Data Input

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Model Layer of MVC

- Contains the data to be displayed

- Data can be:
  - Stored on device
  - Pulled down from a server

- Data displayed in app should be:
  - Personalized
  - Secure
User Defaults

- Storage on the device itself
- Can hold persistent key/value pairs
- Used for application configuration data
- Accessed via the NSUserDefaults singleton object:
  - `NSUserDefaults.standardUserDefaults()`
- Write back to hard drive using `synchronize()`
User Defaults Example

// Define keys for the values to store
let kUserIdKey = "userId"
let kTotalKey = "total"
let kNameKey = "name"

// Define the values to store
let userId = 900
let total = 1275.55
let name = "University of Texas"

// Get a reference to the global user defaults object
let defaults = NSUserDefaults.standardUserDefaults()

// Store various values
defaults.setInteger(userId, forKey: kUserIdKey)
defaults.setDouble(total, forKey: kTotalKey)
defaults setObject(name, forKey: kNameKey)
defaults synchronize() // force the write to the device

// Retrieve the previously stored values
let retrievedUserId = defaults.integerForKey(kUserIdKey)
defaults retrievedTotal = defaults.doubleForKey(kTotalKey)
defaults retrievedName = defaults.objectForKey(kNameKey)
Read and Write Functions

- NS prefix signifies Foundation data type
- Can store:
  - NSData
  - NSString/String
  - NSNumber (UInt, Int, Float, Double)
  - NSDate
  - NSArray/Array, NSDictionary/Dictionary
- Write convenience functions:
  - setBool(value: Bool, forKey defaultName: String)
  - setFloat, setInteger, setObject, setDouble, setURL
- Read convenience functions:
  - arrayForKey(defaultName: String)
  - boolForKey, dataForKey, dictionaryForKey, floatForKey, integerForKey, objectForKey, stringArrayForKey, stringForKey, doubleForKey, URLForKey
Using User Default Methods

- Methods that return Bool, Int, Float and Double do not return Optionals
  - Return values appropriate to their type
- Methods that return Any must be cast to correct type before use
What to Store in User Defaults?

- Relatively small amounts of data
- Related to the device user
- Settings/preferences etc
- Not for sensitive data!
  - User Defaults in an unencrypted plist
  - Use Keychain to encrypt passwords, identifying information, etc
Plists

- Property lists organize data into named values and lists of values
- Converts to and from standard XML
- Convenient way to import standard app data to all devices
- Can be modified at runtime
Plist Values

- Plists can store:
  - Arrays / Dictionaries
  - Strings
  - NSData
  - Ints / Floats / Doubles
  - Booleans
<?xml version="1.0" encoding="UTF-8"?>

<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">

<plist version="1.0">
  <dict>
    <key>Name</key>
    <string>John Doe</string>
    <key>Phones</key>
    <array>
      <string>408-974-0000</string>
      <string>503-333-5555</string>
    </array>
  </dict>
</plist>
Accessing Plists

1. Create reference from main bundle (e.g. the app’s file structure)

2. Access as either NSArray or NSDictionary (depending on the plist)

   ```swift
   let inputFile = Bundle.main.path(forResource: "plist_name", ofType: "plist")

   let inputArray = NSArray(contentsOfFile: inputFile!)

   for item in inputArray as! [item_type] {
     /* Place plist items into appropriate object or data structures */
   }
   ```
PlistDemo
What to Store in Plists?

- Data that is consistent across all users
- Data that is primarily read-only
- Information and variables that are used globally
- Settings that are related to the app rather than the user
  - e.g. level settings in a game or style settings for an app layout
Quiz Question!

How do you access a plist at runtime?

A. `NSArray(contentsOfFile:)`

B. `Bundle.main.path(forResource: ofType:)`

C. `NSUserDefaults.standardUserDefaults()`
Quiz Answer

B: Bundle.main.path(forResource: ofType:)