

# Accessibility on iOS

## Developing for everyone

Session 210  
Clare Kasemset  
iOS Accessibility

# What You Will Learn

# What You Will Learn

Introduction to accessibility

# What You Will Learn

## Introduction to accessibility

- Accessibility features on iOS

# What You Will Learn

## Introduction to accessibility

- Accessibility features on iOS
- What's new

# What You Will Learn

Introduction to accessibility

- Accessibility features on iOS
- What's new

Accessibility tutorial

# What You Will Learn

## Introduction to accessibility

- Accessibility features on iOS
- What's new

## Accessibility tutorial

- Visual accommodations

# What You Will Learn

## Introduction to accessibility

- Accessibility features on iOS
- What's new

## Accessibility tutorial

- Visual accommodations
- Semantic accessibility

# Introduction to Accessibility

# What Is Accessibility?



# What Is Accessibility?

# What Is Accessibility?



# What Is Accessibility?



# What Is Accessibility?



# What Is Accessibility?





# Physical and Motor Switch Control



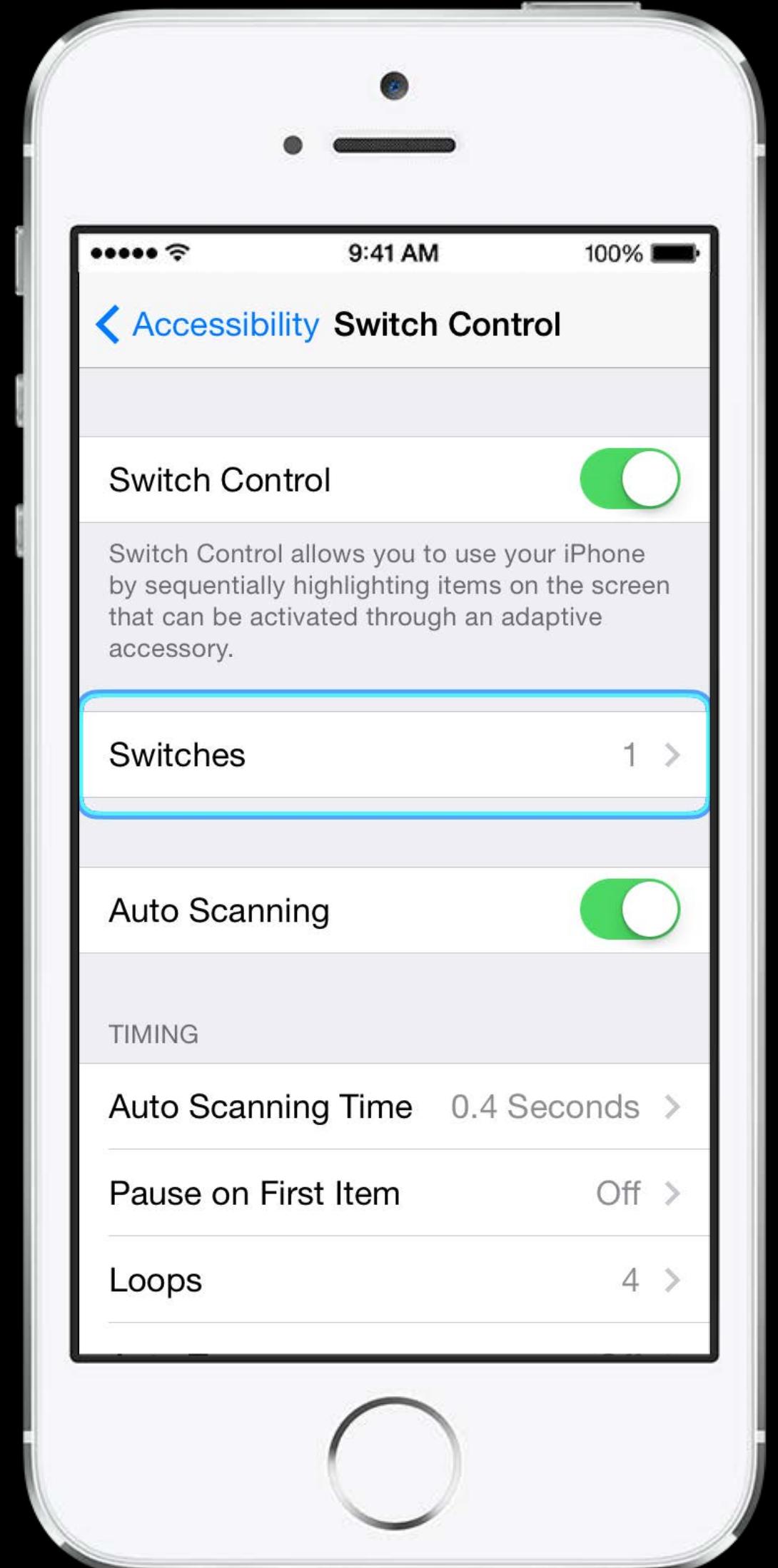
# Physical and Motor Switch Control



# Physical and Motor Switch Control



# Physical and Motor Switch Control



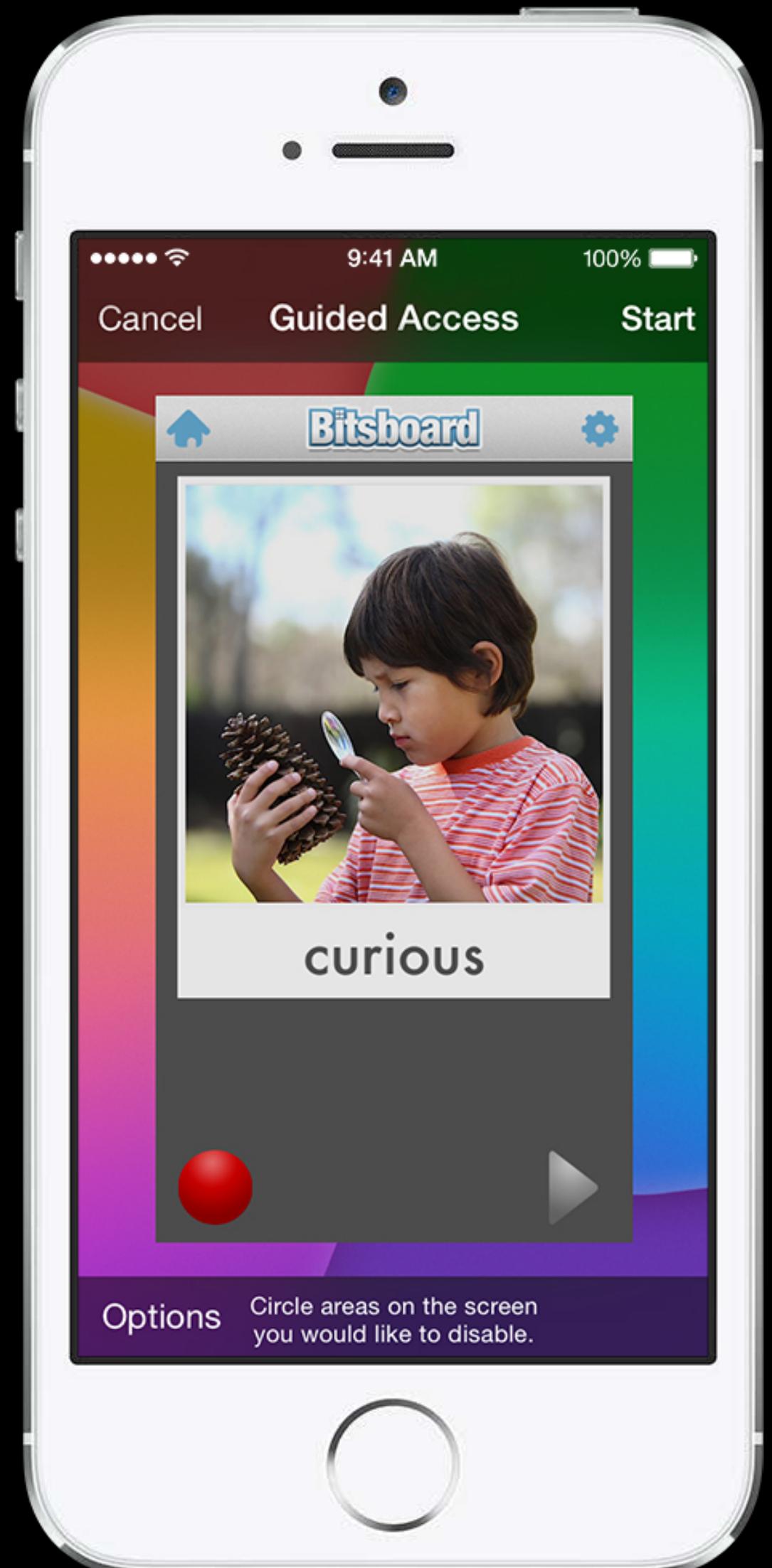
# Physical and Motor Switch Control





Deutsch Russisch  
Deutsch Russisch  
Deutsch Russisch  
Deutsch Russisch  
Deutsch Russisch  
Deutsch Russisch

# Learning Guided Access



# Learning Guided Access





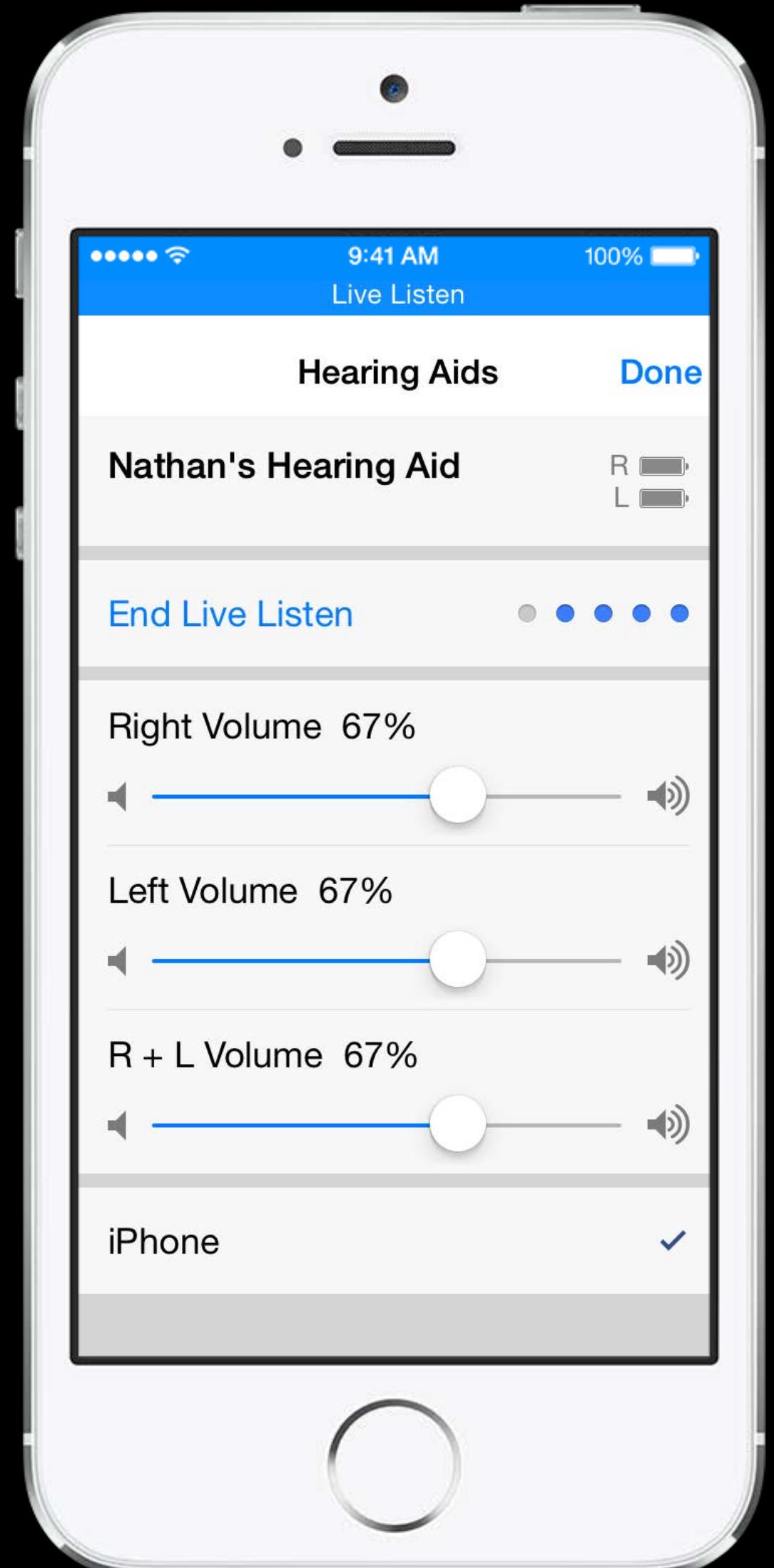
# Hearing

## Made for iPhone Hearing Aids



# Hearing

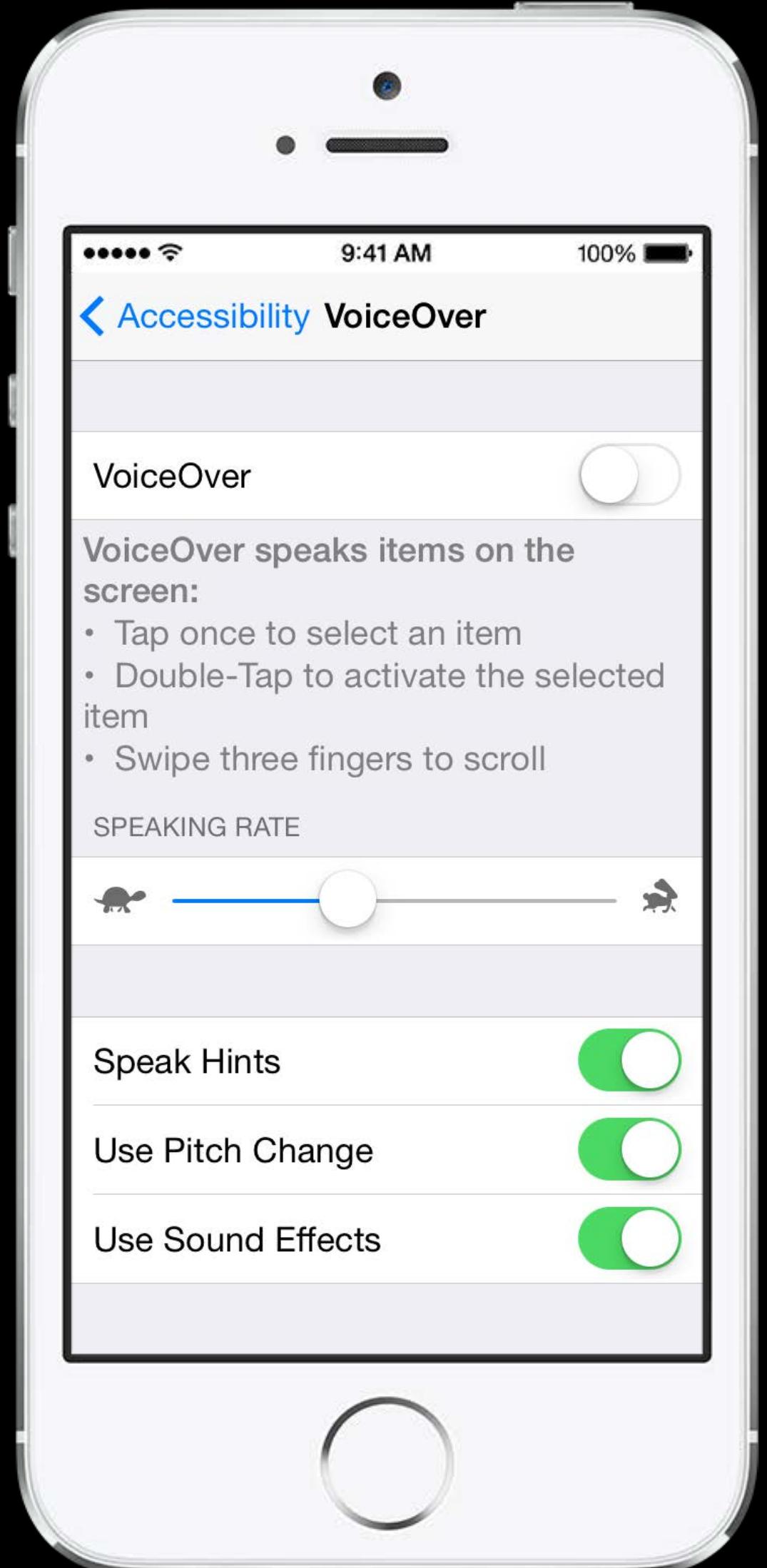
## Made for iPhone Hearing Aids





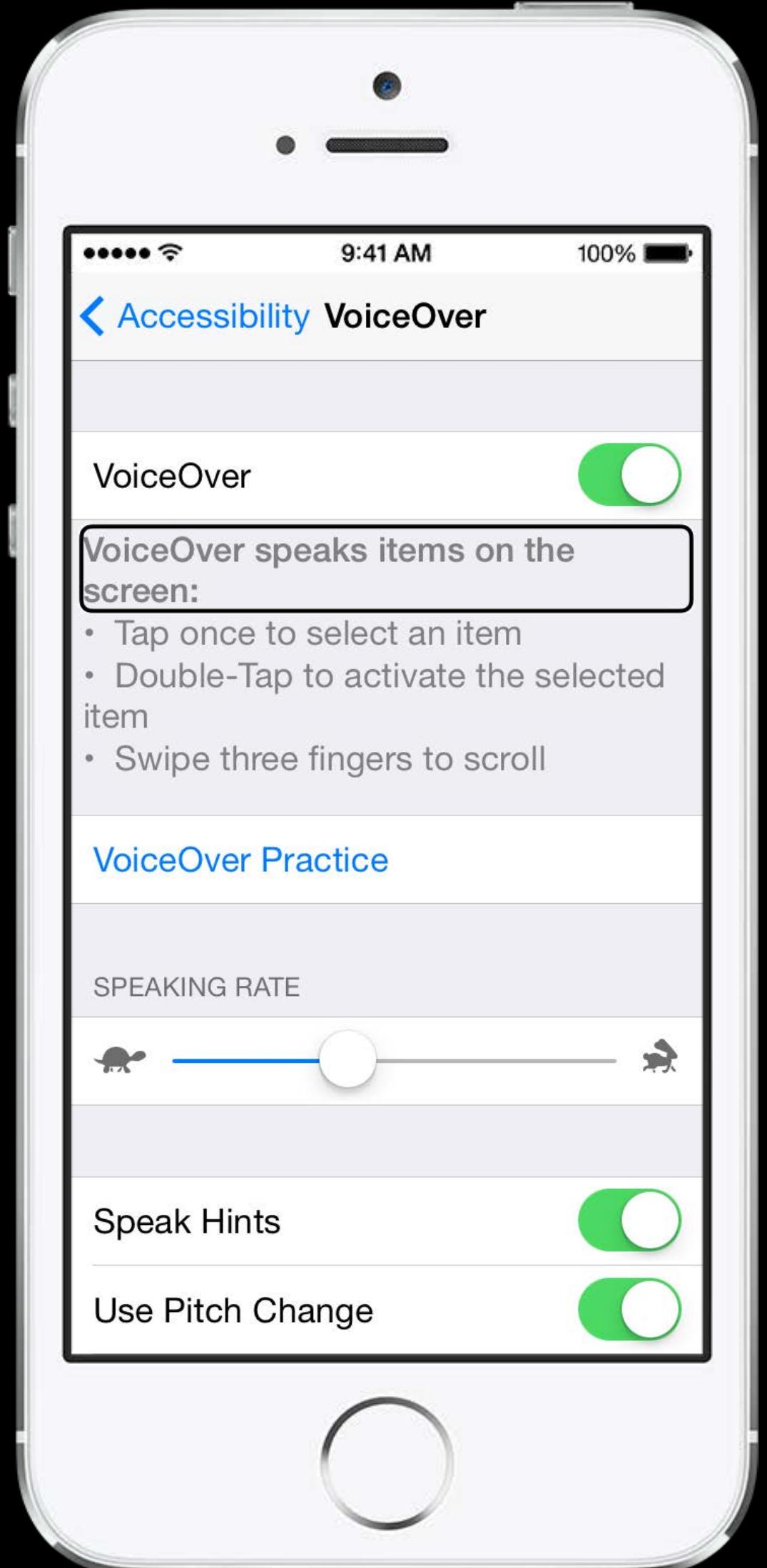
# Vision

## VoiceOver



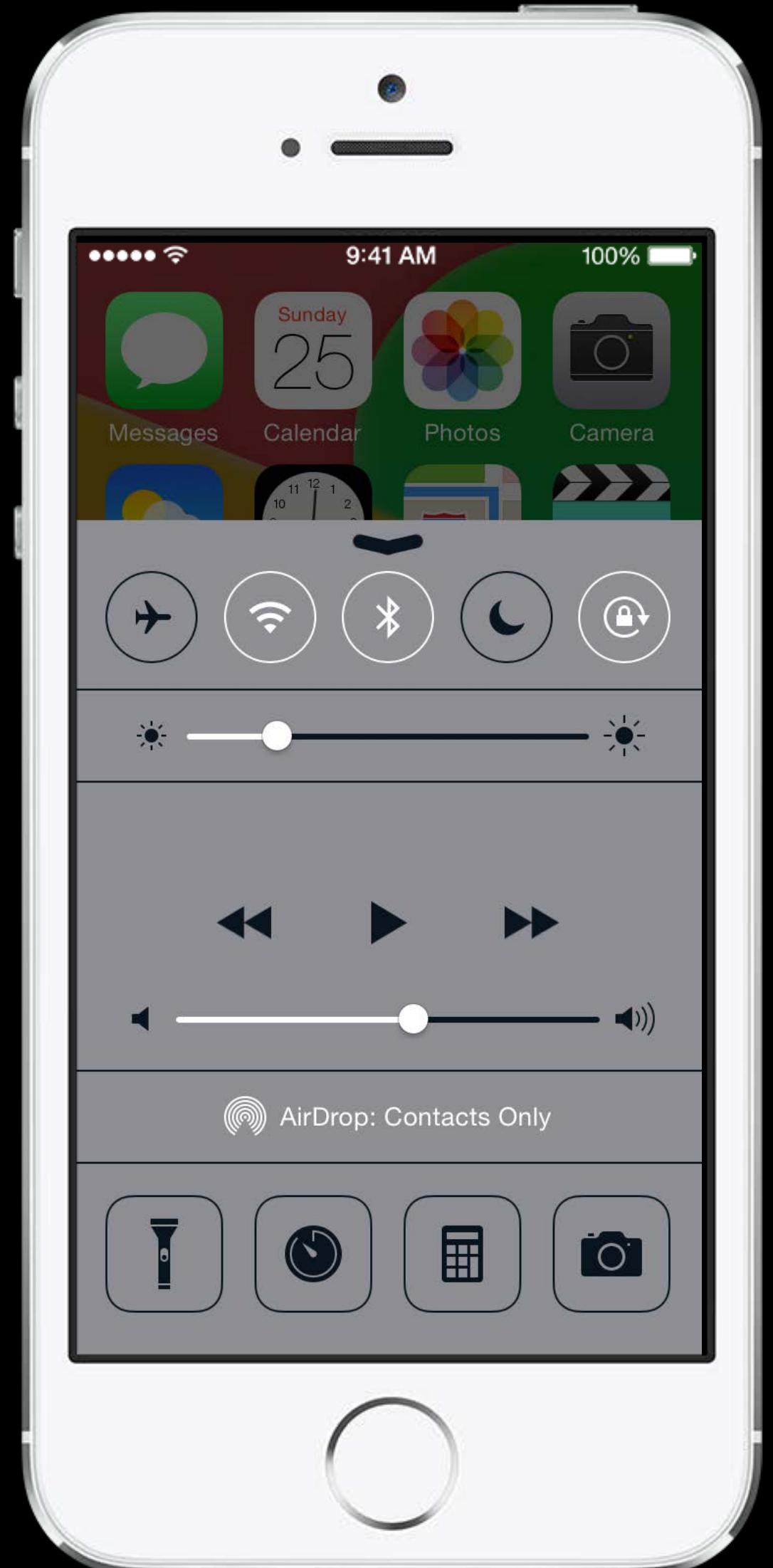
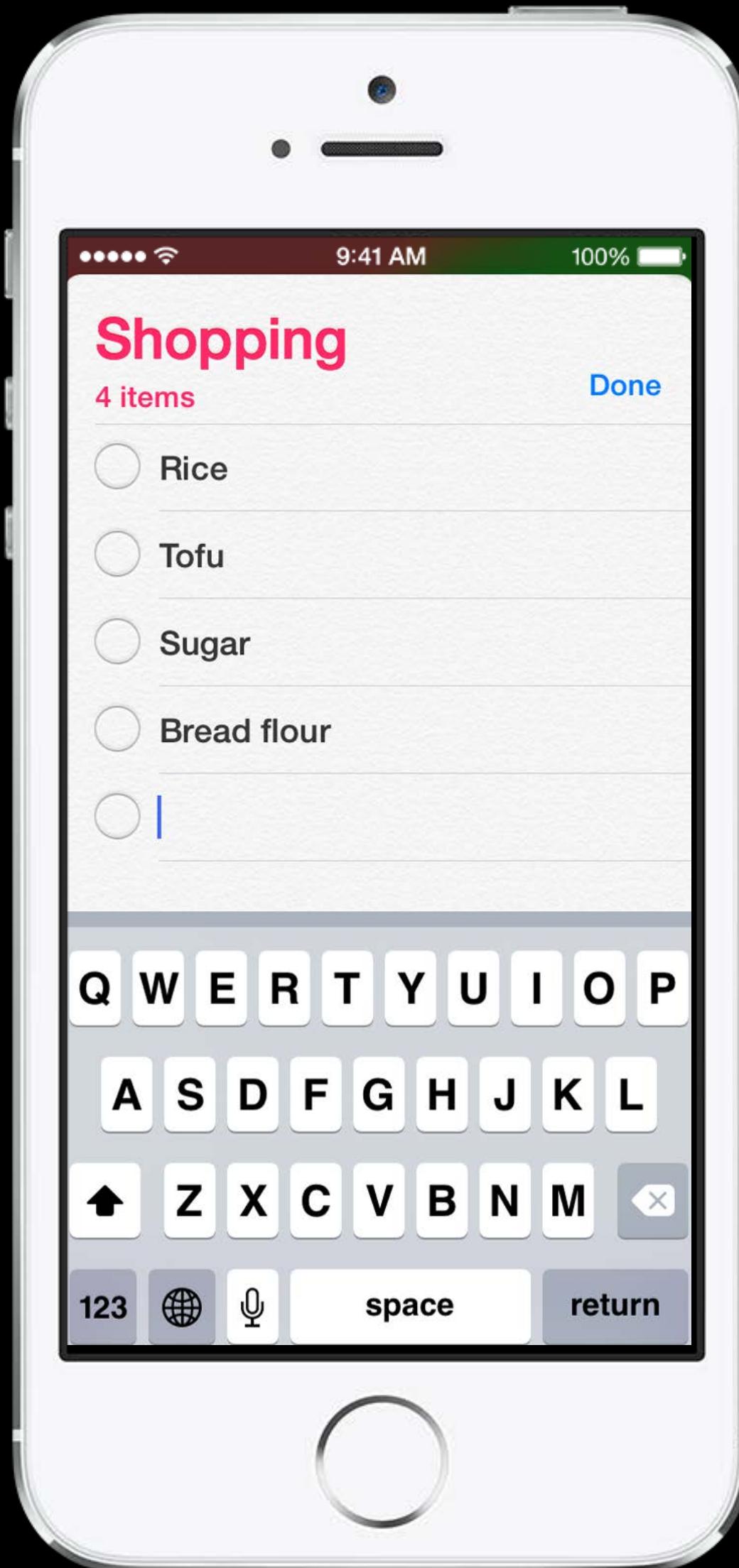
# Vision

## VoiceOver



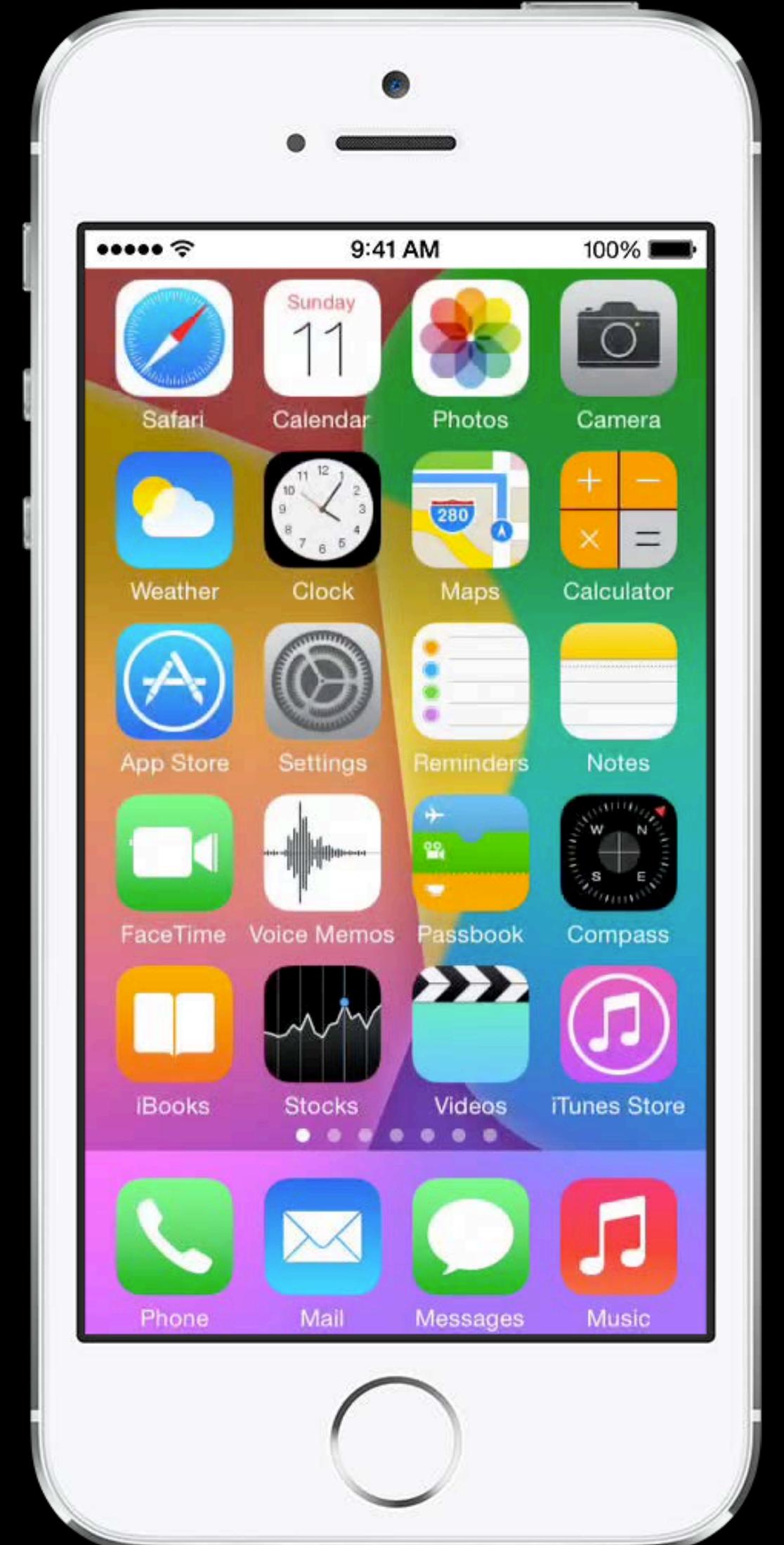
# Vision

## Low vision accommodations



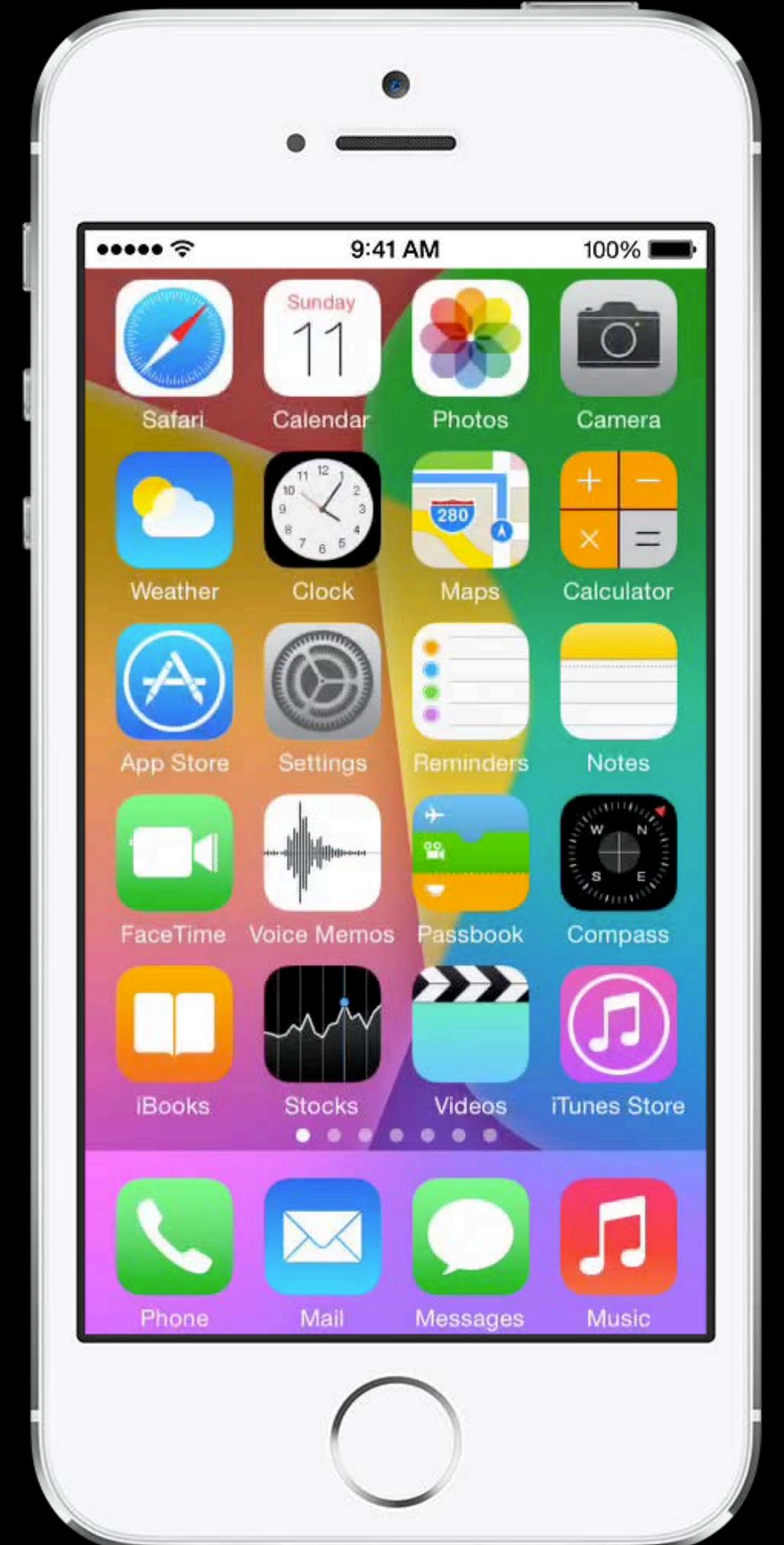
# Vision

## Reduce Motion



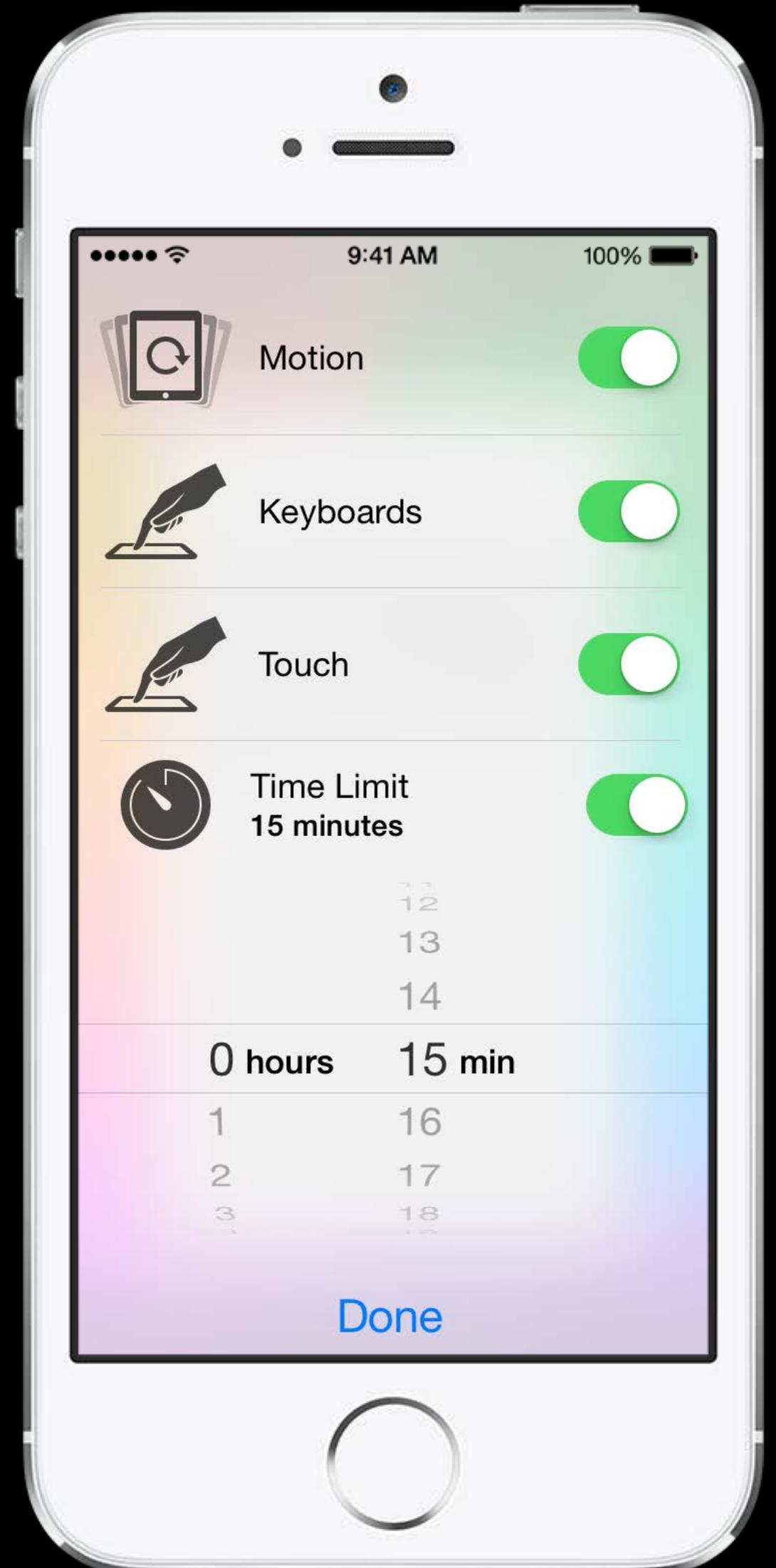
# Vision

## Reduce Motion



# New Accessibility Features in iOS 8

# Guided Access Time Limits



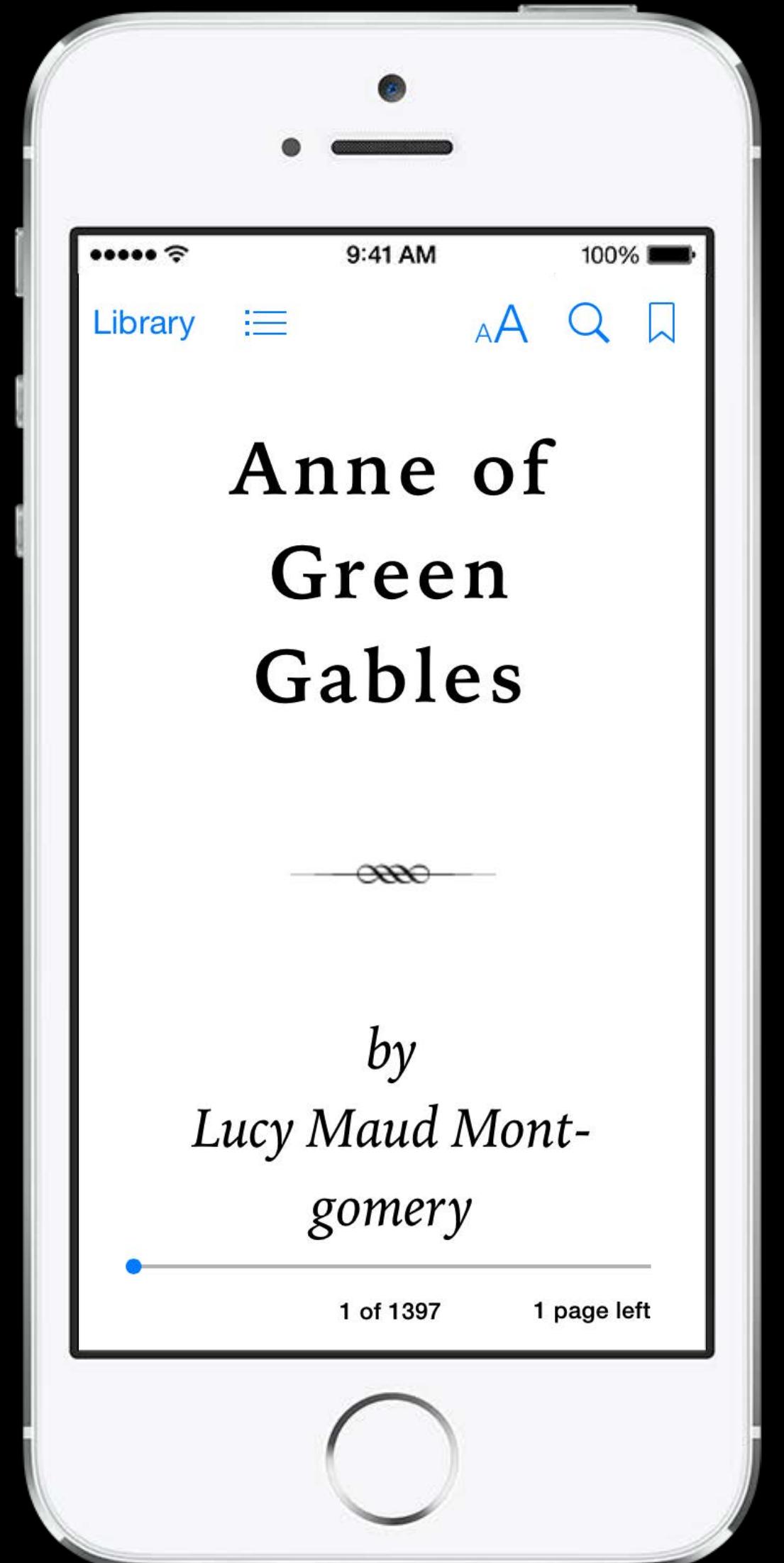
# Alex



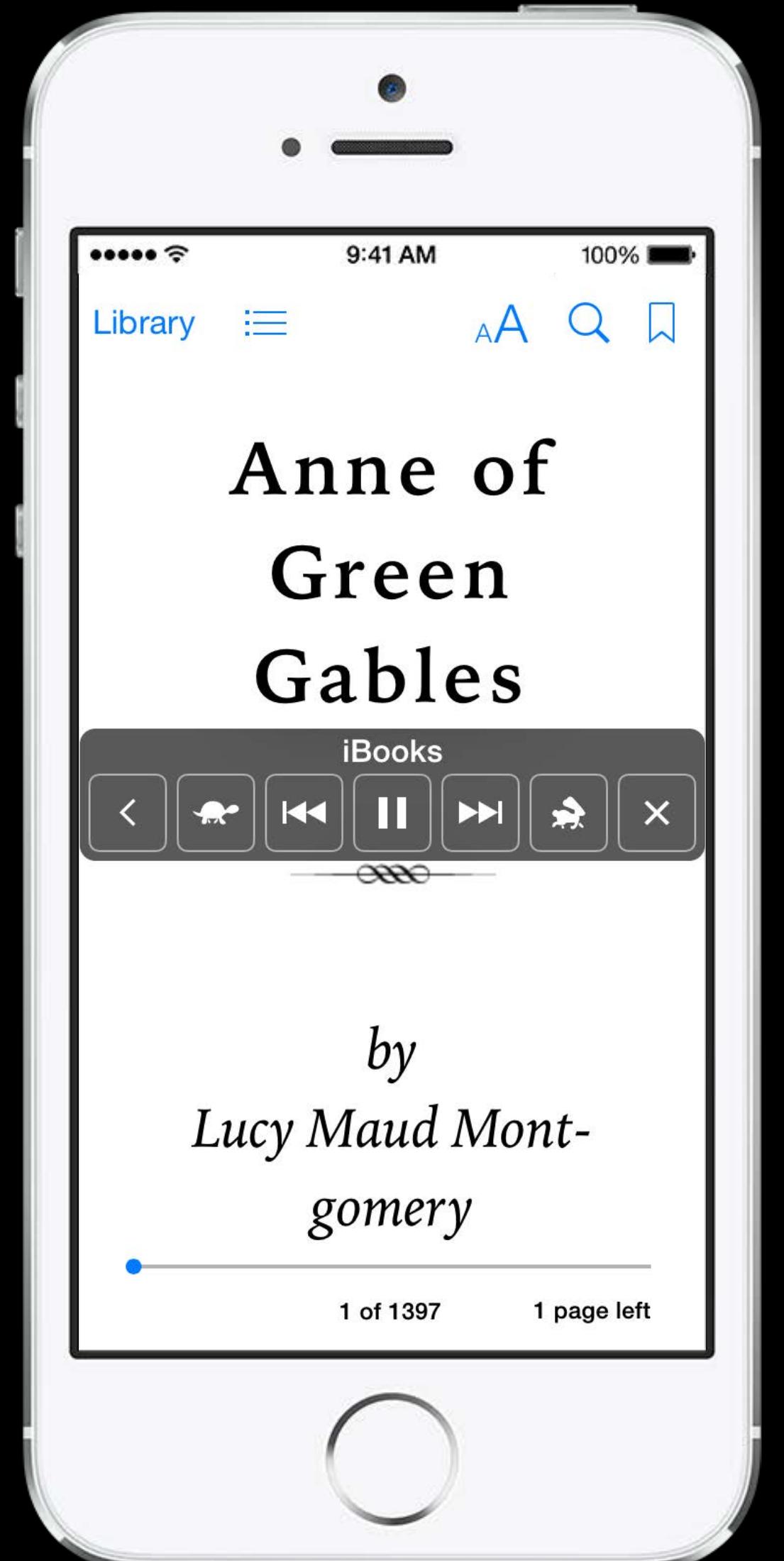
# Alex



# Speak Screen

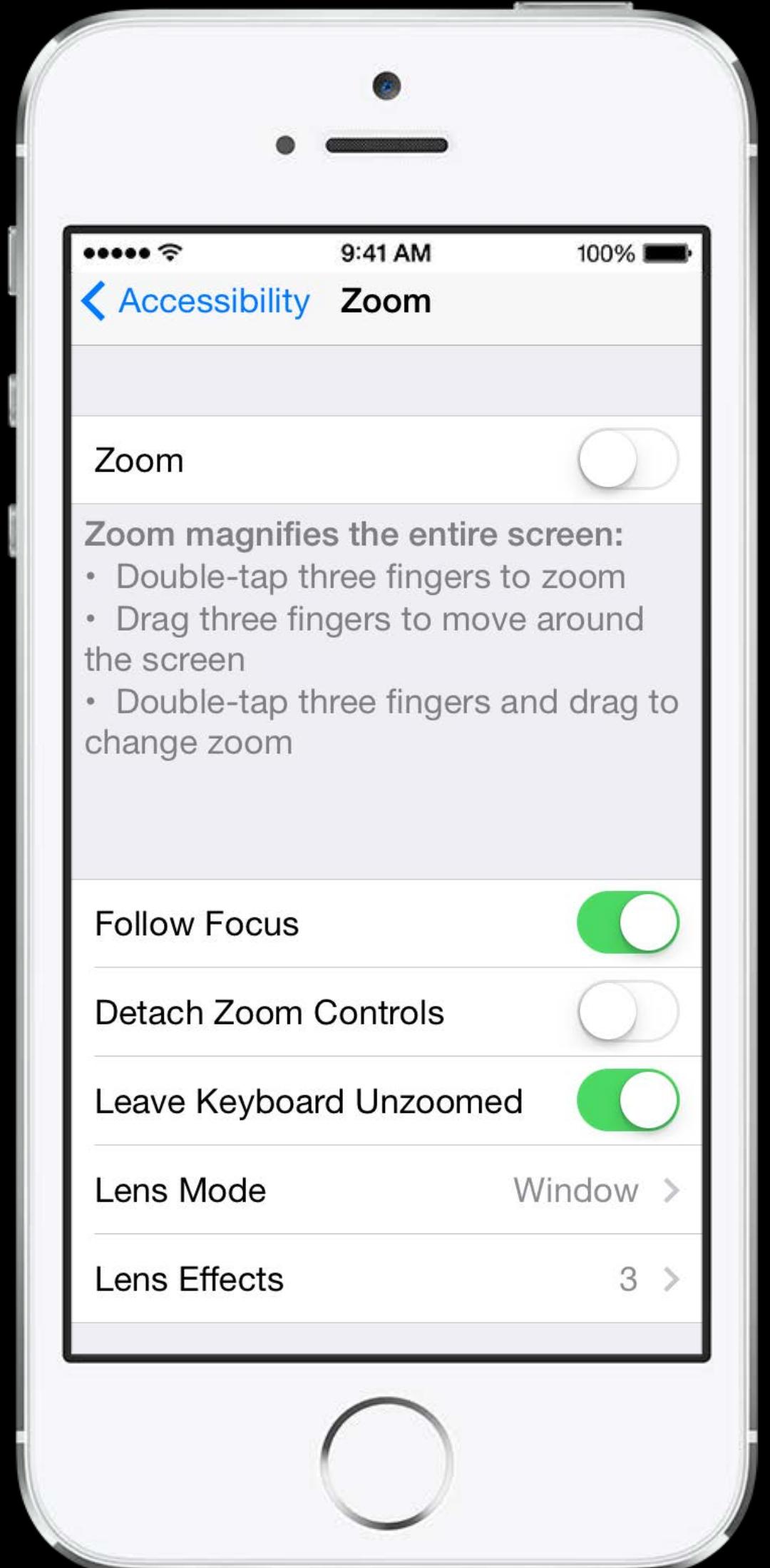


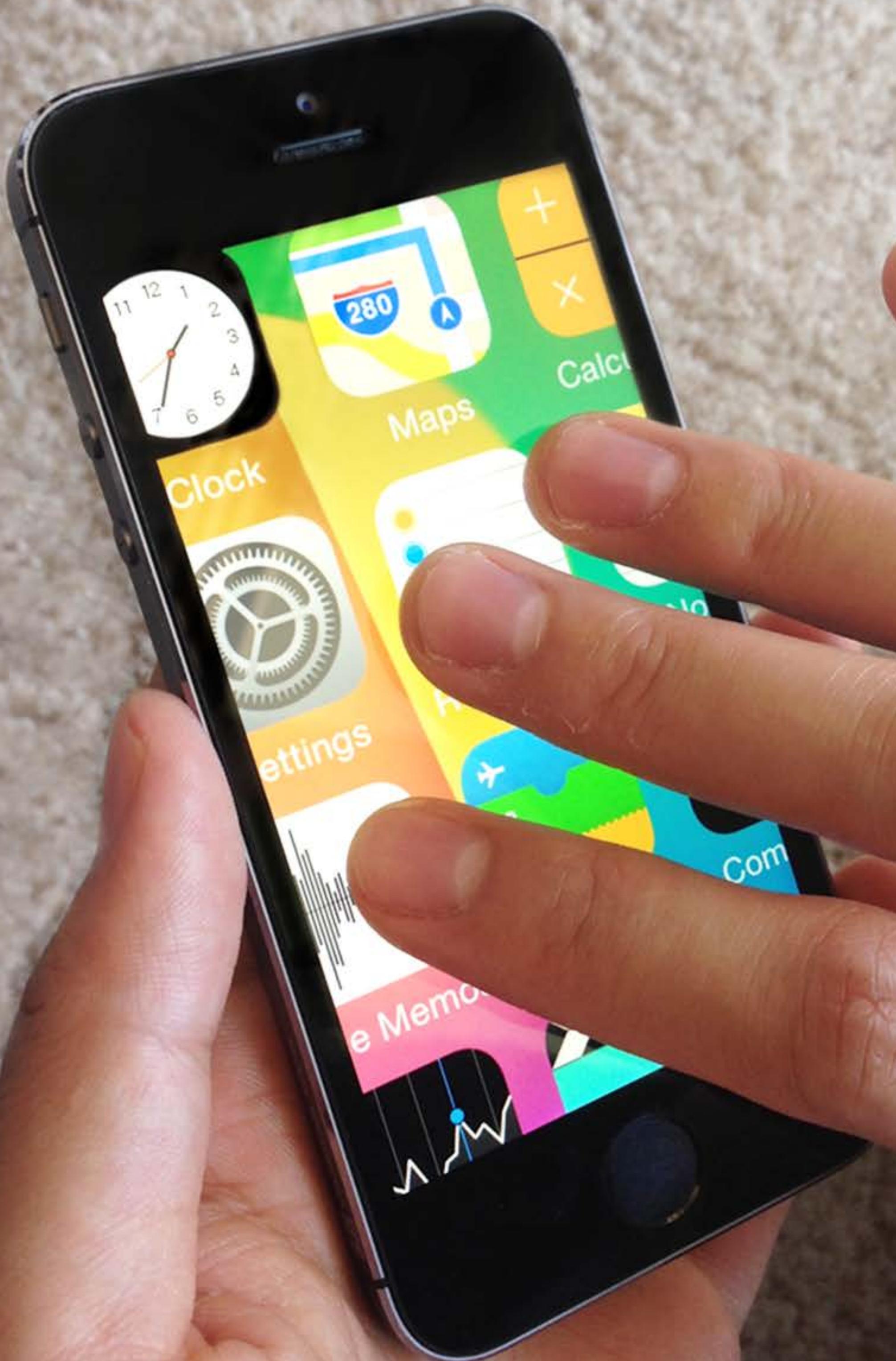
# Speak Screen



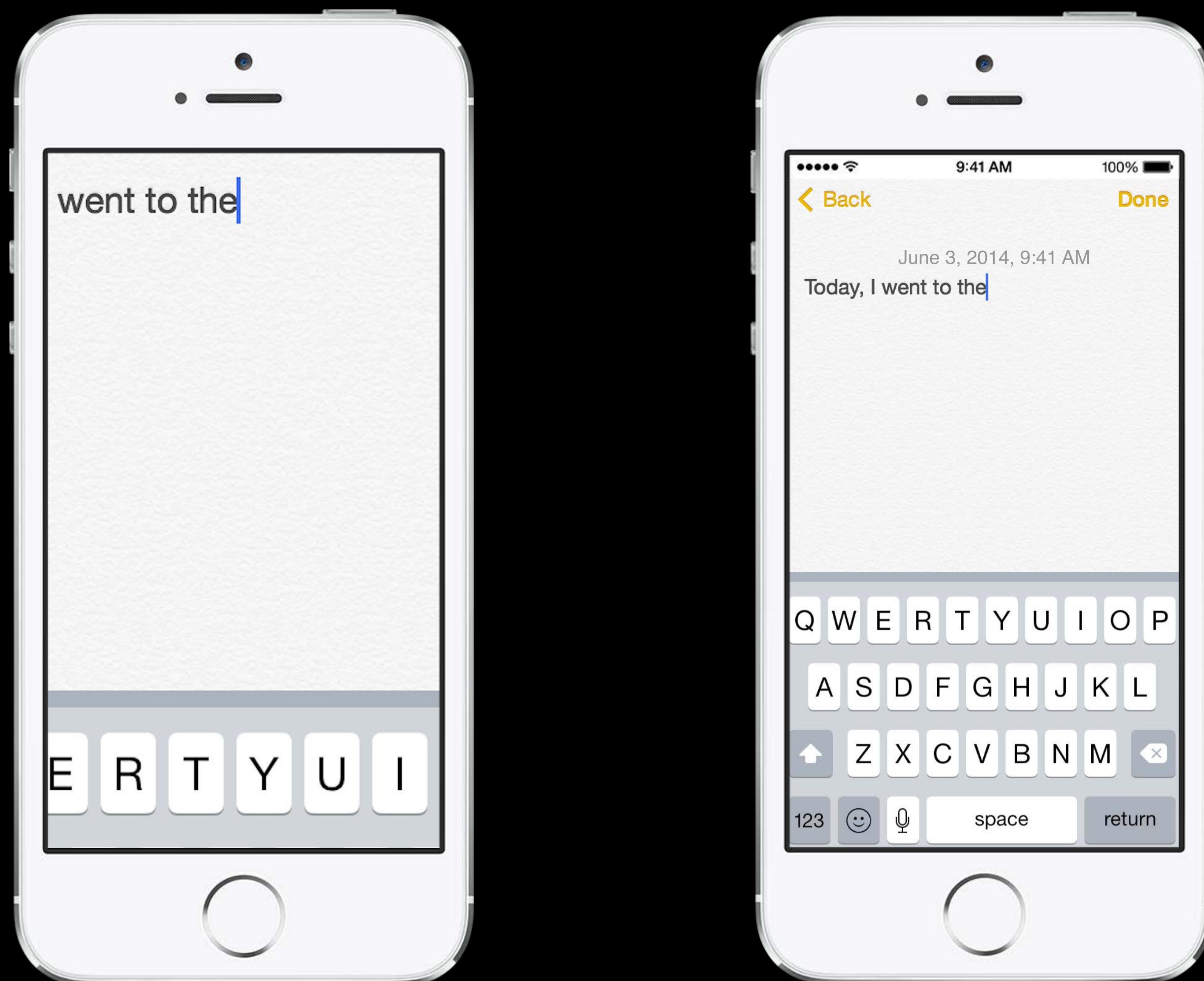
# Zoom

NEW





# Zoom



*Demo*

Zoom

# Accessibility Tutorial

# Accessibility Tutorial

Visual accommodations

Semantic accessibility

# Visual Accommodations API



```
BOOL UIAccessibilityIsBoldTextEnabled();
```

```
BOOL UIAccessibilityIsReduceTransparencyEnabled();
```

```
BOOL UIAccessibilityDarkerSystemColorsEnabled();
```

```
BOOL UIAccessibilityIsReduceMotionEnabled();
```

*Demo*

Visual accommodations

# Semantic Accessibility

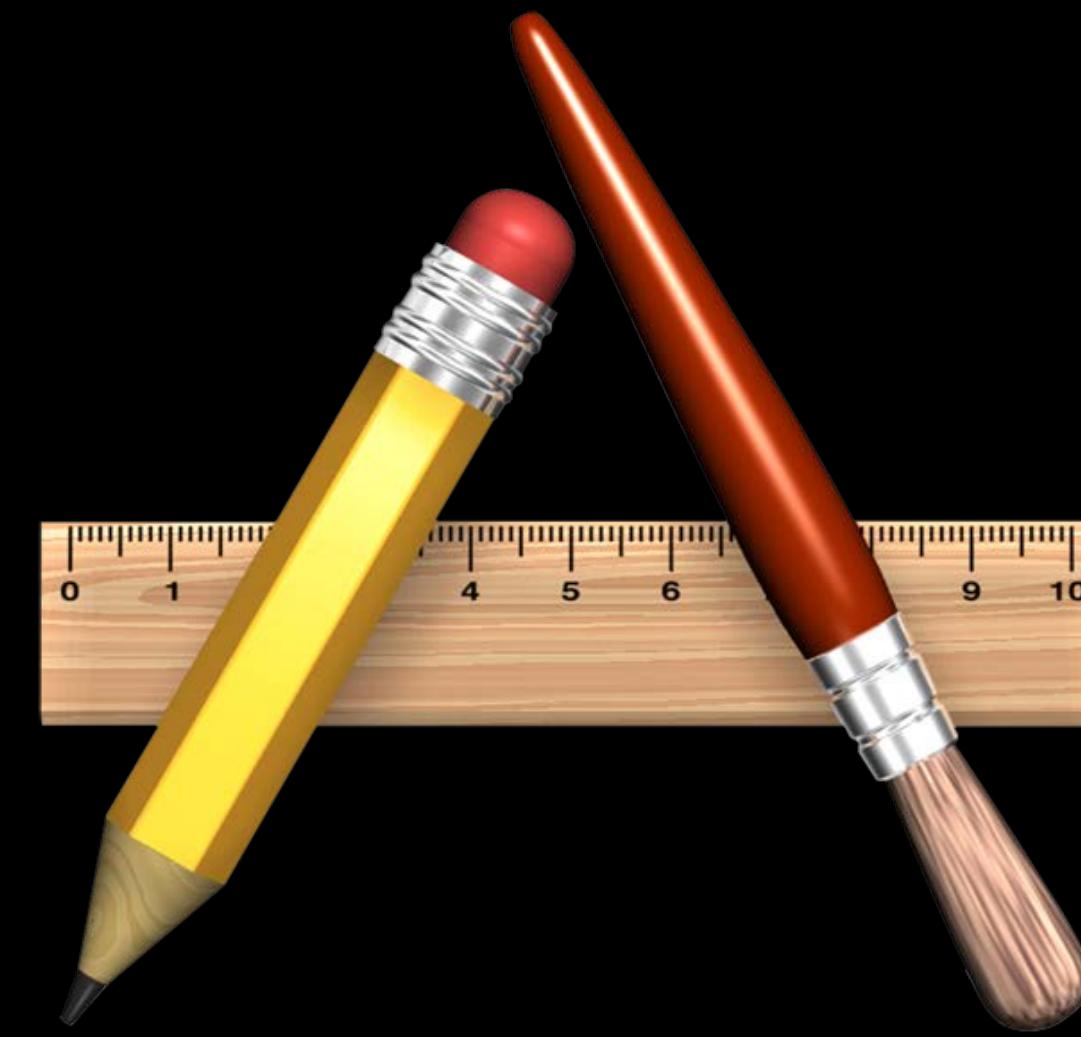
# Semantic Accessibility



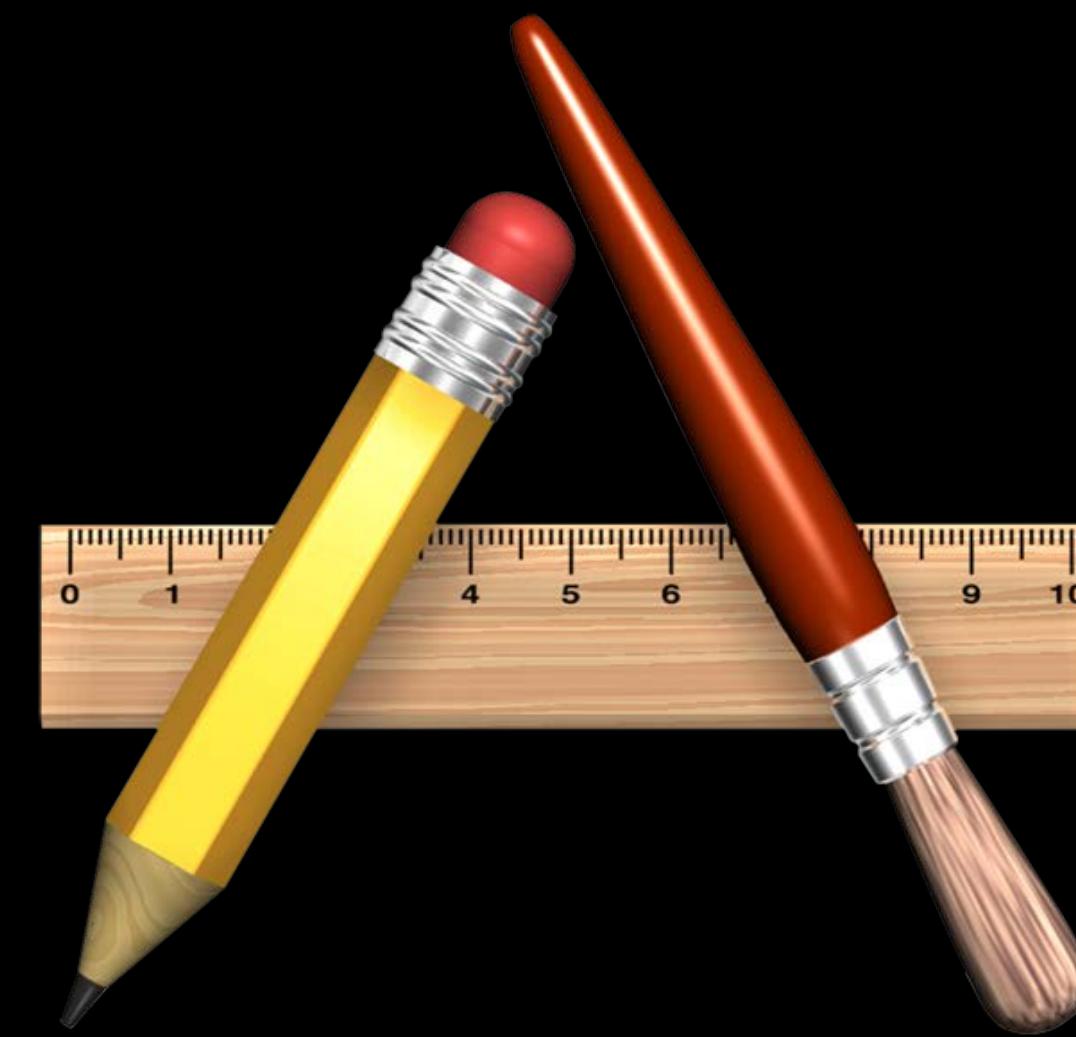
# Semantic Accessibility



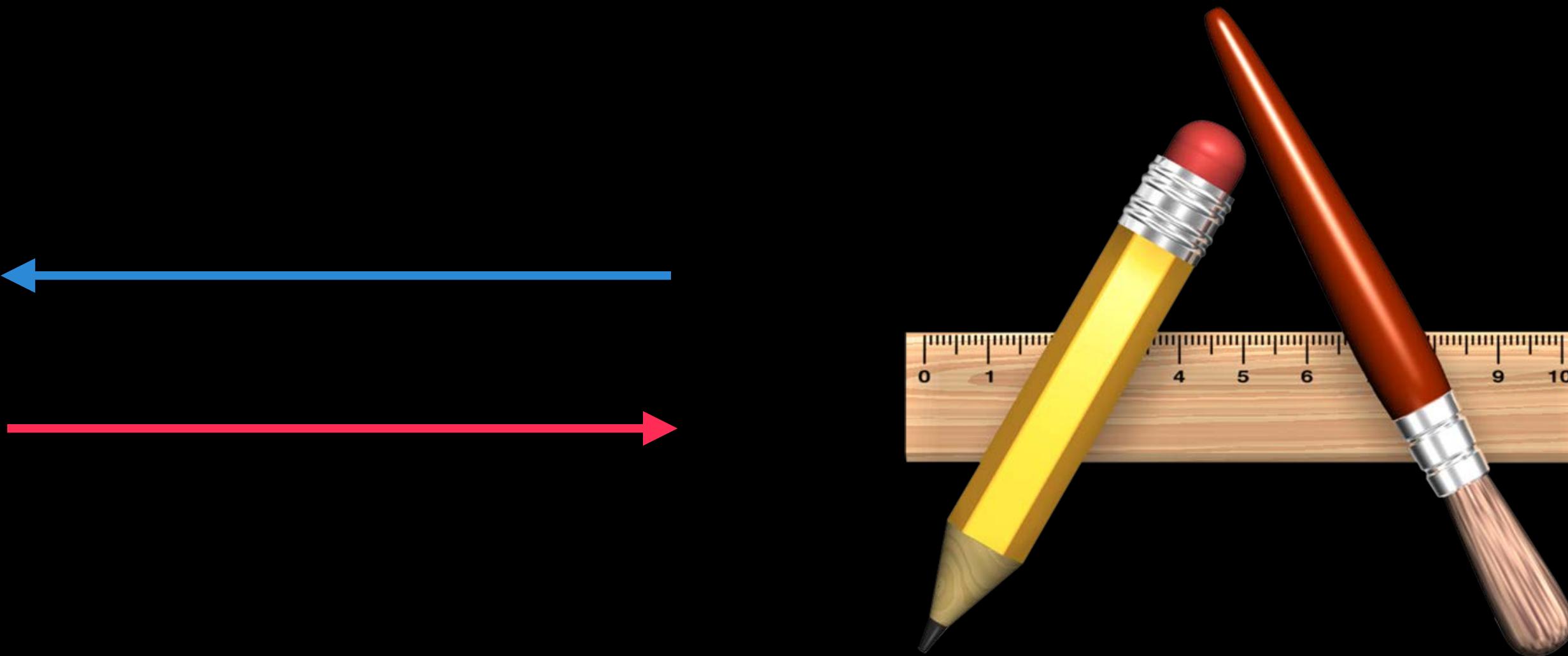
# Semantic Accessibility



# Semantic Accessibility

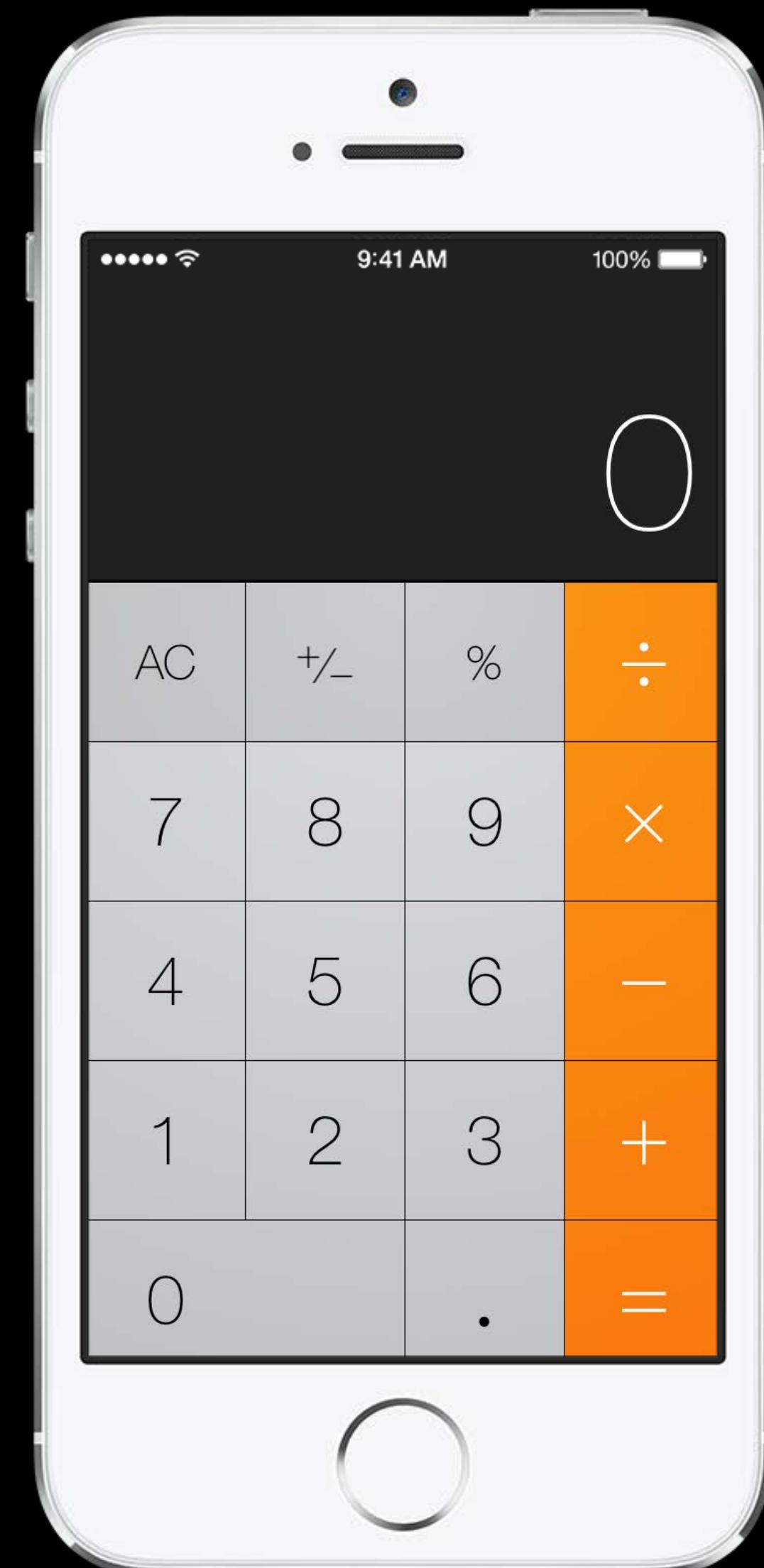


# Semantic Accessibility



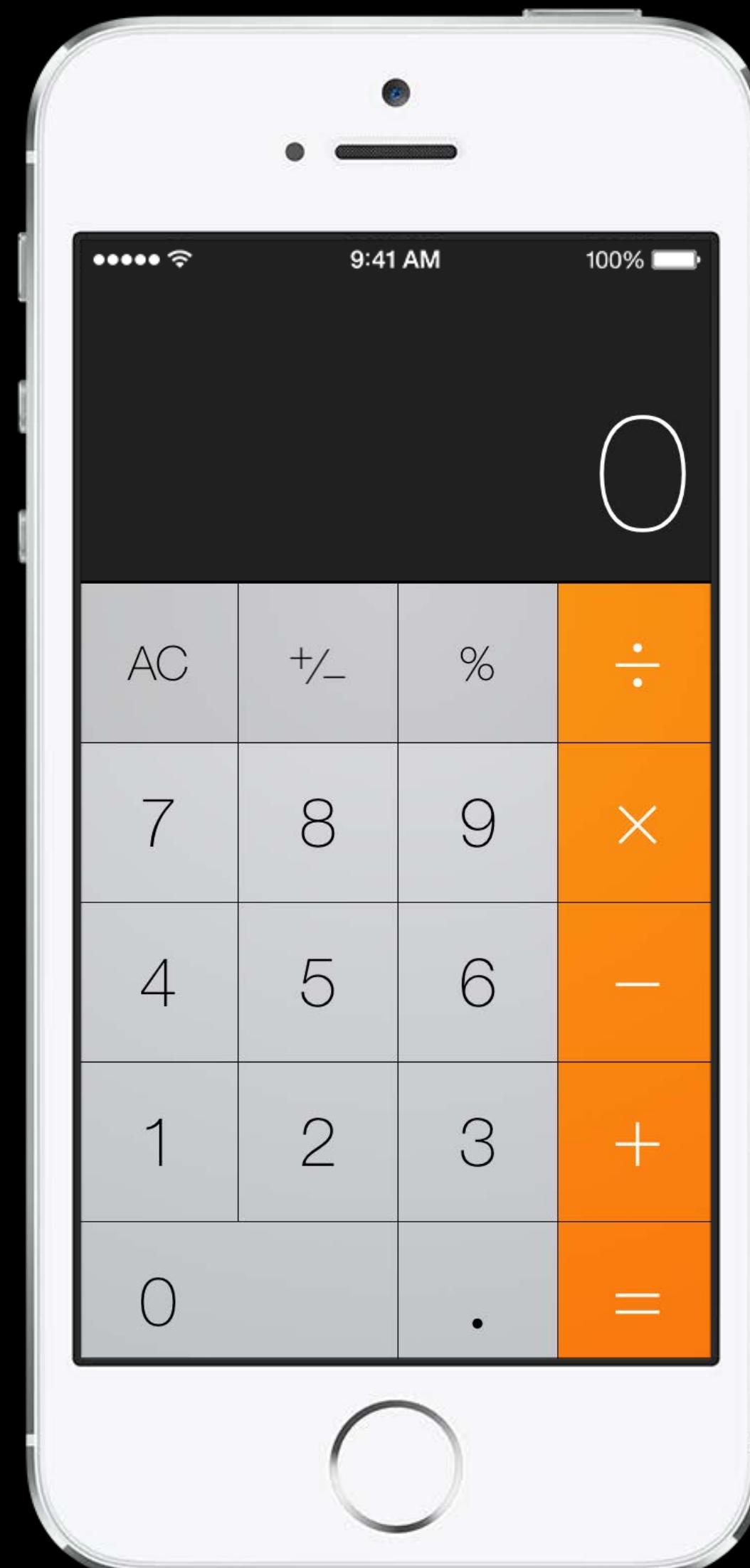
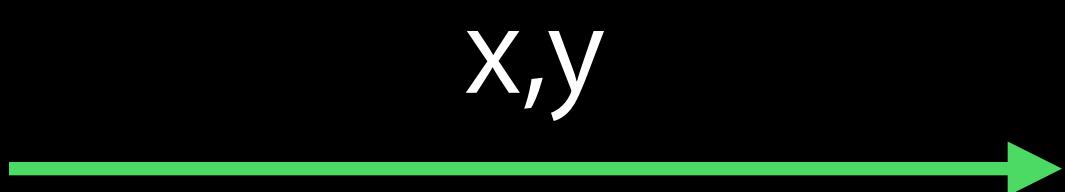
# Semantic Accessibility

Example: VoiceOver



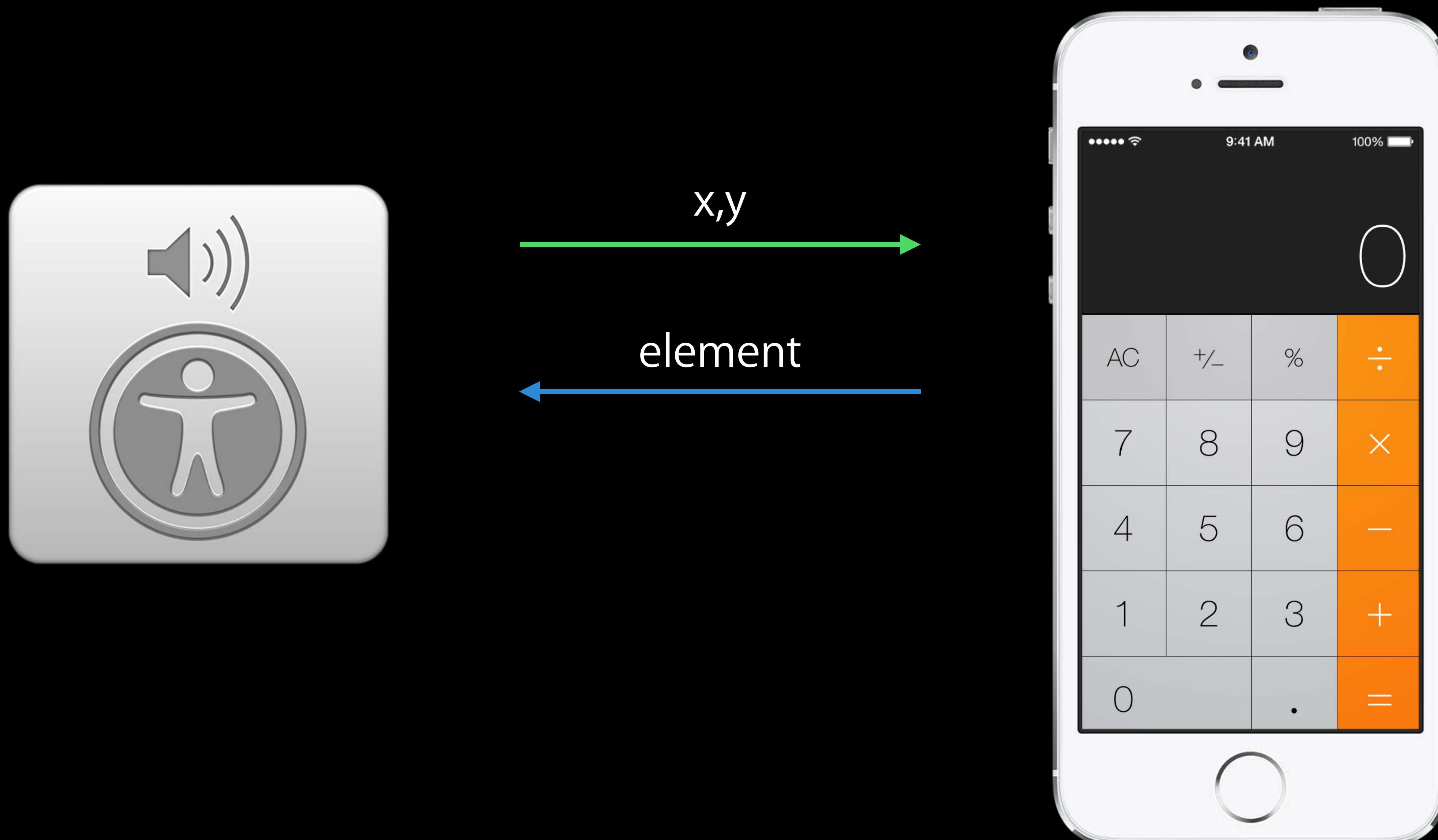
# Semantic Accessibility

Example: VoiceOver



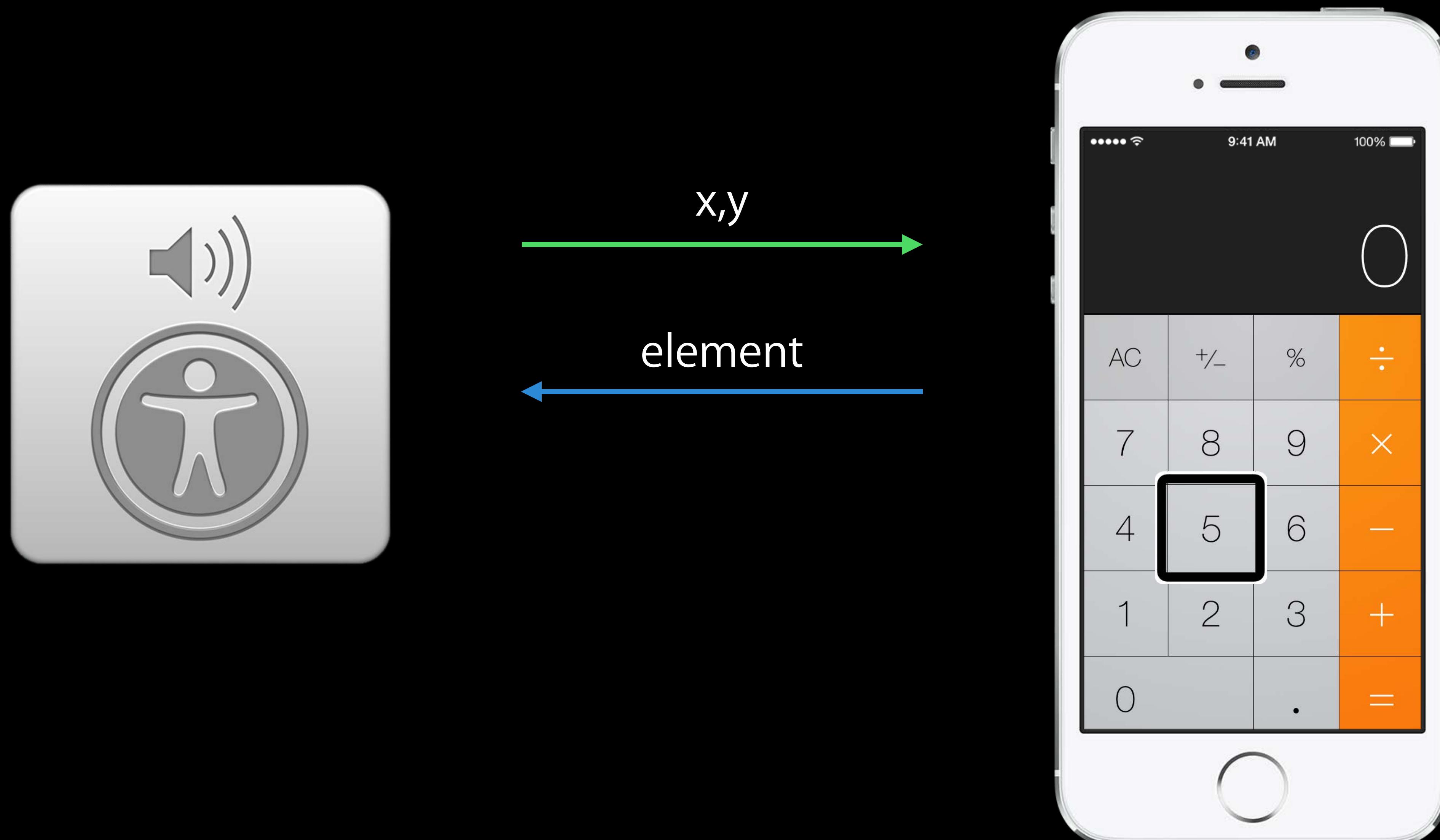
# Semantic Accessibility

Example: VoiceOver



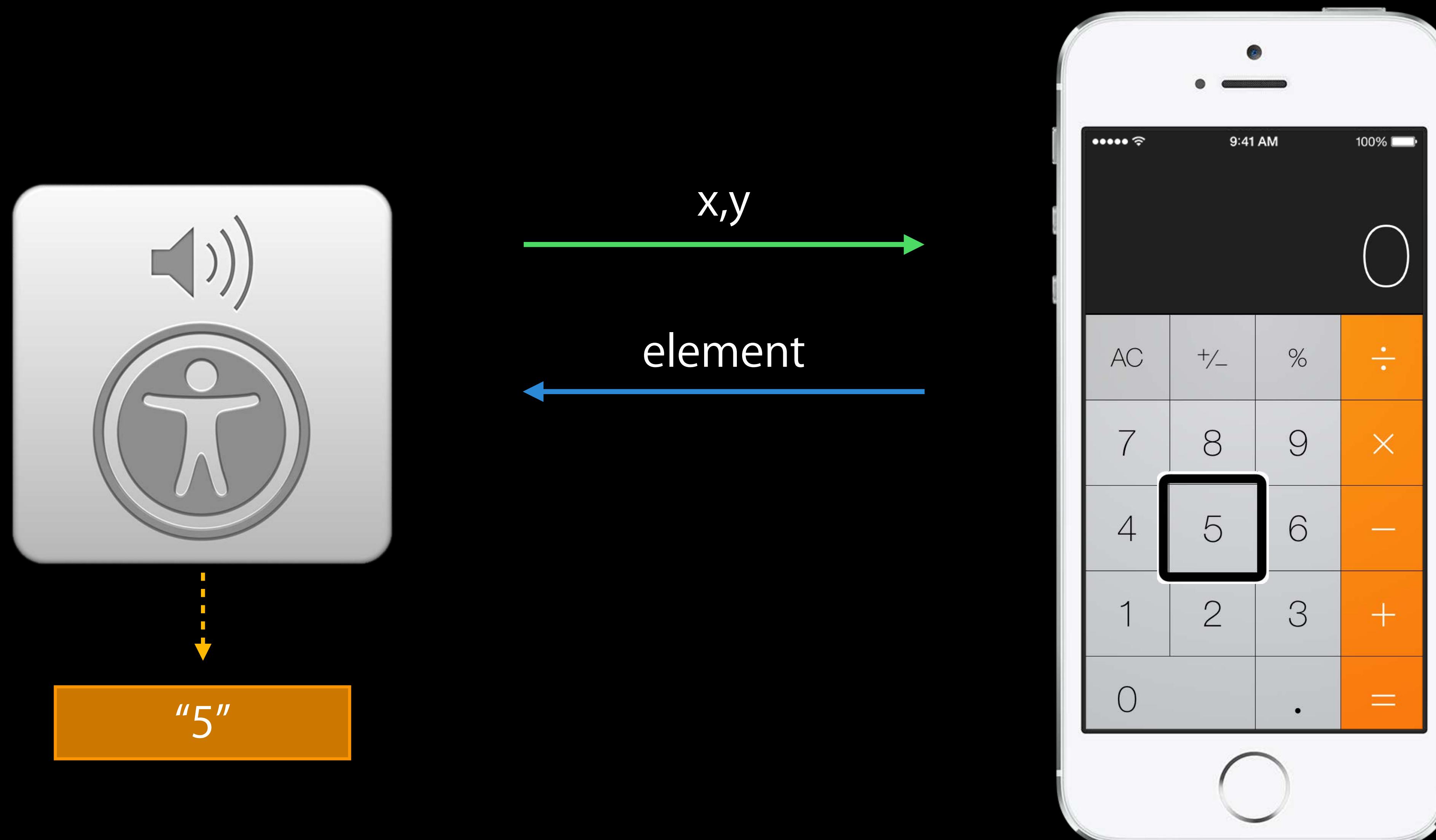
# Semantic Accessibility

Example: VoiceOver



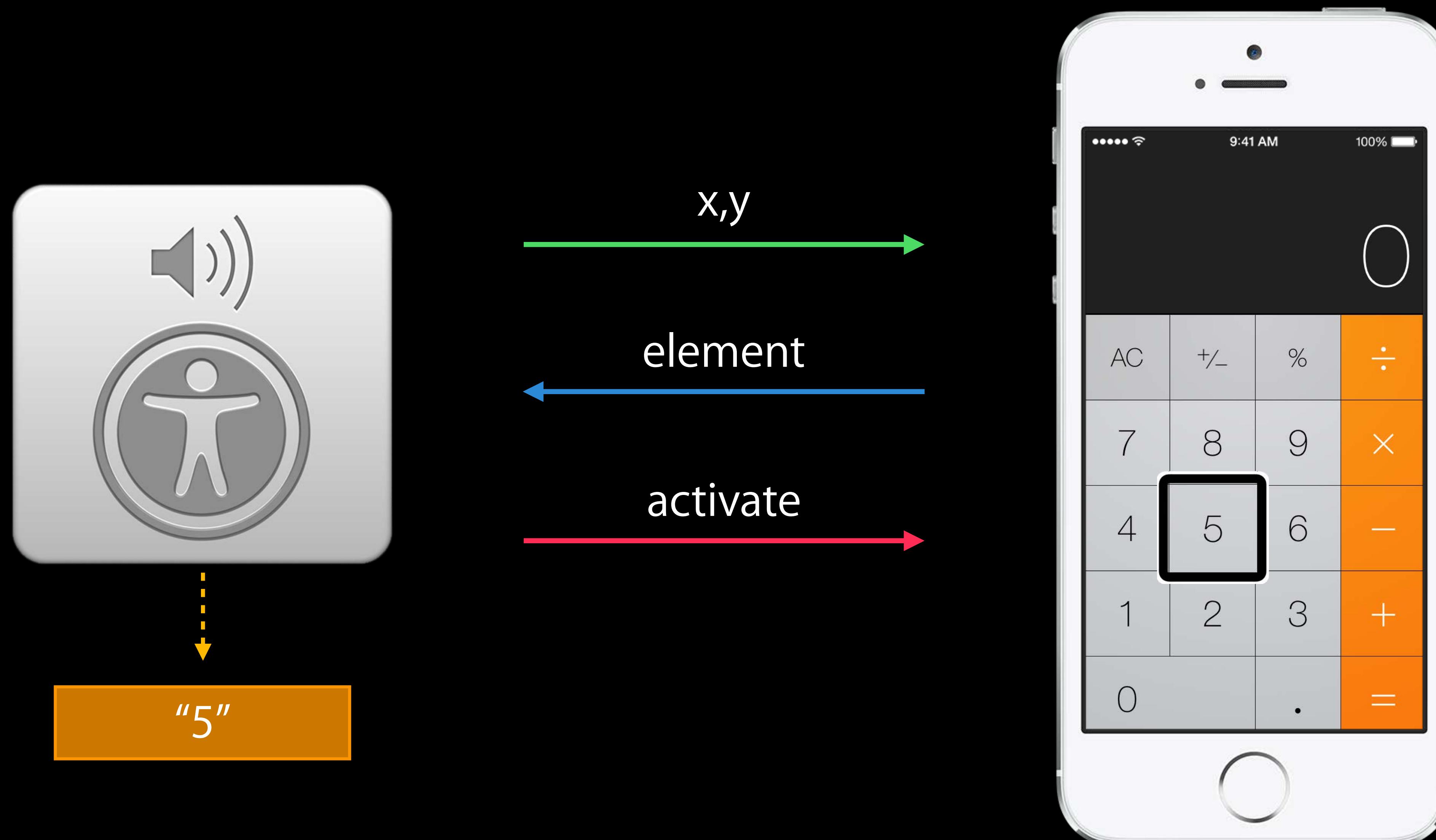
# Semantic Accessibility

Example: VoiceOver



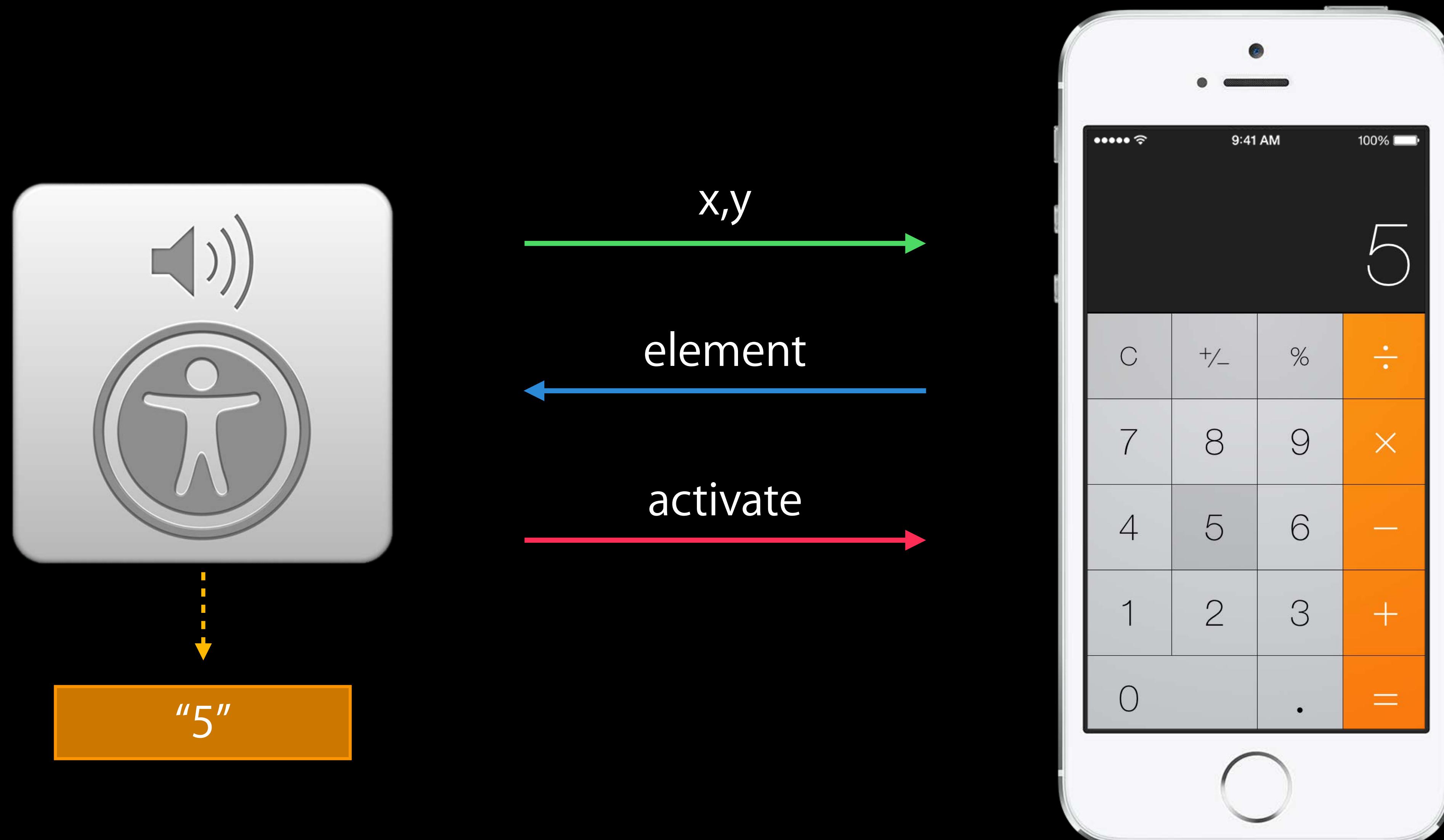
# Semantic Accessibility

Example: VoiceOver



# Semantic Accessibility

Example: VoiceOver



# Semantic Accessibility Audit

# Semantic Accessibility Audit

Most is built into iOS

# Semantic Accessibility Audit

Most is built into iOS

Audit with VoiceOver

# Semantic Accessibility Audit

Most is built into iOS

Audit with VoiceOver

- Can VoiceOver speak everything?

# Semantic Accessibility Audit

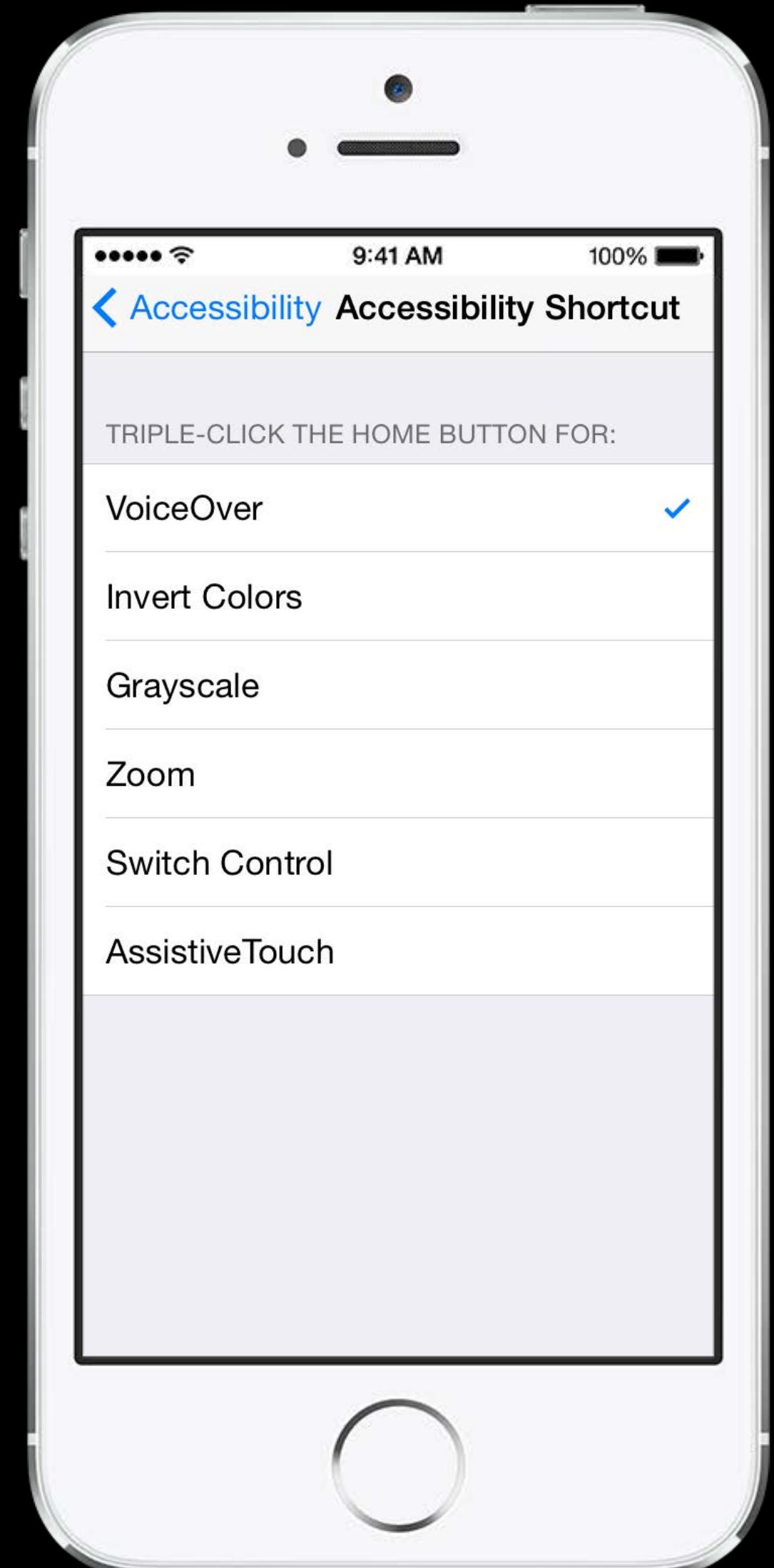
Most is built into iOS

Audit with VoiceOver

- Can VoiceOver speak everything?
- Can VoiceOver do everything?

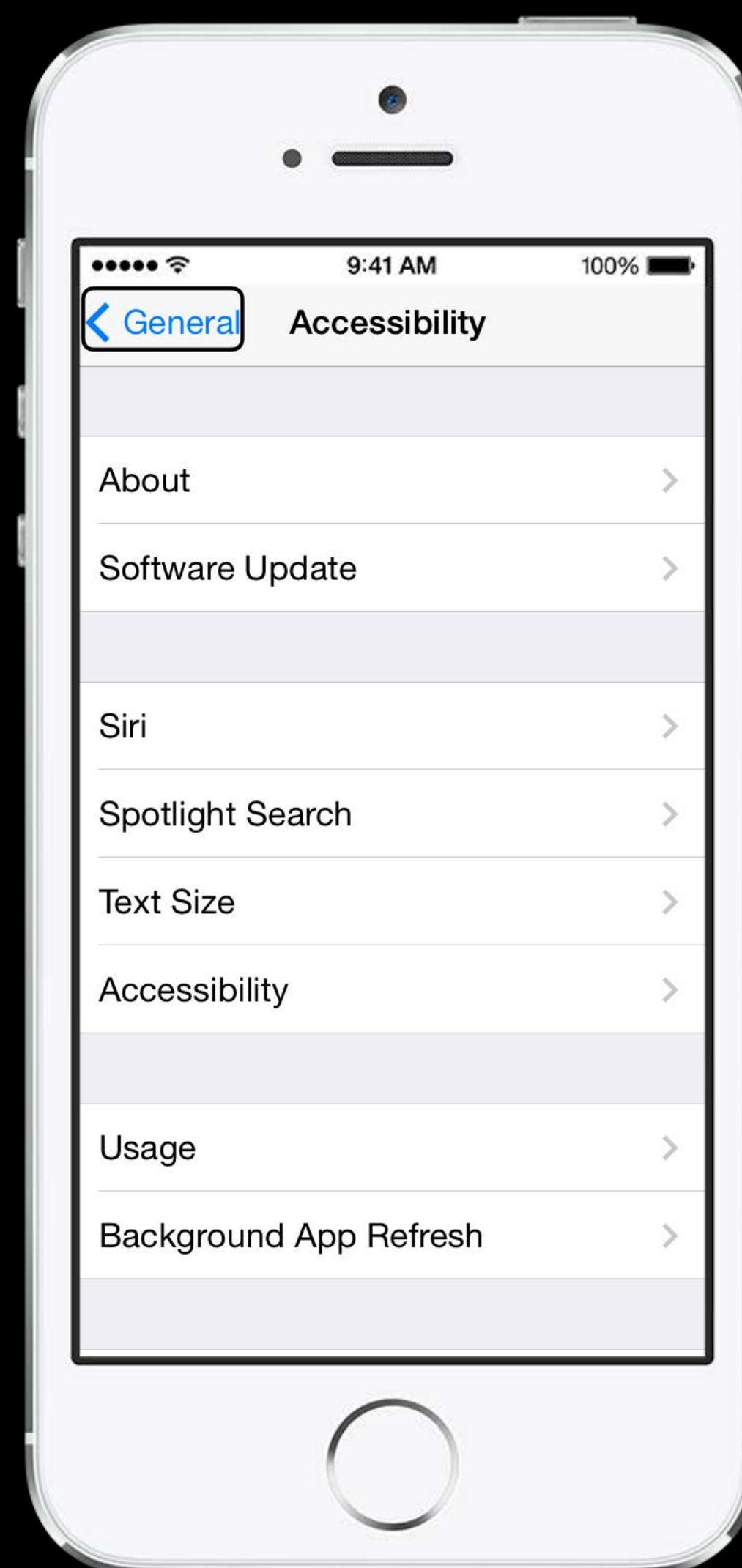
# Semantic Accessibility Audit

## Setup



# Semantic Accessibility Audit

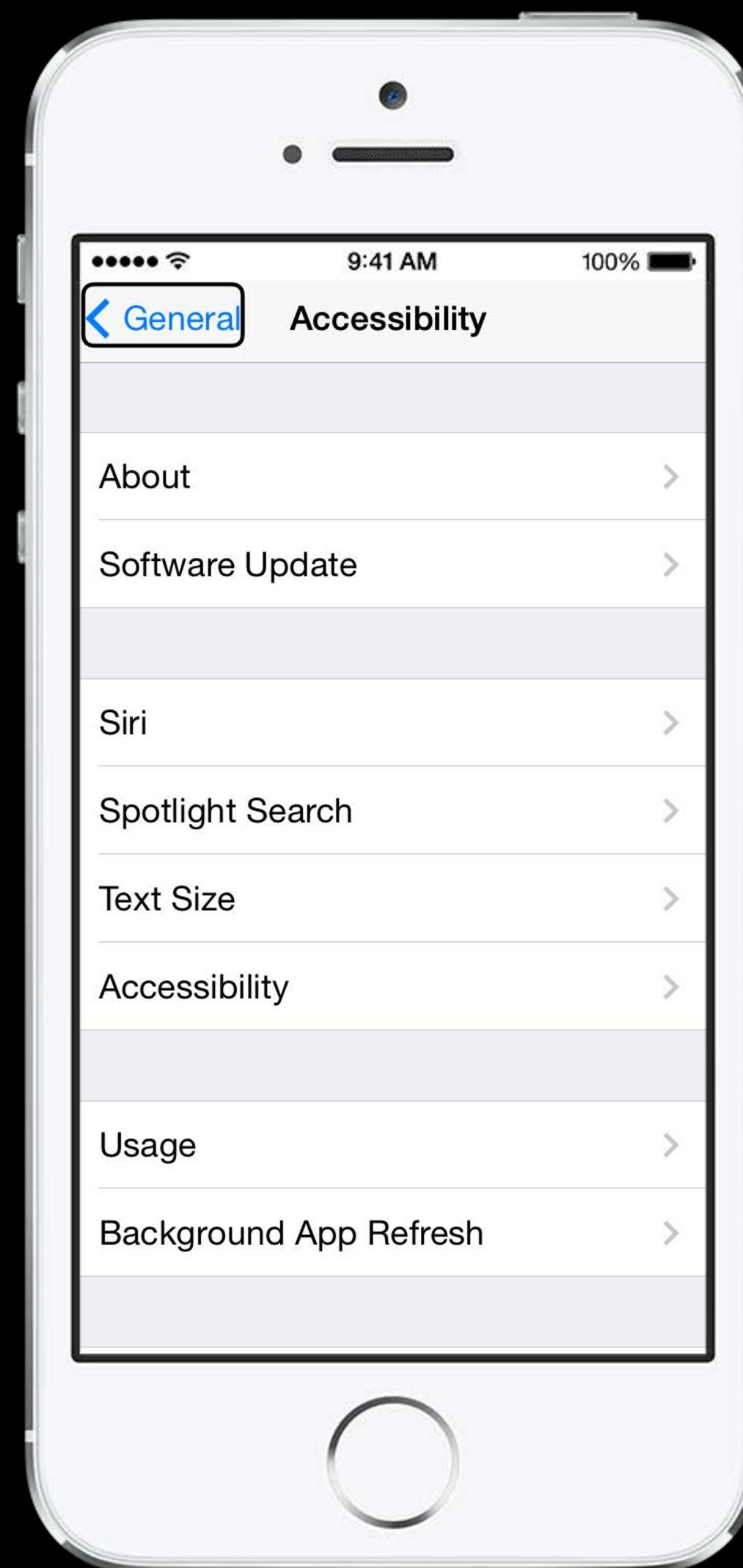
## VoiceOver cheat sheet



# Semantic Accessibility Audit

## VoiceOver cheat sheet

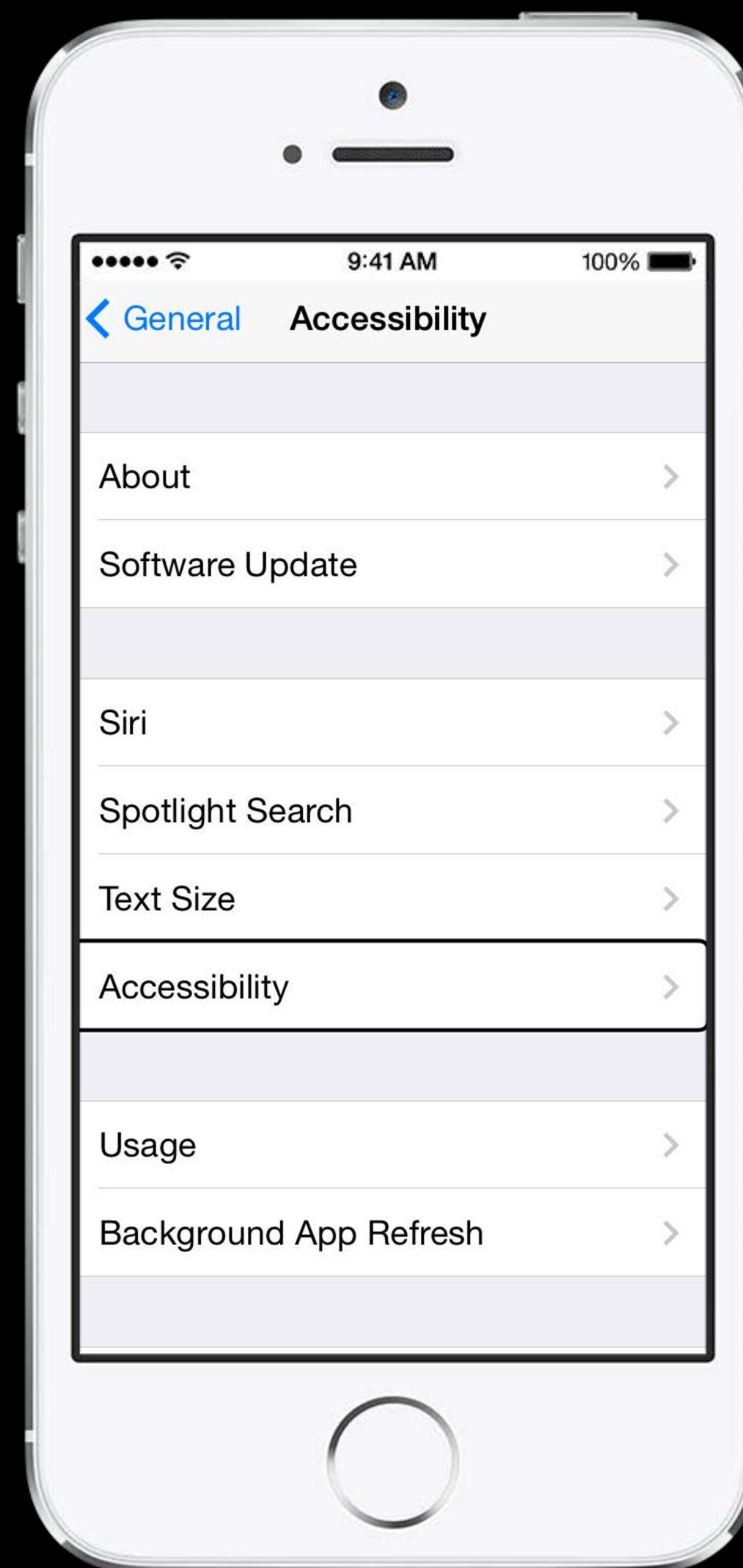
Tap: select and speak



# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

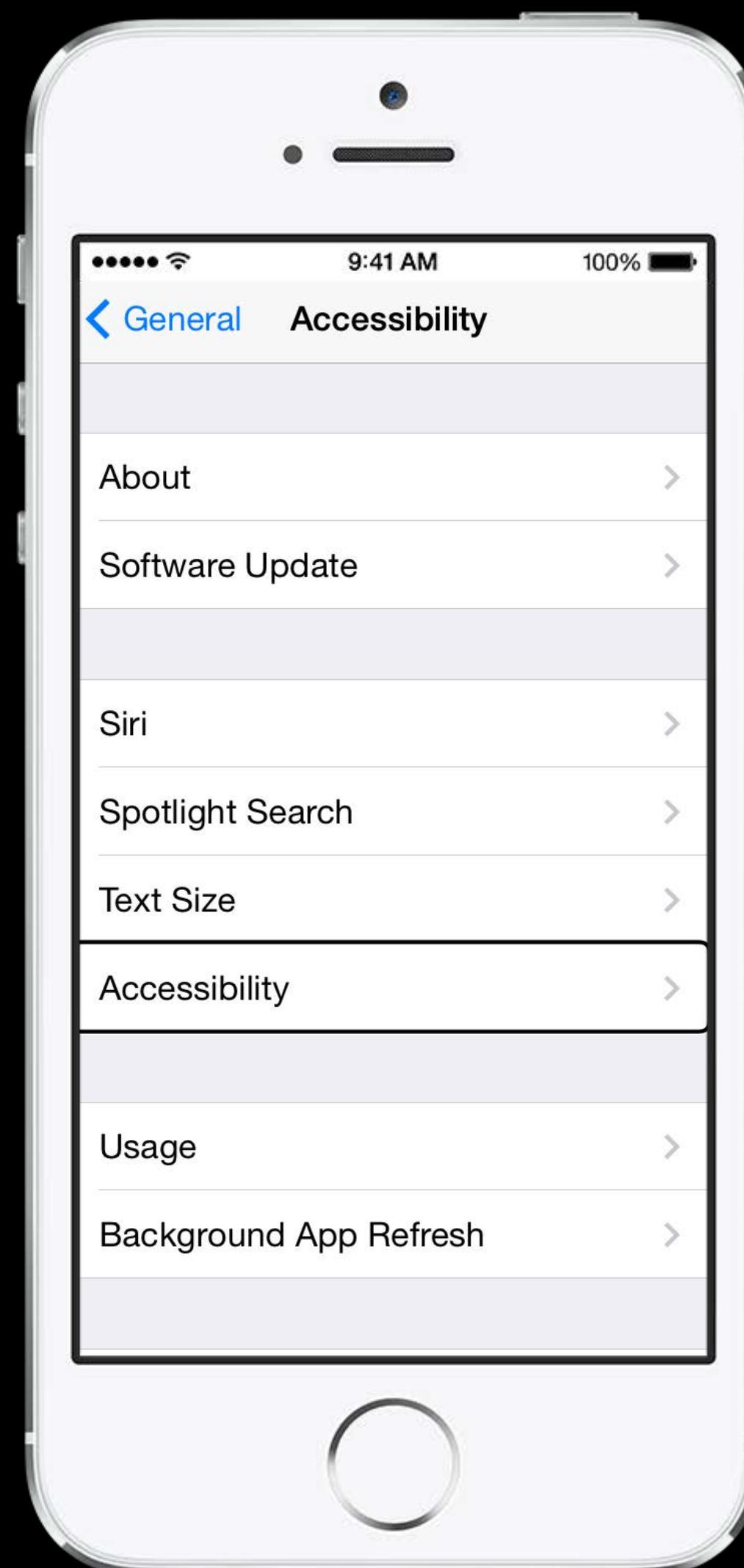


# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate

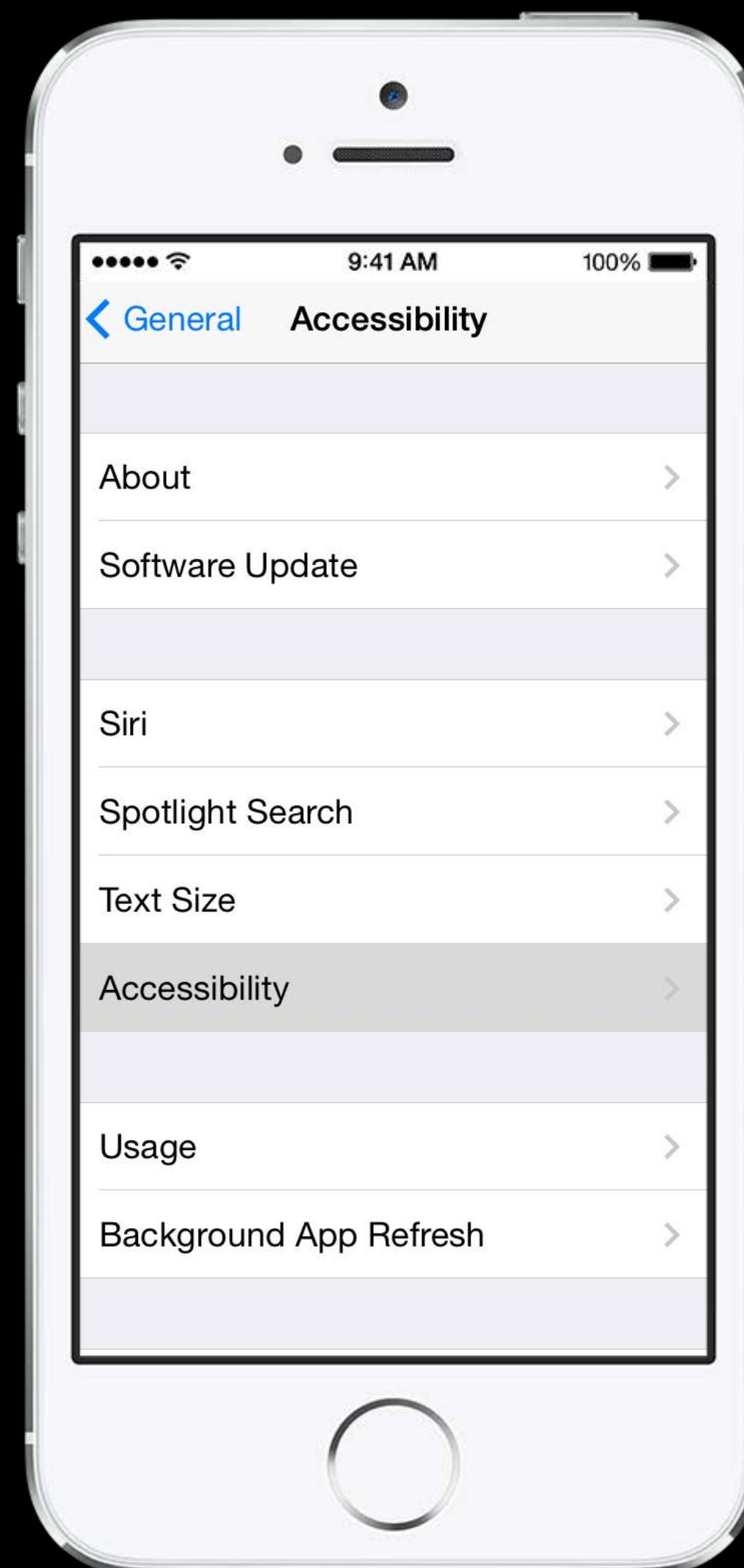


# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate



# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate



# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate

Swipe right: select and speak the next element



# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate

Swipe right: select and speak the next element



# Semantic Accessibility Audit

## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate

Swipe right: select and speak the next element

Three finger swipe: scroll



# Semantic Accessibility Audit

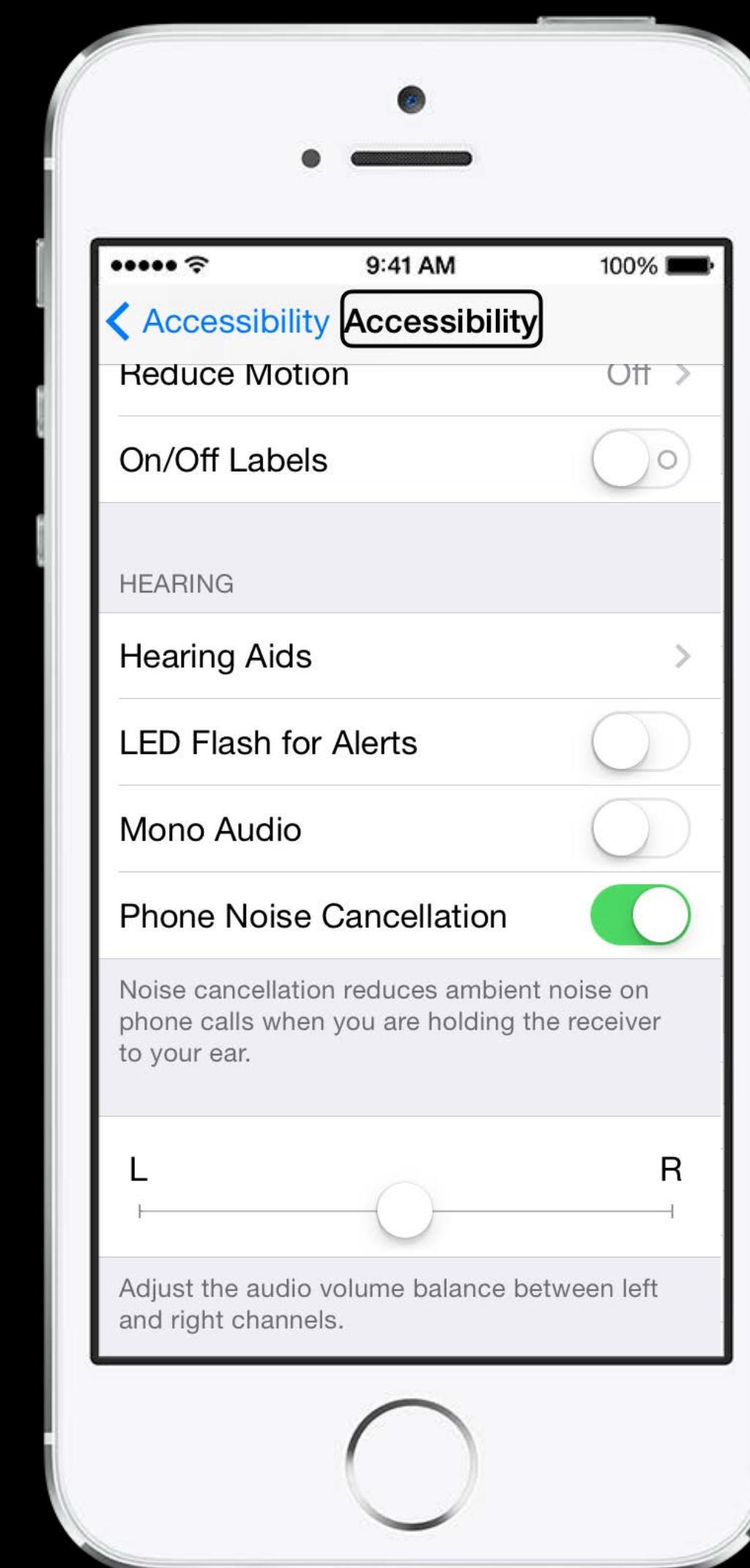
## VoiceOver cheat sheet

Tap: select and speak

Double tap: activate

Swipe right: select and speak the next element

Three finger swipe: scroll



*Demo*

Semantic accessibility audit

# Basic Accessibility API

# Basic Accessibility API

```
@property(nonatomic) BOOL isAccessibilityElement;
```

Return YES to make a view visible to an assistive technology

Default is YES for controls and labels

# Basic Accessibility API

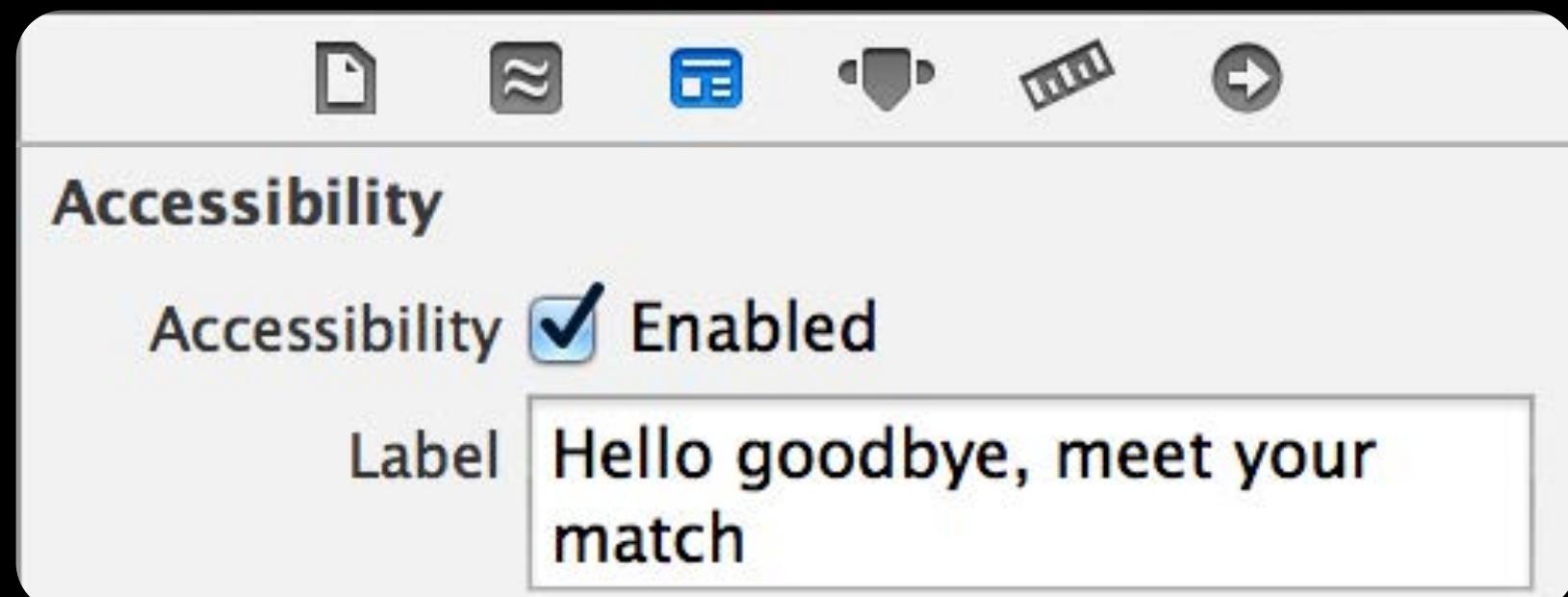
@property(nonatomic, copy) NSString \*accessibilityLabel;

Return a description of the view

Spoken by VoiceOver

# Basic Accessibility API

## Interface Builder



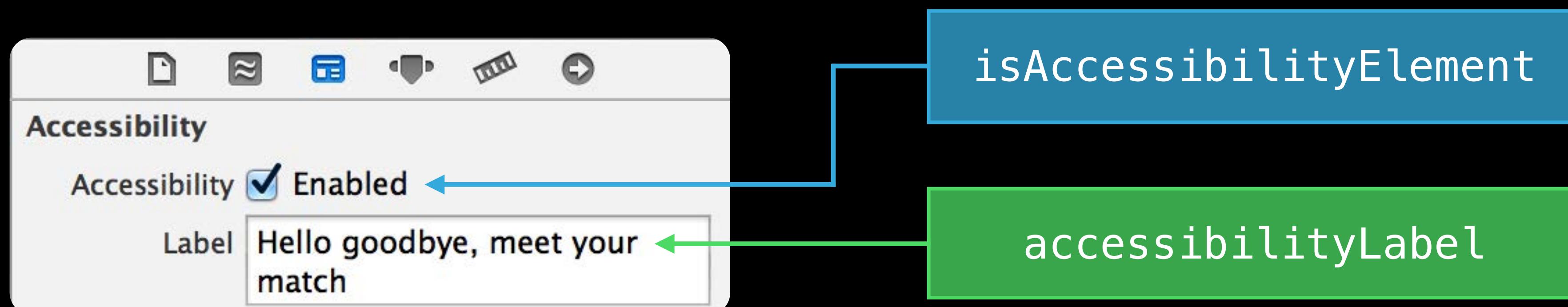
# Basic Accessibility API

## Interface Builder



# Basic Accessibility API

## Interface Builder



# Basic Accessibility API

## Code

```
view.isAccessibilityElement = YES;  
view.accessibilityLabel = @"Profile photo";
```

*Demo*

Basic accessibility API

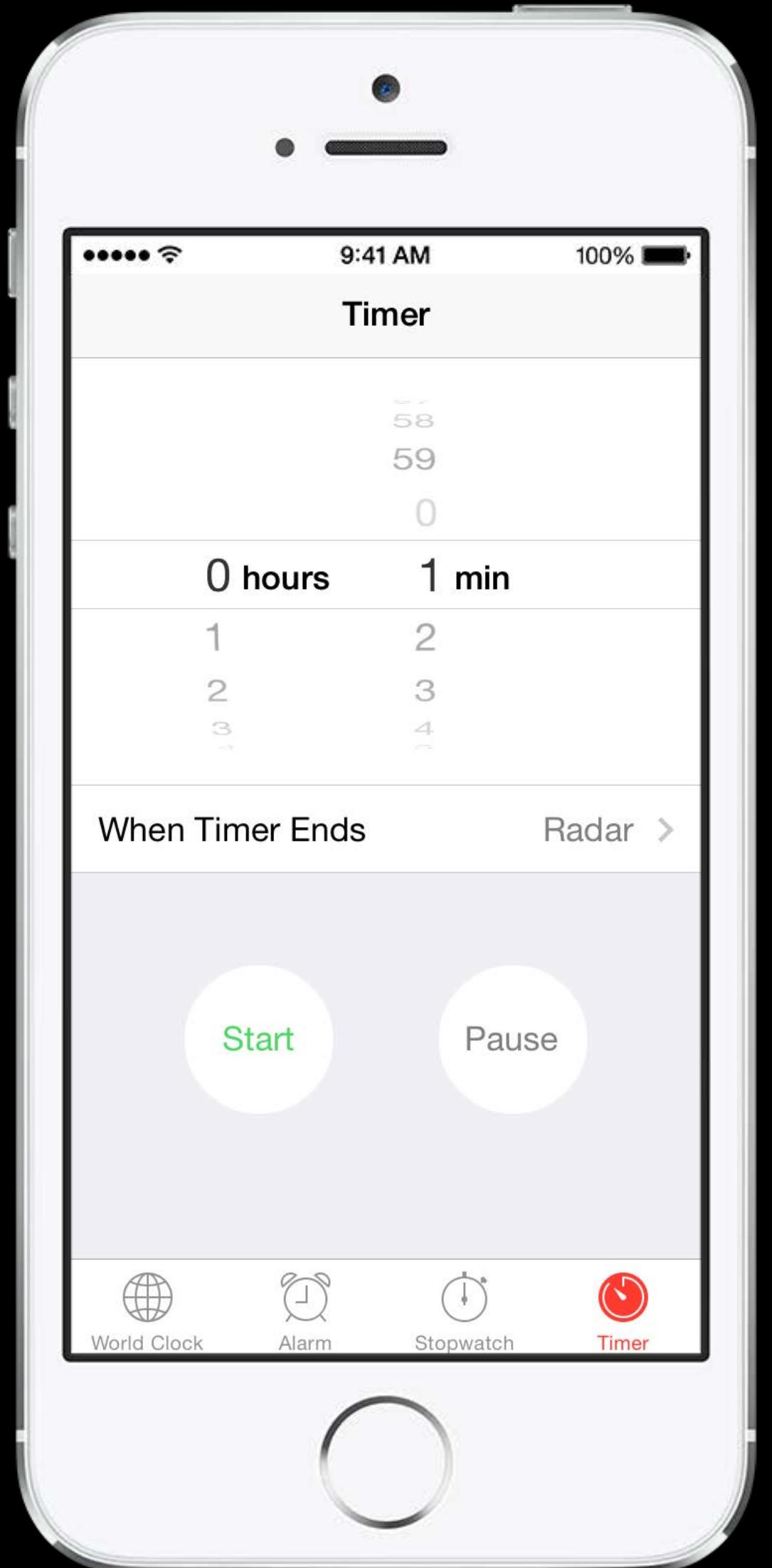
# Accessibility API for Custom UI

# Accessibility Traits

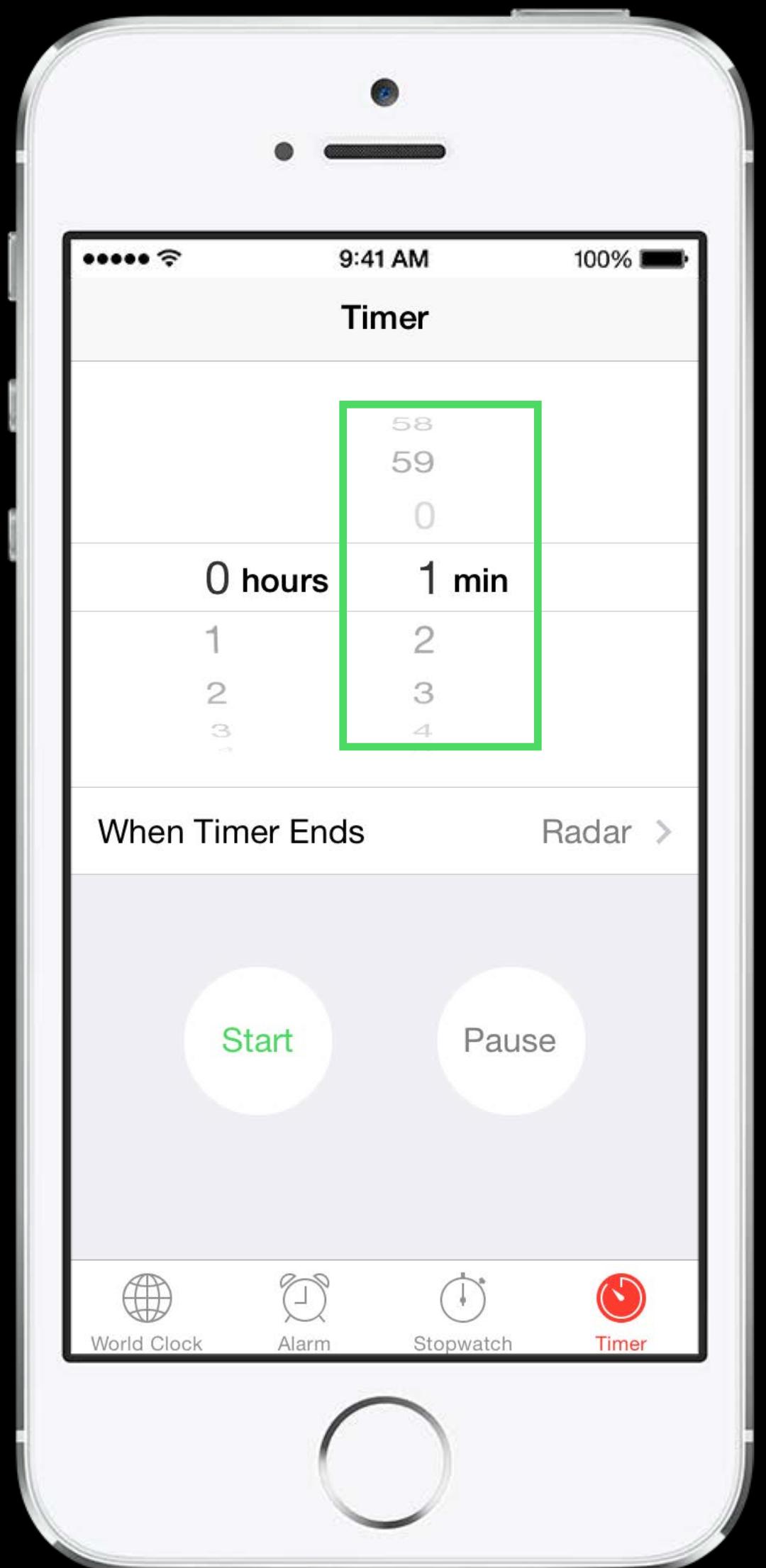
```
@property(nonatomic) UIAccessibilityTraits accessibilityTraits;
```

Describe the function of a view

# Accessibility Traits

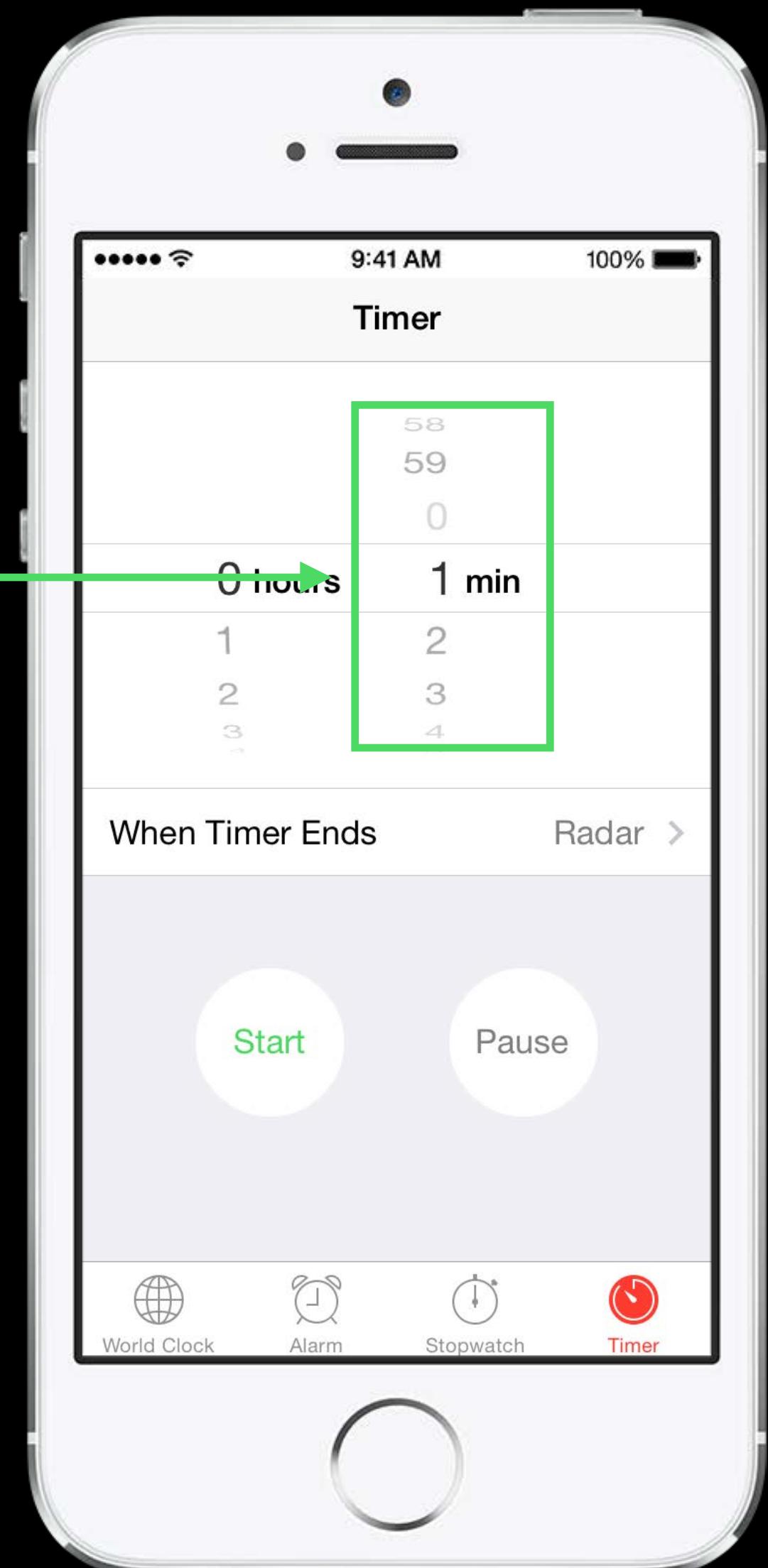


# Accessibility Traits



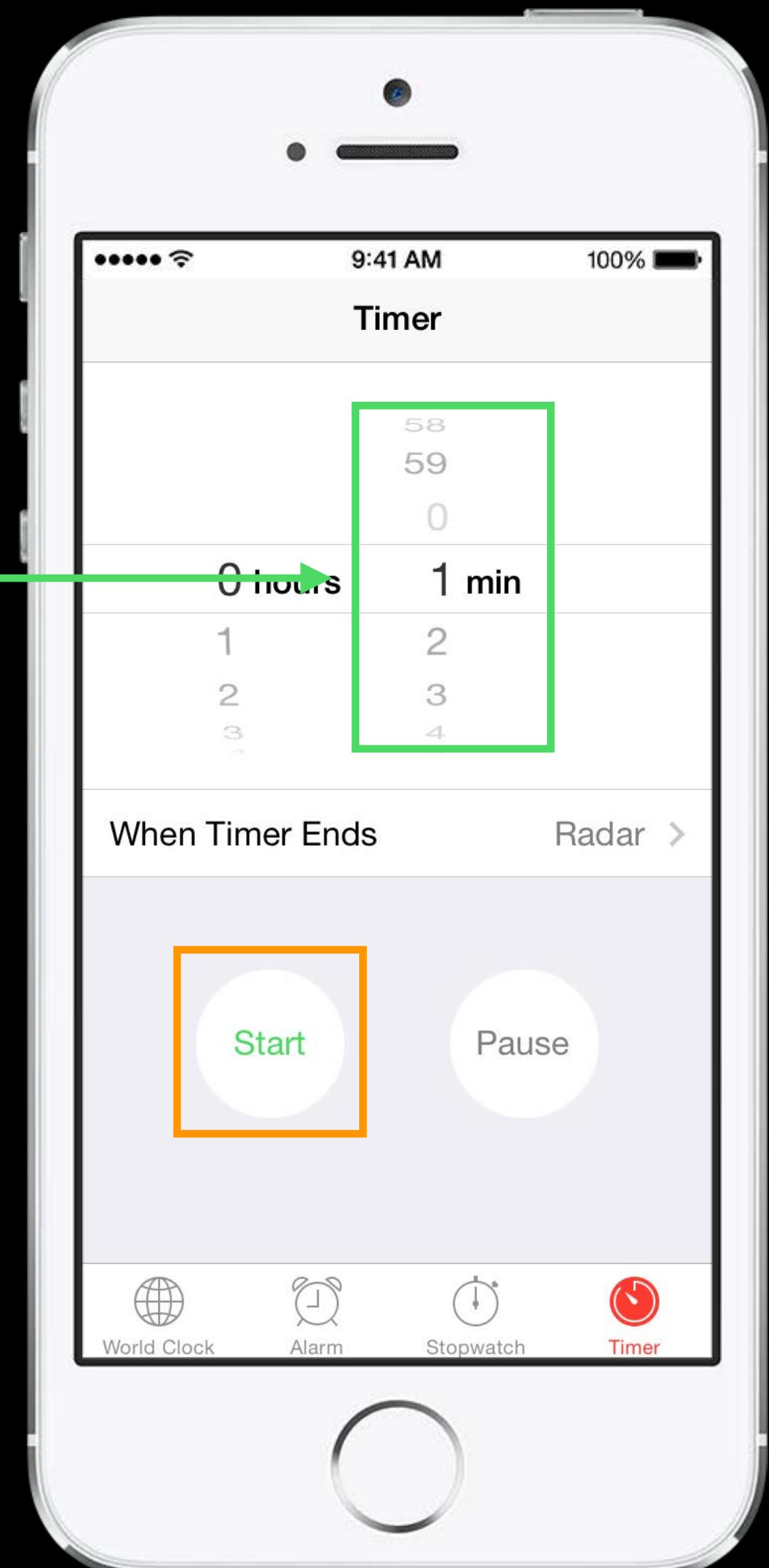
# Accessibility Traits

UIAccessibilityTraitAdjustable

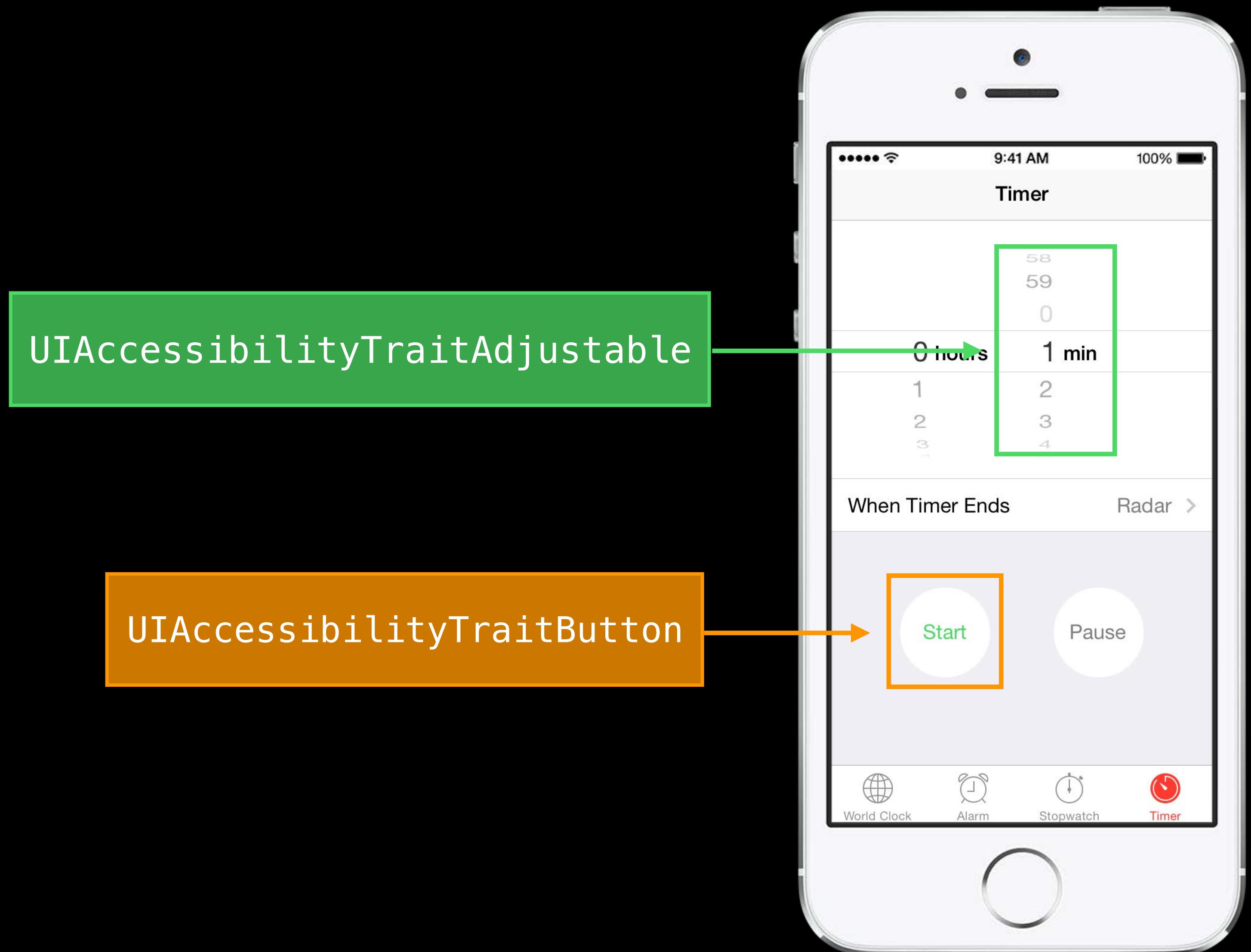


# Accessibility Traits

UIAccessibilityTraitAdjustable

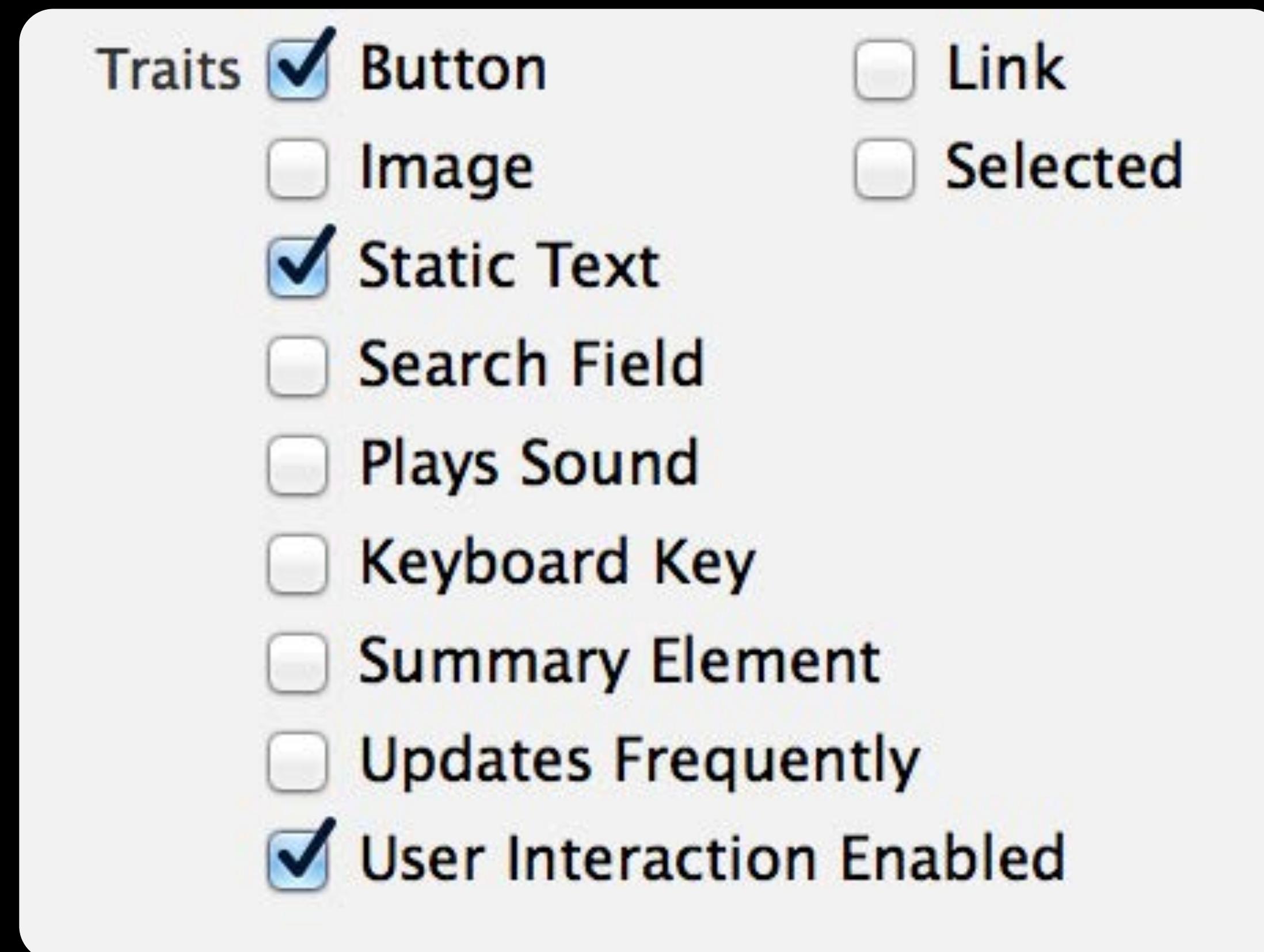


# Accessibility Traits



# Accessibility Traits

## Interface Builder



# Accessibility Traits

## Code

```
view.accessibilityTraits = (view.accessibilityTraits |  
UIAccessibilityTraitButton);
```

# Accessibility Value

# Accessibility Value

```
@property(nonatomic, copy) NSString *accessibilityValue;
```

# Accessibility Value

```
@property(nonatomic, copy) NSString *accessibilityValue;
```

Use with UIAccessibilityTraitAdjustable

# Accessibility Value

```
@property(nonatomic, copy) NSString *accessibilityValue;
```

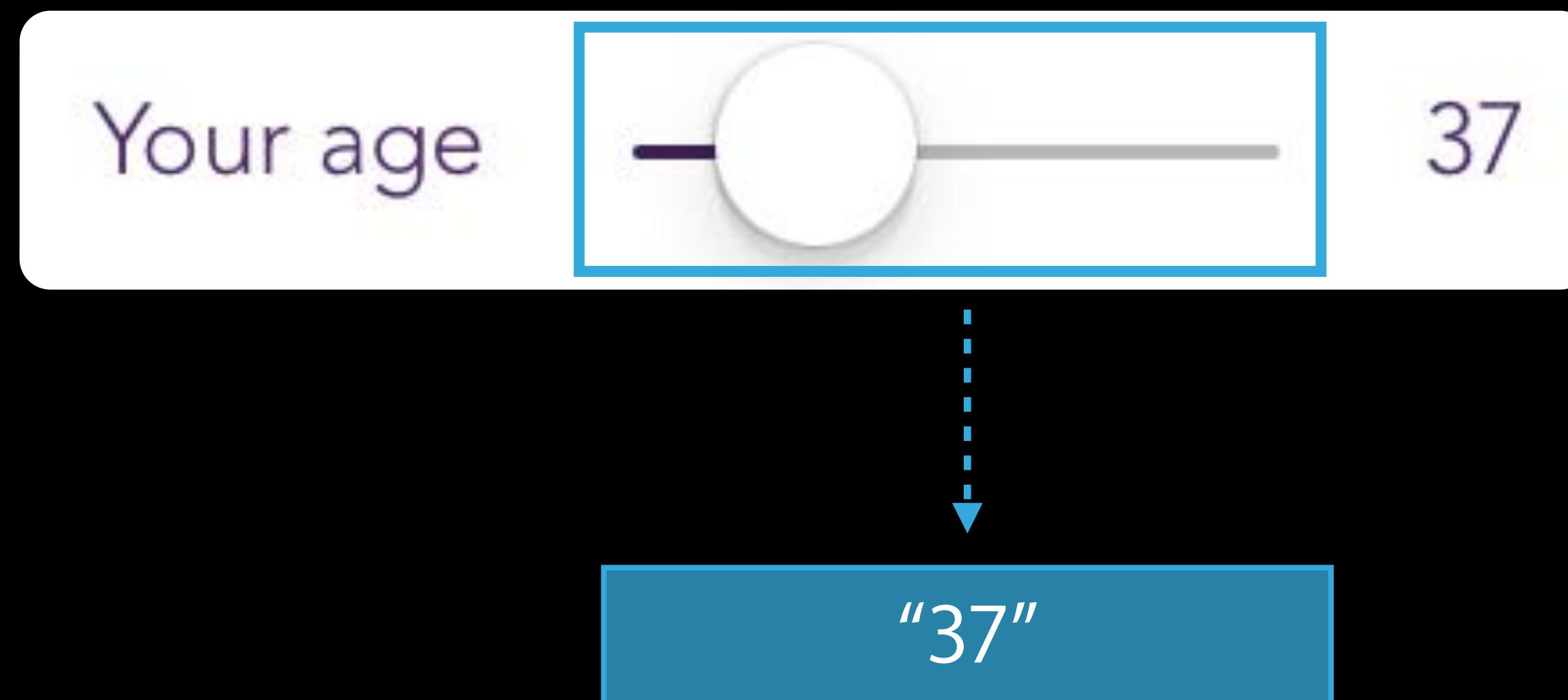
Use with UIAccessibilityTraitAdjustable



# Accessibility Value

```
@property(nonatomic, copy) NSString *accessibilityValue;
```

Use with UIAccessibilityTraitAdjustable



# Accessibility Actions

# Accessibility Actions

- (void)accessibilityIncrement;

# Accessibility Actions

- `(void)accessibilityIncrement;`
- `(void)accessibilityDecrement;`

# Accessibility Actions

- `(void)accessibilityIncrement;`
- `(void)accessibilityDecrement;`

Use with `UIAccessibilityTraitAdjustable`

# Accessibility Actions

- `(void)accessibilityIncrement;`
- `(void)accessibilityDecrement;`

Use with `UIAccessibilityTraitAdjustable`

Increase or decrease an element's value

# Accessibility Actions

- `(void)accessibilityIncrement;`
- `(void)accessibilityDecrement;`

Use with `UIAccessibilityTraitAdjustable`

Increase or decrease an element's value

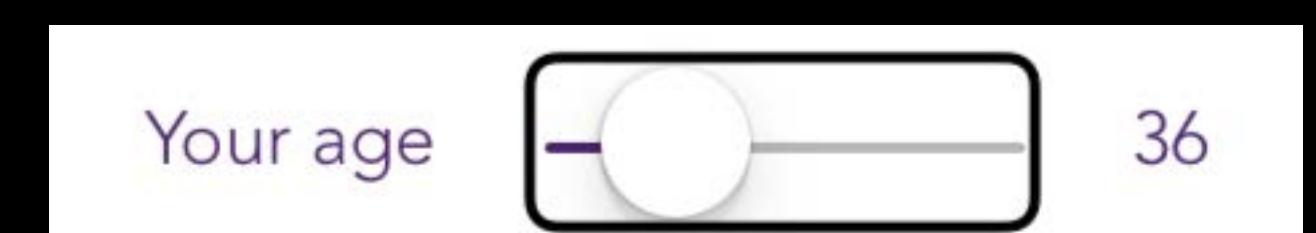


# Accessibility Actions

- (void)accessibilityIncrement;
- (void)accessibilityDecrement;

Use with UIAccessibilityTraitAdjustable

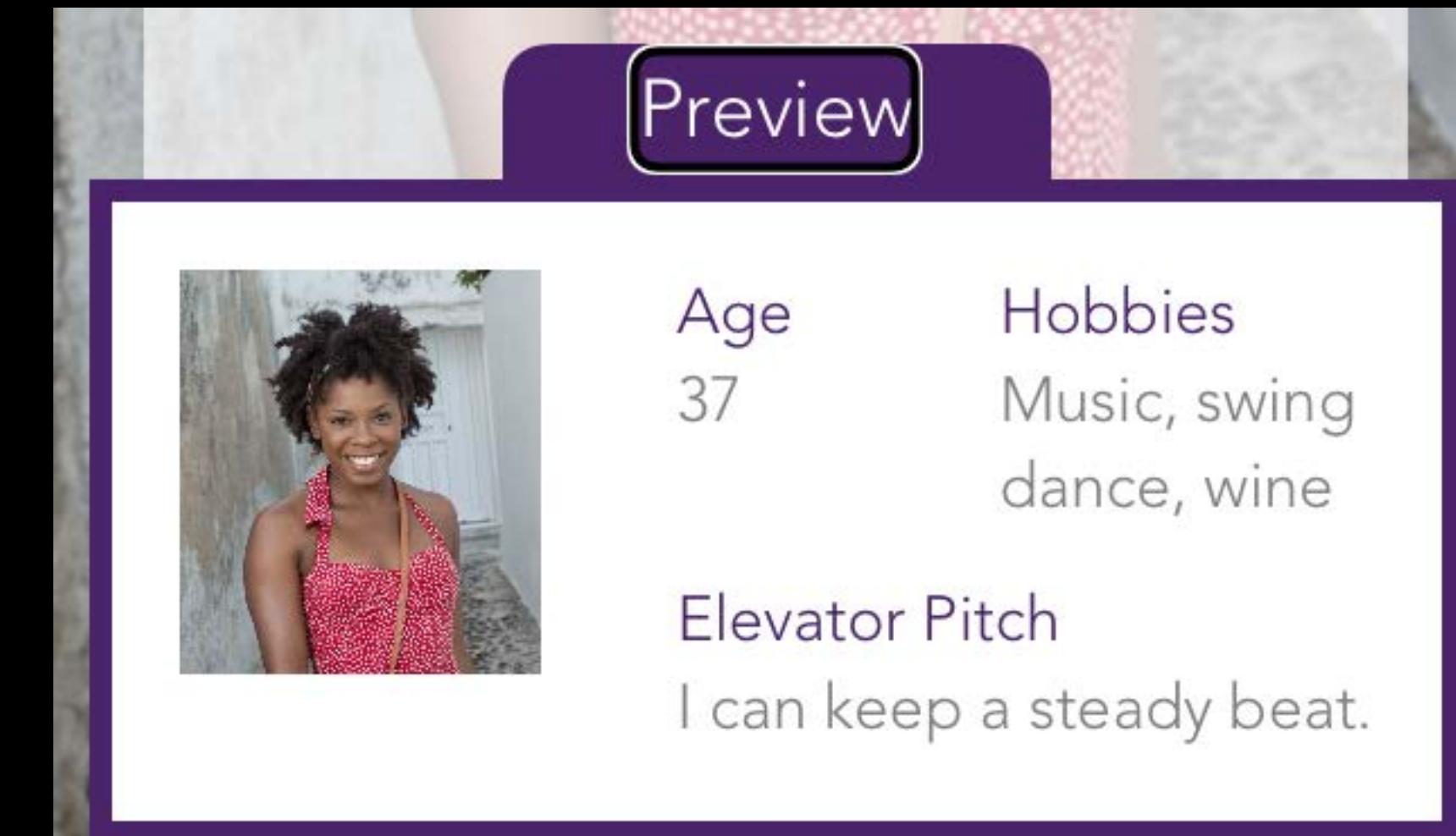
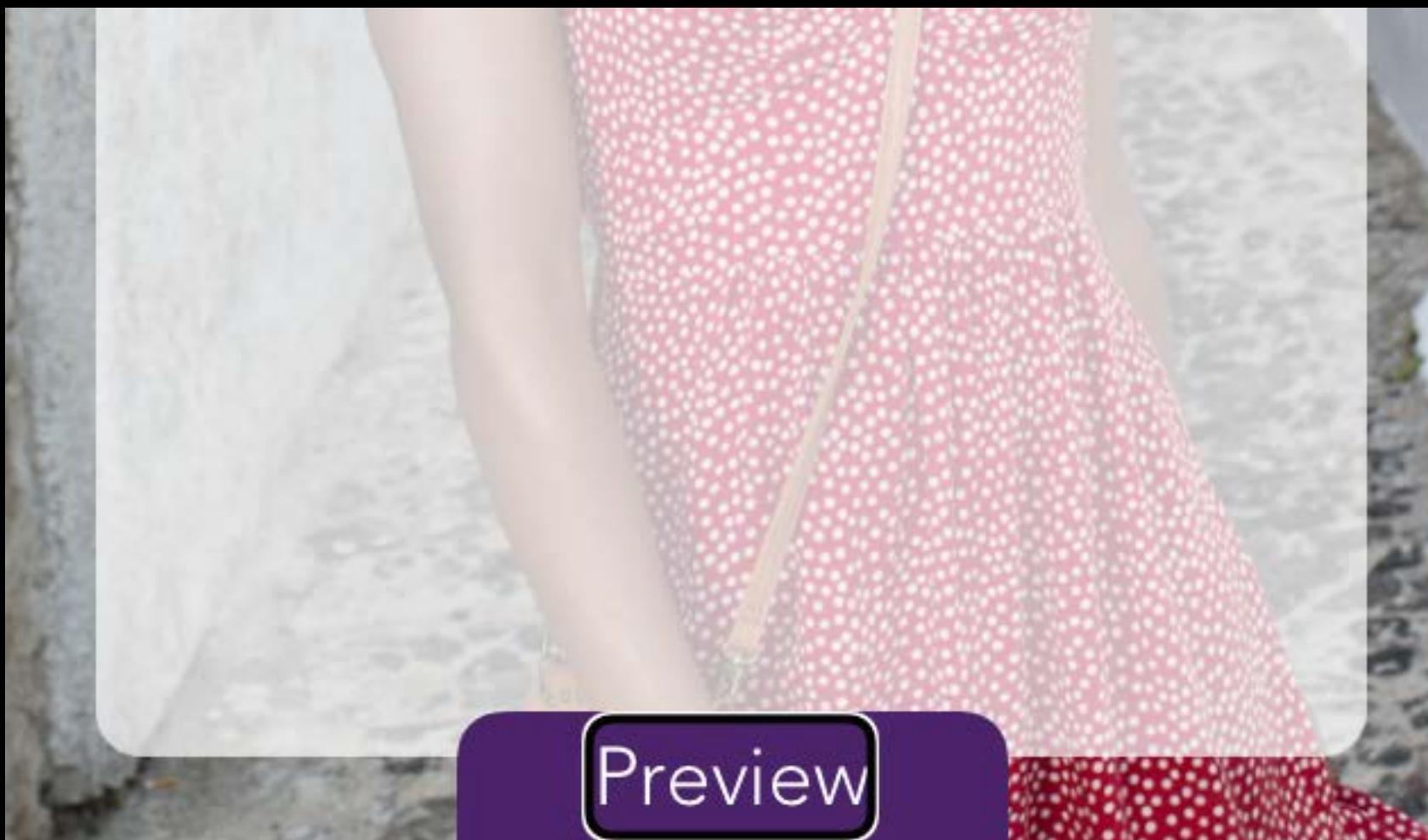
Increase or decrease an element's value



# Accessibility Actions

- `(BOOL)accessibilityActivate;`

Provide a default action for views requiring a specific gesture



# Accessibility Notifications

# Accessibility Notifications

Notify assistive technology of a change

# Accessibility Notifications

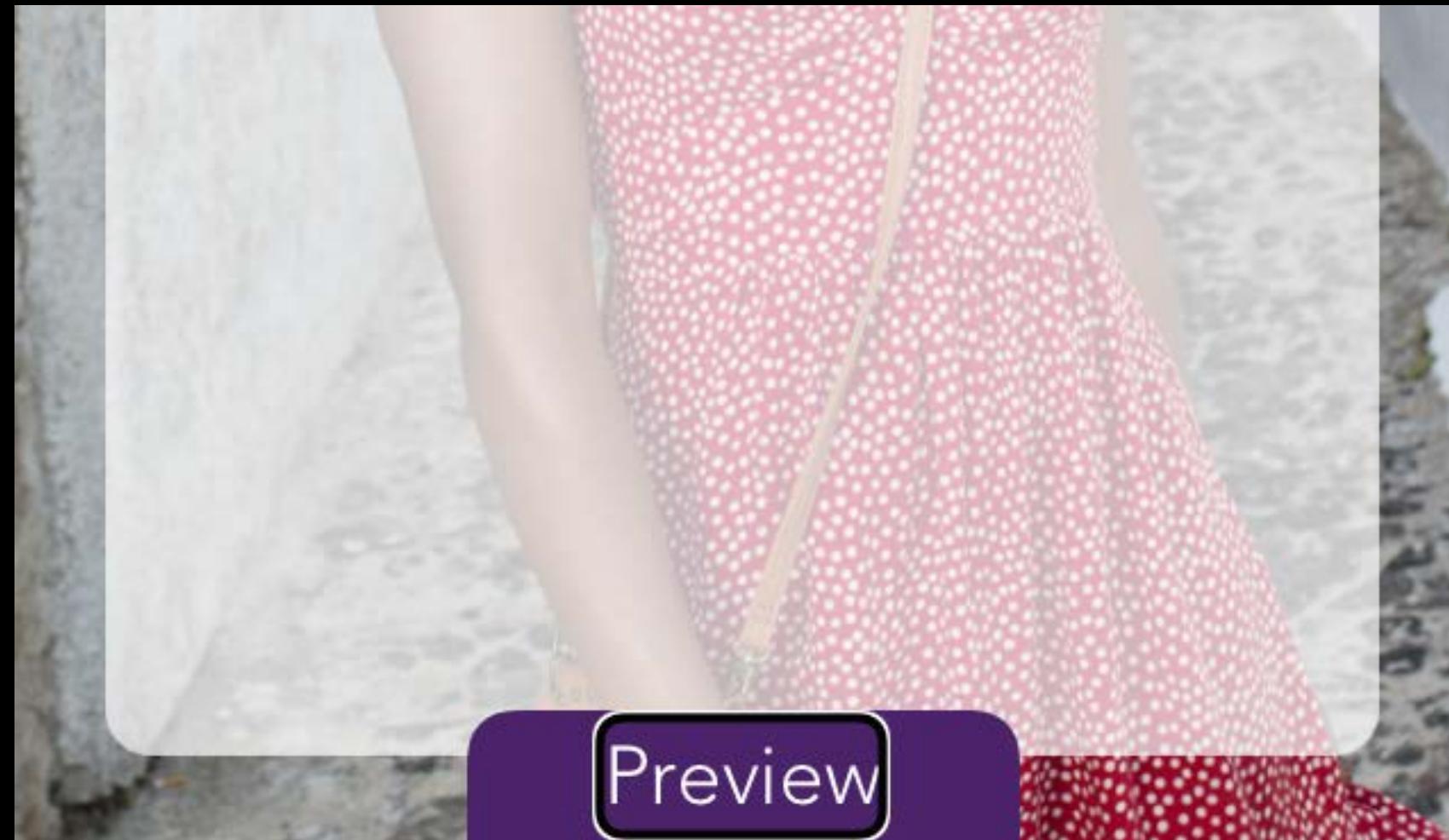
Notify assistive technology of a change

`UIAccessibilityLayoutChangedNotification`

# Accessibility Notifications

Notify assistive technology of a change

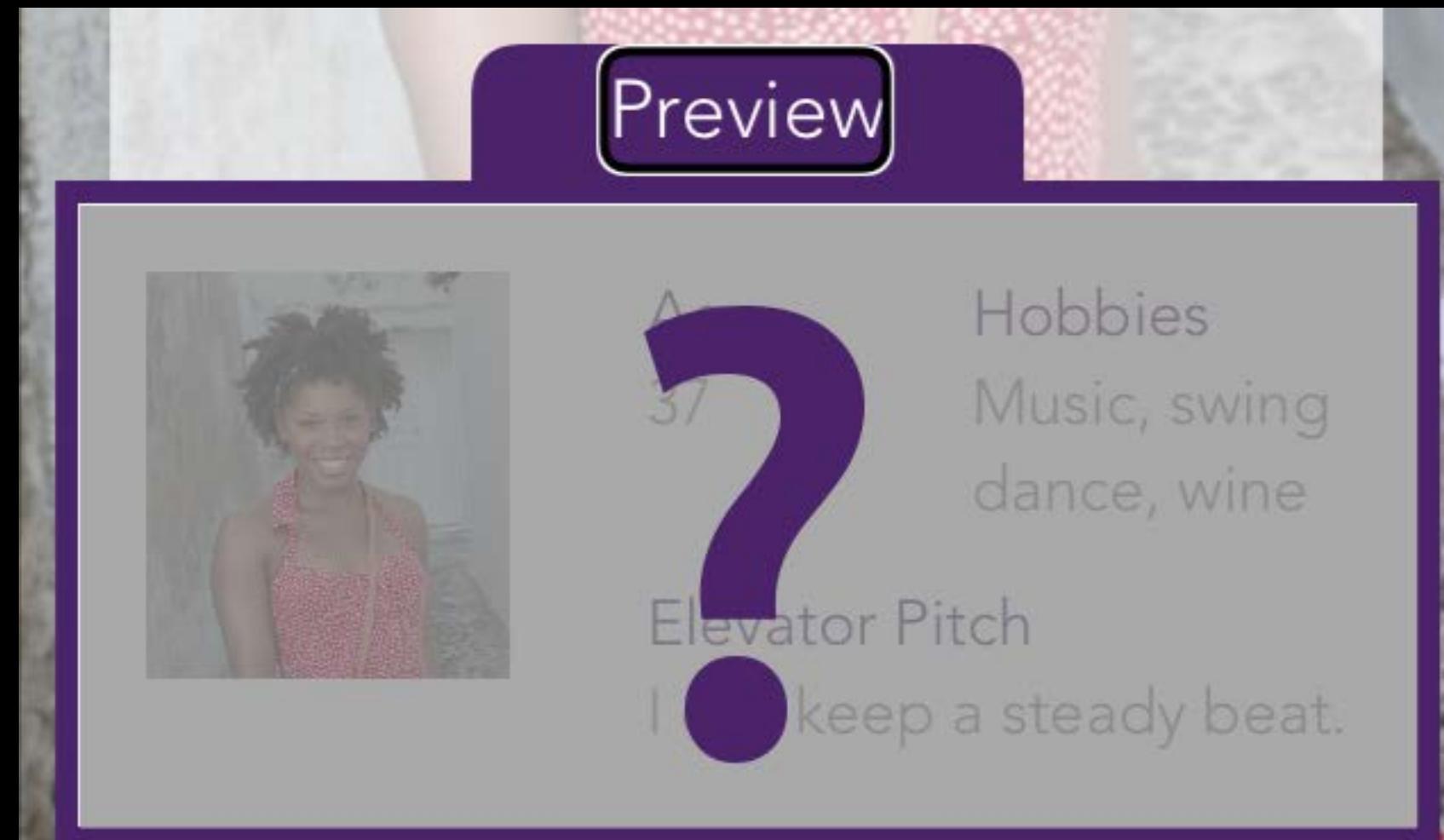
`UIAccessibilityLayoutChangedNotification`



# Accessibility Notifications

Notify assistive technology of a change

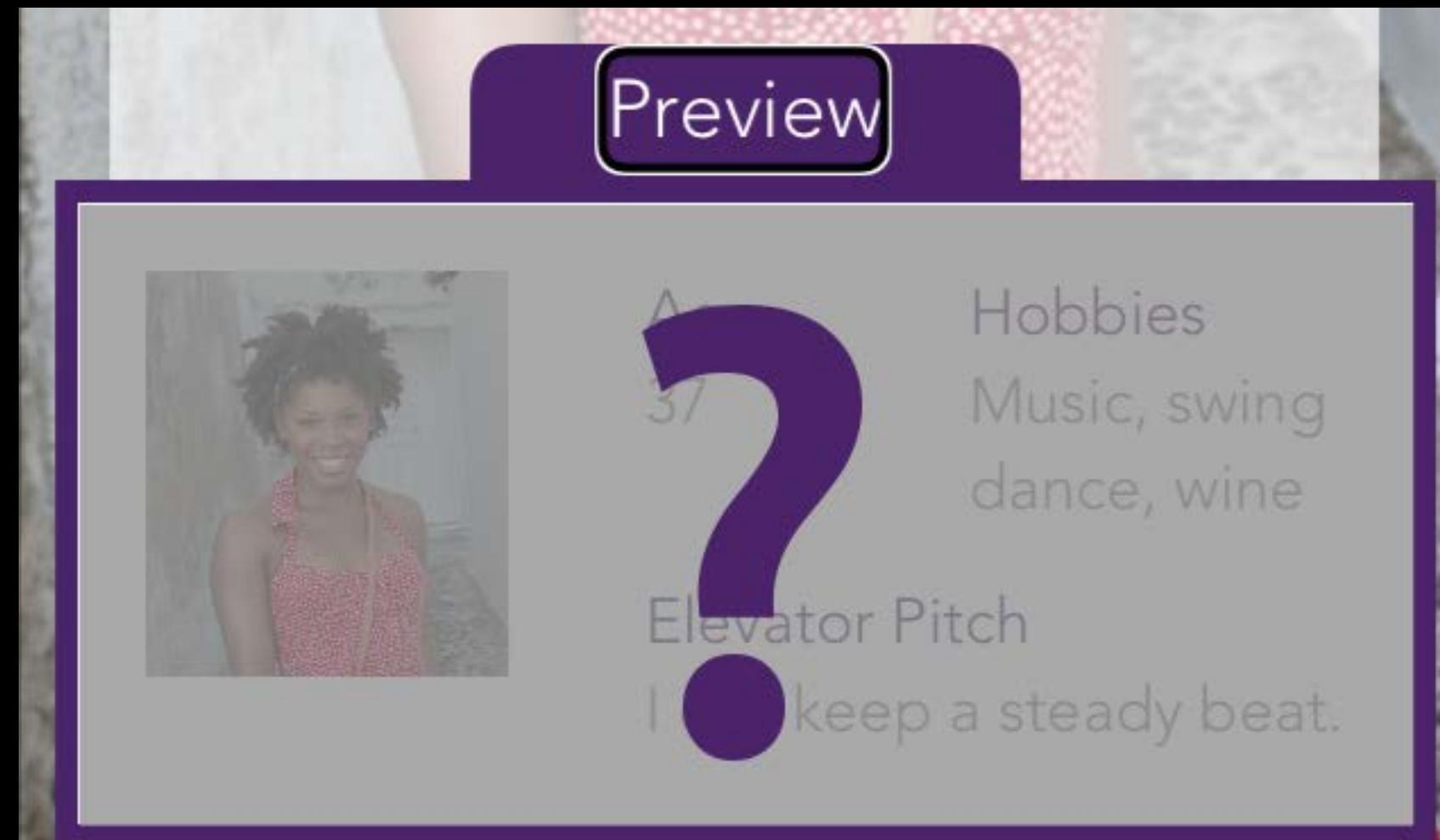
`UIAccessibilityLayoutChangedNotification`



# Accessibility Notifications

Notify assistive technology of a change

`UIAccessibilityLayoutChangedNotification`

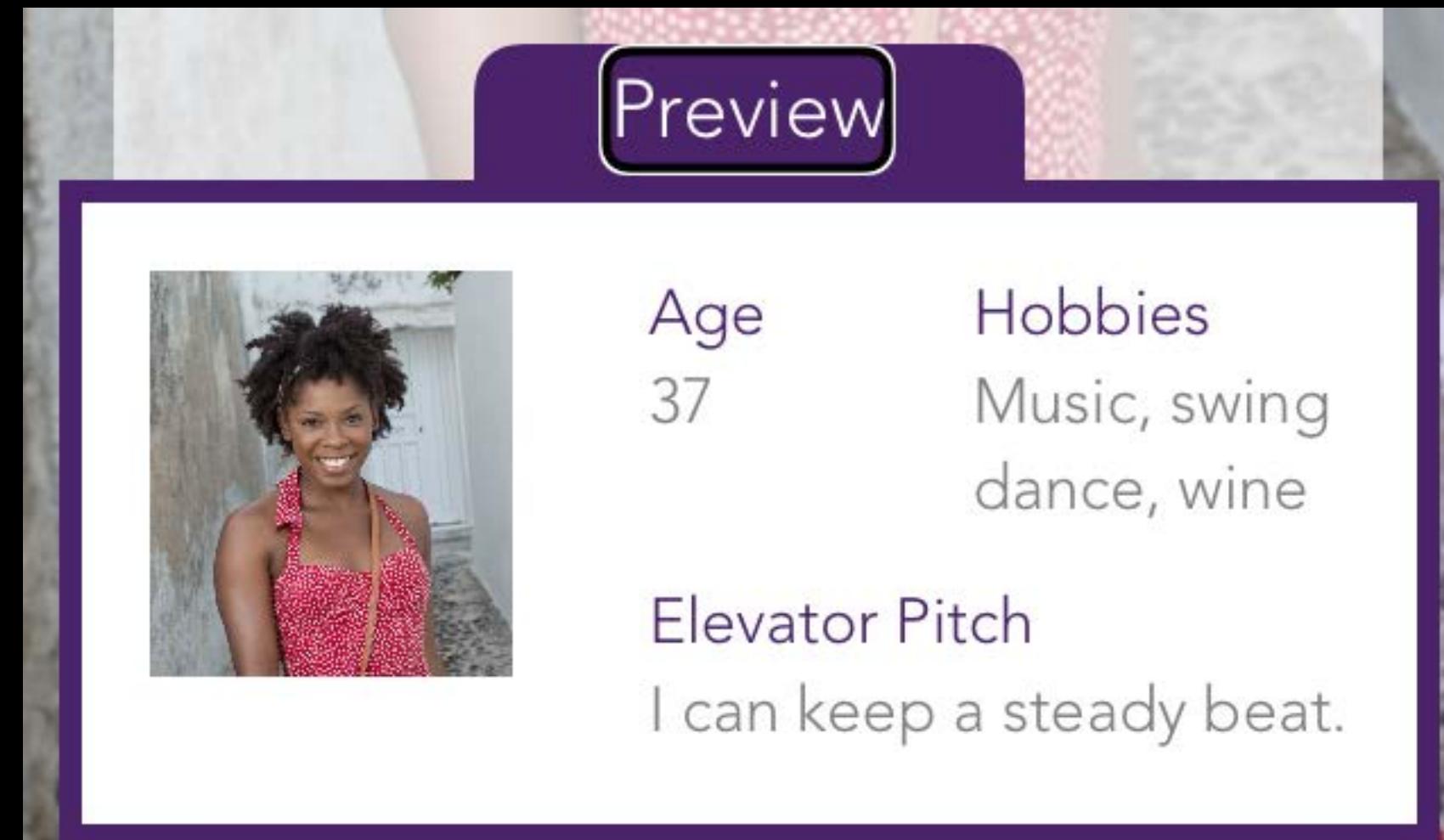


```
UIAccessibilityPostNotification(UIAccessibilityLayoutChangedNotification,  
nil);
```

# Accessibility Notifications

Notify assistive technology of a change

`UIAccessibilityLayoutChangedNotification`



```
UIAccessibilityPostNotification(UIAccessibilityLayoutChangedNotification,  
nil);
```

*Demo*

Accessibility API for custom UI

# New Accessibility API

# UIAccessibilityContainer

# UIAccessibilityContainer

Return a list of accessibility elements from a view

# UIAccessibilityContainer

Return a list of accessibility elements from a view

Necessary for elements that don't correspond to views

# UIAccessibilityContainer

Return a list of accessibility elements from a view

Necessary for elements that don't correspond to views



# UIAccessibilityContainer

Return a list of accessibility elements from a view

Necessary for elements that don't correspond to views



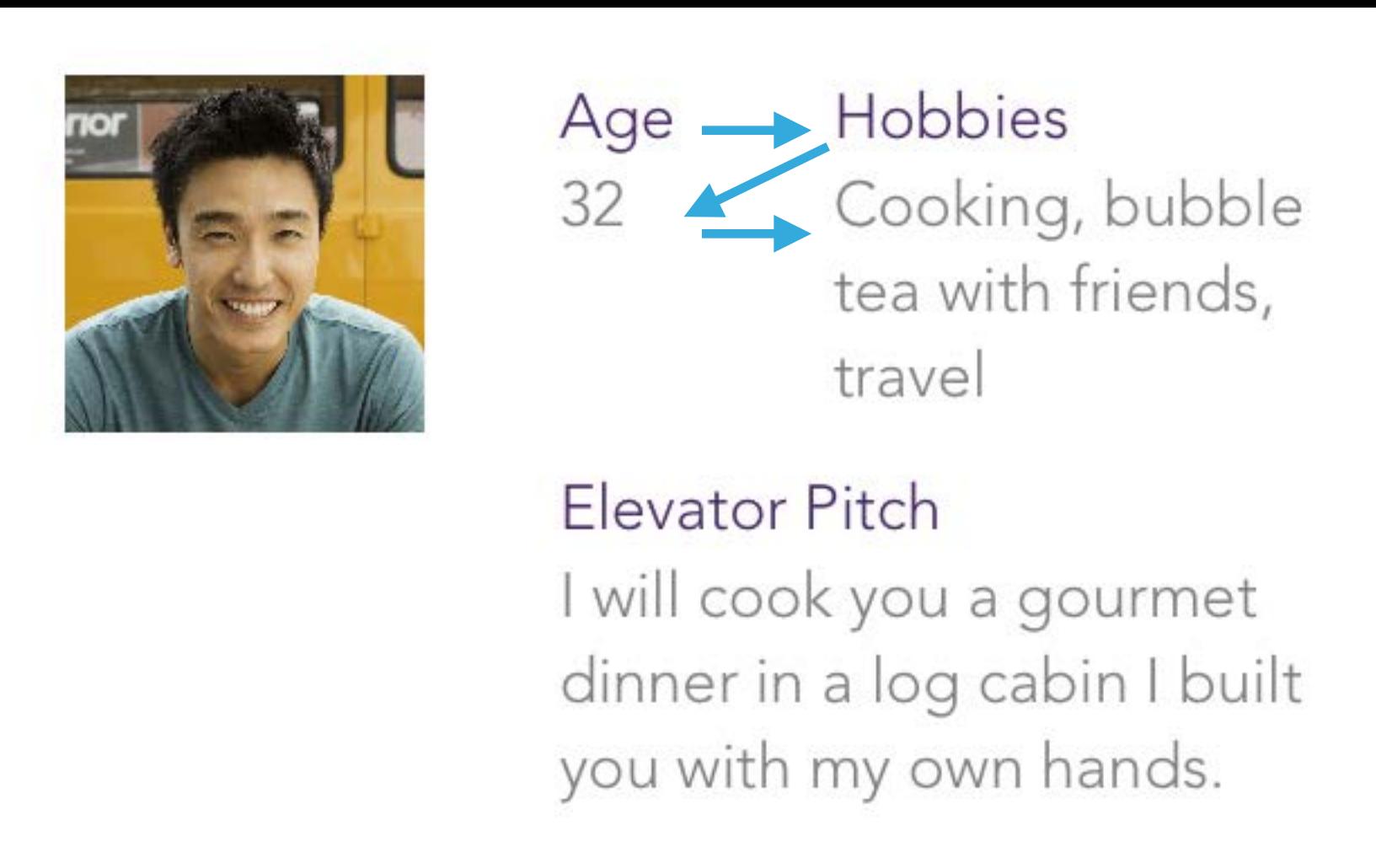
See last year's talk for example

# UIAccessibilityContainer

Can be used to sort existing elements

# UIAccessibilityContainer

Can be used to sort existing elements



Age → Hobbies  
32 ← Cooking, bubble tea with friends, travel

Elevator Pitch  
I will cook you a gourmet dinner in a log cabin I built you with my own hands.

# UIAccessibilityContainer

Can be used to sort existing elements



Age 32

Hobbies  
Cooking, bubble tea with friends, travel

Elevator Pitch  
I will cook you a gourmet dinner in a log cabin I built you with my own hands.

Diagram: A diagram showing the relationship between age and hobbies. 'Age' and '32' are connected by a double-headed arrow, and 'Hobbies' and 'Cooking, bubble tea with friends, travel' are also connected by a double-headed arrow.



Age 32

Hobbies  
Cooking, bubble tea with friends, travel

Elevator Pitch  
I will cook you a gourmet dinner in a log cabin I built you with my own hands.

Diagram: A diagram showing the relationship between age and hobbies. 'Age' and '32' are connected by a single-headed arrow pointing down, and 'Hobbies' and 'Cooking, bubble tea with friends, travel' are also connected by a single-headed arrow pointing down.

# UIAccessibilityContainer



```
@interface NSObject (UIAccessibilityContainer)
```

- (NSInteger)accessibilityElementCount;
- (id)accessibilityElementAtIndex:(NSInteger)index;
- (NSInteger)indexOfAccessibilityElement:(id)element;

```
@end
```

# UIAccessibilityContainer



```
@interface NSObject (UIAccessibilityContainer)
```

- (NSInteger)accessibilityElementCount;
- (id)accessibilityElementAtIndex:(NSInteger)index;
- (NSInteger)indexOfAccessibilityElement:(id)element;

```
@property (nonatomic, strong) NSArray *accessibilityElements;
```

```
@end
```

# UIAccessibilityCustomAction



# UIAccessibilityCustomAction



More than one action for an element

# UIAccessibilityCustomAction



More than one action for an element

App switcher: launch or close app



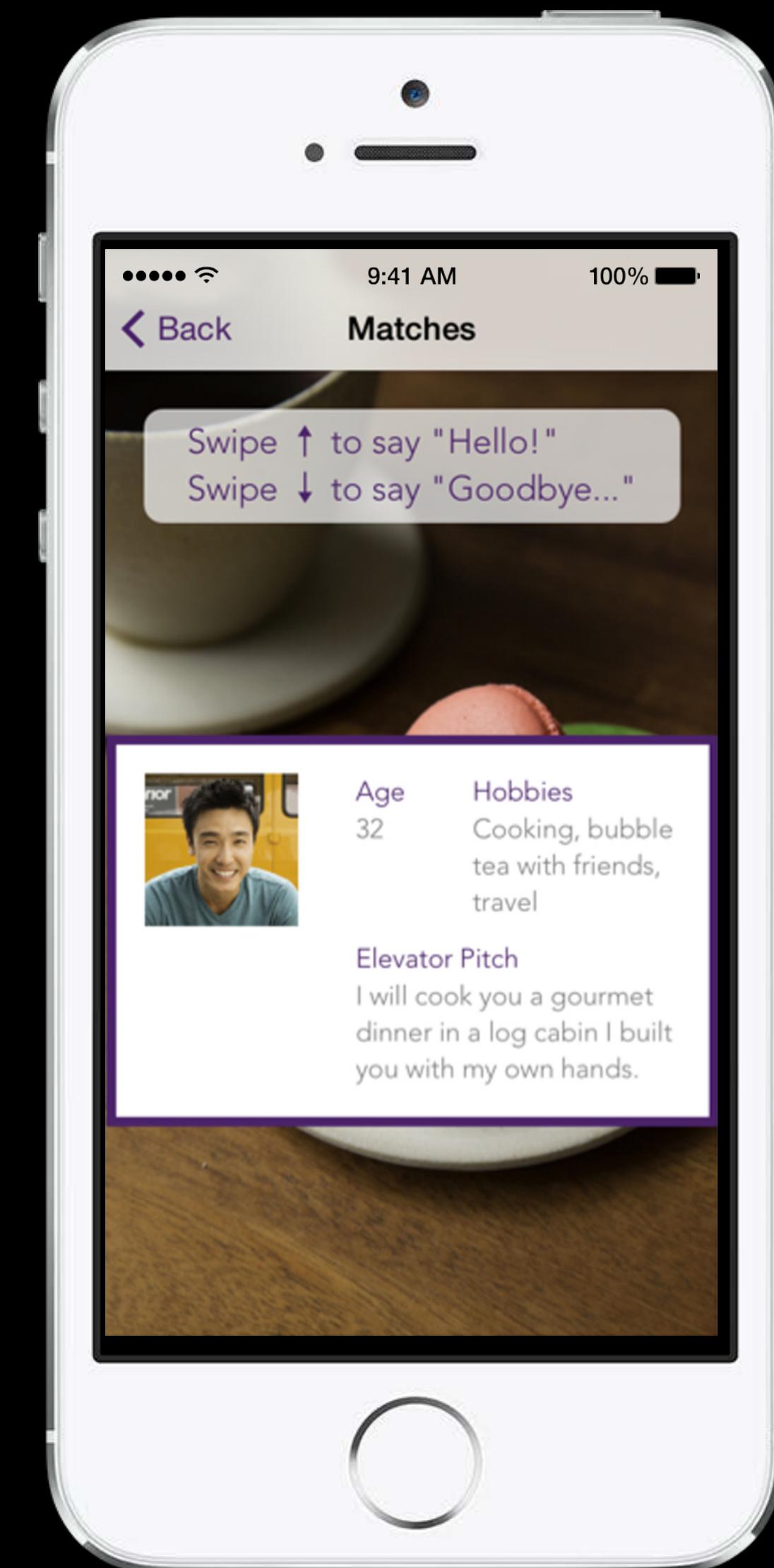
# UIAccessibilityCustomAction



More than one action for an element

App switcher: launch or close app

Say hello or goodbye to a match



# UIAccessibilityCustomAction



```
@interface UIAccessibilityCustomAction : NSObject  
  
- (instancetype)initWithName:(NSString *)name target:(id)target selector:(SEL)selector;  
  
@property (nonatomic, copy) NSString *name;  
@property (nonatomic, weak) id target;  
@property (nonatomic, assign) SEL selector;  
  
@end
```

# UIAccessibilityCustomAction



```
@property (nonatomic, retain) NSArray *accessibilityCustomActions;
```

*Demo*

New accessibility API

# Summary



# Summary

iOS users are diverse



# Summary

iOS users are diverse

Widen your user base



# Summary

iOS users are diverse

Widen your user base

Low effort, high reward



# More Information

Jake Behrens  
App Frameworks Evangelist  
[behrens@apple.com](mailto:behrens@apple.com)

Documentation  
Accessibility Programming Guide for iOS  
<https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/iPhoneAccessibility>

Apple Developer Forums  
<http://devforums.apple.com>

# Related Sessions

---

- Accessibility on OS X Russian Hill Tuesday 2:00PM
  - Designing for the Sensitive Mind: The Digital Experience in the Autistic Spectrum Presidio Wednesday 12:45PM
  - Improving the Accessibility and Usability of Complex Web Applications Marina Friday 9:00AM
-

# Labs

---

- Accessibility and Speech Lab
- 

Frameworks Lab B Wednesday 10:15AM

