VISUAL TIME-SAVING REFERENCE

SwiftUI Views

Quick Start

Mark Moeykens

A VISUAL REFERENCE GUIDE FOR SWIFTUI DEVELOPERS

Big Mountain Studio

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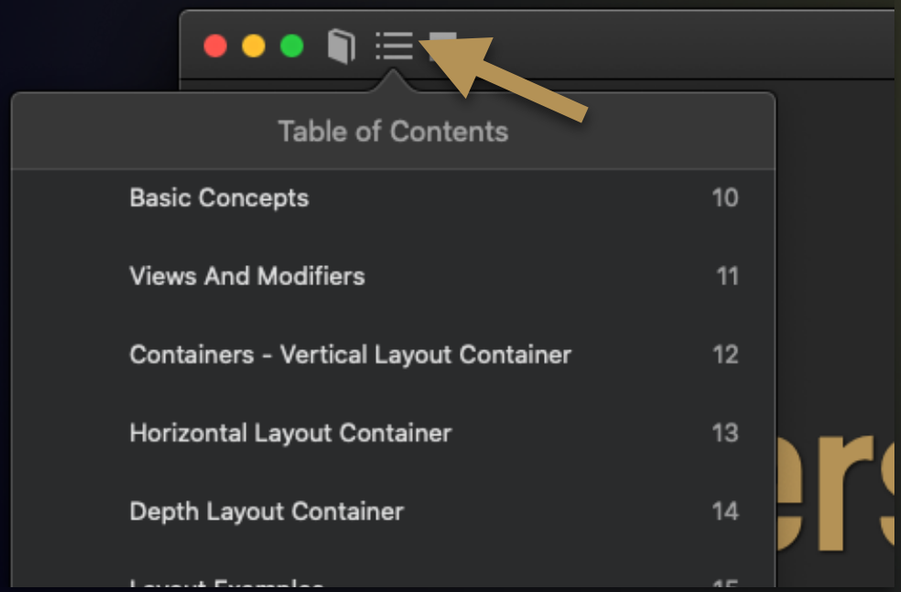

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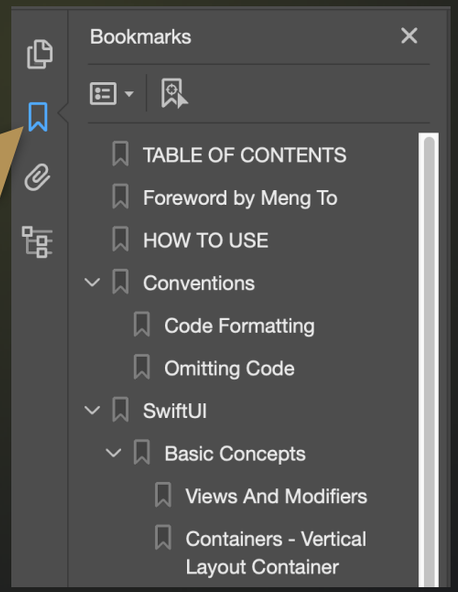

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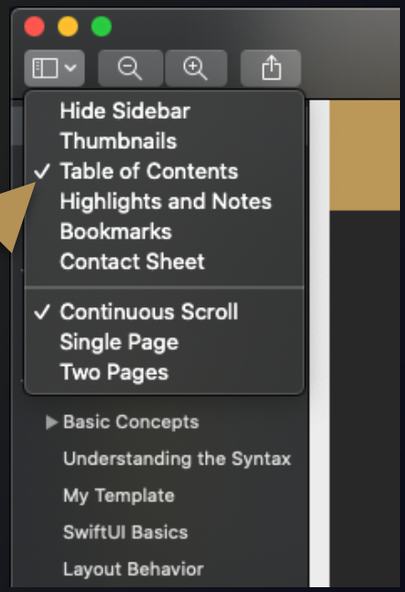


Foreword by Chris Ching

I've been teaching iOS app development to non-coders and beginners since 2013 and without fail, Apple changes things up to improve the developer experience every year.

As an iOS educator, it used to frustrate me because I'd have to update all of my training and content to reflect the new changes.

However, in retrospect, it was this annual song and dance that forced me to improve in my craft.

It forced me to reflect on where my students were getting confused or stuck.

It forced me to make my training better.

Reading Mark Moeykens' books gives me that same feeling.

I'm inspired by his ability to break down complex concepts into relatable analogies and his use of simple imagery to convey what a page of words can't.

That's why I always get new ideas about how I can improve my own training whenever I read his books.

When it comes down to it, a learning resource is only as valuable as its ability to transfer knowledge to you, the reader.

And for that reason, I think you have something of incredible value in your hands.

I've learned a lot from Mark and I think you will too.

Chris Ching

Chris Ching
codewithchris.com

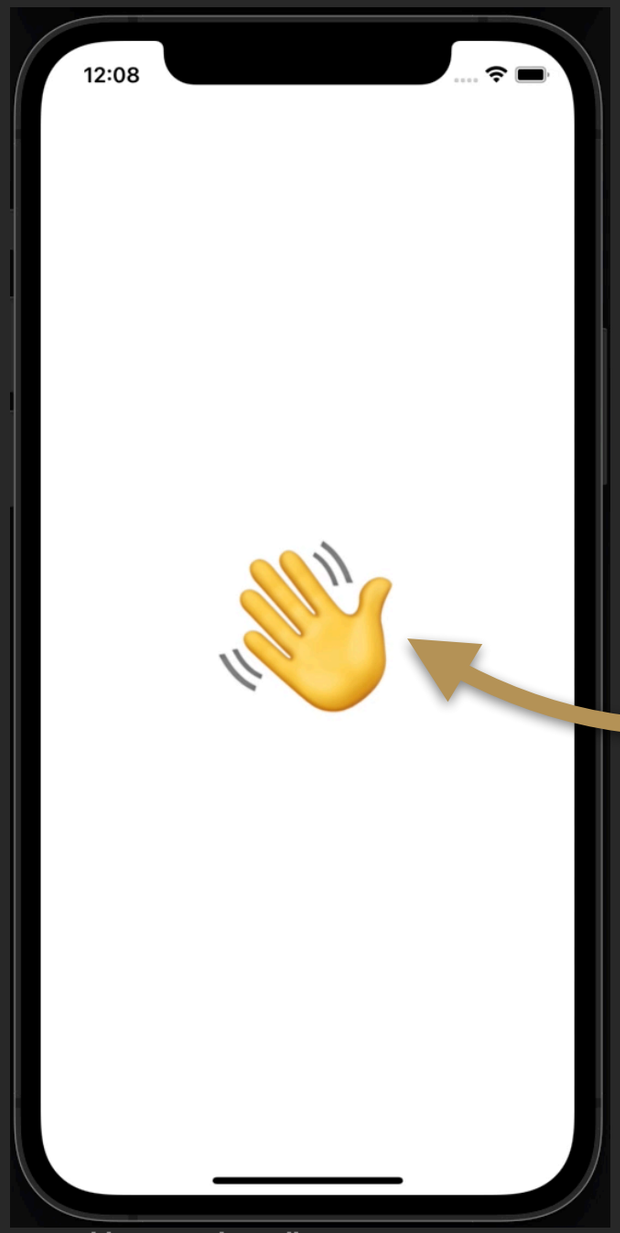
HOW TO USE

This is a visual **REFERENCE GUIDE**. Find a screenshot of something you want to learn more about or produce in your app and then read it and look at the code.

Read what is on the screenshots to learn more about the views and what they can do.
You can also read the book from beginning to end. The choice is yours.

CONVENTIONS

Embedded Videos



The ePUB version of the book supports embedded videos.

The PDF version does not.

This play button indicates that this is a playable video in the ePUB format.

But in PDF it renders as simply a screenshot.

Note: In some ePUB readers, including Apple Books, you might have to **tap TWICE** (2) to play the video.

Code Formatting

Throughout this book, you may notice I don't always follow the same formatting conventions. This is due to limited vertical space. For example, on one page you may see code formatted like this (pseudo-code):

```
NewView()
    .modifyTheView1()
    .modifyTheView2()
```

And then on another page, you see code formatted like this:

```
NewView().modifyTheView1().modifyTheView2()
```

Other times, functions may be on the same line as the closing brace:

```
NewView {
    ...
}.modifyTheView2()
```

Or on the next line:

```
NewView {
    ...
}
.modifyTheView2()
```

In the end, how the code is formatted in your project is up to you. These inconsistencies are strictly due to limited page space.

Omitting Code

When using SwiftUI, the views (screens) are represented in a **struct**, inside a **body** property. (More on this later.) This will become apparent when you add your first SwiftUI file to your project.

In most examples, **you will see the struct and body property are missing**. Again, this is due to limited vertical spacing. The main thing to remember is that the relevant code is always shown.

For example, I may take this view here (pseudo-code):

```
struct MyView {
    var body {
        NewView()
            .modifyTheView1()
            .modifyTheView2()
    }
}
```

And show only the relevant code:

```
        NewView()
            .modifyTheView1()
            .modifyTheView2()
```

When space is limited, I omit the unnecessary code and show an ellipsis:

```
struct MyView {
    var body {
        ... // Unnecessary code omitted
        NewView()
    }
}
```

Custom Code Color Theme

I created a code color theme based off of another color theme called “Gruvbox”.

If you like this color theme and would like to use it in Xcode then you can find it on my GitHub as a gist here.

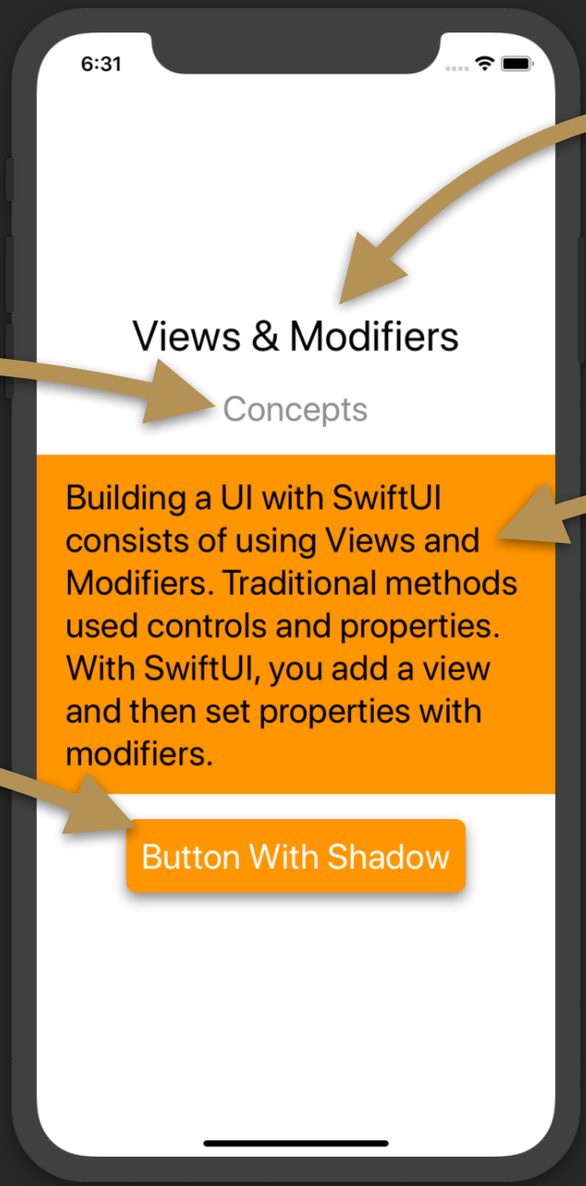
SWIFTUI

Basic Concepts

If you are absolutely new to SwiftUI, you should definitely read through this chapter to establish some basic concepts that you can think with.

Views And Modifiers

In SwiftUI, you build a UI with **Views** and then you change those views with **Modifiers**.



View

Modifiers:

- Title text size
- Gray text color

View

Modifiers:

- Large title text size

View

Modifiers:

- Title text size
- Orange background color
- Stretched to fit device width

View

Modifiers:

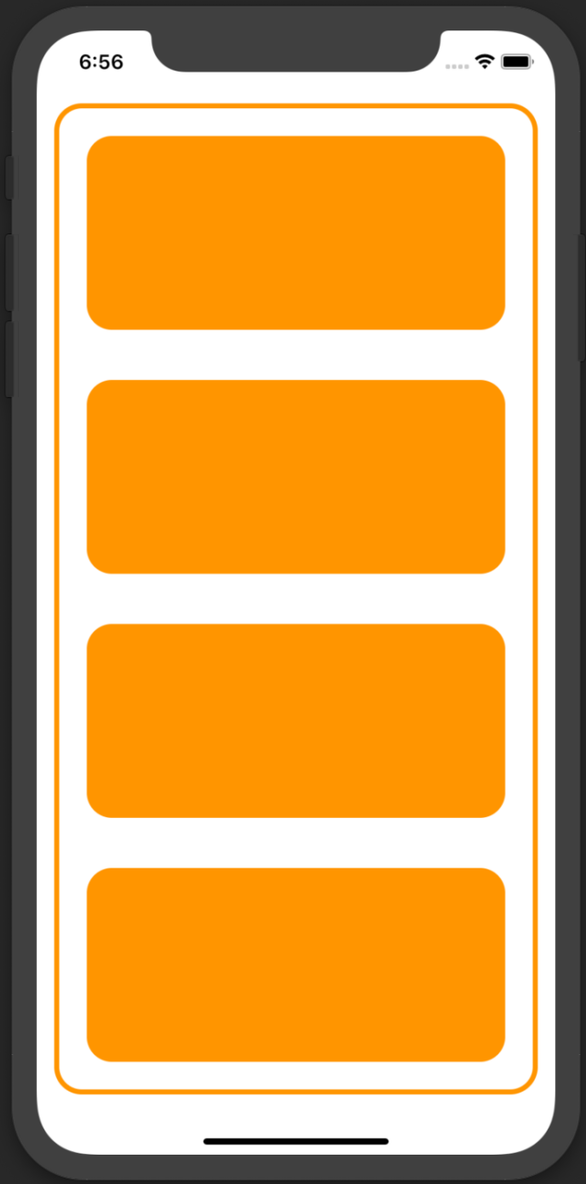
- Title text size
- White text color
- Orange background color
- Rounded corners
- Shadow

Containers - Vertical Layout Container

Views can be organized in containers. Some containers organize views in one direction. This is called **Stack**.

Here is an example of a **Vertical Stack** or as SwiftUI calls it, a "**VStack**".

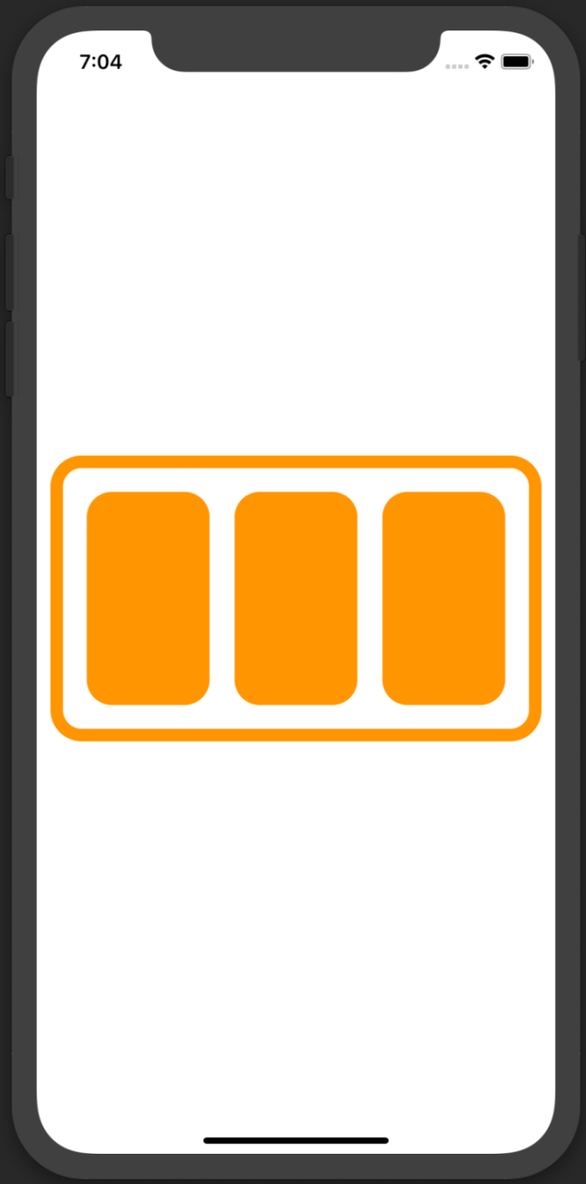
Stacks are views too. They are views that can have modifiers applied to them.



Horizontal Layout Container

There is another stack that can organize views horizontally.

SwiftUI calls this horizontal stack an **HStack**.



Depth Layout Container

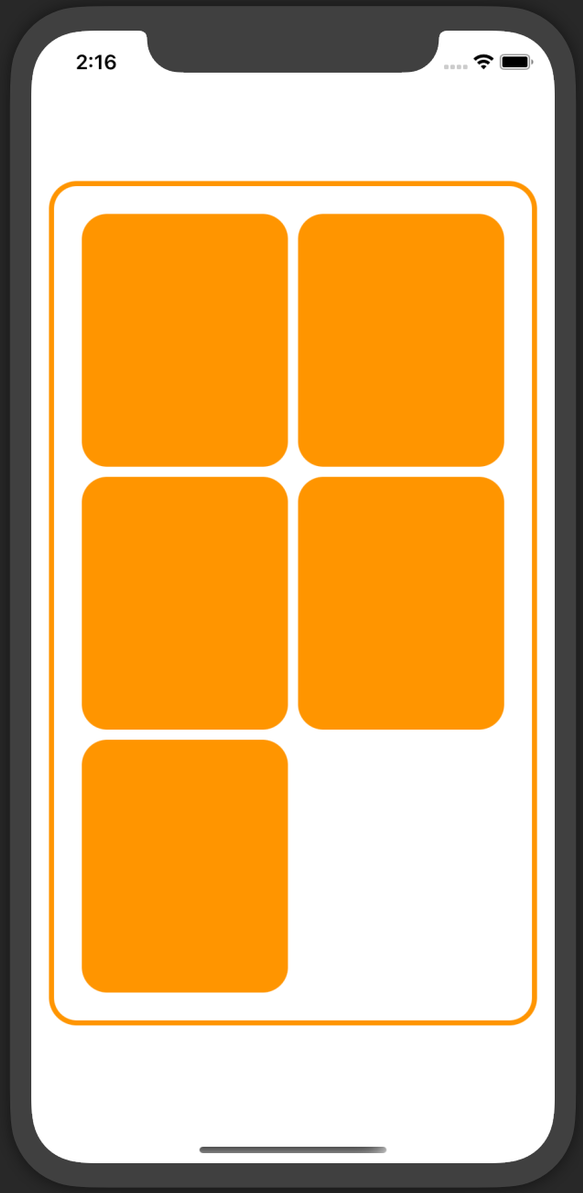
Another stack view will organize your views so they are one on top of another.

This is called the Depth Stack or **ZStack**.

Grid Layout Container

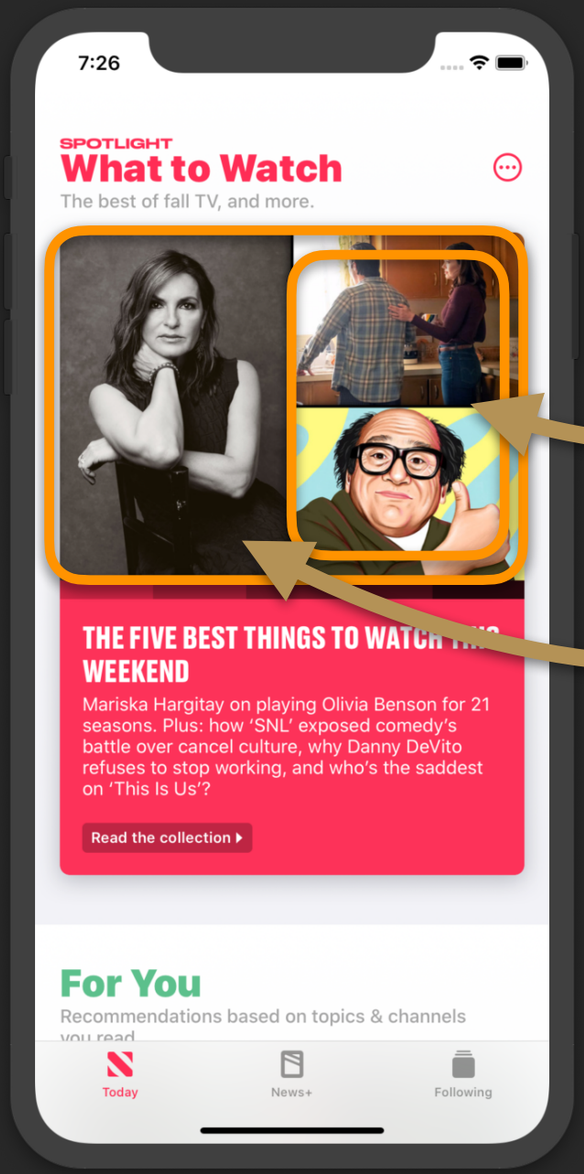
iOS 14

In the second version of SwiftUI, the grid container view was introduced. There is one for horizontal and vertical layouts.



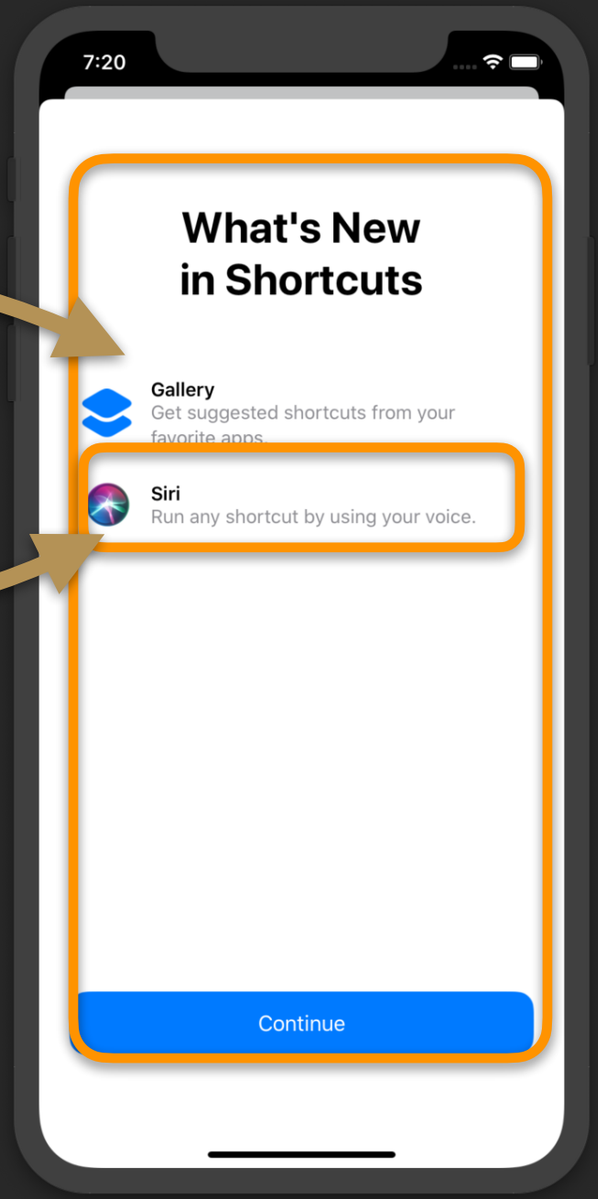
Layout Examples

Now that you know these layout stacks, you can start to guess how views like these might be arranged using SwiftUI.



VStack

HStack



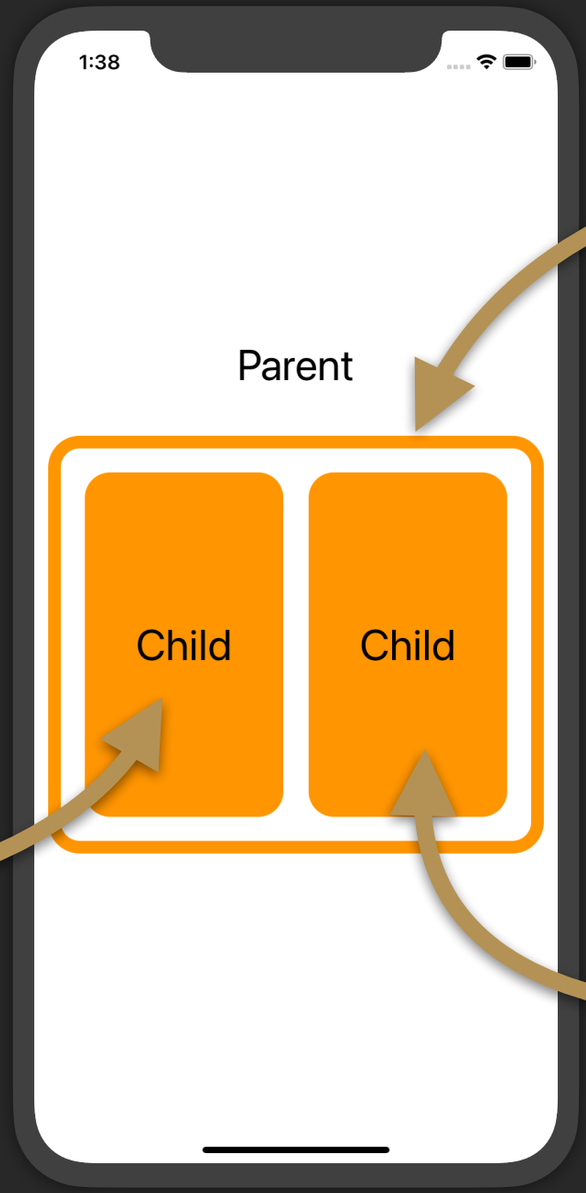
In this book, you will be seeing hundreds of layout examples. Pretty soon, it will become a natural ability of yours to recognize layout.

Relationships - Parent & Child

It is common in programming to express a hierarchy of objects as a parent and child relationship.

In this book, I use this concept to express relationships with SwiftUI views.

In this example, you have an HStack view that contains two child views within it. The HStack is the parent.



It is beneficial to know that Apple refers to child views that have no children of their own as "**leaf views**".

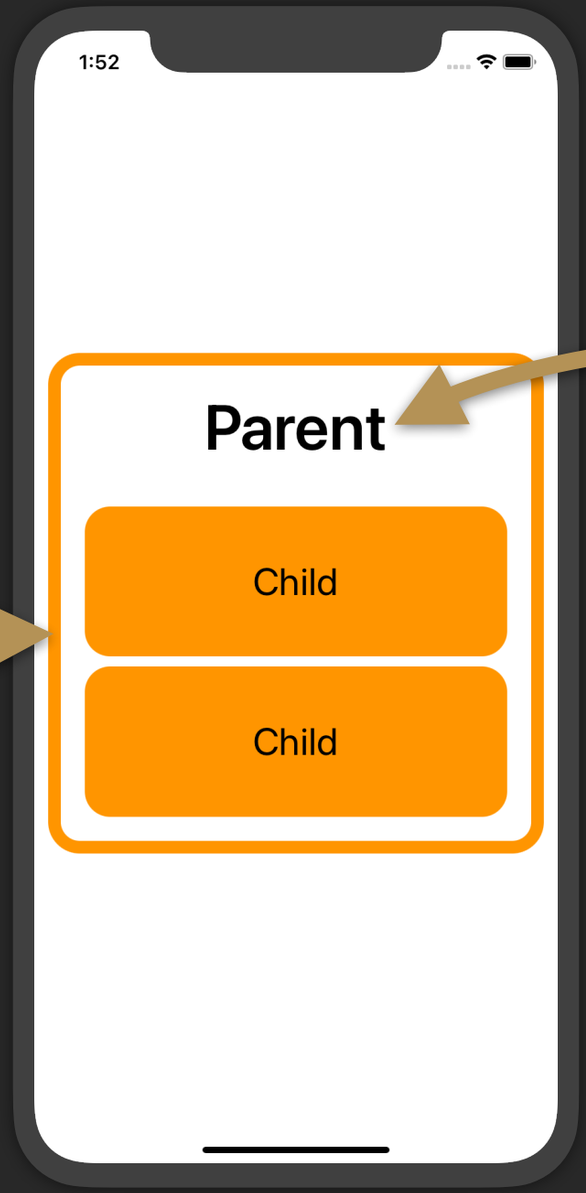
These two child views are leaf views because they contain no other views within them.

Relationships - And Modifiers

Some modifiers can be set on the parent view and it will also apply to all children in the container.

In this example, the font size is set on the parent and the child views use it.

The “Parent” text does not use the font size because it overrides it with a larger font size.



VStack View (Parent)

Modifiers applied to all child views:

- Font size of 30 points

Text View (Child)

Overriding Modifiers:

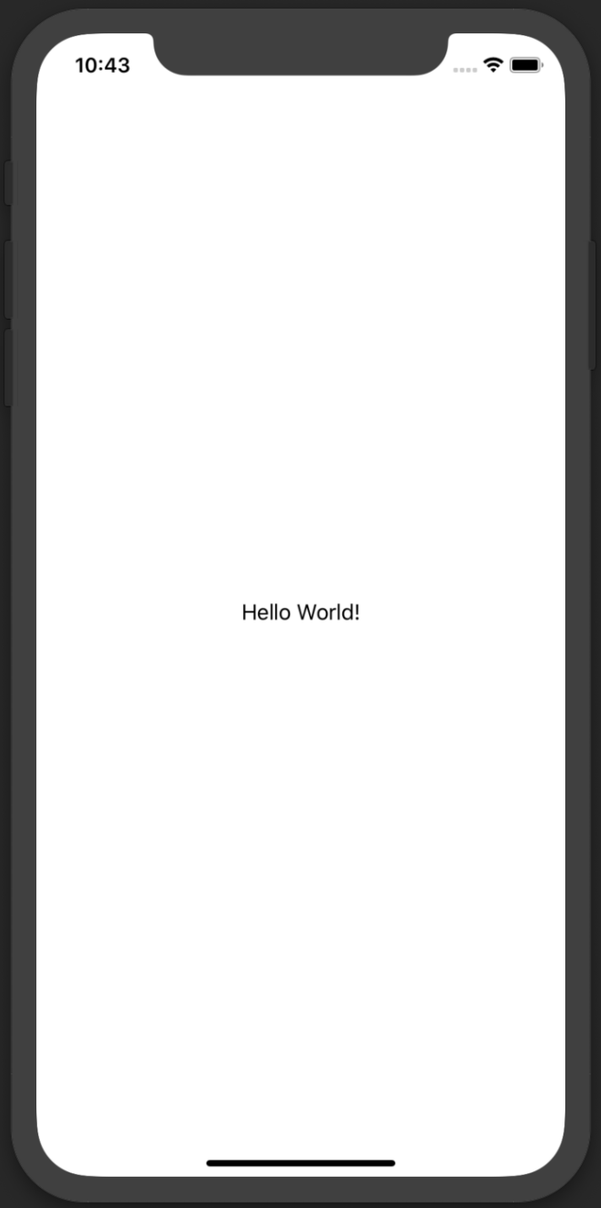
- Font size of 50 points

Understanding the Syntax

If you have used Swift in the past, then the SwiftUI syntax may look a little different.

It may not be readily apparent just how this code can even compile. This chapter is to help you understand how the code is able to work.

The View




```
struct BasicSyntax: View {
    var body: some View {
        Text("Hello World!") // Adds a text view to the screen
    }
}
```

Views in SwiftUI are structs that conform to the View protocol.

There is just one property to implement, the **body** property.

If "body" is a property then where is the "get" and the "return" syntax?

Property Getters

Properties can have a getter and setter. But when a property has no setter, it's called a "**read-only**" property. And when the property does not store a value, it is called a "**computed**" property. This is because the value is computed or generated every time the property is read.
In this example, `personType` is a **computed read-only** property.

You can further simplify this property in two ways:

1. When the code inside the `get` is a single expression (one thing), the getter will just return it automatically. You can remove `return`.
   See "Change 1" in the code example.

2. When a property is read-only (no setter), we can remove the `get`.
   Just know that these changes are **optional**.

```
struct Person {
    // Computed read-only property (no set, value is not stored)
    var personType: String {
        get {
            return "human"
        }
    }
}
```

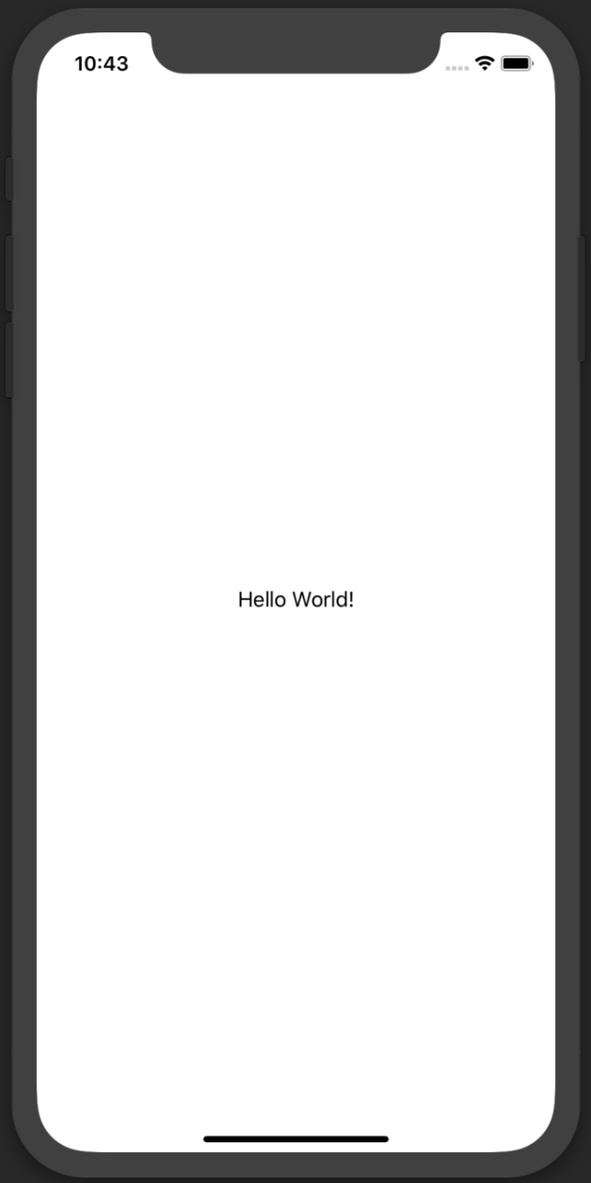
```
// Change 1 - Remove the return
struct Person {
    var personType: String {
        get {
            "human"
        }
    }
}
```

```
// Change 2 - Remove the get
    var personType: String {
        "human"
    }
}
```

Now when looking at this property again, you can better understand and see that it is written without the extra `get` and `return` keywords.

```
struct BasicSyntax: View {
    var body: some View {
        Text("Hello World!")
    }
}
```

SwiftUI With Property Getters



Since these property changes are optional, you can, for example, write the previous SwiftUI syntax with a `get` and `return` inside the **`body`** property. This might look more familiar to you now:

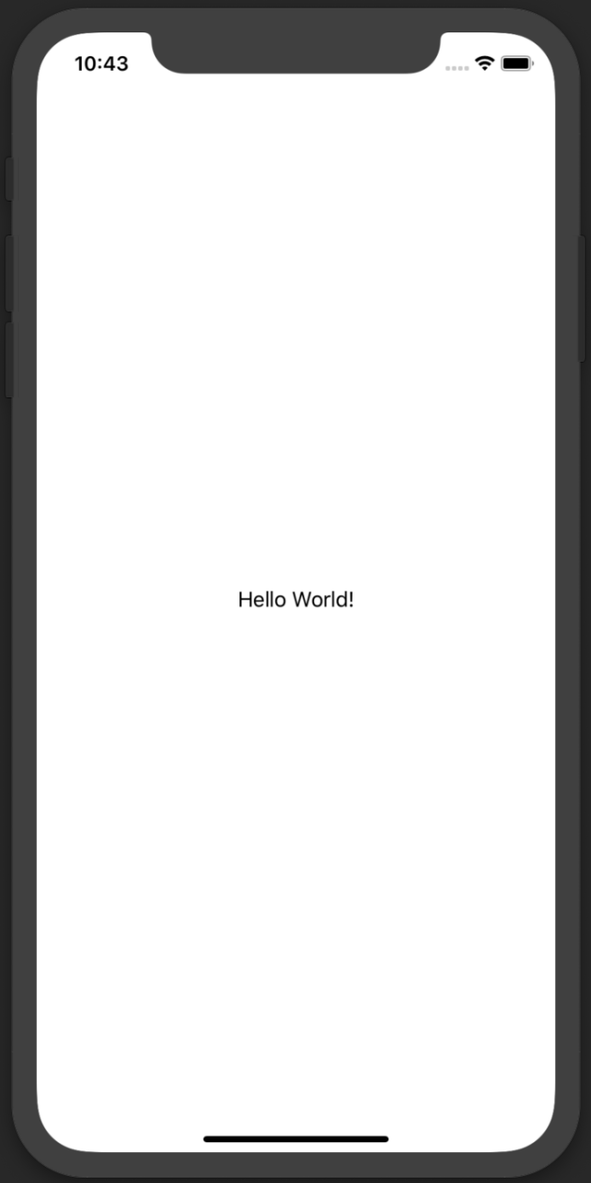
```
// SwiftUI with the get and return keywords
struct BasicSyntax: View {
    var body: some View {
        get {
            return Text("Hello World!")
        }
    }
}
```

Looking at this code again, you notice the `some` keyword here.

Normally, when defining a type for a property, you wouldn't see this word.

So, what does the some keyword do?

Opaque Types




```
struct BasicSyntax: View {
    var body: some View {
        Text("Hello World!")
    }
}
```

Opaque Types

The keyword `some` is specifying that an opaque type is being returned. In this case, the opaque type is `View`. So why is the type called "opaque"? Well, the English definition for the word "opaque", when referring to languages, means "hard or impossible to understand." And this is true here because opaque types hide the value's type information and implementation details. This will certainly make it "hard or impossible to understand" but still usable.

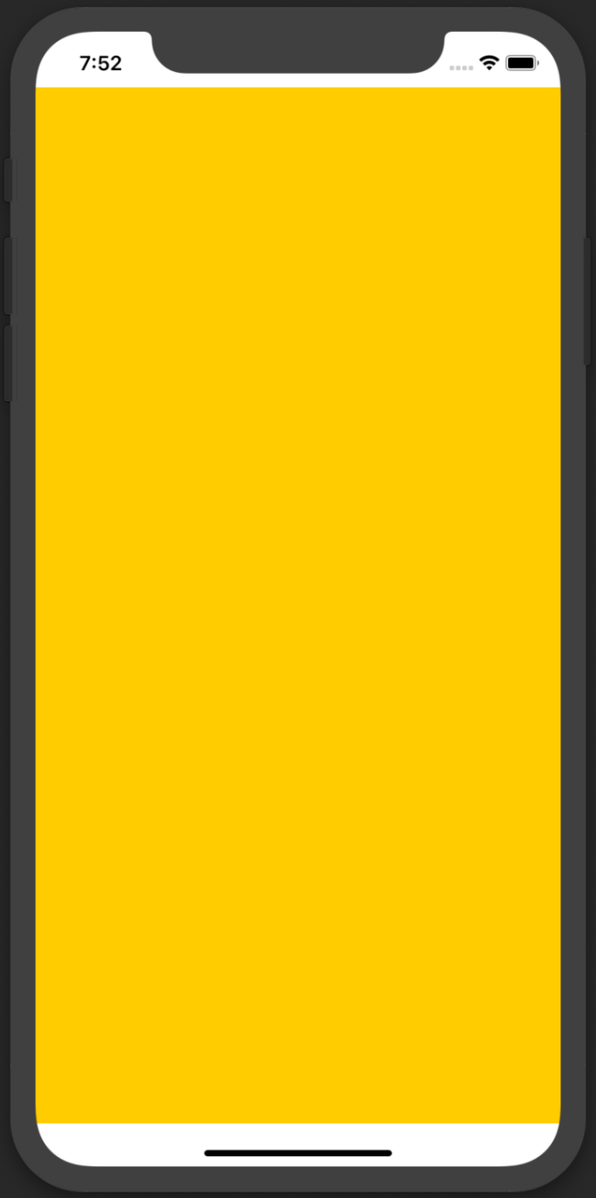
When this View (`BasicSyntax`) is used by iOS to draw the screen, it doesn't have to know that, in this example, the type `Text` is being returned. It is OK with just knowing that `some View` is being returned and can use it to draw the screen.

And so you can return anything in that `body` property as long as it conforms to the `View` protocol.

For more information on Opaque Types, I recommend referring to the Swift Programming Language documentation.

There is another important thing to know about opaque types too...

Opaque Types (some Keyword)

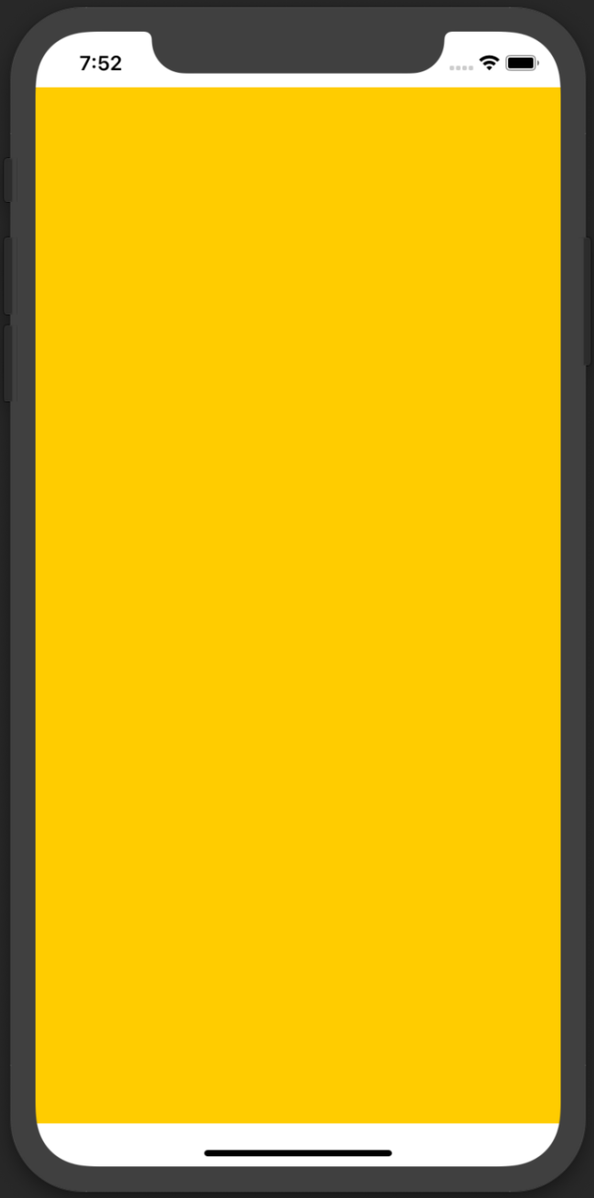


You already know from the previous page that what is returned from the `body` property is something that conforms to the `View` protocol.
But what you also need to know is when returning an opaque type (using the some keyword), is that **all possible return types must all be of the same type**.
In most cases you are only returning one type. But you might have a scenario like this:

```
struct UnderstandingTheSomeKeyword: View {
    var isYellow = true

    // The keyword "some" tells us that whatever we return, it has to:
    // 1. Conform to the View protocol
    // 2. Has to ALWAYS be the same type of View that is returned.
    var body: some View {

        // ERROR: Function declares an opaque return type, but the return statements
           in its body do not have matching underlying types
        if isYellow {
            return Color.yellow // Color type does not match the Text type
        }

        return Text("No color yellow") // Text type does not match the color type
    }
}
```

The body property returns a Color and a Text type. This violates the some keyword.

Opaque Types Solution

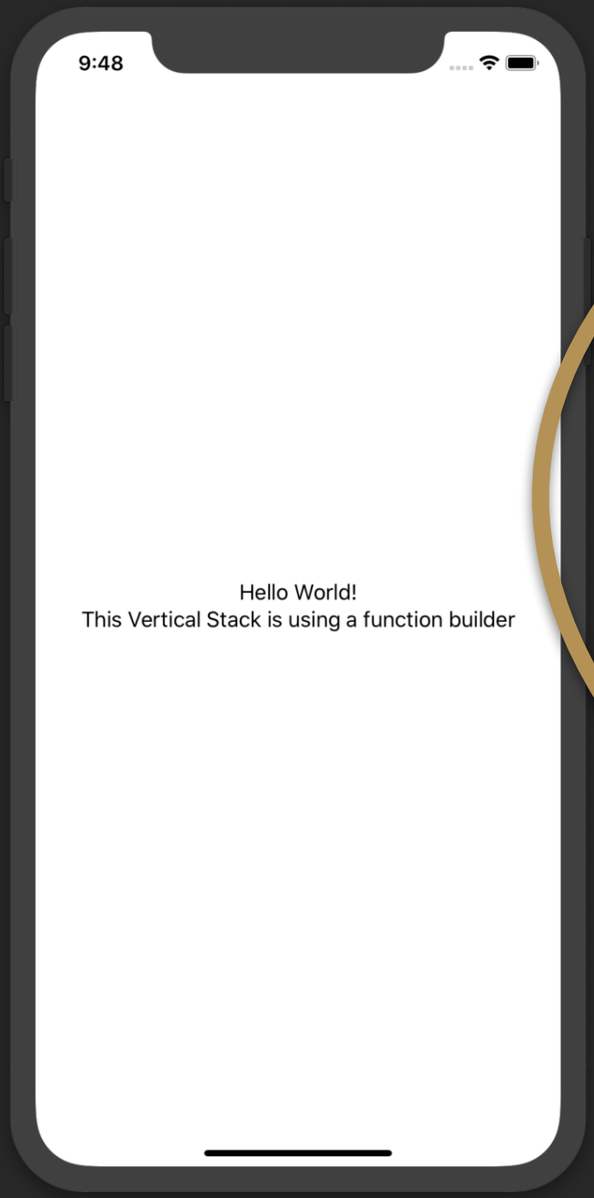


The solution would be to change the views returned so they are **all the same TYPE**. The body now returns the same type of view (Color).

```
struct UnderstandingTheSomeKeywordSolution: View {
    var isYellow = true

    // The keyword "some" tells us that whatever we return, it has to:
    // 1. Conform to the View protocol
    // 2. Has to ALWAYS be the same type of View that is returned.

    var body: some View {

        if isYellow {
            return Color.yellow
        }

        return Color.clear
    }
}
```

Now, the body property always returns a Color type. This satisfies the some keyword.

View Containers




```
struct Example: View {
    var body: some View {
        VStack {
            Text("Hello World!")
            Text("This Vertical Stack is using a function builder")
        }
    }
}
```

So far, you have learned that `body` is a computed read-only property and can only return ONE object that is `some View`. What if you want to show multiple views though?

You learned earlier about the concept of "containers" views. These are views that can contain other views. Remember, the `body` property can only return one view. You will get an error if you try to return more than one view in the `body` property.

In the example above, the `VStack` (Vertical Stack) is that one view being returned. And that vertical stack is a container with two more views inside of it.

The `VStack` is using a "trailing closure," which just means that it is a code block that is passed into the initializer to be run by the `VStack`. You have probably seen this before in Swift, this is not new.

What is new in Swift is the ability to create multiple, new views within the constructor like this. Before we get into this though, let's better understand how this constructor works.

View Container Initialization

In Swift, you usually see parentheses during initialization but **with a trailing closure, the parentheses are optional.**
You can add them and the code will still work just fine.

See "Change 1" in the code example.

This change may start looking more familiar to you. Now, the question is:

How does the VStack know how to accept the multiple views like this?

This is new in Swift. To better understand this, take a look at the VStack's initializer.

The `alignment` and `spacing` parameters are optional, that is why you don't see them in the examples above. But notice before the `content` parameter there is `@ViewBuilder` syntax.

This is what allows you to declare multiple views within the `content` parameter's closure.

```
struct Example: View {
    var body: some View {
        VStack {
            Text("Hello World!")
            Text("This Vertical Stack is using a function builder")
        }
    }
}

// Change 1 - Add parentheses and parameter name
struct Example: View {
    var body: some View {
        VStack(content: {
            Text("Hello World!")
            Text("This Vertical Stack is using a function builder")
        })
    }
}

// VStack initializer
init(alignment: HorizontalAlignment = .center,
     spacing: CGFloat? = nil,
     @ViewBuilder content: () -> Content)
```

@ViewBuilder Parameter Attribute

The `@ViewBuilder` parameter attribute allows Swift to build multiple child views from within a closure.

How many child views can I build within a closure?

The way this functionality is set up, you can only initialize a maximum of ten (10) views. In the example here, you will get an error because of the 11th view.

What if I need more child views?

If you need to declare more child views for your user interface, then you will have to use another view container, such as another VStack. (You will be seeing more options for containers in this book.)

In the second example, I use another `VStack` to contain text views 10 and 11.

```
struct ViewBuilderExample: View {
    var body: some View {
        VStack {
            Text("View 1")
            Text("View 2")
            Text("View 3")
            Text("View 4")
            Text("View 5")
            Text("View 6")
            Text("View 7")
            Text("View 8")
            Text("View 9")
            Text("View 10")
            Text("View 11") // Will cause an error
        }
    }
}
```

Only 10 views allowed.

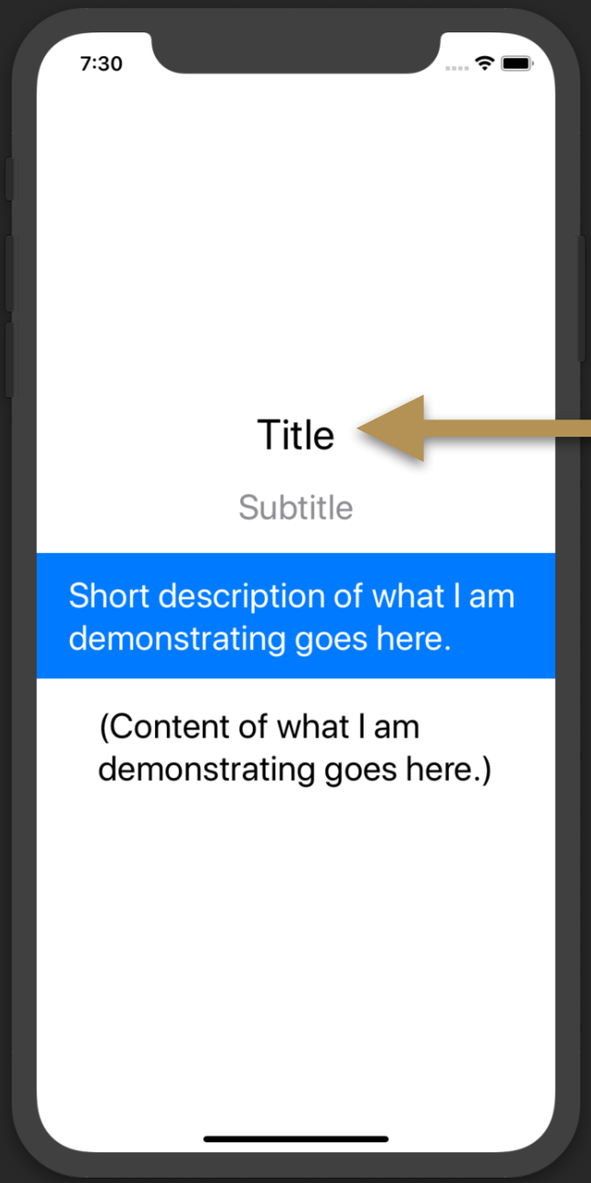
```
struct ViewBuilderExample: View {
    var body: some View {
        VStack {
            ... // Text views 1 - 5
            Text("View 6")
            Text("View 7")
            Text("View 8")
            Text("View 9")
            VStack { // The VStack is now the 10th view
                Text("View 10")
                Text("View 11")
            }
        }
    }
}
```

My Template

If you are completely new to SwiftUI you may wonder what a lot of this code means right at the beginning of the book. I have “templates” that contains a title, subtitle and a short description on most SwiftUI screens.

I will take you through step-by-step on how I build this template that I use throughout the book. I will describe each one only briefly because each modifier I apply to the views here are described in more detail throughout the book within their own sections.

My Basic Template



Here is my basic template I use throughout the book to explain views and modifiers.

In the next pages I'm going to explain how this is built in SwiftUI. I want to make sure you understand these parts because you will see them everywhere in this book.

I want to remove any confusion right at the beginning so it doesn't get in your way to learning the topics in the book.

Let's start with the title.

Starting with the Title


```
struct Title: View {
    var body: some View {
        Text("Title") // Create text on the screen
            .font(.largeTitle) // Use a font modifier to make text larger
    }
}
```

Here, you have a `Text` view. You want to make it larger so you use the `font` modifier so you can set the size to a SwiftUI preset size called `largeTitle` (this is the largest preset size).

There are more ways you can change the size of text that are covered in this book in the **Control Views** chapter, in the section called **Text**.

Add a VStack


```
struct AddVStack: View {
    var body: some View {
        // Only one view can be returned from the body property.
        // Add 20 points between views within this container.
        VStack(spacing: 20) { // VStack is a container view that can hold up to 10 views
            Text("Title")
                .font(.largeTitle)
        }
    }
}
```

VStack

The `body` property can **only return one view**. You will get an error if you have two views.

So, you need to use a container view that will contain multiple views. The vertical stack (`VStack`) is the perfect choice here.

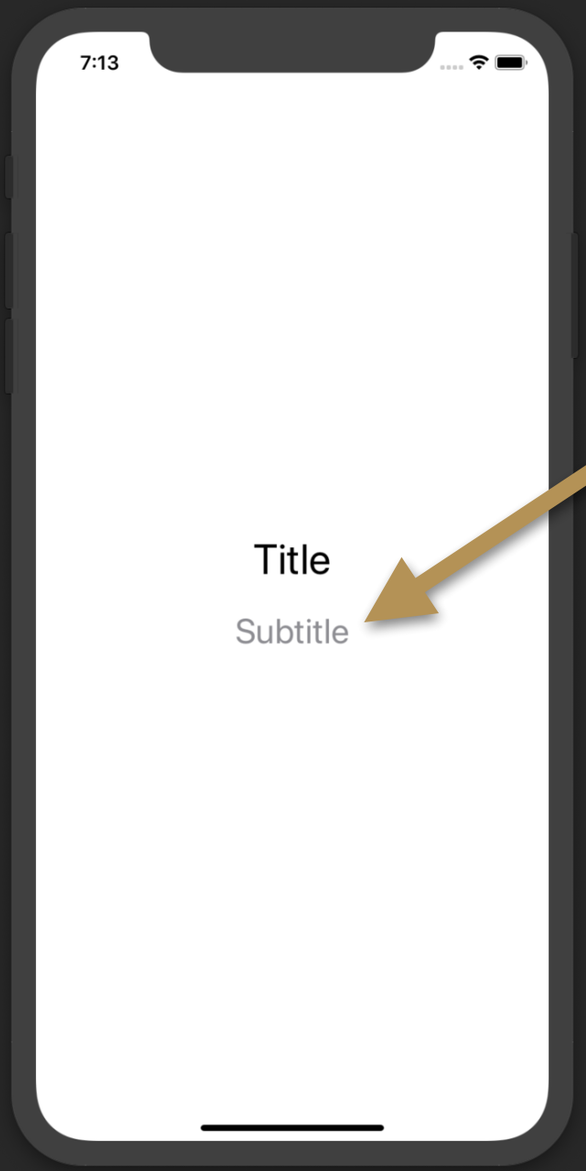
Now you can add up to 9 more views to the VStack.

Spacing

The VStack has an optional parameter you can use in its initializer to specify how many points of spacing you want in between views. (***Note:*** *`spacing` does not add spacing to the top or bottom of the `VStack`.*)

Now, let's add the subtitle text.

Adding the Subtitle




```
struct Subtitle: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Title")
                .font(.largeTitle)

            Text("Subtitle")
                .font(.title) // Set to be the second largest font.
                .foregroundColor(Color.gray) // Change text color to gray.
        }
    }
}
```

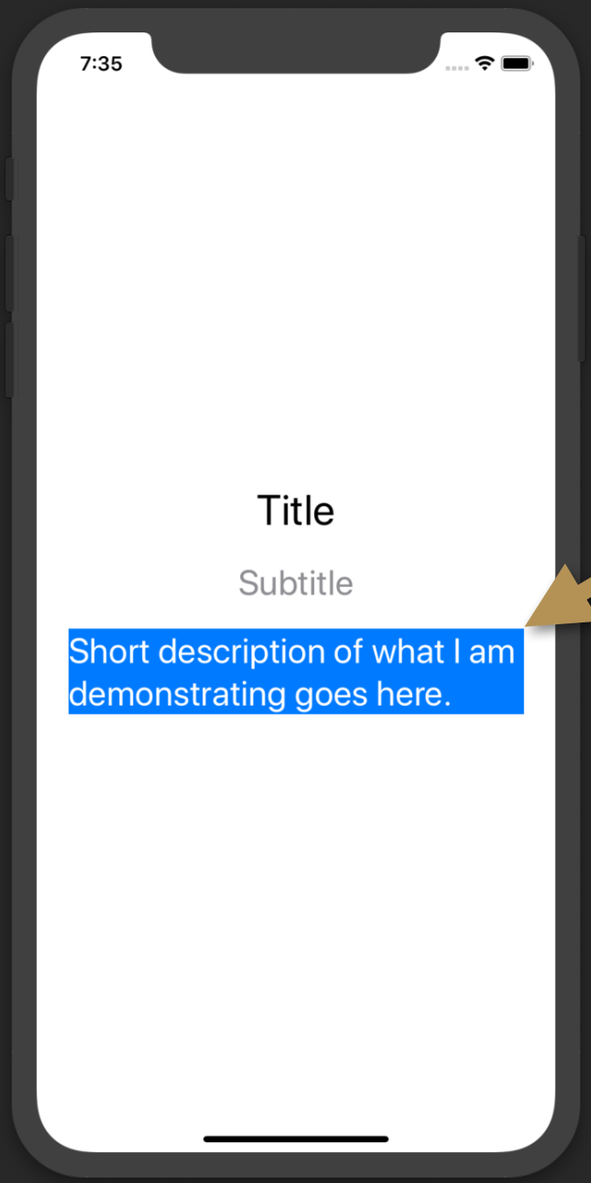
Subtitle

The subtitle is another text view. This time, you set the size to be the second largest preset size with the `title` parameter.

Finally, you modify the view to change the text color to gray. (***Note**: instead of using `Color.gray` you can also use just `.gray`.*)

Now, let's add the description text.

Add the Description with a Background Color




```
struct Description1: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Title")
                .font(.largeTitle)

            Text("Subtitle")
                .font(.title)
                .foregroundColor(.gray)

            Text("Short description of what I am demonstrating goes here.")
                .font(.title)
                .foregroundColor(Color.white)
                .background(Color.blue) // Add the color blue behind the text.
        }
    }
}
```

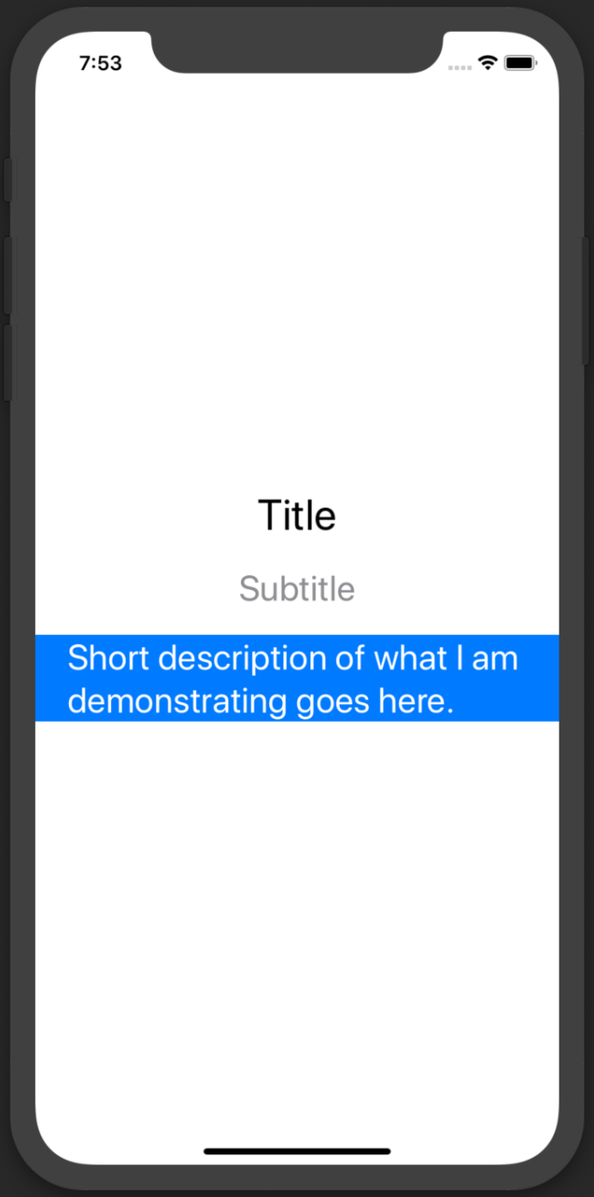
With the description text view, you are now familiar with the `font` and `foregroundColor` modifiers. But now you want to add a color behind the text. So you use the `background` modifier to set a color.

The important thing to notice here is it is not a background**Color** modifier. That does not exist. It is a `background` modifier because it adds a layer **behind** the view.

`Color.blue` is actually a view. So the `background` modifier is adding a blue view on a layer behind the text.

We want this view to extend to the edges of the screen. So let's add that next.

Adding a Frame Modifier

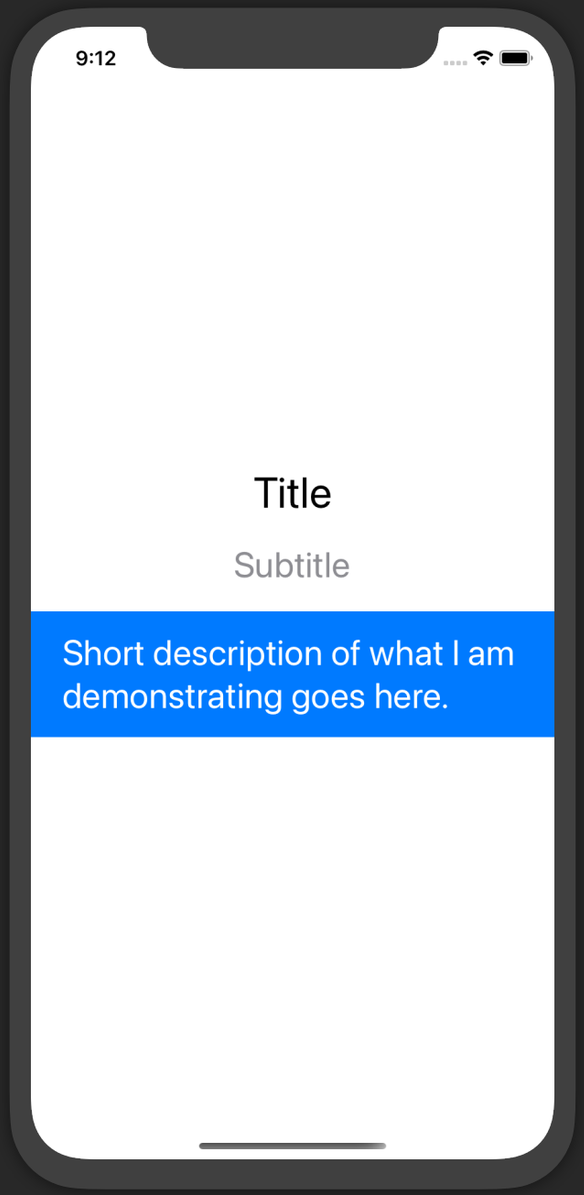



```
struct Description2: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Title")
                .font(.largeTitle)

            Text("Subtitle")
                .font(.title)
                .foregroundColor(.gray)

            Text("Short description of what I am demonstrating goes here.")
                .frame(maxWidth: .infinity) // Extend until you can't go anymore.
                .font(.title)
                .foregroundColor(Color.white)
                .background(Color.blue)
        }
    }
}
```

To extend the text to the edges of the device, we use the `frame` modifier. You don't need to set a fixed value. Instead, you can just modify the text view and say its frame's maximum width can extend to `infinity` until it hits its parent's frame and then will stop. Its parent's frame is the `VStack`.

This is looking good. It would look better though if there was more space around the text that pushed out the blue background.

Add Padding Around the Text View

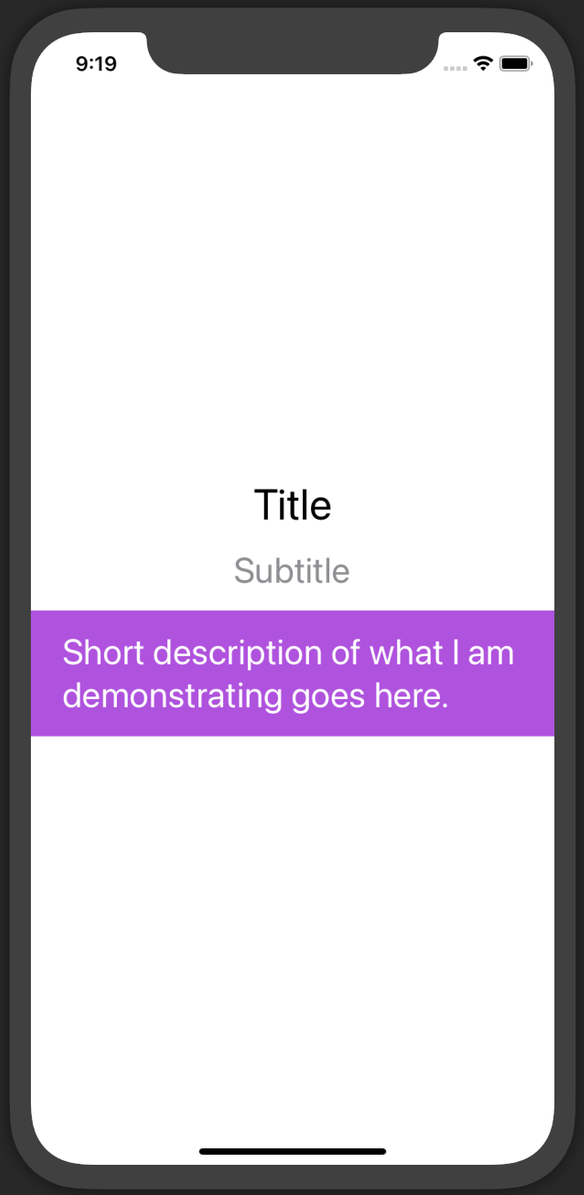



```
struct Description3: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Title")
                .font(.largeTitle)

            Text("Subtitle")
                .font(.title)
                .foregroundColor(.gray)

            Text("Short description of what I am demonstrating goes here.")
                .frame(maxWidth: .infinity)
                .font(.title)
                .foregroundColor(Color.white)
                .padding() // Add space all around the text
                .background(Color.blue)
        }
    }
}
```

Padding

Use the `padding` modifier to add space around a view. Remember, the order of modifiers matter. You can add the `padding` modifier anywhere as long as it is BEFORE the `background` modifier. If it was after the `background`, it would add space around the blue background. We want the space between the text and the background.

Version 2 of the Template




```
struct Version2: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Title",
                       subtitle: "Subtitle",
                       desc: "Short description of what I am demonstrating goes here.",
                       back: .purple, textColor: .white)
        }
        .font(.title)
    }
}
```

Version 2

When I updated the book with SwiftUI 2, I wanted a more efficient way of adding a title, subtitle and description.

So I made my own view, called HeaderView, where I can pass in the information and it will format it.

As you can see, this saves repetitive code and space.

If you're interested in how this is done, look in the Xcode project that comes with the paid book bundle for the file "**HeaderView.swift**".

SwiftUI Basics

Now that you understand this basic template I use for demonstrating topics, I will start using it. Be sure to read what is on each screenshot (or find the text in the code to read).

Refactoring


```swift
struct Refactoring: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Refactoring")
                .font(.largeTitle)

            Text("Reusing Modifiers")
                .foregroundColor(.gray)

            Text("You can put common modifiers on the parent views to be applied to all the
                child views.")
                .frame(maxWidth: .infinity)
                .foregroundColor(Color.white)
                .padding()
                .background(Color.blue)
        }
        .font(.title) // This font style will be applied to ALL text views inside the VStack.
    }
}
```

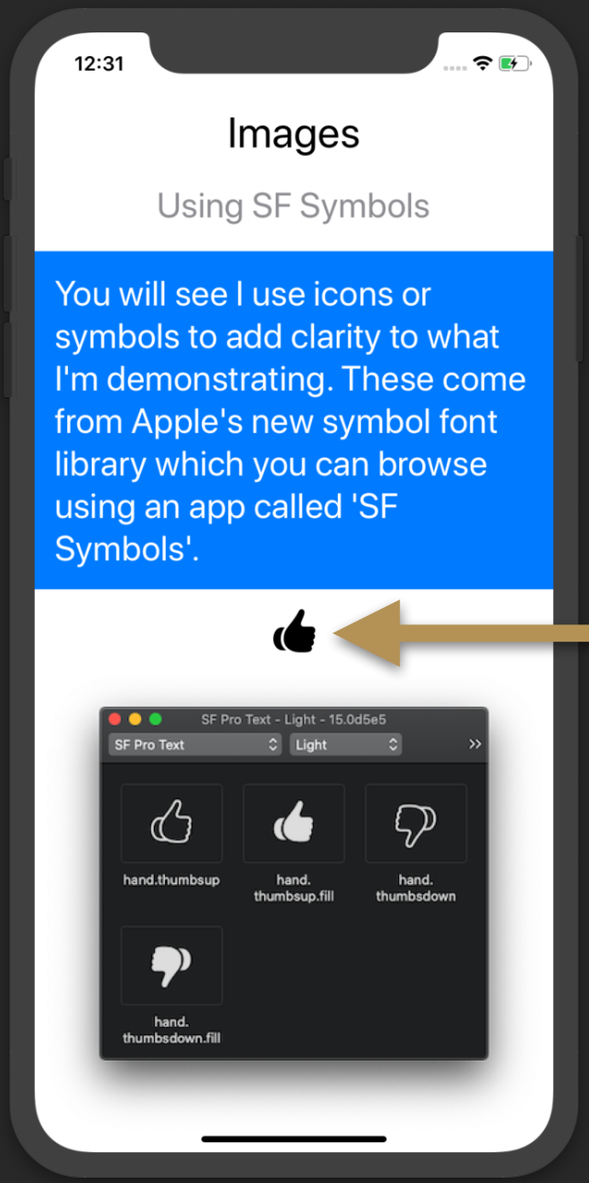
Overrides `.font(.title)`

Here, the `title` font is being applied to all three text views inside of the parent view (`VStack`).

Why isn't the title text view affected?

Because the title text view sets the font again, it overrides the `title` size with the `largeTitle` size.

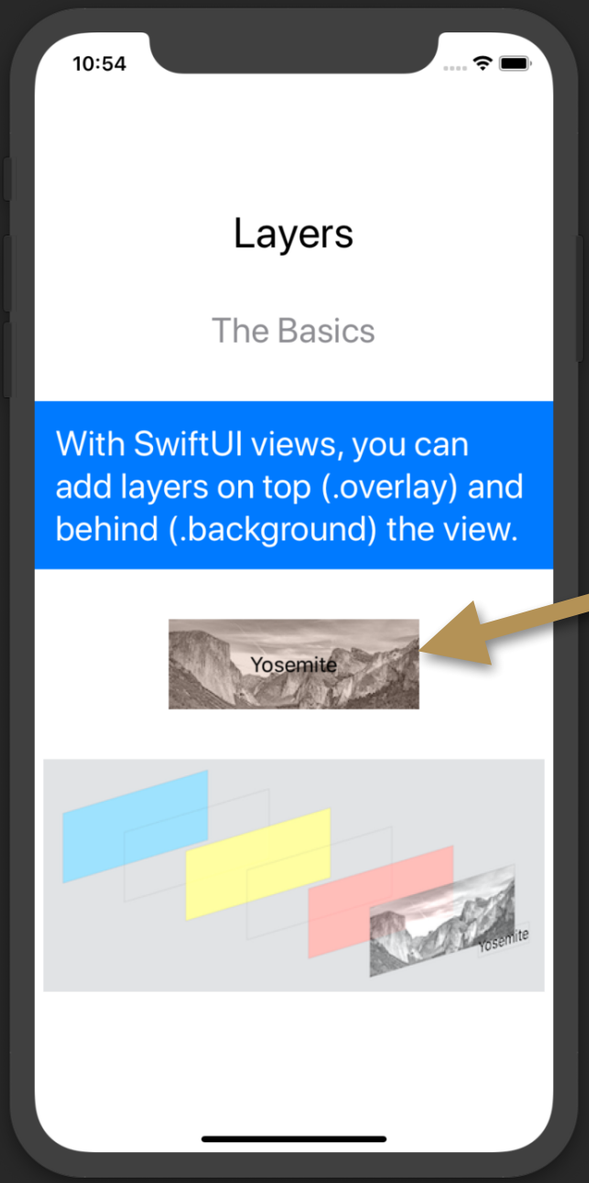
Short Introduction to Symbols




```
struct SymbolsIntro: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Images")
                .font(.largeTitle)
            Text("Using SF Symbols")
                .foregroundColor(.gray)

            Text("You will see I use icons or symbols to add clarity to what I'm demonstrating.
                These come from Apple's new symbol font library which you can browse using an
                app called 'SF Symbols'.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.blue)
                .foregroundColor(Color.white)

            // Use "systemName" when you want to use "SF Symbols"
            Image(systemName: "hand.thumbsup.fill")
                .font(.largeTitle) // Make the symbol larger

            Image("SF Symbols") // Regular image from Assets.xcassets
        }
        .font(.title)
        .ignoresSafeArea(edges: .bottom) // Ignore the bottom screen border
    }
}
```

Even though an `Image` view is used to initialize a symbol, you use the `font` modifier to change its size. These symbols actually come from fonts. So use font modifiers to change them. There is a whole section that covers this. Go here to download and install the SF Symbols app.

Layers

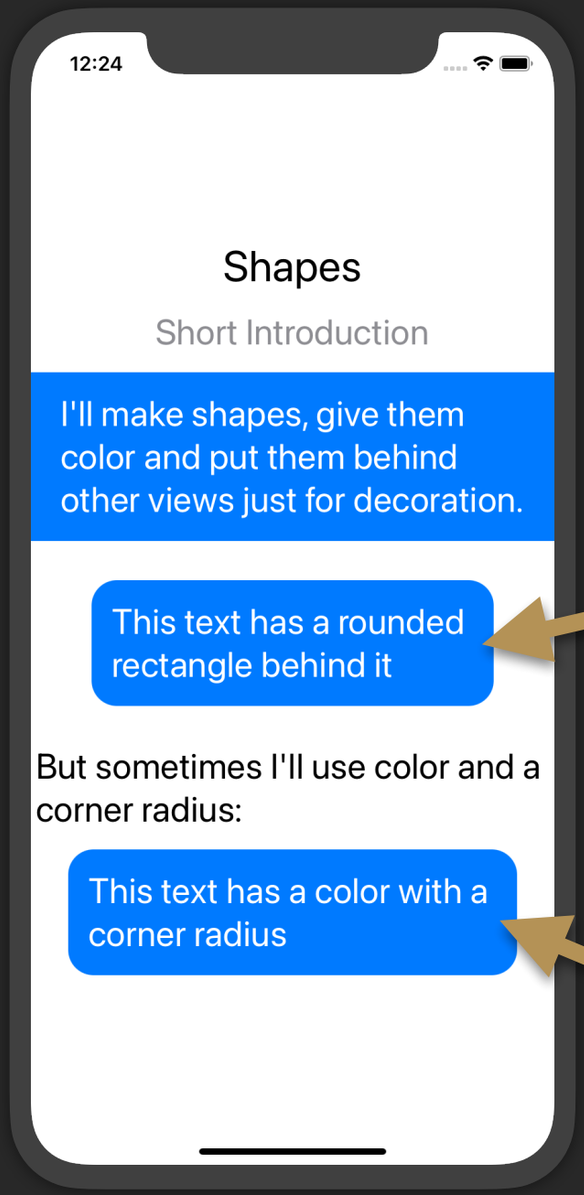



```
VStack(spacing: 40) {
    Text("Layers")
        .font(.largeTitle)

    Text("The Basics")
        .foregroundColor(.gray)

    Text("With SwiftUI views, you can add layers on top (.overlay) and behind (.background) the
view.")
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.blue)
        .foregroundColor(Color.white)

    Image("yosemite") // Show an image from Assets.xcassets
        .opacity(0.7) // Make image only 70% solid
        .background(Color.red.opacity(0.3)) // Layer behind image
        .background(Color.yellow.opacity(0.3)) // Layer behind red
        .background(Color.blue.opacity(0.3)) // Layer behind yellow
        .overlay(Text("Yosemite")) // Layer on top of image

    Image("Layers")
}
.font(.title)
```

I use layers (`background` and `overlay`) early in the book so I want to make sure you understand this concept.

Both of these modifiers are explained in detail in their own sections.

Short Introduction to Shapes




```
VStack(spacing: 20) {
    Text("Shapes")
        .font(.largeTitle)
    Text("Short Introduction")
        .foregroundColor(.gray)
    Text("I'll make shapes, give them color and put them behind other views just for
decoration.")
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.blue)
        .foregroundColor(Color.white)

    Text("This text has a rounded rectangle behind it")
        .foregroundColor(Color.white)
        .padding()
        .background(
            RoundedRectangle(cornerRadius: 20) // Create the shape
                .foregroundColor(Color.blue)) // Make shape blue
        .padding()

    Text("But sometimes I'll use color and a corner radius:")

    Text("This text has a color with a corner radius")
        .foregroundColor(Color.white)
        .padding()
        .background(Color.blue) // Use a color as the background layer
        .cornerRadius(20) // Rounded corners on whole text view
}
.font(.title)
```

RoundedRectangle is a common shape.

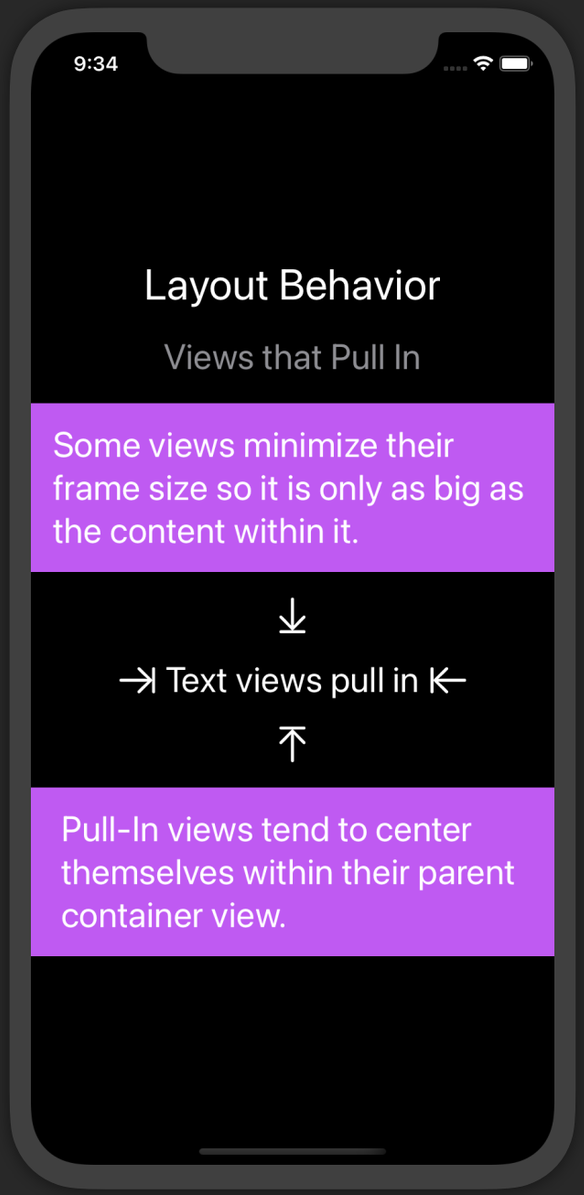
Layout Behavior

In SwiftUI, you may wonder why some views layout differently than others. You can observe two behaviors when it comes to the size and layout of views:

1. Some views pull in to be as small as possible to fit their content. (I will refer to these as “pull-in” views.)
2. Some views push out to fill all available space. (I will refer to these as “push-out” views.)

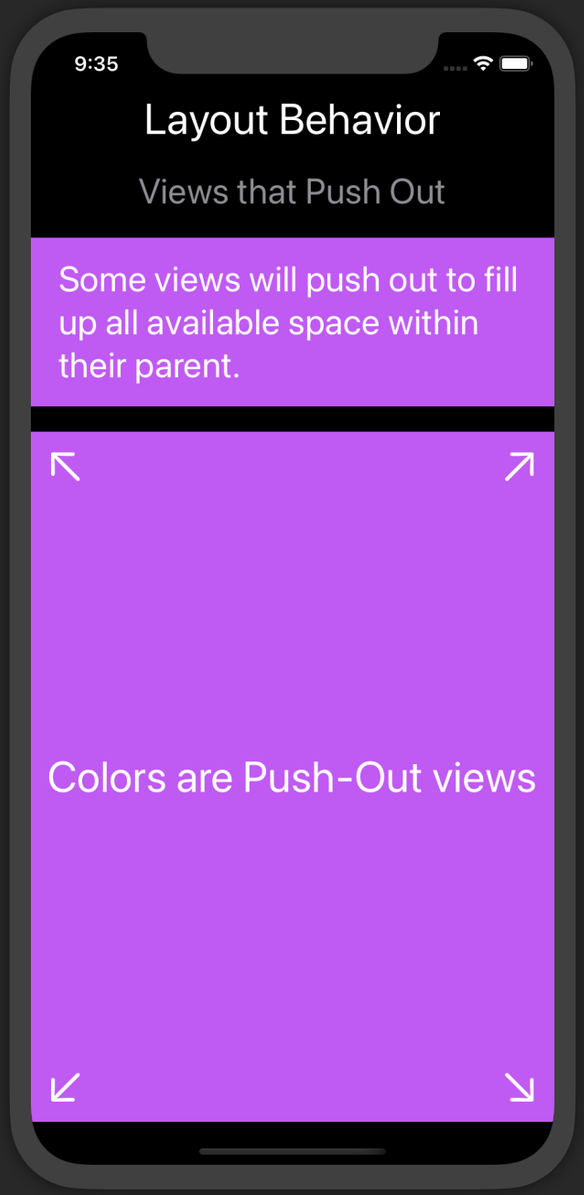
Knowing these two behaviors can help you predict what will happen when using the different views.

Some Views Pull In




```
struct ViewSizes_Pull_In: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Layout Behavior").font(.largeTitle)
            Text("Views that Pull In").foregroundColor(.gray)
            Text("Some views minimize their frame size so it is only as big as the
content within it.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.purple)
                .foregroundColor(Color.white)

            Image(systemName: "arrow.down.to.line.alt")

            HStack { // Order views horizontally
                Image(systemName: "arrow.right.to.line.alt")
                Text("Text views pull in")
                Image(systemName: "arrow.left.to.line.alt")
            }

            Image(systemName: "arrow.up.to.line.alt")

            Text("Pull-In views tend to center themselves within their parent container
view.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.purple)
                .foregroundColor(Color.white)
        }.font(.title)
    }
}
```

Some Views Push Out




```swift
struct ViewSizes_Push_Out: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Layout Behavior")
            Text("Views that Push Out")
                .font(.title).foregroundColor(.gray)
            Text("Some views will push out to fill up all available space within their parent.")
                .frame(maxWidth: .infinity).padding().font(.title)
                .background(Color.purple)

            Color.purple
                // Add 5 layers on top of the color view
                .overlay(
                    Image(systemName: "arrow.up.left")
                        .padding() // Add spacing around the symbol
                    , alignment: .topLeading) // Align within the layer
                .overlay(
                    Image(systemName: "arrow.up.right")
                        .padding(), alignment: .topTrailing)
                .overlay(
                    Image(systemName: "arrow.down.left")
                        .padding(), alignment: .bottomLeading)
                .overlay(
                    Image(systemName: "arrow.down.right")
                        .padding(), alignment: .bottomTrailing)
                .overlay(Text("Colors are Push-Out views"))
        }.font(.largeTitle) // Make all text and symbols larger
    }
}
```

Colors are push-out views.

For the most part, I will be telling you if a view is a push-out view or a pull-in view at the beginning of the sections.

SEE YOUR WORK

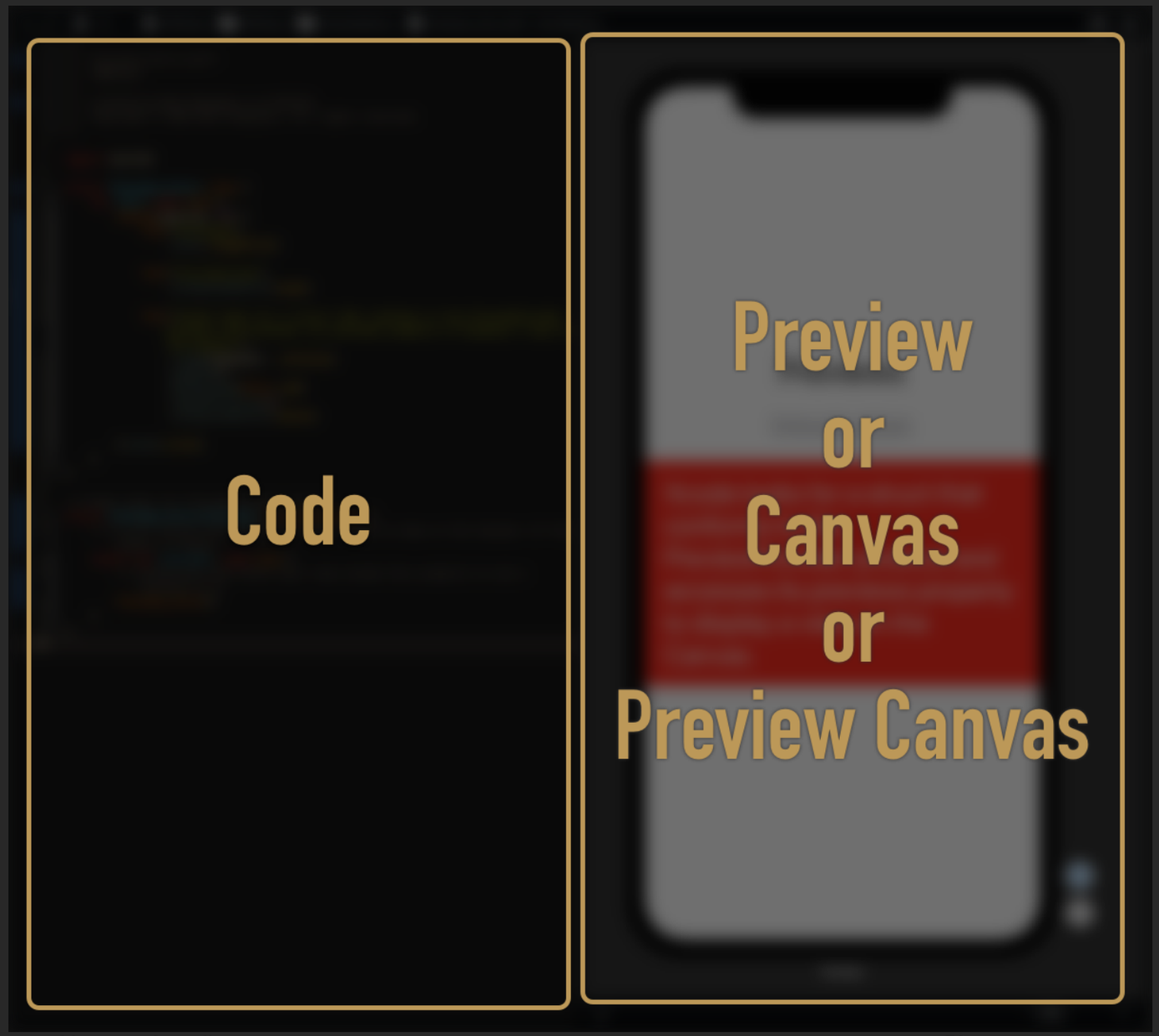
Preview Options

As you practice these examples, you might want to see your SwiftUI working on different devices in different modes, including light or dark mode or with different accessibility settings.

You can do all of this without even having to launch the Simulator. When using SwiftUI, you get a preview canvas that will show you how your views will render.

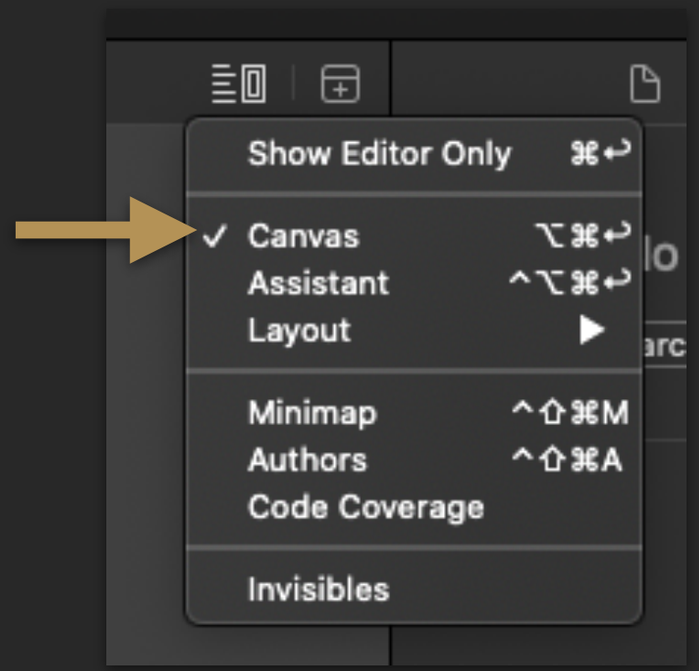
(Note: You will need to be running Xcode 11 or later on macOS Catalina or later.)

The Canvas - What is it?

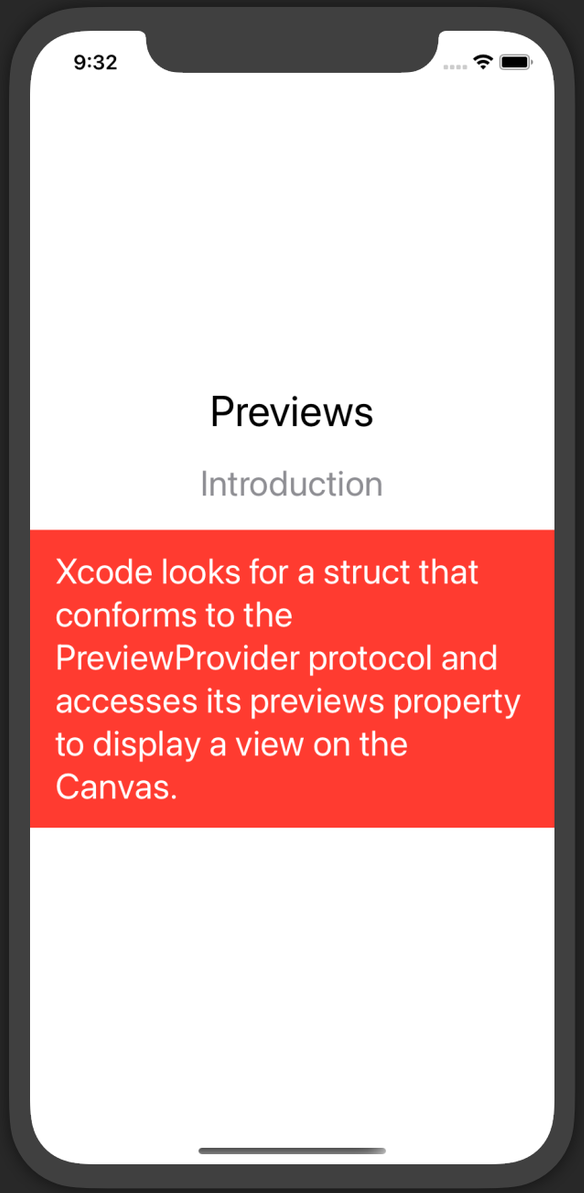


The canvas is the area next to the code that shows you a preview of how your SwiftUI will look. You might also hear this called the "**Preview**" or "**Preview Canvas**".

If you do not see this pane, click on the Editor Options button on the top right of your code window and click Canvas:



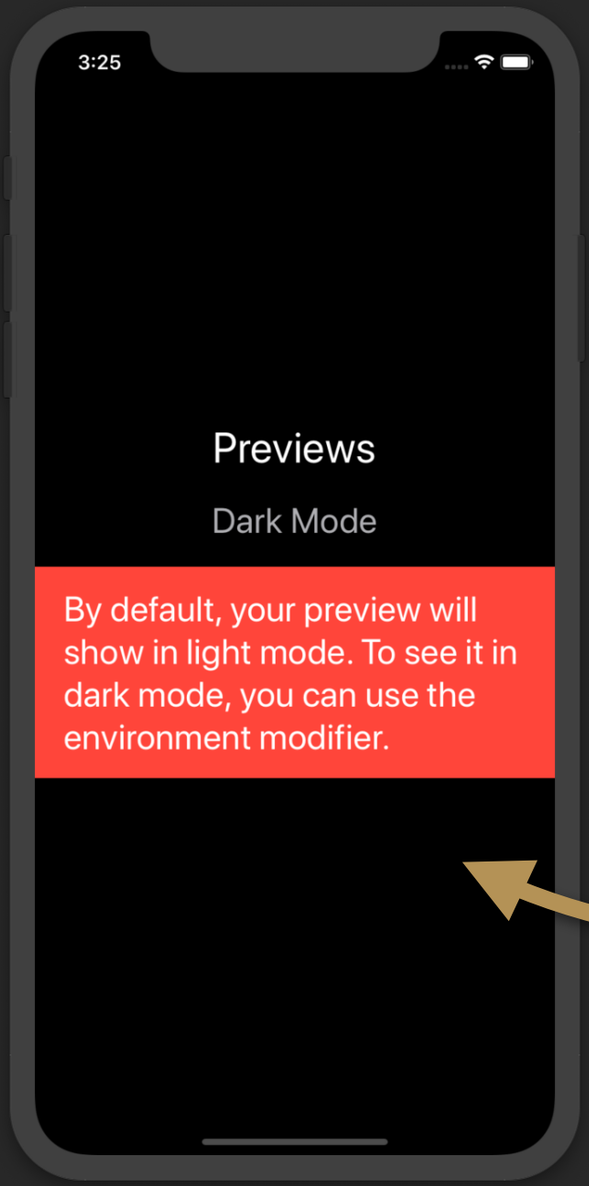
Introduction




```
struct Previews_Intro: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Previews")
                .font(.largeTitle)

            Text("Introduction")
                .foregroundColor(.gray)

            Text("Xcode looks for a struct that conforms to the PreviewProvider protocol
and accesses its previews property to display a view on the Canvas.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.red)
                .foregroundColor(.white)

        }.font(.title)
    }
}
```

```
// Xcode looks for PreviewProvider struct
struct Previews_Intro_Previews: PreviewProvider {
    // It will access this property to get a view to show in the Canvas (if the Canvas
is shown)
    static var previews: some View {
        // Instantiate and return your view inside this property to see a preview of it
        Previews_Intro()
    }
}
```

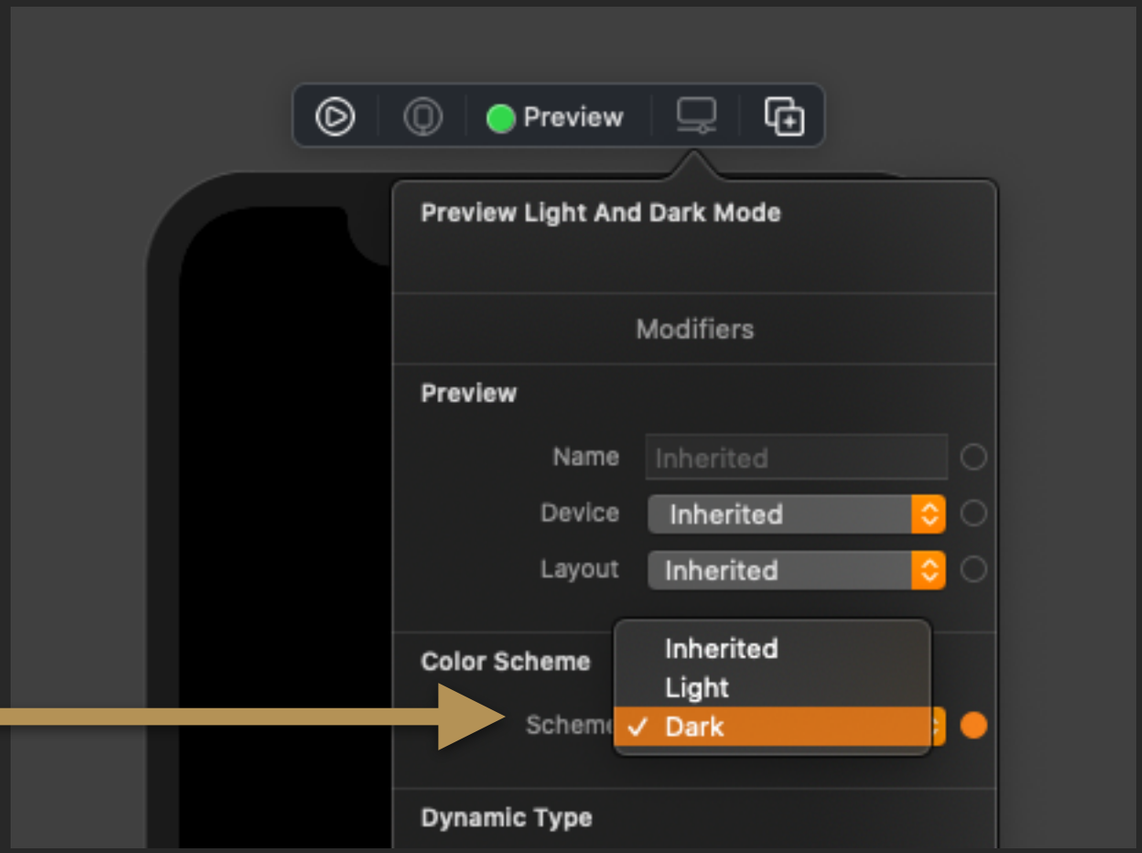
Dark Mode




```
struct Preview_DarkMode: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Previews").font(.largeTitle)
            Text("Dark Mode").foregroundColor(.gray)
            Text("By default, your preview will show in light mode. To see it in dark
mode, you can use the environment modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.red)
                .foregroundColor(.white)

        }.font(.title)
    }
}
```

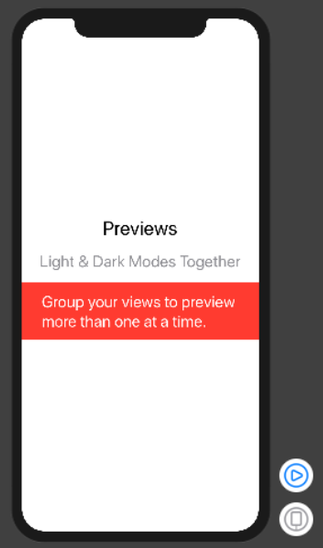
```
struct Preview_DarkMode_Previews: PreviewProvider {
    static var previews: some View {
        Preview_DarkMode()
            .preferredColorScheme(.dark)
    }
}
```

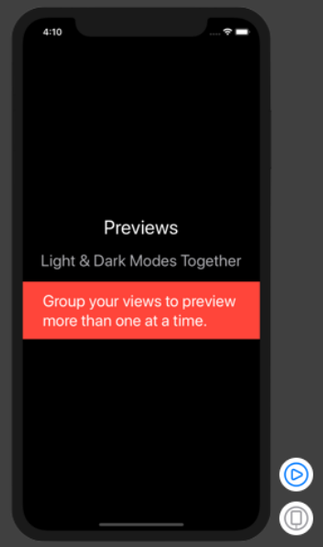
Dark Mode



You can also change the color scheme here.

Light & Dark Modes Together



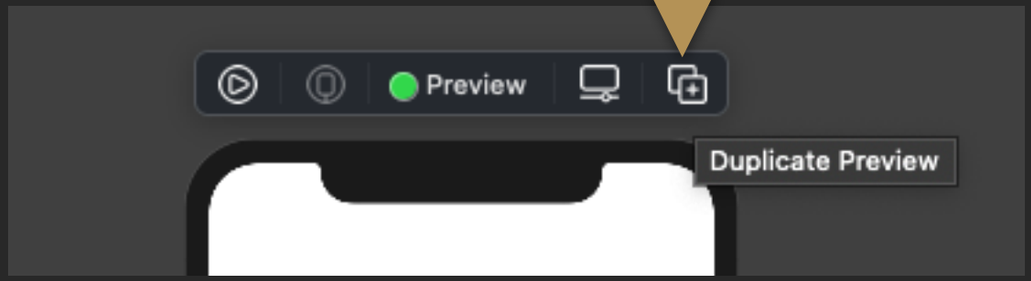



```
struct Preview_LightAndDarkMode: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Previews").font(.largeTitle)
            Text("Light & Dark Modes Together").foregroundColor(.gray)
            Text("Group your views to preview more than one at a time.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.red)
                .foregroundColor(.white)

        }.font(.title)
    }
}

struct Preview_LightAndDarkMode_Previews: PreviewProvider {
    static var previews: some View {
        // Just use a Group container to instantiate your views in
        Group {
            Preview_LightAndDarkMode() // Light Mode
            Preview_LightAndDarkMode()
                .preferredColorScheme(.dark)
        }
    }
}
```

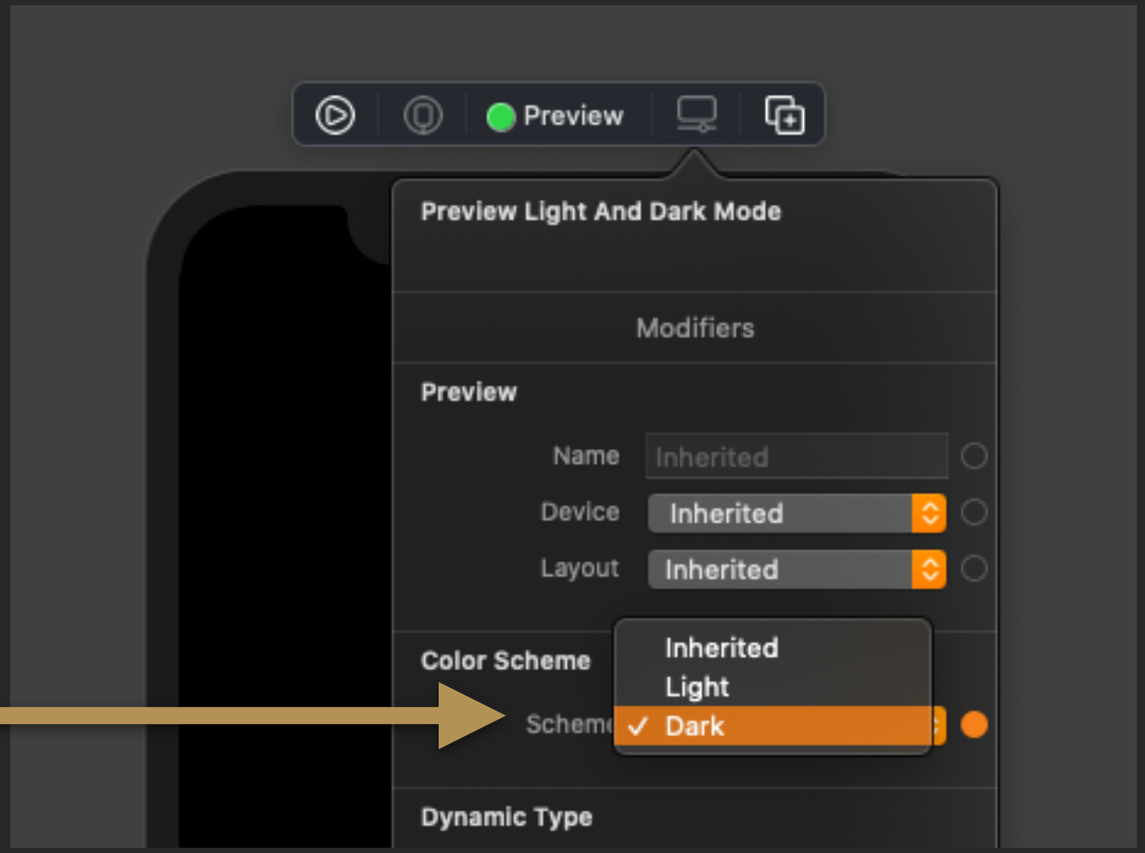
When a dark mode option is added (from the previous page) the code is updated to use preferredColorScheme(.dark).

Light & Dark Modes Together

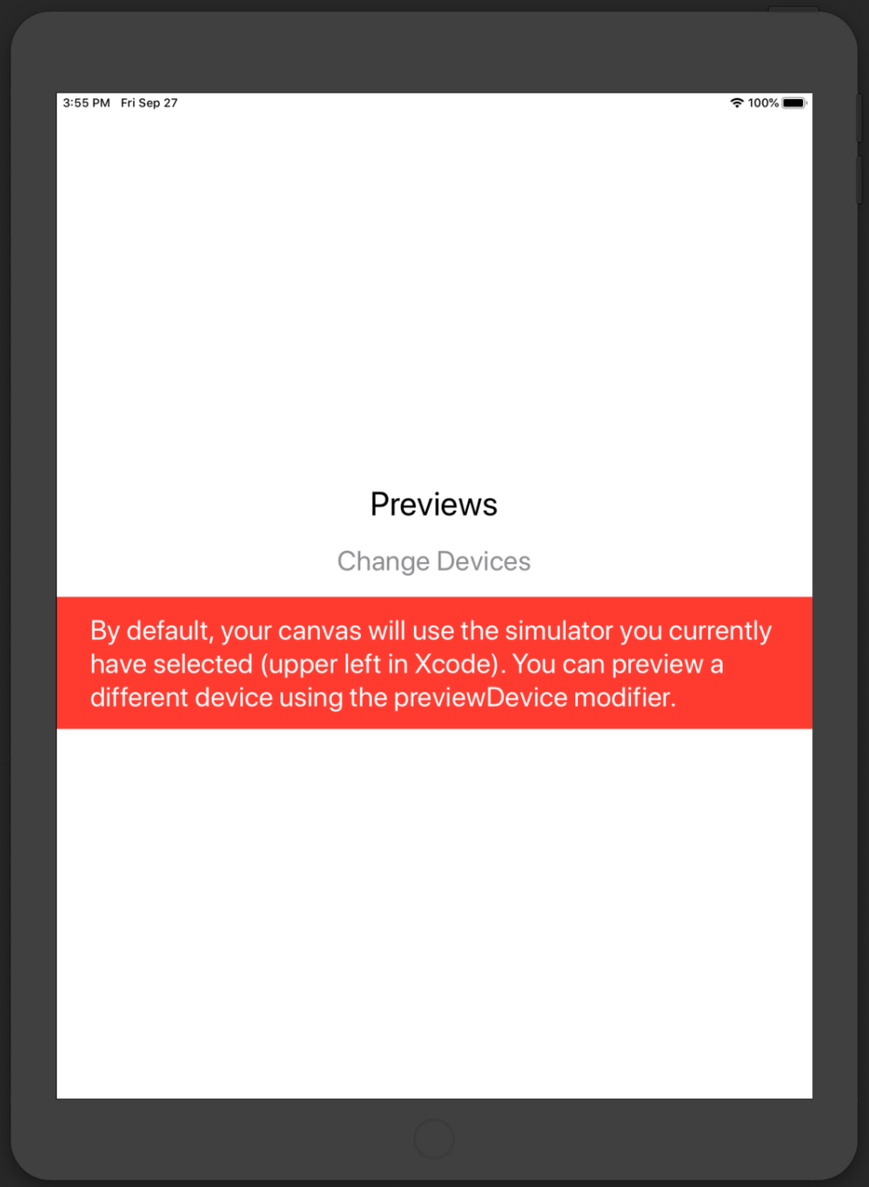
You can also click this button to create a new preview.



And then change the color scheme here.



Changing Devices




```
struct Previews_Devices: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Previews").font(.largeTitle)
            Text("Change Devices").foregroundColor(.gray)
            Text("By default, your canvas will use the simulator you
currently have selected (upper left in Xcode). You can preview a
different device using the previewDevice modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.red)
                .foregroundColor(.white)
        }.font(.title)
    }
}
```

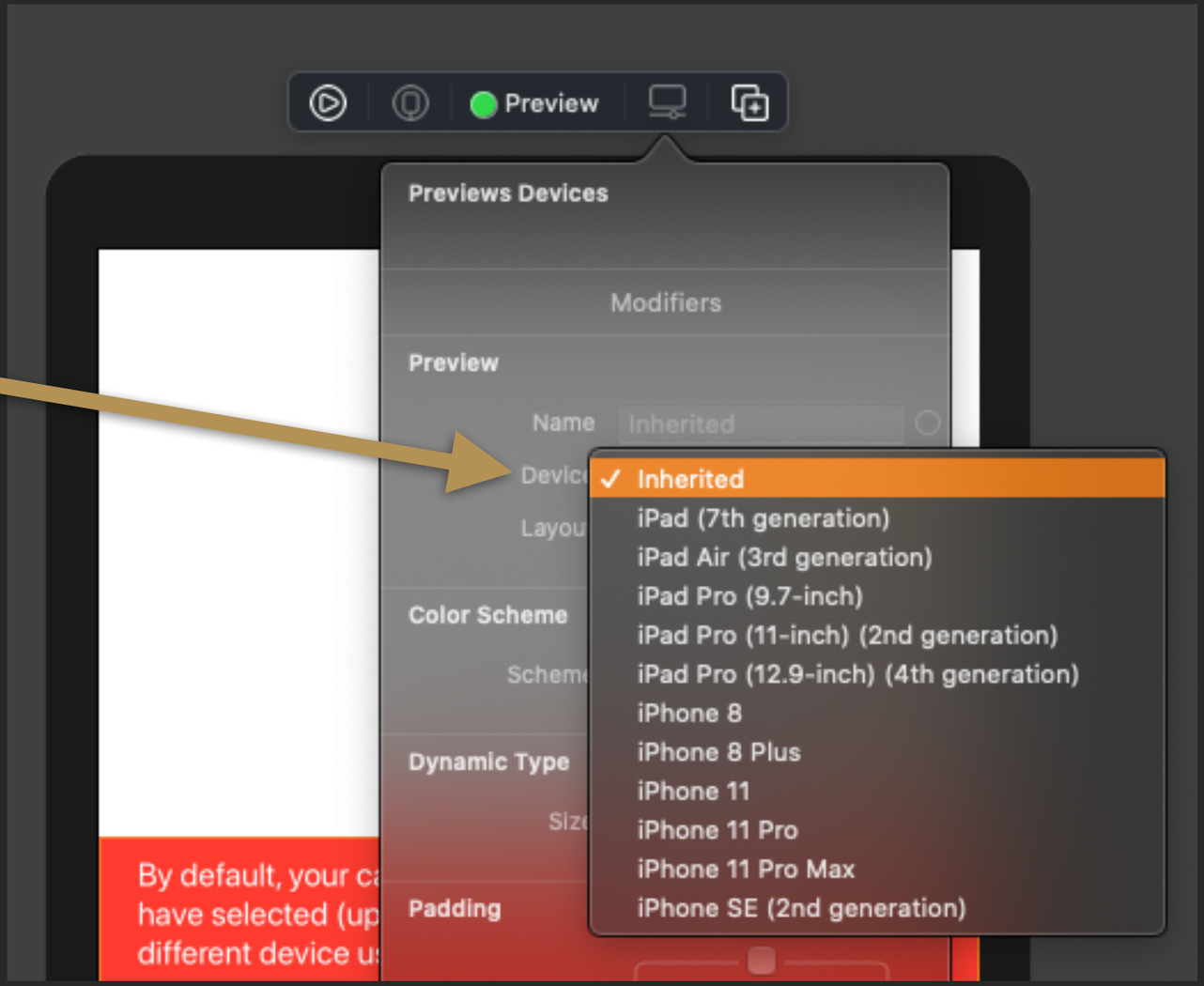
```
struct Previews_Devices_Previews: PreviewProvider {
    static var previews: some View {
        Previews_Devices()
            .previewDevice(PreviewDevice(rawValue: "iPad Pro (9.7-
inch)"))
    }
}
```

How do I know what to type for a device?

Just look at your list of simulators and type in exactly as you see them displayed in the list.

Changing Devices

You can also change the device with the Device drop down here.

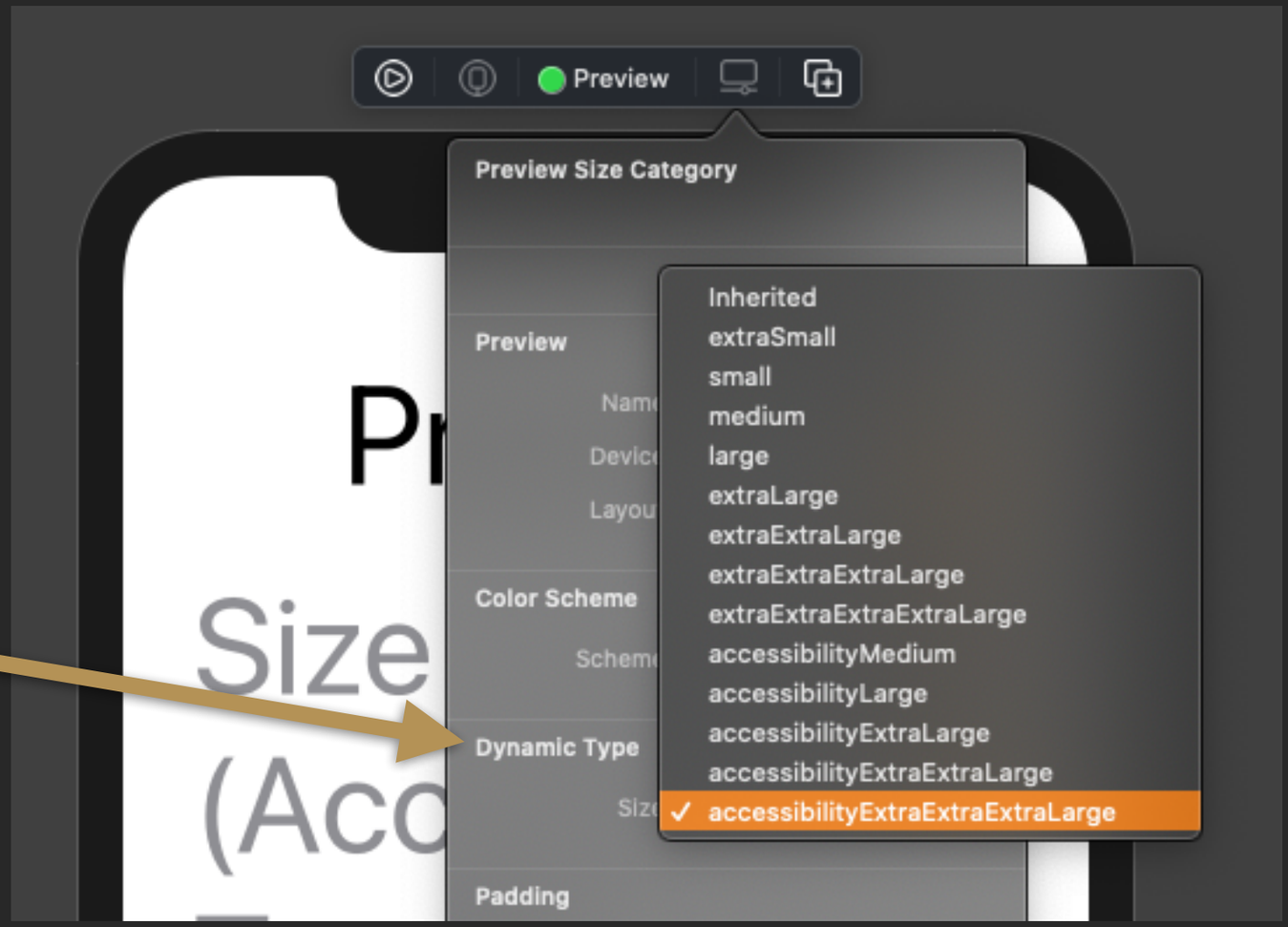


Size Category

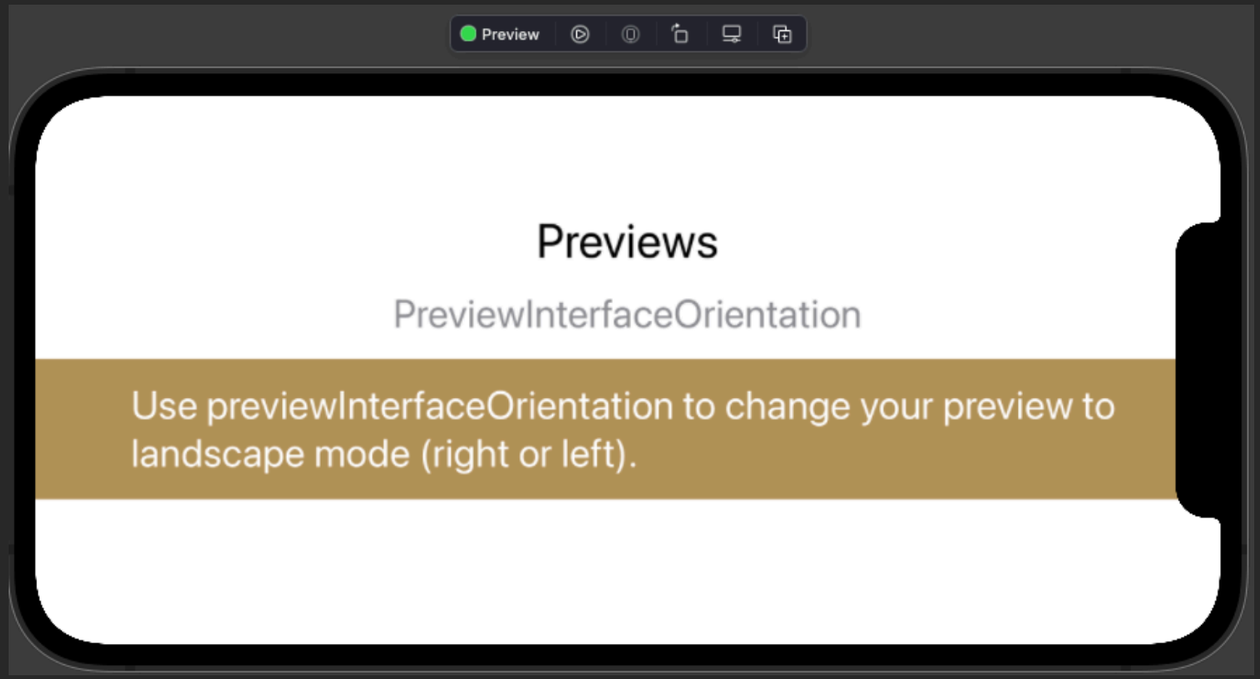

```
struct Preview_SizeCategory: View {
    var body: some View {
        VStack(spacing: 20) {
            ...
             Text("For testing accessibility text size, set the sizeCategory property.")
                ...
        }.font(.title)
    }
}

struct Preview_SizeCategory_Previews: PreviewProvider {
    static var previews: some View {
        Preview_SizeCategory()
            .environment(\.sizeCategory, .accessibilityExtraExtraExtraLarge)
        /*
         Options:
         case accessibilityExtraExtraExtraLarge
         case accessibilityExtraExtraLarge
         case accessibilityExtraLarge
         case accessibilityLarge
         case accessibilityMedium
         case extraExtraExtraLarge
         case extraExtraLarge
         case extraLarge
         case extraSmall
         case large
         case medium
         case small
         */
    }
}
```

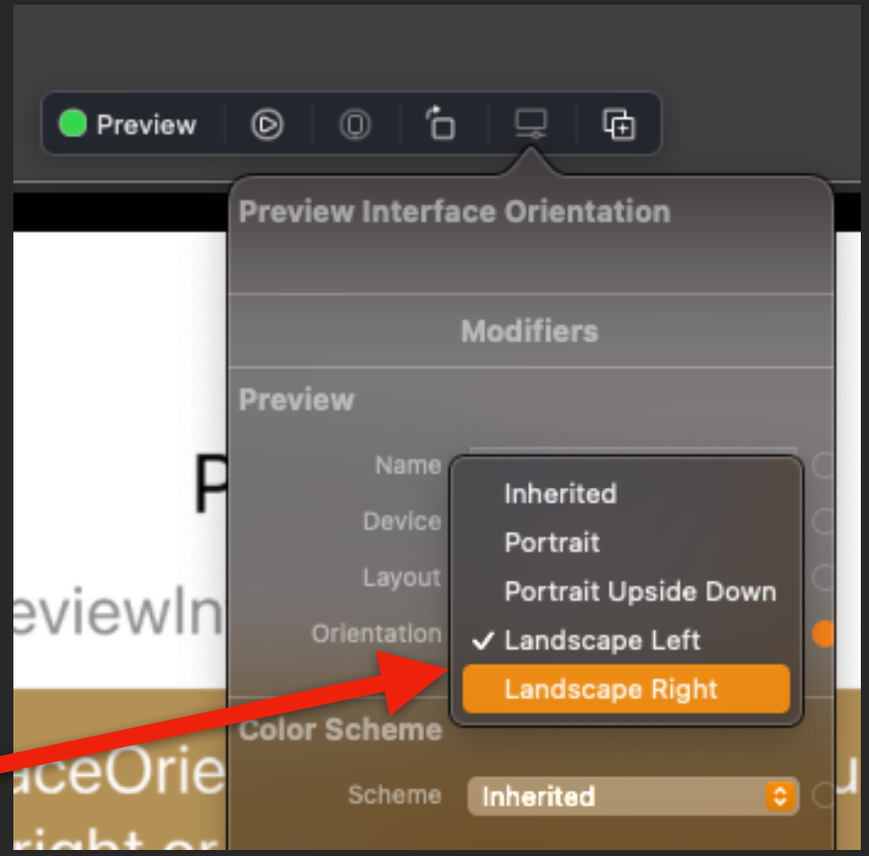
Size Category

You can set the size category here under Dynamic Type.



Landscape

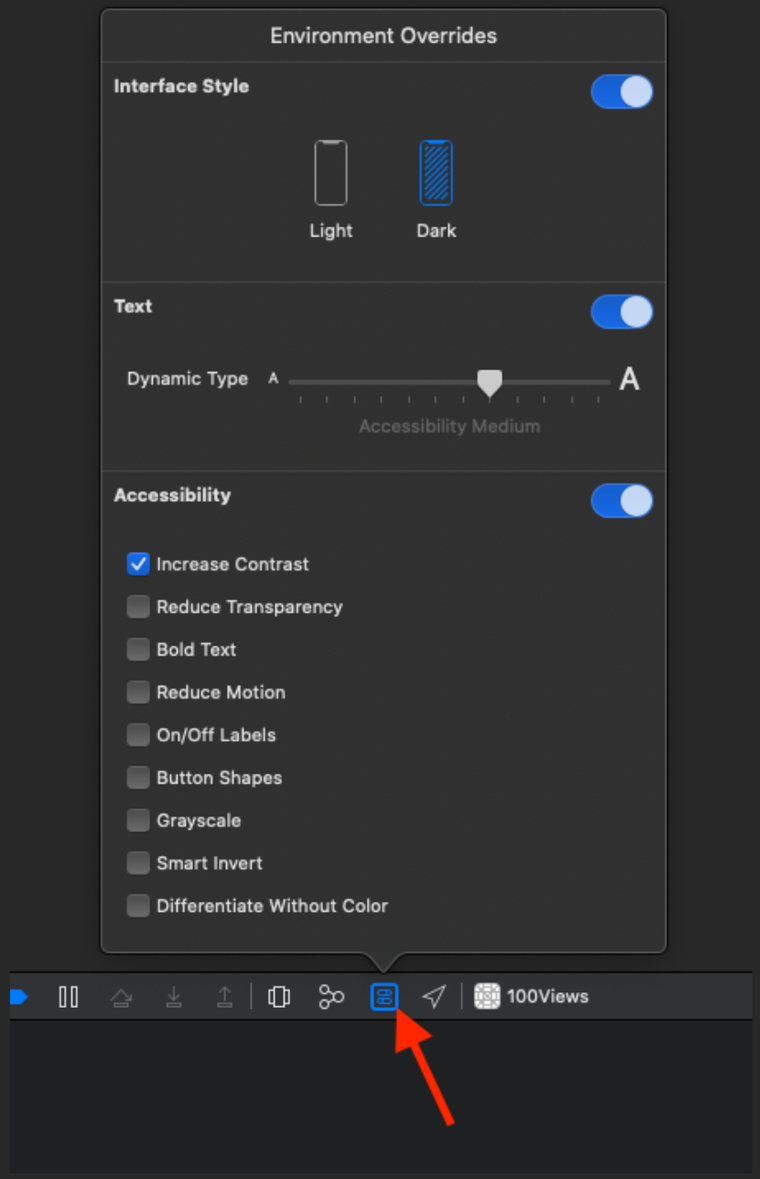





```
struct Preview_InterfaceOrientation_Previews: PreviewProvider {
    static var previews: some View {
        Preview_InterfaceOrientation()
            .previewInterfaceOrientation(.landscapeLeft)
    }
}
```

You could select Landscape Left or Right to preview your device in landscape mode.
(Note: This functionality became available in Xcode 13.)

Environment Overrides



If you prefer to see your work in the Simulator then you can access many of the options mentioned through the Environment Overrides options.

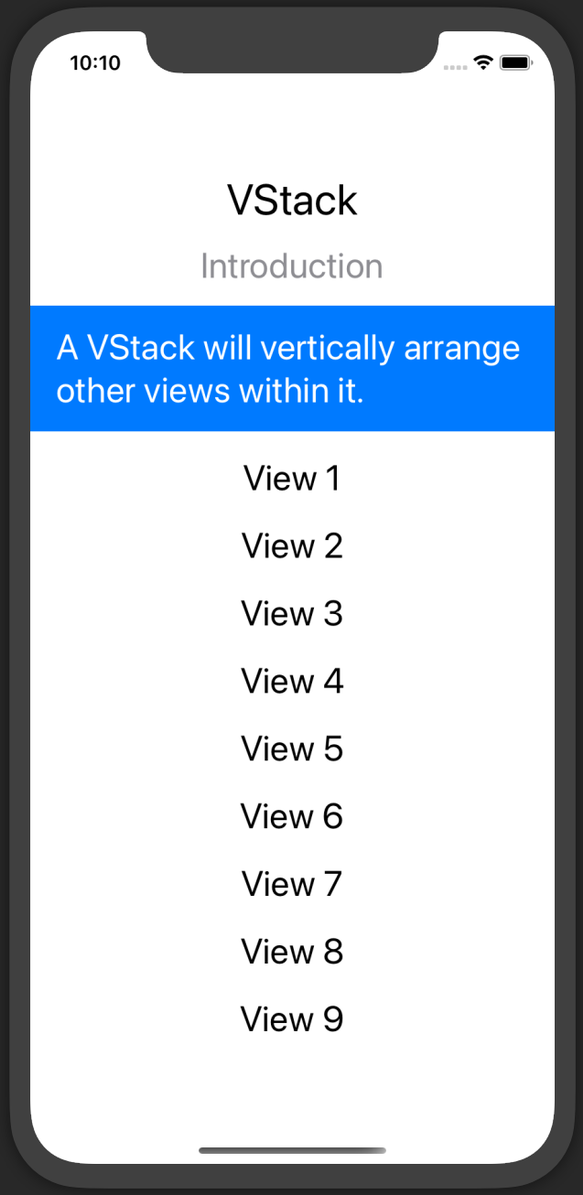
This button will show up when you run your app in the debugging toolbar at the bottom of Xcode.

LAYOUT VIEWS

VStack

VStack stands for “Vertical Stack”. It is a pull-in container view in which you pass in up to ten views and it will compose them one below the next, going down the screen.

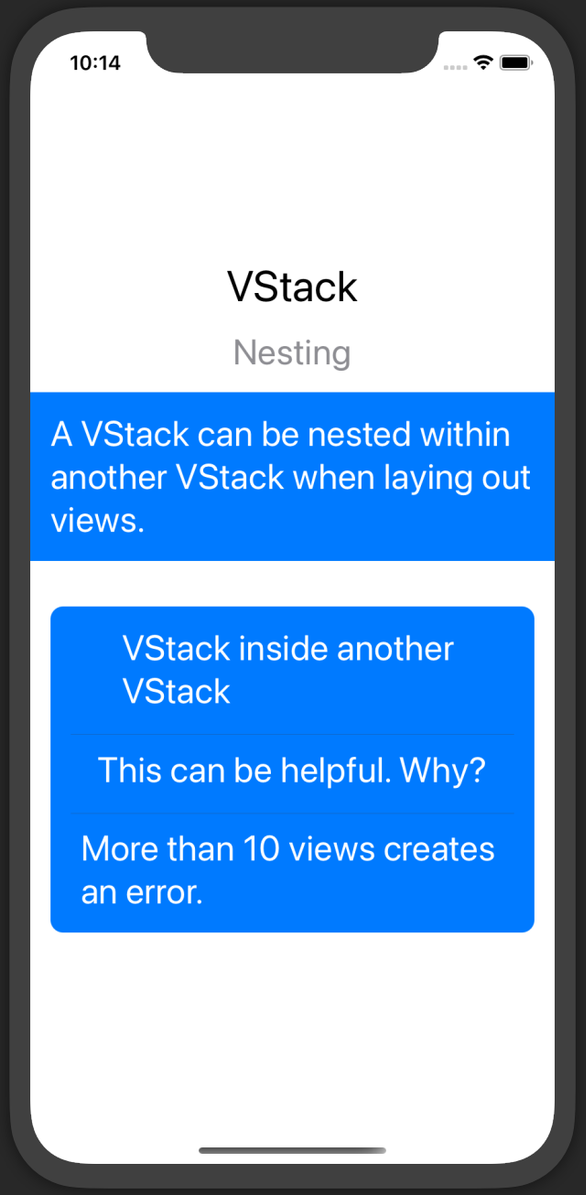
Introduction




```
struct VStack_Intro : View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("VStack",
                       subtitle: "Introduction",
                       desc: "A VStack will vertically arrange other views within it.",
                       back: .blue, textColor: .white)

            Text("View 1")
            Text("View 2")
            Text("View 3")
            Text("View 4")
            Text("View 5")
            Text("View 6")
            Text("View 7")
            Text("View 8")
            Text("View 9")
        }
        .font(.title)
    }
}
```

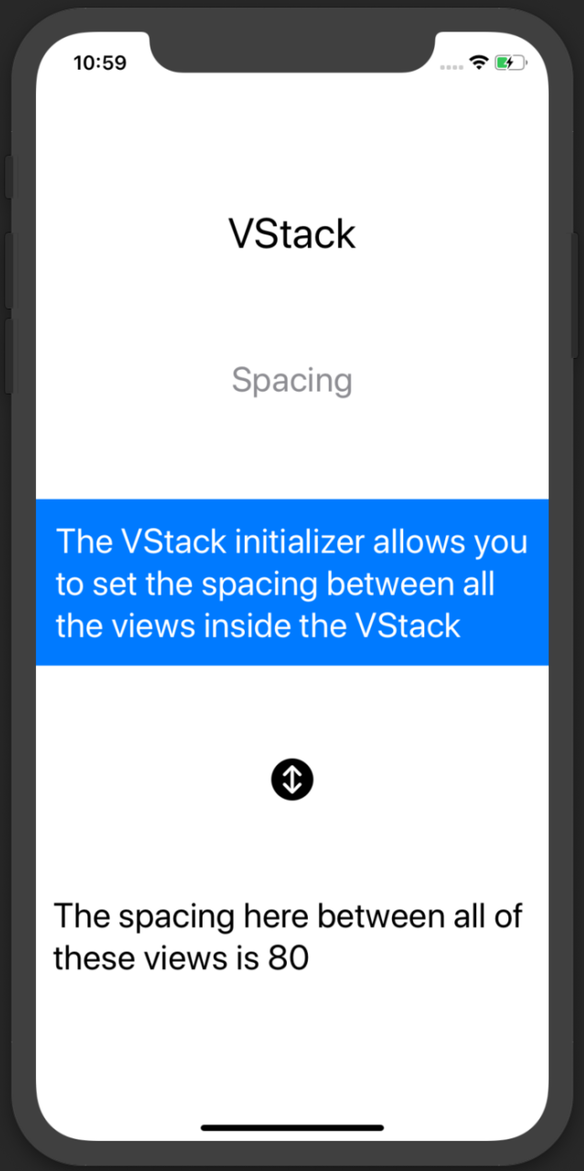
In SwiftUI, container views, like the VStack, can only contain up to 10 views.

Nesting




```
struct VStack_Nesting: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("VStack",
                       subtitle: "Nesting",
                       desc: "A VStack can be nested within another VStack when laying out
views.",
                       back: .blue, textColor: .white)

            VStack {
                Text("VStack inside another VStack")
                Divider()
                Text("This can be helpful. Why?")
                Divider()
                Text("More than 10 views creates an error.")
            }
            .padding()
            .foregroundColor(Color.white)
            .background(
                // Use a blue rectangle as the background
                RoundedRectangle(cornerRadius: 10)
                    .foregroundColor(.blue))
            .padding()
        }
        .font(.title)
    }
}
```

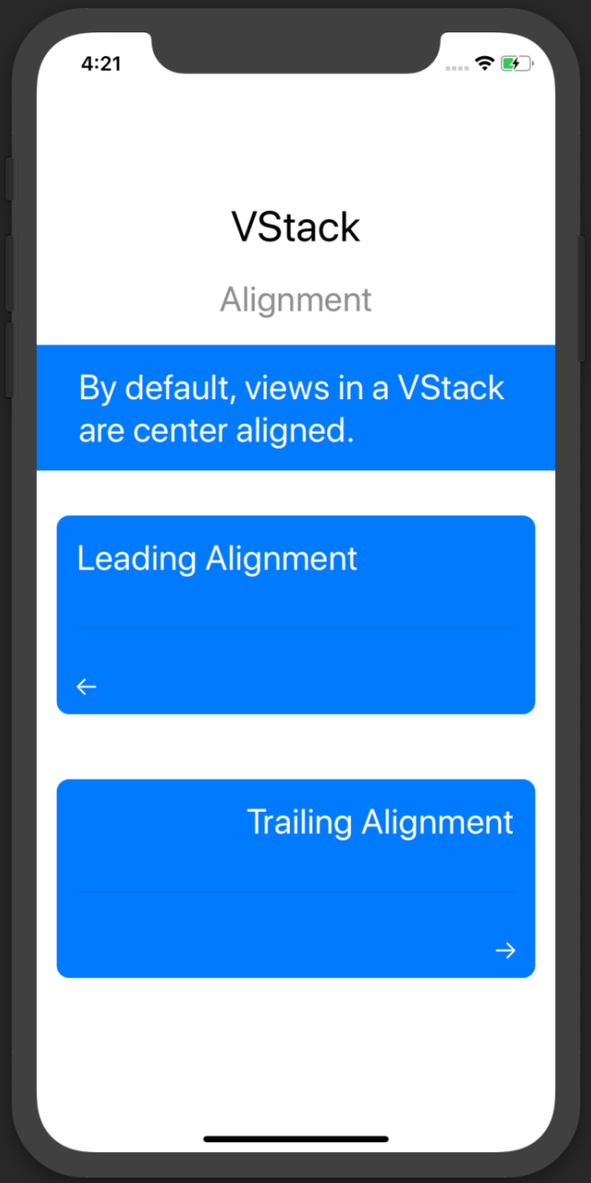
Spacing



Set spacing in the initializer.

```
VStack(spacing: 80) {
    Text("VStack")
        .font(.largeTitle)

    Text("Spacing")
        .font(.title)
        .foregroundColor(.gray)

    Text("The VStack initializer allows you to set the spacing between all the views inside the
VStack")
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.blue).font(.title)
        .foregroundColor(.white)

    Image(systemName: "arrow.up.and.down.circle.fill")
        .font(.largeTitle)

    Text("The spacing here between all of these views is 80")
        .font(.title)
}
```

Alignment




```
VStack(spacing: 20) {
    Text("VStack")
        .font(.largeTitle)
    Text("Alignment")
        .font(.title)
        .foregroundColor(.gray)
    Text("By default, views in a VStack are center aligned.")
        ...

    VStack(alignment: .leading, spacing: 40) {
        Text("Leading Alignment")
            .font(.title)
        Divider() // Creates a thin line (Push-out view)
        Image(systemName: "arrow.left")
    }
    .padding()
    .foregroundColor(Color.white)
    .background(RoundedRectangle(cornerRadius: 10)
    .foregroundColor(.blue))
    .padding()

    VStack(alignment: .trailing, spacing: 40) {
        Text("Trailing Alignment")
            .font(.title)
        Divider()
        Image(systemName: "arrow.right")
    }
    .padding()
    .foregroundColor(Color.white)
    .background(RoundedRectangle(cornerRadius: 10)
    .foregroundColor(.blue))
    .padding()
}
```

Set alignment in the initializer.

This book is a preview of:

SwiftUI Views Mastery

- Over **900** pages of SwiftUI
- Over **600** screenshots and video showing you what you can do so you can quickly come back and reference the code
- Learn all the ways to work with and modify images
- See the many ways you can use color as views
- Discover the different gradients and how you can apply them
- Find out how to implement action sheets, modals, popovers and custom popups
- Master all the layout modifiers including background and overlay layers, scaling, offsets padding and positioning
- How do you hide the status bar in SwiftUI? Find out!
- ***This is just the tip of the mountain!***

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iOS 14

LazyVStack

This SwiftUI content is locked in this preview.

The Lazy Vertical Stack is similar to the VStack. It's "lazy" because if you have views scrolling off the screen, SwiftUI will not load them unless it needs to show them on the screen. The VStack does not do this. The VStack loads all child views when displayed.

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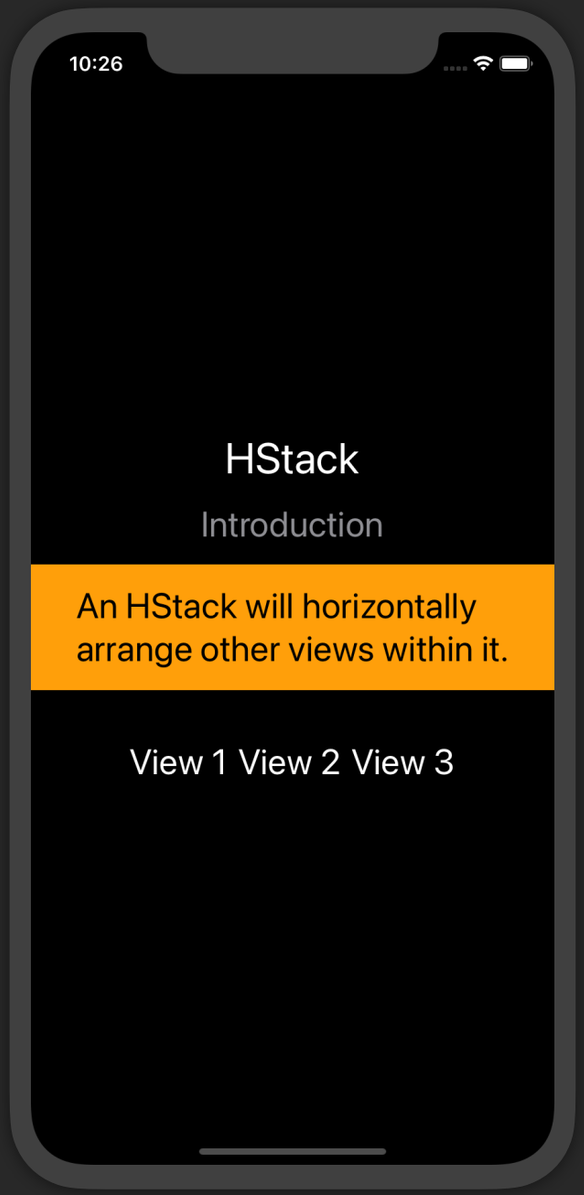
HStack

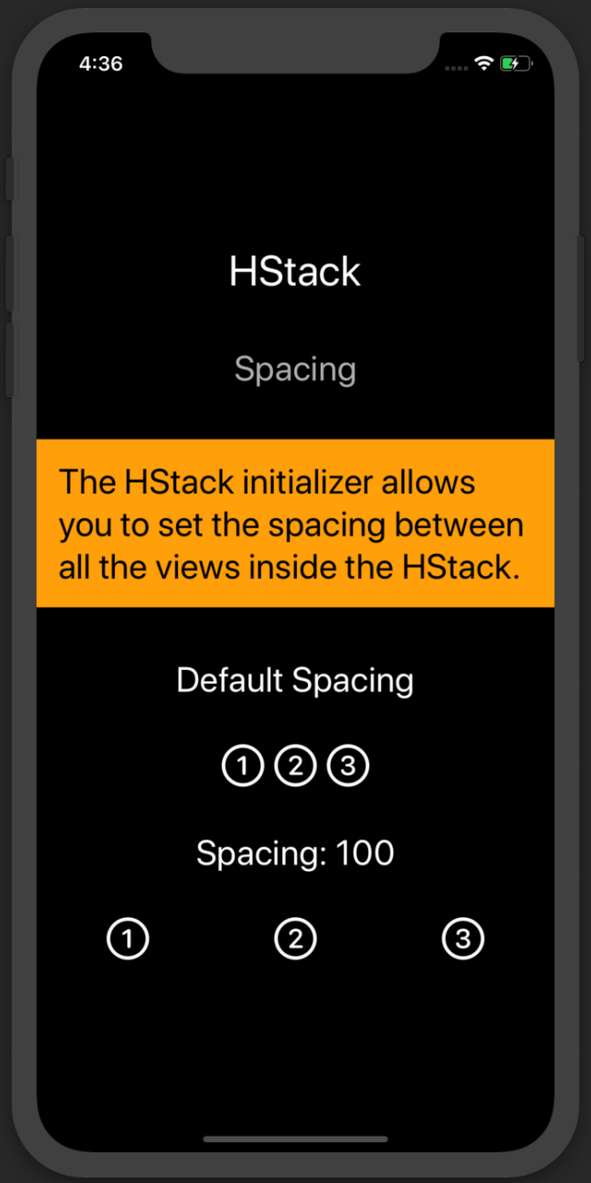
HStack stands for “Horizontal Stack”. It is a pull-in container view in which you pass in up to ten views and it will compose them side-by-side.

Introduction




```
struct HStack_Intro: View {
    var body: some View {
        VStack(spacing: 40) {
            HeaderView("HStack",
                       subtitle: "Introduction",
                       desc: "An HStack will horizontally arrange other views within it.",
                       back: .orange)

            HStack {
                Text("View 1")
                Text("View 2")
                Text("View 3")
            }
        }
        .font(.title)
    }
}
```

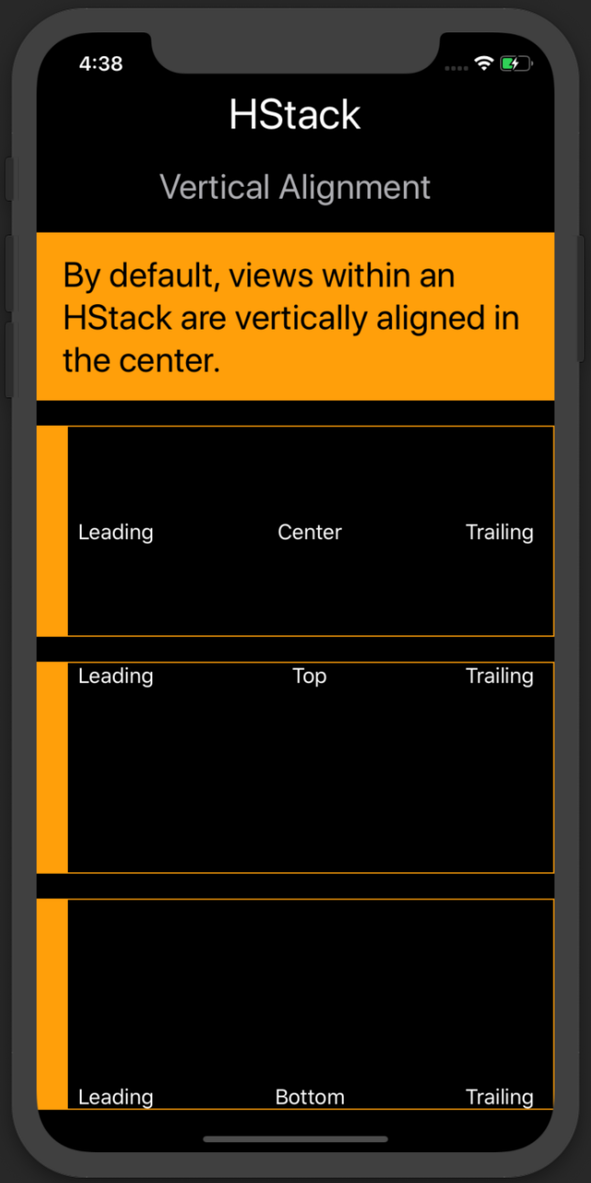
Spacing




```
VStack(spacing: 40) {
    Text("HStack")
        .font(.largeTitle)

    Text("Spacing")
        .font(.title)
        .foregroundColor(.gray)

    Text("The HStack initializer allows you to set the spacing between all the views inside the
HStack")
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.orange).font(.title)
        .foregroundColor(.black)

    Text("Default Spacing")
        .font(.title)
    HStack {
        Image(systemName: "1.circle")
        Image(systemName: "2.circle")
        Image(systemName: "3.circle")
    }.font(.largeTitle)

    Divider()

    Text("Spacing: 100")
        .font(.title)
    HStack(spacing: 100) {
        Image(systemName: "1.circle")
        Image(systemName: "2.circle")
        Image(systemName: "3.circle")
    }.font(.largeTitle)
}
```

Set spacing in the initializer.

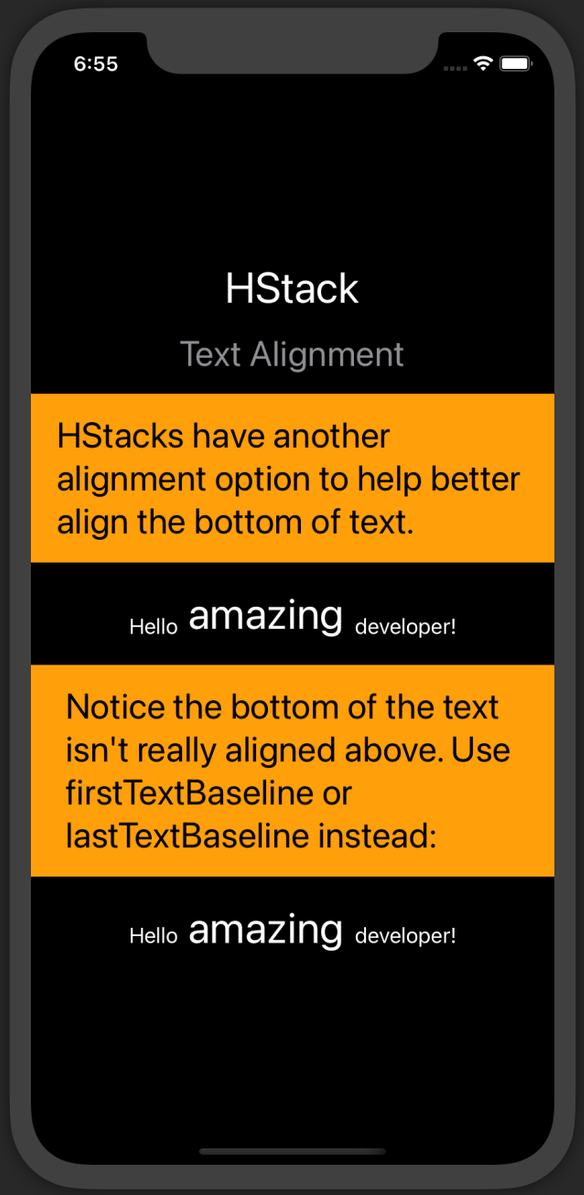
Alignment




```
Text("By default, views within an HStack are vertically aligned in the center.")
...
HStack {
    Rectangle().foregroundColor(.orange).frame(width: 25)
    Text("Leading")
    Spacer()
    Text("Center")
    Spacer()
    Text("Trailing")
        .padding(.trailing)
}
.border(Color.orange)
HStack(alignment: .top) {
    Rectangle().foregroundColor(.orange).frame(width: 25)
    Text("Leading")
    Spacer()
    Text("Top")
    Spacer()
    Text("Trailing")
        .padding(.trailing)
}
.border(Color.orange)
HStack(alignment: .bottom) {
    Rectangle().foregroundColor(.orange).frame(width: 25)
    Text("Leading")
    Spacer()
    Text("Bottom")
    Spacer()
    Text("Trailing")
        .padding(.trailing)
}
.border(Color.orange)
```

Set alignment in the initializer.

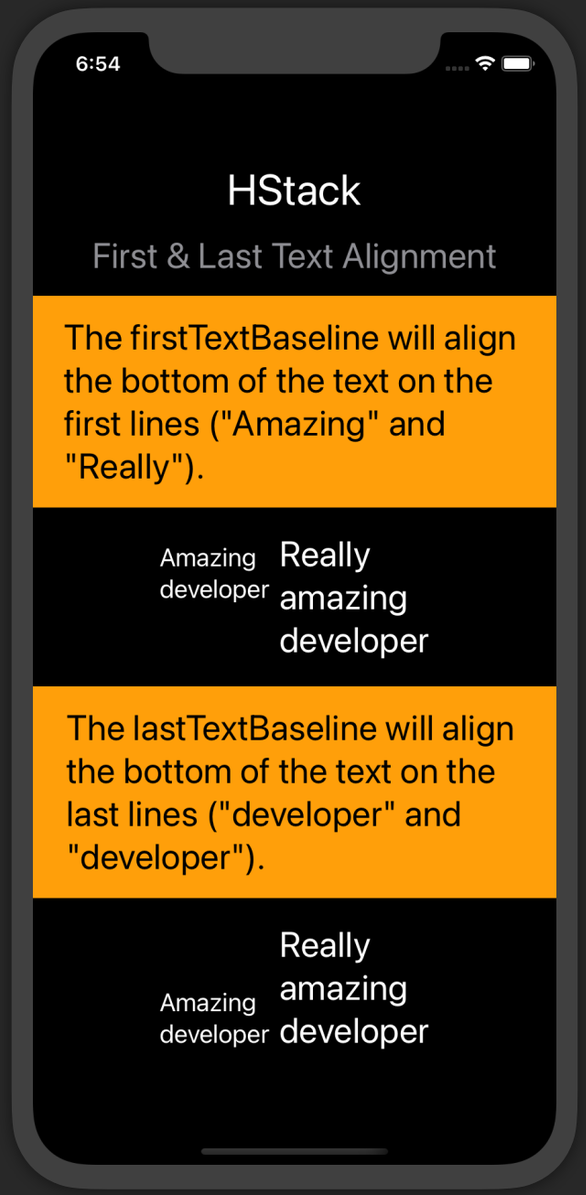
Text Alignment




```
struct HStack_TextAlignment: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("HStack",
                       subtitle: "Text Alignment",
                       desc: "HStacks have another alignment option to help better align the
bottom of text.",
                       back: .orange)

            HStack(alignment: .bottom) {
                Text("Hello")
                Text("amazing")
                    .font(.largeTitle)
                Text("developer!")
            }
            .font(.body)

            DescView(desc: "Notice the bottom of the text isn't really aligned above. Use
firstTextBaseline or lastTextBaseline instead:", back: .orange)

            HStack(alignment: .firstTextBaseline) {
                Text("Hello")
                Text("amazing")
                    .font(.largeTitle)
                Text("developer!")
            }
            .font(.body)
        }
        .font(.title)
    }
}
```

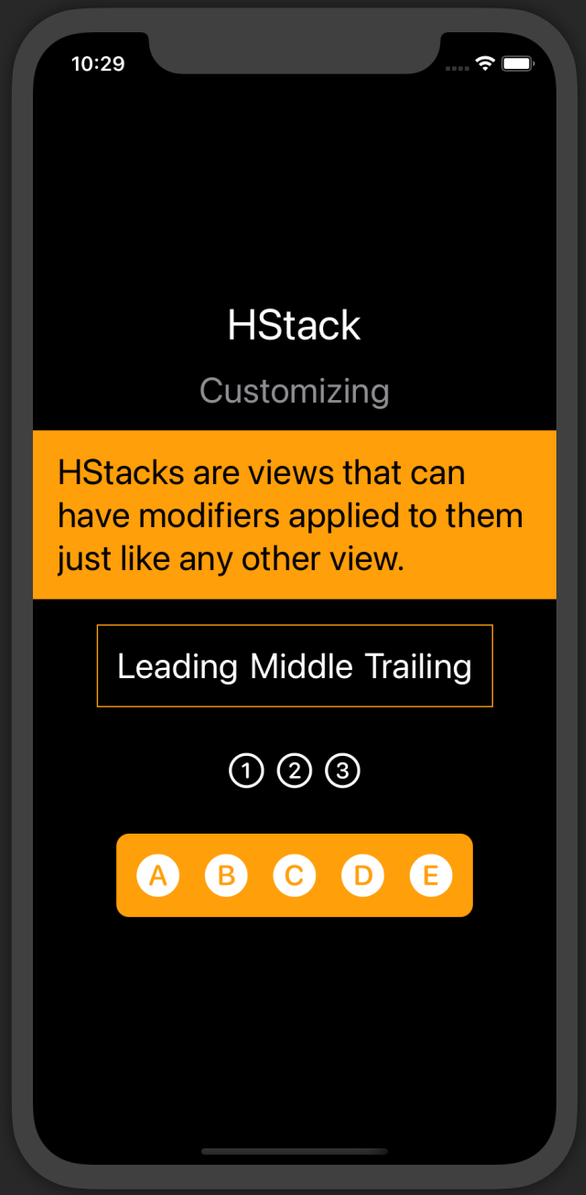
This will align the text normally.
But what's the difference between first and last text baseline? See on the next page.

First & Last Text Alignment



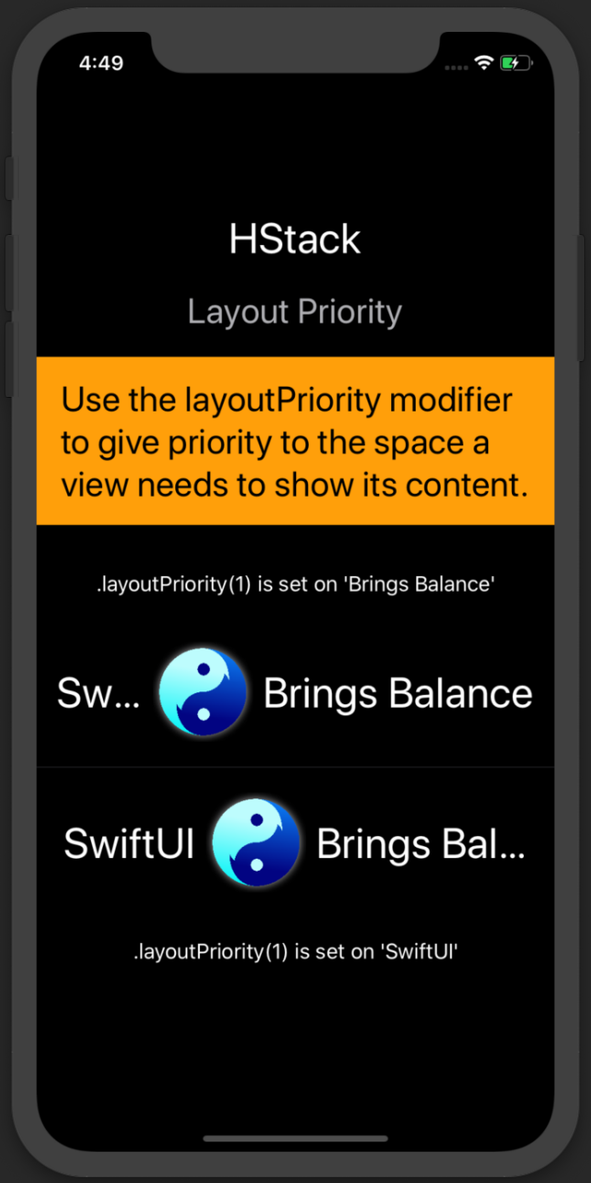

```
struct HStack_TextAlignment_FirstLast: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("HStack",
                       subtitle: "First & Last Text Alignment",
                       desc: "The firstTextBaseline will align the bottom of the text on the
first lines (\"Amazing\" and \"Really\").",
                       back: .orange)

            HStack(alignment: .firstTextBaseline) {
                Text("Amazing developer")
                    .font(.title3)
                Text("Really amazing developer")
            }
            .frame(width: 250)

            DescView(desc: "The lastTextBaseline will align the bottom of the text on the last
lines (\"developer\" and \"developer\").", back: .orange)

            HStack(alignment: .lastTextBaseline) {
                Text("Amazing developer")
                    .font(.title3)
                Text("Really amazing developer")
            }
            .frame(width: 250)
        }
        .font(.title)
    }
}
```

Customization




```
struct HStack_Customizing : View {
    var body: some View {
        VStack(spacing: 20) {
                HeaderView("HStack",
                           subtitle: "Customizing",
                           desc: "HStacks are views that can have modifiers applied to them just
like any other view.",
                           back: .orange)

            HStack {
                Text("Leading")
                Text("Middle")
                Text("Trailing")
            }
            .padding()
                .border(Color.orange) // Create a 2 point border using the color specified

            HStack(spacing: 10) {
                Image(systemName: "1.circle")
                Image(systemName: "2.circle")
                Image(systemName: "3.circle")
            }.padding()

            HStack(spacing: 20) {
                Image(systemName: "a.circle.fill")
                Image(systemName: "b.circle.fill")
                Image(systemName: "c.circle.fill")
                Image(systemName: "d.circle.fill")
                Image(systemName: "e.circle.fill")
            }
            .font(.largeTitle).padding()
            .background(RoundedRectangle(cornerRadius: 10)
            .foregroundColor(.orange))
        }
        .font(.title)
    }
}
```

Layout Priority



When using a horizontal stack with text views within it, there's a chance that text might truncate if you are not allowing them to wrap. In this case, you can prioritize which one will truncate last with layout priority. The default value is 0. The higher the number, the higher the priority to have enough space to not be truncated.

```
HStack {
    Text("SwiftUI")
        .font(.largeTitle).lineLimit(1) // Don't let text wrap
    Image("SwiftUI")
        .resizable()
        .frame(width: 80, height: 80)
    Text("Brings Balance")
        .font(.largeTitle)
        .layoutPriority(1) // Truncate last
}
.padding([.horizontal])
Divider()
HStack {
    Text("SwiftUI")
        .font(.largeTitle)
        .layoutPriority(1) // Truncate last
    Image("SwiftUI")
        .resizable()
        .frame(width: 80, height: 80)
    Text("Brings Balance")
        .font(.largeTitle).lineLimit(1) // Don't let text wrap
}
.padding(.horizontal)
```

Note: You can learn more about layout priority in the chapter "Layout Modifiers", section "LayoutPriority".

iOS 14

LazyHStack

This SwiftUI content is locked in this preview.

The Lazy Horizontal Stack is similar to the HStack. It's "lazy" because if you have views scrolling off the screen, SwiftUI will not load them unless it needs to show them on the screen. The HStack does not do this. The HStack loads all child views when displayed.

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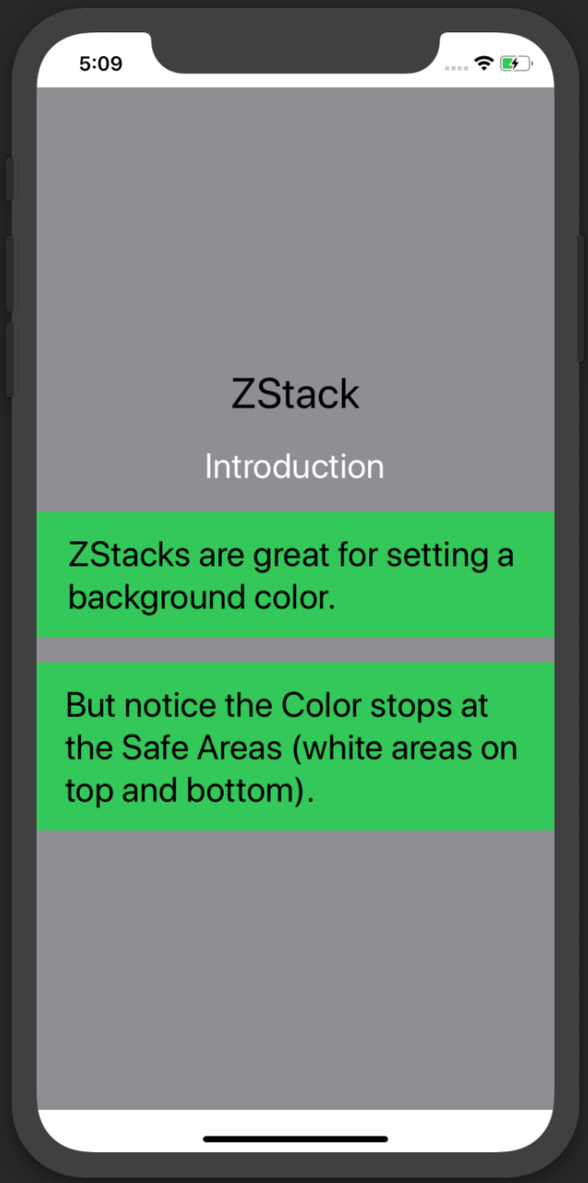
Depth (Z) Stack

A Depth Stack (ZStack) is a pull-in container view. It is a view that overlays its child views on top of each other. (“Z” represents the Z-axis which is depth-based in a 3D space.)

You learned earlier about creating layers with the background and overlay modifiers. ZStack is another way to create layers with views that control their own sizing and spacing.

So, the ZStack is a pull-in container view but you may think it is a push-out view because of the first example but it’s actually the color that is pushing out.

Introduction

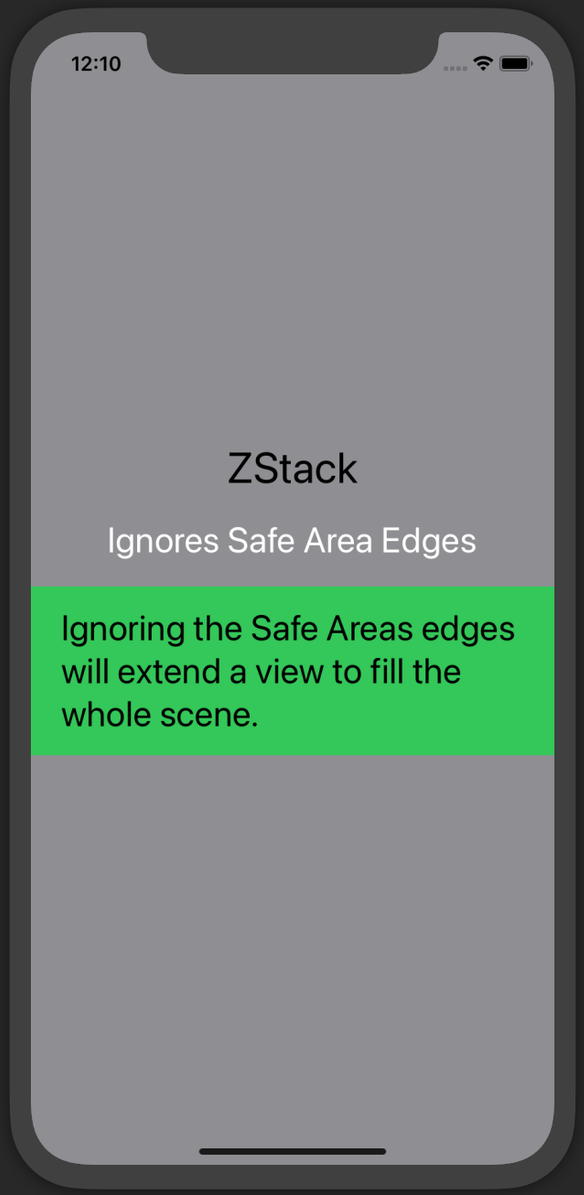



```
ZStack {
    // LAYER 1: Furthest back
    Color.gray // Yes, Color is a view!

    // LAYER 2: This VStack is on top.
    VStack(spacing: 20) {
        Text("ZStack")
            .font(.largeTitle)

        Text("Introduction")
            .foregroundColor(.white)

        Text("ZStacks are great for setting a background color.")
            .frame(maxWidth: .infinity)
            .padding()
            .background(Color.green)

        Text("But notice the Color stops at the Safe Areas (white areas on top and bottom).")
            .frame(maxWidth: .infinity)
            .padding()
            .background(Color.green)
    }
    .font(.title)
}
```

You set depth by the order of the views inside the ZStack.

Note: The Color view is a push-out view. It is pushing out the ZStack container view.

Ignores Safe Area Edges

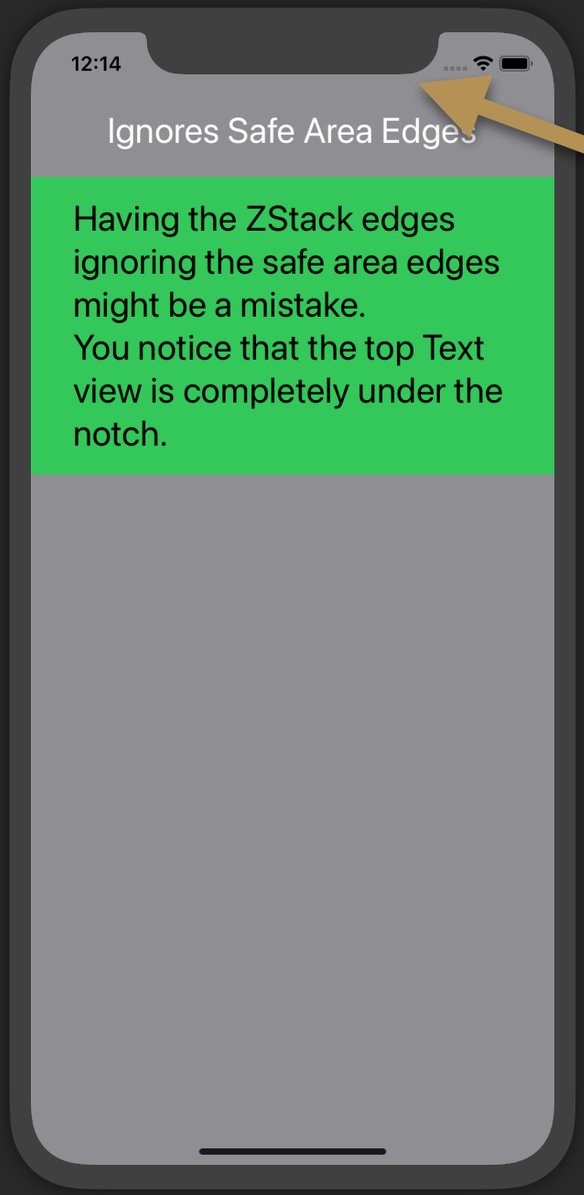



```
ZStack {
    Color.gray

    VStack(spacing: 20) {
        Text("ZStack")
            .font(.largeTitle)

        Text("Edges Ignoring Safe Area")
            .foregroundColor(.white)

        Text("Ignoring the Safe Areas will extend a view to fill the whole scene.")
            .frame(maxWidth: .infinity)
            .padding()
            .foregroundColor(.white)
            .background(Color.green)

    }
    .font(.title)
}
.ignoresSafeArea(.all) // Ignore the safe areas
```

Allows views to extend past the safe areas.

Learn more about what Safe Areas are and ways to ignore edges in the chapter “Layout Modifiers” in the section “Ignores Safe Area”.

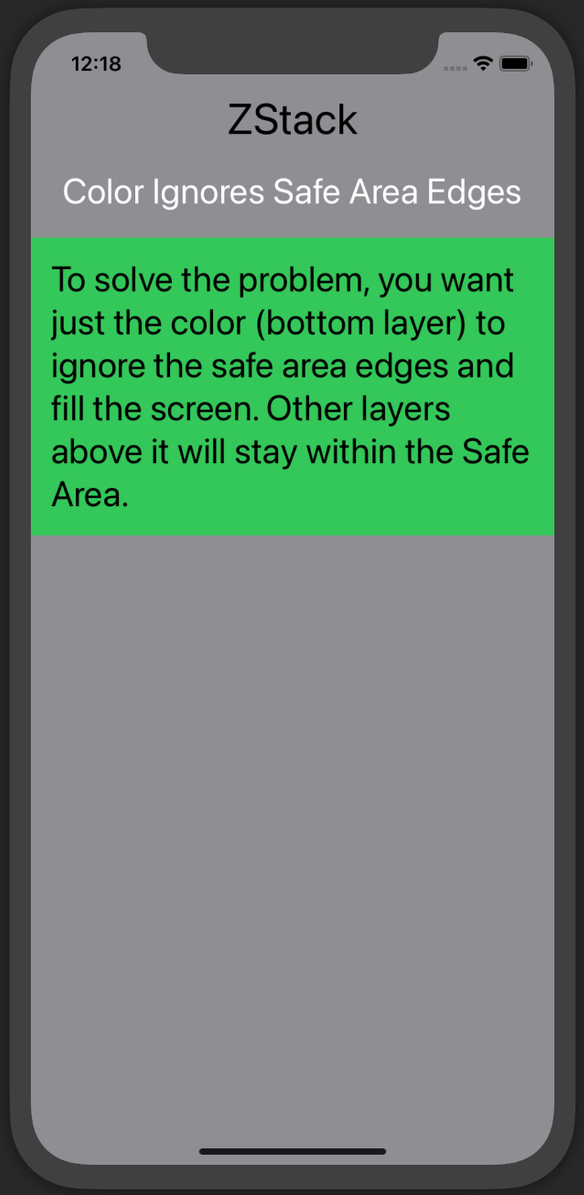
Background Problem




```
struct ZStack_BackgroundColor_Problem: View {
    var body: some View {
        ZStack {
            Color.gray

            VStack(spacing: 20) {
                Text("ZStack") // This view is under the notch
                    .font(.largeTitle)

                Text("Ignores Safe Area Edges")
                    .foregroundColor(.white)

                Text("Having the ZStack edges ignoring the safe area edges might be a mistake.
\nYou notice that the top Text view is completely under the notch.")
                    .frame(maxWidth: .infinity)
                    .padding()
                    .background(Color.green)

                Spacer() // Added a spacer to push the views up.
            }
            .font(.title)
        }
        .ignoresSafeArea()
    }
}
```

Ignores all Safe Area edges.

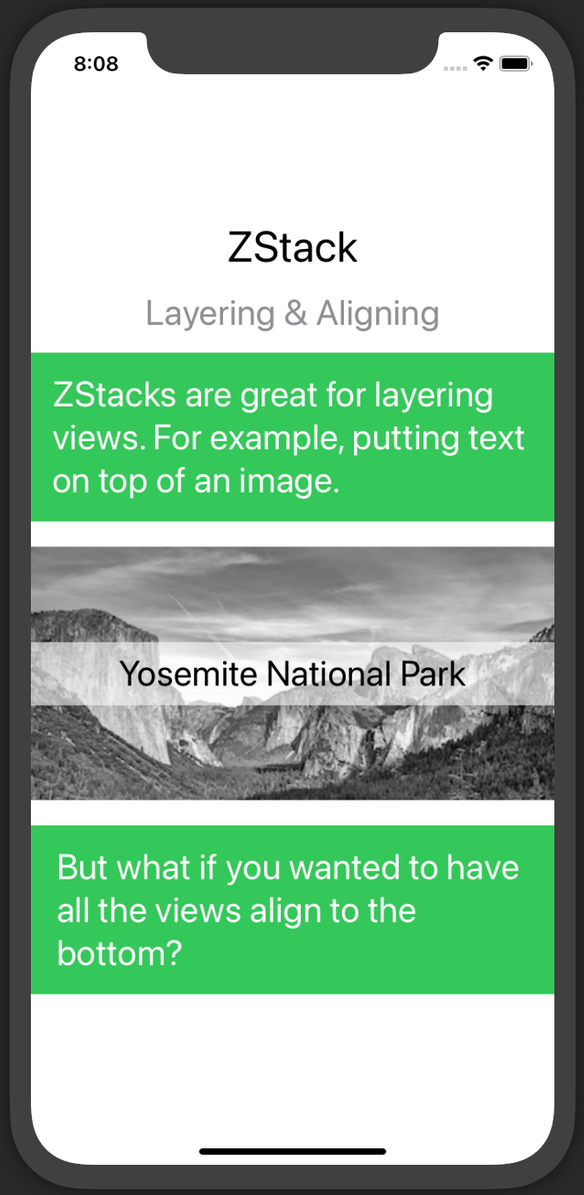
Background Solution




```
struct ZStack_BackgroundColor_Solution: View {
    var body: some View {
        ZStack {
            Color.gray
                .ignoresSafeArea() // Have JUST the color ignore the safe areas edges, not
the VStack.

            VStack(spacing: 20) {
                Text("ZStack")
                    .font(.largeTitle)

                Text("Color Ignores Safe Area Edges")
                    .foregroundColor(.white)

                Text("To solve the problem, you want just the color (bottom layer) to ignore
the safe area edges and fill the screen. Other layers above it will stay within the Safe
Area.")
                    .frame(maxWidth: .infinity)
                    .padding()
                    .background(Color.green)
                Spacer()
            }
            .font(.title)
        }
    }
}
```

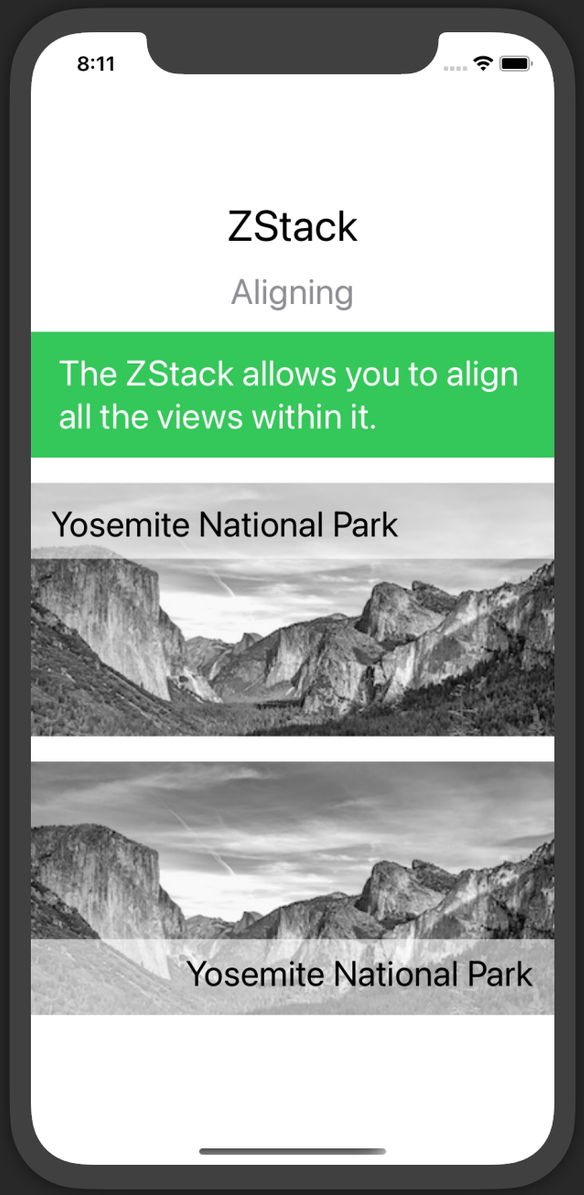
Remove ignoresSafeArea modifier from the ZStack and put it just on the color.

Layering




```
struct ZStack_Layering: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("ZStack",
                       subtitle: "Layering & Aligning",
                       desc: "ZStacks are great for layering views. For example, putting text on
top of an image.", back: .green, textColor: .white)

            ZStack {
                Image("yosemite_large")
                    .resizable() // Allows image to change size
                    .scaledToFit() // Keeps image the same aspect ratio when resizing

                Rectangle()
                    .fill(Color.white.opacity(0.6))
                    .frame(maxWidth: .infinity, maxHeight: 50)

                Text("Yosemite National Park")
                    .font(.title)
                    .padding()
            }

            DescView(desc: "But what if you wanted to have all the views align to the bottom?",
back: .green, textColor: .white)
        }
        .font(.title)
    }
}
```

Aligning




```
struct ZStack_Aligning: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("ZStack",
                       subtitle: "Aligning",
                       desc: "The ZStack allows you to align all the views within it.",
                       back: .green, textColor: .white)

            ZStack(alignment: .topLeading) {
                Image("yosemite_large")
                    .resizable()
                    .aspectRatio(contentMode: .fit)

                Rectangle()
                    .fill(Color.white.opacity(0.6))
                    .frame(maxWidth: .infinity, maxHeight: 60)

                Text("Yosemite National Park")
                    .font(.title)
                    .padding()
            }

            ZStack(alignment: .bottomTrailing) {
                Image("yosemite_large")
                    .resizable()
                    .aspectRatio(contentMode: .fit)
```

Use the alignment parameter in the ZStack's initializer to set where you want all views within to be aligned.

```
                Rectangle()
                    .fill(Color.white.opacity(0.6))
                    .frame(maxWidth: .infinity, maxHeight: 60)

                Text("Yosemite National Park")
                    .font(.title)
                    .padding()
            }
        }
        .font(.title)
    }
}
```

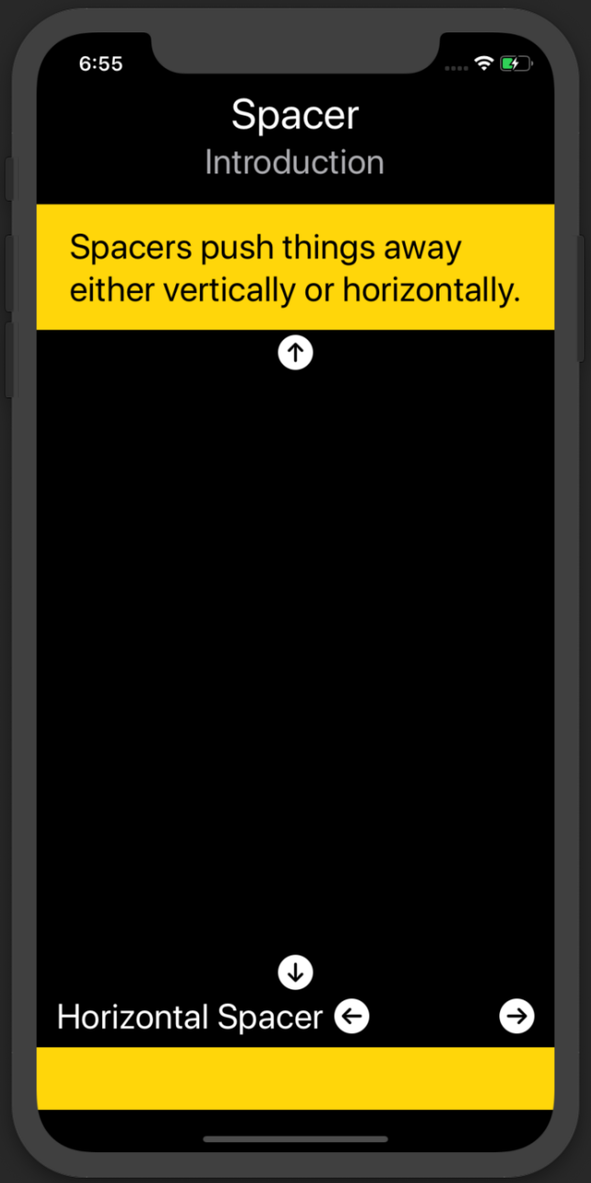
Alignment Choices

- center
- leading
- trailing
- top
- bottom
- topLeading
- topTrailing
- bottomLeading
- bottomTrailing

Spacer

You may notice that when you add new pull-in views, such as Text views, they appear in the center of the screen. You can use the Spacer to push these views apart, away from the center of the screen.

Introduction

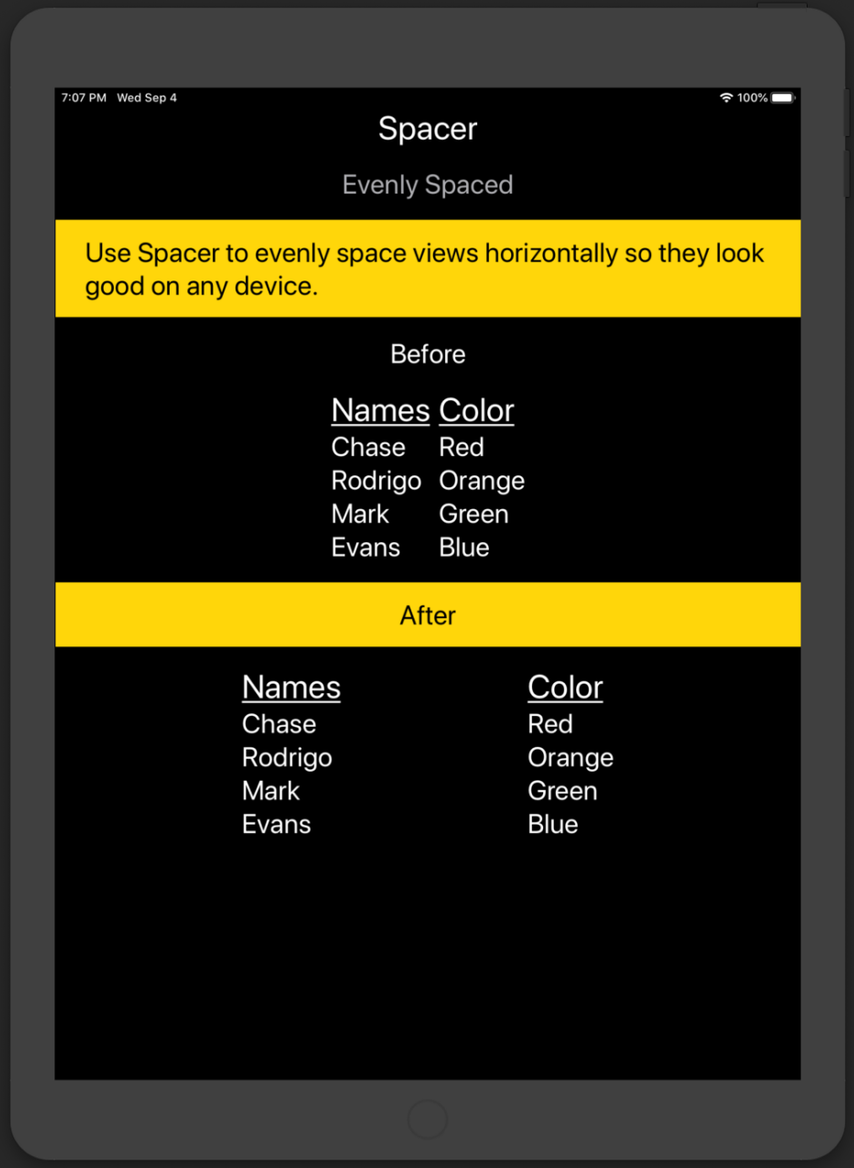



```
VStack {
    Text("Spacer")
        .font(.largeTitle)

    Text("Introduction")
        .foregroundColor(.gray)

    Text("Spacers push things away either vertically or horizontally")
        ...

    Image(systemName: "arrow.up.circle.fill")

    Spacer()

    Image(systemName: "arrow.down.circle.fill")

    HStack {
        Text("Horizontal Spacer")

        Image(systemName: "arrow.left.circle.fill")

        Spacer()

        Image(systemName: "arrow.right.circle.fill")
    }
    .padding(.horizontal)

    Color.yellow
        .frame(maxHeight: 50) // Height can decrease but not go higher than 50
}
.font(.title) // Apply this font to every view within the VStack
```

Pushes away vertically when in a VStack.

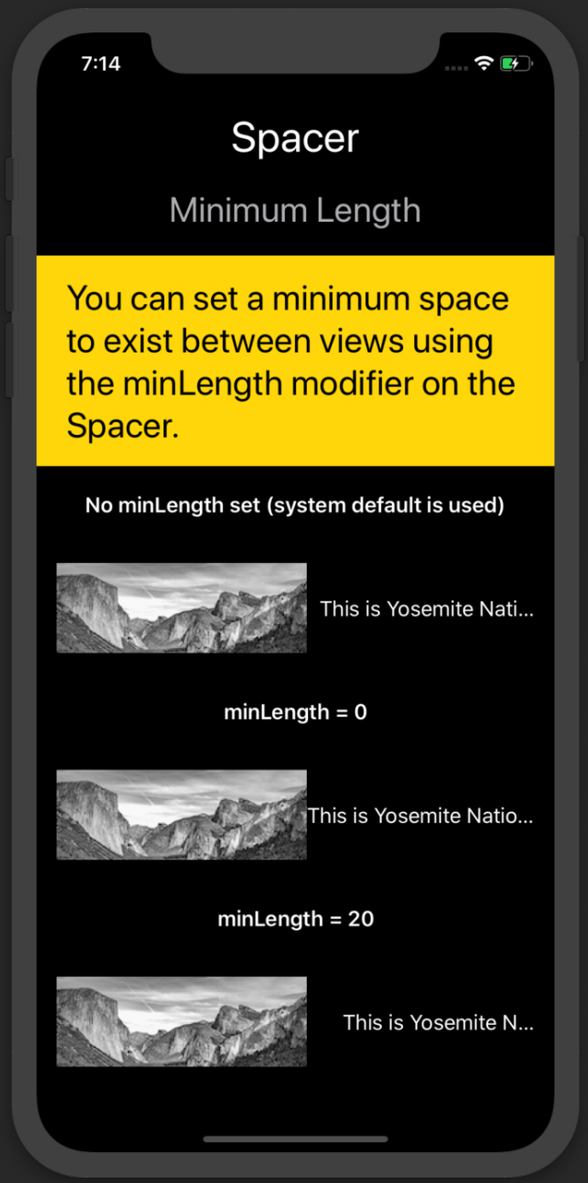
Pushes away horizontally when in an HStack.

Evenly Spaced




```
Text("Use Spacer to evenly space views horizontally so they look good on any
device.")
...
Text("After")
...
HStack {
    Spacer()

    VStack(alignment: .leading) {
        Text("Names")
            .font(.largeTitle)
            .underline()
        Text("Chase")
        Text("Rodrigo")
        Text("Mark")
        Text("Evans")
    }

    Spacer()

    VStack(alignment: .leading) {
        Text("Color")
            .font(.largeTitle)
            .underline()
        Text("Red")
        Text("Orange")
        Text("Green")
        Text("Blue")
    }

    Spacer()
}
```

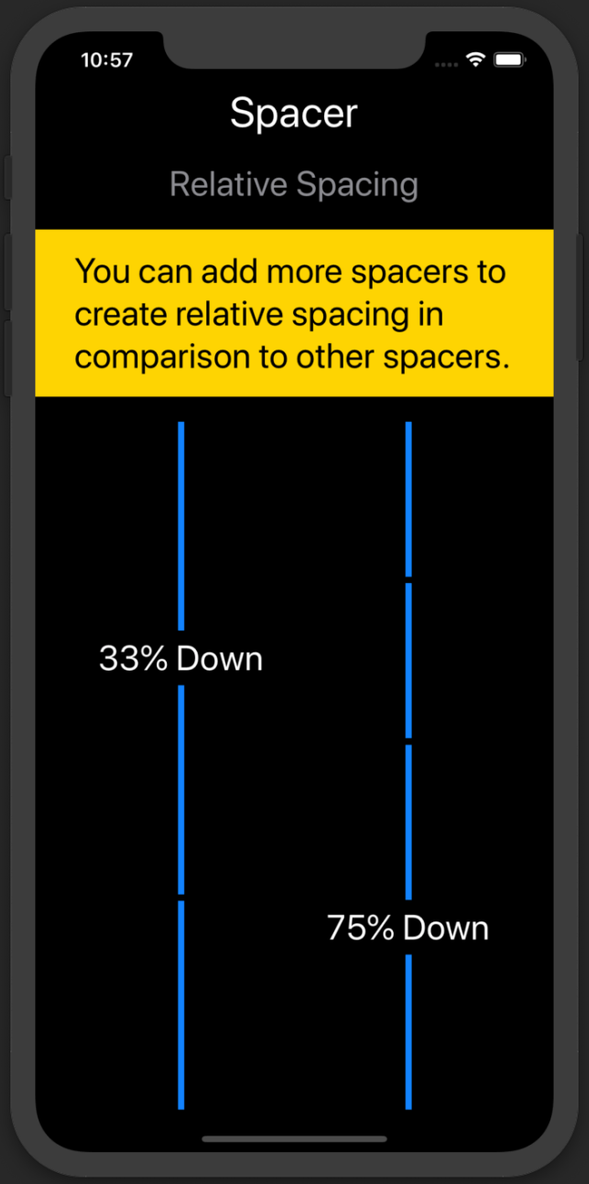
Minimum Length




```
VStack(spacing: 10) {
    Text("Spacer")
        .font(.largeTitle)
    Text("Minimum Length")
        .font(.title)
        .foregroundColor(.gray)
    Text("You can set a minimum space to exist between views using the minLength modifier on the
Spacer.")
        ...
    Text("No minLength set (system default is used)")
        .bold()
    HStack {
        Image("yosemite")
        Spacer()
        Text("This is Yosemite National Park").lineLimit(1)
    }.padding()

    Text("minLength = 0")
        .bold()
    HStack {
        Image("yosemite")
        Spacer(minLength: 0)
        Text("This is Yosemite National Park").lineLimit(1)
    }.padding()

    Text("minLength = 20")
        .bold()
    HStack {
        Image("yosemite")
        Spacer(minLength: 20)
        Text("This is Yosemite National Park").lineLimit(1)
    }.padding()
}
```

Set the minimum length in the Spacer's initializer.

Relative Spacing with Spacers




```swift
struct Spacer_RelativeSpacing: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Spacer").font(.largeTitle)
            Text("Relative Spacing").foregroundColor(.gray)
            Text("You can add more spacers to create relative spacing in comparison to other
spacers.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.yellow).foregroundColor(.black)
            HStack(spacing: 50) {
                VStack(spacing: 5) {
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                    Text("33% Down")
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                }
                VStack(spacing: 5) {
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
```

Spacers are views and can be modified like views.

```
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                    Text("75% Down")
                    Spacer()
                        .frame(width: 5)
                        .background(Color.blue)
                }
            }
        }.font(.title)
    }
}
```

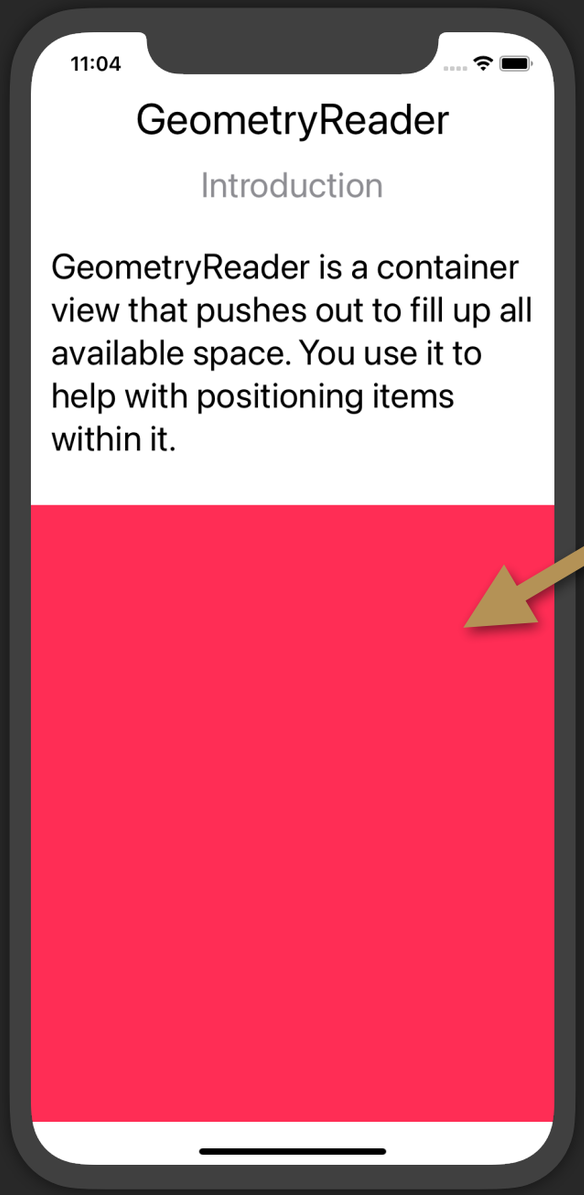
You can also use Spacers horizontally to place views a percentage from the leading or trailing sides of the screen.

GeometryReader

It is difficult, if not impossible, to get the size of a view. This is where the GeometryReader can help.

The GeometryReader is similar to a push-out container view in that you can add child views to it. It will allow you to inspect and use properties that can help with positioning other views within it. You can access properties like height, width and safe area insets which can help you dynamically set the sizes of views within it so they look good on any size device.

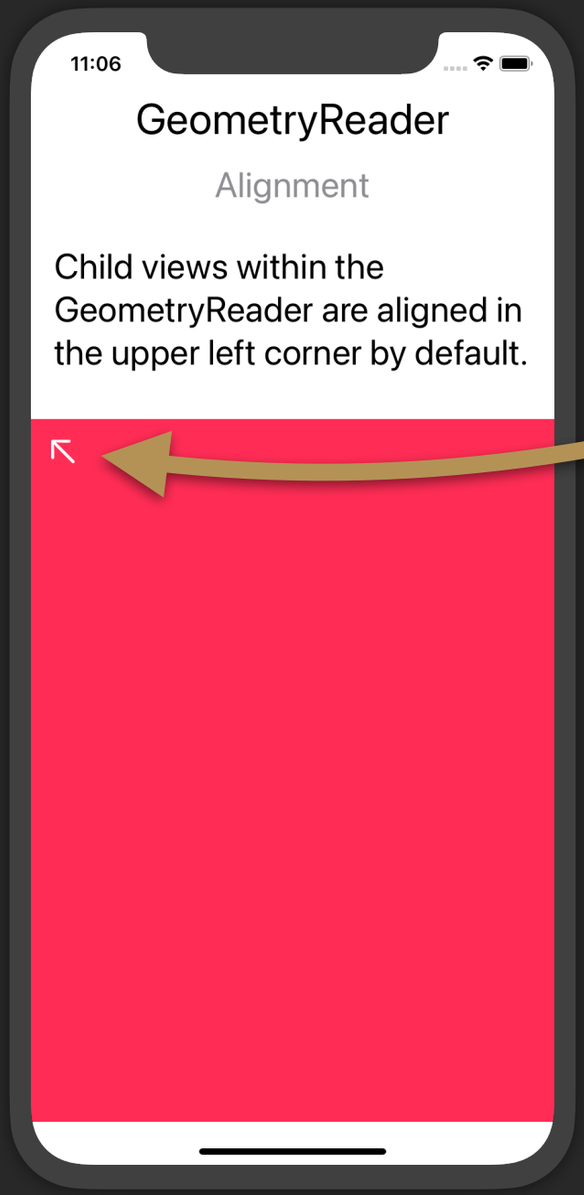
Introduction




```
struct GeometryReader_Intro : View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("GeometryReader", subtitle: "Introduction", desc: "GeometryReader is a
container view that pushes out to fill up all available space. You use it to help with
positioning items within it.",
                       back: .clear)

            GeometryReader {_ in
                // No child views inside
            }
            .background(Color.pink)
        }
        .font(.title)
    }
}
```

In SwiftUI, when you see the word "**geometry**", think size and position.

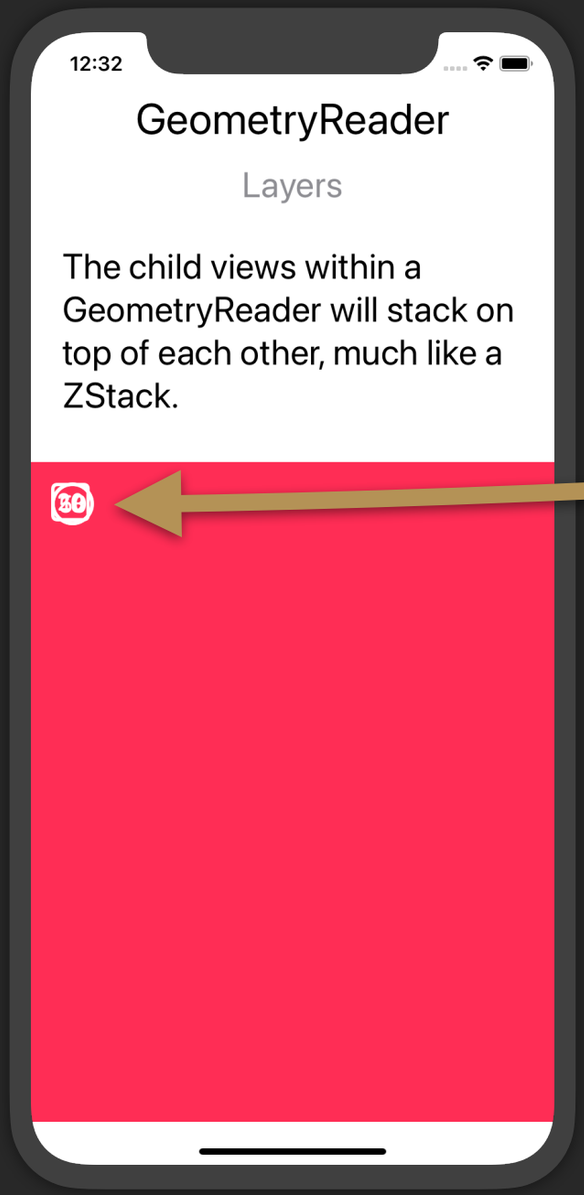
Alignment




```
struct GeometryReader_Alignment: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("GeometryReader", subtitle: "Alignment", desc: "Child views within the
GeometryReader are aligned in the upper left corner by default.", back: .clear)

            GeometryReader {_ in
                Image(systemName: "arrow.up.left")
                    .padding()
            }
            .background(Color.pink)
        }
        .font(.title)
    }
}
```

Notice that there is no alignment or positioning specified on the image.

Layers

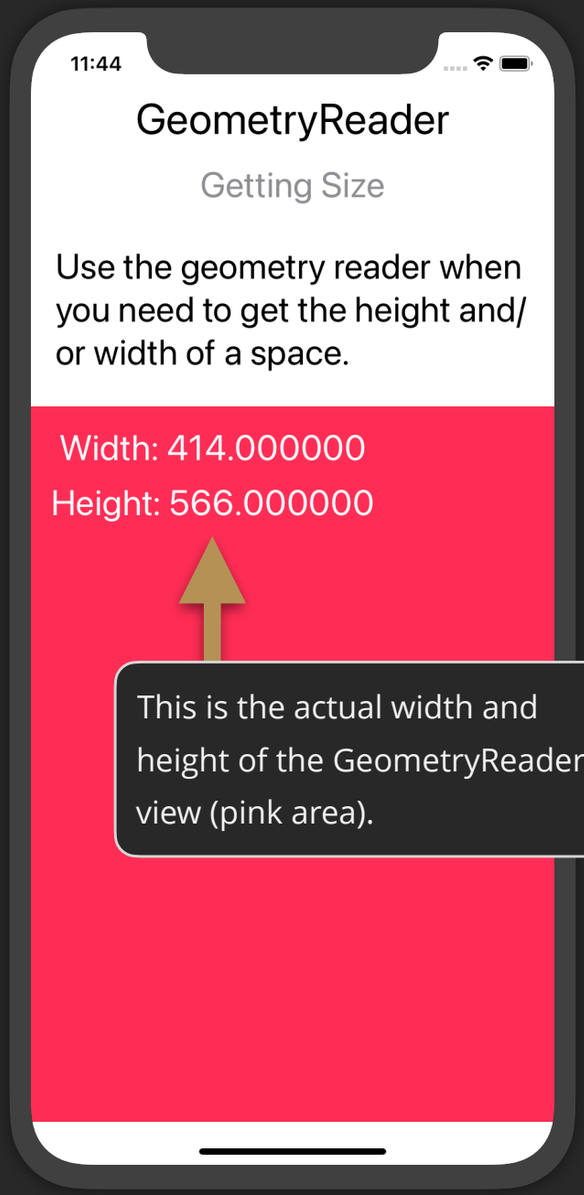



```
struct GeometryReader_Layers: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("GeometryReader", subtitle: "Layers", desc: "The child views within a
GeometryReader will stack on top of each other, much like a ZStack.",
                       back: .clear)

            GeometryReader {_ in
                Image(systemName: "18.circle")
                    .padding()
                Image(systemName: "20.square")
                    .padding()
                Image(systemName: "50.circle")
                    .padding()
            }
            .font(.largeTitle)
            .foregroundColor(.white)
            .background(Color.pink)
        }
        .font(.title)
    }
}
```

Note, I wouldn't recommend using a GeometryReader in place of a ZStack.

ZStack provides convenient alignment options for layout that GeometryReader does not.

Getting Size



This is the actual width and height of the GeometryReader view (pink area).

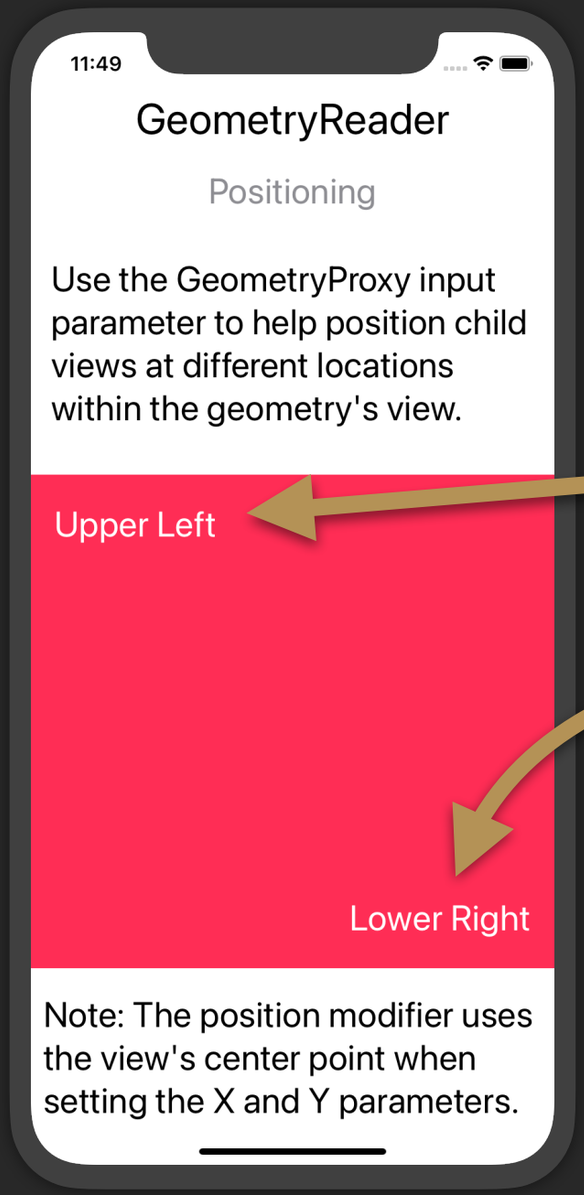
```
struct GeometryReader_GettingSize : View {
    var body: some View {
        VStack(spacing: 10) {
            HeaderView("GeometryReader", subtitle: "Getting Size", desc: "Use the geometry
reader when you need to get the height and/or width of a space.",
                       back: .clear)


            GeometryReader { geometryProxy in
                VStack(spacing: 10) {
                    Text("Width: \(geometryProxy.size.width)")
                    Text("Height: \(geometryProxy.size.height)")
                }
                .padding()
                .foregroundColor(.white)
            }
            .background(Color.pink)
        }
        .font(.title)
    }
}
```

Define a parameter to reference the geometry's coordinate space from a "proxy".

The GeometryProxy is a representation of the GeometryReader's size and coordinate space.

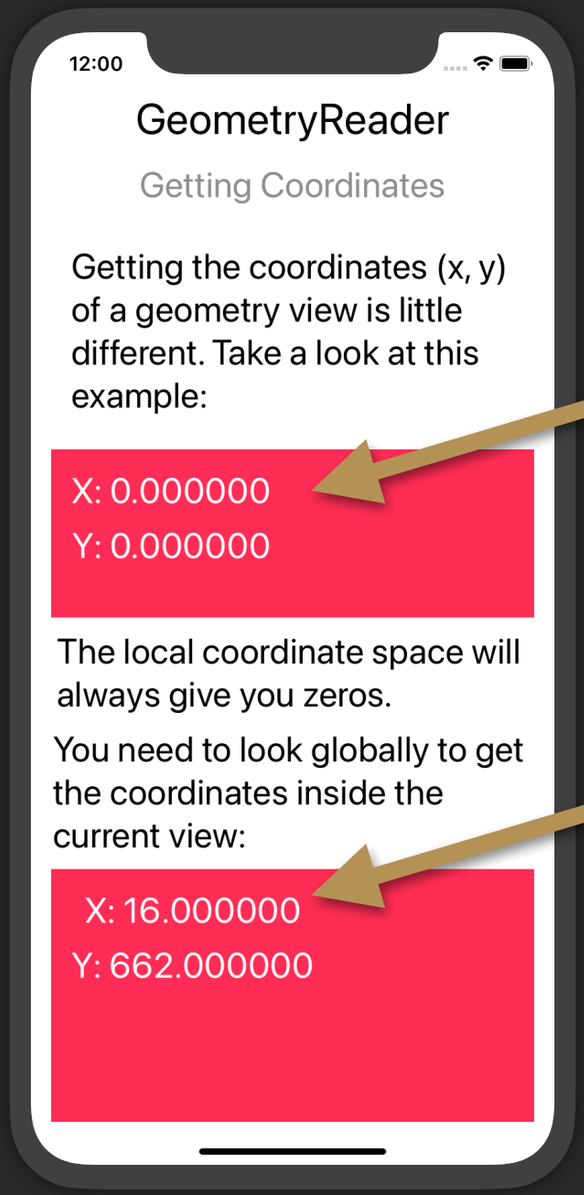
The geometryProxy.size will give you access to the height and width of the space the GeometryReader is taking up on the screen.

Positioning




```
struct GeometryReader_Positioning: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("GeometryReader").font(.largeTitle)
            Text("Positioning").font(.title).foregroundColor(.gray)
            Text("Use the GeometryProxy input parameter to help position child views at
different locations within the geometry's view.")
                .font(.title)
                .padding()

            GeometryReader { geometryProxy in
                Text("Upper Left")
                    .font(.title)
                    .position(x: geometryProxy.size.width/5,
                              y: geometryProxy.size.height/10)

                Text("Lower Right")
                    .font(.title)
                    .position(x: geometryProxy.size.width - 90,
                              y: geometryProxy.size.height - 40)
            }
            .background(Color.pink)
            .foregroundColor(.white)

            Text("Note: The position modifier uses the view's center point when setting the X
and Y parameters.")
                .font(.title)
        }
    }
}
```

Getting Coordinates

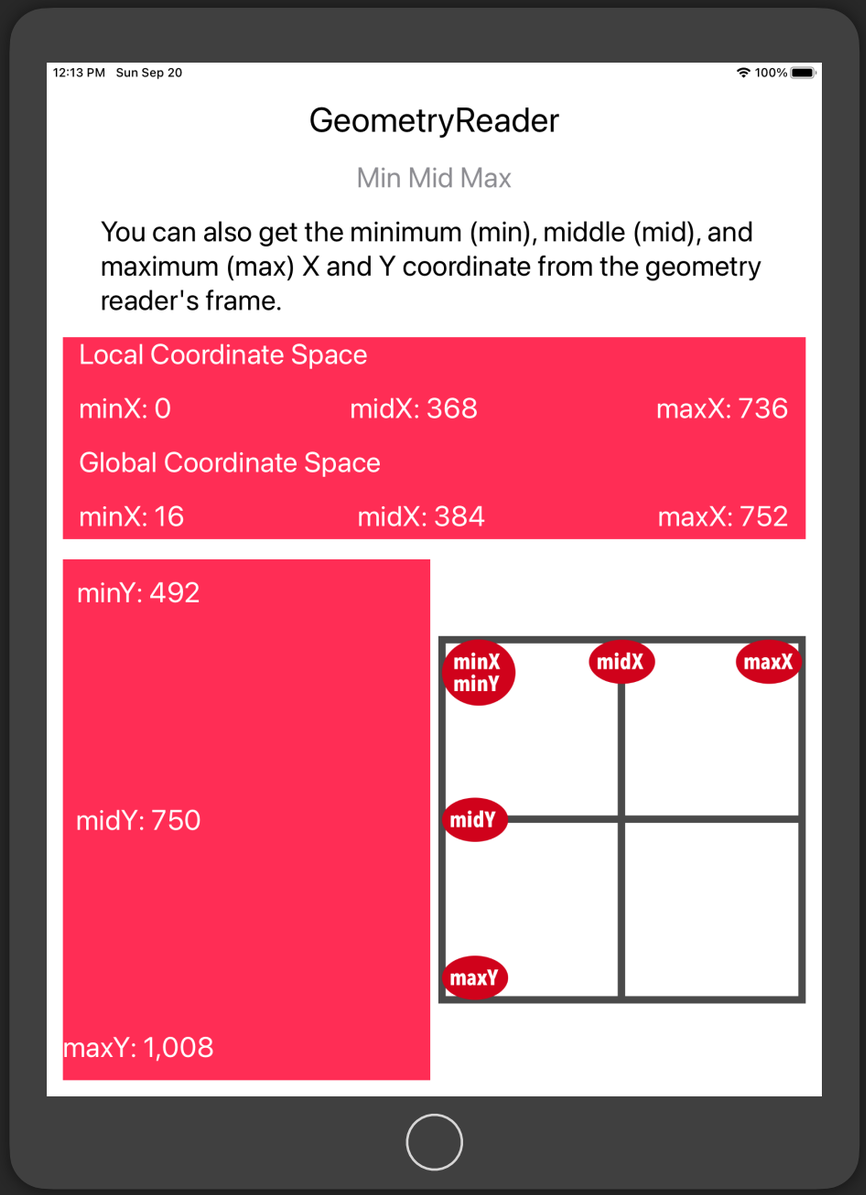



```
struct GeometryReader_GettingCoordinates : View {
    var body: some View {
        VStack(spacing: 10) {
            HeaderView("GeometryReader", subtitle: "Getting Coordinates", desc: "Getting the
coordinates (x, y) of a geometry view is little different. Take a look at this example:",
back: .clear)

            GeometryReader { geometryProxy in
                VStack(spacing: 10) {
                    Text("X: \(geometryProxy.frame(in: CoordinateSpace.local).origin.x)")
                    Text("Y: \(geometryProxy.frame(in: CoordinateSpace.local).origin.y)")
                }
                .foregroundColor(.white)
            }
            .background(Color.pink)

            Text("The local coordinate space will always give you zeros.")
            Text("You need to look globally to get the coordinates inside the current view:")
            GeometryReader { geometryProxy in
                VStack(spacing: 10) {
                    Text("X: \(geometryProxy.frame(in: .global).origin.x)")
                    Text("Y: \(geometryProxy.frame(in: .global).origin.y)")
                }
                .foregroundColor(.white)
            }
            .background(Color.pink)
            .frame(height: 200)
        }
        .font(.title)
        .padding(.horizontal)
    }
}
```

I left out “CoordinateSpace” in this example (it’s optional).

The global coordinate space is the entire screen. We are looking at the origin of the geometry proxy’s frame within the entire screen.

Min Mid Max Coordinates

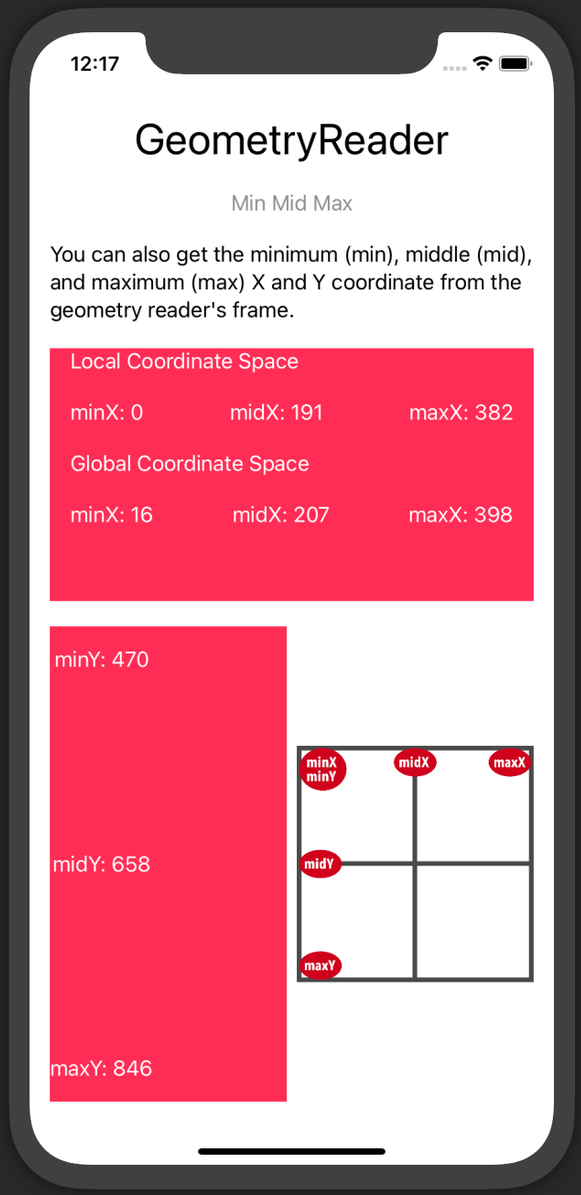



```
struct GeometryReader_MinMidMax: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("GeometryReader", subtitle: "Min Mid Max", desc: "You can
also get the minimum (min), middle (mid), and maximum (max) X and Y coordinate from
the geometry reader's frame.", back: .clear)

            GeometryReader { geometry in
                VStack(alignment: .leading, spacing: 20) {
                    Text("Local Coordinate Space")
                    HStack(spacing: 10) {
                        // I'm converting to Int just so we don't have so many zeros
                        Text("minX: \(Int(geometry.frame(in: .local).minX))")
                        Spacer()
                        Text("midX: \(Int(geometry.frame(in: .local).midX))")
                        Spacer()
                        Text("maxX: \(Int(geometry.frame(in: .local).maxX))")
                    }
                    Text("Global Coordinate Space")
                    HStack(spacing: 10) {
                        // I'm converting to Int just so we don't have so many zeros
                        Text("minX: \(Int(geometry.frame(in: .global).minX))")
                        Spacer()
                        Text("midX: \(Int(geometry.frame(in: .global).midX))")
                        Spacer()
                        Text("maxX: \(Int(geometry.frame(in: .global).maxX))")
                    }
                }.padding(.horizontal)
            }
```

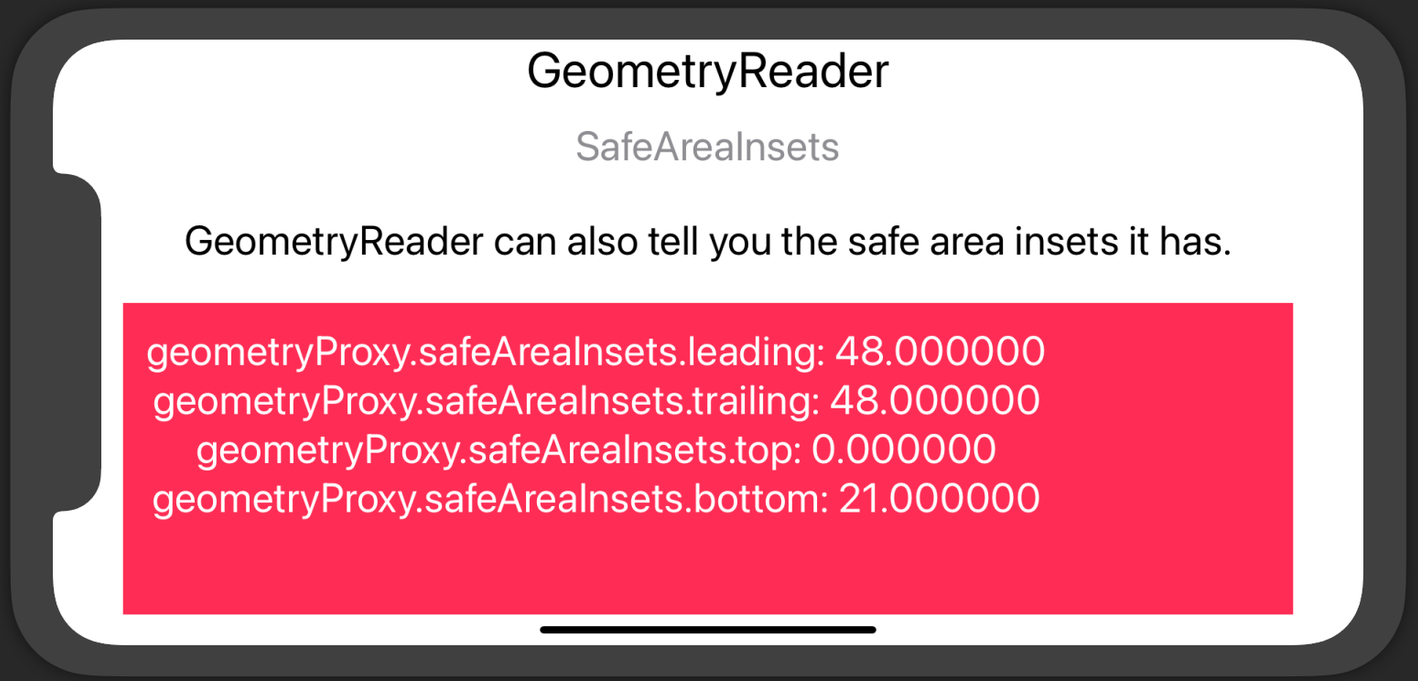
Min Mid Max Coordinates Continued

```
            .frame(height: 200)
            .foregroundColor(.white)
            .background(Color.pink)

            HStack {
                GeometryReader { geometry in
                    VStack(spacing: 10) {
                        Text("minY: \(Int(geometry.frame(in: .global).minY))")
                        Spacer()
                        Text("midY: \(Int(geometry.frame(in: .global).midY))")
                        Spacer()
                        Text("maxY: \(Int(geometry.frame(in: .global).maxY))")
                    }.padding(.vertical)
                }
                .foregroundColor(.white)
                .background(Color.pink)

                Image("MinMidMax")
                    .resizable()
                    .aspectRatio(contentMode: .fit)
            }
        }
        .font(.title)
        .padding()
    }
}
```

Notice how the min, mid and max values change as the geometry reader adapts to different device sizes.



Safe Area Insets




```
HeaderView("GeometryReader", subtitle: "SafeAreaInsets", desc: "GeometryReader can also tell you the safe area insets it has.",
back: .clear)

GeometryReader { geometryProxy in
    VStack {
        Text("geometryProxy.safeAreaInsets.leading: \(geometryProxy.safeAreaInsets.leading)")
        Text("geometryProxy.safeAreaInsets.trailing: \(geometryProxy.safeAreaInsets.trailing)")
        Text("geometryProxy.safeAreaInsets.top: \(geometryProxy.safeAreaInsets.top)")
        Text("geometryProxy.safeAreaInsets.bottom: \(geometryProxy.safeAreaInsets.bottom)")
    }
    .padding()
}
.background(Color.pink)
.foregroundColor(.white)
```

iOS 14

LazyHGrid

This SwiftUI content is locked in this preview.

Similar to an HStack, the Lazy Horizontal Grid will layout views horizontally but can be configured to use multiple rows and scroll off the screen. The word "lazy" here means that the child views are only created when SwiftUI needs them. This is called "lazy loading".

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iOS 14

LazyVGrid

This SwiftUI content is locked in this preview.

Similar to an HStack, the Lazy[illegible]ical Grid will layout views vertically but can be configured to use multiple columns and scroll off the screen. The word "lazy" here means that the child views are only created when SwiftUI needs them. This is called "lazy loading".

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iOS 14

ScrollViewReader

This SwiftUI content is locked in this preview.

The Scroll View Reader gives you access to a function called **scrollTo**. With this function you can make a view within a scroll view visible by automatica

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iOS 15

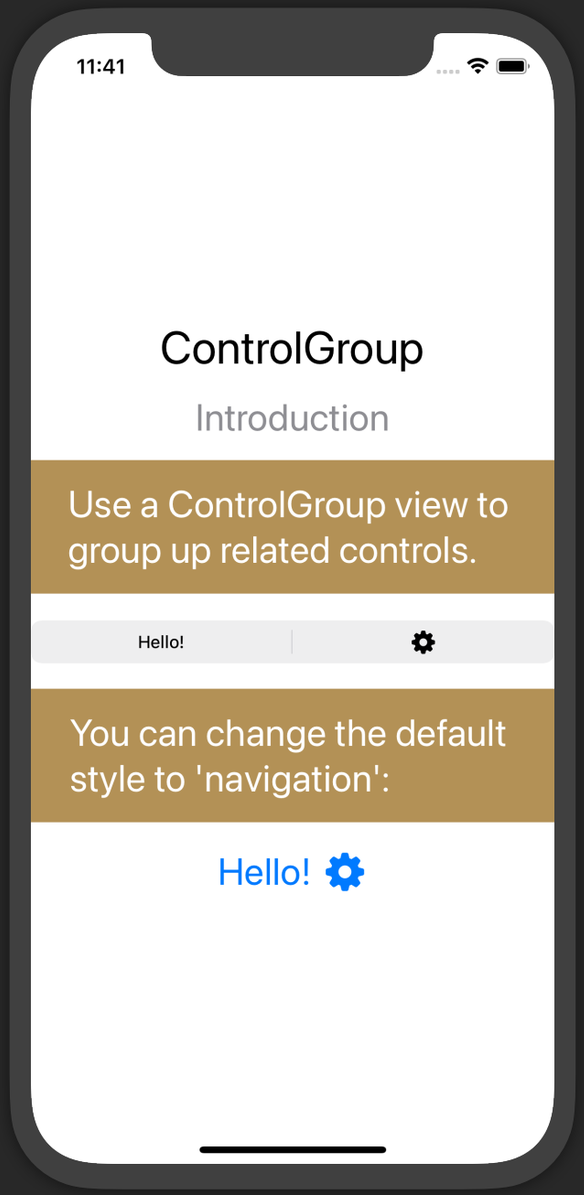
ControlGroup

Use the ControlGroup to put similar types of controls together, such as buttons. In my opinion, the use of this seems limited.

This is a pull-in view.

Introduction

iOS 15




```
struct ControlGroup_Intro: View {
    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("ControlGroup",
                       subtitle: "Introduction",
                       desc: "Use a ControlGroup view to group up related controls.")

            ControlGroup {
                Button("Hello!") { }
                Button(action: {}) {
                    Image(systemName: "gearshape.fill")
                }
            }

            DescView(desc: "You can change the default style to 'navigation':")
            ControlGroup {
                Button("Hello!") { }
                Button(action: {}) {
                    Image(systemName: "gearshape.fill")
                }
            }
            .controlGroupStyle(.navigation)
        }
        .font(.title)
    }
}
```

Note: You may ask yourself when you would use this.

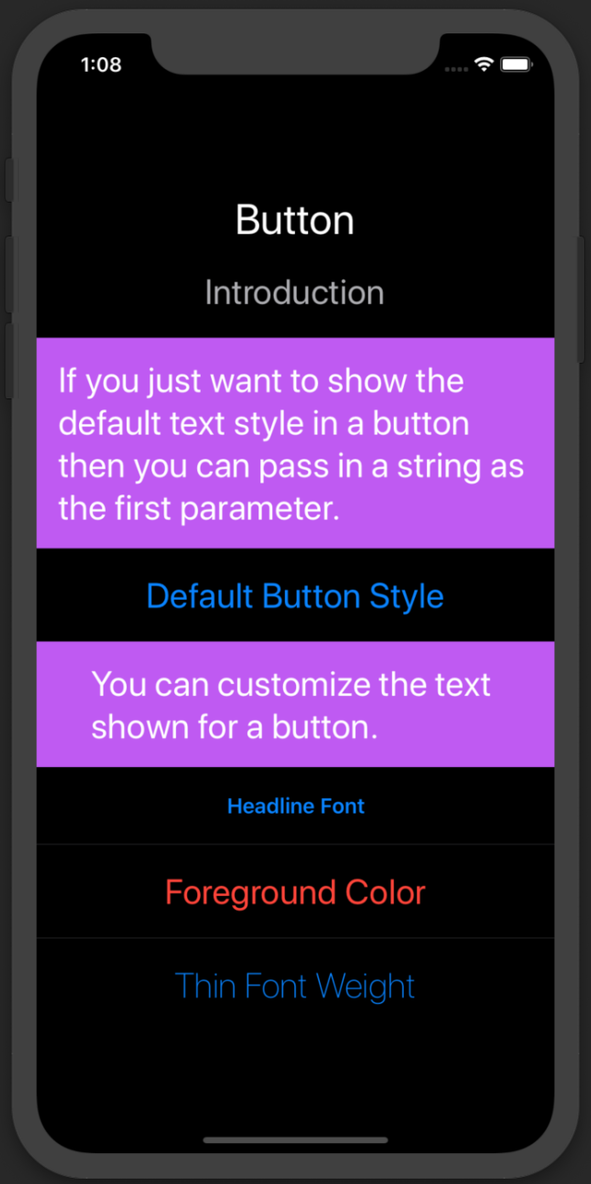
I think it makes more sense inside of toolbars as well as on macOS.

CONTROL VIEWS

Button

The Button is a pull-in view with a wide range of composition and customization options to be presented to the user. The button can be just text, just an image or both combined.

Introduction



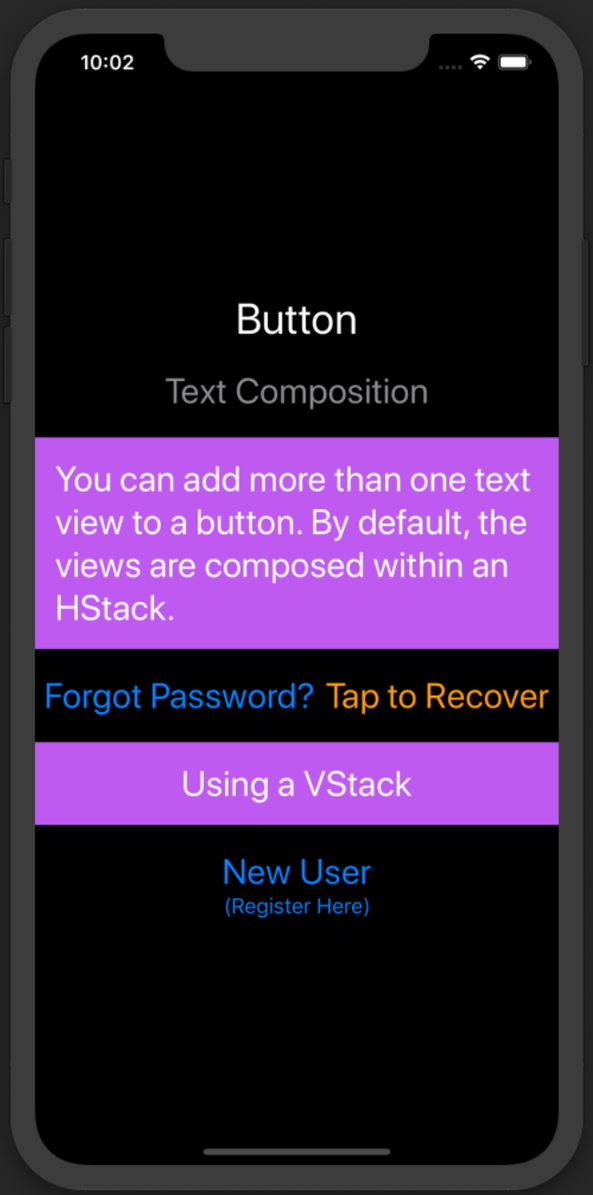

```
VStack(spacing: 20) {
    Text("Button")
        .font(.largeTitle)
    Text("Introduction")
        .font(.title).foregroundColor(.gray)
    Text("If you just want to show the default text style in a button then you can pass in a
         string as the first parameter")
        ...

    Button("Default Button Style") {
        // Your code here
    }

    Text("You can customize the text shown for a button")
        ...
    Button(action: {
        // Your code here
    }) {
        Text("Headline Font")
            .font(.headline)
    }
    Divider()
    Button(action: {}) {
        Text("Foreground Color")
            .foregroundColor(Color.red)
    }
    Divider()
    Button(action: {}) {
        Text("Thin Font Weight")
            .fontWeight(.thin)
    }
}
```

Default text-only buttons.

Use this initializer to customize the text.

For more text customization options, see the chapter on Text.

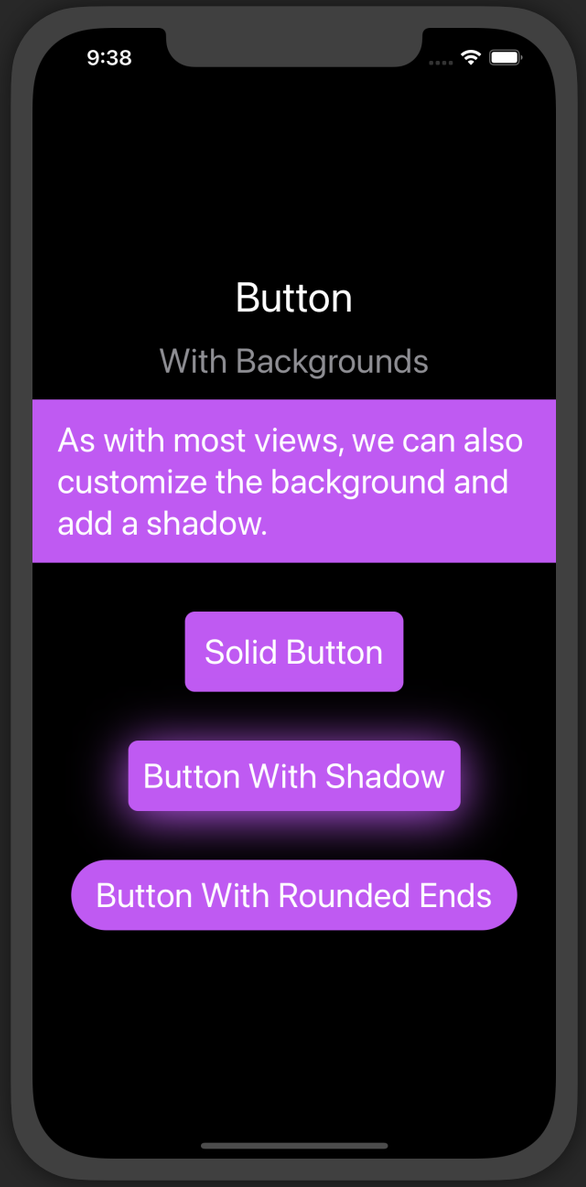
Text Composition




```
struct Button_TextModifiers : View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Button").font(.largeTitle)
            Text("Text Composition").foregroundColor(.gray)
            Text("You can add more than one text view to a button. By default, the views are
                  composed within an HStack.")
                .padding().frame(maxWidth: .infinity)
                .background(Color.purple)
                .foregroundColor(.white).font(.title)

            Button(action: {}, label: {
                Text("Forgot Password?")
                Text("Tap to Recover")
                    .foregroundColor(.orange)
            })

            Text("Using a VStack")
                .padding().frame(maxWidth: .infinity)
                .background(Color.purple)
                .foregroundColor(.white)

            Button(action: {}, label: {
                VStack {
                    Text("New User")
                    Text("(Register Here)").font(.body)
                }
            })
        }.font(.title)
    }
}
```

Views arranged horizontally by default.

With Backgrounds

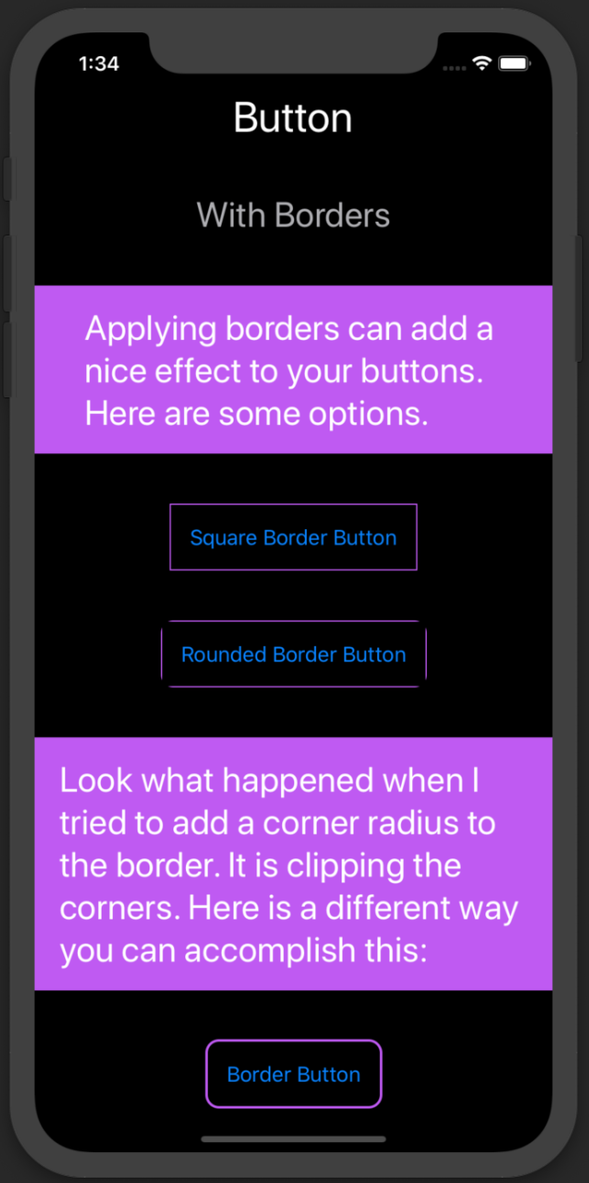



```
struct Button_EffectModifiers : View {
    var body: some View {
        VStack(spacing: 40) {
            HeaderView("Button", subtitle: "With Backgrounds",
                       desc: "As with most views, we can also customize the background and add a
                              shadow.", back: .purple, textColor: .white)

            Button(action: {}) {
                Text("Solid Button")
                    .padding()
                    .foregroundColor(Color.white)
                    .background(Color.purple)
                    .cornerRadius(8)
            }
            Button(action: {}) {
                Text("Button With Shadow")
                    .padding(12)
                    .foregroundColor(Color.white)
                    .background(Color.purple)
                    .cornerRadius(8)
            }
            .shadow(color: Color.purple, radius: 20, y: 5)

            Button(action: {}) {
                Text("Button With Rounded Ends")
                    .padding(EdgeInsets(top: 12, leading: 20, bottom: 12, trailing: 20))
                    .foregroundColor(Color.white)
                    .background(Color.purple)
                    .cornerRadius(100)
            }
        }
        .font(.title)
    }
}
```

You will learn another way to do this using Shapes in the “Other Views” chapter.

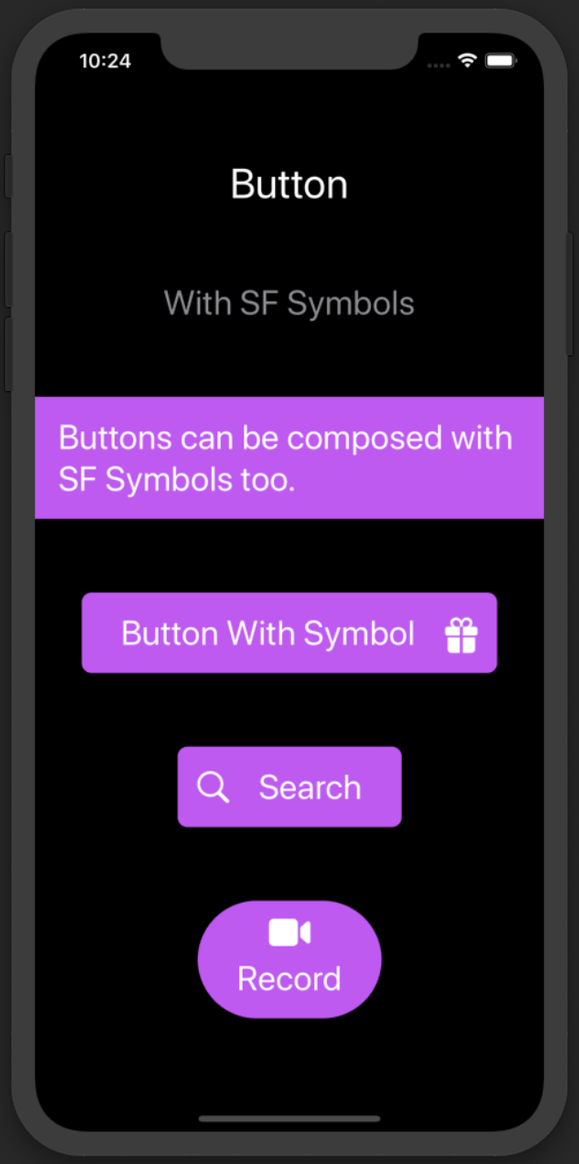
A number higher than the height of the button will always give you a rounded ends.

With Borders




```
Text("Button").font(.largeTitle)
Text("With Borders").font(.title).foregroundColor(.gray)
Text("Applying borders can add a nice effect to your buttons. Here are some options.")
    .padding().frame(maxWidth: .infinity)
    .background(Color.purple)
    .foregroundColor(.white).font(.title)

Button(action: {}) {
    Text("Square Border Button")
        .padding()
        .border(Color.purple)
}
Button(action: {}) {
    Text("Rounded Border Button")
        .padding()
        .border(Color.purple)
        .cornerRadius(10)
}
Text("Look what happened when I tried to add a corner radius to the border. It is clipping the
      corners. Here is a different way you can accomplish this:")
    ...

Button(action: {}) {
    Text("Border Button")
        .padding()
        .background(
            RoundedRectangle(cornerRadius: 10)
                .stroke(Color.purple, lineWidth: 2)
    )
}
```

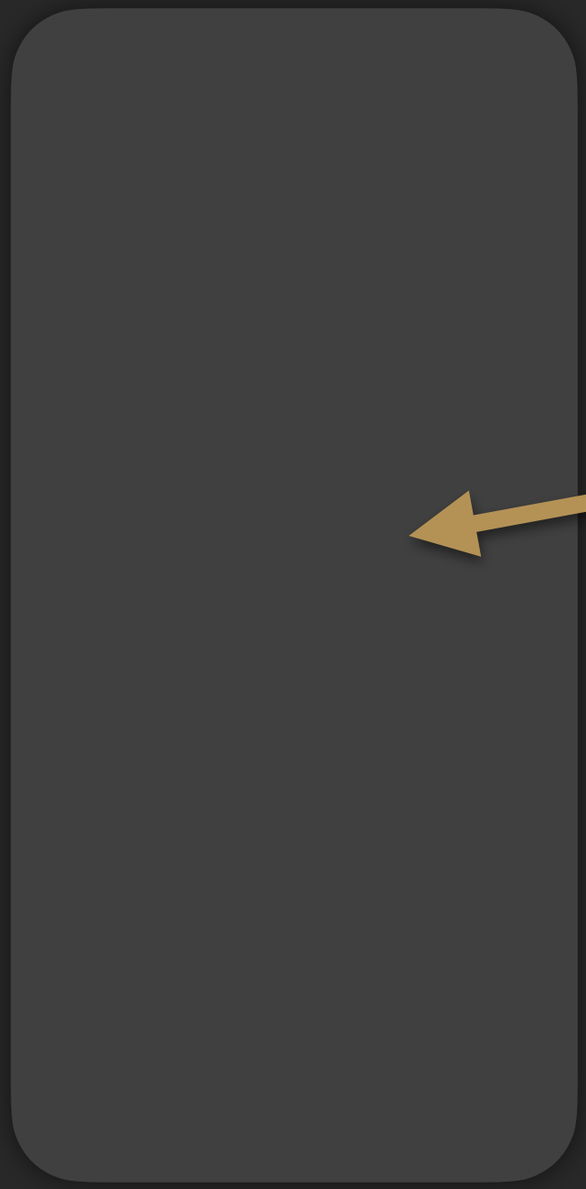
With SF Symbols




```
Button(action: {}) {
    Text("Button With Symbol")
        .padding(.horizontal)
    Image(systemName: "gift.fill")
}
.padding()
.foregroundColor(Color.white)
.background(Color.purple)
.cornerRadius(8)

Button(action: {}) {
    Image(systemName: "magnifyingglass")
    Text("Search")
        .padding(.horizontal)
}
.padding()
.foregroundColor(Color.white)
.background(Color.purple)
.cornerRadius(8)

Button(action: {}) {
    VStack {
        Image(systemName: "video.fill")
        Text("Record")
            .padding(.horizontal)
    }
}
.padding()
.foregroundColor(Color.white)
.background(Color.purple)
.cornerRadius(.infinity)
```

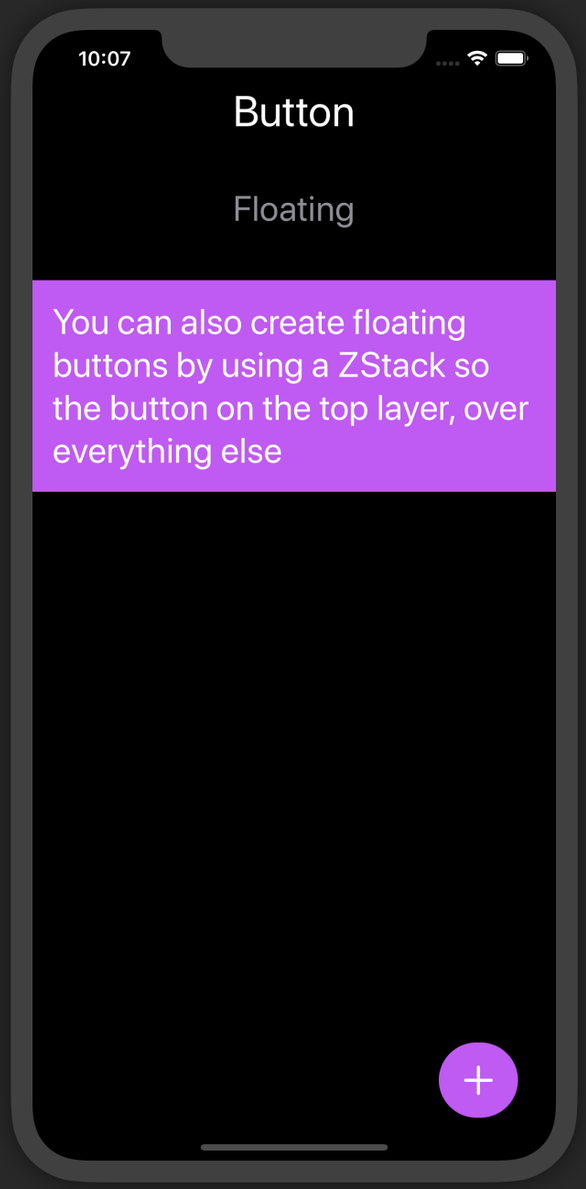
For even more ways to customize buttons, see the chapter on **Paints** where you can learn how to apply the 3 different gradients to them.

With Images



```
struct Button_WithPhotos: View {
    var body: some View {
        VStack(spacing: 10) {
            HeaderView("Button", subtitle: "With Images",
                       desc: "Buttons work fine with the SF Symbols. But what if you wanted to
                              use a photo?", back: .purple)

            Button(action: {}) {
                Image("yosemite")
                    .cornerRadius(40)
            }
        }
        .font(.title)
    }
}
```

Floating Action Button

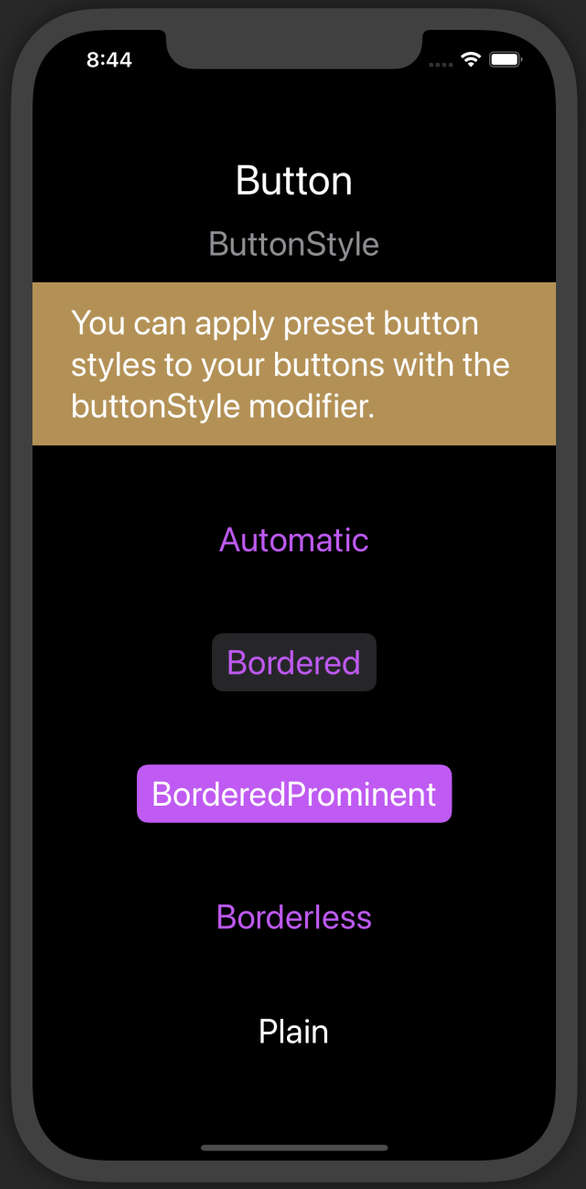



```
ZStack {
    VStack(spacing: 40) {
        Text("Button")
            .font(.largeTitle)

        Text("Floating")
            .font(.title).foregroundColor(.gray)

        Text("You can also create floating buttons by using a ZStack so the button is on the top
              layer, over everything else")
            ...
        Spacer()
    }

    VStack {
        Spacer()
        HStack {
            Spacer()
            Button(action: {}) {
                Image(systemName: "plus")
                    .font(.title)
            }
            .padding(20)
            .foregroundColor(Color.white)
            .background(Color.purple)
            .cornerRadius(.infinity)
        }
        .padding(.trailing, 30) // Add 30 points on the trailing side of the button
    }
}
```

See the section on the Overlay modifier in the **Layout Modifiers** chapter for more ways to accomplish the same thing.

ButtonStyle

iOS 15



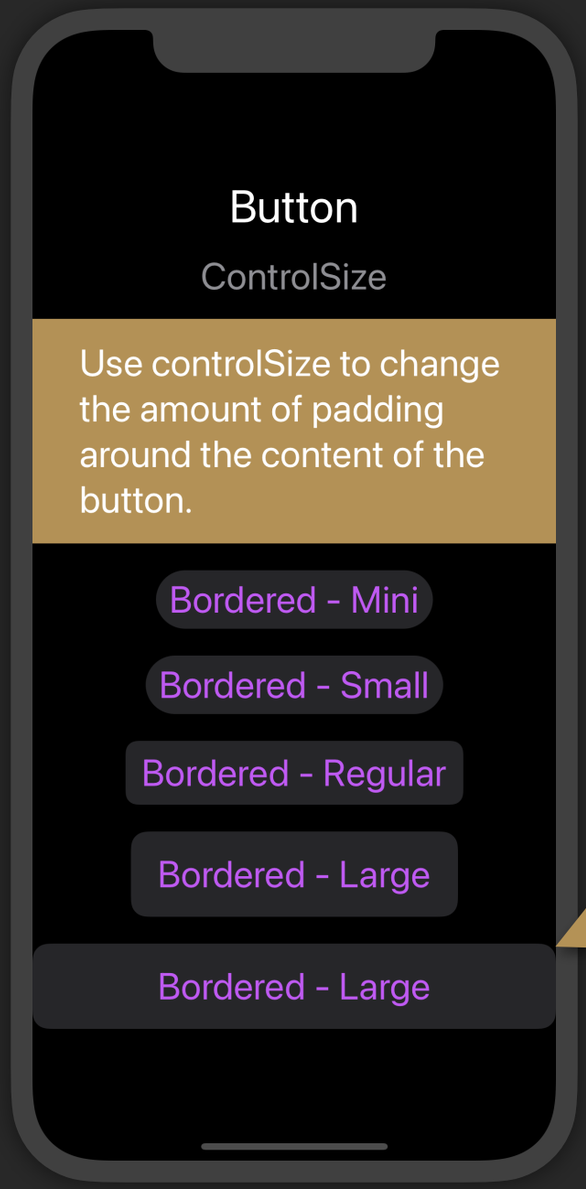

```
struct Button_ButtonStyle: View {
    var body: some View {
        VStack(spacing: 60.0) {
            HeaderView("Button",
                       subtitle: "ButtonStyle",
                       desc: "You can apply preset button styles to your buttons with the
                              buttonStyle modifier.")

            Button("Automatic") { }
            .buttonStyle(.automatic)

            Button("Bordered") { }
            .buttonStyle(.bordered)

            Button("BorderedProminent") { }
            .buttonStyle(.borderedProminent)

            Button("Borderless") { }
            .buttonStyle(.borderless)

            Button("Plain") { }
            .buttonStyle(.plain)
        }
        .font(.title)
        .accentColor(.purple)
    }
}
```

Text becomes primary color.

Accent color does not get applied.

ControlSize

iOS 15

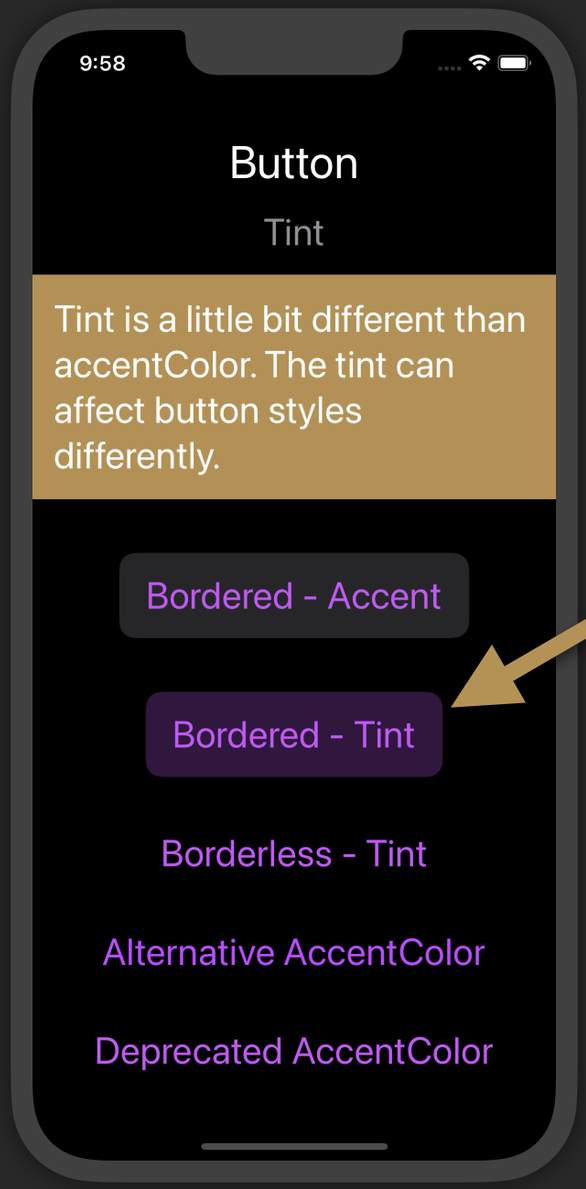



```swift
struct Button_ControlSize: View {
    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("Button",
                       subtitle: "ControlSize",
                       desc: "Use controlSize to change the amount of padding around the content
                              of the button.")

            Button("Bordered - Mini") { }
            .buttonStyle(.bordered)
            .controlSize(.mini)

            Button("Bordered - Small") { }
            .buttonStyle(.bordered)
            .controlSize(.small)

            Button("Bordered - Regular") { }
            .buttonStyle(.bordered)
            .controlSize(.regular)

            Button("Bordered - Large") { }
            .buttonStyle(.bordered)
            .controlSize(.large)

            Button(action: {}) {
                Text("Bordered - Large")
                    .frame(maxWidth: .infinity)
            }
            .buttonStyle(.bordered)
            .controlSize(.large)
        }
        .accentColor(.purple)
        .font(.title)
    }
}
```

You can still change the size manually and the shape will be the same.

Tint

iOS 15




```swift
struct Button_Tint: View {
    var body: some View {
        VStack(spacing: 40) {
            HeaderView("Button",
                       subtitle: "Tint",
                       desc: "Tint is a little bit different than accentColor. The tint can
                              affect button styles differently.")

            Button("Bordered - Accent") { }
            .buttonStyle(.bordered)
            .foregroundColor(Color.purple)

            Button("Bordered - Tint") { }
            .buttonStyle(.bordered)
            .tint(.purple)

            Button("Borderless - Tint") { }
            .buttonStyle(.borderless)
            .tint(.purple)

            Button("Alternative AccentColor") { }
            .buttonStyle(.borderless)
            .foregroundColor(Color.purple)

            Button("Deprecated AccentColor") { }
            .buttonStyle(.borderless)
            .accentColor(.purple)
        }
        .controlSize(.large)
        .font(.title)
    }
}
```

Tint will affect the background of a bordered button and change the text color.

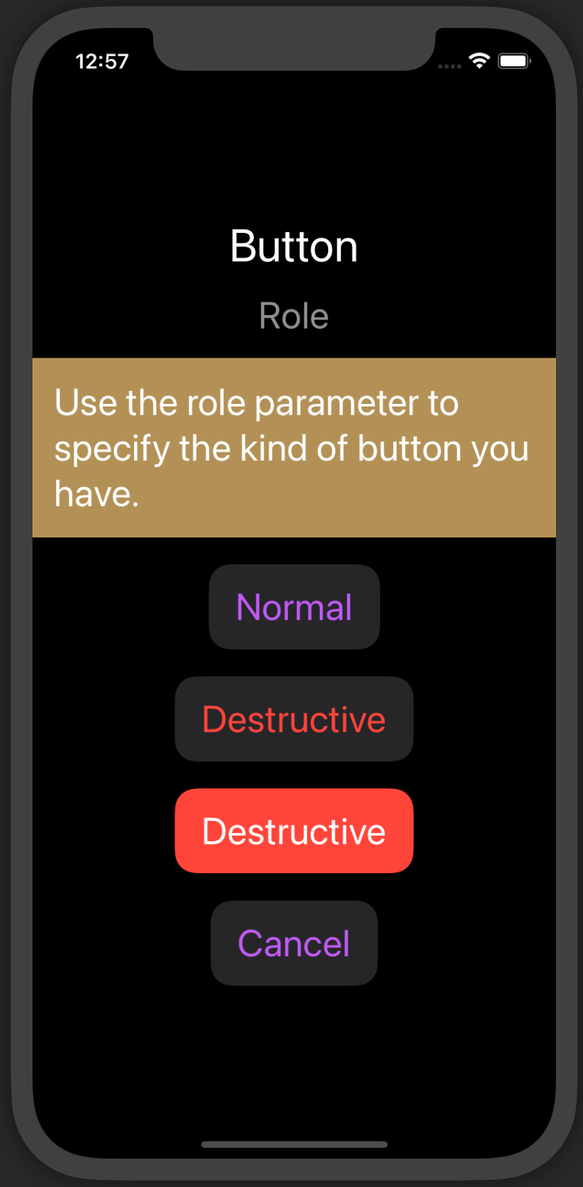
You can also use foregroundColor to change the color of button text.

Deprecation Note: The `accentColor` modifier will be deprecated.
Instead use:

- tint
- foregroundColor(Color.accentColor)

Role

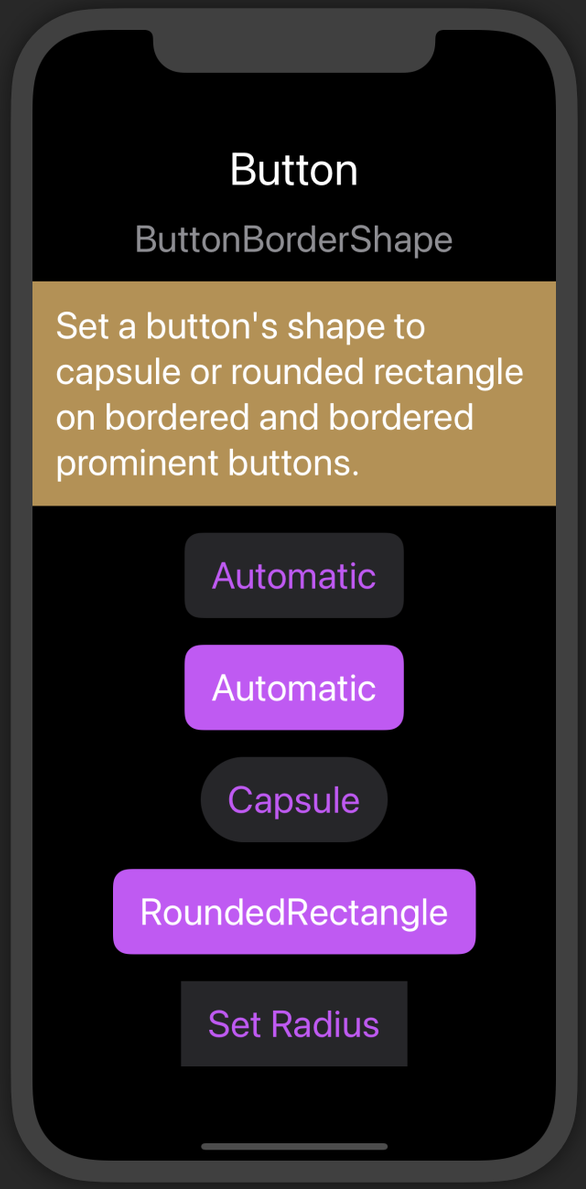
iOS 15




```
struct Button_Role: View {
    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("Button",
                       subtitle: "Role",
                       desc: "Use the role parameter to specify the kind of button you have.")

            Button("Normal") { }
            .buttonStyle(.bordered)
            .controlSize(.large)

            Button("Destructive", role: .destructive) { }
            .buttonStyle(.bordered)
            .controlSize(.large)

            Button("Destructive", role: .destructive) { }
            .buttonStyle(.borderedProminent)
            .controlSize(.large)

            Button("Cancel", role: .cancel) { }
            .buttonStyle(.bordered)
            .controlSize(.large)
        }
        .font(.title)
        .accentColor(.purple)
    }
}
```

ButtonBorderShape

iOS 15

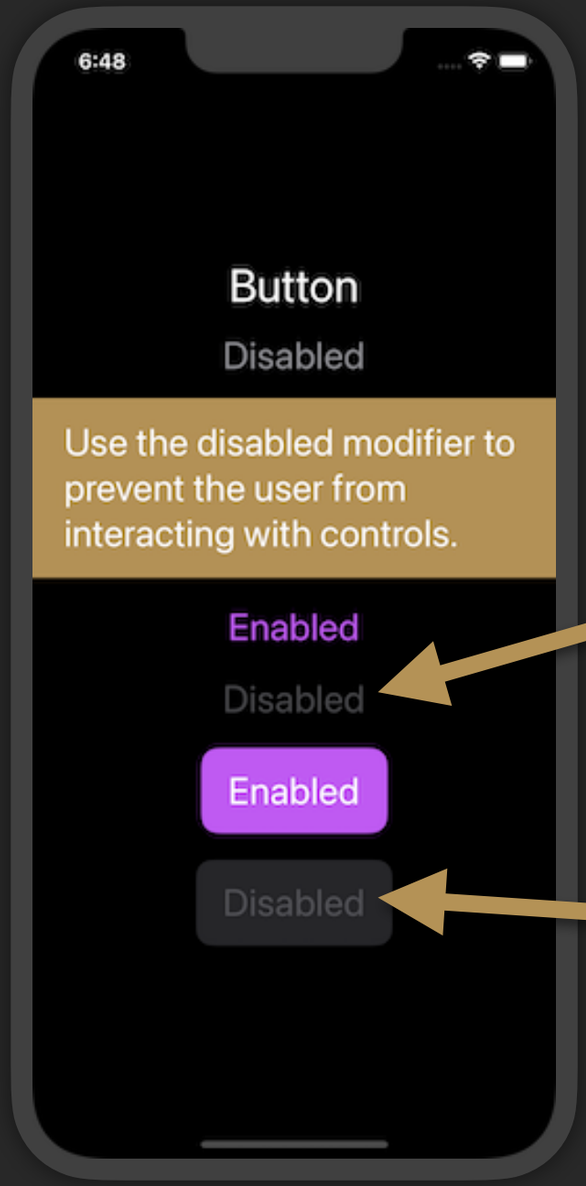



```swift
struct Button_ButtonBorderShape: View {
    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("Button",
                       subtitle: "ButtonBorderShape",
                       desc: "Set a button's shape to capsule or rounded rectangle on bordered
                              and bordered prominent buttons.")

            Button("Automatic") { }
            .buttonStyle(.bordered)
            .buttonBorderShape(.automatic)
            .controlSize(.large)

            Button("Automatic") { }
            .buttonStyle(.borderedProminent)
            .buttonBorderShape(.automatic)
            .controlSize(.large)

            Button("Capsule") { }
            .buttonStyle(.bordered)
            .buttonBorderShape(.capsule)
            .controlSize(.large)

            Button("RoundedRectangle") { }
            .buttonStyle(.borderedProminent)
            .buttonBorderShape(.roundedRectangle)
            .controlSize(.large)

            Button("Set Radius") { }
            .buttonStyle(.bordered)
            .buttonBorderShape(.roundedRectangle(radius: 0))
            .controlSize(.large)
        }
        .font(.title)
        .accentColor(.purple)
    }
}
```

Note: This modifier **ONLY** works on buttons that are bordered or borderedProminent.

You can use the radius option to create rectangle backgrounds too by setting it to zero.

Disabled




```
struct Button_Disabled: View {
    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("Button",
                       subtitle: "Disabled",
                       desc: "Use the disabled modifier to prevent the user from interacting
                            with buttons.")

            Button("Enabled") { }
            .controlSize(.large)

            Button("Disabled") { }
            .controlSize(.large)
            .disabled(true)

            Button("Enabled") { }
            .buttonStyle(.borderedProminent)
            .controlSize(.large)

            Button("Disabled") { }
            .buttonStyle(.borderedProminent)
            .controlSize(.large)
            .disabled(true)
        }
        .font(.title)
        .tint(.purple)
    }
}
```

iOS 14

ColorPicker

This SwiftUI content is locked in this preview.

The ColorPicker control allows you to give users the ability to select a color. This could be useful if you want to allow users to set the color of visual elements on the user interface.

This is a push-out horizon

UNLOCK THE BOOK TODAY FOR ONLY $55!

iOS 14

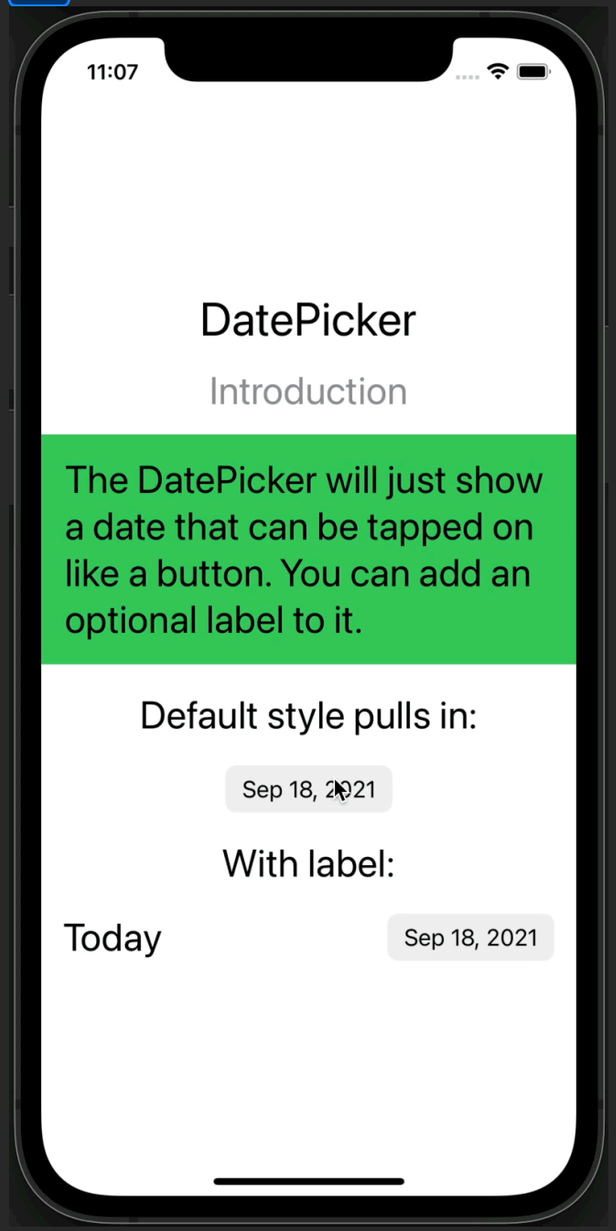
DatePicker

The date picker provides a way for the user to select a date and time. You bind the selected date to a property. You can read this property to find out what was selected or set this property for the DatePicker to show the date you want.
(Note: If you have to support the DatePicker for iOS 13, then it will look different from what you see in this chapter.)

This is a push-out view.

Introduction

iOS 14




```
struct DatePicker_Intro: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("DatePicker",
                       subtitle: "Introduction",
                       desc: "The DatePicker will just show a date that can be tapped on like a
                              button. You can add an optional label to it.", back: .green)

            Text("Default style pulls in:")

            DatePicker("Today", selection: $date, displayedComponents: .date)
                .labelsHidden()
                .padding(.horizontal)

            Text("With label:")

            DatePicker("Today", selection: $date, displayedComponents: .date)
                .padding(.horizontal)

        }.font(.title)
    }
}
```

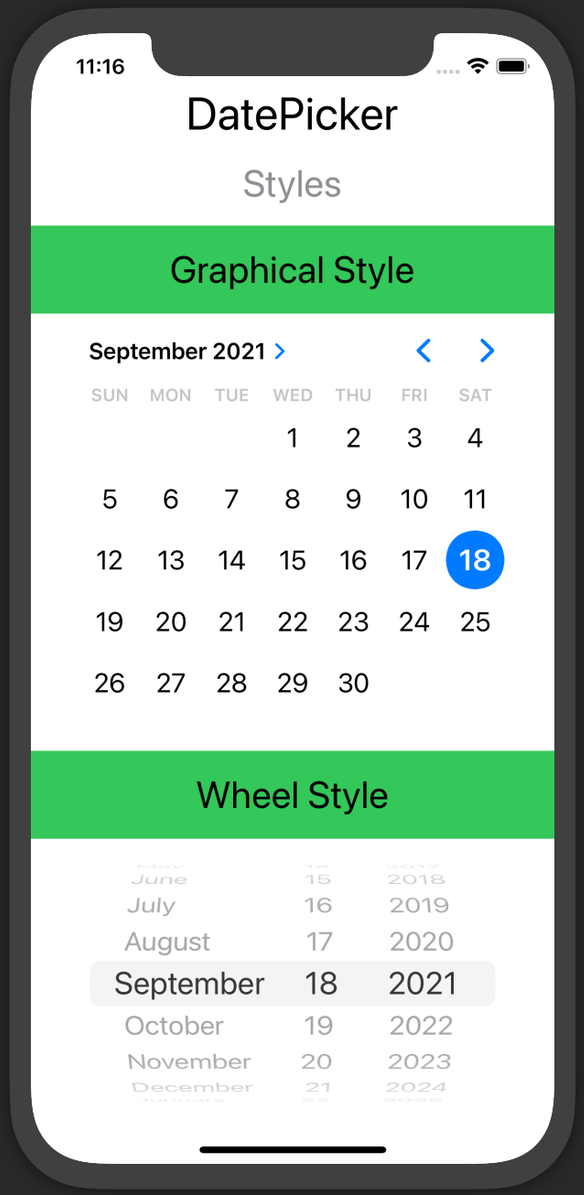
Hiding the label makes this view pull in.

What you see here is representative of the **compact** date picker style (text representation of the date).

There are other styles available...

Styles

iOS 14




```
struct DatePicker_Styles: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 0) {
            HeaderView("DatePicker",
                       subtitle: "Styles",
                       desc: "Graphical Style", back: .green)

            DatePicker("Birthday", selection: $date, displayedComponents: .date)
                .datePickerStyle(.graphical)
                .frame(width: 320)

            DescView(desc: "Wheel Style", back: .green)
            DatePicker("Birthday", selection: $date, displayedComponents: .date)
                .datePickerStyle(.wheel)
                .labelsHidden()

        }
        .font(.title)
        .ignoresSafeArea(edges: .bottom)
    }
}
```

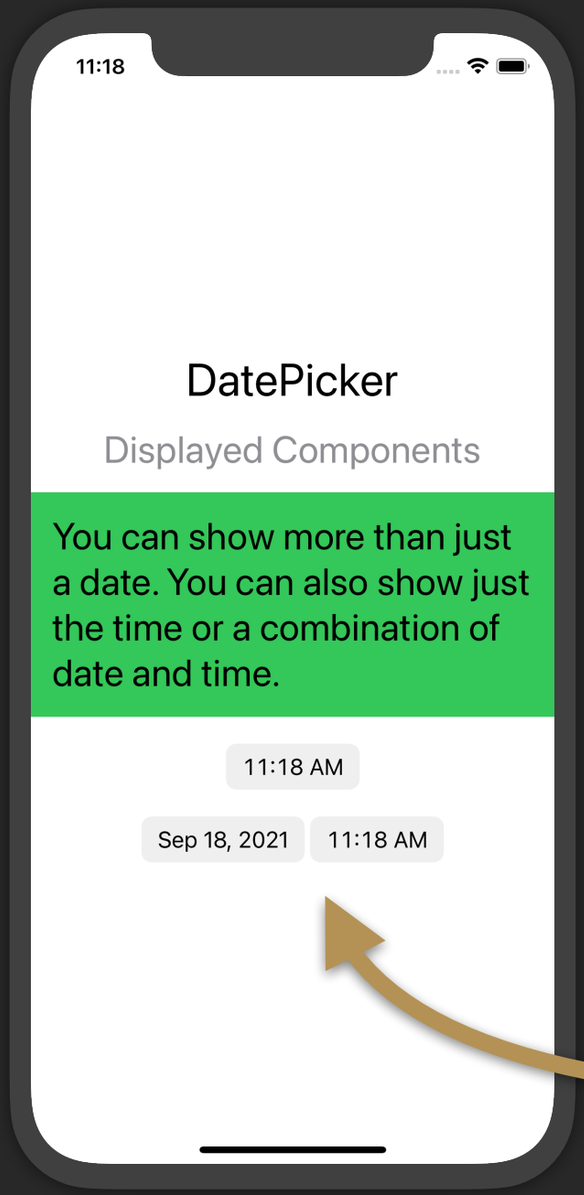
Notice we didn't have to hide the labels on the graphical style. It's not shown. (But you should keep it set for accessibility purposes.)

For datePickerStyle, use:

< iOS 15	`GraphicalDatePickerStyle()` `WheelDatePickerStyle()`
iOS 15+	`.graphical` `.wheel`

Displayed Components

iOS 14

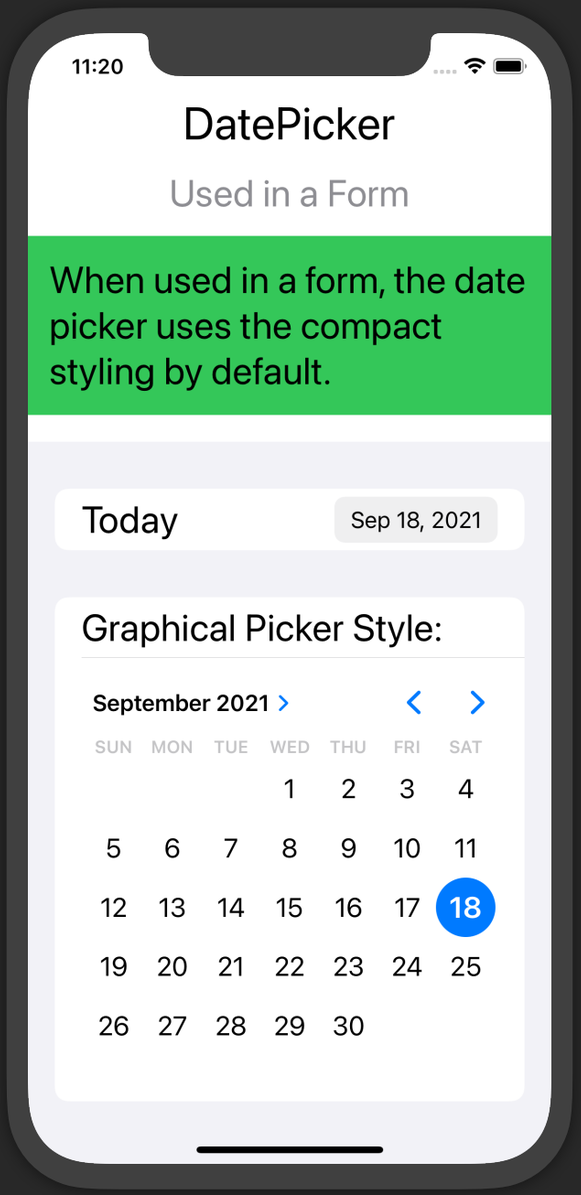



```
struct DatePicker14_DisplayedComponents: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("DatePicker - iOS 14+",
                       subtitle: "Displayed Components",
                       desc: "You can show more than just a date. You can also show just the
                              time or a combination of date and time.", back: .green)

            DatePicker("Today", selection: $date, displayedComponents: .hourAndMinute)
                .labelsHidden()
                .padding(.horizontal)

            DatePicker("Today", selection: $date, displayedComponents: [.hourAndMinute, .date])
                .labelsHidden()
                .padding(.horizontal)
                .buttonStyle(.bordered)
        }
        .font(.title)
    }
}
```

Note that the order of the displayed components does not affect the displayed order. The hour and minute still come second.

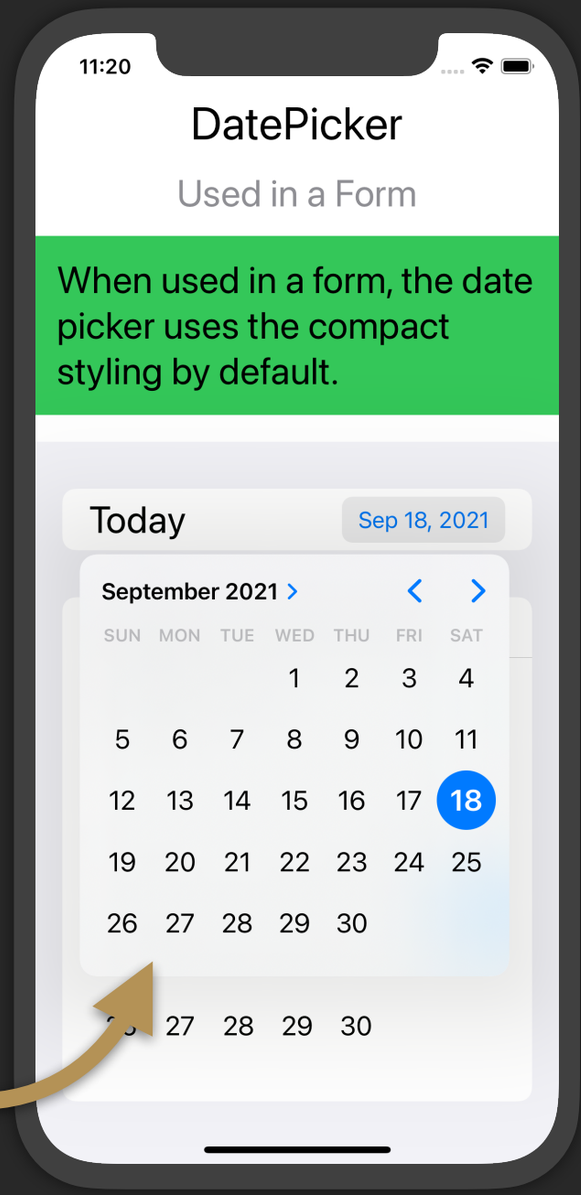
Displayed in Form

iOS 14



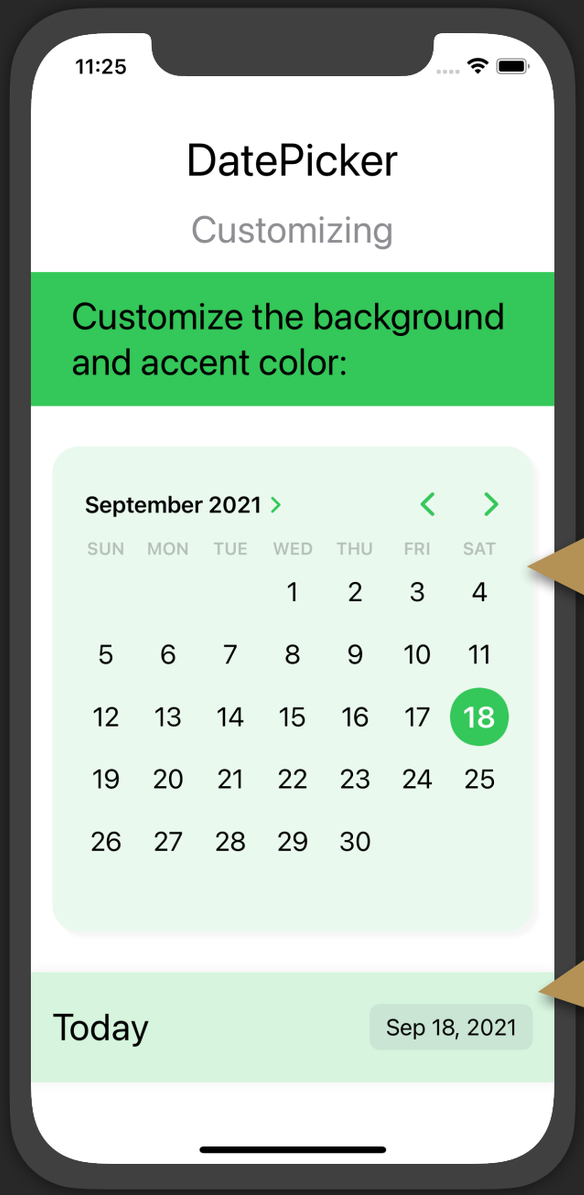

```
struct DatePicker_InForm: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("DatePicker",
                       subtitle: "Used in a Form",
                       desc: "When used in a form, the date
picker uses the compact styling by default.",
                       back: .green)

            Form {
                DatePicker("Today", selection: $date,
                           displayedComponents: .date)

                Section {
                    Text("Graphical Picker Style:")
                    DatePicker("Birthday", selection: $date,
                               displayedComponents: .date)
                     .datePickerStyle(.graphical)
                }
            }
            .font(.title)
    }
}
```

When the compact style is tapped, a pop up shows the graphical date picker.



Customizing

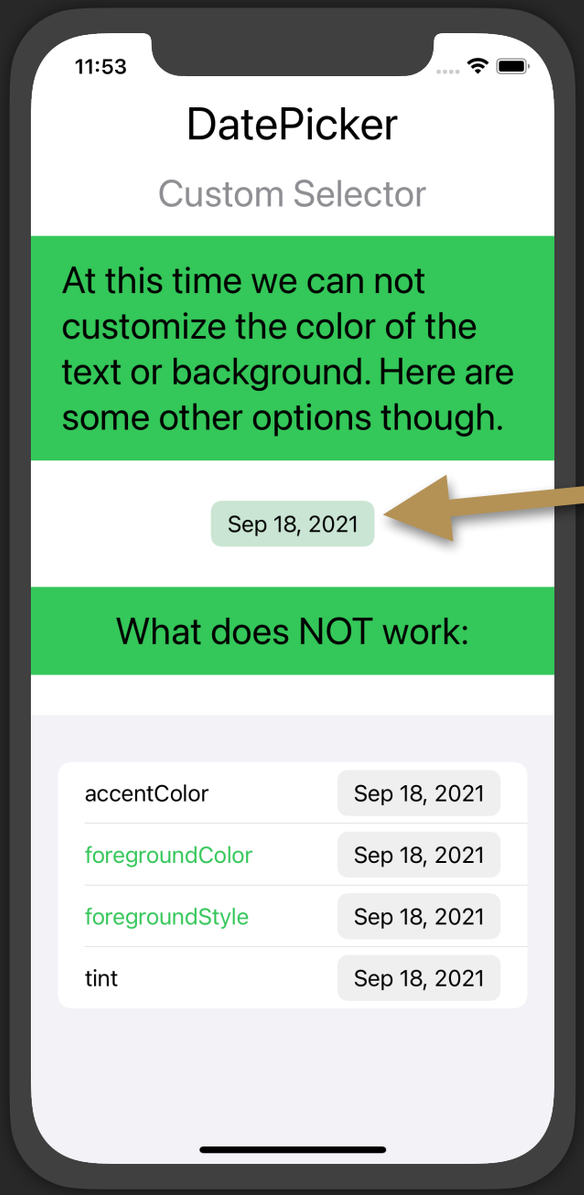
iOS 14




```
struct DatePicker_Customizing: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 30) {
            HeaderView("DatePicker",
                       subtitle: "Customizing",
                       desc: "Customize the background and accent color:", back: .green)

            DatePicker("Birthday", selection: $date, displayedComponents: .date)
                .datePickerStyle(.graphical)
                .accentColor(.green)
                .padding()
                .background(RoundedRectangle(cornerRadius: 20)
                                .fill(Color.green)
                                .opacity(0.1)
                                .shadow(radius: 1, x: 4, y: 4))
                .padding(.horizontal)

            DatePicker("Today", selection: $date, displayedComponents: .date)
                .frame(height: 50)
                .padding()
                .background(Rectangle()
                                .fill(Color.green)
                                .shadow(radius: 4)
                                .opacity(0.2))

        }.font(.title)
    }
}
```

Custom Selector

iOS 14




```
struct DatePicker_CustomSelector: View {
    @State private var date = Date()

    var body: some View {
        VStack(spacing: 30) {
            HeaderView("DatePicker",
                       subtitle: "Custom Selector",
                       desc: "At this time we can not customize the color of the text or
                              background. Here are some other options though.", back: .green)

            DatePicker("Today", selection: $date, displayedComponents: .date)
                .labelsHidden()
                .background(RoundedRectangle(cornerRadius: 8, style: .continuous)
                                .fill(Color.green).opacity(0.2))

            DescView(desc: "What does NOT work:", back: .green)
            Form {
                DatePicker("accentColor", selection: $date, displayedComponents: .date)
                    .accentColor(.green)

                DatePicker("foregroundColor", selection: $date, displayedComponents: .date)
                    .foregroundColor(.green)

                DatePicker("foregroundStyle", selection: $date, displayedComponents: .date)
                    .foregroundStyle(.green, .green, .green)

                DatePicker("tint", selection: $date, displayedComponents: .date)
                    .tint(.green)
            }
            .font(.body)
        }
        .font(.title)
    }
}
```

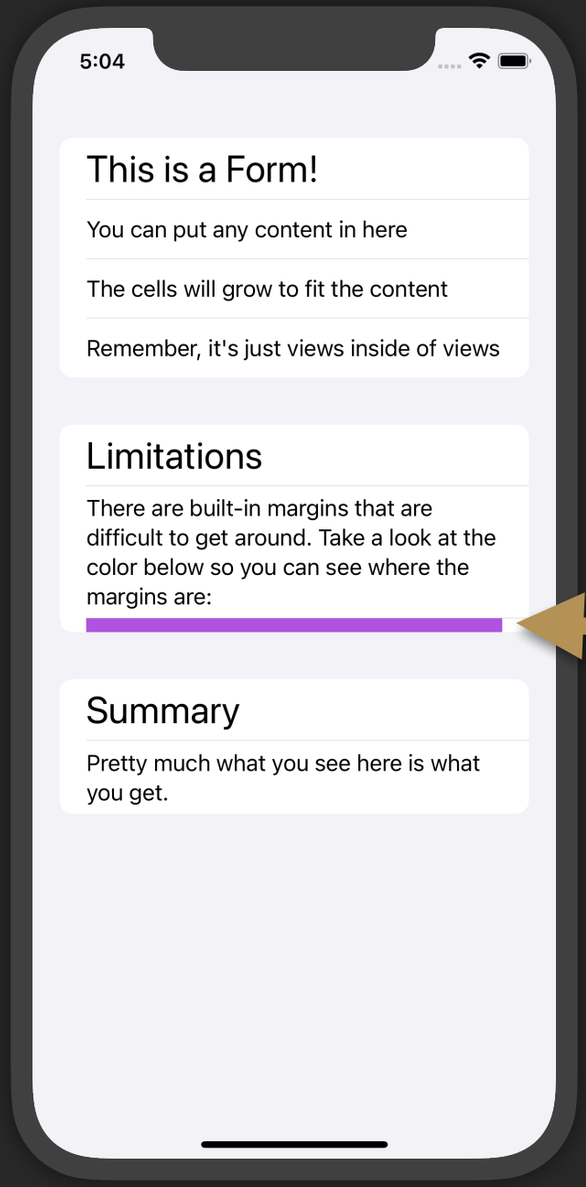
Using a cornerRadius of 8 and a continuous corner style is the best I could get to match the existing gray background.

Form

The Form view is a great choice when you want to show settings, options, or get some user input. It is easy to set up and customize as you will see on the following pages.

This is a push-out view.

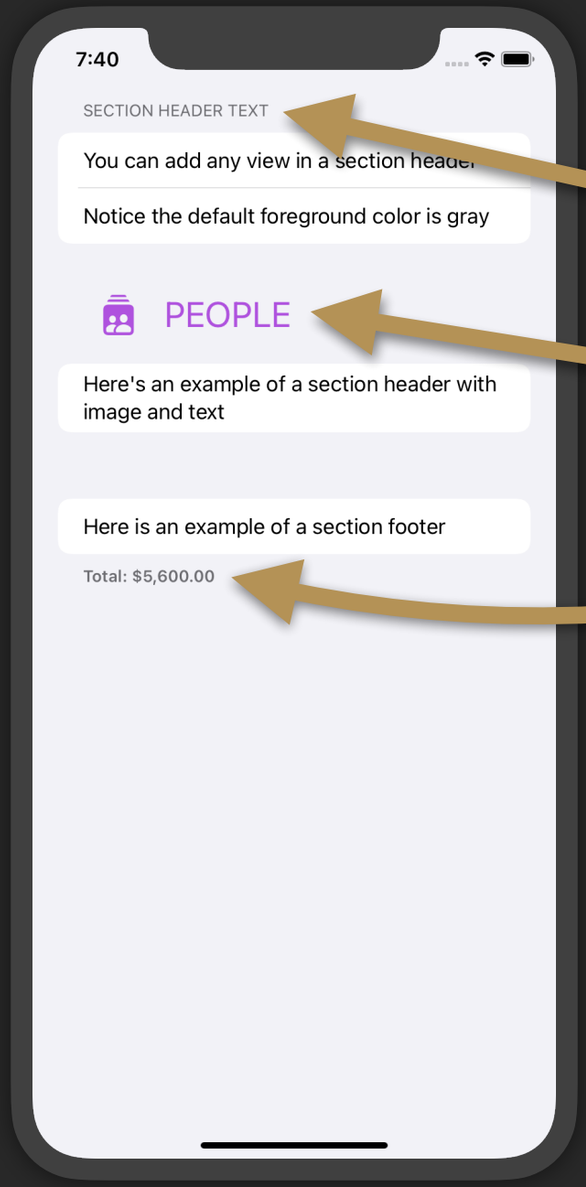
Introduction




```
struct Form_Intro : View {
    var body: some View {
        Form {
            Section {
                Text("This is a Form!")
                    .font(.title)
                Text("You can put any content in here")
                Text("The cells will grow to fit the content")
                Text("Remember, it's just views inside of views")
            }

            Section {
                Text("Limitations")
                    .font(.title)
                Text("There are built-in margins that are difficult to get around. Take a look
                      at the color below so you can see where the margins are:")
                Color.purple
            }

            Section {
                Text("Summary")
                    .font(.title)
                Text("Pretty much what you see here is what you get.")
            }
        }
    }
}
```

Forms come with a built-in scroll view if the contents exceed the height of the screen.

Section Headers and Footers

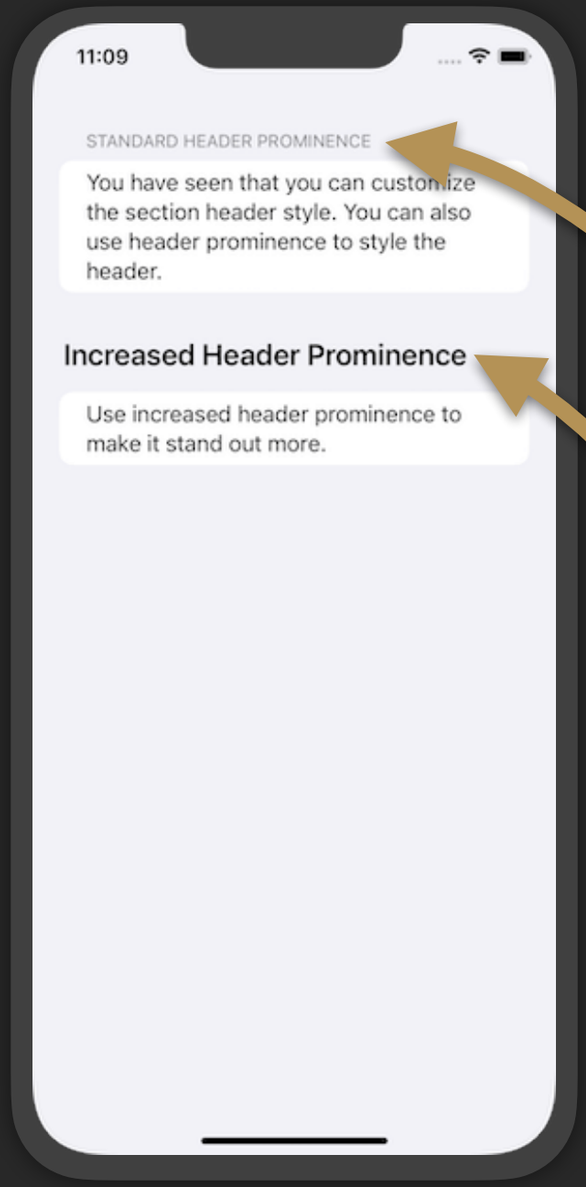



```
struct Form_HeadersAndFooters : View {
    var body: some View {
        Form {
            Section {
                Text("You can add any view in a section header")
                Text("Notice the default foreground color is gray")
            } header: {
                Text("Section Header Text")
            }
            Section {
                Text("Here's an example of a section header with image and text")
            } header: {
                SectionTextAndImage(name: "People", image: "person.2.square.stack.fill")
            }
            Section {
                Text("Here is an example of a section footer")
            } footer: {
                Text("Total: $5,600.00").bold()
            }
        }
    }
}
```

```
struct SectionTextAndImage: View {
    var name: String
    var image: String
    var body: some View {
        HStack {
            Image(systemName: image).padding(.trailing)
            Text(name)
        }
        .padding()
        .font(.title)
        .foregroundColor(Color.purple)
    }
}
```

Header Prominence

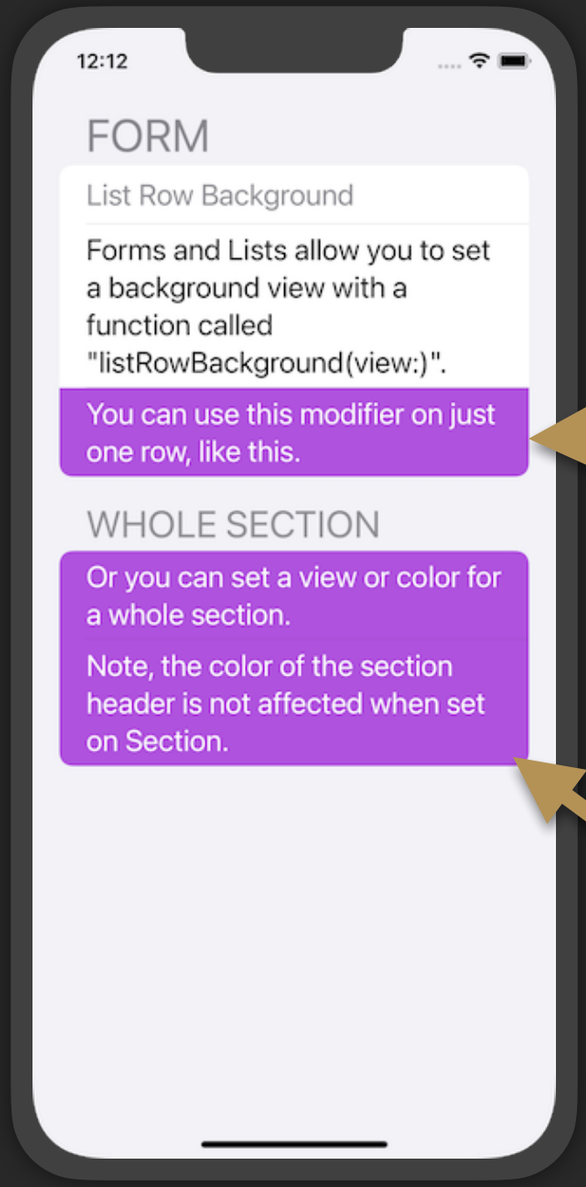
iOS 15




```
struct Form_HeaderProminence: View {
    var body: some View {
        Form {
            Section {
                Text("You have seen that you can customize the section header style. You can
                    also use header prominence to style the header.")
            } header: {
                Text("Standard Header Prominence")
            }
            .headerProminence(.standard)

            Section {
                Text("Use increased header prominence to make it stand out more.")
            } header: {
                Text("Increased Header Prominence")
            }
            .headerProminence(.increased)
        }
    }
}
```

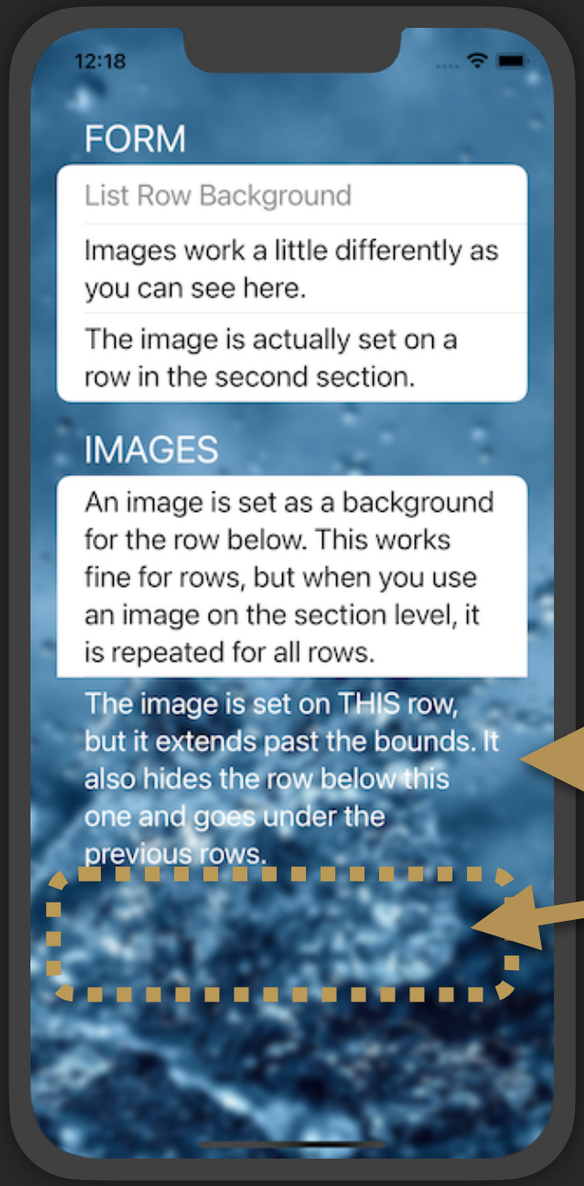
Note: I have found that I can put this modifier on the Section or the Text inside the header closure for it to work.

List Row Background




```
struct Form_ListRowBackground : View {
    var body: some View {
        Form {
            Section {
                Text("List Row Background")
                    .foregroundColor(.gray)

                Text("Forms and Lists allow you to set a background view with a function called
\"listRowBackground(view:)\".")

                Text("You can use this modifier on just one row, like this.")
                    .listRowBackground(Color.purple)
                    .foregroundColor(.white)
            } header: {
                Text("Form").font(.largeTitle)
            }

            Section {
                Text("Or you can set a view or color for a whole section.")

                Text("Note, the color of the section header is not affected when set on
Section.")
                    .fixedSize(horizontal: false, vertical: true)
            } header: {
                Text("Whole Section")
                    .font(.title).foregroundColor(.gray)
            }
            .foregroundColor(.white)
            .listRowBackground(Color.purple)
        }
        .font(.title2)
    }
}
```

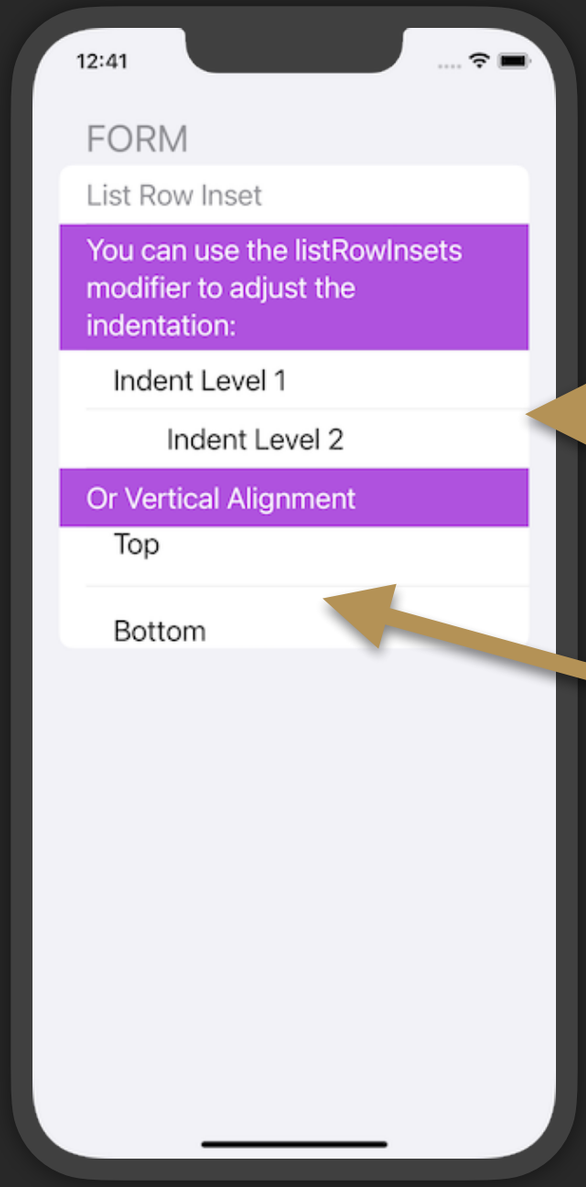
Background Images




```
struct Form_RowBackgroundImage : View {
    var body: some View {
        Form {
            Section {
                Text("List Row Background")
                    .foregroundColor(.gray)
                Text("Images work a little differently as you can see here.")
                Text("The image is actually set on a row in the second section.")
            } header: {
                Text("Form")
                    .font(.title)
                    .foregroundColor(.white)
            }

            Section {
                Text("An image is set as a background for the row below. This works fine for
                     rows, but when you use an image on the section level, it is repeated for all
                     rows.")
                Text("The image is set on THIS row, but it extends past the bounds. It also
                     hides the row below this one and goes under the previous rows.")
                    .foregroundColor(.white)
                    .listRowBackground(Image("water")
                                           .blur(radius: 3))

                Text("This row cannot be seen.")
            } header: {
                Text("Images")
                    .font(.title)
                    .foregroundColor(.white)
            }
        }
        .font(.title2)
    }
}
```

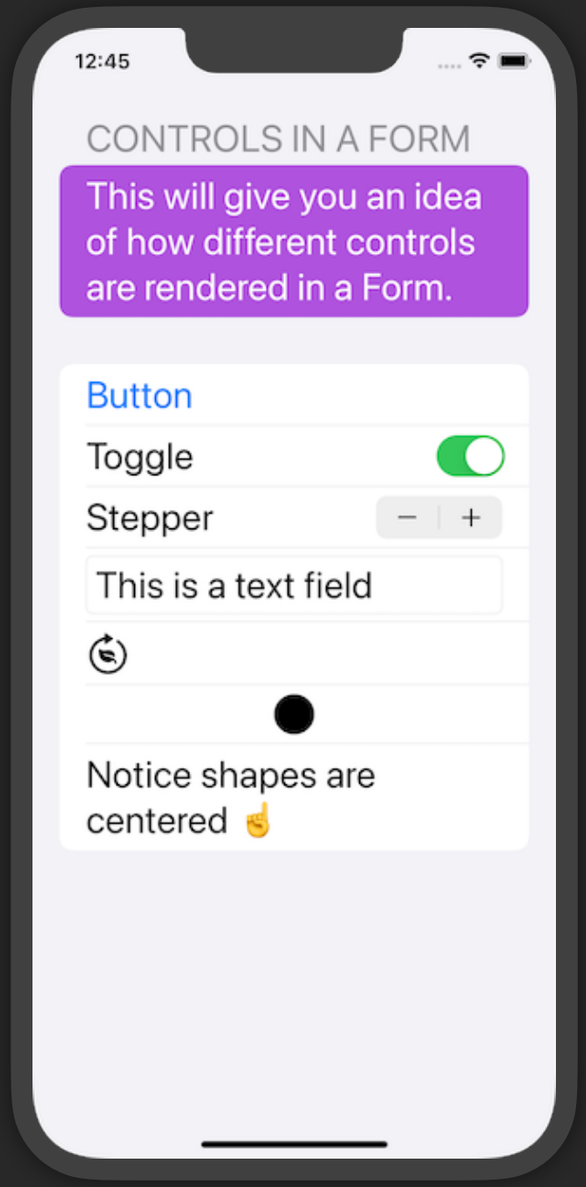
Be careful when using images with listRowBackground as they can go into other rows and cover rows.

List Row Inset




```
struct Form_ListRowInset : View {
    var body: some View {
        Form {
            Section {
                Text("List Row Inset")
                    .foregroundColor(.gray)
                Text("You can use the listRowInsets modifier to adjust the indentation:")
                    .foregroundColor(.white)
                    .listRowBackground(Color.purple)

                Text("Indent Level 1")
                    .listRowInsets(EdgeInsets(top: 0, leading: 40, bottom: 0, trailing: 0))

                Text("Indent Level 2")
                    .listRowInsets(EdgeInsets(top: 0, leading: 80, bottom: 0, trailing: 0))

                Text("Or Vertical Alignment")
                    .foregroundColor(.white)
                    .listRowBackground(Color.purple)

                Text("Top")
                    .listRowInsets(EdgeInsets(top: -20, leading: 40, bottom: 0, trailing: 0))

                Text("Bottom")
                    .listRowInsets(EdgeInsets(top: 20, leading: 40, bottom: 0, trailing: 0))
            } header: {
                Text("Form")
                    .font(.title)
                    .foregroundColor(.gray)
            }
        }
        .font(.title2)
    }
}
```

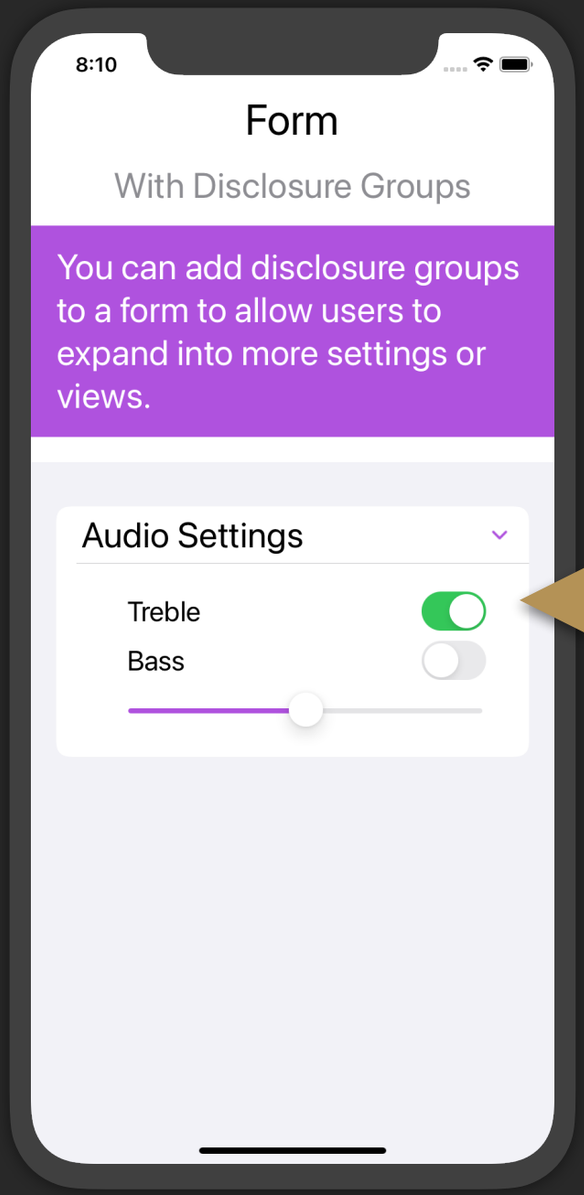
With Controls




```
struct Form_WithControls : View {
    @State private var isOn = true
    @State private var textFieldData = "This is a text field"

    var body: some View {
        Form {
            Section {
                Text("This will give you an idea of how different controls are rendered in a
                    Form.")
                    .foregroundColor(.white)
                    .listRowBackground(Color.purple)
            } header: {
                Text("Controls in a form")
                    .font(.title)
                    .foregroundColor(Color.gray)
            }
            Section {
                Button(action: {}) { Text("Button") }
                Toggle(isOn: $isOn) { Text("Toggle") }
                Stepper(onIncrement: {}, onDecrement: {}) { Text("Stepper") }
                TextField("", text: $textFieldData)
                    .textFieldStyle(.roundedBorder)
                Image(systemName: "leaf.arrow.circlepath").font(.title)
                Circle()
                    .frame(height: 30)
                Text("Notice shapes are centered ☝")
            }
        }
        .font(.title)
    }
}
```

With the Disclosure Group

iOS 14




```
struct Form_WithDisclosureGroup: View {
    @State private var settingsExpanded = true
    @State private var trebleOn = true
    @State private var bassOn = false
    @State private var levels = 0.5

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Form",
                       subtitle: "With Disclosure Groups",
                       desc: "You can add disclosure groups to a form to allow users to expand
into more settings or views.",
                       back: .purple, textColor: .white)

            Form {
                DisclosureGroup("Audio Settings", isExpanded: $settingsExpanded) {
                    VStack {
                        Toggle("Treble", isOn: $trebleOn)
                        Toggle("Bass", isOn: $bassOn)
                        Slider(value: $levels)
                    }
                    .font(.title2)
                    .padding()
                }
            }
        }
        .font(.title)
        .accentColor(.purple)
    }
}
```

See **Control Views** > DisclosureGroup for more info.

iOS 14

GroupBox

This SwiftUI content is locked in this preview.

The group box is container [illegible] grouping similar items together.

The GroupBox is a pull-in

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iOS 14

Label

This SwiftUI content is locked in this preview.

The label view is a pretty s w that will handle the layout, spacing and formatting of an image and text that you pass into it.

This is a pull-in view.

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iOS 14

Link

This SwiftUI content is locked in this preview.

The Link is similar to the Button but the NavigationLink except it can navigate you to a place outside your app.

This is a pull-in view.

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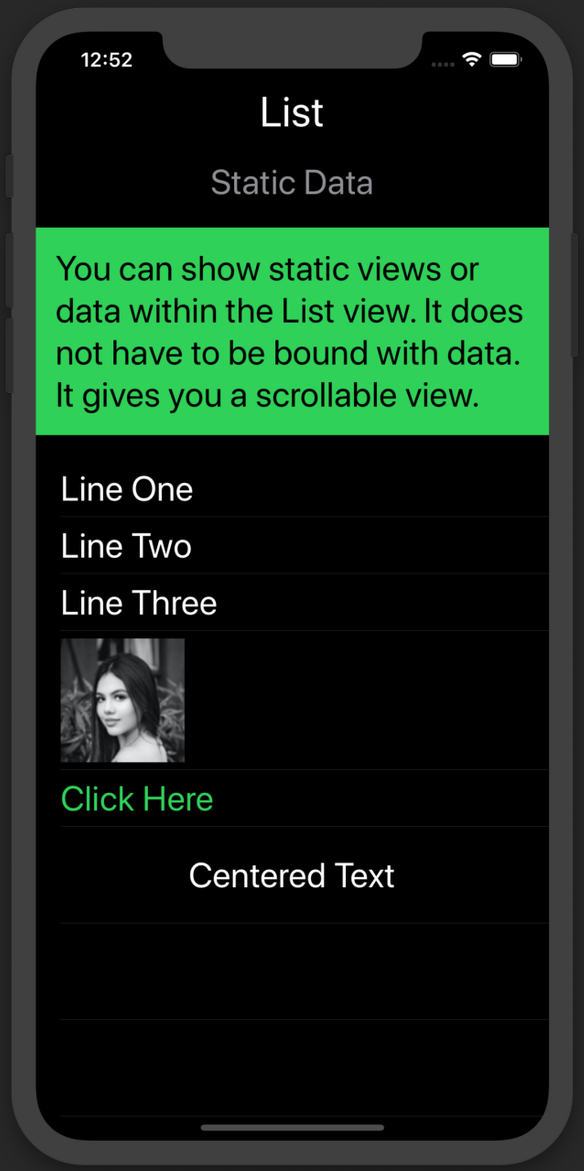
List

Using a List view is the most efficient way of displaying vertically scrolling data. You can display data in a ScrollView, as you will see later on, but it will not be as efficient in terms of memory or performance as the List view.

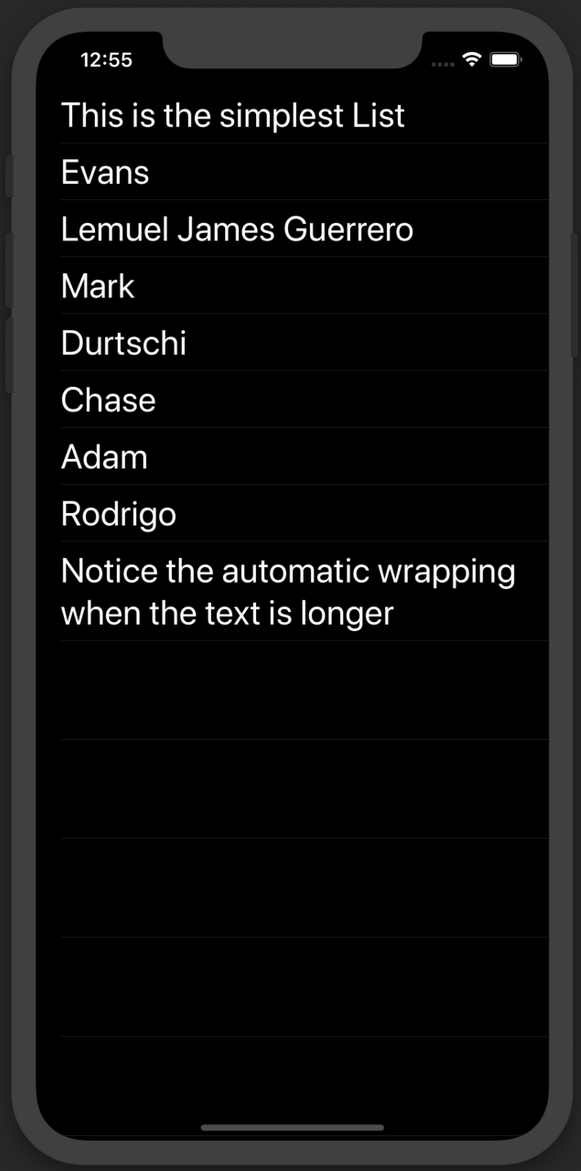
With Static Views




```
struct List_WithStaticData: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("List").font(.largeTitle)
            Text("Static Data").font(.title).foregroundColor(.gray)
            Text("You can show static views or data within the List view. It does not have to be
                 bound with data. It gives you a scrollable view.")
                .frame(maxWidth: .infinity)
                .font(.title).padding()
                .background(Color.green)
                .foregroundColor(.black)

            List {
                Text("Line One")
                Text("Line Two")
                Text("Line Three")
                Image("profile")
                Button("Click Here", action: {})
                    .foregroundColor(.green)
                HStack {
                    Spacer()
                    Text("Centered Text")
                    Spacer()
                }.padding()
            }
            .font(.title)
        }
    }
}
```

Note: Like other container views, you cannot have more than 10 views inside.

With Data




```
struct List_WithData : View {
    var stringArray = ["This is the simplest List", "Evans", "Lemuel James Guerrero", "Mark",
"Durtschi", "Chase", "Adam", "Rodrigo", "Notice the automatic wrapping when the text is longer"]

    var body: some View {
        List(stringArray, id: \.self) { string in
            Text(string)
        }
        .font(.largeTitle) // Apply this font style to all items in the list
    }
}
```

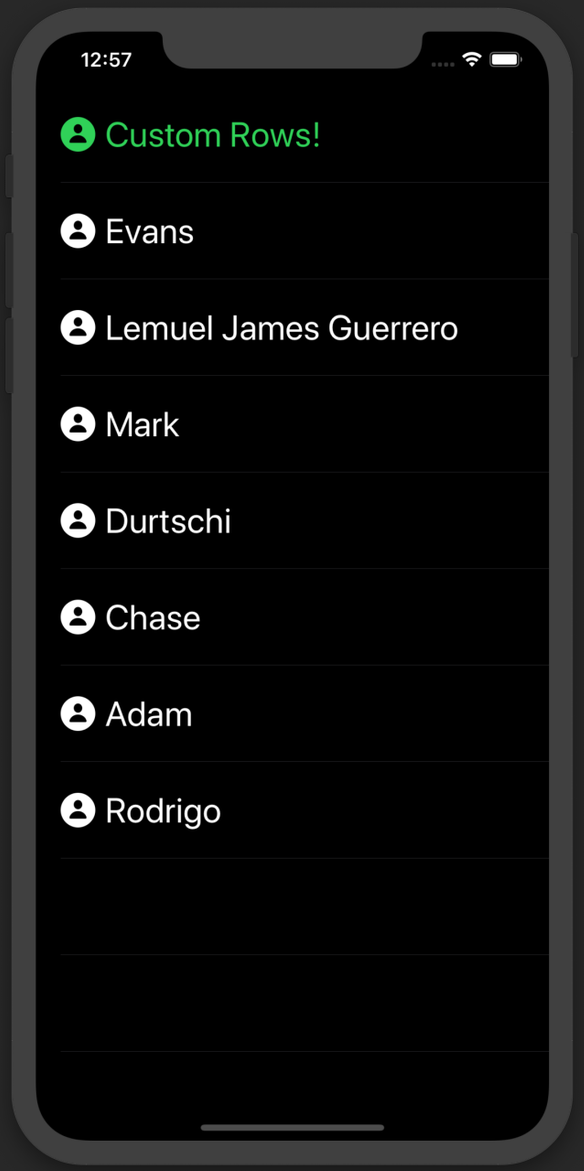
The List view can iterate through an array of data and pass in one item at a time to its closure.

What is that .id parameter?

You use this parameter to tell the List how it can uniquely identify each row by which value. The List needs to know this so it can compare rows by this value to perform different operations like reordering and deleting rows for us.

In this scenario, we are using “self” to say, “Just use the value of the string itself to uniquely identify each row.”

Custom Rows

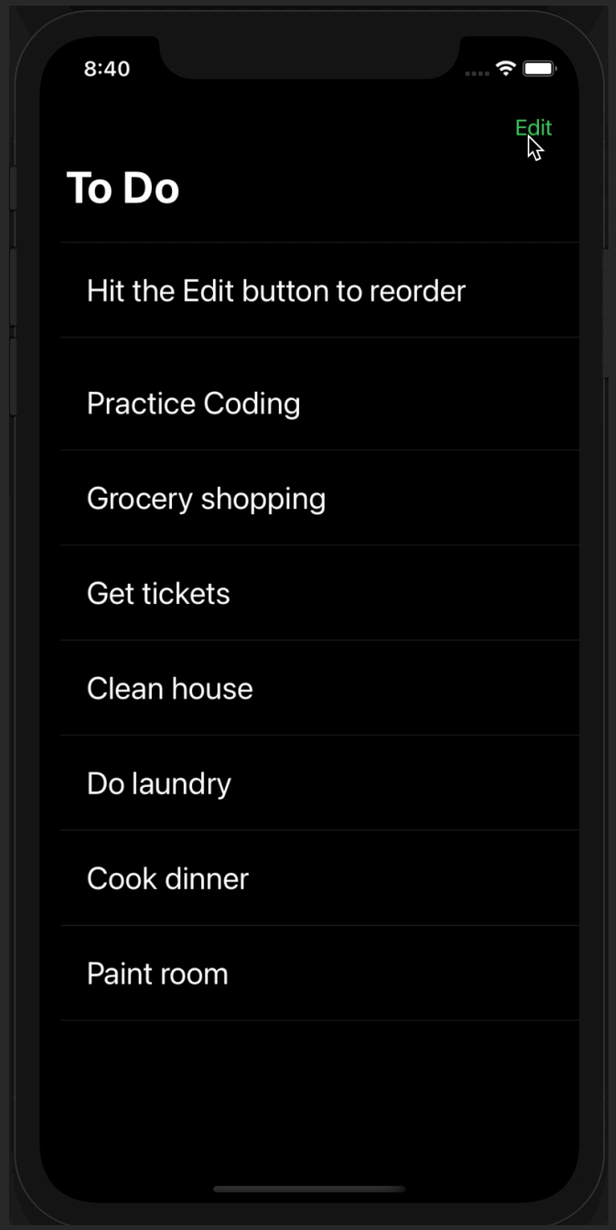



```swift
struct List_CustomRows : View {
    var data = ["Custom Rows!", "Evans", "Lemuel James Guerrero", "Mark", "Durtschi", "Chase",
"Adam", "Rodrigo"]

    var body: some View {
        List(data, id: \.self) { datum in
            CustomRow(content: datum)
        }
    }
}
```

```swift
struct CustomRow: View {
    var content: String

    var body: some View {
        HStack {
            Image(systemName: "person.circle.fill")
            Text(content)
            Spacer()
        }
        .foregroundColor(content == "Custom Rows!" ? Color.green : Color.primary)
        .font(.title)
        .padding([.top, .bottom])
    }
}
```

Extracting rows into separate views is a common practice in SwiftUI. You can then have a separate preview just for the row.

Move Rows



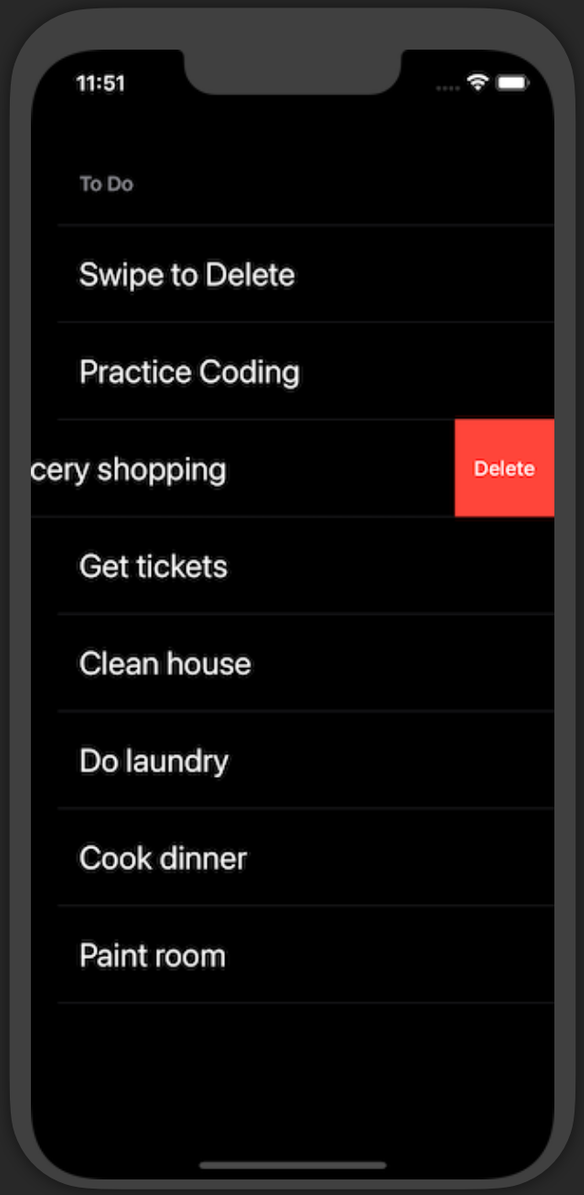

```
struct List_MoveRow : View {
    @State var data = ["Hit the Edit button to reorder", "Practice Coding", "Grocery shopping",
"Get tickets", "Clean house", "Do laundry", "Cook dinner", "Paint room"]

    var body: some View {
        NavigationView {
            List {
                ForEach(data, id: \.self) { datum in
                    Text(datum).font(Font.system(size: 24)).padding()
                }
                .onMove { source, destination in
                    data.move(fromOffsets: source, toOffset: destination)
                }
            }
            .navigationTitle("To Do")
            .toolbar {
                ToolbarItem { EditButton() }
            }
        }
        .tint(.green) // Changes color of buttons
    }
}
```

The onMove modifier goes on the ForEach, not the List.

What is EditButton()?

This is a built-in function that returns a view (Button) that will automatically toggle edit mode on the List. Its text says “Edit” and then when tapped you will see the move handles appear on the rows and the button text says “Done”.

Delete Rows

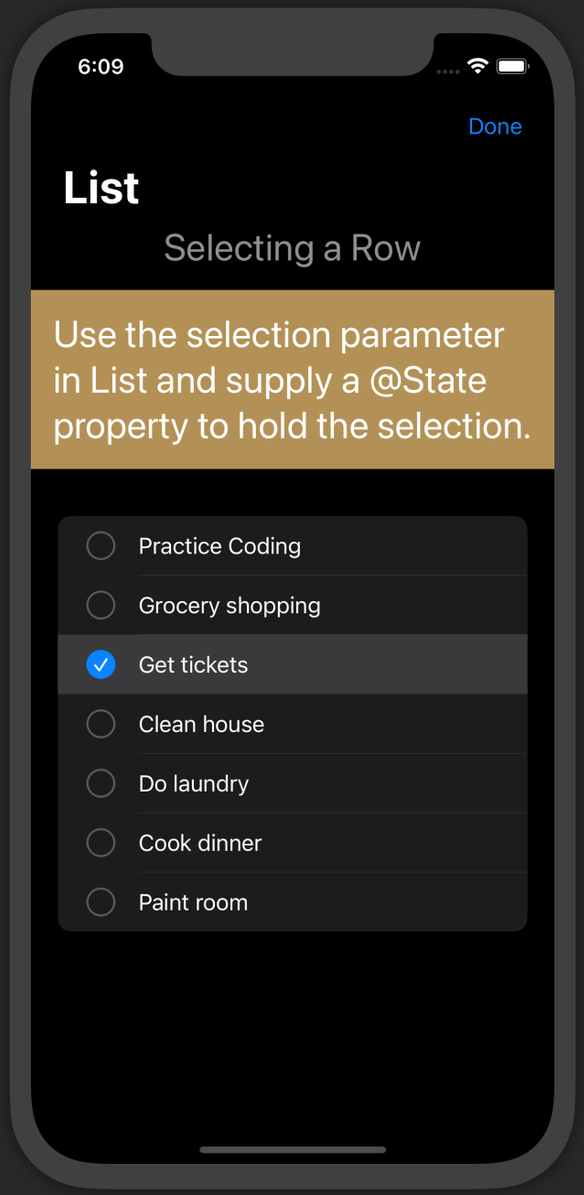



```
struct List_Delete : View {
    @State var data = ["Swipe to Delete", "Practice Coding", "Grocery shopping", "Get tickets",
"Clean house", "Do laundry", "Cook dinner", "Paint room"]

    var body: some View {
        List {
            Section {
                ForEach(data, id: \.self) { datum in
                    Text(datum).font(Font.system(size: 24)).padding()
                }
                .onDelete { offsets in
                    data.remove(atOffsets: offsets)
                }
            } header: {
                Text("To Do")
                    .padding()
            }
        }
        .listStyle(.plain)
    }
}
```

onDelete, onMove, onInsert

These three functions only work on views that implement the DynamicViewContent protocol. Currently, the only view that conforms to the DynamicViewContent protocol is the ForEach view. So these functions are only available on a ForEach view, not a List view.

Selecting a Row



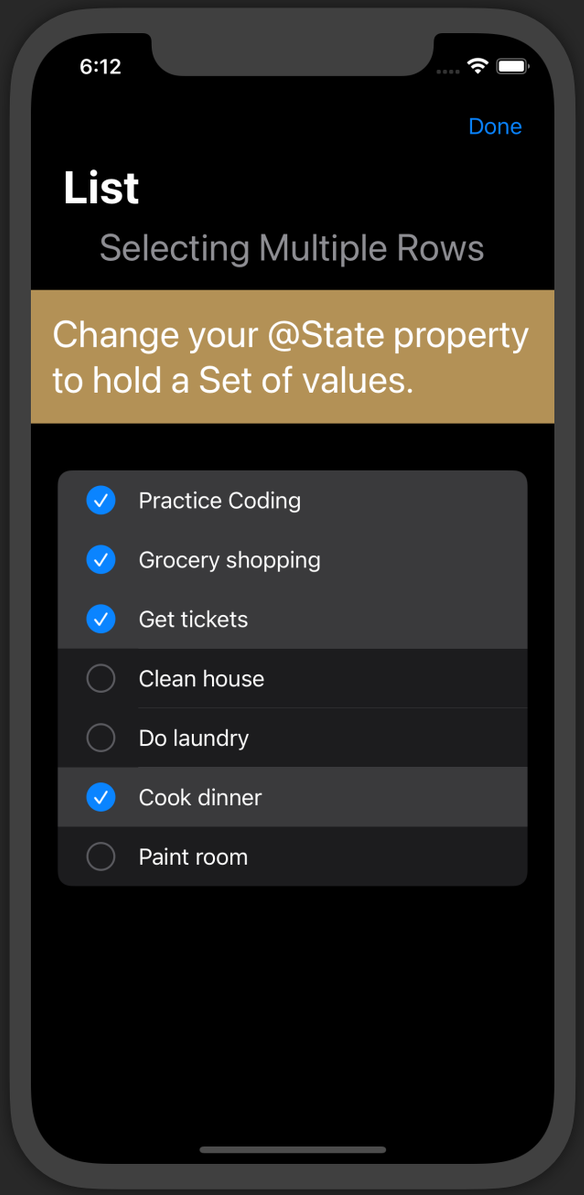

```
struct List_Selection_Single: View {
    @State private var data = ["Practice Coding", "Grocery shopping", "Get tickets",
                               "Clean house", "Do laundry", "Cook dinner", "Paint room"]
    @State private var selection: String?

    var body: some View {
        NavigationView {
            VStack(spacing: 0) {
                HeaderView("",
                           subtitle: "Selecting a Row",
                           desc: "Use the selection parameter in List and supply a @State
                                  property to hold the selection.")

                List(data, id: \.self, selection: $selection) { item in
                    Text(item)
                }
            }
            .font(.title)
            .navigationTitle("List")
            .toolbar { EditButton() }
        }
    }
}
```

Use an optional type to store which row is selected.

Bind the selection parameter to your @State property above using the dollar sign ($).

You need the edit button to enable edit mode for row selection.

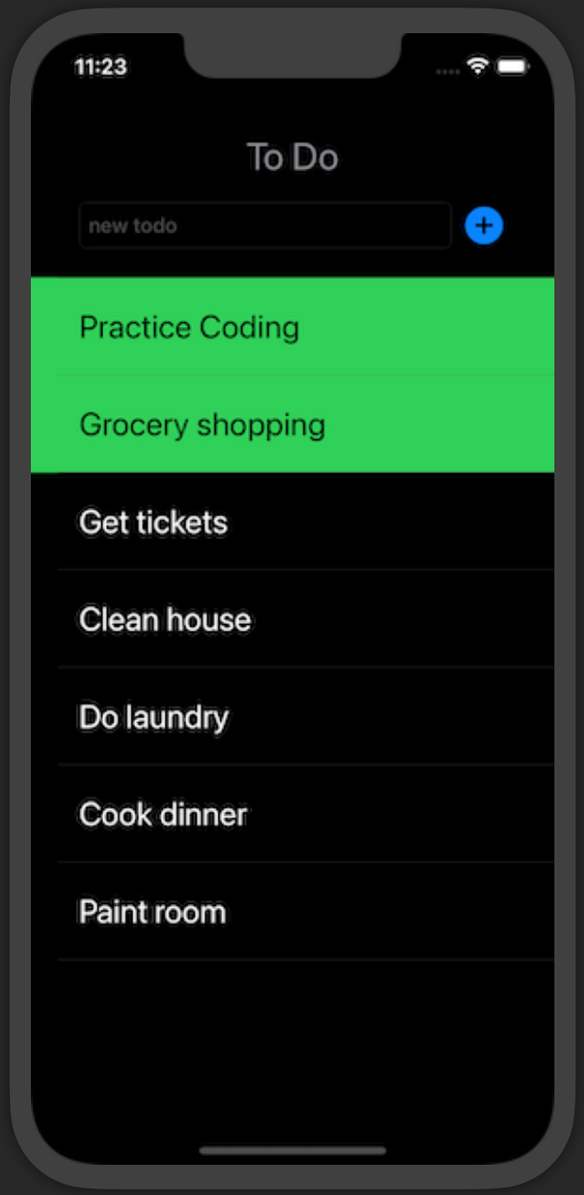
Selecting Multiple Rows




```
struct List_Selection_Multiple: View {
    @State private var data = ["Practice Coding", "Grocery shopping", "Get tickets",
                               "Clean house", "Do laundry", "Cook dinner", "Paint room"]
    @State private var selections = Set<String>()

    var body: some View {
        NavigationView {
            VStack(spacing: 0) {
                HeaderView("",
                           subtitle: "Selecting Multiple Rows",
                           desc: "Change your @State property to hold a Set of values.")

                List(data, id: \.self, selection: $selections) { item in
                    Text(item)
                }
            }
            .font(.title)
            .navigationTitle("List")
            .toolbar { EditButton() }
        }
    }
}
```

By changing the type to a Set, the List will automatically know it can hold multiple selection values.

List Row Background



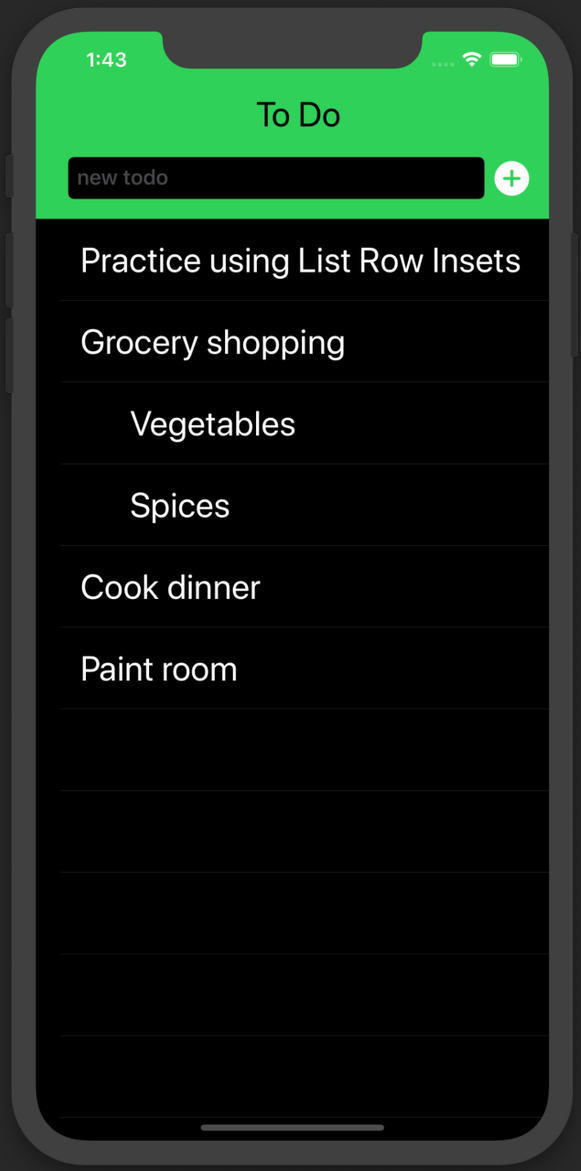

```swift
struct Todo: Identifiable {
    let id = UUID()
    var action = ""
    var due = ""
    var isIndented = false
}

struct List_ListRowBackground : View {
    @State private var newToDo = ""

    @State var data = [
        Todo(action: "Practice Coding", due: "Today"),
        Todo(action: "Grocery shopping", due: "Today"),
        Todo(action: "Get tickets", due: "Tomorrow"),
        Todo(action: "Clean house", due: "Next Week"),
        Todo(action: "Do laundry", due: "Next Week"),
        Todo(action: "Cook dinner", due: "Next Week"),
        Todo(action: "Paint room", due: "Next Week")
    ]

    var body: some View {
        List {
            Section {
                ForEach(data) { datum in
                    Text(datum.action)
                        .font(Font.system(size: 24))
                        .foregroundColor(self.getTextColor(due: datum.due))
                        // Turn row green if due today
                        .listRowBackground(datum.due == "Today" ? Color.green : Color.clear)
                        .padding()
                }
```

Notice the .listRowBackground function is on the view inside the ForEach. You want to call this function on whatever view will be inside the row, not on the List itself.

List Row Background Continued

```
            } header: {
                VStack {
                    Text("To Do").font(.title)
                    HStack {
                        TextField("new todo", text: $newToDo)
                            .textFieldStyle(.roundedBorder)
                        Button(action: {
                            data.append(Todo(action: newToDo))
                            newToDo = ""
                        }) {
                            Image(systemName: "plus.circle.fill").font(.title)
                        }
                    }
                }
                .padding(.bottom)
            }
        }
        .listStyle(.plain)
    }

    // This logic was inline but the compiler said it was "too complex" 🤷
    private func getTextColor(due: String) -> Color {
        due == "Today" ? Color.black : Color.primary
    }
}
```

List Row Inset




```
struct List_ListRowInsets : View {
    @State private var newToDo = ""

    @State var data = [
        Todo(action: "Practice using List Row Insets", due: "Today"),
        Todo(action: "Grocery shopping", due: "Today"),
        Todo(action: "Vegetables", due: "Today", isIndented: true),
        Todo(action: "Spices", due: "Today", isIndented: true),
        Todo(action: "Cook dinner", due: "Next Week"),
        Todo(action: "Paint room", due: "Next Week")
    ]

    var body: some View {
        VStack {
            VStack {
                Text("To Do")
                    .font(.title)
                    .foregroundColor(.black)
                HStack {
                    TextField("new todo", text: $newToDo)
                        .textFieldStyle(.roundedBorder)
                    Button(action: {
                        data.append(Todo(action: newToDo))
                        newToDo = ""
                    }) {
                        Image(systemName: "plus.circle.fill")
                            .font(.title)
```

See next page for the code that insets the rows.

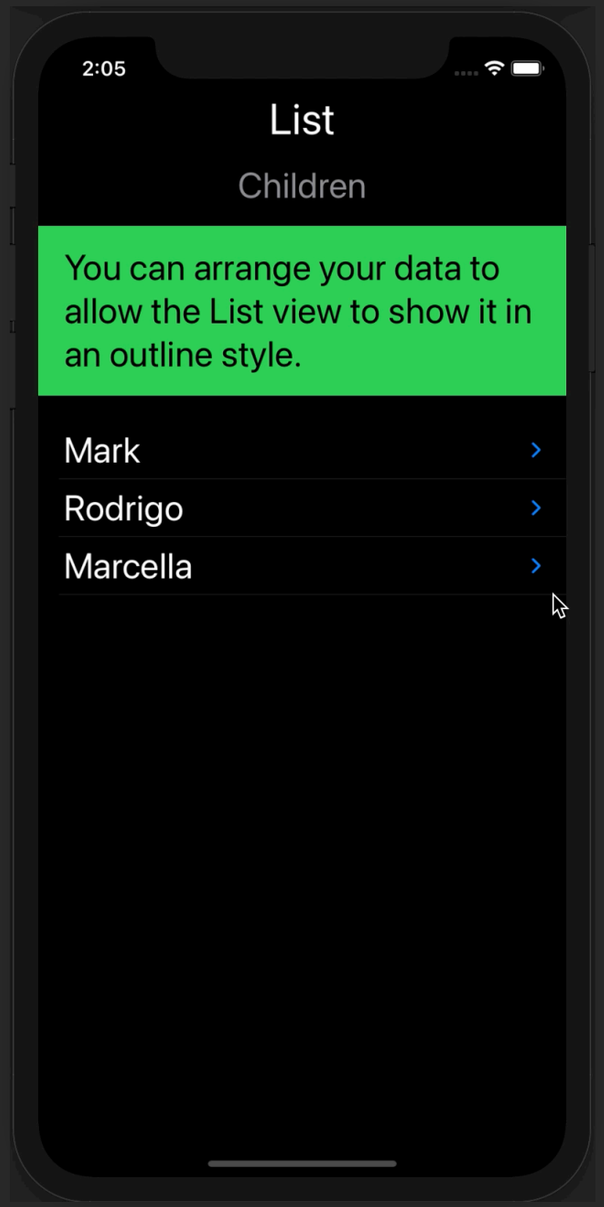
List Row Inset Continued

```
                        .foregroundColor(.white)
                }
            }
        }
        .padding()
        .background(Color.green)

        List {
            ForEach(self.data) { datum in
                Text(datum.action)
                    .font(.title)
                    .padding()
                // Inset row based on data
                    .listRowInsets(EdgeInsets(top: 0,
                                              leading: datum.isIndented ? 60 : 20,
                                              bottom: 0, trailing: 0))
            }
        }
        .listStyle(.plain)
    }
  }
}
```

I'm using a condition here to determine just how much to inset the row.

List With Children

iOS 14



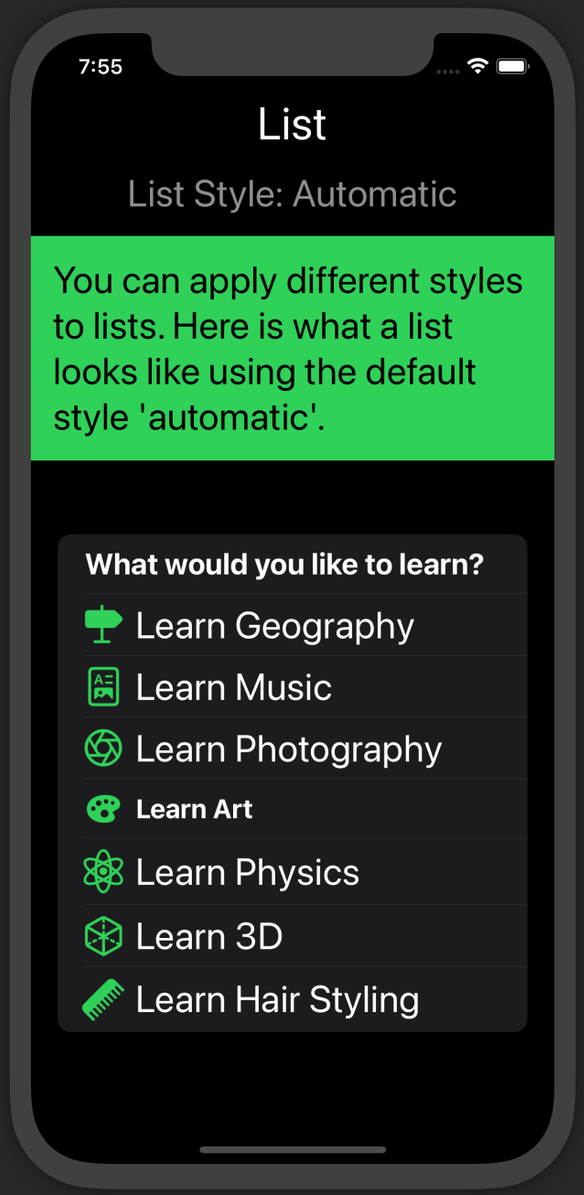

```swift
// Need to conform to Identifiable
struct Parent: Identifiable {
    var id = UUID()
    var name = ""
    var children: [Parent]? // Had to make this optional
}
```

If you have nested data, this could be a good way to represent it in a List.

```swift
struct List_WithChildren: View {
    var parents = [Parent(name: "Mark",
                          children: [Parent(name: "Paola")]),
                   Parent(name: "Rodrigo",
                          children: [Parent(name: "Kai"), Parent(name: "Brennan"),
                                     Parent(name: "Easton")]),
                   Parent(name: "Marcella",
                          children: [Parent(name: "Sam"), Parent(name: "Melissa"),
                                     Parent(name: "Melanie")])]

    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("List",
                       subtitle: "Children",
                       desc: "You can arrange your data to allow the List view to show it in an
                              outline style.", back: .green)

            List(parents, children: \.children) { parent in
                Text("\(parent.name)")
            }
        }
        .font(.title)
    }
}
```

Use the List init with the children parameter and use a key path to point to your nested property.

ListStyle: Automatic




```
struct List_ListStyle_Automatic: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("List",
                       subtitle: "List Style: Automatic",
                       desc: "You can apply different styles to lists. Here is what a list looks
                              like using the default style 'automatic'.",
                       back: .green)
            List {
                Text("What would you like to learn?")
                    .font(.title2)
                    .fontWeight(.bold)
                Label("Learn Geography", systemImage: "signpost.right.fill")
                Label("Learn Music", systemImage: "doc.richtext")
                Label("Learn Photography", systemImage: "camera.aperture")
                Label("Learn Art", systemImage: "paintpalette.fill")
                    .font(Font.system(.title3).weight(.bold))
                Label("Learn Physics", systemImage: "atom")
                Label("Learn 3D", systemImage: "cube.transparent")
                Label("Learn Hair Styling", systemImage: "comb.fill")
            }
            .accentColor(.green)
            .listStyle(.automatic)
        }
        .font(.title)
    }
}
```

Note: You do not have to apply this modifier if the value is automatic. This is how it will anyway.

iOS 14 iOS 15

Additional List Content

Discover even more you can do with a list including: customizing separators (or removing them), swipe actions, section separators, safe area insets, apply tints and header/footer list styles.

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iOS 14

Menu

The Menu view allows you to attach acti s (with or without images) and define a label, or a visible view to th user. When the user taps the label, the actions will show.

This is similar to the **cont** modifier (in the Controls Modifiers chapter) where you can attach a menu to any view that becomes visible when y g-press the view.

This is a pull-in view.

This SwiftUI content is locked in this preview.

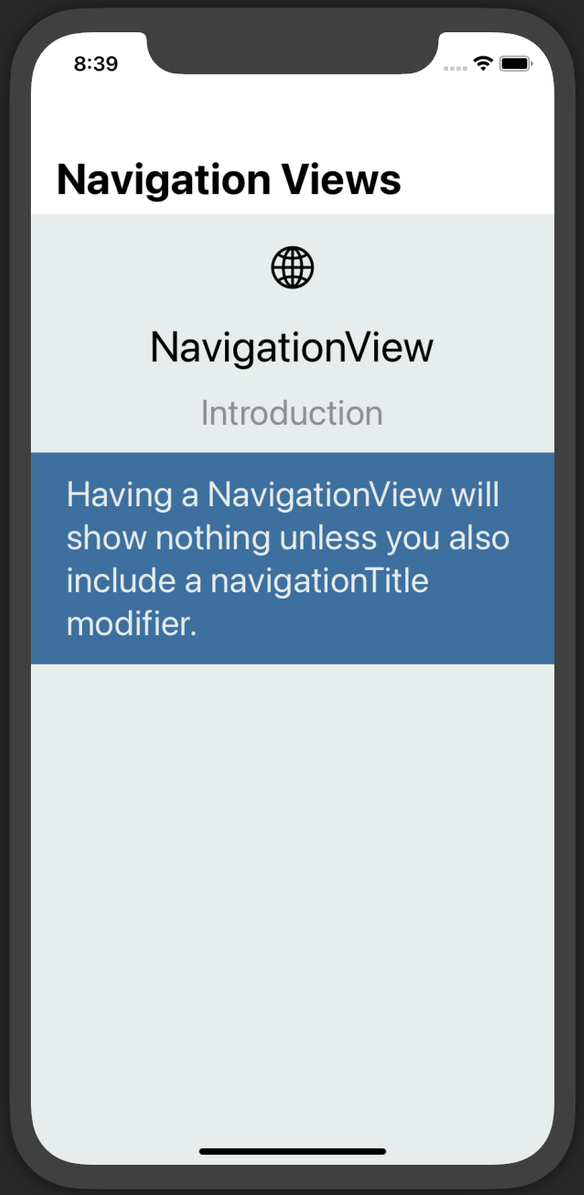
UNLOCK THE BOOK TODAY FOR ONLY $55!

NavigationView

The NavigationView is a little different in that it will fill the whole screen when used. You will never have to specify its size. But there are some ways you can customize it which you will see in the following pages.

This is a push-out view.

Introduction

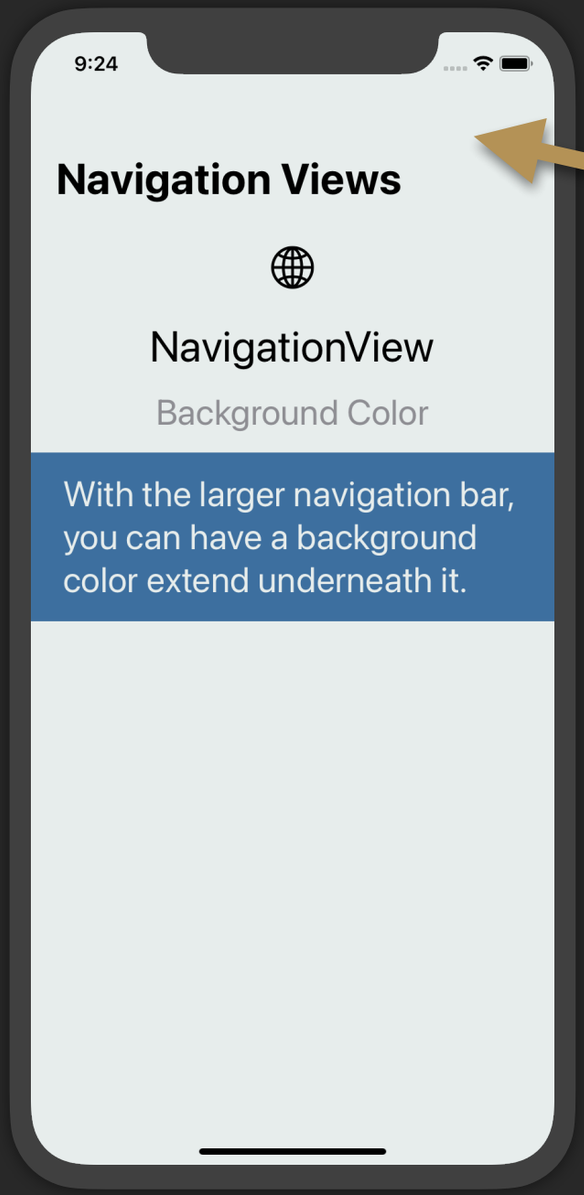



```
struct Navigation_Intro : View {
    var body: some View {
        NavigationView {
            ZStack {
                Color("Theme3BackgroundColor")
                VStack(spacing: 25) {
                    Image(systemName: "globe")
                        .font(.largeTitle)

                    HeaderView("NavigationView",
                               subtitle: "Introduction",
                               desc: "Having a NavigationView will show nothing unless you also
include a navigationTitle modifier.",
                               back: Color("Theme3ForegroundColor"),
                               textColor: Color("Theme3BackgroundColor"))

                    Spacer()
                }
                .font(.title)
                .padding(.top, 25)
            }
            // This creates a title in your nav bar
            .navigationTitle("Navigation Views")
            .ignoresSafeArea(edges: .bottom)
        }
    }
}
```

The navigationTitle goes **INSIDE** the NavigationView, not on it.

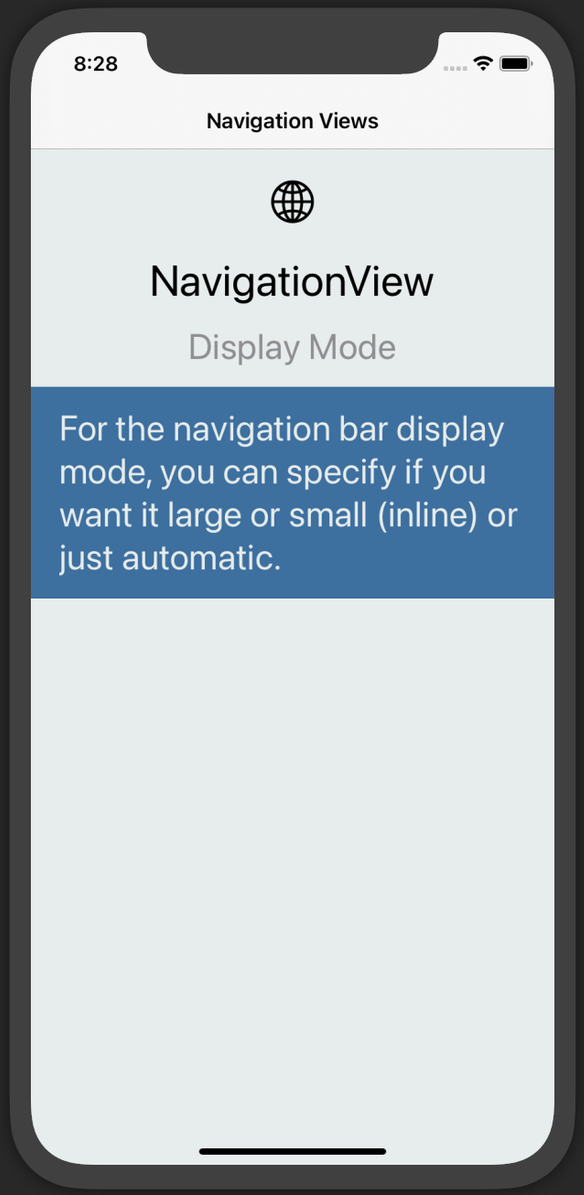
Also notice that the default style of the nav bar is large. How can you change this?

Background Color




```
struct Navigation_BackgroundColor: View {
    var body: some View {
        NavigationView {
            ZStack {
                Color("Theme3BackgroundColor")
                    .ignoresSafeArea() // Allows background color to go BEHIND large nav bar.

                VStack(spacing: 25) {
                    Image(systemName: "globe")
                        .font(.largeTitle)
                    HeaderView("NavigationView", subtitle: "Background Color", desc: "With the
larger navigation bar, you can have a background color extend underneath it.",
                               back: Color("Theme3ForegroundColor"),
                               textColor: Color("Theme3BackgroundColor"))

                    Spacer()
                }
                .font(.title)
                .padding(.top, 25)
            }
            .navigationTitle("Navigation Views")
        }
    }
}
```

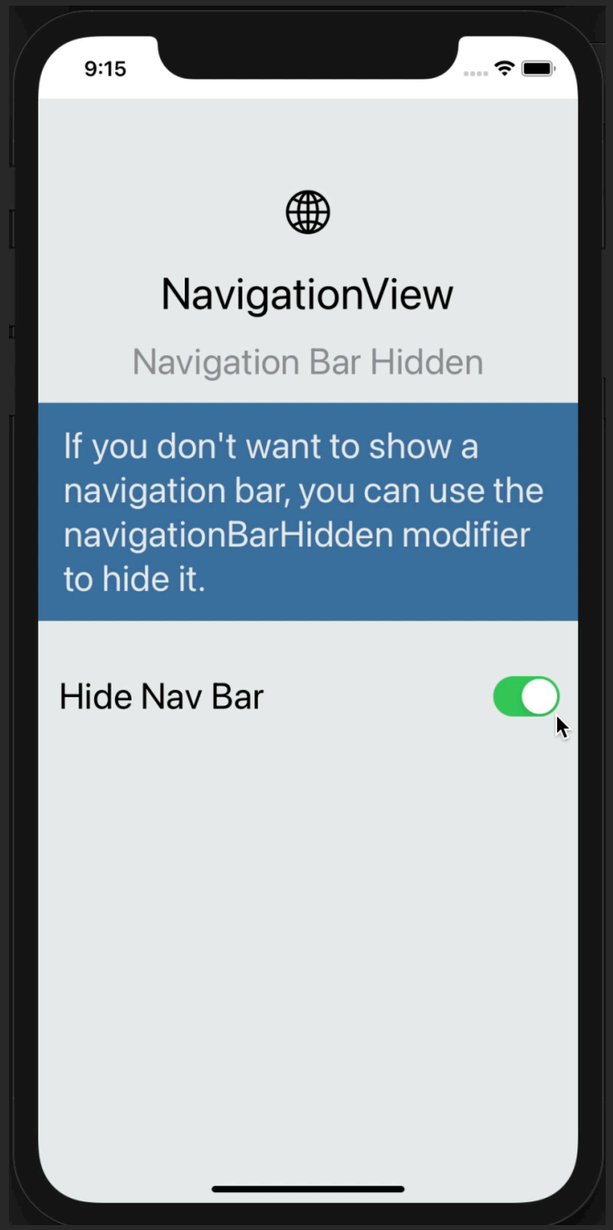
Display Mode




```
struct Navigation_DisplayMode: View {
    var body: some View {
        NavigationView {
            ZStack {
                Color("Theme3BackgroundColor")
                VStack(spacing: 25) {
                    Image(systemName: "globe")
                        .font(.largeTitle)

                    HeaderView("NavigationView",
                               subtitle: "Display Mode",
                               desc: "For the navigation bar display mode, you can specify if
you want it large or small (inline) or just automatic.",
                               back: Color("Theme3ForegroundColor"),
                               textColor: Color("Theme3BackgroundColor"))

                    Spacer()
                }
                .font(.title)
                .padding(.top, 25)
            }
            .navigationTitle("Navigation Views")
            // Use .inline for the smaller nav bar
            .navigationBarTitleDisplayMode(.inline)
            .ignoresSafeArea(edges: .bottom)
        }
    }
}
```

Using .inline will render the smaller nav bar.

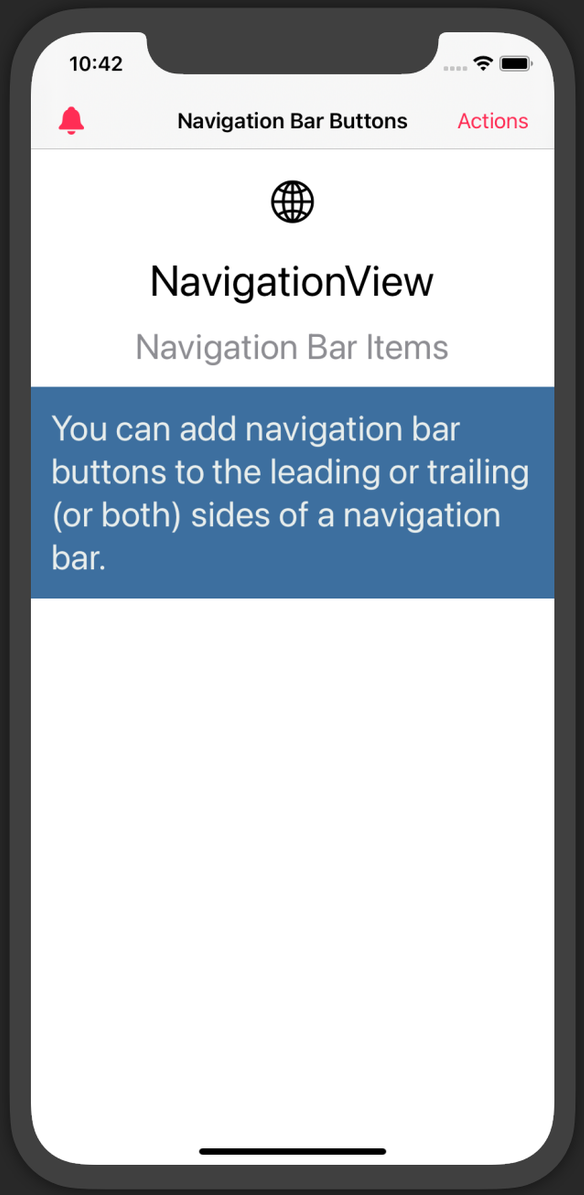
NavigationBarHidden




```
struct Navigation_BarHidden: View {
    @State private var isHidden = true

    var body: some View {
        NavigationView {
            ZStack {
                Color("Theme3BackgroundColor")
                VStack(spacing: 25) {
                    Image(systemName: "globe").font(.largeTitle)

                    HeaderView("NavigationView",
                               subtitle: "Navigation Bar Hidden",
                               desc: "If you don't want to show a navigation bar, you can use
the navigationBarHidden modifier to hide it.",
                               back: Color("Theme3ForegroundColor"),
                               textColor: Color("Theme3BackgroundColor"))

                    Toggle("Hide Nav Bar", isOn: $isHidden)
                        .padding()

                    Spacer()
                }
                .font(.title)
                .padding(.top, 70)
            }
            // Hide when the Toggle is on
            .navigationBarHidden(isHidden)
            .ignoresSafeArea(edges: .bottom)
        }
    }
}
```

Notice the navigationBarHidden modifier is INSIDE the NavigationView.

Navigation Bar Items

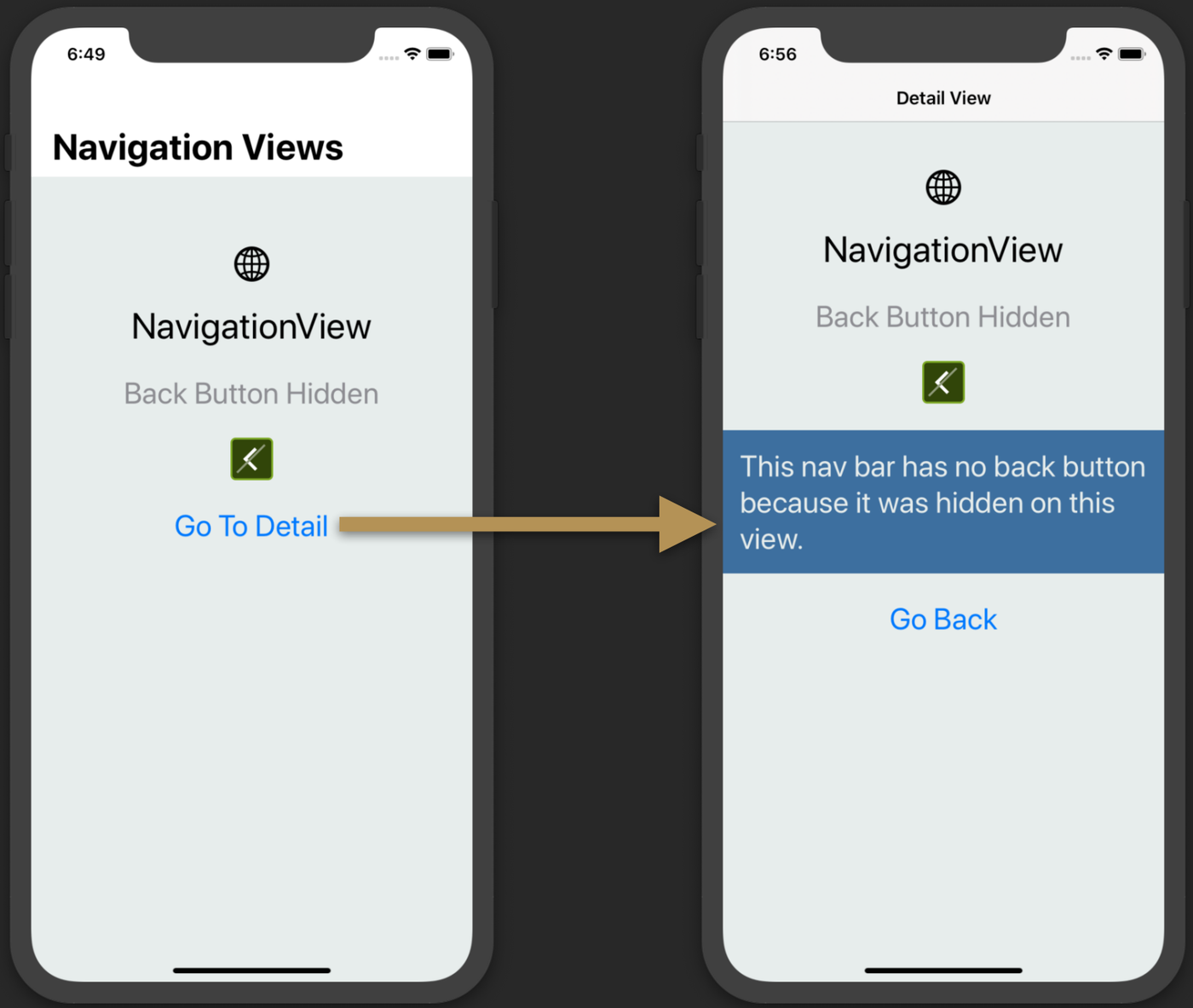



```
struct Navigation_NavBarItems : View {
    var body: some View {
        NavigationView {
            VStack(spacing: 25) {
                Image(systemName: "globe").font(.largeTitle)

                HeaderView("NavigationView",
                           subtitle: "Navigation Bar Items",
                           desc: "You can add navigation bar buttons to the leading or trailing
(or both) sides of a navigation bar.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))

                Spacer()
            }
            .font(.title)
            .padding(.top, 25)
            .navigationTitle("Navigation Bar Buttons")
            .navigationBarTitleDisplayMode(.inline)
            .toolbar {
                ToolbarItem(placement: .navigationBarLeading) {
                    Button(action: {}) {
                        Image(systemName: "bell.fill")
                            .padding(.horizontal)
                    }
                }
                ToolbarItem(placement: .navigationBarTrailing) {
                    Button("Actions", action: { })
                }
            }
            .tint(.pink)
        }
    }
}
```

For more ways on how to use the toolbar modifier, go to the "Controls Modifiers" chapter > "Toolbar" section.

Use tint to change the color of the buttons.

NavigationBarBackButtonHidden



You can hide the back button in the navigation bar for views by using a modifier. (Code on next page.)

This is good in scenarios where you supply another button to navigate the user back or you want to supply your own custom back button (see next example for custom back button).

(Code) NavigationBarBackButtonHidden

```
// First Screen
struct Navigation_BackButtonHidden: View {
    var body: some View {
        NavigationView {
            ZStack {
                Color("Theme3BackgroundColor")
                VStack(spacing: 25) {
                    Image(systemName: "globe").font(.largeTitle)
                    Text("NavigationView").font(.largeTitle)
                    Text("Back Button Hidden").foregroundColor(.gray)
                    Image("NavBarBackButtonHidden")

                    NavigationLink("Go To Detail", destination: BackButtonHiddenDetail())
                    Spacer()
                }
                .font(.title)
                .padding(.top, 70)
            }
            .navigationTitle("Navigation Views")
            .ignoresSafeArea(edges: .bottom)
        }
    }
}

// Second Screen
struct BackButtonHiddenDetail: View {
    @Environment(\.dismiss) var dismiss

    var body: some View {
```

Use NavigationLink to navigate to a new screen.
More about NavigationLink in the next section.

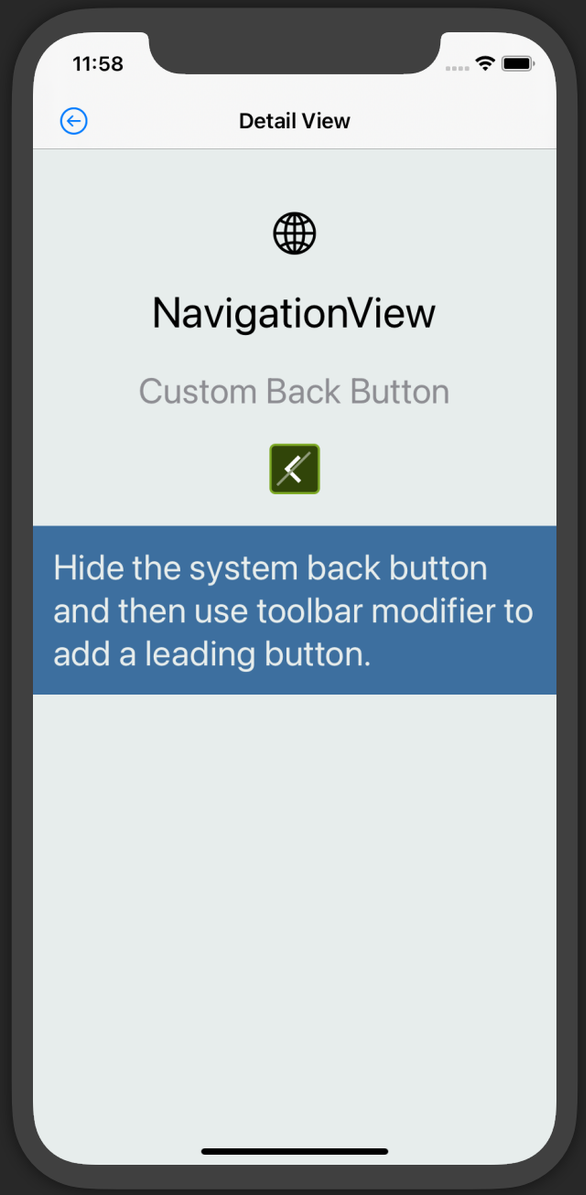
This will allow you to navigate backward.

```
        ZStack {
            Color("Theme3BackgroundColor")
            VStack(spacing: 25) {
                Image(systemName: "globe").font(.largeTitle)
                Text("NavigationView").font(.largeTitle)
                Text("Back Button Hidden").foregroundColor(.gray)
                Image("NavBarBackButtonHidden")
                Text("This nav bar has no back button because it was hidden on this view.")
                    .frame(maxWidth: .infinity)
                    .padding()
                    .background(Color("Theme3ForegroundColor"))
                    .foregroundColor(Color("Theme3BackgroundColor"))

                Button("Go Back") {
                    dismiss()
                }

                Spacer()
            }
            .font(.title)
            .padding(.top, 50)
        }
        .navigationTitle("Detail View")
        .navigationBarTitleDisplayMode(.inline)
        .ignoresSafeArea(edges: .bottom)
        // Hide the back button
        .navigationBarBackButtonHidden(true)
    }
}
```

Dismissing what is being presented will navigate you back to the previous view.

Hide the back button.

Custom Back Button




```
struct Navigation_CustomBackButton_Detail: View {
    @Environment(\.presentationMode) var presentationMode

    var body: some View {
        ZStack {
            Color("Theme3BackgroundColor")
            VStack(spacing: 25) {
                Image(systemName: "globe").font(.largeTitle)
                HeaderView("NavigationView",
                           subtitle: "Custom Back Button",
                           desc: "Hide the system back button and then use toolbar modifier to
add a leading button.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                Image("NavBarBackButtonHidden")
                Spacer()
            }
            .font(.title)
            .padding(.top, 50)
        }
        .navigationTitle("Detail View")
        .navigationBarTitleDisplayMode(.inline)
        .ignoresSafeArea(edges: .bottom)
        // Hide the system back button
        .navigationBarBackButtonHidden(true)
        .toolbar {
            ToolbarItem(placement: .navigation) {
                Button(action: {
                    presentationMode.wrappedValue.dismiss()
                }) {
                    Image(systemName: "arrow.left.circle")
                }
            }
        }
    }
}
```

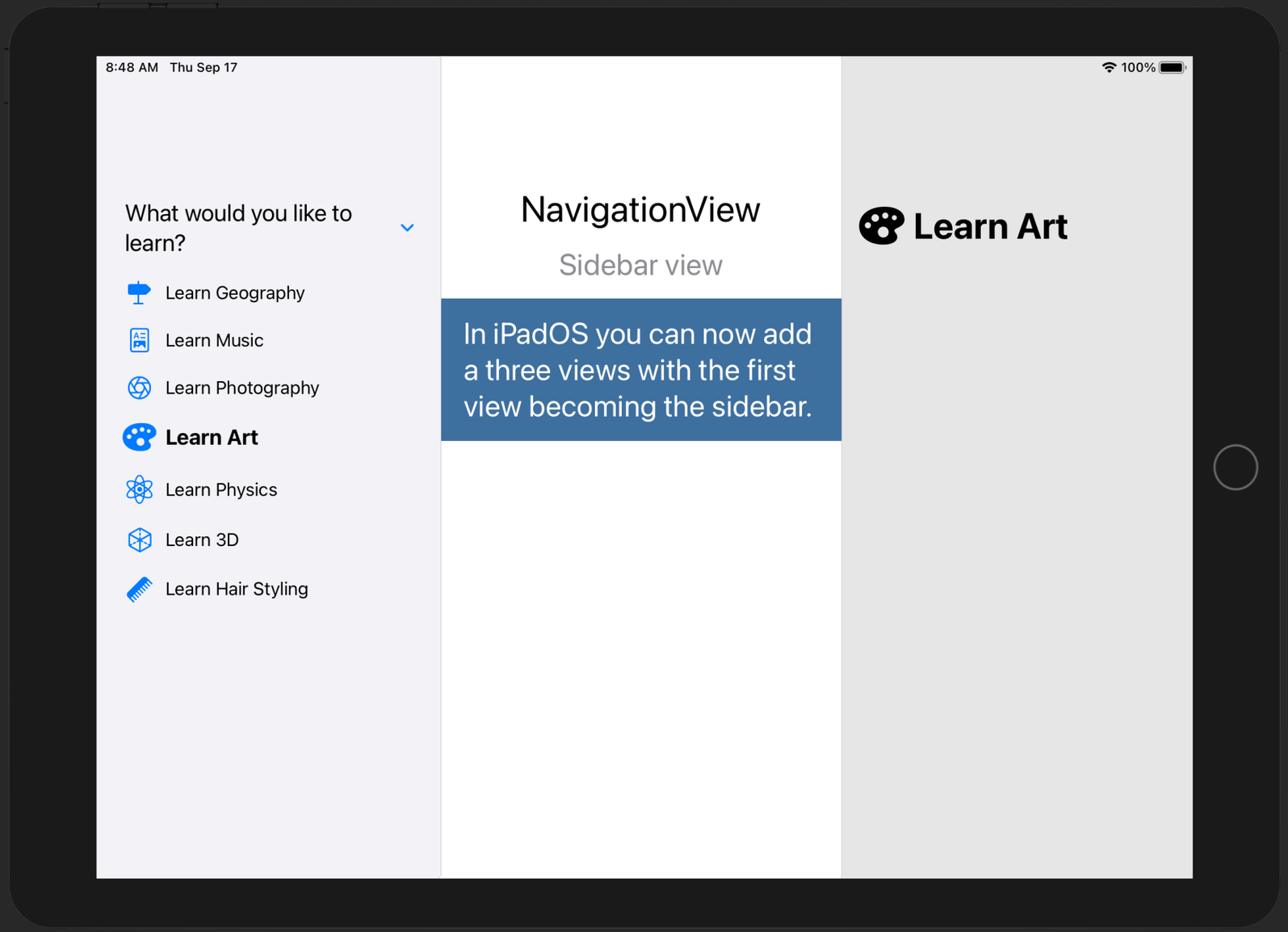
Hide the back button.

Custom back button. (Doesn't allow for both image and text.)

Note: By hiding the back button, you will lose the ability to swipe back to the previous screen.

Sidebar in iPad

iOS 14



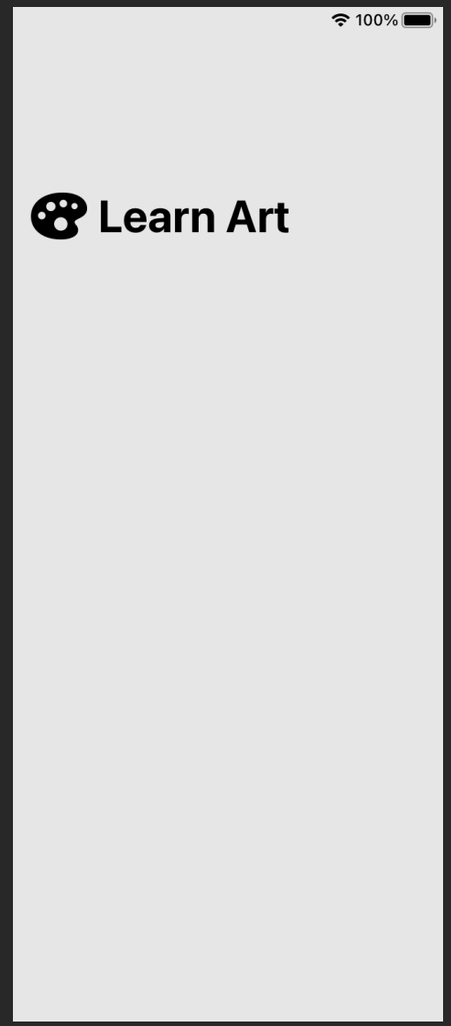
(Code) Sidebar in iPad

iOS 14

```
struct Navigation_MultipleViewsWithin: View {
    var body: some View {
        NavigationView {
            // Sidebar
            List {
                Section {
                    Label("Learn Geography", systemImage: "signpost.right.fill")
                    Label("Learn Music", systemImage: "doc.richtext")
                    Label("Learn Photography", systemImage: "camera.aperture")
                    Label("Learn Art", systemImage: "paintpalette.fill")
                        .font(Font.system(.title3).weight(.bold))
                    Label("Learn Physics", systemImage: "atom")
                    Label("Learn 3D", systemImage: "cube.transparent")
                    Label("Learn Hair Styling", systemImage: "comb.fill")
                } header: {
                    Text("What would you like to learn?")
                        .font(.title2)
                } footer: {
                    Text("Count: 7")
                }
            }
            .listStyle(.sidebar)

            // Main View
            VStack(spacing: 20) {
                HeaderView("NavigationView",
                           subtitle: "Sidebar view",
                           desc: "In iPadOS you can now add a three views with the first view becoming the sidebar.")
```

iOS 14

```
                Spacer()
            }
            .font(.title)

            // Detail View
            VStack {
                HStack {
                    Label("Learn Art", systemImage: "paintpalette.fill")
                        .font(Font.system(.largeTitle).weight(.bold))
                    Spacer()
                }
                .padding()

                Spacer()
            }
        }
        .navigationTitle("Side Bar")
    }
}
```

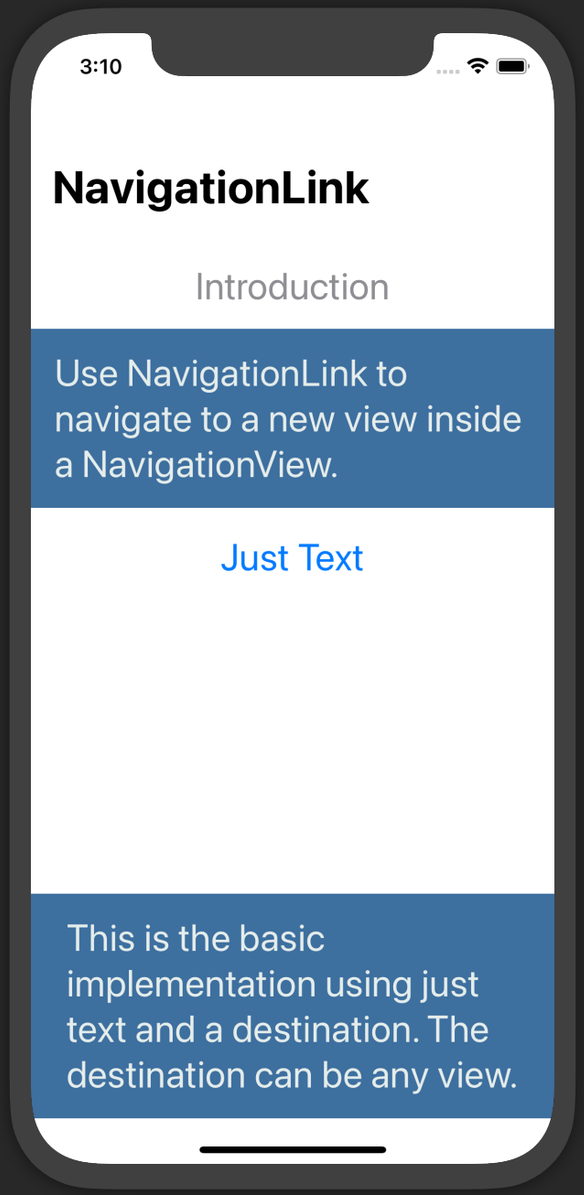


NavigationLink

The NavigationLink is your way to navigate to another view. It ONLY works inside of a NavigationView. The appearance is just like a Button. You can customize it just like you can customize a Button too.

This is a pull-In view.

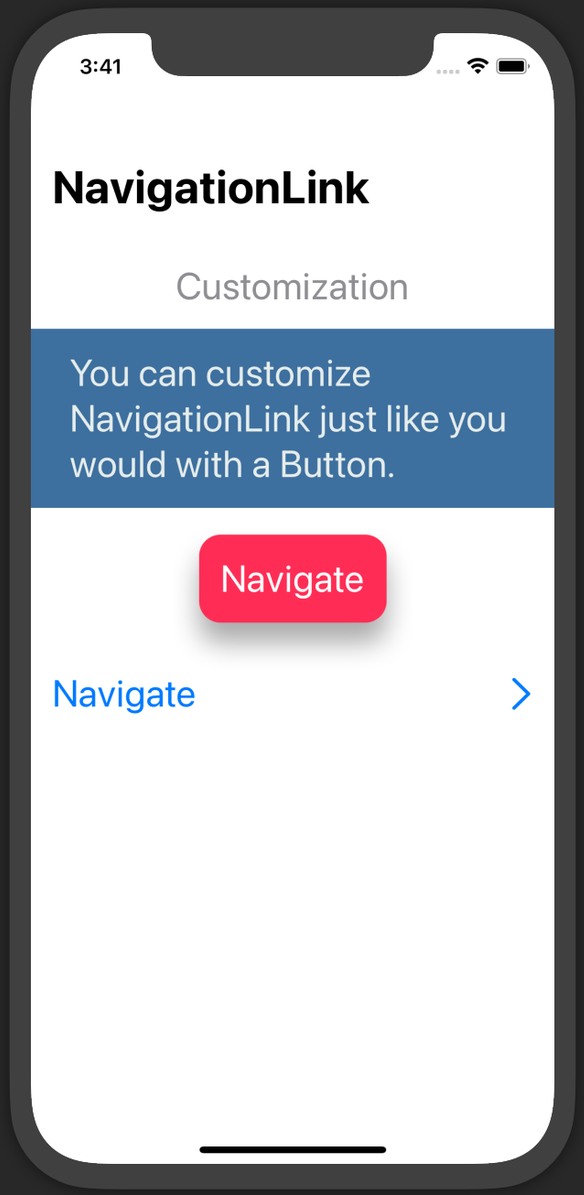
Introduction




```
struct NavLink_Intro: View {
    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "Introduction",
                           desc: "Use NavigationLink to navigate to a new view inside a
NavigationView.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                NavigationLink("Just Text", destination: SecondView())
                Spacer()
                DescView(desc: "This is the basic implementation using just text and a
destination. The destination can be any view.",
                         back: Color("Theme3ForegroundColor"),
                         textColor: Color("Theme3BackgroundColor"))
            }
            .navigationTitle("NavigationLink")
        }
        .font(.title)
    }
}

struct SecondView: View {
    var body: some View {
        VStack {
            Text("View 2")
                .font(.largeTitle)
            Spacer()
        }
    }
}
```

Define text and a view for the destination.

Customization

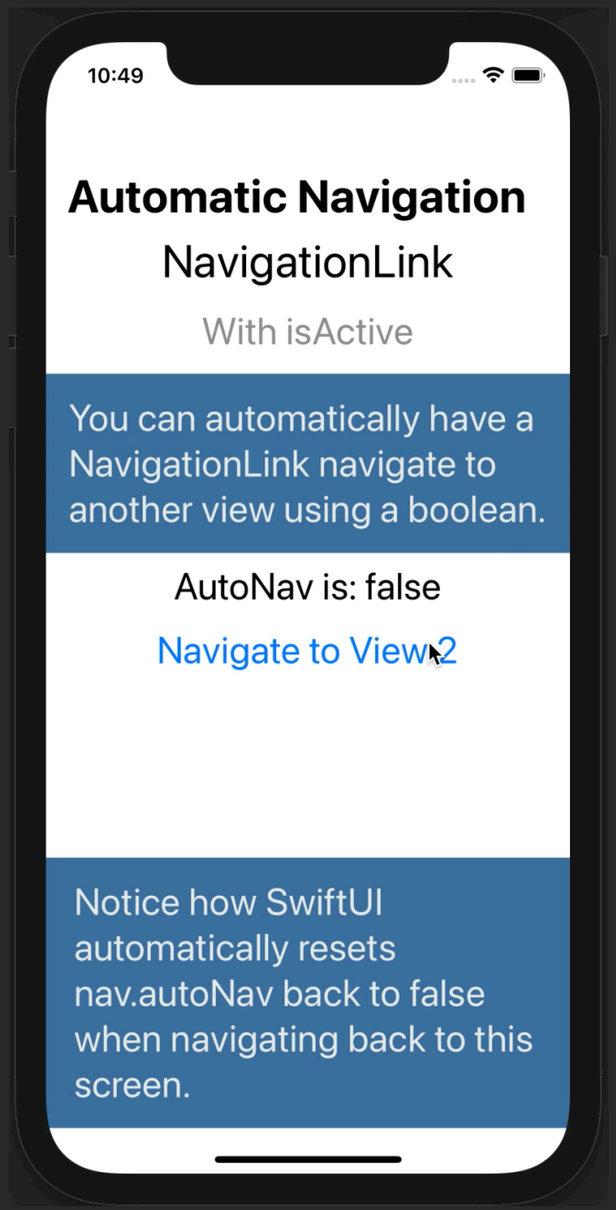



```
struct NavLink_Customization: View {
    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "Customization",
                           desc: "You can customize NavigationLink just like you would with a
Button.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))

                NavigationLink(destination: SecondView()) {
                    Text("Navigate")
                        .foregroundColor(.white)
                        .padding()
                        .background(RoundedRectangle(cornerRadius: 16)
                                        .shadow(radius: 10, y: 15))
                }
                .accentColor(.pink)

                NavigationLink(destination: SecondView()) {
                    HStack {
                        Text("Navigate")
                        Spacer()
                        Image(systemName: "chevron.right")
                    }
                    .padding()
                }
                Spacer()
            }
            .navigationTitle("NavigationLink")
        }
        .font(.title)
    }
}
```

The trailing closure is the label parameter. This allows you to compose any view that will navigate you.

Tip: Try to keep your views and modifiers within the closure. Like the Button, anything inside will fade when tapped.

With isActive

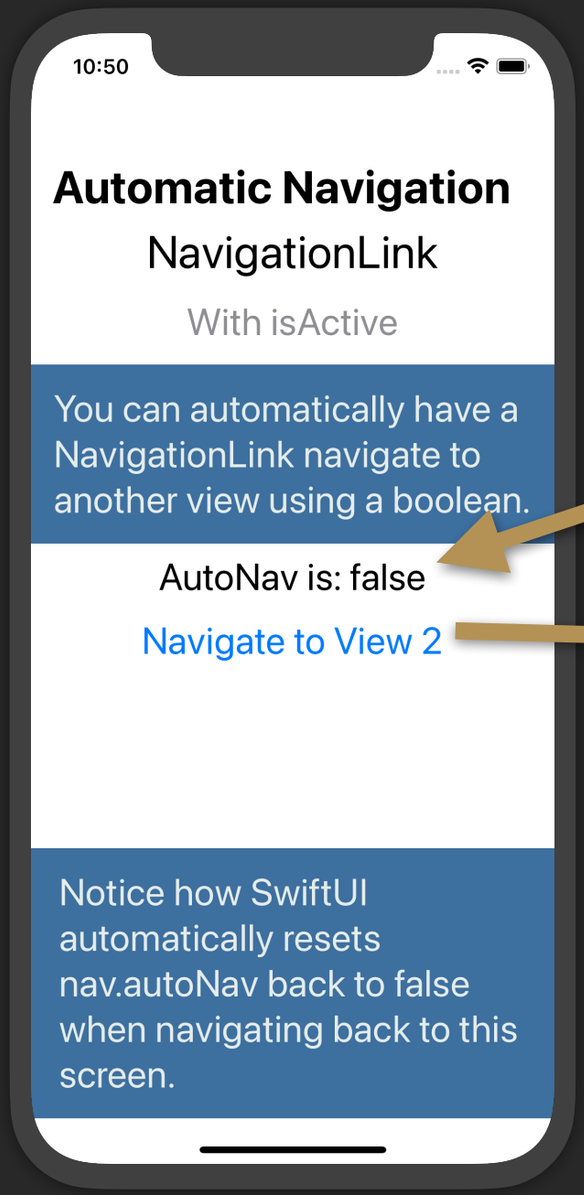



```
struct NavLink_WithIsActive: View {
    @State var nav = false

    var body: some View {
        NavigationView {
            VStack {
                HeaderView("NavigationLink",
                           subtitle: "With isActive",
                           desc: "You can automatically have a NavigationLink navigate to
another view using a boolean.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                Text("AutoNav is: \(nav.description)")

                NavigationLink(destination: NavLink_View2(nav: $nav), isActive: $nav,
                               label: { EmptyView() })

                Button("Navigate to View 2") {
                    nav = true
                }
                Spacer()
                DescView(desc: "Notice how SwiftUI automatically resets nav.autoNav back to
false when navigating back to this screen.",
                         back: Color("Theme3ForegroundColor"),
                         textColor: Color("Theme3BackgroundColor"))
            }
            .font(.title)
            .navigationTitle("Automatic Navigation")
        }
    }
}
```

The NavigationLink here has no visual representation so you won't see it in the UI.

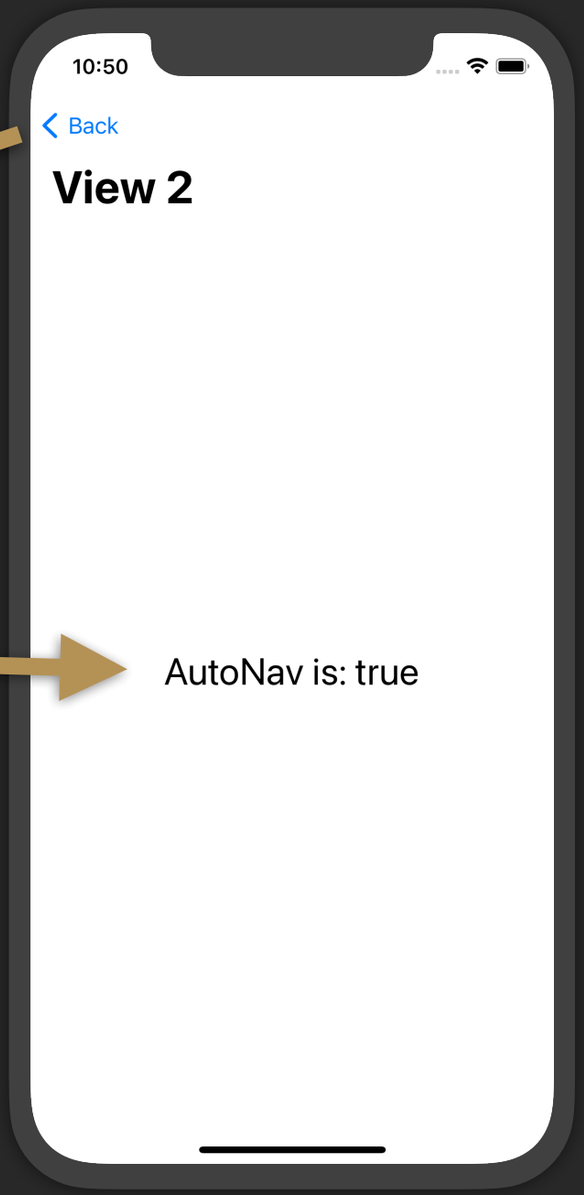
It's important to note that SwiftUI changes what you have bound to `isActive` back to `false` when you navigate back.
See next page for more.

SwiftUI Resets isActive

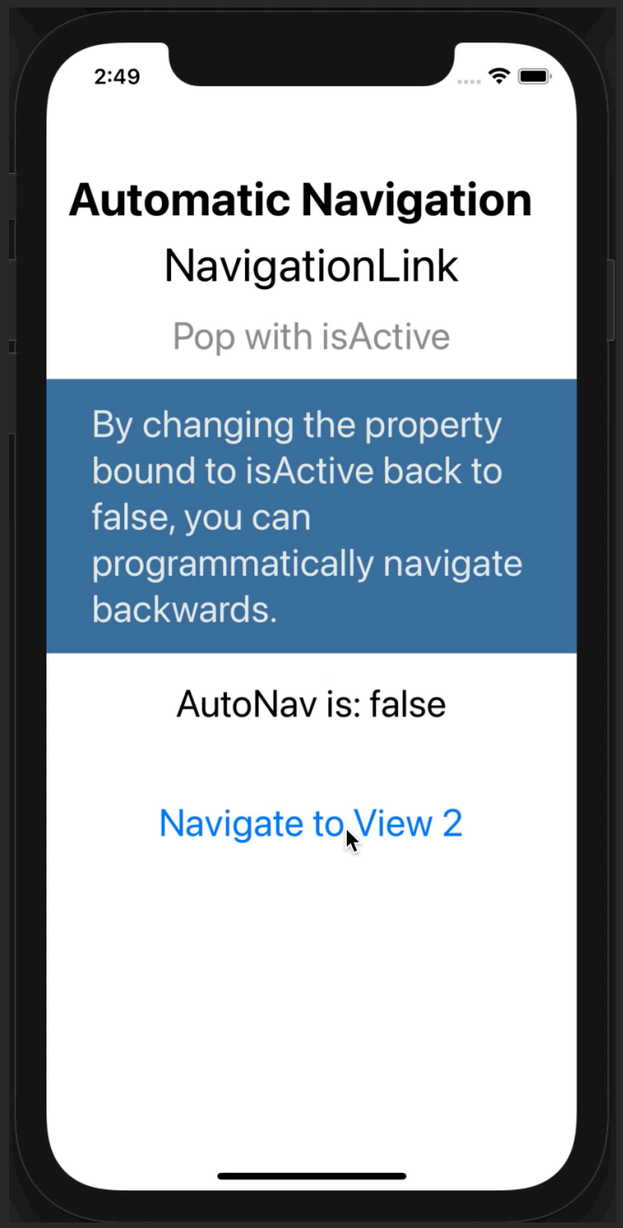


When the Back button is tapped, SwiftUI changes what you have bound to `isActive` to `false` for you. You don't have to do anything.

When this button is tapped the property that is bound to `isActive` is set to `true` and navigation takes place.
That bound property remains true until the Back button is tapped.



Using isActive to Pop Views




```
struct NavLink_WithIsActivePop: View {
    @State var nav = false

    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("NavigationLink",
                           subtitle: "Pop with isActive",
                           desc: "By changing the property bound to isActive back to false, you
can programmatically navigate backwards.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                Text("AutoNav is: \(nav.description)")

                NavigationLink(destination: NavLink_View2(nav: $nav), isActive: $nav,
                               label: { EmptyView() })

                Button("Navigate to View 2") {
                    nav = true
                }
                Spacer()
            }
            .font(.title)
            .navigationTitle("Automatic Navigation")
        }
    }
}
```

"Popping" a view just means removing it from the top so you navigate back to the previous view. You can also "pop" directly to the root view.

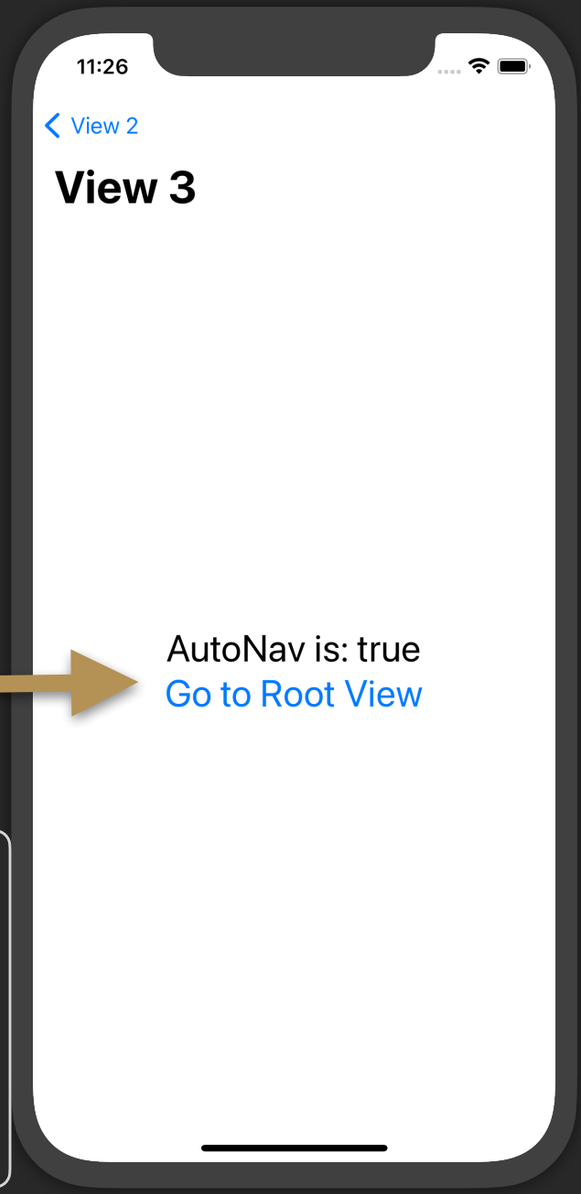
Using isActive to Pop Views

```
struct NavLink_SecondView: View {
    @Binding var nav: Bool

    var body: some View {
        VStack {
            Text("AutoNav is: \(nav.description)")
            NavigationLink("Navigate to View 3", destination: NavLink_ThirdView(nav: $nav))
        }
        .font(.title)
        .navigationTitle("View 2")
    }
}

struct NavLink_ThirdView: View {
    @Binding var nav: Bool

    var body: some View {
        VStack {
            Text("AutoNav is: \(nav.description)")
            Button("Go to Root View") {
                nav.toggle()
            }
        }
        .font(.title)
```

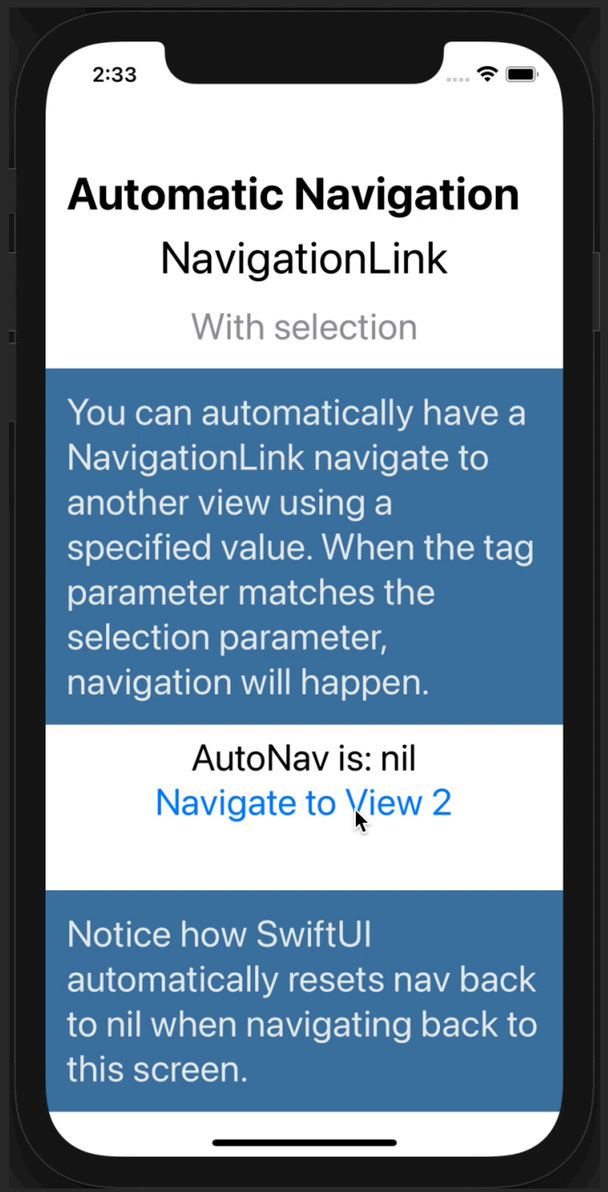
Notice the second NavigationLink doesn't need to use the isActive parameter. But you do need to pass the original property bound to `isActive`.

By setting the same bound variable that was connected to `isActive` back to `false`, you can pop back to the root.

Note: In these examples I'm using `@State` and `@Binding`. You would more likely be using this with a view model.
To learn more, see the end of this book for information on how you can get the book "Working with Data in SwiftUI".



With selection

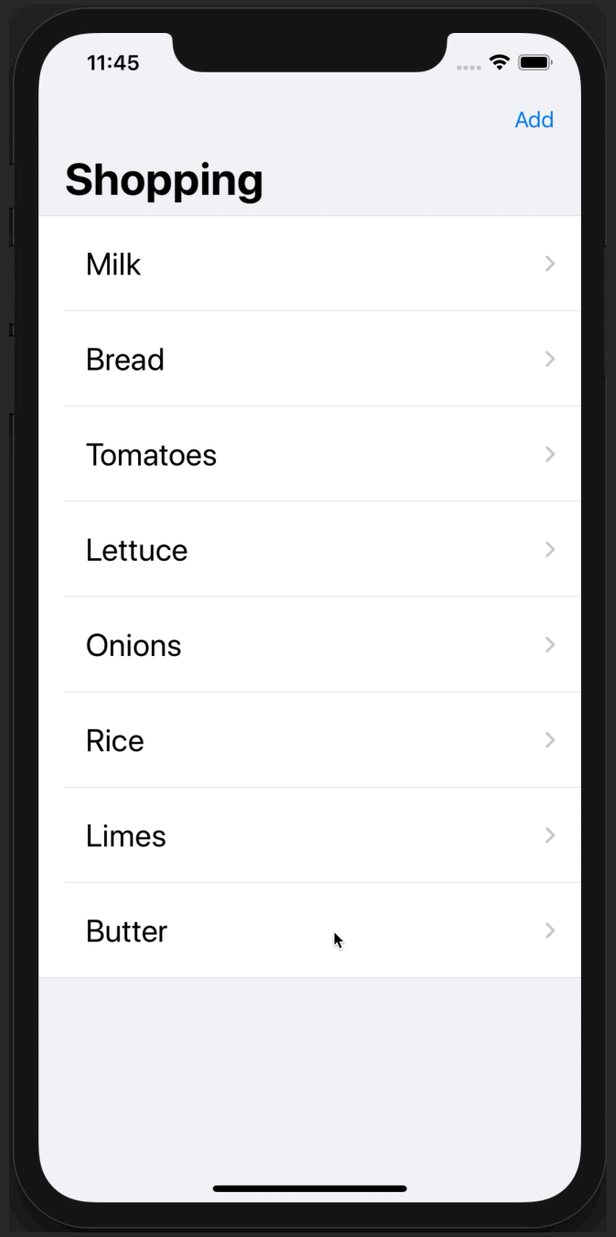



```
struct NavLink_WithSelection: View {
    @State var nav: String?

    var body: some View {
        NavigationView {
            VStack {
                HeaderView("NavigationLink",
                           subtitle: "With selection",
                           desc: "You can automatically have a NavigationLink navigate to
another view using a specified value. When the tag parameter matches the selection parameter,
navigation will happen.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))

                Text("AutoNav is: \(nav ?? "nil")")

                NavigationLink(destination: NavigationWithSelection(nav: $nav),
                               tag: "To View 2", selection: $nav, label: {})

                Button("Navigate to View 2") {
                    nav = "To View 2"
                }
                Spacer()
                DescView(desc: "Notice how SwiftUI automatically resets nav back to nil when
navigating back to this screen.",
                         back: Color("Theme3ForegroundColor"),
                         textColor: Color("Theme3BackgroundColor"))
            }
            .font(.title)
            .navigationTitle("Automatic Navigation")
        }
    }
}
```

Basically, when the selection parameter value matches the value of the tag parameter, navigation happens.

It's important to note that SwiftUI changes what you have bound to `selection` back to `nil` when you navigate back.

List In NavigationView with NavigationLink

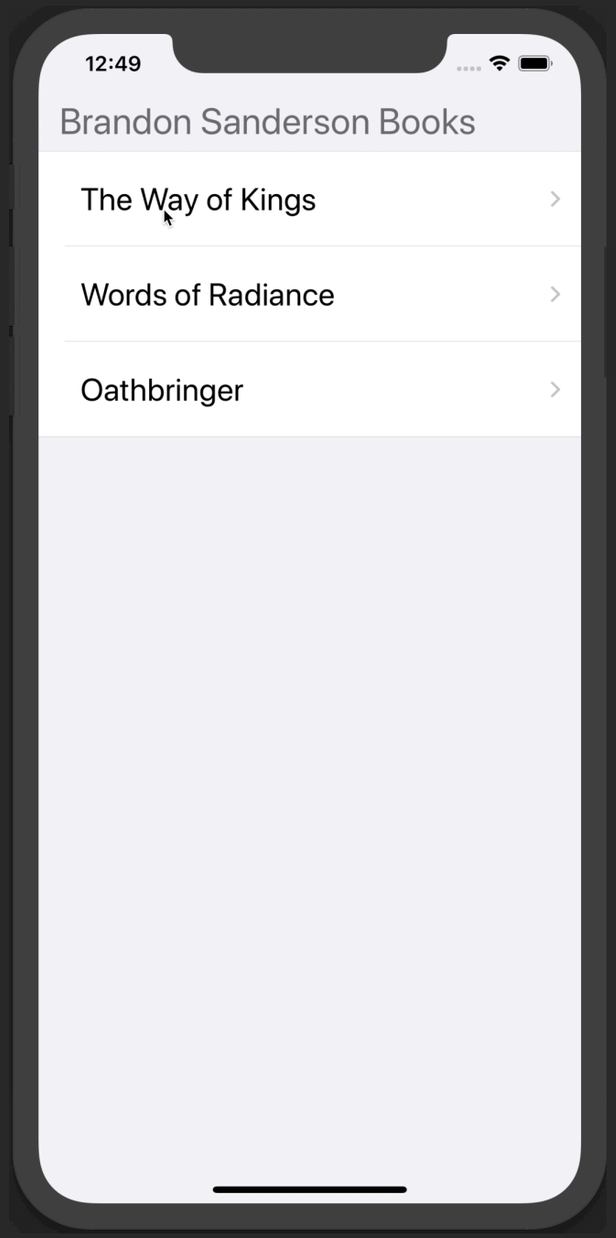



```
struct Navigation_WithList: View {
    @State var data = ["Milk", "Bread", "Tomatoes", "Lettuce", "Onions", "Rice", "Limes"]

    var body: some View {
        NavigationView {
            List(data, id: \.self) { datum in
                NavigationLink(destination: ShoppingDetail(shoppingItem: datum)) {
                    Text(datum).font(Font.system(size: 24)).padding()
                }
            }
            .listStyle(.grouped)
            .navigationTitle("Shopping")
            .toolbar {
                ToolbarItem {
                    Button("Add", action: { data.append("New Shopping Item") })
                }
            }
        }
    }
}

struct ShoppingDetail: View {
    var shoppingItem: String!
    var body: some View {
        VStack {
            Text("Shopping List Details").font(.title)
                .frame(maxWidth: .infinity).padding()
                .background(Color("Theme3ForegroundColor"))
                .foregroundColor(Color("Theme3BackgroundColor"))
            Spacer()
            Text(shoppingItem).font(.title)
            Spacer()
        }.navigationTitle(shoppingItem)
    }
}
```

Navigate to detail view

Learn more about the toolbar and ToolbarItem in the “Controls Modifiers” chapter.

List Navigation with No NavigationView

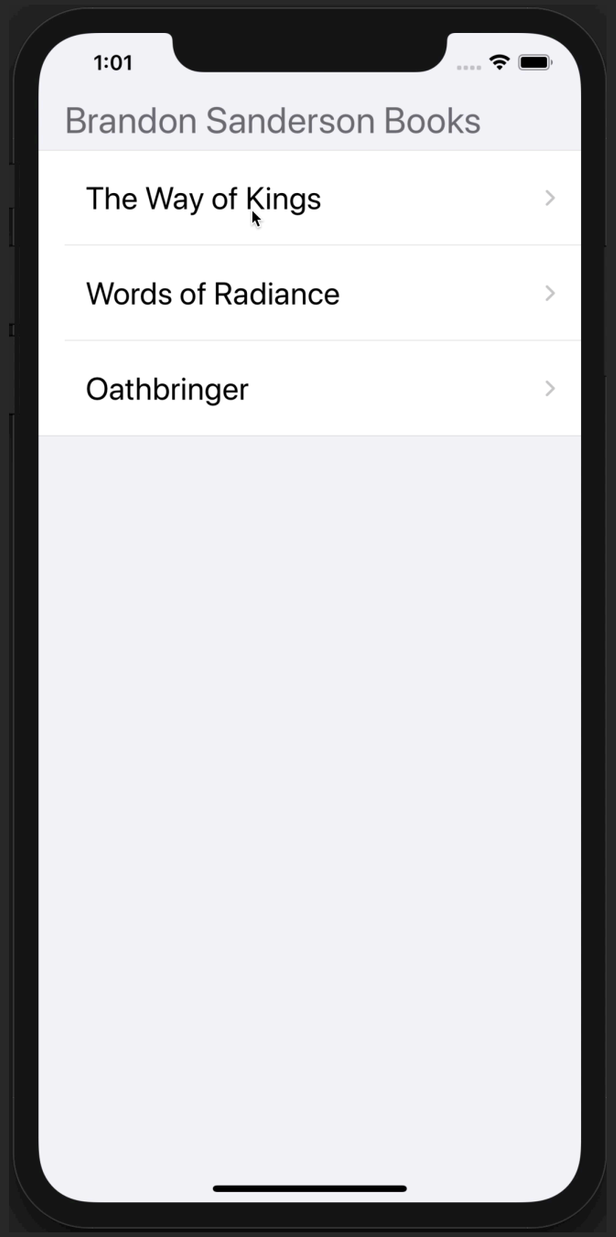



```
struct Navigation_WithListNoNavBar: View {
    @State var books = ["The Way of Kings", "Words of Radiance", "Oathbringer"]

    var body: some View {
        NavigationView {
            List {
                Section(header: Text("Brandon Sanderson Books").font(.title)) {
                    ForEach(books, id: \.self) { book in
                        NavigationLink(destination: BookDetail(bookItem: book)) {
                            Text(book).font(Font.system(size: 24)).padding()
                        }
                    }
                }
            }
            .listStyle(.grouped)
            .navigationTitle("Book List") // Your back button text
            .navigationBarHidden(true)
        }
    }
}

struct BookDetail: View {
    var bookItem: String!

    var body: some View {
        VStack {
            Text("Book Details").font(.title)
                .frame(maxWidth: .infinity).padding()
                .background(Color("Theme3ForegroundColor"))
                .foregroundColor(Color("Theme3BackgroundColor"))
            Spacer()
            Text(bookItem).font(.title)
            Spacer()
        }.navigationTitle(bookItem)
    }
}
```

The NavigationLink is the whole row. It automatically adds the gray chevron icon.

Now this just looks like a regular list view but has navigation on the rows.

List Navigation with No NavigationView & No Back Button

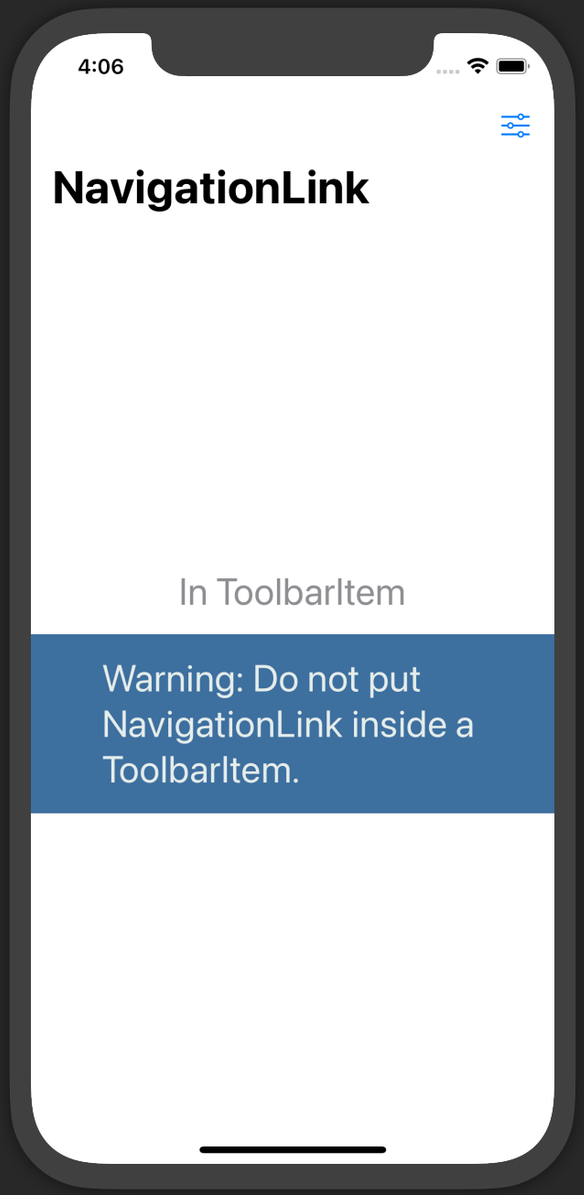


The first view will be exactly the same as the previous page. The detail view will be different though:

```
struct BookDetail_NoBack: View {
    @Environment(\.presentationMode) var presentationMode
    var bookItem: String!

    var body: some View {
        VStack {
            Text("Book Details").font(.title)
                .frame(maxWidth: .infinity).padding()
                .background(Color("Theme3ForegroundColor"))
                .foregroundColor(Color("Theme3BackgroundColor"))
            Spacer()
            Text(bookItem).font(.title)
            Spacer()
            Button(action: {
                presentationMode.wrappedValue.dismiss()
            }) {
                HStack {
                    Image(systemName: "arrow.left.circle")
                    Text("Go Back")
                }
            }
            Spacer()
        }
        .navigationTitle(bookItem)
        .navigationBarHidden(true)
    }
}
```

This will allow you to navigate backward.

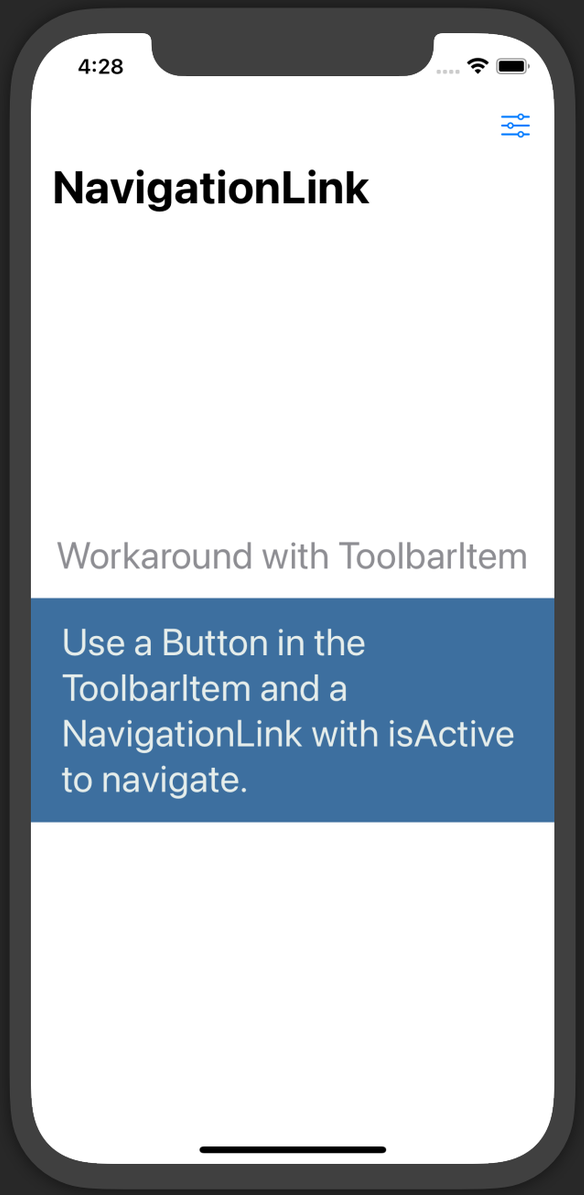
Warning: NavigationLink in ToolbarItem




```
struct NavLink_InToolbarItem: View {
    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "In ToolbarItem",
                           desc: "Warning: Do not put NavigationLink inside a ToolbarItem.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
            }
            .toolbar {
                ToolbarItem {
                    // Do not do this
                    NavigationLink(destination: Text("Settings"),
                        label: {
                            Image(systemName: "slider.horizontal.3")
                        })
                }
            }
            .navigationTitle("NavigationLink")
            .font(.title)
        }
    }
}
```

Without getting too technical, the NavigationLink isn't the type of view that SwiftUI knows when and when not to recreate. So it is recreated all the time. Xcode will not warn you against this. And, whether intentional or a bug, **it can navigate multiple times or not at all depending on the iOS version**.
It might look like it works in Preview, but be sure to test on Simulator and on a device.
Workaround: There is another way around this though which you will see on the next page.

Workaround: NavigationLink in ToolbarItem




```
struct NavLink_InToolbarWorkaround: View {
    @State private var navigate = false

    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "Workaround with ToolbarItem",
                           desc: "Use a Button in the ToolbarItem and a NavigationLink with
                                  isActive to navigate.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                NavigationLink(destination: Text("Settings"),
                               isActive: $navigate,
                               label: {})
            }
            .toolbar {
                ToolbarItem {
                    Button(action: { navigate = true }) {
                        Image(systemName: "slider.horizontal.3")
                    }
                }
            }
            .navigationTitle("NavigationLink")
            .font(.title)
        }
    }
}
```

You can use a NavigationLink with no visual element to do the navigation for you.

Using a Button in a ToolbarItem is the preferred way to do this.

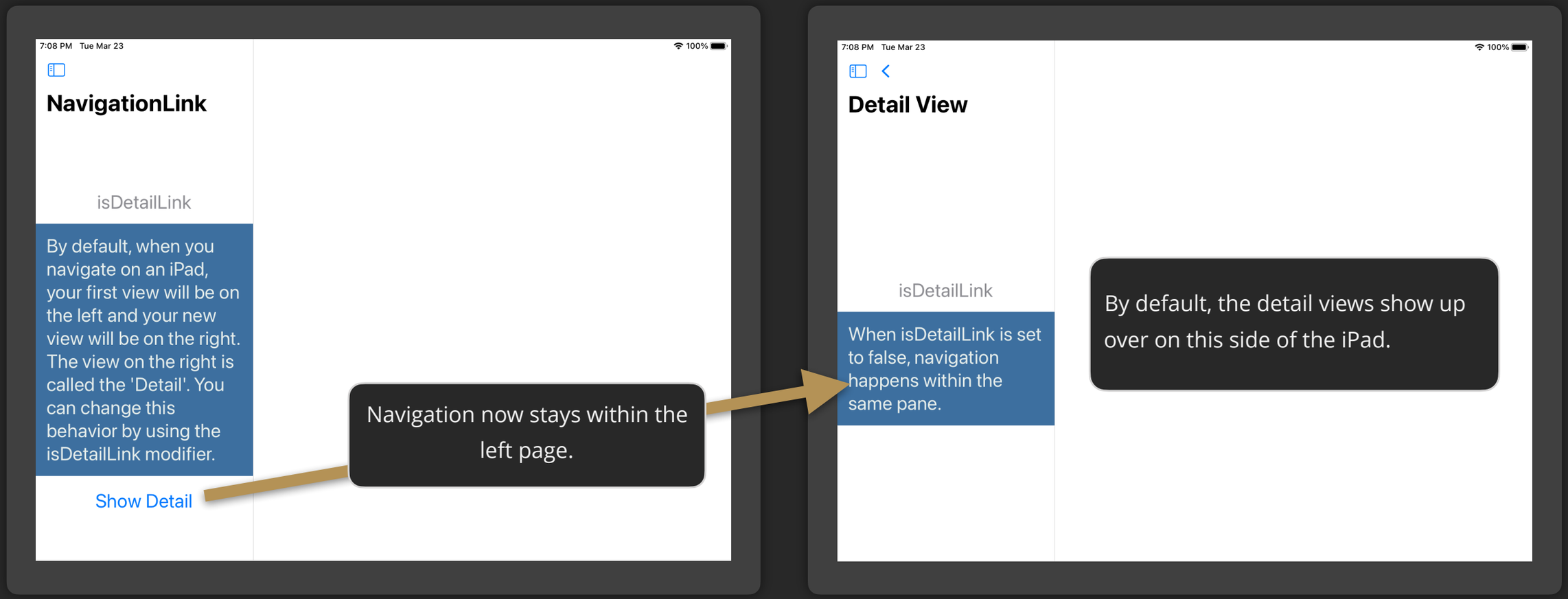
Using isDetailLink with iPads

```
struct NavLink_IsDetailLink: View {
    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "isDetailLink",
                           desc: "By default, when you navigate on an iPad, your first view will
be on the left and your new view will be on the right. The view on the right is called the
'Detail'. You can change this behavior by using the isDetailLink modifier.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))
                NavigationLink(
                    destination: DetailLinkView(),
                    label: {
                        Text("Show Detail Inside")
                    })
                    .isDetailLink(false)
            }
            .navigationTitle("NavigationLink")
            .font(.title)
        }
    }
}
struct DetailLinkView: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("",
                       subtitle: "isDetailLink",
                       desc: "When isDetailLink is set to false, navigation happens within the
same pane.",
                       back: Color("Theme3ForegroundColor"),
                       textColor: Color("Theme3BackgroundColor"))
        }
        .navigationTitle("Detail View")
        .font(.title)
    }
}
```

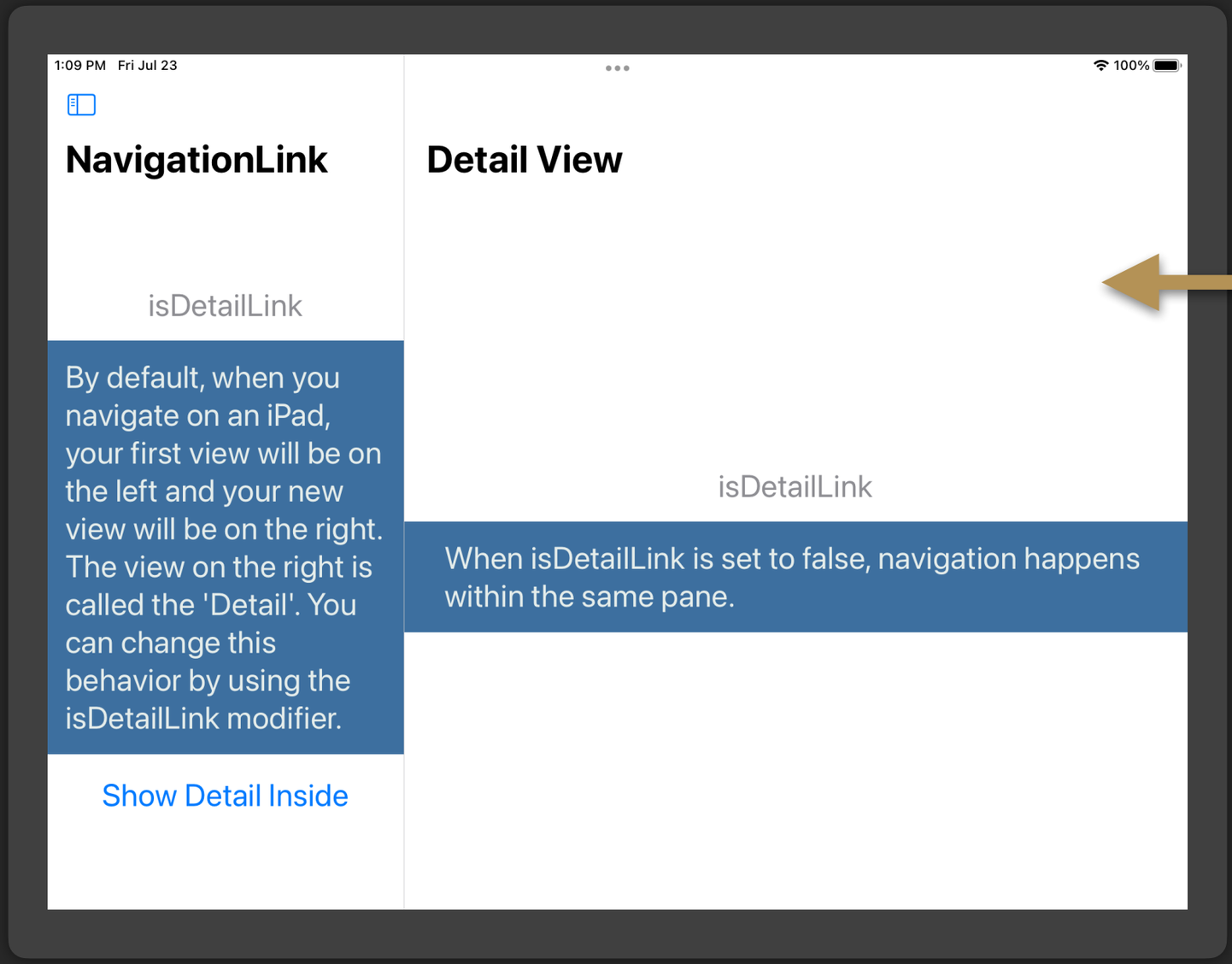
Let SwiftUI know you don't want to open the view on the right pane when on iPad.

See result on next page...

When isDetailLink is false



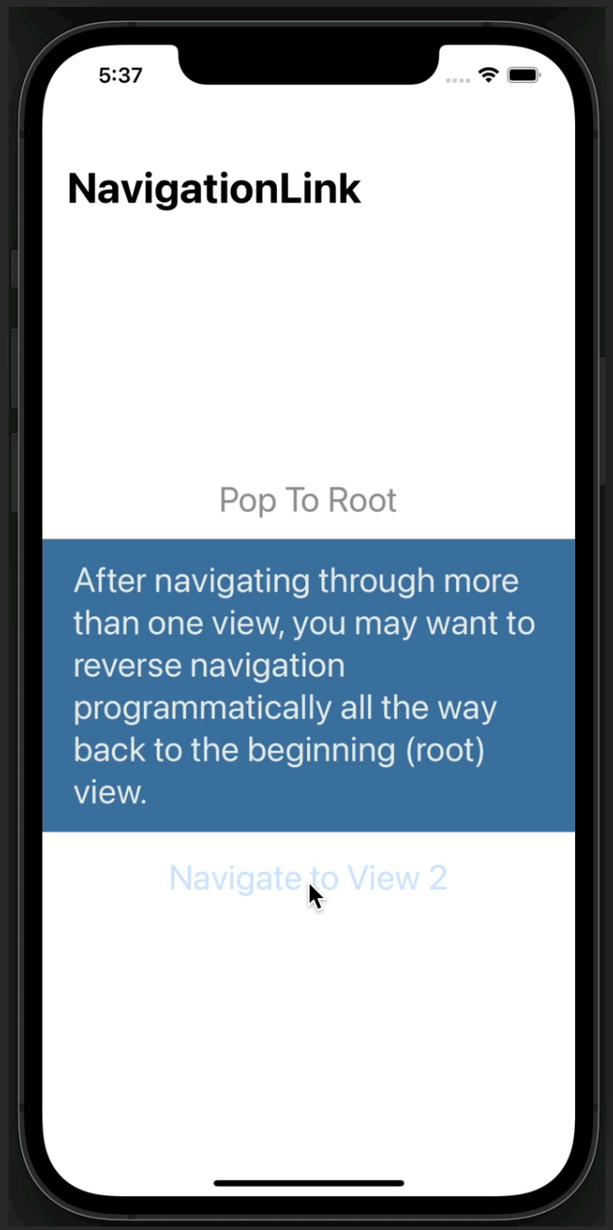
When isDetailLink is true



When isDetailLink is set to true, the new view appears here.

With iOS, it does not matter. The source view is replaced with the destination view.

Pop to Root




```
struct NavLink_PopToRoot: View {
    @State private var isActive = false

    var body: some View {
        NavigationView {
            VStack(spacing: 20) {
                HeaderView("",
                           subtitle: "Pop To Root",
                           desc: "After navigating through more than one view, you may want to
                                  reverse navigation programmatically all the way back to the
                                  beginning (root) view.",
                           back: Color("Theme3ForegroundColor"),
                           textColor: Color("Theme3BackgroundColor"))

                NavigationLink(
                    destination: NavLinkView2(isActive: $isActive),
                    isActive: $isActive,
                    label: {
                        Text("Navigate to View 2")
                    })
            }
            .navigationTitle("NavigationLink")
            .font(.title)
        }
    }
}
```

The key is to use this isActive parameter and then pass that value to the views that should pop back to the root.

Pop to Root (The other views)

```
struct NavLinkView2: View {
    @Binding var isActive: Bool

    var body: some View {
        VStack {
            NavigationLink("Navigate to View 3", destination: NavLinkView3(isActive: $isActive))
        }
        .navigationTitle("View 2")
        .font(.title)
    }
}

struct NavLinkView3: View {
    @Binding var isActive: Bool

    var body: some View {
        VStack {
            Button(action: {
                isActive.toggle()
            }, label: {
                Text("Go Back to Root View")
            })
        }
        .navigationTitle("View 3")
        .font(.title)
    }
}
```

Pass in the value for isActive but only use it to pop back to root. Don't use it to open another NavigationLink.

This is where the magic happens. Set the original isActive binding to false and it will pop all the way back to the root.

iOS 14

OutlineGroup

This SwiftUI content is locked in this preview.

OutlineGroups gives you a [illegible]ay to present hierarchical data. It is very similar to using a List with the children parameter. Except this cont[illegible]iew does not scroll. It's probably best for limited data.

This is a pull-in view.

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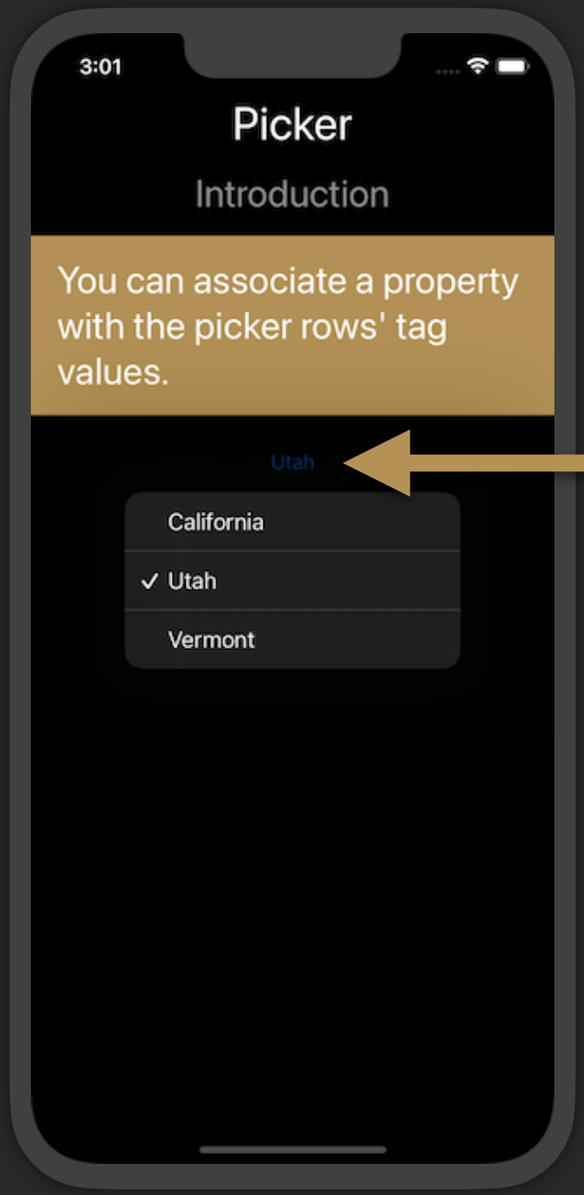
Picker

To get or set a value for the Picker, you need to bind it to a variable. This variable is then passed into the Picker's initializer. Then, all you need to do is change this bound variable's value to select the row you want to show in the Picker. Or read the bound variable's value to see which row is currently selected. One thing to note is that this variable is actually bound to the Picker row's **tag property** which you will see in the following pages.

Introduction



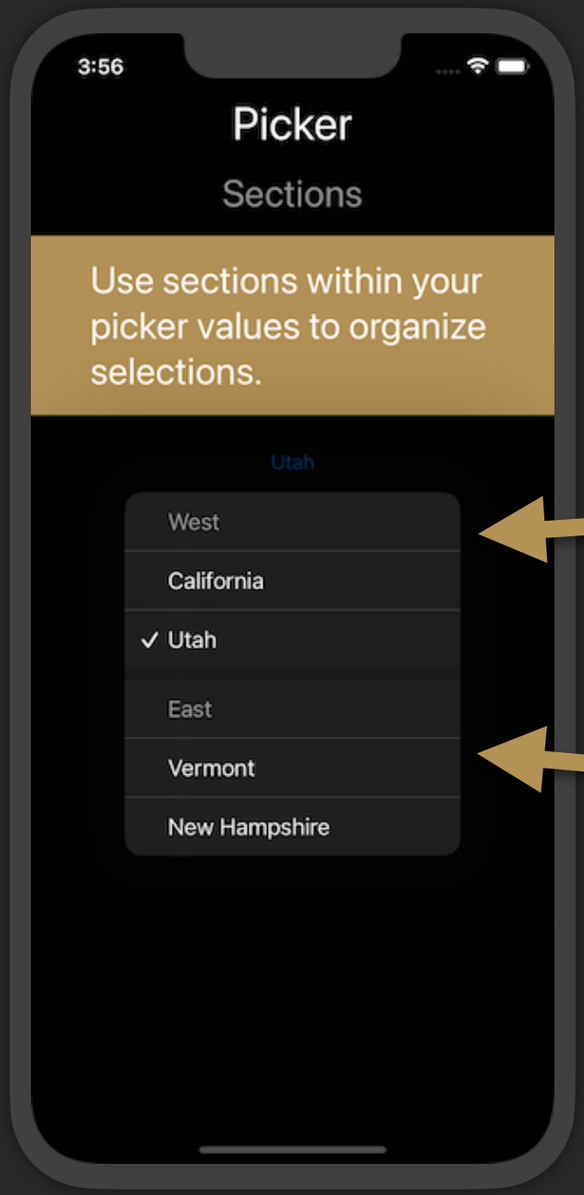

```
struct Picker_Intro : View {
    @State private var favoriteState = 1

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Introduction",
                       desc: "You can associate a property with the picker rows' tag values.")

            Picker("States", selection: $favoriteState) {
                Text("California").tag(0)
                Text("Utah").tag(1)
                Text("Vermont").tag(2)
            }

            Spacer()
        }
        .font(.title)
    }
}
```

Starting in iOS 15, the default picker style will look like the menu style. (Before, the default was the wheel style.)

iOS 15

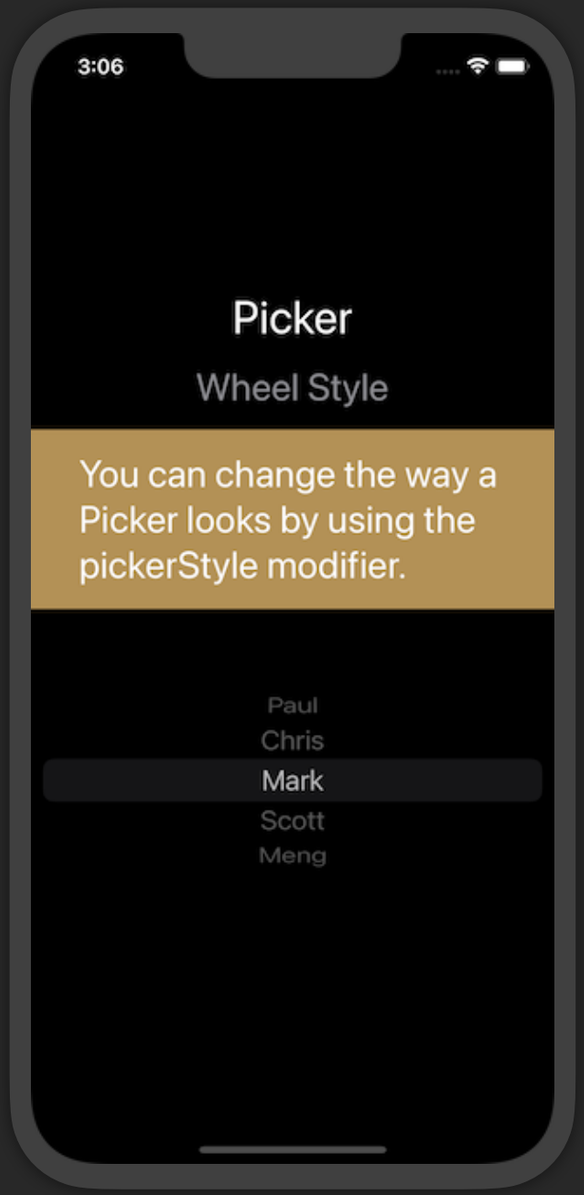
This picker is actually binding the tag values to the `favoriteState` property.

Sections




```
struct Picker_Sections: View {
    @State private var favoriteState = 1

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Sections",
                       desc: "Use sections within your picker values to organize selections.")

            Picker("States", selection: $favoriteState) {
                Section {
                    Text("California").tag(0)
                    Text("Utah").tag(1)
                } header: {
                    Text("West")
                }

                Section {
                    Text("Vermont").tag(2)
                    Text("New Hampshire").tag(3)
                } header: {
                    Text("East")
                }
            }

            Spacer()
        }
        .font(.title)
    }
}
```

Wheel Style

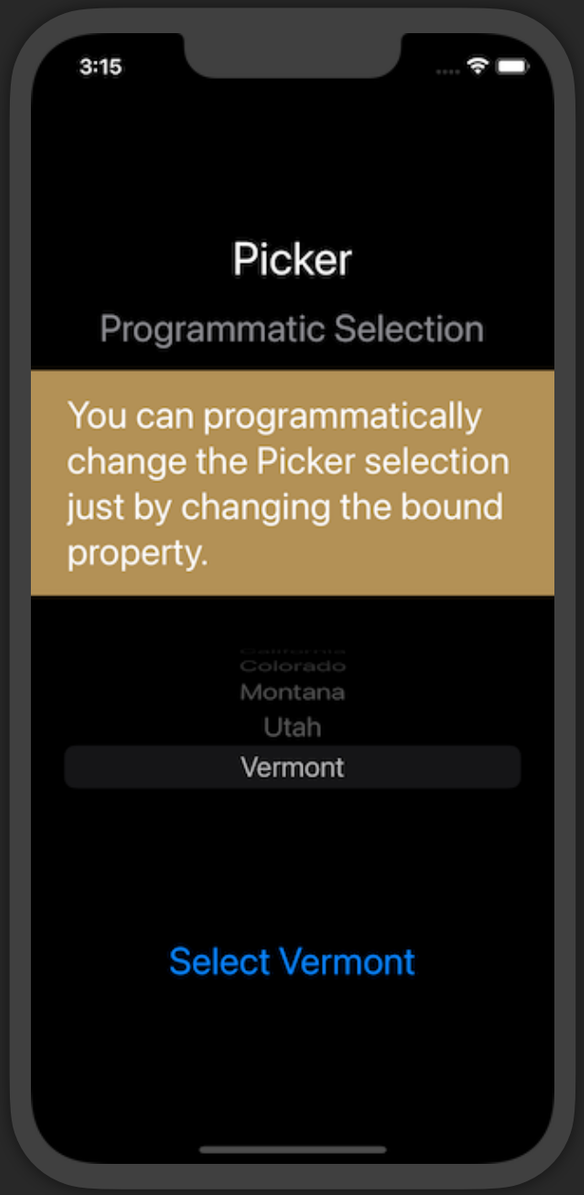



```
struct Picker_Wheel: View {
    @State private var yourName = "Mark"

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Wheel Style",
                       desc: "You can change the way a Picker looks by using the pickerStyle
                            modifier.")

            Picker("Name", selection: $yourName) {
                Text("Paul").tag("Paul")
                Text("Chris").tag("Chris")
                Text("Mark").tag("Mark")
                Text("Scott").tag("Scott")
                Text("Meng").tag("Meng")
            }
            .pickerStyle(.wheel)
        }
        .font(.title)
    }
}
```

This will be the default value selected in the Picker.

Set the style right on the Picker.

Programmatic Selection

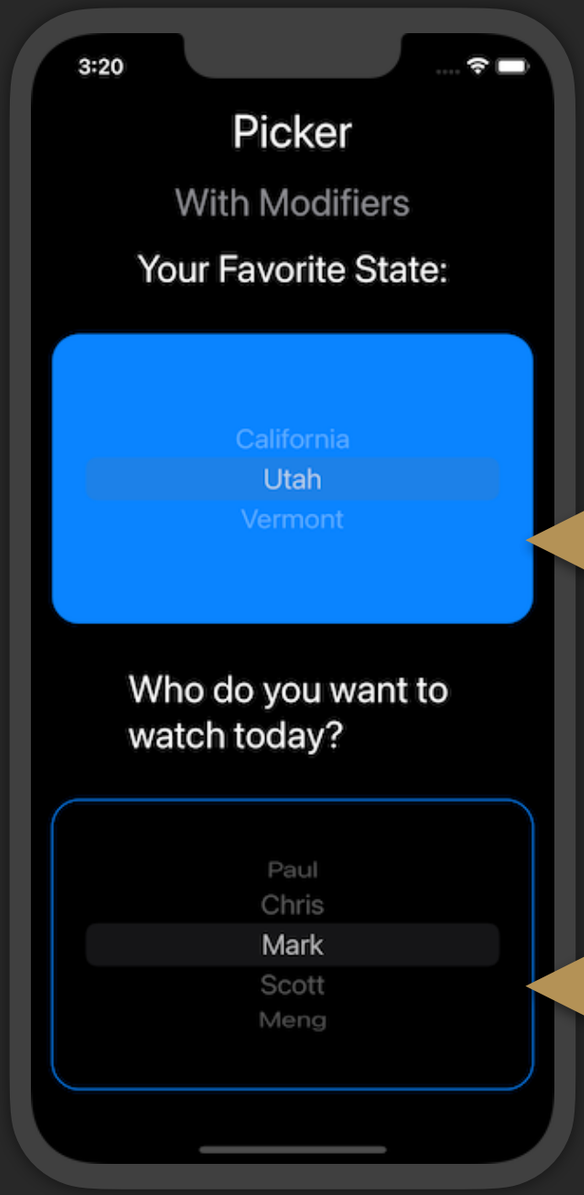



```
struct Picker_ProgrammaticSelection: View {
    @State private var favoriteState = 1

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Programmatic Selection",
                       desc: "You can programmatically change the Picker selection just by
                            changing the bound property.")

            Picker("States", selection: $favoriteState) {
                Text("California").tag(0)
                Text("Colorado").tag(1)
                Text("Montana").tag(2)
                Text("Utah").tag(3)
                Text("Vermont").tag(4)
            }
            .pickerStyle(.wheel)
            .padding(.horizontal)

            Button("Select Vermont") {
                withAnimation {
                    favoriteState = 4
                }
            }
        }
        .font(.title)
    }
}
```

When you change the Picker's bound property value, the Picker then updates and selects the matching row.

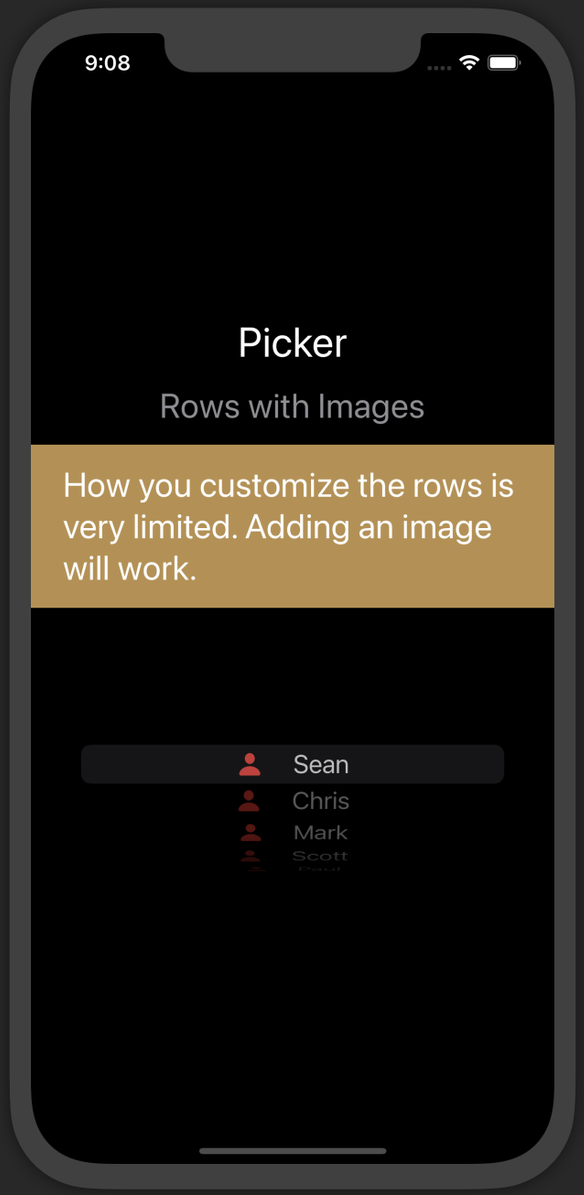
Note: I added withAnimation so you see the wheel actually spin.

Customized




```
struct Picker_Customized : View {
    @State private var favoriteState = 1
    @State private var youTuberName = "Mark"

    var body: some View {
        VStack(spacing: 16) {
            Text("Picker").font(.largeTitle)
            Text("With Modifiers").foregroundColor(.gray)
            Text("Your Favorite State:")
            Picker("Select State", selection: $favoriteState) {
                Text("California").tag(0)
                Text("Utah").tag(1)
                Text("Vermont").tag(2)
            }
            .pickerStyle(.wheel)
            .padding(.horizontal)
            .background(RoundedRectangle(cornerRadius: 20)
                            .fill(Color.blue))
            .padding()

            Text("Who do you want to watch today?")
            Picker("Select person", selection: $youTuberName) {
                Text("Paul").tag("Paul")
                Text("Chris").tag("Chris")
                Text("Mark").tag("Mark")
                Text("Scott").tag("Scott")
                Text("Meng").tag("Meng")
            }
            .pickerStyle(.wheel)
            .padding(.horizontal)
            .background(RoundedRectangle(cornerRadius: 20)
                            .stroke(Color.blue, lineWidth: 1))
            .padding()
        }
        .font(.title)
    }
}
```

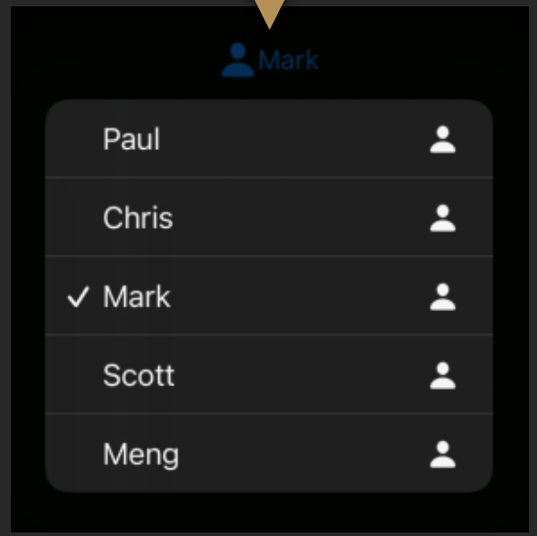
Rows with Images



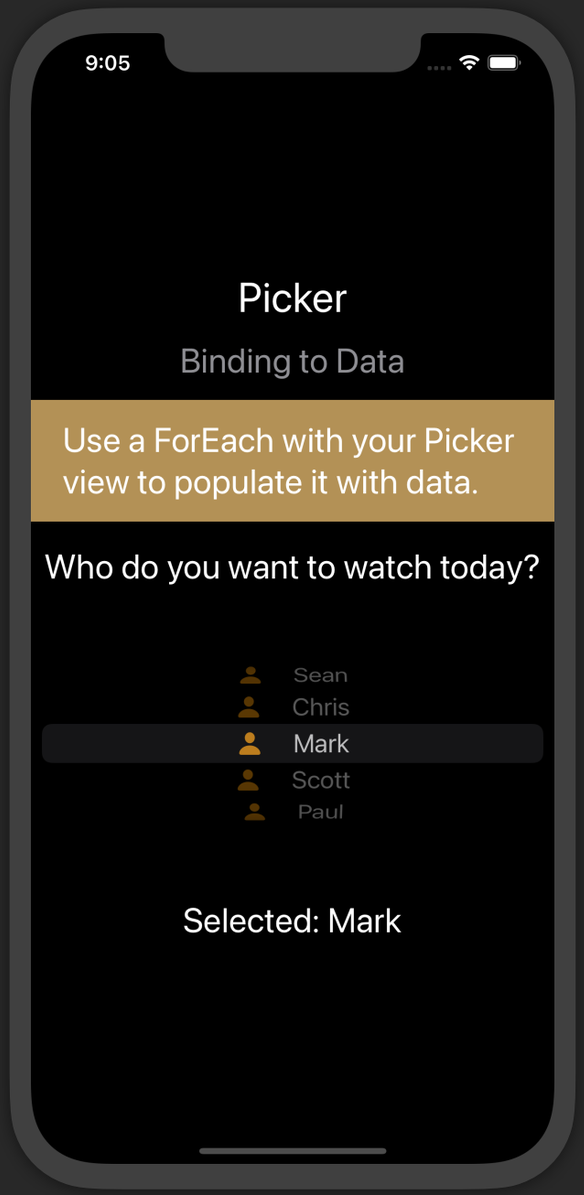

```
struct Picker_RowsWithImages : View {
    @State private var youTuberName = "Mark"

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Rows with Images",
                       desc: "Row customization is limited. Adding an image will work.")
            Picker(selection: $youTuberName, label: Text("")) {
                Row(name: "Paul").tag("Paul")
                Row(name: "Chris").tag("Chris")
                Row(name: "Mark").tag("Mark")
                Row(name: "Scott").tag("Scott")
                Row(name: "Meng").tag("Meng")
            }
            .pickerStyle(.wheel)
            .padding(.horizontal)
        }
        .font(.title)
    }
}
```

```
fileprivate struct Row : View {
    var name: String

    var body: some View {
        return HStack {
            Image(systemName: "person.fill")
                .padding(.trailing)
                .foregroundColor(Color.red)
            Text(name)
        }
    }
}
```

When not using the wheel picker style, the picker looks like this with the image.



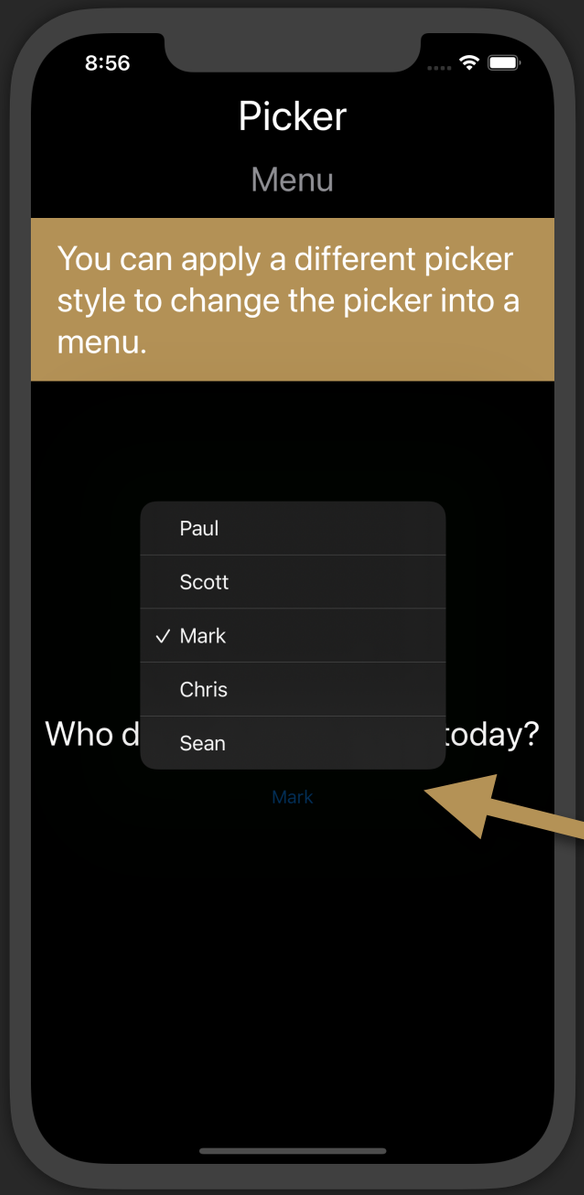
Binding Rows to Data




```
struct Picker_BindingToData : View {
    @State private var youTuberName = "Mark"
    var youTubers = ["Sean", "Chris", "Mark", "Scott", "Paul"]

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Binding to Data",
                       desc: "Use a ForEach with your Picker view to populate it with data.")

            Text("Who do you want to watch today?")

            Picker(selection: $youTuberName, label: Text("")) {
                ForEach(youTubers, id: \.self) { name in
                    Row(name: name)
                }
            }
            .pickerStyle(.wheel)

            Text("Selected: \(youTuberName)")
        }
        .font(.title)
    }
}

fileprivate struct Row : View {
    var name: String
    var body: some View {
        HStack {
            Image(systemName: "person.fill")
                .padding(.trailing)
                .foregroundColor(Color.orange)
            Text(name)
        }
    }
}
```

Menu PickerStyle

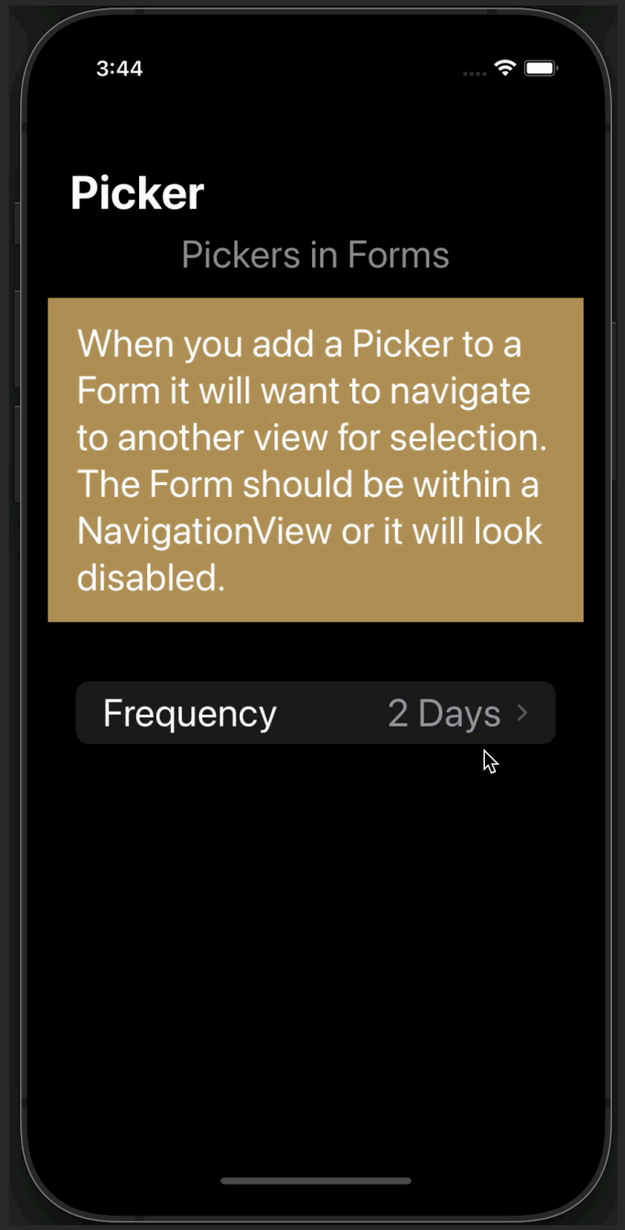
iOS 14




```
struct Picker_Menu: View {
    @State private var youTuberName = "Mark"
    var youTubers = ["Sean", "Chris", "Mark", "Scott", "Paul"]

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Picker",
                       subtitle: "Menu",
                       desc: "You can apply a different picker style to change the picker into a
                              menu.")

            Spacer()

            Text("Who do you want to watch today?")
                .padding(.bottom, 0)

            Picker(selection: $youTuberName, label: Text("Who do you want to watch")) {
                ForEach(youTubers, id: \.self) { name in
                    Text(name)
                }
            }
            .pickerStyle(.menu)

            Spacer()
        }
        .font(.title)
    }
}
```

Note: It doesn't seem we can alter the font style of the selected item from the picker at this time.

Pickers in Forms




```
struct Picker_InForm: View {
    @State private var selectedDaysOption = "2"
    var numberOfDaysOptions = ["1", "2", "3", "4", "5"]

    var body: some View {
        NavigationView {
            VStack {
                HeaderView("", subtitle: "Pickers in Forms",
                           desc: "When you add a Picker to a Form it will want to navigate to
                                  another view for selection. The Form should be within a
                                  NavigationView or it will look disabled.")

                Form {
                    Picker("Frequency", selection: $selectedDaysOption) {
                        ForEach(numberOfDaysOptions, id: \.self) {
                            Text("\($0) Days").tag($0)
                        }
                    }
                }
                .navigationTitle("Picker")
            }
        }
        .font(.title)
    }
}
```

If you don't like this behavior of Pickers in Forms (in NavigationViews) then apply a different picker style (like menu or wheel).

iOS 14

ProgressView

This SwiftUI content is locked in this preview.

The progress view gives you [illegible] different ways to show the user that something is currently happening and optionally give you a way to show the progression of some activity.

This is a pull-in view in so[illegible]e.

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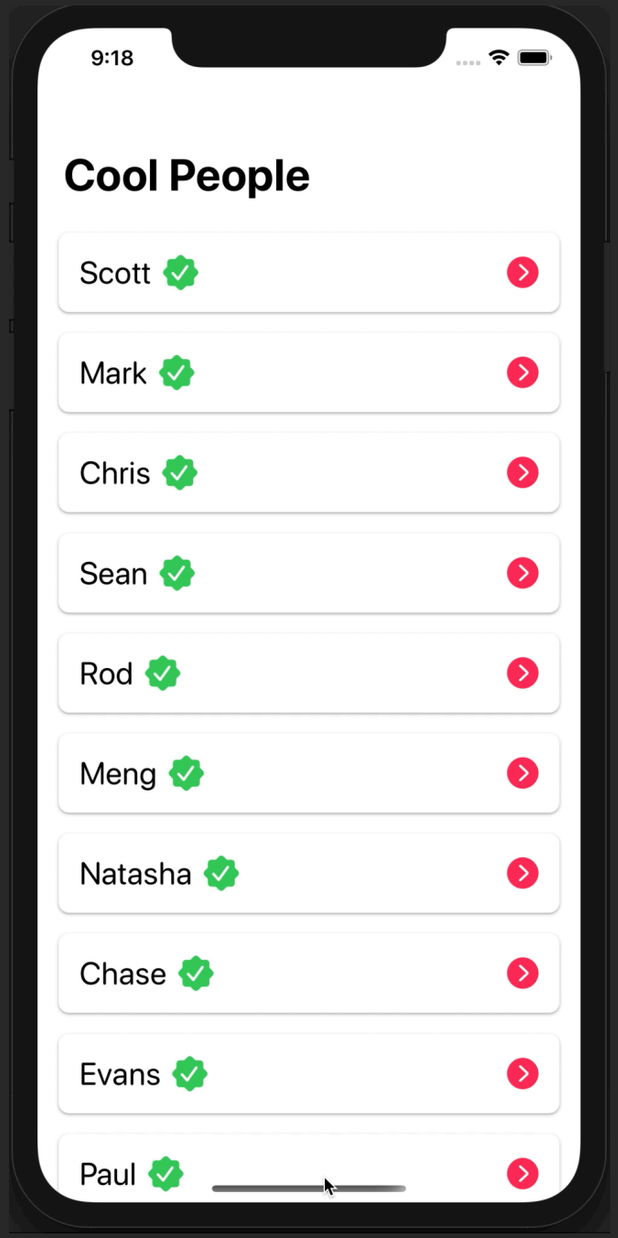
ScrollView

A ScrollView is like a container for child views. When the child views within the ScrollView go outside the frame, the user can scroll to bring the child views that are outside the frame into view.

A ScrollView is a push-out view in the scroll direction you specify. You can set the direction of a ScrollView to be vertical or horizontal.

Introduction

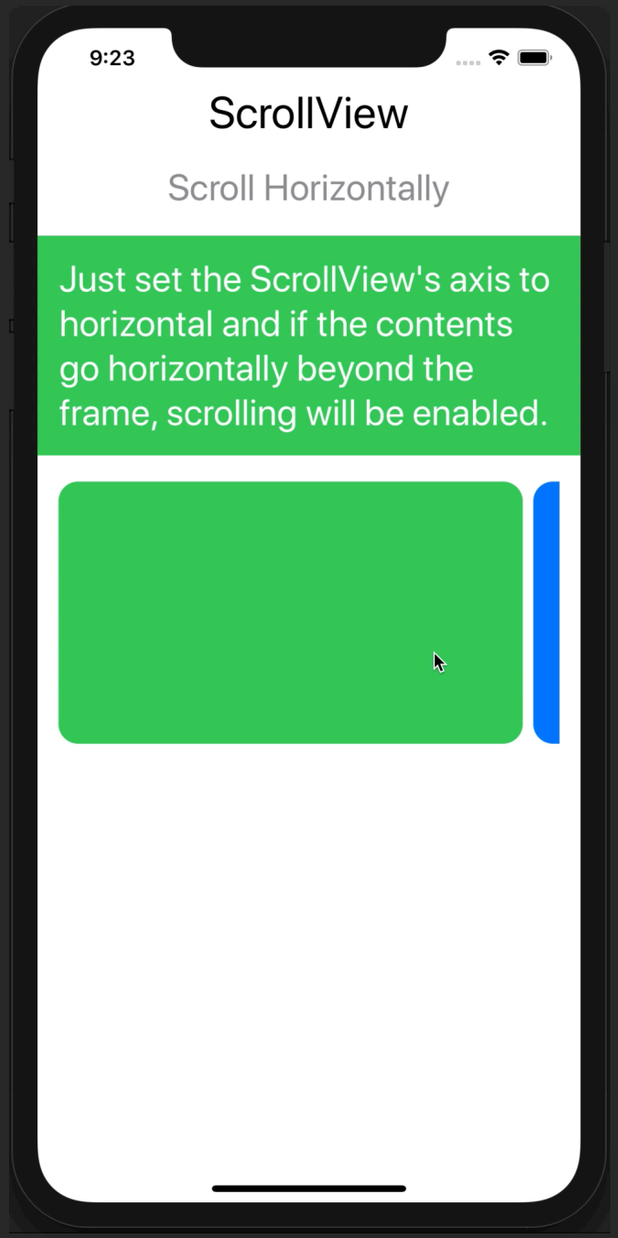



```
@State private var names = ["Scott", "Mark", "Chris", "Sean", "Rod", "Meng", "Natasha", "Chase",
"Evans", "Paul", "Durtschi", "Max"]
...
NavigationView {
    GeometryReader { gr in
        ScrollView {
            ForEach(self.names, id: \.self) { name in
                NavigationLink(destination: DetailView(name: name)) {
                    HStack {
                        Text(name).foregroundColor(.primary)
                        Image(systemName: "checkmark.seal.fill")
                            .foregroundColor(.green)
                        Spacer()
                        Image(systemName: "chevron.right.circle.fill")
                    }
                    .font(.system(size: 24, design: .rounded))
                    .padding().background(Color.white)
                    .cornerRadius(8)
                    .shadow(radius: 1, y: 1)
                }
            } // Set the width on the ForEach (it's a View)
                .frame(width: gr.size.width - 32)
                .tint(.pink)
                .padding()
        }
        .navigationTitle(Text("Cool People"))
    }
}
```

Wrap the ForEach in a ScrollView.

A Scrollview with a ForEach view is similar to a List. But be warned, the rows are not reusable. It is best to limit the number of rows for memory and performance considerations.

Scroll Horizontally




```
struct Scrollview_Horizontal : View {
    var items = [Color.green, Color.blue, Color.purple, Color.pink,
                 Color.yellow, Color.orange]

    var body: some View {
        GeometryReader { gr in
            VStack(spacing: 20) {
                Text("ScrollView")
                    .font(.largeTitle)
                Text("Scroll Horizontally")
                    .font(.title)
                    .foregroundColor(.gray)
                Text("Just set the ScrollView's axis to horizontal and if the contents go
                      horizontally beyond the frame, scrolling will be enabled.")
                    ...
                ScrollView(Axis.Set.horizontal, showsIndicators: true) {
                    HStack {
                        ForEach(self.items, id: \.self) { item in
                            RoundedRectangle(cornerRadius: 15)
                                .fill(item)
                                .frame(width: gr.size.width - 60,
                                       height: 200)
                        }
                    }
                }
                .padding(.horizontal)
                Spacer()
            }
        }
    }
}
```

Set the scroll direction and if you want to show the scroll indicators or not.

iOS 15

Searchable

This SwiftUI content is locked in this preview.

In iOS, the searchable modifier adds a text field to the NavigationView. Using it without a navigation view will show nothing. Use this modifier for situations where you want to give users the ability to either **search** for some data or **filter** an existing set of data already shown.

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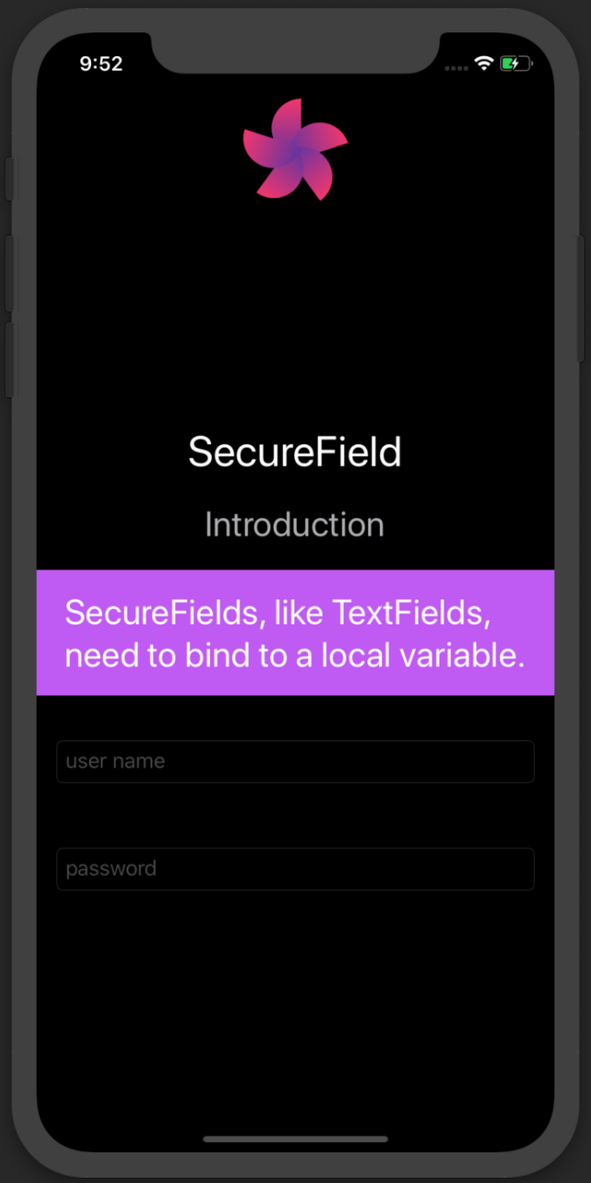
SecureField

In order to get or set the text in a SecureField, you need to bind it to a variable. This variable is passed into the SecureField's initializer. Then, all you need to do is change this bound variable's text to change what is in the SecureField. Or read the bound variable's value to see what text is currently in the SecureField.

This is a pull-in control.

Introduction

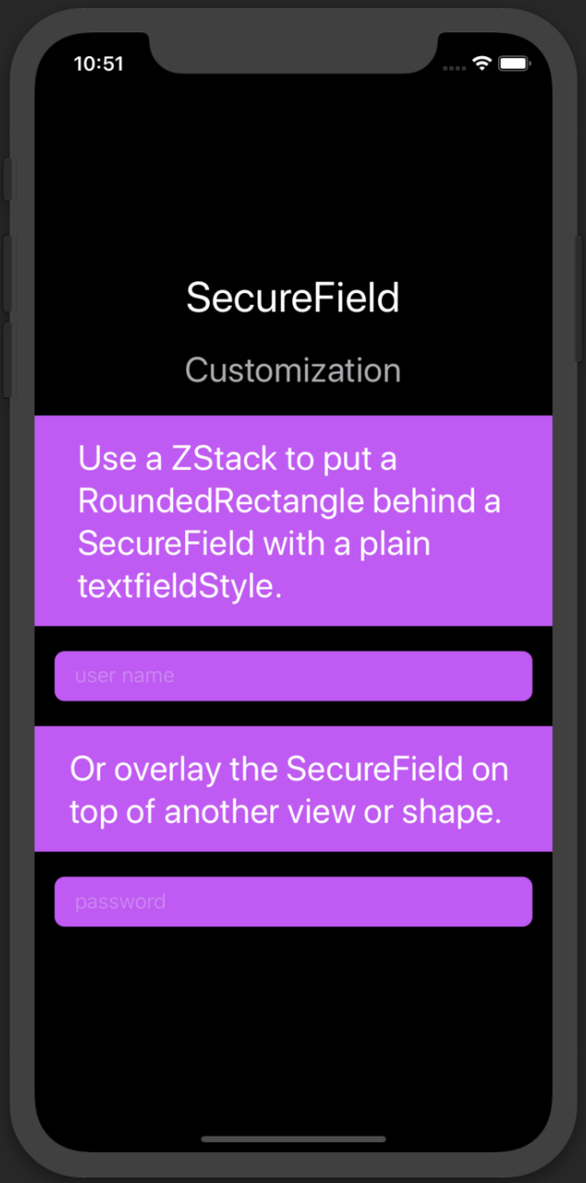



```
@State private var userName = ""
@State private var password = ""
...
VStack(spacing: 20) {
    Image("Logo")

    Spacer()

    Text("SecureField")
        .font(.largeTitle)

    Text("Introduction")
        .font(.title)
        .foregroundColor(.gray)

    Text("SecureFields, like TextFields, need to bind to a local variable.")
        ...

    TextField("user name", text: $userName)
        .textFieldStyle(.roundedBorder)
        .padding()

    SecureField("password", text: $password)
        .textFieldStyle(.roundedBorder)
        .padding()

    Spacer()
}
```

For textFieldStyle, use:

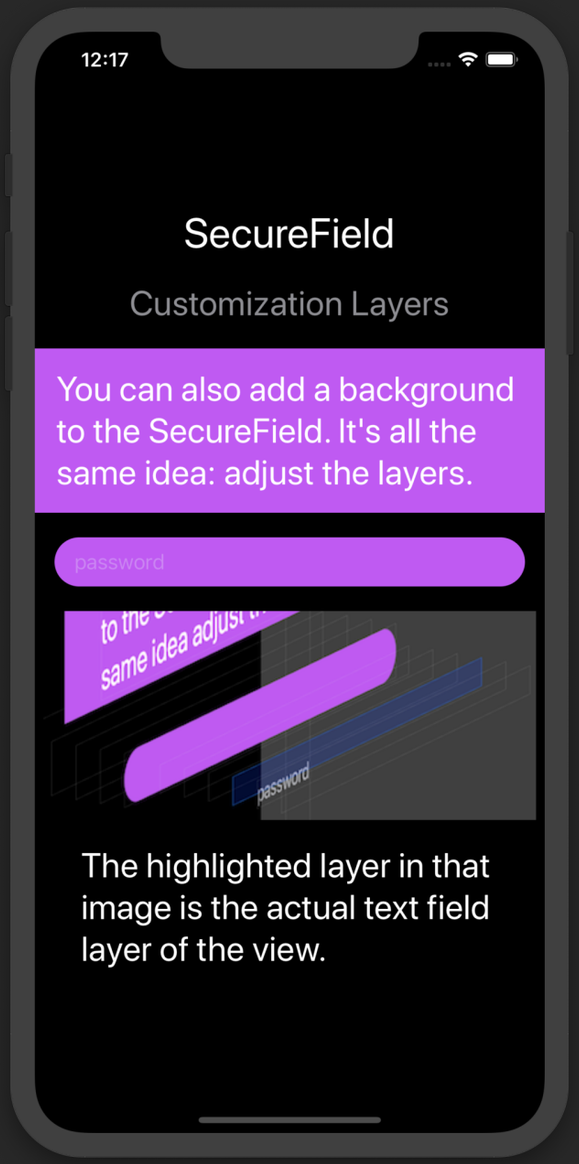
< iOS 15	`RoundedBorderTextFieldStyle()`
iOS 15+	`.roundedBorder`

Customizations




```
@State private var userName = ""
@State private var password = ""

...

Text("Use a ZStack to put a RoundedRectangle behind a SecureField with a plain textfieldStyle.")
    ...

ZStack{
    RoundedRectangle(cornerRadius: 8)
        .foregroundColor(.purple)
    TextField("user name", text: $userName)
        .foregroundColor(Color.white)
        .padding(.horizontal)
}
.frame(height: 40)
.padding(.horizontal)

Text("Or overlay the SecureField on top of another view or shape.")
    ...

RoundedRectangle(cornerRadius: 8)
    .foregroundColor(.purple)
    .overlay(
        SecureField("password", text: $password)
            .foregroundColor(Color.white)
            .padding(.horizontal)
    )
    .frame(height: 40)
    .padding(.horizontal)
```

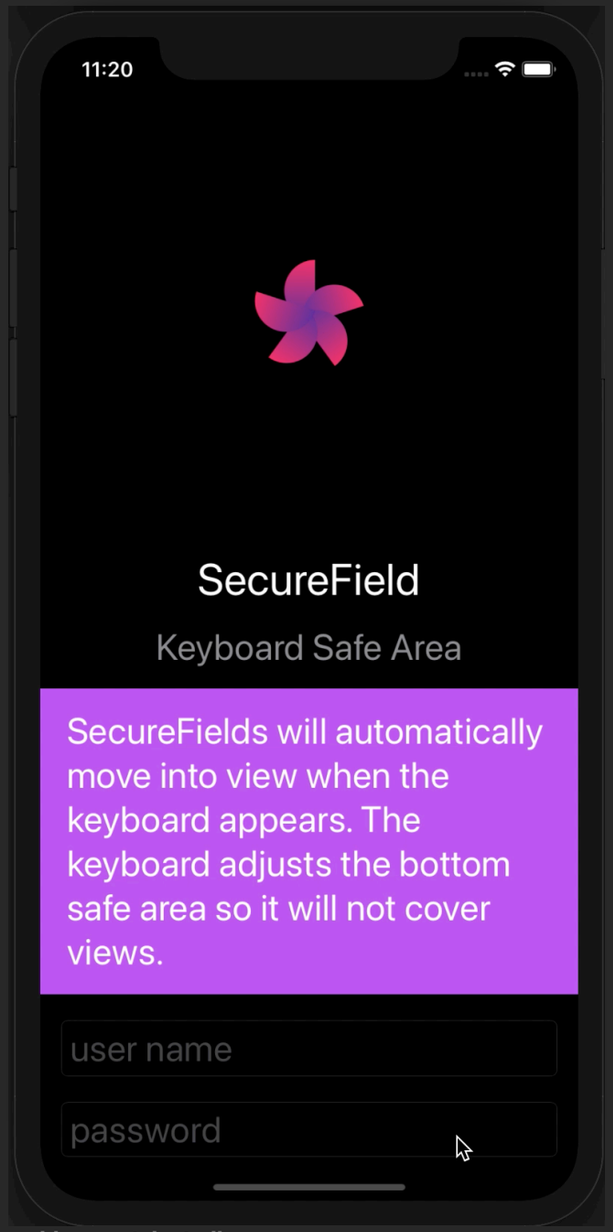
Customization Layers




```
@State private var userName = ""
@State private var password = ""
...
VStack(spacing: 20) {
    Text("SecureField")
        .font(.largeTitle)
    Text("Customization Layers")
        .font(.title)
        .foregroundColor(.gray)
    Text("You can also add a background to the SecureField. It's all the same idea: adjust the layers.")
        ...

    SecureField("password", text: $password)
        .foregroundColor(Color.white)
        .frame(height: 40)
        .padding(.horizontal)
        .background(
            Capsule()
                .foregroundColor(.purple)
        )
        .padding(.horizontal)

    Image("SecureFieldLayers")

    Text("The highlighted layer in that image is the actual text field layer of the view.")
        .font(.title)
        .padding(.horizontal)
}
```

Keyboard Safe Area

iOS 14



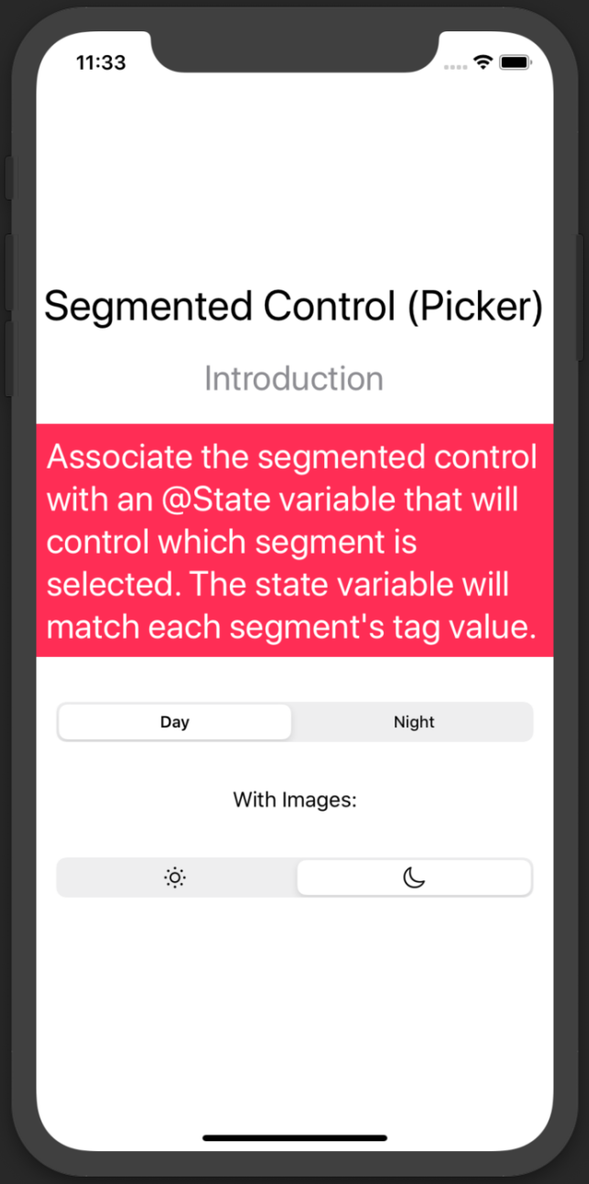

```
struct SecureField_KeyboardSafeArea: View {
    @State private var userName = ""
    @State private var password = ""

    var body: some View {
        VStack(spacing: 20) {
            Spacer()
            Image("Logo")
            Spacer()

            HeaderView("SecureField",
                       subtitle: "Keyboard Safe Area",
                       desc: "SecureFields will automatically move into view when the keyboard
appears. The keyboard adjusts the bottom safe area so it will not cover views.",
                       back: .purple, textColor: .white)

            TextField("user name", text: $userName)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)

            SecureField("password", text: $password)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
        }
        .font(.title)
    }
}
```

Segmented Control (Picker)

Segmented controls are now Picker controls with a different picker style set. In order to get or set the selected segment, you need to bind it to a variable. This variable is passed into the segmented control's (Picker's) initializer. Then, all you need to do is change this bound variable's value to change the selected segment. Or read the bound variable's value to see which segment is currently selected.

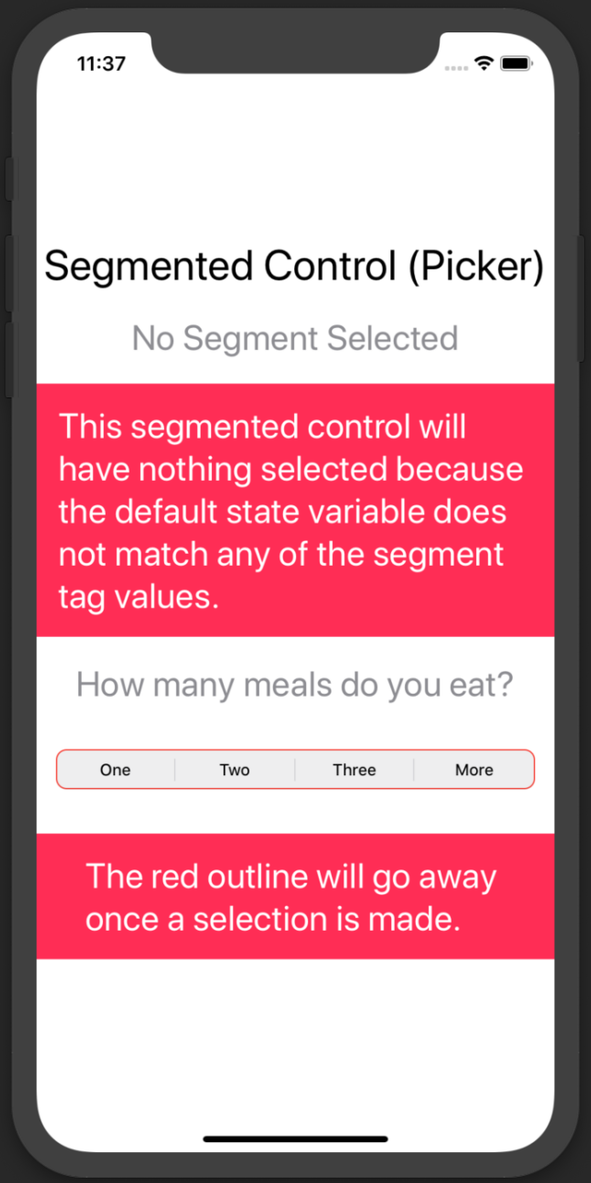
This is a pull-in view.

Introduction



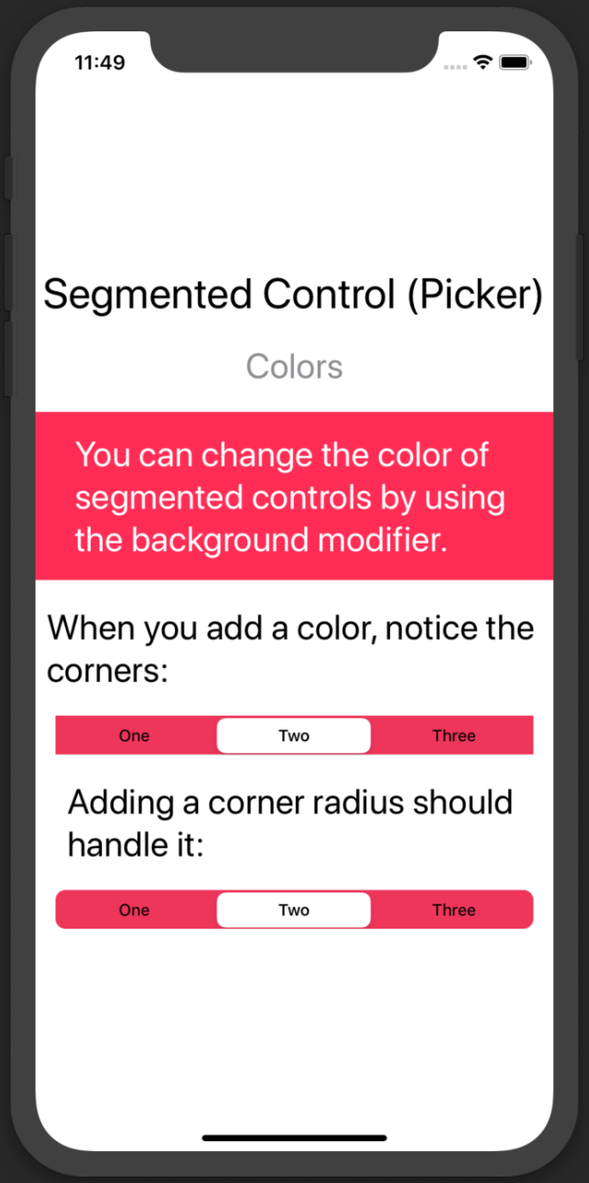

```
@State private var dayNight = "day"
@State private var tab = 1

...

VStack(spacing: 20) {
    Text("Segmented Control (Picker)").font(.largeTitle)
    Text("Introduction")
        .font(.title).foregroundColor(.gray)
    Text("Associate the segmented control with an @State variable that will control which
segment is selected. The state variable will match each segment's tag value.")
        ...

    Picker("", selection: $dayNight) {
        Text("Day").tag("day")
        Text("Night").tag("night")
    }
    .pickerStyle(.segmented)
    .padding()

    Text("With Images:")

    Picker("", selection: $tab) {
        Image(systemName: "sun.min").tag(0)
        Image(systemName: "moon").tag(1)
    }
    .pickerStyle(.segmented)
    .padding()
}
```

No Segment Selected




```
@State private var selection = 0

...

VStack(spacing: 20) {
    Text("Segmented Control (Picker)").font(.largeTitle)
    Text("No Segment Selected")
        .font(.title).foregroundColor(.gray)
    Text("This segmented control will have nothing selected because the default state variable
does not match any of the segment tag values.")
        ...

    Text("How many meals do you eat?")
        .foregroundColor(.gray)
        .font(.title)

    Picker("", selection: $selection) {
        Text("One").tag(1)
        Text("Two").tag(2)
        Text("Three").tag(3)
        Text("More").tag(4)
    }
    .pickerStyle(.segmented)
    .background(RoundedRectangle(cornerRadius: 8)
        .stroke(Color.red, lineWidth: selection == 0 ? 1 : 0))
    .padding()

    Text("The red outline will go away once a selection is made.")
        ...
}
```

Colors




```
@State private var selection = 2
...
VStack(spacing: 20) {
    Text("Segmented Control (Picker)").font(.largeTitle)
    Text("Colors")
        .font(.title).foregroundColor(.gray)
    Text("You can change the color of segmented controls by using the background modifier.")
        ...

    Text("When you add a color, notice the corners:")
    Picker("", selection: $selection) {
        Text("One").tag(1)
        Text("Two").tag(2)
        Text("Three").tag(3)
    }
    .pickerStyle(.segmented)
    .background(Color.pink)
    .padding(.horizontal)

    Text("Adding a corner radius should handle it:")
    Picker("", selection: $selection) {
        Text("One").tag(1)
        Text("Two").tag(2)
        Text("Three").tag(3)
    }
    .pickerStyle(.segmented)
    .background(Color.pink)
    .cornerRadius(8)
    .padding(.horizontal)
}
```

iOS 14

SignInWithAppleButton

This SwiftUI content is locked in this preview.

Apple provides you with a [illegible]at you use in your app to assist your users when it comes time to implementing signing in with Apple.

This is a push-out view.

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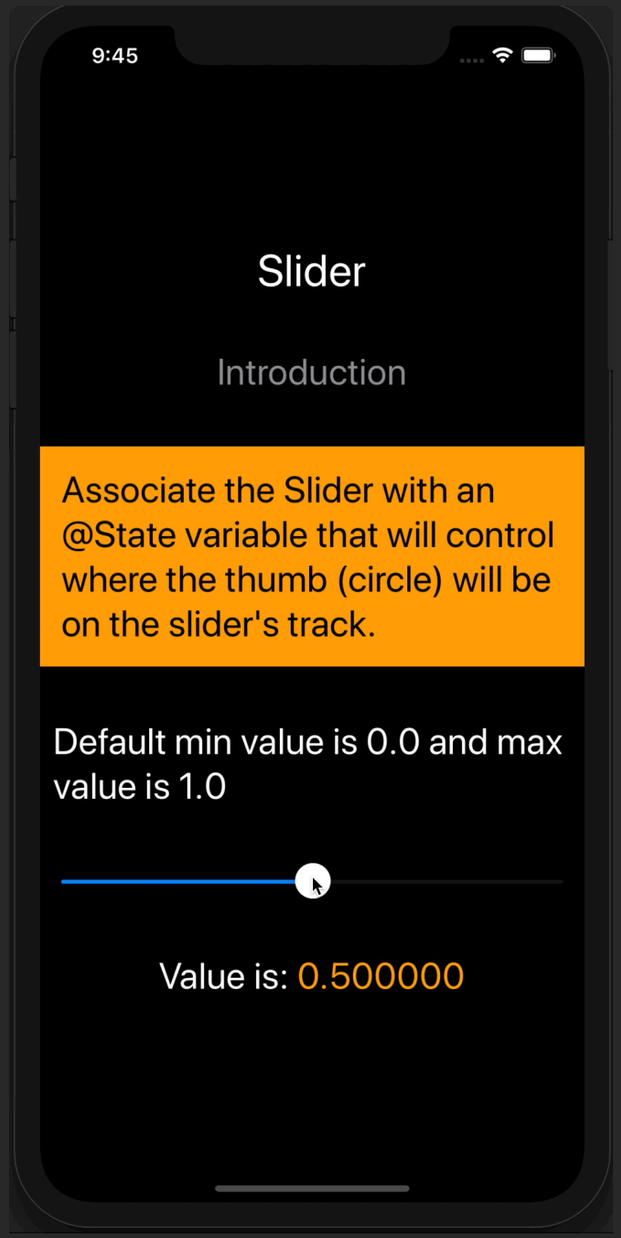
Slider

When using a Slider view, the default range of values is 0.0 to 1.0. You bind the Slider to a state variable, usually a number type, like an Int. But it doesn't have to be a number type. It can be any type that conforms to the Stridable protocol. ("Stride" means to "take steps in a direction; usually long steps".) A type that conforms to Stridable (such as an Int) means it has values that are continuous and can be stepped through and measured. ("Step through", "Stride", I think you see the connection now.)

You use the bound variable to set or get the value the Slider's thumb (circle) is currently at.

This is a pull-in view.

Introduction

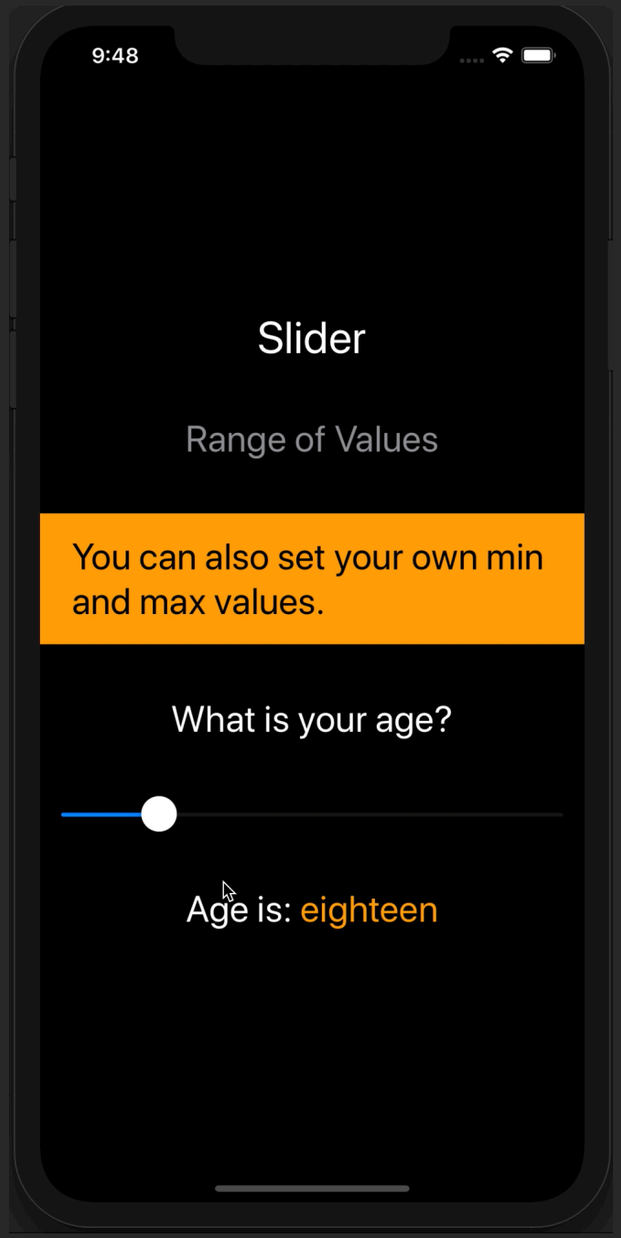



```
struct Slider_Intro : View {
    @State private var sliderValue = 0.5

    var body: some View {
        VStack(spacing: 40) {
            Text("Slider").font(.largeTitle)
            Text("Introduction").foregroundColor(.gray)
            Text("Associate the Slider with an @State variable that will control where the thumb
(circle) will be on the slider's track.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.orange).foregroundColor(Color.black)

            Text("Default min value is 0.0 and max value is 1.0")

            Slider(value: $sliderValue)
                .padding(.horizontal)

            Text("Value is: ") +
                Text("\(sliderValue)").foregroundColor(.orange)

        }.font(.title)
    }
}
```

Value used for the slider.

Set the state variable in the slider's initializer.

Range of Values (Minimum & Maximum)



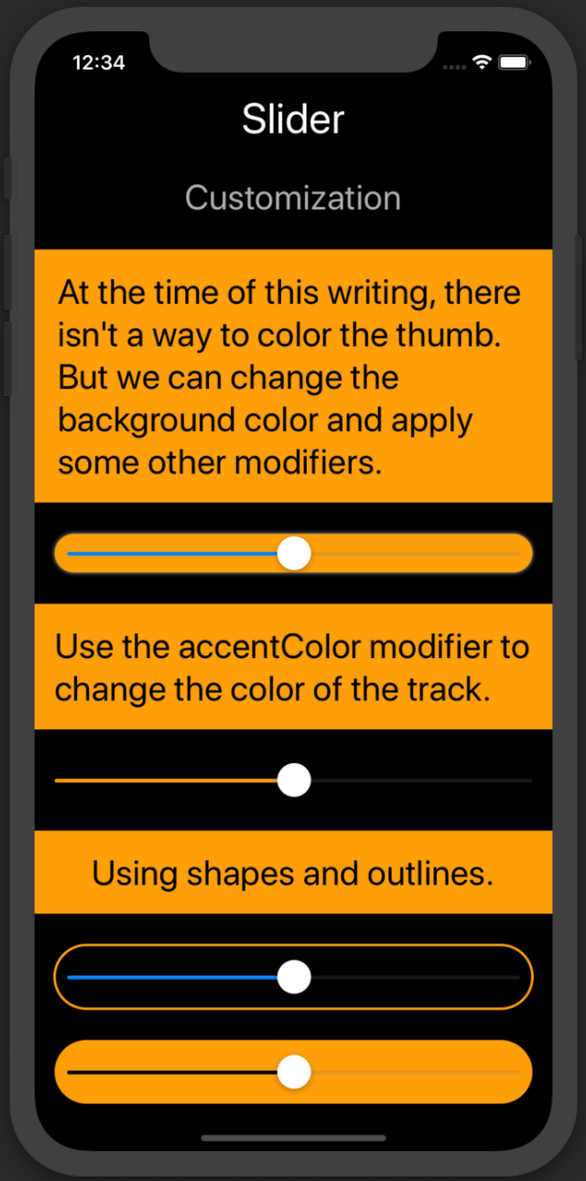

```
struct Slider_RangeOfValues: View {
    @State private var age = 18.0

    let ageFormatter: NumberFormatter = {
        let numFormatter = NumberFormatter()
        numFormatter.numberStyle = .spellOut
        return numFormatter
    }()

    var body: some View {
        VStack(spacing: 40) {
            Text("Slider").font(.largeTitle)
            Text("Range of Values").foregroundColor(.gray)
            Text("You can also set your own min and max values.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.orange).foregroundColor(Color.black)

            Text("What is your age?")

            Slider(value: $age, in: 1...100, step: 1)
                .padding(.horizontal)

            Text("Age is: ") +
                Text("\(ageFormatter.string(from: NSNumber(value: age))!)")
                    .foregroundColor(.orange)
        }.font(.title)
    }
}
```

Format the slider value into a spelled-out number.

Provide a range here.

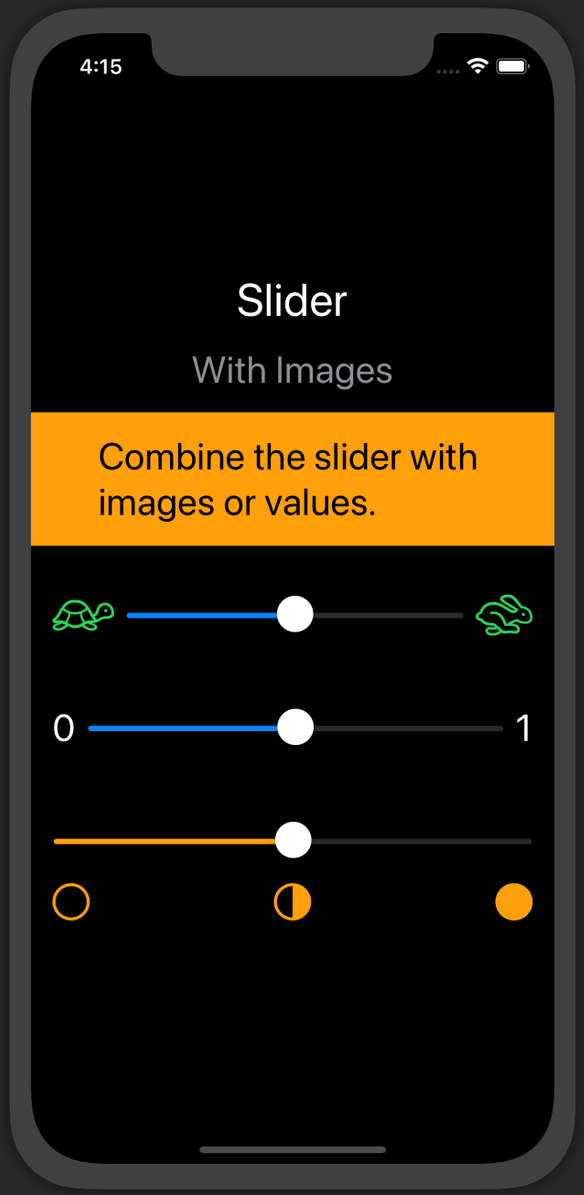
The step parameter defines the increment from one value to the next.

Customization




```
@State private var sliderValue = 0.5
...
Text("At the time of this writing, there isn't a way to color the thumb. But we can change the background color and apply some other modifiers.")
    …
Slider(value: $sliderValue)
    .padding(.horizontal, 10)
    .background(Color.orange)
    .shadow(color: .gray, radius: 2)
    .padding(.horizontal)

Text("Use the accentColor modifier to change the color of the track.")
    ...

Slider(value: $sliderValue)
    .padding(.horizontal)
    .accentColor(.orange)

Text("Using shapes and outlines.")
    ...

Slider(value: $sliderValue)
    .padding(10)
    .background(Capsule().stroke(Color.orange, lineWidth: 2))
    .padding(.horizontal)

Slider(value: $sliderValue)
    .padding(10)
    .background(Capsule().fill(Color.orange))
    .accentColor(.black)
    .padding(.horizontal)
```

With Images

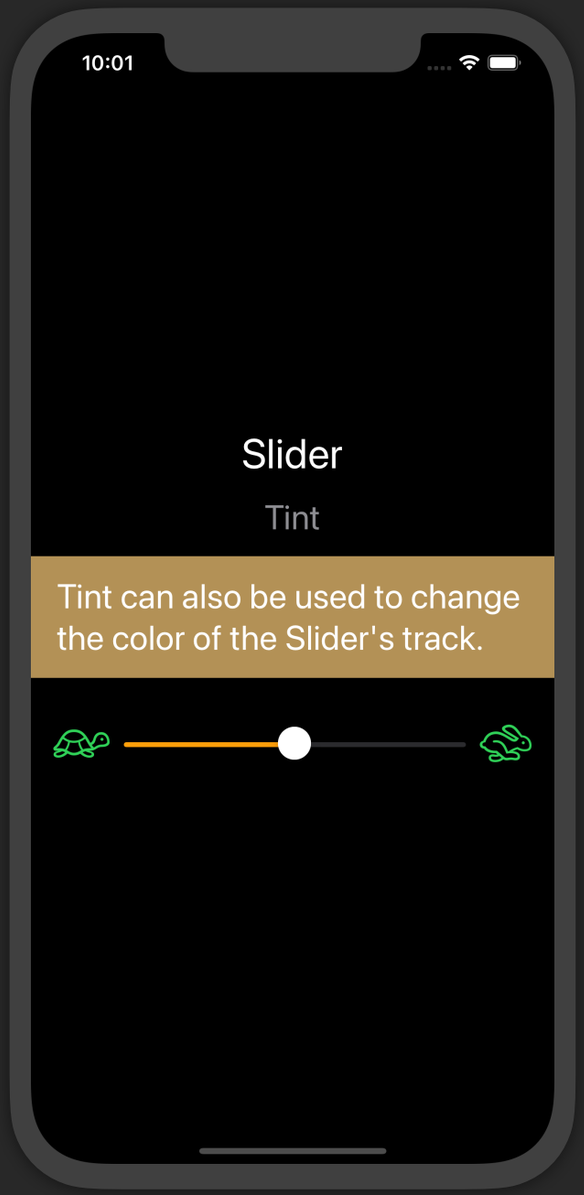



```
struct Slider_WithImages : View {
    @State private var sliderValue = 0.5

    var body: some View {
        VStack(spacing: 20) {
                HeaderView("Slider",
                           subtitle: "With Images",
                           desc: "Combine the slider with images or values.",
                           back: .orange, textColor: .black)

            Slider(value: $sliderValue,
                   minimumValueLabel: Image(systemName: "tortoise"),
                   maximumValueLabel: Image(systemName: "hare"), label: {})
                .foregroundColor(.green)
                .padding()

            Slider(value: $sliderValue,
                   minimumValueLabel: Text("0"),
                   maximumValueLabel: Text("1"), label: {})
                .padding()

            VStack {
                Slider(value: $sliderValue)
                    .accentColor(.orange)
                HStack {
                    Image(systemName: "circle")
                    Spacer()
                    Image(systemName: "circle.righthalf.fill")
                    Spacer()
                    Image(systemName: "circle.fill")
                }
                .foregroundColor(.orange)
                .padding(.top, 8)
            }.padding()
        }.font(.title)
    }
}
```

Use minimum and maximum value labels to add text or images to the ends of the slider.

Tint

iOS 15




```
struct Slider_Tint: View {
    @State private var sliderValue = 0.5

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Slider",
                       subtitle: "Tint",
                       desc: "Tint can also be used to change the color of the Slider's track.")

            Slider(value: $sliderValue,
                   minimumValueLabel: Image(systemName: "tortoise"),
                   maximumValueLabel: Image(systemName: "hare"), label: {})
                .foregroundColor(.green)
                .tint(.orange)
                .padding()
        }
        .font(.title)
    }
}
```

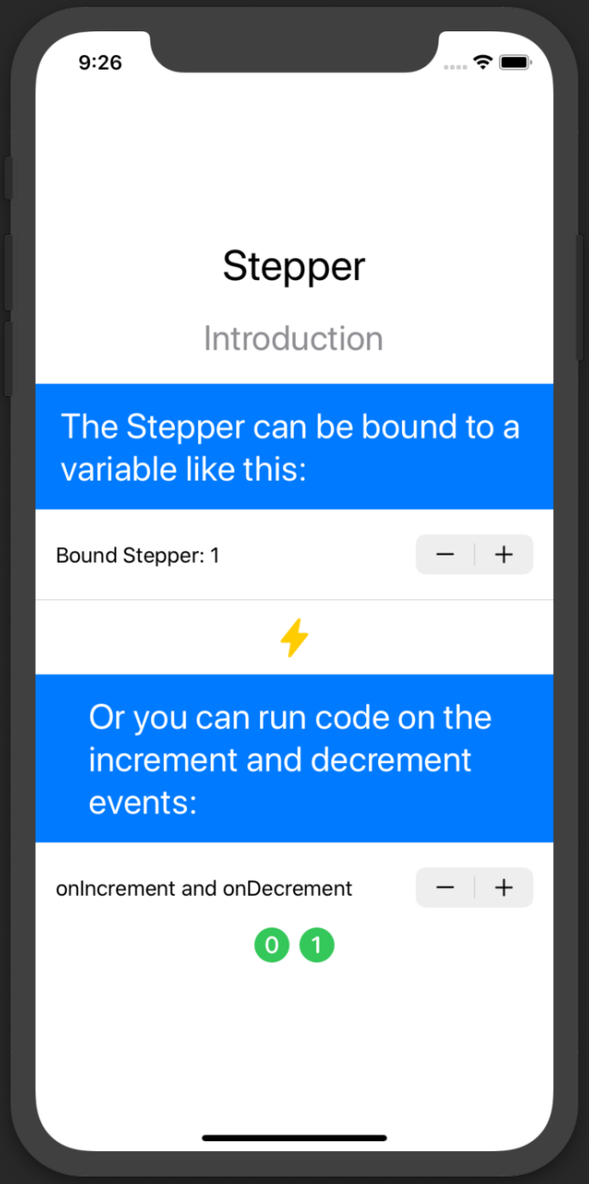
Stepper

When using a Stepper view, you bind it to a state variable, usually a number. But it doesn't have to be a number type. It can be any type that conforms to the Stridable protocol. ("Stride" means to "take steps in a direction; usually long steps".) A type that conforms to Stridable means it has values that are continuous and can be stepped through and measured. ("Step through", "Stride", I think you see the connection now.)

You use the bound variable to set or get the value it is currently at.

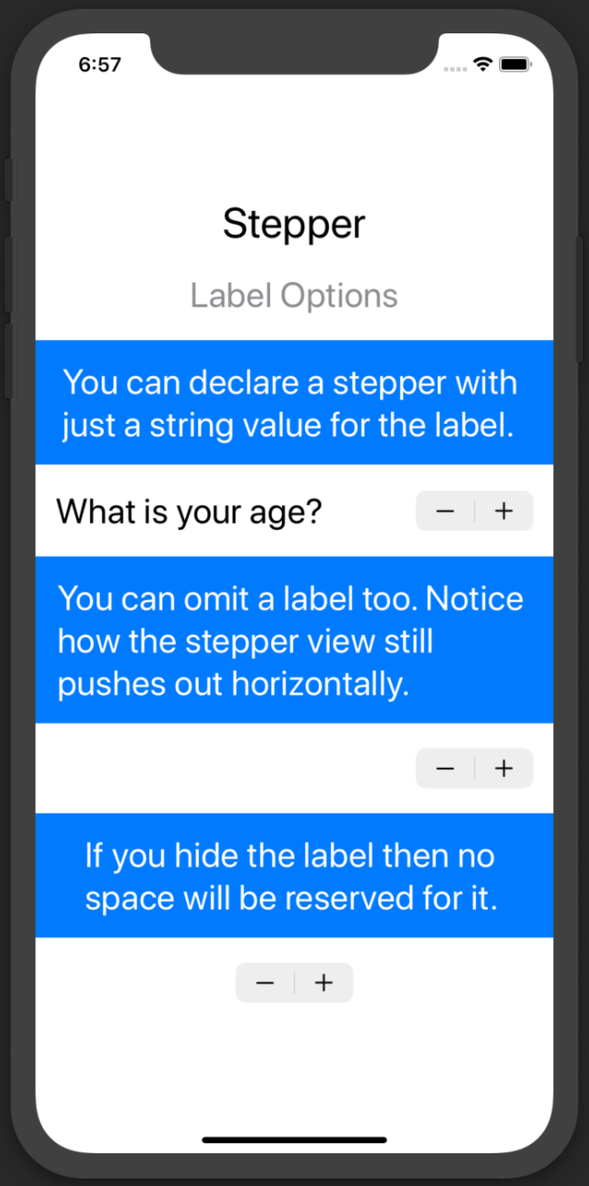
This is a horizontal push-out view. Vertically it is pull-in.

Introduction




```
@State private var stepperValue = 1
@State private var values = [0, 1]
...
VStack(spacing: 20) {
    Text("Stepper")
        .font(.largeTitle)
    Text("Introduction")
        .font(.title).foregroundColor(.gray)
    Text("The Stepper can be bound to a variable like this:")
        ...

    Stepper(value: $stepperValue) {
        Text("Bound Stepper: \(stepperValue)")
    }.padding(.horizontal)
    Divider()
    Image(systemName: "bolt.fill")
        .font(.title).foregroundColor(.yellow)
    Text("Or you can run code on the increment and decrement events:")
        .frame(maxWidth: .infinity).padding()
        .background(Color.blue).foregroundColor(Color.white)
        .font(.title)
    Stepper(onIncrement: {self.values.append(self.values.count)},
            onDecrement: {self.values.removeLast()}) {
                Text("onIncrement and onDecrement")
    }.padding(.horizontal)
    HStack {
        ForEach(values, id: \.self) { value in
            Image(systemName: "\(value).circle.fill")
        }
    }.font(.title).foregroundColor(.green)
}
```

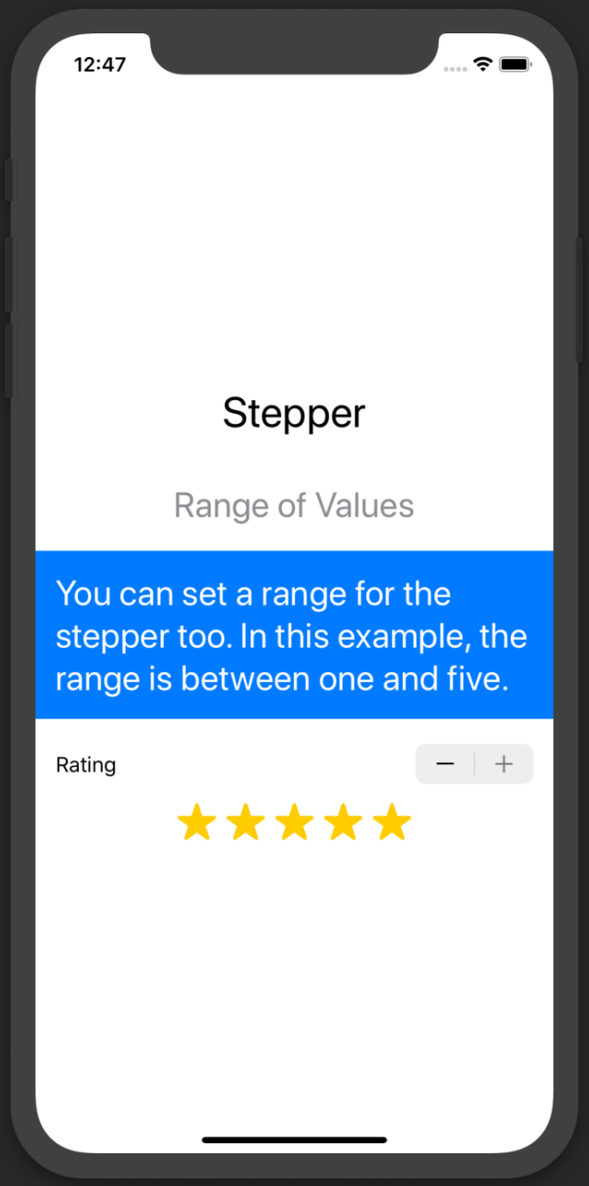
Label Options




```
struct Stepper_LabelsHidden: View {
    @State private var stepperValue = 1

    var body: some View {
        VStack(spacing: 20) {
            Text("Stepper").font(.largeTitle)
            Text("Label Options").foregroundColor(.gray)
            Text("You can declare a stepper with just a string value for the label.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.blue).foregroundColor(Color.white)
            Stepper("What is your age?", value: $stepperValue)
                .padding(.horizontal)
            Text("You can omit a label too. Notice how the stepper view still pushes out
horizontally.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.blue).foregroundColor(Color.white)
            Stepper("", value: $stepperValue)
                .padding(.horizontal)
            Text("If you hide the label then no space will be reserved for it.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.blue).foregroundColor(Color.white)
            Stepper("What is your age?", value: $stepperValue)
                .padding(.horizontal)
                .labelsHidden()
        }.font(.title)
    }
}
```

Note: Even though the label/title is not shown, I would still recommend having one because it will still be used for accessibility purposes.

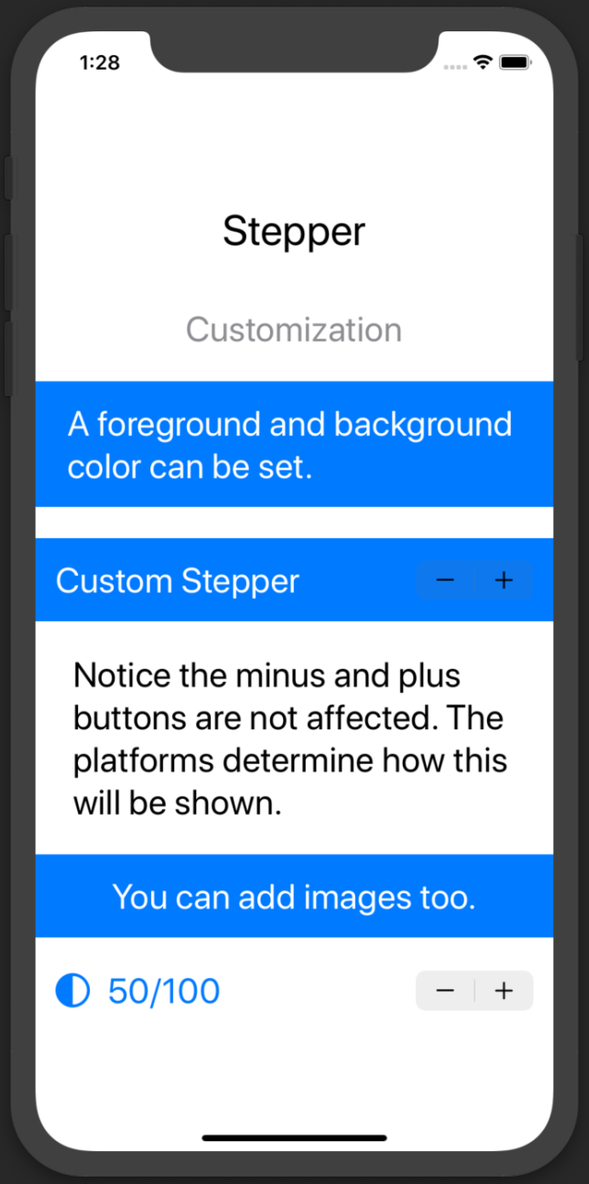
Range




```
@State private var stars = 0

VStack(spacing: 20) {
    Text("Stepper")
        .font(.largeTitle)
        .padding()
    Text("Range of Values")
        .font(.title)
        .foregroundColor(.gray)
    Text("You can set a range for the stepper too. In this example, the range is between one and
five.")
        ...

    Stepper(value: $stars, in: 1...5) {
        Text("Rating")
    }.padding(.horizontal)

    HStack {
        ForEach(1...stars, id: \.self) { star in
            Image(systemName: "star.fill")
        }
    }
    .font(.title)
    .foregroundColor(.yellow)
}
```

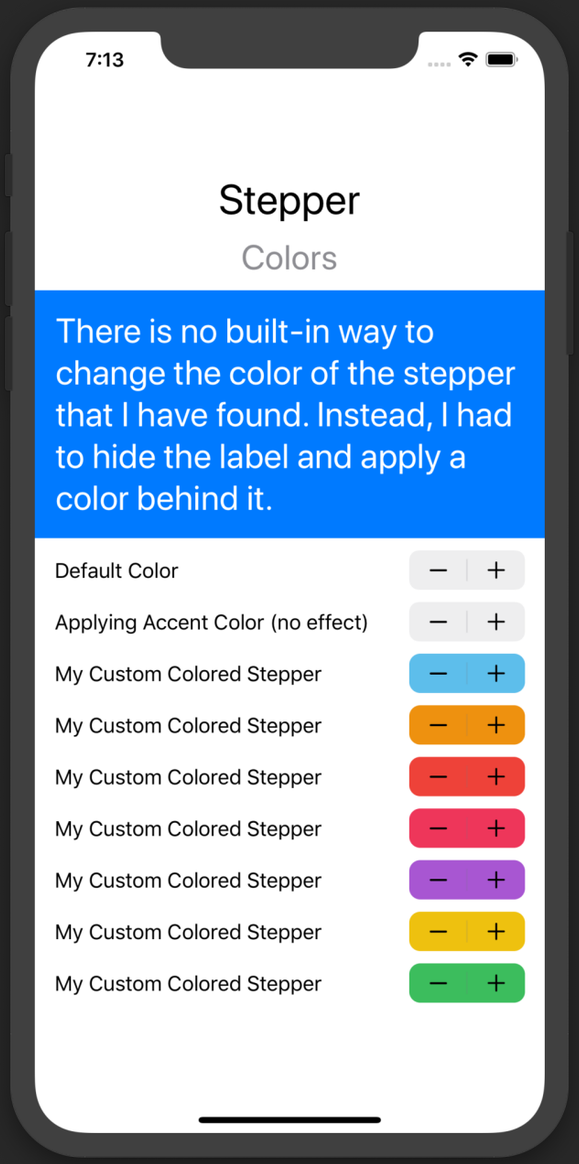
When the Stepper reaches the range limits, the corresponding plus or minus button will appear as disabled. In this screenshot, notice the plus button is disabled.

Customization




```
@State private var contrast = 50
...
Text("A foreground and background color can be set.")
    ...

Stepper(onIncrement: {}, onDecrement: {}) {
    Text("Custom Stepper")
        .font(.title)
        .padding(.vertical)
}
.padding(.horizontal)
.background(Color.blue)
.foregroundColor(.white)

Text("Notice the minus and plus buttons are not affected. The platforms determine how this will be shown.")
    ...

Text("You can add images too.")
    .frame(maxWidth: .infinity).padding()
    .background(Color.blue).foregroundColor(Color.white)
    .font(.title)

Stepper(value: $contrast, in: 0...100) {
    // SwiftUI implicitly uses an HStack here
    Image(systemName: "circle.lefthalf.fill")
    Text(" \(contrast)/100")
}
.font(.title)
.padding(.horizontal)
.foregroundColor(.blue)
```

Colors



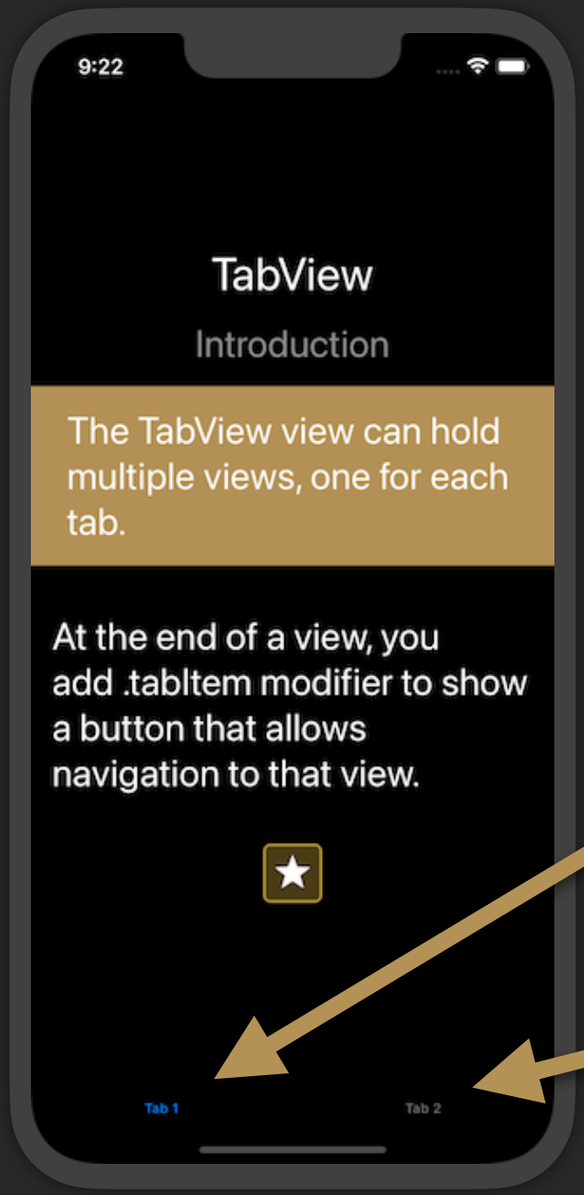

```
Text("There is no built-in way to change the color of the stepper that I have found. Instead, I had to hide the label and apply a color behind it.")
...

Stepper(value: $contrast, in: 0...100) {
    Text("Applying Accent Color (no effect)")
}
.accentColor(.blue)

HStack {
    Text("My Custom Colored Stepper")
    Spacer()
    Stepper("", value: $contrast)
        .background(Color(UIColor.systemTeal))
        .cornerRadius(9)
        .labelsHidden() // Hide the label
}

HStack {
    Text("My Custom Colored Stepper")
    Spacer()
    Stepper("", value: $contrast)
        .background(Color.orange)
        .cornerRadius(9)
        .labelsHidden() // Hide the label
}
```

TabView

The TabView acts like a container for child views within it. These child views are individual screens. It provides tab buttons (TabItems) that allows the user to switch between these child views.

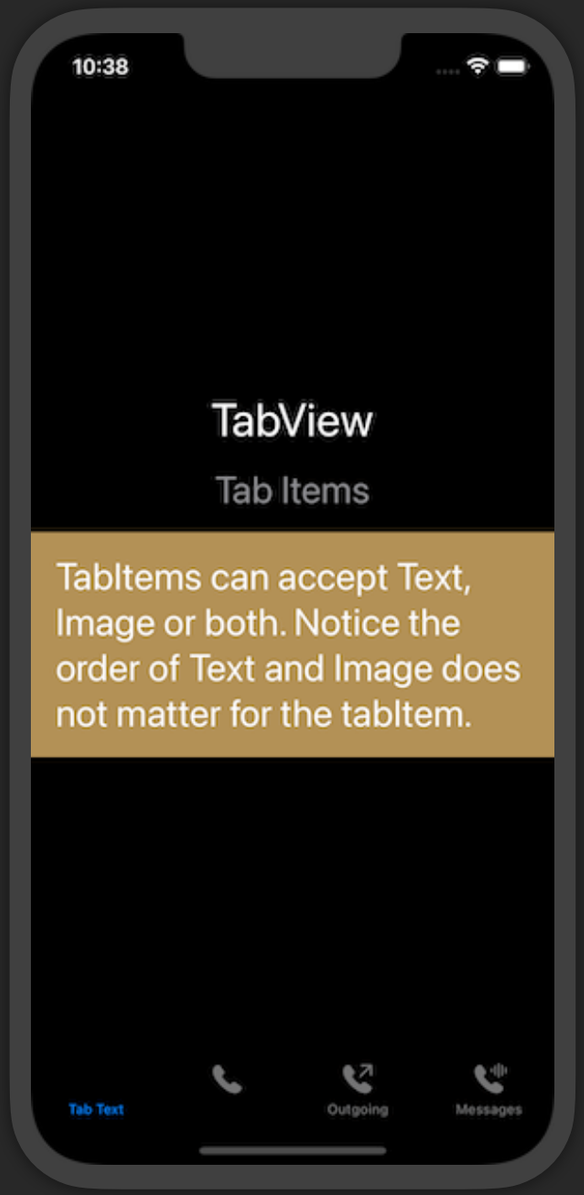
This is a push-out view.

Introduction




```
struct TabView_Intro : View {
    var body: some View {
        TabView {
            // First Screen
            VStack(spacing: 20) {
                HeaderView("TabView",
                           subtitle: "Introduction",
                           desc: "The TabView view can hold multiple views, one for each tab.")

                Text("At the end of a view, you add .tabItem modifier to show a button that
                     allows navigation to that view.")
                    .padding()

                Image("TabItem")

            }
            .tabItem {
                // Creates a tab button in the tab bar
                Text("Tab 1")
            }

            // Second Screen
            Text("This view represents the Second Screen.")
                .tabItem {
                    // Creates a tab button in the tab bar
                    Text("Tab 2")
                }
        }
        .font(.title)
    }
}
```

TabItems




```
struct TabView_TabItems : View {
    var body: some View {
        TabView {
            TabOne()
                .tabItem {
                    Text("Tab Text")
                }
            Text("Phone Calls")
                .tabItem {
                    Image(systemName: "phone")
                }
            Text("Outgoing Phone Calls")
                .tabItem {
                    Image(systemName: "phone.arrow.up.right")
                    Text("Outgoing")
                }
            Text("Messages")
                .tabItem {
                    Label("Messages", systemImage: "phone.and.waveform.fill")
                }
        }
    }
}

struct TabOne: View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("TabView",
                       subtitle: "Tab Items",
                       desc: "TabItems can accept Text, Image or both. Notice the order of Text
                              and Image does not matter for the tabItem.")
                .font(.title)
        }
    }
}
```

Can be just text.

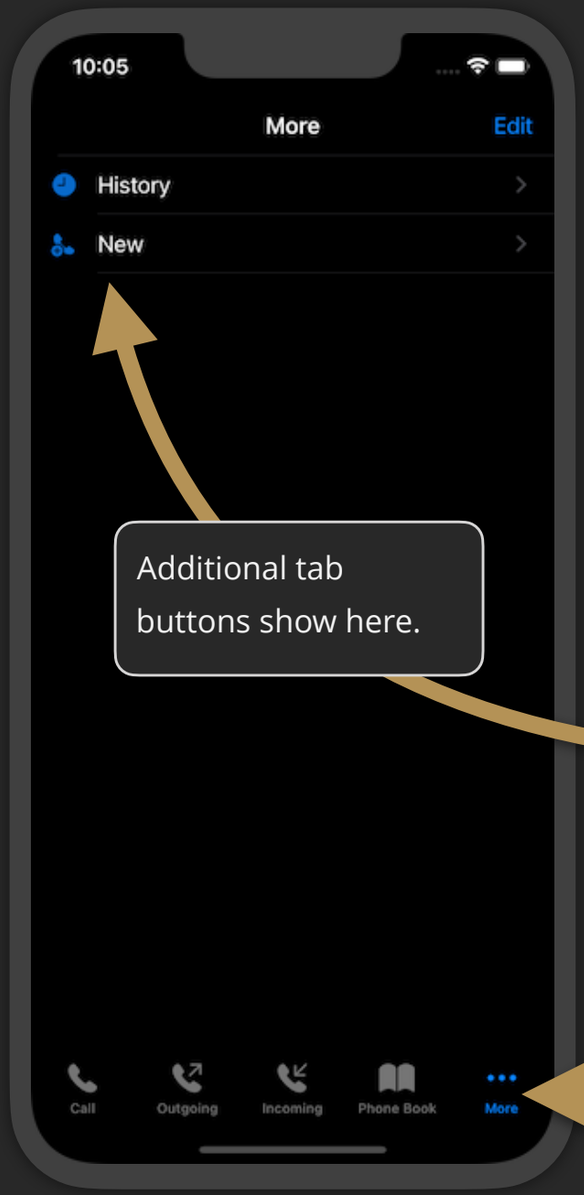
Or just an image.

Can use both.
Order doesn't matter.

iOS 14

You can even use a Label for the text and image.

Too Many Tabs

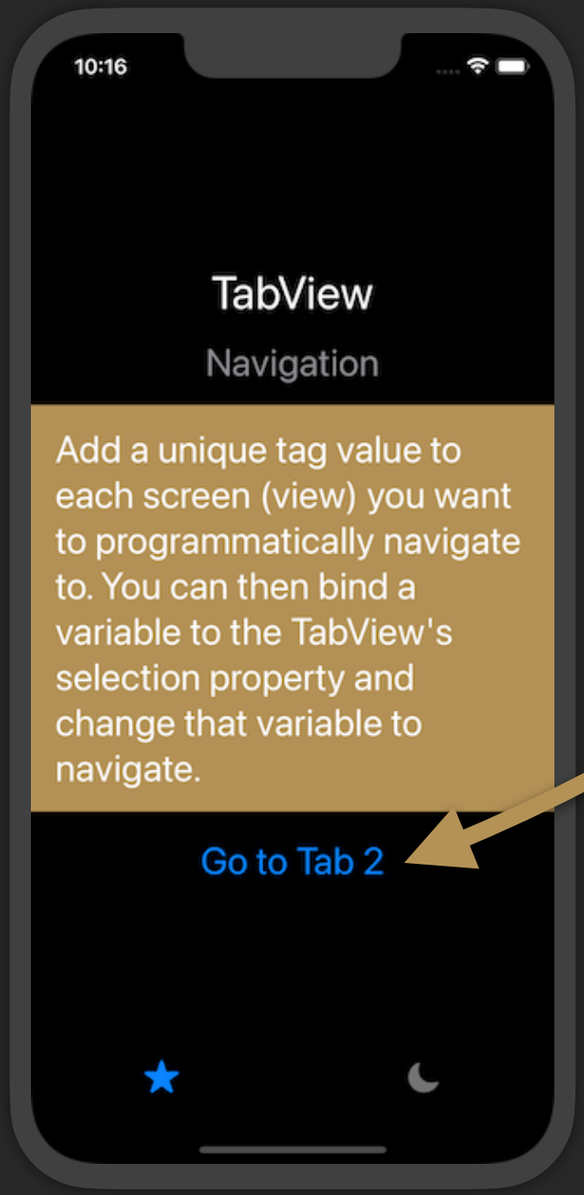


Additional tab buttons show here.

```
TabView {
    Text("Call Screen").tabItem {
            Image(systemName: "phone")
            Text("Call")
    }
    Text("Outgoing Phone Calls Screen").tabItem {
            Image(systemName: "phone.arrow.up.right")
            Text("Outgoing")
    }
    Text("Incoming Phone Calls Screen").tabItem {
            Image(systemName: "phone.arrow.down.left")
            Text("Incoming")
    }
    Text("Phone Book Screen").tabItem {
            Image(systemName: "book")
            Text("Phone Book")
    }
    Text("History Screen").tabItem {
            Image(systemName: "clock")
            Text("History")
    }
    Text("New Phone Number").tabItem {
            Image(systemName: "phone.badge.plus")
            Text("New")
    }
}
```

When there are too many tabs to fit for the device, the **More** button is created where you can find the rest of the tabs listed out.

Navigation

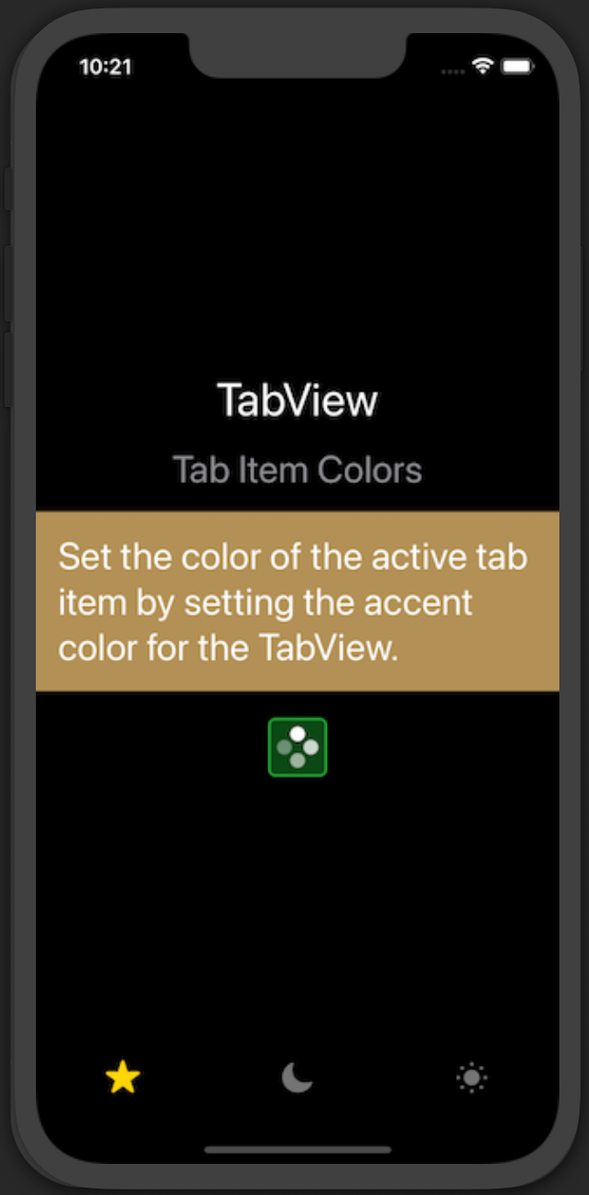



```
struct TabView_Navigating : View {
    @State private var selectedTab = 1 // Set which tab is active

    var body: some View {
        // Tell the TabView which variable to listen to for changes
        TabView(selection: $selectedTab) {
            // Tab 1
            VStack(spacing: 20) {
                HeaderView("TabView",
                           subtitle: "Navigation",
                           desc: "Add a unique tag value to each screen (view) you want to
                                  programmatically navigate to. You can then bind a variable to
                                  the TabView's selection property and change that variable to
                                  navigate.")

                Button("Go to Tab 2") {
                    selectedTab = 2
                }
                .tabItem {
                    Image(systemName: "star.fill")
                }
                .tag(1)

                // Tab 2
                VStack {
                    Text("Second Screen")
                }
                .tabItem {
                    Image(systemName: "moon.fill")
                }
                .tag(2)
            }
            .font(.title)
        }
}
```

Change the state property bound to the TabView's selection parameter to navigate to a different tab.

Add tags to enable programmatically navigating to tabs.

Colors




```
struct TabView_Colors : View {
    var body: some View {
        TabView {
            // Tab 1
            VStack(spacing: 20) {
                HeaderView("TabView",
                           subtitle: "Tab Item Colors",
                           desc: "Set the color of the active tab item by setting the accent
                                  color for the TabView.")

                Image("AccentColor")
            }
            .tabItem {
                Image(systemName: "star.fill")
            }
            // Tab 2
            Text("Second Screen")
                .tabItem {
                    Image(systemName: "moon.fill")
                }
                .foregroundColor(Color.red)
            // Tab 3
            Text("Third Screen")
                .tabItem {
                    Image(systemName: "sun.min.fill")
                }
        }
        .font(.title)
        .accentColor(.yellow)
    }
}
```

Notice that I am setting the foreground color of the second tabItem to red. This will have no effect on the color of the tab item. The background modifier will not work either.

The only thing that works is to set the accent color on the TabView itself.

iOS 14

TabView – Paging Style

This SwiftUI content is locked in this preview.

With the existing TabView, iOS now offers a new style for it that allows the views within a TabView to be able to be swiped horizontally and "snap" into place when the view enters the screen.

This is a push-out view.

UNLOCK THE BOOK TODAY FOR ONLY $55!

Text

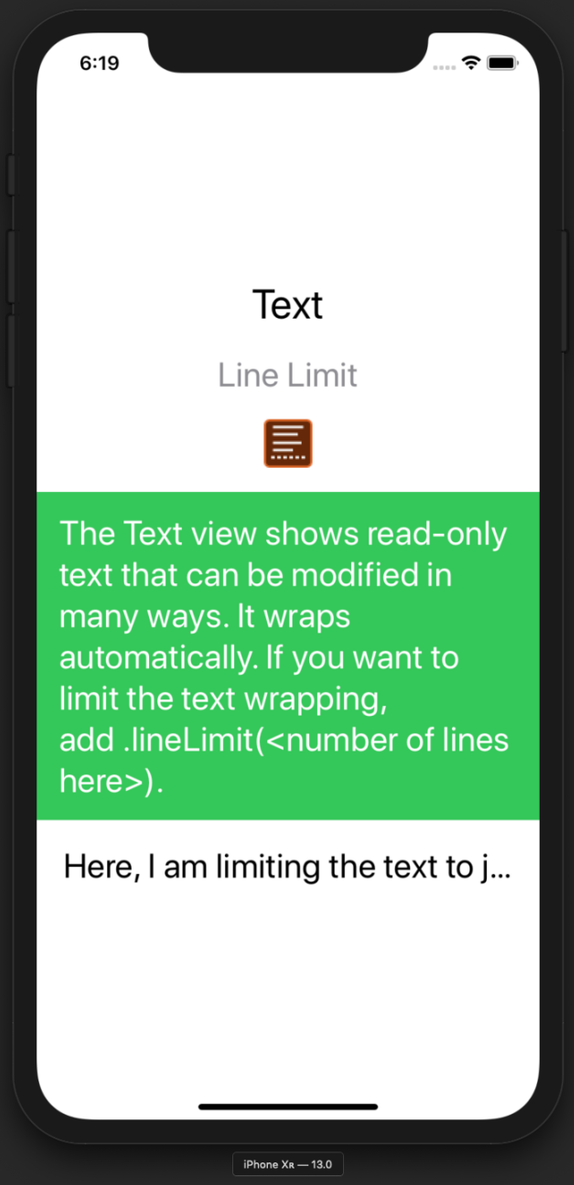
The text view will probably be one of your most-used views. It has many, if not the most, modifiers available to it.

This is a pull-in view.

Text

Line Limit

Text

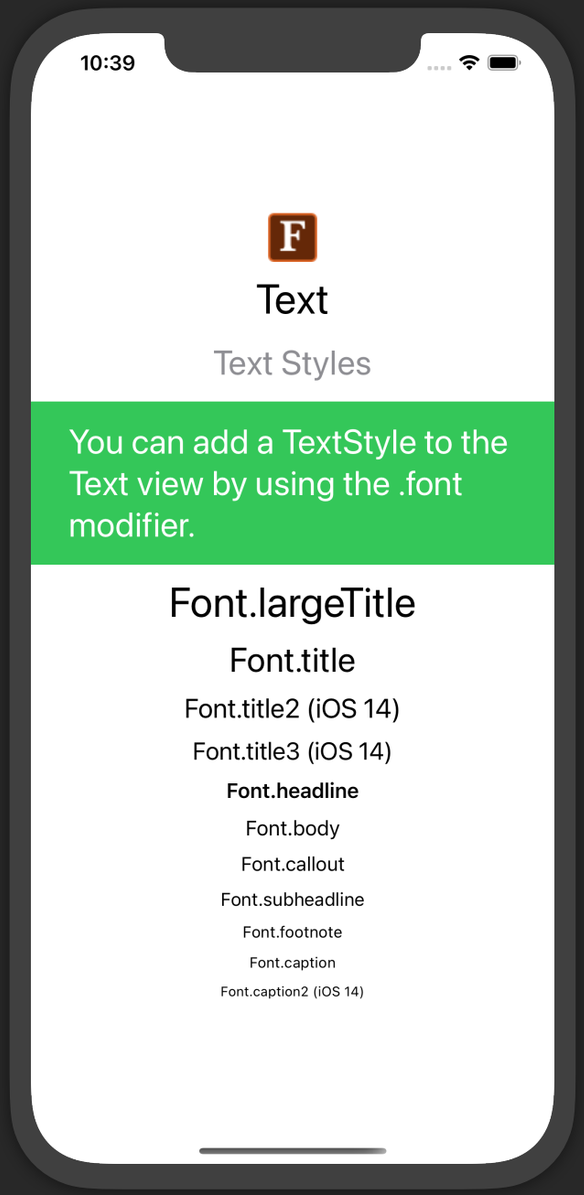



```
VStack(spacing: 20) {
    Text("Text")
        .font(.largeTitle)

    Text(“Line Limit”)
        .font(.title)
        .foregroundColor(.gray)

    Image("LineLimit")

    Text("The Text view shows read-only text that can be modified in many ways. It wraps
automatically. If you want to limit the text wrapping, add .lineLimit(<number of lines here>).")
        ...

    Text("Here, I am limiting the text to just one line.")
        .lineLimit(1)
        .font(.title)
        .padding(.horizontal)
}
```

Text

Text Styles

Text




```swift
struct Text_TextStyles: View {
    var body: some View {
        VStack(spacing: 10) {
            Image("Font")

            HeaderView("Text",
                       subtitle: "Text Styles",
                       desc: "You can add a TextStyle to the Text view by using the .font
                              modifier.",
                       back: .green, textColor: .white)
                .font(.title)


            Group {
                Text("Font.largeTitle").font(.largeTitle)
                Text("Font.title").font(.title)
                Text("Font.title2 (iOS 14)").font(.title2)
                Text("Font.title3 (iOS 14)").font(.title3)
            }
            Group {
                Text("Font.headline").font(.headline)
                Text("Font.body").font(.body)
                Text("Font.callout").font(.callout)
                Text("Font.subheadline").font(.subheadline)
                Text("Font.footnote").font(.footnote)
                Text("Font.caption").font(.caption)
                Text("Font.caption2 (iOS 14)").font(.caption2)
            }
        }
    }
}
```

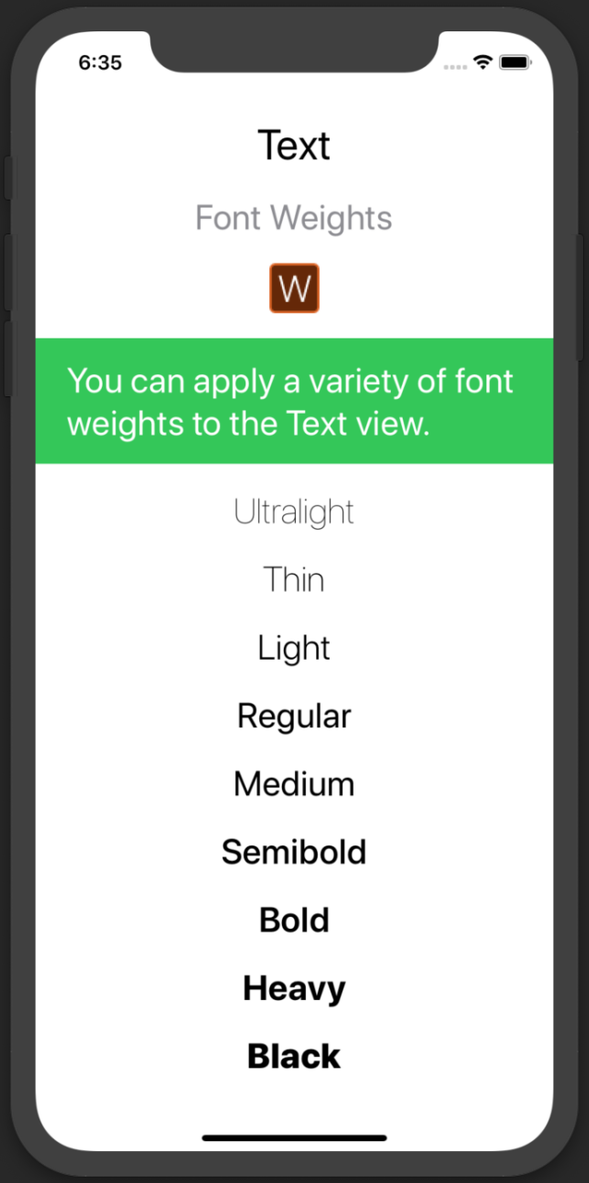
iOS 14

iOS 14

Text

Weights

Text




```swift
Text("Text")
    .font(.largeTitle)
Text("Font Weights")
    .font(.title)
    .foregroundColor(.gray)
Image("FontWeight")
Text("You can apply a variety of font weights to the Text view.")
    .padding()
    .frame(maxWidth: .infinity)
    .background(Color.green)
    .foregroundColor(.white)
    .font(.title)

Group { // Too many views (> 10) in one container
    Text("Ultralight")
        .fontWeight(.ultraLight)
    Text("Thin")
        .fontWeight(.thin)
    Text("Light")
        .fontWeight(.light)
    Text("Regular")
        .fontWeight(.regular)
    Text("Medium")
        .fontWeight(.medium)
    Text("Semibold")
        .fontWeight(.semibold)
    Text("Bold")
        .fontWeight(.bold)
    Text("Heavy")
        .fontWeight(.heavy)
    Text("Black")
        .fontWeight(.black)
}.font(.title)
```

Note: The fontWeight modifier can ONLY be applied to Text views.

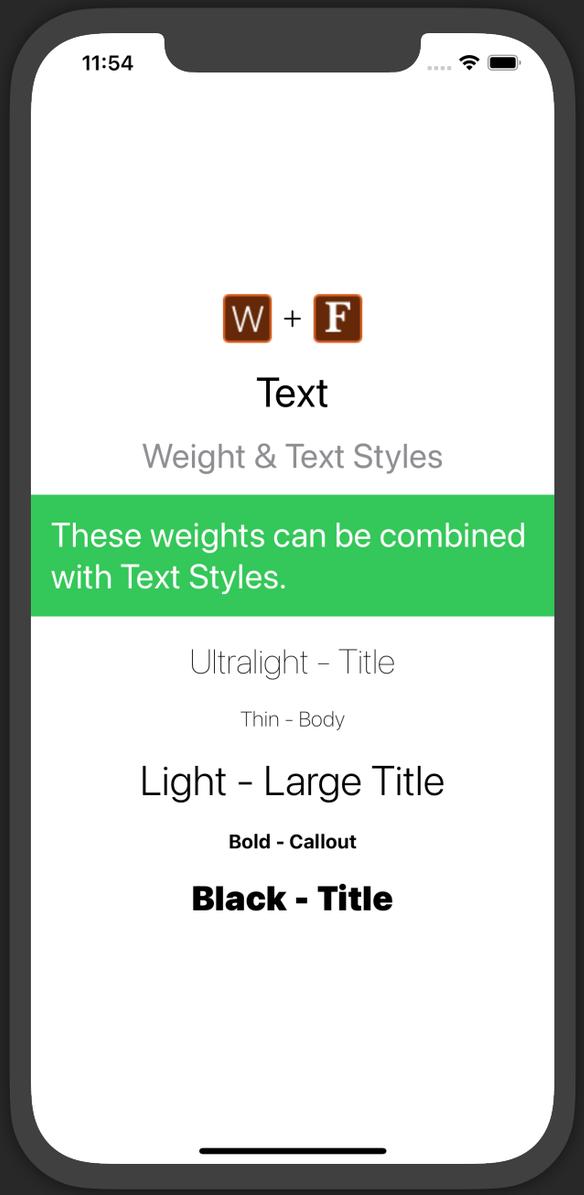
Unlike the font modifier which can be applied to any view.

To apply weight to any view using the font modifier, see next page.

Text

Weight & Text Style Combined

Text



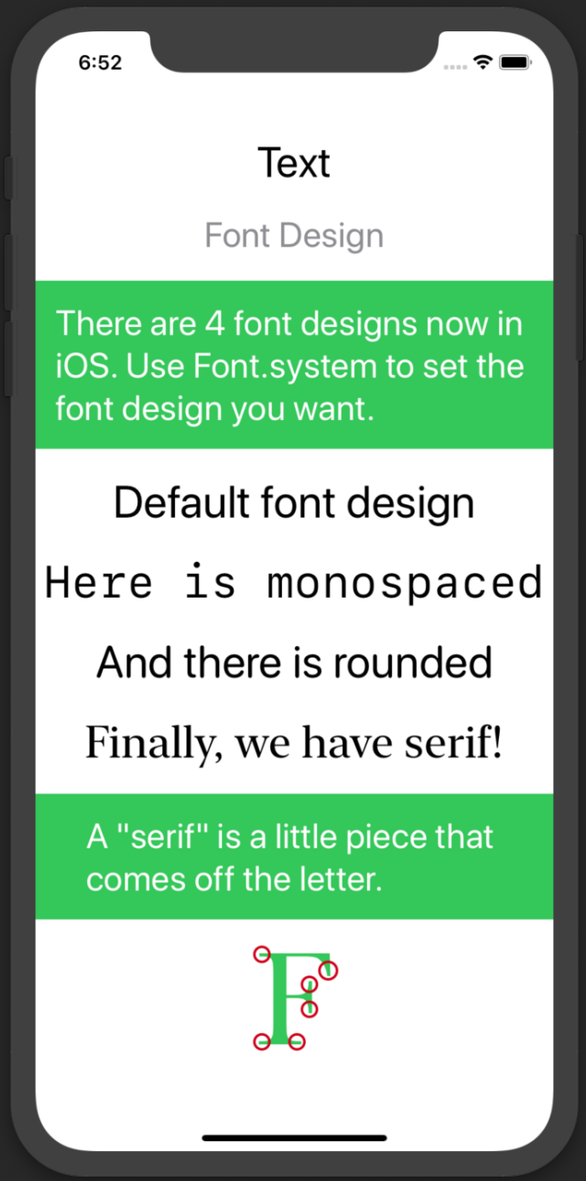

```
struct Text_Weights_TextStyles: View {
    var body: some View {
        return VStack(spacing: 20) {
            HStack {
                Image("FontWeight")
                Image(systemName: "plus")
                Image("Font")
            }

            HeaderView("Text", subtitle: "Weight & Text Styles",
                       desc: "These weights can be combined with Text Styles.",
                       back: .green, textColor: .white)
                .font(.title)

            Text("Ultralight - Title")
                .fontWeight(.ultraLight)
                .font(.title)
            Text("Thin - Body")
                .fontWeight(.thin)
                .font(.body)
            Text("Light - Large Title")
                .fontWeight(.light)
                .font(.largeTitle)
            Text("Bold - Callout")
                .fontWeight(.bold)
                .font(.callout)
            Text("Black - Title")
                .font(Font.title.weight(.black))
        }
    }
}
```

Instead of two modifiers, you can combine text style and weight in just ONE modifier like this.

Text

Font Design

Text



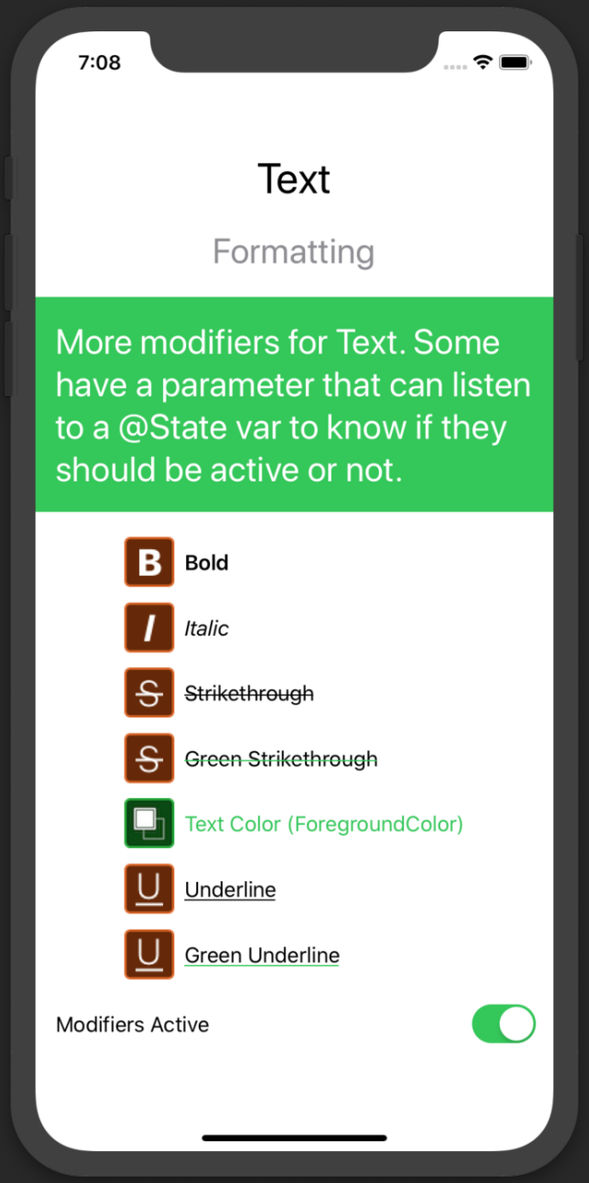

```
struct Text_FontDesign : View {
    var body: some View {
        VStack(spacing: 10) {
            HeaderView("Text", subtitle: "Font Design", desc: "There are 4 font designs now in
                       iOS. Use Font.system to set the font design you want.",
                        back: .green, textColor: .white)

            Text("Default font design")
                .font(Font.system(size: 30, design: Font.Design.default))

            // You can remove the "Font.Design" of the enum
            Text("Here is monospaced")
                .font(.system(size: 30, design: .monospaced))

            Text("And there is rounded")
                .font(.system(.title, design: .rounded))

            Text("Finally, we have serif!")
                .font(.system(.title, design: .serif))

            DescView(desc: "A \"serif\" is a little piece that comes off the letter.",
                back: .green, textColor: .white)

            Image("Serif")
        }
        .font(.title)
    }
}
```

Set the design with a hard-coded size or use a text style.

Text

Formatting

Text

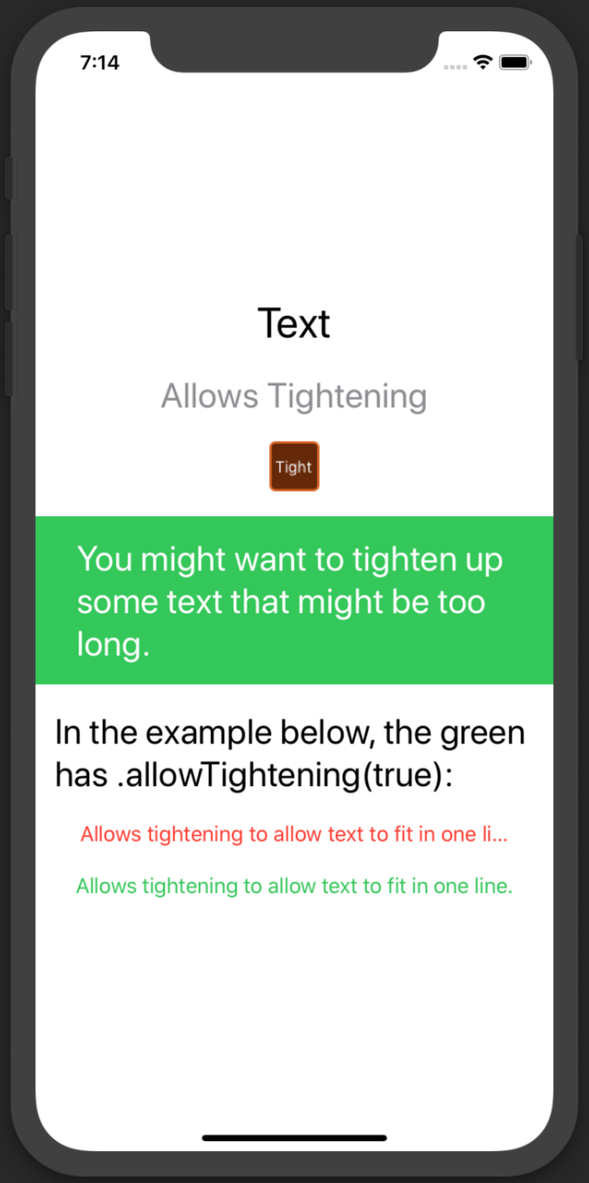



```
@State private var modifierActive = true
...
HStack {
    Image("Bold")
    Text("Bold").bold()
}
HStack {
    Image("Italic")
    Text("Italic").italic()
}
HStack {
    Image("Strikethrough")
    Text("Strikethrough").strikethrough()
}
HStack {
    Image("Strikethrough")
    Text("Green Strikethrough")
        .strikethrough(modifierActive, color: .green)
}
HStack {
    Image("ForegroundColor")
    Text("Text Color (ForegroundColor)").foregroundColor(.green)
}
HStack {
    Image("Underline")
    Text("Underline").underline()
}
HStack {
    Image("Underline")
    Text("Green Underline").underline(modifierActive, color: .green)
}
...
Toggle("Modifiers Active", isOn: $modifierActive)
```

Text

Allows Tightening

Text



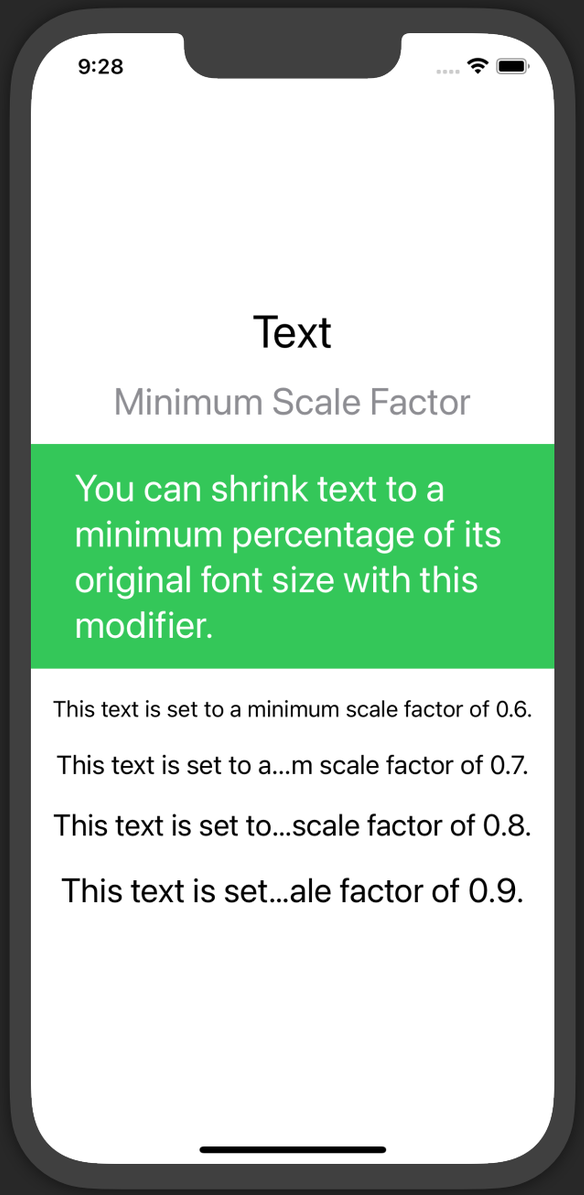

```
VStack(spacing: 20) {
...

    Image("AllowsTightening")

    Text("You might want to tighten up some text that might be too long.")
        ...

    Text("In the example below, the green has .allowTightening(true)")
        ...

    Group {
        Text("Allows tightening to allow text to fit in one line.")
            .foregroundColor(.red)
            .allowsTightening(false)
            .padding(.horizontal)
            .lineLimit(1)
        Text("Allows tightening to allow text to fit in one line.")
            .foregroundColor(.green)
            .allowsTightening(true)
            .padding(.horizontal)
            .lineLimit(1)
    }.padding(.horizontal)
}
```

Allows Tightening can be helpful when you see the last word getting truncated. Applying it may not even fully work depending on just how much space can be tightened. With the default font, I notice I can get a couple of characters worth of space to tighten up.

Text

Minimum Scale Factor

Text



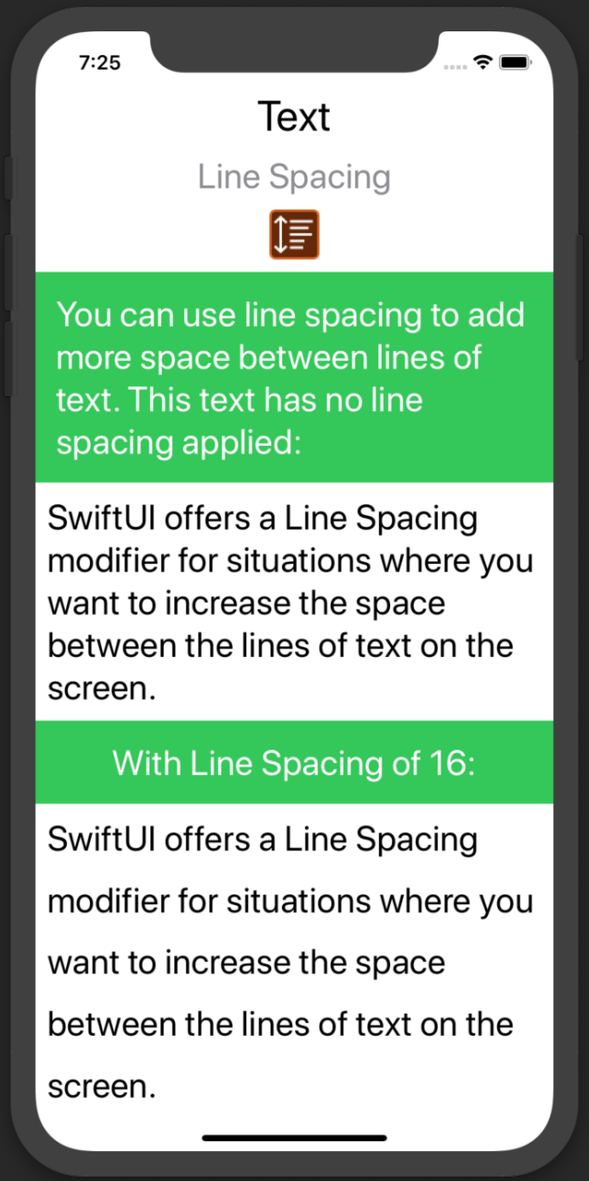

```
struct Text_MinimumScaleFactor : View {
    var body: some View {
        VStack(spacing: 20) {
            HeaderView("Text",
                       subtitle: "Minimum Scale Factor",
                       desc: "You can shrink text to a minimum percentage of its original font
                              size with this modifier.",
                       back: .green, textColor: .white)

            Group {
                Text("This text is set to a minimum scale factor of 0.6.")
                    .lineLimit(1)
                    .minimumScaleFactor(0.6)
                Text("This text is set to a minimum scale factor of 0.7.")
                    .lineLimit(1)
                    .minimumScaleFactor(0.7)
                Text("This text is set to a minimum scale factor of 0.8.")
                    .lineLimit(1)
                    .minimumScaleFactor(0.8)
                Text("This text is set to a minimum scale factor of 0.9.")
                    .lineLimit(1)
                    .minimumScaleFactor(0.9)
            }
            .truncationMode(.middle)
            .padding(.horizontal)
        }
        .font(.title)
    }
}
```

.minimumScaleFactor takes a fraction from 0 to 1. For example, 0.3 is 30% of the original size of the font that it can shrink. If the font size is 100, then it can shrink to 30.

Text

Line Spacing

Text

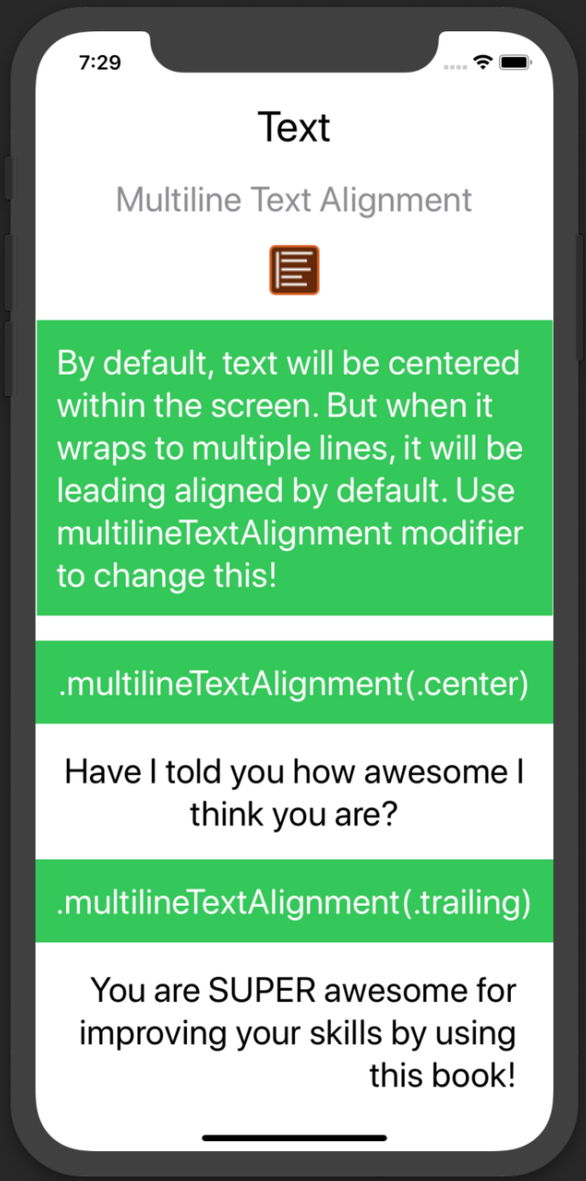



```
VStack(spacing: 10) {
    Text("Text").font(.largeTitle)
    Text("Line Spacing").font(.title).foregroundColor(.gray)
    Image("LineSpacing")

    Text("You can use line spacing to add more space between lines of text. This text has no
line spacing applied:")
        .font(.title)
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.green)
        .foregroundColor(Color.white)

    Text("SwiftUI offers a Line Spacing modifier for situations where you want to increase the
space between the lines of text on the screen.")
        .font(.title)

    Text("With Line Spacing of 16:")
        .font(.title)
        .frame(maxWidth: .infinity)
        .padding()
        .background(Color.green)
        .foregroundColor(Color.white)

    Text("SwiftUI offers a Line Spacing modifier for situations where you want to increase the
space between the lines of text on the screen.")
        .lineSpacing(16.0) // Add spacing between lines
        .font(.title)
}
```

Text

Alignment

Text

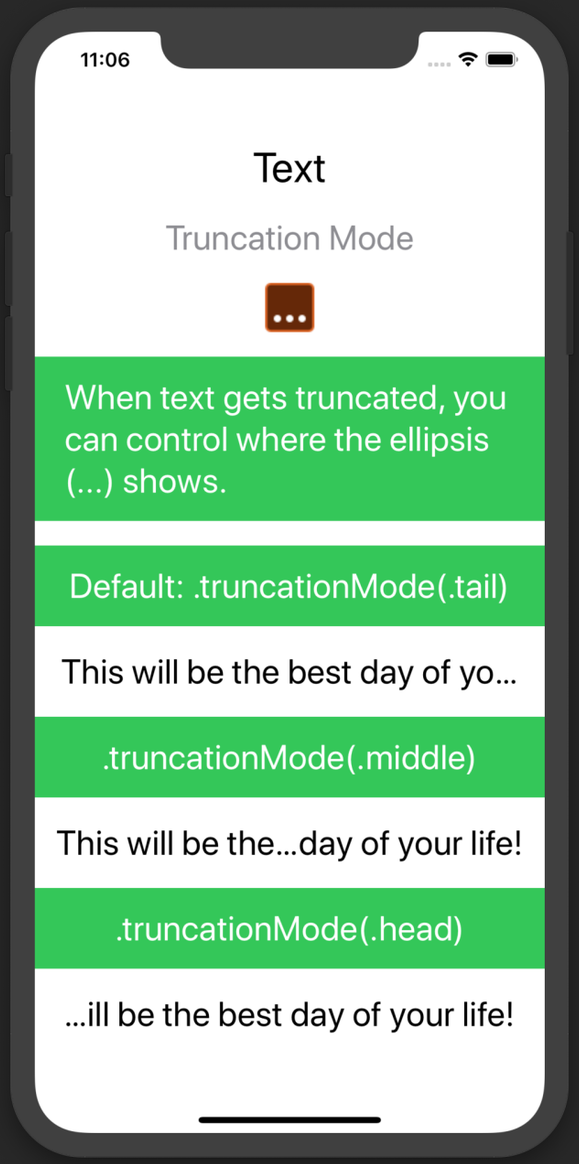



```
VStack(spacing: 20) {
    Text("Text").font(.largeTitle)
    Text("Multiline Text Alignment").foregroundColor(.gray)
    Image("MultilineTextAlignment")
    Text("By default, text will be centered within the screen. But when it wraps to multiple
lines, it will be leading aligned by default. Use multilineTextAlignment modifier to change
this!")
        ...

    Text(".multilineTextAlignment(.center)")
        .frame(maxWidth: .infinity)
        .padding()
        .foregroundColor(.white)
        .background(Color.green)

    Text("Have I told you how awesome I think you are?")
        .multilineTextAlignment(.center) // Center align
        .padding(.horizontal)

    Text(".multilineTextAlignment(.trailing)")
        .frame(maxWidth: .infinity)
        .padding()
        .foregroundColor(.white)
        .background(Color.green)
        .allowsTightening(true) // Prevent truncation

    Text("You are SUPER awesome for improving your skills by using this book!")
        .multilineTextAlignment(.trailing) // Trailing align
        .padding(.horizontal)
}
.font(.title) // Apply this text style to all text views
```

Text

Truncation Mode

Text

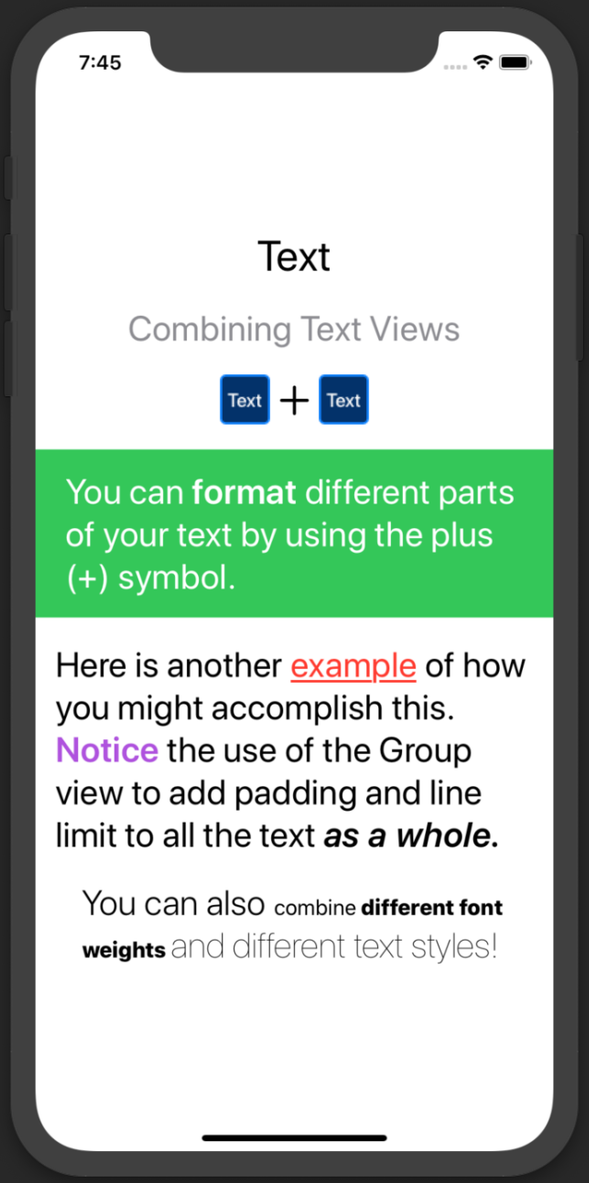



```
VStack(spacing: 20) {
    Text("Text").font(.largeTitle)
    Text("Truncation Mode").font(.title).foregroundColor(.gray)
    Image("TruncationMode")
    Text("When text gets truncated, you can control where the ellipsis (...) shows.")
        .frame(maxWidth: .infinity).padding()
        .foregroundColor(.white).background(Color.green)
        .font(.title)
    Text("Default: .truncationMode(.tail)")
        .frame(maxWidth: .infinity).padding()
        .foregroundColor(.white).background(Color.green)
        .font(.title)
    // Text automatically defaults at end
    Text("This will be the best day of your life!")
        .padding(.horizontal)
        .lineLimit(1)
    Text(".truncationMode(.middle)")
        .frame(maxWidth: .infinity).padding()
        .foregroundColor(.white).background(Color.green)
    Text("This will be the best day of your life!")
        .truncationMode(.middle) // Truncate in middle
        .padding(.horizontal)
        .lineLimit(1)
    Text(".truncationMode(.head)")
        .frame(maxWidth: .infinity).padding()
        .foregroundColor(.white).background(Color.green)
    Text("This will be the best day of your life!")
        .truncationMode(.head) // Truncate at beginning
        .padding(.horizontal)
        .lineLimit(1)
}
.font(.title)
```

Text

Combining Modified Text

Text



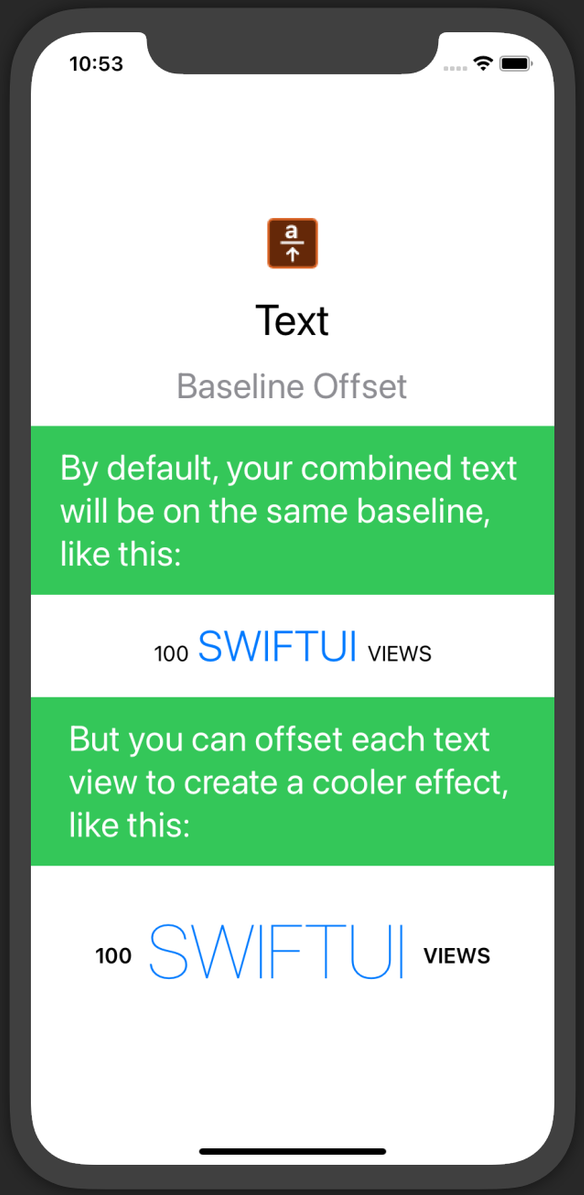

```
Group {
    Text("You can ")
        + Text("format").bold()
        + Text (" different parts of your text by using the plus (+) symbol.")
}
...
Group {
    Text("Here is another ")
        + Text("example").foregroundColor(.red).underline()
        + Text (" of how you might accomplish this. ")
        + Text("Notice").foregroundColor(.purple).bold()
        + Text (" the use of the Group view to add padding and line limit to all the text ")
        + Text("as a whole.").bold().italic()
}
.font(.title)
.padding(.horizontal)

Group {
    Text("You can also ").font(.title).fontWeight(.light)
        + Text("combine")
        + Text(" different font weights ").fontWeight(.black)
        + Text("and different text styles!").font(.title).fontWeight(.ultraLight)
}
.padding(.horizontal)
```

Although you see I'm wrapping my Text views in a Group, it is not required. I only do this so I can apply common modifiers to everything within the Group. See section on the Group view for more information.

Text

Baseline Offset

Text

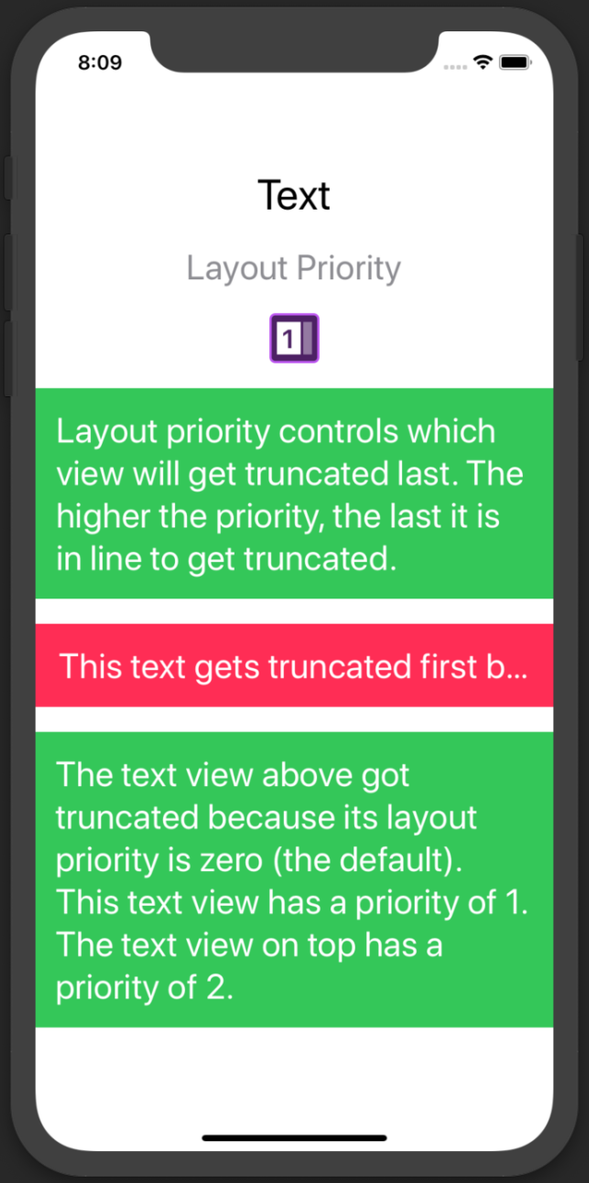



```
struct Text_BaselineOffset : View {
    var body: some View {
        VStack(spacing: 20) {
            Image("BaselineOffset")
            HeaderView("Text",
                       subtitle: "Baseline Offset",
                       desc: "By default, your combined text will be on the same baseline, like
this:", back: .green, textColor: .white)
                .font(.title)
                .layoutPriority(1)

            Text("100")
                + Text(" SWIFTUI ").font(.largeTitle).fontWeight(.light)
                .foregroundColor(.blue)
                + Text ("VIEWS")

            DescView(desc: "But you can offset each text view to create a cooler effect, like
this:", back: .green, textColor: .white)
                .font(.title)

            Group {
                Text("100").bold()
                    + Text(" SWIFTUI ")
                    .font(Font.system(size: 60))
                    .fontWeight(.ultraLight)
                    .foregroundColor(.blue)
                    .baselineOffset(-12) // Negative numbers make it go down
                    + Text ("VIEWS").bold()
            }
        }
    }
}
```

Text

Layout Priority

Text

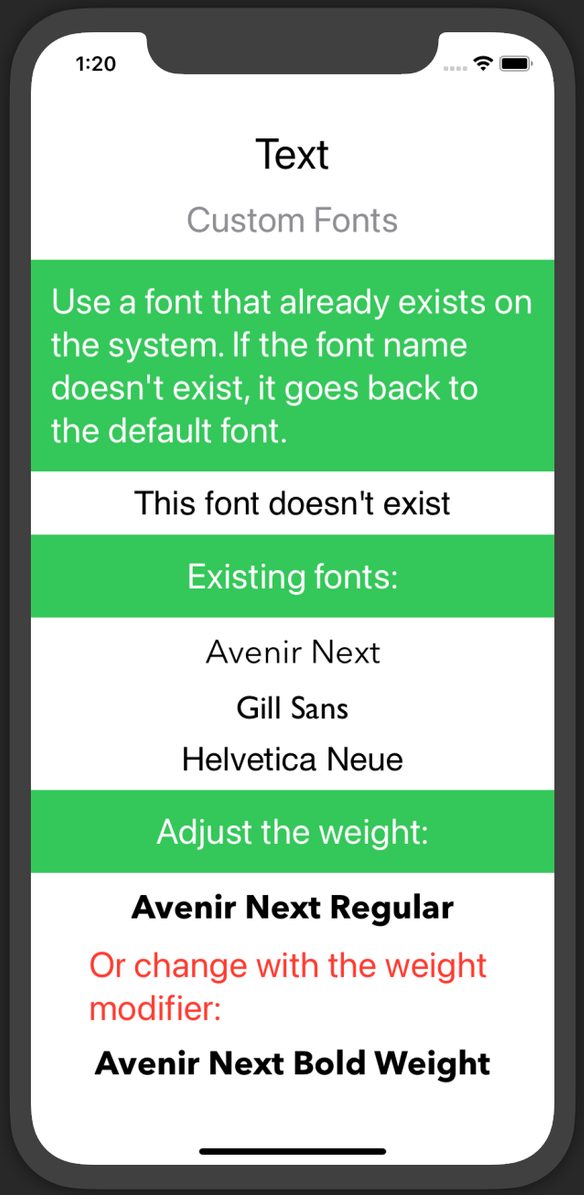



```
Text("Text")
    .font(.largeTitle)
Text("Layout Priority")
    .font(.title)
    .foregroundColor(.gray)

Image("LayoutPriority")

Text("Layout priority controls which view will get truncated last. The higher the priority, the
last it is in line to get truncated.")
    .font(.title)
    .foregroundColor(.white)
    .frame(maxWidth: .infinity)
    .padding()
    .background(Color.green)
    .layoutPriority(2) // Highest priority to get the space it needs

Text("This text gets truncated first because it has no priority.")
    .font(.title)
    .foregroundColor(.white)
    .frame(maxWidth: .infinity)
    .padding()
    .background(Color.pink)

Text("The text view above got truncated because its layout priority is zero (the default). This
text view has a priority of 1. The text view on top has a priority of 2.")
    .font(.title)
    .foregroundColor(.white)
    .frame(maxWidth: .infinity)
    .padding()
    .background(Color.green)
    .layoutPriority(1) // Next highest priority
```

Text

Custom Fonts

Text

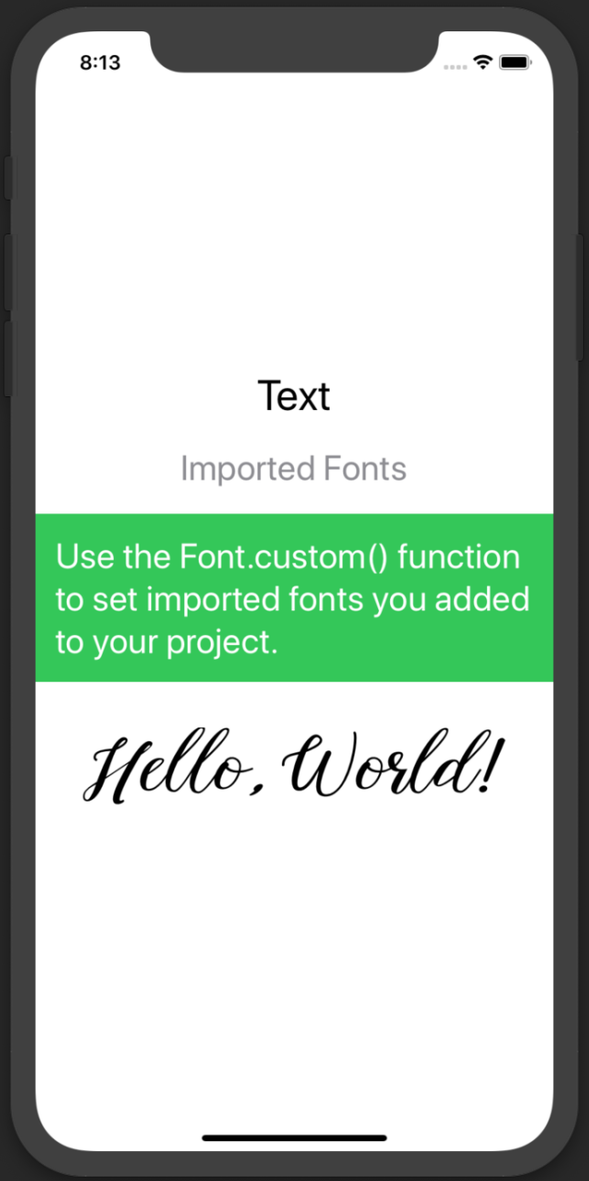



```
struct Text_CustomFont: View {
    var body: some View {
        VStack(spacing: 10) {
            HeaderView("Text",
                       subtitle: "Custom Fonts",
                       desc: "Use a font that already exists on the system. If the font name
doesn't exist, it goes back to the default font.", back: .green, textColor: .white)

            Text("This font doesn't exist")
                .font(Font.custom("No Such Font", size: 26))

            DescView(desc: "Existing fonts:", back: .green, textColor: .white)

            Text("Avenir Next")
                .font(Font.custom("Avenir Next", size: 26))

            Text("Gill Sans")
                .font(Font.custom("Gill Sans", size: 26))

            Text("Helvetica Neue")
                .font(Font.custom("Helvetica Neue", size: 26))

            DescView(desc: "Adjust the weight:", back: .green, textColor: .white)

            Text("Avenir Next Regular")
                .font(Font.custom("Avenir Next Bold", size: 26))

            Text("Or change with the weight modifier:")
                .foregroundColor(.red)

            Text("Avenir Next Bold Weight")
                .font(Font.custom("Avenir Next", size: 26).weight(.bold))
        }
        .font(.title)
        .ignoresSafeArea(edges: .bottom)
    }
}
```

Text

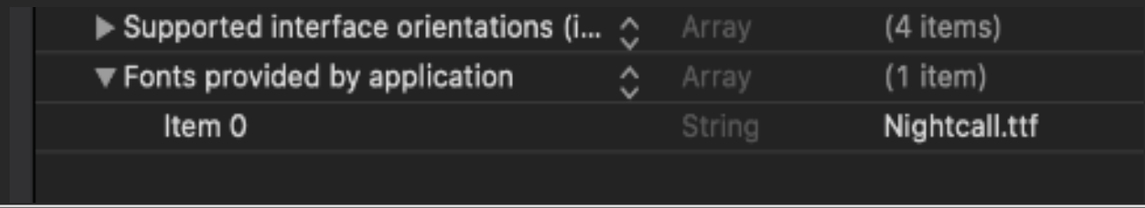
Imported Fonts

Text




```
struct Text_CustomFont: View {
    var body: some View {
        VStack(spacing: 20) {
            Text("Text")
                .font(.largeTitle)

            Text("Imported Fonts")
                .font(.title)
                .foregroundColor(.gray)

            Text("Use the Font.custom() function to set imported fonts you added to your
project.")
                ...

            Text("Hello, World!")
                .font(Font.custom("Nightcall", size: 60))
                .padding(.top)
        }
    }
}
```

In order for this to work, you have to add the font file to your project and be sure to have the font file target your project. Then you need to add the font file name to the Info.plist under the “Fonts provided by application” key:



Text

Custom Font Size & RelativeTo

iOS 14 Text

```
struct Text_CustomFontSize_RelativeTo: View {
    @ScaledMetric private var fontSize: CGFloat = 40
```

This SwiftUI content is locked in this preview.

Unlock over 20 more pages of what you can do with the Text view in the full version of the book.

UNLOCK THE BOOK TODAY FOR ONLY $55!

iOS 14

TextEditor

This SwiftUI chapter is locked in this preview.

You can use the TextEditor to provide text input from users that goes beyond just one line.

This is a push-out view.

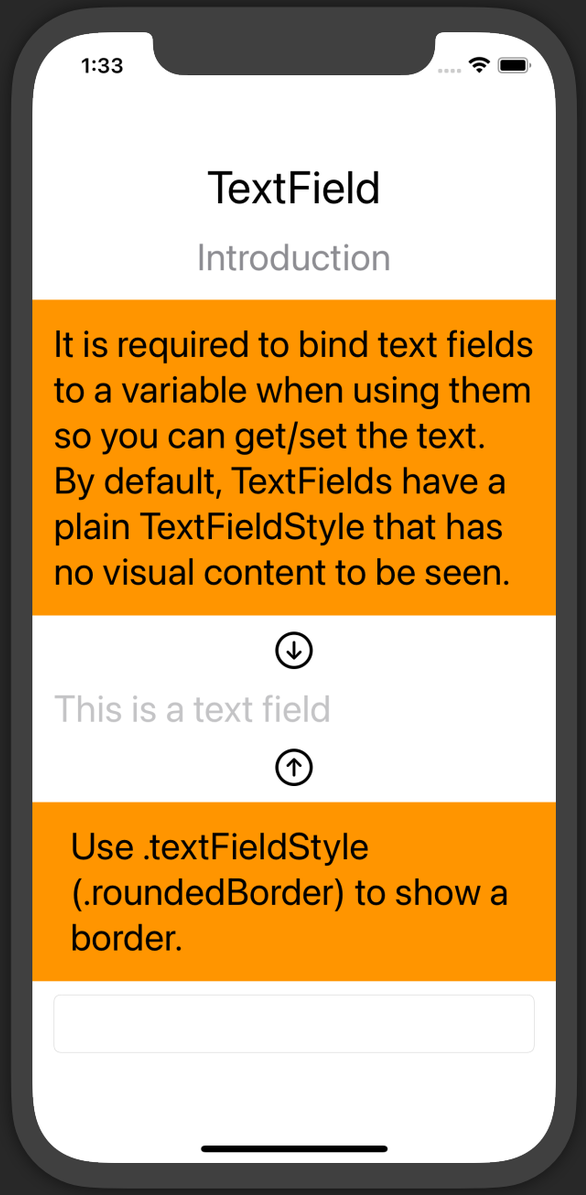
UNLOCK THE BOOK TODAY FOR ONLY $55!

TextField

In order to get or set the text in a TextField, you need to bind it to a variable. This variable is passed into the TextField's initializer. Then, all you need to do is change this bound variable's text to change what is in the TextField. Or read the bound variable's value to see what text is currently in the TextField.

This is a push-out horizontally view.

Introduction




```
struct TextField_Intro : View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 10) {
            HeaderView("TextField", subtitle: "Introduction",
                       desc: "It is required to bind text fields to a variable when using them
                              so you can get/set the text. \nBy default, TextFields have a plain
                              TextFieldStyle that has no visual content to be seen.",
                       back: .orange)
            Image(systemName: "arrow.down.circle")
            TextField("This is a text field", text: $textFieldData)
                .padding(.horizontal)
            Image(systemName: "arrow.up.circle")

            Text("Use .textFieldStyle (.roundedBorder) to show a border.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.orange)
            TextField("", text: $textFieldData)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
        }
        .font(.title)
    }
}
```

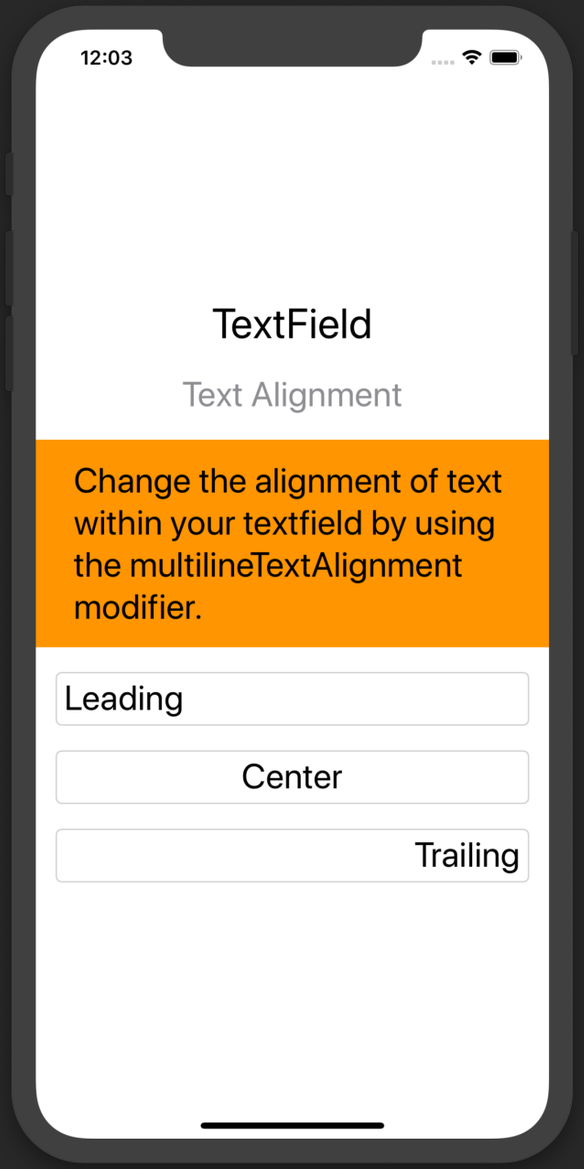
For textFieldStyle, use:

< iOS 15	`RoundedBorderTextFieldStyle()`
iOS 15+	`.roundedBorder`

Title (Placeholder or Hint Text)


```
struct TextField_Placeholder : View {
    @State private var textFieldData = ""
    @State private var username = ""
    @State private var password = ""

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField")
                .font(.largeTitle)

            Text("Title Text (Placeholder or Hint)")
                .foregroundColor(.gray)

            Text("You can supply title text (placeholder/hint text) through the first parameter
to let the user know the purpose of the text field.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.orange)

            Group {
                TextField("Here is title text", text: $textFieldData)
                    .textFieldStyle(.roundedBorder)

                TextField("User name", text: $username)
                    .textFieldStyle(.roundedBorder)

                TextField("Password", text: $password)
                    .textFieldStyle(.roundedBorder)
            }
            .padding(.horizontal)
        }.font(.title)
    }
}
```

Text Alignment

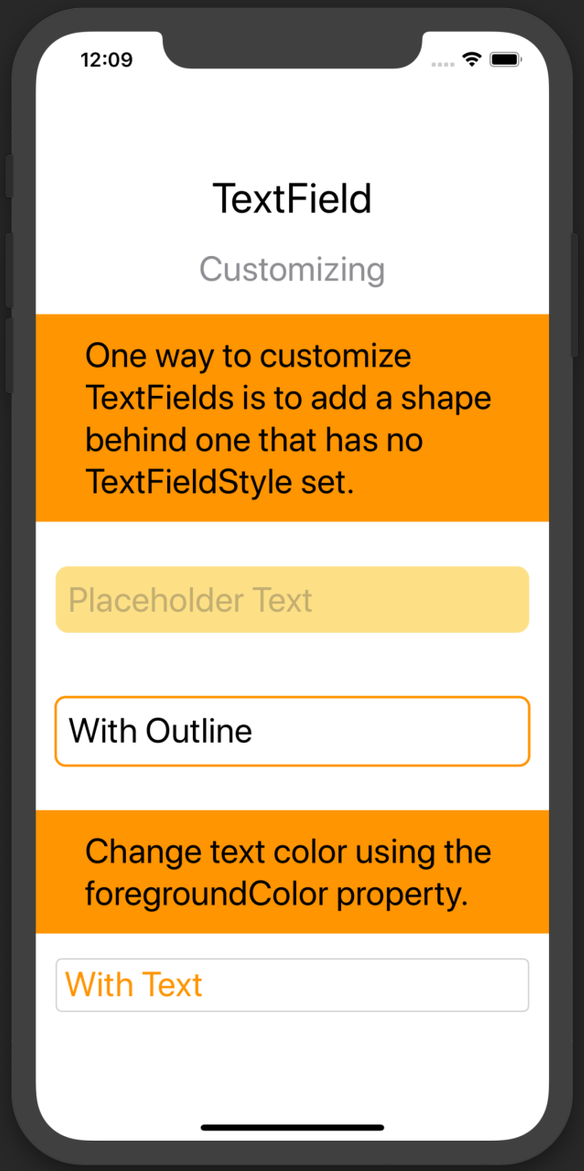



```
struct TextField_Alignment: View {
    @State private var textFieldData1 = "Leading"
    @State private var textFieldData2 = "Center"
    @State private var textFieldData3 = "Trailing"

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField").font(.largeTitle)
            Text("Text Alignment").foregroundColor(.gray)
            Text("Change the alignment of text within your textfield by using the
multilineTextAlignment modifier.")
                .frame(maxWidth: .infinity).padding()
                .background(Color.orange)

            Group {
                TextField("Leading", text: $textFieldData1)
                    .textFieldStyle(.roundedBorder)
                    .multilineTextAlignment(.leading) // Default

                TextField("Center", text: $textFieldData2)
                    .textFieldStyle(.roundedBorder)
                    .multilineTextAlignment(.center)

                TextField("Trailing", text: $textFieldData3)
                    .textFieldStyle(.roundedBorder)
                    .multilineTextAlignment(.trailing)
            }
            .padding(.horizontal)
        }.font(.title)
    }
}
```

Text Size and Fonts

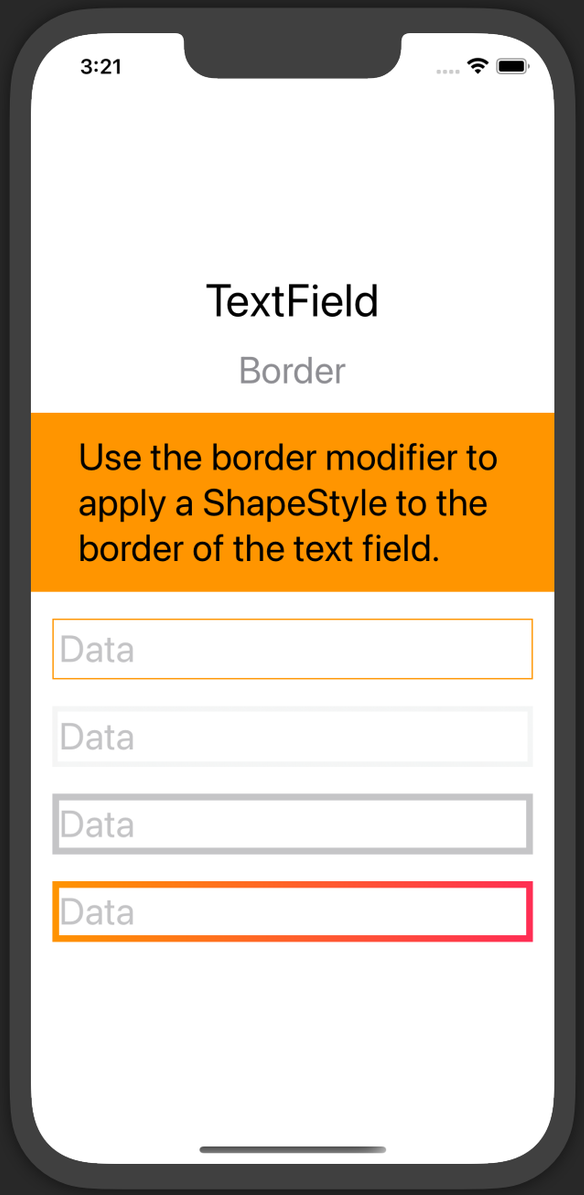

```
struct TextField_FontSize : View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField").font(.largeTitle)
            Text("With Text Modifiers").foregroundColor(.gray)
            Image("Font")
            Text("To change the size of the font used within the TextField, you just need to use
the font modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.orange)
            Group {
                TextField("first name", text: $textFieldData)
                    .textFieldStyle(.roundedBorder)

                TextField("first name", text: $textFieldData)
                    .font(Font.system(size: 36, design: .monospaced))
                    .textFieldStyle(.roundedBorder)

                TextField("first name", text: $textFieldData)
                    .font(Font.system(size: 20, design: Font.Design.serif))
                    .textFieldStyle(.roundedBorder)
            }
            .padding(.horizontal)

            Text("Notice this also changes the placeholder or hint text in the text field.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.orange)
        }.font(.title)
    }
}
```

Customizing Colors




```
struct TextField_Customizing : View {
    @State private var textFieldWithText = "With Text"
    @State private var textFieldNoText = ""
    @State private var withOutline = "With Outline"

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField").font(.largeTitle)
            Text("Customizing").foregroundColor(.gray)
            Text("One way to customize TextFields is to add a shape behind one that has no
TextFieldStyle set.")
                .frame(maxWidth: .infinity).padding().background(Color.orange)

            TextField("Placeholder Text", text: $textFieldNoText)
                .padding(10)
                .background(RoundedRectangle(cornerRadius: 10)
                    .foregroundColor(Color(hue: 0.126, saturation: 0.47, brightness: 0.993)))
                .padding()
            TextField("Placeholder Text", text: $withOutline)
                .padding(10)
                .overlay(
                    // Add the outline
                    RoundedRectangle(cornerRadius: 8)
                        .stroke(Color.orange, lineWidth: 2)
            )
                .padding()

            Text("Change text color using the foregroundColor property.")
                .frame(maxWidth: .infinity).padding().background(Color.orange)

            TextField("first name", text: $textFieldWithText)
                .textFieldStyle(.roundedBorder)
                .foregroundColor(.orange)
                .padding(.horizontal)
        }.font(.title)
    }
}
```

Border

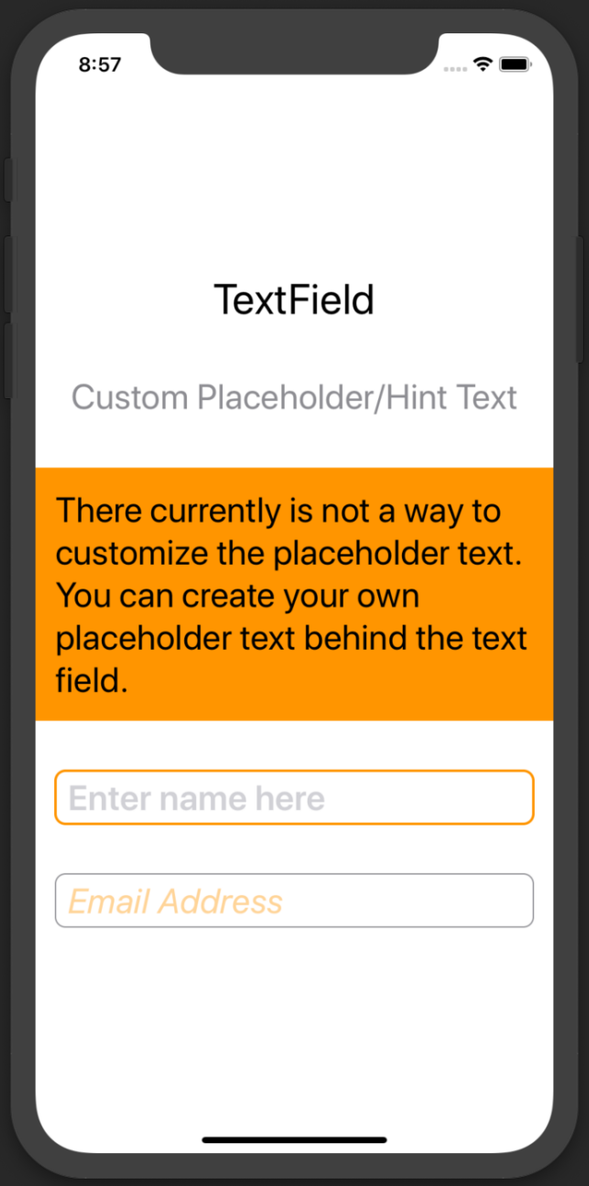



```
struct TextField_Border: View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("TextField", subtitle: "Border",
                       desc: "Use the border modifier to apply a ShapeStyle to the border of the
                              text field.",
                       back: .orange)

            Group {
                TextField("Data", text: $textFieldData)
                    .padding(5)
                    .border(Color.orange)

                TextField("Data", text: $textFieldData)
                    .padding(5)
                    .border(.ultraThickMaterial, width: 4)

                TextField("Data", text: $textFieldData)
                    .padding(5)
                    .border(.tertiary, width: 5)

                TextField("Data", text: $textFieldData)
                    .padding(5)
                    .border(LinearGradient(colors: [.orange, .pink],
                                           startPoint: .topLeading,
                                           endPoint: .bottomTrailing), width: 5)
            }
            .padding(.horizontal)
        }
        .font(.title)
    }
}
```

iOS 15

Material ShapeStyles are available in iOS 15.

Custom Placeholder/Hint Text

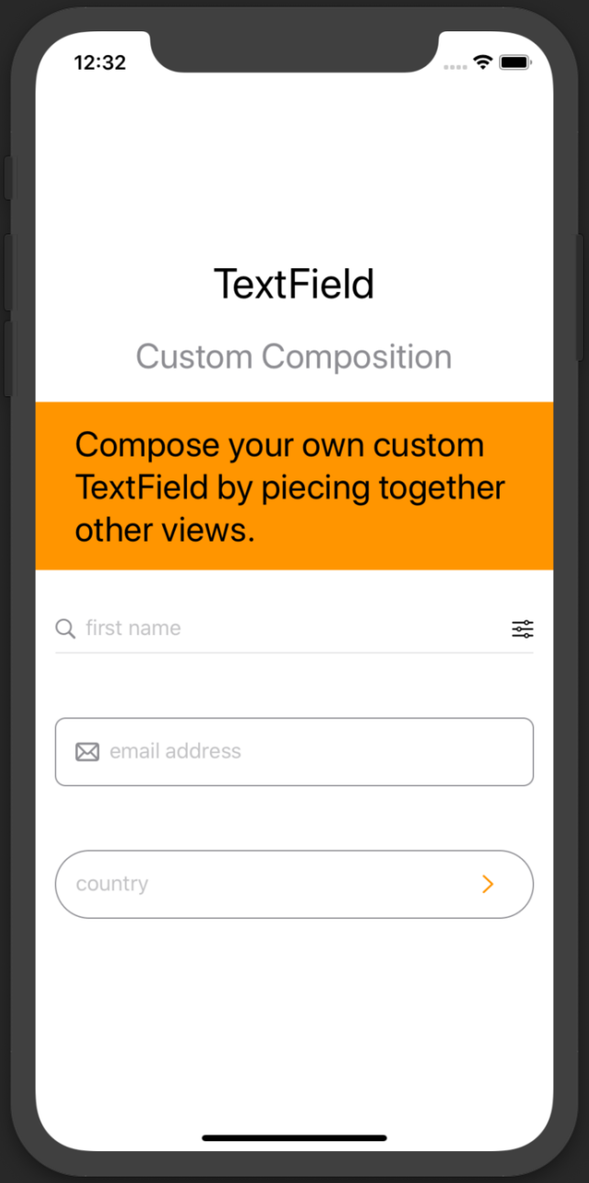



```
struct TextField_CustomPlaceholder: View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 40) {
            Text("TextField").font(.largeTitle)
            Text("Custom Placeholder/Hint Text").foregroundColor(.gray)
            Text("There currently is not a way to customize the placeholder text. You can create
your own placeholder text behind the text field.")
                .frame(maxWidth: .infinity).padding().background(Color.orange)

            Group {
                // First TextField
                ZStack(alignment: .leading) {
                    // Only show custom hint text if there is no text entered
                    if textFieldData.isEmpty {
                        Text("Enter name here").bold()
                            .foregroundColor(Color(.systemGray4))
                    }
                    TextField("", text: $textFieldData)
                }
                .padding(EdgeInsets(top: 4, leading: 10, bottom: 4, trailing: 10))
                .overlay(
                    // Add the outline
                    RoundedRectangle(cornerRadius: 8)
                        .stroke(Color.orange, lineWidth: 2))

                // Second TextField
                ZStack(alignment: .leading) {
                    if textFieldData.isEmpty {
                        Text("Email Address").italic()
```

Custom Placeholder/Hint Text Continued

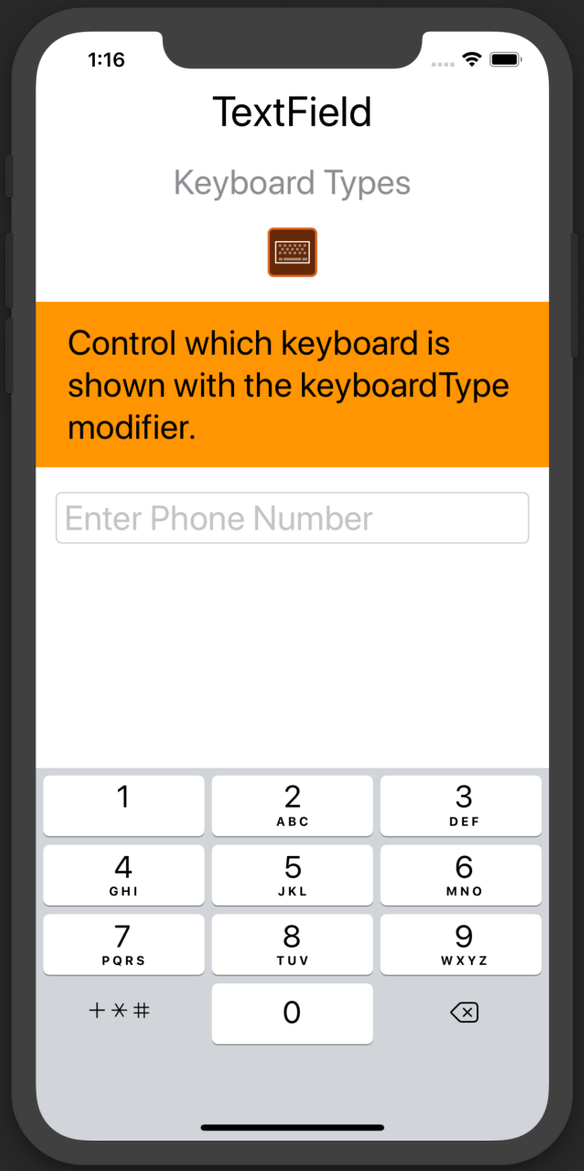
```
                            .foregroundColor(.orange)
                            .opacity(0.4)
                    }
                    TextField("", text: $textFieldData)
                }
                .padding(EdgeInsets(top: 4, leading: 10, bottom: 4, trailing: 10))
                .overlay(
                    RoundedRectangle(cornerRadius: 8)
                        .stroke(Color.gray, lineWidth: 1))
            }.padding(.horizontal)
        }.font(.title)
    }
}
```

Custom Composition




```
@State private var textFieldData = ""
...
VStack {
    HStack {
        Image(systemName: "magnifyingglass").foregroundColor(.gray)
        TextField("first name", text: $textFieldData)
        Image(systemName: "slider.horizontal.3")
    }
    Divider()
}
.padding()

HStack {
    Image(systemName: "envelope")
        .foregroundColor(.gray).font(.headline)
    TextField("email address", text: $textFieldData)
}
.padding()
.overlay(RoundedRectangle(cornerRadius: 8).stroke(Color.gray, lineWidth: 1))
.padding()

HStack {
    TextField("country", text: $textFieldData)
    Button(action: {}) {
        Image(systemName: "chevron.right").padding(.horizontal)
    }
    .accentColor(.orange)
}
.padding()
.overlay(Capsule().stroke(Color.gray, lineWidth: 1))
.padding()
```

Keyboard Type



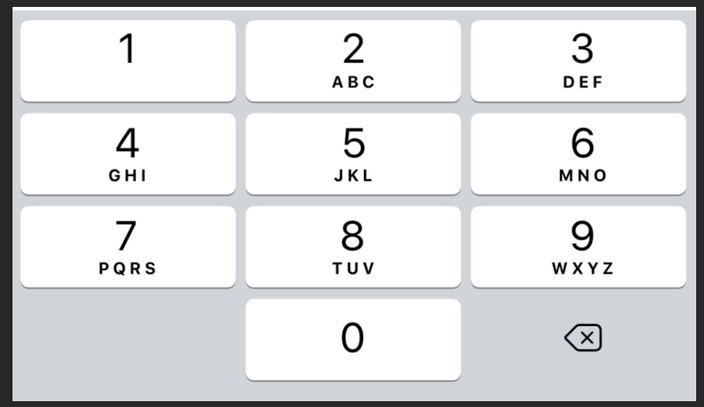

```
struct TextField_KeyboardType: View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField")
                .font(.largeTitle)
            Text("Keyboard Types")
                .foregroundColor(.gray)

            Image(“KeyboardType")

            Text("Control which keyboard is shown with the keyboardType modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.orange)

            TextField("Enter Phone Number", text: $textFieldData)
                .keyboardType(UIKeyboardType.phonePad) // Show keyboard for phone numbers
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)

            Spacer()
        }.font(.title)
    }
}
```

Keyboard Types Available

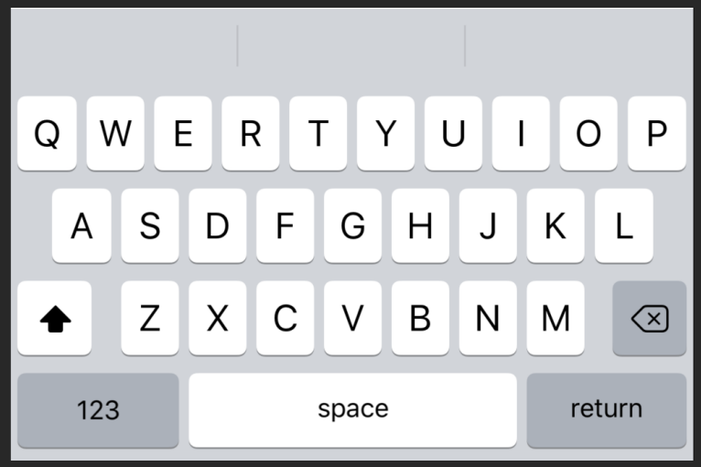
.default

.asciiCapable

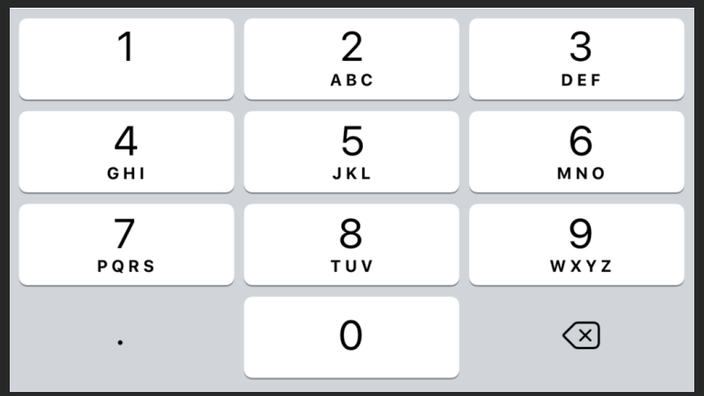
.asciiCapableNumberPad



.alphabet



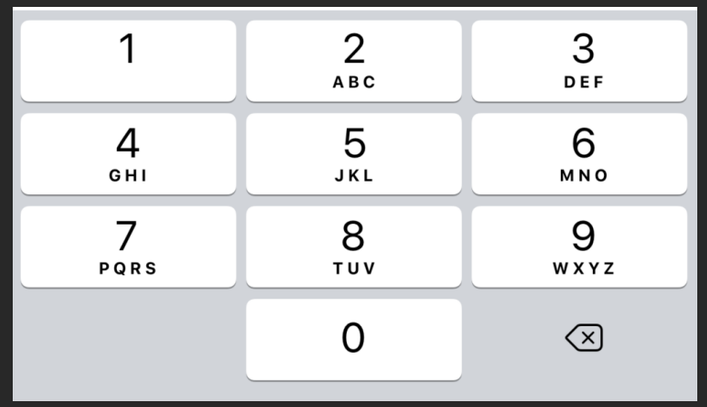
.decimalPad



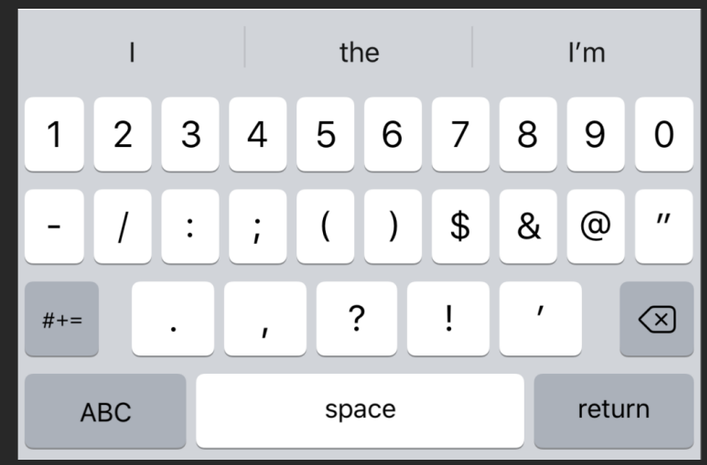
.emailAddress

.namePhonePad

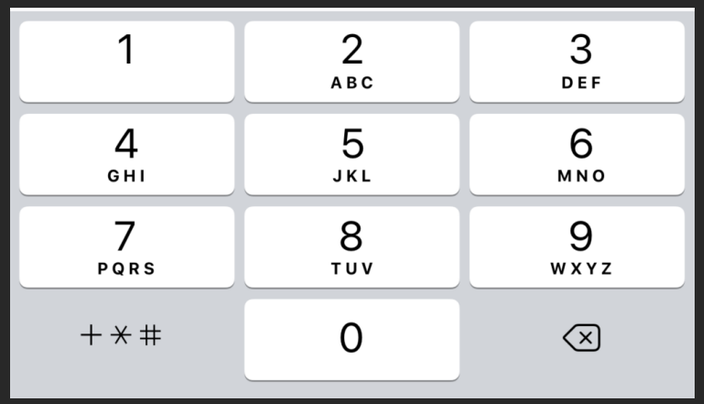
.numberPad



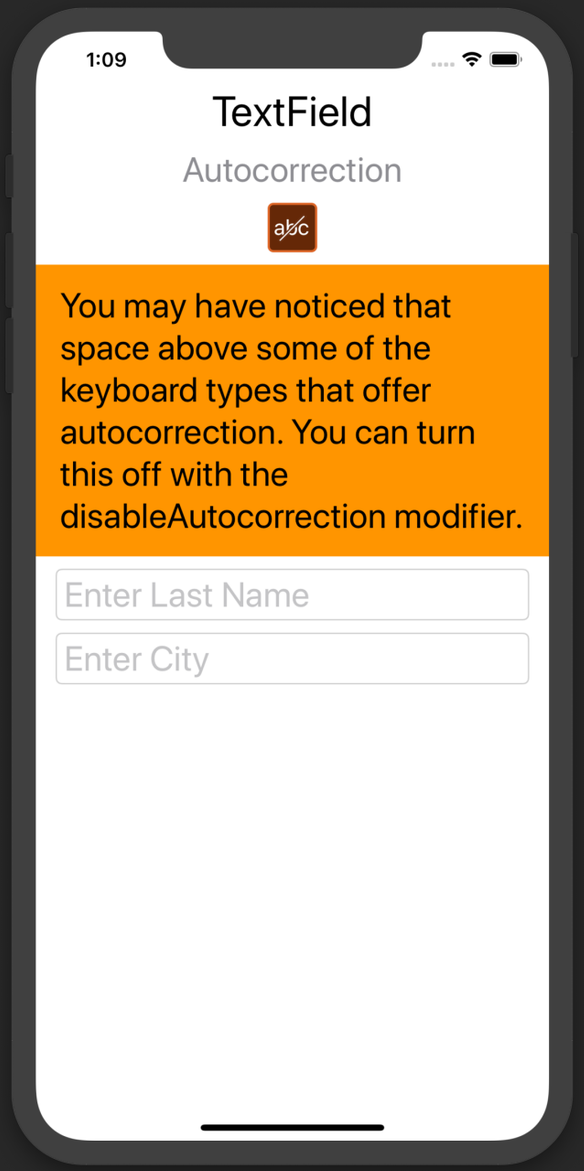
.numbersAndPunctuation



.phonePad

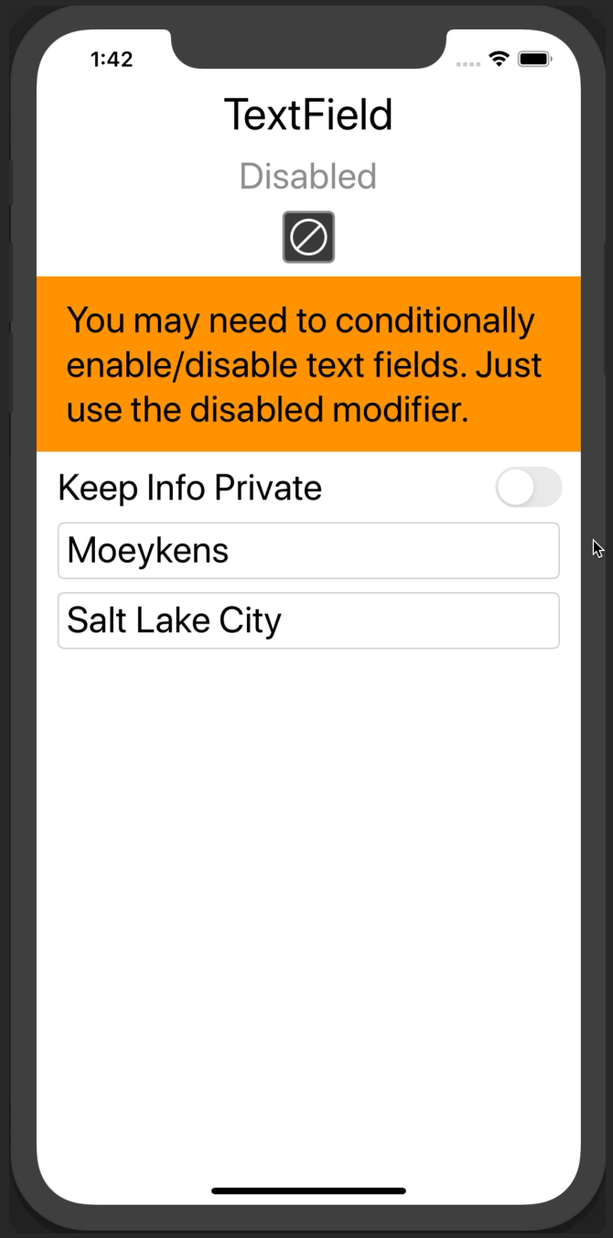


Disabling Autocorrect




```
struct TextField_Autocorrection: View {
    @State private var textFieldData = ""

    var body: some View {
        VStack(spacing: 20) {
            Text("TextField")
                .font(.largeTitle)
            Text("Autocorrection")
                .foregroundColor(.gray)
            Text("You may have noticed that space above some of the keyboard types that offer
autocorrection. You can turn this off with the disableAutocorrection modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.orange)

            TextField("Enter Last Name", text: $textFieldData)
                .disableAutocorrection(true) // Don't offer suggestions
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)

            TextField("Enter City", text: $textFieldData)
                .disableAutocorrection(false) // Offer suggestions
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)

            Spacer()
        }.font(.title)
    }
}
```

Disable TextFields




```
struct TextField_Disabled: View {
    @State private var lastName = "Moeykens"
    @State private var city = "Salt Lake City"
    @State private var disabled = false

    var body: some View {
        VStack(spacing: 10) {
            Text("TextField").font(.largeTitle)
            Text("Disabled").foregroundColor(.gray)
            Image("Disabled")
            Text("You may need to conditionally enable/disable text fields. Just use the
                disabled modifier.")
                .frame(maxWidth: .infinity)
                .padding()
                .background(Color.orange)

            Toggle("Keep Info Private", isOn: $disabled)
                .padding(.horizontal)

            Group {
                TextField("Enter Last Name", text: $lastName)
                TextField("Enter City", text: $city)
            }
            .disableAutocorrection(true)
            .textFieldStyle(.roundedBorder)
            .padding(.horizontal)
            .disabled(disabled) // Don't allow to edit when disabled
            .opacity(disabled ? 0.5 : 1) // Fade out when disabled

            Spacer()
        }.font(.title)
    }
}
```

Note: The disabled modifier applies to ANY VIEW. Not just the TextField view.

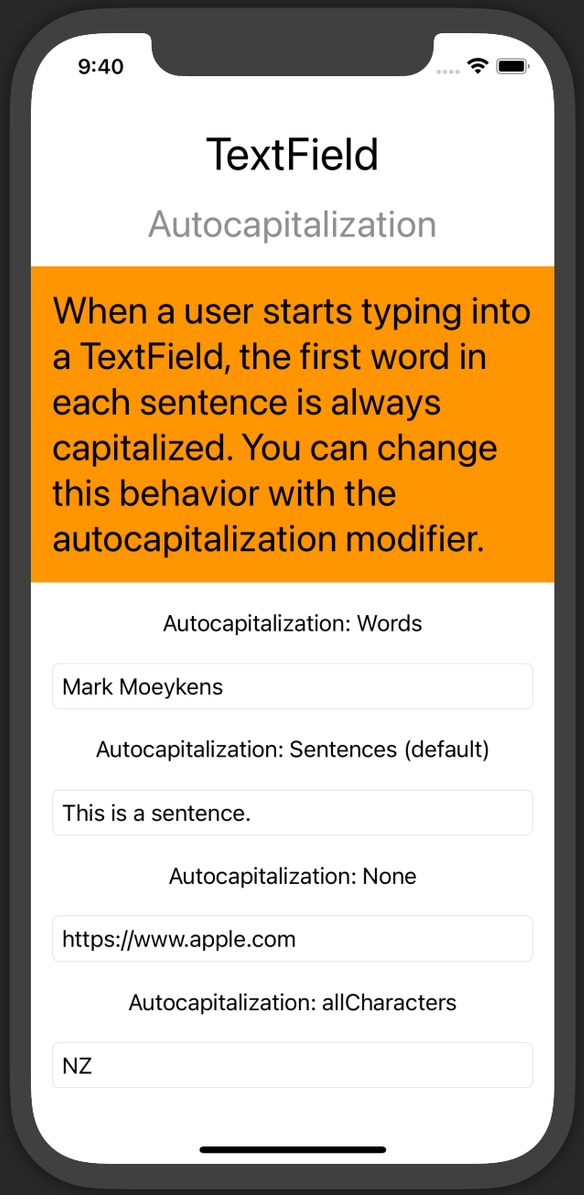
onEditingChanged


```
struct TextField_OnEditingChanged: View {
    @State private var text = ""
    @State private var isEditing = false

    var body: some View {
        VStack(spacing: 20) {
            HeaderView("TextField",
                       subtitle: "onEditingChanged",
                       desc: "The onEditingChanged even tells you when the text field has the
                              focus or not.",
                       back: .orange)

            Text("Turn border green when editing")
            TextField("10 characters", text: $text) { isEditing in
                self.isEditing = isEditing
            }
            .padding()
            .border(isEditing ? Color.green : Color.gray)
            .padding(.horizontal)
        }
        .font(.title)
    }
}
```

When the cursor is in the text field and the keyboard is showing, isEditing will be true.

When the keyboard is dismissed and the text field no longer has the focus, isEditing will change to false.

Autocapitalization



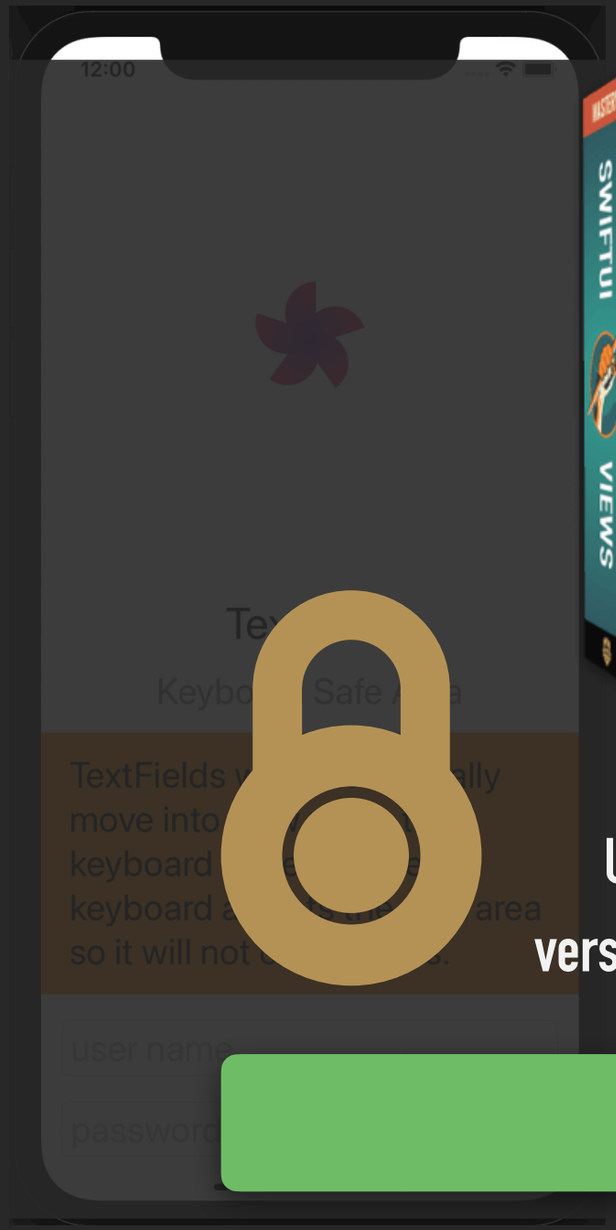

```
struct TextField_Autocapitalization: View {
    @State private var textFieldData1 = ""
    @State private var textFieldData2 = ""
    @State private var textFieldData3 = ""
    @State private var textFieldData4 = ""
   var body: some View {
        VStack(spacing: 20) {
            HeaderView("TextField",
                       subtitle: "Autocapitalization",
                       desc: "When a user starts typing into a TextField, the first word in each
                              sentence is always capitalized. You can change this behavior with
                              the autocapitalization modifier.", back: .orange)
                .font(.title)
            Text("Autocapitalization: Words")
            TextField("First & Last Name", text: $textFieldData1)
                .autocapitalization(.words)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
            Text("Autocapitalization: Sentences (default)”)
            TextField("Bio", text: $textFieldData2)
                .autocapitalization(.sentences)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
            Text("Autocapitalization: None")
            TextField("Web Address", text: $textFieldData3)
                .autocapitalization(.none)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
            Text("Autocapitalization: allCharacters")
            TextField("Country Code", text: $textFieldData4)
                .autocapitalization(.allCharacters)
                .textFieldStyle(.roundedBorder)
                .padding(.horizontal)
        }
    }
}
```

This is the default autocapitalization mode.

Keyboard Safe Area

iOS 14

```
struct TextField_KeyboardSafeArea: View {
    @State private var userName = ""
    @State private var password = ""
```



This SwiftUI content is locked in this preview.

Unlock more pages of what you can do in the latest iOS versions with the TextField view in the full version of the book.

UNLOCK THE BOOK TODAY FOR ONLY $55!

Toggle

The Toggle is a switch that can either be on or off. Much like other controls, you need to bind it to a variable. This variable is passed into the Toggle's initializer. Then, all you need to do is change this bound variable's value to change the Toggle's state on or off. Or read the bound variable's value to see what state the Toggle is currently in.

This is a push-out horizontally view.

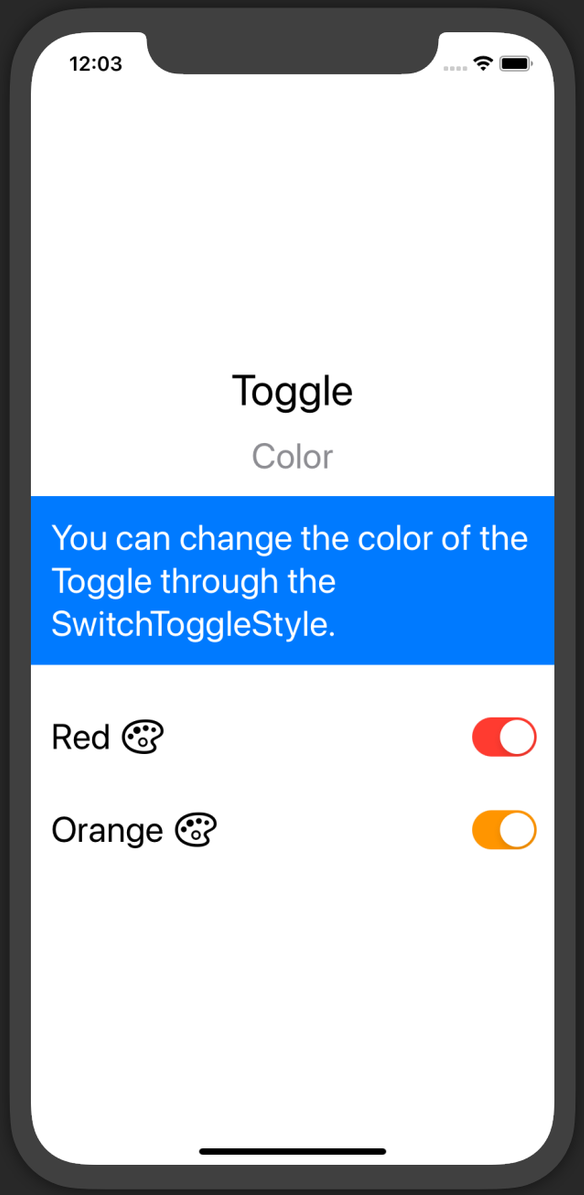
Introduction


```
@State private var isToggleOn = true
...
Text("The Toggle fills the width of its parent view.")
    ...
Toggle("Night Mode", isOn: $isToggleOn)
    .padding()

Text("Combine images with text")
    ...
Toggle(isOn: $isToggleOn) {
    Text("Night Mode")
    Image(systemName: "moon")
}
.padding()

Text("Or you can have nothing")
    ...
VStack {
    Text("Turn Alarm On?")
        .foregroundColor(.white)
    Toggle("Turn this alarm on", isOn: $isToggleOn)
        .labelsHidden() // Hides the label/title
}
.padding(25)
.background(Color.blue)
.cornerRadius(20)
```

There is not a lot you can do to change the colors of the thumb (round white circle), the on and off positions. You can create your own custom Toggle. See the chapter on **Custom Styling**, in the section **ToggleStyle**.

Accent Color

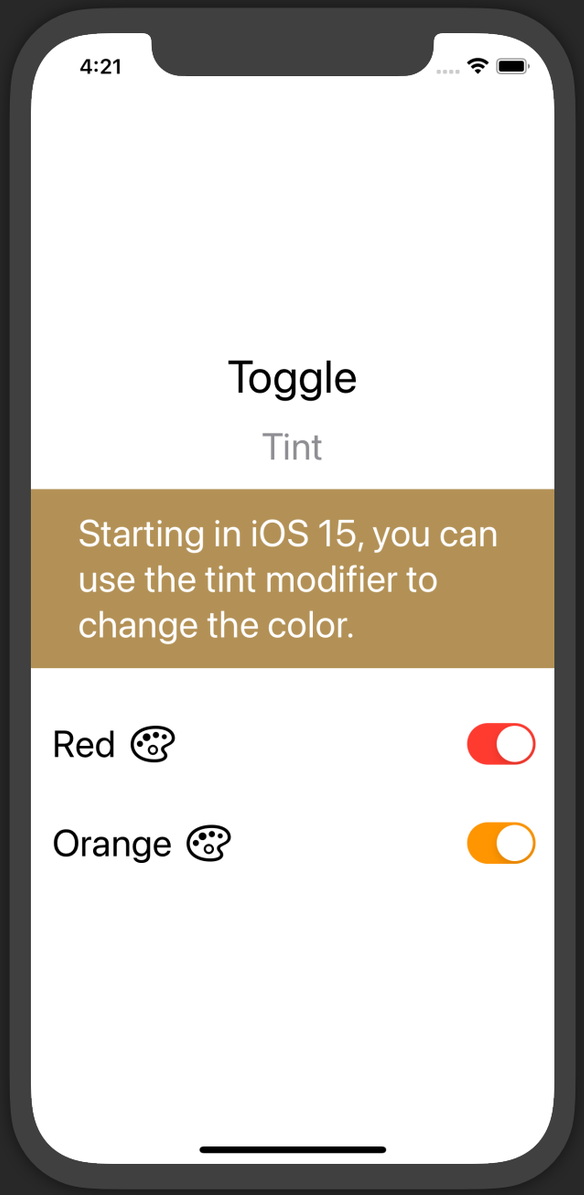
iOS 14




```
struct Toggle_Color: View {
    @State private var isToggleOn = true

    var body: some View {
            VStack(spacing: 40) {
                HeaderView("Toggle",
                           subtitle: "Color",
                           desc: "You can change the color of the Toggle through the
SwitchToggleStyle.", back: .blue, textColor: .white)

                Group {
                    Toggle(isOn: $isToggleOn) {
                        Text("Red")
                        Image(systemName: "paintpalette")
                    }
                    .toggleStyle(SwitchToggleStyle(tint: Color.red))

                    Toggle(isOn: $isToggleOn) {
                        Text("Orange")
                        Image(systemName: "paintpalette")
                    }
                    .toggleStyle(SwitchToggleStyle(tint: Color.orange))
                }
                .padding(.horizontal)
            }
            .font(.title)
    }
}
```

Tint

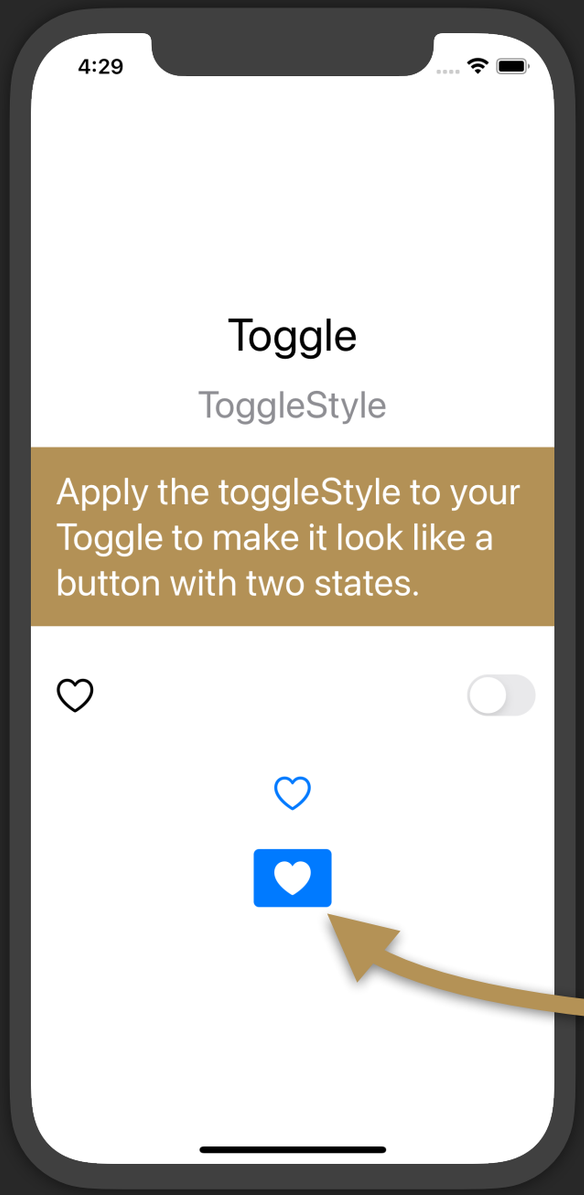
iOS 15




```
struct Toggle_Tint: View {
    @State private var isToggleOn = true

    var body: some View {
            VStack(spacing: 40) {
                HeaderView("Toggle",
                           subtitle: "Tint",
                           desc: "Starting in iOS 15, you can use the tint modifier to change
                                  the color.")

            Group {
                Toggle(isOn: $isToggleOn) {
                    Text("Red")
                    Image(systemName: "paintpalette")
                }
                .tint(.red)

                Toggle(isOn: $isToggleOn) {
                    Text("Orange")
                    Image(systemName: "paintpalette")
                }
                .tint(.orange)
            }
            .padding(.horizontal)
        }
        .font(.title)
    }
}
```

ToggleStyle

iOS 15




```
struct Toggle_ToggleStyle: View {
    @State private var isOn = false
    @State private var toggleOn = true

    var body: some View {
        VStack(spacing: 20.0) {
            HeaderView("Toggle",
                       subtitle: "ToggleStyle",
                       desc: "Apply the toggleStyle to your Toggle to make it look like a button
with two states.")

            Toggle(isOn: $isOn) {
                Image(systemName: "heart")
                    .symbolVariant(isOn ? .fill : .none)
            }.padding()

            Toggle(isOn: $isOn) {
                Image(systemName: "heart")
                    .symbolVariant(isOn ? .fill : .none)
            }
            .toggleStyle(.button)

            Toggle(isOn: $toggleOn) {
                Image(systemName: "heart")
                    .symbolVariant(toggleOn ? .fill : .none)
            }
            .toggleStyle(.button)
        }
        .font(.title)
    }
}
```

These examples are using the symbol variant to switch between filled and not filled SF symbols.

Notice when the toggleStyle is button and it is in the on state, the whole button becomes filled.

ADDITIONAL CHAPTERS

The following chapters are locked in this preview.

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OTHER VIEWS

Covered in the SwiftUI Views Mastery book.

Includes: Circle, Ellipse, Capsule, Rectangle, RoundedRectangle, Color, Divider, Group, Image, Path and Inset along with the many modifiers and examples of how they work.

PAINTS

Covered in the SwiftUI Views Mastery book.

Includes: AngularGradient, ImagePaint, LinearGradient and RadialGradient with the many examples of how they work when applied to different views.

CONTROLS MODIFIER

Covered in the SwiftUI Views Mastery book.

Includes: ActionSheet, Alert, ContextMenu, Sheet (Modals), Popover, Custom Popups and the StatusBar Hidden modifier with the many examples of how they work when used with different views.

LAYOUT MODIFIERS

Covered in the SwiftUI Views Mastery book.

Includes: AspectRatio, Background, EdgesIgnoringSafeArea, FixedSize, Frame, Hidden, LayoutPriority, Offset, Overlay, Padding, Position, ScaleToFill, ScaleToFit, and zIndex with the many examples of how they work when used with different views and modifiers.

EFFECT MODIFIERS

Covered in the SwiftUI Views Mastery book.

Includes: AccentColor, BlendMode, Blur, Border, Brightness, Clipped, ClipShape, ColorInvert, ColorMultiply, ColorScheme, CompositingGroup, ContentShape, Contrast, CornerRadius, DrawingGroup, ForegroundColor, Grayscale, HueRotation, LuminanceToAlpha, Mask, Opacity, PreferredColorScheme, RotationEffect, Rotation3DEffect, Saturation, ScaleEffect, Shadow, and TransformEffect with the many examples of how they work.

CUSTOM STYLING

Covered in the SwiftUI Views Mastery book.

Includes: ButtonStyle, DatePickerStyle, ListStyle, NavigationViewStyle, PickerStyle, TextFieldStyle, ToggleStyle, Global Styling, View Modifiers and Styling Shapes with the many examples of how they work when used.

IMAGE MODIFIERS

Covered in the SwiftUI Views Mastery book.

Includes: Interpolation, RenderingMode, Resizable, and Symbol ImageScale with the many examples of how they work.

GESTURES

Covered in the SwiftUI Views Mastery book.

Includes: Drag Gesture, On Long Press Gesture, Magnification Gesture, Rotation Gesture, On Tap Gesture, Exclusive Gesture, Simultaneous Gesture, Sequence Gesture and High Priority Gesture with the examples of how they work when applied to different views.

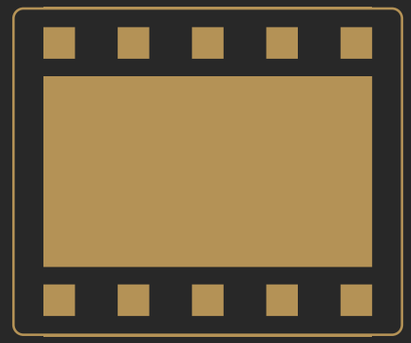
OTHER MODIFIERS

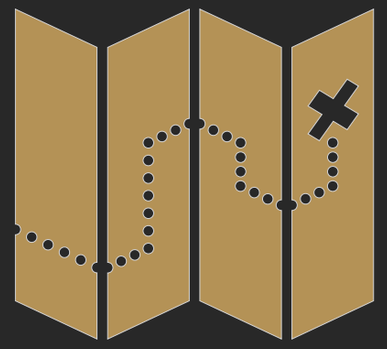
Covered in the SwiftUI Views Mastery book.

These are new modifiers that SwiftUI introduced after iOS 13. They include: Disabled, Preference and Redacted.

IMPORTING VIEWS

Covered in the SwiftUI Views Mastery book.
Includes how to use the new views that came with the release of iOS 14:
VideoPlayer view in the AVKit and **Map** view in the MapKit.





ACCESSIBILITY

Covered in the SwiftUI Views Mastery book.

Learn how to include accessibility to enable things like voice over and guidance to the disabled.

THE END

I hope you enjoyed this free SwiftUI Views Quick Start!

This was just the beginning of a larger book.

Continue your journey...

SwiftUI Views Mastery

THE COMPLETE, VISUAL TIME-SAVING REFERENCE

- Over **900** pages of SwiftUI
- Over **550** screenshots/videos showing you what you can do so you can quickly come back and reference the code
- Learn all the ways to work with and modify images
- See the many ways you can use color as views
- Discover the different gradients and how you can apply them
- Find out how to implement action sheets, modals, popovers and custom popups
- Master all the layout modifiers including background and overlay layers, scaling, offsets padding and positioning
- How do you hide the status bar in SwiftUI? Find out!
- ***This is just the tip of the mountain!***

GET THE BOOK!

Hi, I'm Mark Moeykens

I'm a full-time mobile developer with over two decades of programming experience. I have created desktop, web and mobile apps in many fields including insurance, banking, transportation, health, and sales. I have also given talks on programming and enjoy breaking down complex subjects into simple parts to teach in a practical and useful manner.

youtube.com/markmoeykens

Find tutorials on iOS topics where I guide you step-by-step through all different aspects of development.

Website: www.bigmountainstudio.com

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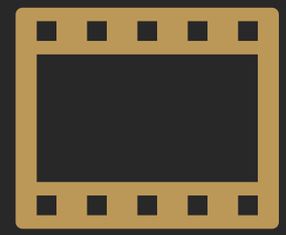

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SwiftUI Animations Mastery

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SwiftUI made animations super easy...except when it isn't. Most new SwiftUI developers can get a simple animation working but as soon as they want to customize it, they get lost and waste more time than they should trying to get it working. This book will help you with that struggle.

- ✓ Learn all the animation types and options with embedded video samples and code
- ✓ Master spring animations
- ✓ Master transitions for views that are inserted and removed from the screen
- ✓ Learn how matchedGeometryReader should really work
- ✓ Customize animations with speeds, delays, and durations

GET THE BOOK!

Working with Data in SwiftUI

DATA IN SWIFTUI DOESN'T HAVE TO BE CONFUSING. YOU WILL MAKE MISTAKES. BUT YOU DON'T HAVE TO WITH THIS BOOK.

Working with data in SwiftUI is super confusing. I know, I was there trying to sort it all out. That's why I made this simple to read book so that anyone can learn it.

- ✓ Learn what binding is
- ✓ What is @StateObject and when should you use it?
- ✓ How is @State different from @StateObject?
- ✓ How can you have data update automatically from parent to child views?
- ✓ How can you work with a data model and still be able to preview your views while creating them?
- ✓ How do you persist data even after your app shuts down?

GET THE BOOK!

Combine Mastery in SwiftUI

HAVE YOU TRIED TO LEARN COMBINE AND FAILED LIKE I DID...MULTIPLE TIMES?

I finally figured out the secret to understanding Combine after 2 years and now I'm able to share it with you in this visual, game-changing reference guide.

- ✓ How can you architect your apps to work with Combine?
- ✓ Which Swift language topics should you know specifically that will allow you to understand how Combine works?
- ✓ What are the important 3 parts of Combine that allows you to build new data flows?
- ✓ How can Combine kick off multiple API calls all at one time and handle all incoming data to show on your screen? Using about **12 lines of code**...which includes error handling.

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Visual Swift Memory Mastery

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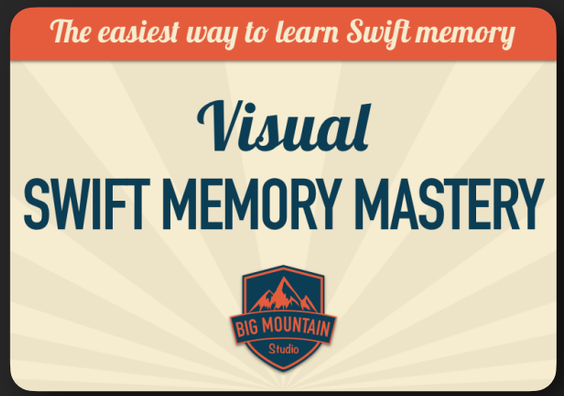

- ✓ Uses simple language to describe complex things
- ✓ Plenty of visuals so you understand more easily
- ✓ Identify potential memory leak by the Swift type alone
- ✓ Remove confusions about Swift memory
- ✓ Find and fix memory leaks in real-world scenarios
- ✓ What's the difference between strong, weak and unowned?
- ✓ Learn tools in Xcode you probably don't even know exist
- ✓ Visually see what automatic reference counting is and how it creates memory leaks
- ✓ Learn the little known 2-Step method of fixing retain cycles
- ✓ See example of how the Notification Center causes leaks
- ✓ ***Bonus section to help you conquer the interview!***

GET THE COURSE!

THANK YOU

I hope you have enjoyed this book as your visual quick start reference guide.

A lot of time and work went into this to make it as easy as possible for you to use.

If you find anything wrong or have suggestions for improvement, please let me know.

Email:
mark@bigmountainstudio.com

Direct Message me on Twitter:
@bigmtnstudio

Found a way to create a cool UI? I'd be super interested to see it!

If you would like to write a positive review on how this book has helped you, I would love to hear that too!

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2. Start sharing content (social posts, video mentions, blogs, etc.) with your partner link.

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YOU CANNOT

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- Be specific in your comments. Tell us exactly what you liked, what you learned or what helped you.
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- Help others with what you learned. Add value.
- Be open that you are sharing an affiliate link.
- Share more than one time.

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- Be pushy or overly aggressive.
- Make people feel wrong or stupid for not buying a product.
- Be deceptive in any way.
- Endlessly promote. Mix it in with your other content.
- Think you'll make money by sharing one time. You should casually share regularly. Try with once a week, for example.