House Course 59-20

Web and Mobile Applications
Week 6: Data Persistence, App Store Submission

Attendance: http://goo.gl/forms/QQfQMakPLc
Attendance will appear later if you miss it

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Demo so far

Attendance

Attendance: http://goo.gl/forms/QQfQMakPLc

What does it mean for an app to be “turned off”?

- Two different active states:
- Active. This is the state of the app that is actively controlling the screen.
- Background. This is the state of apps that are actively running, but are not on screen. Consider the Maps app, giving directions while you check your email. Or a music app, playing audio while you look up something on the map.

What does it mean for an app to be “turned off”?

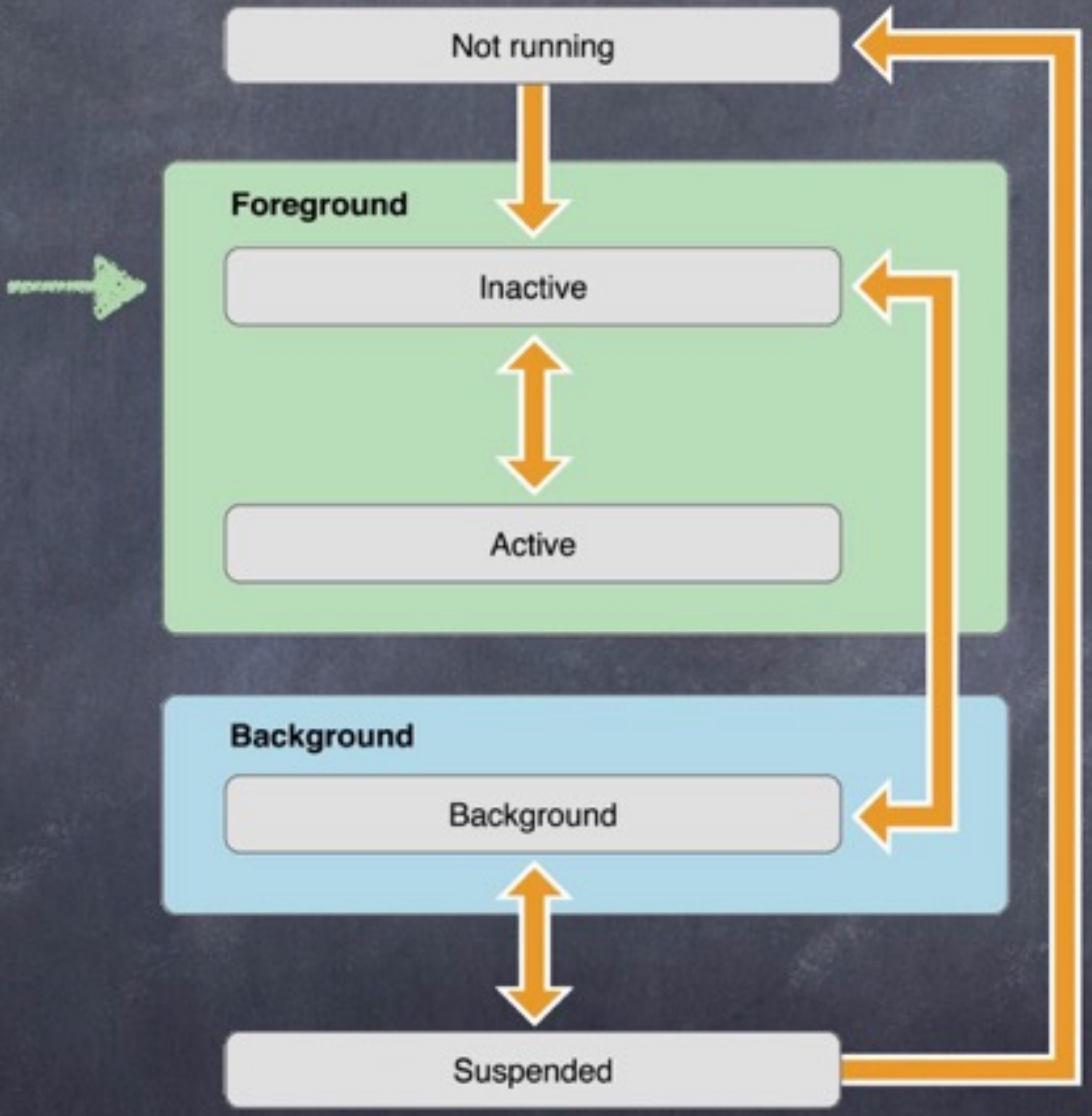
- Two states of rest:
  - Not Running. The state of apps that have never been started, for instance.
  - Inactive. This is the state of an app that was running, until the user taps the home button, or receives a phone call.
- Fifth state that is harder to see:
  - Suspended. This is the state of apps that could be running in the background, but have no work to do.

What does it mean for an app to be “turned off”?

- Of these five states, it is the not running state that most interests us.
  - This is the state that we might call “turned off”. It is the only state in which an app's memory is not preserved.
  - When apps transition in and out of the not running state we need to make sure that any state that we want to be persistent has made its way into a persistent storage mechanism.

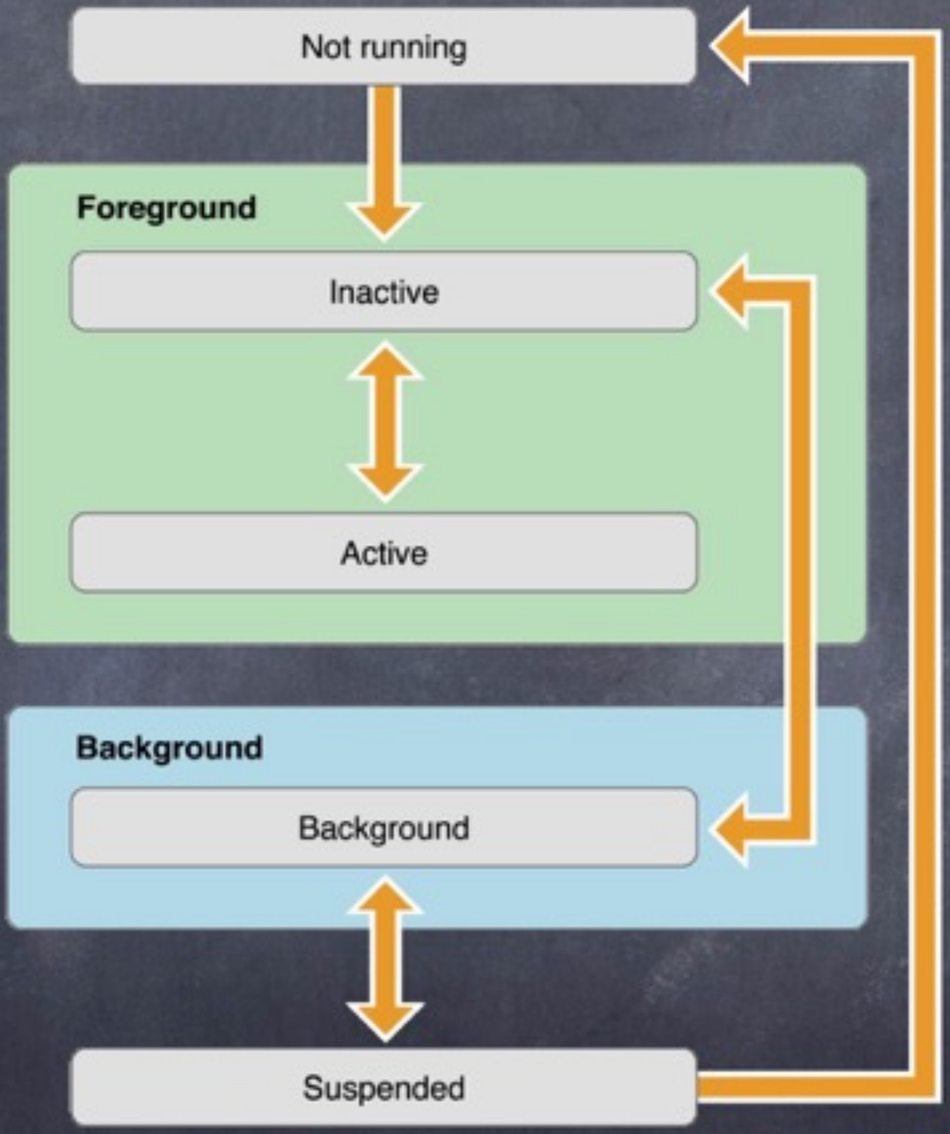
Application Lifecycle

Running your code, but no UI events.

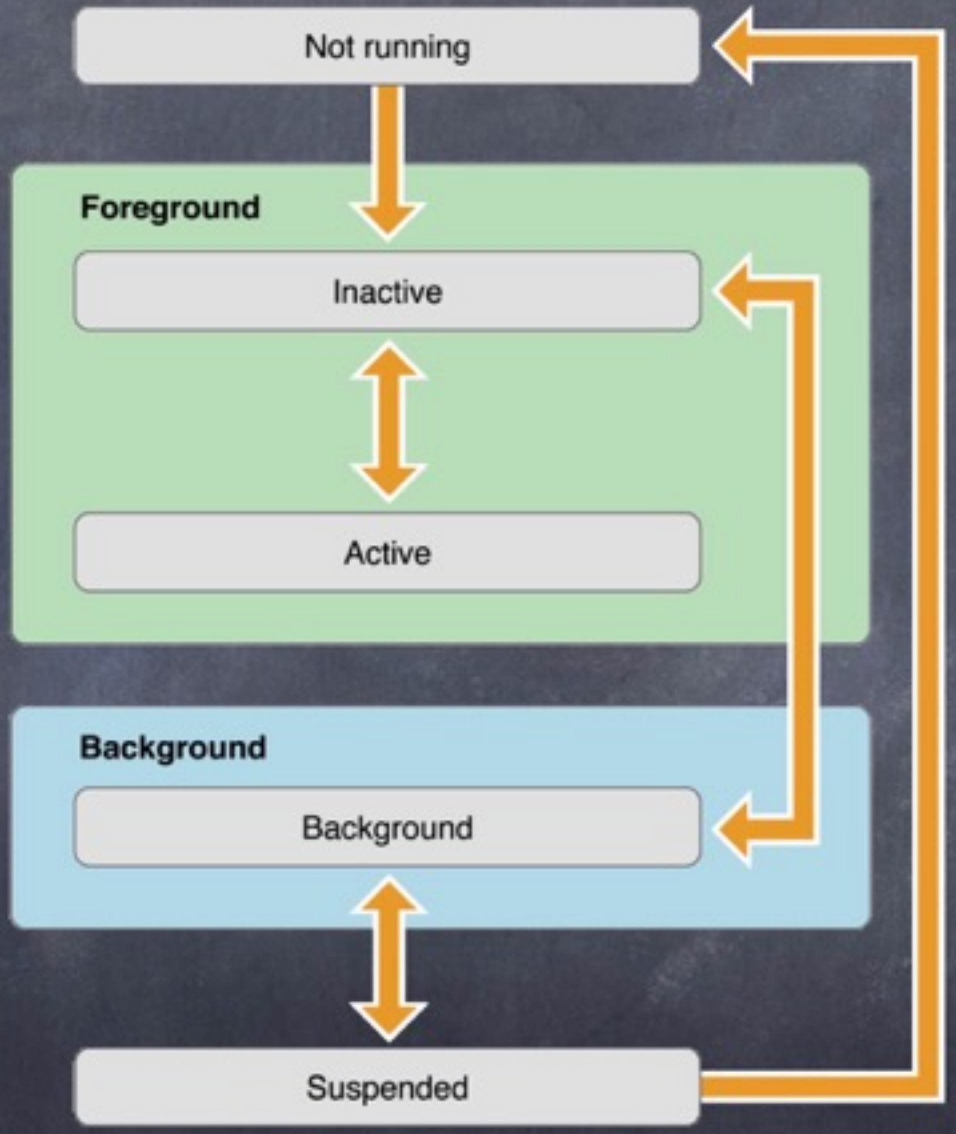


Application Lifecycle

Running your code, receiving and processing UI events.

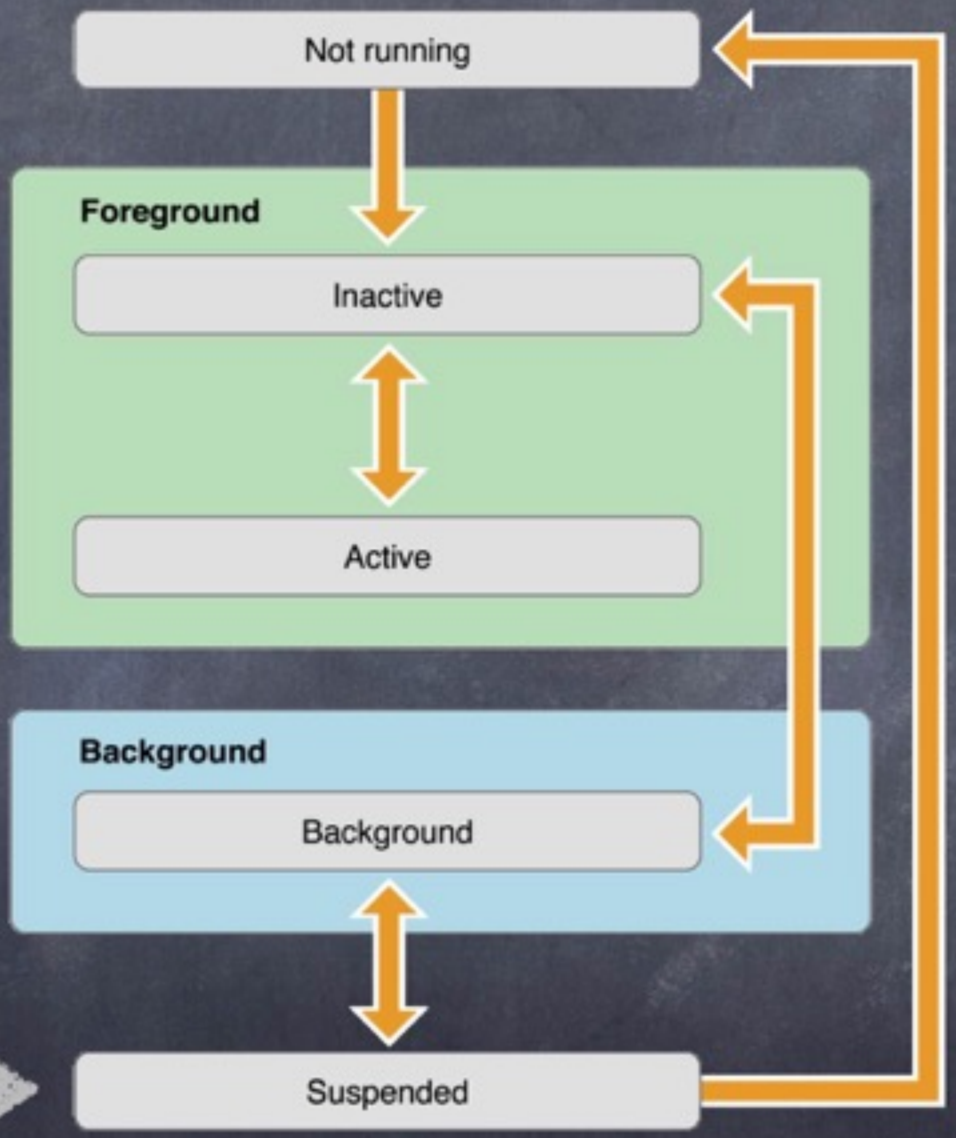


Application Lifecycle



Running your code for a limited time, no UI events.

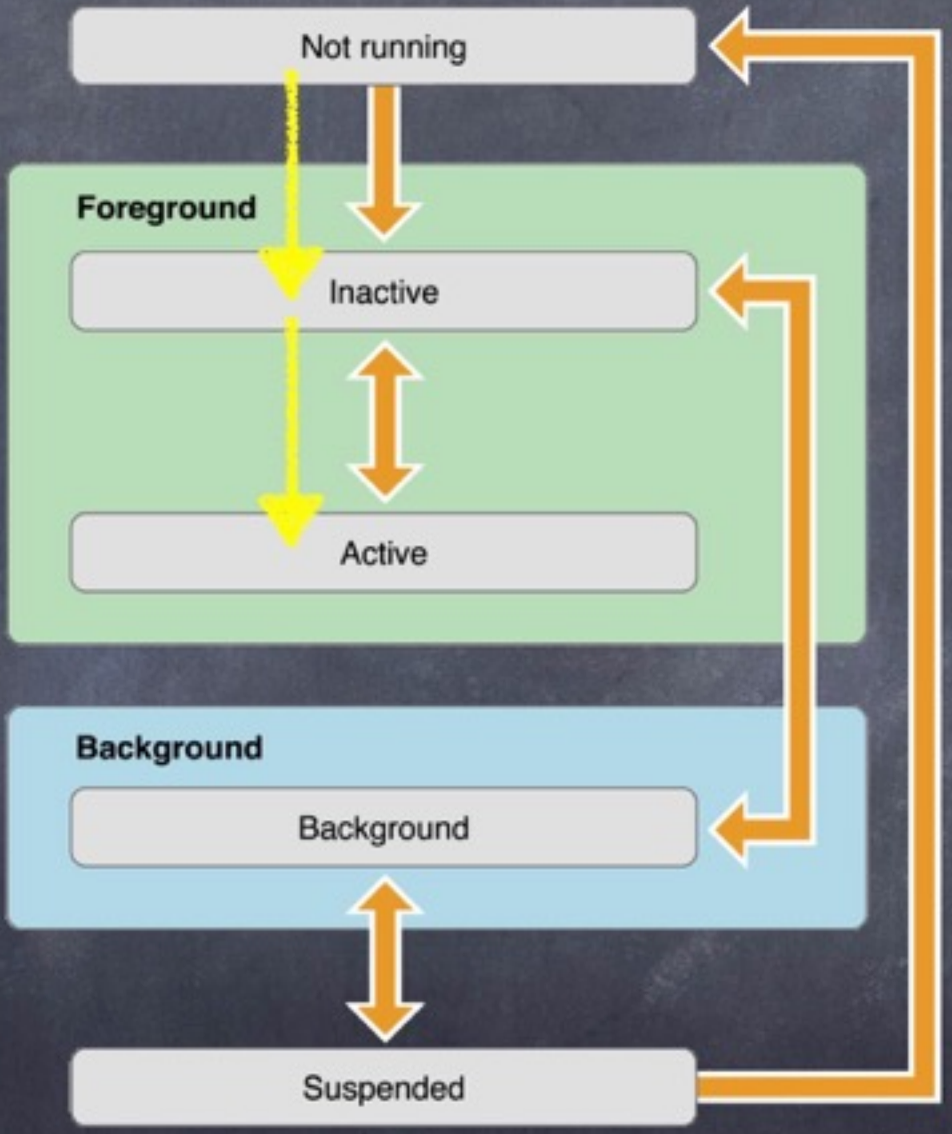
Application Lifecycle



Your code not running.
You could be killed.

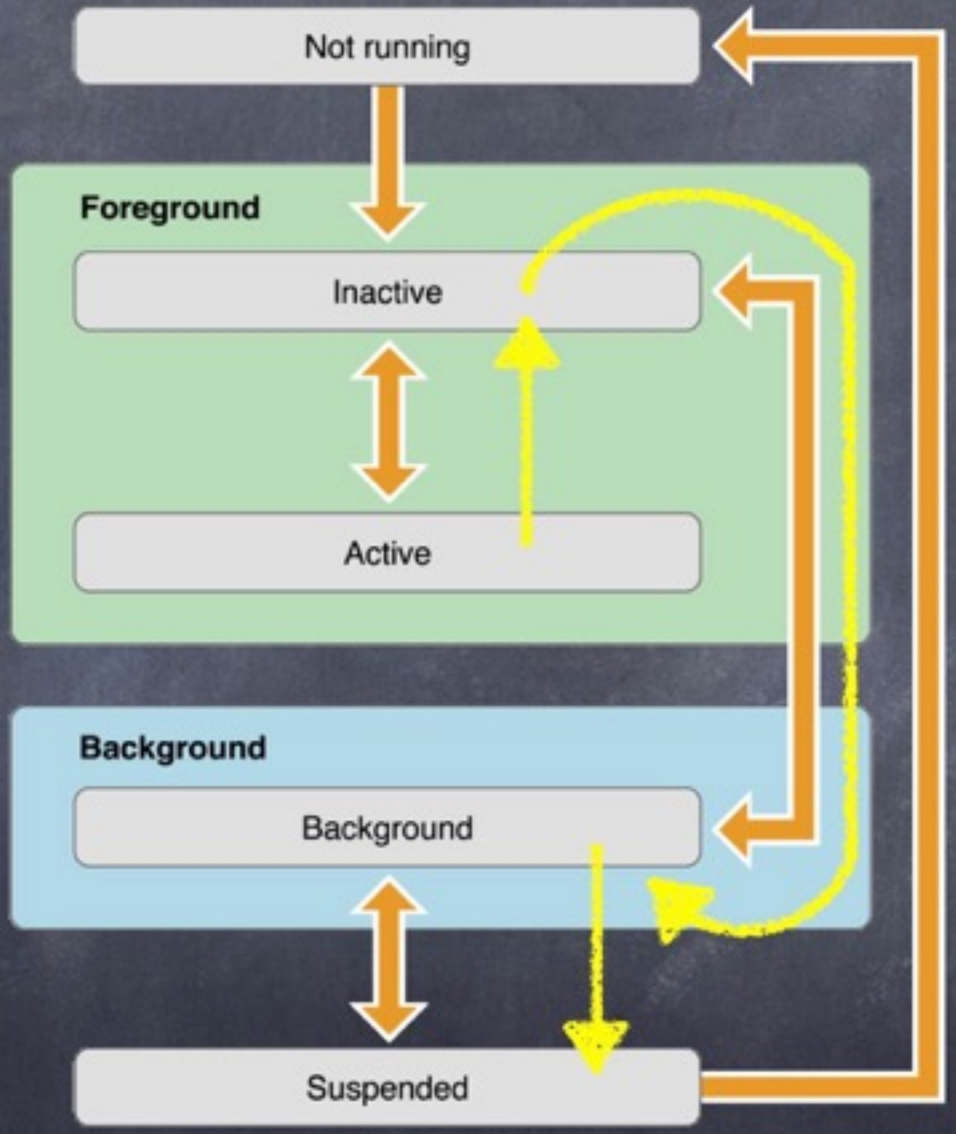
Application Lifecycle

Launch



Application Lifecycle

Switch to another application



CS193p
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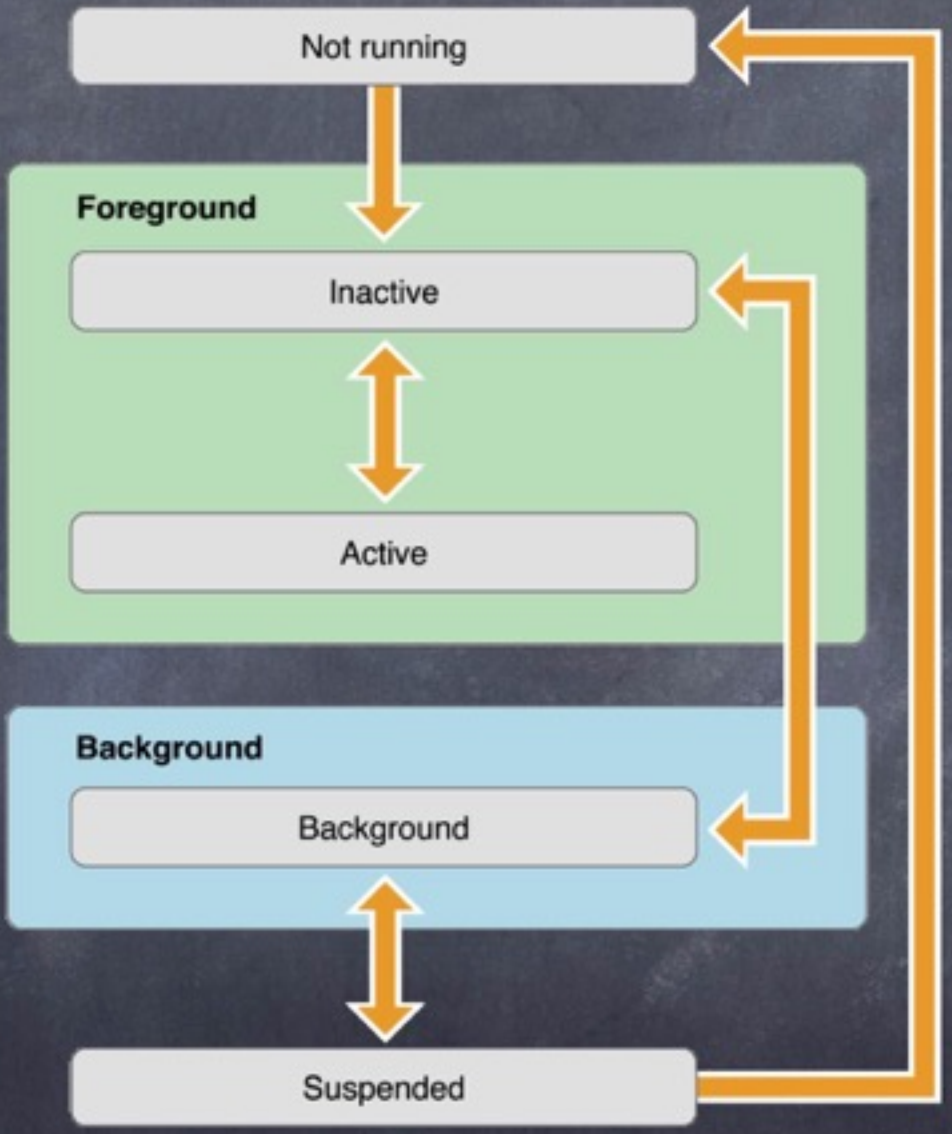
Application Lifecycle



Killed
(notice no code runs between suspended and killed)

UIApplicationDelegate

- Protocol methods provide notification of app lifecycle events
    - `application(_:willFinishLaunchingWithOptions:)`
    - `application(_:didFinishLaunchingWithOptions:)`
    - `applicationDidBecomeActive(_:)`
    - `applicationWillResignActive(_:)`
    - `applicationDidEnterBackground(_:)`
    - `applicationWillEnterForeground(_:)`
    - `applicationWillTerminate(_:)`

Persistence

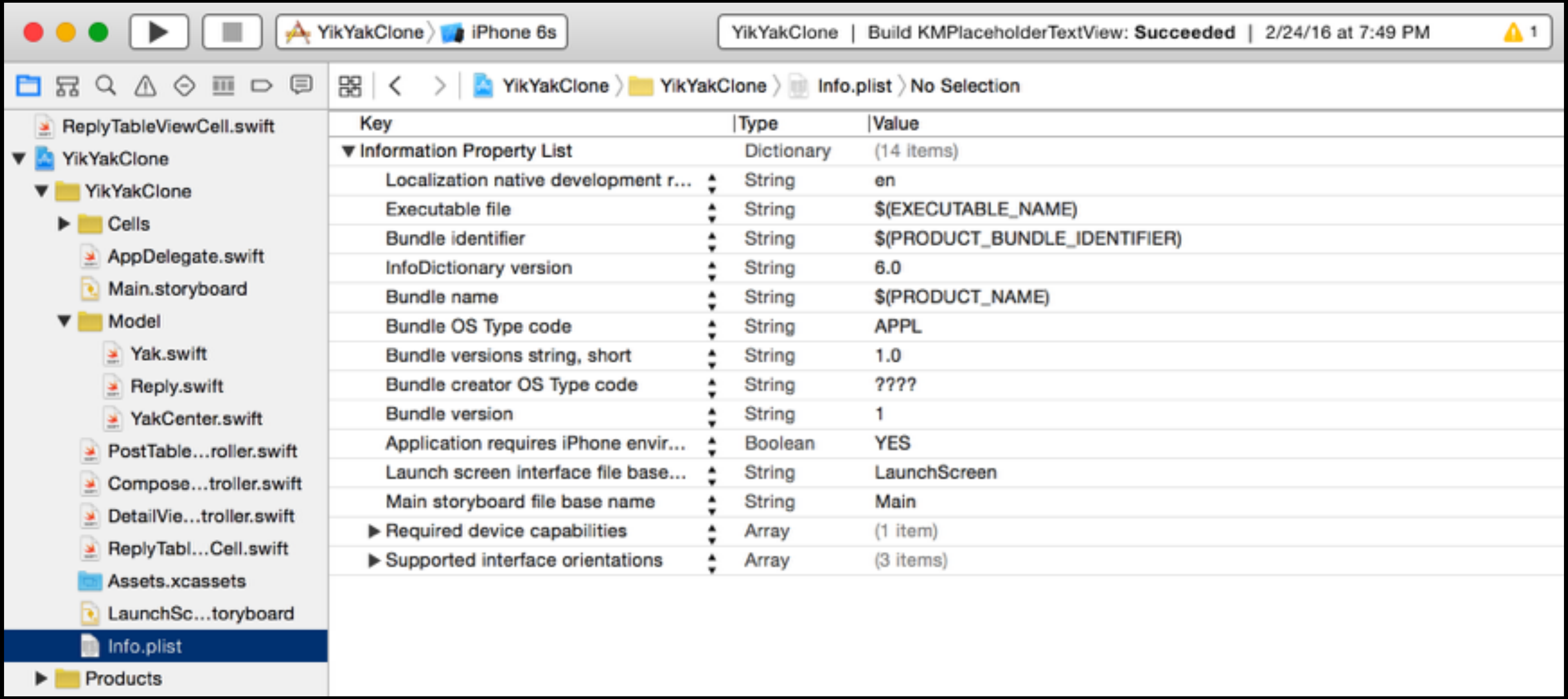
- Property Lists
- NSUserDefaults
- Archiving
- SQLite
- File System
- Core Data
- mBaaS (Firebase, Parse)

Property Lists

- Only viable for very small data sets.
- Convenient but they do not scale well.
  - Many of your application’s settings are in **Info.plist**
  - You can edit this file (in Xcode’s property list editor) by clicking on Info.plist

Property Lists

- Many of your application's settings are in **Info.plist**
- Key-value storage



YikYakClone 〉 iPhone 6s

YikYakClone | Build KMPlaceholderTextView: **Succeeded** | 2/24/16 at 7:49 PM

YikYakClone 〉 YikYakClone 〉 Info.plist 〉 No Selection

```
ReplyTableViewCell.swift
▼ YikYakClone
  ▼ YikYakClone
    ▶ Cells
      AppDelegate.swift
      Main.storyboard
    ▼ Model
        Yak.swift
        Reply.swift
        YakCenter.swift
      PostTable...roller.swift
      Compose...troller.swift
      DetailVie...troller.swift
      ReplyTabl...Cell.swift
      Assets.xcassets
      LaunchSc...toryboard
      Info.plist
  ▶ Products
```

Key	Type	Value
▼ Information Property List	Dictionary	(14 items)
Localization native development r...	String	en
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle creator OS Type code	String	????
Bundle version	String	1
Application requires iPhone envir...	Boolean	YES
Launch screen interface file base...	String	LaunchScreen
Main storyboard file base name	String	Main
▶ Required device capabilities	Array	(1 item)
▶ Supported interface orientations	Array	(3 items)

NSUserDefaults

- Apple's easy-to-use infrastructure for saving app information associated with user preferences.
- Open-ended. We can store primitive types and object types. It behaves like a dictionary—data is stored as keys and values.
- iOS keeps a database of these user preference values for each app on the device. The values are persisted from one run of an app to another.
- "Singleton Design Pattern" (shared instance):

```
let defaults =
NSUserDefaults.standardUserDefaults()

defaults.setObject("Coding Explorer", forKey:
"userNameKey"
```

File System

- iOS has a Unix filesystem underneath it
- You can read and write files into it with some restrictions
- Can store files in the "documents" directory, using NSFileManager

```
let dirPath =
NSSearchPathForDirectoriesInDomains(.DocumentDirectory,
.UserDomainMask, true)[0] as! String
let pathArray = [dirPath, filename]
let fileURL =
NSURL.fileURLWithPathComponents(pathArray)!
```

Archiving

- Very rarely used for persistence, but it is how storyboards are made persistent
- objects in the graph to implement NSCoding protocol
  - `func encodeWithCoder(encoder: NSCoder` and `init(coder: NSCoder)`

SQLite

- SQLite is good if you prefer a more database-like approach and don't mind writing code to translate between SQL records and model objects.
- Rarely used unless you have a legacy SQL database you need to access

Core Data

- An object-oriented database
- Primary way to store data in a sophisticated application
- Core Data is good if you like the idea of being able to read and write your model objects directly.
- It offers the same kind of searching and filtering you might expect with SQL except that you deal with your own objects all the way through.
- Integration with iCloud

Firebase Persistence

- Firebase apps automatically handle temporary network interruptions for you.
    - Cached data will still be available while offline and writes will be resent when network connectivity is recovered.
- One line:

```
Firebase.defaultConfig().persistenceEnabled = true
```

Firebase Transactions

- When an app needs realtime bidding, voting, etc. the traditional setValue concept breaks
- Use transactions

App Distribution Overview

- Your identity (certificate) is of type “iOS Development”
  - This allows you to load apps onto devices connected to your Xcode environment.
  - Provisioning profiles are updated automatically for you by Xcode, or you can register device in Member Center
  - You can managed your identities and provisioning profiles in Xcode -> Preferences -> Accounts
- To actually distribute an app, an “iOS Distribution” identity is required

Credit: Ric Telford ECE 590

Archiving and Distribution

- There are two kinds of distribution of your app:
  1. Ad Hoc Distribution – you provide a copy of your app to a limited set of known users so that they can try it on their devices to report bugs. See *TestFlight* for more info
  2. App Store Distribution – you provide the app to the App Store so that anyone can download and run it.
- To create a copy of your app for distribution, you need first to build an *archive* of the app
  - A "preserved" build that you can use for distribution, reproduction, and symbolication (viewing crash logs)
  - Set device to "iOS Device" and then Product -> Archive
- To actually distribute the archive, you would then need an "iOS Distribution" identity

Credit: Ric Telford ECE 590

Submission to the App Store

- The Apple portal page for the app store is http://itunesconnect.apple.com .
  - Provides App management, App analytics, Sales and Trends, Payments and iAd
  - See *iTunes Connect Developer's Guide* for more information
- Key information you will need to supply at some point:
  - App name – the name that will appear in the App Store. 25 characters or fewer, unique to App Store
  - Description – fewer than 4,000 characters, pure text.
  - Keywords – comma-separated
  - SKU number / string – you generate, unique to your apps
  - Support site URL, Copyright, Price, Avail Date
- Export App to .ipa using Window -> Organizer
- Upload App to iTunes using Xcode -> Open Developer Tool -> Application Loader

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