App Frameworks #WWDC16

Mastering UIKit on tvOS

Session 210

Justin Voss UIKit Engineer

Agenda

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Event Handling

Agenda

Event Handling

Layered Images

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Layered Images

Scrolling

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Layered Images

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Text Input

Event Handling

Event Handling Best Practices

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Navigation should rely on the focus engine

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Use gesture recognizers when possible

Event Handling Best Practices

Navigation should rely on the focus engine

Use gesture recognizers when possible

Avoid gestures that can’t be used on all input devices

Touches

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- Begins centered in the focused view

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- Just like the iOS version
- UITouchTypeIndirect
- Begins centered in the focused view
- No absolute coordinates on the touch surface

Presses

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- UIPress events mimic UITouch events

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```
func pressesBegan(_ presses: Set<UIPress>, with event: UIPressesEvent?) {}
func pressesChanged(_ presses: Set<UIPress>, with event: UIPressesEvent?) {}
func pressesEnded(_ presses: Set<UIPress>, with event: UIPressesEvent?) {}
func pressesCancelled(_ presses: Set<UIPress>, with event: UIPressesEvent?) {}
```

Press Types

An illustrated guide

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`UIPressTypeSelect`

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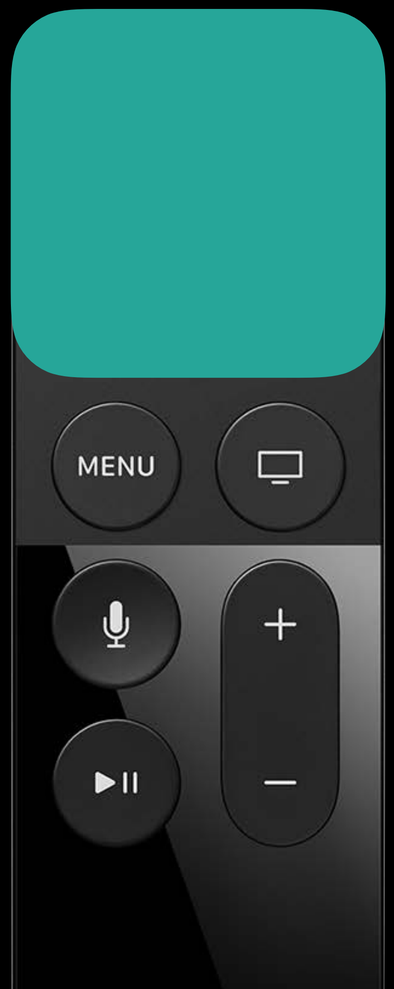

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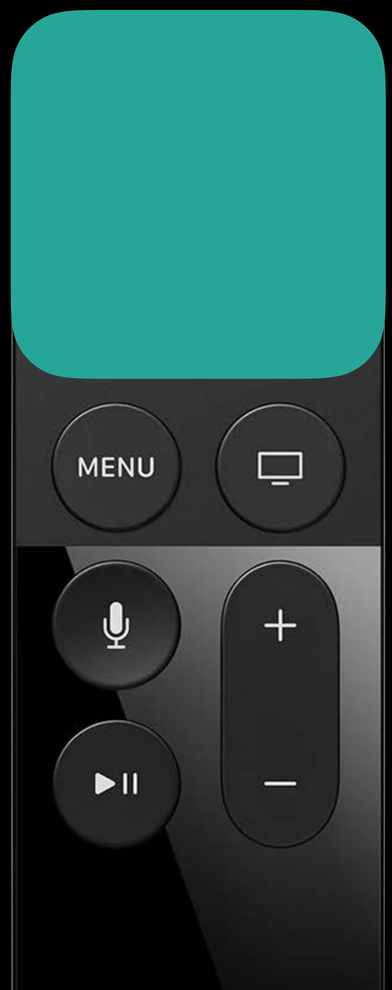
An illustrated guide

`UIPressTypeSelect`



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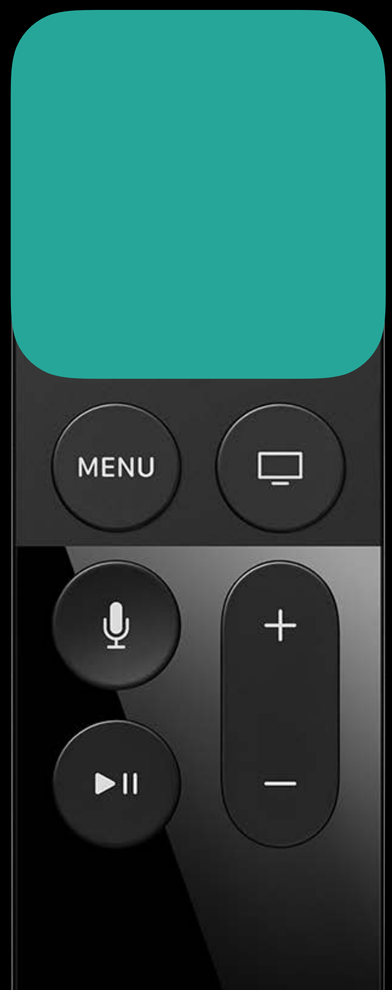

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`UIPressTypeSelect`

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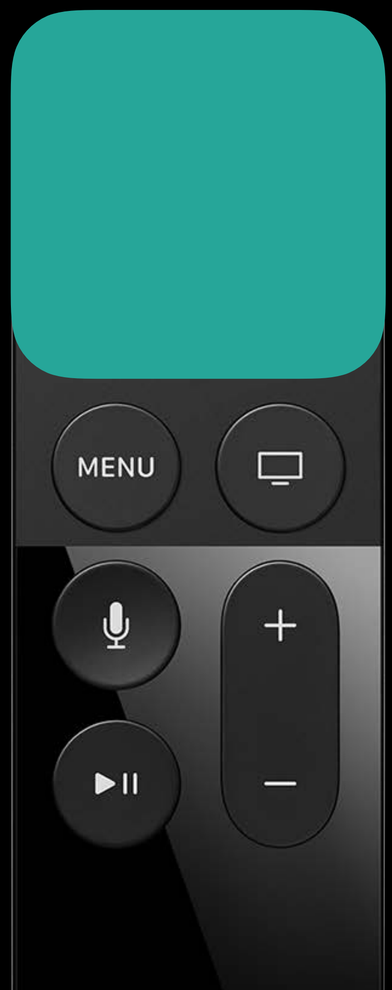

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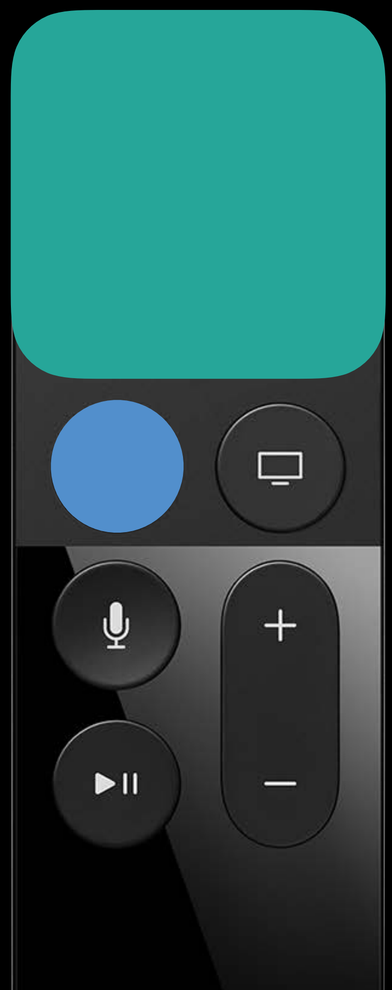

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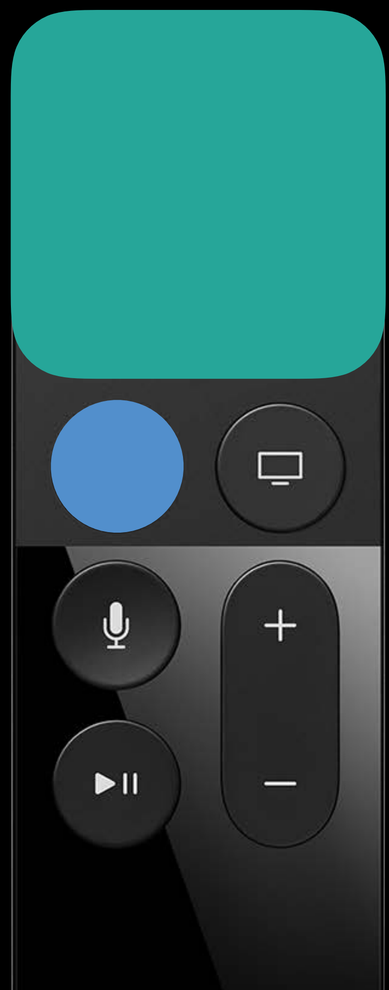

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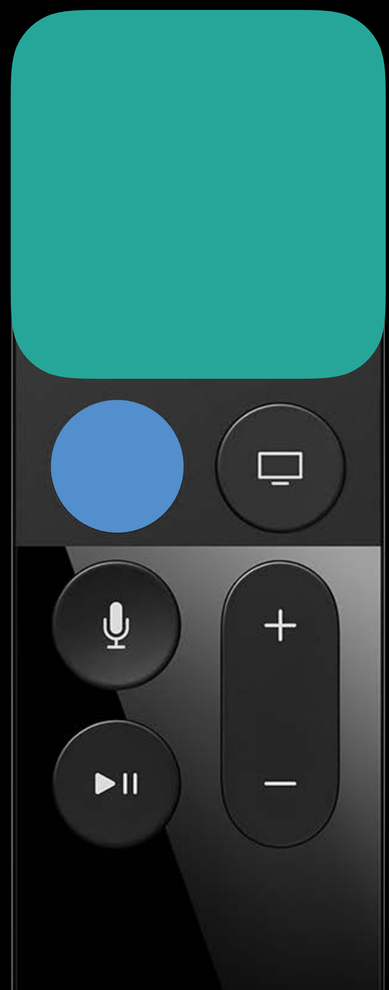

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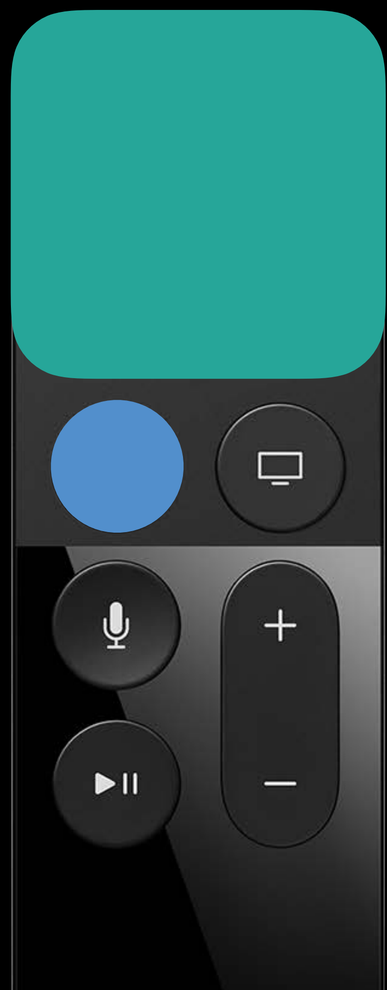

Press Types

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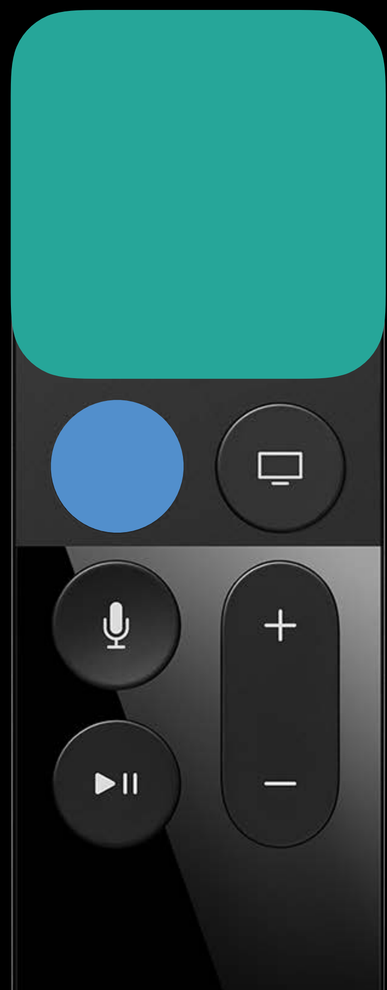
`UIPressTypeSelect`

`UIPressTypeMenu`

`UIPressTypePlayPause`



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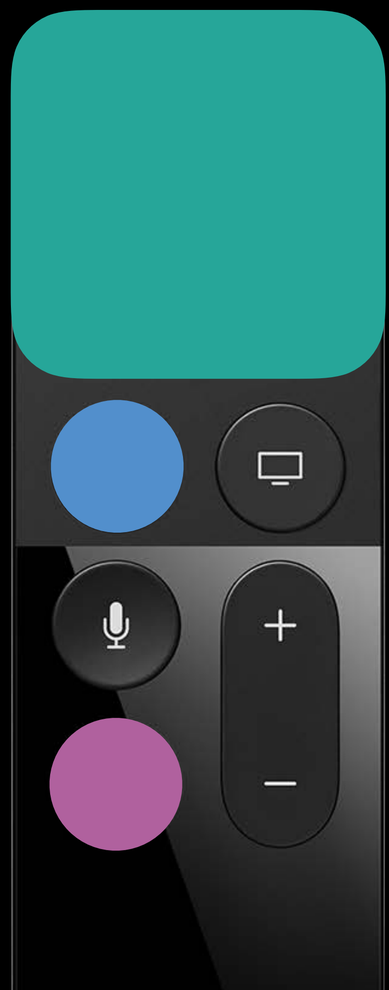

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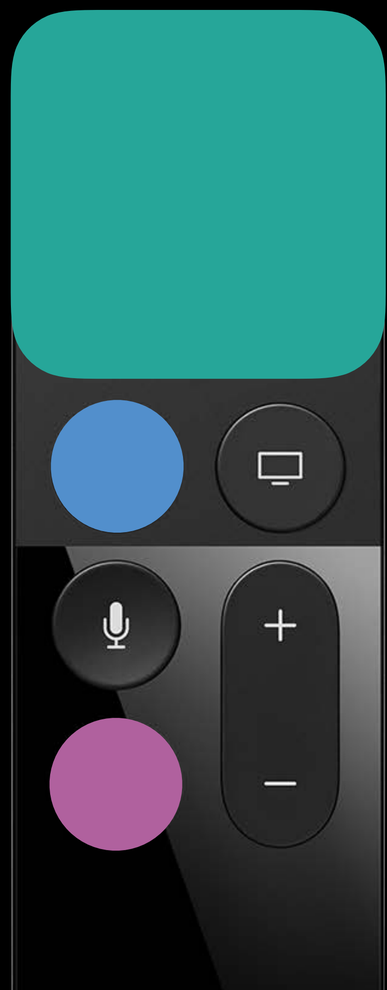

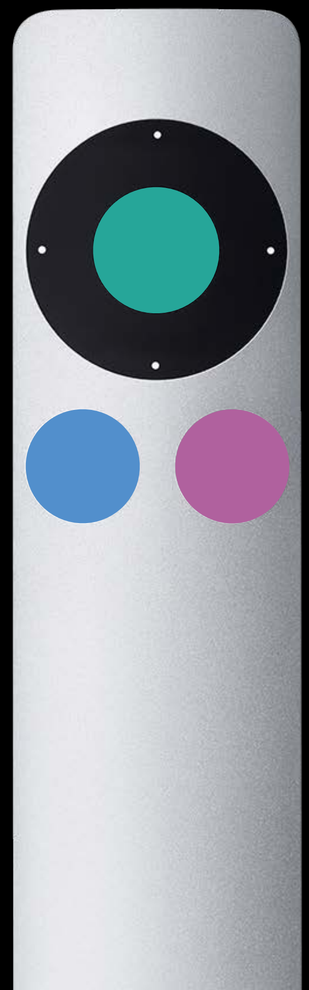

Press Types

An illustrated guide

- `UIPressTypeUpArrow`
- `UIPressTypeDownArrow`
- `UIPressTypeLeftArrow`
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- `UIPressTypeUpArrow`
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```
// Tap on Play-Pause button.
let playPauseTap = UITapGestureRecognizer(target: self, action:
   #selector(MyClass.handlePlayPause(_:)))
playPauseTap.allowedPressTypes = [ UIPressType.playPause.rawValue ]

// Long-press on Select button.
let selectLongPress = UILongPressGestureRecognizer(target: self, action:
   #selector(MyClass.handleSelectLongPress(_:)))
selectLongPress.allowedPressTypes = [ UIPressType.select.rawValue ]
```

```
// Double-tap on Select button.
let selectDoubleTap = UITapGestureRecognizer(target: self, action:
   #selector(MyClass.handleSelectDoubleTap(_:)))
selectDoubleTap.allowedPressTypes = [ UIPressType.select.rawValue ]
selectDoubleTap.numberOfTapsRequired = 2
```

The Menu Button

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Users must be able to exit your app using the Menu button

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- This is a requirement that App Review specifically looks for

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- This is a requirement that App Review specifically looks for
- The event must reach UIApplication pressesEnded:withEvent: in order for the app to exit

Custom Menu Button Handling

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Remove the gesture from its view

Custom Menu Button Handling

Remove the gesture from its view

Disable the gesture

Custom Menu Button Handling

Remove the gesture from its view

Disable the gesture

Implement the gesture delegate method `gestureRecognizerShouldBegin`

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In `pressesEnded` call super if you're not going to handle the event

Custom Menu Button Handling

Remove the gesture from its view

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Implement the gesture delegate method `gestureRecognizerShouldBegin`

In `pressesEnded` call super if you're not going to handle the event

GCEventViewController and `controllerUserInteractionEnabled`

Layered Images

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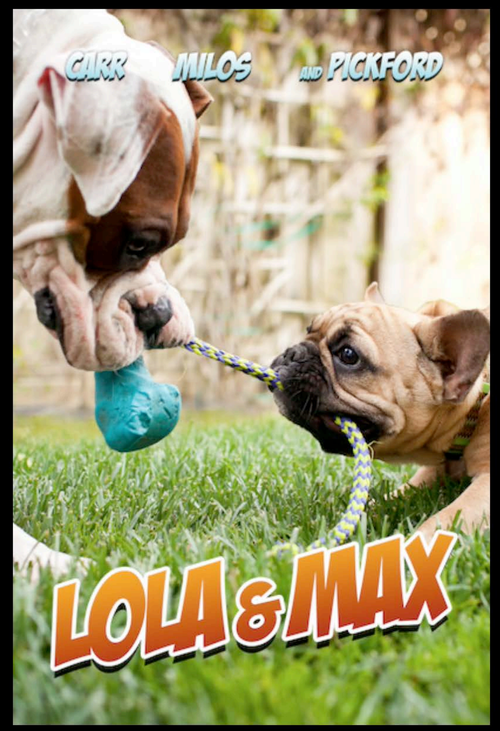

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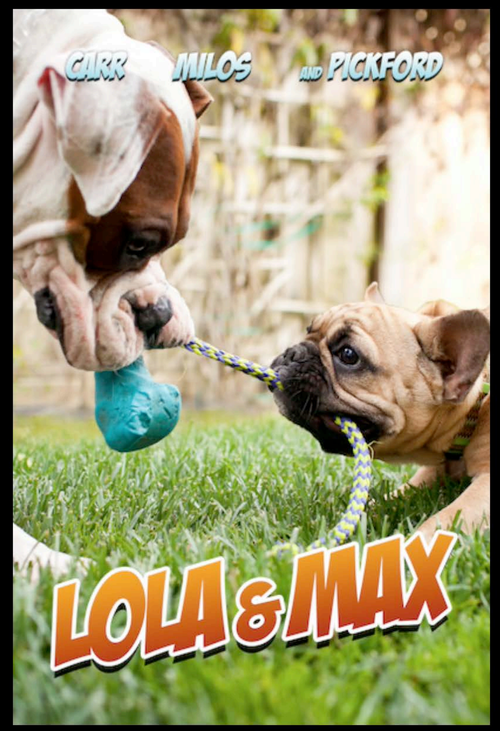
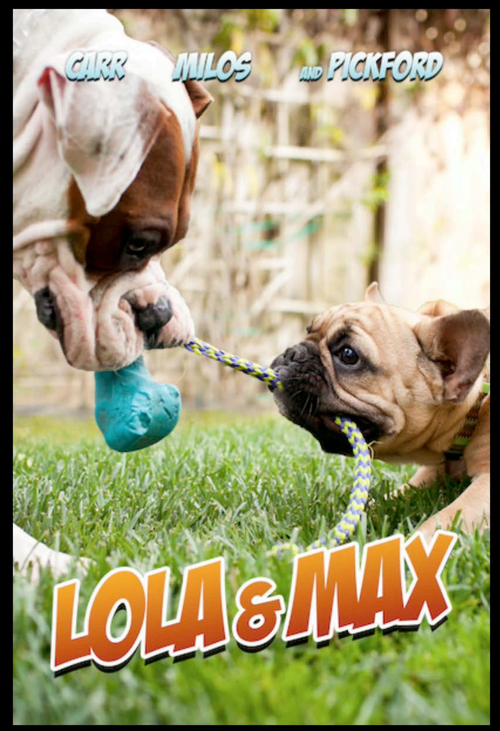


Layered Images

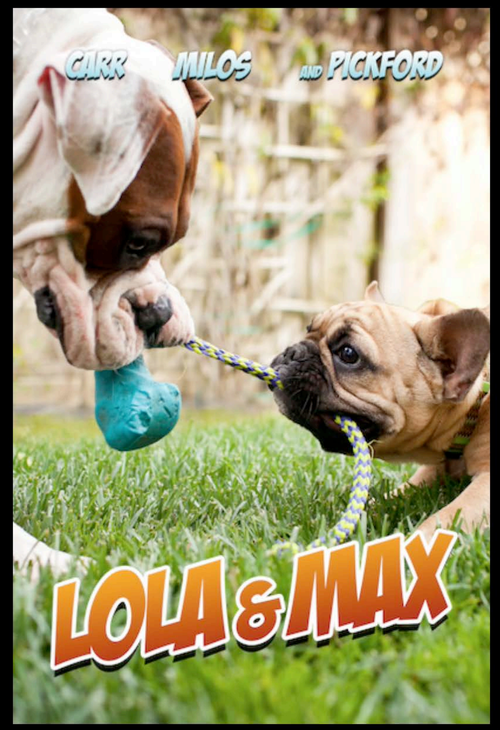
Specific to tvOS



Layered Images

Specific to tvOS

Can have up to five layers



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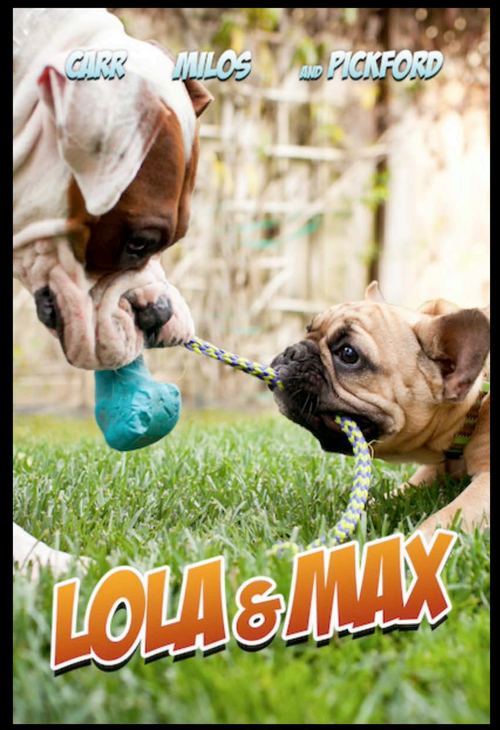
Required for app icons



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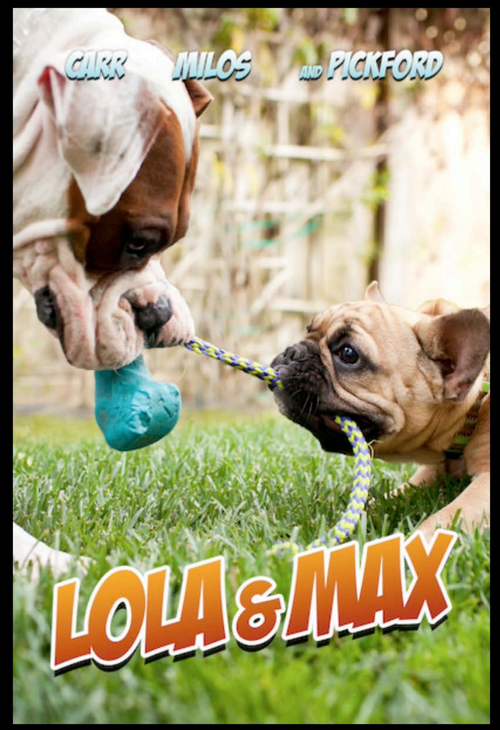
Interactive



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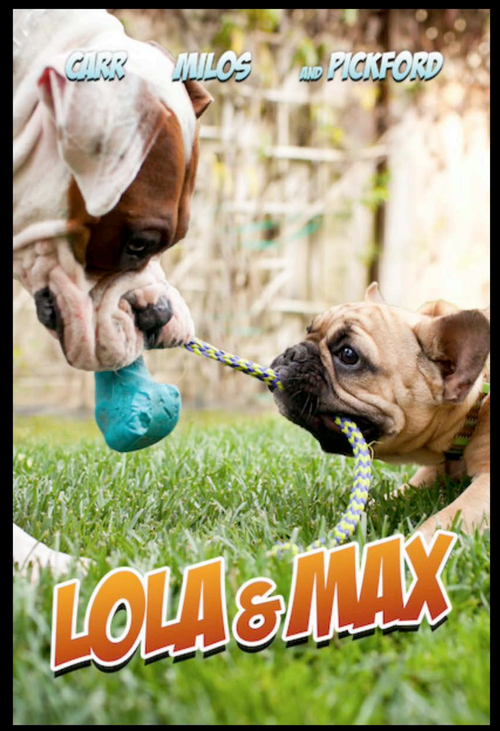
Interactive

Animated



Interactivity with Layered Images

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```
imageView.isHighlighted = pressed ? true : false
```

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Two common use cases that are covered for you:

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- Images inside UICollectionViewCells

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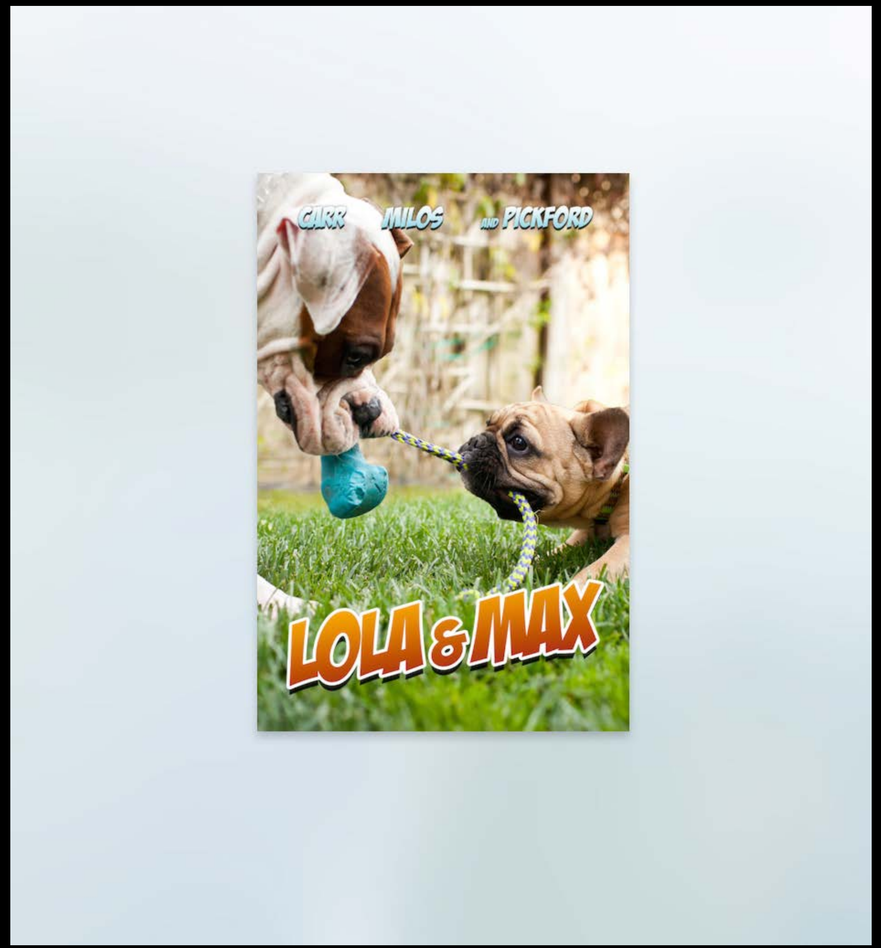
Two common use cases that are covered for you:

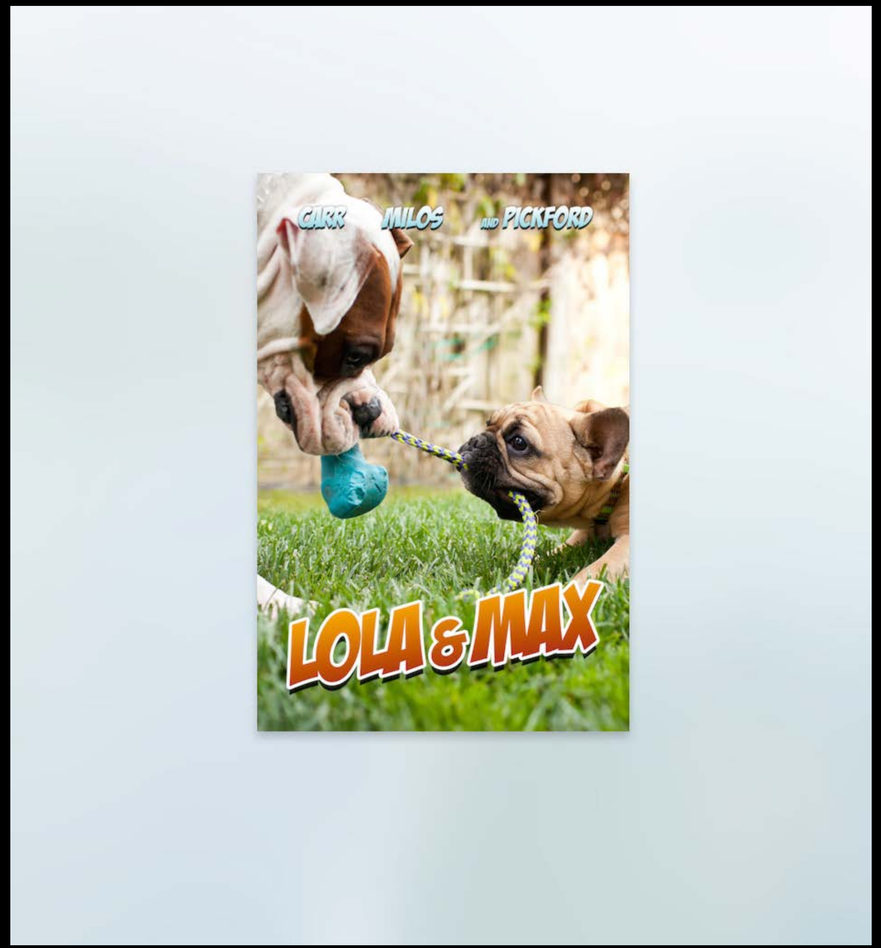
- Images inside UICollectionViewCells
- The imageView within a custom UIButton

Animations with Layered Images



Animations with Layered Images

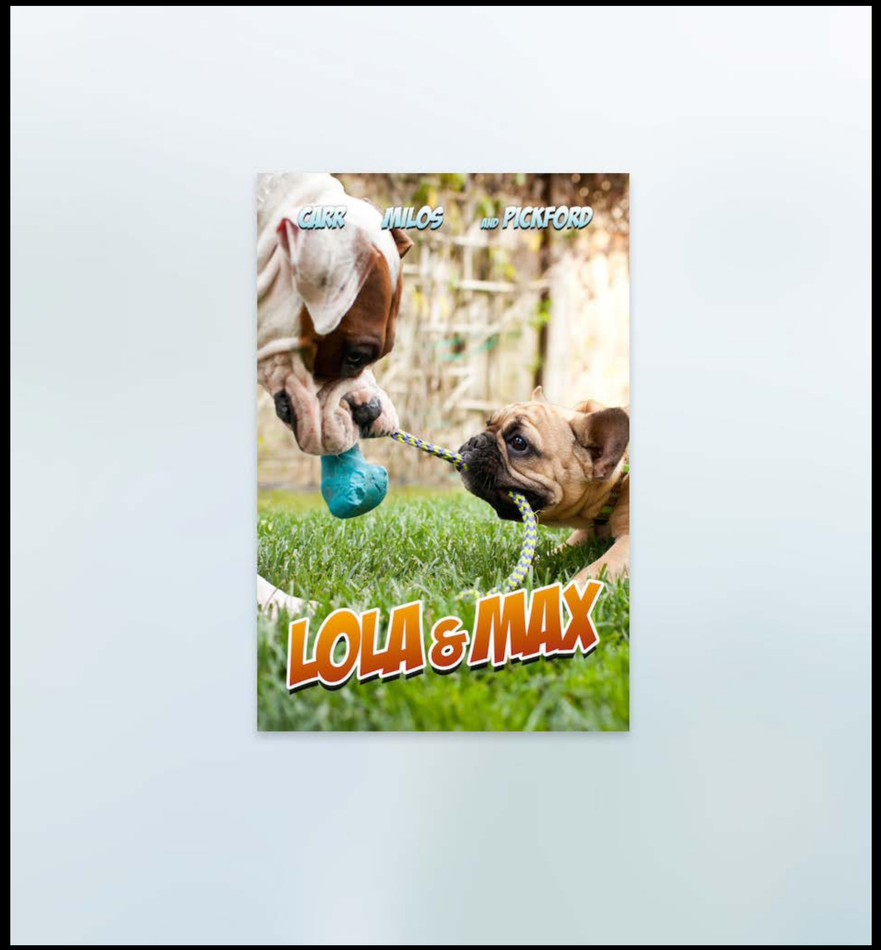
When an image enlarges, you can rearrange nearby views using Auto Layout



Animations with Layered Images

When an image enlarges, you can rearrange nearby views using Auto Layout

- Use the layout guide `focusedFrameGuide` to create a constraint



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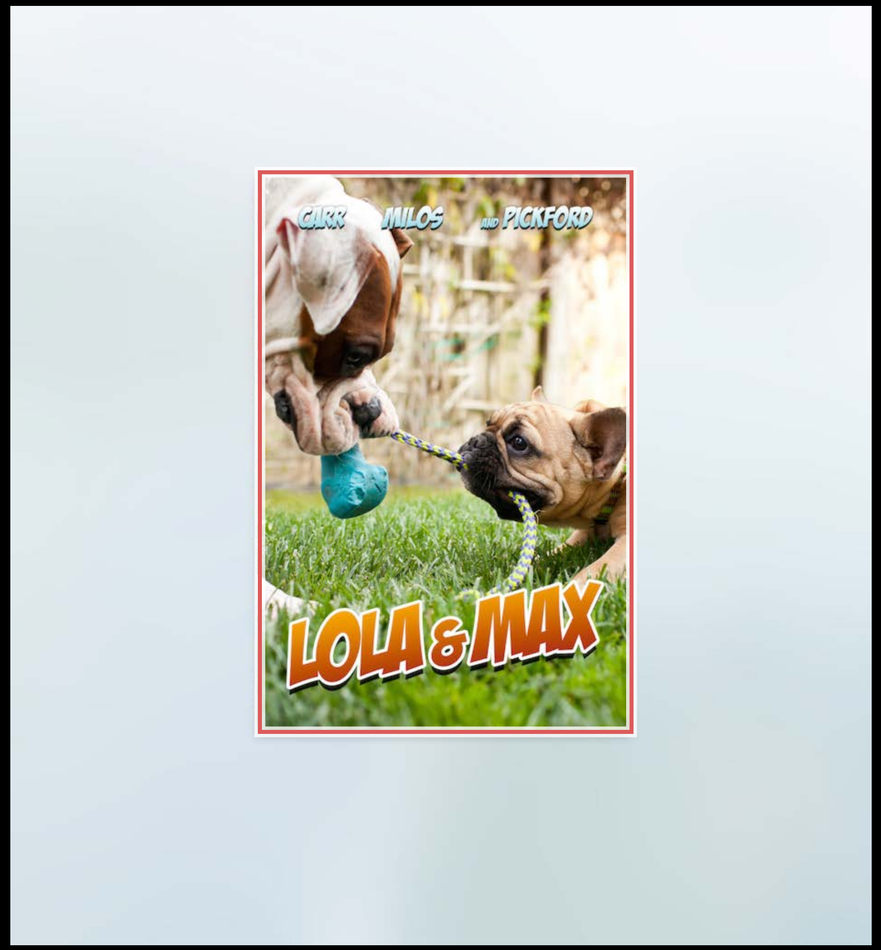

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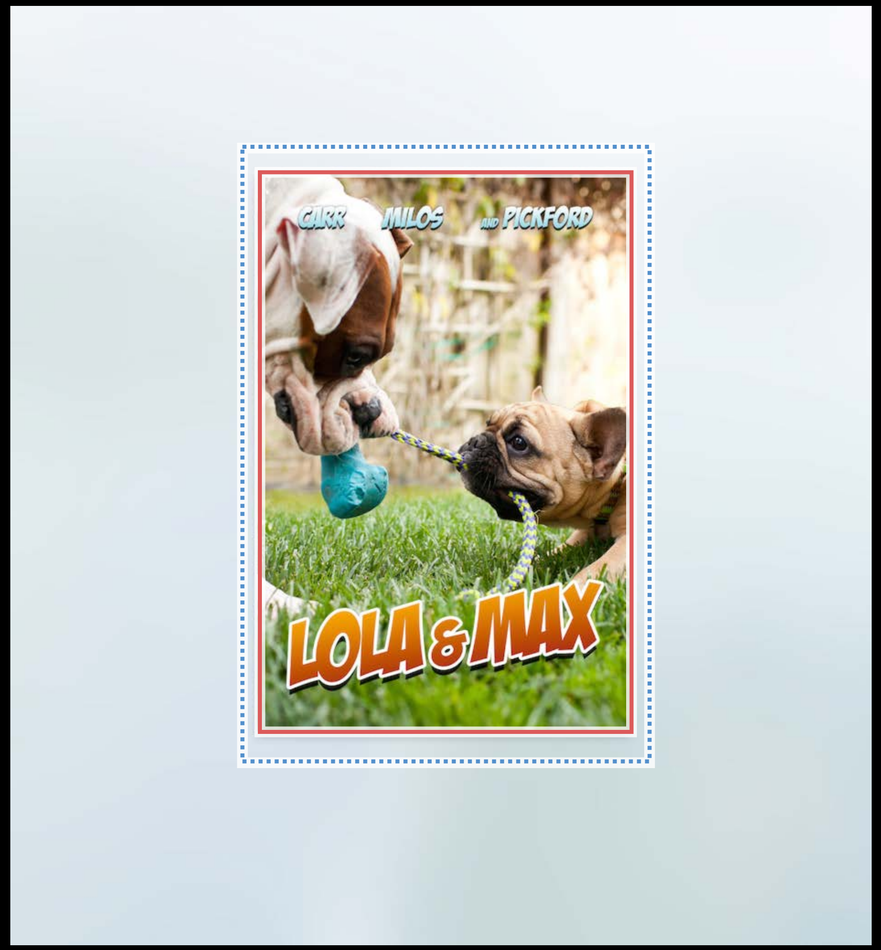
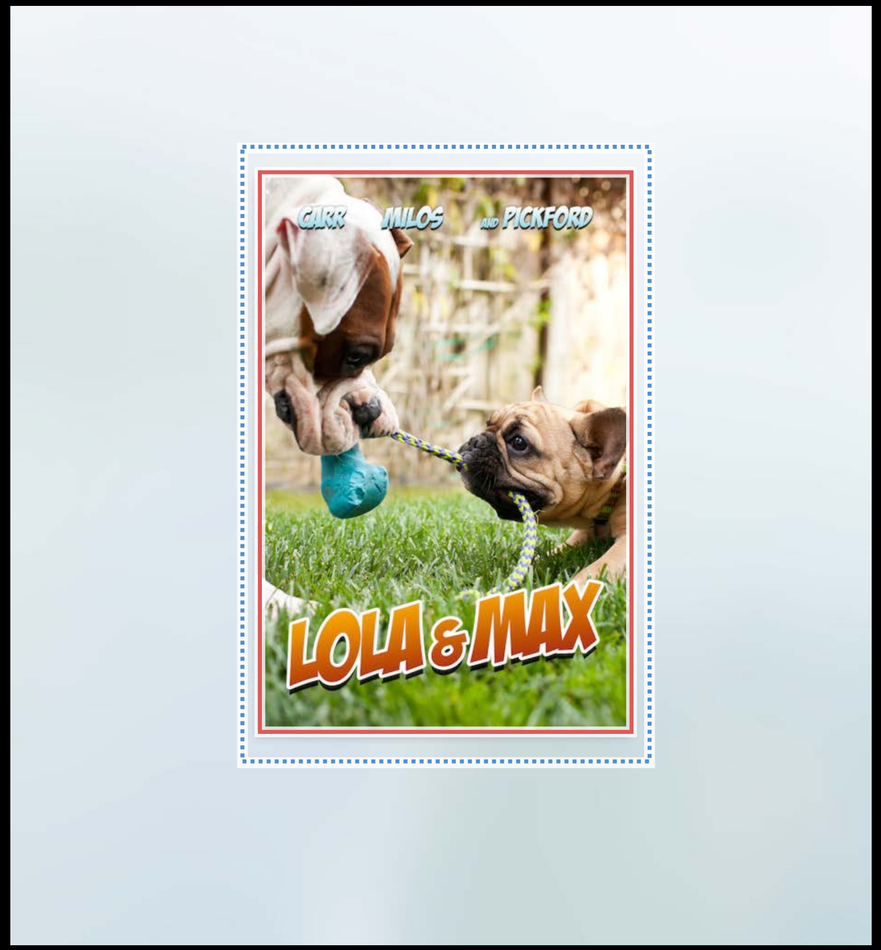


Animations with Layered Images

When an image enlarges, you can rearrange nearby views using Auto Layout

- Use the layout guide `focusedFrameGuide` to create a constraint
- Use focus context methods to coordinate animations correctly



Demo

Interactivity and animation for layered images

Randy Becker

Scrolling

Scroll Offset Selection

Scroll Offset Selection

Usually not doing direct manipulation

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Usually not doing direct manipulation

- The user manipulates focus, and the focus engine chooses a scroll offset

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- The user manipulates focus, and the focus engine chooses a scroll offset
- UIScrollViewDelegate can override the automatic scroll offset

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- The user manipulates focus, and the focus engine chooses a scroll offset
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```
func scrollViewWillEndDragging(_ scrollView: UIScrollView, withVelocity velocity: CGPoint,
   targetContentOffset: UnsafeMutablePointer<CGPoint>) {
      let myOffset = CGPoint(x: 42.0, y: 0) // Do your own calculations here.
      targetContentOffset.initialize(with: myOffset)
}
```

Direct Manipulation

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It is possible to do direct manipulation if the situation calls for it

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- Enable the directional press gesture

```
scrollView.panGestureRecognizer.allowedTouchTypes = [ UITouchType.indirect.rawValue ]
scrollView.directionalPressGestureRecognizer.isEnabled = true
```

Demo

Focus and direction manipulation

Kevin Hiscott

Text Input

The System Keyboard

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The system standard keyboard is the only way to get certain text input features

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- Automatic grid or linear layout based on input device

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Don’t try to create your own keyboard, or your users will miss out on these features

Keyboard Appearance

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Adding custom UI to the keyboard is possible

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- Use inputAccessoryView or inputAccessoryViewController

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- Use inputAccessoryView or inputAccessoryViewController

UITextField appearance no longer dictated by keyboardAppearance

Accessory View

Everything in the red box is part of the text field's inputAccessoryView property.

Hold to dictate

SPACE a b c d e f g h i j k l m n o p q r s t u v w x y z

1 2 3 4 5 6 7 8 9 0 . - _ ! @ # $ % ^ & *

ABC abc #+-

Done

Search Controller

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UISearchController

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Keyboard and search results visible at the same time

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Custom view controller for search results

```swift
// Embedding UISearchController
class MySearchController: UIViewController, UISearchResultsUpdating
{
    var searchController: UISearchController!
    override func viewDidAppear(_ animated: Bool) {
        super.viewDidAppear(animated)
        if (searchController == nil) {
            let results = UIViewController()
            searchController = UISearchController(searchResultsController: results)
            searchController.searchResultsUpdater = self
            let container = UISearchContainerViewController
               (searchController: searchController)
            self.addChildViewController(container)
            self.view.addSubview(container.view)
            container.didMove(toParentViewController: self)
        }
    }
}
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            let container = UISearchContainerViewController
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            self.addChildViewController(container)
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            let container = UISearchContainerViewController
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            self.addChildViewController(container)
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```

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            searchController = UISearchController(searchResultsController: results)
            searchController.searchResultsUpdater = self
            let container = UISearchContainerViewController
               (searchController: searchController)
            self.addChildViewController(container)
            self.view.addSubview(container.view)
            container.didMove(toParentViewController: self)
        }
    }
}
```

```swift
// Embedding UISearchController
class MySearchController: UIViewController, UISearchResultsUpdating
{
    var searchController: UISearchController!
    override func viewDidAppear(_ animated: Bool) {
        super.viewDidAppear(animated)
        if (searchController == nil) {
            let results = UIViewController()
            searchController = UISearchController(searchResultsController: results)
            searchController.searchResultsUpdater = self
            let container = UISearchContainerViewController
               (searchController: searchController)
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Use the system standard keyboard for text input

More Information

developer.apple.com/wwdc16/210

Related Sessions

What's New in tvOS	Presidio	Tuesday 3:00PM
Focus Interaction on tvOS	Mission	Wednesday 4:00PM

Labs

tvOS Lab	Frameworks Lab D	Wednesday 2:00PM
tvOS Lab	Frameworks Lab D	Thursday 9:00AM

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