Deliver an Exceptional Accessibility Experience

Session 230

Skylar Peterson, Software Engineer
Bhavya Garg, Software Engineer
Making technology usable by everyone
Cognitive
Motor
Vision
Hearing
The Basics

Check out existing resources

Still lots to gain from today’s session

<table>
<thead>
<tr>
<th>What’s New in Accessibility</th>
<th>WWDC 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design for Everyone</td>
<td>WWDC 2017</td>
</tr>
<tr>
<td>Media and Gaming Accessibility</td>
<td>WWDC 2017</td>
</tr>
</tbody>
</table>
Making technology usable by everyone
usable
usable
exceptional
Visual Design

Assistive Technology Experience
Visual Design

Assistive Technology Experience
Visual Design

Transparency and Blurring
Contrast
Sizing
Motion
Complexity
// Transparency and Blurring

// iOS
extension UIAccessibility {
    public static var isReduceTransparencyEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceTransparency: Bool { get }
}
// Transparency and Blurring

// iOS
extension UIAccessibility {
    public static var isReduceTransparencyEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceTransparency: Bool { get }
}
// Transparency and Blurring

// iOS
extension UIAccessibility {
    public static var isReduceTransparencyEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceTransparency: Bool { get }
}
Visual Design

Transparency and Blurring

Contrast

Sizing

Motion

Complexity
Contrast
Contrast
Contrast
Contrast
Contrast
Minimum Contrast Ratio

Follow the WCAG 2.0 guidelines

• Minimum contrast should be 4.5:1

• https://www.w3.org/TR/WCAG20/
Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla. Aliquam ac libero nec nunc lobortis varius.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla. Aliquam ac libero nec nunc lobortis varius.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla. Aliquam ac libero nec nunc lobortis varius. Praesent et mi vulputate, rutrum ligula in, ultrices nisi.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla. Aliquam ac libero nec nunc lobortis varius.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In nec ultrices mauris, a blandit nulla. Aliquam ac libero nec nunc lobortis varius. Praesent et mi vulputate, rutrum ligula in, ultrices nisi.
// Increase Contrast (Darken Colors)

// iOS
extension UIAccessibility {
    public static var isDarkerSystemColorsEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldIncreaseContrast: Bool { get }
}
// Increase Contrast (Darken Colors)

// iOS
extension UIAccessibility {
    public static var isDarkerSystemColorsEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldIncreaseContrast: Bool { get }
}
// Increase Contrast (Darken Colors)

// iOS
extension UIAccessibility {
    public static var isDarkerSystemColorsEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldIncreaseContrast: Bool { get }
}
Visual Design

Transparency and Blurring
Contrast
Sizing
Motion
Complexity
Fri Jun 8
Dentist Appointment
1:00 – 2:00 PM
Apple Park Wellness Center

Thu Jun 14
Flag Day

Fri Jun 15
Eid al-Fitr
UIContentSizeCategory

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

extraSmall
small
medium
large
extraLarge
extraExtraLarge
extraExtraExtraLarge
Larger Accessibility Sizes

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

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.
extension UIAccessibility {
    public static var isBoldTextEnabled: Bool { get }
}

// Bold Text
extension UIAccessibility {
    public static var isBoldTextEnabled: Bool { get }
}

// Bold Text
Visual Design

Transparency and Blurring
Contrast
Sizing
Motion
Complexity
Warning!

Vestibular motion triggers
Motion Trigger 1
Scaling and zooming
Motion Trigger 1
Scaling and zooming
Motion Trigger 1
Scaling and zooming
Motion Trigger 2
Spinning and vortex effects
Motion Trigger 2
Spinning and vortex effects
Motion Trigger 3
Plane shifting animations
Motion Trigger 3
Plane shifting animations
Motion Trigger 3
Plane shifting animations
Motion Trigger 4
Multi-directional or multi-speed motion
Motion Trigger 4
Multi-directional or multi-speed motion
Motion Trigger 4
Multi-directional or multi-speed motion
Motion Trigger 5
Peripheral movement
Motion Trigger 5
Peripheral movement
// Motion

// iOS
extension UIAccessibility {
    public static var isReduceMotionEnabled: Bool {
        get
    }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceMotion: Bool {
        get
    }
}
// Motion

// iOS
extension UIAccessibility {
    public static var isReduceMotionEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceMotion: Bool { get }
}
// Motion

// iOS
extension UIAccessibility {
    public static var isReduceMotionEnabled: Bool { get }
}

// macOS
extension NSWorkspace {
    open var accessibilityDisplayShouldReduceMotion: Bool { get }
}
Visual Design

Transparency and Blurring
Contrast
Sizing
Motion
Complexity
1 in 6

Children have a developmental disability in the U.S.

https://www.cdc.gov/ncbddd/developmentaldisabilities/index.html
Easy to navigate
Quick to get started
Consistent behavior
Experience
Visual Design
Assistive Technology Experience
Wanna meet in 5 mins

Let’s do it!

Hey there, how are you feeling about the talk?

I feel like it’s coming together pretty well!

Hopefully our developers will feel the same

How’s the demo looking?

Delivered

Exceptional!

No but really, I think it’s gonna go well 👍

Can’t wait!
Wanna meet in 5 mins

Hey there, how are you feeling about the talk?

I feel like it’s coming together pretty well!

Hopefully our developers will feel the same

How’s the demo looking?

Exceptional!

No but really, I think it’s gonna go well 👍

Can’t wait!

Let’s do it!

Feel like it’s coming together pretty well!

Hopefully our developers will feel the same

How’s the demo looking?

Exceptional!

No but really, I think it’s gonna go well 👍

Can’t wait!
Wanna meet in 5 mins

Hey there, how are you feeling about the talk?

I feel like it’s coming together pretty well!

Hopefully our developers will feel the same

How’s the demo looking?

Delivered

Exceptional!

No but really, I think it’s gonna go well 😊

Can’t wait!

Let’s do it

I feel like it’s coming together pretty well!

Hopefully our developers will feel the same

How’s the demo looking?

Delivered

Exceptional!

No but really, I think it’s gonna go well 😊

Can’t wait!
What makes an accessible experience exceptional?
It works
It works well
An Exceptional Experience

Easy to navigate

Quick and prioritized interaction

Predictable

Context
Demo

Auditing an app’s accessibility experience

Bhavya Garg, Software Engineer
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

ATTITUDE: energetic, loyal

Skylar's Animal Shelter
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**ATTITUDE**: energetic, loyal

Skylar's Animal Shelter
Reachable
// Custom Accessibility Elements

public class UIAccessibilityElement : NSObject {
    public init(accessibilityContainer container: Any)
}

extension NSObject {
    open var accessibilityElements: [Any]?}

/ Custom Accessibility Elements

```swift
public class UIAccessibilityElement : NSObject {
    public init(accessibilityContainer container: Any)
}

extension NSObject {
    open var accessibilityElements: [Any]?
}
```
// Custom Accessibility Elements

public class UIAccessibilityElement : NSObject {
    public init(accessibilityContainer container: Any)
}

extension NSObject {
    open var accessibilityElements: [Any]?
}
NAME: Bro  BREED: Corgi
AGE: 7.0 years  WEIGHT: 25.0 lbs
GENDER: Male  FOSTERED: Yes
ATTITUDE: energetic, loyal

Skylar's Animal Shelter
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**ATTITUDE**: energetic, loyal

Skylar’s Animal Shelter
// Increment and Decrement

extension NSObject {
    // Must have UIAccessibilityTraits.adjustable
    open func accessibilityIncrement()
    open func accessibilityDecrement()
}
// Increment and Decrement

extension NSObject {
    // Must have UIAccessibilityTraits.adjustable
    open func accessibilityIncrement()
    open func accessibilityDecrement()
}
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

ATTITUDE: energetic, loyal

Skylar's Animal Shelter
Context
Quick navigation
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>energetic, loyal</td>
</tr>
</tbody>
</table>

Skylar's Animal Shelter
<table>
<thead>
<tr>
<th><strong>NAME</strong></th>
<th><strong>BREED</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AGE</strong></th>
<th><strong>WEIGHT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GENDER</strong></th>
<th><strong>FOSTERED</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ATTITUDE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>energetic, loyal</td>
</tr>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Bro</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**ATTITUDE**  
energetic, loyal

Skylar's Animal Shelter
NAME: Bro
BREED: Corgi
AGE: 7.0 years
WEIGHT: 25.0 lbs
GENDER: Male
FOSTERED: Yes
ATTITUDE: energetic, loyal

Skylar's Animal Shelter
Context
Quick navigation
Prioritized
extension NSObject {
    open var accessibilityCustomActions: [UIAccessibilityCustomAction]?
}

class UIAccessibilityCustomAction : NSObject {
    open var name: String
    open var target: AnyObject?
    open var selector: Selector

    public init(name: String, target: Any?, selector: Selector)
}
// Custom Actions

extension NSObject {
    open var accessibilityCustomActions: [UIAccessibilityCustomAction]?
}

class UIAccessibilityCustomAction : NSObject {
    open var name: String
    open var target: AnyObject?
    open var selector: Selector

    public init(name: String, target: Any?, selector: Selector)
}
// Custom Actions

extension NSObject {
    open var accessibilityCustomActions: [UIAccessibilityCustomAction]?
}

class UIAccessibilityCustomAction : NSObject {
    open var name: String
    open var target: AnyObject?
    open var selector: Selector

    public init(name: String, target: Any?, selector: Selector)
}
// Custom Actions

extension NSObject {
    open var accessibilityCustomActions: [UIAccessibilityCustomAction]?
}

class UIAccessibilityCustomAction : NSObject {
    open var name: String
    open var target: AnyObject?
    open var selector: Selector

    public init(name: String, target: Any?, selector: Selector)
}
<table>
<thead>
<tr>
<th>NAME</th>
<th>BREED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bro</td>
<td>Corgi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 years</td>
<td>25.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FOSTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Attitude:** energetic, loyal

Skylar's Animal Shelter
Where am I?
// Modality

extension UIView {
    open var accessibilityViewIsModal: Bool
}

// Modality

extension UIView {
    open var accessibilityViewIsModal: Bool
}
// Screen Change

extension UIAccessibility {
    public static func post(notification: UIAccessibility.Notification, argument: Any?)
}

extension UIAccessibility.Notification {
    public static var screenChanged: UIAccessibility.Notification
}
extension UIAccessibility {
    public static func post(notification: UIAccessibility.Notification, argument: Any?) {
    }
}

extension UIAccessibility.Notification {
    public static var screenChanged: UIAccessibility.Notification {
    }
}
// Screen Change

extension UIAccessibility {
    public static func post(notification: UIAccessibility.Notification, argument: Any?) {
    }
}

extension UIAccessibility.Notification {
    public static var screenChanged: UIAccessibility.Notification {
    }
}
Demo
Developing an exceptional experience

Bhavya Garg, Software Engineer
usable
exceptional
Summary
Design your app for accessibility from the beginning
Summary

Design your app for accessibility from the beginning

Tweak based on enabled settings when necessary
Design your app for accessibility from the beginning
Tweak based on enabled settings when necessary
Craft the accessibility experience purposefully
More Information


Accessibility Lab

Technology Lab 9

Friday 11:00AM