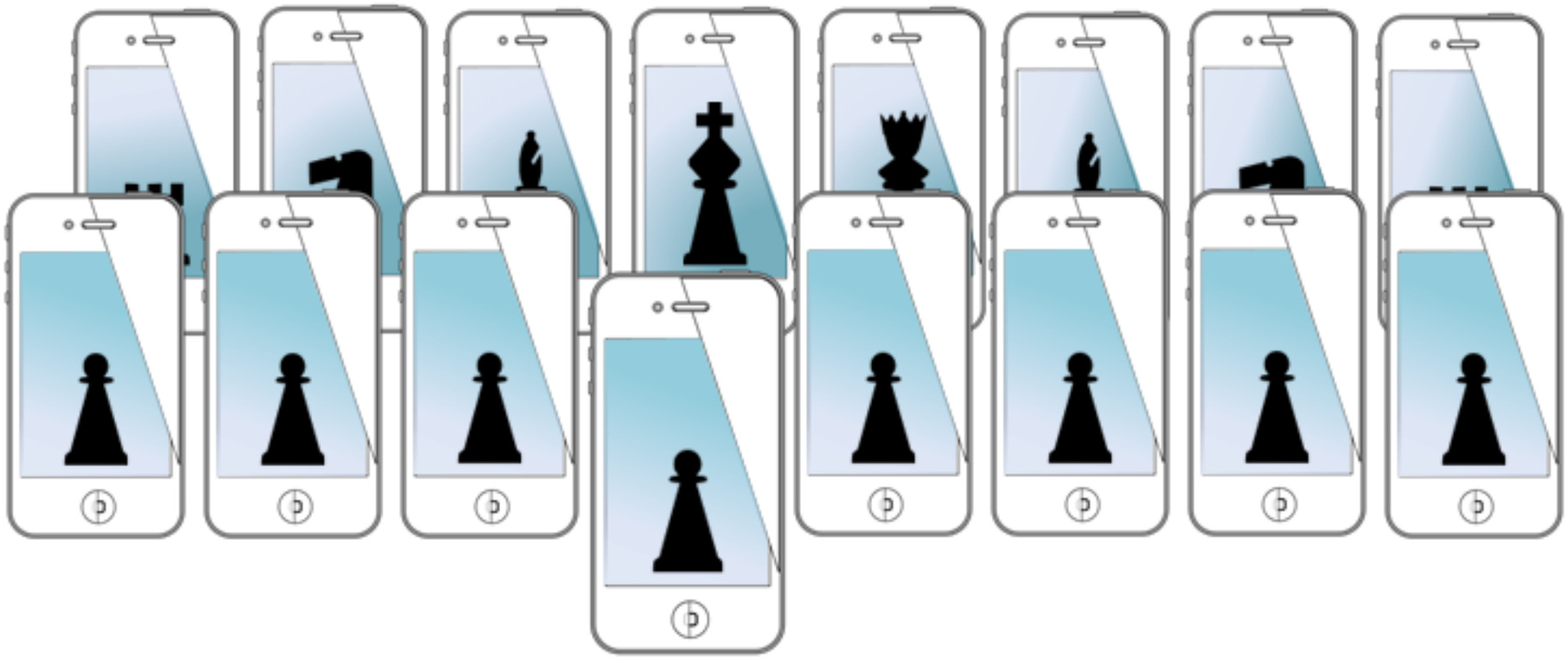


CS5323 & 7323

Mobile Sensing & Learning

Video Module One, model view controllers

Eric C. Larson, Lyle School of Engineering,
Department of Computer Science, Southern Methodist University

agenda (video)

- MVC (potential review)
  - outlets, actions, delegates, protocols, data source
- ViewControllers in iOS
  - TableViewControllers, NavigationViewController, CollectionViewController, UIViewController
- storyboard (with UIViewController)
  - outlets, auto layout, programatic creation
  - timers, UIScrollView, image assets,

MVC's

controller has direct connection to view class

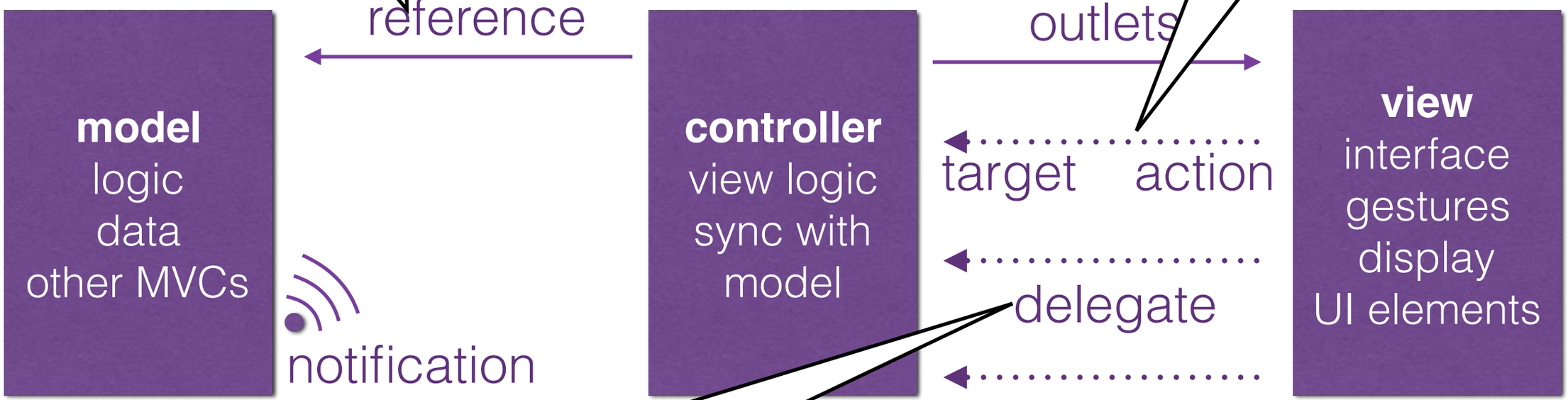
```
@property (weak, nonatomic) IBOutlet UITextField *firstName;
@property (weak, nonatomic) IBOutlet UITextField *lastName;
@property (weak, nonatomic) IBOutlet UITextField *phoneNumber;
```

controller has direct connection to model class

```
ModelClass *myModel = [get global handle to model]
PhoneNumberStruct * phNumber = [myModel getNumber];
self.phoneNumberLabel.text = phNumber.number;
```

view sends a targeted message

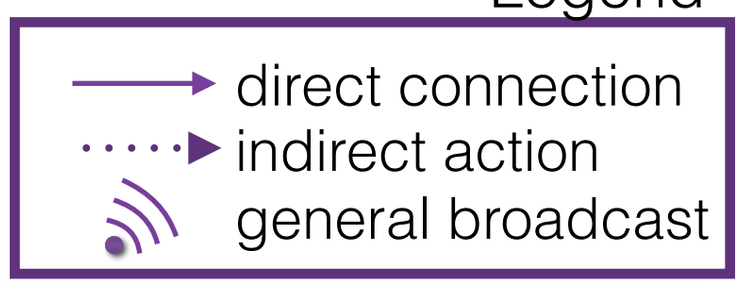
```
- (IBAction)buttonPressed:(id)sender;
- (IBAction)showPhBookPressed:(id)sender;
```




```
MainViewController ()<UITextFieldDelegate>
#pragma  mark - UITextfield Delegate
- (BOOL)textFieldShouldReturn:(UITextField *)textField { …  }
```

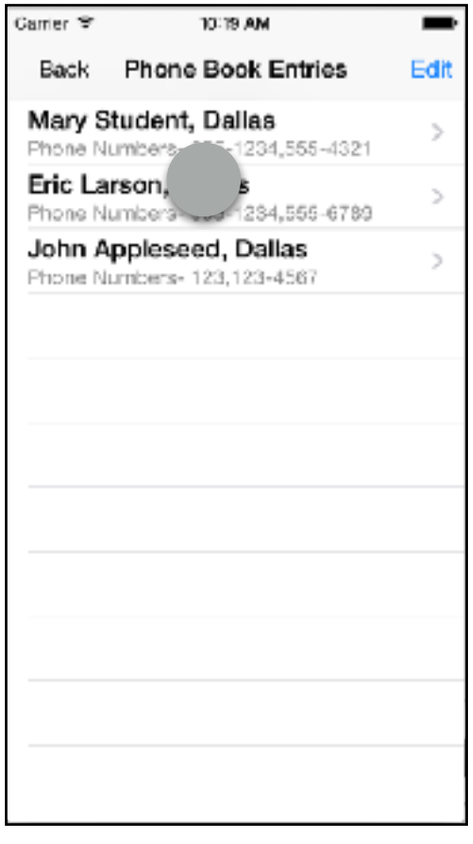
controller implements method for view class

```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
```



controller life cycle review

- problem: we need to handoff control of the screen to a new view
- the app itself is handling most of this transition
  - app will “unfreeze” the new view and its class properties
  - **you** need to send information from **source** ViewController to **destination** ViewController



controller life cycle review

Source Controller

`prepareForSegue`
prepare to leave the screen
set properties of destination, if needed

Destination Controller

view is unfrozen, property memory allocated

view outlets are ready for interaction

`viewDidLoad`

`viewWillAppear`

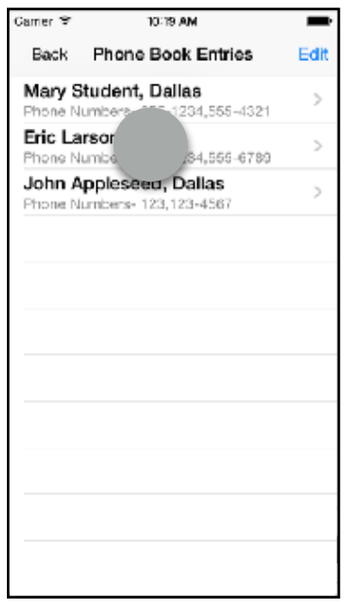
`viewDidAppear`

`viewWillDisappear`

`viewDidDisappear`

memory deallocated when app is ready

source



destination

user

the storyboard

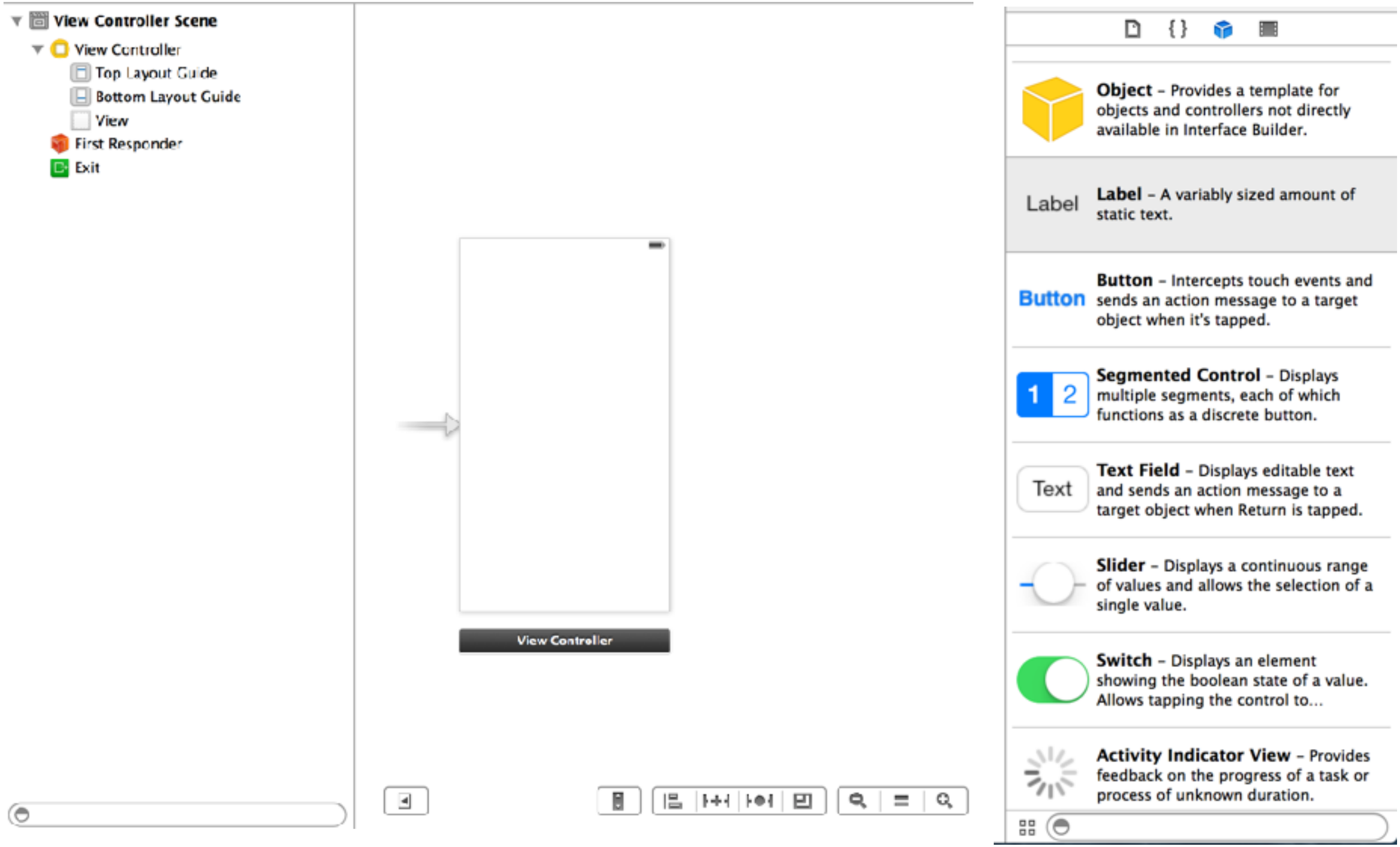
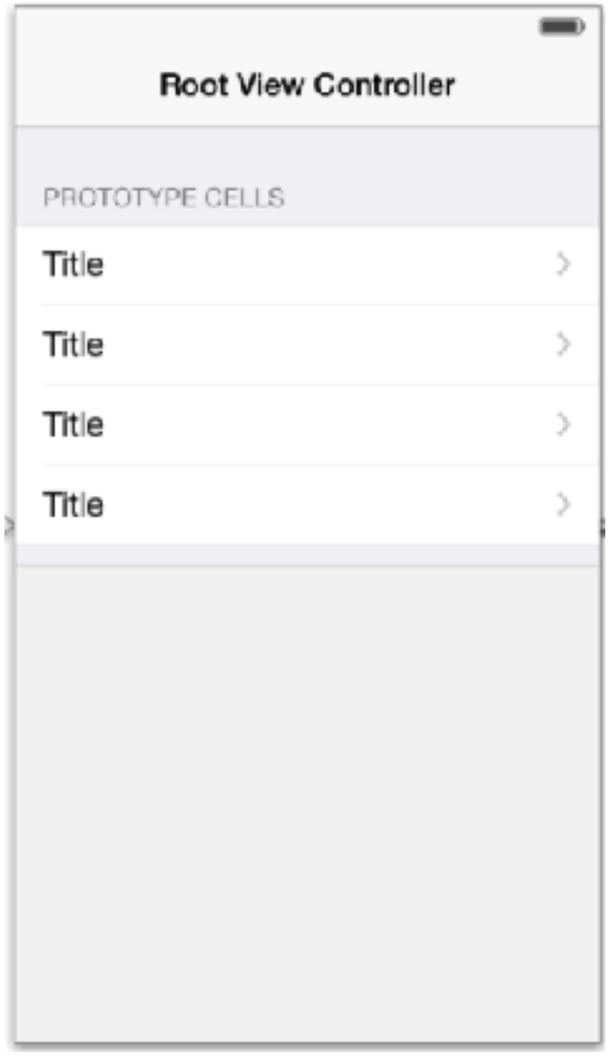
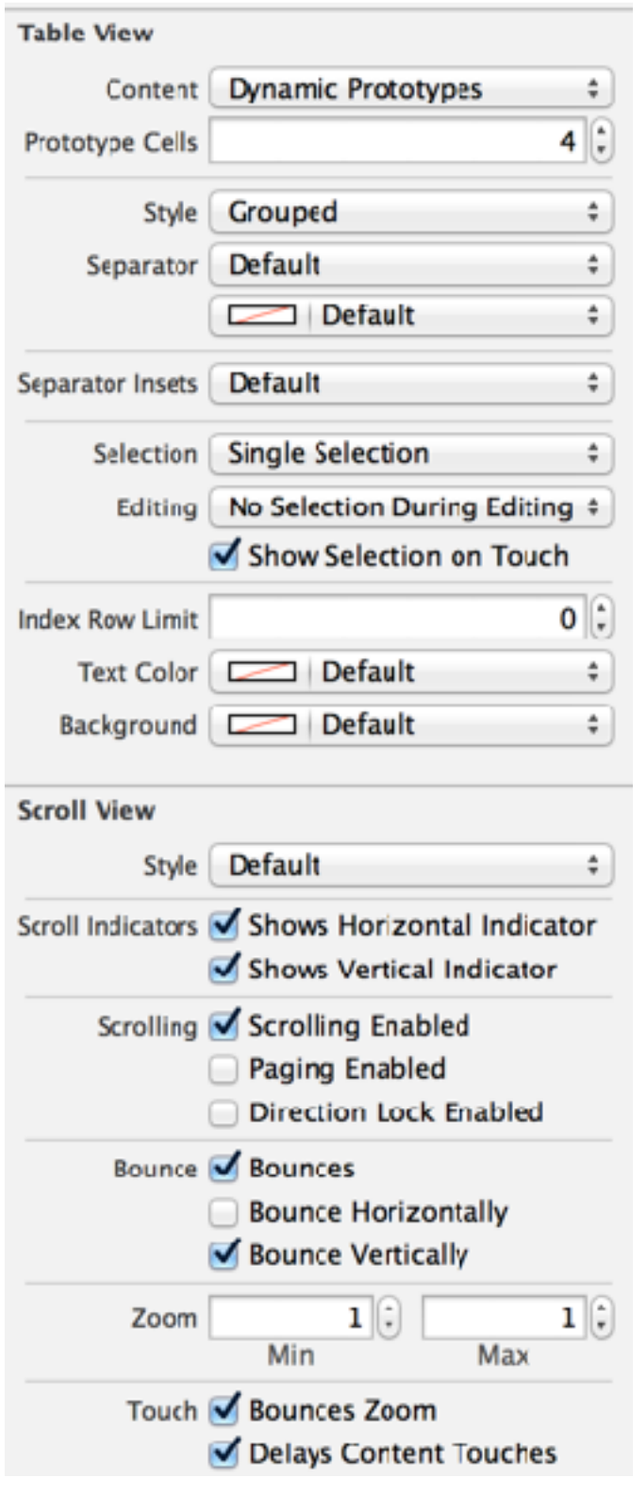
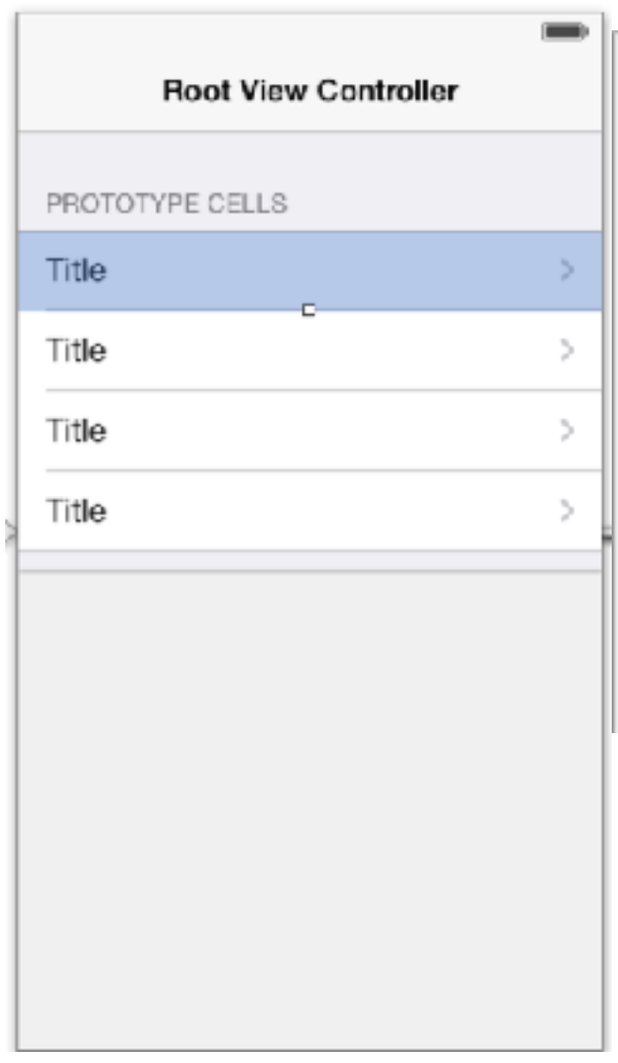


table view controller







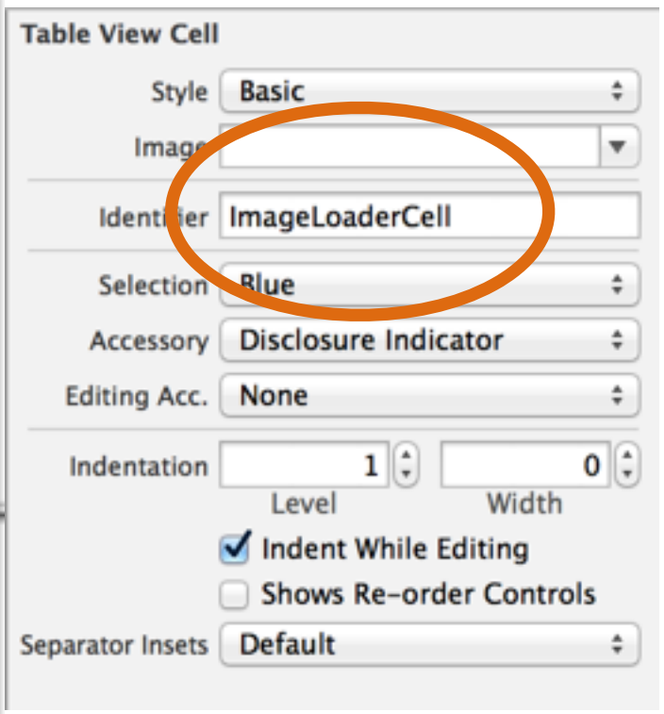


table view controller

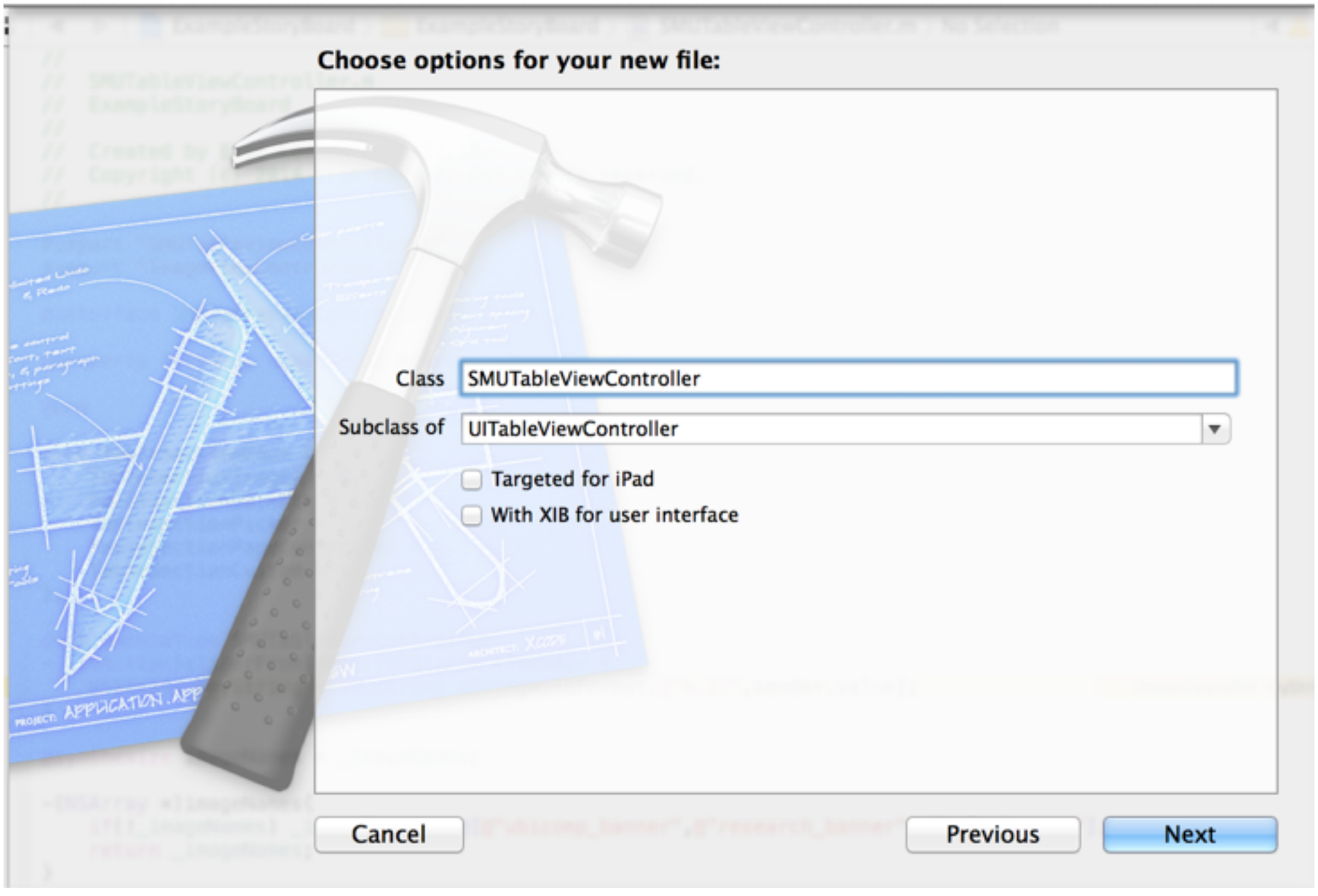


table view controller

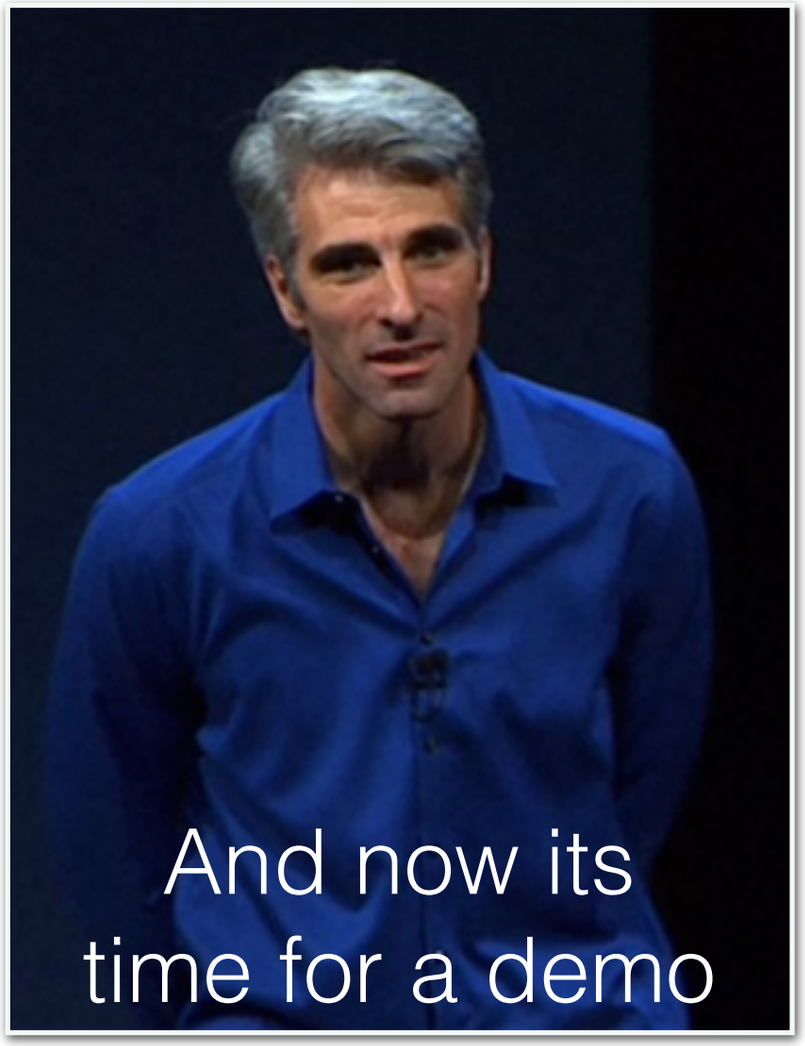
- must implement “data source” methods

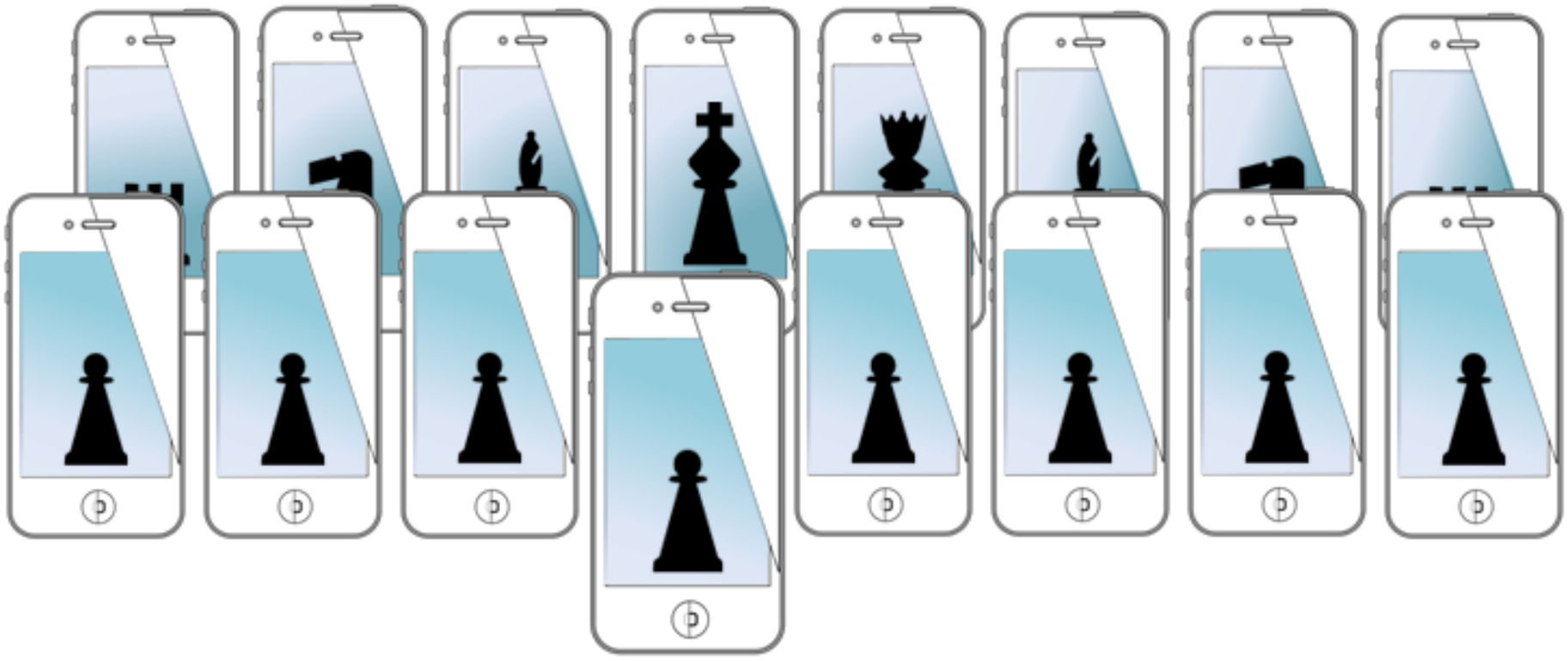
```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
    return numSections;
}


- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
{
    return rowsInSectionNumber[section];
}

- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath
*)indexPath
{
    static NSString *CellIdentifier = nil;
    UITableViewCell *cell = nil;

    CellIdentifier = @"ImageLoaderCell";
    cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier forIndexPath:indexPath];

    // Configure the cell
    cell.textLabel.text = @“An Image”;
    return cell;
}
```

cell prototype from storyboard

set cell attributes

table view controller demo





CS5323 & 7323

Mobile Sensing & Learning

Video Module One, model view controllers

Eric C. Larson, Lyle School of Engineering,
Department of Computer Science, Southern Methodist University

scroll view delegate

```
@interface SomeViewController () <UIScrollViewDelegate>
```

add view to the scroll view

I am a delegate for the Scroll View: I implement methods in the Scroll View Protocol!

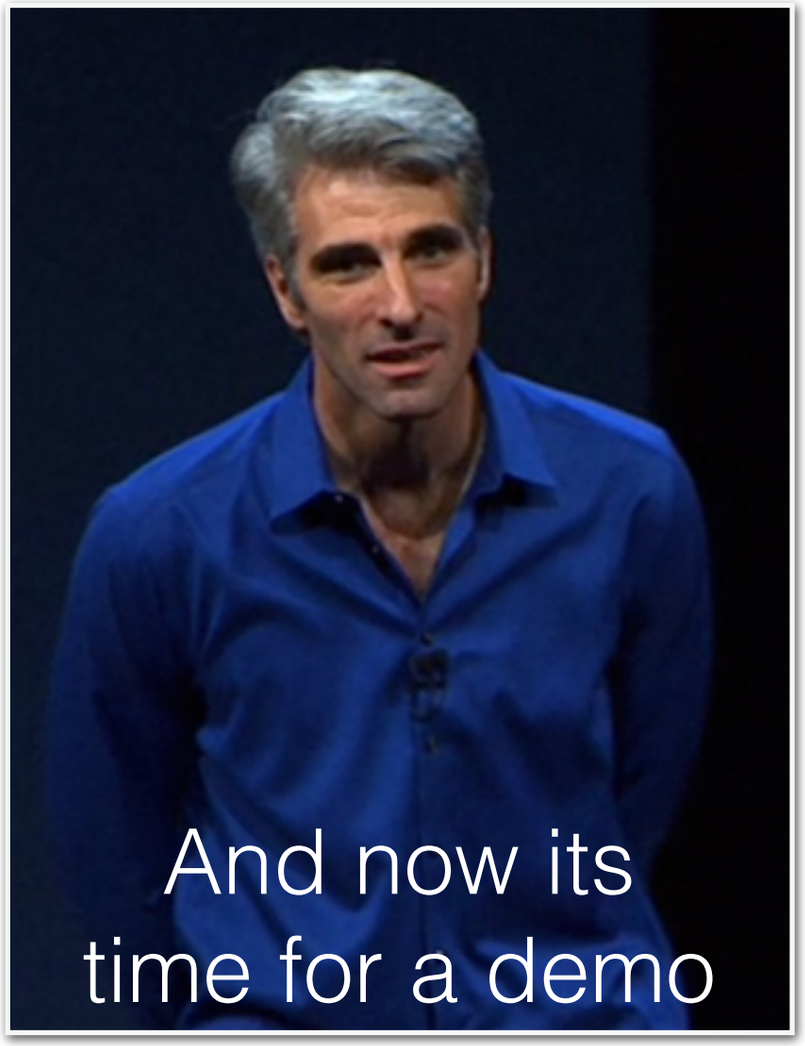
```
[self.someScrollView addSubview:self.imageView];
self.someScrollView.contentSize = self.image.size;
self.someScrollView.minimumZoomScale = 0.1;
self.someScrollView.delegate = self;
```

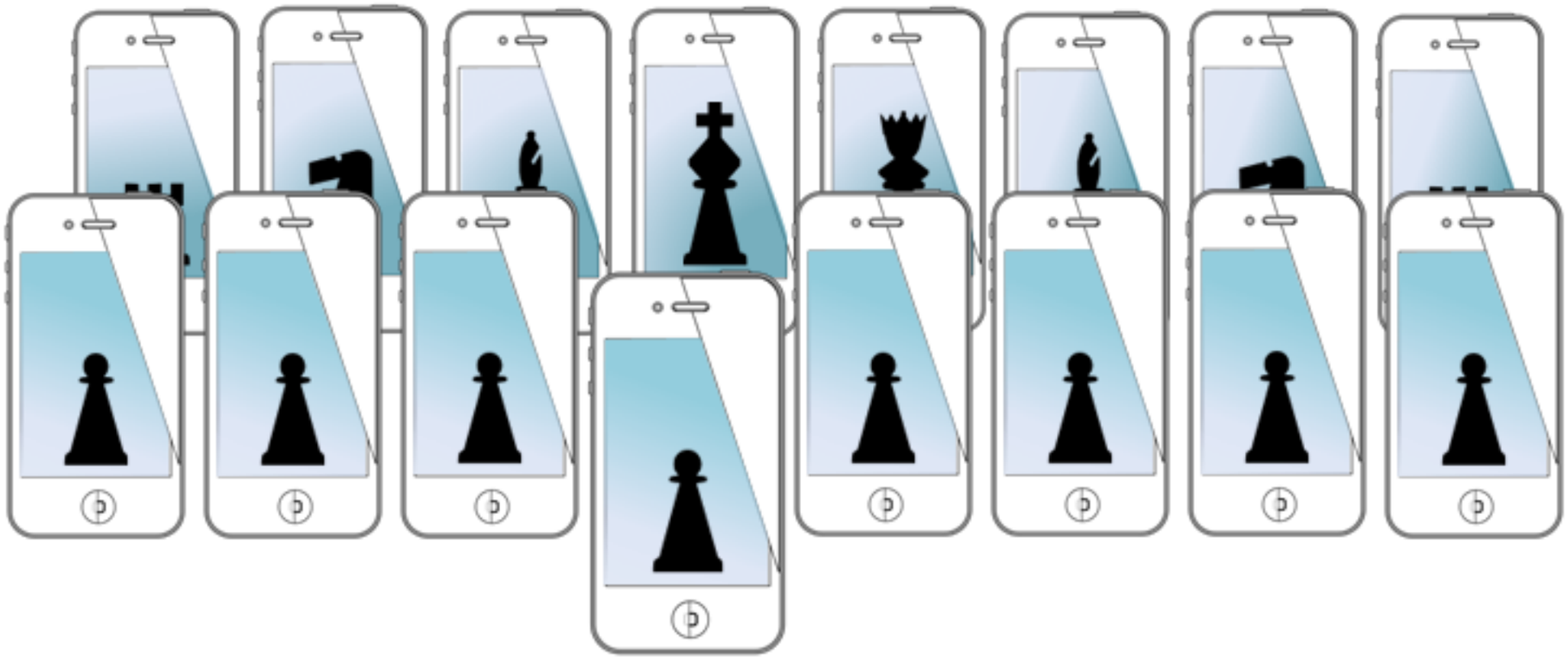
set VC as delegate

```
#pragma Delegate Methods
-(UIView*) viewForZoomingInScrollView:(UIScrollView *)scrollView
{
    return self.imageView;
}
```

one of many methods in the protocol

demo





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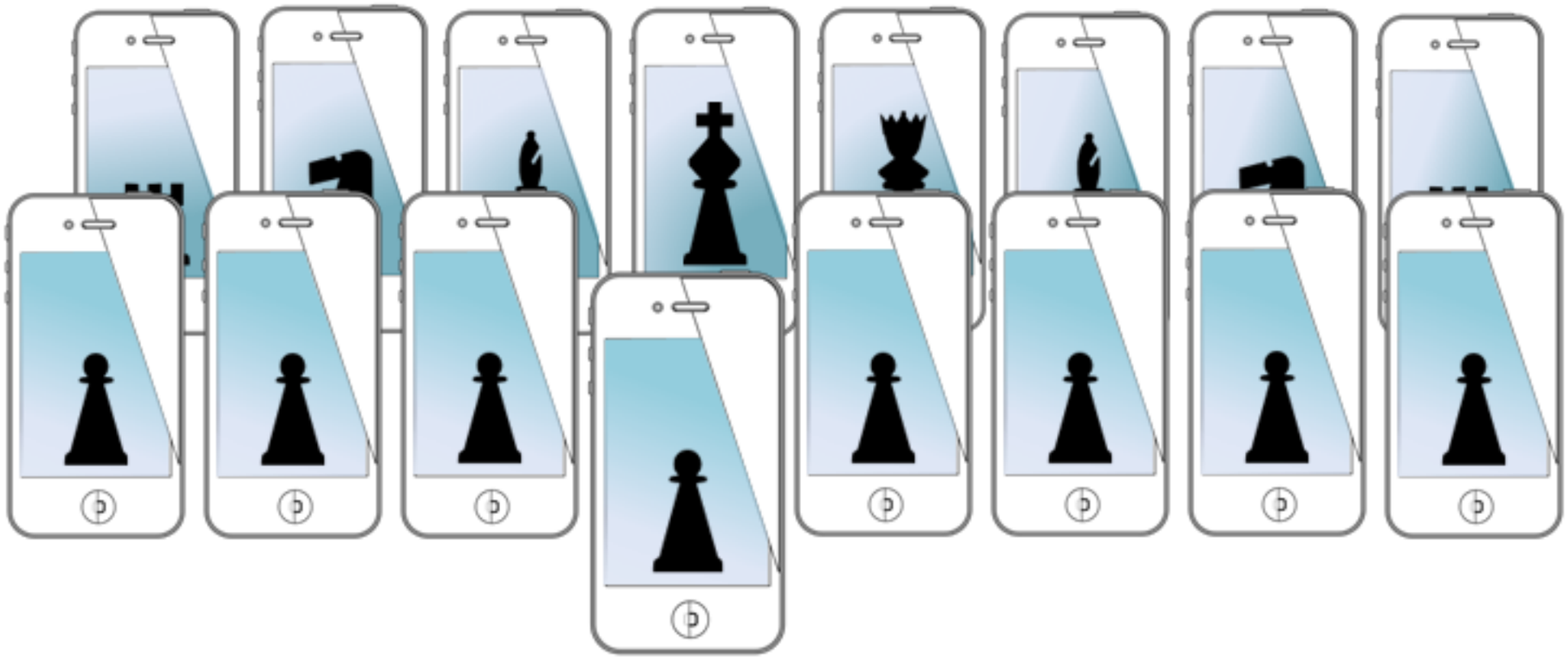
MOBILE SENSING & LEARNING



CS5323 & 7323

Mobile Sensing & Learning

UI elements in swift

Eric C. Larson, Lyle School of Engineering,
Department of Computer Science, Southern Methodist University

course logistics

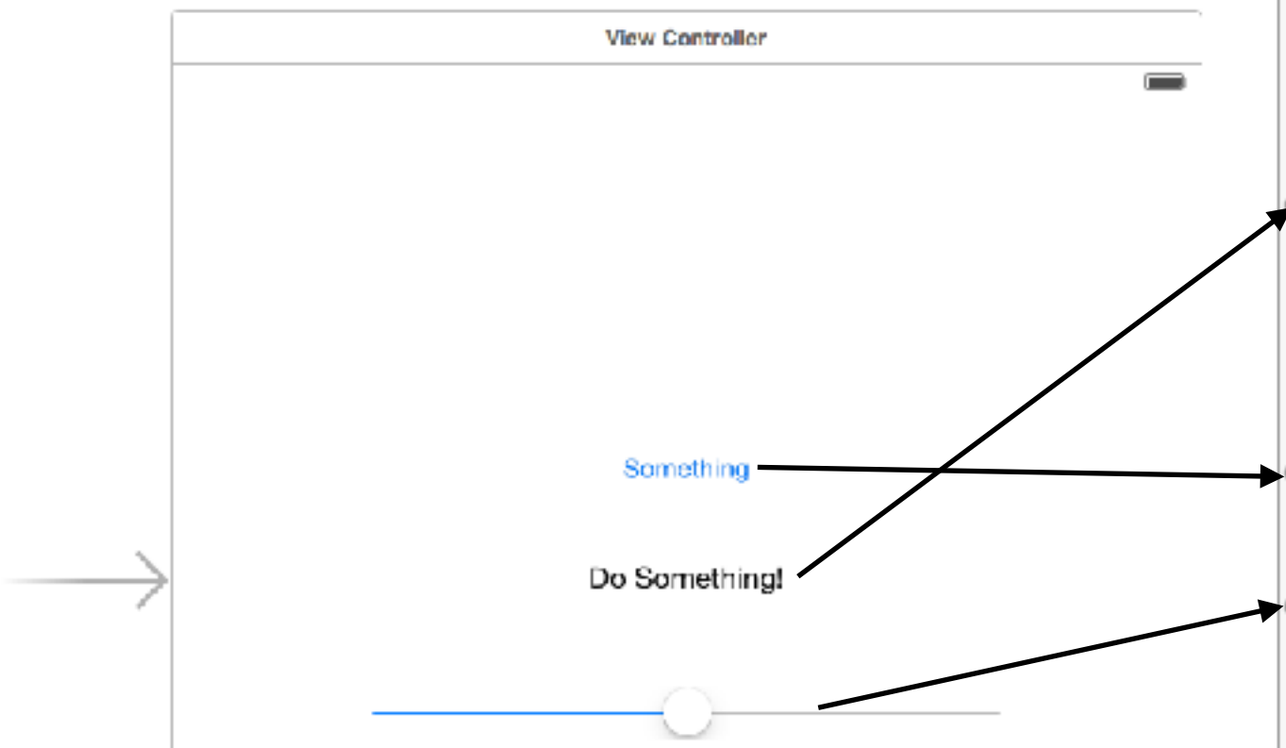
- **TA**: None
- Reminder: University developer program!
- A1 due at **end of next week**
  - make a video of the app and submit it (YouTube, dropbox, direct upload to canvas, etc.)
  - use quicktime for video (if you don't know what to use)

agenda

- target action behavior
  - and constraints
- text fields
- gesture recognizers
- timers / segmented control
- **if time**: swift!

target and action

- UI elements communicate back to their controllers with **actions**



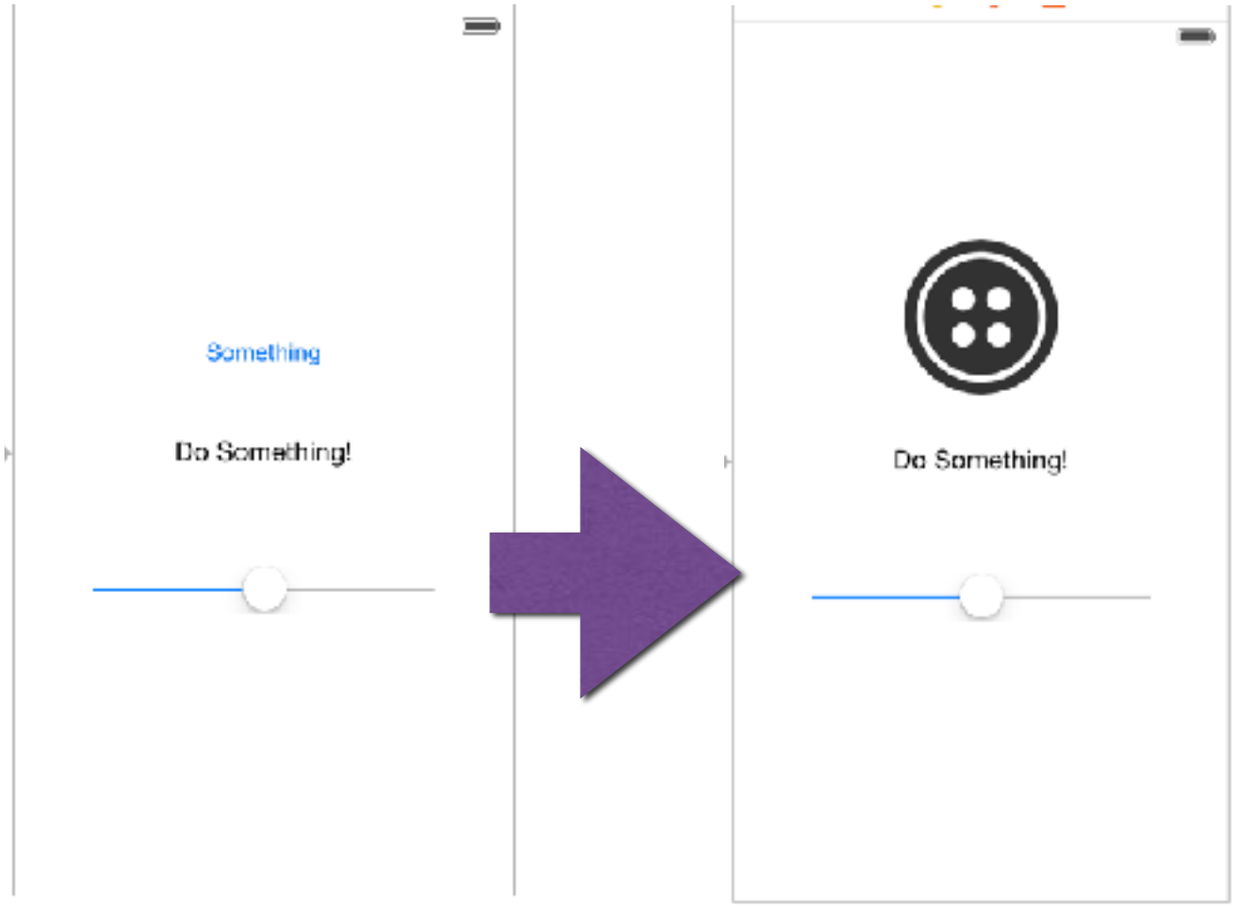
storyboard classes: the views

class: the controller

```
//
#import "ViewController.h"

@interface ViewController ()
@property (weak, nonatomic) IBOutlet UILabel *
    somethingLabel;

@end

@implementation ViewController
- (IBAction)buttonPressed:(UIButton *)sender {
    self.somethingLabel.text = @"Thanks!";
}
- (IBAction)sliderChanged:(UISlider *)sender {
    self.somethingLabel.text = [NSString
        stringWithFormat:@"Value of slider is %.
        2f",sender.value];
}

- (void)viewDidLoad {
    [super viewDidLoad];
    // Do any additional setup after loading the
        view, typically from a nib.
}
```

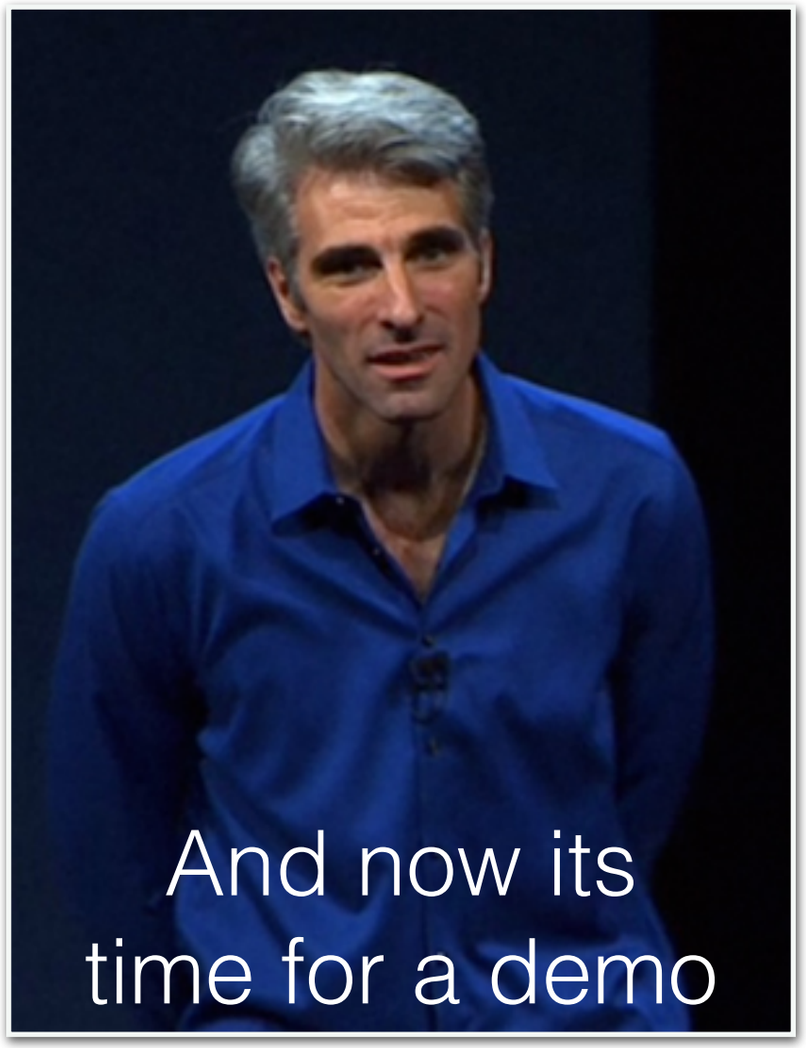
bring your buttons to life

- in many settings you are **given criteria** from a graphic designer
  - but right now, **you** are the graphic designer
- use **images** for more **descriptive** buttons and labels
- **good tip**: make them the right size from the start!

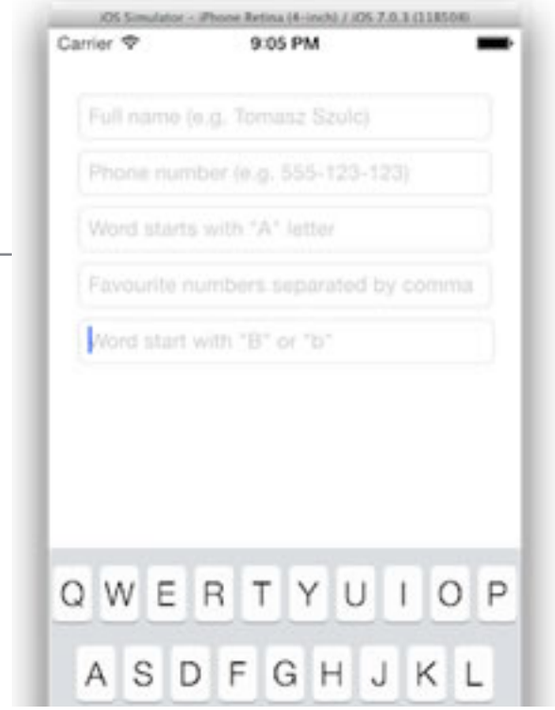


UI basics demo

in swift?
or
obj-c?



text fields



- text fields are common
- but they require the use of the keyboard!
- so you need **delegate** when events happen
  - say when to dismiss the keyboard
  - define what happens to text that the user entered

outlet, setup from storyboard

```
@interface ViewController () <UITextFieldDelegate>
@property (weak, nonatomic) IBOutlet UITextField *nameTextField;
@end

@implementation ViewController

- (void)viewDidLoad {
    [super viewDidLoad];
    self.nameTextField.delegate = self;
}

-(BOOL)textFieldShouldReturn:(UITextField *)textField{
    [textField resignFirstResponder];
    return YES;
}
```

tell compiler we are delegate

return button pressed

make VC delegate

give up keyboard control

UI text field demo

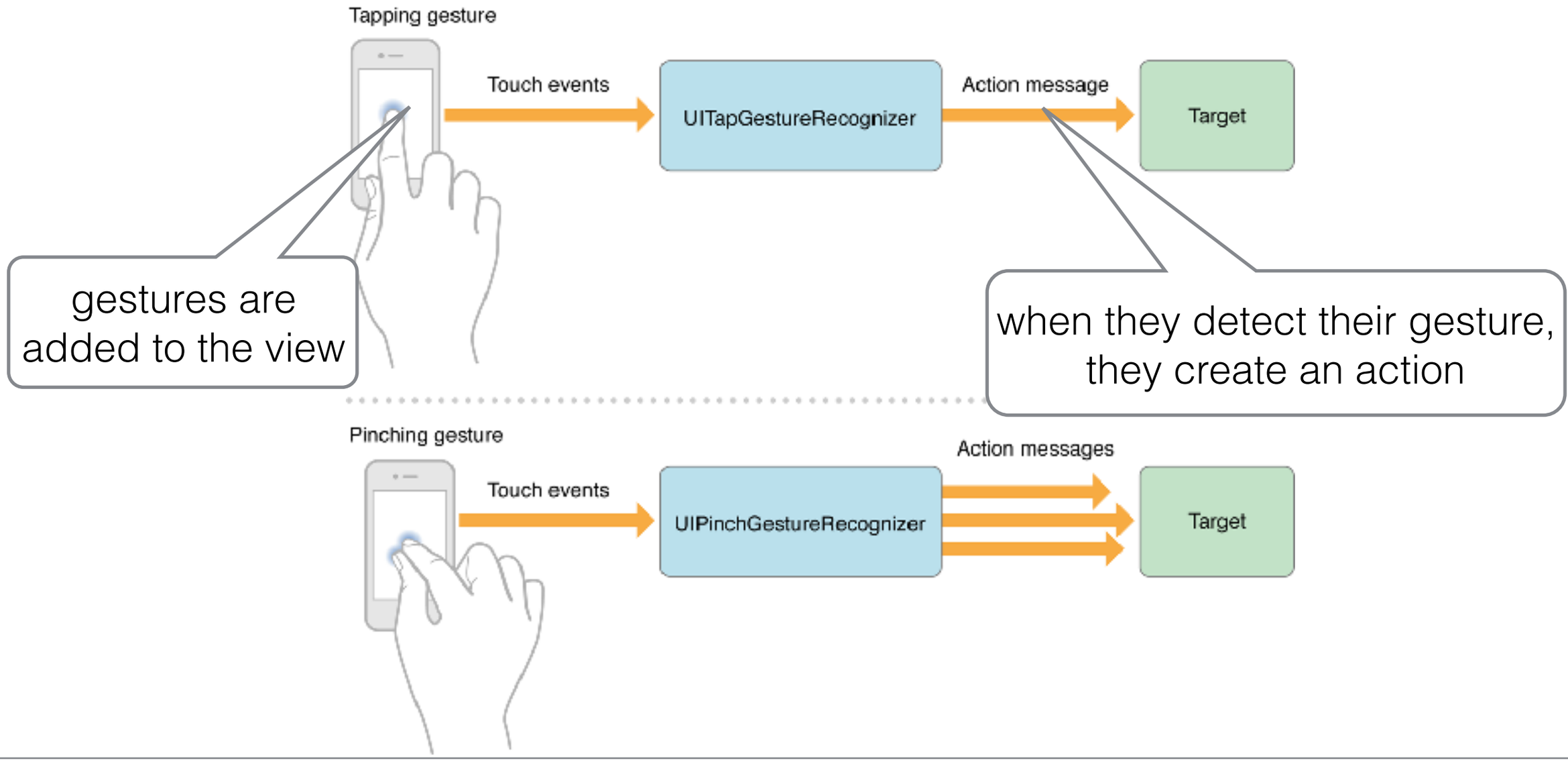
gesture recognition

- the fun part about doing things on the iPhone!
- **the point**: recognize different gestures and then make something happen
- lots of ways to do this
  - **programmatically**: quick and versatile
  - **target-action**: easy
  - **delegation**: more feature rich
- here is the complete documentation:

https://developer.apple.com/library/ios/documentation/EventHandling/Conceptual/EventHandlingiPhoneOS/GestureRecognizer_basics/GestureRecognizer_basics.html

gesture recognition

- need a UIGestureRecognizer
  - UITapGestureRecognizer, UIPinchGestureRecognizer, …



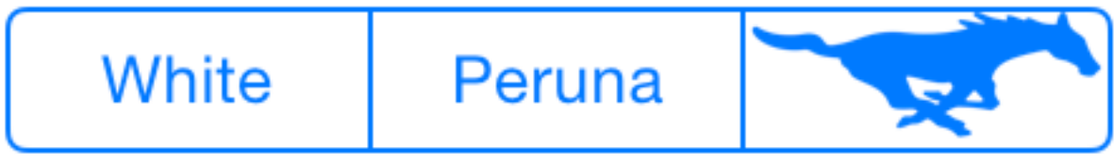
UI gesture demo

timers, segmented control

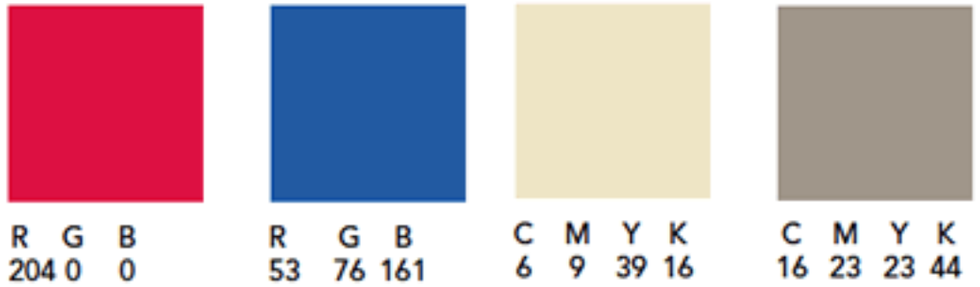
```
- (IBAction)updateFromSegmentedControl:(UISegmentedControl *)sender {

    NSString *selectedText = [sender titleForSegmentAtIndex: [sender selectedSegmentIndex]];

    YOUR_CODE
}
```

get title from control

get value of control



standard SMU colors




```
NSTimer *timer = [NSTimer scheduledTimerWithTimeInterval:someIntervalInSeconds
                                                  target:self
                                                selector:@selector(someFunction:)
                                                userInfo:nil
                                                 repeats:YES];

// don't get blocked by the main thread
[[NSRunLoop mainRunLoop] addTimer:timer forMode:NSRunLoopCommonModes];
```

when should the timer be running? what modes?

pickers

- **look at documentation**: find out how to use a picker view
- you have all the tools to do it from working with collections and the table view controllers!
- you are the data source

assignment one

- Posted on Canvas!

and now…

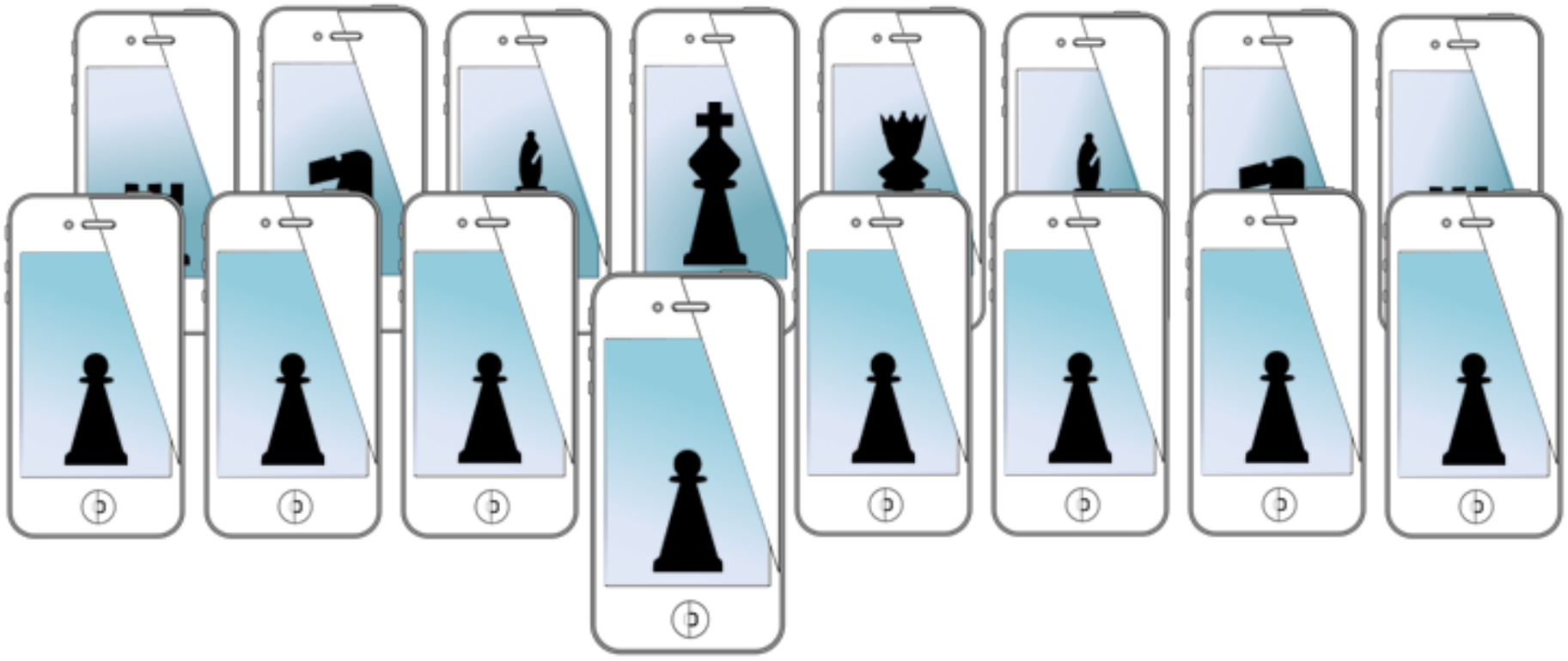
- swift!?
- from Apple, because Apple isn't afraid to force you to adopt new paradigms

https://developer.apple.com/swift/

for next time…

- mobile HCI
- concurrency though blocks
- View Controllers in iOS
  - Watch videos **before class**
- Come ready to work in teams on an in-class assignment

MOBILE SENSING & LEARNING



CS5323 & 7323

Mobile Sensing & Learning

UI elements swift

Eric C. Larson, Lyle School of Engineering,
Department of Computer Science, Southern Methodist University

Supplemental Slides

- we do not explicitly cover these topics in class anymore
- some of the info in these slides may be deprecated!
- otherwise, have fun browsing the material

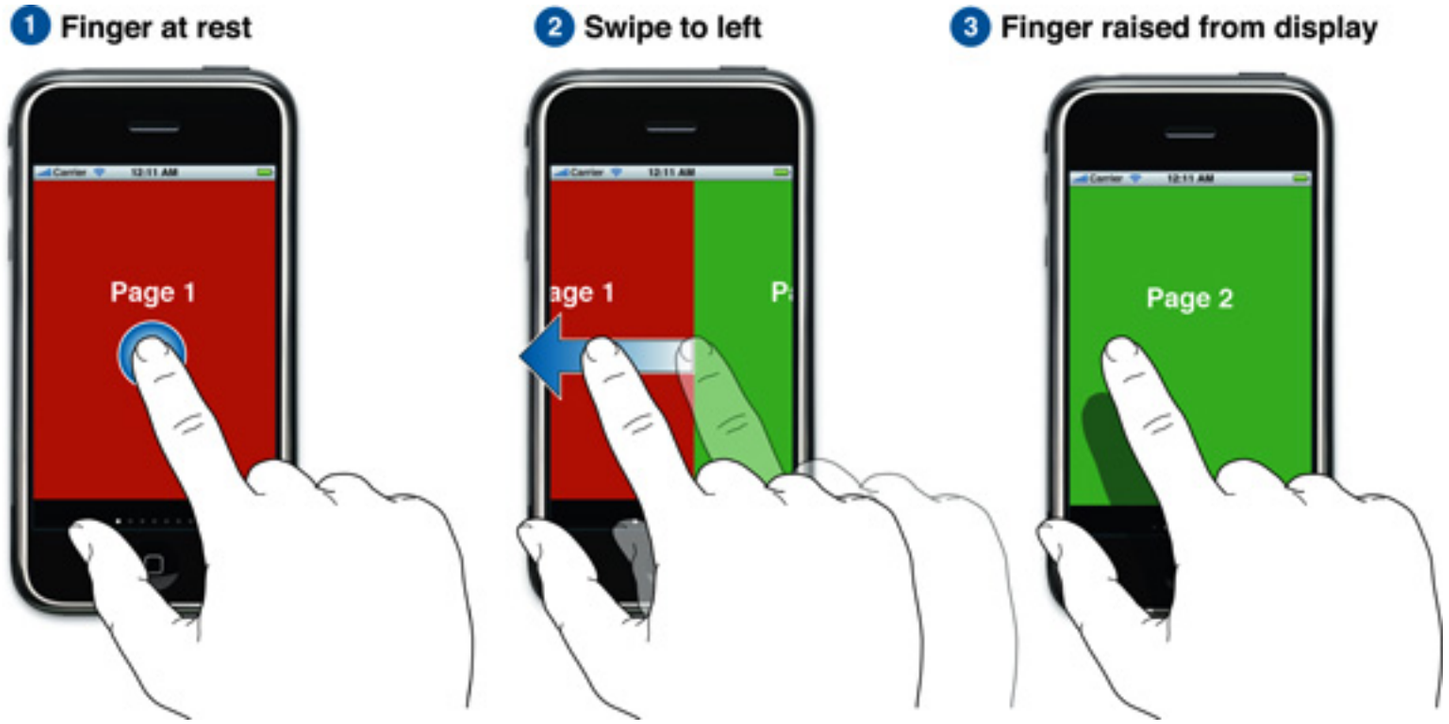
disclaimer!

page view controller

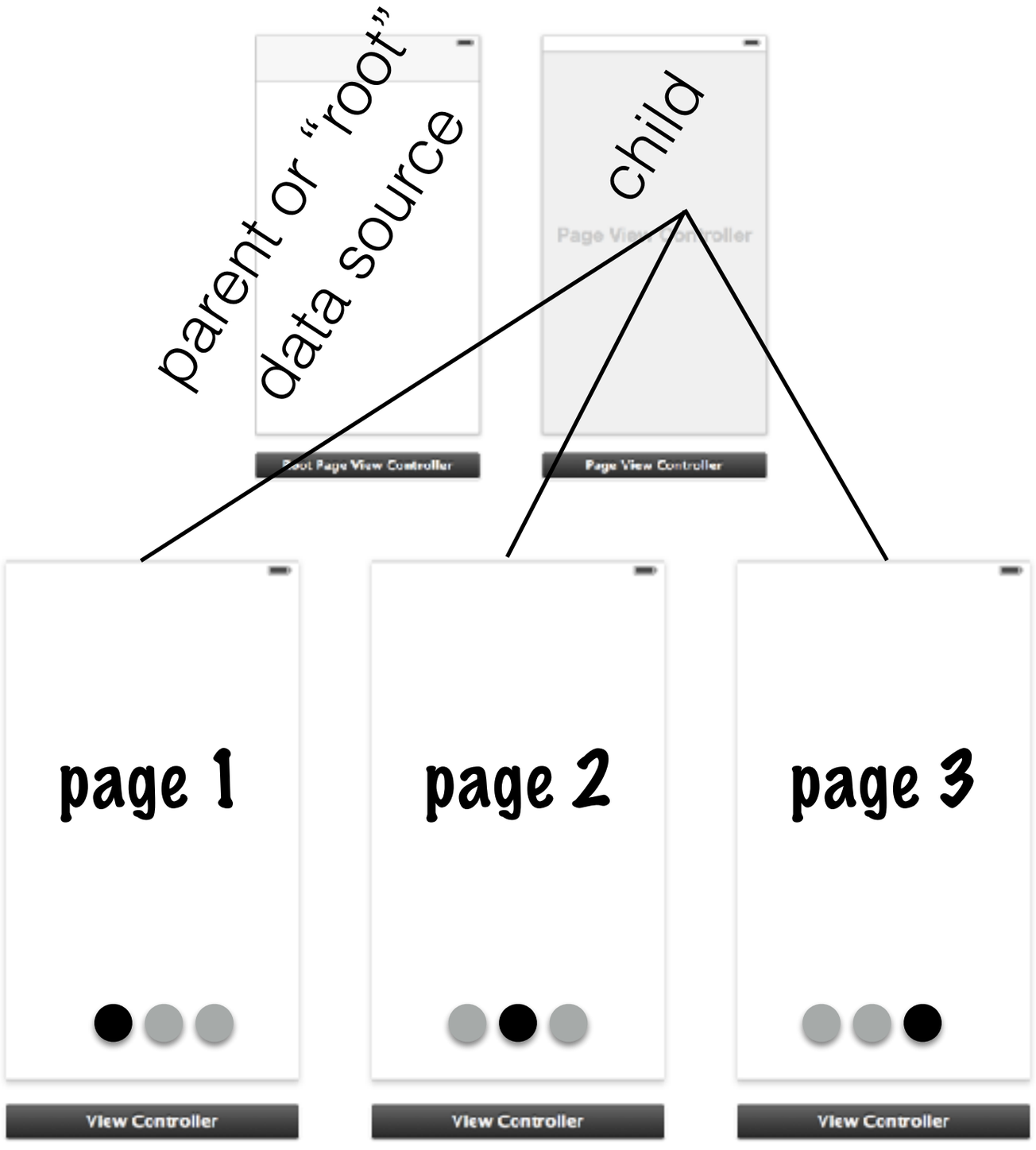
- place UIPageViewController in storyboard
- place a “root controller” for the page
  - adopt <UIPageViewControllerDataSource>
  - instantiate pageViewController
  - instantiate views to be paged

page view controller

- place UIPageViewController in storyboard
- place a “root controller” for the page
  - adopt <UIPageViewControllerDataSource>
  - instantiate pageViewController from “root”
  - instantiate views to be paged in “root”



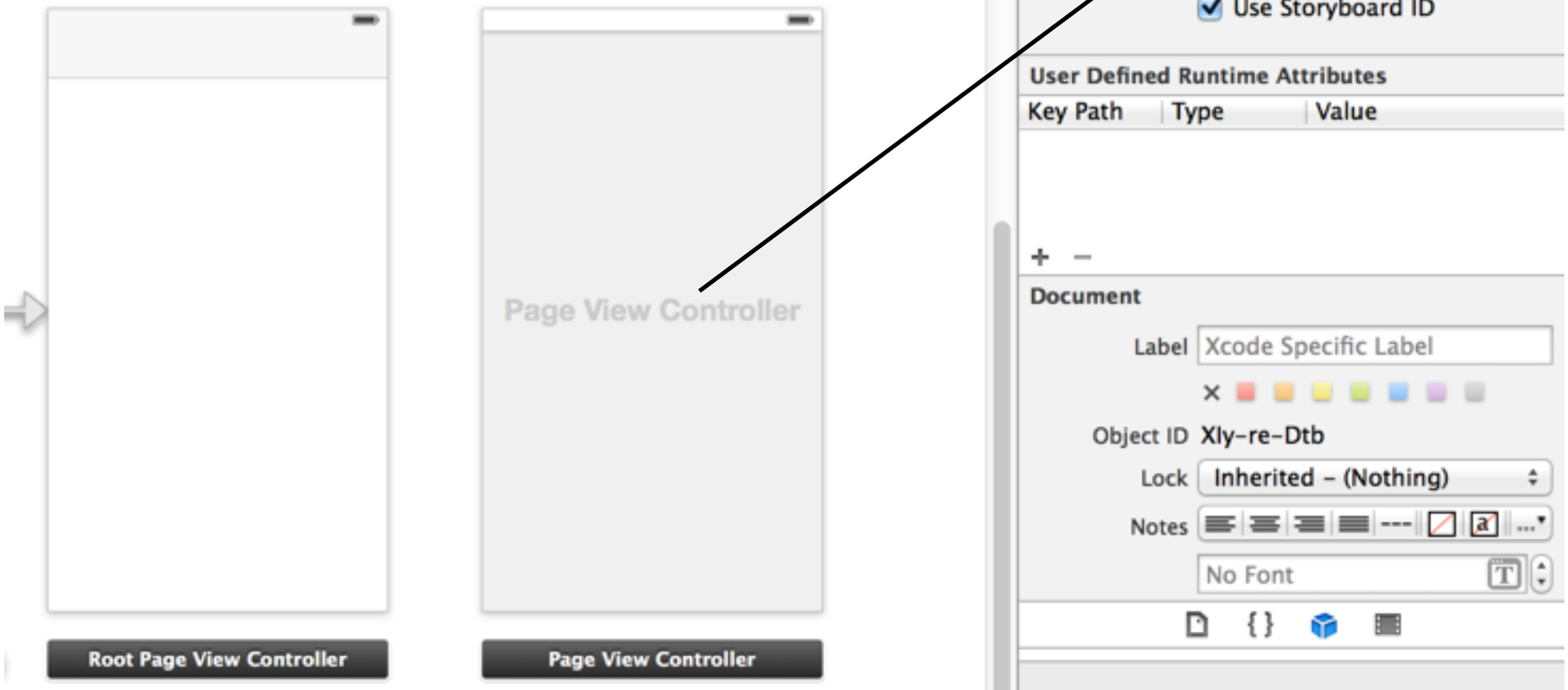
page view controller



different instantiations of view controller

page view controller

no need to subclass the page controller!



but root of the page controller must be the data source…

root page view controller

instantiation in root view controller

```
@property (strong, nonatomic) UIPageViewController * pageViewController;
@property (strong, nonatomic) NSArray *pageContent;

_pageViewController = [self.storyboard instantiateViewControllerWithIdentifier:@"PageViewController"];
_pageViewController.dataSource = self;
```

set first page

instantiate!

in viewDidLoad

```
[self.pageViewController setViewControllers:firstPageToDisplay // the page is a view controller!
                                  direction:UIPageViewControllerNavigationDirectionForward
                                   animated:NO
                                 completion:nil];

[self addChildViewController:_pageViewController];
[self.view addSubview:_pageViewController.view];
[self.pageViewController didMoveToParentViewController:self];
```

apple says do this, in order

some datasource protocol methods

```
- (NSInteger)presentationCountForPageViewController:(UIPageViewController *)pageViewController
{
    return [self.pageContent count];
}

- (NSInteger)presentationIndexForPageViewController:(UIPageViewController *)pageViewController
{
    return 0;
}
```

pageViewController

some datasource protocol methods (cont.)

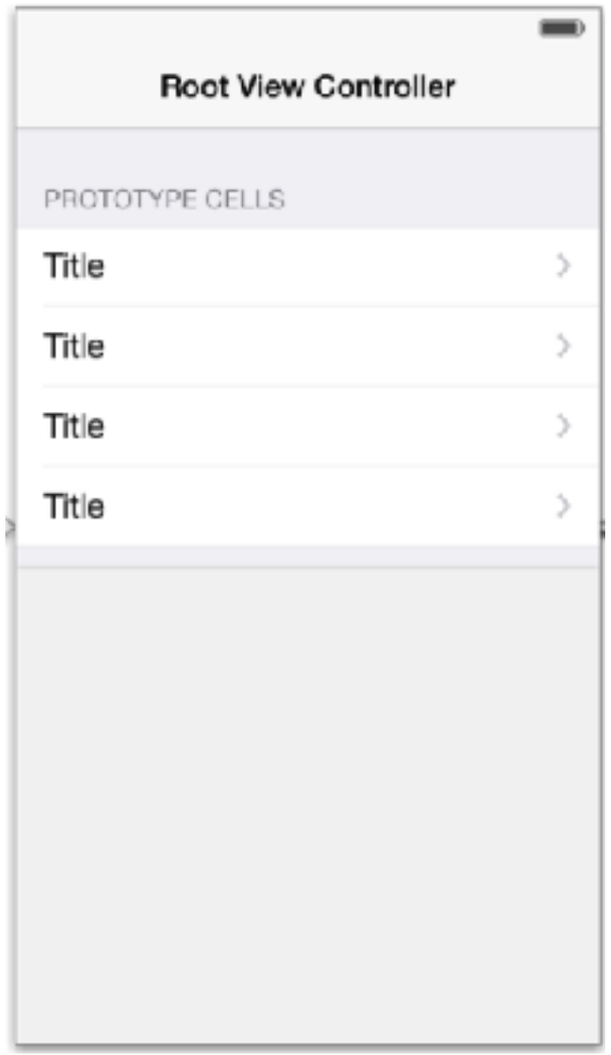
```
- (NSInteger)presentationCountForPageViewController:(UIPageViewController *)pageViewController
{
    return [self.pageContent count];
}

- (NSInteger)presentationIndexForPageViewController:(UIPageViewController *)pageViewController
{
    return 0;
}

-(UIViewController*)pageViewController:(UIPageViewController *)pageViewController
viewControllerBeforeViewController:(UIViewController *)viewController
{}

-(UIViewController*)pageViewController:(UIPageViewController *)pageViewController
viewControllerAfterViewController:(UIViewController *)viewController
{}
```

1. create pages (VCs)
2. set any information for loading
3. return the instantiated VC

page view demo

assignment one

- Automatic Layout (storyboard and programmatically)
- UIButtons (created in storyboard and programmatically)
- Sliders (created in storyboard and programmatically)
- Labels (created in storyboard and programmatically)
- Stepper
- Switch
- Picker (Date or otherwise)
- UINavigationController
- **UISegmentedControl**
- **NSTimer** (which should repeat and somehow update the UIView)
- UIScrollView (with scrollable, zoomable content)
- UIPageViewController
- UIImageView
- **(optional) Persistent storage via CoreData**



due Friday, Feb. 7

programatic UI creation

```
@property (strong, nonatomic) IBOutlet UIButton *button;
```

…

```
// a button, created programmatically
self.button = [UIButton buttonWithType:UIButtonTypeSystem];

// set a target method for a control event, touch down
[self.button addTarget:self
                action:@selector(updateLabelFromProgramButton:)
 forControlEvents:UIControlEventTouchDown];

// set the button attribute
[self.button setTitle:@"PButton" forState:UIControlStateNormal];
```

visual format language

```
// say that these exist and are initialized and added to the view as subviews
UIButton *button;
UILabel *label;
[button setTranslatesAutoresizingMaskIntoConstraints:NO];

// setup button and label constraints, also make same size
NSDictionary *varBindings = NSDictionaryOfVariableBindings(button, label);
NSArray *constraints =
    [NSLayoutConstraint constraintsWithVisualFormat:@"|-[button]-24-[label(==button)]-|"
                                            options:0
                                            metrics:nil
                                              views:varBindings];
    [self.view addConstraints:constraints];
```

same size as button

8 points from left side

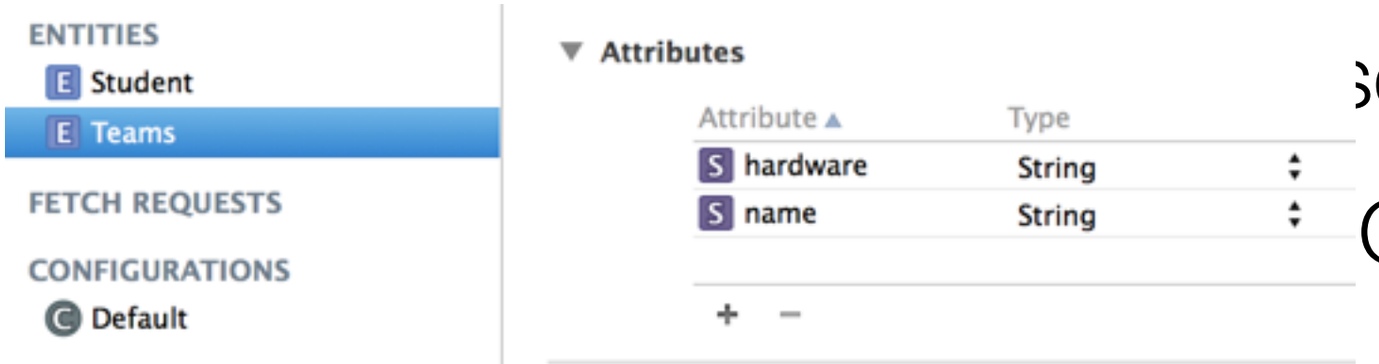
24 points between

```
// metrics for use in visual constraints
NSDictionary *metrics = @{@“spacing":@10.0};

[NSLayoutConstraint constraintsWithVisualFormat:@"|-[button]-spacing-[label(==button)]-|"
                                            options:0
                                            metrics:metrics
                                              views:varBindings];


        @“V:|-[button]”
        options:NSLayoutFormatAlignAllTop | NSLayoutFormatAlignAllCenterX
```

core data databases

- allows access to SQLite database
- integrated deeply into Xcode and into iOS
- highly optimized
- excellent for storing persistent table data
- but usable for most anything

core data schema

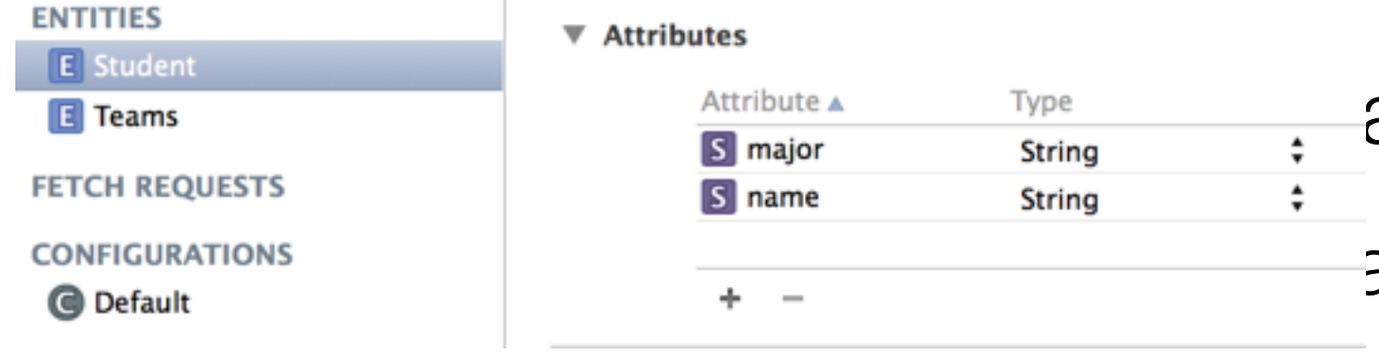


se

OS

- highly optimized

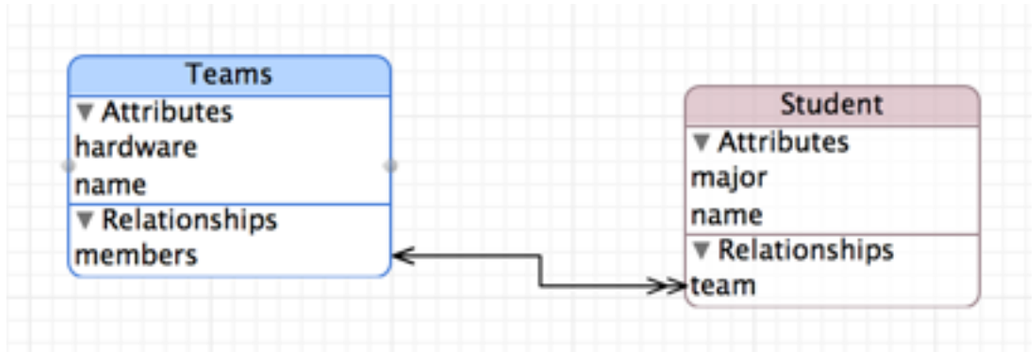
able data



ata

```
@interface Teams : NSManagedObject

@property (nonatomic, retain) NSString * name;
@property (nonatomic, retain) NSString * hardware;
@property (nonatomic, retain) NSSet *members;

@end
```

```
@interface Student : NSManagedObject
@property (nonatomic, retain) NSString * name;
@property (nonatomic, retain) NSString * major;
@property (nonatomic, retain) Teams *team;
@end
```



core data

- schema creation
  - automatic subclassing
- NSManagedObject
- NSManagedObjectContext
- NSPersistentStore
- NSFetchRequest

create SQLite Database on phone

enable access through properties

bundle “data models”

get “context” for using data model

coordinate access to the data model

create and execute queries

core data setup

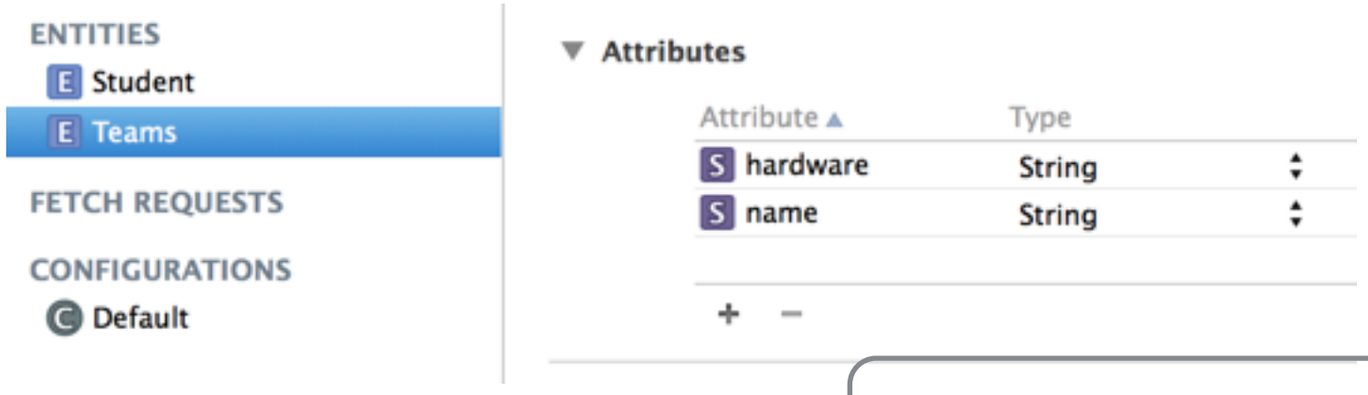
```
// Getter for managed context
- (NSManagedObjectContext *) managedObjectContext {

    if(!_managedObjectContext){
        // create the storage coordinator
        NSPersistentStoreCoordinator *coordinator = [self persistentStoreCoordinator];
        if (coordinator != nil) {
            _managedObjectContext = [[NSManagedObjectContext alloc] init];
            [_managedObjectContext setPersistentStoreCoordinator: coordinator];
        }
    }

    return _managedObjectContext;
}
```

```
// getter for the storage coordinator
- (NSPersistentStoreCoordinator *)persistentStoreCoordinator {
    if (!_persistentStoreCoordinator) {

        // this points to our model
        NSURL *storeUrl = [NSURL fileURLWithPath: [[self applicationDocumentsDirectory]
                                                   stringByAppendingPathComponent: @"ModelName.sqlite"]];
        NSError *error = nil;
        _persistentStoreCoordinator = [[NSPersistentStoreCoordinator alloc]
                                       initWithManagedObjectModel:[self managedObjectModel]];

        if(![_persistentStoreCoordinator addPersistentStoreWithType:NSSQLiteStoreType
                                 configuration:nil URL:storeUrl options:nil error:&error]) {
            // exit gracefully if you need the database to function in the UI
        }
    }
    return _persistentStoreCoordinator;
}
```

core data setup

```
// getter for the storage coordinator
- (NSPersistentStoreCoordinator *)persistentStoreCoordinator {
    if (!_persistentStoreCoordinator) {

        // this points to our model
        NSURL *storeUrl = [NSURL fileURLWithPath: [[self applicationDocumentsDirectory]
                                                   stringByAppendingPathComponent: @"ModelName.sqlite"]];
        NSError *error = nil;
        _persistentStoreCoordinator = [[NSPersistentStoreCoordinator alloc]
                                       initWithManagedObjectModel:[self managedObjectModel]];

        if(![_persistentStoreCoordinator addPersistentStoreWithType:NSSQLiteStoreType
                                 configuration:nil URL:storeUrl options:nil error:&error]) {
            // exit gracefully if you need the database to function in the UI
        }
    }
    return _persistentStoreCoordinator;
}


// getter for the object model, create if needed
- (NSManagedObjectModel *)managedObjectModel {
    if (!_managedObjectModel) {
        _managedObjectModel = [NSManagedObjectModel mergedModelFromBundles:nil];
    }
    return _managedObjectModel;
}
```

entering data



create a new entity from model

```
//  get a new entry
 team = [NSEntityDescription insertNewObjectForEntityForName:@"Teams"
                                                 inManagedObjectContext:self.managedObjectContext];

// save the attributes
team.name = self.teamNameTextField.text;
team.hardware = [self assignHardware];

//  save into the database
NSError *error;
if (![self.managedObjectContext save:&error]) {
    NSLog(@"save database failed: %@", [error localizedDescription]);
}
```

set attributes

not saved in database until here

queries in core data

```
-(NSArray*)getAllTeamsFromDatabase
{
    // initializing NSFetchRequest
    NSFetchRequest *fetchRequest = [[NSFetchRequest alloc] init];

    //Setting Entity to be Queried
    NSEntityDescription *entity = [NSEntityDescription entityForName:@"Teams"
                                              inManagedObjectContext:self.managedObjectContext];

    [fetchRequest setEntity:entity];
    NSError* error;

    // Query on managedObjectContext With Generated fetchRequest
    NSArray *fetchedRecords = [self.managedObjectContext executeFetchRequest:fetchRequest error:&error];

    // Returning Fetched Records
    return fetchedRecords;
}


-(NSArray*)getTeamFromDatabase:(NSString*)teamName
{
    // initializing NSFetchRequest

    …

   fetchRequest.predicate =
        [NSPredicate predicateWithFormat:@"name = %@",teamName];

    …

    // Returning Fetched Records
    return [self.managedObjectContext executeFetchRequest:fetchRequest error:&error];
}
```

request

fetch

entity to request from

array of results, even if size=0

set predicate

```
@"name = %@“
@"name contains[c] %@“
@"value > 7“
@“team.name = %@“
@“any student.name contains %@“
```

core data demo

- Who Was In That!
- Class Teams! will make available on website

notifications

- NotificationCenter - a radio station for which any method can tune in on

```
MCDAppDelegate* appDelegate =                    delegate;

    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(tableDataDidChange)
                                                 name:NSManagedObjectContextDidSaveNotification
                                               object:appDelegate.managedObjectContext];
```

access notification center

do this

when this happens

from this context

lets add notifications to WhoWasInThat!

if time slides!

swift

- syntax is nothing like objective c
- a lot like python syntax (but not)
- weakly typed, no need for semicolons
- can be hard to read or interpret
- powerful use of *tuples,optionals,switch*
- you need to look online for more material than this lecture
  - https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

variables

```
let maximumNumberOfLoginAttempts = 10
var currentLoginAttempt = 0
```

not mutable

mutable

```
let pi = 3.14159
// pi is inferred to be of type Double
let three = 3
let pointOneFourOneFiveNine = 0.14159
let pi = Double(three) + pointOneFourOneFiveNine
// pi equals 3.14159, and is inferred to be of type Double
let meaningOfLife = 42
// meaningOfLife is inferred to be of type Int
```

and then there is this…

```
let π = 3.14159
let 你好 = "你好世界"
let 🐶🐮 = "dogcow"
```

```
let orangesAreOrange = true
let turnipsAreDelicious = false
```

```
var friendlyWelcome = “Hello World!"
var friendlyWelcome:  String = “Hello World!"

println(friendlyWelcome)

println("The current value of friendlyWelcome is \(friendlyWelcome)")
```

no need to set

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

tuples

```
let http404Error = (404, "Not Found")
// http404Error is of type (Int, String), and equals (404, "Not Found")
```

```
let (statusCode, statusMessage) = http404Error
println("The status code is \(statusCode)")
// prints "The status code is 404"
println("The status message is \(statusMessage)")
// prints "The status message is Not Found"
```

```
println("The status code is \(http404Error.0)")
// prints "The status code is 404"
println("The status message is \(http404Error.1)")
// prints "The status message is Not Found"
```

```
let http200Status = (statusCode: 200, description: "OK")
```

```
println("The status code is \(http200Status.statusCode)")
// prints "The status code is 200"
println("The status message is \(http200Status.description)")
// prints "The status message is OK"
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

optionals

```
let possibleNumber = "123"
let convertedNumber = possibleNumber.toInt()
// convertedNumber is inferred to be of type "Int?", or "optional Int"
```

```
var serverResponseCode:  Int? = 404
// serverResponseCode contains an actual Int value of 404
serverResponseCode = nil
// serverResponseCode now contains no value
```

can now set to nil :)

```
var surveyAnswer:  String?
// surveyAnswer is automatically set to nil
```

```
if convertedNumber != nil {
    println("convertedNumber has an integer value of \(convertedNumber!).")
}
// prints "convertedNumber has an integer value of 123."
```

```
if let actualNumber = possibleNumber.toInt() {
    println("\'\(possibleNumber)\' has an integer value of \(actualNumber)")
} else {
    println("\'\(possibleNumber)\' could not be converted to an integer")
}
// prints "'123' has an integer value of 123"
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

accessing optionals

optional

! **unwrap** output to be **string**. Else: **error**

```
let possibleString:  String? = "An optional string."
let forcedString:  String  = possibleString! // requires an exclamation mark
```

implicit unwrap

```
let assumedString:  String! = "An implicitly unwrapped optional string."
let implicitString:  String  = assumedString // no need for an exclamation mark
```

output always unwrapped to be **string**. Else: **error**

```
if assumedString != nil {
    println(assumedString)
}
// prints "An implicitly unwrapped optional string."


if let definiteString = assumedString {
    println(definiteString)
}
// prints "An implicitly unwrapped optional string."
```

Optional unwrapping is not my favorite part of swift

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

arrays

```swift
var shoppingList = ["Eggs", "Milk"]

println("The shopping list contains \(shoppingList.count) items.")
// prints "The shopping list contains 2 items."
```

```swift
if shoppingList.isEmpty {
    println("The shopping list is empty.")
} else {
    println("The shopping list is not empty.")
}
// prints "The shopping list is not empty."
```

```swift
shoppingList += ["Baking Powder"]
shoppingList += ["Chocolate Spread", "Cheese", "Butter"]

var firstItem = shoppingList[0]
// firstItem is equal to "Eggs"

shoppingList[0] = "Six eggs"
```

```swift
let butter = shoppingList.removeLast()
let sixEggs = shoppingList.removeAtIndex(0)
```

like a dequeue

like a pop

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

dictionaries

```swift
var airports = ["YYZ": "Toronto Pearson", "DUB": "Dublin"]

airports["LHR"] = "London"
// the airports dictionary now contains 3 items
```

```swift
if let oldValue = airports.updateValue("Dublin Airport", forKey: "DUB") {
    println("The old value for DUB was \(oldValue).")
}
// prints "The old value for DUB was Dublin."
```

```swift
airports["APL"] = "Apple International"
// "Apple International" is not the real airport for APL, so delete it
airports["APL"] = nil
// APL has now been removed from the dictionary
```

```swift
let airportCodes = [String](airports.keys)
// airportCodes is ["YYZ", "LHR"]

let airportNames = [String](airports.values)
// airportNames is ["Toronto Pearson", "London Heathrow"]
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

loops

```
for index in 1...3 {
    println("\(index) times 5 is \(index * 5)")
}
// 1 times 5 is 5
// 2 times 5 is 10
// 3 times 5 is 15
```

```
let names = ["Anna", "Alex", "Brian"]
for name in names {
    println("Hello, \(name)!")
}
// Hello, Anna!
// Hello, Alex!
// Hello, Brian!
```

```
for (index, value) in enumerate(names) {
    println("Item \(index + 1): \(value)")
}
// Item 1: Anna
// Item 2: Alex
// Item 3: Brian
```

```
let numberOfLegs = ["spider": 8, "ant": 6, "cat": 4]
for (animalName, legCount) in numberOfLegs {
    println("\(animalName)s have \(legCount) legs")
}
// ants have 6 legs
// cats have 4 legs
// spiders have 8 legs
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

switch

```
let someCharacter:  Character  = "e"
switch someCharacter {
case "a", "e", "i", "o", "u":
    println("\(someCharacter) is a vowel")
case "b", "c", "d", "f", "g", "h", "j", "k", "l", "m",
"n", "p", "q", "r", "s", "t", "v", "w", "x", "y", "z":
    println("\(someCharacter) is a consonant")
default:
    println("\(someCharacter) is not a vowel or a consonant")
}
// prints "e is a vowel"
```

no pass through

```
let somePoint = (1, 1)
switch somePoint {
case (0, 0):
    println("(0, 0) is at the orig
case (_, 0):
    println("(\(so      oint.0), 0) is on the x-axis")
case (0, _):
    println("(0, \(somePoint.1)) is on the y-axis")
case (-2...2, -2...2):
    println("(\(somePoint.0), \(somePoint.1)) is inside the box")
default:
    println("(\(somePoint.0), \(somePoint.1)) is outside of the box")
}
// prints "(1, 1) is inside the box"
```

“any” value

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

switch continued…

```
let anotherPoint = (2, 0)
switch anotherPoint {
case (let x, 0):
    println("on the x-axis with an x value of \(x)")
case (0, let y):
    println("on the y-axis with a y value of \(y)")
case let (x, y):
    println("somewhere else at (\(x), \(y))")
}
// prints "on the x-axis with an x value of 2"
```

"any" value and set

```
let yetAnotherPoint = (1, -1)
switch yetAnotherPoint {
case let (x, y) where x == y:
    println("(\(x), \(y)) is on the line x == y")
case let (x, y) where x == -y:
    println("(\(x), \(y)) is on the line x == -y")
case let (x, y):
    println("(\(x), \(y)) is just some arbitrary point")
}
// prints "(1, -1) is on the line x == -y"
```

very powerful, concise, readable

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

functions

internal name

input type

```
func sayHello(personName: String ) ->  String  {
    let greeting = "Hello, " + personName + "!"
    return greeting
}
```

return type

internal name

input type

external name

```
func join(string s1:  String, toString s2: String, withJoiner joiner: String)
    ->  String {
        return s1 + joiner + s2
}
```

return type

external name

passed value

```
join(string: "hello", toString: "world", withJoiner: ", ")
// returns "hello, world"
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

There are too many ways of defining functions to cover it all. For instance you can also setup default values…

array of ints

```
func minMax(array: [ Int ]) -> (min:  Int , max:  Int ) {
    var currentMin = array[0]
    var currentMax = array[0]
    for value in array[1..<array.count] {
        if value < currentMin {
            currentMin = value
        } else if value > currentMax {
            currentMax = value
        }
    }
    return (currentMin, currentMax)
}
```

return tuple

tuple keys are external names!!

```
let bounds = minMax([8, -6, 2, 109, 3, 71])
println("min is \(bounds.min) and max is \(bounds.max)")
// prints "min is -6 and max is 109"
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

classes and properties

```
class DataImporter {
    var fileName = "data.txt"
    // the DataImporter class would provide data importing functionality here
}

class DataManager {
    lazy var importer = DataImporter()
    var data = [String]()
    // the DataManager class would provide data management functionality here
}
```

class variable

lazy instantiation

```
let manager = DataManager()
manager.data.append("Some data")
manager.data.append("Some more data")
// the DataImporter instance for the importer property has not yet been created
```

class initialized, but importer is not set

```
println(manager.importer.fileName)
// the DataImporter instance for the importer property has now been created
// prints "data.txt"
```

when accessed first, sets value

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

swift

classes and properties

```
class StepCounter {
  var totalSteps: Int  = 0 {
       willSet(newTotalSteps) {
           println("About to set totalSteps to \(newTotalSteps)")
       }
       didSet {
           if totalSteps > oldValue  {
               println("Added \(totalSteps - oldValue) steps")
           }
       }
   }
}
```

no custom setter or getters

but we can still do custom actions around the property access

```
let stepCounter = StepCounter()
stepCounter.totalSteps = 200
// About to set totalSteps to 200
// Added 200 steps
stepCounter.totalSteps = 360
// About to set totalSteps to 360
// Added 160 steps
stepCounter.totalSteps = 896
// About to set totalSteps to 896
// Added 536 steps
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

class methods

```
class Counter {
    var count = 0
    func increment() {
        count++
    }
    func incrementBy(amount: Int) {
        count += amount
    }
    func reset() {
        count = 0
    }
}
```

```
class Counter {
    var count: Int  = 0
    func incrementBy(amount:  Int, numberOfTimes: Int) {
        count += amount * numberOfTimes
    }
}
```

see this: https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html

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Lots more on the inter-webs!

Need more help on MVC's ? Check out Ray Wenderlich:

http://www.raywenderlich.com/46988/ios-design-patterns

for next time…

- View Controllers in iOS
  - Watch videos **before class**
- Come ready to work in teams on an in class project