



Accessibility

Barrierefreiheit



Fabian Ehlert
@fabianehlert



Steps
Kopenhagen



HTW
Dresden

```
graph TD; A((Bedeutung)) --- B((Technologien in iOS)); B --- C((UIAccessibility)); C --- D((Audit));
```

Bedeutung

Technologien
in iOS

UIAccessibility

Audit

Bedeutung von Accessibility

Menschen nehmen Dinge
unterschiedlich wahr.

Dauerhaft oder temporär

Situationsabhängig

*Was müssen wir tun, damit jeder unser
Produkt benutzen kann?*

Anforderungen

- Sehen
 - Geringes Sehvermögen
 - (Farben-) Blindheit
- Hören
- Wahrnehmung
- Motorische Einschränkungen
 - Lähmungen

Hardware







Accessibility

Sort By: Featured ▾

A grid of three accessibility products. The first two items are circular trackballs with a red face and a black base. The first one has a vertical cable extending upwards. The second one has a vertical cable extending upwards and a small circular hole at the top of the base. The third item is a square trackball with an orange face and a black base, also featuring a vertical cable extending upwards.



Bedeutung

Technologien
in iOS

UIAccessibility

Audit

Technologien in iOS



19:18

97 %

[Accessibility](#)

Larger Text

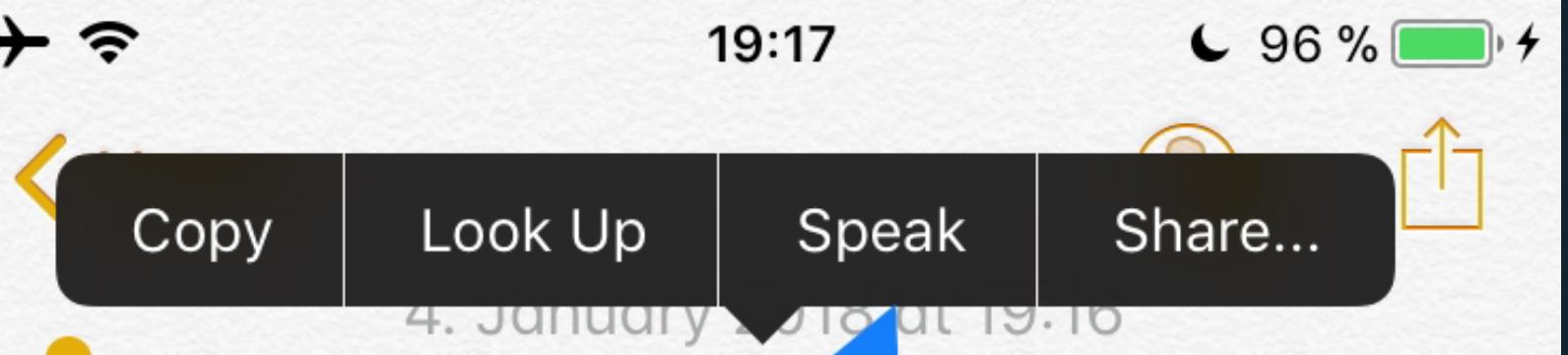
Larger Accessibility Sizes

Apps that support Dynamic Type will
adjust to your preferred reading size
below.

Dynamic Type



Sprachausgabe



Cupcake ipsum dolor sit amet. Sugar plum chocolate chupa chups gummies biscuit. Soufflé tiramisu icing cupcake apple pie marshmallow candy canes danish. Cookie marshmallow dessert tootsie roll macaroon pastry croissant fruitcake. Toffee sugar plum biscuit chocolate apple pie powder candy jujubes. Jelly fruitcake chocolate bar ice cream chocolate cake sweet roll croissant pudding chocolate cake. Bonbon toffee biscuit jujubes dragée croissant icing. Toffee tiramisu danish soufflé jujubes cake pastry icing danish.

Bear claw tootsie roll cheesecake chocolate cake liquorice cake muffin cookie. Icing icing fruitcake gummi bears pie pastry. Jelly-o cheesecake tiramisu apple pie cheesecake. Jelly muffin cupcake candy canes bonbon. Tart topping brownie dragée liquorice sugar plum danish. Pastry chocolate cake apple



19:26

98 %

Fotos

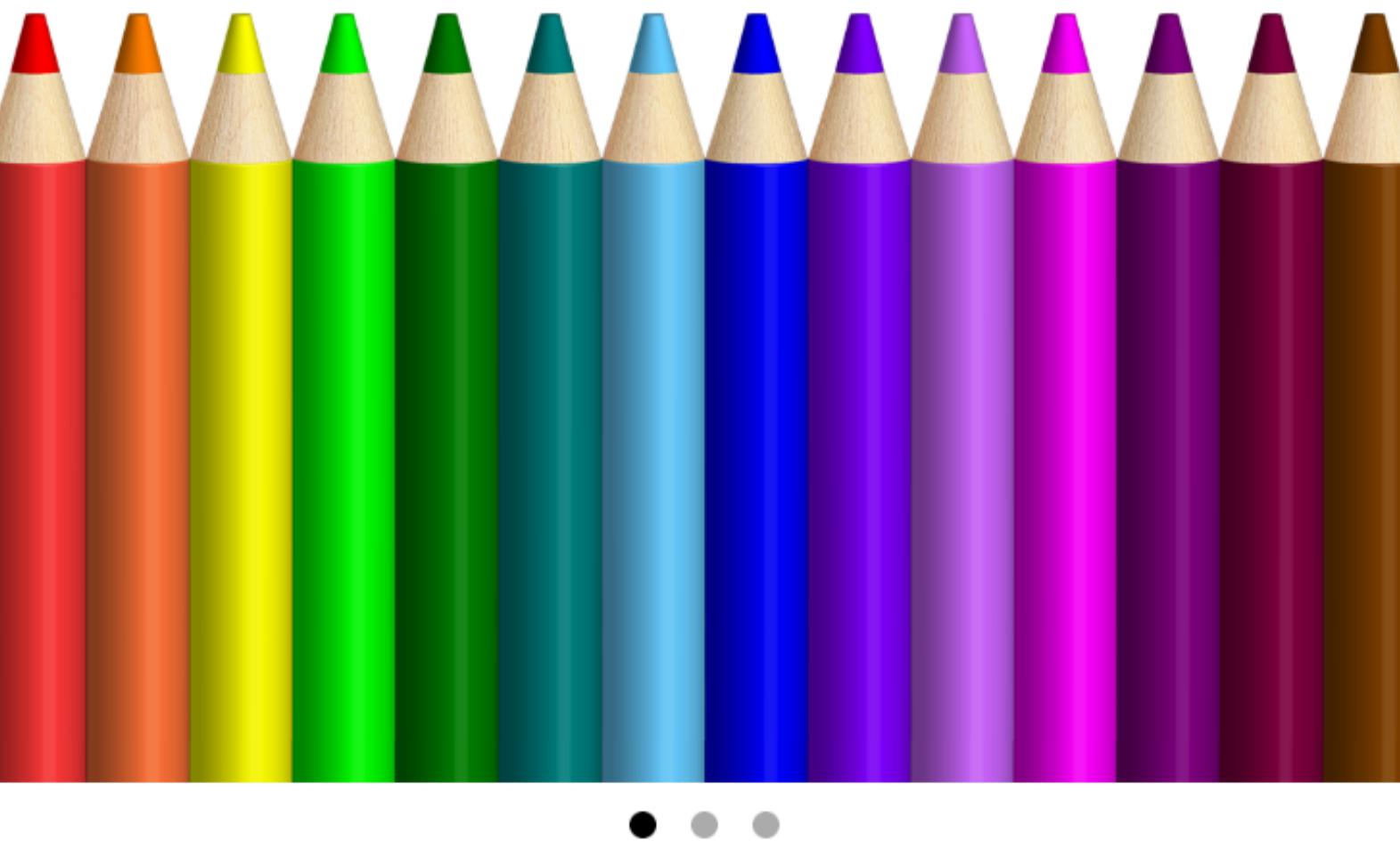
Search Cat 4 Possible Matches Select

0:19

Photos Memories Shared Albums

Farbfilter

[Display Accommodations](#) Colour Filters



Colour Filters



Greyscale

Red/Green Filter

Protanopia



Green/Red Filter

Deutanopia

Blue/Yellow Filter

Tritanopia

Colour Tint

Smart Invert



09:41 100 %

Jan 2018

M T W T F S S

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----|----|----|----|----|----|----|
| • | • | • | • | • | • | • |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| • | • | • | • | • | • | • |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| • | • | • | • | • | • | • |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| • | • | • | • | • | • | • |
| 29 | 30 | 31 | | | | |
| • | • | • | | | | |

07:30 BS I - Practical by Baumgartl
09:00 Z 136c

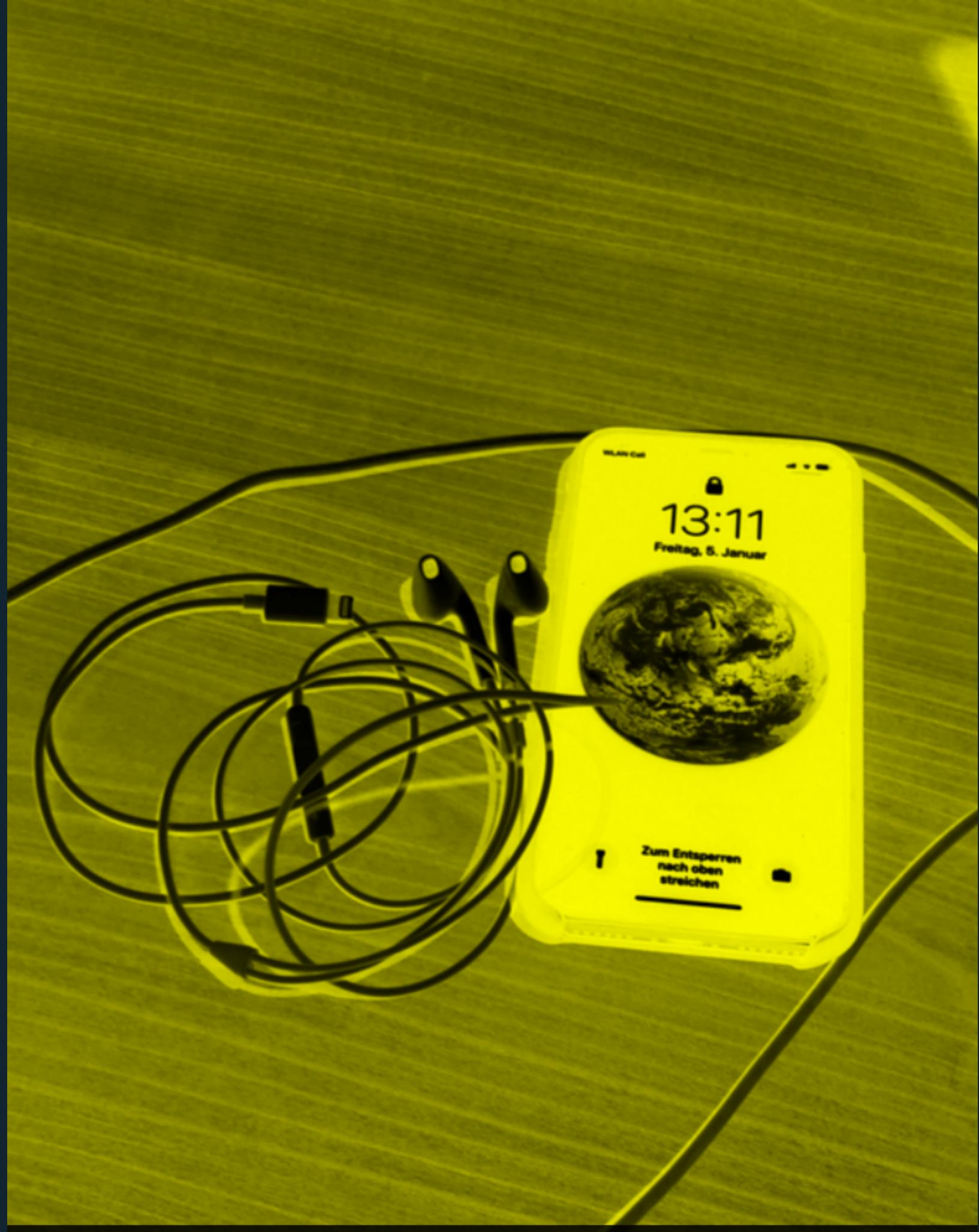
09:20 Mathe I - Lecture by Schwarzen...
10:50 S 409

11:10 Mathe I - Übung by Kohl
12:40 S 409

19:00 Cocoaheads
20:00

Today Calendars Inbox

Lupe + Filter



GREyscale



YELLOW/BLACK



RED/BLACK





16:08

87 %

Hören

[General](#)**Accessibility**

HEARING

MFi Hearing Devices >

Textphone

Off >

LED Flash for Alerts

Off >

Mono Audio



Phone Noise Cancellation



Noise cancellation reduces ambient noise on phone calls when you are holding the receiver to your ear.

L

R



Adjust the audio volume balance between left and right channels.

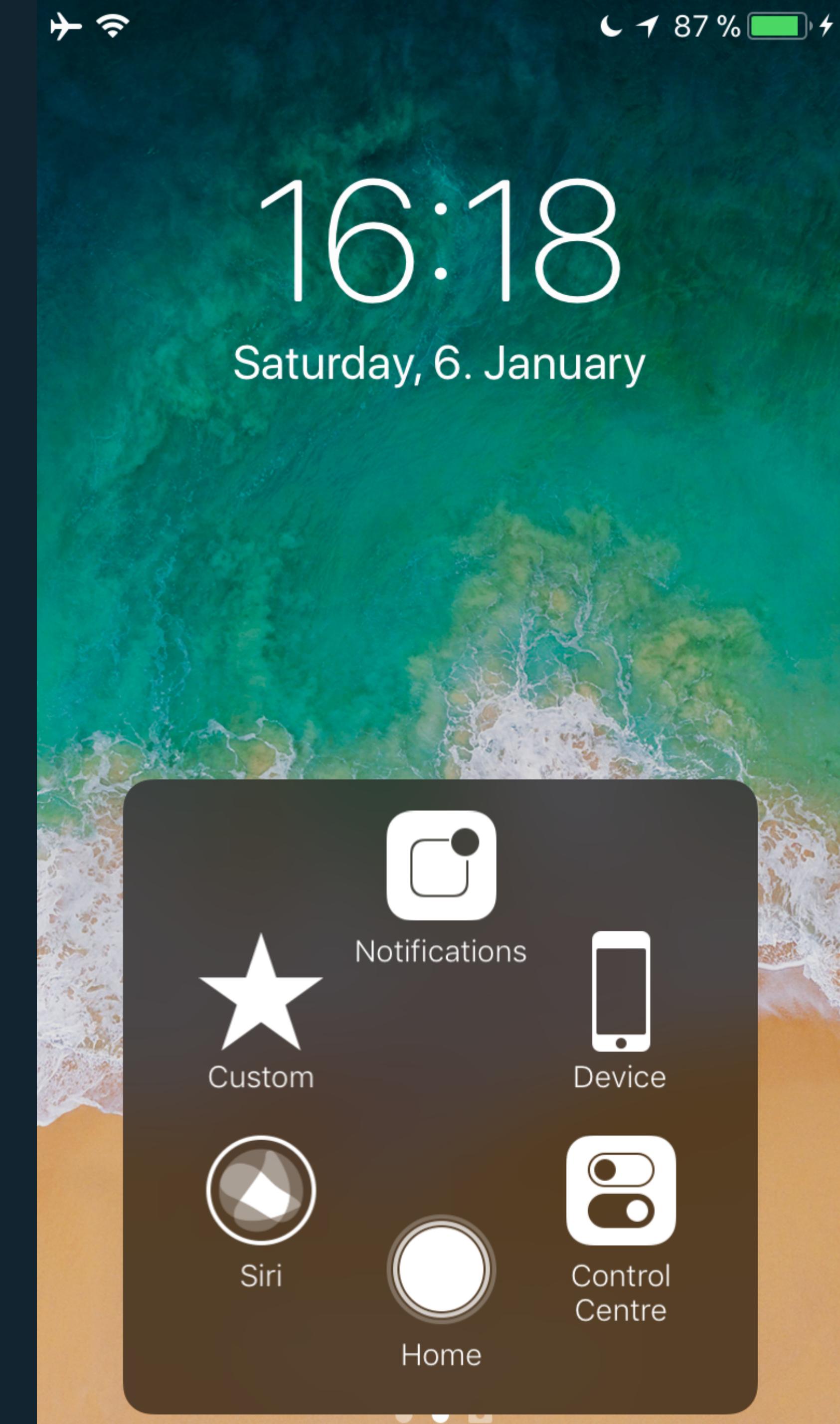
Hearing Aid Compatibility



Hearing Aid Compatibility improves audio quality with some hearing aids.

MEDIA

AssistiveTouch



VoiceOver

Accessibility VoiceOver

VoiceOver



VoiceOver speaks items on the screen:

- Tap once to select an item
- Double-tap to activate the selected item
- Swipe three fingers to scroll

SPEAKING RATE



Speech >

Verbosity >

Braille >

Audio >

Rotor >

Rotor Actions >

VoiceOver

- Beschreibt Elemente* auf dem Bildschirm
 - *Was bin ich?*
 - *Wer genau bin ich?*
 - *Was mache ich?*
- Fokus auf ein Element
- Durch Elemente via Wischgeste gehen
- Ganzer Bildschirm zur Eingabe verwendbar

*) *UIAccessibilityElement*. z.B. *UIButton*, *UILabel*, *UISwitch*, ...

Demo

Jan Blüher @visorApps



UIAccessibility

UIAccessibility

- Einfach zu implementieren
- Standard UIKit Objekte sind accessible by default
- Eigene UI Objekte benötigen etwas mehr Arbeit

Grundlagen

Properties I

- accessibilityLabel
 - „Wer bin ich?“
- accessibilityHint
 - „Was mache ich?“
 - Wird nicht immer vorgelesen
- accessibilityTraits
 - „Was bin ich?“

Properties II

- accessibilityValue
 - „Welchen Wert habe ich?“
- isAccessibilityElement
 - „Will ich erkannt werden?“
- accessibilityLanguage
 - „In welcher Sprache soll ich ausgesprochen werden?“

Praxis

Demo-Projekt

[github.com/fabianehlert/
KakaoAccess](https://github.com/fabianehlert/KakaoAccess)

Table

Airbus A319neo



6950 km range
140 seats
64.0 tons

Airbus A320neo



6500 km range
165 seats
73.5 tons

Airbus A321neo



7400 km range
206 seats
89.0 tons

Airbus A330-800neo



13900 km range
257 seats
242.0 tons

Airbus A350-900



Table



Collection



Controls

Settings Button

Settings Button 🤔

09:41 100 %



Controls



Think Different

Here's to the crazy ones.
The misfits.
The rebels.
The troublemakers.

The round pegs in the square holes.
The ones who see things differently.
They're not fond of rules.
And they have no respect for the status quo.
You can quote them, disagree with them, glorify
or vilify them.
But the only thing you can't do is ignore them.
Because they change things.
They push the human race forward.
And while some may see them as the
crazy ones,
We see genius.

Because the people who are crazy enough
to think
they can change the world,
Are the ones who do.



Settings Button

```
button.accessibilityLabel = "Settings"
```



Controls



Settings Button 😊

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Table



Collection



Controls

Image Views

Smart Invert 🤔

Collection



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Image Views

```
imageView.accessibilityIgnoresInvertColors = true
```



Smart Invert 😇

Collection



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Airbus A320neo

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Accessibility Shortcuts

Smart Invert

Colour Filters

VoiceOver

Cancel

Collection View

TableView 😇

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Table



Collection



Controls

Collection View 🤔

Collection



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242.0 tons



Collection View Cell

```
isAccessibilityElement = true  
labels.forEach { $0.isAccessibilityElement = false }  
  
let label = model.name + ", " + model.range + ...  
accessibilityLabel = label
```

Collection View 😇

Collection



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Settings Cell

Settings Cell 🤔

09:41 100 %

< Controls

Settings

FRUITS

Banana 🍌



Strawberry 🍓



Apple 🍏



Lemon 🍋



Table



Collection



Controls

Settings Cell

```
isAccessibilityElement = true
```

```
toggle.isAccessibilityElement = false
```

```
accessibilityValue = toggle.isOn ? "On" : "Off"
```

```
accessibilityHint = "Double tap to toggle"
```

Settings Cell

```
override func accessibilityActivate() -> Bool {  
    toggle.setOn(!toggle.isOn, animated: true)  
    return true  
}
```

Settings Cell 😇

09:41 100 %

< Controls

Settings

FRUITS

Banana 🍌



Strawberry 🍓



Apple 🍏



Lemon 🍋



Table



Collection



Controls

Page Control



Controls



Page Control 🤔

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Table



Collection



Controls

Page Control I

```
control.isAccessibilityElement = true
```



Controls



Page Control 😊

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Controls

Page Control II

accessibilityTraits |= UIAccessibilityTraitAdjustable



Controls



Page Control 😊

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Table



Collection



Controls

Page Control III

```
let value = "Page \current of \max"  
control.accessibilityValue = value
```



Controls



Page Control 😊

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Table



Collection



Controls

Page Control IV

```
override func accessibilityIncrement() {  
    control.increment()  
}
```

```
override func accessibilityDecrement() {  
    control.decrement()  
}
```



Controls



Page Control 😊

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Table



Collection



Controls

*Wie erkennt VoiceOver die
letzte Seite des Page Control?*



Controls



accessibilityValue = arc4random()

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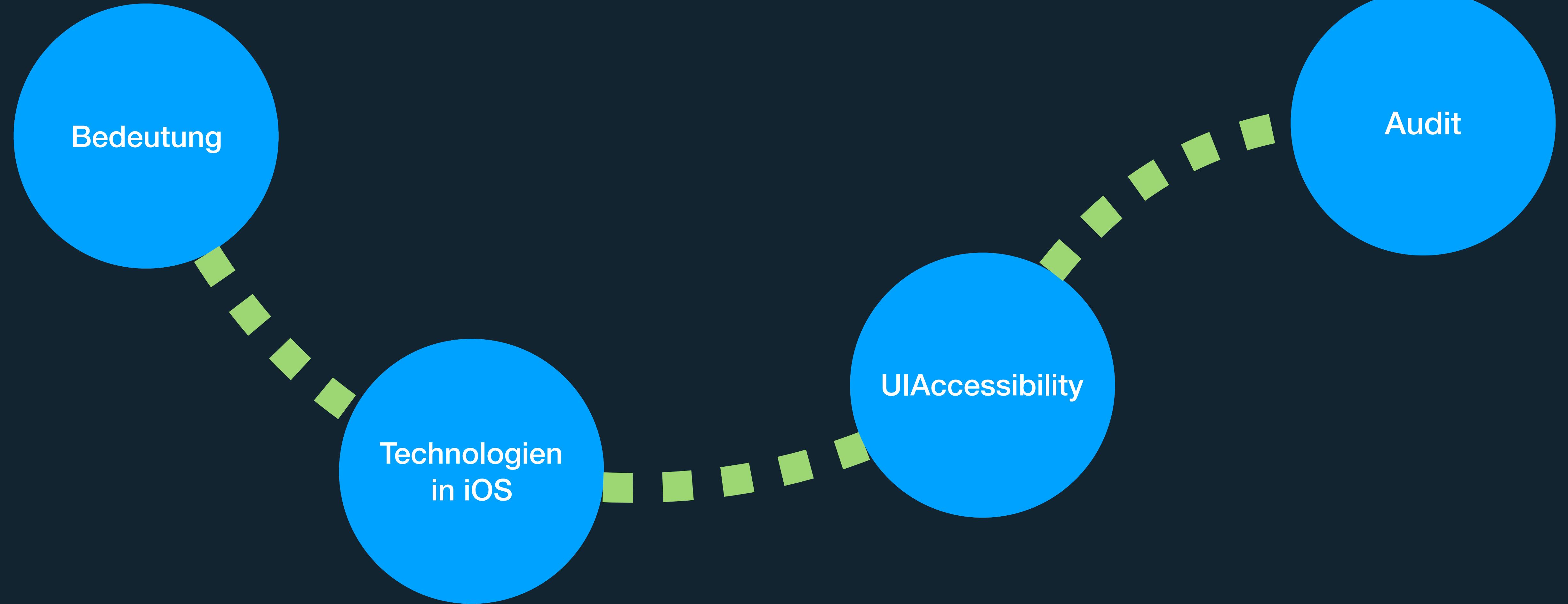
Table



Collection



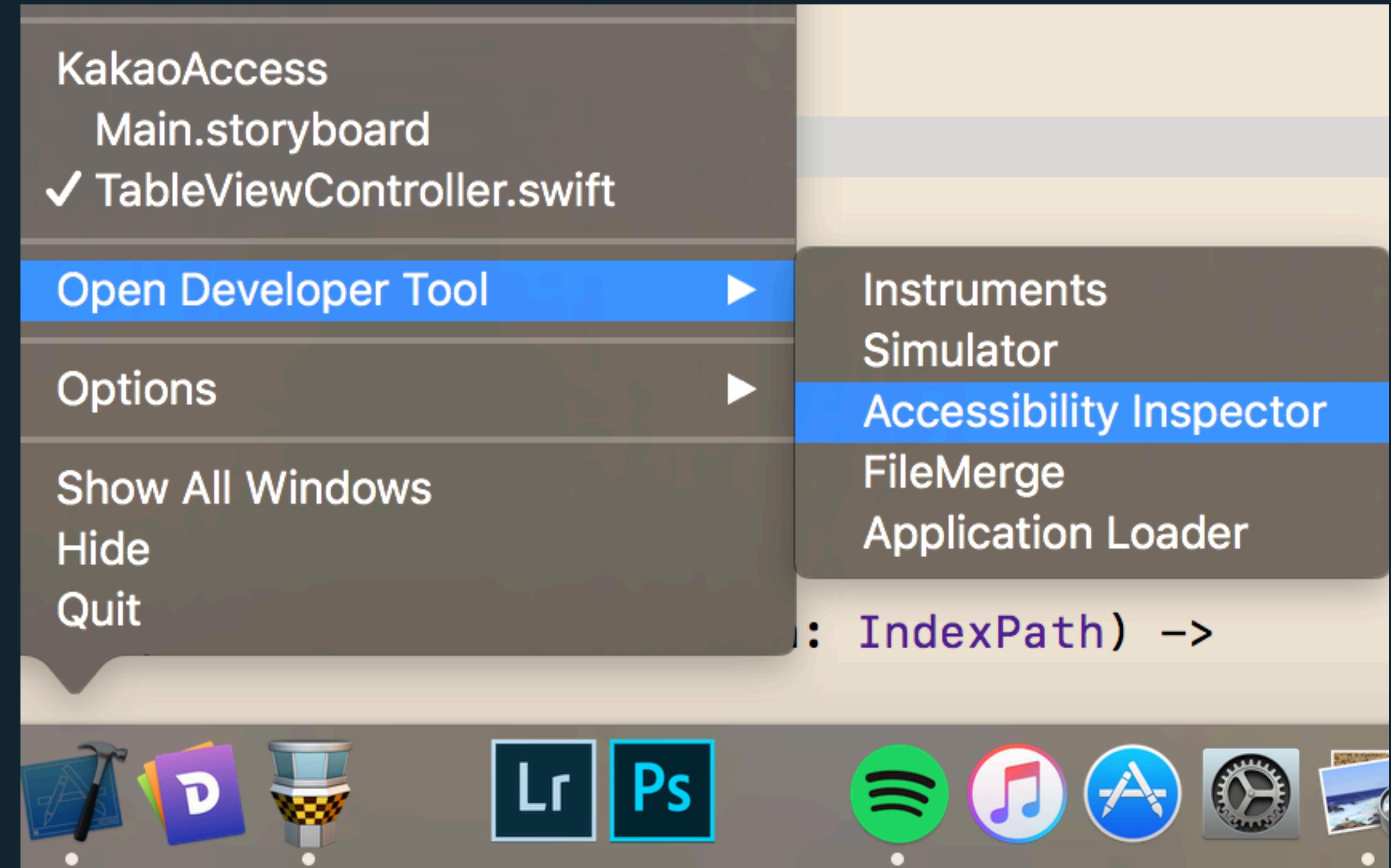
Controls



Audit

Mit Nutzern testen

Demo Accessibility Inspector



Tipps

Text nicht als Bild anzeigen

Simples Farbschema

Buttons ohne Text brauchen
ein Label

UIKit verwenden

Erlebnis

Andere Apps ausprobieren

Was haben wir gelernt?

Weniger Elemente

Fokus

Kontext

accessibilityLabel

accessibilityHint

accessibilityValue

accessibilityTrait

accessibilityLabel

Custom rotors

Custom actions

Notifications

Texterkennung

Container

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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Danke

Switch control

VoiceOver

The right thing

AssistiveTouch

Night Shift



Inclusion

Dynamic Type

Discover

Siri

Dictation

Guided access