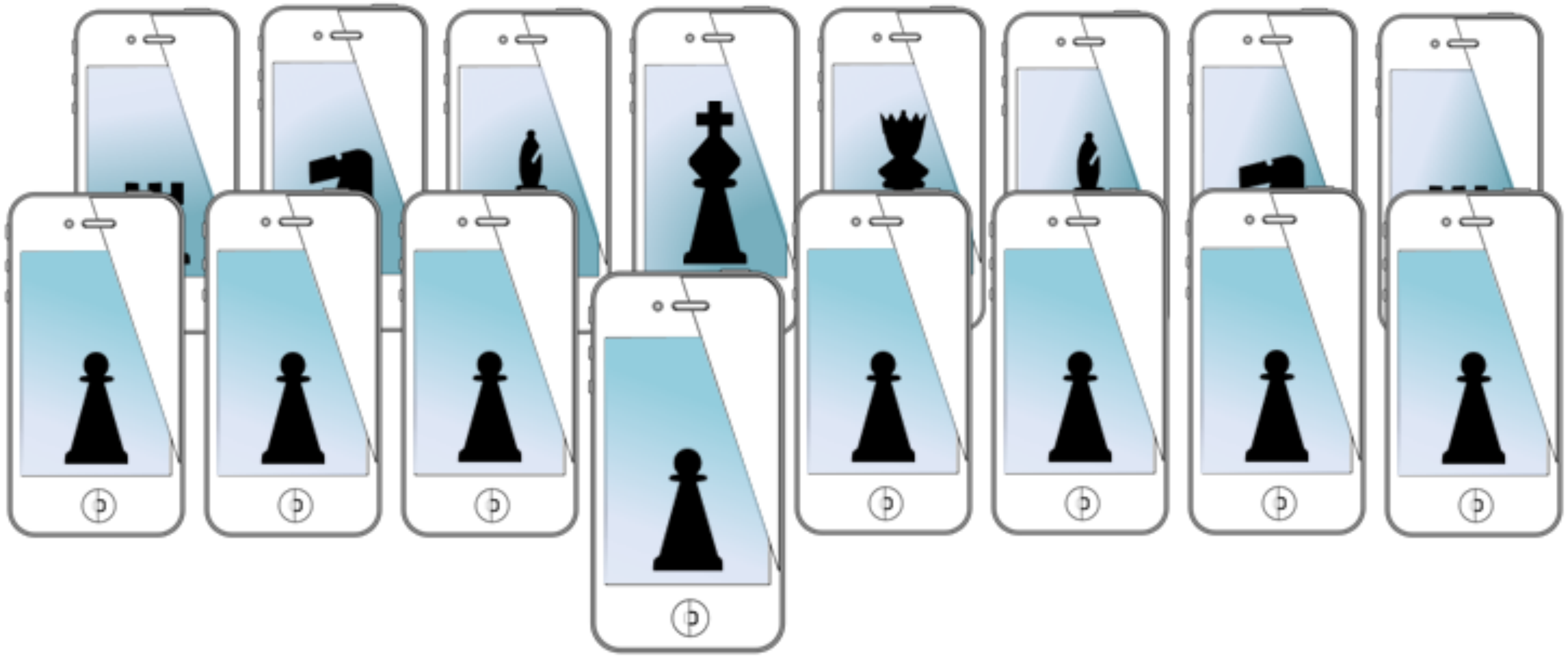
MOBILE SENSING & LEARNING



CS5323 & 7323

Mobile Sensing & Learning

UI elements

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

course logistics

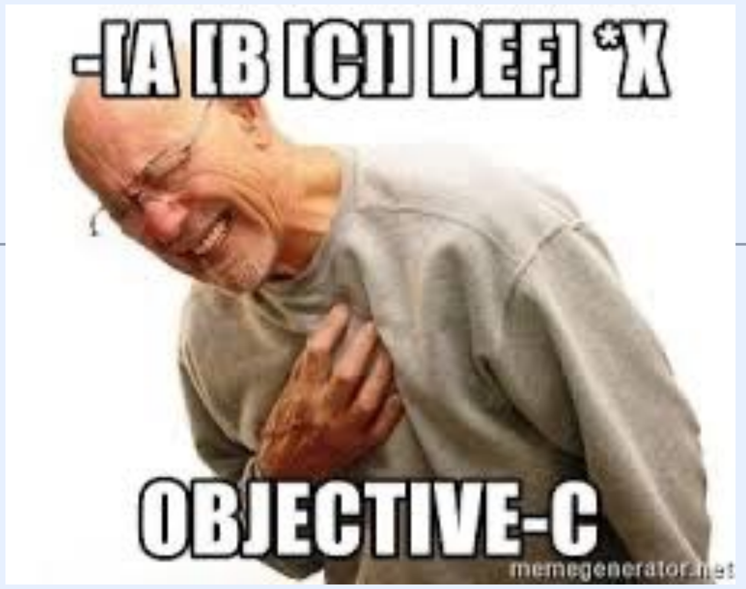
- reminder: university developer program!
- next Time: flipped assignment, in person
- a1 due at the **end of week**
    - make a video of the app and submit it (YouTube, dropbox, direct upload to canvas, etc.)
    - use quicktime for video (if you don’t know what to use)

agenda

- syntax review
- blocks and concurrency
- target action behavior
  - and constraints
- text fields
- gesture recognizers
- timers / segmented control
- **remainder of time**: demo!

objective c

- strict superset of c
  - but with “messages”
    - so “functions” look very different (i.e., the braces in the logo)

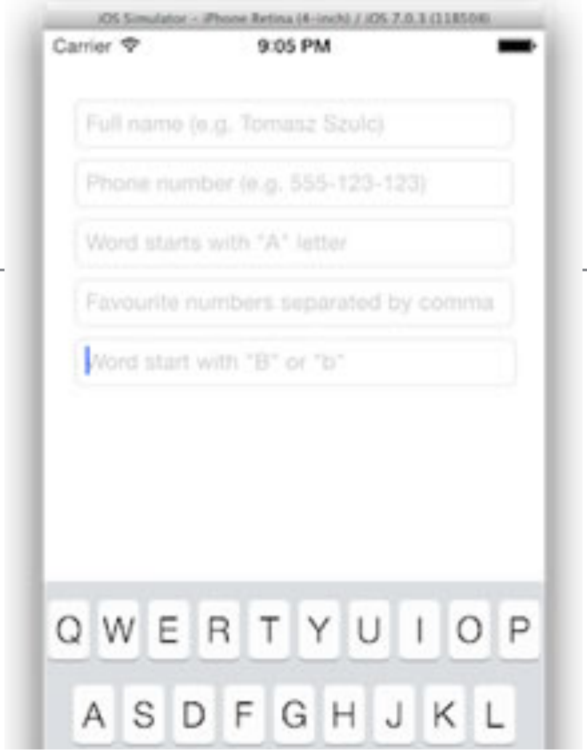


swift

- syntax is nothing like objective-c
- but uses the same libraries…
- similarities with python syntax
  - weakly typed, no need for semicolons

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



Carrier
9:05 PM
Full name (e.g. Tomasz Szulc)
Phone number (e.g. 555-123-123)
Word starts with "A" letter
Favourite numbers separated by comma
Word start with "B" or "b"
Q W E R T Y U I O P
A S D F G H J K L

outlet, setup from storyboard

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

@implementation ViewController

                    DidLoad {
                    iewDidLoad];
            elf.nameTextField.delegate = self;
}

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

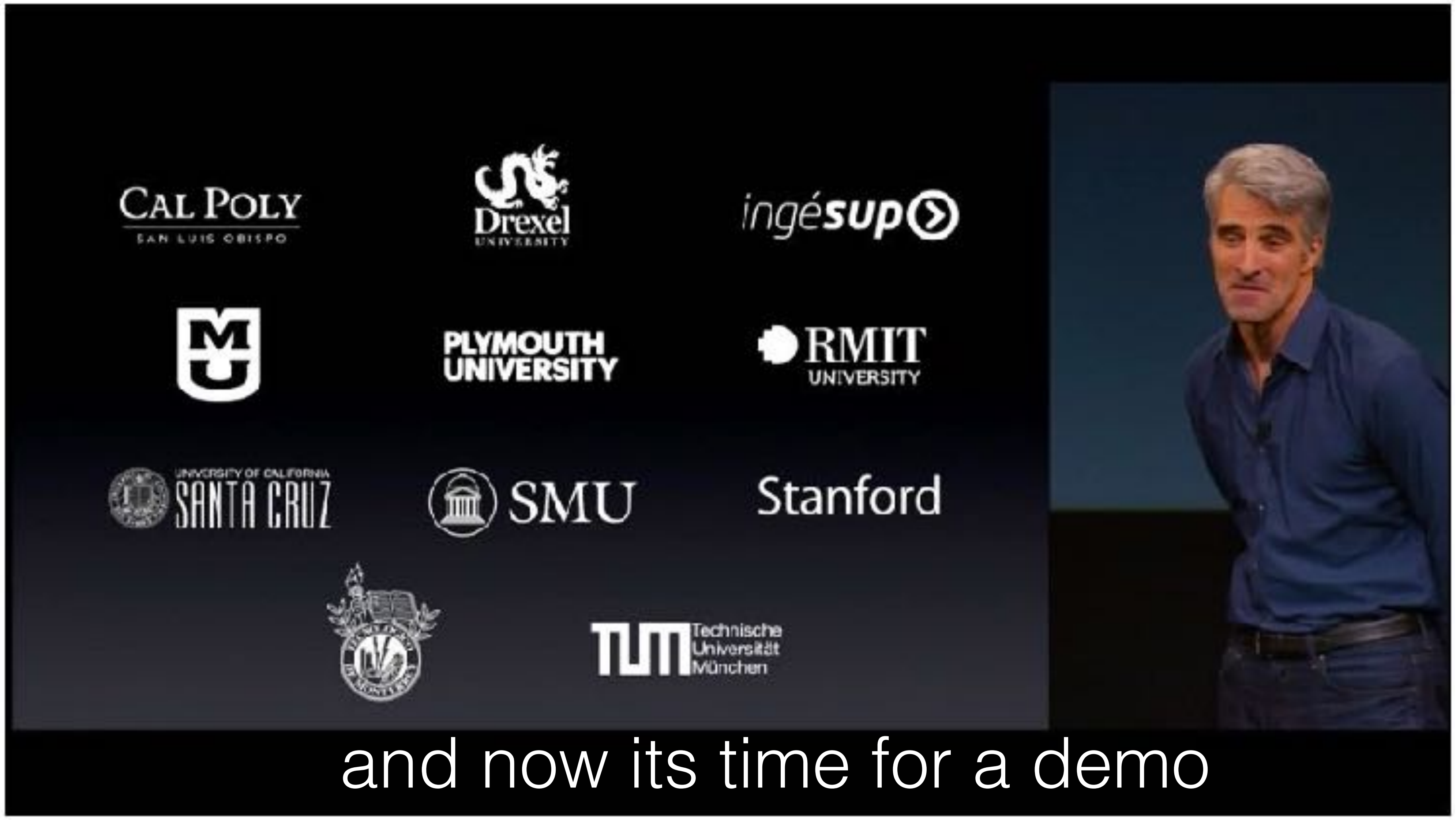
tell compiler we are delegate

return button pressed

make VC delegate

give up keyboard control

UI text field demo



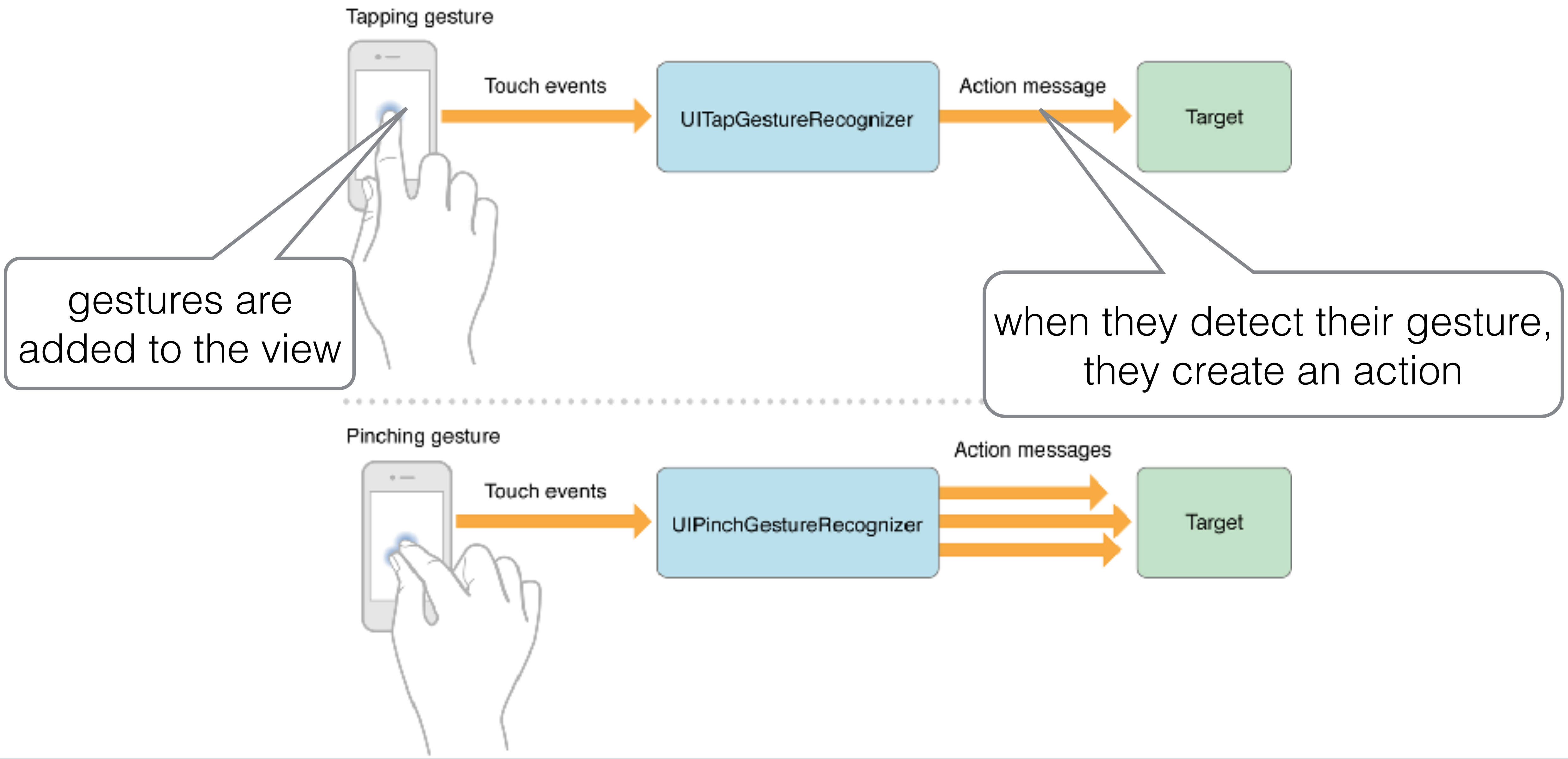
gesture recognition

- 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:

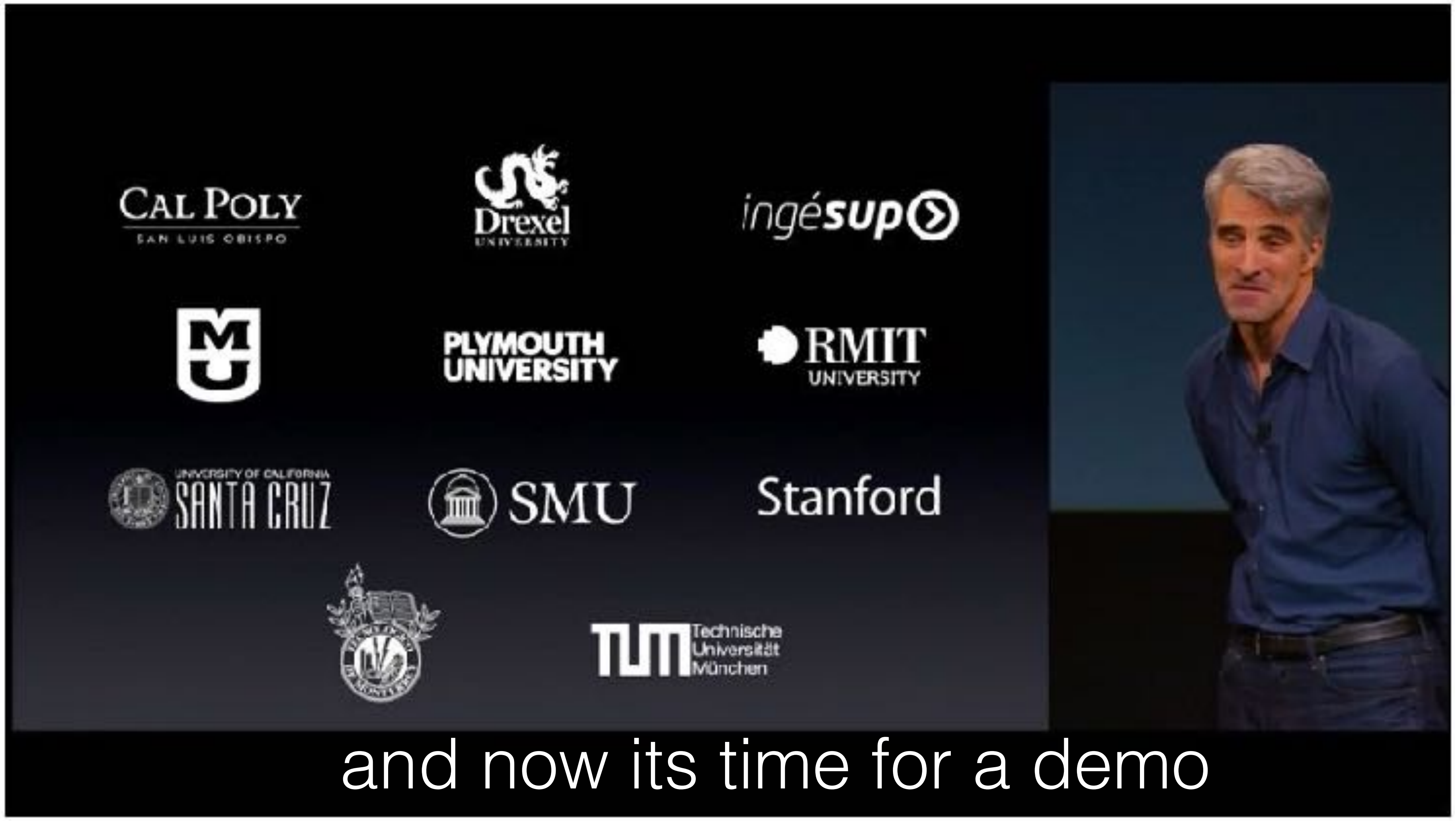
https://developer.apple.com/library/ios/documentation/EventHandling/Conceptual/EventHandlingiPhoneOS/GestureRecognizer_basics/GestureRecognizer_basics.html

gesture recognition

- need a UIGestureRecognizer
  - UITapGestureRecognizer, UIPinchGestureRecognizer, …



UI gesture demo


CAL POLY
SAN LUIS OBISPO
Drexel
UNIVERSITY
ingésup
PLYMOUTH UNIVERSITY
RMIT UNIVERSITY
UNIVERSITY OF CALIFORNIA SANTA CRUZ
SMU
Stanford
Technische Universität München
and now its time for a demo

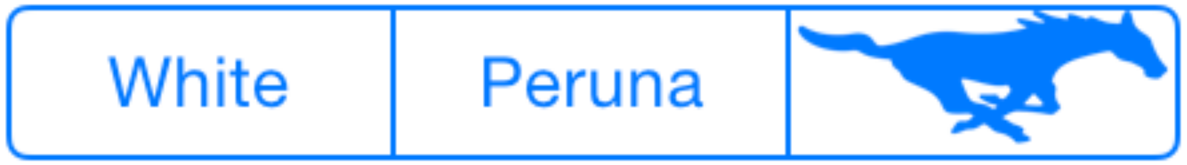
timers, segmented control

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

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

    YOUR_CODE
}
```

get title from control

get value of control

standard SMU colors



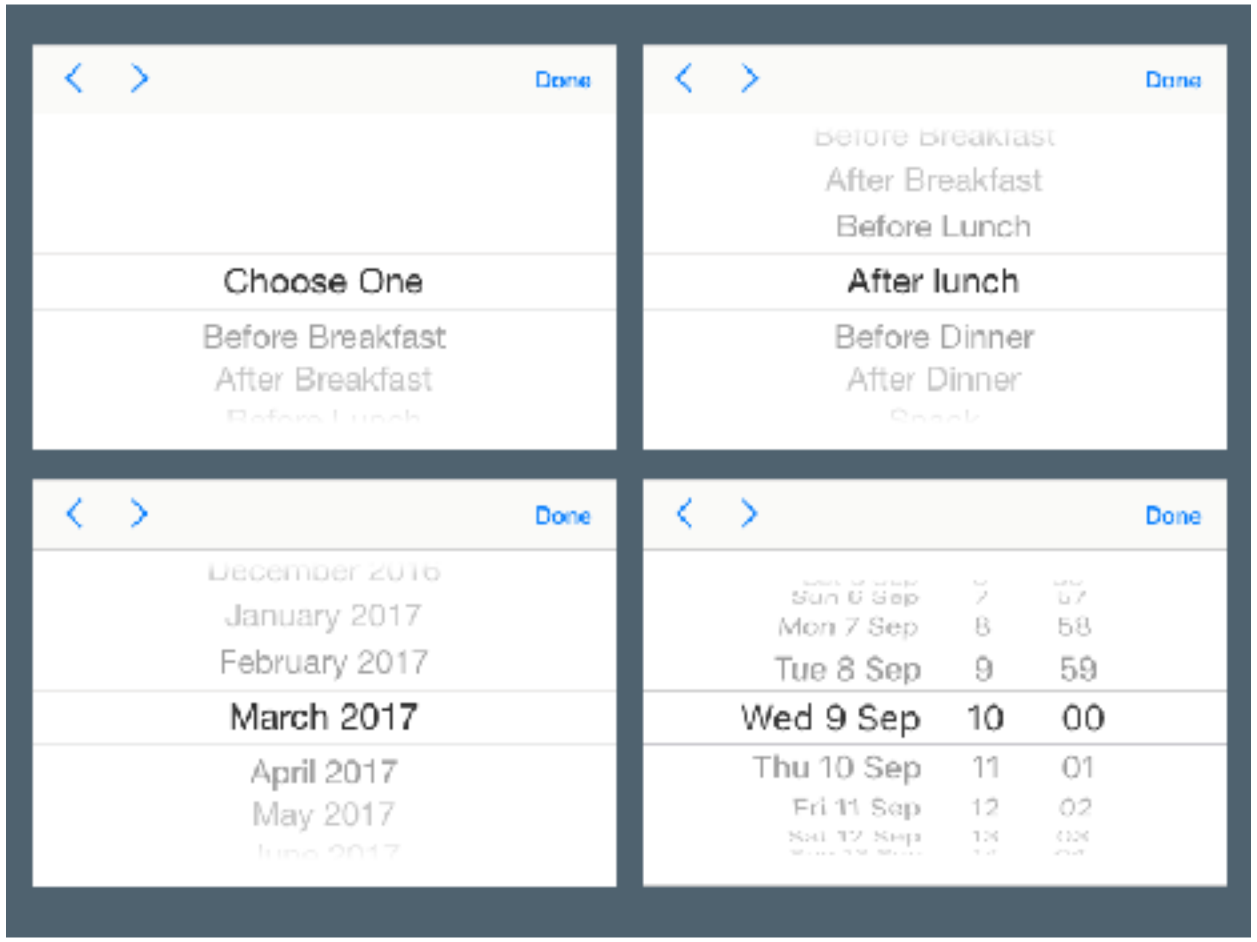
🟥	R	G	B	
	204	0	0	
🟦	R	G	B	
	53	76	161	
⬜	C	M	Y	K
	6	9	39	16
⬛	C	M	Y	K
	16	23	23	44

```
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?

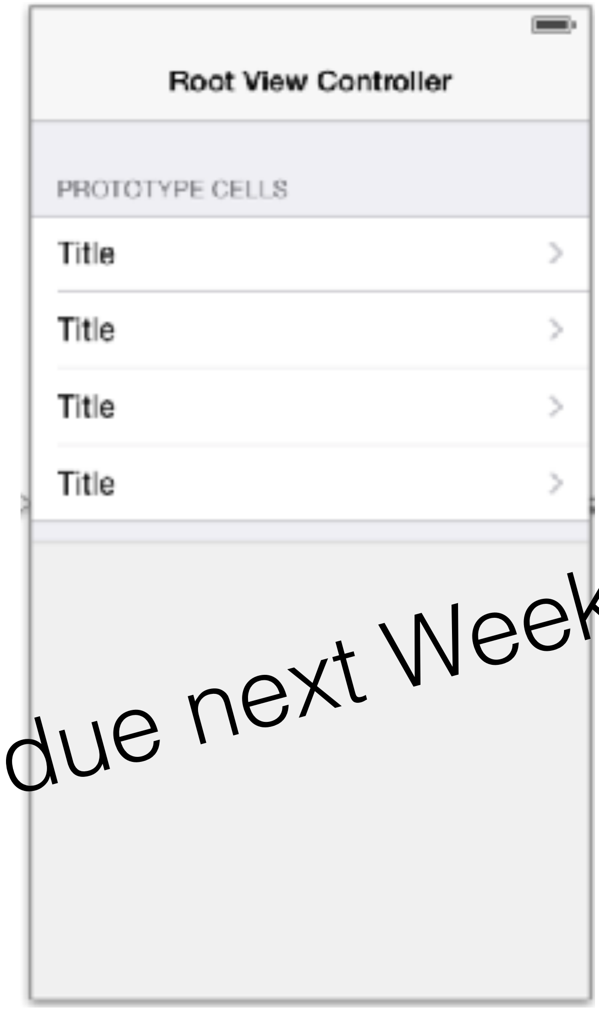
pickers

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



assignment one

- Posted on Canvas!



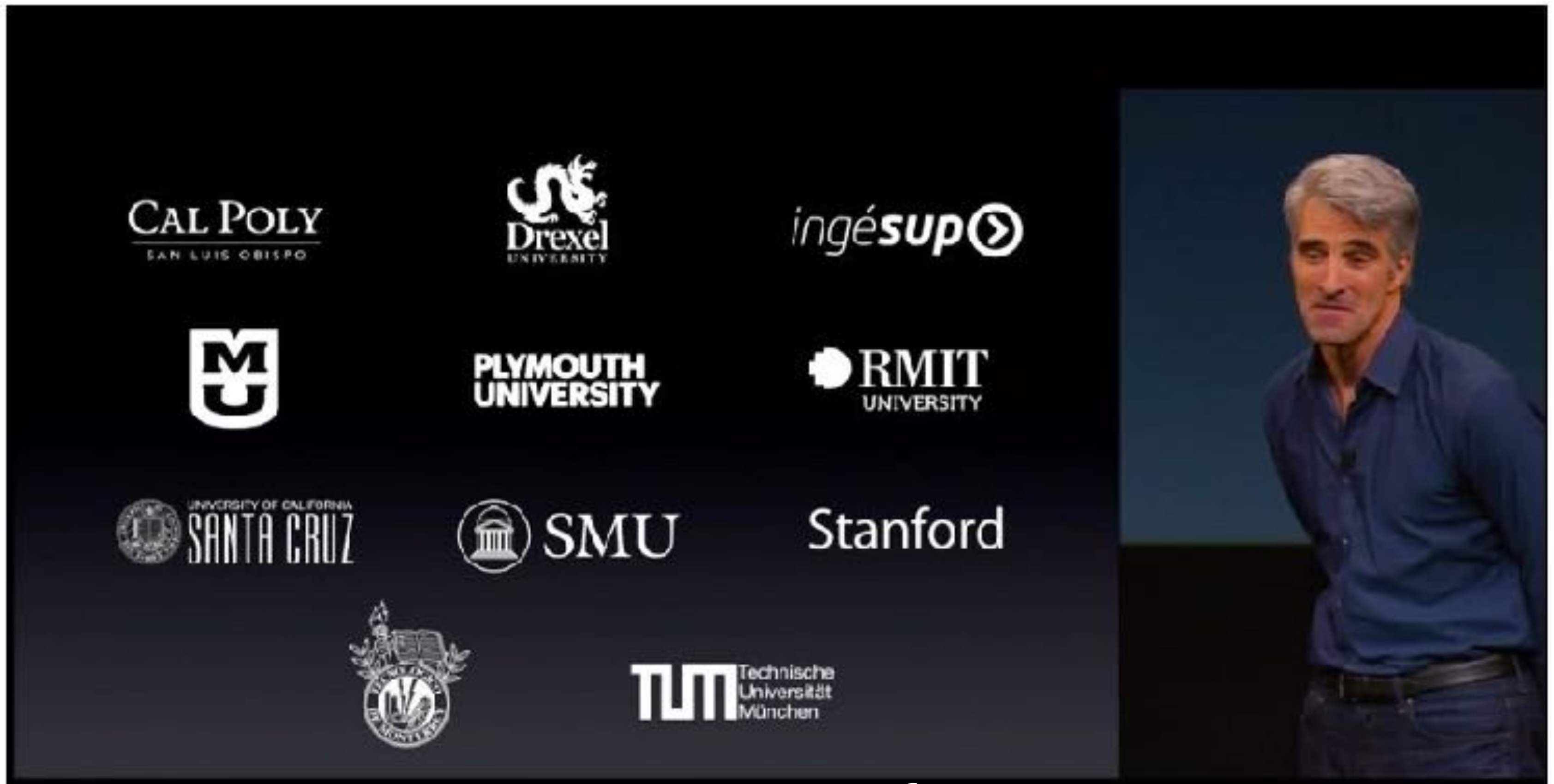
due next Week

before demo… don't forget

- View Controllers in iOS via flipped assignment
  - Watch videos **before class**
  - download GitHub project and have running **before class**
  - come ready to work in teams on an in-class assignment
  - distance students: turn in within a few days of the assignment
- next lectures:
  - mobile HCI
  - audio access

adding functionality

- additional functionality, feedback, etc.
- using the `switch` statement in swift (very powerful)
- `if let`
- mixing objective-c
- and more!

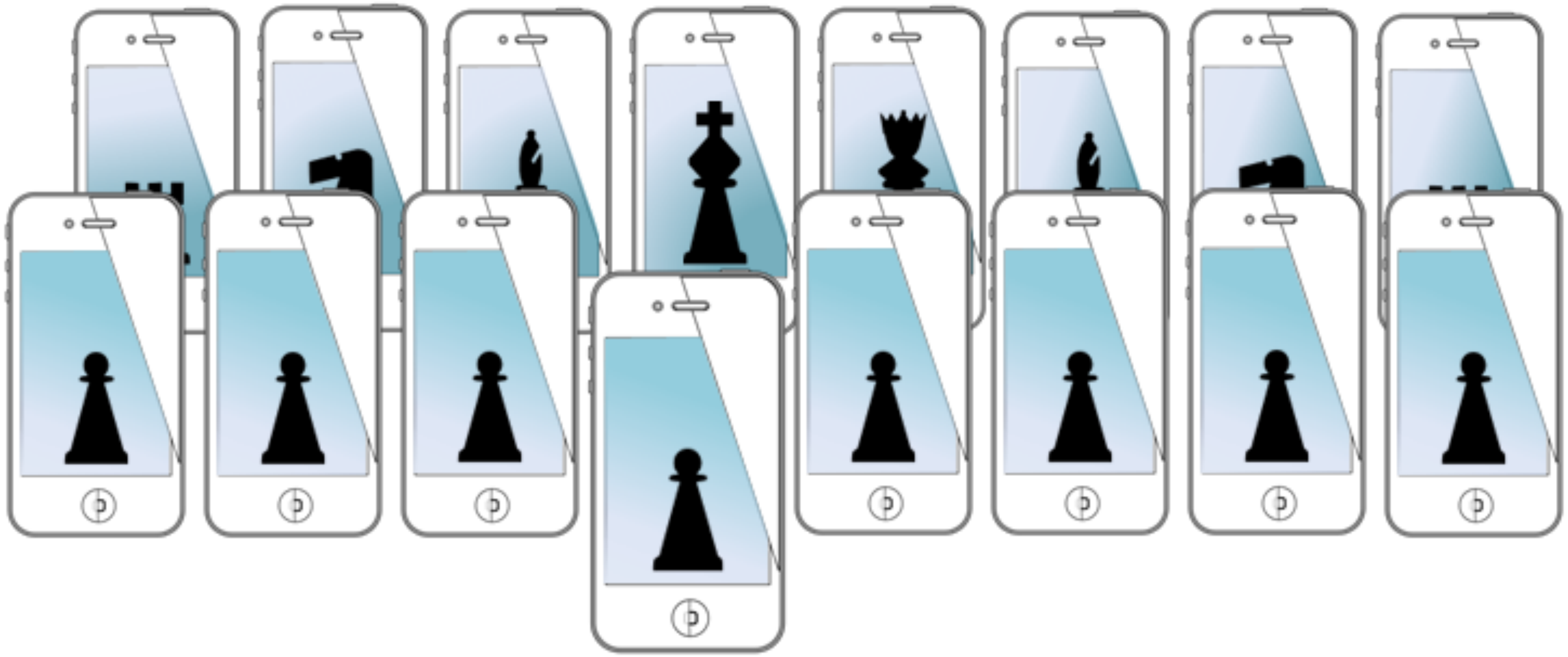


and now its time for a demo

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

https://docs.swift.org/swift-book/GuidedTour/GuidedTour.html

MOBILE SENSING & LEARNING



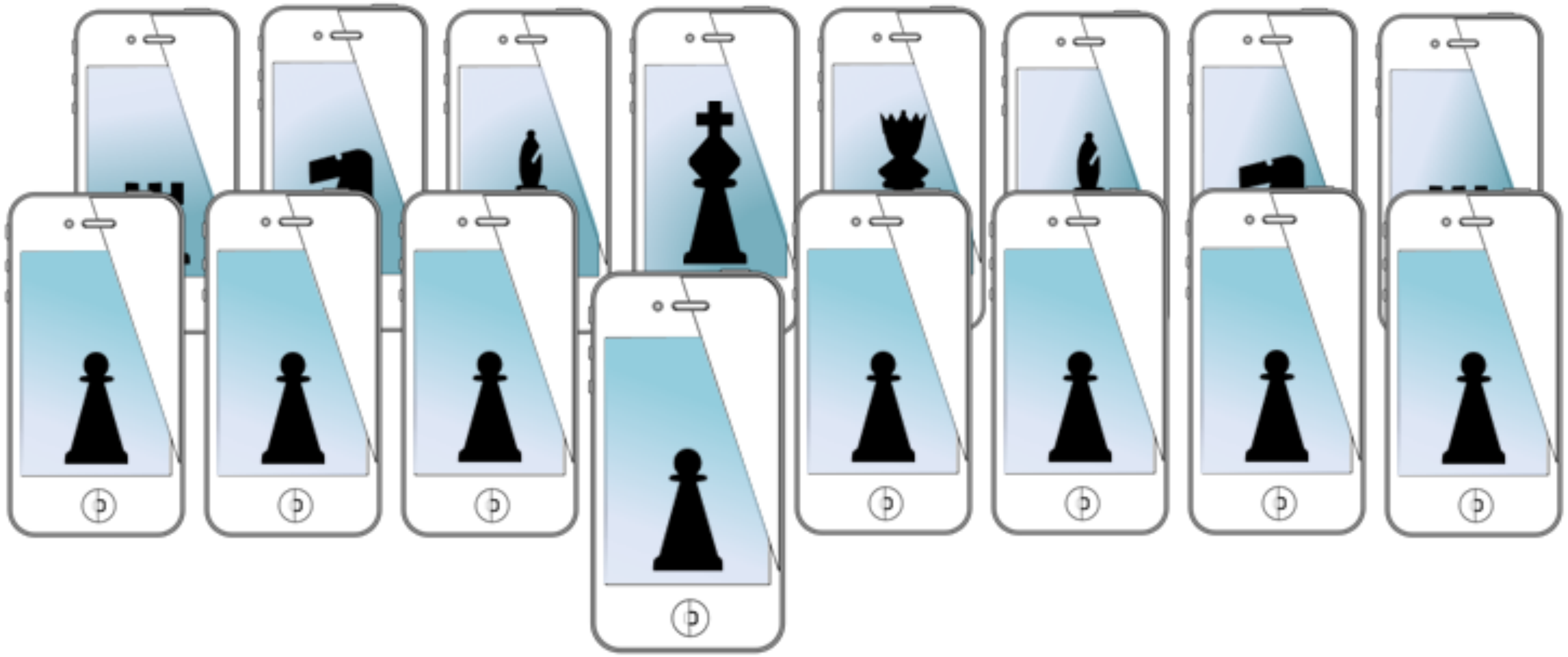
CS5323 & 7323

Mobile Sensing & Learning

UI elements

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

MOBILE SENSING & LEARNING



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

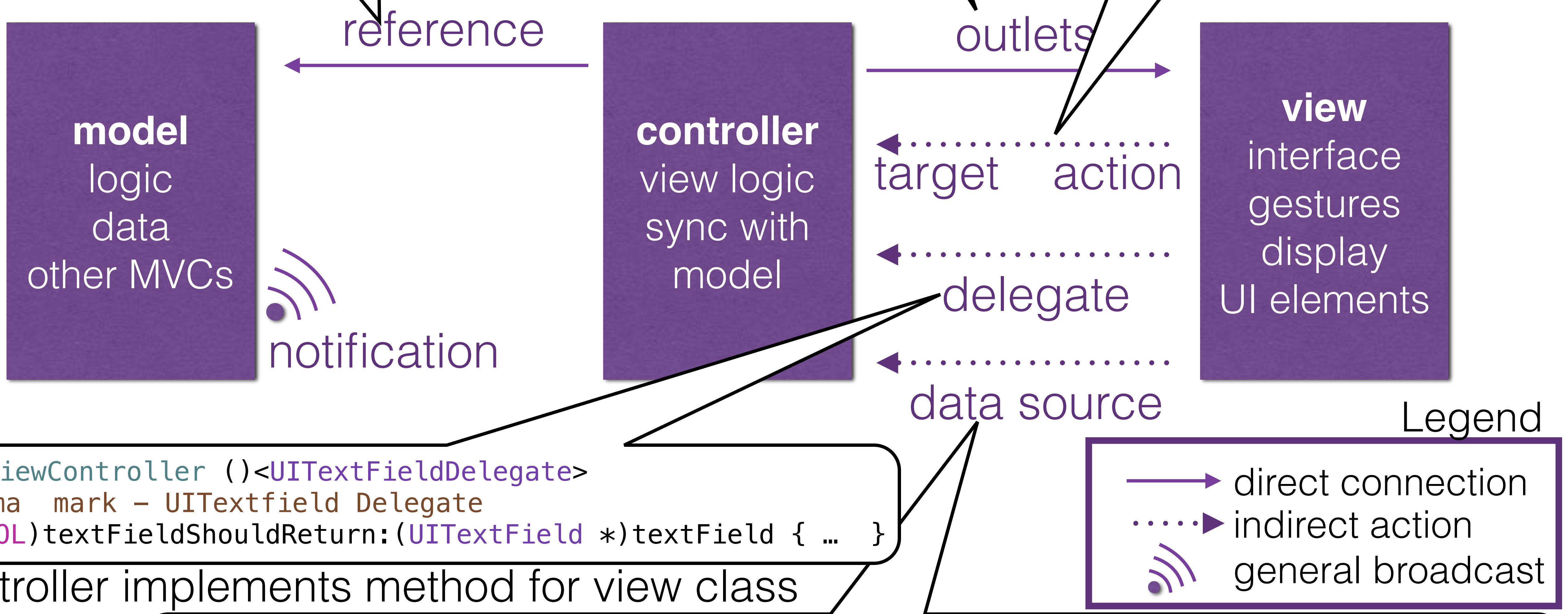
```
@property (weak, nonatomic) IBOutlet UITextField *firstName;
@property (weak, nonatomic) IBOutlet UITextField *lastName;
@property (weak, nonatomic) IBOutlet UITextField *phoneNumber;
```

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;
```



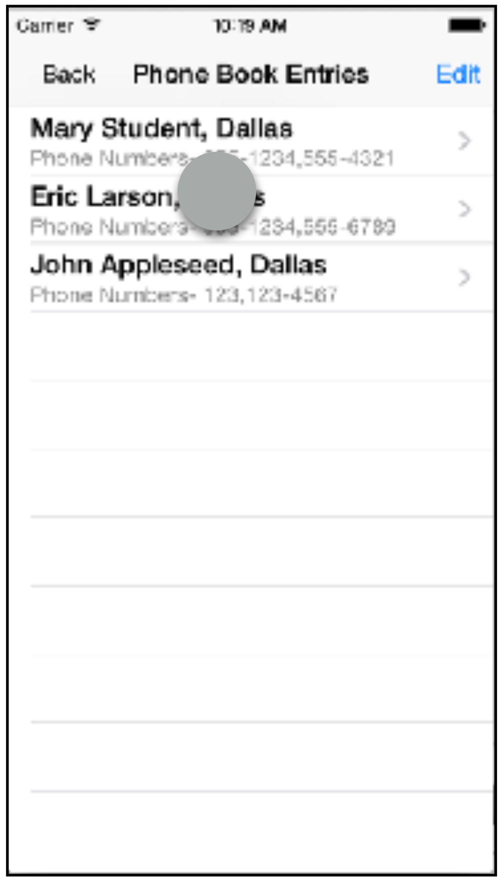
```
MainViewController ()<UITextFieldDelegate>
#pragma  mark - UITextfield Delegate
- (BOOL)textFieldShouldReturn:(UITextField *)textField { …  }
```

controller implements method for view class

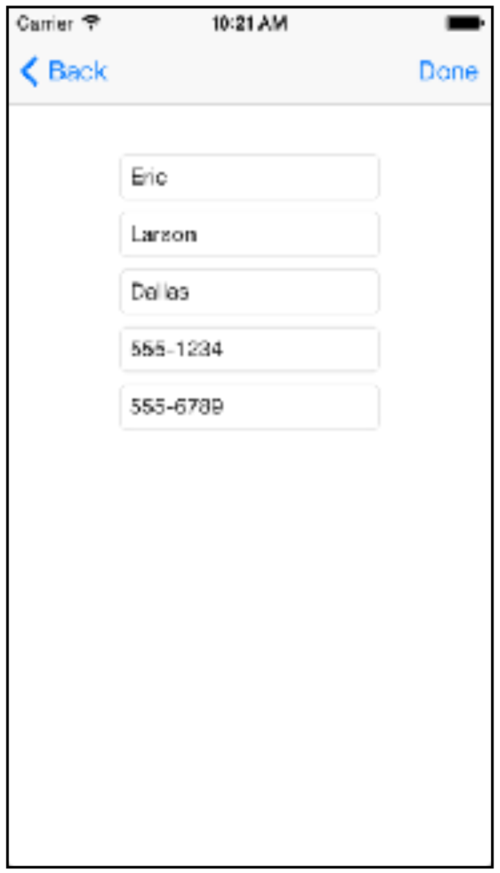
```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
```

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



Mary Student, Dallas
Phone Numbers- [illegible]-1234,555-4321
Eric Larson, [illegible]s
Phone Numbers- [illegible]1234,555-6789
John Appleseed, Dallas
Phone Numbers- 123,123-4567



Eric
Larson
Dallas
555-1234
555-6789

controller life cycle review

Source Controller

Destination Controller

view is unfrozen, property memory allocated

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

view outlets are ready for interaction

`viewDidLoad`

`viewWillAppear`

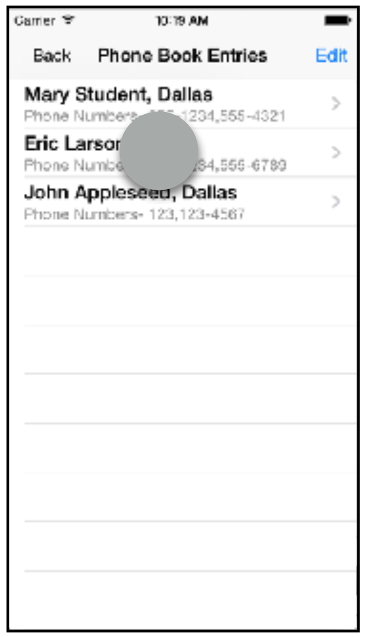
`viewDidAppear`

`viewWillDisappear`

`viewDidDisappear`

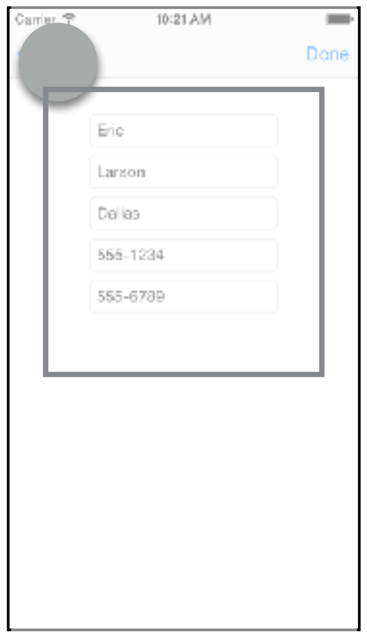
memory deallocated when app is ready

source



Mary Student, Dallas
Phone Numbers- 555-1234,555-4321
Eric Larson
Phone Numbers- 1234,555-6789
John Appleseed, Dallas
Phone Numbers- 123,123-4567

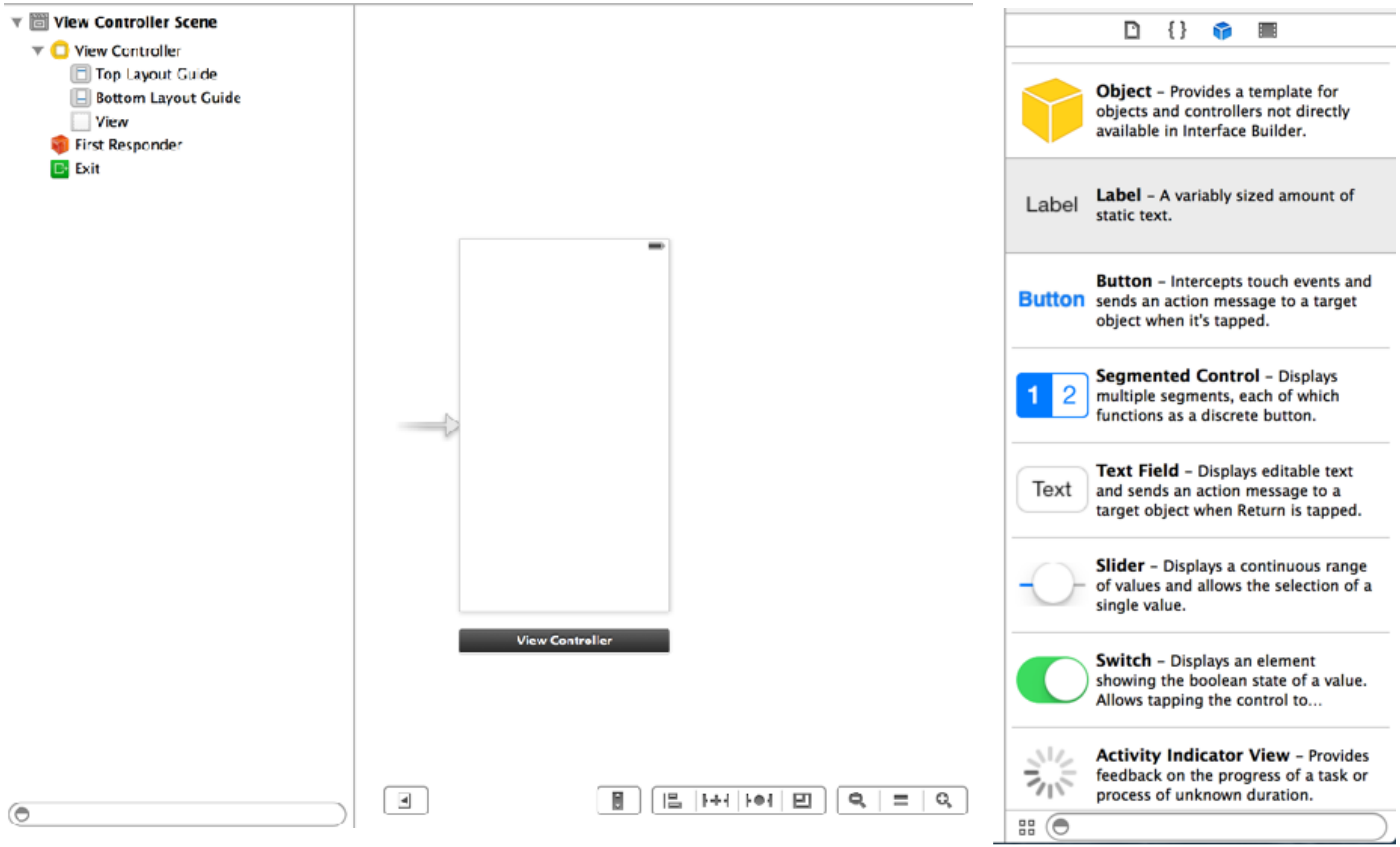
destination



Eric
Larson
Dallas
555-1234
555-6789

user

the storyboard



Object – Provides a template for objects and controllers not directly available in Interface Builder.

Label – A variably sized amount of static text.

Button – Intercepts touch events and sends an action message to a target object when it's tapped.

Segmented Control – Displays multiple segments, each of which functions as a discrete button.

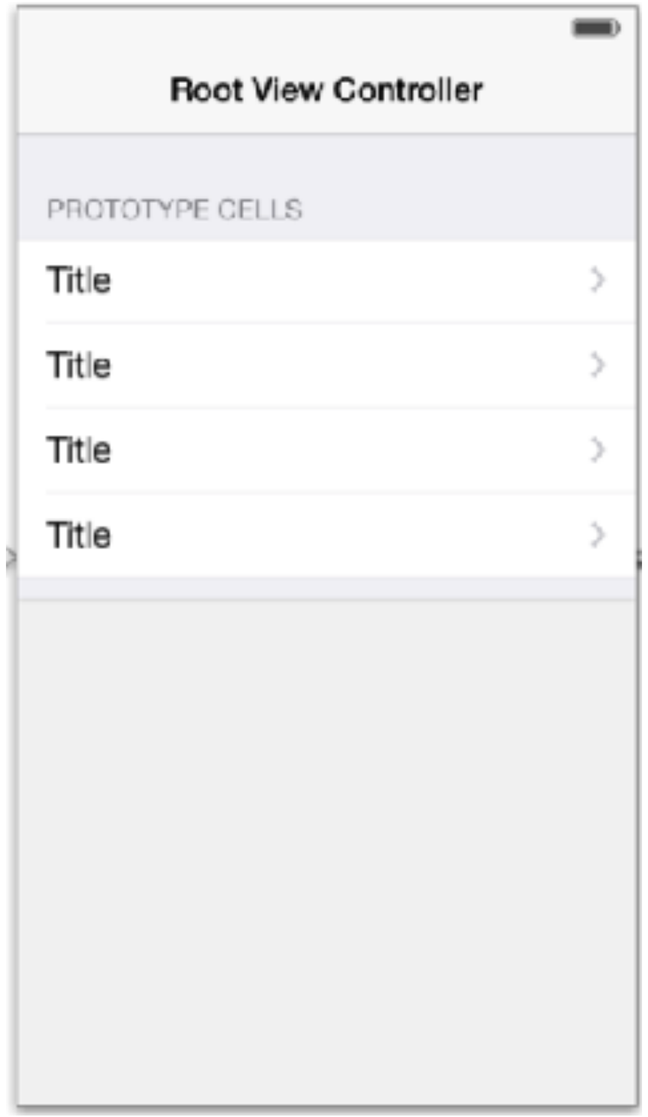
Text Field – Displays editable text and sends an action message to a target object when Return is tapped.

Slider – Displays a continuous range of values and allows the selection of a single value.

Switch – Displays an element showing the boolean state of a value. Allows tapping the control to...

Activity Indicator View – Provides feedback on the progress of a task or process of unknown duration.

table view controller



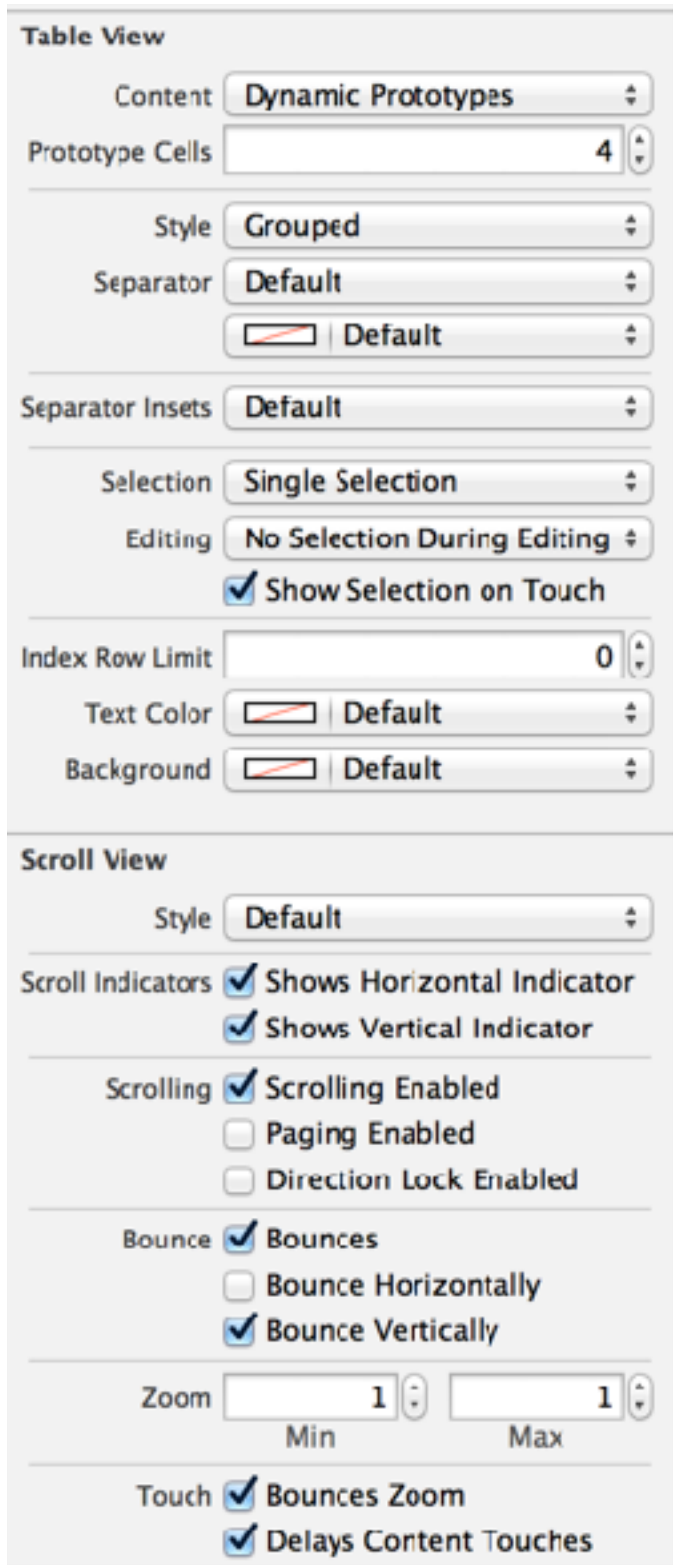
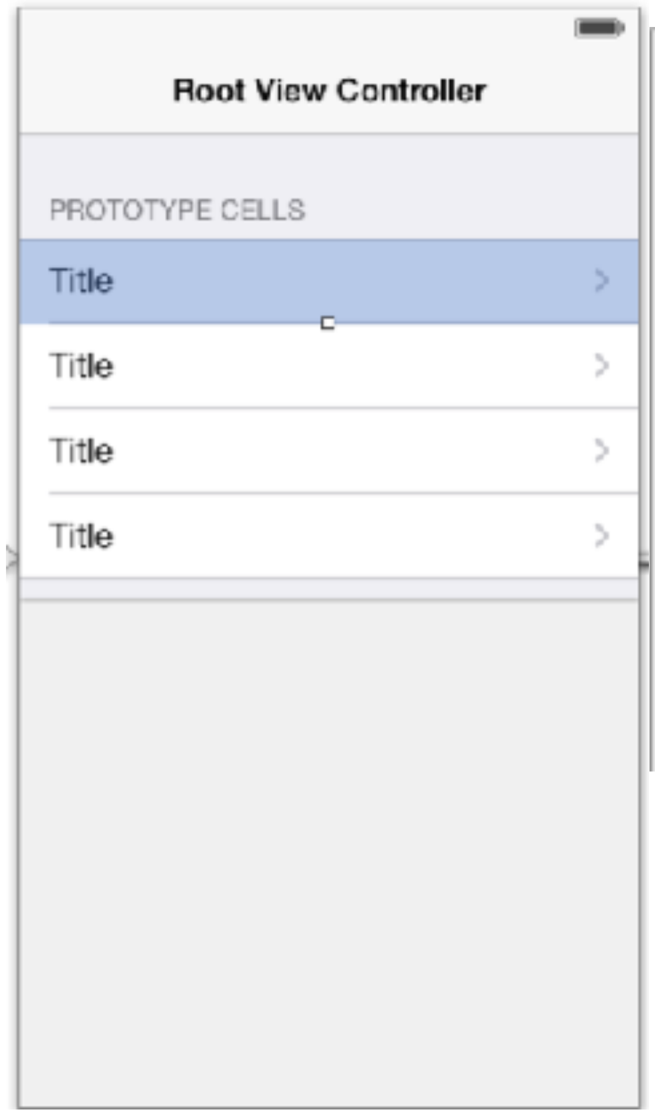


Table View

Content: Dynamic Prototypes
Prototype Cells: 4
Style: Grouped
Separator: Default
Default
Separator Insets: Default
Selection: Single Selection
Editing: No Selection During Editing
✓ Show Selection on Touch
Index Row Limit: 0
Text Color: Default
Background: Default

Scroll View

Style: Default
Scroll Indicators: ✓ Shows Horizontal Indicator
✓ Shows Vertical Indicator
Scrolling: ✓ Scrolling Enabled
☐ Paging Enabled
☐ Direction Lock Enabled
Bounce: ✓ Bounces
☐ Bounce Horizontally
✓ Bounce Vertically
Zoom: Min 1, Max 1
Touch: ✓ Bounces Zoom
✓ Delays Content Touches



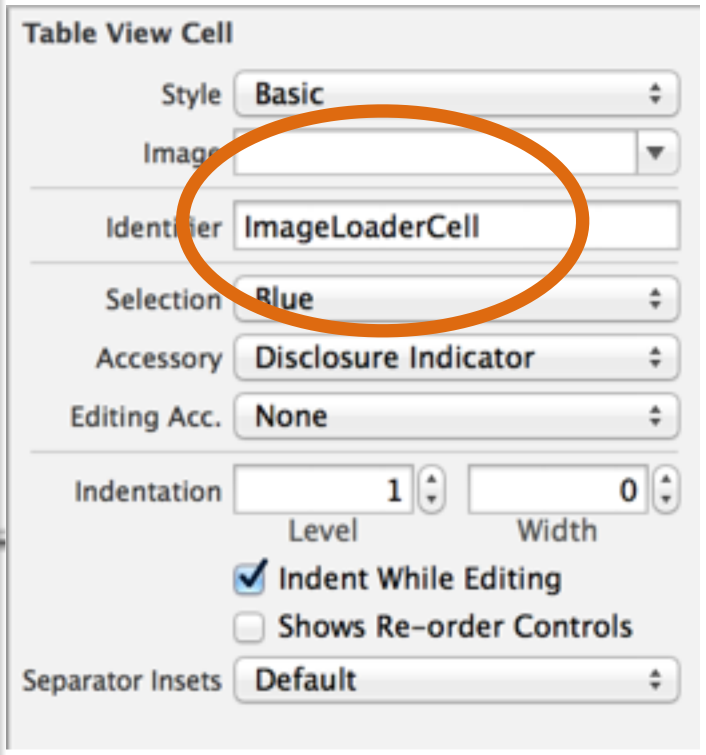
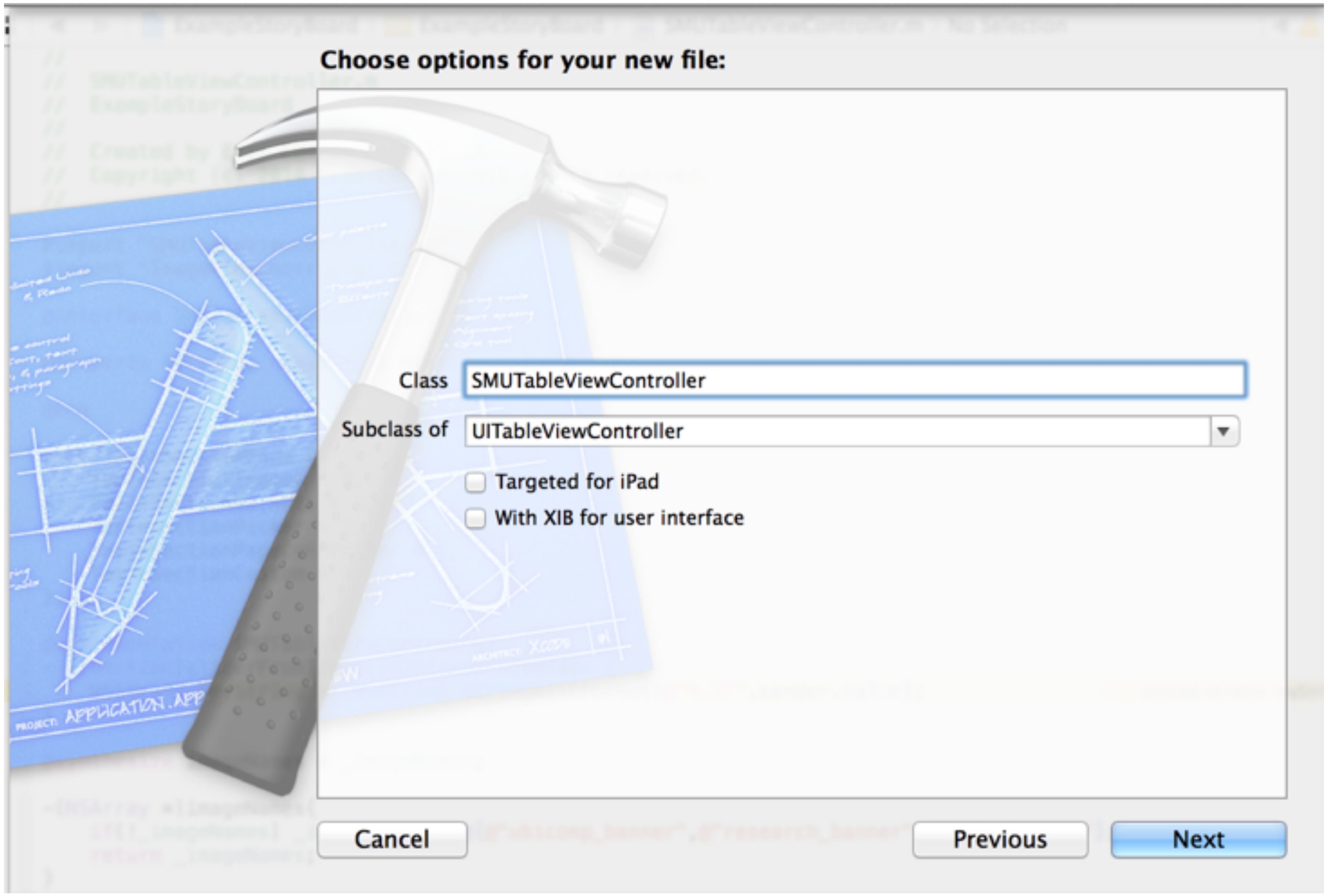


Table View Cell

Style: Basic
Image:
Identifier: ImageLoaderCell
Selection: Blue
Accessory: Disclosure Indicator
Editing Acc.: None
Indentation: Level 1, Width 0
✓ Indent While Editing
☐ Shows Re-order Controls
Separator Insets: Default

table view controller



Choose options for your new file:

Class: SMUTableViewController

Subclass of: UITableViewController

- [ ] Targeted for iPad
- [ ] With XIB for user interface

table view controller

- must implement "data source" methods

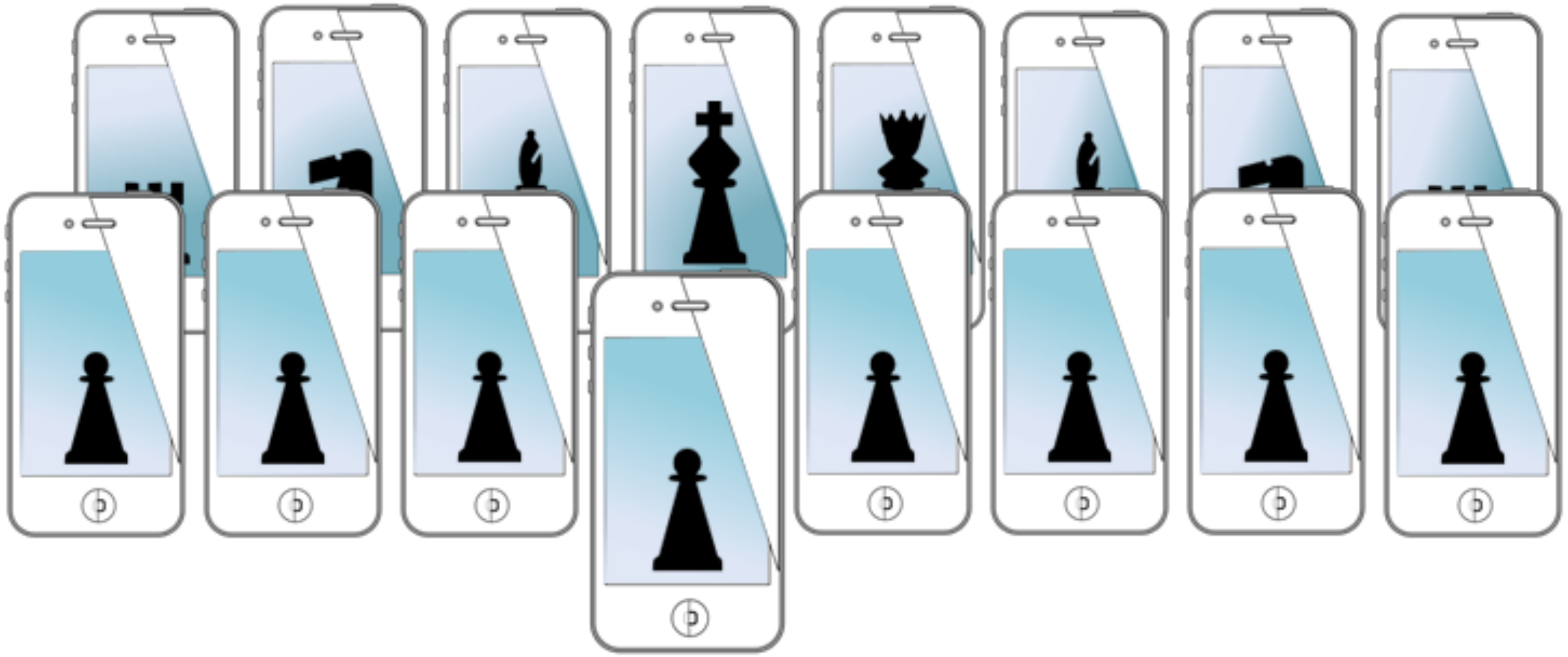
```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
    return numSections;
}


- (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

MOBILE SENSING & LEARNING



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;
```

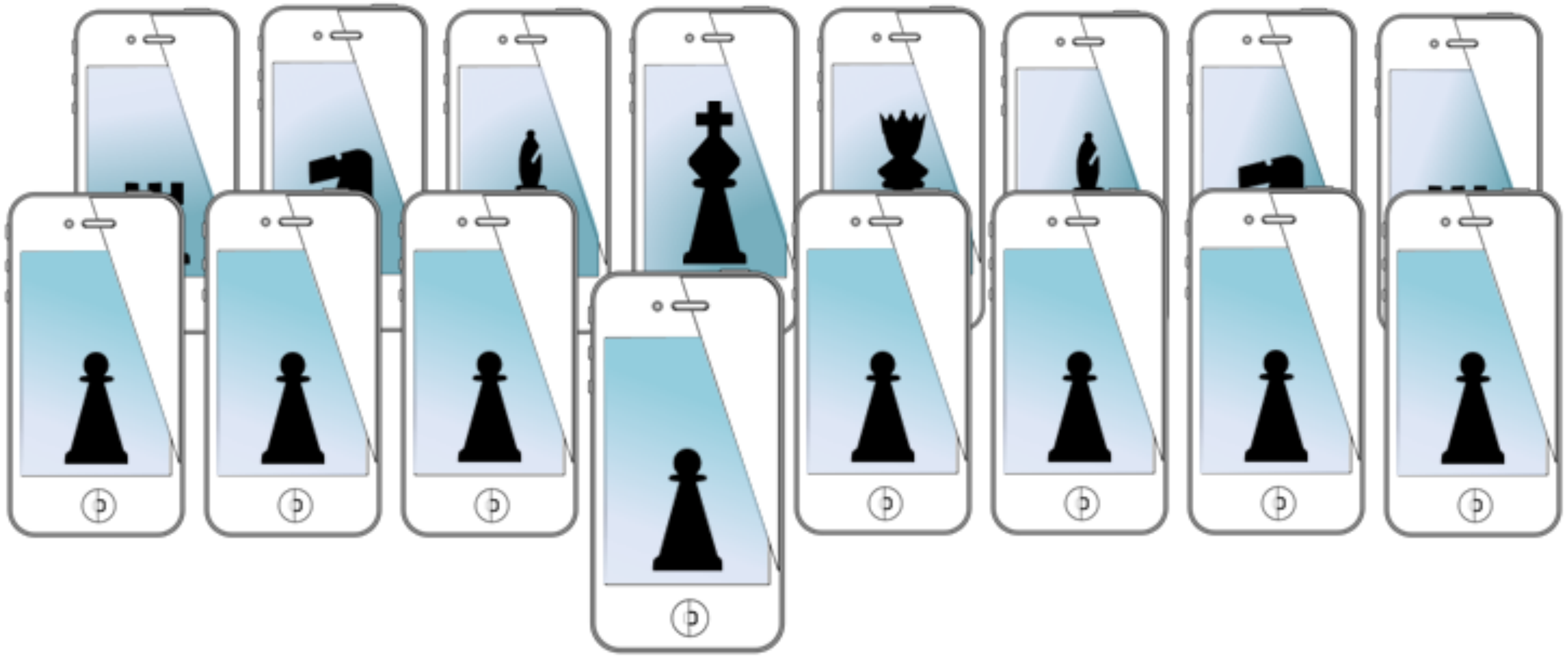
set VC as delegate

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

one of many methods in the protocol

demo

MOBILE SENSING & LEARNING



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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

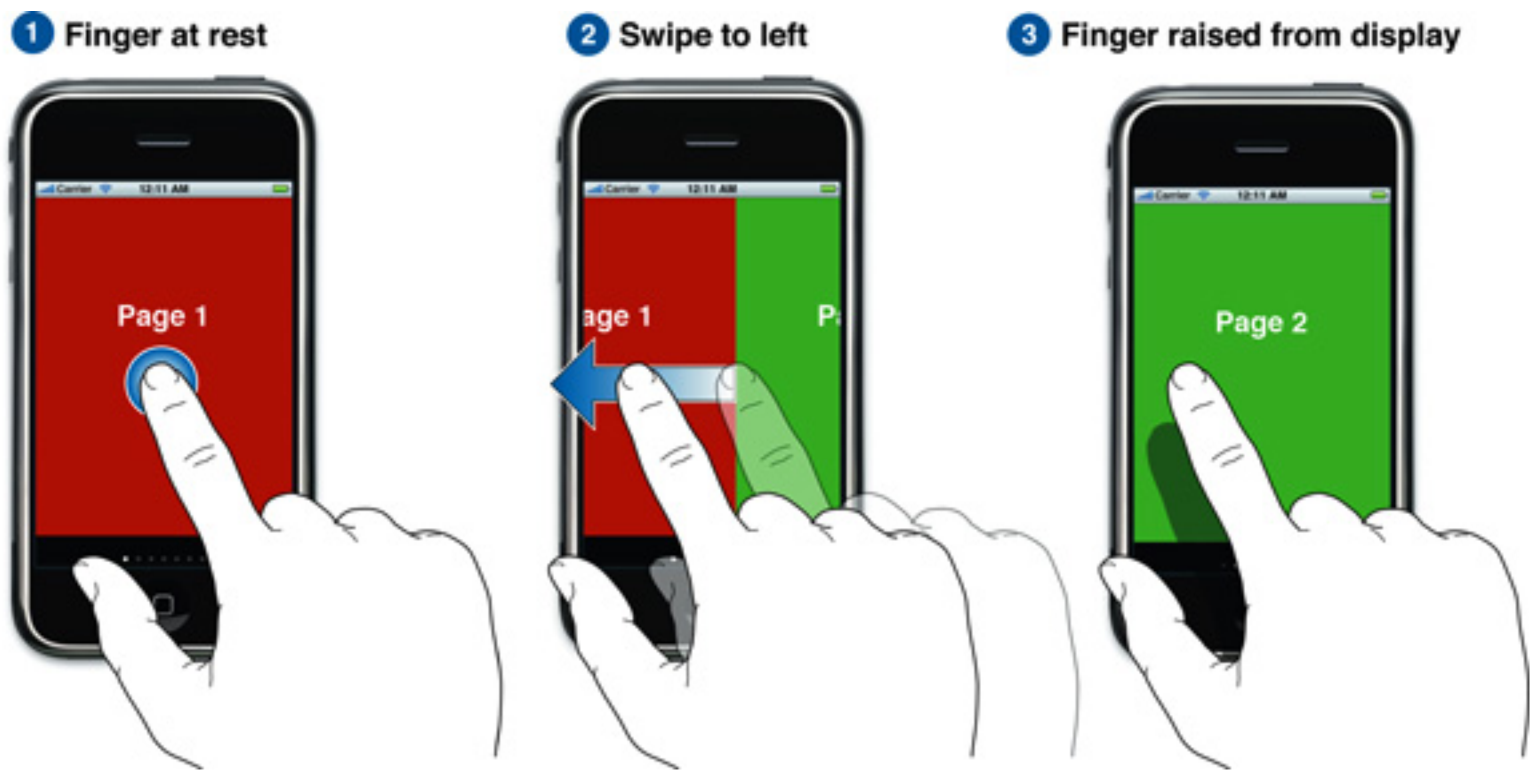
disclaimer!

page view controller

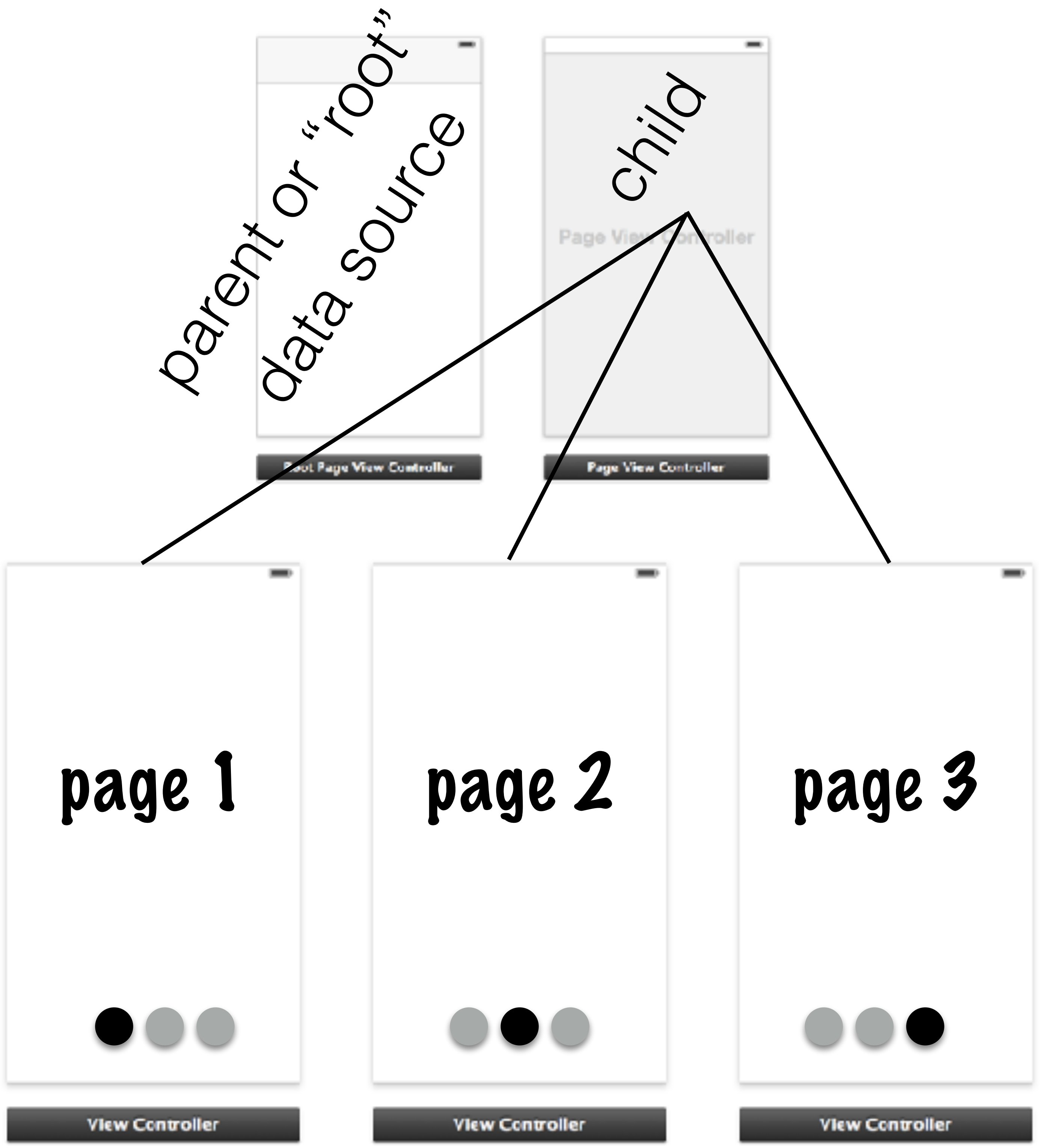
- place UIPageViewController in storyboard
- place a “root controller” for the page
  - adopt <UIPageViewControllerDataSource>
  - instantiate pageViewController
  - instantiate views to be paged

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”



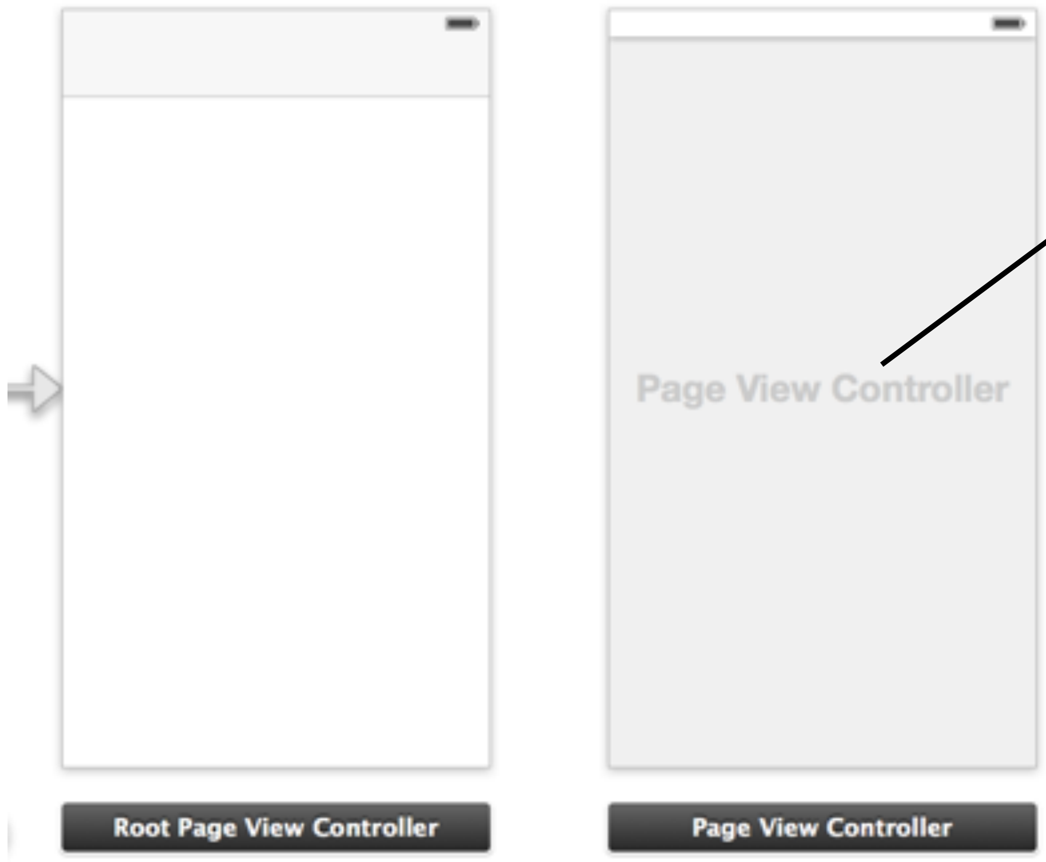
page view controller

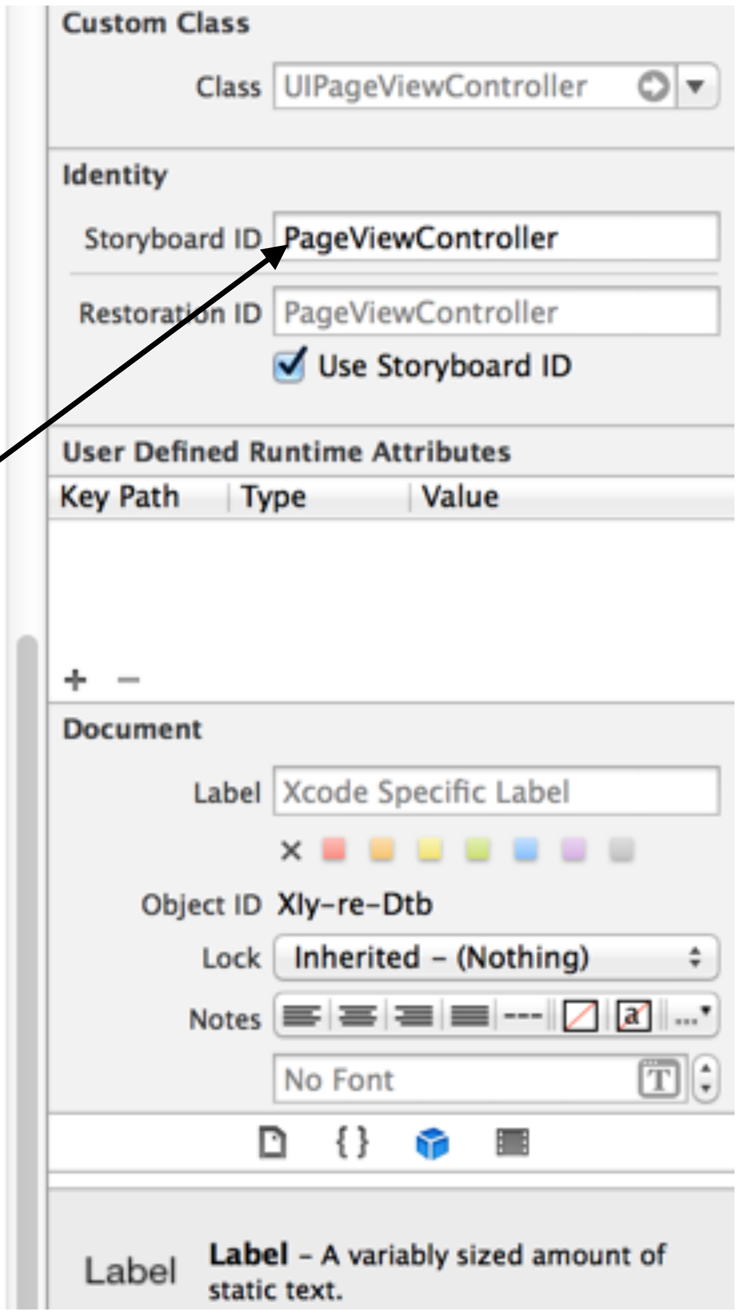


different instantiations of view controller

page view controller

no need to subclass the page controller!





Custom Class

Class: UIPageViewController

Identity

Storyboard ID: PageViewController

Restoration ID: PageViewController

✓ Use Storyboard ID

User Defined Runtime Attributes

Key Path	Type	Value

Document

Label: Xcode Specific Label

Object ID: Xly-re-Dtb

Lock: Inherited - (Nothing)

Notes

No Font

Label **Label** - A variably sized amount of static text.

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;
}
```

page view controller

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

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];
```

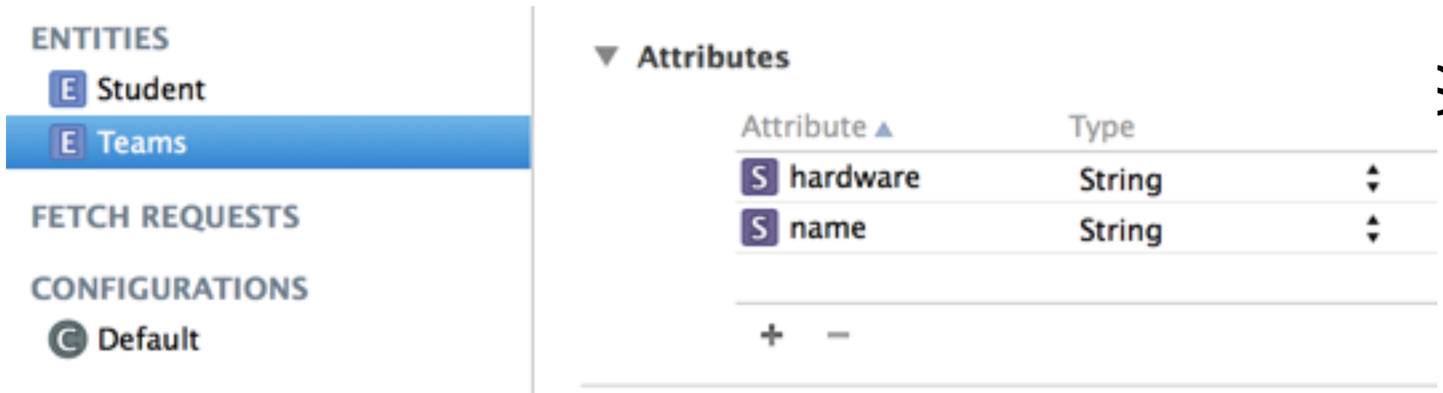
```
@"V:|-[button]"

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



ENTITIES
- E Student
- E Teams

FETCH REQUESTS

CONFIGURATIONS
- C Default

▼ Attributes

Attribute ▲	Type
S hardware	String
S name	String

+ −

se

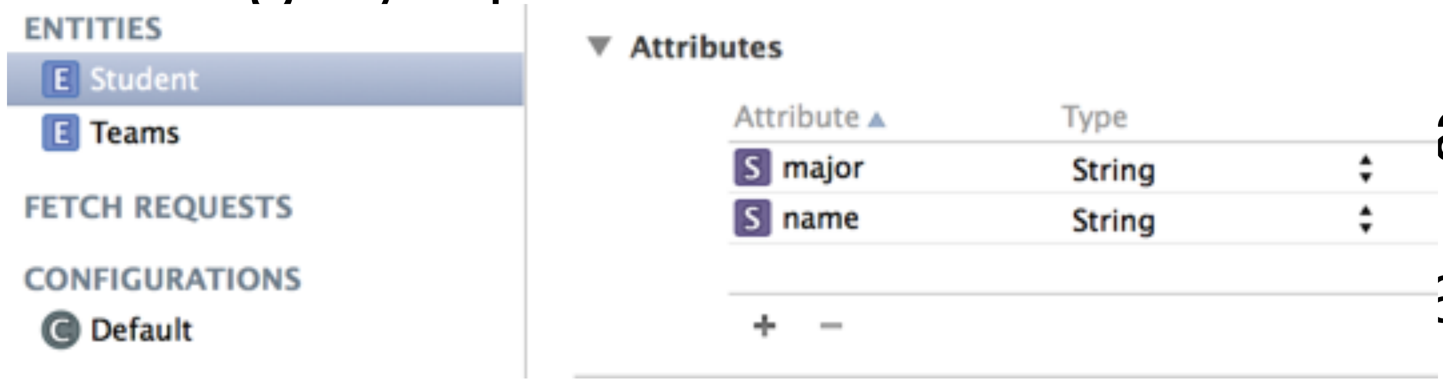
OS

```
@interface Teams : NSManagedObject

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

@end
```

• highly optimized



ENTITIES
- E Student
- E Teams

FETCH REQUESTS

CONFIGURATIONS
- C Default

▼ Attributes

Attribute ▲	Type
S major	String
S name	String

+ −

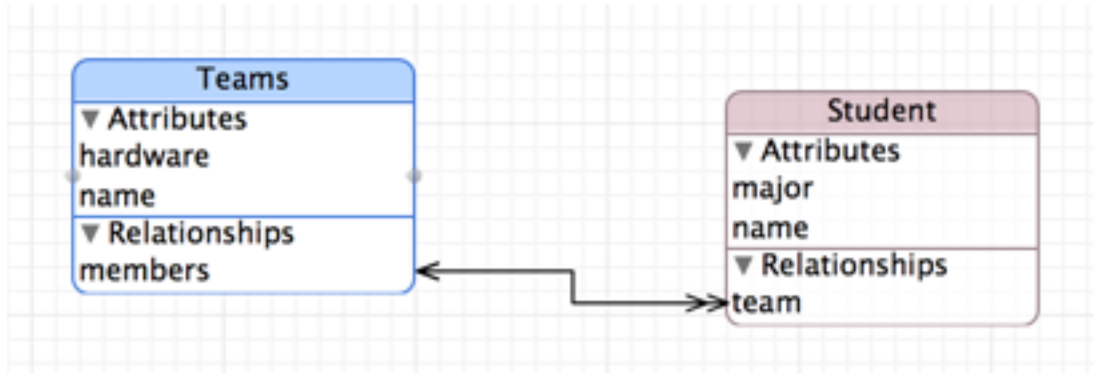
able data

ata

```
@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

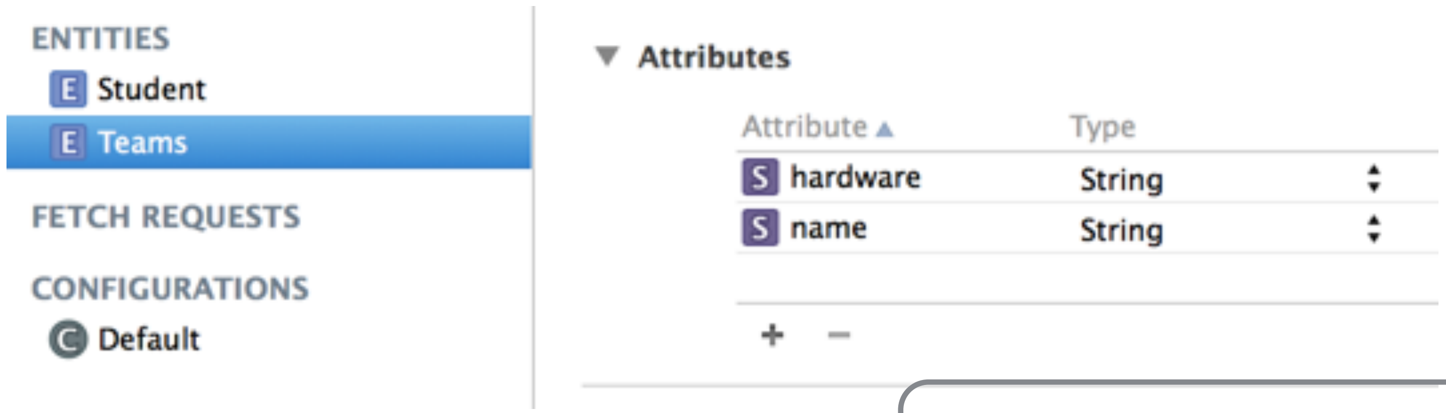
```
// getter for the storage coordinator
- (NSPersistentStoreCoordinator *)persistentStoreCoordinator {
    if (!_persistentStoreCoordinator) {

        // 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



Attribute	Type
hardware	String
name	String

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;
}
```

request

entity to request from

fetch

array of results, even if size=0

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

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

    …

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

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

access notification center

do this

```
MCDAppDelegate* appDelegate =                          edApplication].delegate;

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

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

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

not mutable

mutable

```swift
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…

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

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

```swift
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

swift

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

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

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

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

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

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

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

like a dequeue

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

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 origi
case (_, 0):
    println("(\(somePoint.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

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

return type

internal name

input type

external name

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

return type

external name

passed value

```swift
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

swift

functions

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")
            }
       }
    }
}
```

```
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

swift

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

swift

class methods

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

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