Announcements

• Lab 1 regrade form will be posted on Piazza

• Lab 2 is due tonight by 11:59 PM
  – Late policy is 10% of lab total per day late (max 3 days late, after that it is a zero)
    • So -7.5 points per day late for lab 2

• Labs 3 and 4 are posted on the course website

Today’s Topics

• Finish Circle Drawing App

• Designing iPhone Applications

• Model-View-Controller (Why and How?)

• View Controllers
Circle Drawing App

Designing iPhone Applications
Different Flavors of Mail

Organizing Content
Organizing Content

- Focus on your user’s data
- One thing at a time
- Screenfuls of content

Patterns for Organizing Content

Navigation Bar

Tab Bar
Navigation Bar

- Hierarchy of content
- Drill down into greater detail

Tab Bar

- Self-contained modes
A Screenful of Content

- Slice of your application
- Views, data, logic

Parts of a Screenful
Parts of a Screenful

Model - View - Controller
(Why and How?)
Why Model-View-Controller?

• Ever used the word “spaghetti” to describe code?
• Clear responsibilities make things easier to maintain
• Avoid having one monster class that does everything

Why Model-View-Controller?

• Separating responsibilities also leads to reusability
• By minimizing dependencies, you can take a model or view class you’ve already written and use it elsewhere
• Think of ways to write fewer lines of code
Communication and MVC

View Controllers
Problem: Managing a Screenful

- Controller manages views, data and application logic
- Apps are made up of many of these
- Would be nice to have a well-defined starting point
  - A la UIView for views
  - Common language for talking about controllers

Problem: Building Typical Apps

- Some application flows are very common
  - Navigation-based
  - Tab bar-based
  - Combine the two
- Don’t reinvent the wheel
- Plug individual screens together to build an app
UIViewController

- Basic building block
- Manages a screenful of content
- Subclass to add your application logic

“Your” and Apple View Controllers

- Create your own UIViewController subclass for each screenful
- Plug them together using existing composite view controllers
“Your” and “Our” View Controllers

- Create your own UIViewController subclass for each screenful

- Plug them together using existing composite view controllers

Your View Controller Subclass

```swift
import UIKit

class MyViewController : UIViewController {
    // A view controller will usually
    // manage views and data
    var myData = [String]()

    // And respond to actions
    @IBAction func doSomeAction(_ sender: UIButton) {
        // Do something here when button pressed
    }
}
```
The “View” in “View Controller”

- UIViewController superclass has a view property
  - view: UIView

- Loads lazily
  - On demand when requested
    - OS figures this out
  - Can be purged on demand as well (low memory)

- Sizing and positioning the view?
  - Depends on where it’s being used
  - Don’t make assumptions, be flexible

When to call -loadView?

- Don’t do it!

- Cocoa tends to embrace a lazy philosophy
  - Call setNeedsDisplay() instead of draw(_:)

- Allows work to be deferred
  - Performance!
    - Consider time to launching an application
override func viewDidLoad() {
    // Your view has been loaded
    // Customize it here if needed

    view.someWeirdProperty = true
}

override func viewWillAppear(_ animated: Bool) {
    super.viewWillAppear(animated)
    // Your view is about to show on the screen
    beginLoadingDataFromTheWeb()
    startShowingLoadingProgress()
}
override func viewWillDisappear(_ animated: Bool) {

    super.viewWillDisappear(animated)
    // Your view is about to leave the screen
    rememberScrollPosition()
    saveDataToDisk()
}

View Controller Lifecycle

Navigation View Controller Demo
Loading and Saving Data

- Lots of options out there, depends on what you need
  - UserDefaults
  - Property lists
  - SQLite
  - Web services
- Covering in greater depth in a few lectures

Saving State Across App Launches

- UserDefaults (renamed from NSUserDefaults) to read and write prefs & state
- Singleton object: `UserDefaults.standard`
- Methods for storing & fetching common types:
  ```Swift
  integer(forKey: String)
  set(value: Int, forKey: String)
  ```
- Find an appropriate time to store and restore your state
UserDefaults Demo