# Color Contrast for Accessibility

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STOP

止まれ

# Main Content

## Secondary Text

### Placeholder

| #FFD1D1 #000000 15.3:1 | #FFC5C5 #000000 14:1 | #FF6060 #000000 7:1 | #FF0000 #000000 5.25:1 | #EA0000 #000000 4.5:1 | #B70000 #000000 3:1 | #9E0000 #000000 2.4:1 | #600000 #000000 1.5:1 |
|---|---|---|---|---|---|---|---|
| #00FF00 #000000 15.3:1 | #00F400 #000000 14:1 | #00AD00 #000000 7:1 | #009000 #000000 5.25:1 | #008800 #000000 4.5:1 | #006800 #000000 3:1 | #005900 #000000 2.4:1 | #003400 #000000 1.5:1 |
| #D9D9FF #000000 15.3:1 | #CFCFFF #000000 14:1 | #8888FF #000000 7:1 | #6C6CFF #000000 5.25:1 | #5D5DFF #000000 4.5:1 | #3131FF #000000 3:1 | #0000FF #000000 2.4:1 | #00009F #000000 1.5:1 |
| #DCDCDC #000000 15.3:1 | #D3D3D3 #000000 14:1 | #959595 #000000 7:1 | #7F7F7F #000000 5.25:1 | #747474 #000000 4.5:1 | #595959 #000000 3:1 | #4B4B4B #000000 2.4:1 | #2C2C2C #000000 1.5:1 |

# The HIG (Apple's Human Interface Guidelines)

https://developer.apple.com/design/human-interface-guidelines/

# Web Content Accessibility Guidelines

https://www.w3.org/TR/WCAG20/

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| #FFD1D1 15.3:1 | #FFC5C5 14:1 | #FF6060 7:1 | #FF0000 5.25:1 | #EA0000 4.5:1 | #B70000 3:1 | #9E0000 2.4:1 | #600000 1.5:1 |
| #00FF00 15.3:1 | #00F400 14:1 | #00AD00 7:1 | #009000 5.25:1 | #008800 4.5:1 | #006800 3:1 | #005900 2.4:1 | #003400 1.5:1 |
| #D9D9FF 15.3:1 | #CFCFFF 14:1 | #8888FF 7:1 | #6C6CFF 5.25:1 | #5D5DFF 4.5:1 | #3131FF 3:1 | #0000FF 2.4:1 | #00009F 1.5:1 |
| #DCDCDC 15.3:1 | #D3D3D3 14:1 | #959595 7:1 | #7F7F7F 5.25:1 | #747474 4.5:1 | #595959 3:1 | #4B4B4B 2.4:1 | #2C2C2C 1.5:1 |

7

4.5

# Color Contrast Checker

Home > Resources > Color Contrast Checker

## Foreground Color

#0000FF

#0000FF

Lightness

## Background Color

#FFFFFF

#FFFFFF

Lightness

Contrast Ratio

**8.59**:1

permalink

https://webaim.org/resources/contrastchecker/

$$CC = \begin{cases} \dfrac{CC_{sRGB}}{12.92}, & \text{if } CC_{sRGB} \leq 0.03928 \\[2em] \left(\dfrac{CC_{sRGB} + 0.055}{1.055}\right)^{2.4}, & \text{otherwise} \end{cases}$$

$$L = 0.2126 \times R + 0.7152 \times G + 0.0722 \times B$$

$$contrast = \frac{L_1 + 0.05}{L_2 + 0.05}$$

```swift
func relativeLuminance(_ color: CGColor) -> CGFloat {
    let sRGBColorSpace = CGColorSpaceMakeSRGB // ???
    let sRGB = color.converted(to: sRGBColorSpace,
                               intent: .defaultIntent,
                               options: nil)!.components!
    let adjusted = sRGB.map { (c) -> CGFloat in
        if c <= 0.03928 { return c / 12.92
        } else { return pow((c + 0.055)/1.055, 2.4) }
    }
    return 0.2126 * adjusted[0] +
           0.7152 * adjusted[1] +
           0.0722 * adjusted[2]
}


func contrastRatio(_ foreground: CGColor, _ background: CGColor) -> CGFloat {
    let ratio = (foreground + 0.05) / (background + 0.05)
    return ratio > 1 ? ratio : 1 / ratio
}
```

```swift
let sRGBColorSpace = CGColorSpaceMakeSRGB // ???
let sRGB = color.converted(to: sRGBColorSpace,
                           intent: .defaultIntent,
                           options: nil)!.components!
```

```
let adjusted = sRGB.map { (c) -> CGFloat in
        if c <= 0.03928 {
            return c / 12.92
        }
        else {
            return pow((c + 0.055)/1.055, 2.4) }
    }
```

```
return 0.2126 * adjusted[0] +      // red
       0.7152 * adjusted[1] +      // green
       0.0722 * adjusted[2]        // blue
```

```swift
func contrastRatio(c1: CGColor, c2: CGColor) ->
CGFloat {
    let ratio = (c1 + 0.05) / (c2 + 0.05)
    return ratio > 1 ? ratio : 1 / ratio
}
```

# Where is Apple Leading?

*I don't know but I'm going to guess anyways…*

# Dark Mode
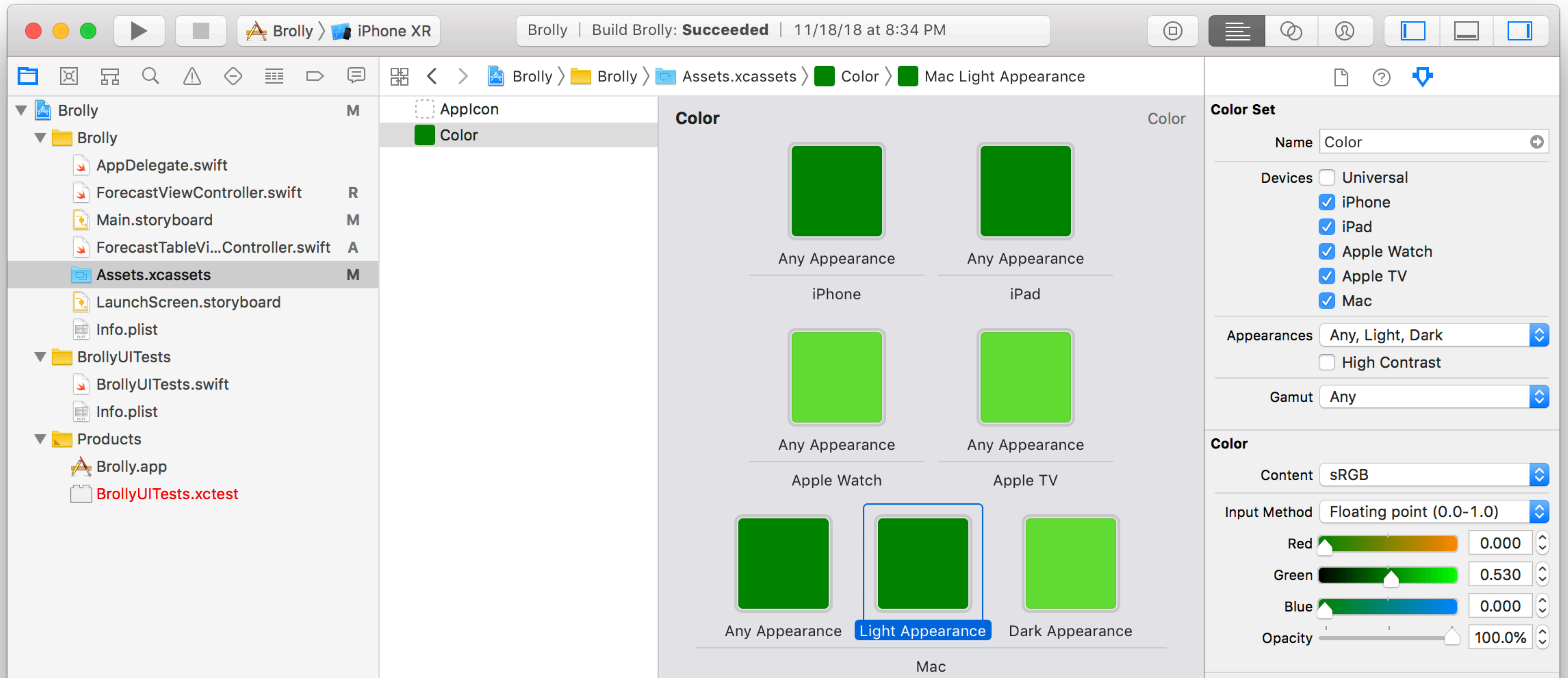
# NSColor.labelColor

## NSColor.secondaryLabelColor

### NSColor.placeholderTextColor

UIColor.darkText
UIColor.lightText
UIColor.groupTableViewBackground

Color Assets

# Accessibility is for Everyone

Use a color contrast ratio of 7 to help people access your content.

# Thank you.

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