

Accessibility

INSPIRED BY A PUBLIC SCHOOL STUDENT WITH DISABILITIES



CLEARING A PATH
FOR PEOPLE WITH SPECIAL NEEDS
CLEARS THE PATH FOR EVERYONE!

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*Digital access/inclusion*¹

¹ <http://globalaccessibilityawarenessday.org>

Challenges

- Vision
 - low vision, (color) blindness
- Hearing
- Cognition
- Motor
 - e.g. paralysis

Solutions

Hardware



[https://en.wikipedia.org/wiki/Glasses#/media/
File:Glasses_black.jpg](https://en.wikipedia.org/wiki/Glasses#/media/File:Glasses_black.jpg)



[https://en.wikipedia.org/wiki/Hearing_aid#/media/
File:Hearing_aid_20080620.jpg](https://en.wikipedia.org/wiki/Hearing_aid#/media/File:Hearing_aid_20080620.jpg)



Mac

iPad

iPhone

Watch

TV

Music

Support



iPhone Accessories

Browse all ▾



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Sort By: Featured ▾

Product Type x

- Vision
- Physical & Motor Skills
- Learning & Literacy

iPhone Compatibility +



AbleNet Jelly Bean Twist

\$64.95



AbleNet Specs Switch

\$64.95



AbleNet Plate Switch

\$89.95



AbleNet Big Beamer Transmitter
and Original Receiver Kit
\$189.95



AbleNet Candy Corn Proximity
Sensor Switch
\$194.95



[Skoogmusic Skoog 2.0 Tactile
Musical Interface for iOS and...](#)
\$299.95



HumanWare Brailliant BI 32
Braille Display
\$2,594.95



HumanWare Brailliant BI 40
Braille Display
\$2,994.95

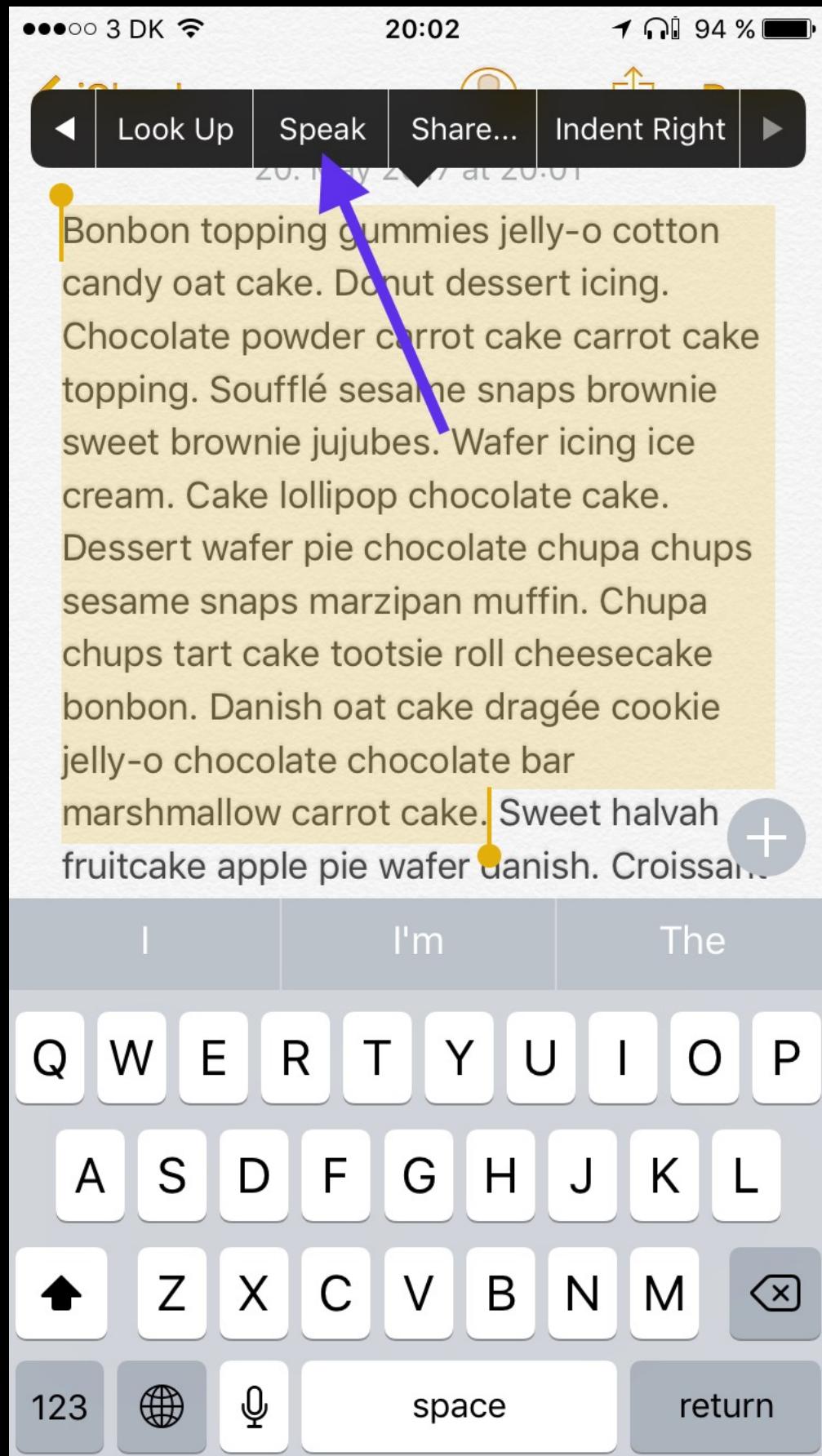
It's nothing unusual

Solutions

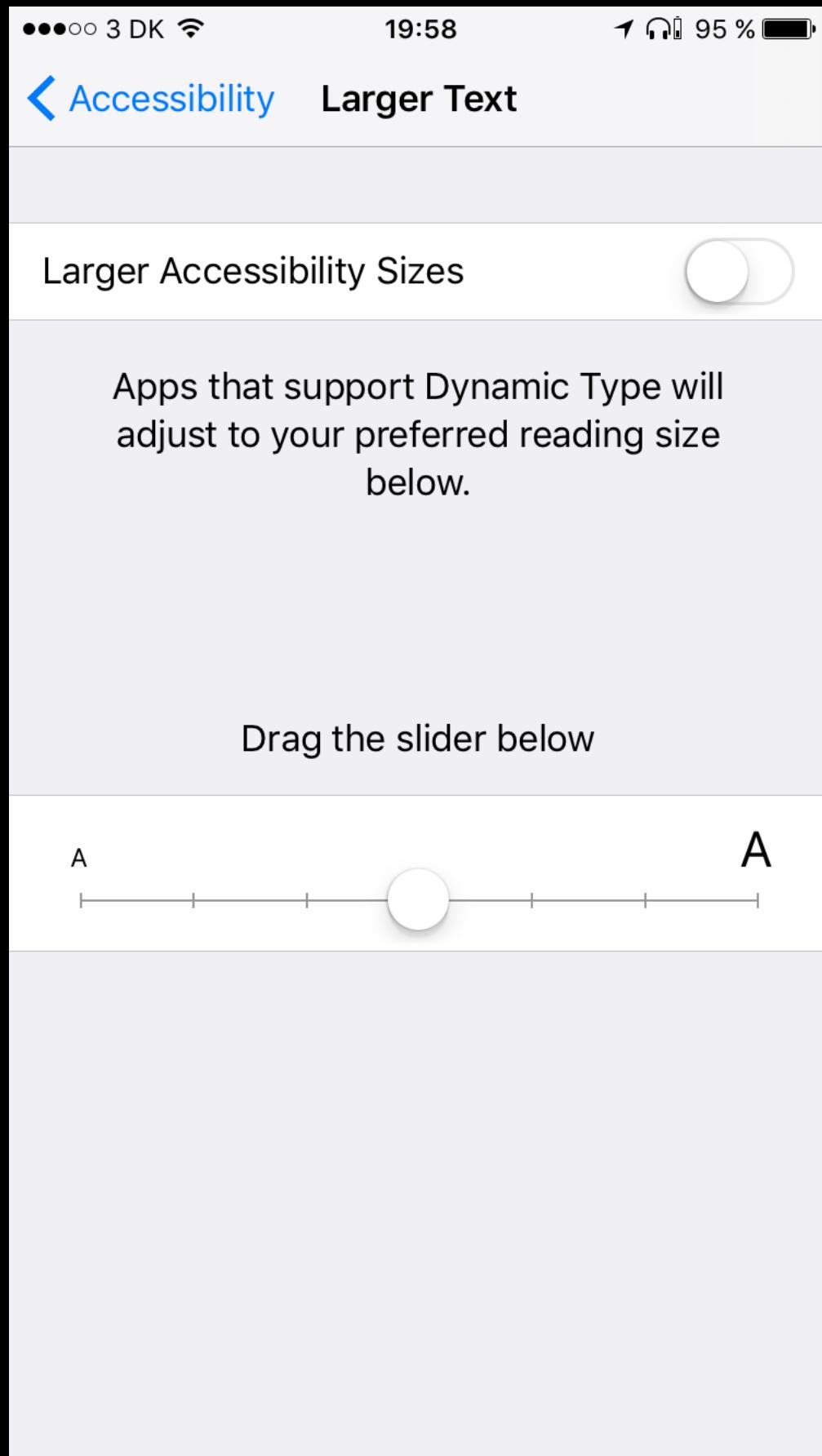
iOS

Using iOS

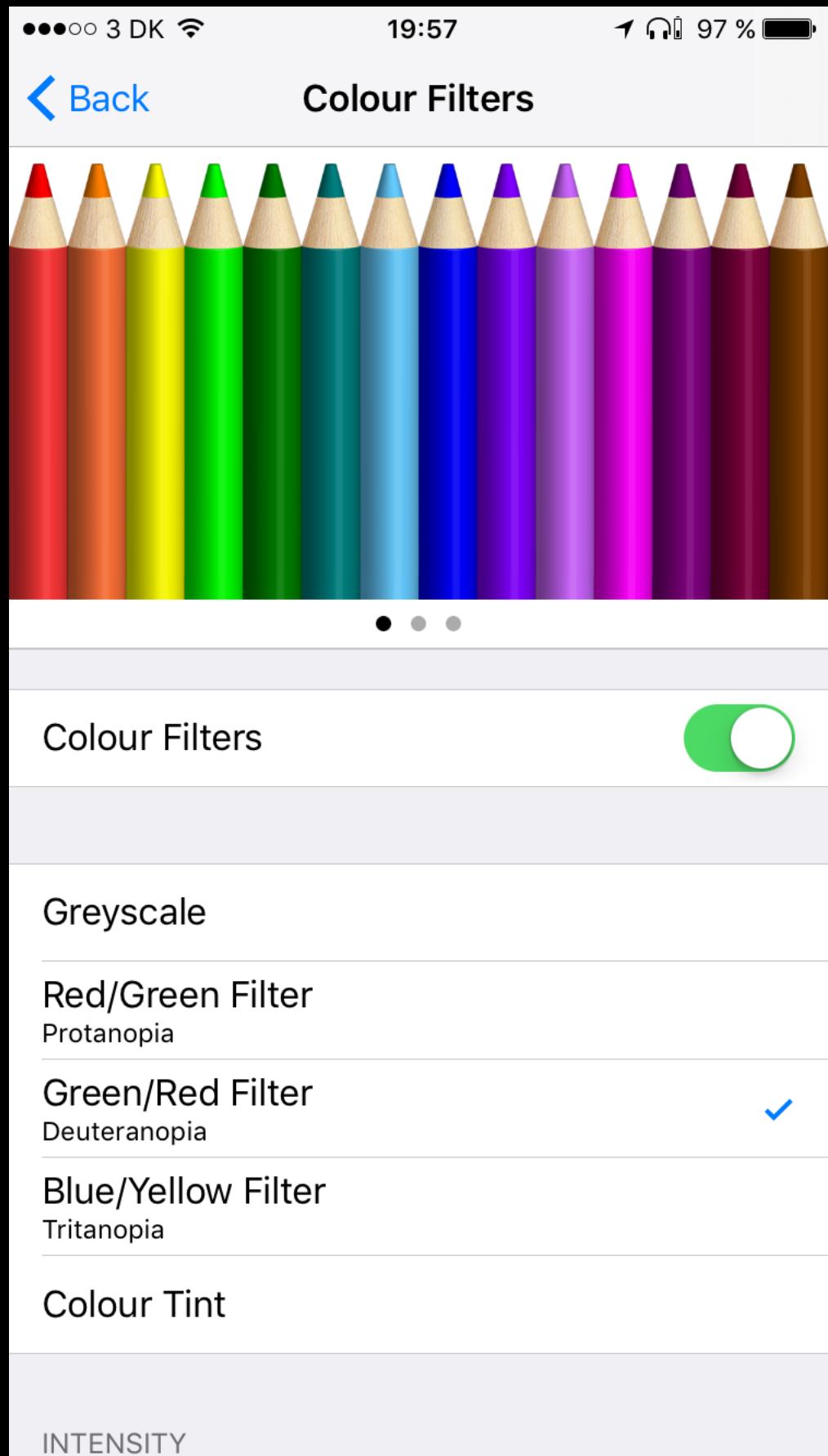
Text to speech



Dynamic Type



Color filters



Magnifier + Filters



More Accessibility features

- Display Zoom
- Color inversion
- Siri
- HomeKit
- VoiceOver

VoiceOver

VoiceOver

- Apple's screen-reading system
- Focus on one element at a time
 - *what's there? what does it do?*
 - go through elements by swiping over the screen

VoiceOver demo

What was good and what not?

Principles

- Context – *What's around?*
- Focus – *What am I looking at?*
- Action – *What happens when I click here?*

Designing and developing

<https://developer.apple.com/accessibility/>



- Easy to implement, you *get a lot for free*
- Standard UIKit controls and views are accessible by default
- Custom UI elements need more work

UIAccessibility protocol

Feeds VoiceOver

accessibilityLabel

accessibilityHint

accessibilityTraits

accessibilityLabel: "my name"

accessibilityHint: "what I do"

accessibilityTraits: "what I am"

accessibilityLabel: "Add note"

accessibilityHint: "Creates new note"

accessibilityTraits: Button

Example



Label

- ✓ accessibilityLabel is the text
- ⚠️ accessibilityHint
- ✓ accessibilityTrait is "Text"

Button

- ✓ accessibilityLabel is the title
- ⚠️ accessibilityHint
- ✓ accessibilityTrait is "Button"

Good 👍

Beware of state changes



Invite a friend over for dinner

Taking the time to cook and eat a meal with a friend is a sign of appreciation. It's also a good way to catch up in a safe and calm environment.

COMPLETE

I need help

Button

- ✗ accessibilityLabel is filename
- 🤔 accessibilityHint
- ✓ accessibilityTrait is "Button"
- ✗ state is not clear

Needs some work 🚧





Button

If no text, image resource name is used ⚡
e.g. "play_playing.png"

~~accessibilityLabel = "Play
button"~~

-> Don't include trait info in Label or Hint

```
button.accessibilityLabel = "Play. Not playing."  
button.accessibilityHint = "Double tap to play track"  
button.accessibilityTraits |= UIAccessibilityTraitButton
```

Label

Consider grouping track and artist label.



Localization

Localization

- accessibilityLabel and accessibilityHint
- **NOT** accessibilityTraits
- Explicitly define with accessibilityLanguage
- 🤞 You may have to apply tricks

Contextual grouping

Contextual grouping

- Avoid scattered elements
 - context might not become clear
- Group elements instead
 - create containers that sum subviews

Example: Twitter⁴



⁴ Source: <https://realm.io/news/sommer-panage-accessibility-implementation-ios/>

UICollectionViewCell

isAccessibilityElement = true



⚠ Full-screen cells

VoiceOver unintentionally jumps between cells while swiping.
It might even skip a few cells.

Do you have an idea?

Custom order of elements

```
self.view.accessibilityElements = [  
    self.emailButton as Any,  
    self.airbusLabel as Any,  
    self.boeingLabel as Any,  
    self.segmentControl as Any  
]
```

Special gestures

Special gestures

- VoiceOver offers special gestures
- Override to perform custom action
- If not implemented, default system action will be performed

Escape

Draw a "Z" on the screen using two fingers

Commonly used to dismiss a view controller

```
override func accessibilityPerformEscape() -> Bool {  
    self.dismiss(animated: true, completion: nil)  
    return true  
}
```

Magic Tap

Two-finger double tap on the screen

Perform most intended action

```
override func accessibilityPerformMagicTap() -> Bool {  
    // Perform most intended action (e.g. play/pause)  
    return true  
}
```

Three-Finger Scroll

A three-finger swipe that scrolls content vertically or horizontally

```
override func accessibilityScroll(...) -> Bool {  
    // Perform scroll  
    return true  
}
```

Increment and Decrement

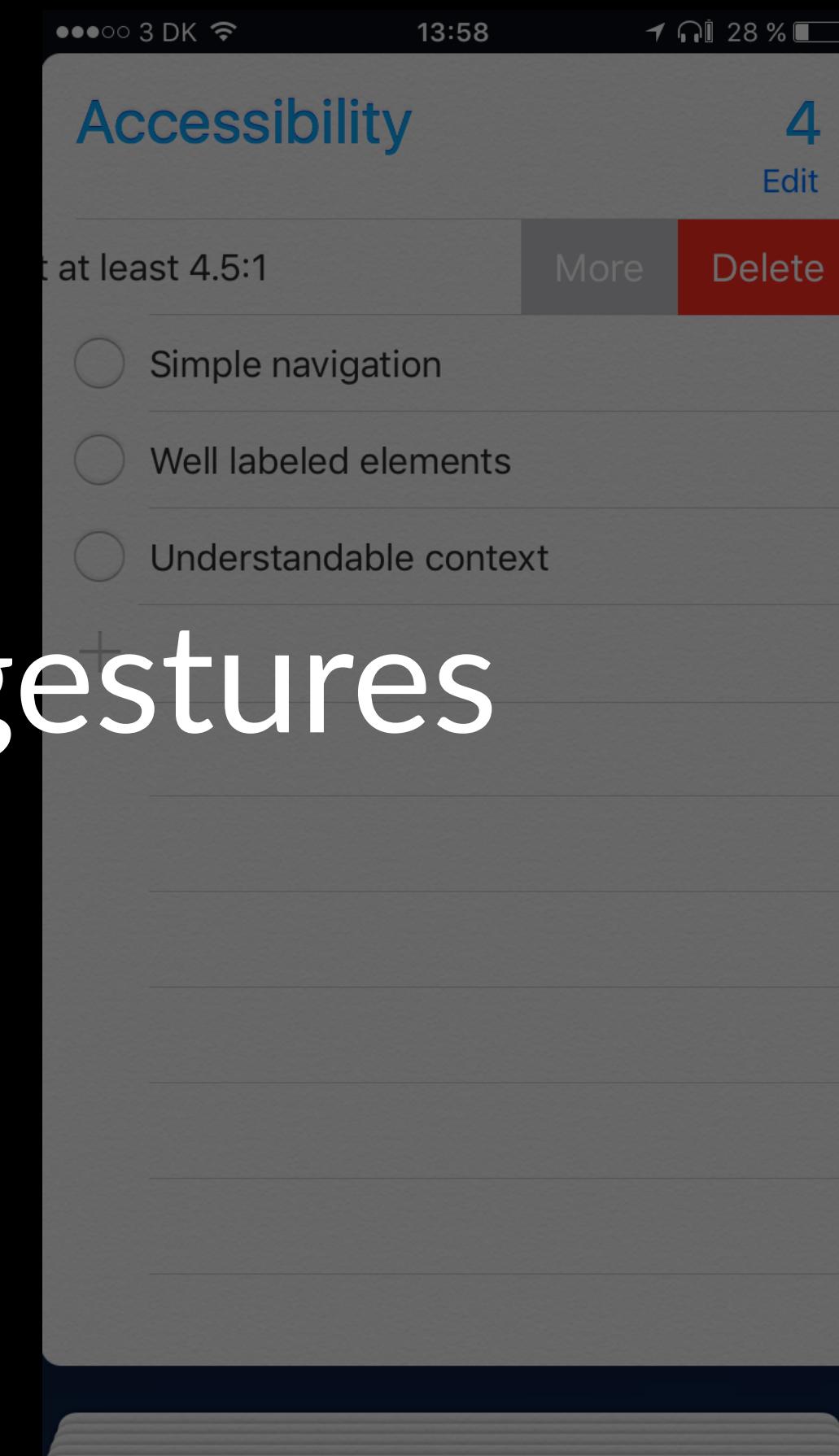
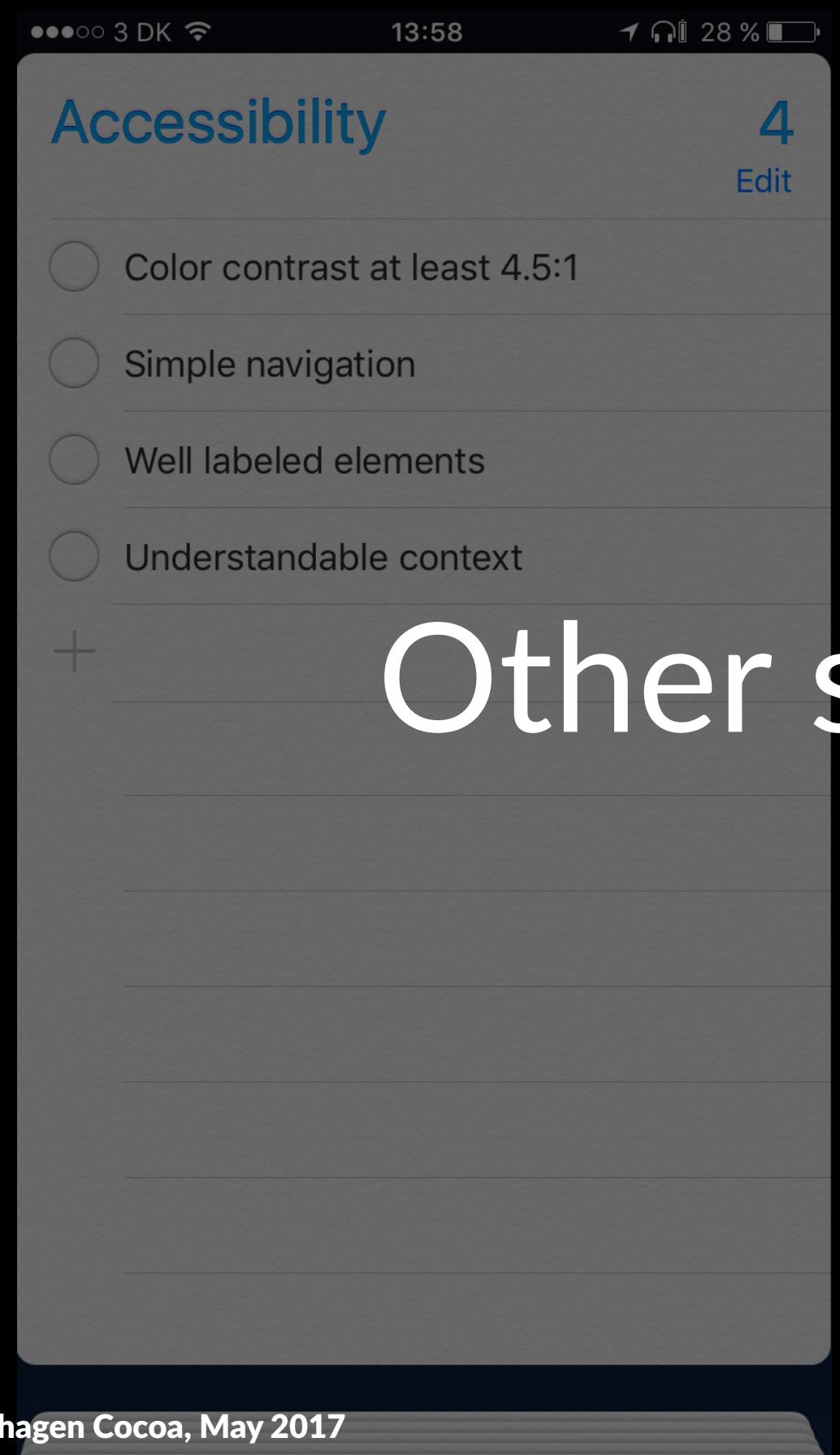
A one-finger swipe up/down that increments/decrements a value in an element.

```
override func accessibilityIncrement() {  
    // Increment.
```

```
}
```

```
override func accessibilityDecrement() {  
    // Decrement.
```

```
}
```



Other special gestures

Other special gestures

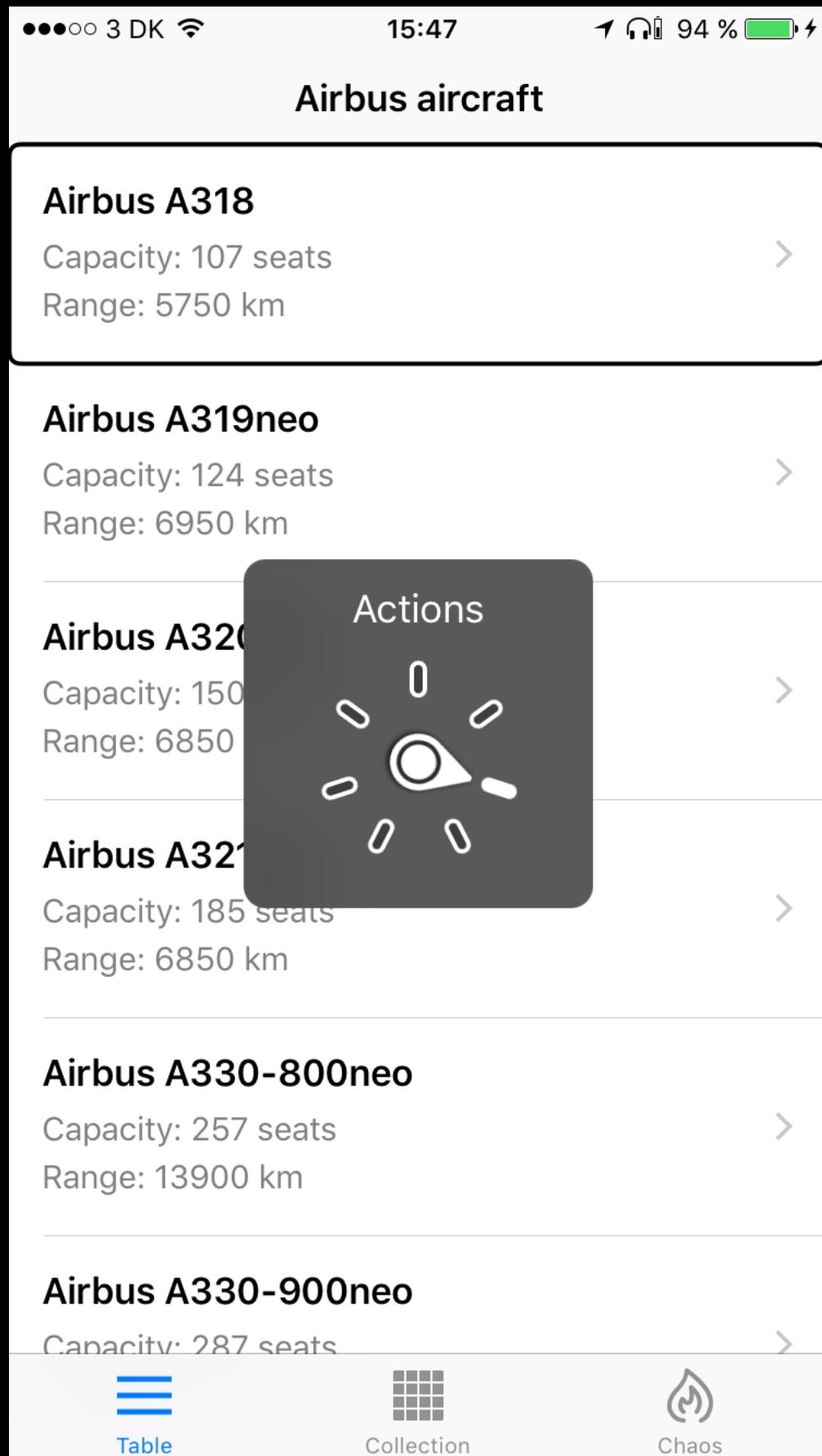
- swipe to delete
- long-press

👉 `UIAccessibilityCustomAction`

Custom actions

1. Spin two fingers in a circle
2. Swipe up/down with one finger to select an action
3. Double tap to execute

```
let more = UIAccessibilityCustomAction(  
    name: "More",  
    target: self,  
    selector: #selector(showMore))  
  
self.accessibilityCustomActions = [more]
```



Custom UI controls

- Build a container for your control
- Override UIAccessibility aspects where default value is incomplete/wrong
- You might have to override more properties
 - e.g. accessibilityFrame, accessibilityValue

Some advice

Keep your navigation simple

- Rely on existing navigation types
 - UITabBarController
 - UINavigationController

👉 they work best with VoiceOver

Less elements on one screen

- Don't display text as image
- Avoid discoverable, non-obvious elements
- Never indicate a state **only** by color
- Tap targets at least 44x44px
- Simple color scheme
- Color contrast for text: **4.5:1**

Color Contrast Checker

[Home](#) > [Resources](#) > Color Contrast Checker

Foreground color: #  [lighten](#) | [darker](#)

Background color: #  [lighten](#) | [darker](#)

Contrast Ratio: 6.12:1

Normal Text

WCAG AA: **Pass**

WCAG AAA: **Fail**

Sample: **I am normal text**

Large Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

Sample: **I am large text**

<http://webaim.org/resources/contrastchecker/>

Test with people who experience disabilities

Global Accessibility Awareness Day

May 18th 2017

<http://globalaccessibilityawarenessday.org>

Apple

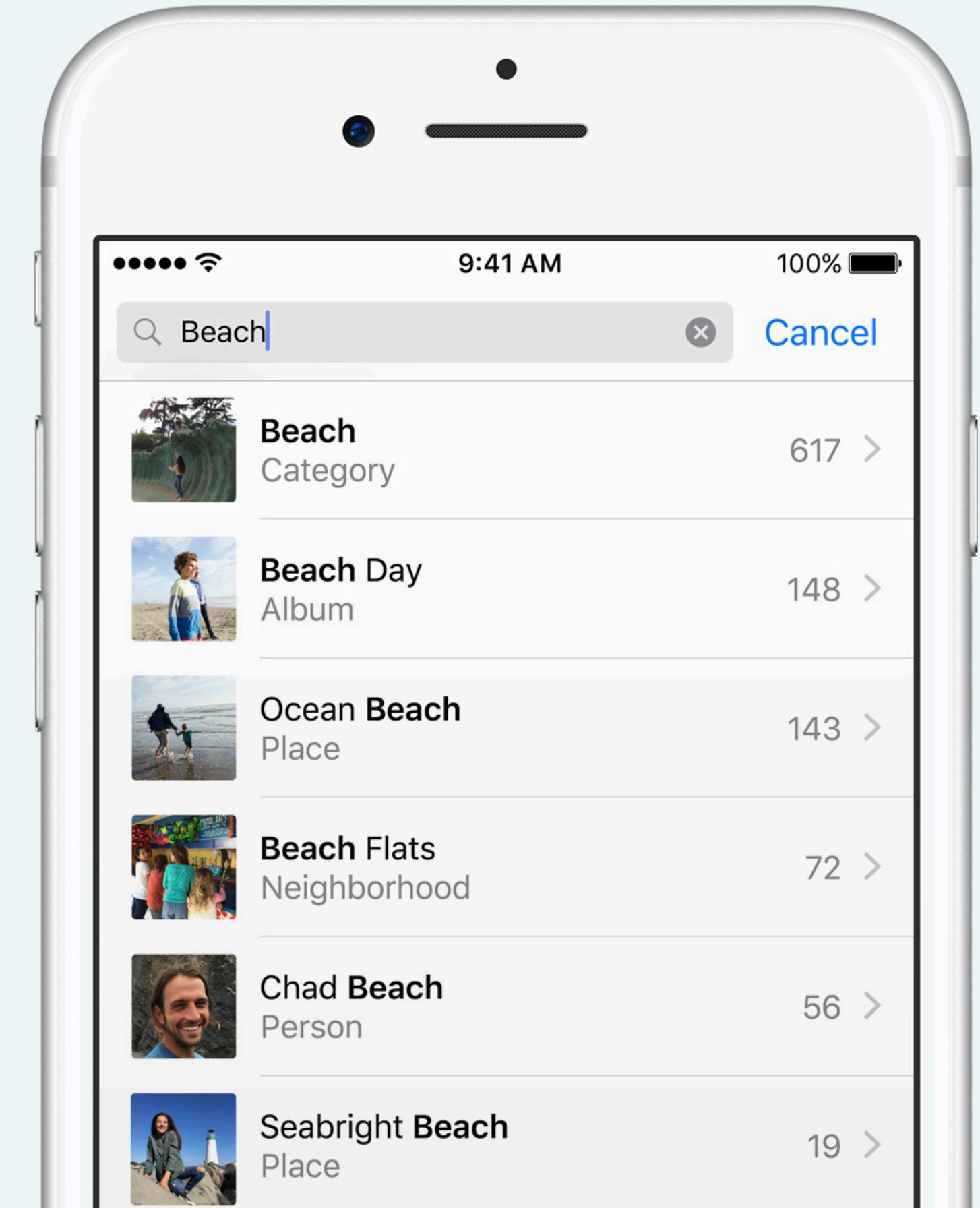
<https://www.apple.com/accessibility/>

VoiceOver in photos

Tell me what and who a picture shows and where it was taken.

»*This is a picture of your parents at the beach in Santa Monica.*«

Copenhagen Cocoa, May 2017



Start designing & developing for accessibility

- It's the right thing to do
- It shouldn't be an additional, time-consuming task
- Everybody can benefit from it

Accessible design is good design.

– *Steve Ballmer*

Universal design

Thanks!

Get in touch

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