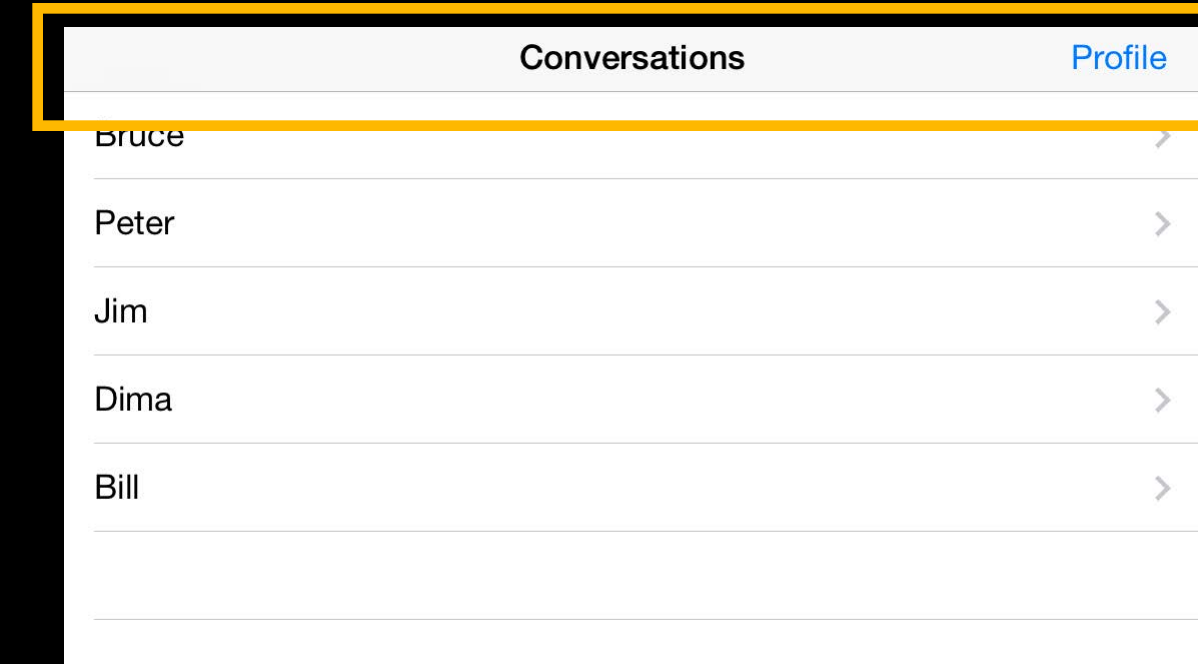
Regular



Regular

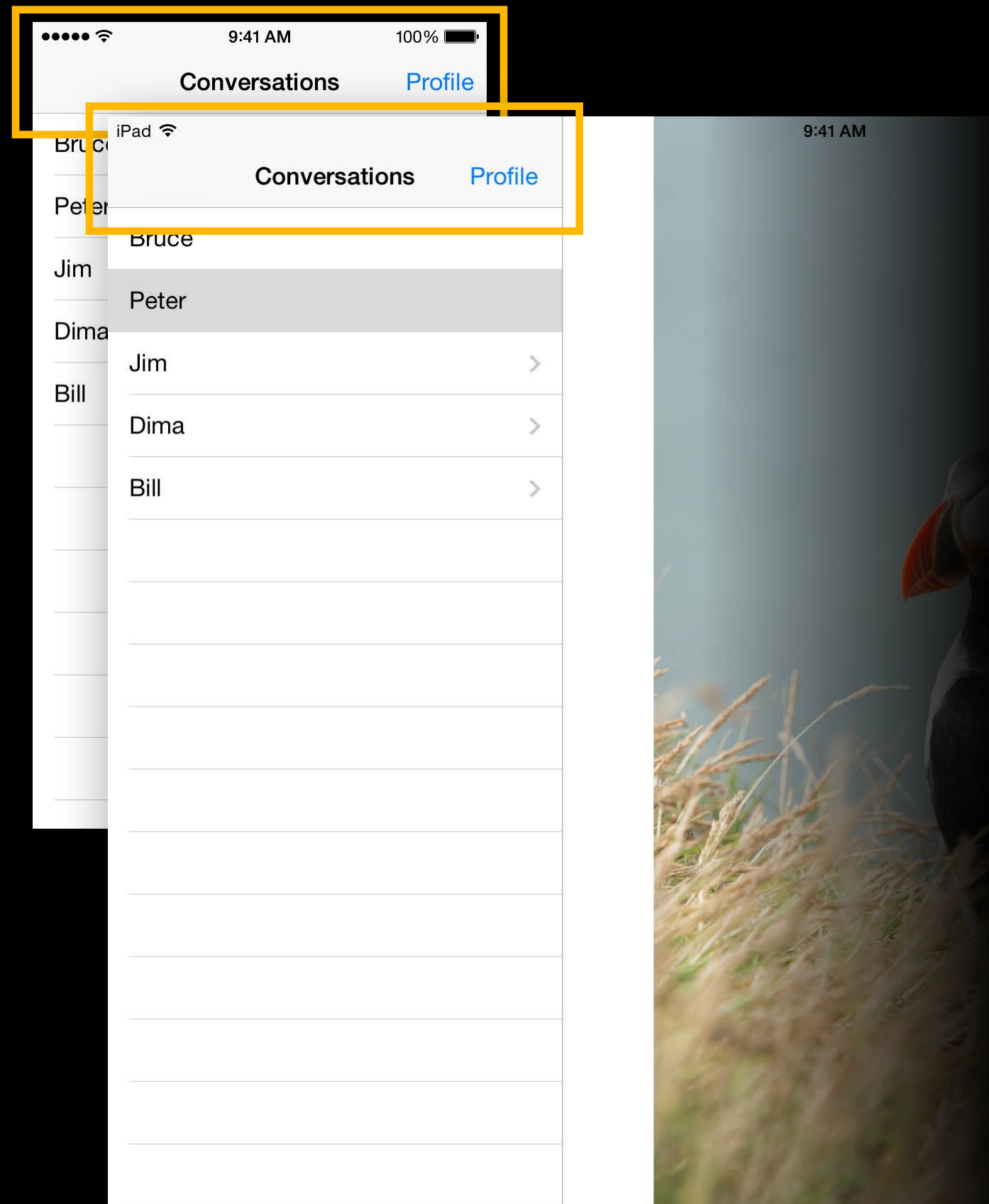


Compact

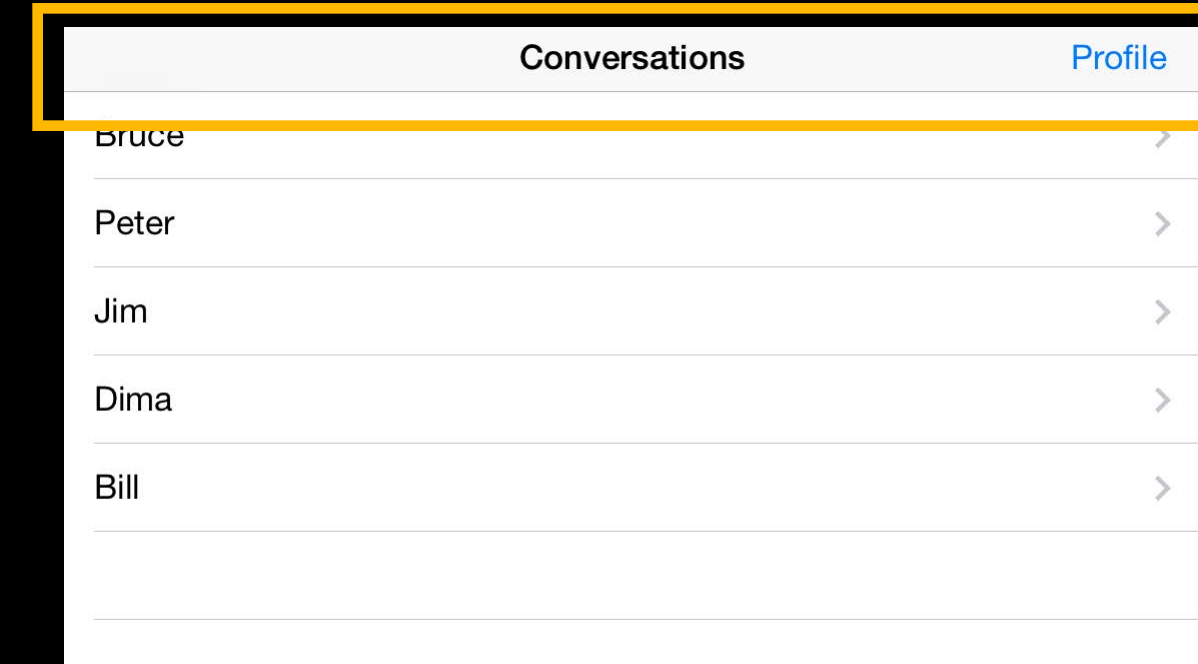


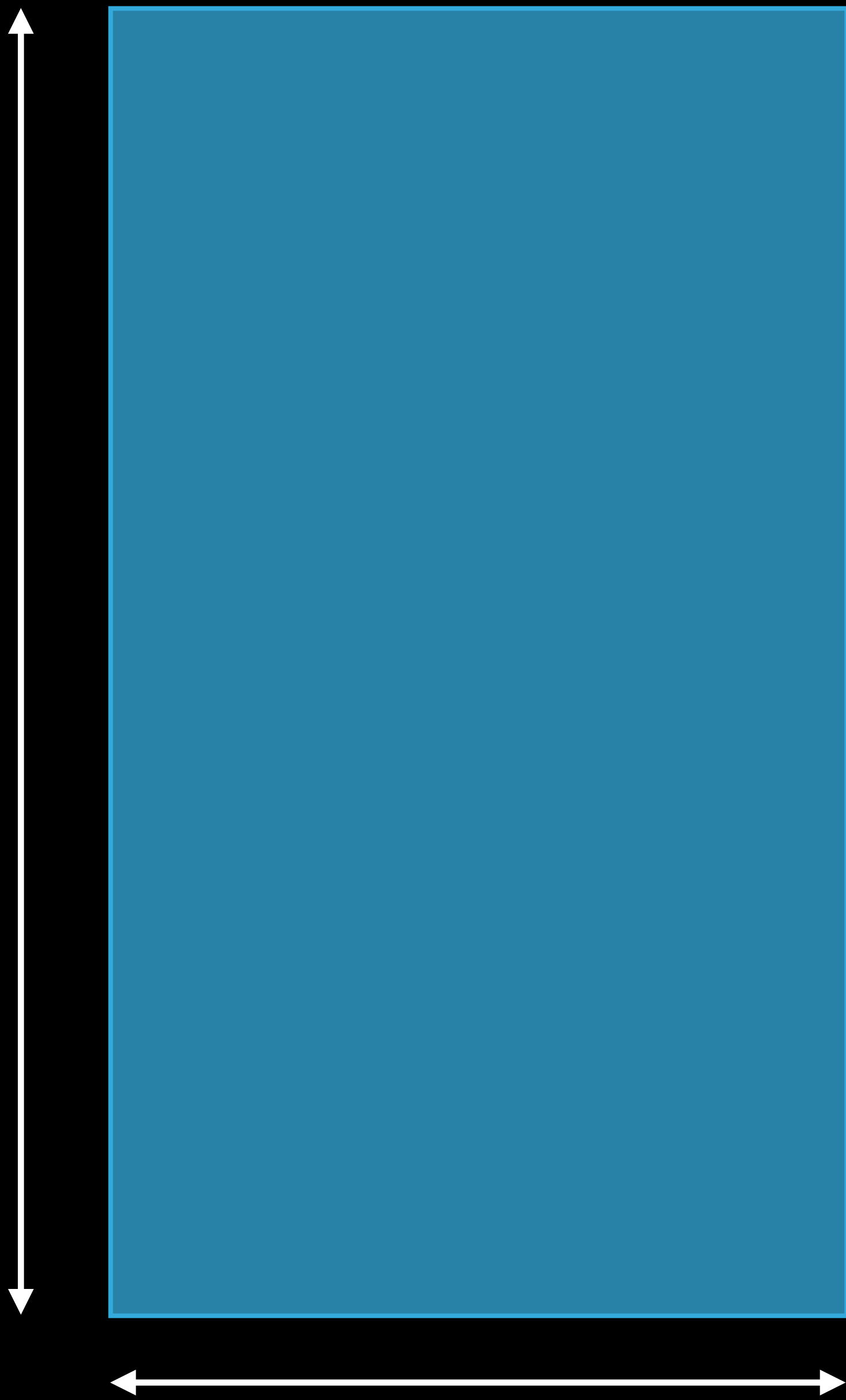
Vertical Size Class

Regular

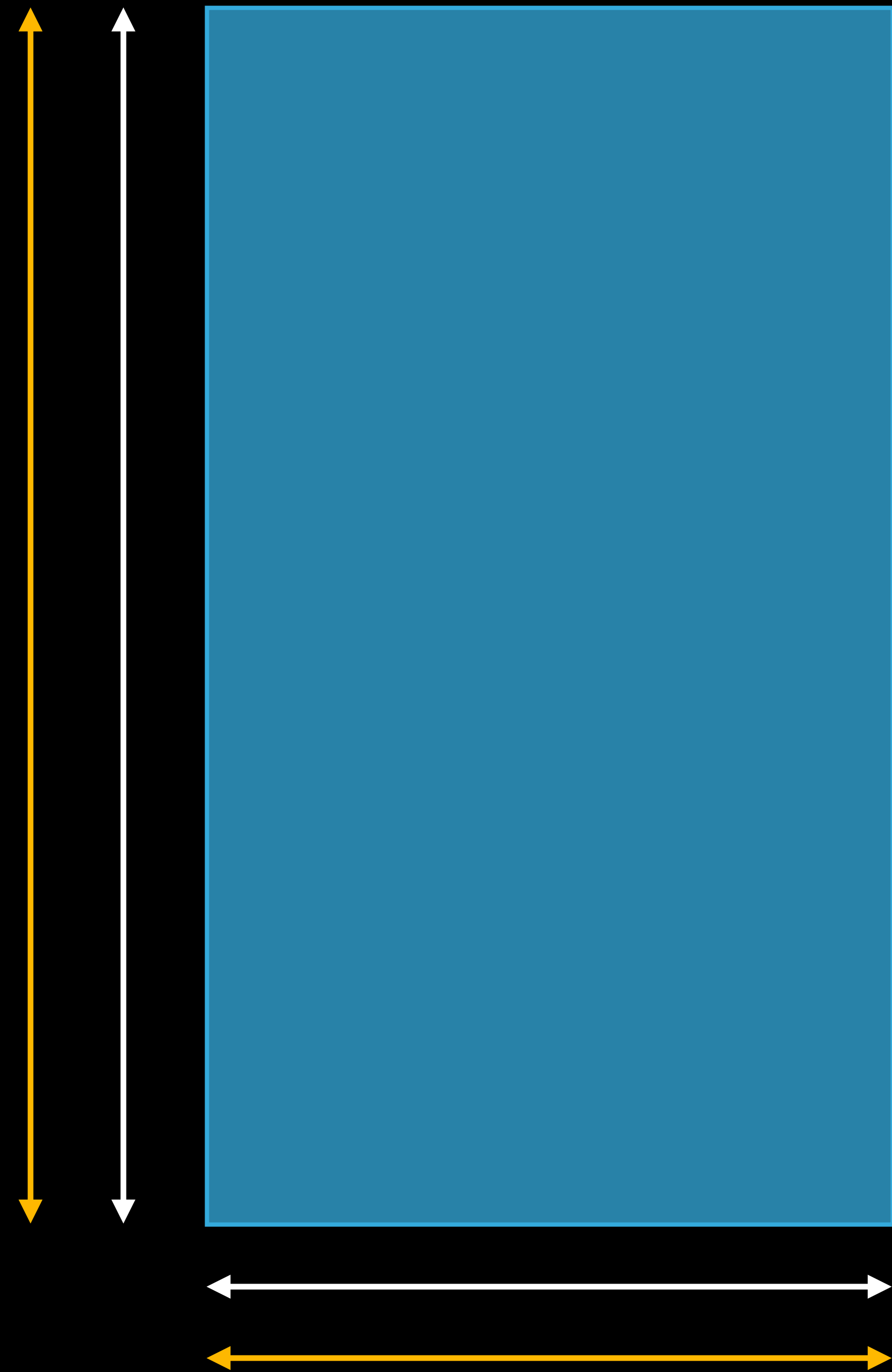


Compact





Size



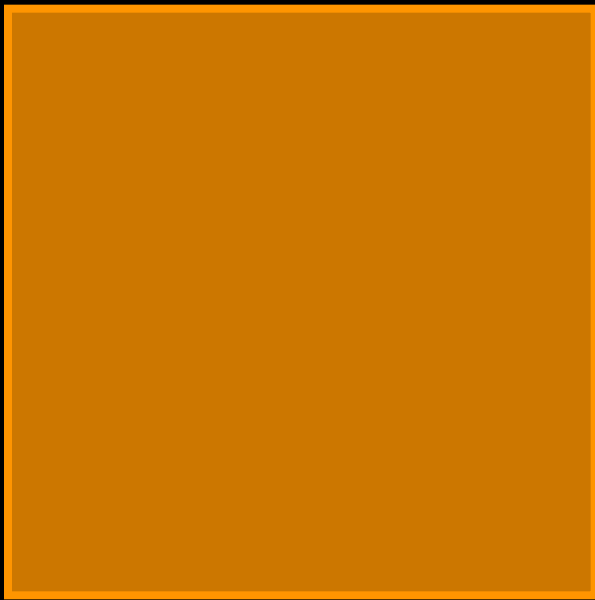



Size

Size Class

Size Classes

Horizontal

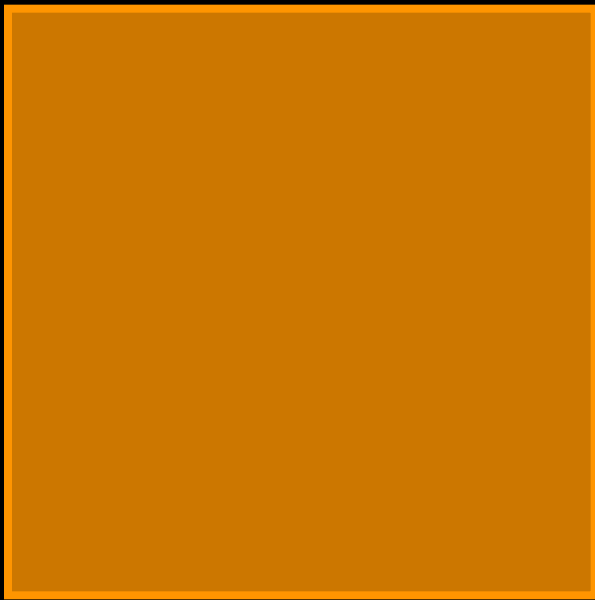

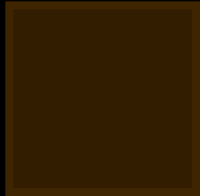
Vertical

	Regular	Compact
Regular		
Compact		

Size Classes

Horizontal




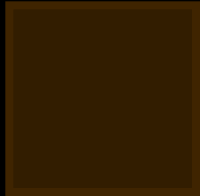
Vertical

	Regular	Compact
Regular		
Compact		

Size Classes

Horizontal





Vertical

	Regular	Compact
Regular		
Compact		

Size Classes

Horizontal

Vertical

	Regular	Compact
Regular		
Compact		

Demo

Traits

Traits

```
@property (nonatomic, readonly) UIUserInterfaceSizeClass horizontalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceSizeClass verticalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceIdiom userInterfaceIdiom;  
@property (nonatomic, readonly) CGFloat displayScale;
```

Traits

```
@property (nonatomic, readonly) UIUserInterfaceSizeClass horizontalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceSizeClass verticalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceIdiom userInterfaceIdiom;  
@property (nonatomic, readonly) CGFloat displayScale;
```

horizontalSizeClass	
verticalSizeClass	
userInterfaceIdiom	
displayScale	

Traits

```
@property (nonatomic, readonly) UIUserInterfaceSizeClass horizontalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceSizeClass verticalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceIdiom userInterfaceIdiom;  
@property (nonatomic, readonly) CGFloat displayScale;
```

horizontalSizeClass	Compact
verticalSizeClass	Regular
userInterfaceIdiom	Phone
displayScale	2.0

Traits

```
@property (nonatomic, readonly) UIUserInterfaceSizeClass horizontalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceSizeClass verticalSizeClass;  
@property (nonatomic, readonly) UIUserInterfaceIdiom userInterfaceIdiom;  
@property (nonatomic, readonly) CGFloat displayScale;
```

horizontalSizeClass	Compact
verticalSizeClass	Regular
userInterfaceIdiom	Phone
displayScale	2.0

UITraitCollection

Trait Environments

Trait Environments



UIScreen

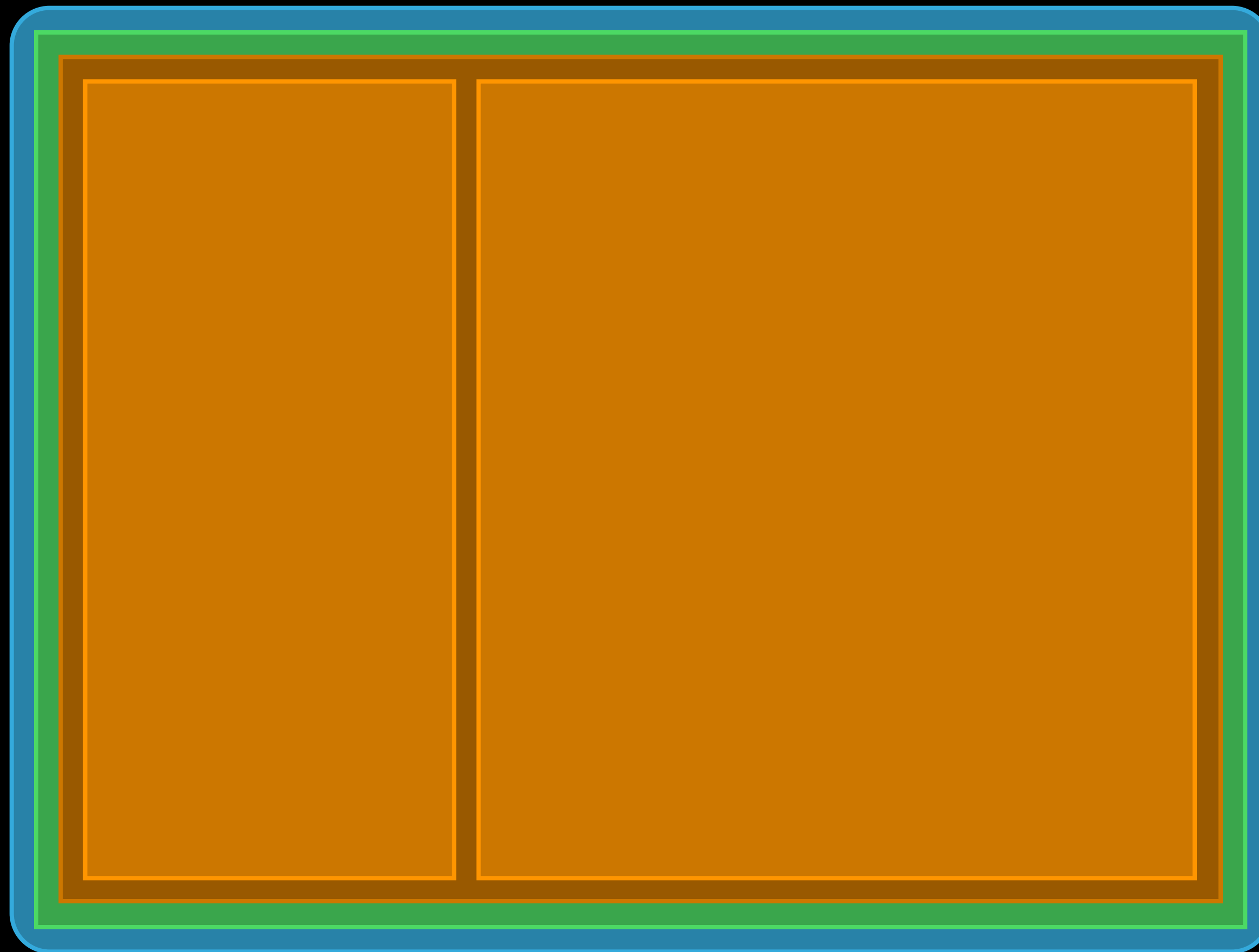
Trait Environments



UIScreen

UIWindow

Trait Environments

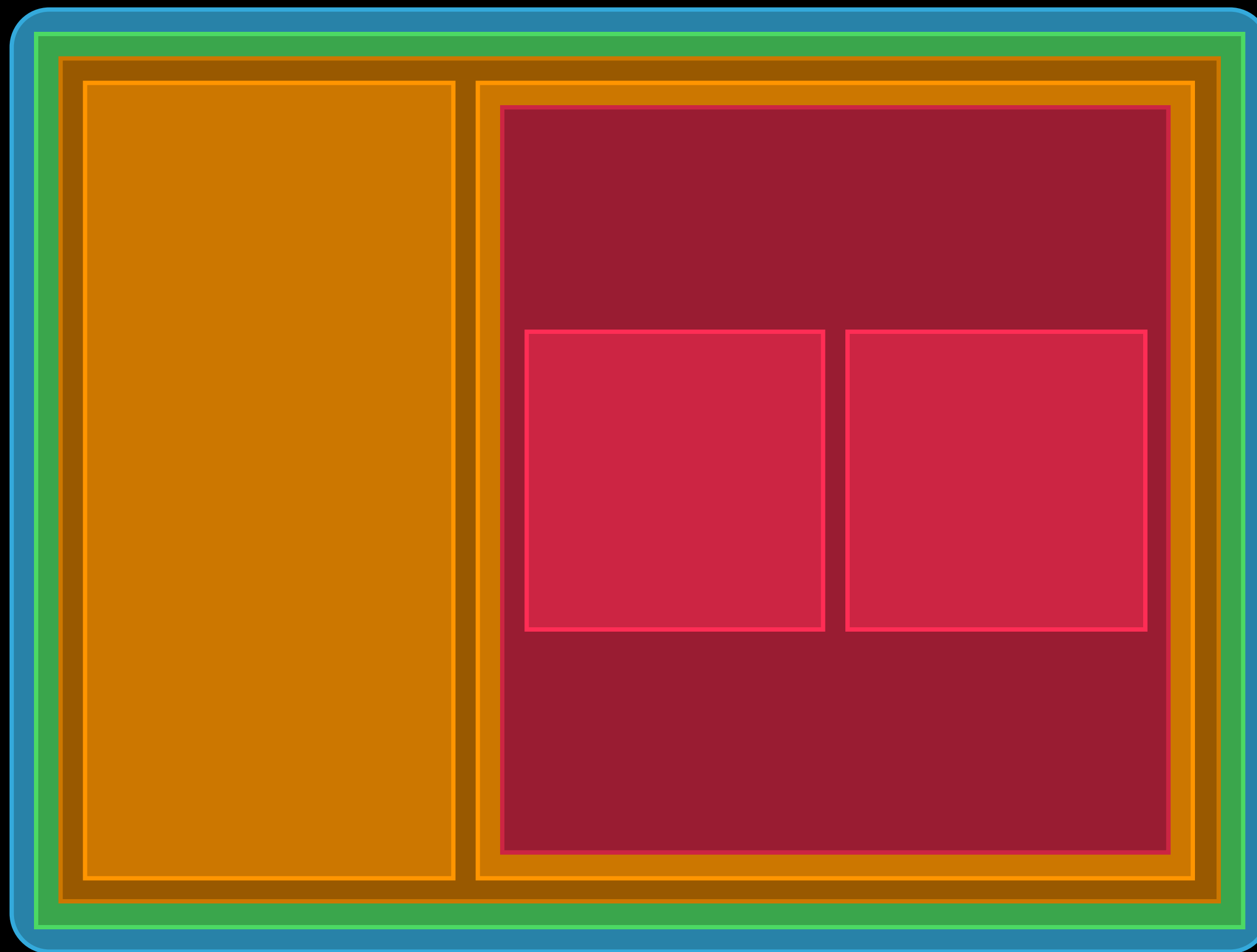


UIScreen

UIWindow

UIViewController

Trait Environments



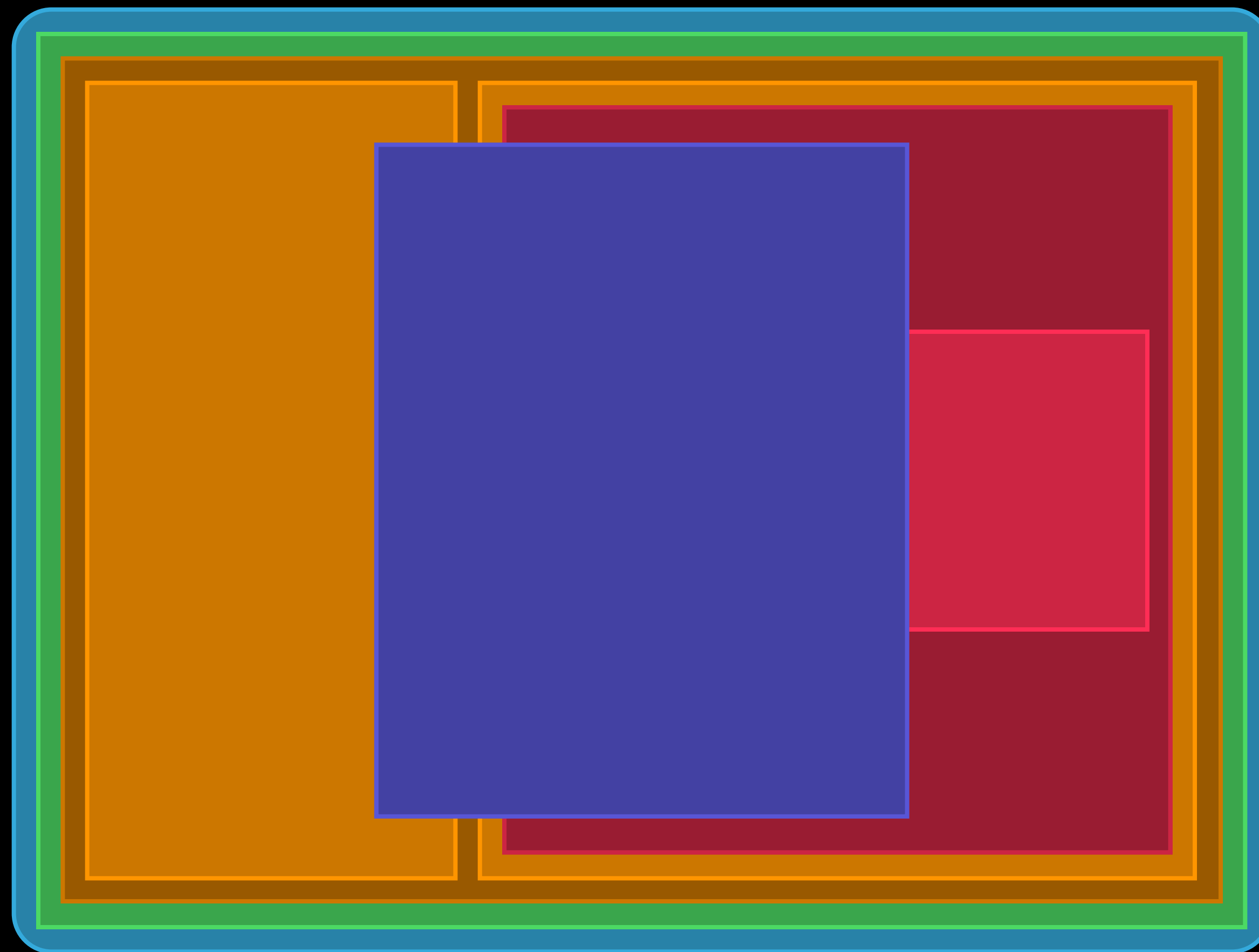
UIScreen

UIWindow

UIViewController

UIView

Trait Environments



UIScreen

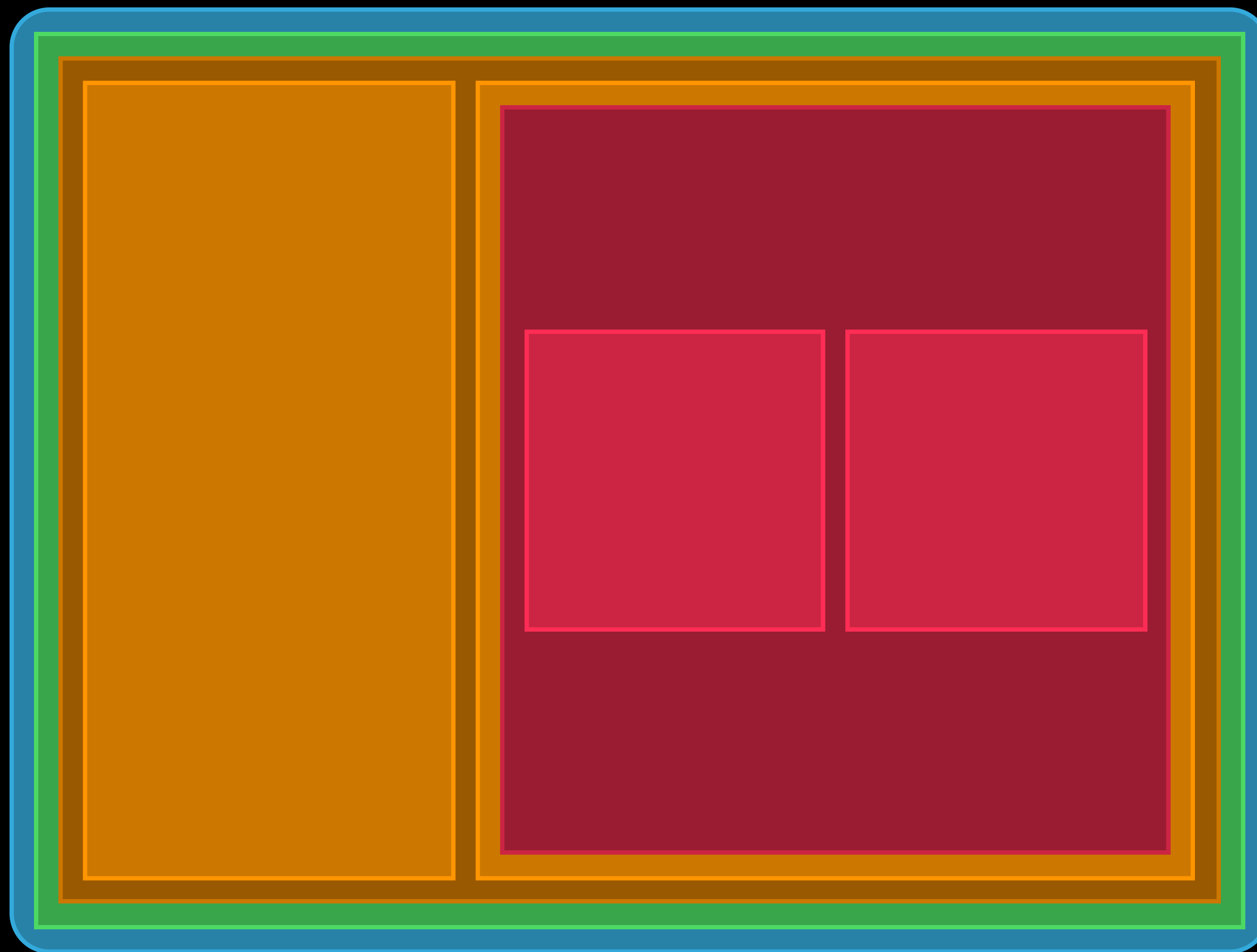
UIWindow

UIViewController

UIView

UIPresentationController

Trait Environments



UIScreen

UIWindow

UIViewController

UIView

UIPresentationController

Trait Environments



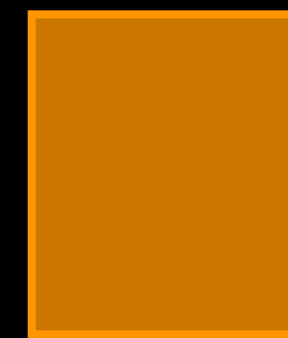
UIScreen



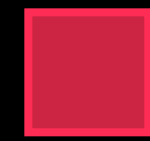
UIWindow



UIViewController



UIView

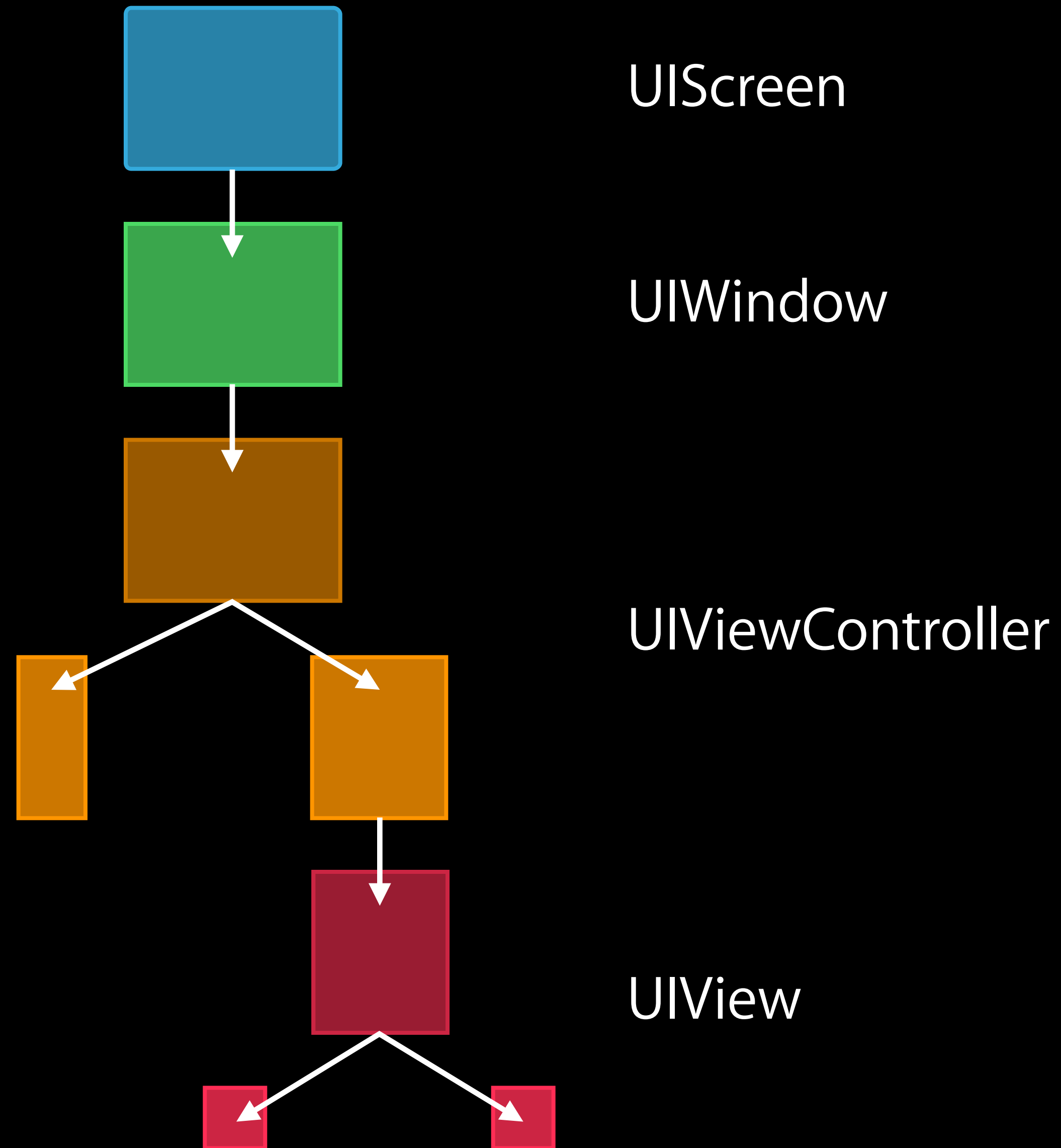


Trait Environments

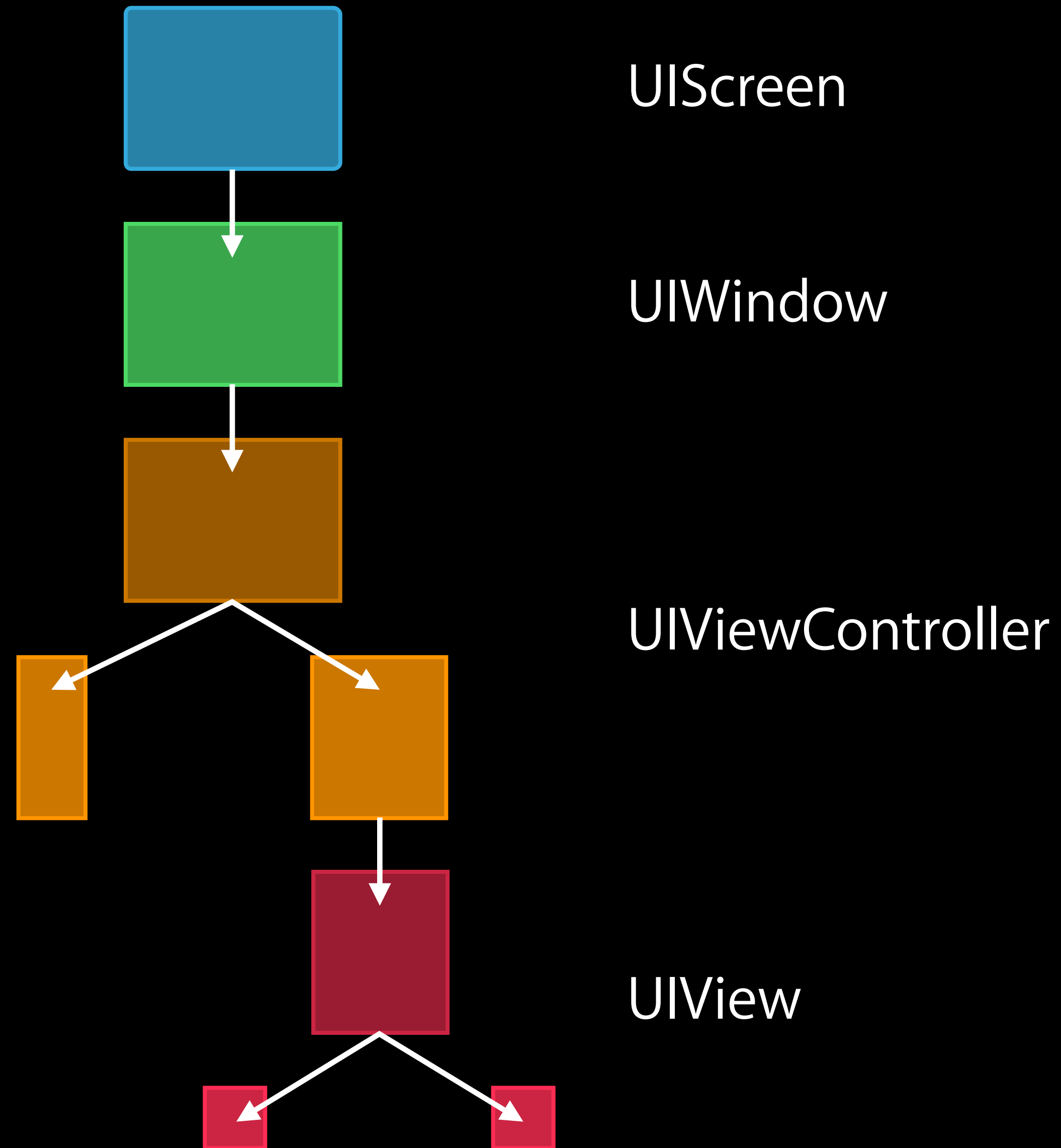


Trait Environments

horizontalSizeClass
verticalSizeClass
userInterfaceIdiom
displayScale



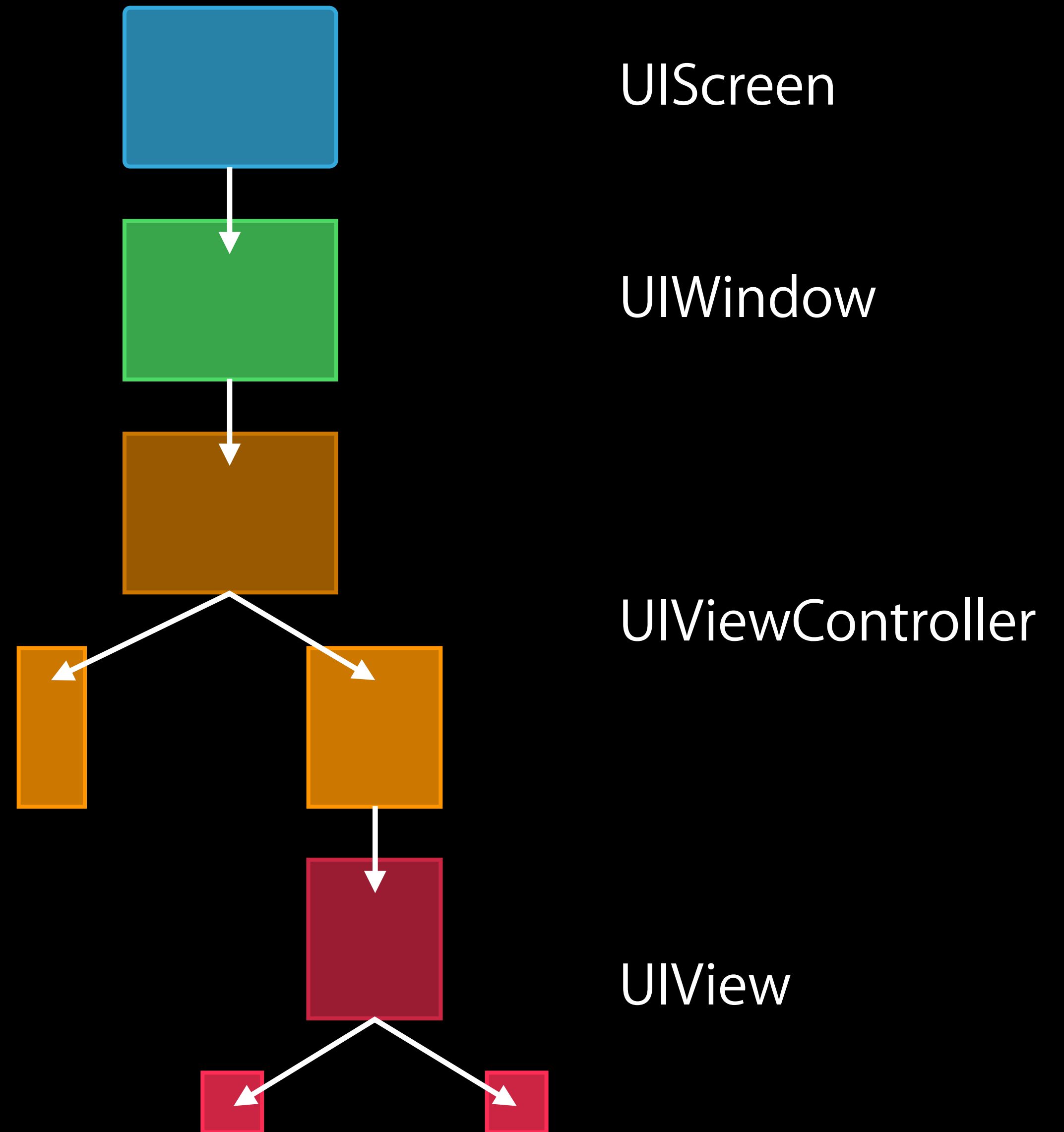
Trait Environments



Trait Environments

traitCollectionDidChange:

- Override in UIView and UIViewController subclasses to react to trait changes



Trait Collections

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

horizontalSizeClass	Compact
verticalSizeClass	
userfaceIdiom	
displayScale	

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

```
+traitCollectionWithHorizontalSizeClass:
```

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

Contains

horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

Contains



horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

Contains



horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

`containsTraitsInCollection:`

Trait Collections

horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

Contains

horizontalSizeClass	Regular
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

`containsTraitsInCollection:`

Trait Collections

horizontalSizeClass	Compact	Contains	horizontalSizeClass	Regular
verticalSizeClass	Regular		verticalSizeClass	(Unspecified)
userfaceIdiom	Phone		userfaceIdiom	(Unspecified)
displayScale	2.0		displayScale	(Unspecified)

containsTraitsInCollection:

Trait Collections

horizontalSizeClass	Compact	Contains 	horizontalSizeClass	Regular
verticalSizeClass	Regular		verticalSizeClass	(Unspecified)
userfaceIdiom	Phone		userfaceIdiom	(Unspecified)
displayScale	2.0		displayScale	(Unspecified)

containsTraitsInCollection:

Appearance Proxy

Appearance Proxy

`appearanceForTraitCollection:`

- Customize views for different traits

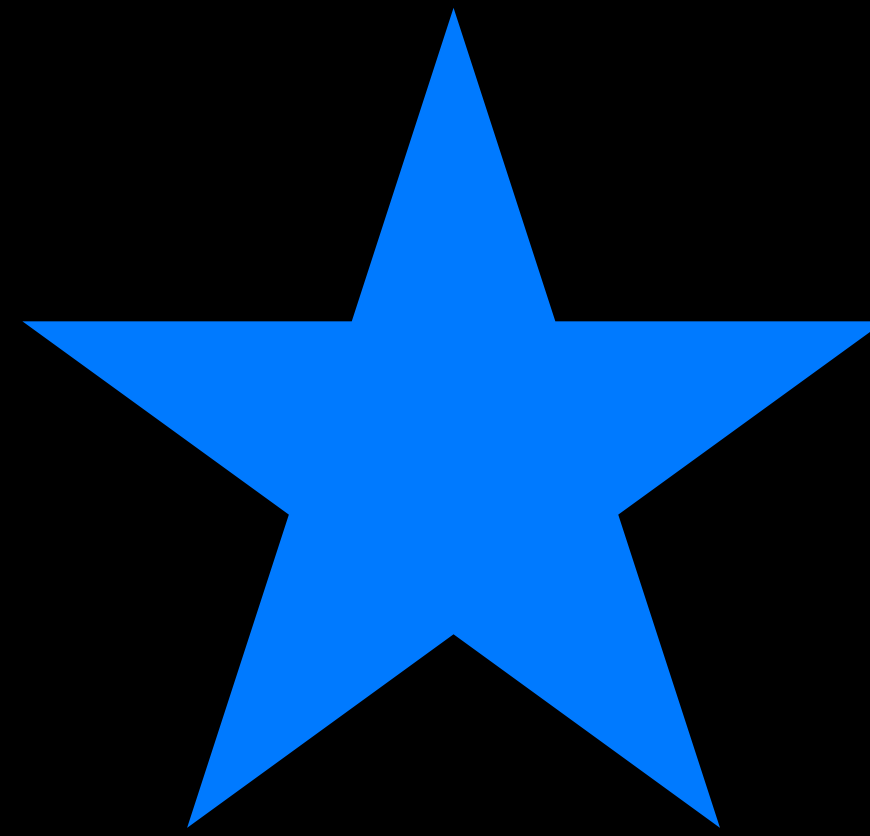
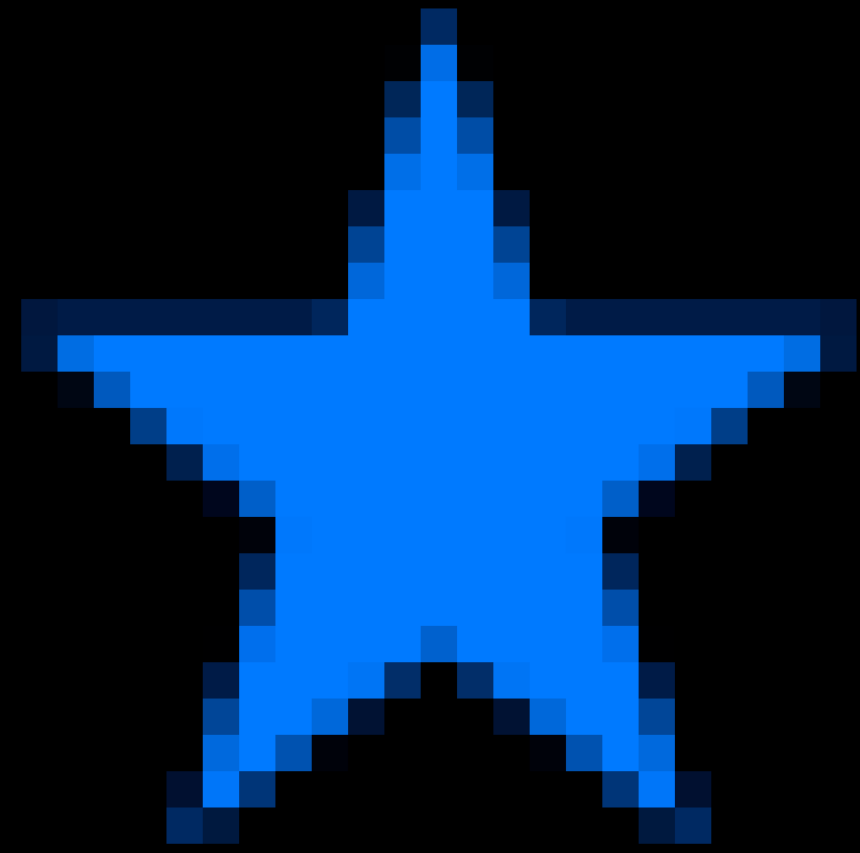
Appearance Proxy

appearanceForTraitCollection:

- Customize views for different traits

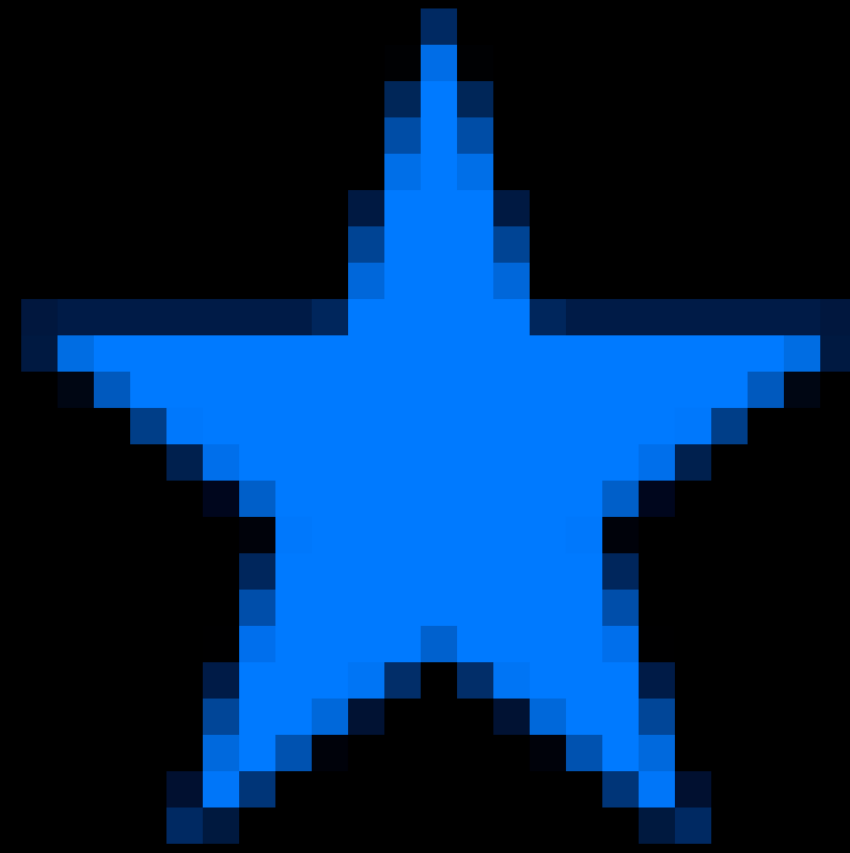
horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

UIImage

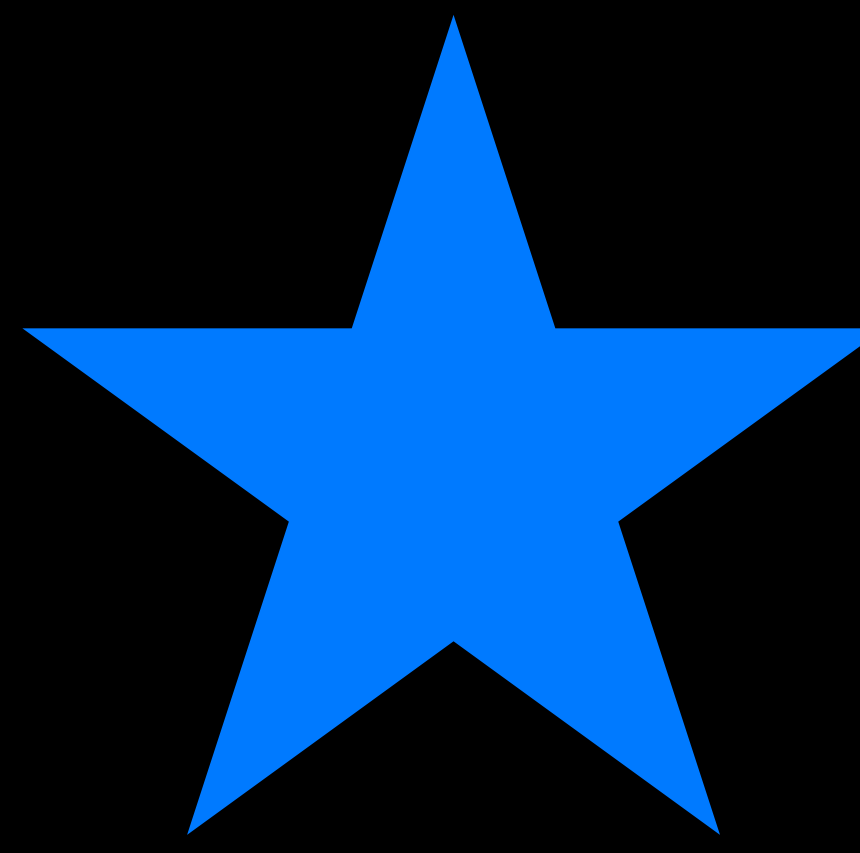


UIImage

1x



2x

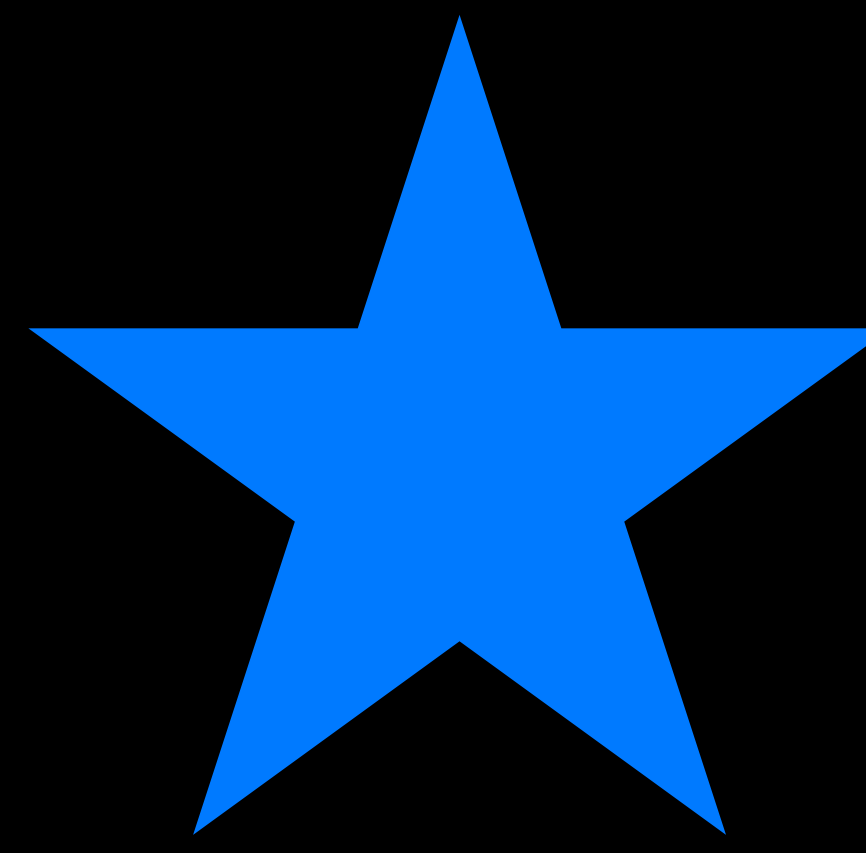
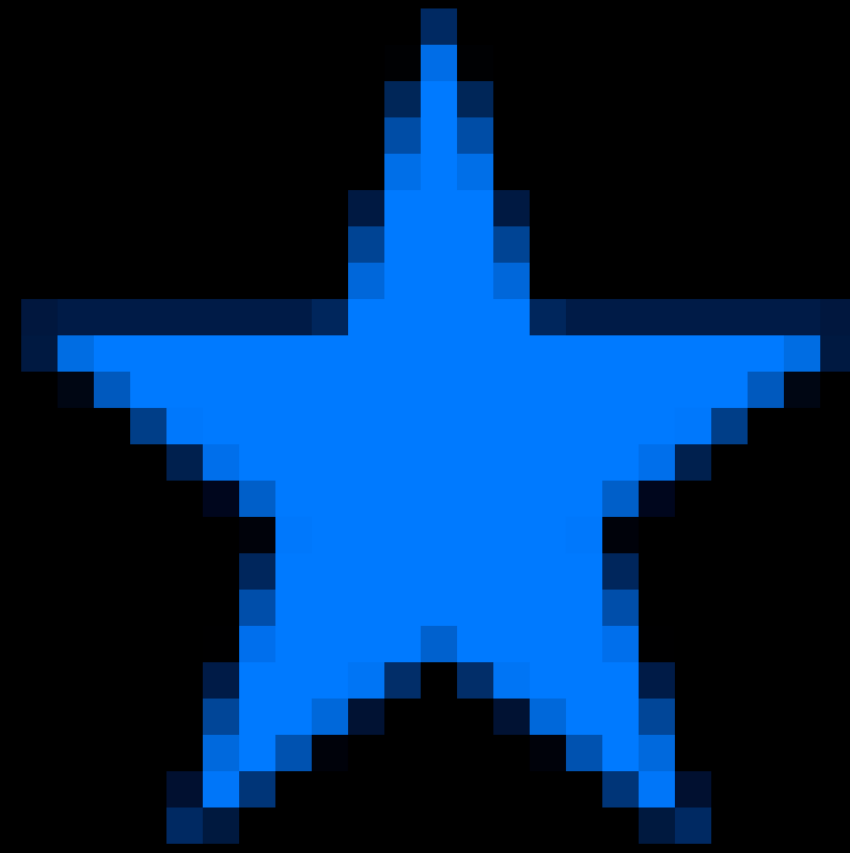


UIImage

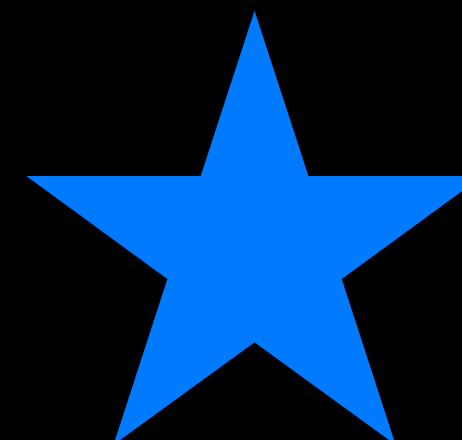
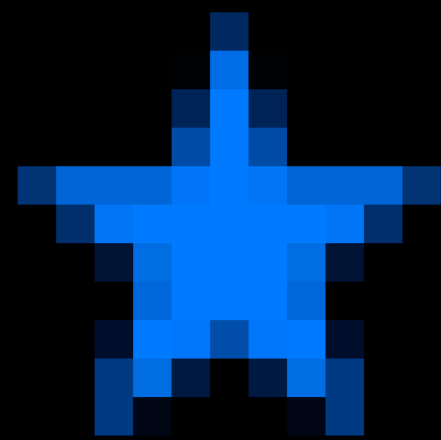
1x

2x

Any



Compact



UIImage



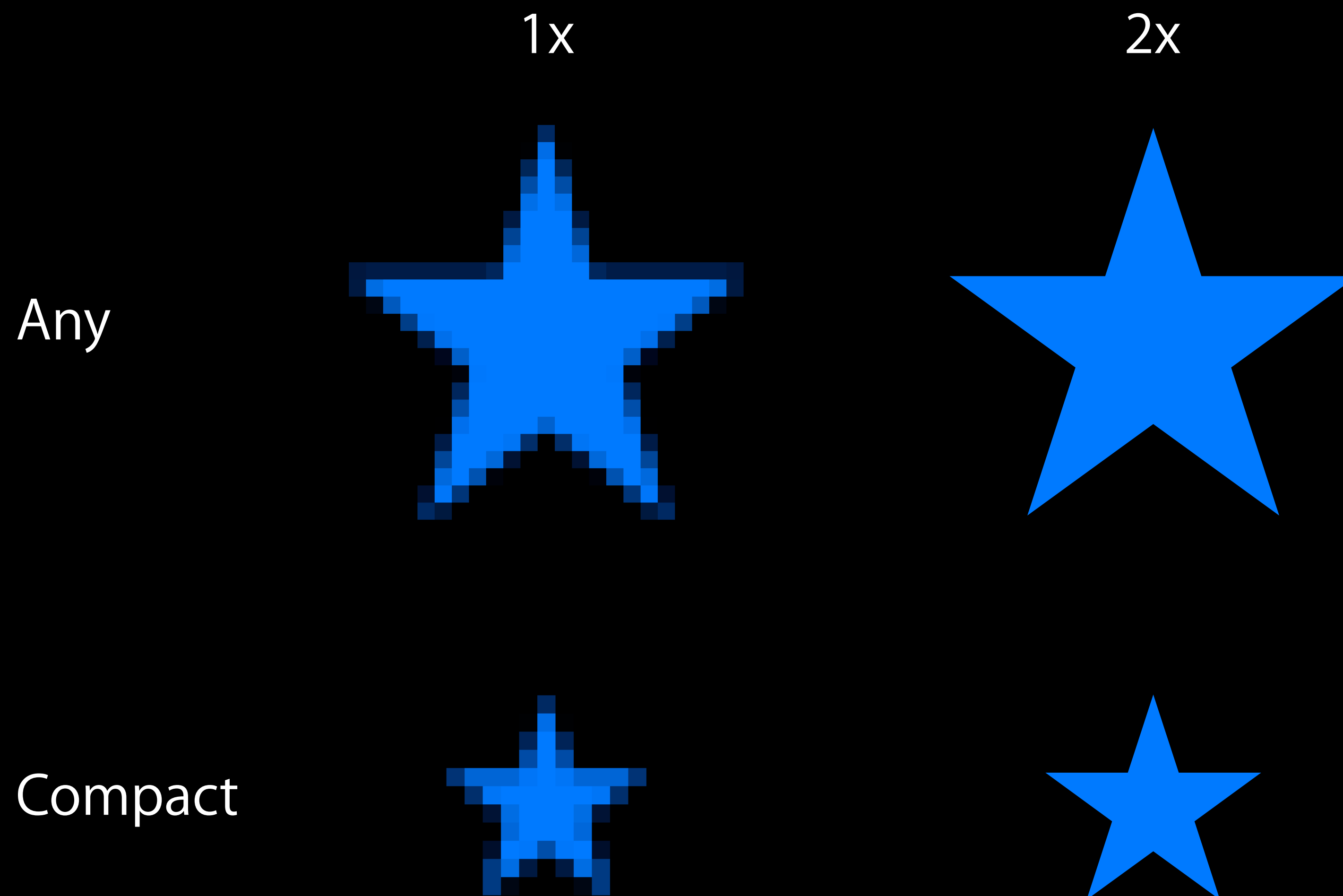
horizontalSizeClass	Compact
verticalSizeClass	Regular
userfaceIdiom	Phone
displayScale	2.0

UIImage

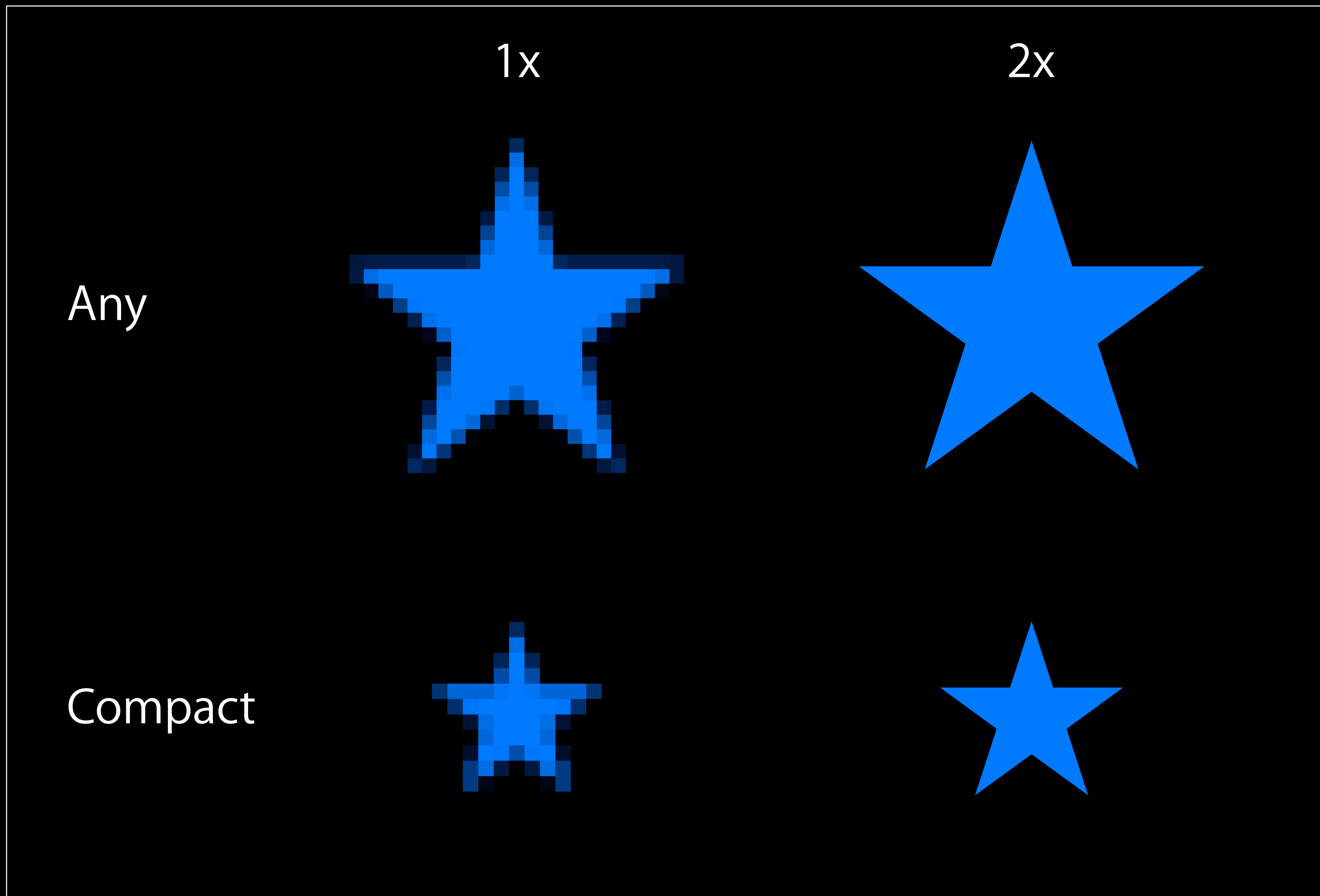


horizontalSizeClass	Compact
verticalSizeClass	Compact
userfaceIdiom	Phone
displayScale	2.0

UIImageAsset



UIImageAsset



Trait Collections

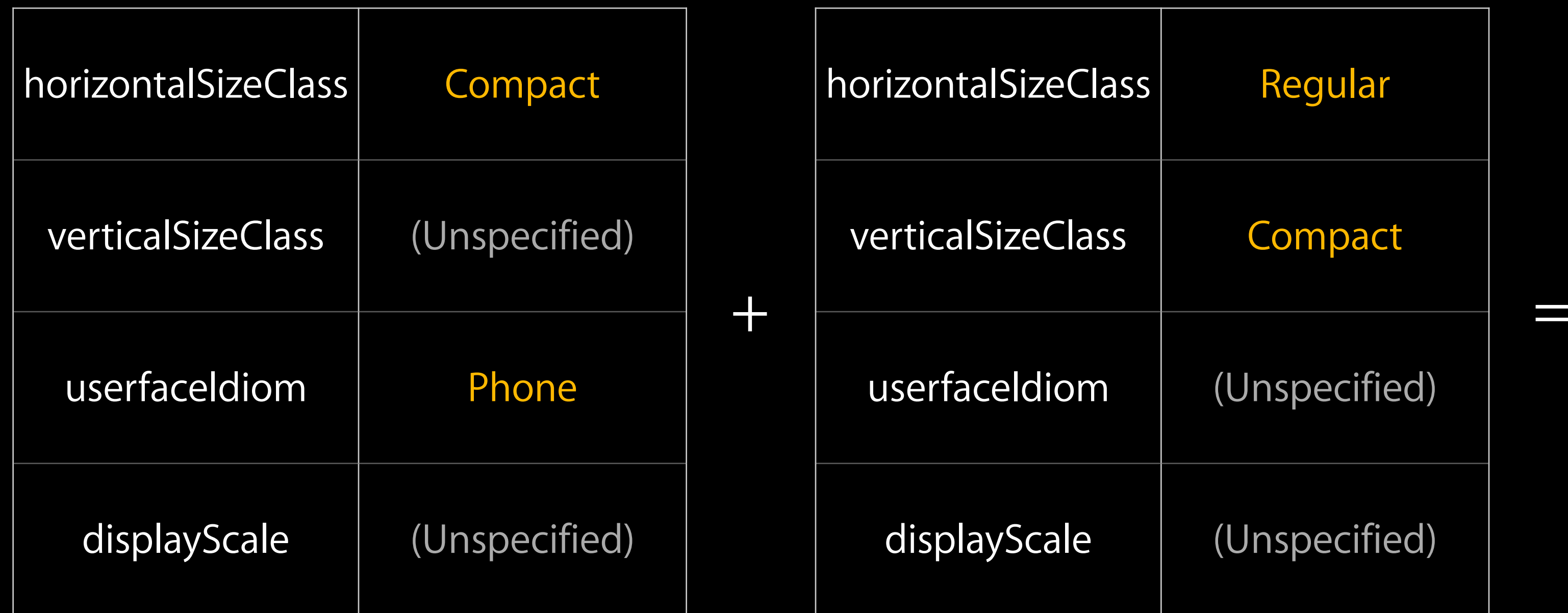
horizontalSizeClass	Compact
verticalSizeClass	(Unspecified)
userfaceIdiom	Phone
displayScale	(Unspecified)

+

horizontalSizeClass	Regular
verticalSizeClass	Compact
userfaceIdiom	(Unspecified)
displayScale	(Unspecified)

=

Trait Collections



```
traitCollectionWithTraitsFromCollections:
```

Trait Collections

horizontalSizeClass	Compact	+	horizontalSizeClass	Regular	=	horizontalSizeClass	Regular
verticalSizeClass	(Unspecified)		verticalSizeClass	Compact		verticalSizeClass	Compact
userfaceIdiom	Phone		userfaceIdiom	(Unspecified)		userfaceIdiom	Phone
displayScale	(Unspecified)		displayScale	(Unspecified)		displayScale	(Unspecified)

```
traitCollectionWithTraitsFromCollections:
```

Trait Collections

horizontalSizeClass	Compact		horizontalSizeClass	Regular		horizontalSizeClass	Regular
verticalSizeClass	(Unspecified)	+	verticalSizeClass	Compact	=	verticalSizeClass	Compact
userfaceldiom	Phone		userfaceldiom	(Unspecified)		userfaceldiom	Phone
displayScale	(Unspecified)		displayScale	(Unspecified)		displayScale	(Unspecified)

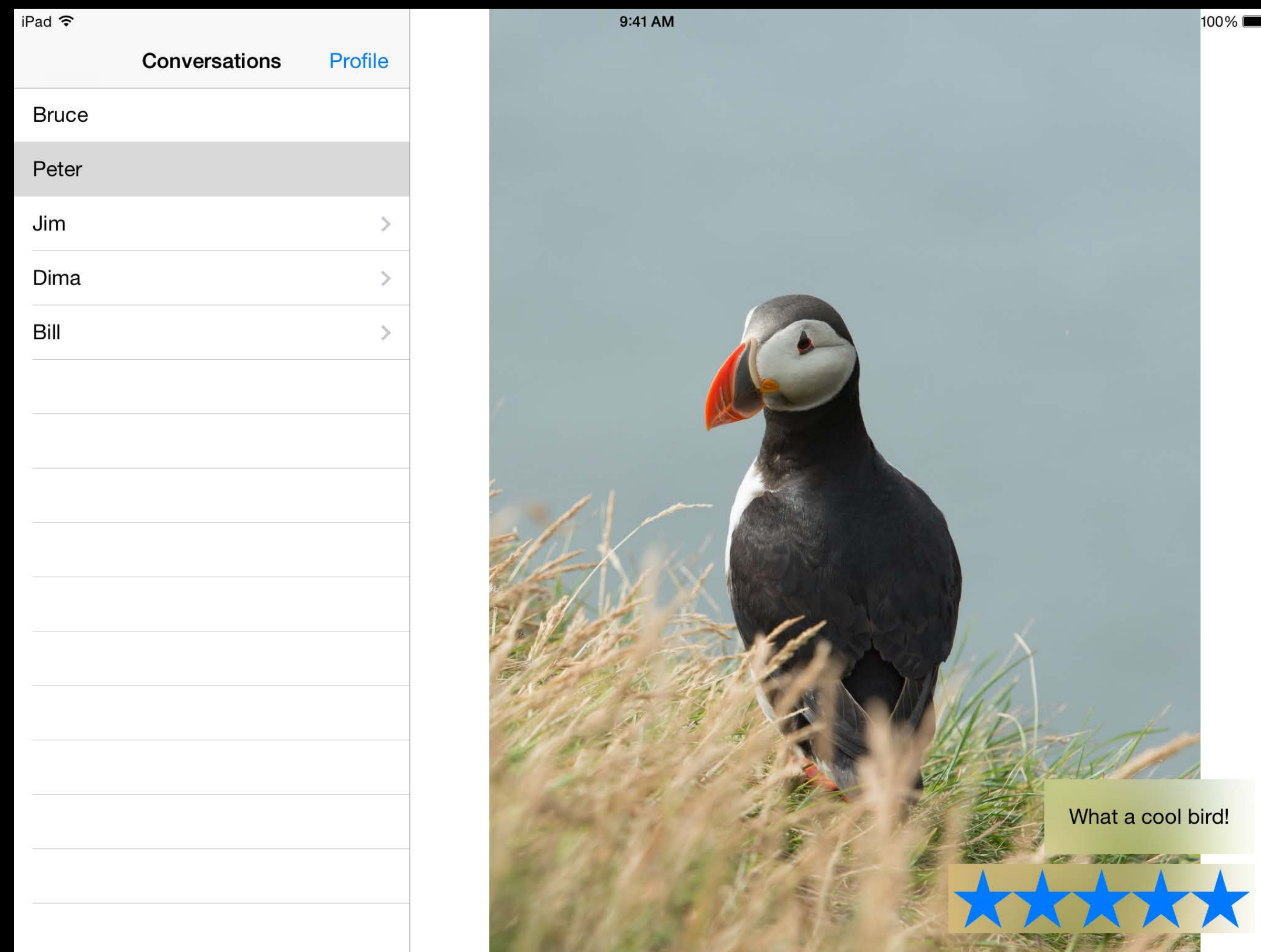
```
traitCollectionWithTraitsFromCollections:
```


Demo

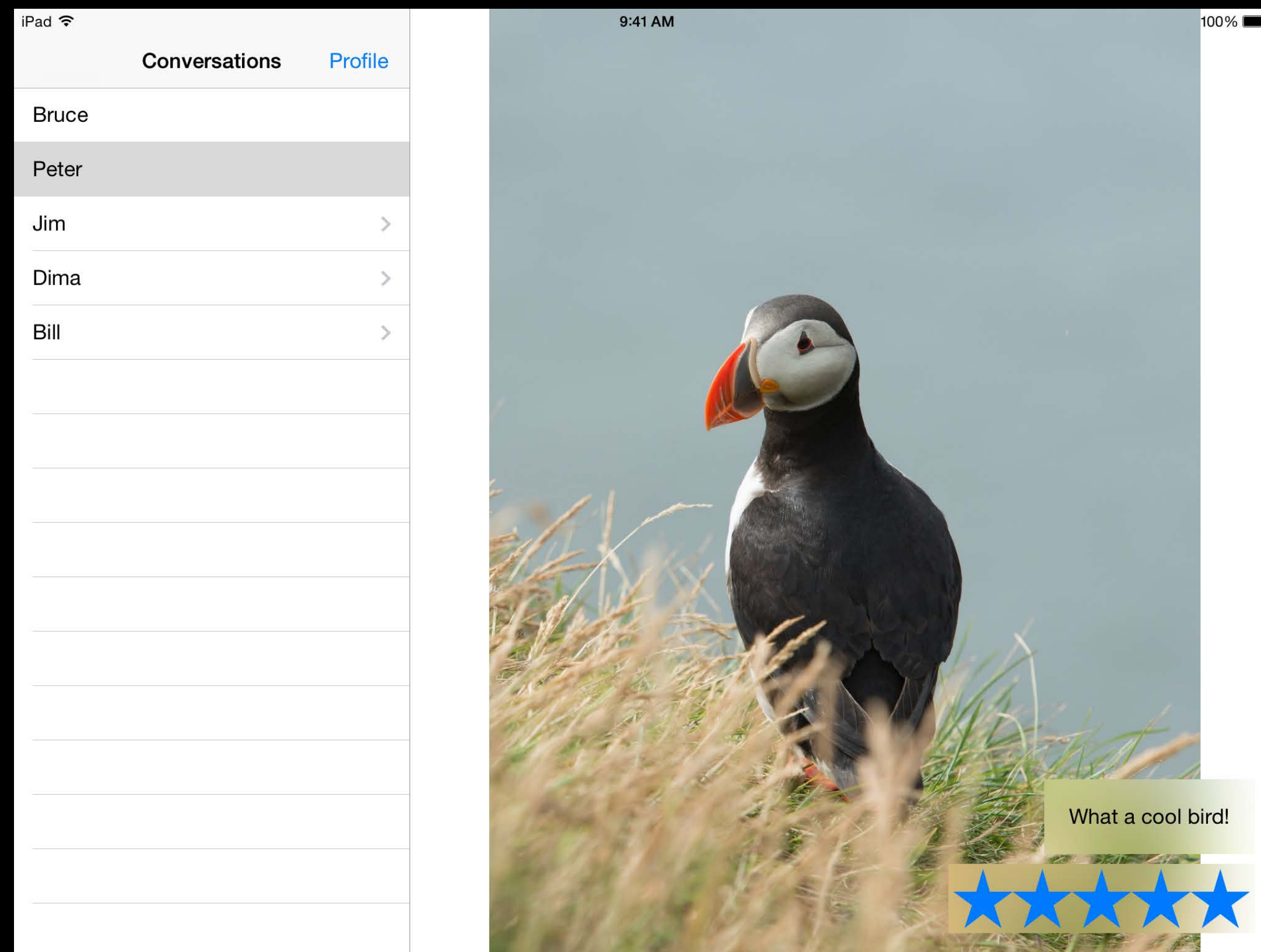
Adaptive View Controllers

Split View Controller

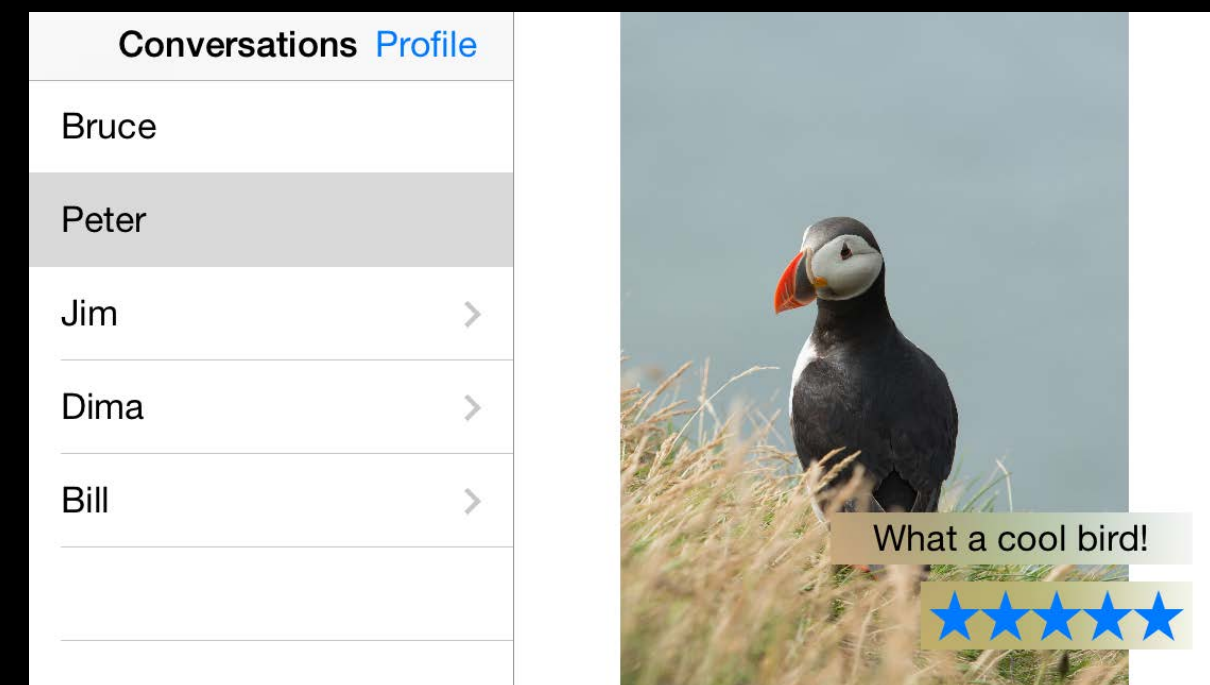
Split View Controller



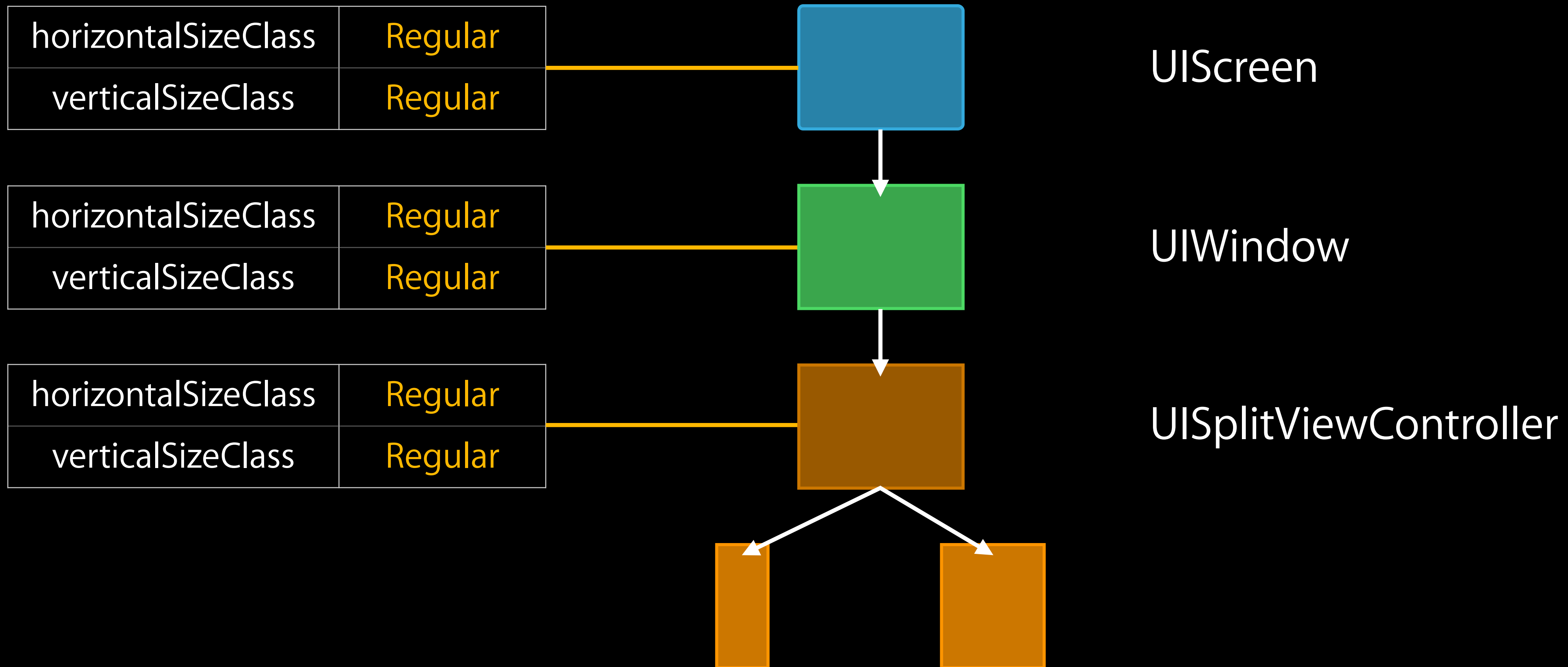
Split View Controller



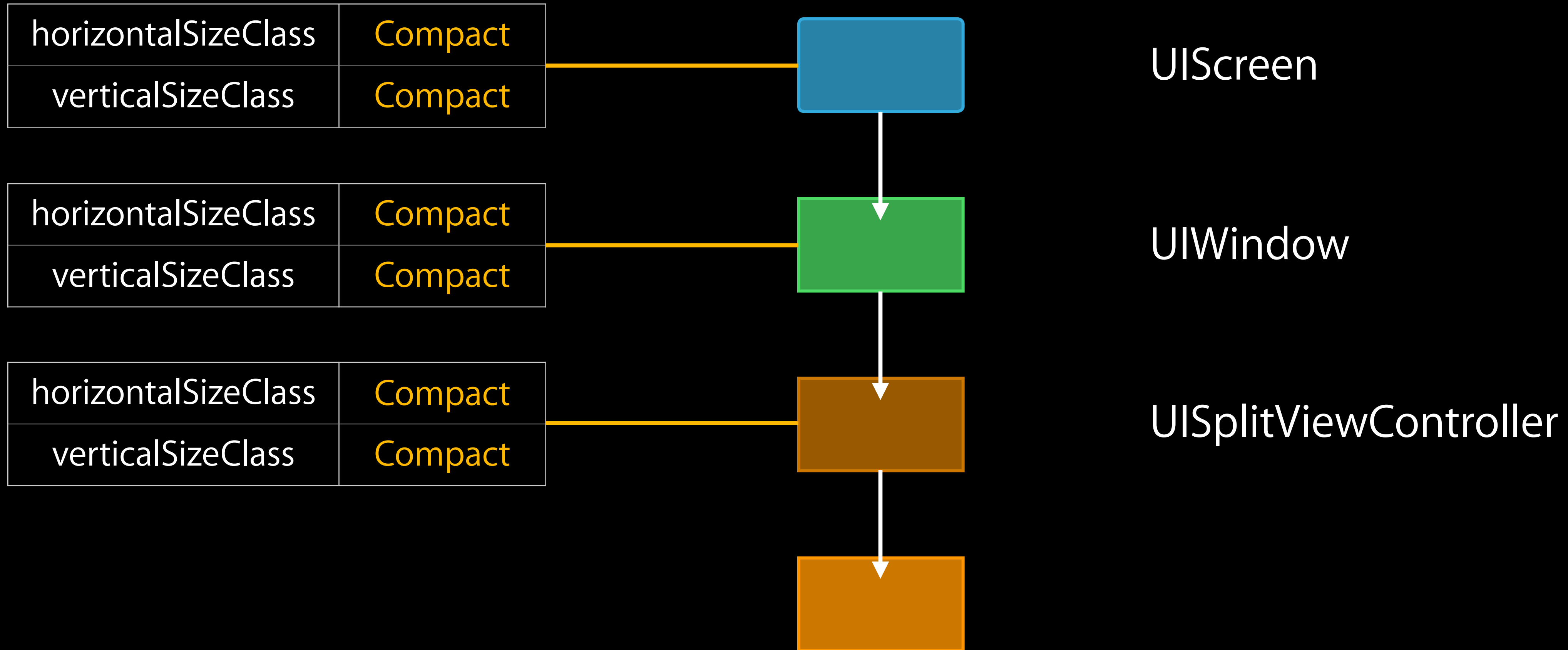
Split View Controller



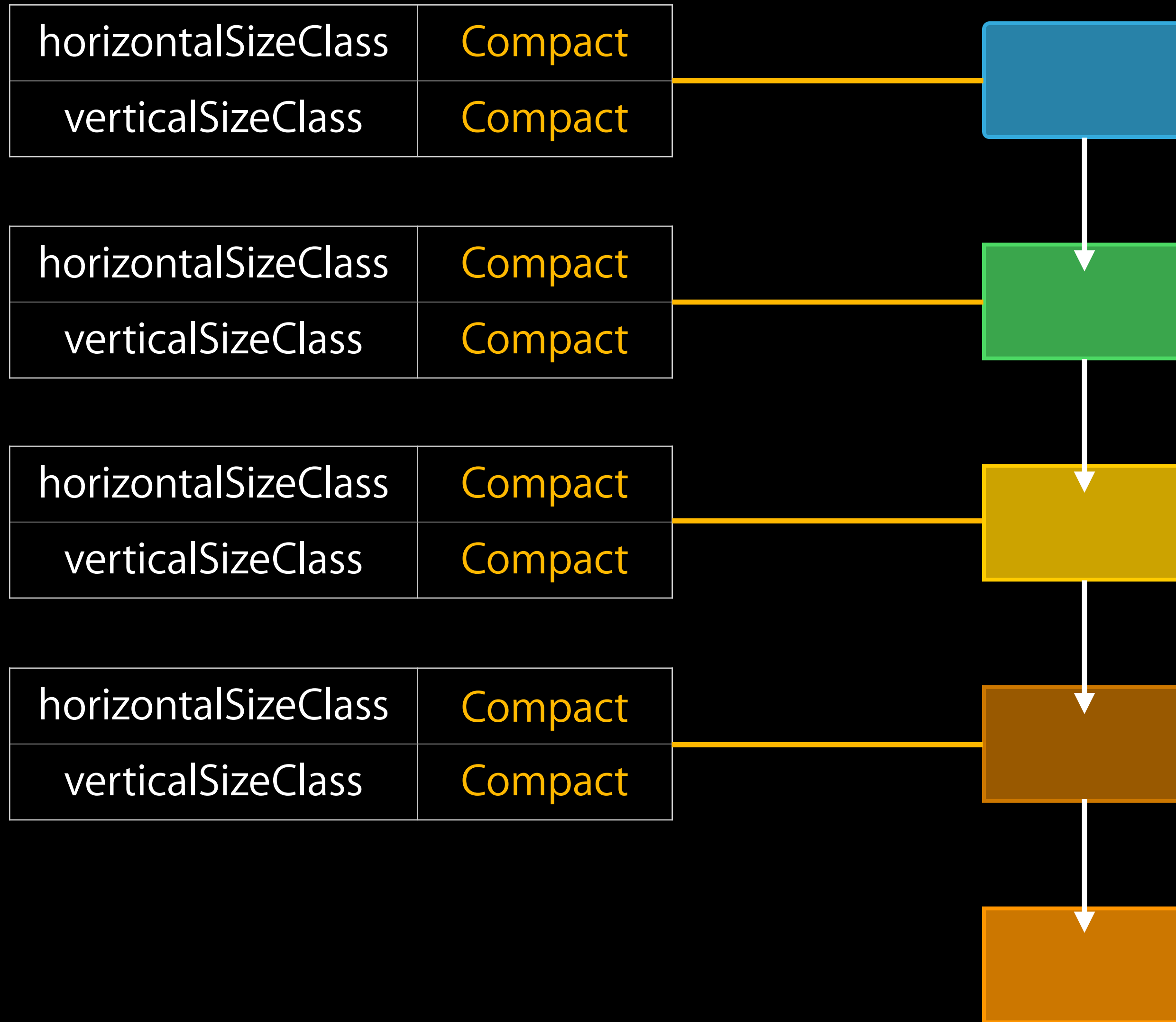
Overriding Traits



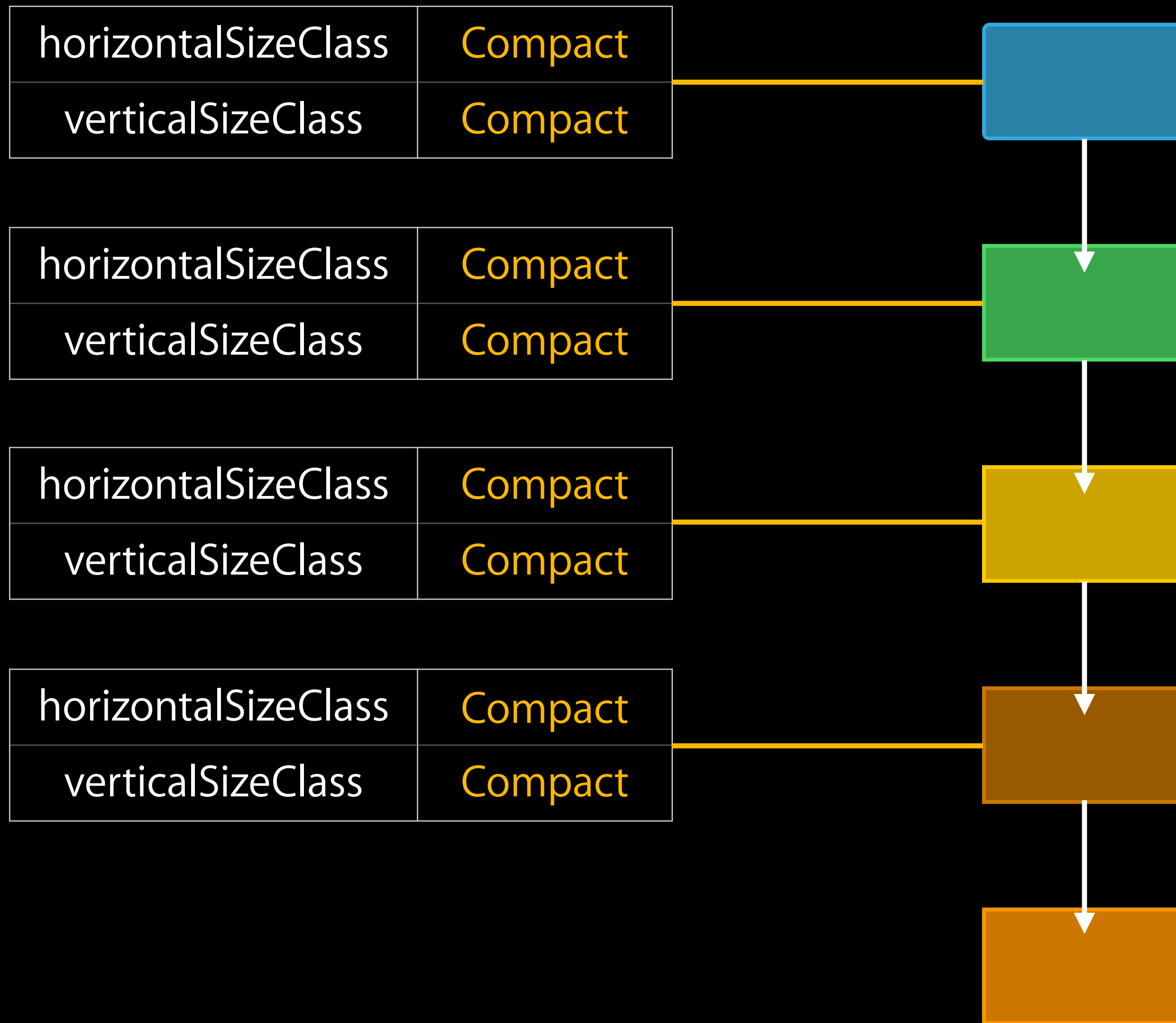
Overriding Traits



Overriding Traits

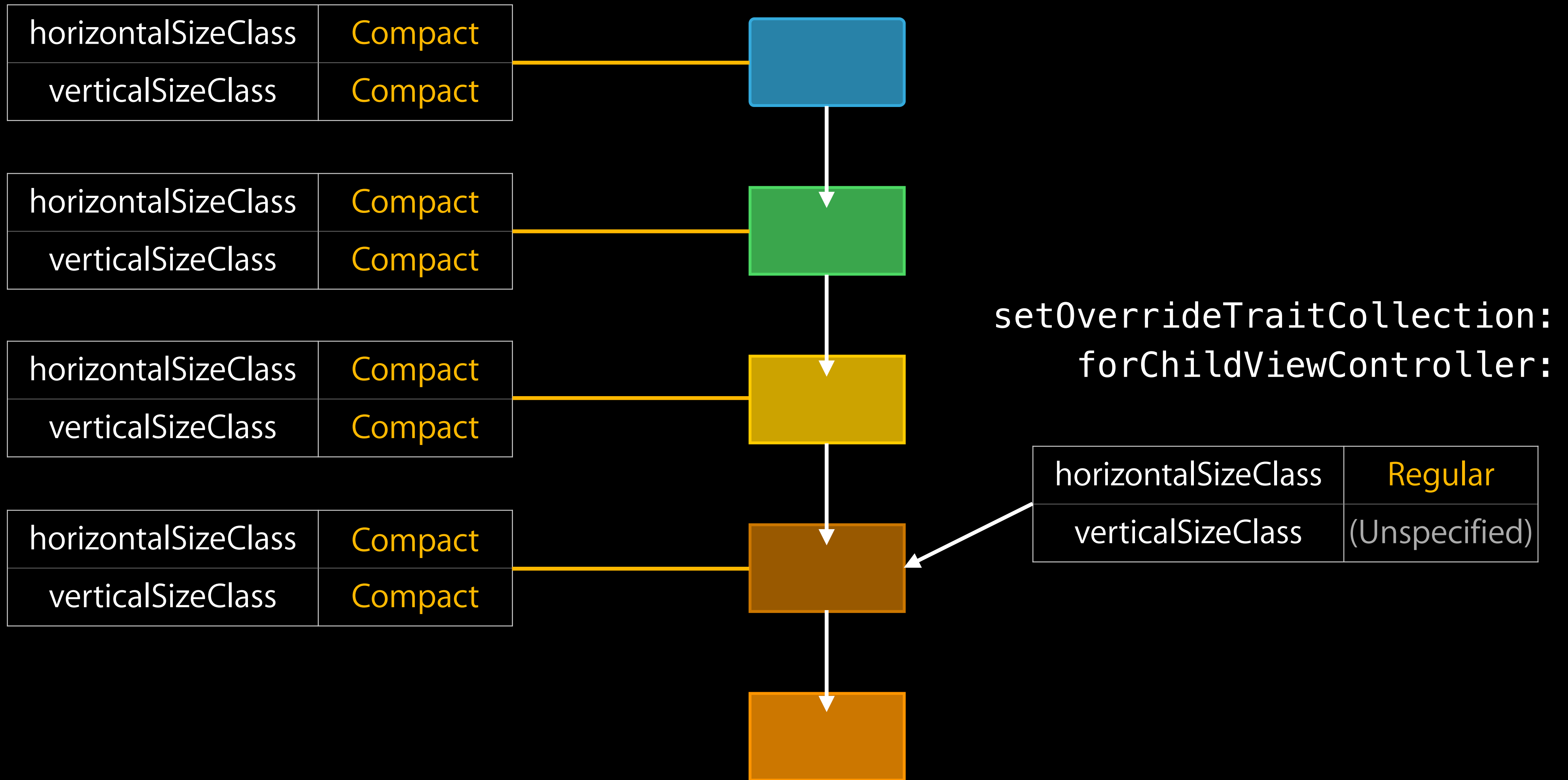


Overriding Traits

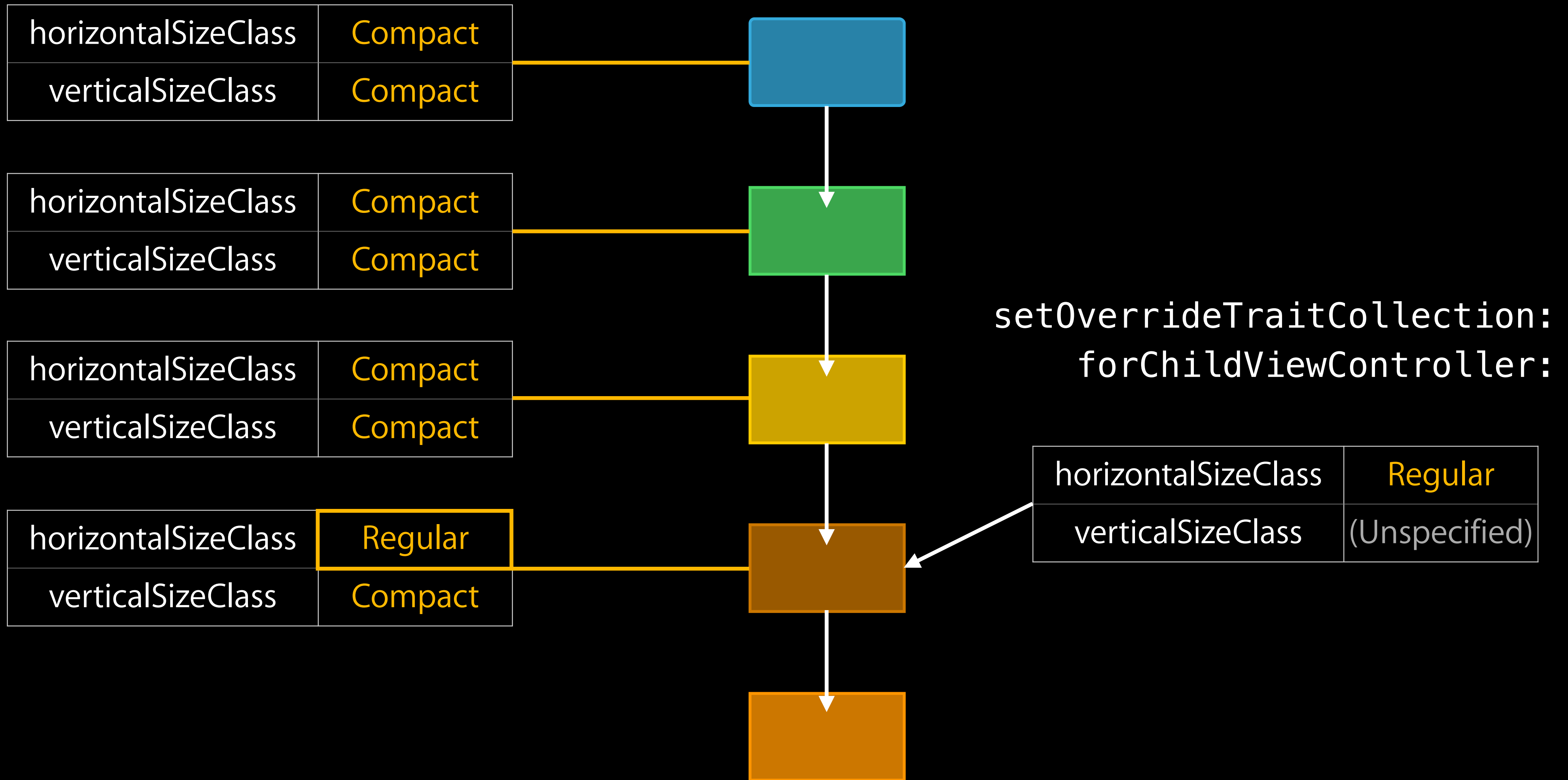


```
setOverrideTraitCollection:  
forChildViewController:
```

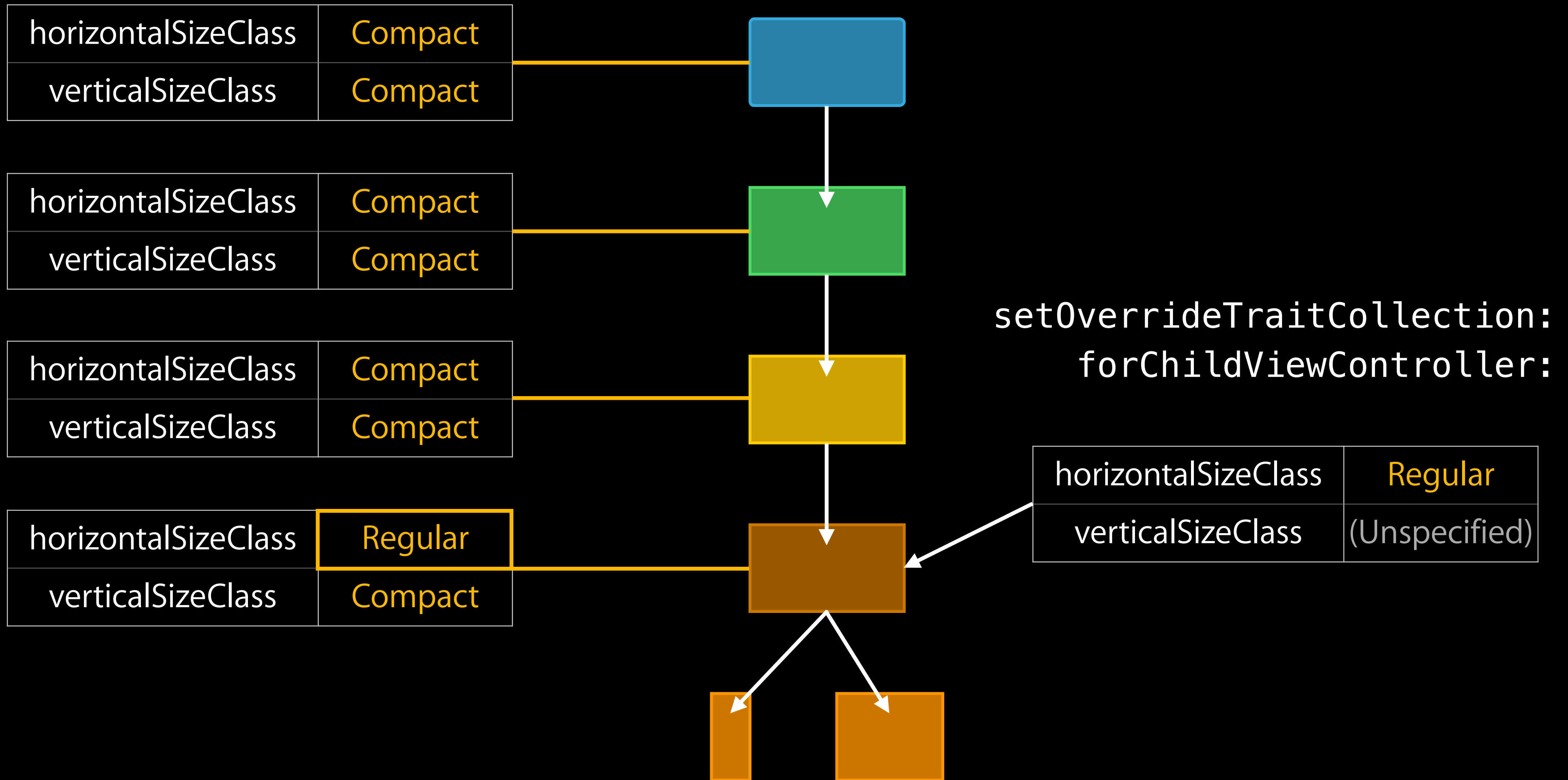
Overriding Traits



Overriding Traits



Overriding Traits





What a cool bird!



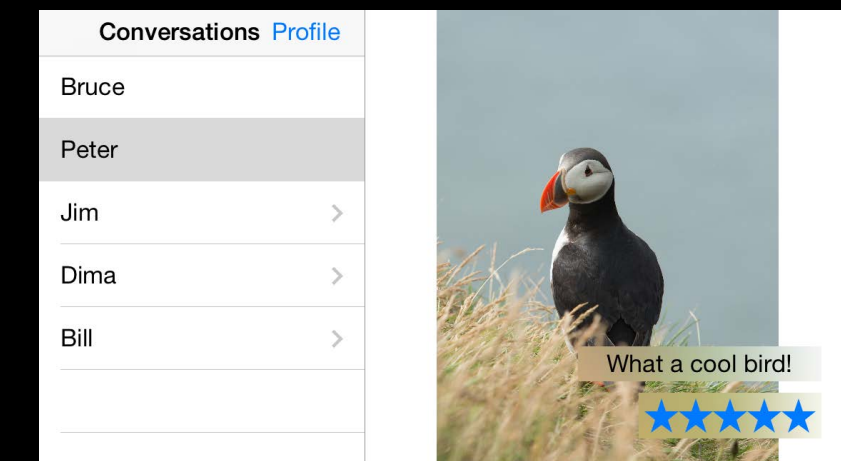
Conversations	Profile
Bruce	
Peter	
Jim	>
Dima	>
Bill	>



Conversations	Profile
Bruce	
Peter	
Jim	>
Dima	>
Bill	>



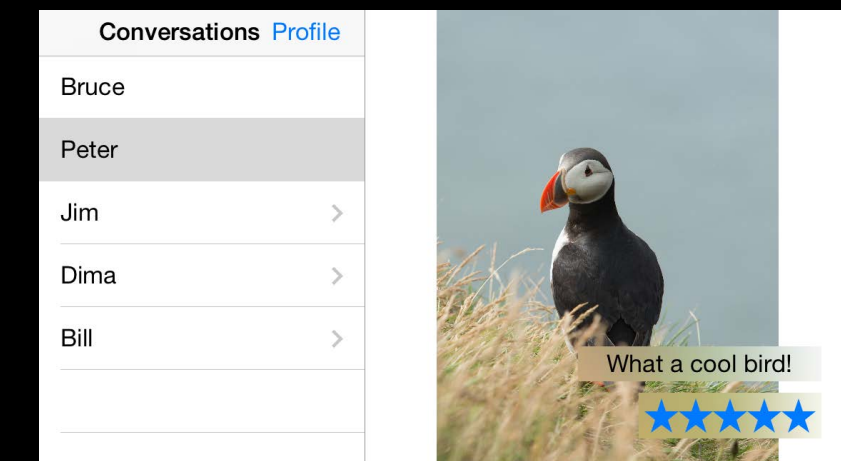
Trait Changes



Trait Changes



Setup



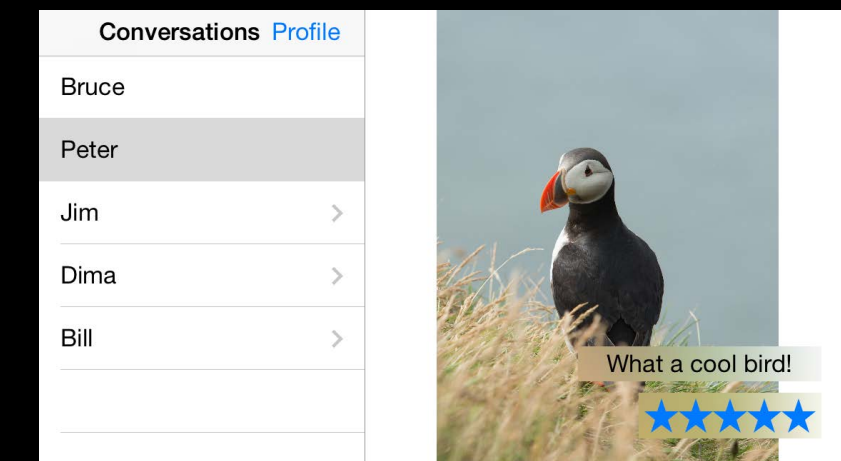
Trait Changes



Setup



Animations



Trait Changes



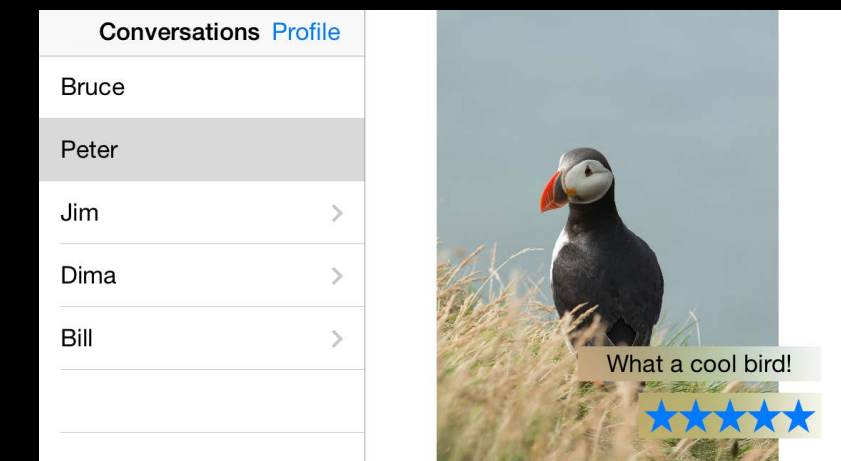
Setup



Animations



Cleanup



Trait Changes



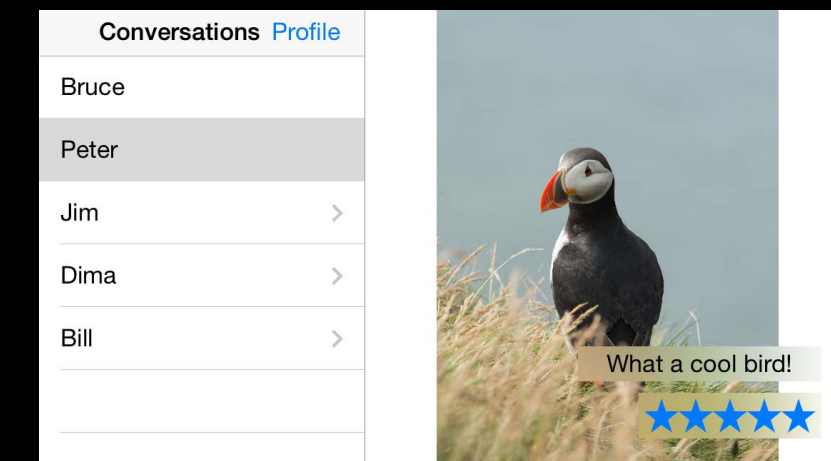
Setup

Animations

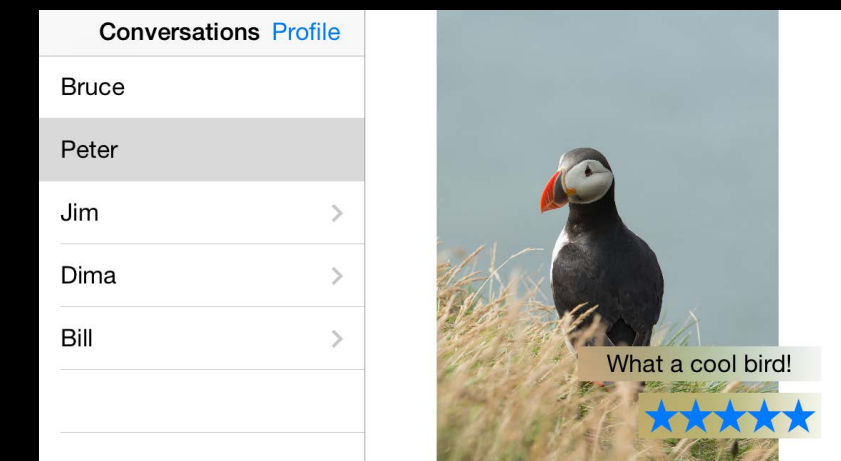
Cleanup



`willTransitionToTraitCollection:withTransitionCoordinator:`



Trait Changes



Setup

Animations

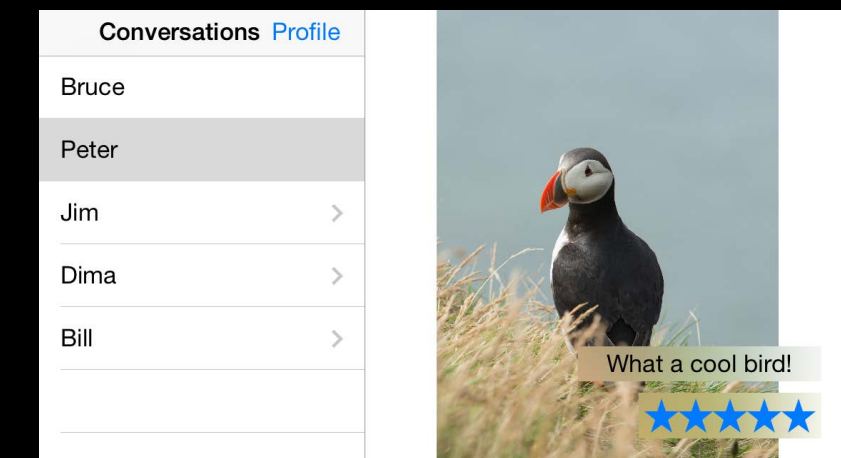
Cleanup



`willTransitionToTraitCollection:withTransitionCoordinator:`

`traitCollectionDidChange:`

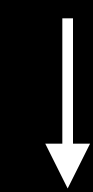
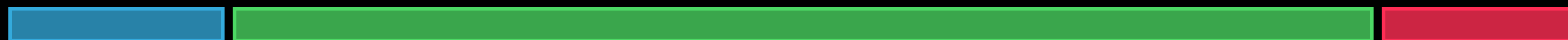
Trait Changes



Setup

Animations

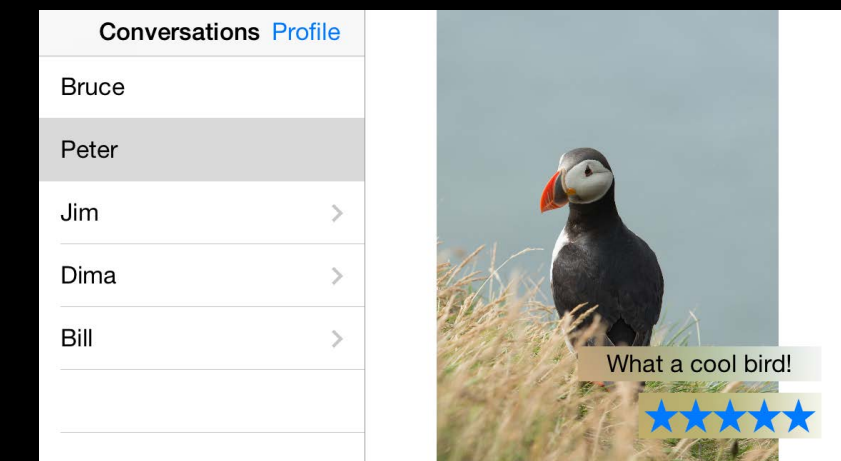
Cleanup



`willTransitionToTraitCollection:withTransitionCoordinator:`

`traitCollectionDidChange:`

Trait Changes



Setup

Animations

Cleanup



`willTransitionToTraitCollection:withTransitionCoordinator:`

`traitCollectionDidChange:`

Trait Changes

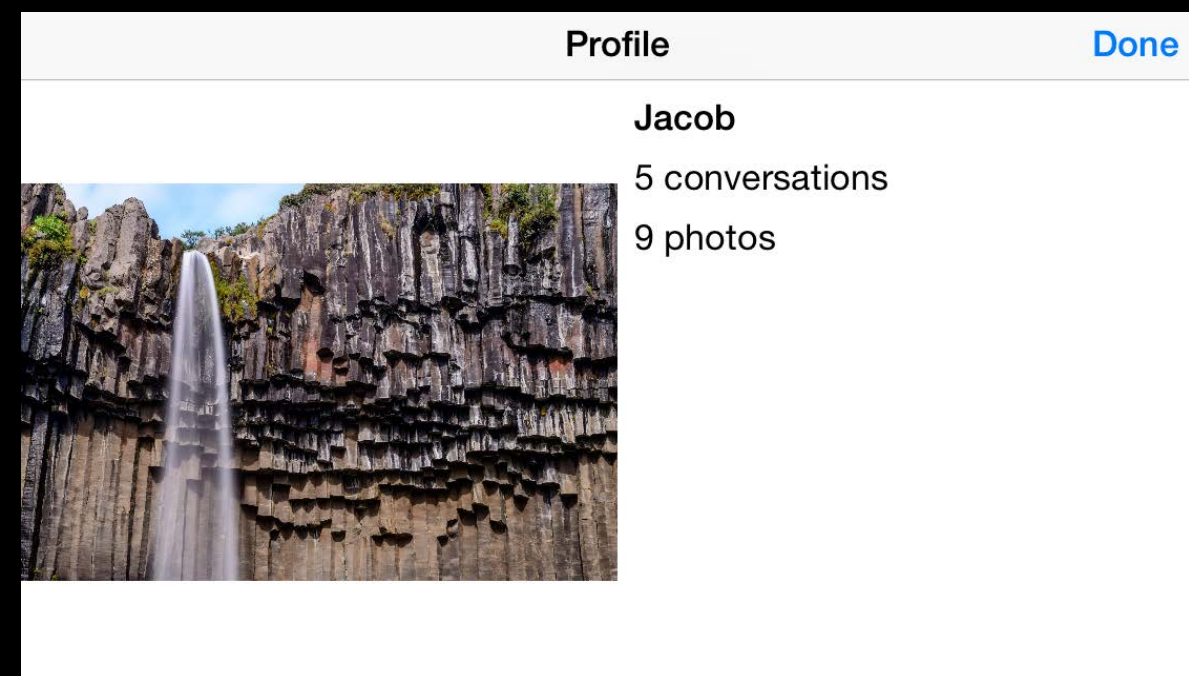
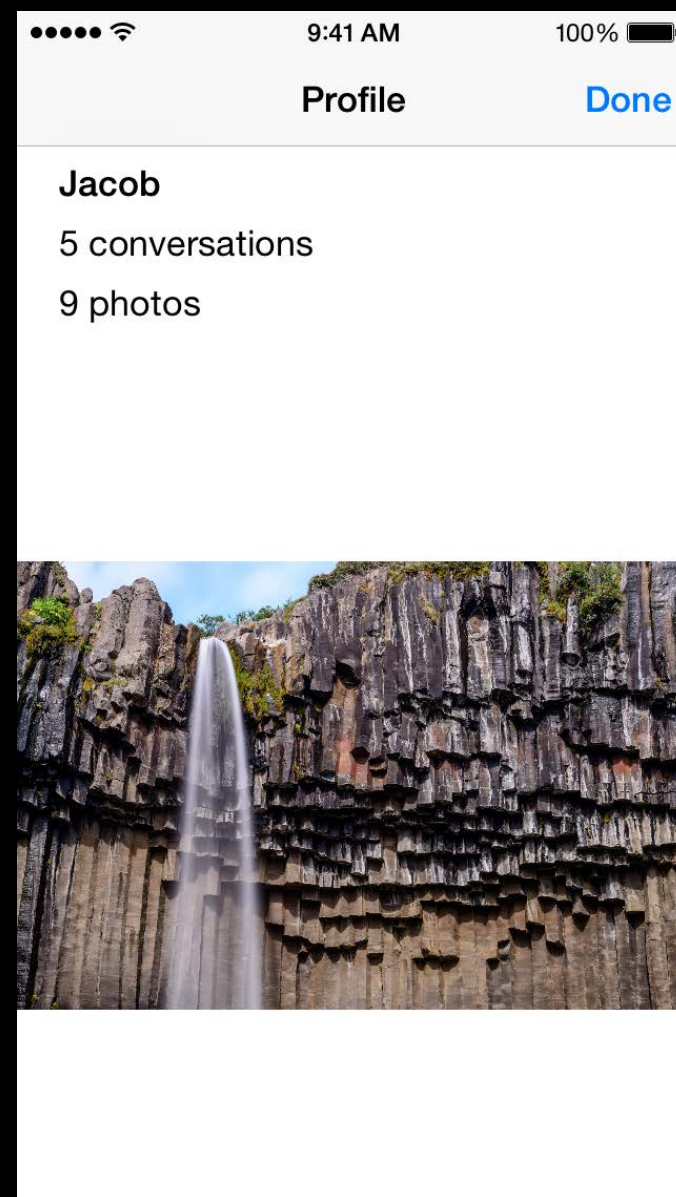
`willTransitionToTraitCollection:withTransitionCoordinator:`

- Animating view controller changes

Trait Changes

`willTransitionToTraitCollection:withTransitionCoordinator:`

- Animating view controller changes



Trait Changes

`traitCollectionDidChange:`

- Updating in UIView subclass

Trait Changes

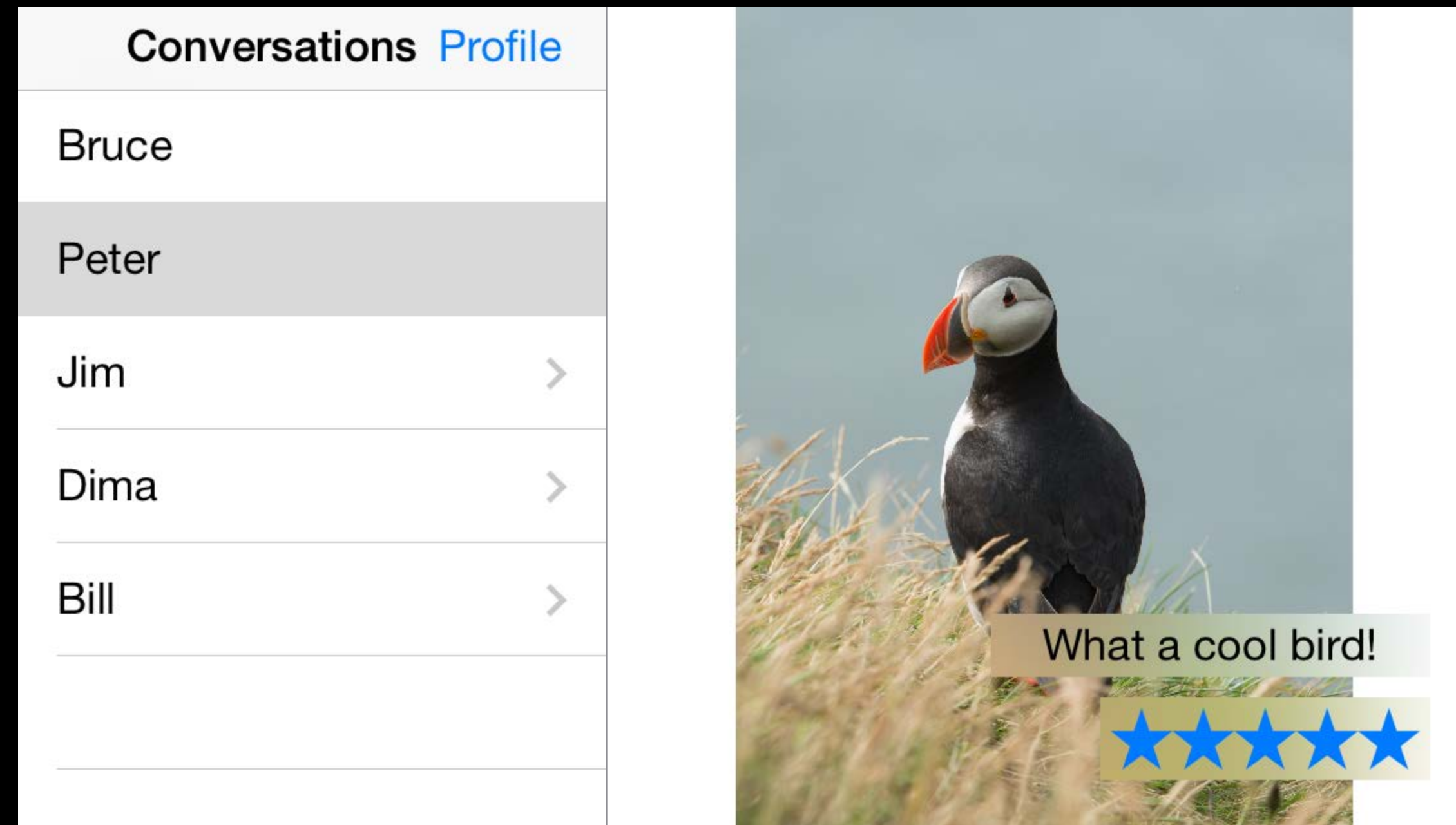
`traitCollectionDidChange:`

- Updating in UIView subclass

This is a comment

This is a comment

Collapsing



Collapsing



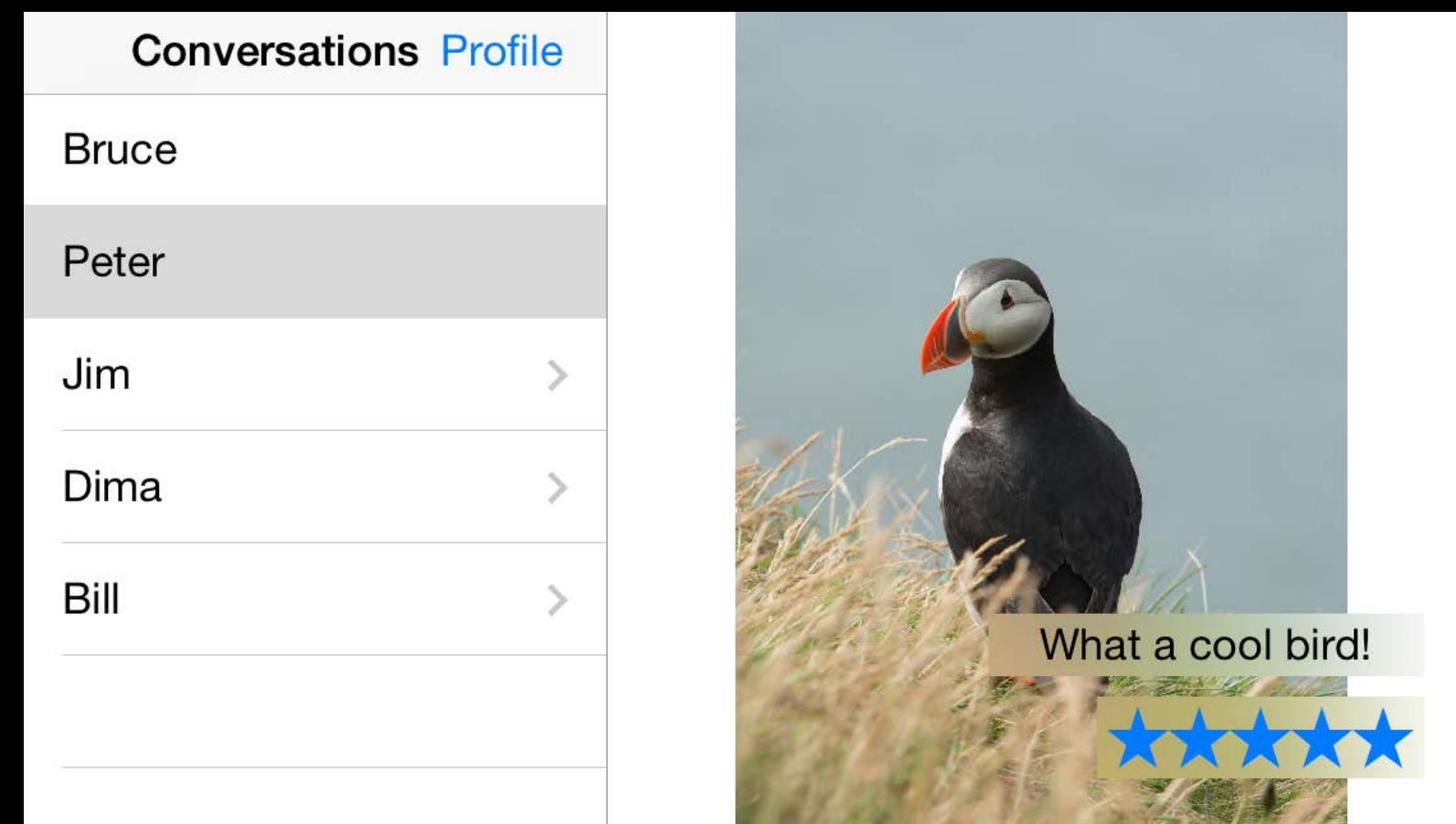
Collapsing



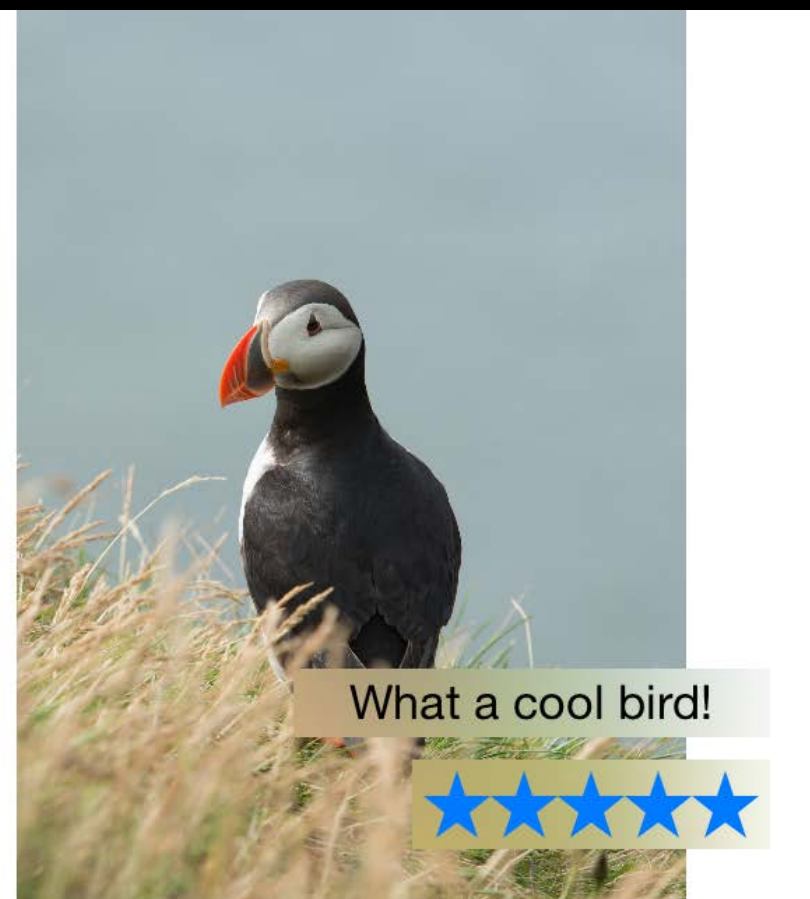
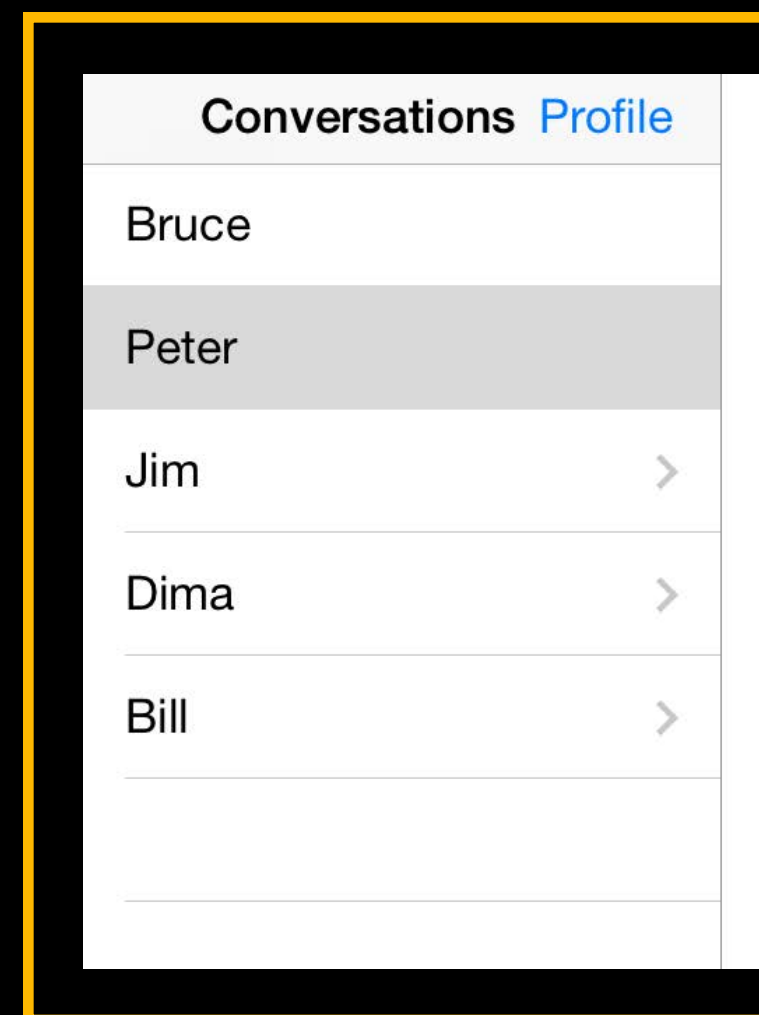
Collapsing



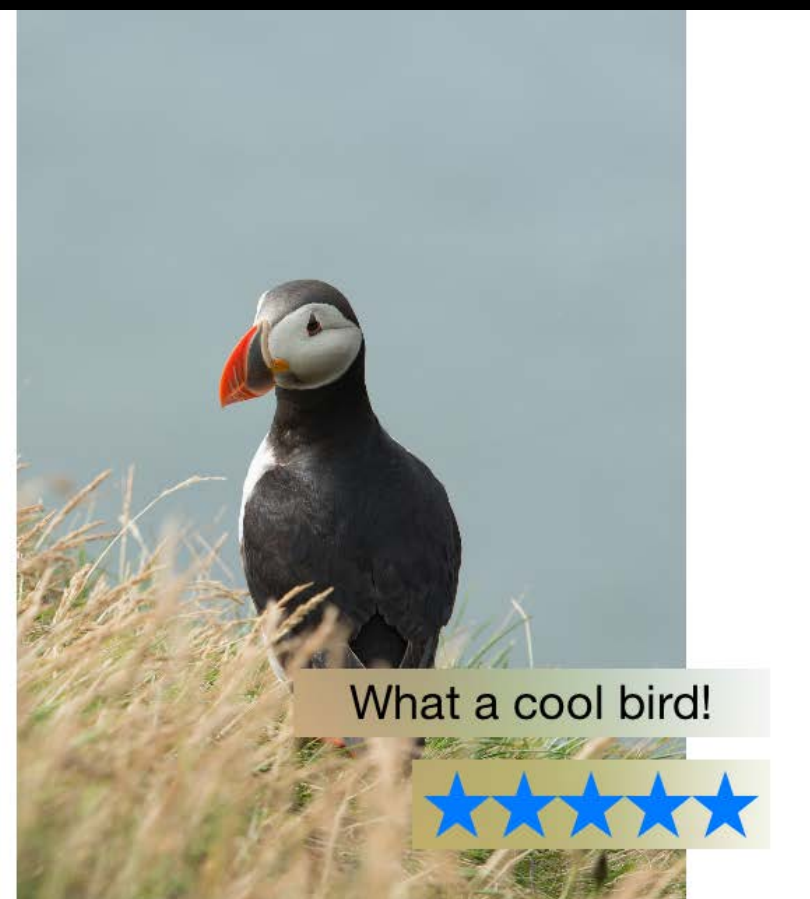
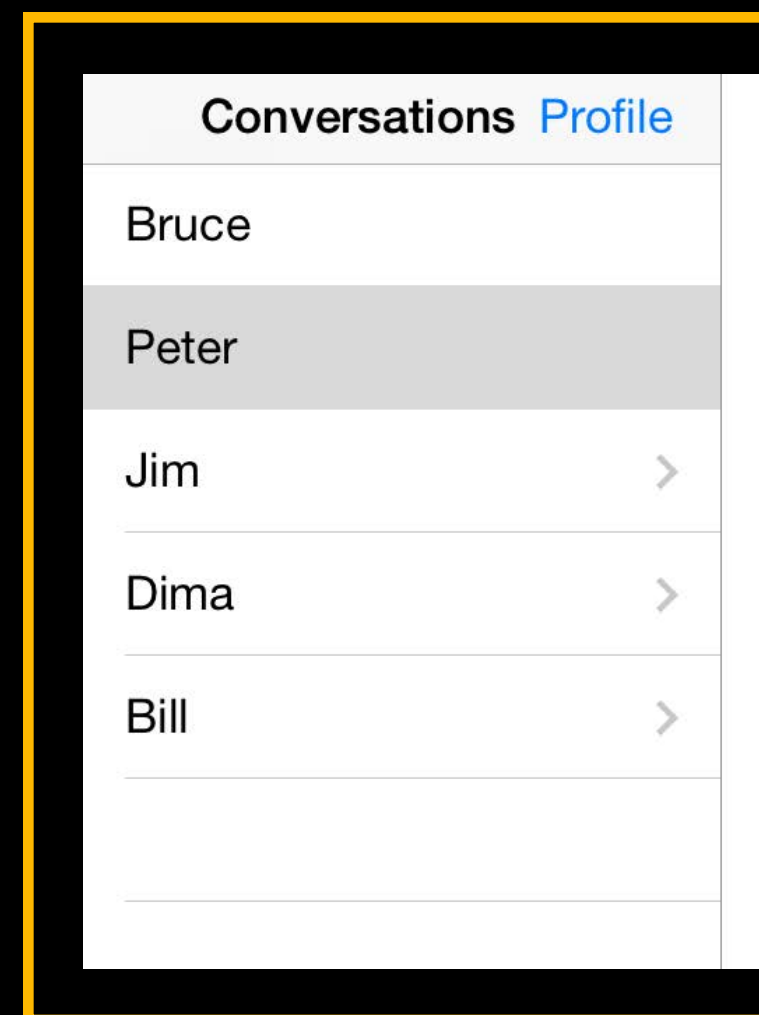
Collapsing



Collapsing

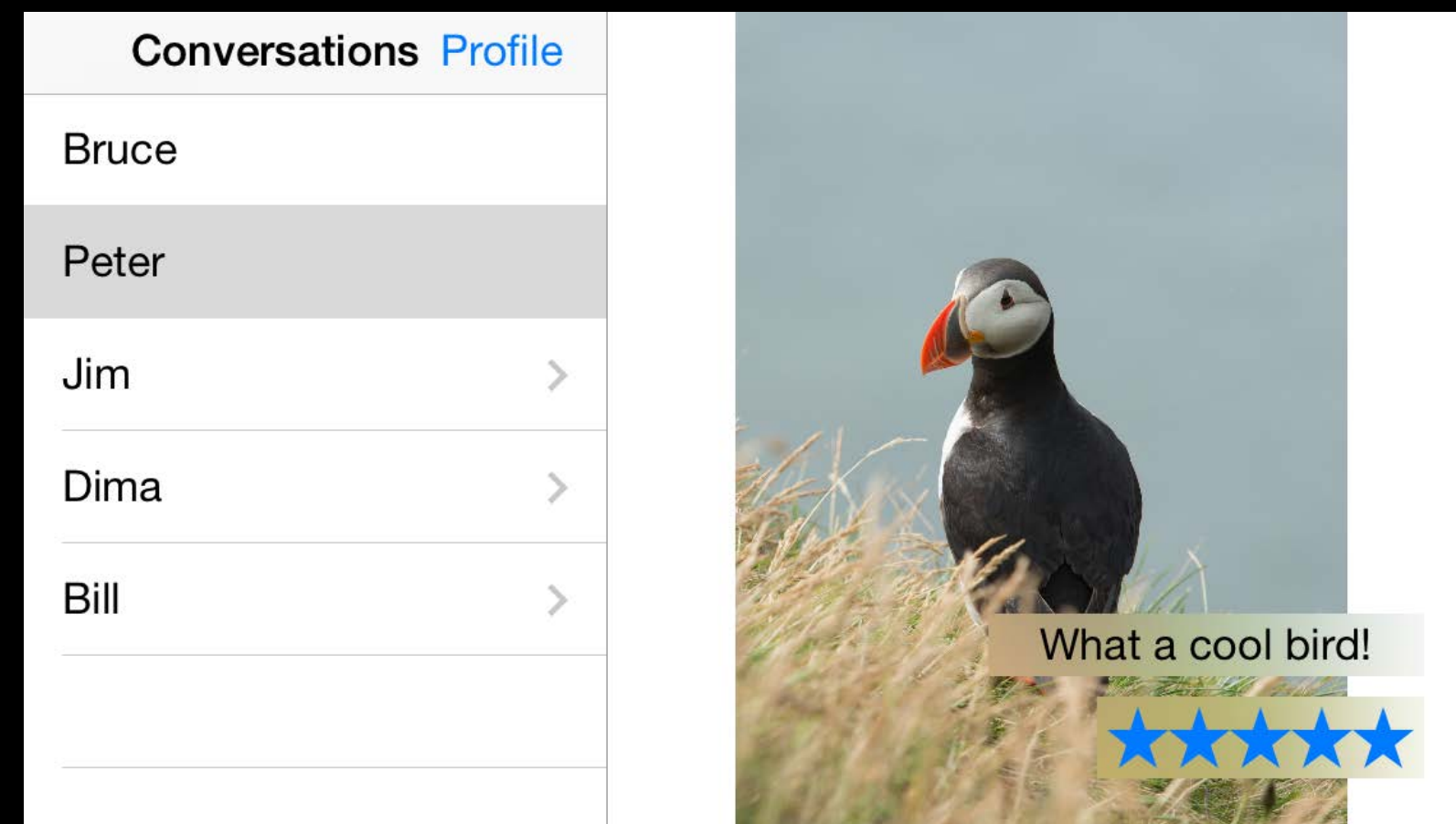


Collapsing



```
primaryViewControllerForCollapsingSplitViewController:
```

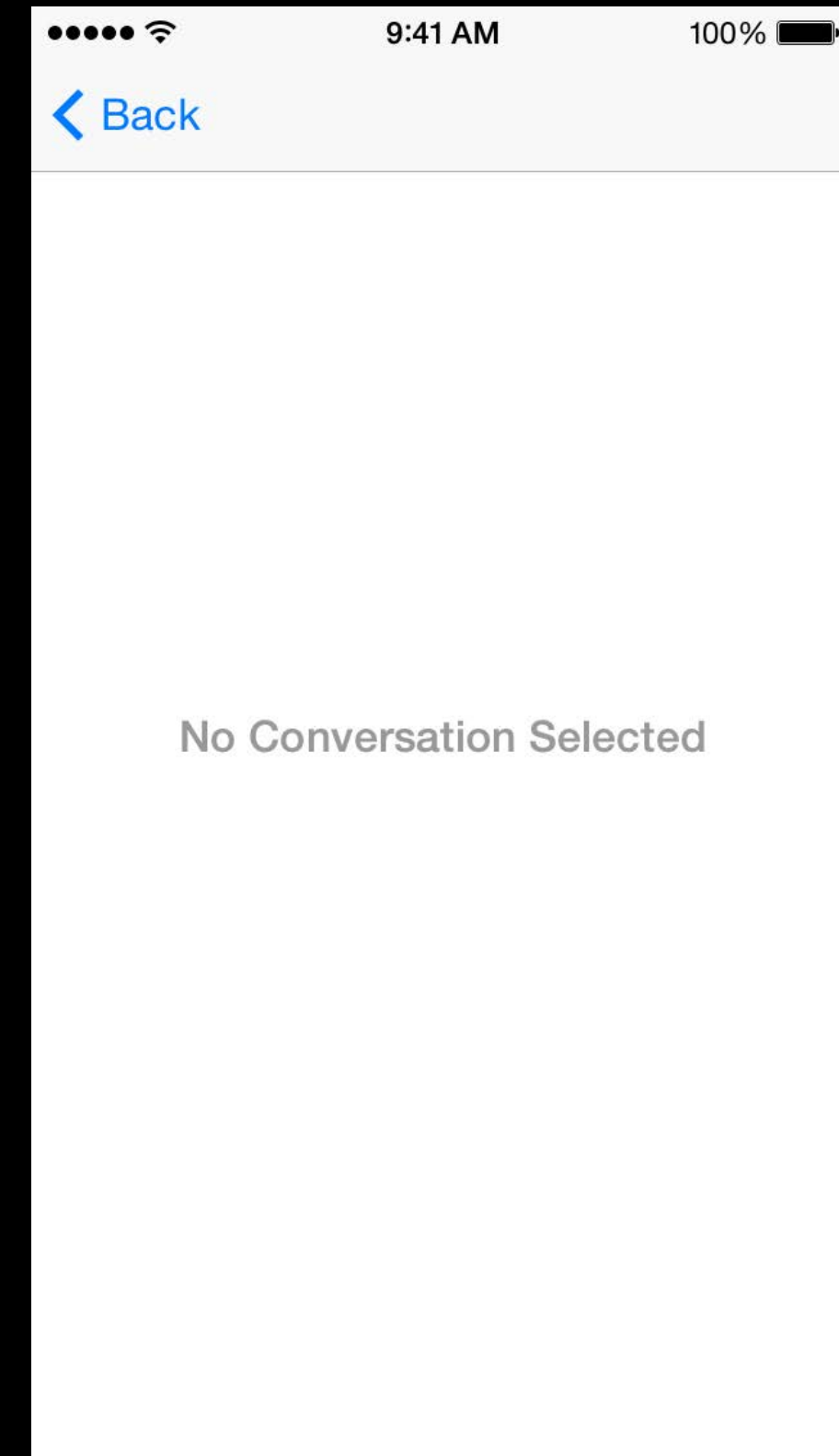
Collapsing



Collapsing

Conversations	Profile
Bruce	
Peter	
Jim	>
Dima	>
Bill	>

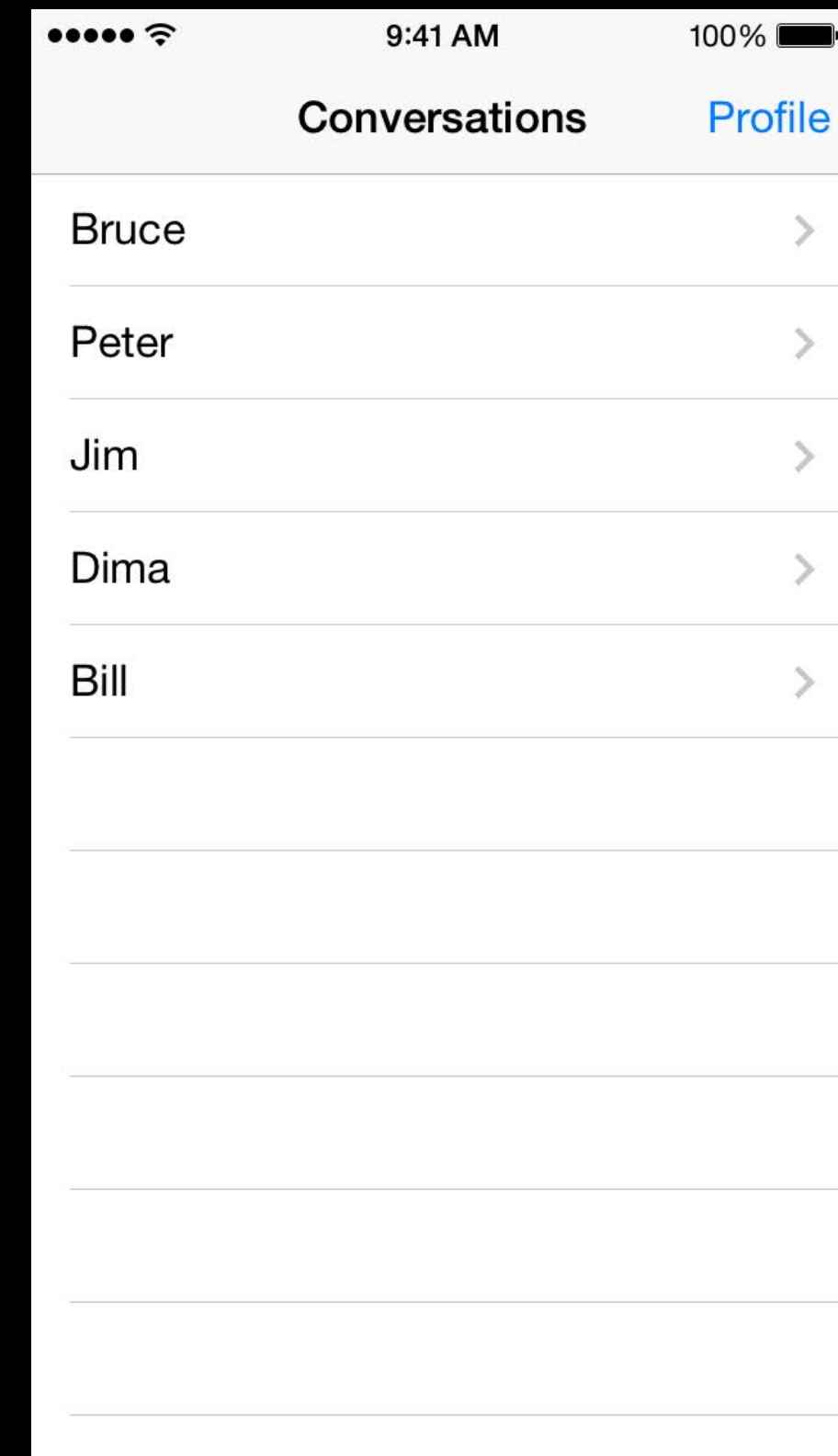
No Conversation Selected



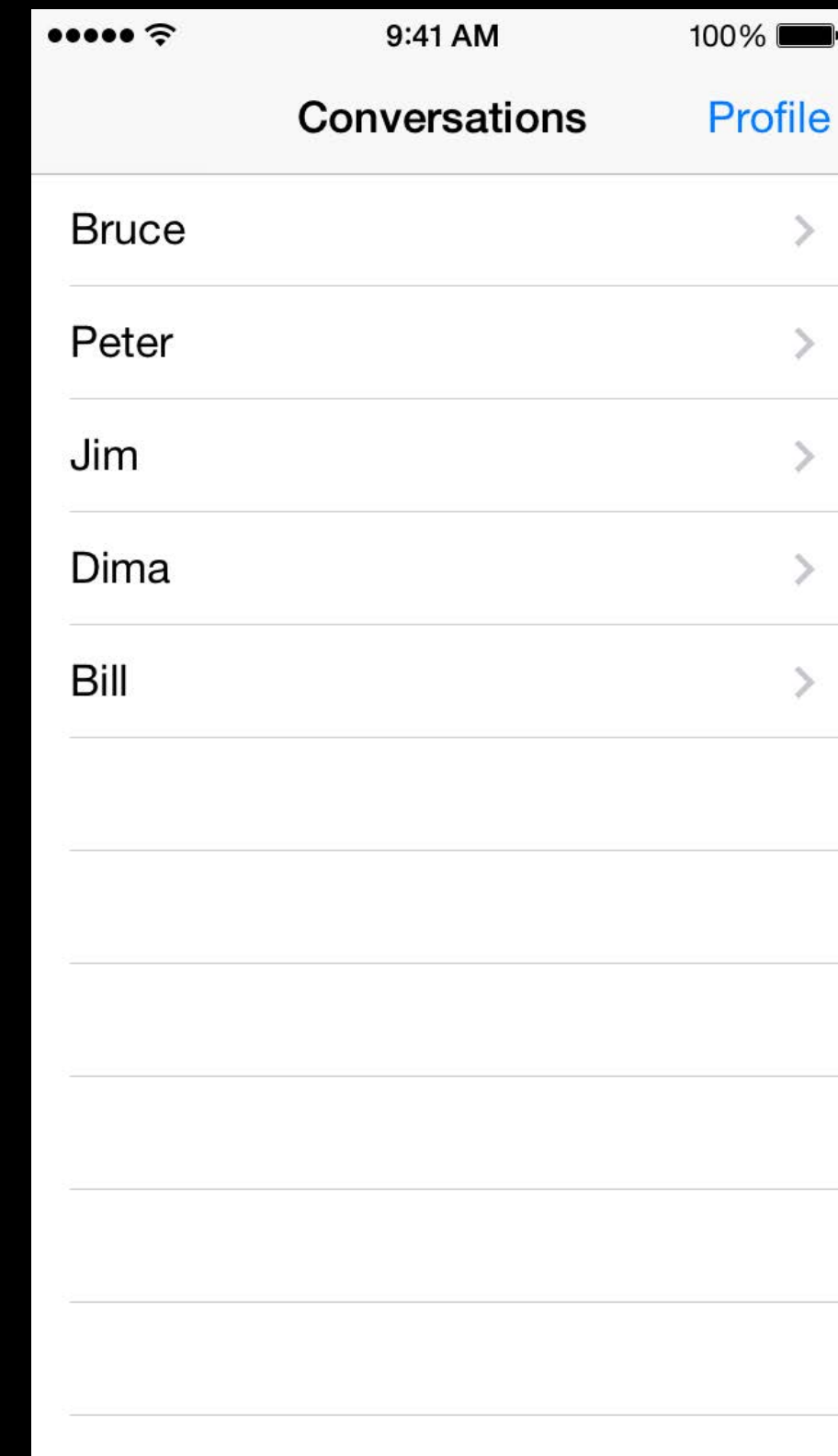
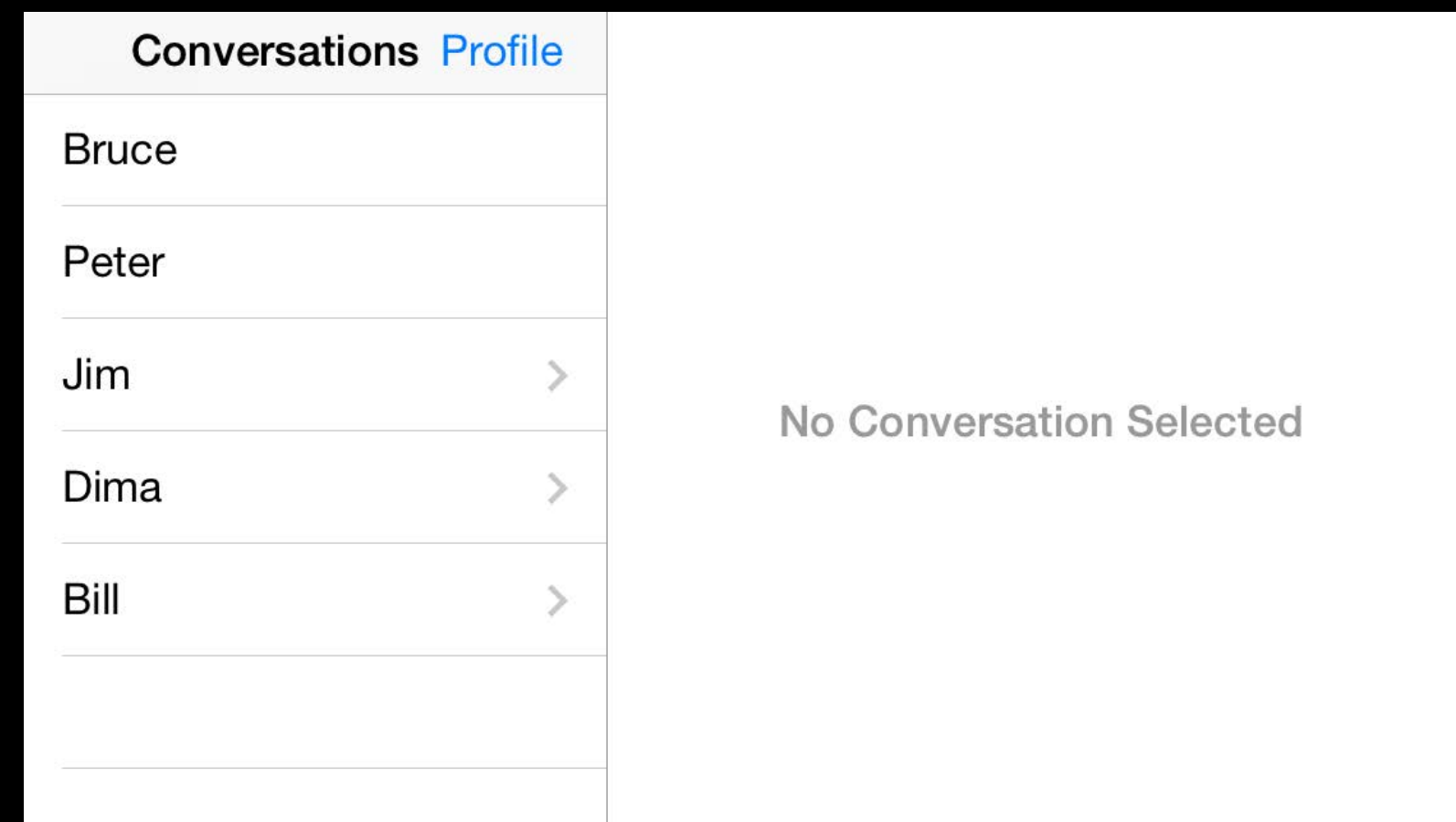
Collapsing

Conversations	Profile
Bruce	
Peter	
Jim	>
Dima	>
Bill	>

No Conversation Selected



Collapsing

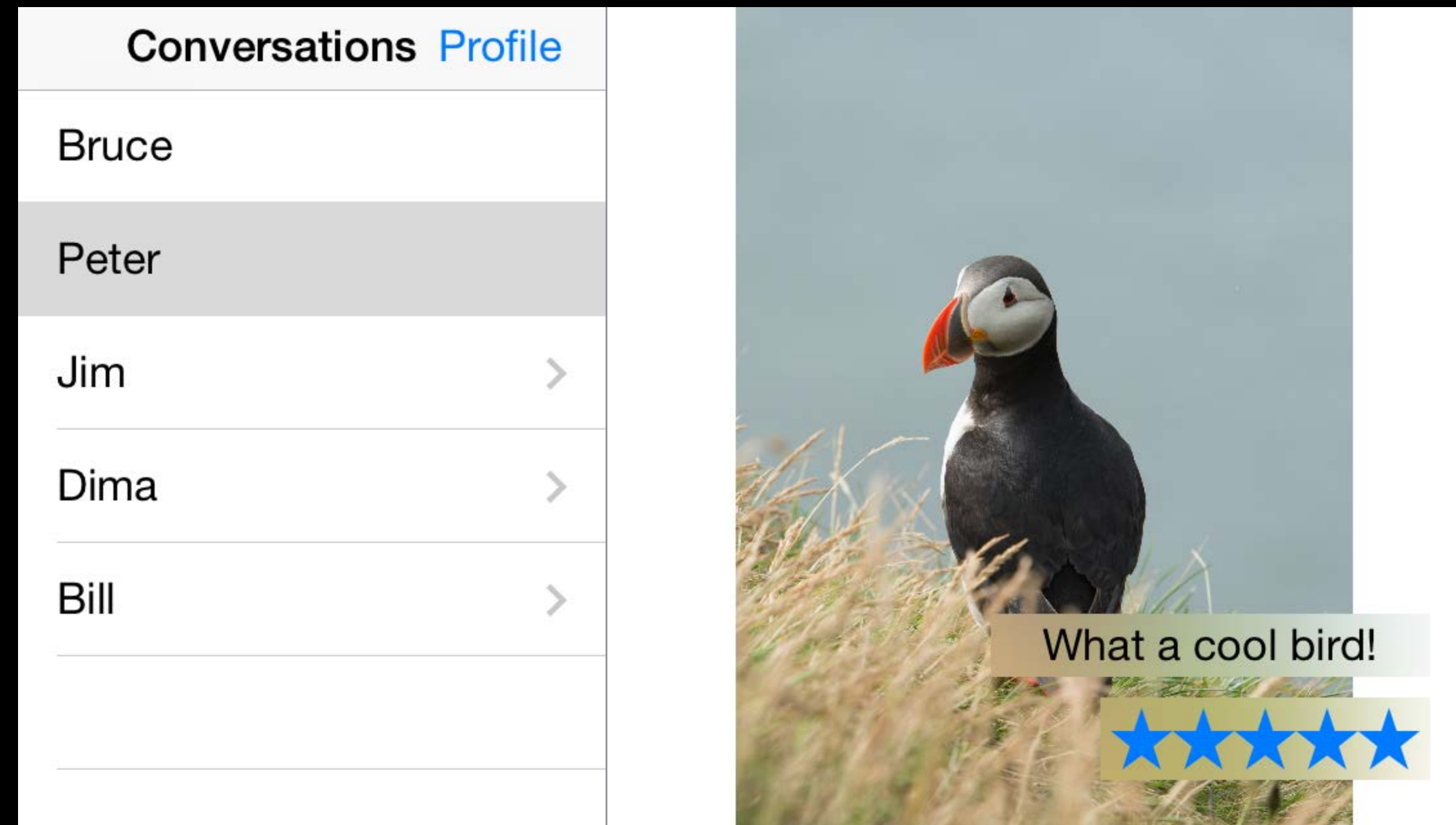


```
splitViewController:collapseSecondaryViewController:ontoPrimaryViewController:
```

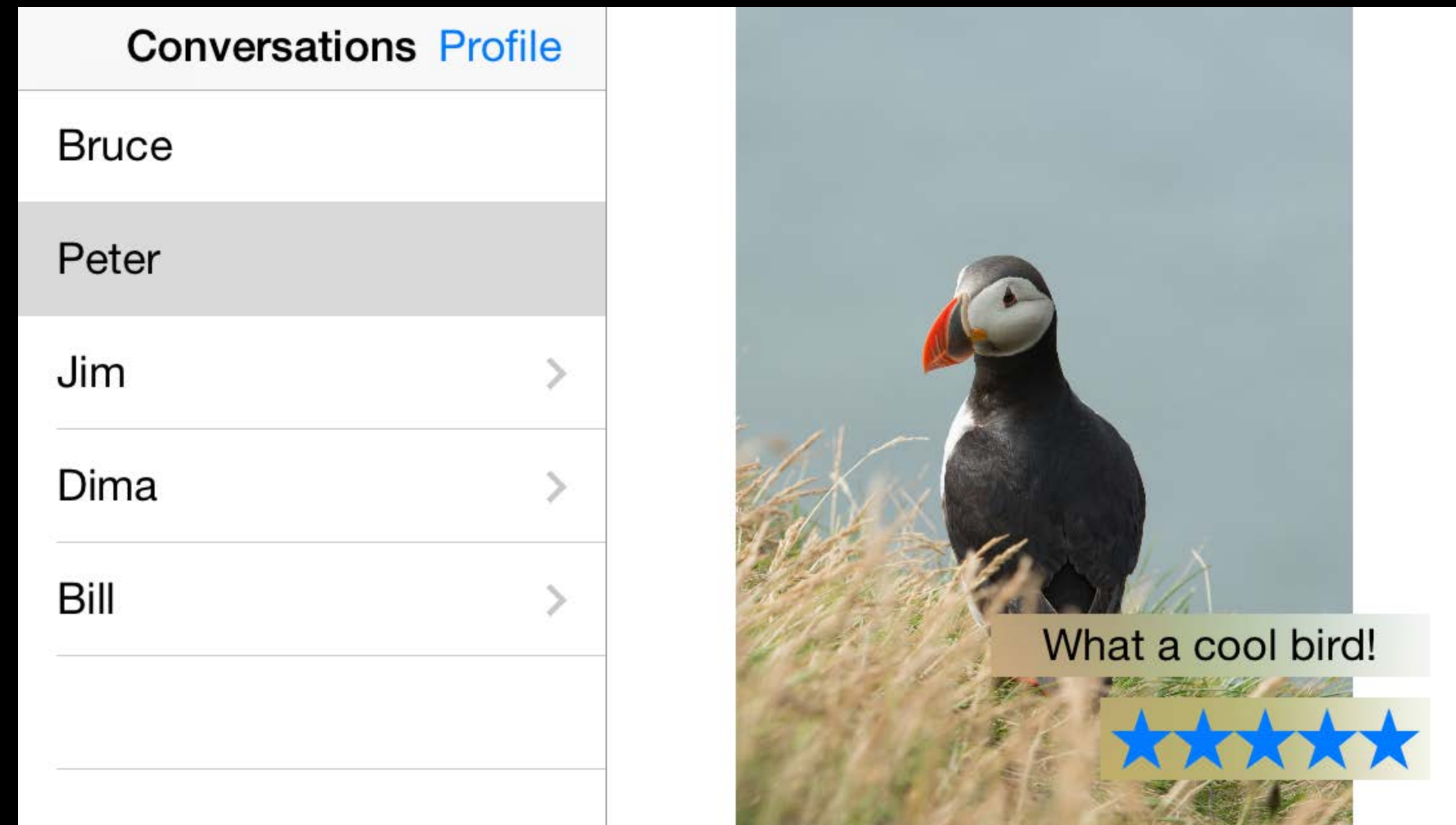
Expanding



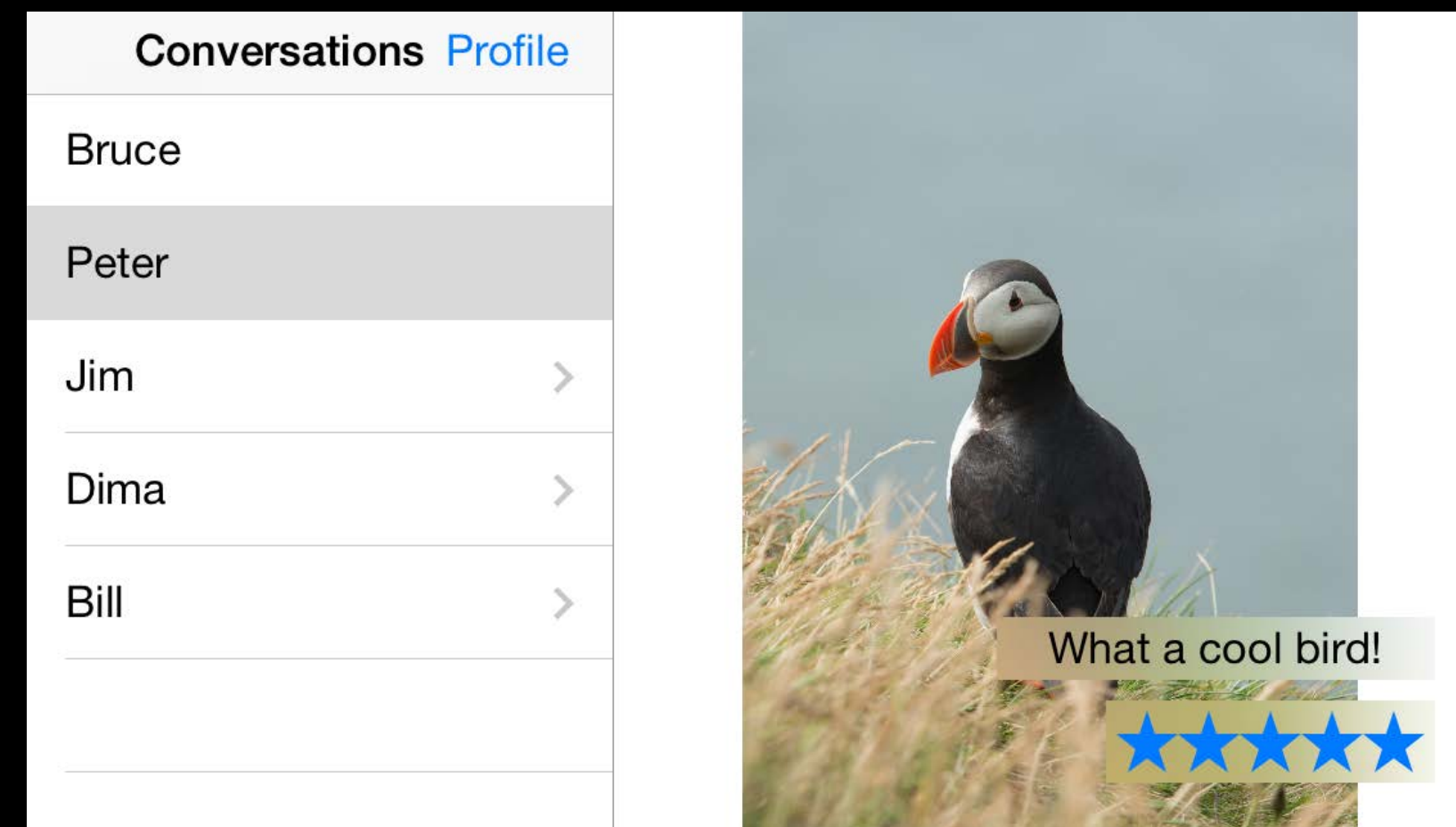
Expanding



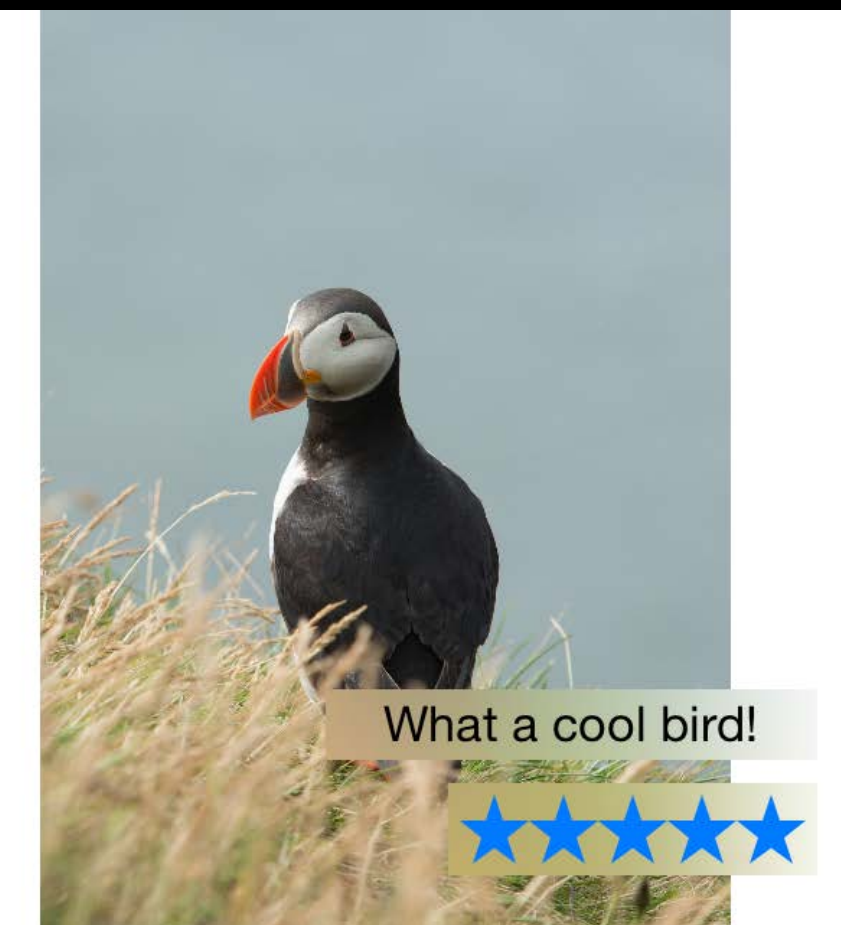
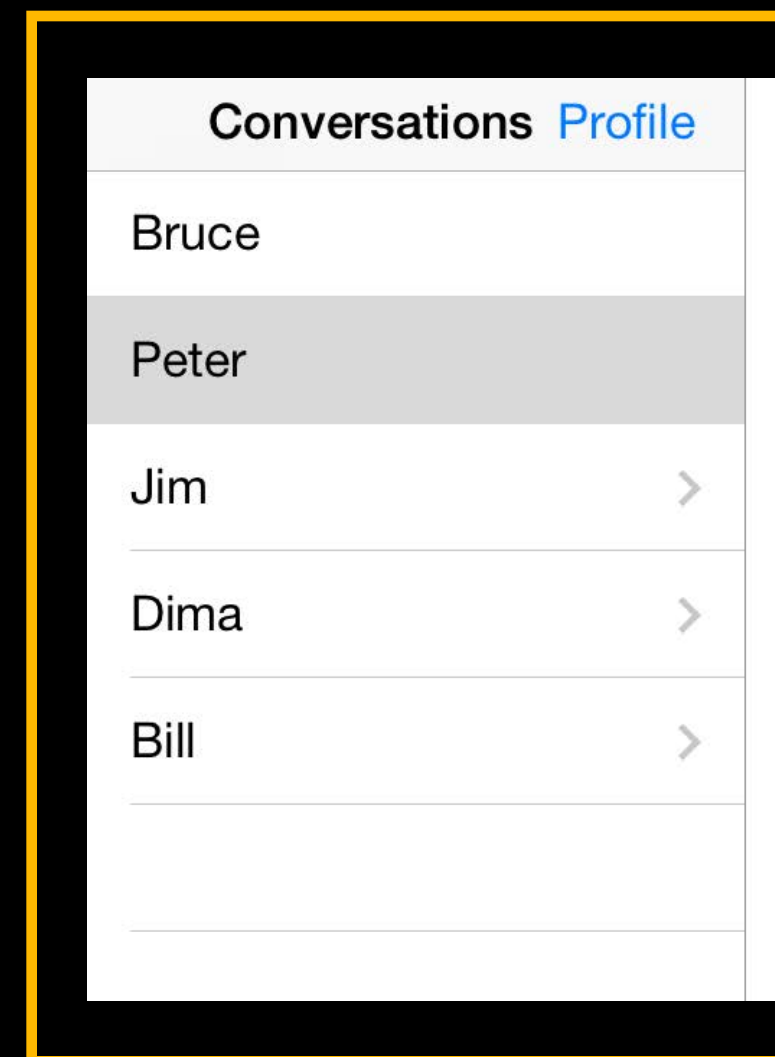
Expanding



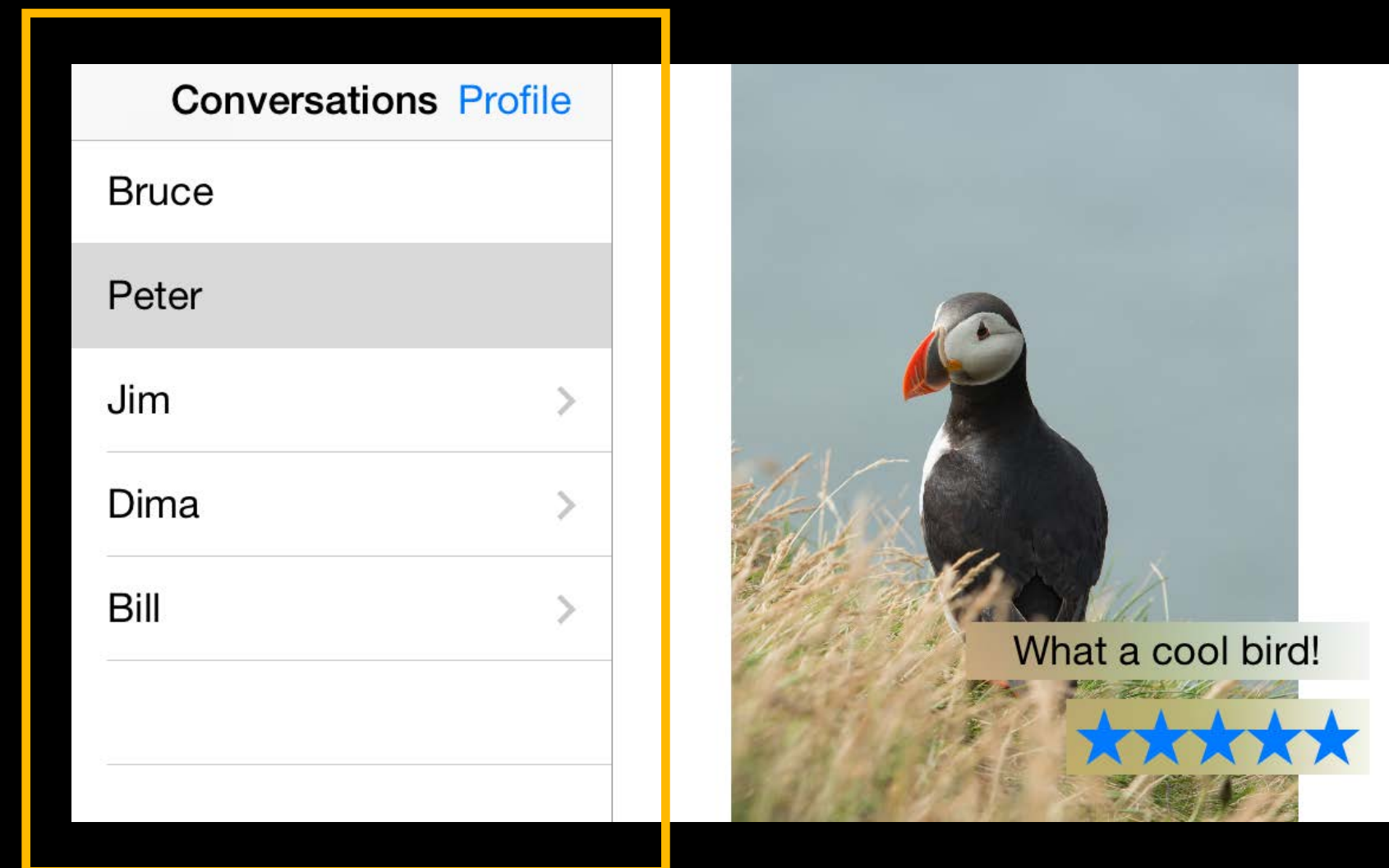
Expanding



Expanding

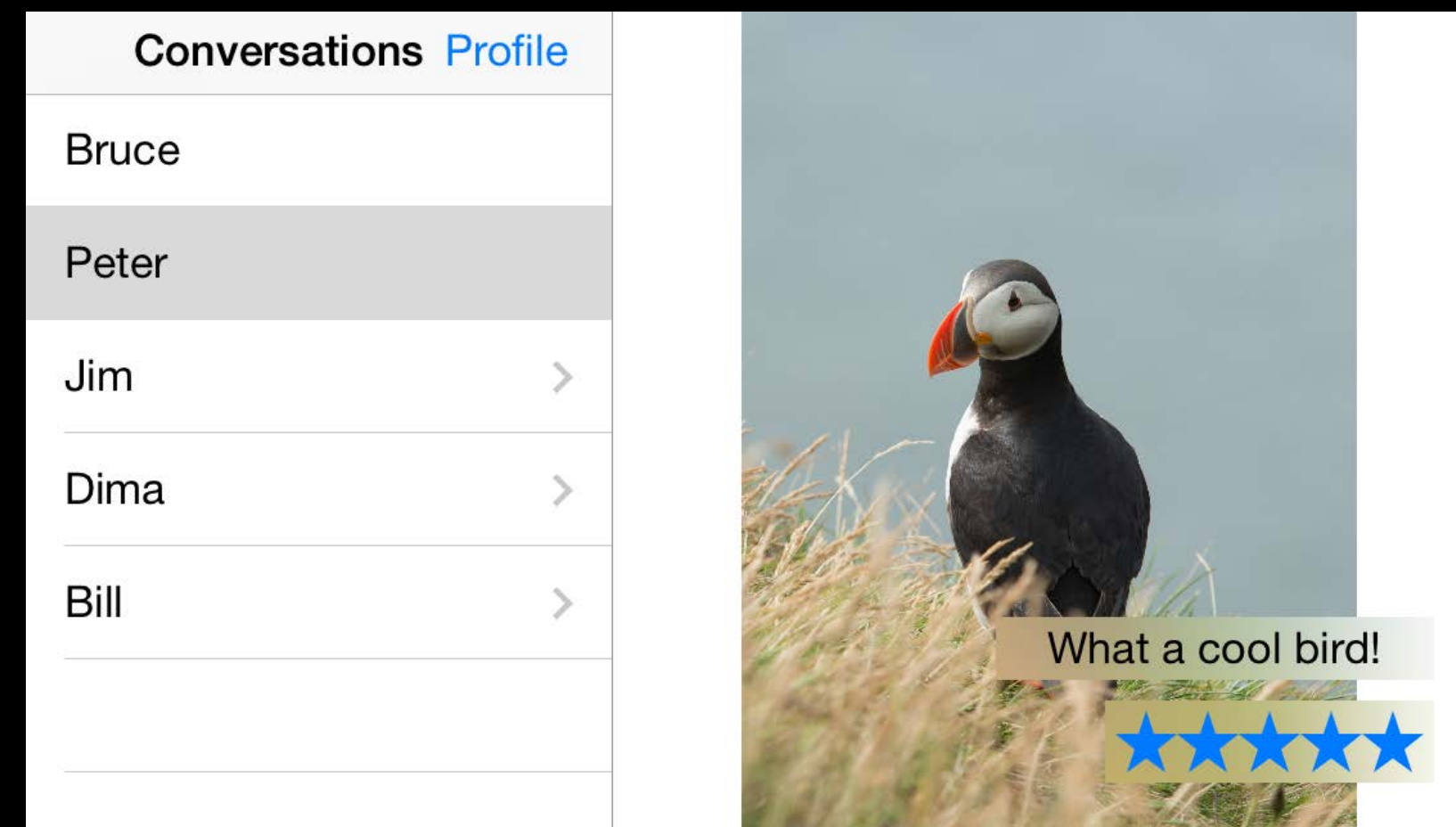


Expanding

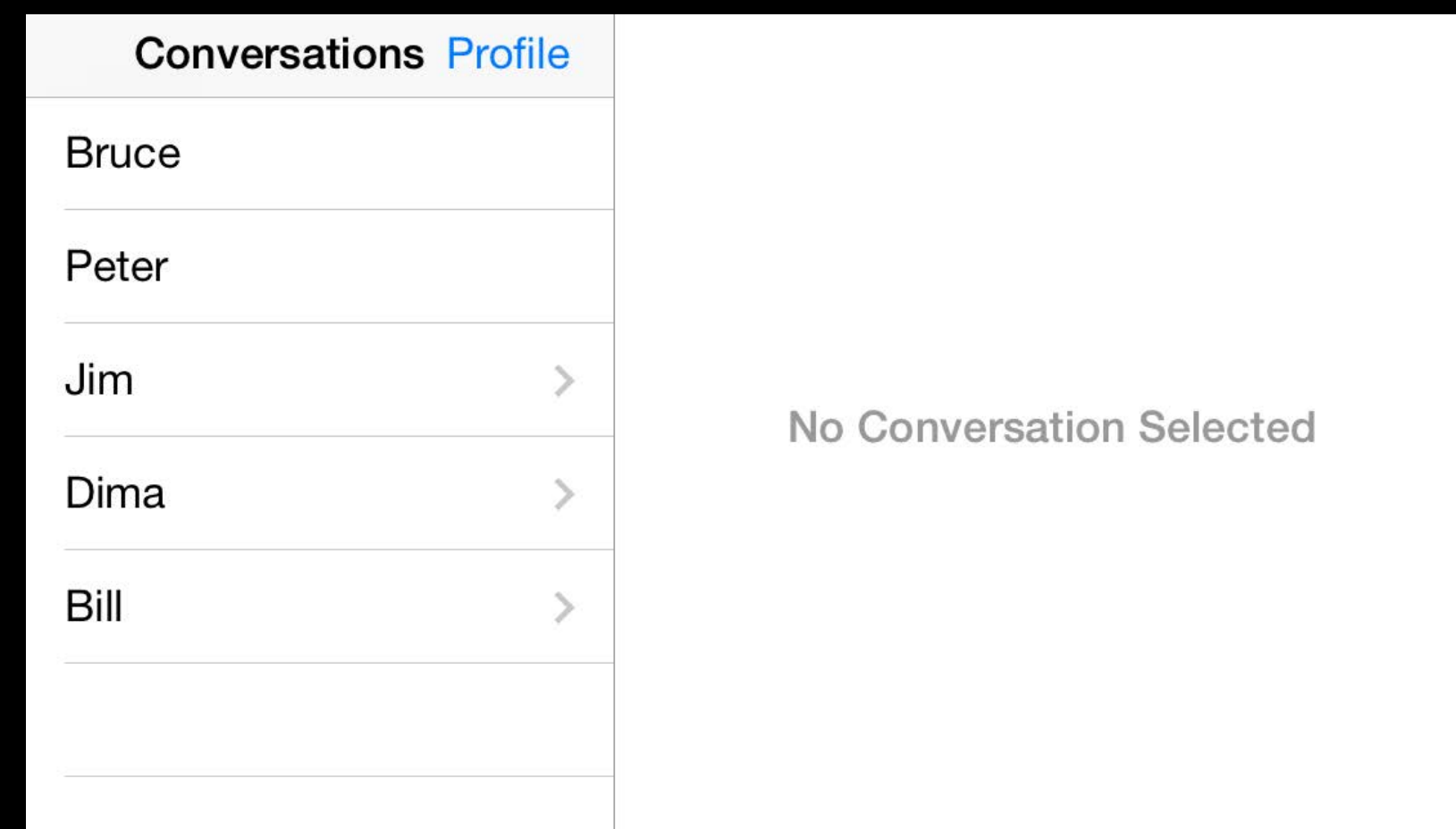
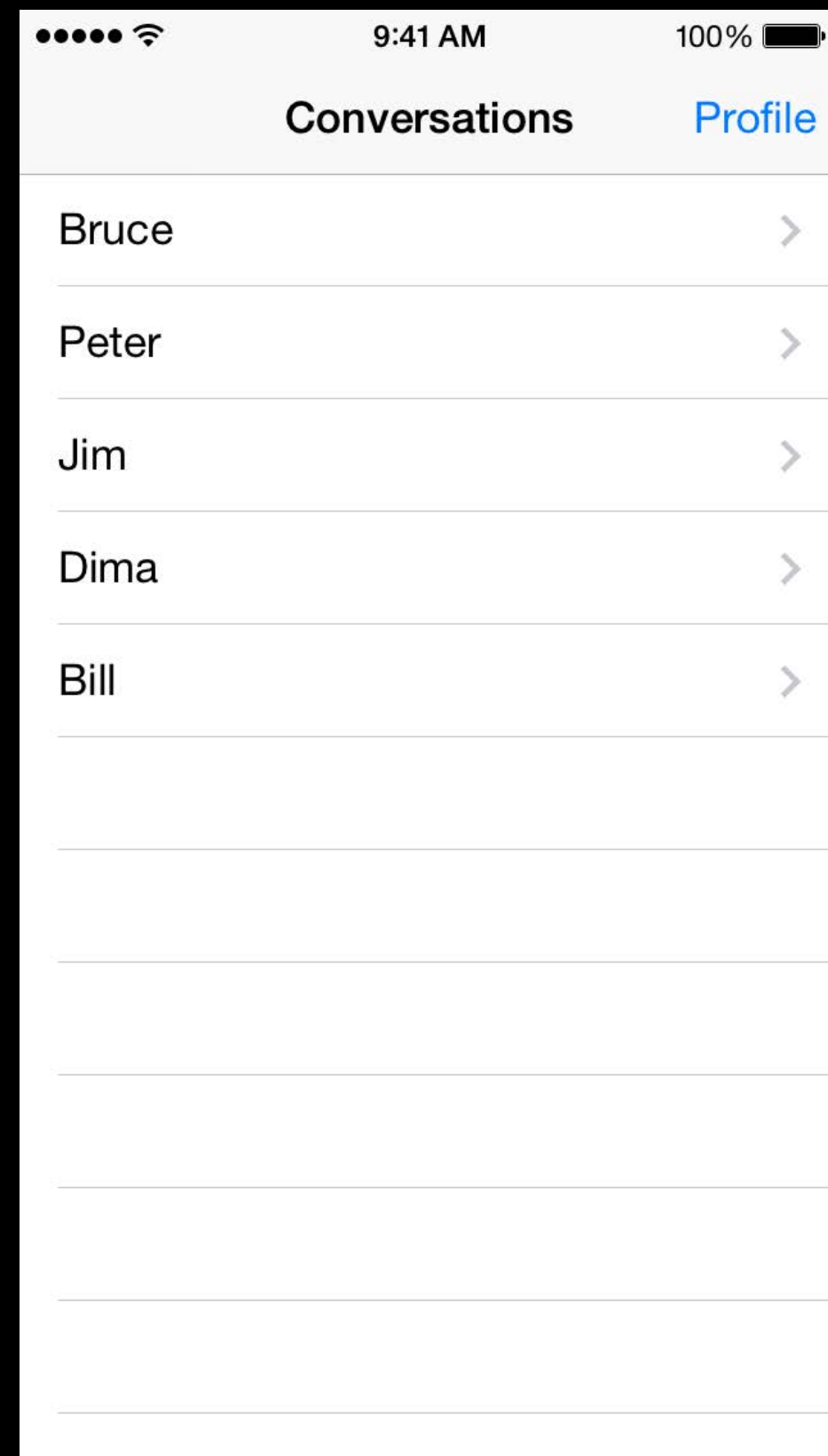


`primaryViewControllerForExpandingSplitViewController:`

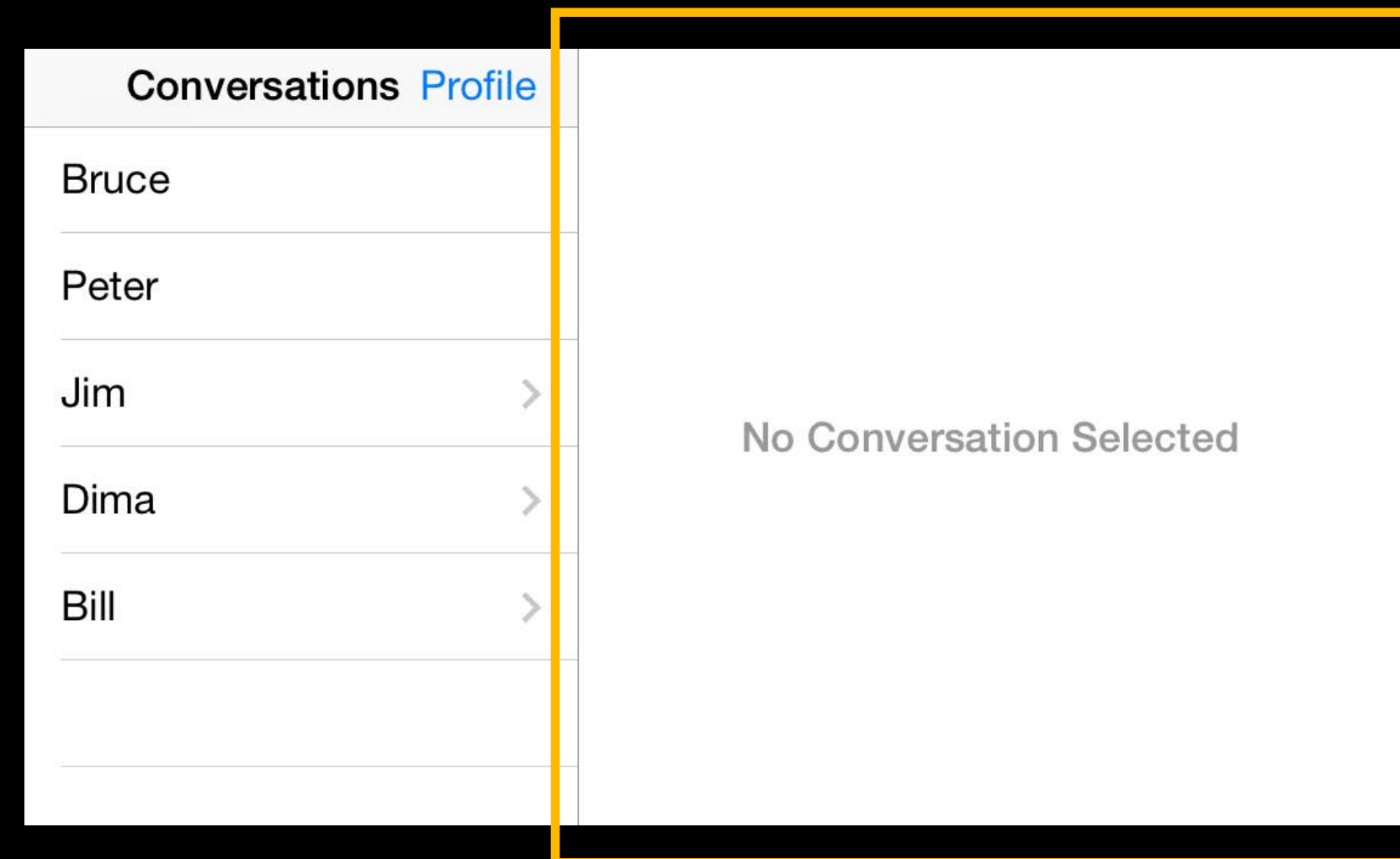
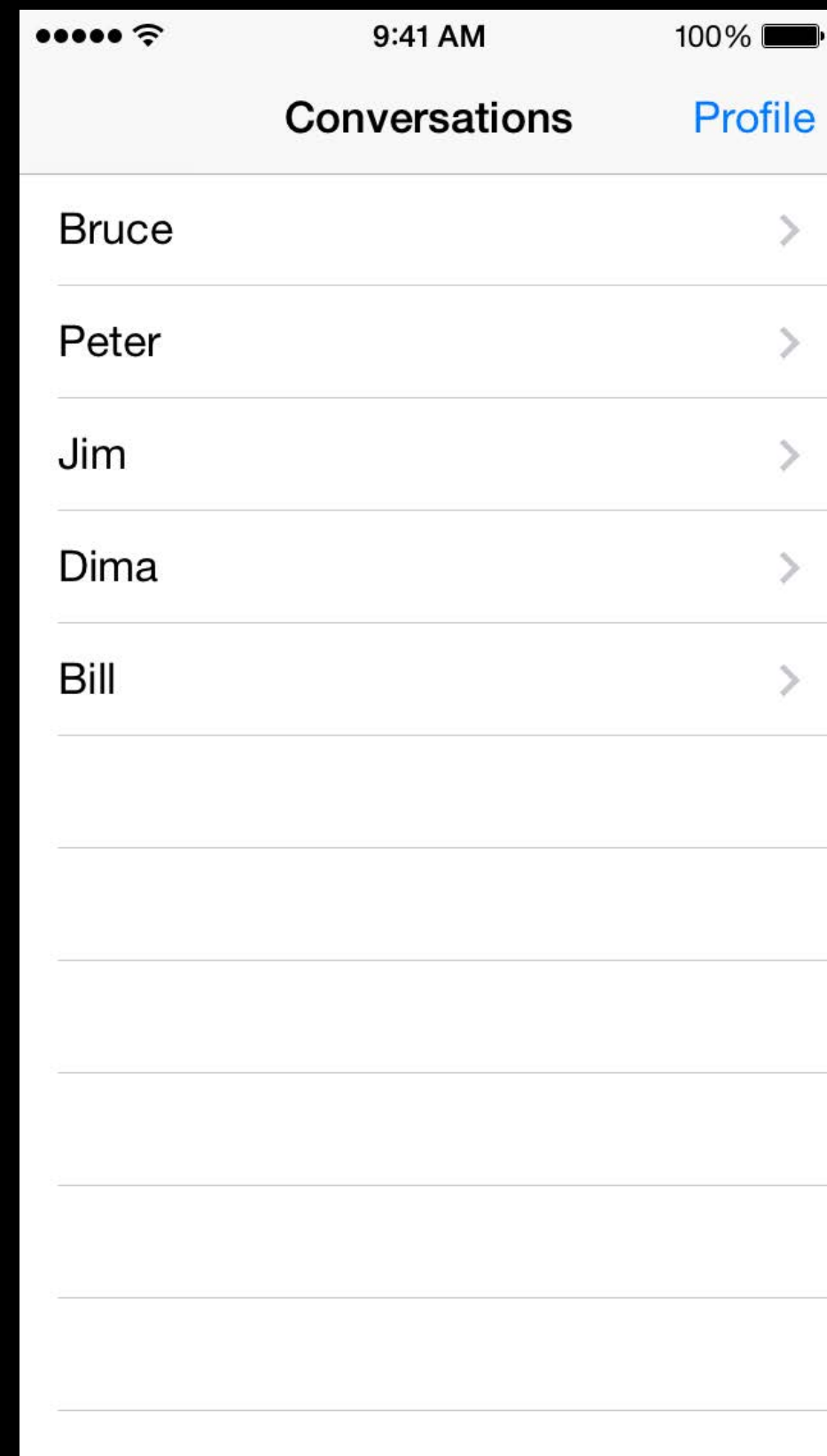
Expanding



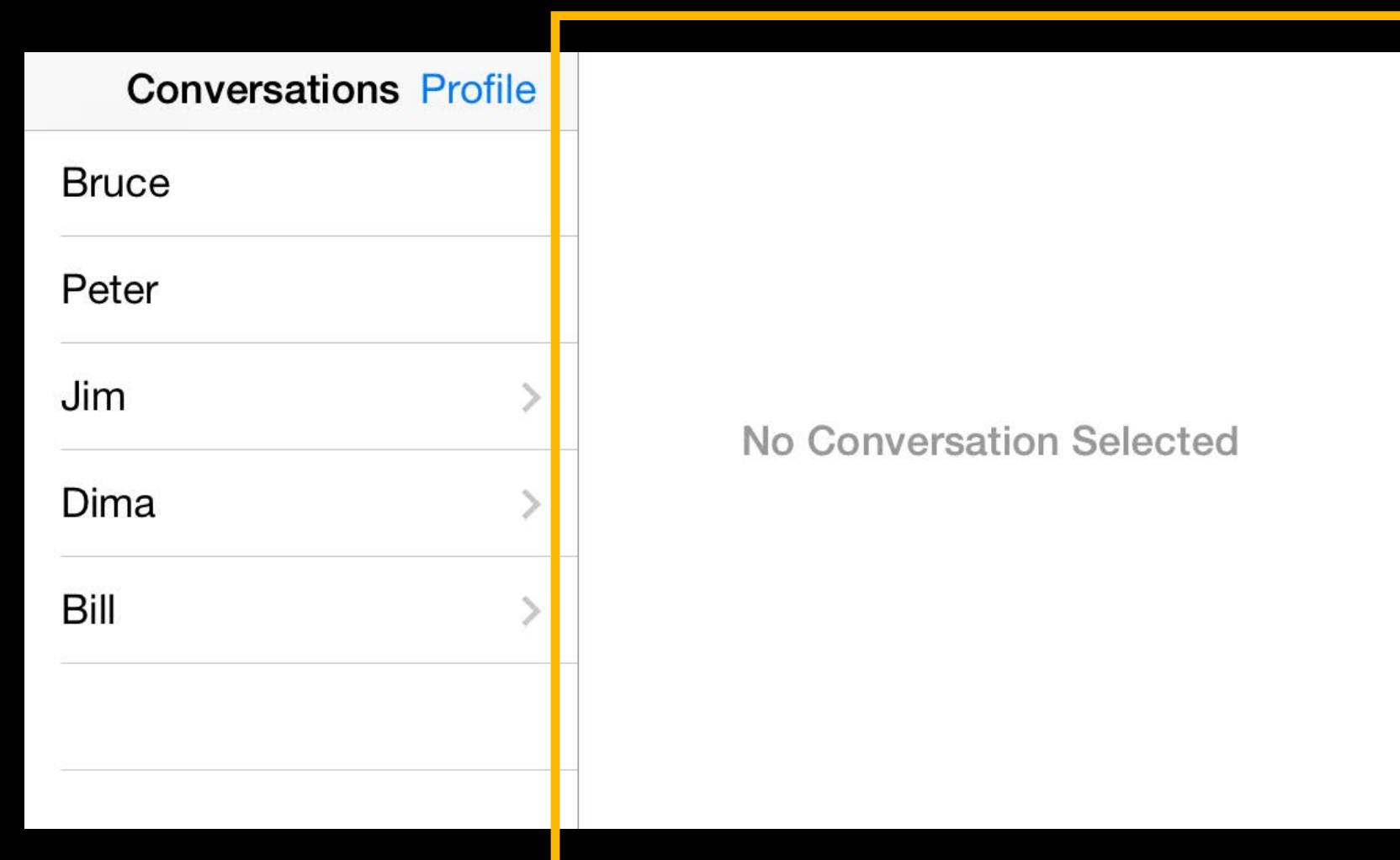
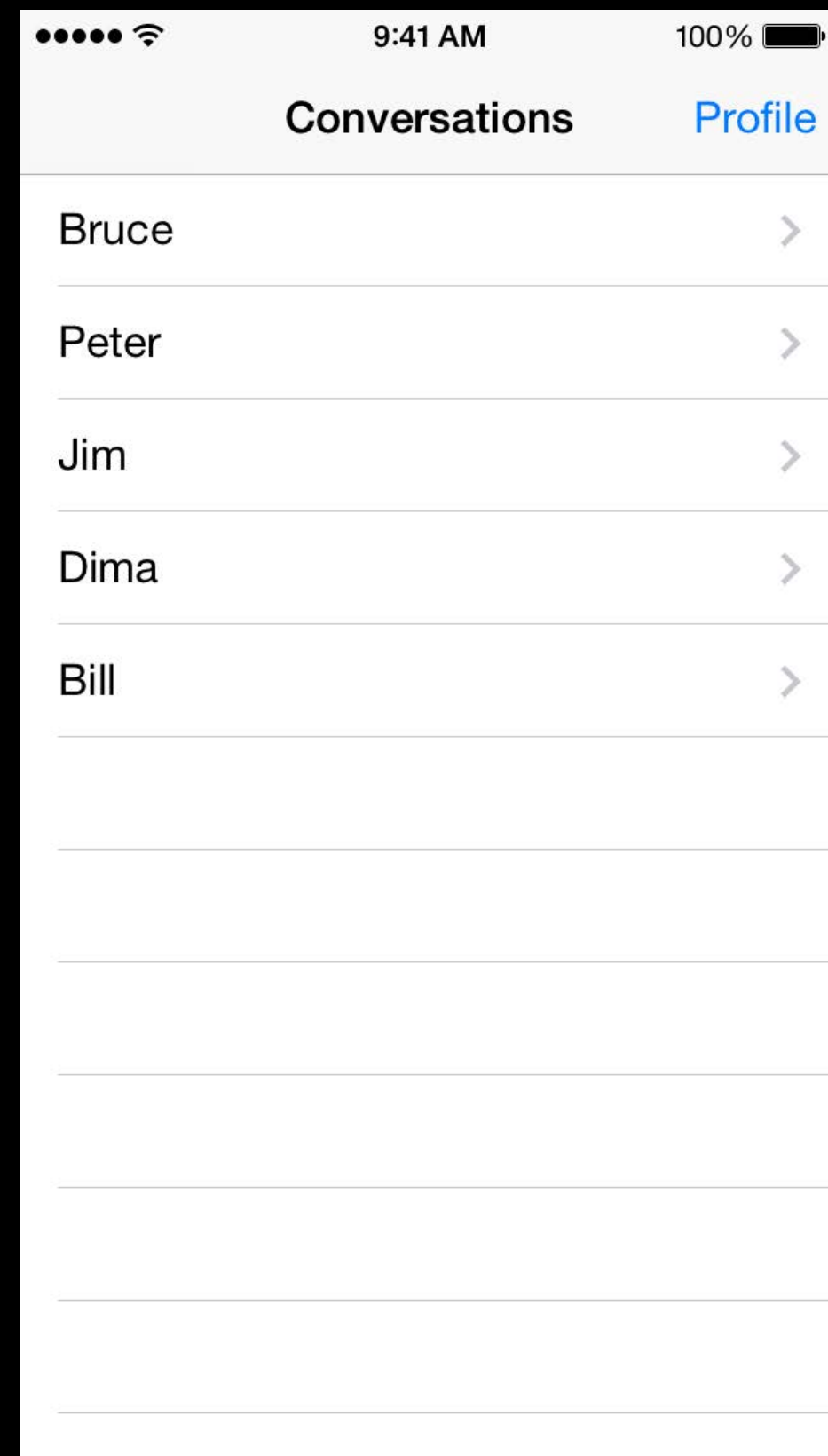
Expanding



Expanding



Expanding



`splitViewController:`
`separateSecondaryViewControllerFromPrimaryViewController:`

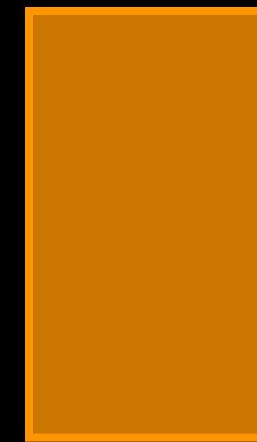
Split View Controller

- (void)**collapseSecondaryViewController:**(UIViewController *)secondaryViewController **forSplitViewController:**(UISplitViewController *)splitViewController;
- (UIViewController *)**separateSecondaryViewControllerForSplitViewController:**(UISplitViewController *)splitViewController;
- For implementing collapsing in custom container view controllers

Showing View Controllers

Leaf
Controller

Navigation
Controller



Showing View Controllers

Leaf
Controller

Navigation
Controller



```
[self.navigationController pushViewController:...]
```

Showing View Controllers

Leaf
Controller

Navigation
Controller

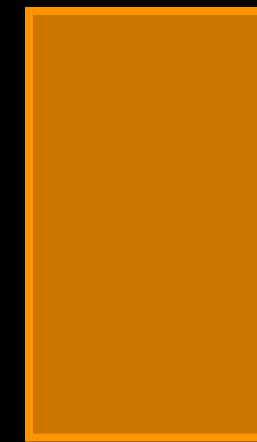


```
[self.navigationController pushViewController:...
```

Showing View Controllers

Leaf
Controller

Navigation
Controller



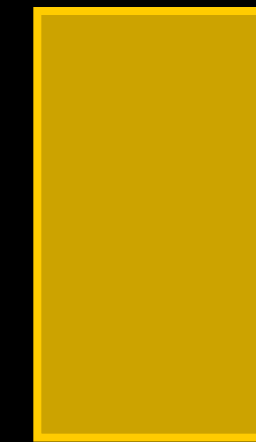
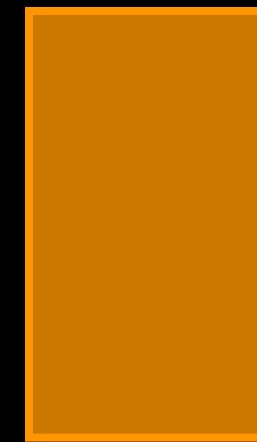
Showing View Controllers

`showViewController:sender:`

`showDetailViewController:sender:`

Leaf
Controller

Navigation
Controller



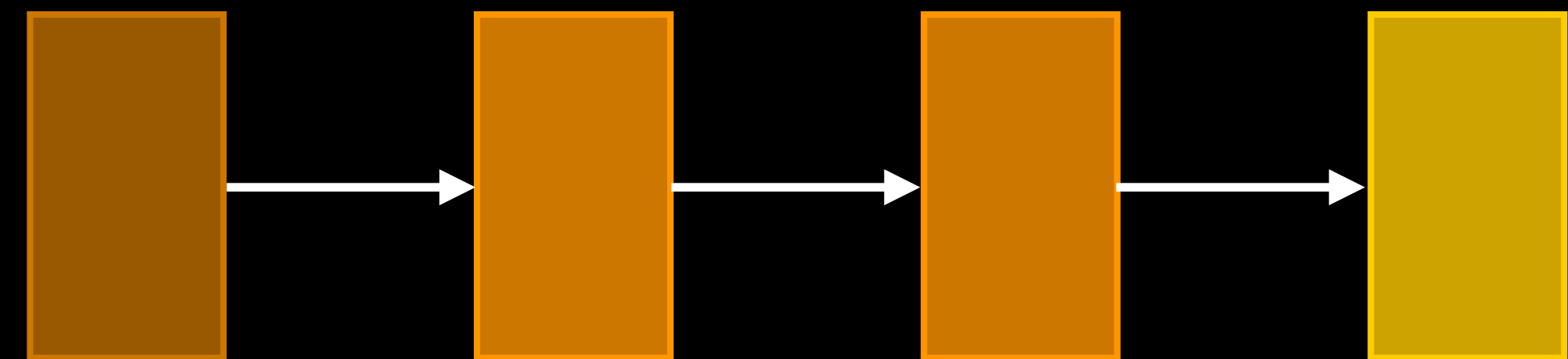
Showing View Controllers

`showViewController:sender:`

`showDetailViewController:sender:`

Leaf
Controller

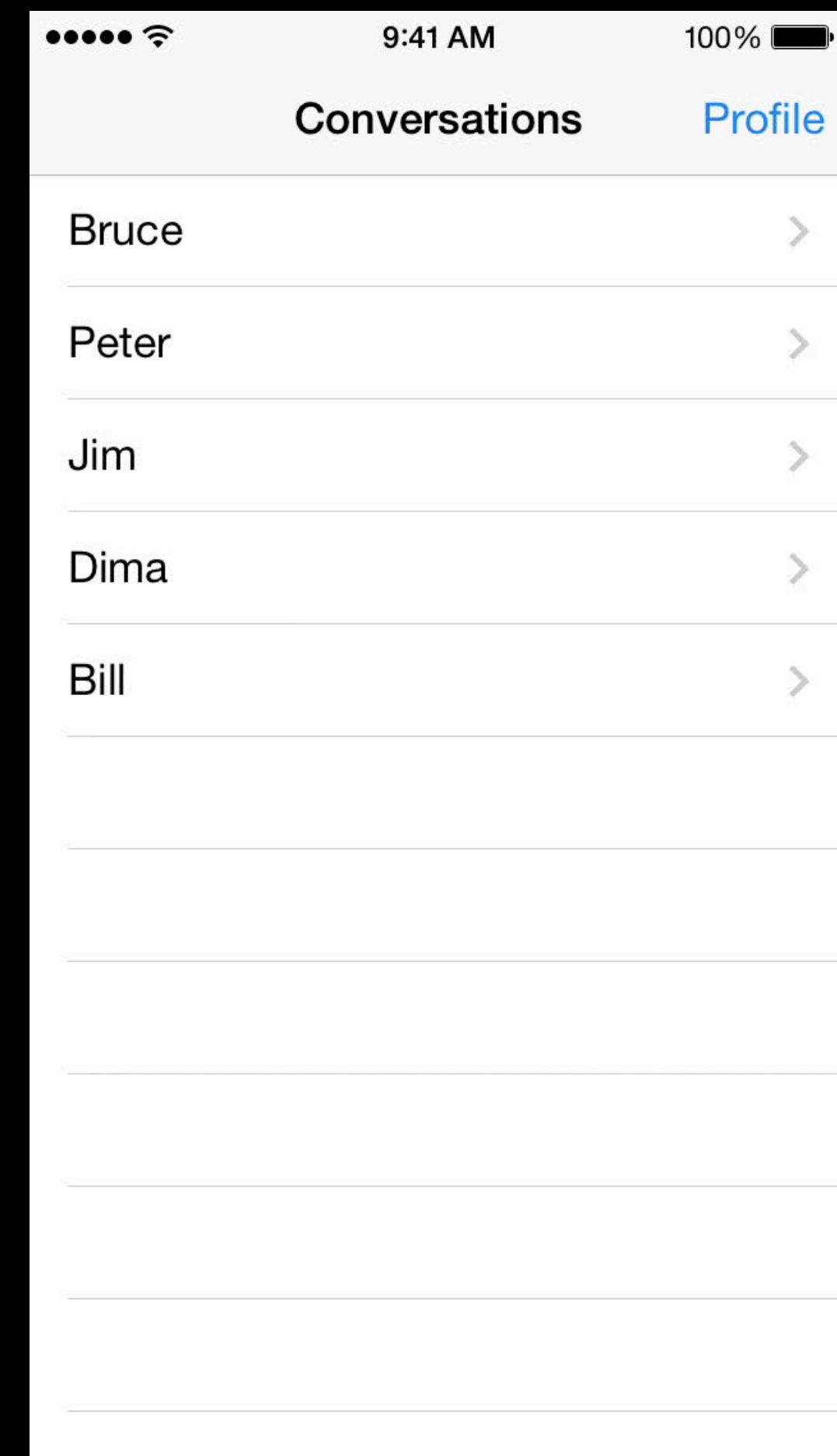
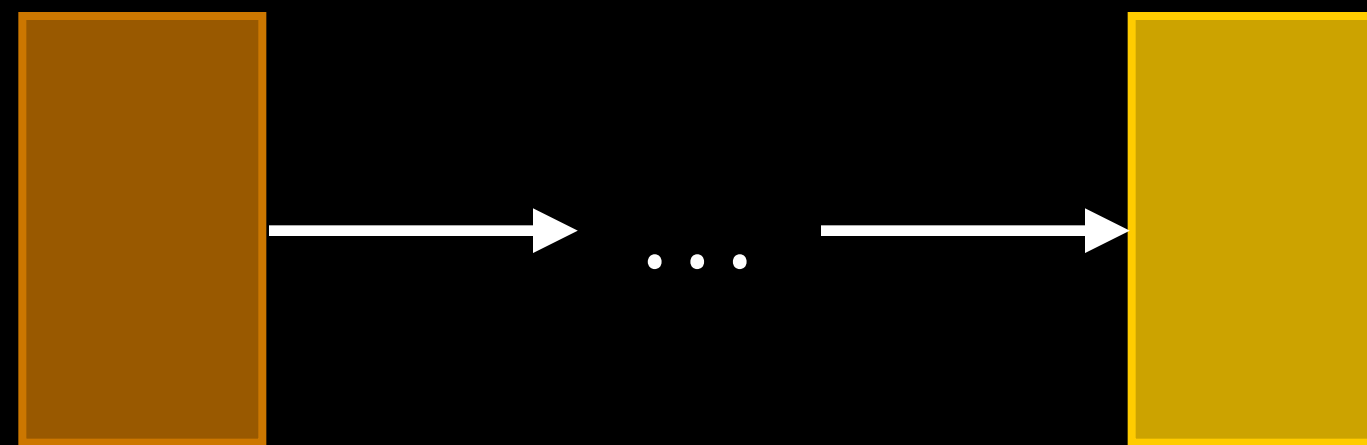
Navigation
Controller



Showing View Controllers

`showViewController:sender:`

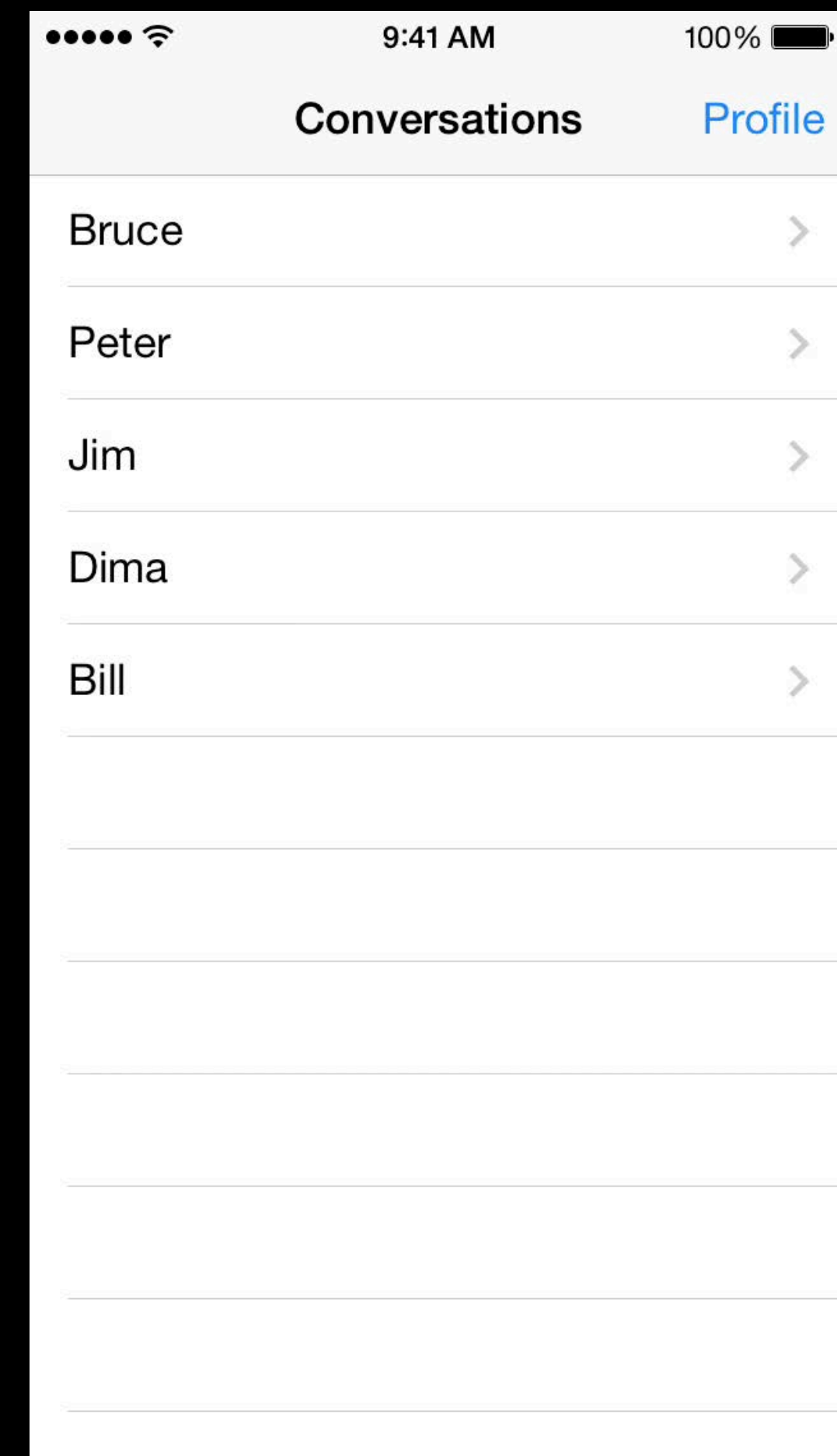
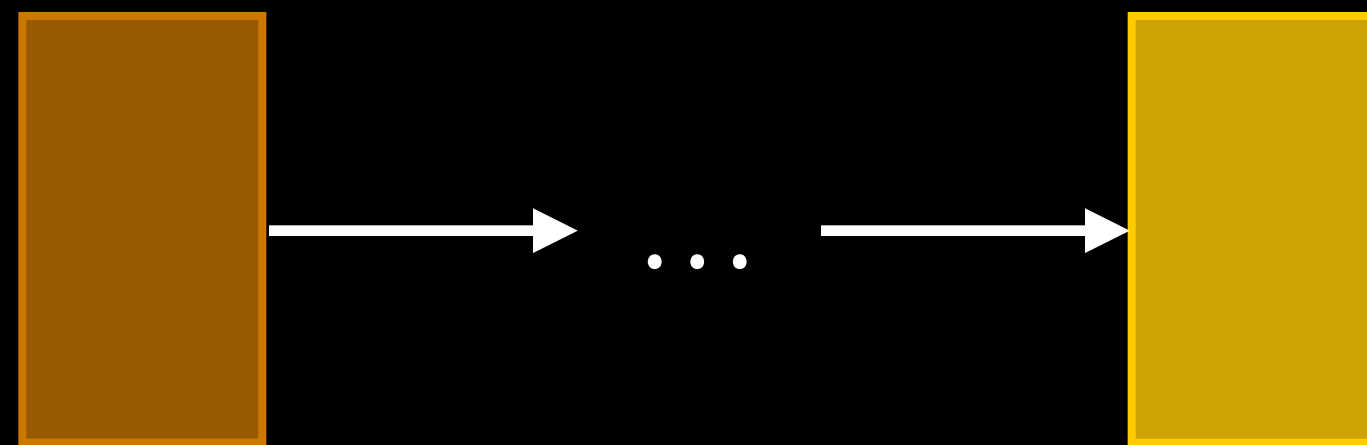
`UINavigationController`



Showing View Controllers

`showViewController:sender:`

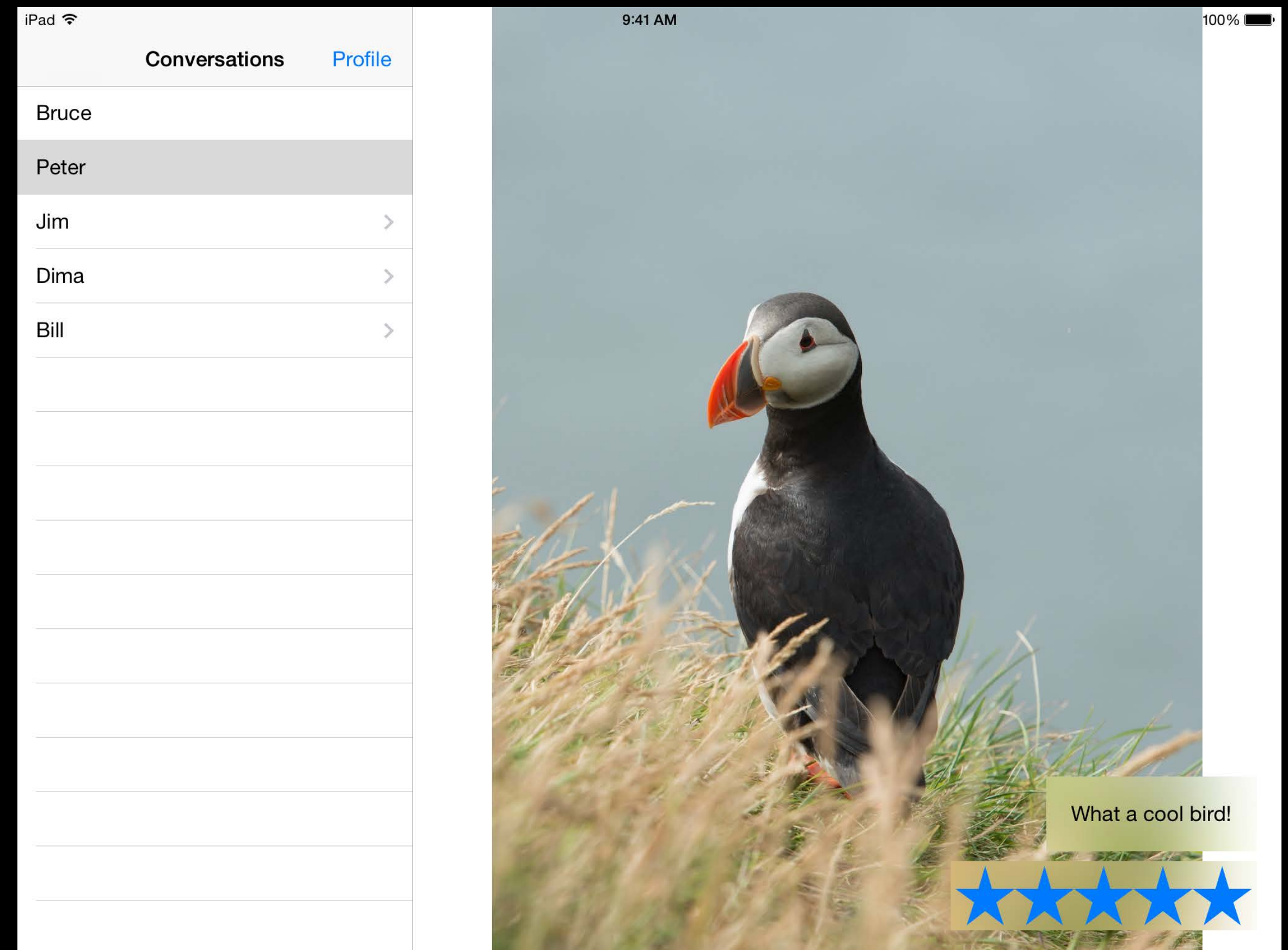
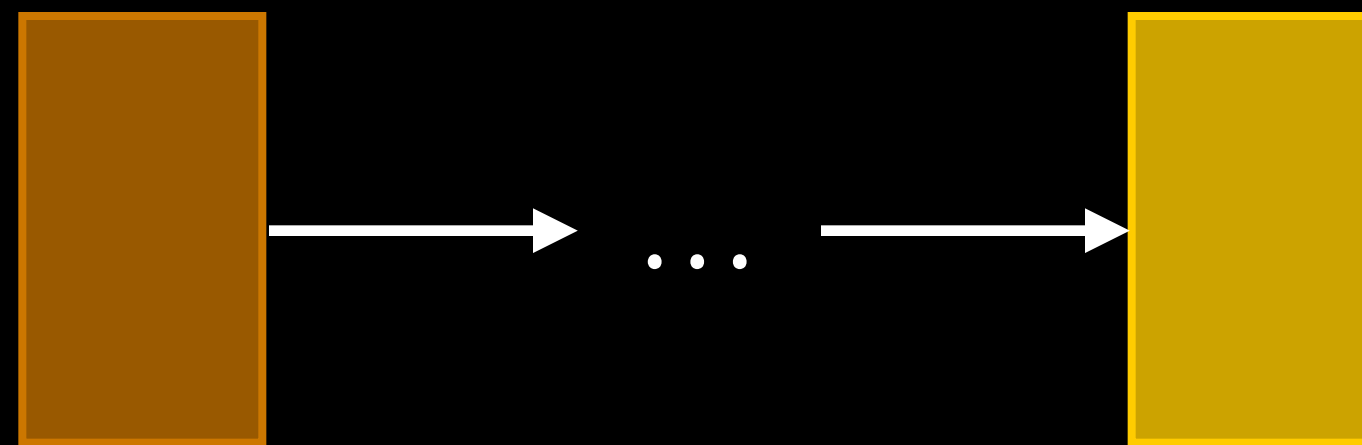
`UINavigationController`



Showing View Controllers

`showViewController:sender:`

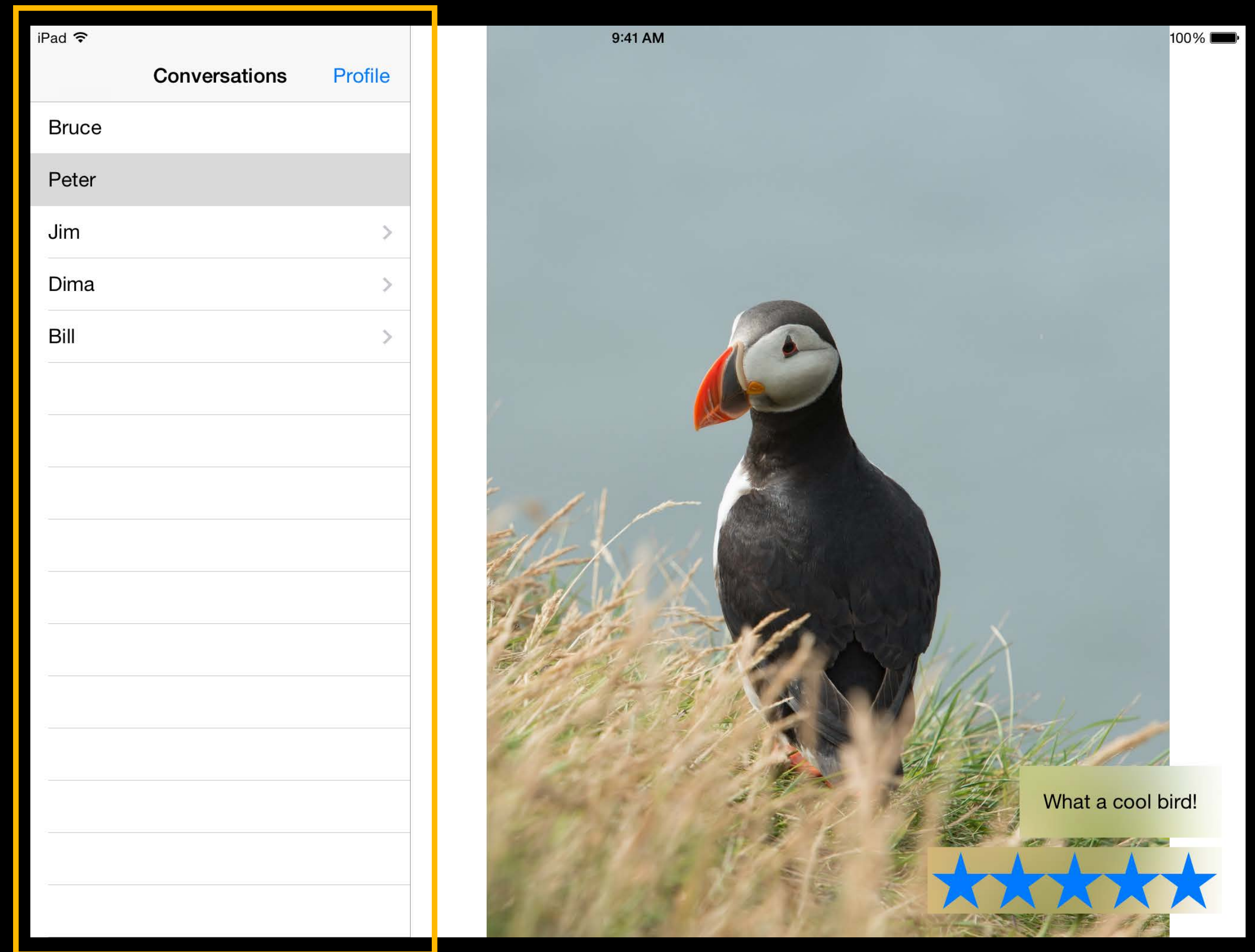
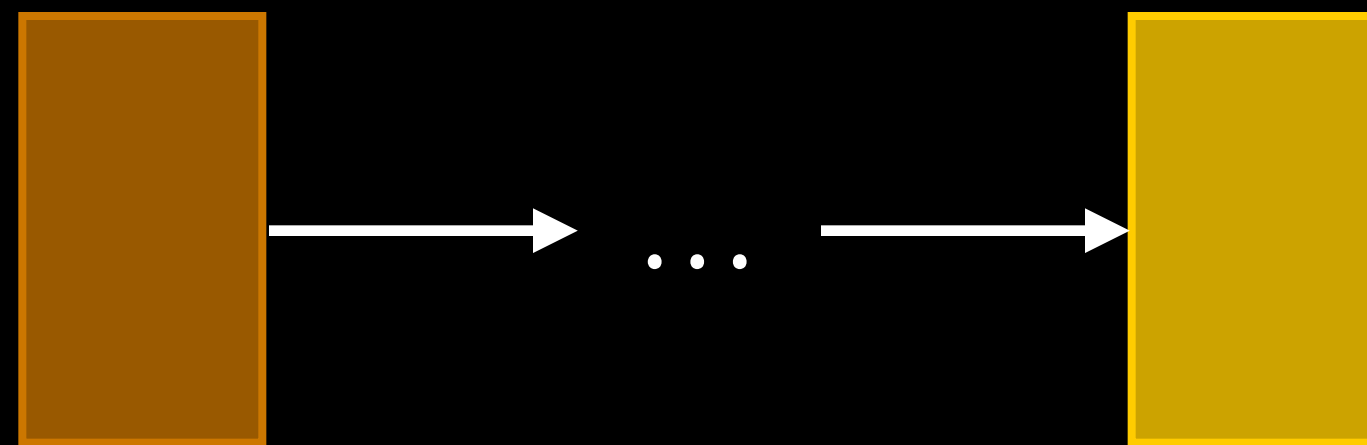
`UISplitViewController`



Showing View Controllers

`showViewController:sender:`

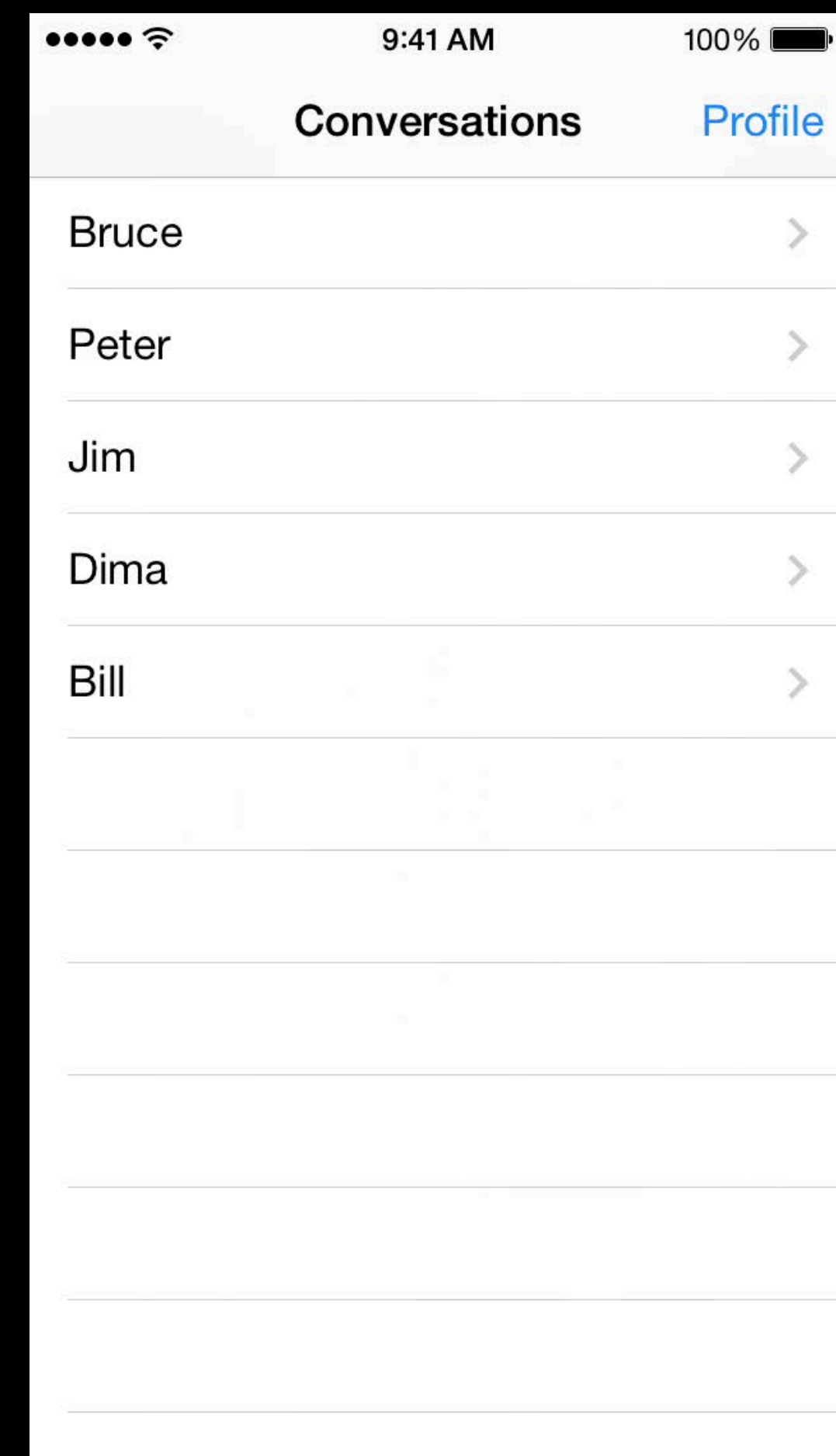
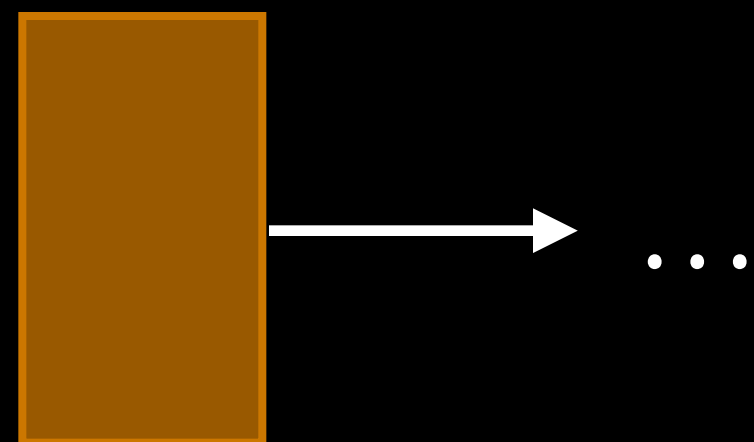
`UISplitViewController`



Showing View Controllers

`showViewController:sender:`

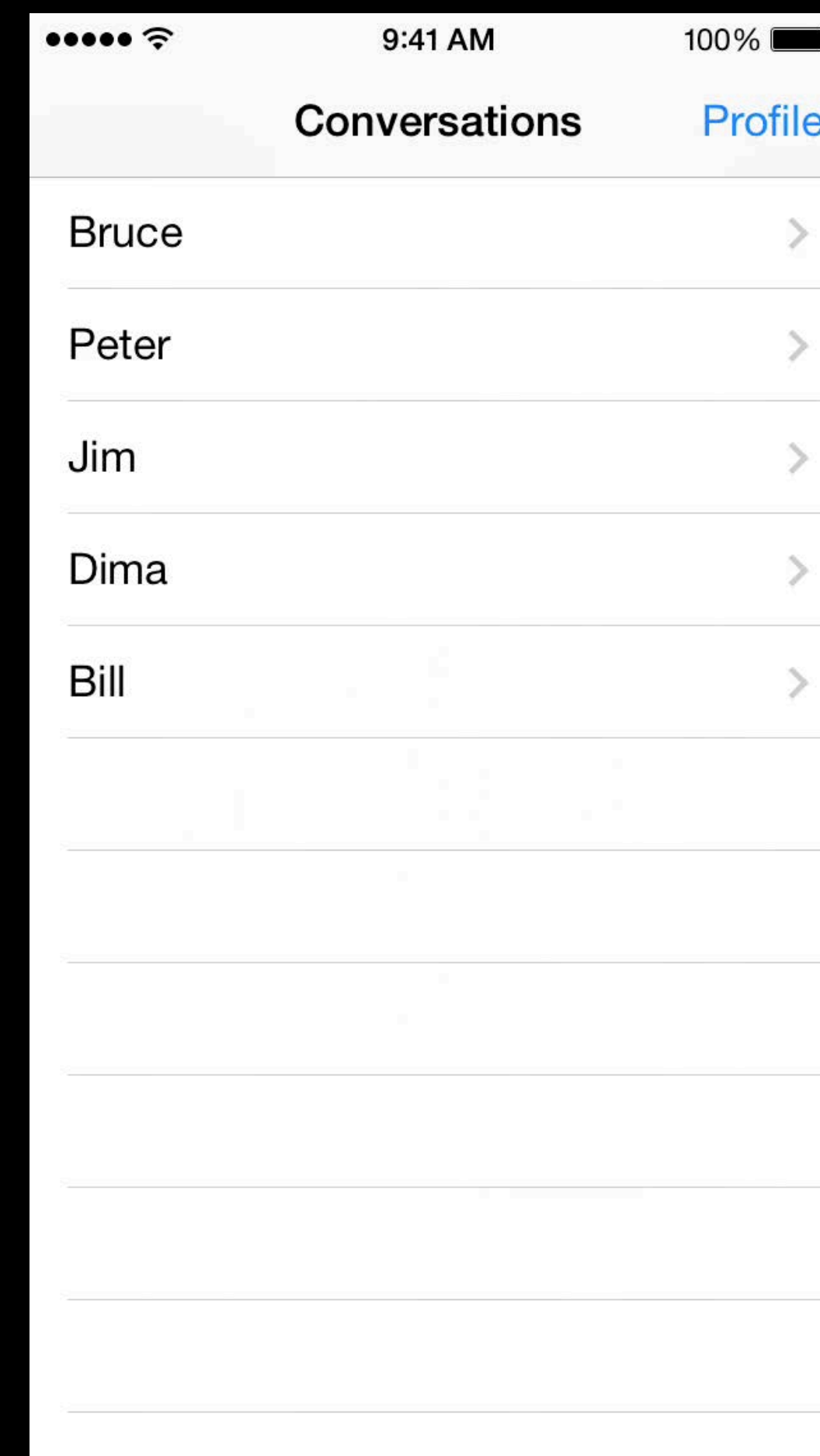
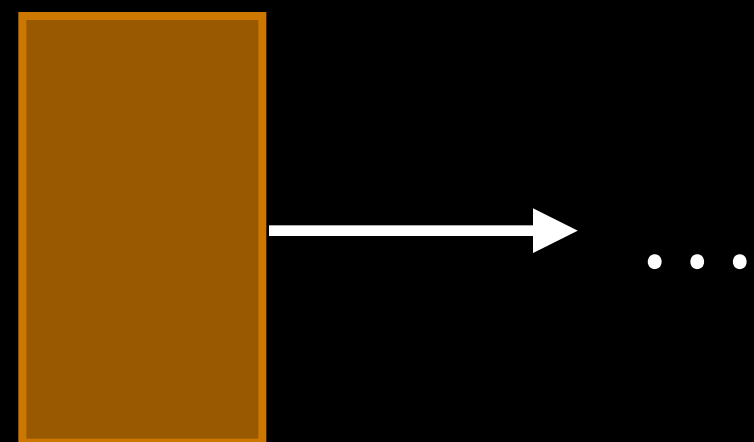
(no container)



Showing View Controllers

`showViewController:sender:`

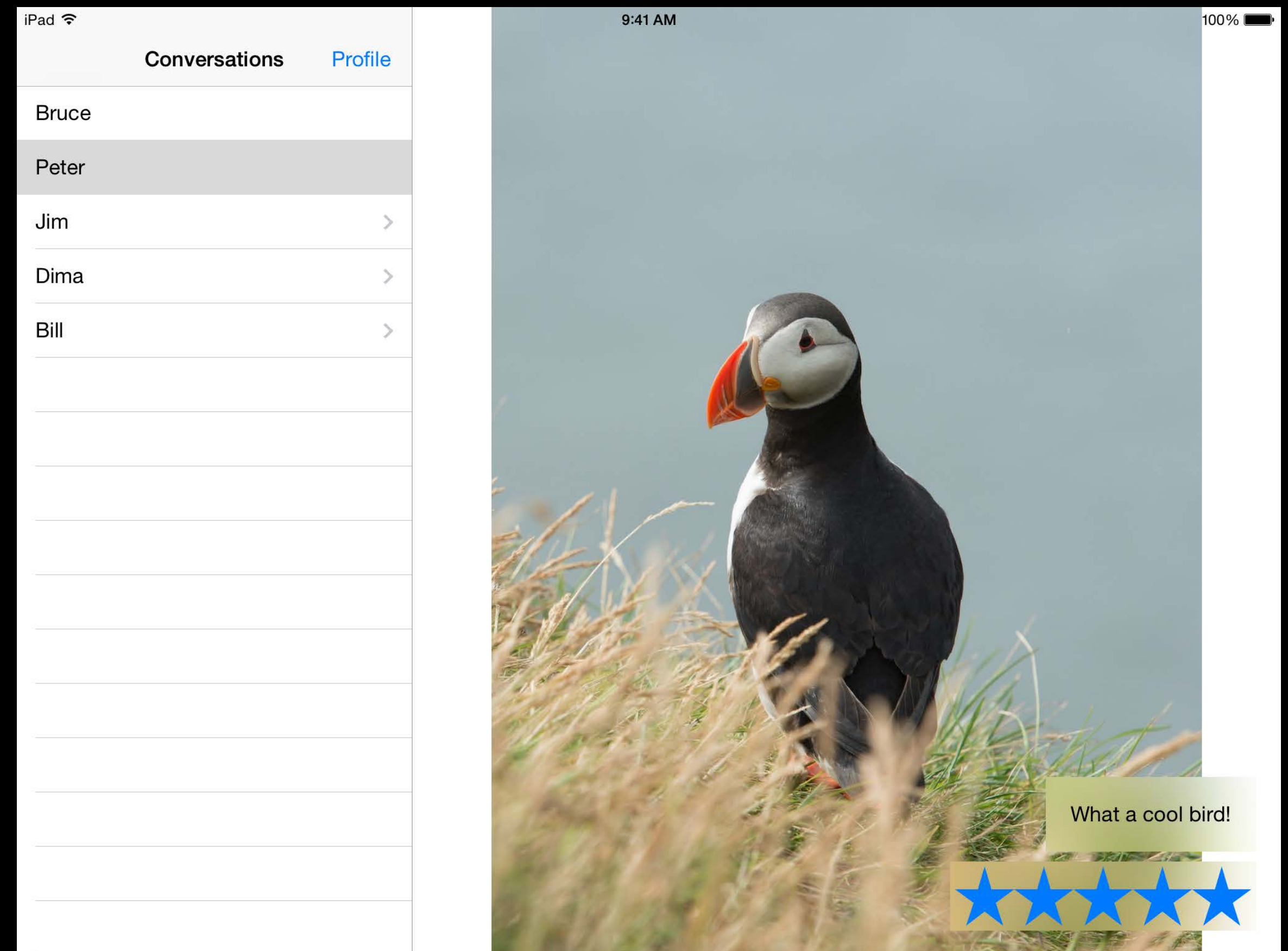
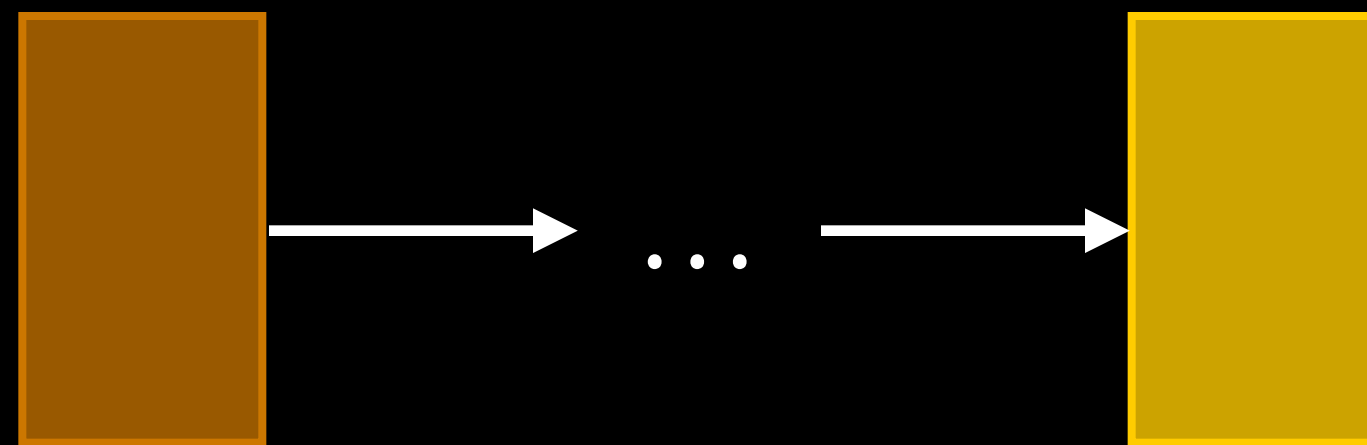
(no container)



Showing View Controllers

`showDetailViewController:sender:`

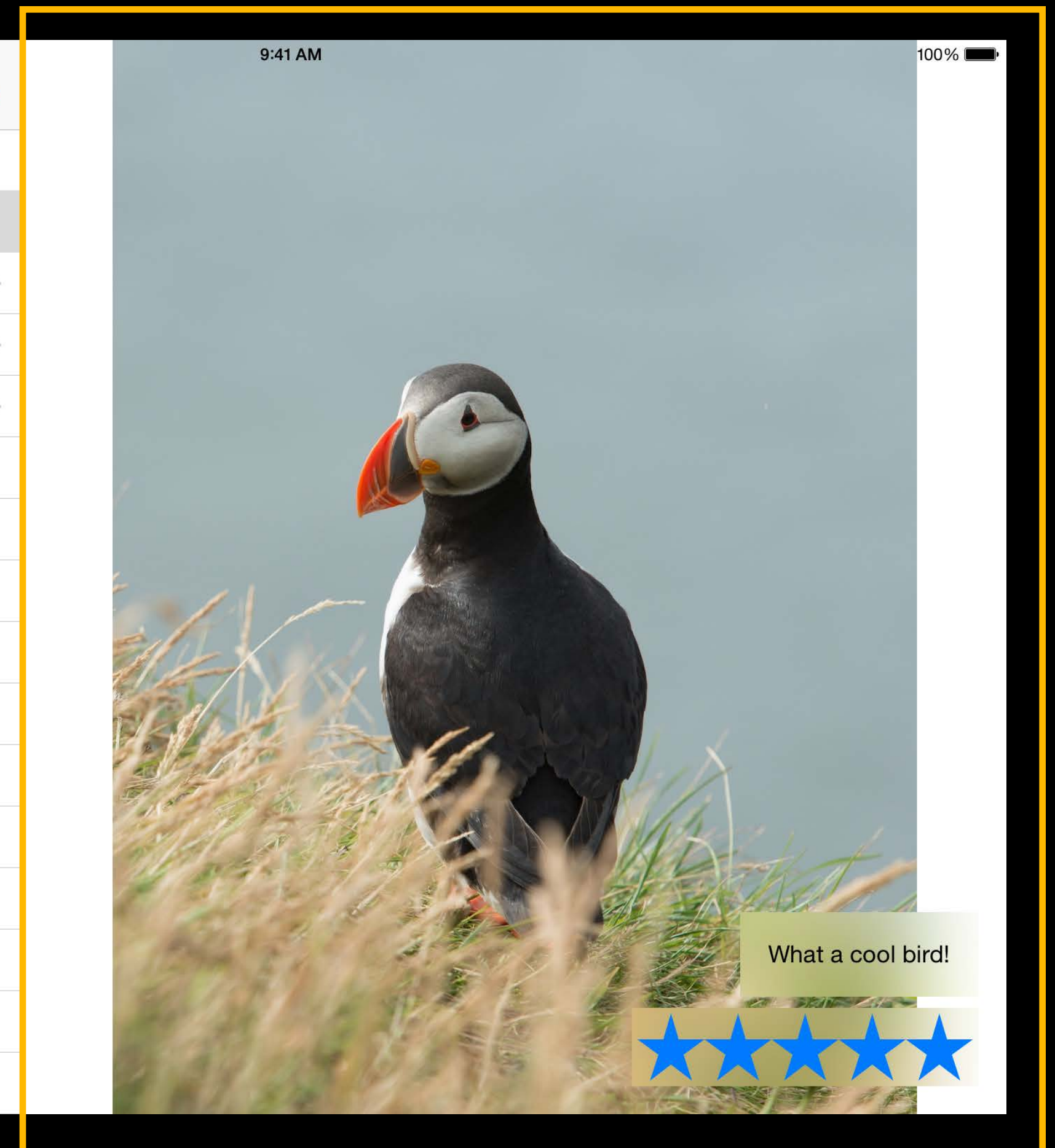
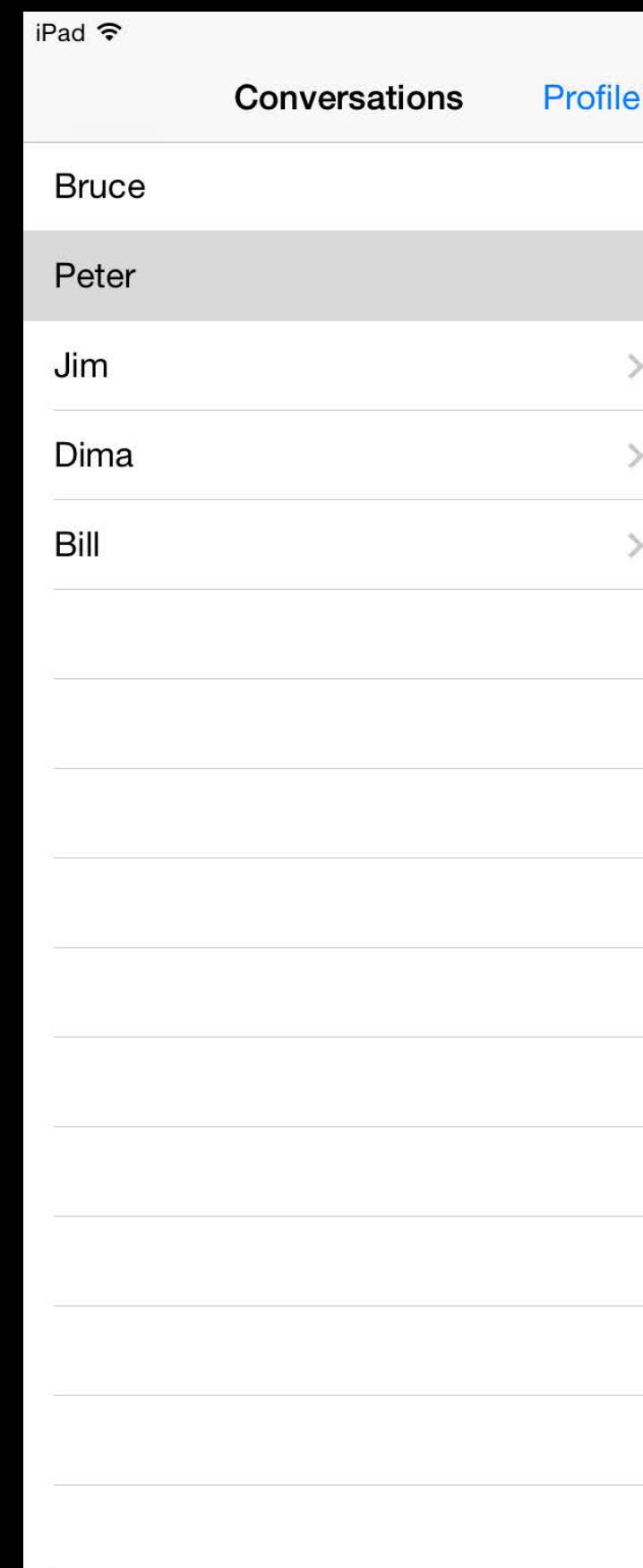
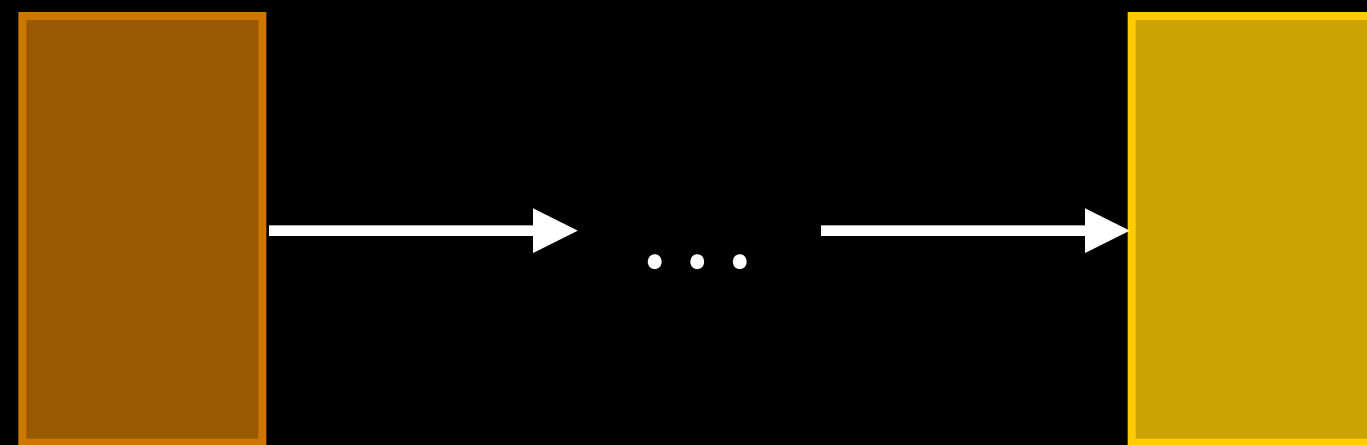
`UISplitViewController`



Showing View Controllers

`showDetailViewController:sender:`

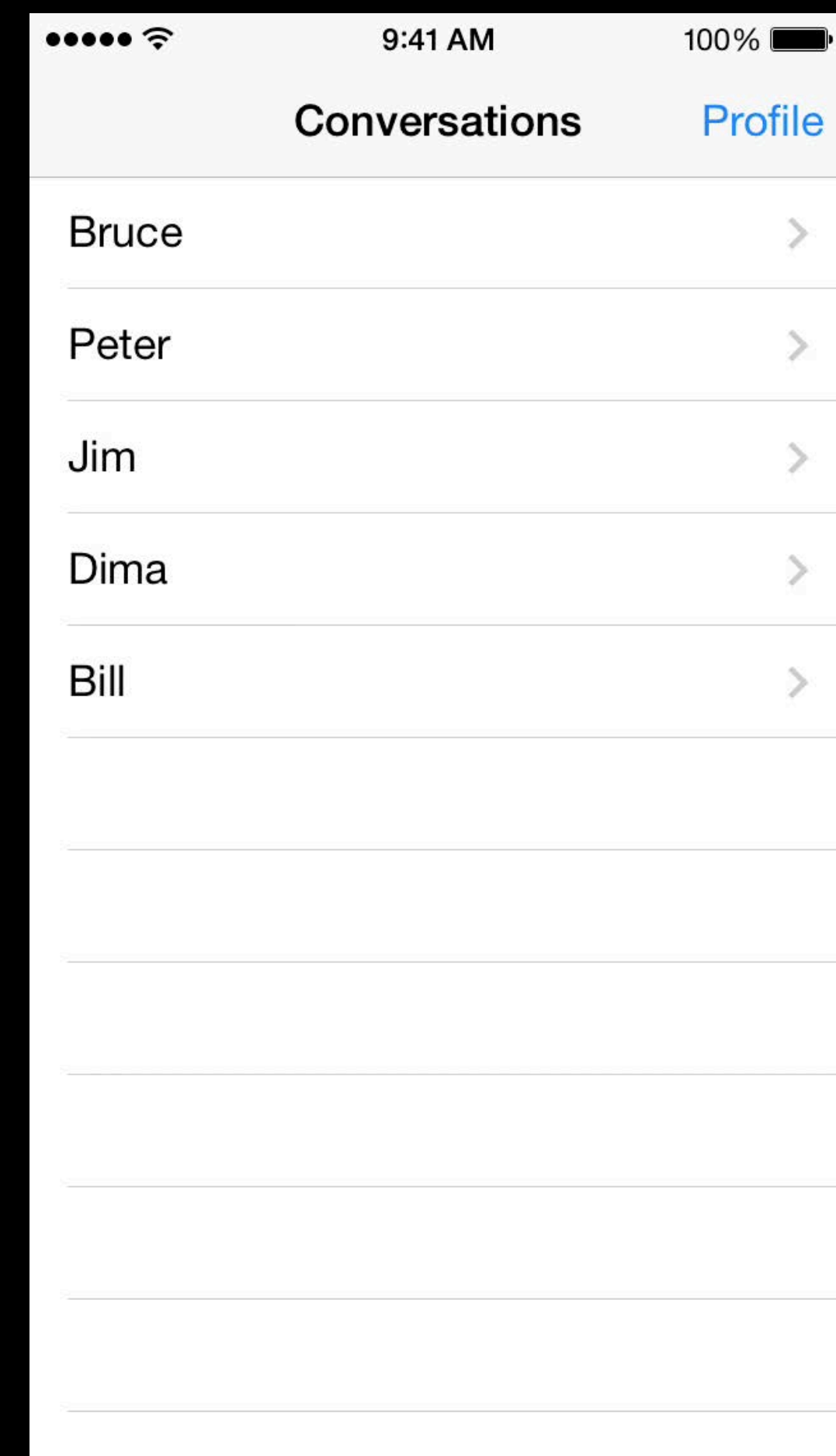
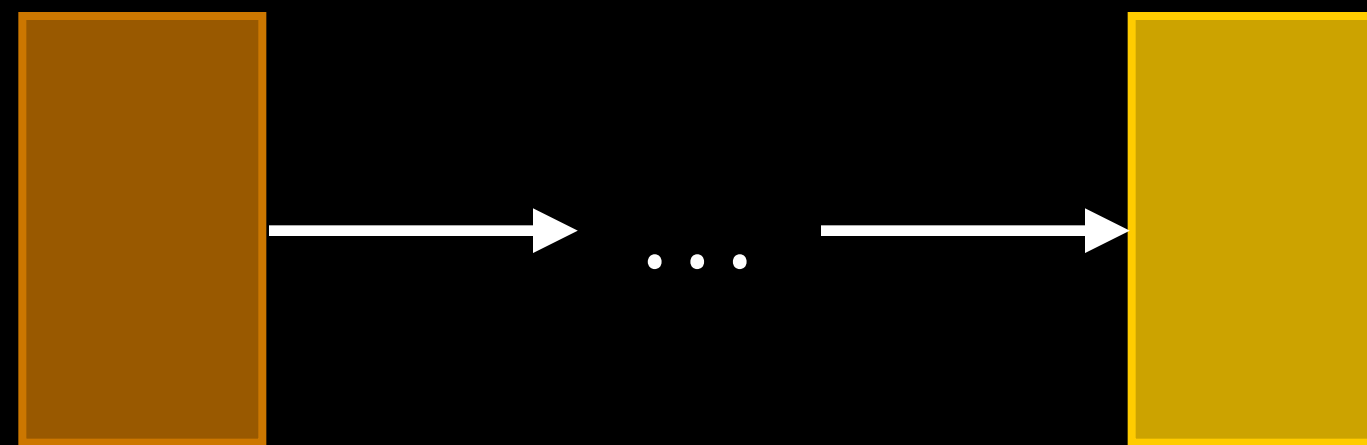
`UISplitViewController`



Showing View Controllers

`showDetailViewController:sender:`

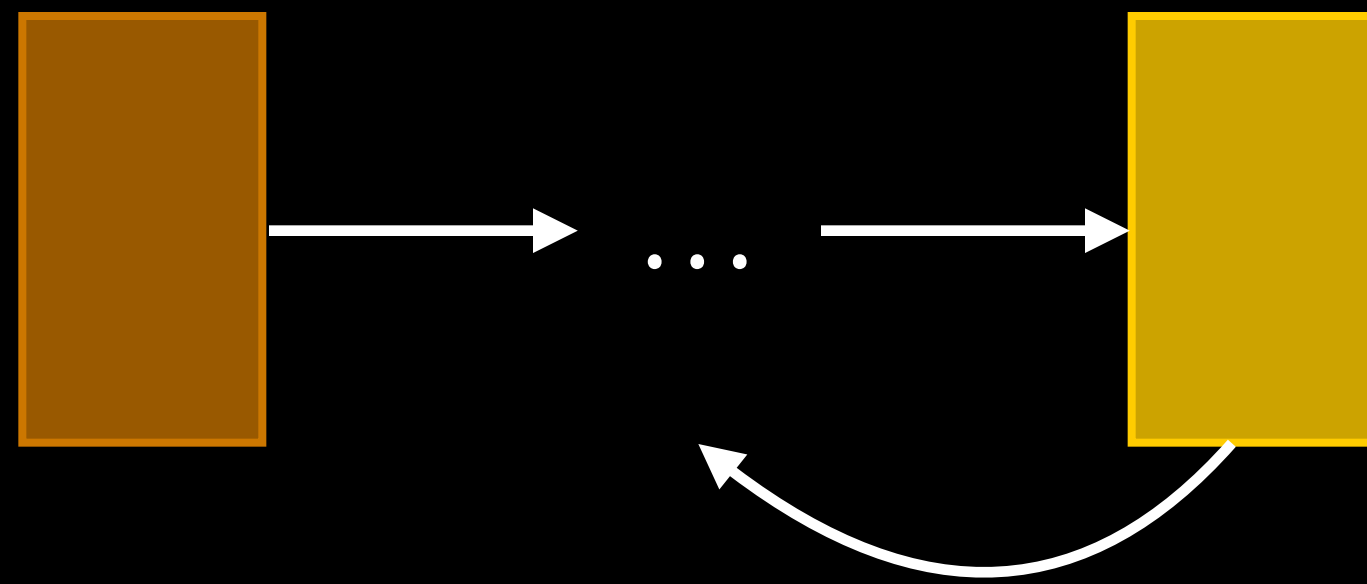
`UISplitViewController`
(collapsed)



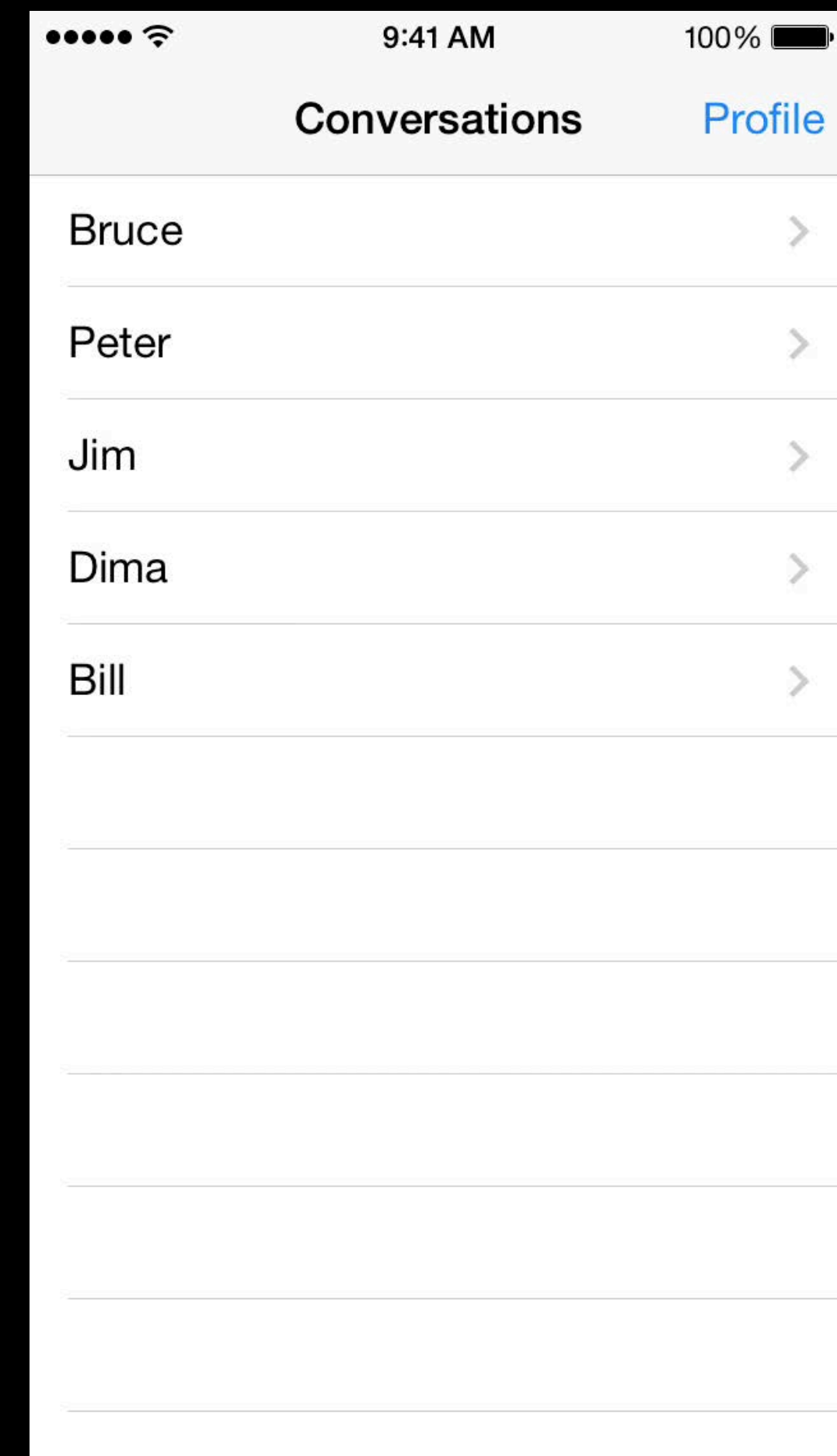
Showing View Controllers

`showDetailViewController:sender:`

`UISplitViewController`
(collapsed)



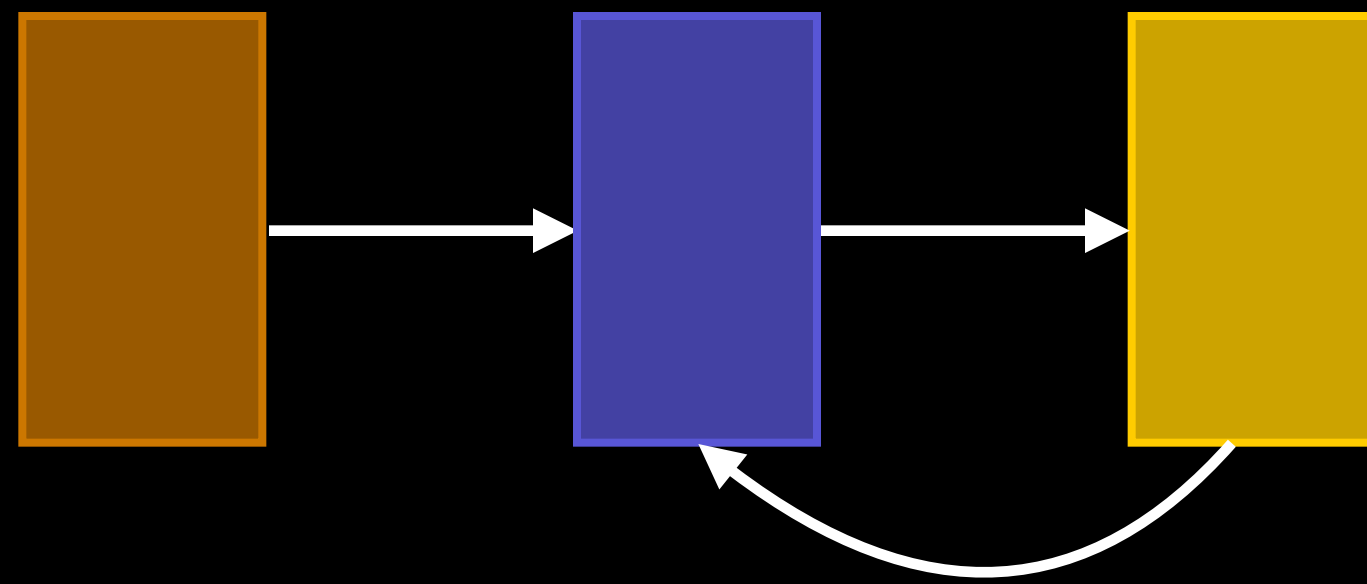
`showViewController:sender:`



Showing View Controllers

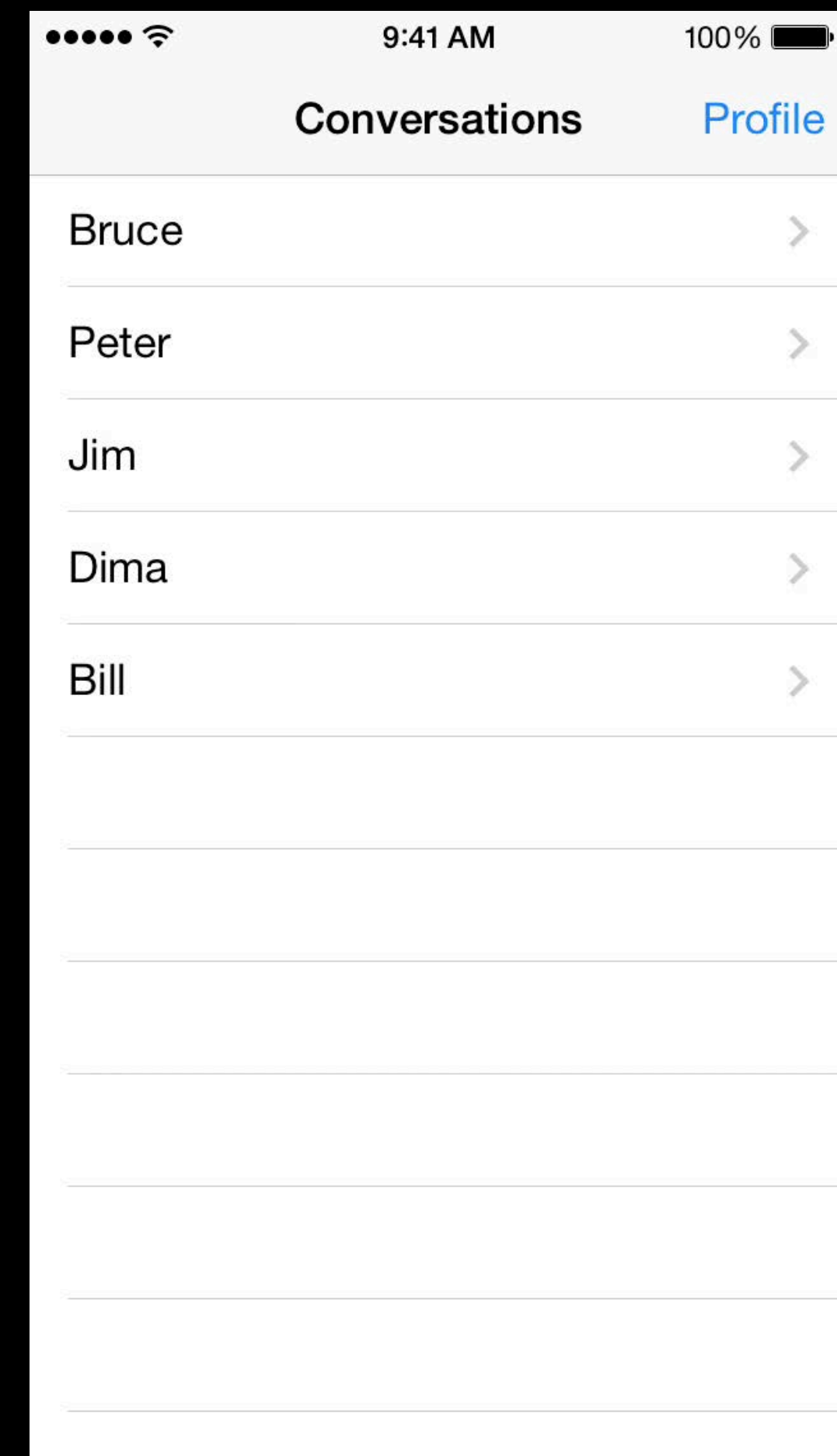
`showDetailViewController:sender:`

`UISplitViewController`
(collapsed)



`showViewController:sender:`

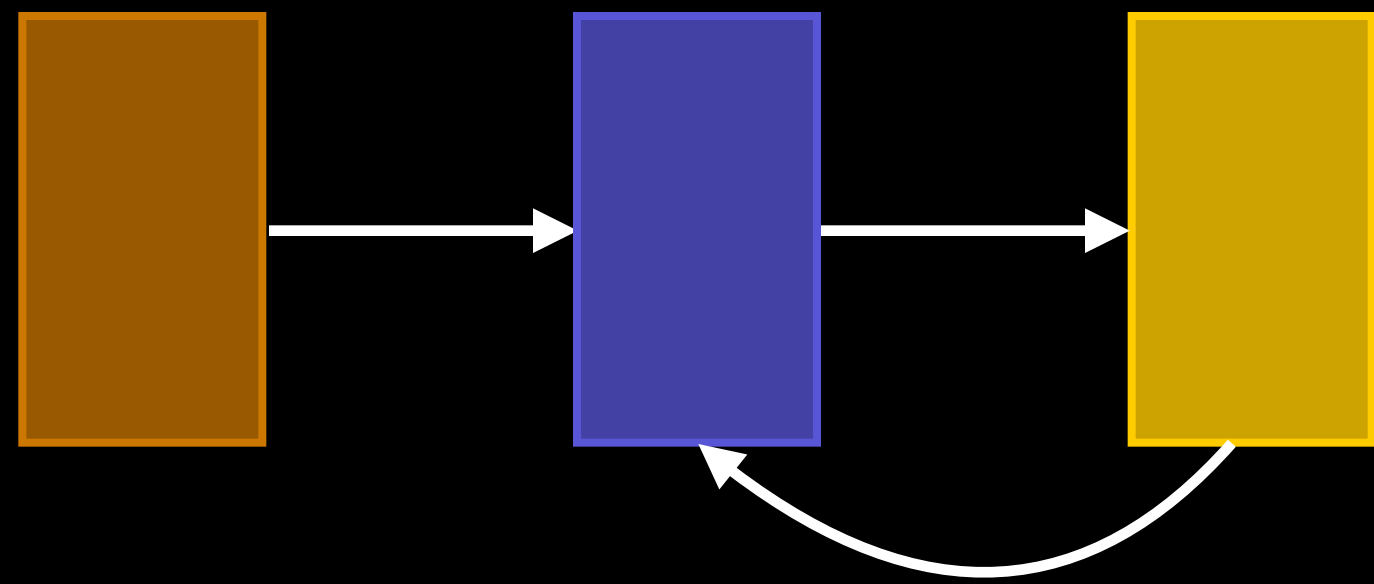
`UINavigationController`



Showing View Controllers

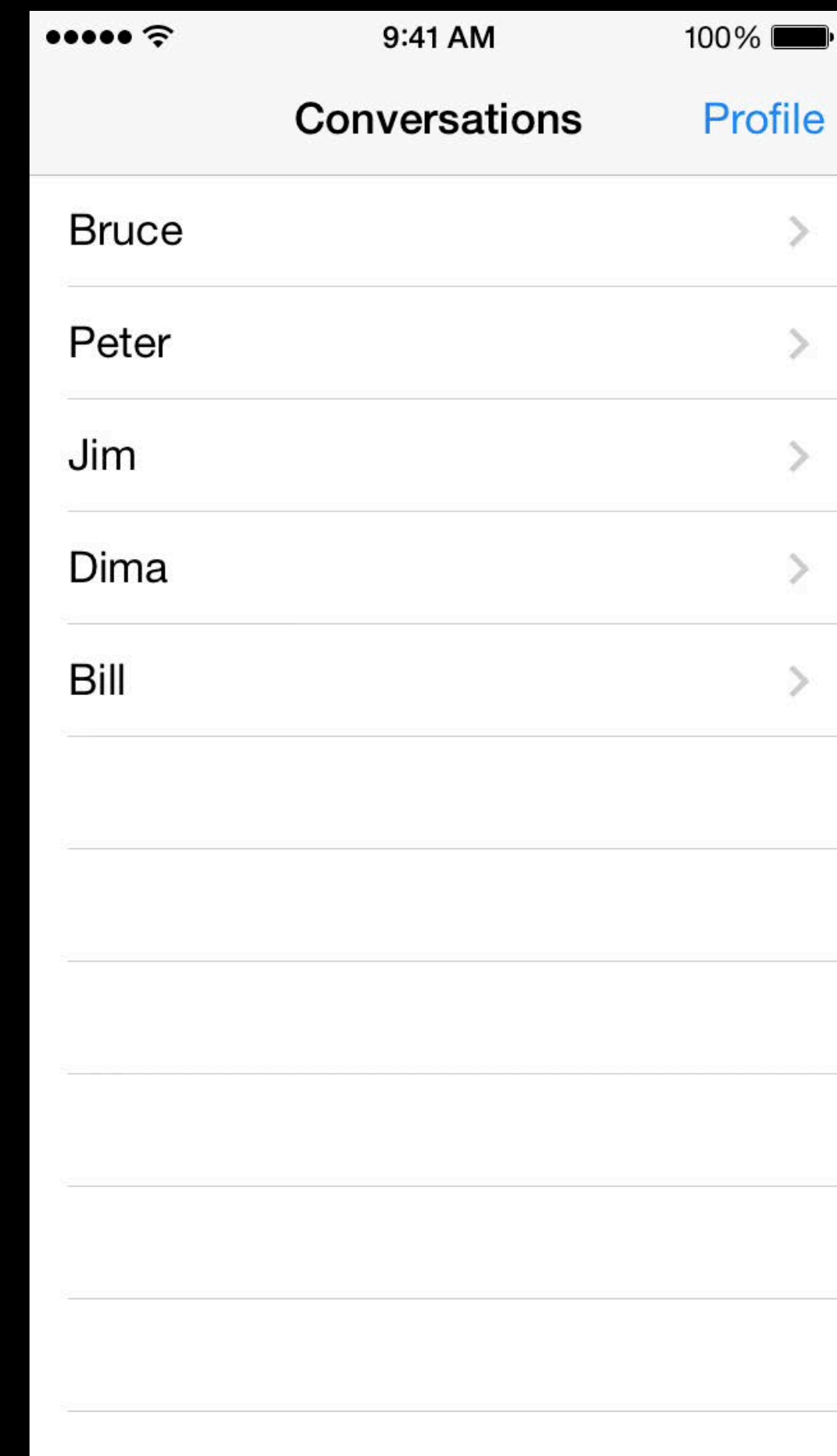
`showDetailViewController:sender:`

`UISplitViewController`
(collapsed)



`showViewController:sender:`

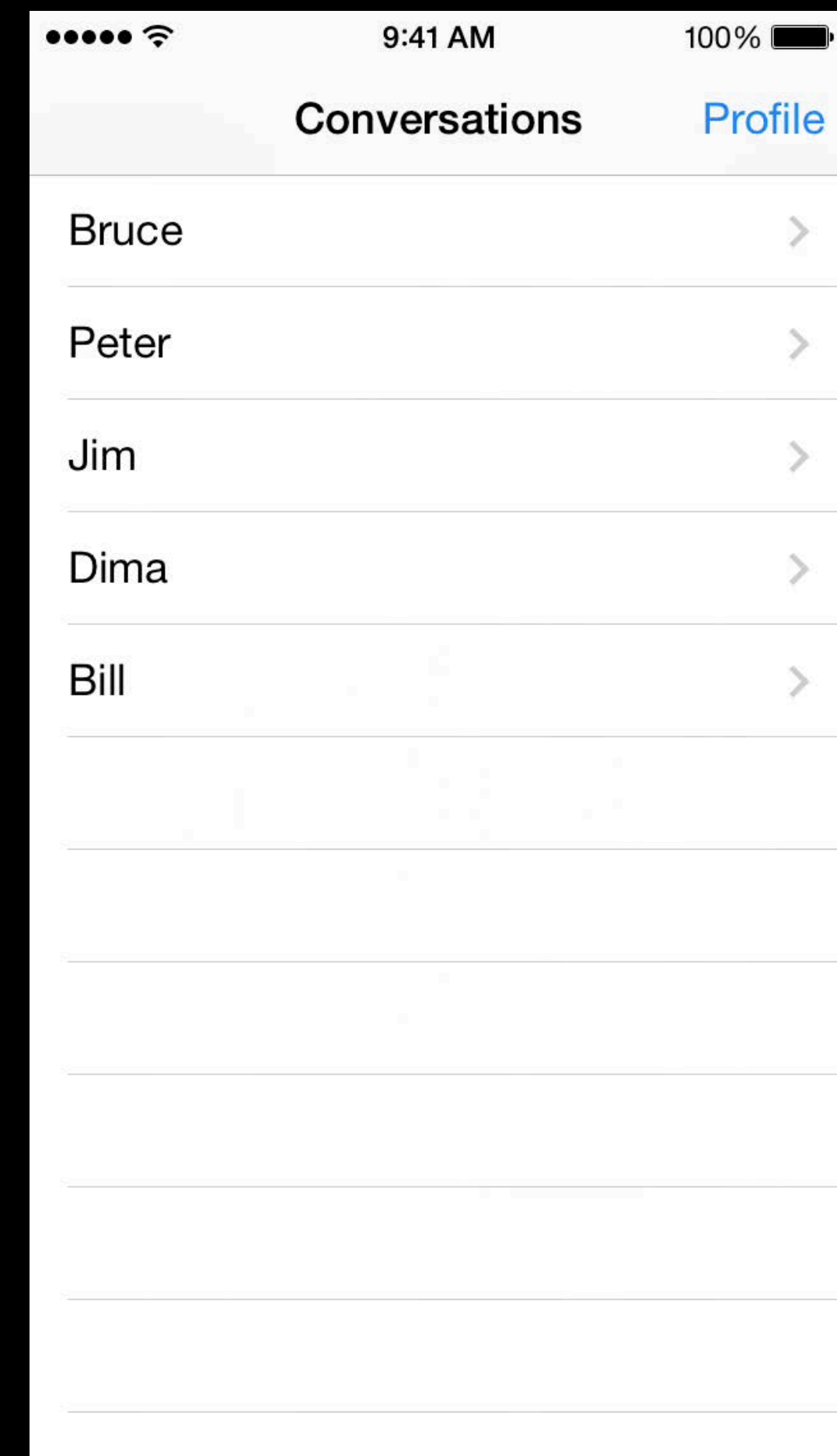
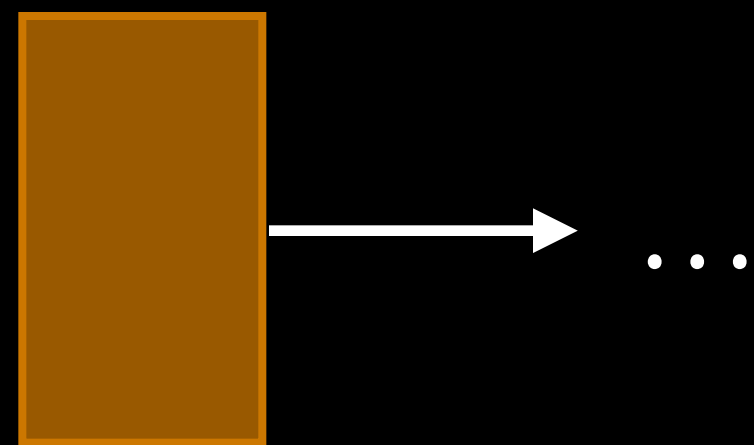
`UINavigationController`



Showing View Controllers

`showDetailViewController:sender:`

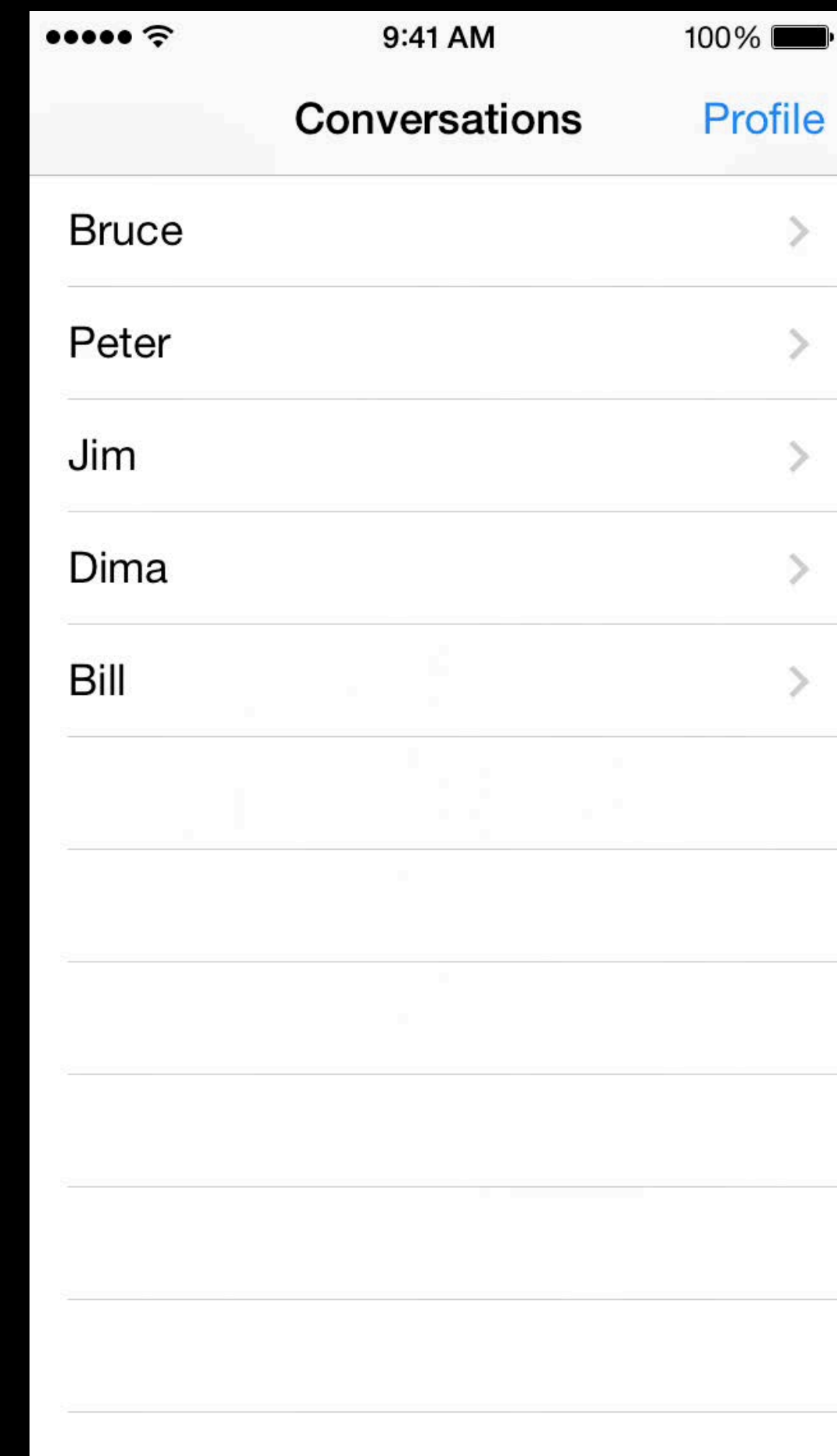
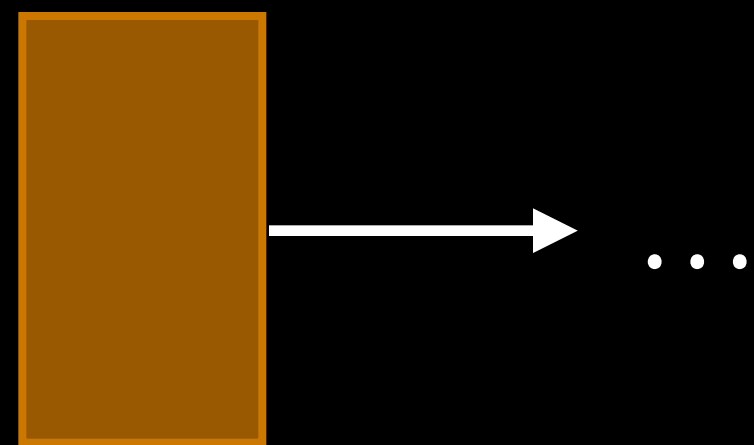
(no container)



Showing View Controllers

```
showDetailViewController:sender:
```

(no container)



Showing View Controllers

- (void)showViewController:(UIViewController *)vc sender:(id)sender;
- (void)showDetailViewController:(UIViewController *)vc sender:(id)sender;

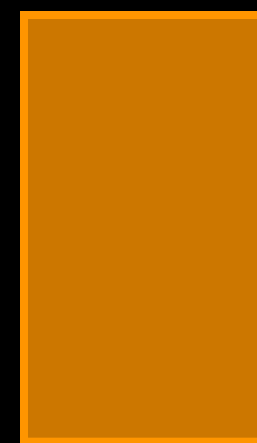
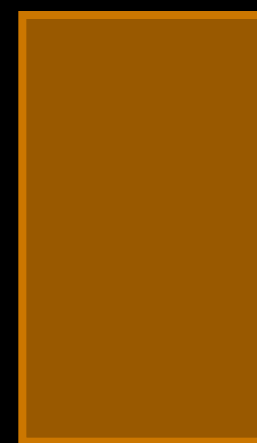
Showing View Controllers

- (void)showViewController:(UIViewController *)vc sender:(id)sender;
- (void)showDetailViewController:(UIViewController *)vc sender:(id)sender;
- Can implement these in custom container view controllers

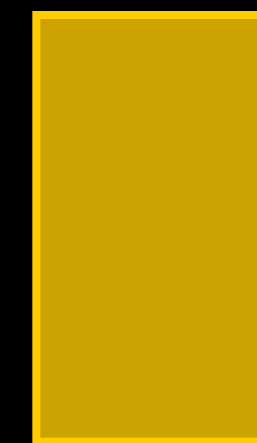
How Does It Work?

targetViewControllerForAction:sender:

Leaf
Controller



Navigation
Controller



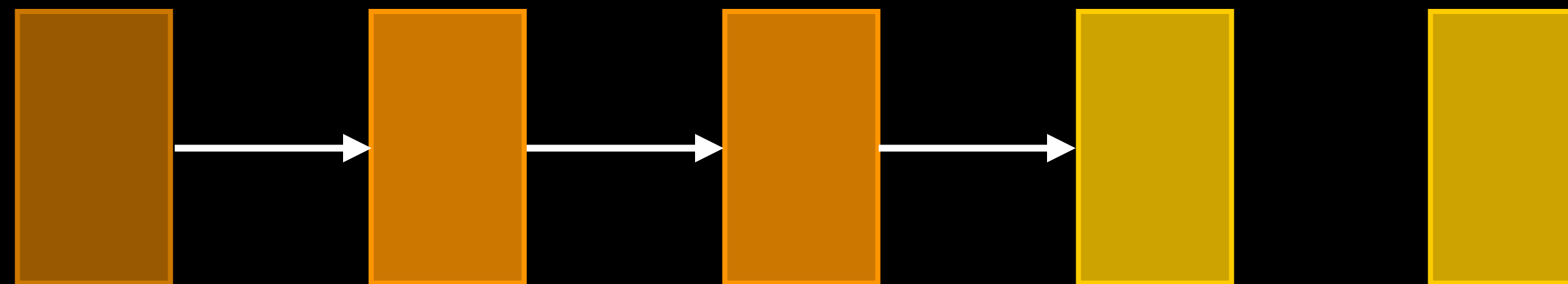
Split View
Controller

How Does It Work?

targetViewControllerForAction:sender:

Leaf
Controller

Navigation
Controller



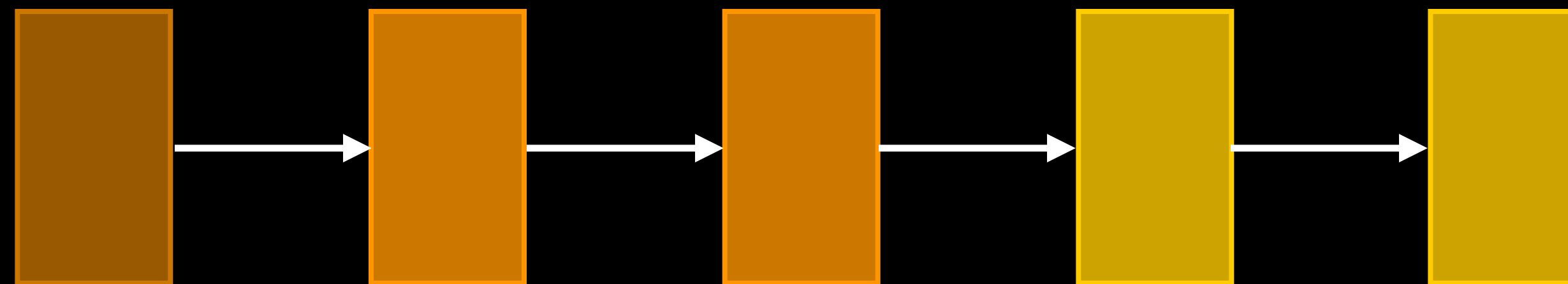
Split View
Controller

How Does It Work?

targetViewControllerForAction:sender:

Leaf
Controller

Navigation
Controller



Split View
Controller

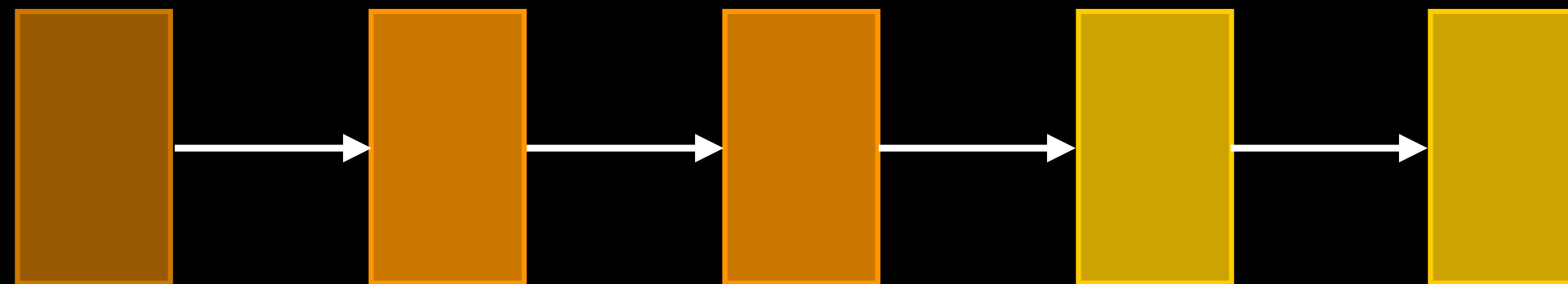
How Does It Work?

`targetViewControllerForAction:sender:`

- You can make your own!

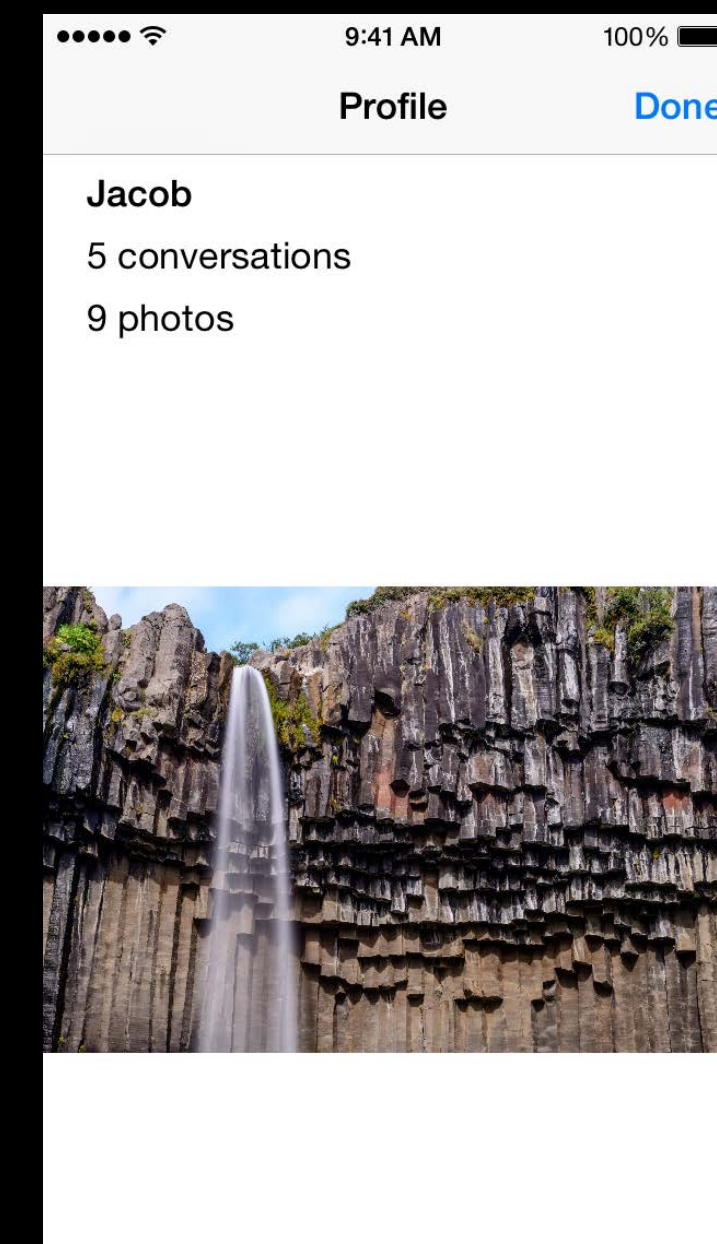
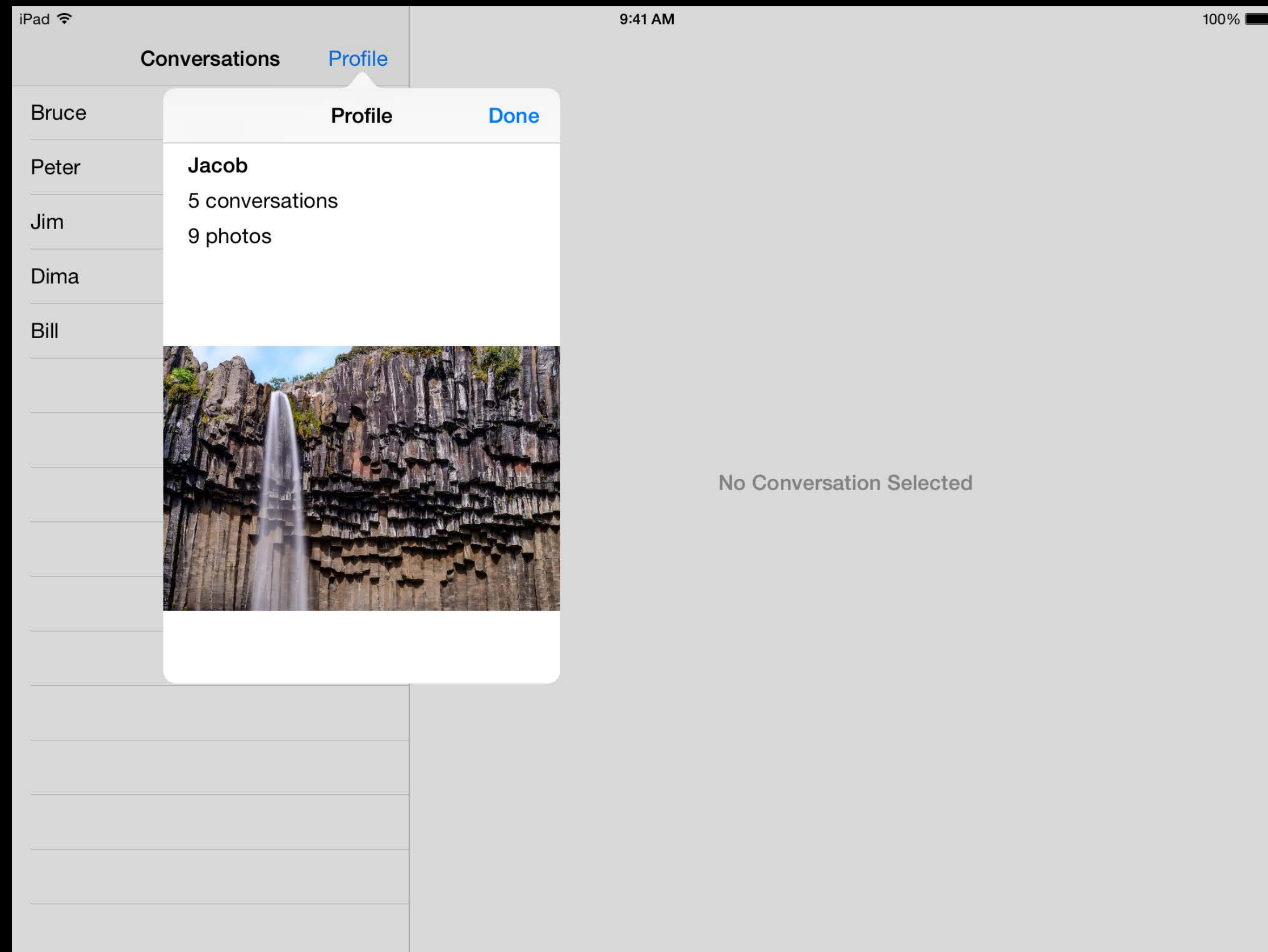
Leaf
Controller

Navigation
Controller



Split View
Controller

Adaptive Presentation



Demo

Interface Builder

Tony Ricciardi

Interface Builder Engineer

Interface Builder

Interface Builder

Use same Storyboard/XIB for iPhone and iPad

Interface Builder

Use same Storyboard/XIB for iPhone and iPad

Deploy backwards to iOS 6 and 7

Interface Builder

Use same Storyboard/XIB for iPhone and iPad

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Preview devices, orientations and OS versions

Interface Builder

Use same Storyboard/XIB for iPhone and iPad

Deploy backwards to iOS 6 and 7

Preview devices, orientations and OS versions

Requires Xcode 6 and Auto Layout

Demo

Interface Builder

Interface Builder

Use Auto Layout to design a flexible UI

Interface Builder

Use Auto Layout to design a flexible UI

Override subviews and constraints for specific size classes if needed

Interface Builder

Use Auto Layout to design a flexible UI

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Preview devices, orientations and iOS versions

Summary

Summary

Size Classes

Trait Collections

Summary

Size Classes

Trait Collections

View Controllers

Summary

Size Classes

Trait Collections

View Controllers

Interface Builder

More Information

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Apple Developer Forums

<http://devforums.apple.com>

Related Sessions

-
- View Controller Advancements in iOS 8 Mission Wednesday 9:00AM

 - What's New in Interface Builder Mission Wednesday 3:15PM

 - Core iOS Application Architectural Patterns Mission Thursday 9:00AM

 - A Look Inside Presentation Controllers Mission Thursday 11:30AM

Labs

-
- View Controllers and Adaptivity Lab Frameworks Lab A Wednesday 2:00PM
 - Xcode and Interface Builder Lab Tools Lab C Thursday 9:00AM
 - Cocoa Touch Lab Frameworks Lab A Thursday 2:00PM
 - Interface Builder and Auto Layout Lab Tools Lab C Friday 9:00AM
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