Media Playback and Recording

CS193W - Spring 2016 - Lecture 3

Today

- Images and animated images
- Text input controller
- Media playback controller
- Inline video playback
- Playing extended audio
- Recording audio

Images

Ways to show an Image

- The `WKInterfaceImage` class displays a single image or a sequence of images as standalone content.
- The `WKInterfaceGroup`, `WKInterfaceButton`, and `WKInterfaceController` classes allow you to specify an image as the background for other content.
- The `WKInterfaceSlider` class can display custom images for the increment and decrement controls.
- The `WKInterfaceMovie` class displays a poster image for video or audio content.
- The `WKInterfacePicker` class displays items that can contain images.

WKInterfaceImage

- Displays a single image or an animated sequence of images.

- All images should be designed for retina displays and should have the `@2x` suffix

  e.g. `myimage@2x.png`

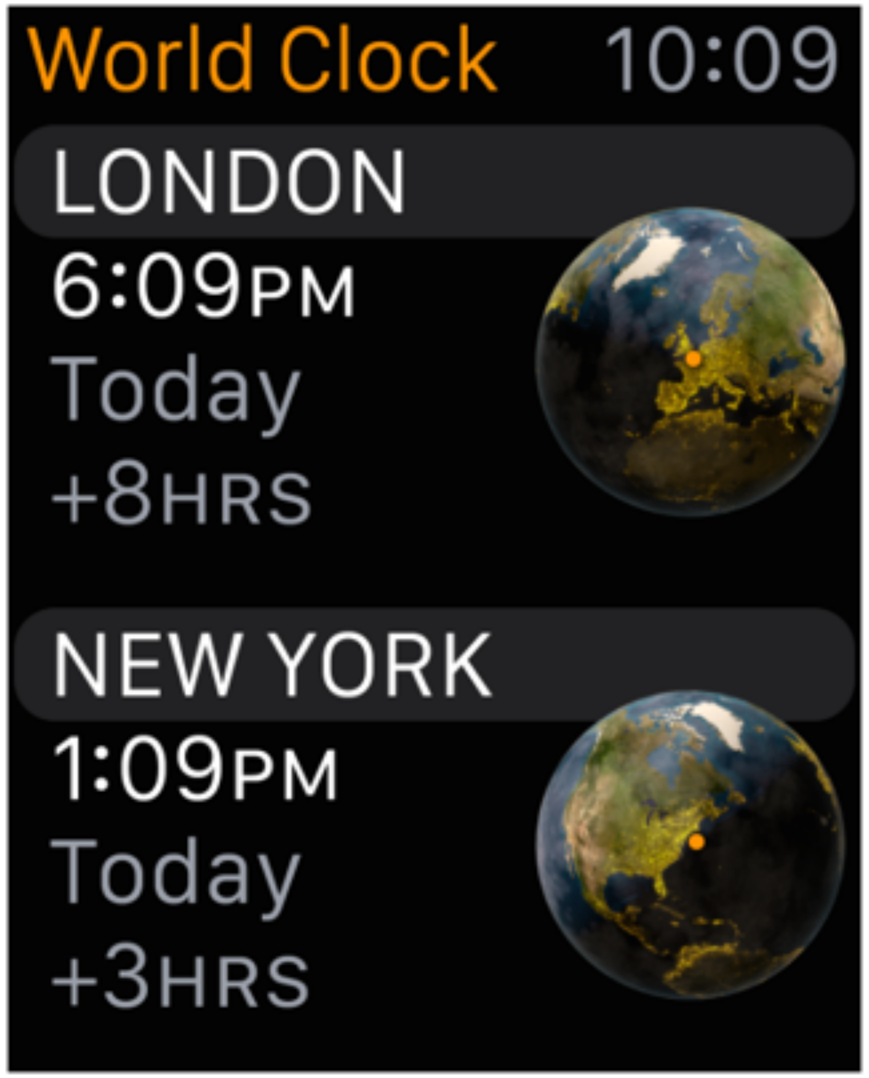


Image Asset Guidelines

- The preferred image types is PNG. JPEG is almost as good. Other image types can cause performance issues when rendering.
- Use the 8-bit color palette for PNG graphics that don’t require full 24-bit color.
- For JPEGs, make sure to set the quality no higher than necessary
- Avoid resizing images on the watch whenever possible. Create images at the desired size.
- Avoid transparency if possible

Image Caching

- In watchOS 1, because transferring between the extension to the app was expensive, there was a built-in image cache
- In watchOS 2, this is no longer needed

WKInterfaceImage API

```
func setImage(_ image: UIImage?)

func setImageData(_ imageData: NSData?)

func setImageNamed(_ imageName: String?)

func setTintColor(_ tintColor: UIColor?)
```

Where to Place Images

- You can place images in either your WatchKit App target or your WatchKit Extension target. Both allow you to use `setImageNamed:` and to use images in the storyboard.

Animatable Images

- Create an animatable `UIImage` (*not* a `WKImage`)

```
class func animatedImageNamed(_ name: String,
                         duration duration: NSTimeInterval) -> UIImage)
```

If *name* is `myimage`, then the images in your bundle should be named `myimage0`, `myimage1`, `myimage2`, etc.

Animating WKInterfaceImage

`WKInterfaceImage` conforms to the `WKImageAnimatable` protocol:

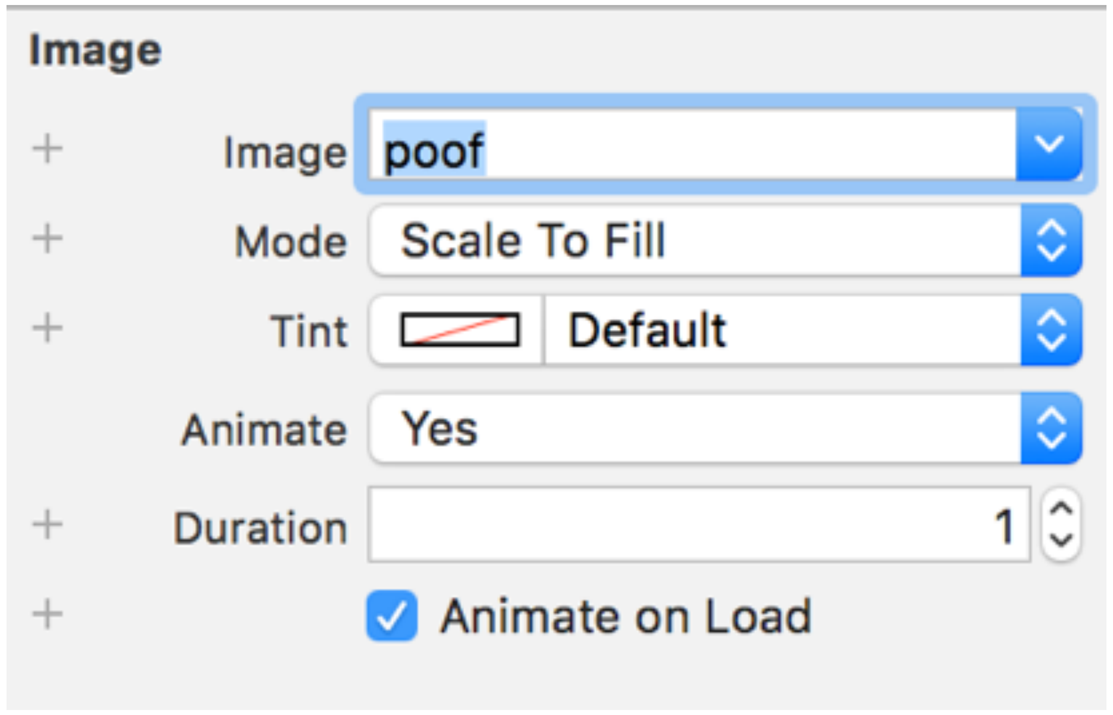
```
func startAnimating()

func stopAnimating()

func startAnimatingWithImagesInRange(_ imageRange: NSRange,
                                     duration duration: NSTimeInterval,
                                  repeatCount repeatCount: Int)
```

`imageRange:` `0` represents the first image in the sequence

duration: Loop time in seconds. Negative values cause the image to loop in reverse.

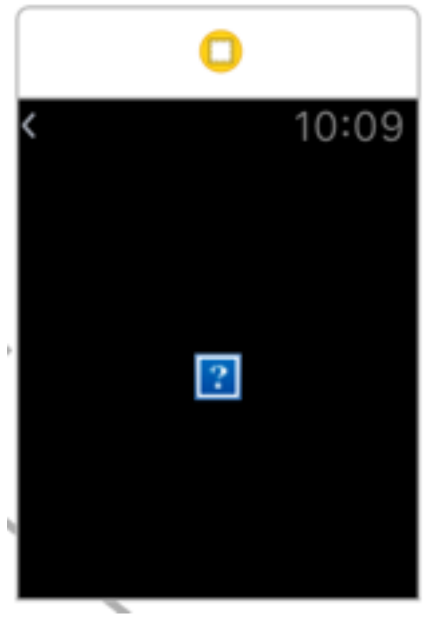
repeatCount: Specify `0` to loop indefinitely.

Images in the Storyboard



Image

Image	poof
Mode	Scale To Fill
Tint	Default
Animate	Yes
Duration	1
✓	Animate on Load

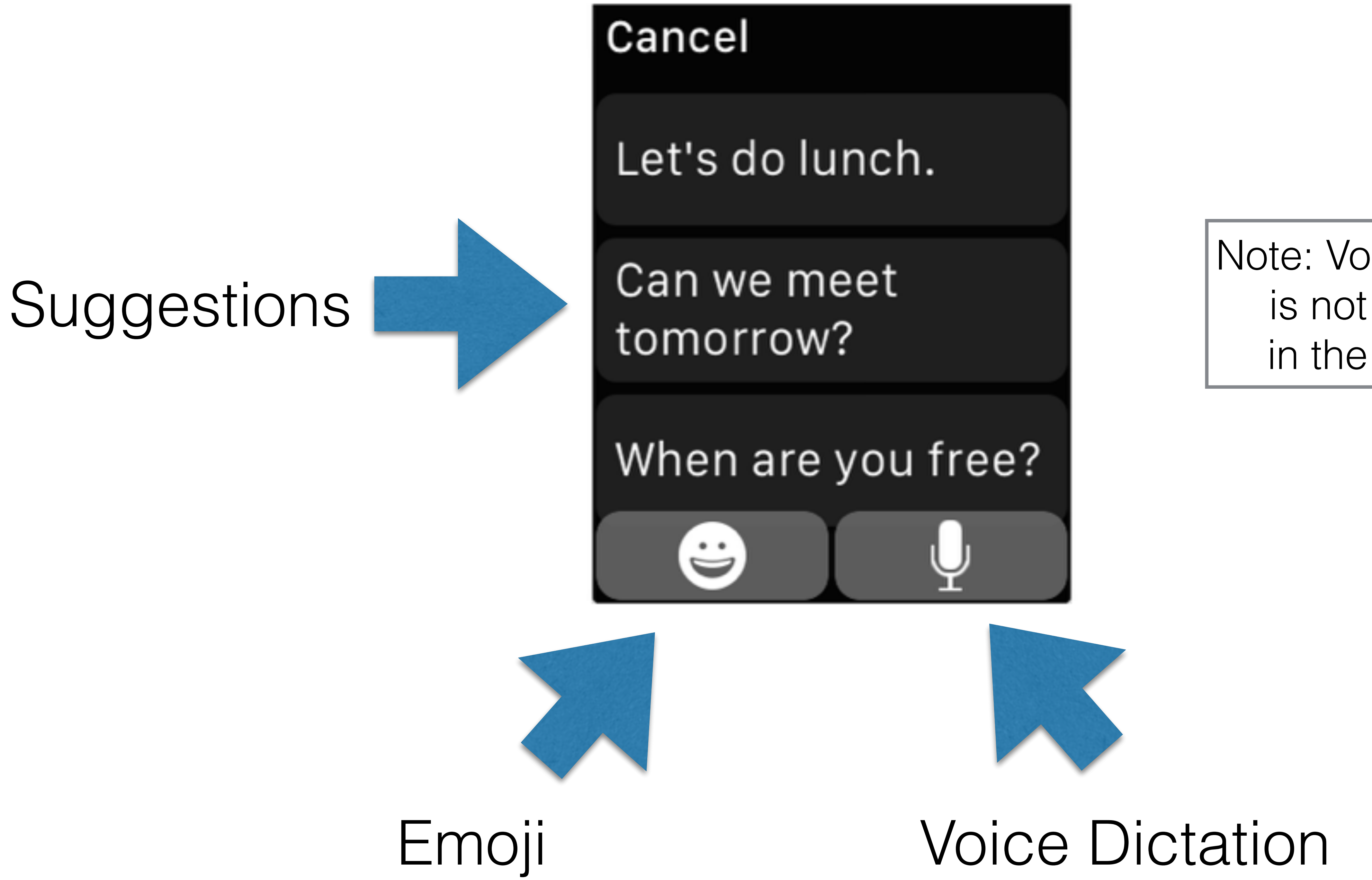


- Fill in the image name, animate, and duration if desired

- Note that a question mark will show up for animated images; nothing is wrong.

Text Input Controllers

Text Input Controllers


Cancel

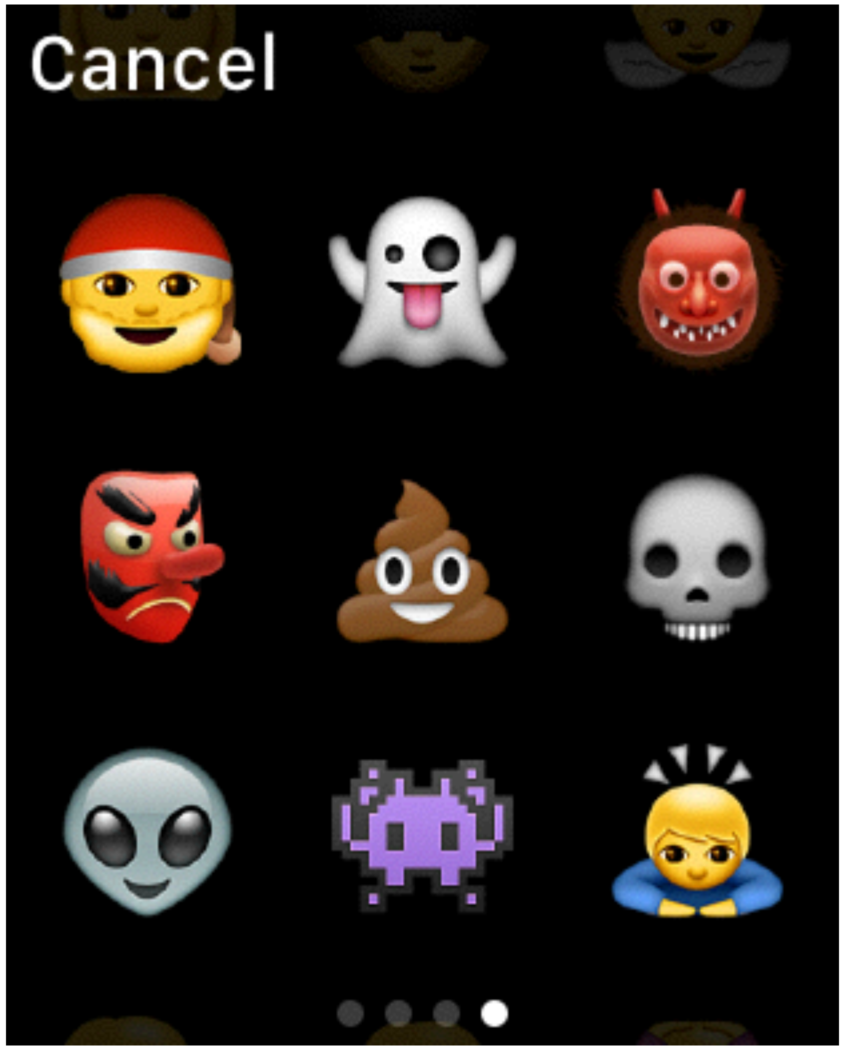
Let's do lunch.

Can we meet tomorrow?

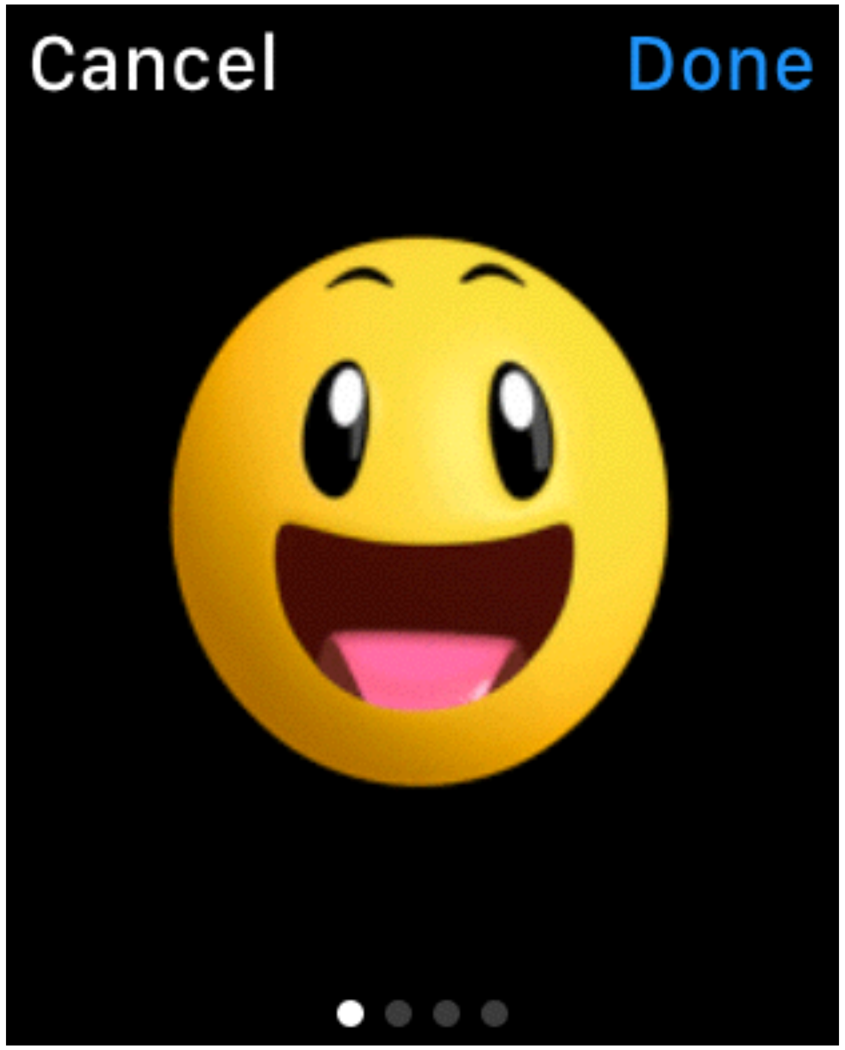
When are you free?

Note: Voice dictation is not available in the simulator

Emoji Pickers



Static Emoji



Animated Emoji

Presenting Text Input Controllers

```
func presentTextInputControllerWithSuggestions(_ suggestions: [String]?,
                                  allowedInputMode inputMode: WKTextInputMode,
                                        completion completion: ([AnyObject]?) -> Void)

enum WKTextInputMode : Int {
    case Plain
    case AllowEmoji
    case AllowAnimatedEmoji
}

func dismissTextInputController()
```

- The result will either be `nil` (if the user cancels) or an array of a single element (a `String` or `NSData` representing an image). Note that emoji are returned as `Strings`.

- Passing `nil` to suggestions results in the voice dictation screen being brought up directly.

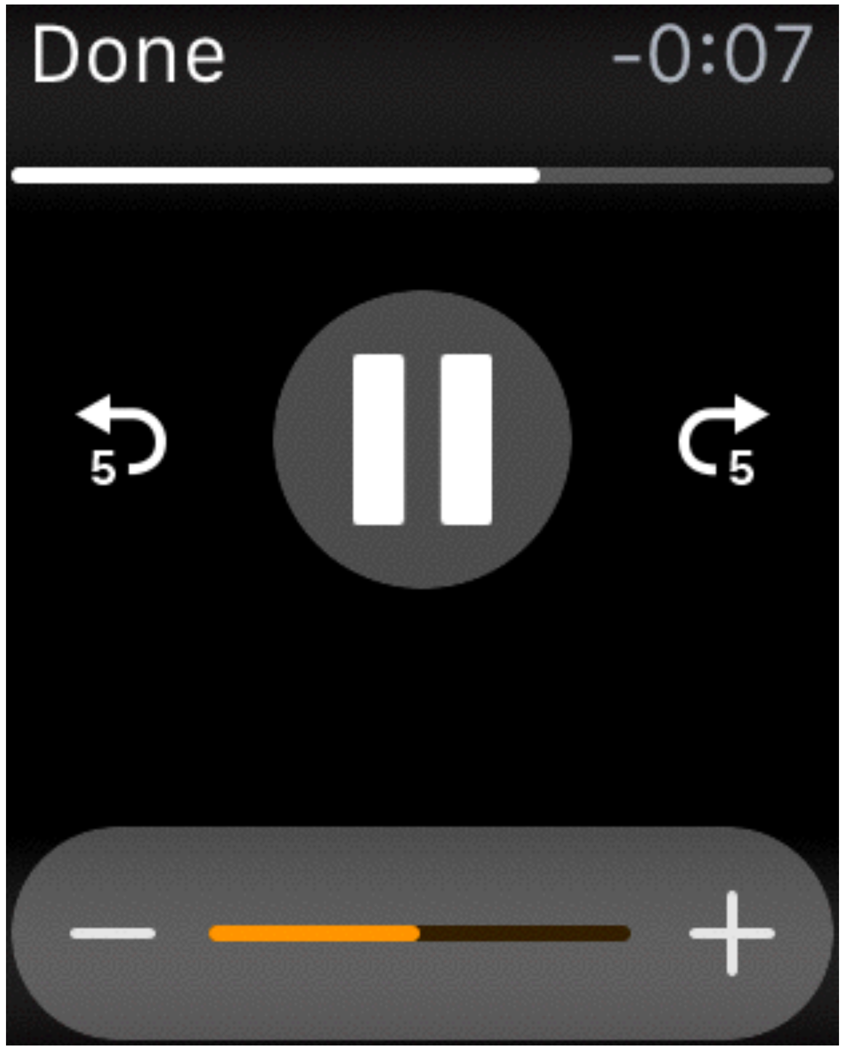
Text Input Controller Example

```swift
self.presentTextInputControllerWithSuggestions(["foo", "bar", “baz"],
                                                allowedInputMode: .AllowAnimatedEmoji) {
 (answers) -> Void in
    if (answers != nil) {
        if let resultString = answers?.first as? String {
            print(resultString);
        } else if let resultImageData = answers?.first as? NSData {
            let image = UIImage(data: resultImageData)
        }
    }
}
```

Using the Media Player Controller

Media Player

- A modal interface that can play audio or video



Media Player API

```
func presentMediaPlayerControllerWithURL(_ URL: NSURL,
                                    options options: [NSObject : AnyObject]?,
                                 completion completion: (Bool,
                                                         NSTimeInterval,
                                                         NSError?) -> Void)

func dismissMediaPlayerController()
```

Completion arguments:

didPlayToEnd – `true` if the media playback completed

endTime – the point at which playback was terminated, in seconds

error – the error object, or `nil`

Note that calling `dismissMediaPlayerController` results in *endTime* being passed back as 0.0.

Media Player URL

- Can be a local URL or a remote one
- If it is remote, it must be secure (https)
- In the case of a remote URL, a progress indicator is shown while the media is downloading

Media Player Options

`WKMediaPlayerControllerOptionsAutoplayKey`
True if the media player starts playing automatically; the default is false.

`WKMediaPlayerControllerOptionsStartTimeKey`
The start time, in seconds.

`WKMediaPlayerControllerOptionsVideoGravityKey`
- `.ResizeAspect` - Size to fit, preserving aspect ratio. No cropping.
- `.ResizeAspectFill` - Size to fill, preserving aspect ratio. Allows cropping.
- `.Resize` - Size to fill, not preserving aspect ratio. No cropping.

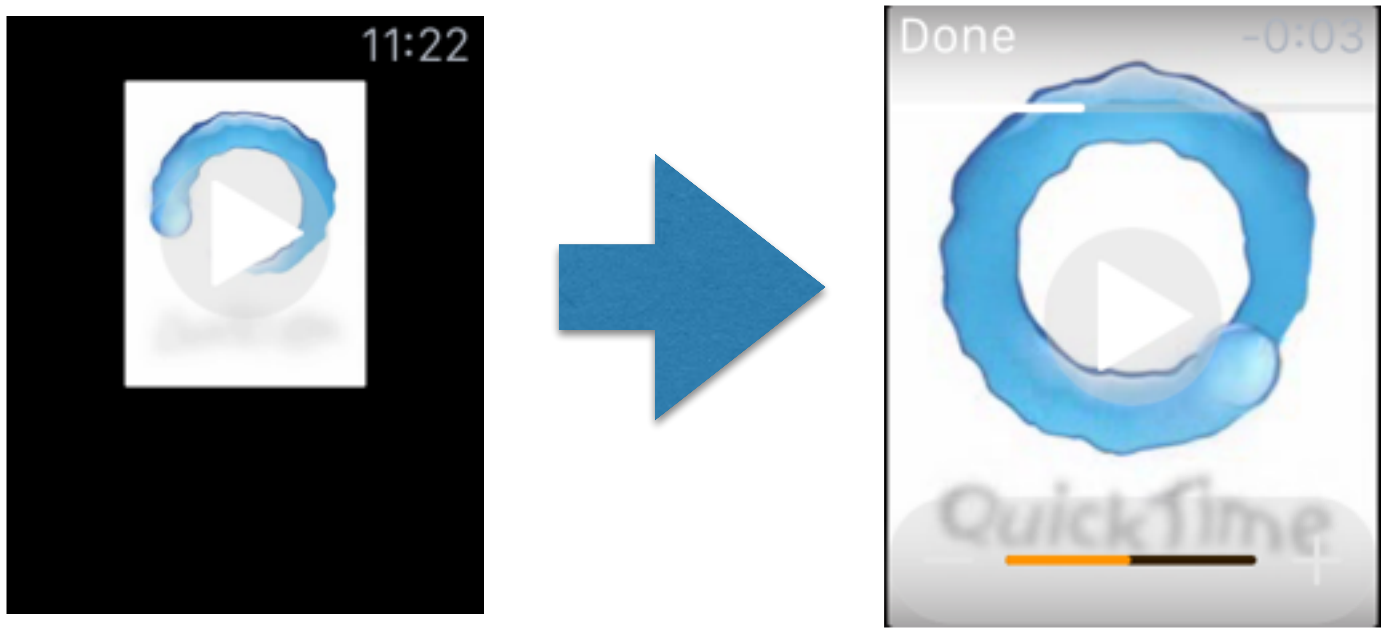
`WKMediaPlayerControllerOptionsLoopsKey`
True if the the content plays repeatedly in a loop

Playing Inline Videos

WKInterfaceMovie

```
func setMovieURL(_ URL: NSURL)

func setVideoGravity(_ videoGravity: WKVideoGravity)

func setLoops(_ loops: Bool)

func setPosterImage(_ posterImage: WKImage?)
```

An placeholder image to show while the movie is not playing.



Playing Extended Audio

Classes Involved in Background Audio Playback

`WKAudioFileAsset`
Stores a reference to an audio file and provides metadata access

`WKAudioFilePlayerItem`
Manages the state of an `WKAudioFileAsset` as it is being played

`WKAudioFilePlayer`
Controls playback of a single `WKAudioFilePlayerItem`

`WKAudioFileQueuePlayer`
Controls playback of multiple `WKAudioFilePlayerItem`s

WKAudioFileAsset

Initializers

```
convenience init(URL URL: NSURL)

convenience init(URL URL: NSURL,
           title title: String?,
      albumTitle albumTitle: String?,
          artist artist: String?)
```

Properties (all read-only)

```
URL:        NSURL
duration:   NSTimeInterval
title:      String?
albumTitle: String?
artist:     String?
```

WKAudioFilePlayerItem

Initializer

`init(asset asset: WKAudioFileAsset)`

Properties (all read-only)

`asset: WKAudioFileAsset`

`status: WKAudioFilePlayerItemStatus {.Unknown, .ReadyToPlay, .Failed}`

`error: NSError` – non-`nil` if `status` is `.Failed`

`currentTime: NSTimeInterval` – valid if `status` is `.ReadyToPlay`

Notifications

`WKAudioFilePlayerDidPlayToEndTimeNotification`

`WKAudioFilePlayerItemFailedToPlayToEndTimeNotification`

WKAudioFilePlayer

Initializer

```
convenience init(playerItem item: WKAudioFilePlayerItem)
```

Playing audio

```
var rate: Float
```

`0.0` – Stopped
`1.0` – Playing at regular speed
`-1.0` – Playing at backwards at regular speed
`0.5` – Playing at half speed
`2.0` – Playing at double speed

```
func play()
```

Sets rate to 1.0

```
func pause()
```

Sets rate to 0.0

WKAudioPlayer also “passes through” the properties `status`, `error`, `currentTime` for its current item, accessed by:

var currentItem: WKAudioFilePlayerItem?

WKAudioFileQueuePlayer

A subclass of `WKAudioFilePlayer`

Initializer

```
convenience init(items items: [WKAudioFilePlayerItem])
```

Managing Items

```
var items: [WKAudioFilePlayerItem] { get }

func advanceToNextItem()

func appendItem(_ item: WKAudioFilePlayerItem)

func removeItem(_ item: WKAudioFilePlayerItem)

func removeAllItems()
```

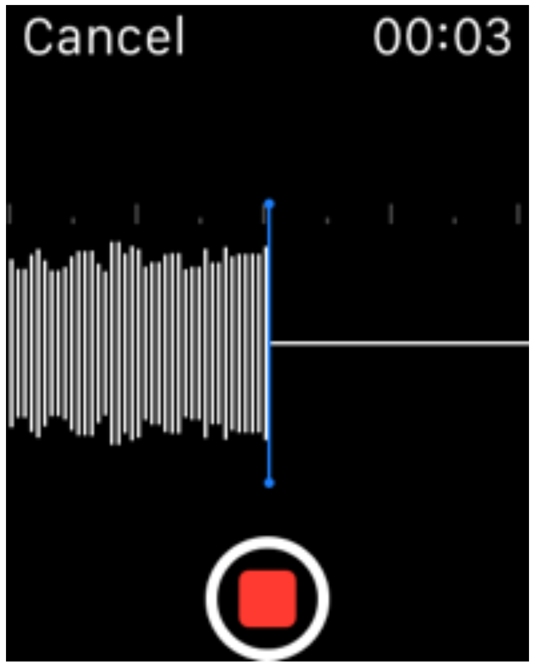
Keeping the App Open

- Normally, your app will go to sleep when you stop interacting with it
- To prevent this while audio is playing, add the `UIBackgroundModes` key with the `audio` value to the `Info.plist` file of your watch app.

Recording Audio

Recording Audio

```
func presentAudioRecorderControllerWithOutputURL(_ URL: NSURL,
                                          preset preset: WKAudioRecorderPreset,
                                         options options: [NSObject : AnyObject]?,
                                      completion completion: (Bool,
                                                       NSError?) -> Void)
```



File System

- The file system on the watch is structured the same as the file system on the iPhone

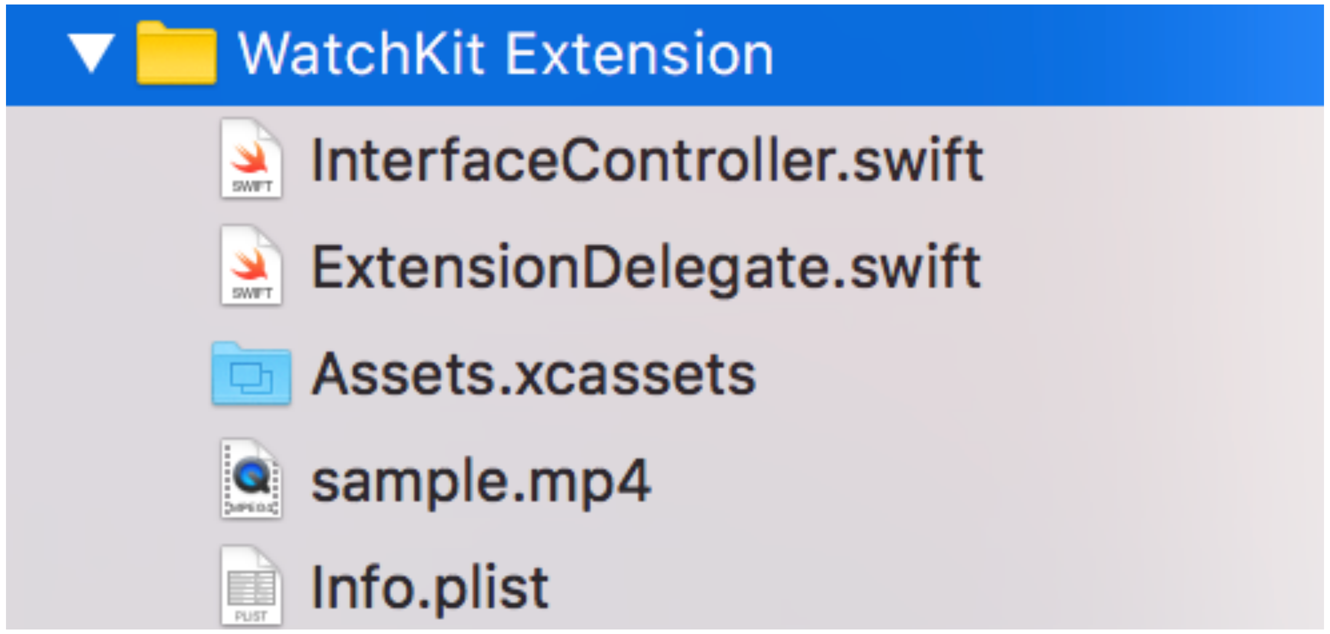
Library - storage for non-user-facing data

Documents - storage for user-generated files

tmp - short-term storage that may be purged

Accessing files in the Watch Extension

```swift
let path = NSBundle.mainBundle().pathForResource("sample", ofType: "mp4")!
let url = NSURL(fileURLWithPath: path)
```



WatchKit Extension
InterfaceController.swift
ExtensionDelegate.swift
Assets.xcassets
sample.mp4
Info.plist

File System URLs

Library

```
NSFileManager.defaultManager().URLsForDirectory(.LibraryDirectory,
inDomains:.UserDomainMask).first
```

Documents

```
NSFileManager.defaultManager().URLsForDirectory(.DocumentDirectory,
inDomains:.UserDomainMask).first
```

tmp

```
NSTemporaryDirectory()
```

Audio Recording

- Apple Watch can record audio as Linear PCM or as AAC
- Linear PCM is raw, uncompressed sound data. LPCM is stored in `.wav` files.
- AAC is a lossy format that is more space efficient but has less fidelity. It is stored in `.mp4` or `.m4a` files.
- LPCM vs AAC is analogous to bitmap vs jpeg

WKAudioRecorderPreset enum

`NarrowBandSpeech`
Suitable for voice messages

`WideBandSpeech`
Higher fidelity voice recording

`HighQualityAudio`
Suitable for recording music

Options

- A dictionary of options. Some notable options are:

`WKAudioRecorderControllerOptionsAutorecordKey`
True if the controller starts recording automatically, `true` is the default.

`WKAudioRecorderControllerOptionsActionTitleKey`
The title for the action button; “Save” is the default.

Recording Audio Example

```
let directoryURL =
NSFileManager.defaultManager().URLsForDirectory(.DocumentDirectory,
inDomains:.UserDomainMask).first

let fileURL = NSURL(fileURLWithPath: "audio.wav", isDirectory:
false, relativeToURL:directoryURL)

self.presentAudioRecorderControllerWithOutputURL(fileURL,
  preset: .WideBandSpeech, options:
  [WKAudioRecorderControllerOptionsAutorecordKey:false,
  WKAudioRecorderControllerOptionsAlwaysShowActionTitleKey:false]) {
     (success, error) -> Void in
      print("done")
}
```