THE UNIVERSITY OF CHICAGO

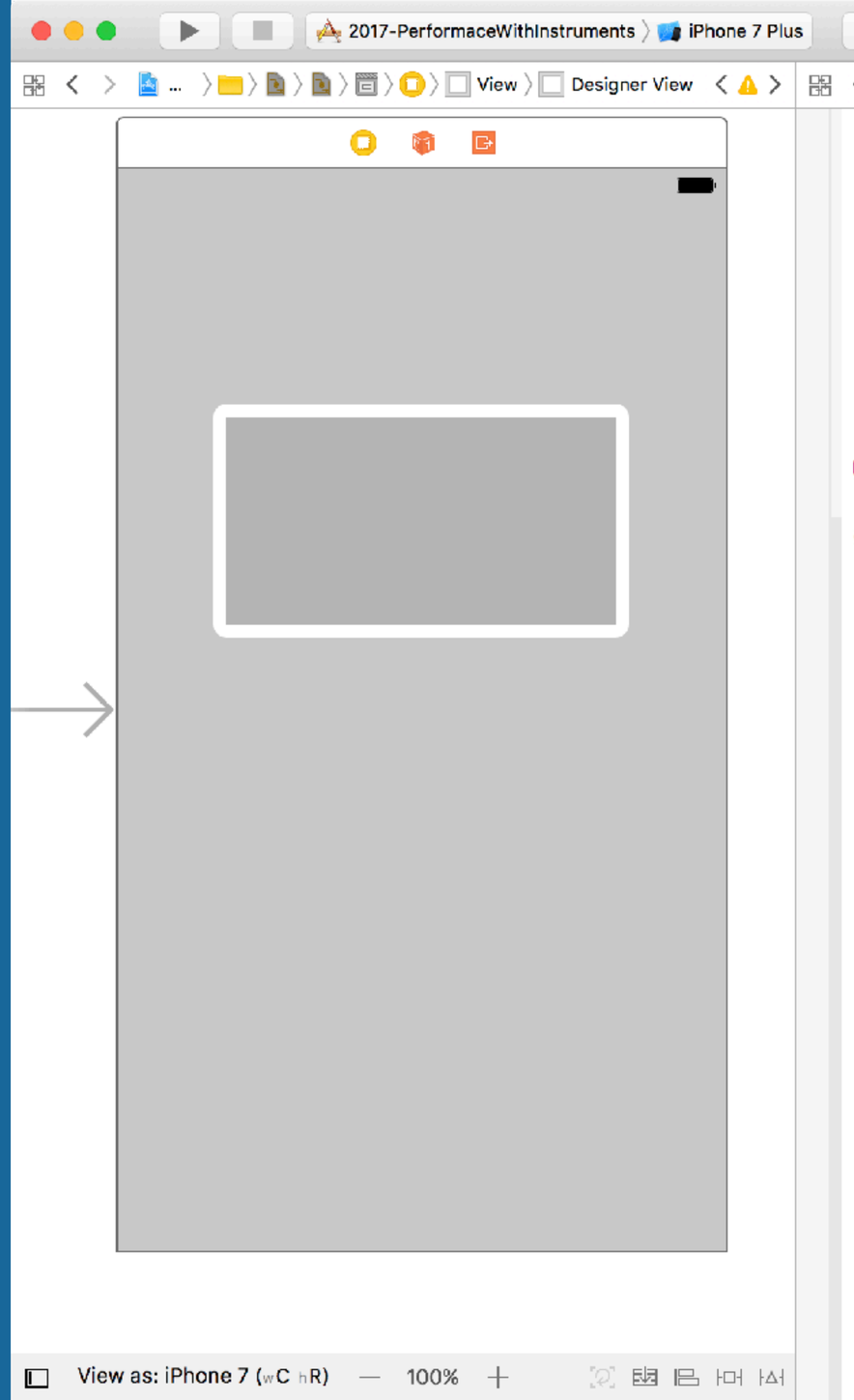
ADVANCED iOS APPLICATION DEVELOPMENT

MPCS 51032 • SPRING 2020 • SESSION 8

CUSTOM DESIGNED VIEWS

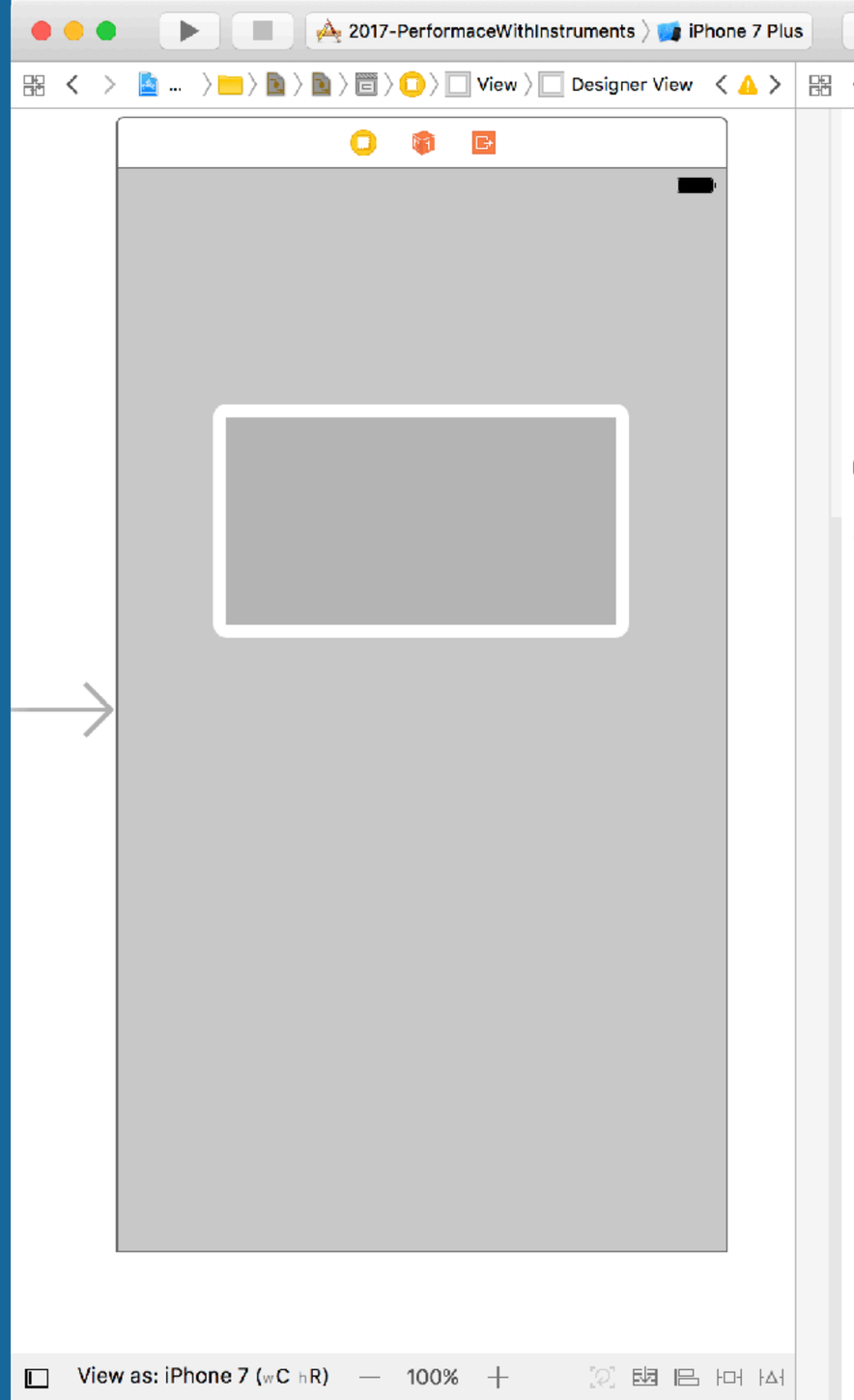
CUSTOM DESIGNED VIEWS

- Interface builder declarations that expose your custom attributes in Interface Builder
- Allows custom classes to be rendered in real time in Interface Builders without running

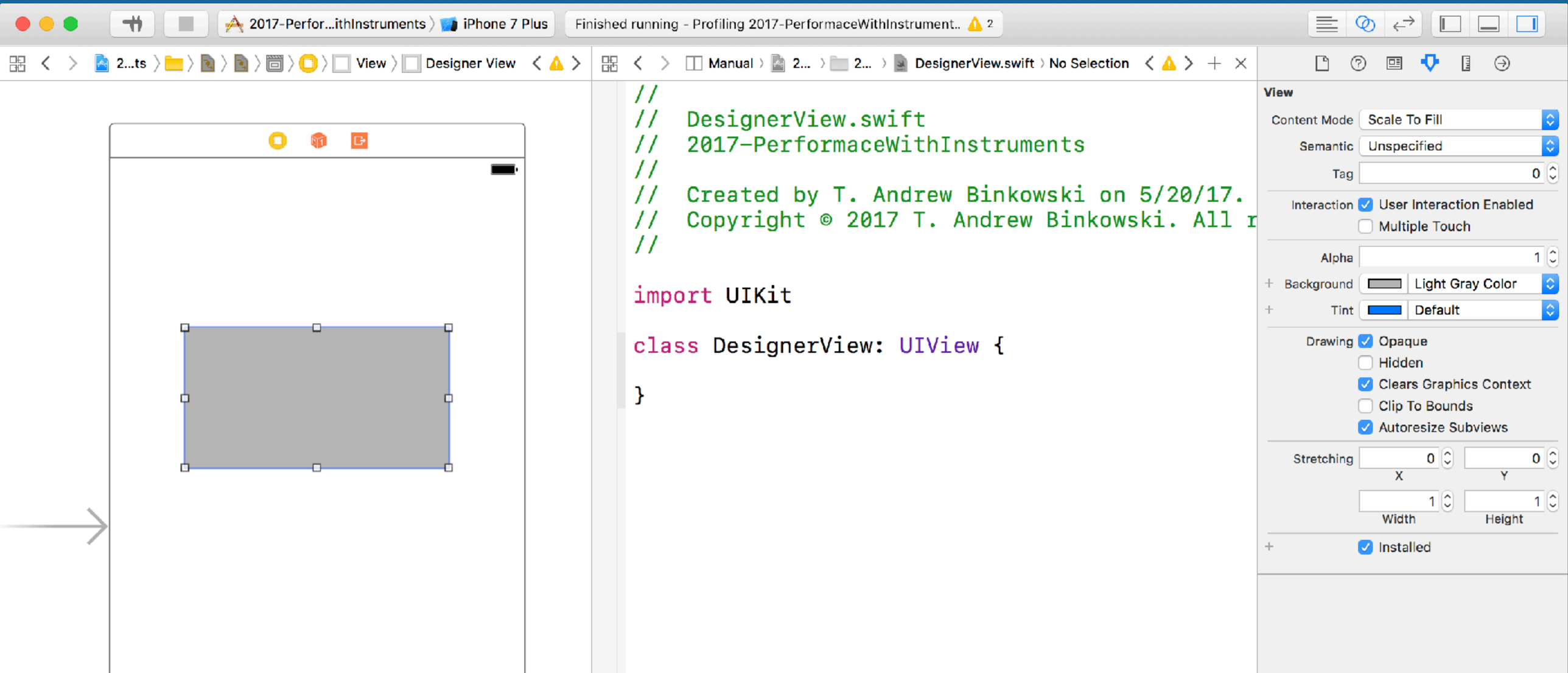


CUSTOM DESIGNED VIEWS

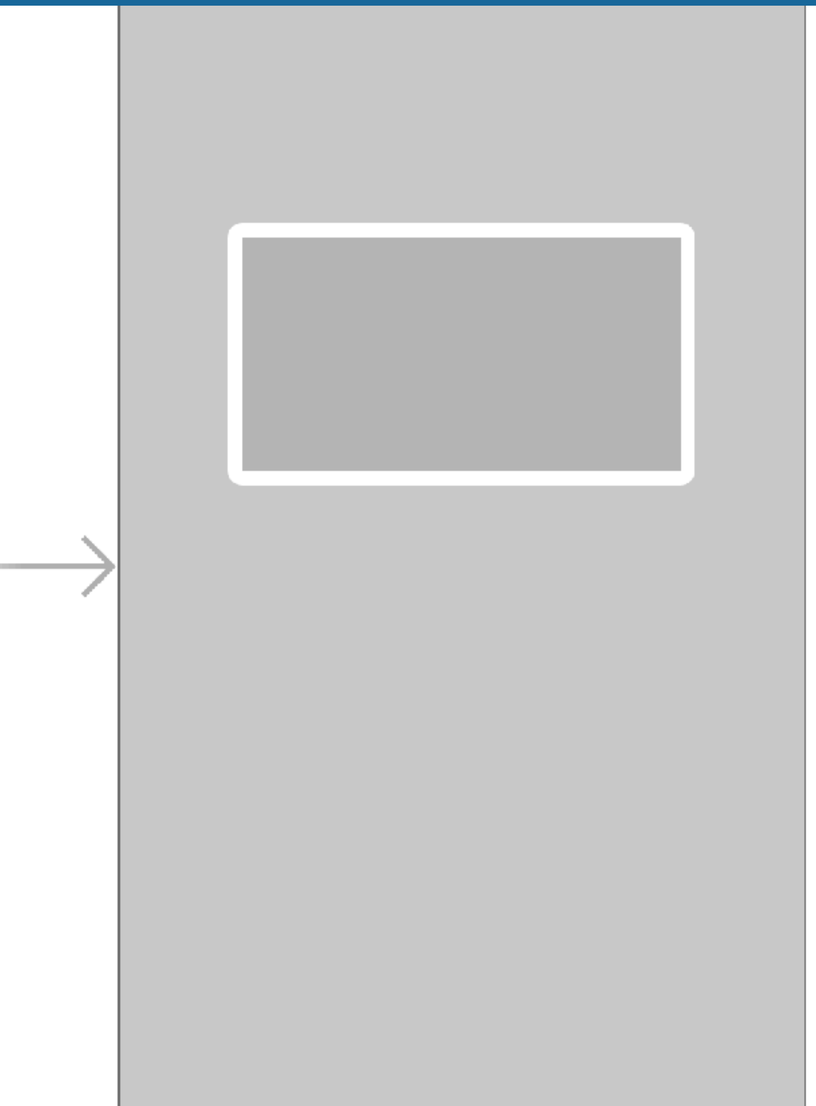
- @IBInspectable - adds interface to interface builder for custom views
- @IBDesignable - renders custom views in interface builder at design time



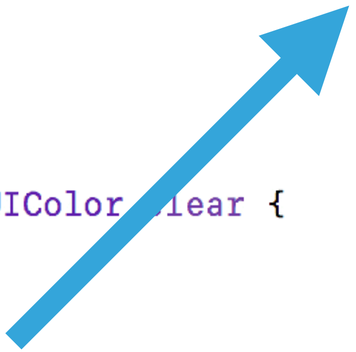
CUSTOM DESIGNED VIEWS

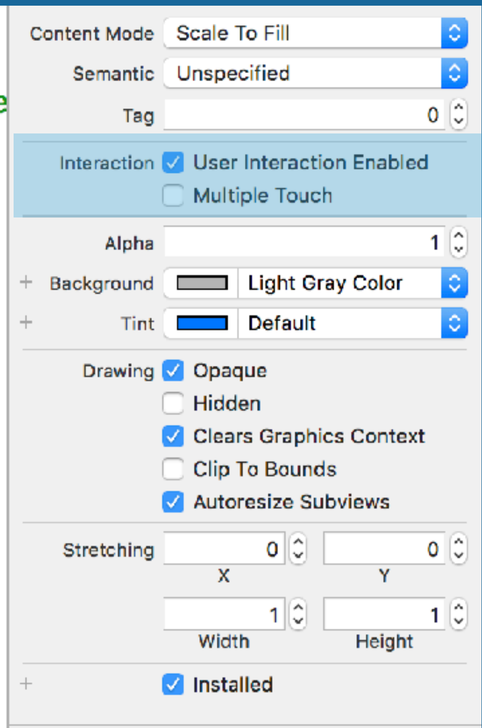


CUSTOM DESIGNED VIEWS



```
//
//  Created by T. Andrew Binkowski on 5/20/17.
//  Copyright © 2017 T. Andrew Binkowski. All rights rese
//

import UIKit

@IBDesignable

class DesignerView: UIView {
  @IBInspectable var color: UIColor = UIColor.clear {
    didSet {
      self.backgroundColor = color
    }
  }
```





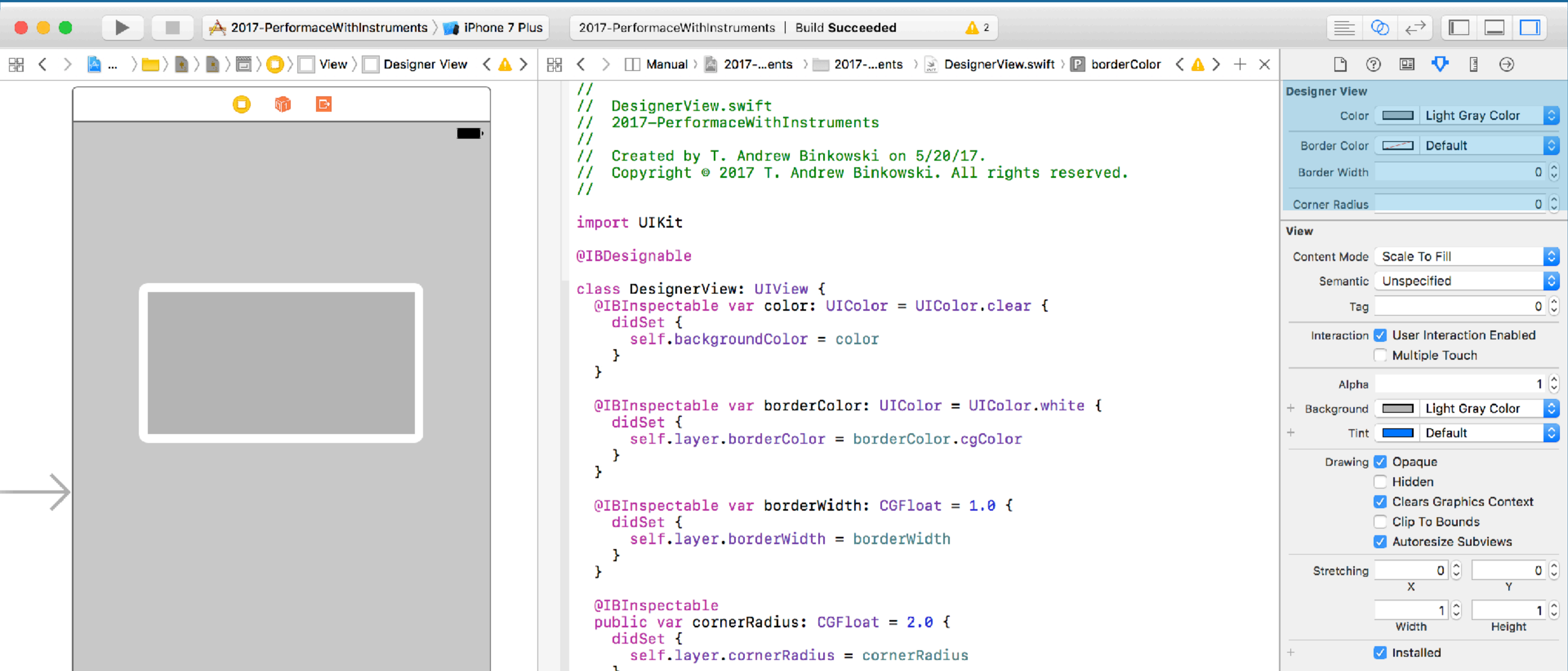
CUSTOM DESIGNED VIEWS

SUBTITLE

- Valid types to be inspectable
- They do not have to be visible

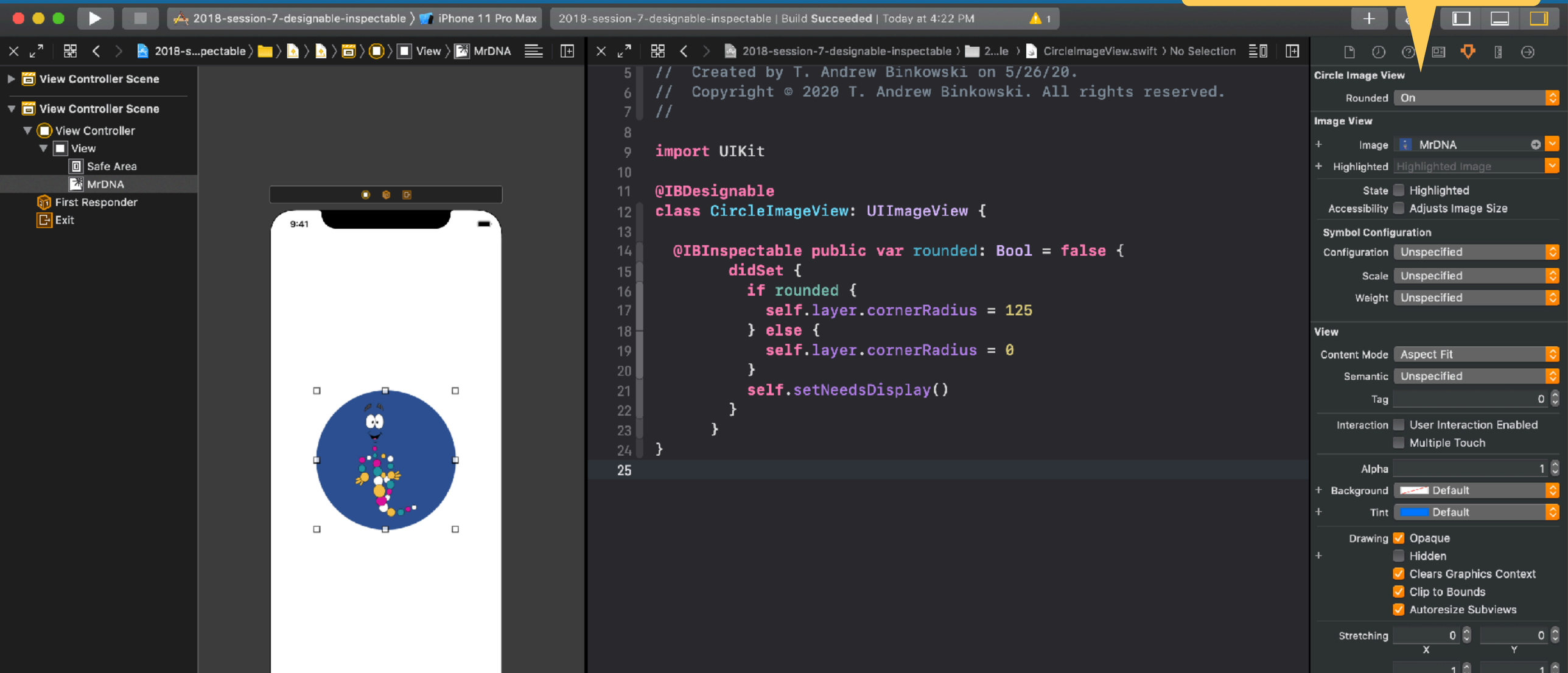
- `Int`
- `CGFloat`
- `Double`
- `String`
- `Bool`
- `CGPoint`
- `CGSize`
- `CGRect`
- `UIColor`
- `UIImage`

CUSTOM DESIGNED VIEWS

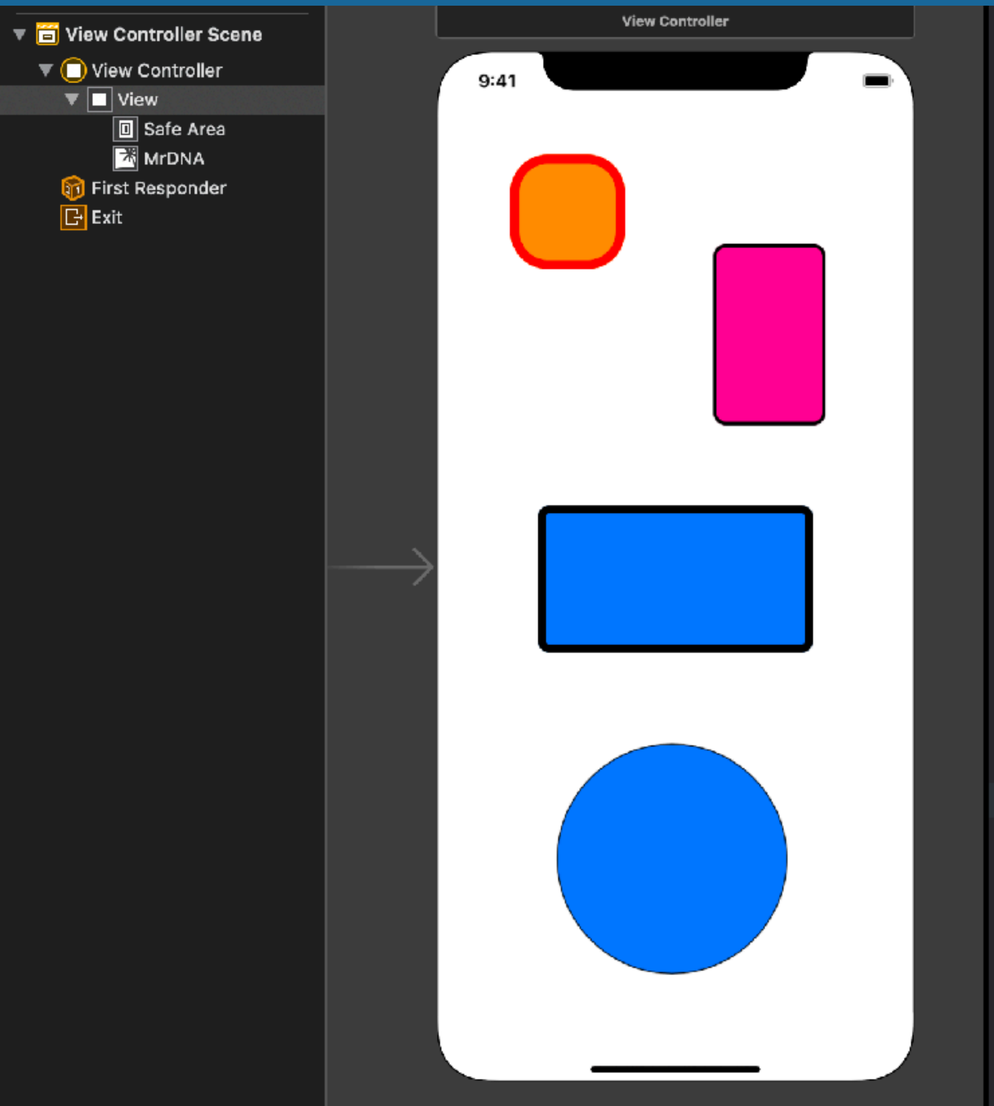


CUSTOM DESIGNED VIEWS

Inspectable as **Bool**



CUSTOM DESIGNED VIEWS

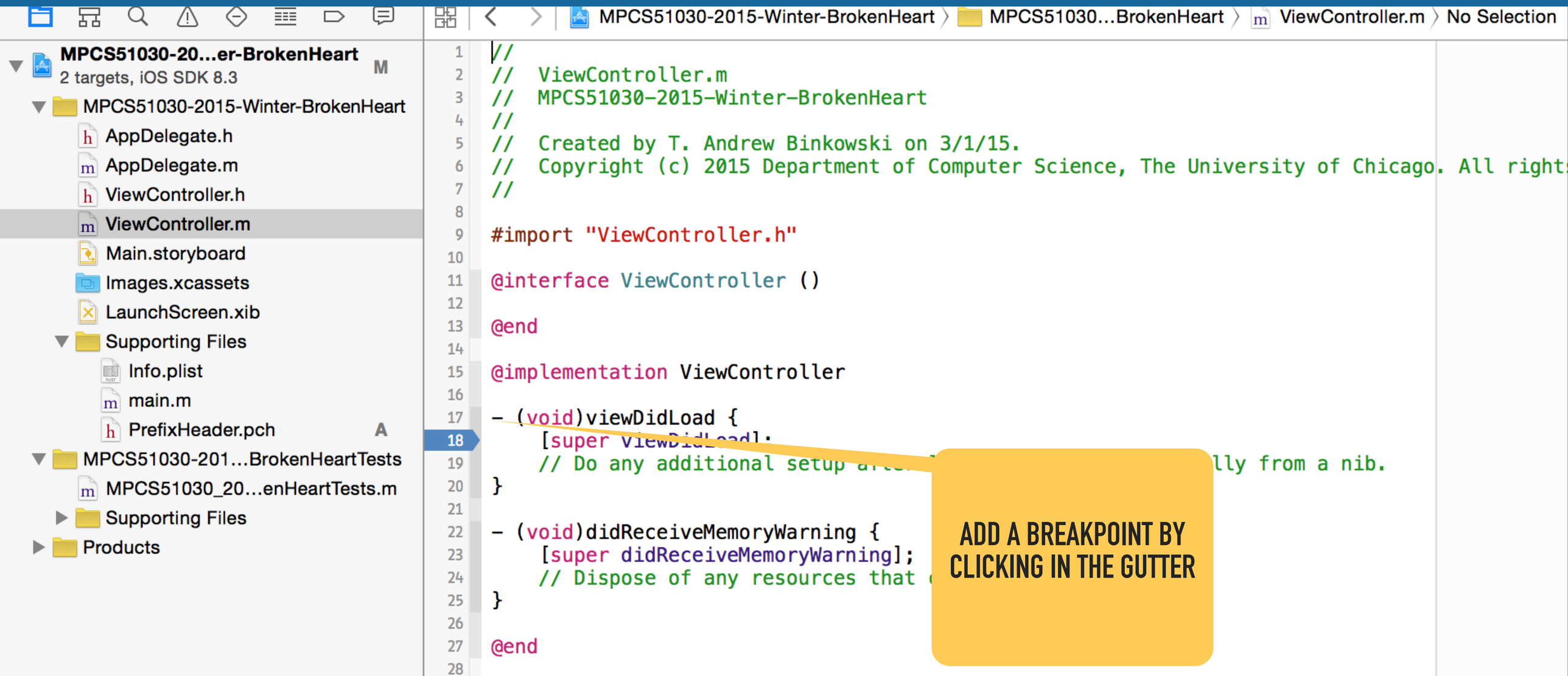



```
@IBDesignable class ShapeView: UIView {
    @IBInspectable var strokeColor: UIColor = UIColor.black
    @IBInspectable var fillColor: UIColor = UIColor.clear
    var path: UIBezierPath?

    override class var layerClass: AnyClass {
        return CAShapeLayer.self
    }

    override func layoutSubviews() {
        guard let layer = layer as? CAShapeLayer else { return }
        layer.path = path?.cgPath
        layer.strokeColor = strokeColor.cgColor
        layer.fillColor = fillColor.cgColor
    }

  override func prepareForInterfaceBuilder() {
      let drawRect = CGRect(x: 0, y: 0, width: 200, height: 200)
      path = UIBezierPath(ovalIn: drawRect)
  }
}
```

Provide "preview" data

DEBUGGING 

DEBUGGING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2 targets, iOS SDK 8.3
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MPCS51030-2015-Winter-BrokenHeart
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Main.storyboard
Images.xcassets
LaunchScreen.xib
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main.m
PrefixHeader.pch
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Supporting Files
Products
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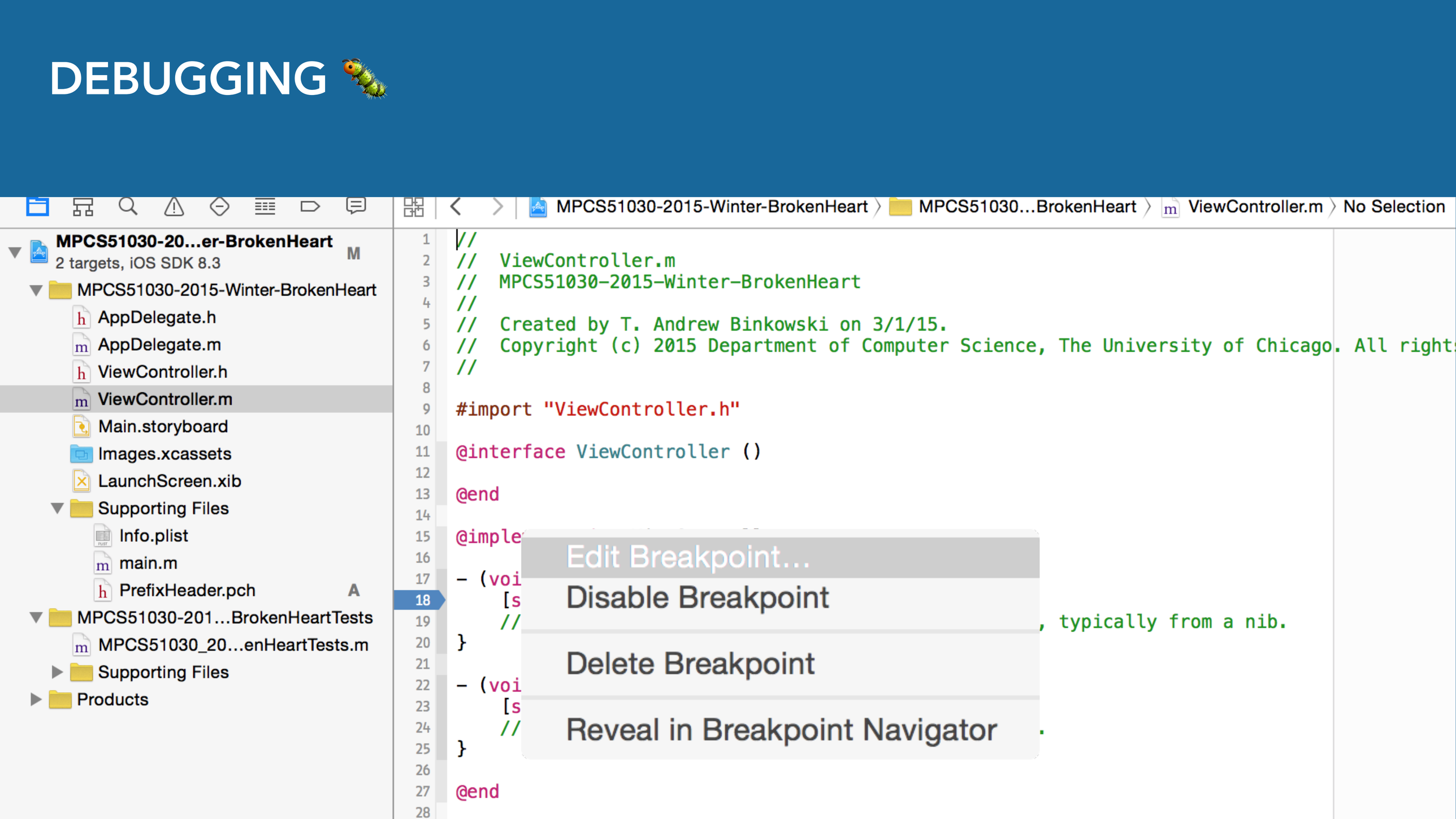
MPCS51030...BrokenHeart
ViewController.m
No Selection
1 //
2 // ViewController.m
3 // MPCS51030-2015-Winter-BrokenHeart
4 //
5 // Created by T. Andrew Binkowski on 3/1/15.
6 // Copyright (c) 2015 Department of Computer Science, The University of Chicago. All right
7 //
8
9 #import "ViewController.h"
10
11 @interface ViewController ()
12
13 @end
14
15 @implementation ViewController
16
17 - (void)viewDidLoad {
18   [super
19   // Do any additional setup
lly from a nib.
20 }
21
22 - (void)didReceiveMemoryWarning {
23   [super didReceiveMemoryWarning];
24   // Dispose of any resources that
25 }
26
27 @end
28
ADD A BREAKPOINT BY CLICKING IN THE GUTTER

DEBUGGING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19 //
20 }
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22 - (voi
23 [s
24 //
25 }
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27 @end
28
Edit Breakpoint...
Disable Breakpoint
Delete Breakpoint
Reveal in Breakpoint Navigator
, typically from a nib.
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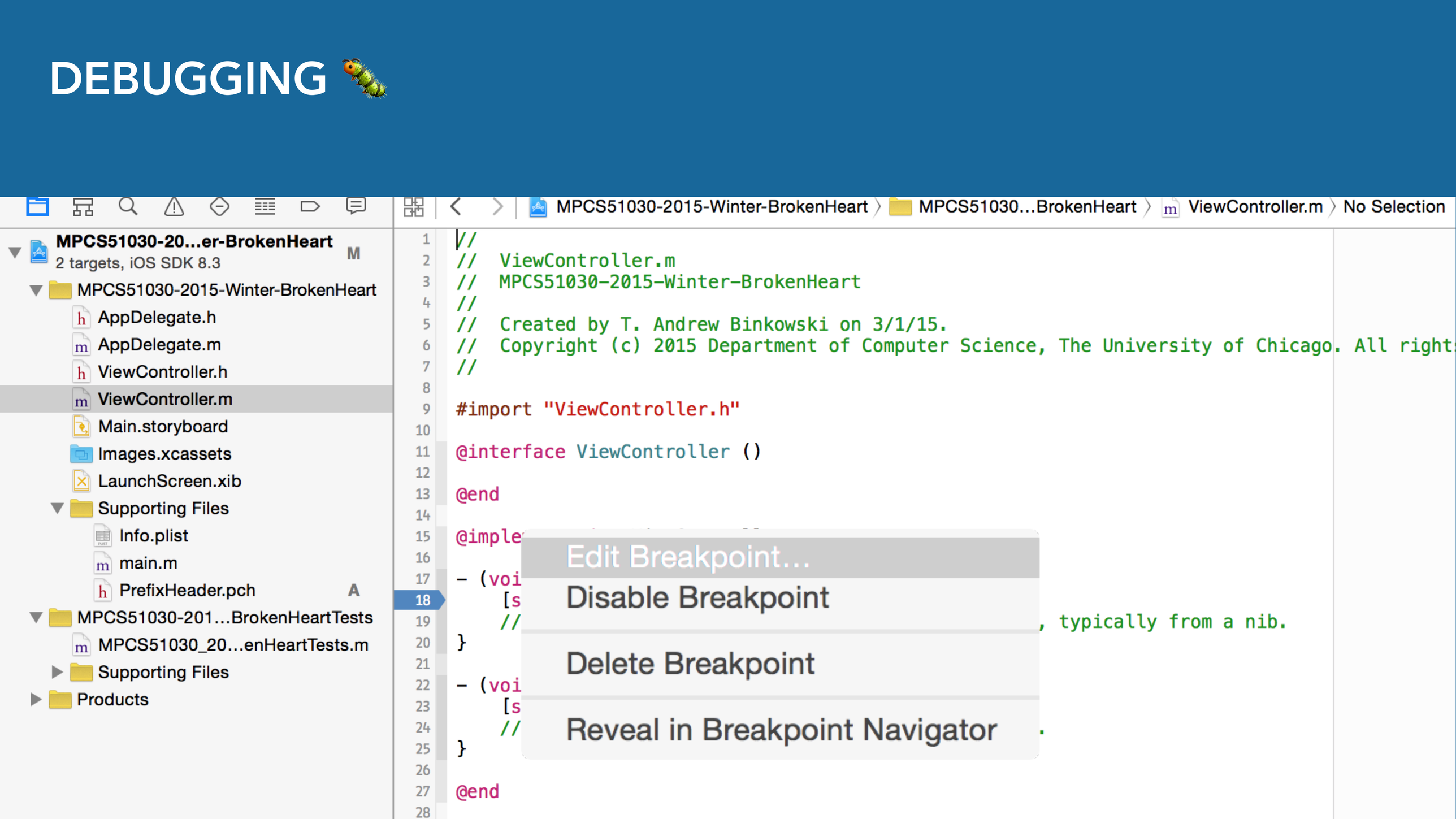
DEBUGGING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Delete Breakpoint
Reveal in Breakpoint Navigator
, typically from a nib.
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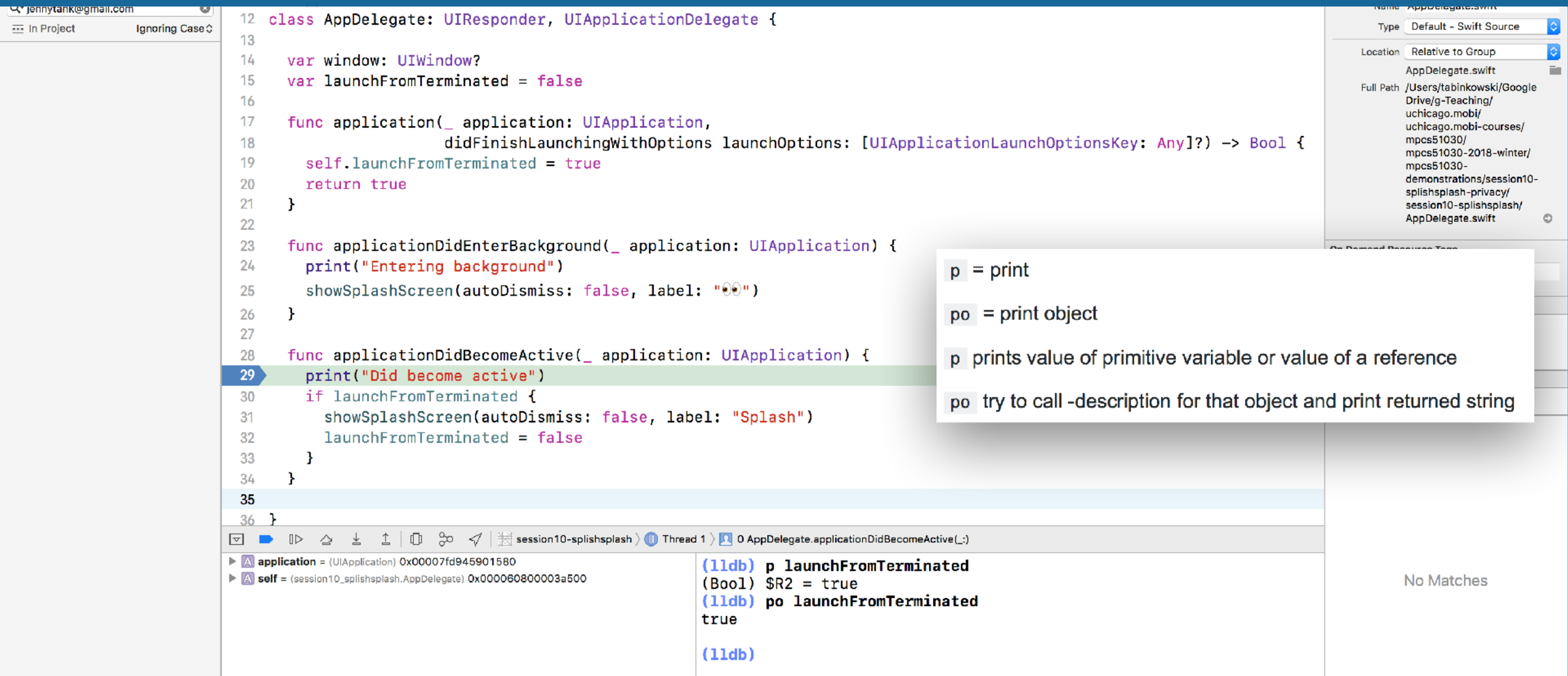
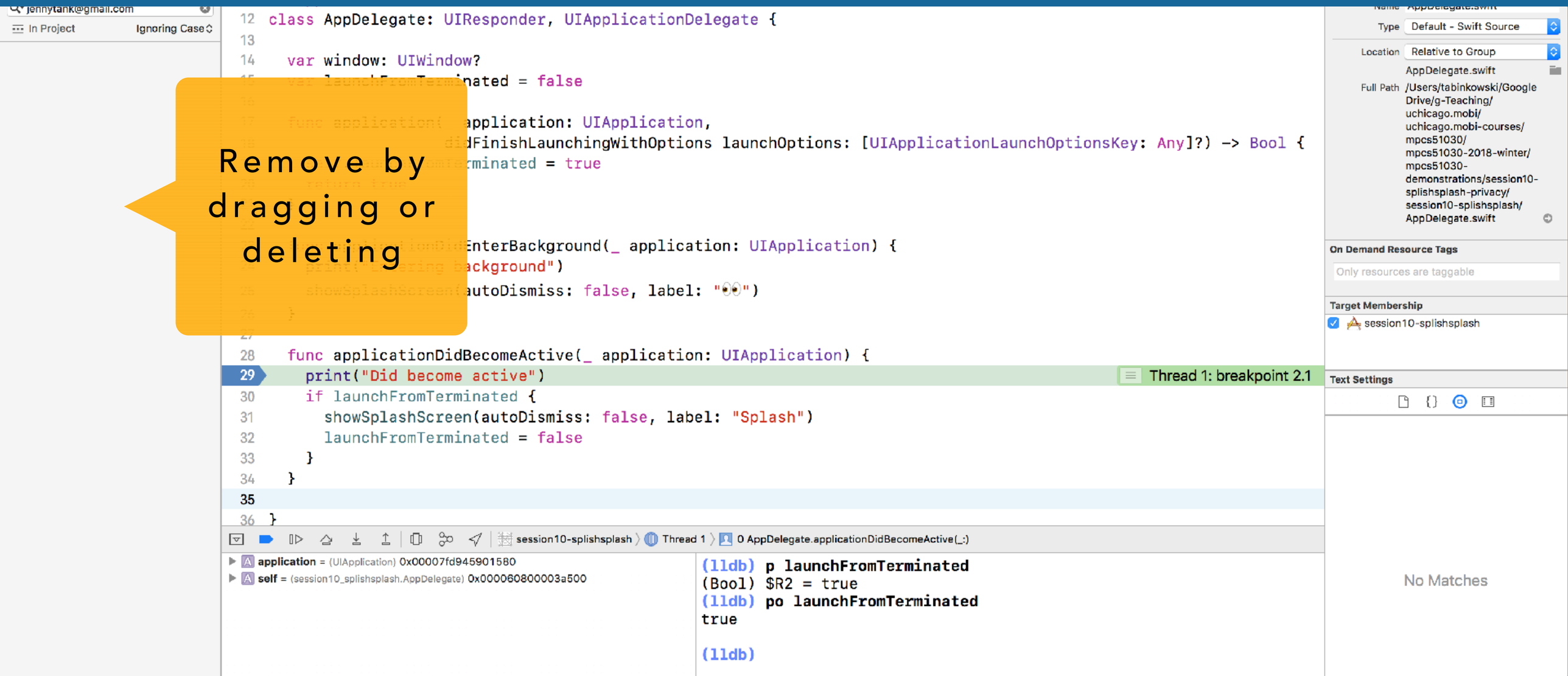
DEBUGGING 🐛

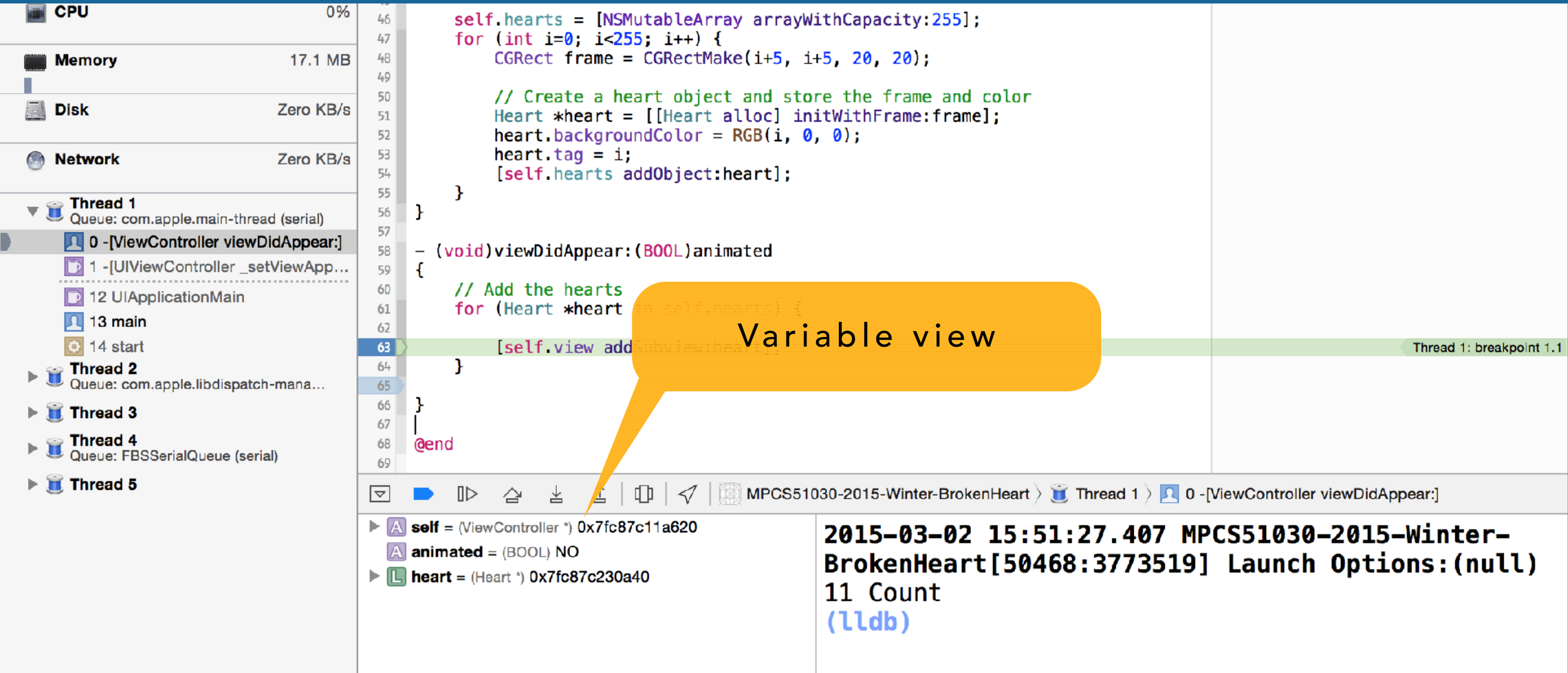

jennytank@gmail.com
In Project
Ignoring Case
12 class AppDelegate: UIResponder, UIApplicationDelegate {
13
14 var window: UIWindow?
15 var launchFromTerminated = false
16
17 func application(_ application: UIApplication,
18 didFinishLaunchingWithOptions launchOptions: [UIApplicationLaunchOptionsKey: Any]?) -> Bool {
19 self.launchFromTerminated = true
20 return true
21 }
22
23 func applicationDidEnterBackground(_ application: UIApplication) {
24 print("Entering background")
25 showSplashScreen(autoDismiss: false, label: "👀")
26 }
27
28 func applicationDidBecomeActive(_ application: UIApplication) {
29 print("Did become active")
30 if launchFromTerminated {
31 showSplashScreen(autoDismiss: false, label: "Splash")
32 launchFromTerminated = false
33 }
34 }
35
36 }
p = print
po = print object
p prints value of primitive variable or value of a reference
po try to call -description for that object and print returned string
Type Default - Swift Source
Location Relative to Group
AppDelegate.swift
Full Path /Users/tabinkowski/Google Drive/g-Teaching/ uchicago.mobi/ uchicago.mobi-courses/ mpcs51030/ mpcs51030-2018-winter/ mpcs51030-demonstrations/session10-splishsplash-privacy/ session10-splishsplash/ AppDelegate.swift
session10-splishsplash 〉 Thread 1 〉 0 AppDelegate.applicationDidBecomeActive(_:)
application = (UIApplication) 0x00007fd945901580
self = (session10_splishsplash.AppDelegate) 0x000060800003a500
(lldb) p launchFromTerminated
(Bool) $R2 = true
(lldb) po launchFromTerminated
true
(lldb)
No Matches

DEBUGGING 🐛

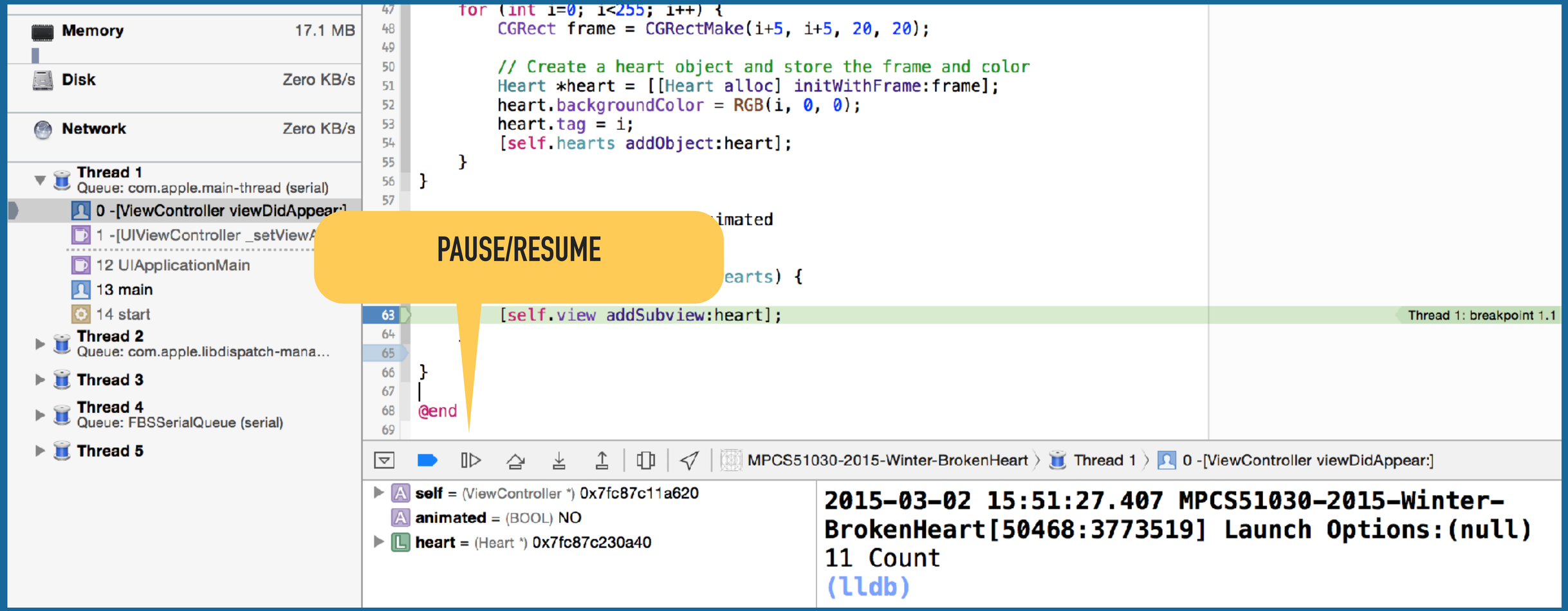

Remove by dragging or deleting
12 class AppDelegate: UIResponder, UIApplicationDelegate {
14 var window: UIWindow?
28 func applicationDidBecomeActive(_ application: UIApplication) {
29 print("Did become active")
30 if launchFromTerminated {
31 showSplashScreen(autoDismiss: false, label: "Splash")
32 launchFromTerminated = false
33 }
34 }
35
36 }
Thread 1: breakpoint 2.1
session10-splishsplash 〉 Thread 1 〉 0 AppDelegate.applicationDidBecomeActive(_:)
application = (UIApplication) 0x00007fd945901580
self = (session10_splishsplash.AppDelegate) 0x000060800003a500
(lldb) p launchFromTerminated
(Bool) $R2 = true
(lldb) po launchFromTerminated
true
(lldb)
Type Default - Swift Source
Location Relative to Group
AppDelegate.swift
Full Path /Users/tabinkowski/Google Drive/g-Teaching/uchicago.mobi/uchicago.mobi-courses/mpcs51030/mpcs51030-2018-winter/mpcs51030-demonstrations/session10-splishsplash-privacy/session10-splishsplash/AppDelegate.swift
On Demand Resource Tags
Only resources are taggable
Target Membership
session10-splishsplash
Text Settings
No Matches

VARIABLES AND CONSOLE

VARIABLES VIEW

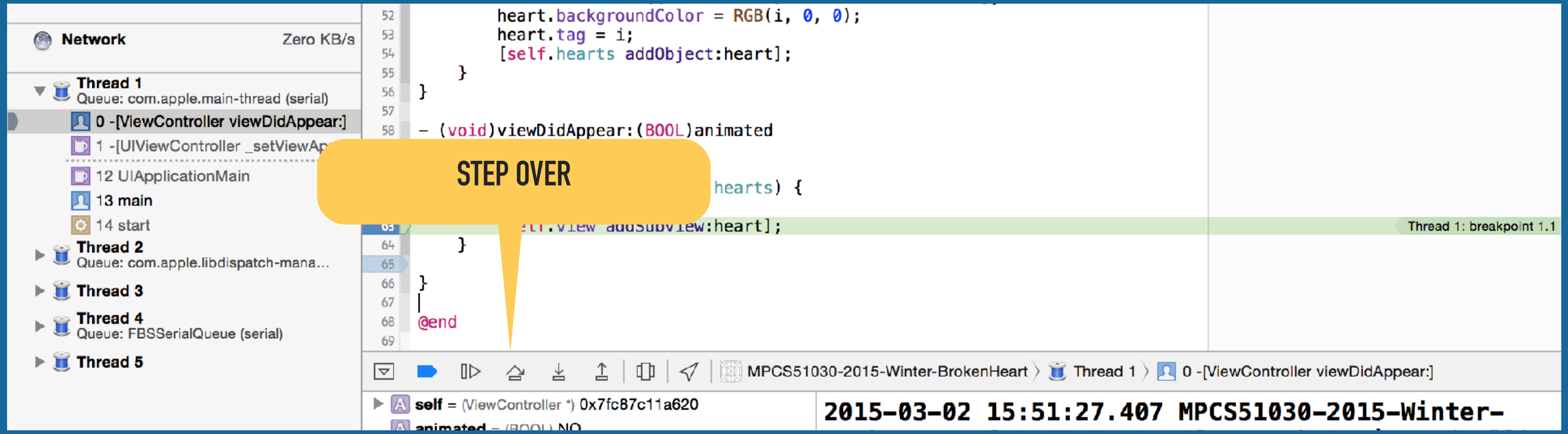


VARIABLES VIEW



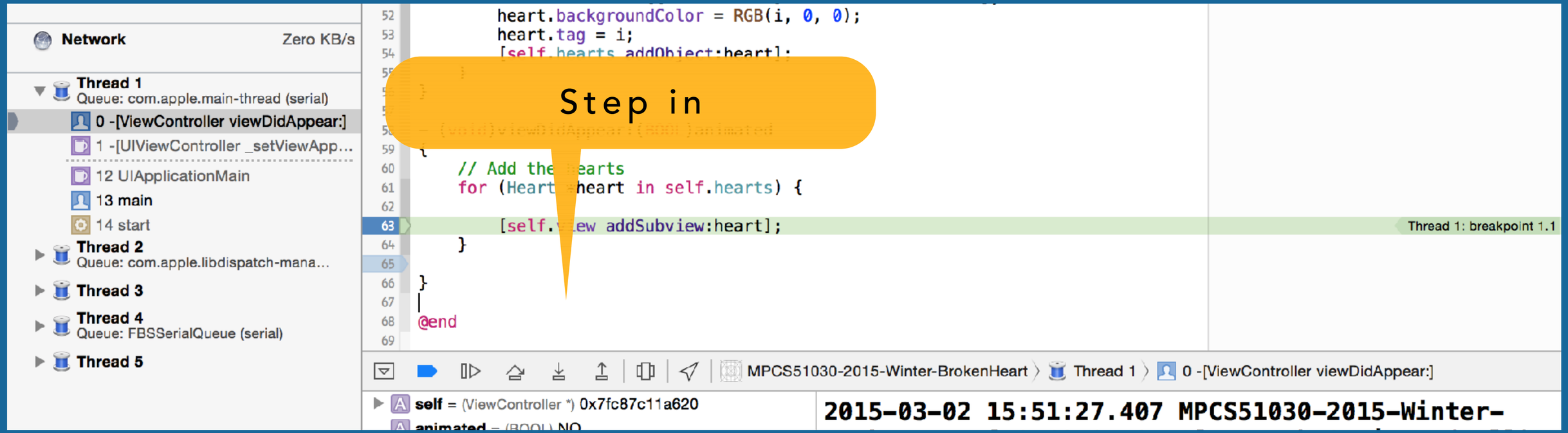
- Pause or resume execution of code

VARIABLES VIEW



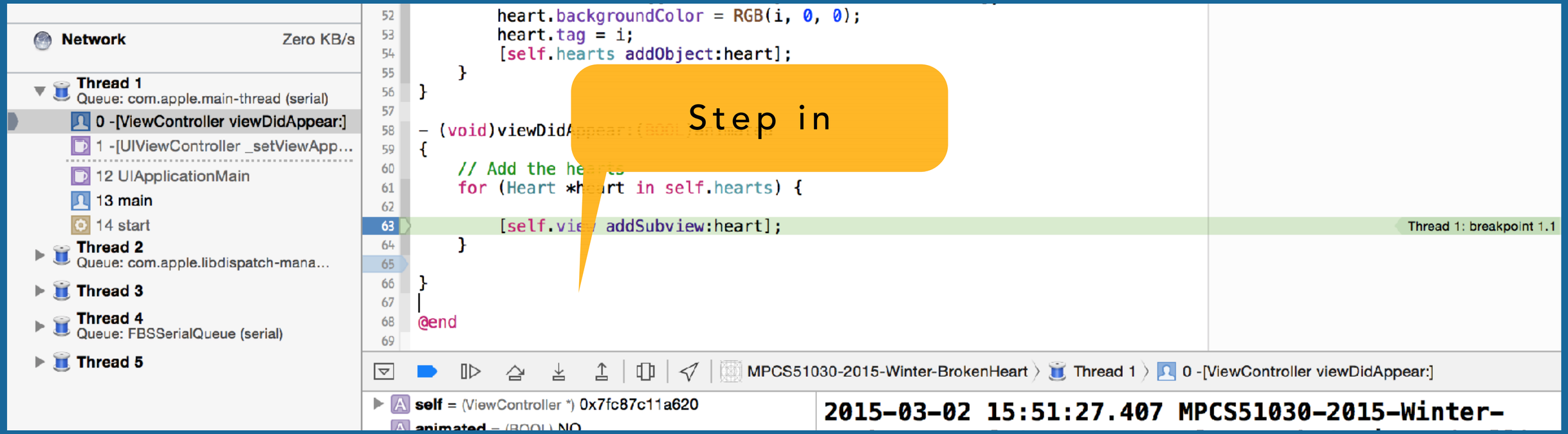
- Step over
  - Execute the current line of code
  - If the statement is a function call, the function will be executed
  - Debugger will stop at the statement after the function call

VARIABLES VIEW



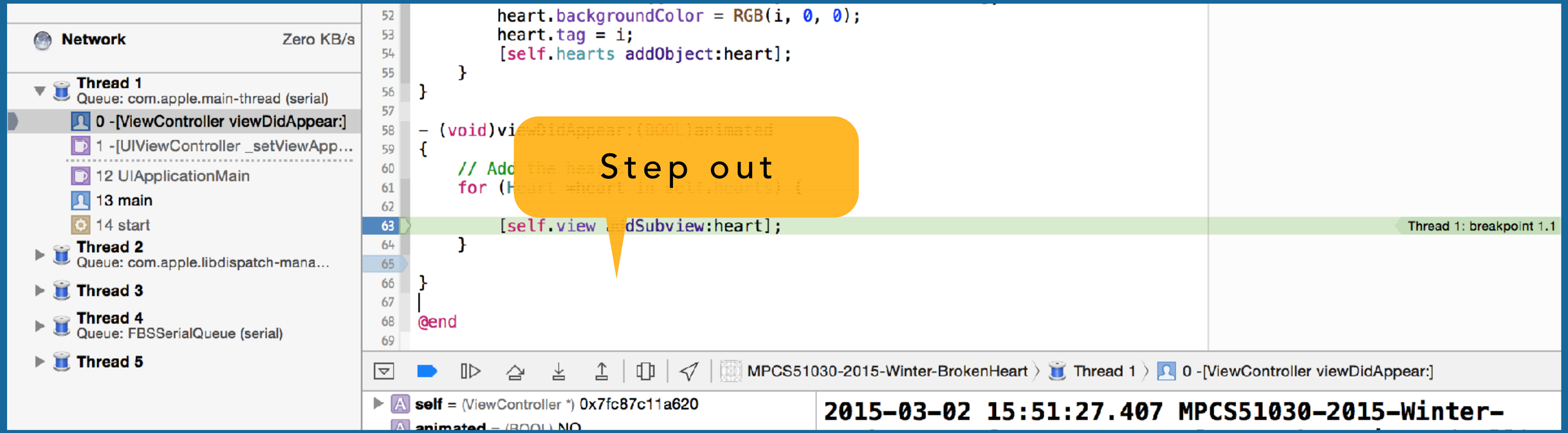
- Step in
  - Execute the current line of code
  - If it is a routine jump to its first line
  - The debugger will stop at the first statement inside the function

VARIABLES VIEW



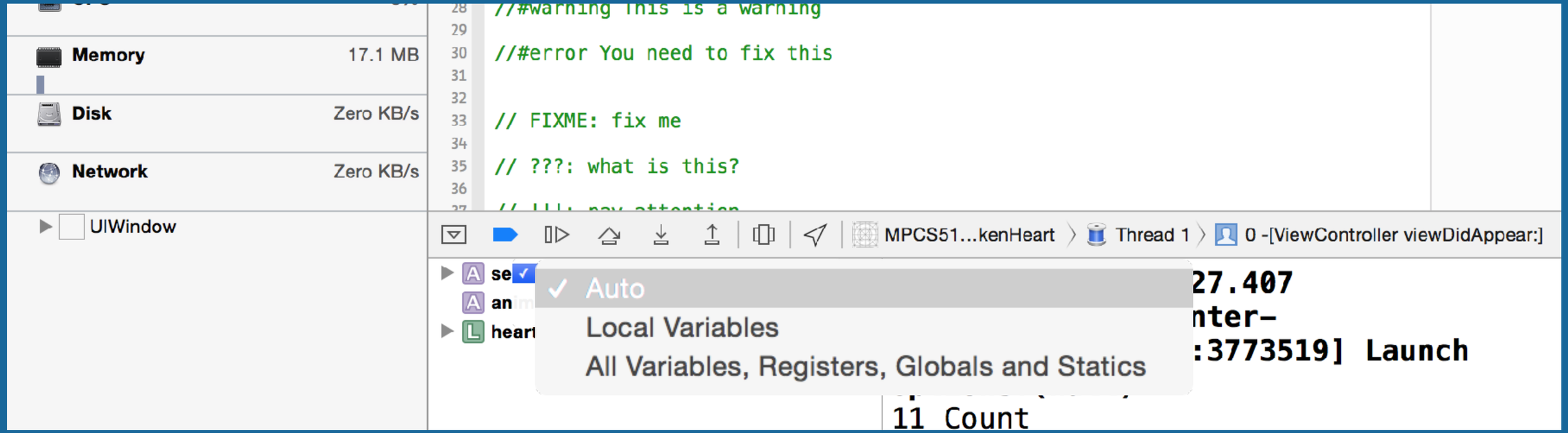
- Step into and Step over are indistinguishable if the present statement is not a function call

VARIABLES VIEW



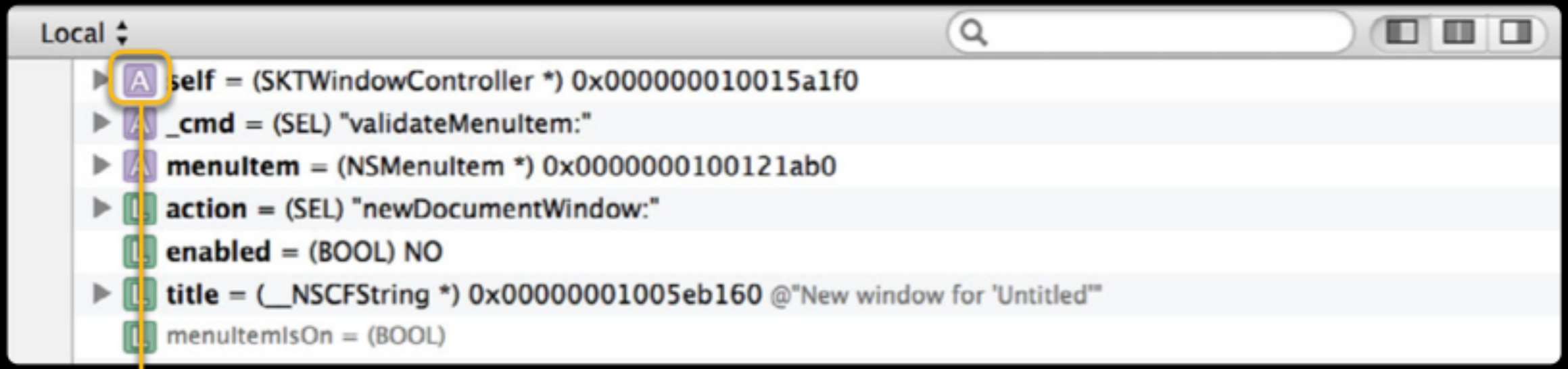
- "Step out" of a jumped-to routine
  - Complete the current routine
  - Step to the next routine or back to the calling routine
  - Debugger will stop at the statement after the function call.

VARIABLES VIEW



- Viewing Mode
  - Auto - variables around the line of code you're paused at
  - Local - all variables in local scope
  - All - all variables including globals and registers

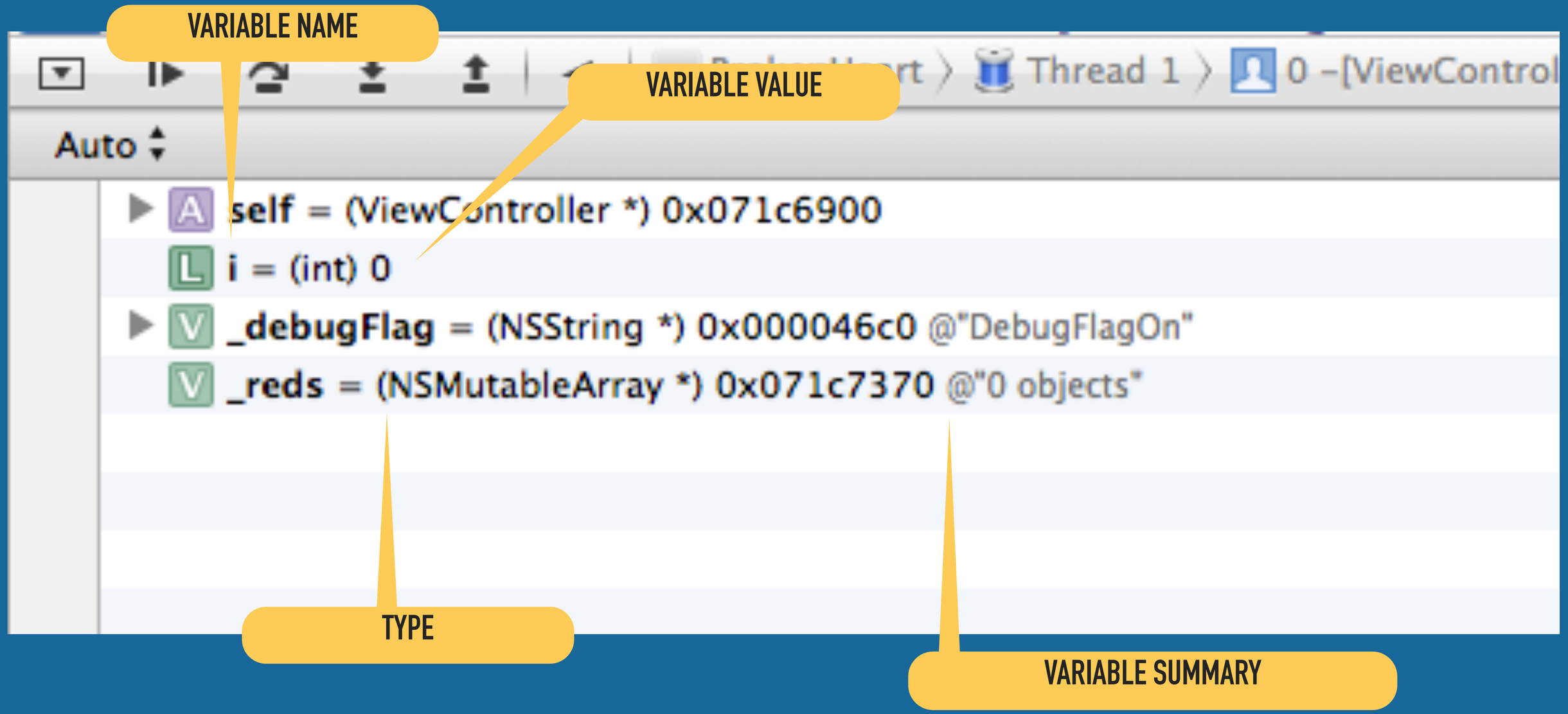
VARIABLES VIEW



Variable Kind

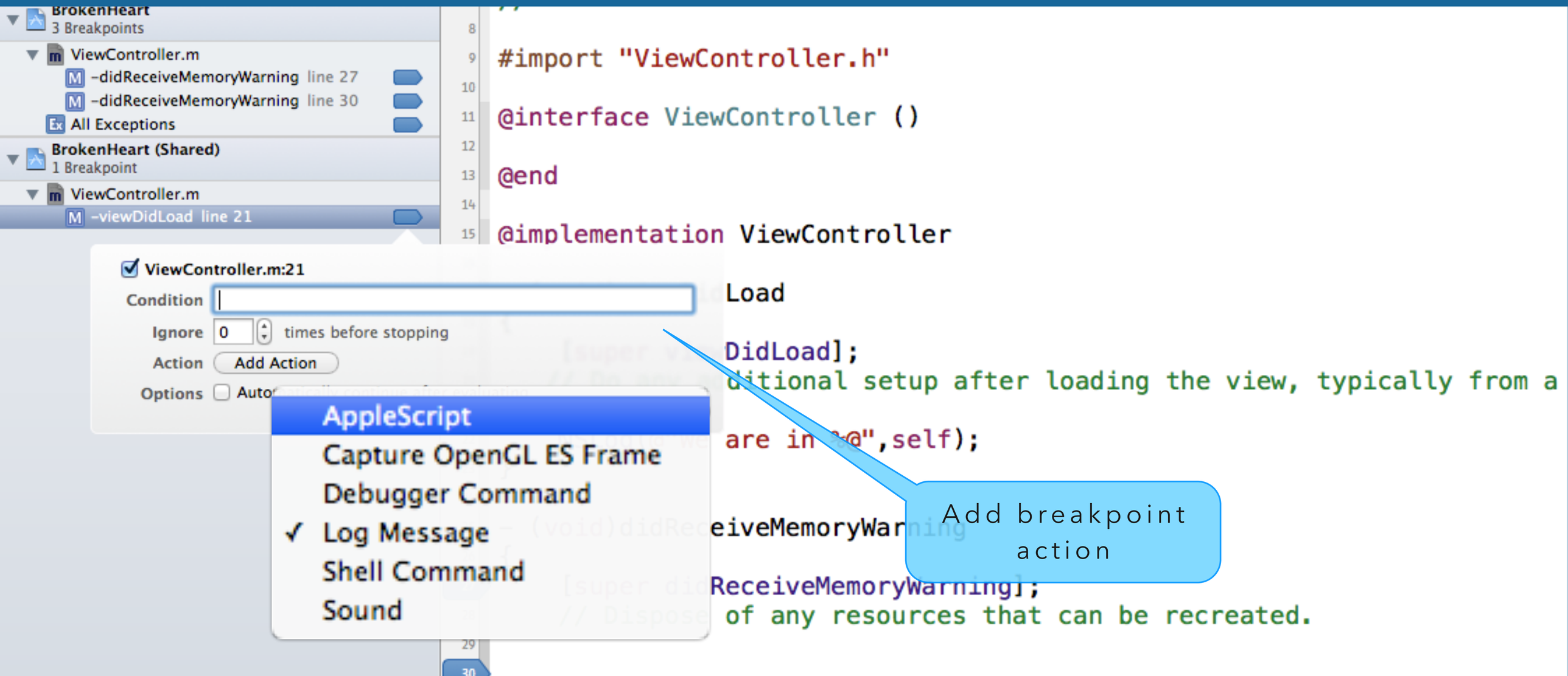
- L Local Variable
- A Argument
- S Static Variable
- V Global Variable
- R Register
- V Instance Variable
- E Expression

VARIABLES VIEW

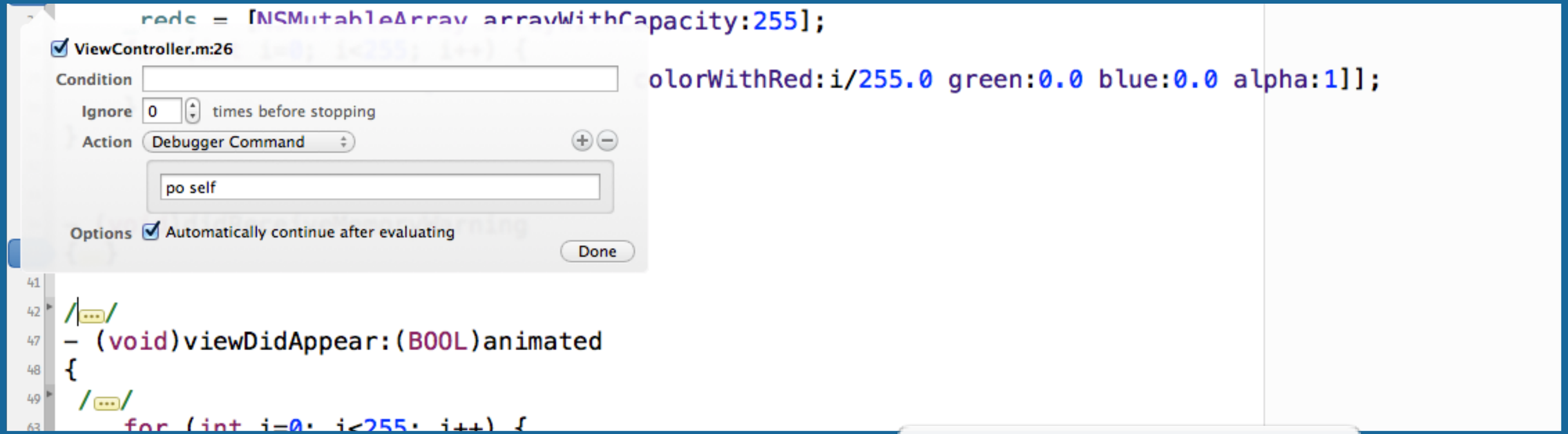


BREAKPOINTS ACTIONS

BREAKPOINT ACTIONS

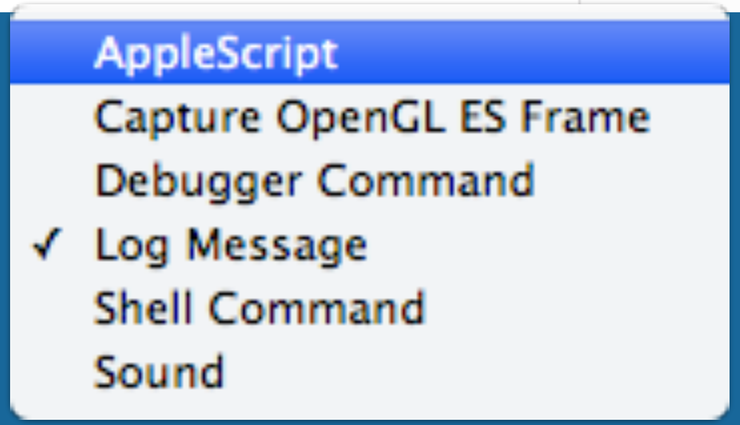


BREAKPOINT ACTIONS

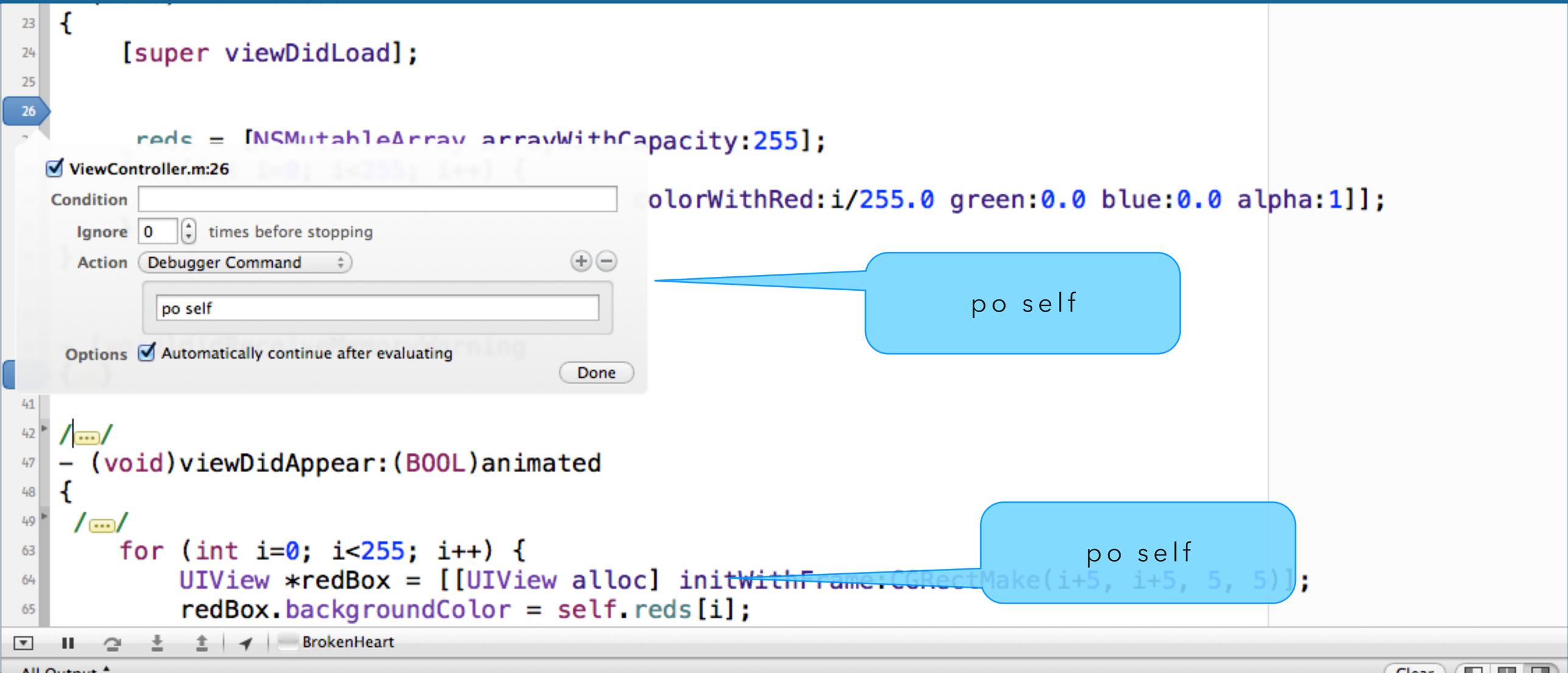


- Add multiple actions per breakpoint
- Print object description

```
- po self
```



BREAKPOINT ACTIONS DEBUGGER COMMANDS



BREAKPOINT ACTIONS

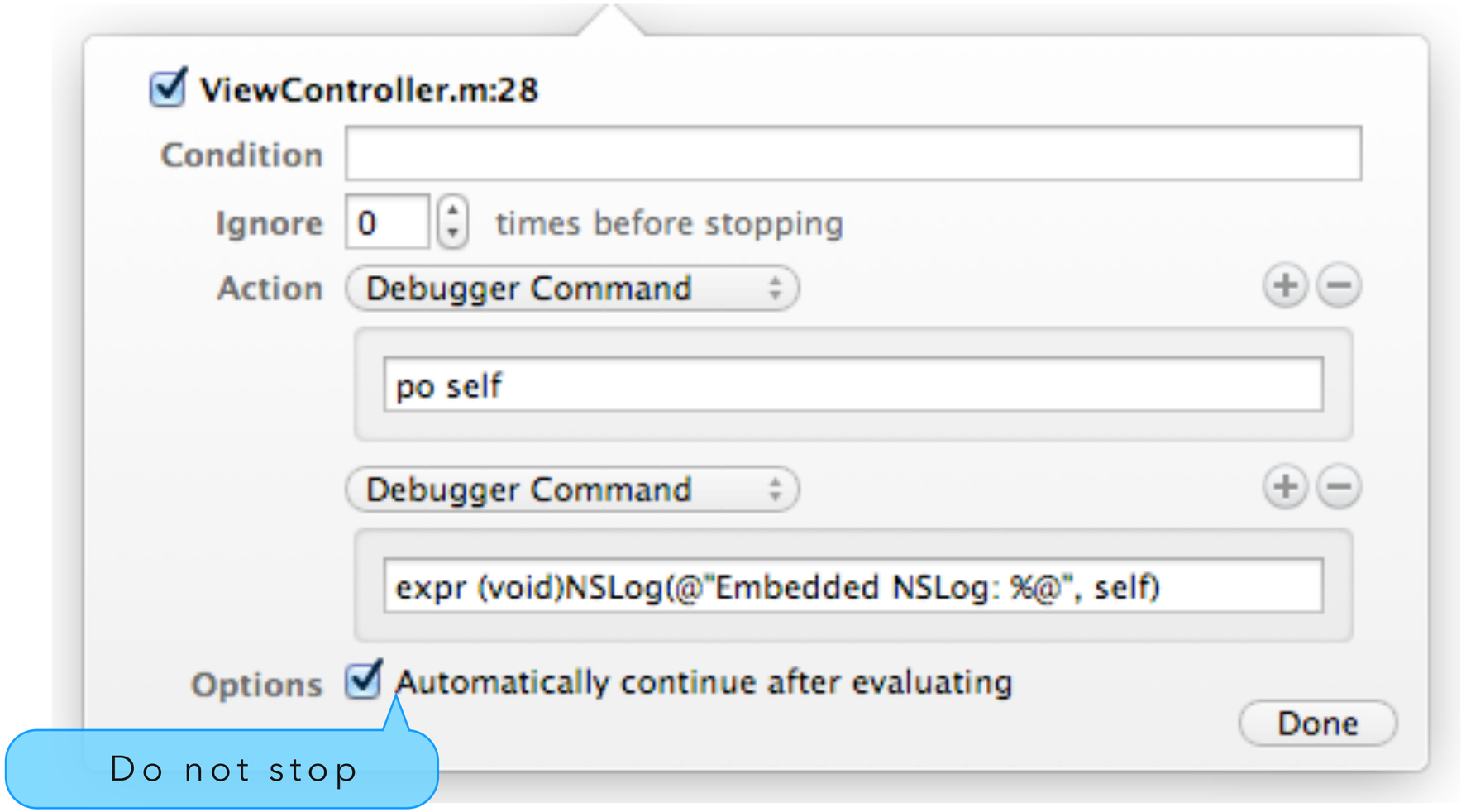
- Trying to avoid a littering of log statements

```
print("We are in \(self)")
```

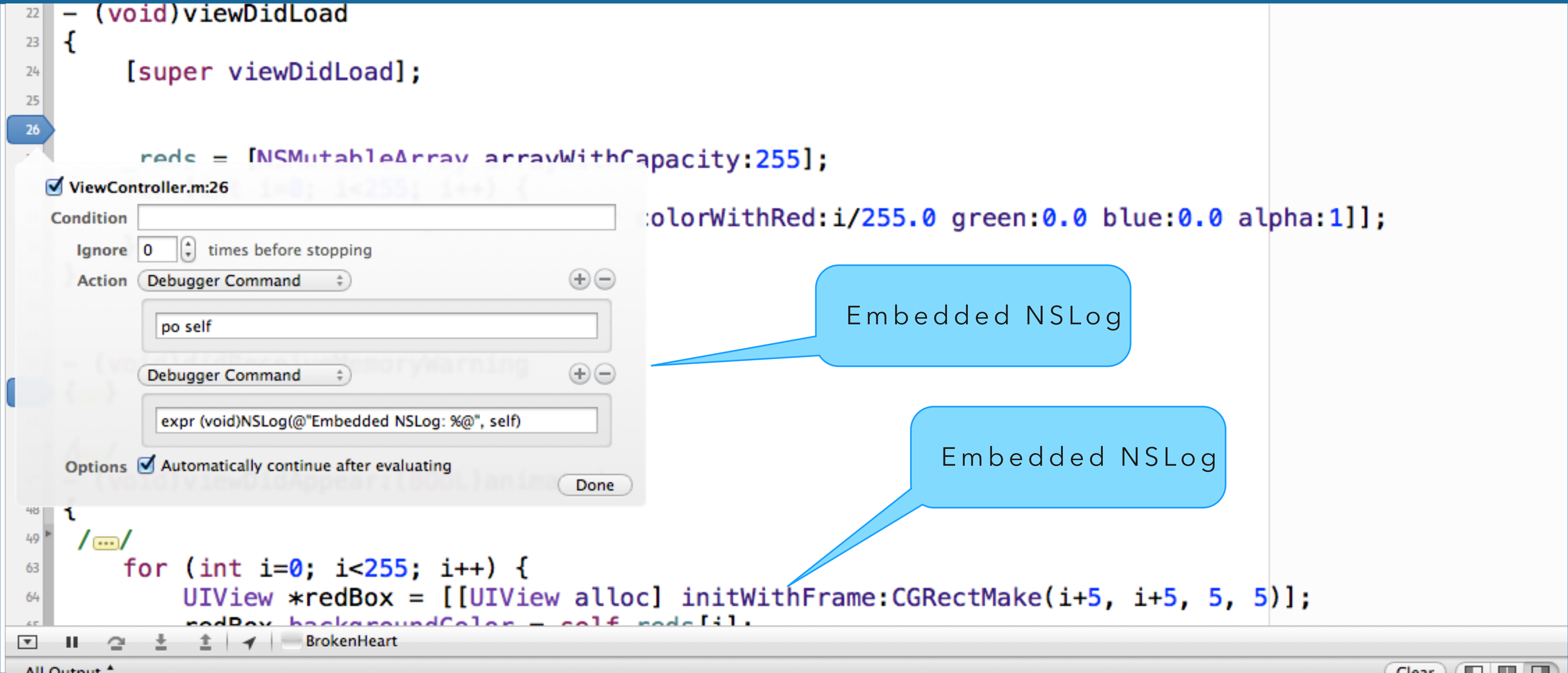
- Use breakpoints in Xcode to create embedded NSLogs

```
expr (void)NSLog(@"Embedded NSLog: %@", self)
```

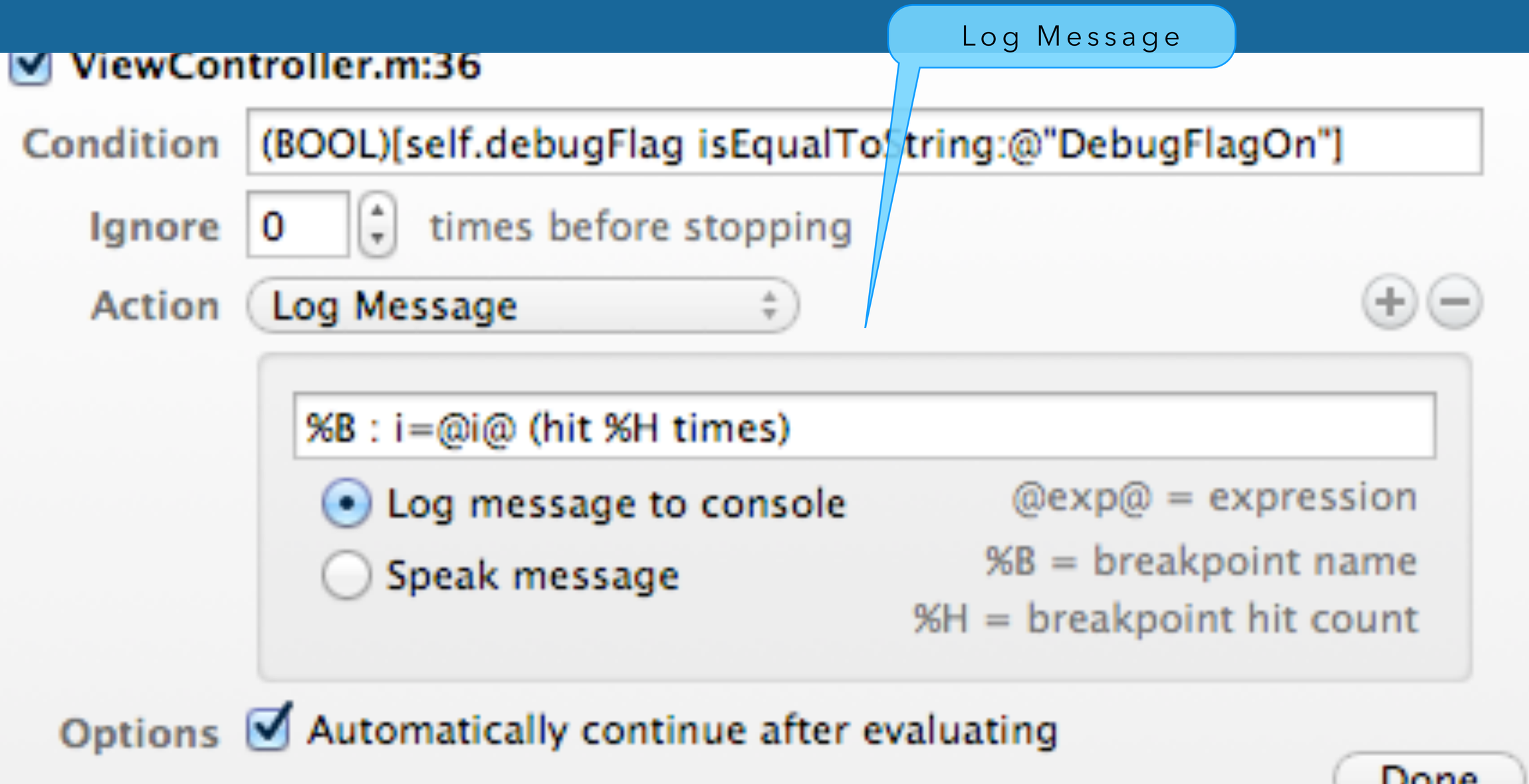
BREAKPOINT ACTIONS DEBUGGER COMMANDS



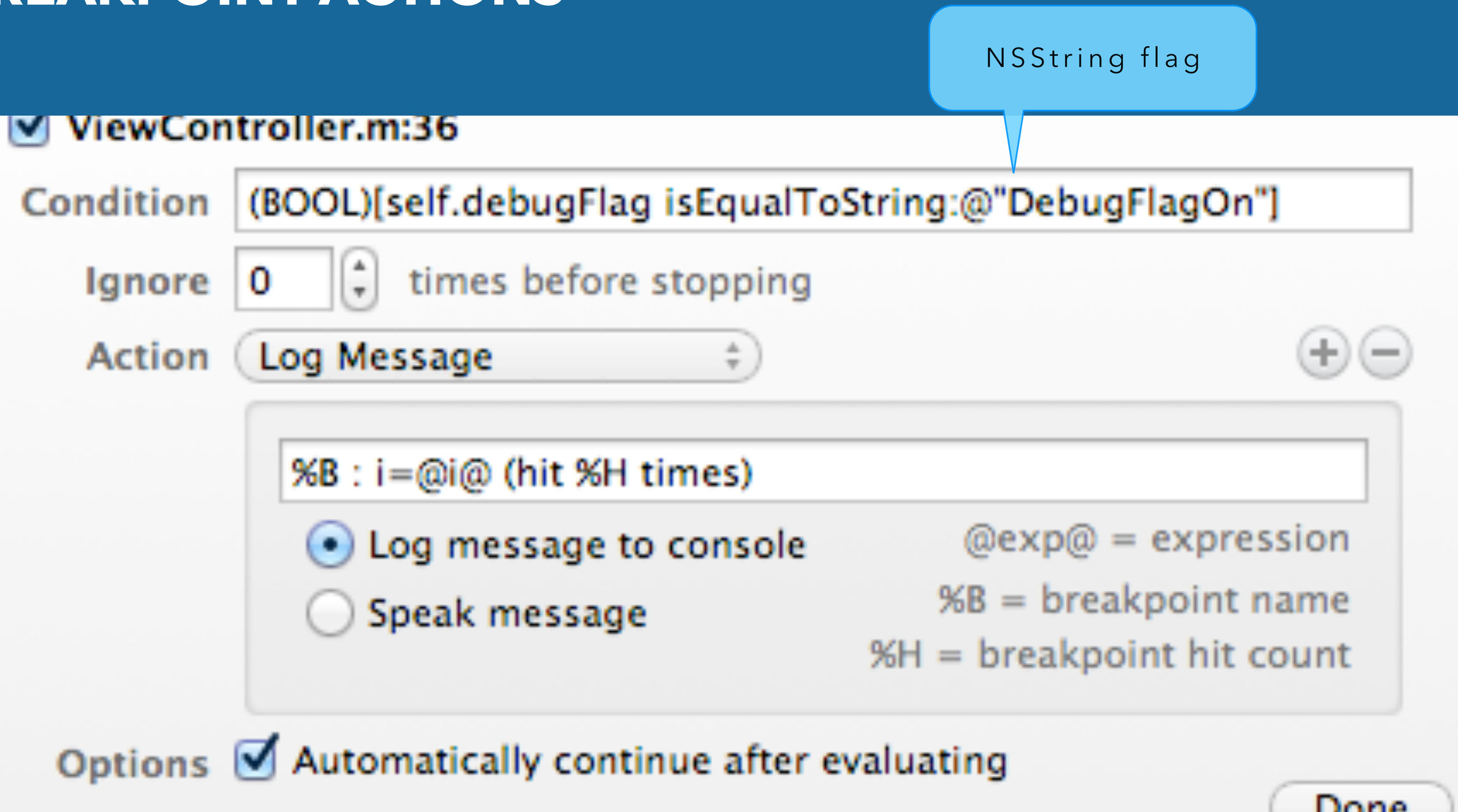
BREAKPOINT ACTIONS



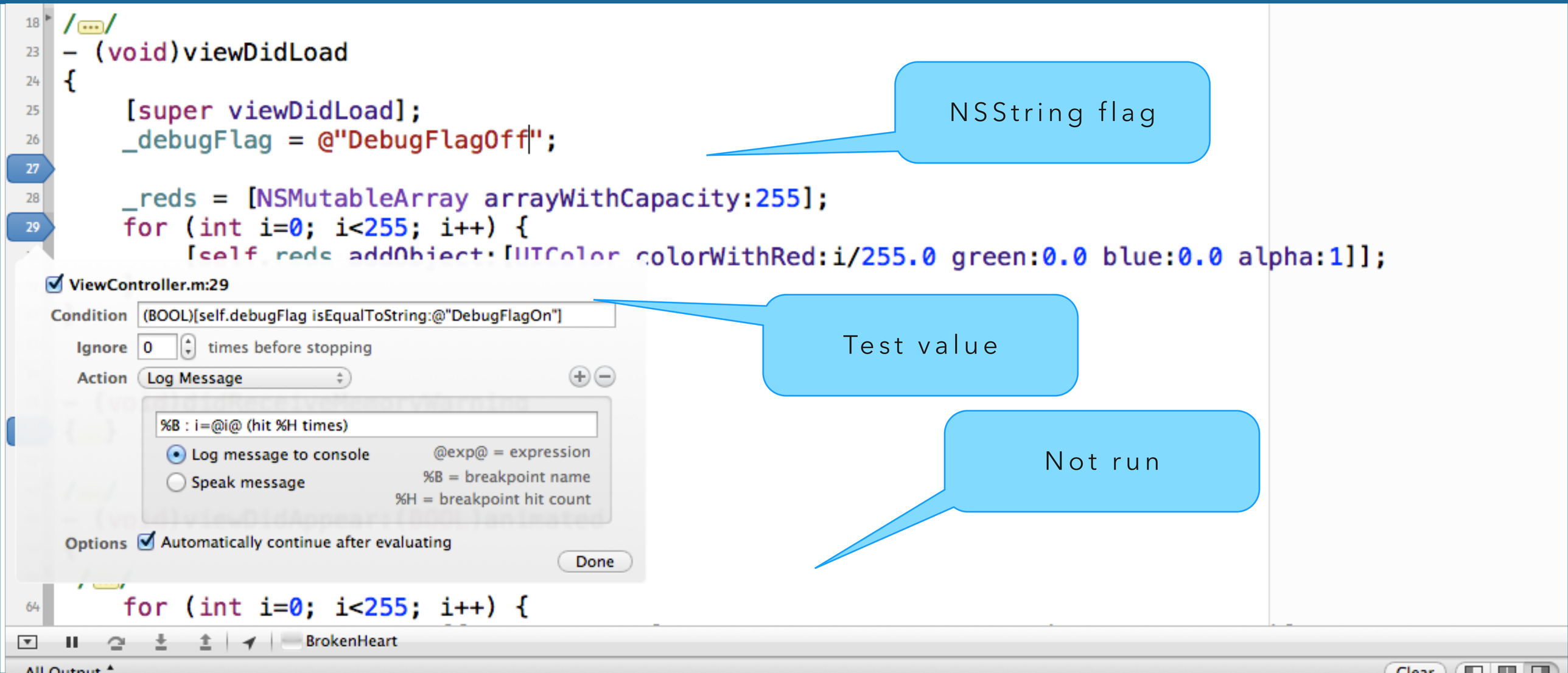
BREAKPOINT ACTIONS



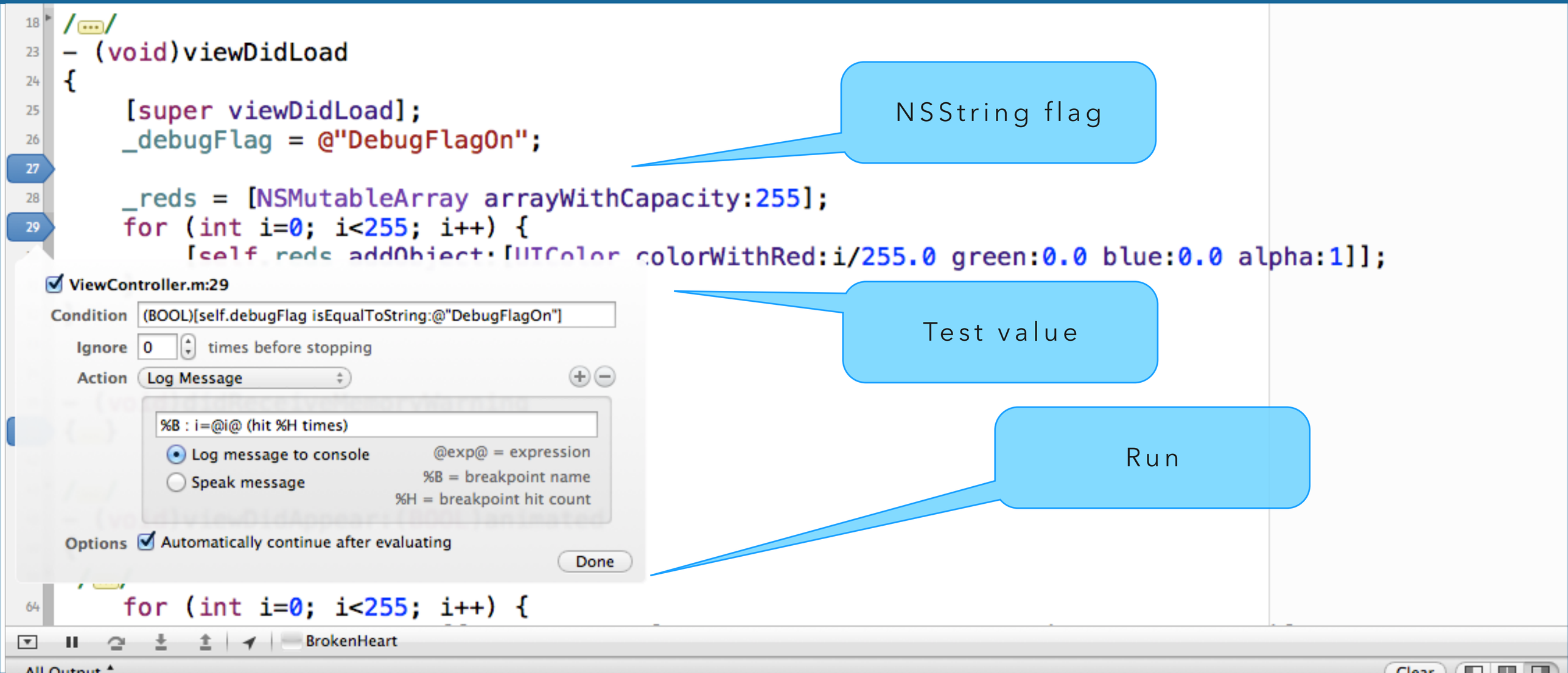
BREAKPOINT ACTIONS



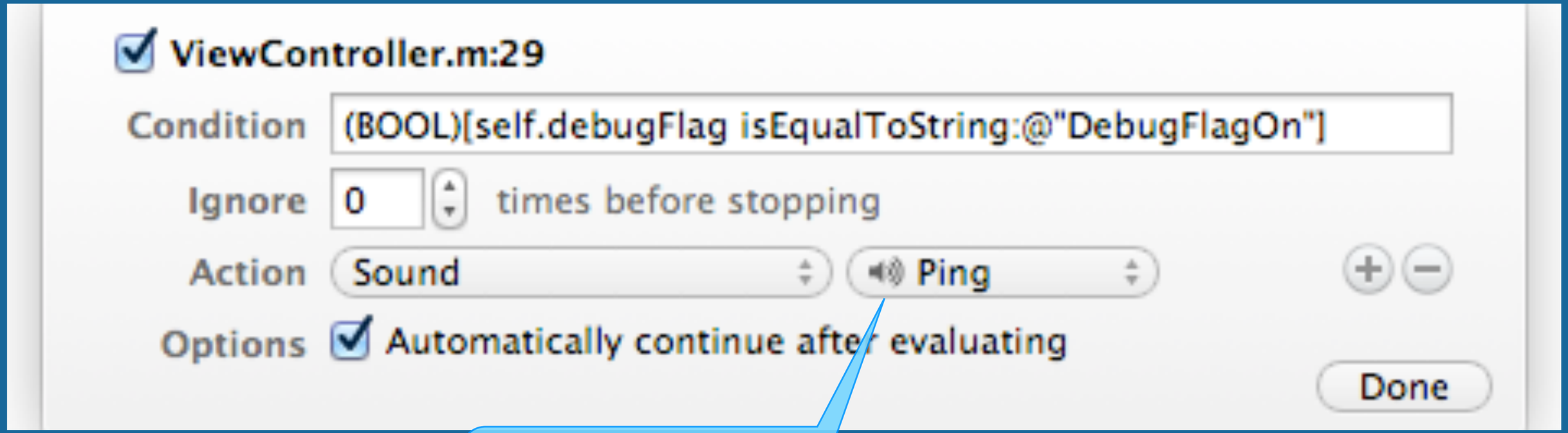
BREAKPOINT ACTIONS CONDITION



BREAKPOINT ACTIONS CONDITION

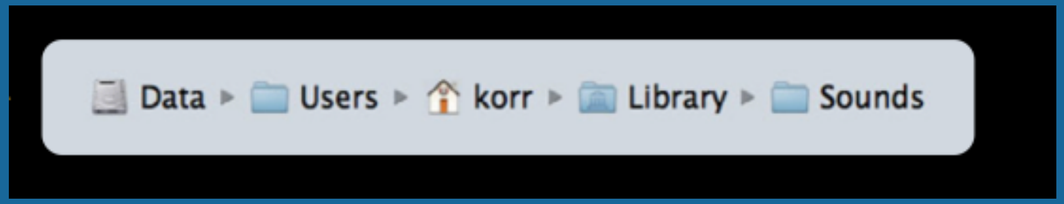


BREAKPOINT ACTIONS SOUNDS

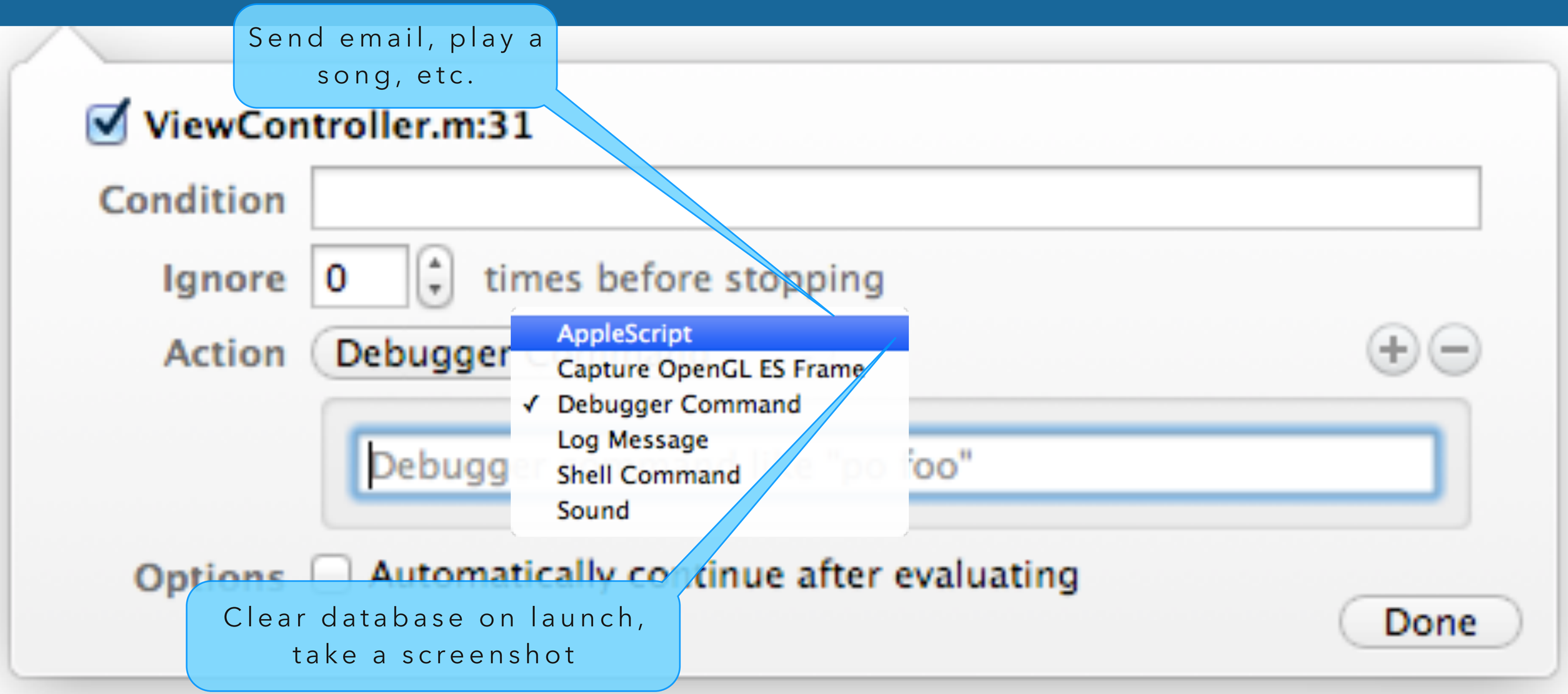


"Ping" in debug mode

- Sound library



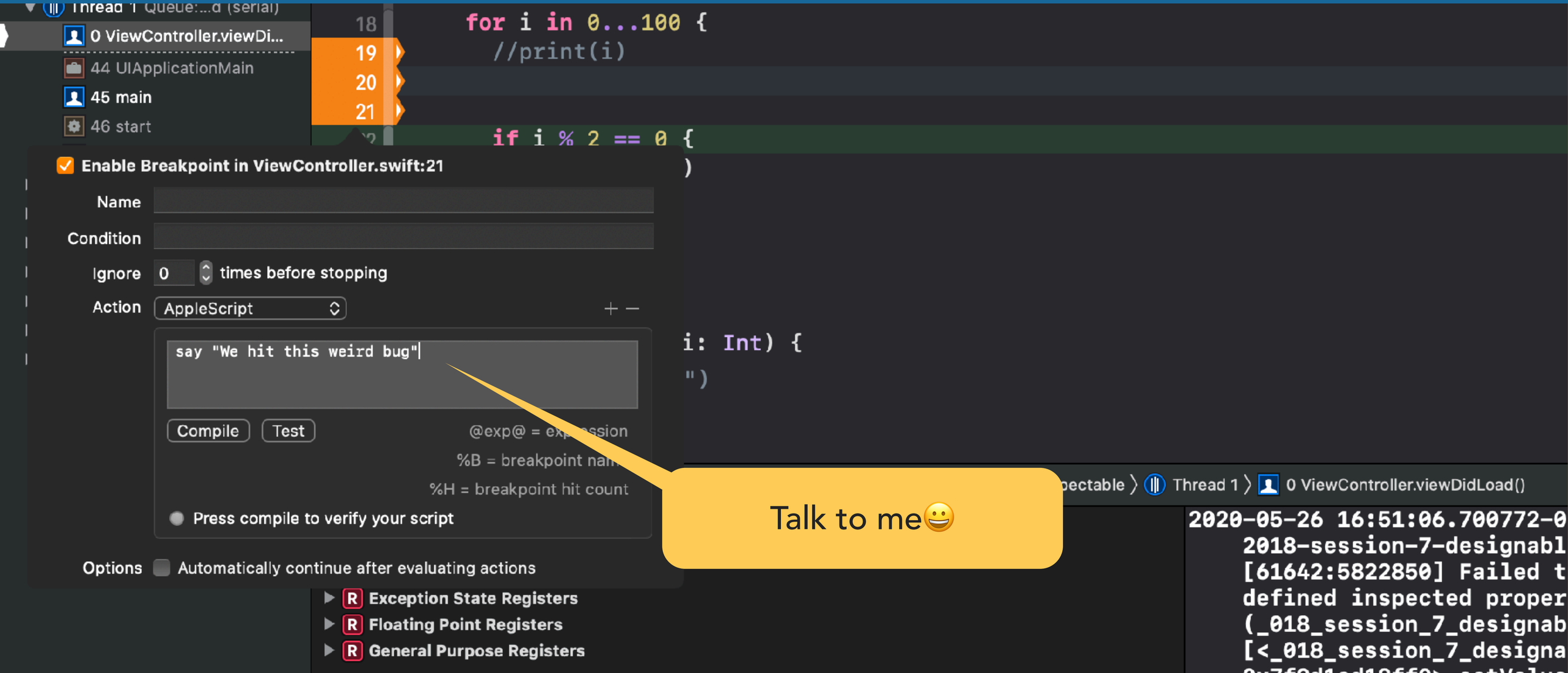
BREAKPOINT ACTIONS APPLE SCRIPT



BREAKPOINT ACTIONS APPLE SCRIPT

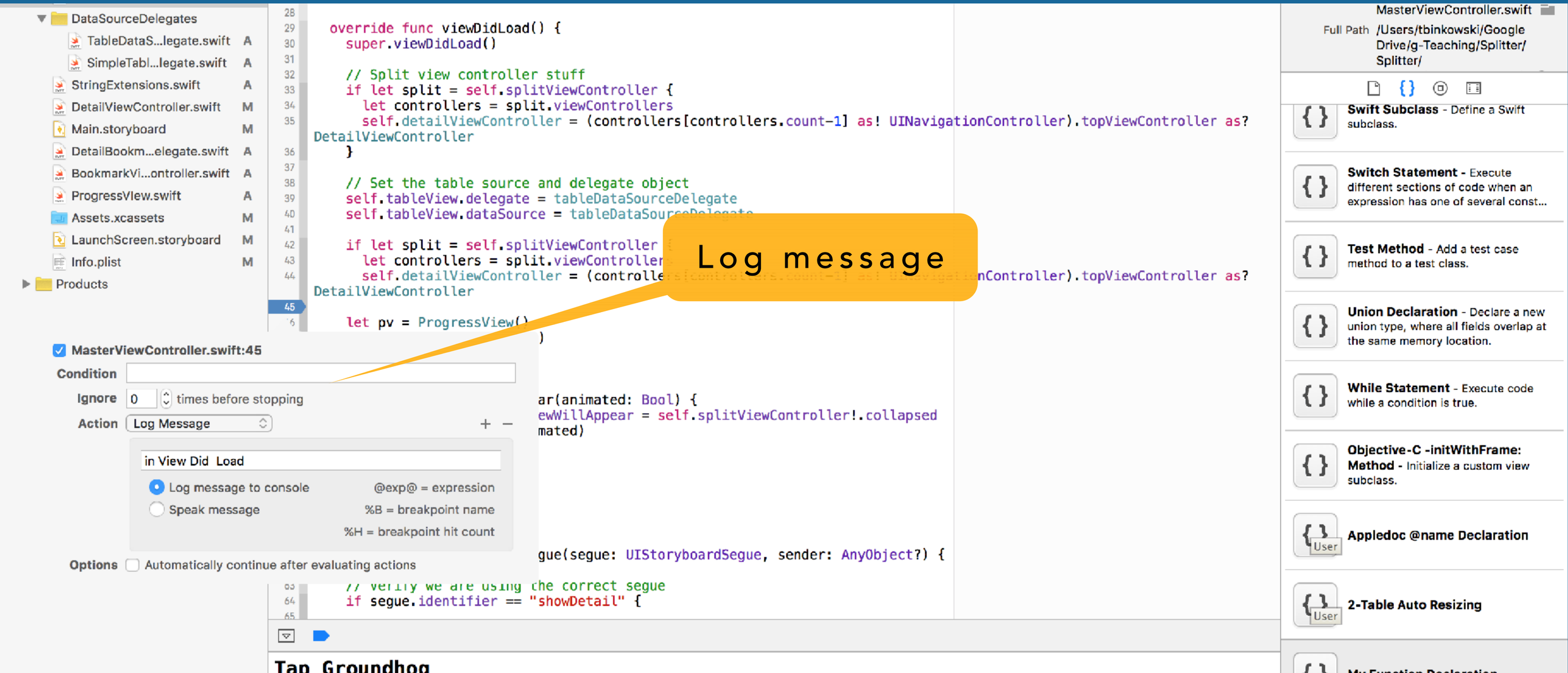
```
tell application "Mail"
  set myMessage to make new outgoing message with properties
      {visible:false, subject:"Test Failed", content:"The test failed"}
  tell myMessage
    make new to recipient at end of to recipients with properties
      {name:"Ken Orr", address:"orr@apple.com"}
    myMessage send
  end tell
end tell
```

BREAKPOINT ACTIONS

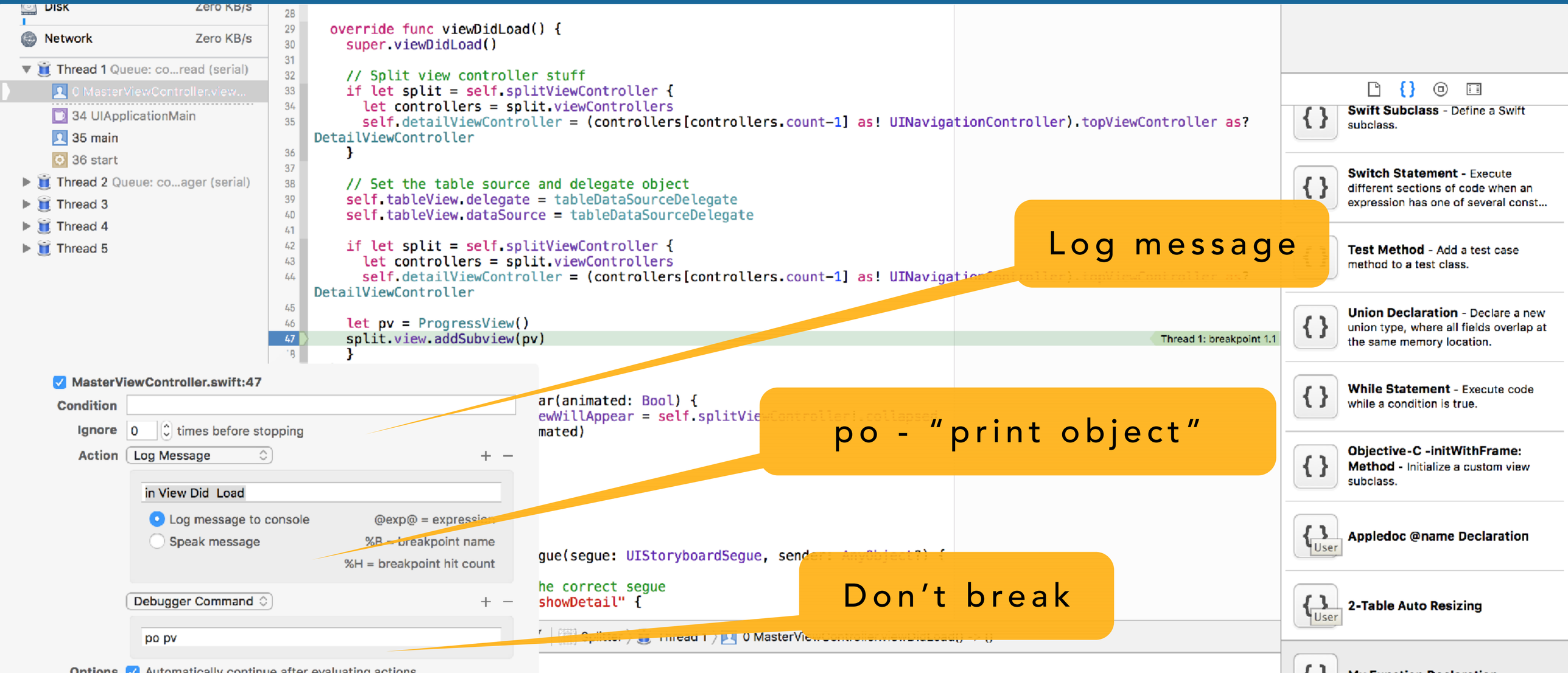


LOGGING WITH THE DEBUGGER

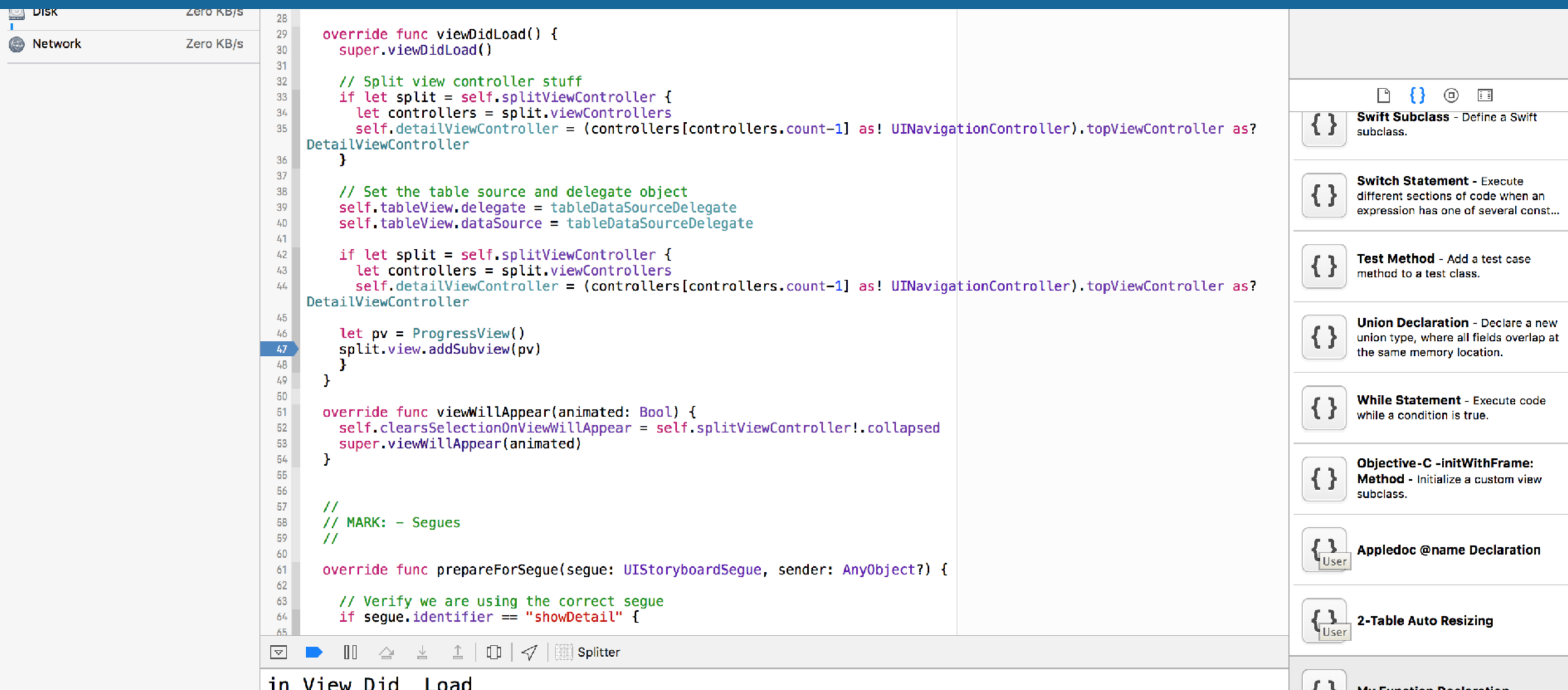
LOGGING


DataSourceDelegates
TableDataS...legate.swift A
SimpleTabl...legate.swift A
StringExtensions.swift A
DetailViewController.swift M
Main.storyboard M
DetailBookm...elegate.swift A
BookmarkVi...ontroller.swift A
ProgressView.swift A
Assets.xcassets M
LaunchScreen.storyboard M
Info.plist M
Products
override func viewDidLoad() {
super.viewDidLoad()
// Split view controller stuff
if let split = self.splitViewController {
let controllers = split.viewControllers
self.detailViewController = (controllers[controllers.count-1] as! UINavigationController).topViewController as?
DetailViewController
}
// Set the table source and delegate object
self.tableView.delegate = tableDataSourceDelegate
self.tableView.dataSource = tableDataSourceDelegate
if let split = self.splitViewController
let controllers = split.viewController
self.detailViewController = (controlle nController).topViewController as?
DetailViewController
let pv = ProgressView()
)
ar(animated: Bool) {
ewWillAppear = self.splitViewController!.collapsed
mated)
gue(segue: UIStoryboardSegue, sender: AnyObject?) {
// Verify we are using the correct segue
if segue.identifier == "showDetail" {
Log message
MasterViewController.swift:45
Condition
Ignore 0 times before stopping
Action Log Message
in View Did Load
Log message to console
Speak message
@exp@ = expression
%B = breakpoint name
%H = breakpoint hit count
Options Automatically continue after evaluating actions
MasterViewController.swift
Full Path /Users/tbinkowski/Google Drive/g-Teaching/Splitter/Splitter/
Swift Subclass - Define a Swift subclass.
Switch Statement - Execute different sections of code when an expression has one of several const...
Test Method - Add a test case method to a test class.
Union Declaration - Declare a new union type, where all fields overlap at the same memory location.
While Statement - Execute code while a condition is true.
Objective-C -initWithFrame: Method - Initialize a custom view subclass.
Appledoc @name Declaration
2-Table Auto Resizing
Tap Groundhog

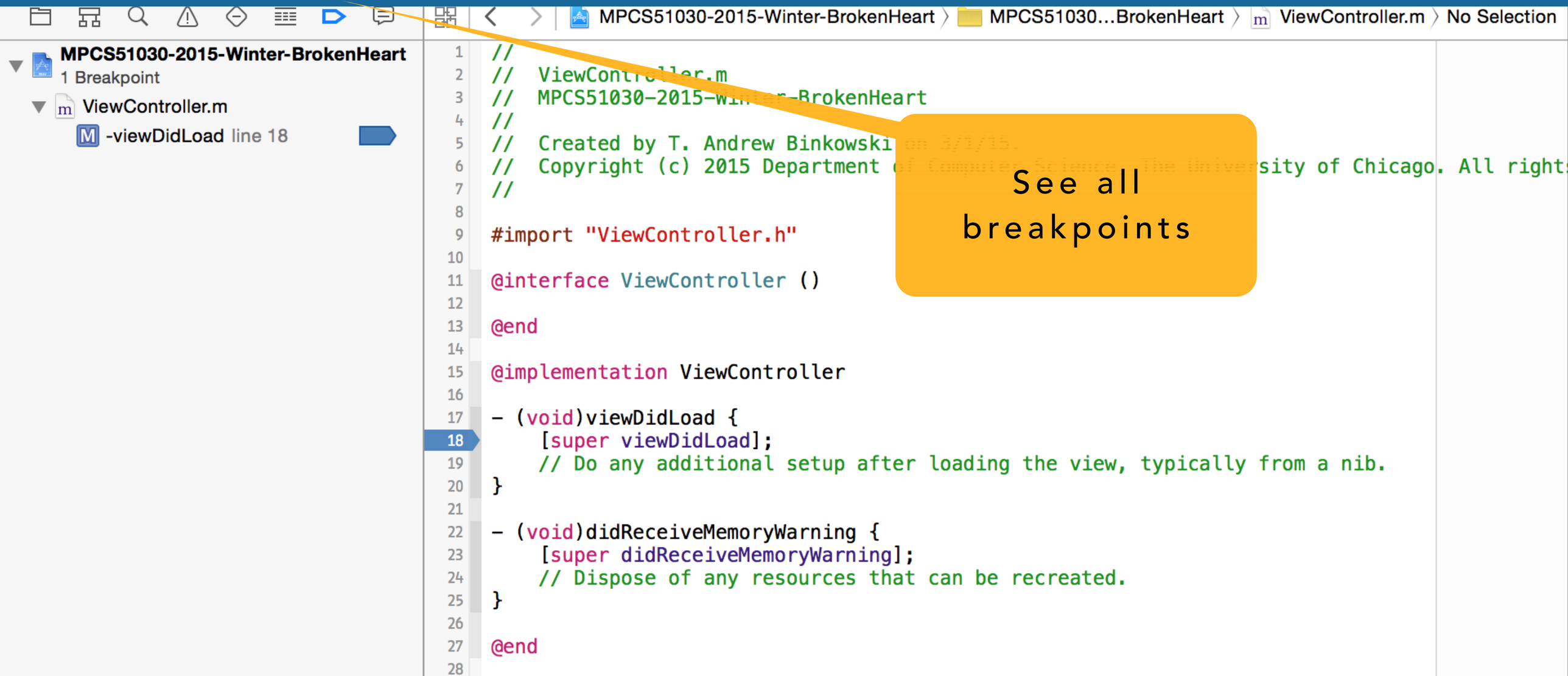
LOGGING


Disk Zero KB/s
Network Zero KB/s
Thread 1 Queue: co...read (serial)
0 MasterViewController.view...
34 UIApplicationMain
35 main
36 start
Thread 2 Queue: co...ager (serial)
Thread 3
Thread 4
Thread 5
override func viewDidLoad() {
super.viewDidLoad()
// Split view controller stuff
if let split = self.splitViewController {
let controllers = split.viewControllers
self.detailViewController = (controllers[controllers.count-1] as! UINavigationController).topViewController as? DetailViewController
}
// Set the table source and delegate object
self.tableView.delegate = tableDataSourceDelegate
self.tableView.dataSource = tableDataSourceDelegate
if let split = self.splitViewController {
let controllers = split.viewControllers
self.detailViewController = (controllers[controllers.count-1] as! UINavigationController).topViewController as? DetailViewController
let pv = ProgressView()
split.view.addSubview(pv)
Thread 1: breakpoint 1.1
MasterViewController.swift:47
Condition
Ignore 0 times before stopping
Action Log Message
in View Did Load
Log message to console
Speak message
@exp@ = expression
%B = breakpoint name
%H = breakpoint hit count
Debugger Command
po pv
Options Automatically continue after evaluating actions
Log message
po - “print object”
Don’t break
Swift Subclass - Define a Swift subclass.
Switch Statement - Execute different sections of code when an expression has one of several const...
Test Method - Add a test case method to a test class.
Union Declaration - Declare a new union type, where all fields overlap at the same memory location.
While Statement - Execute code while a condition is true.
Objective-C -initWithFrame: Method - Initialize a custom view subclass.
Appledoc @name Declaration
2-Table Auto Resizing

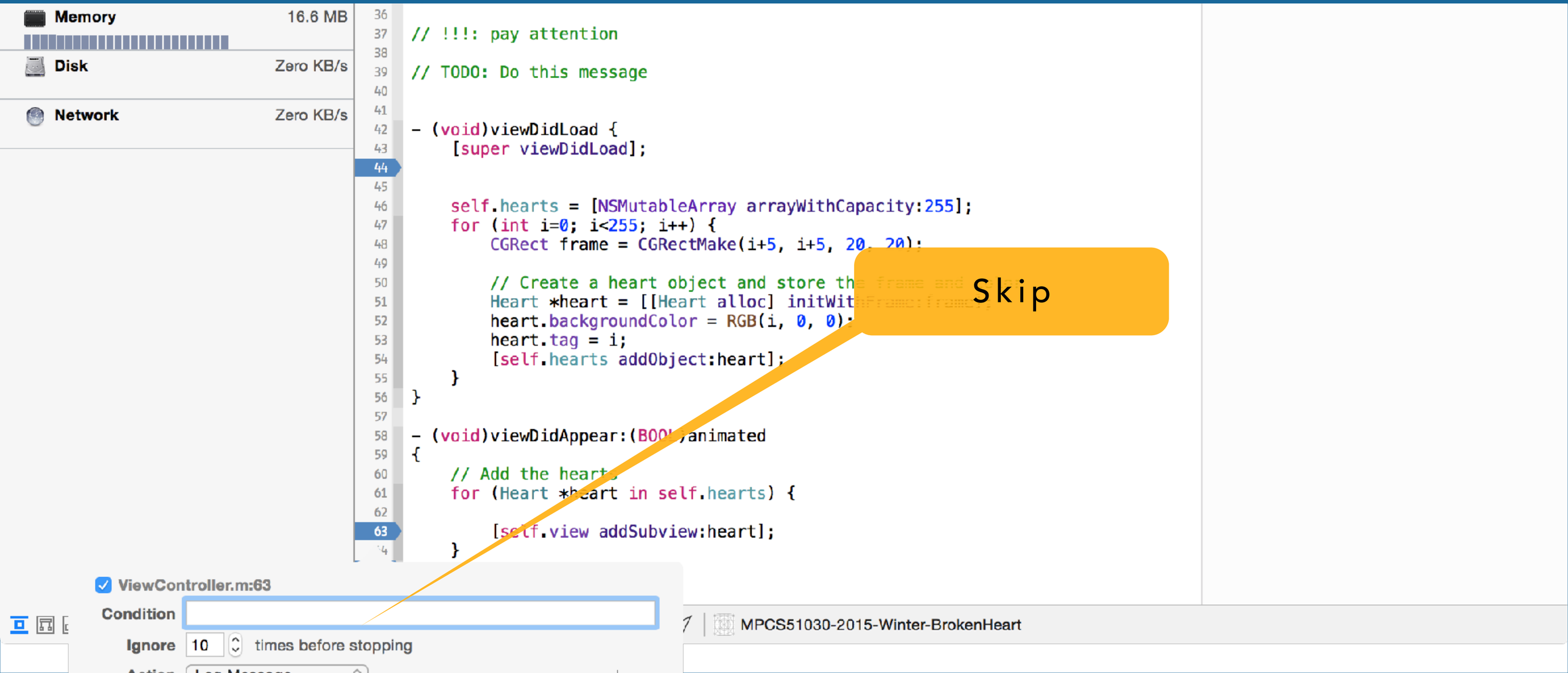
LOGGING


Disk Zero KB/s
Network Zero KB/s
override func viewDidLoad() {
super.viewDidLoad()
// Split view controller stuff
if let split = self.splitViewController {
let controllers = split.viewControllers
self.detailViewController = (controllers[controllers.count-1] as! UINavigationController).topViewController as? DetailViewController
}
// Set the table source and delegate object
self.tableView.delegate = tableDataSourceDelegate
self.tableView.dataSource = tableDataSourceDelegate
if let split = self.splitViewController {
let controllers = split.viewControllers
self.detailViewController = (controllers[controllers.count-1] as! UINavigationController).topViewController as? DetailViewController
let pv = ProgressView()
split.view.addSubview(pv)
}
}
override func viewWillAppear(animated: Bool) {
self.clearsSelectionOnViewWillAppear = self.splitViewController!.collapsed
super.viewWillAppear(animated)
}
//
// MARK: - Segues
//
override func prepareForSegue(segue: UIStoryboardSegue, sender: AnyObject?) {
// Verify we are using the correct segue
if segue.identifier == "showDetail" {
Splitter
Swift Subclass - Define a Swift subclass.
Switch Statement - Execute different sections of code when an expression has one of several const...
Test Method - Add a test case method to a test class.
Union Declaration - Declare a new union type, where all fields overlap at the same memory location.
While Statement - Execute code while a condition is true.
Objective-C -initWithFrame: Method - Initialize a custom view subclass.
Appledoc @name Declaration
2-Table Auto Resizing

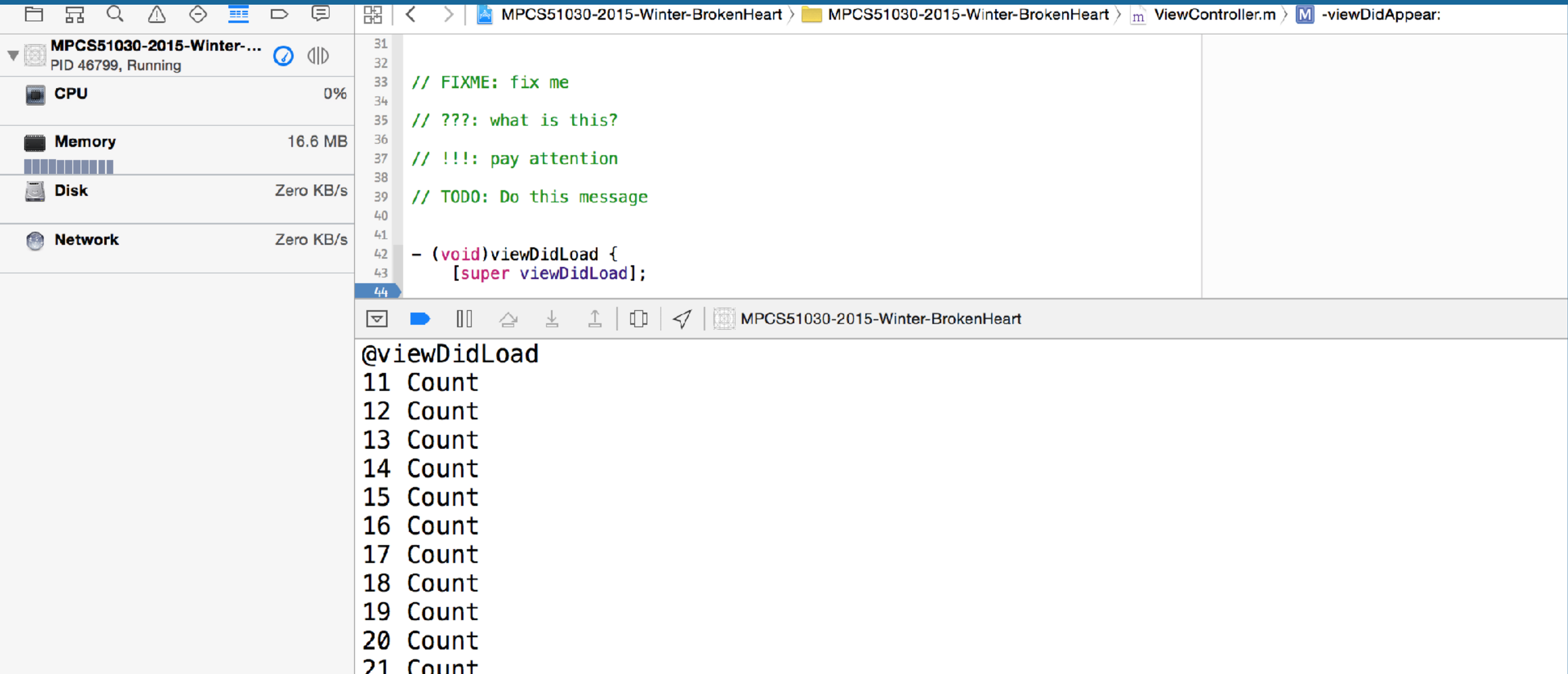
LOGGING


MPCS51030-2015-Winter-BrokenHeart
1 Breakpoint
ViewController.m
-viewDidLoad line 18
MPCS51030-2015-Winter-BrokenHeart
MPCS51030…BrokenHeart
ViewController.m
No Selection
1 //
2 // ViewController.m
3 // MPCS51030-2015-Winter-BrokenHeart
4 //
5 // Created by T. Andrew Binkowski on 3/1/15.
6 // Copyright (c) 2015 Department of Computer Science. The University of Chicago. All rights
7 //
8
9 #import "ViewController.h"
10
11 @interface ViewController ()
12
13 @end
14
15 @implementation ViewController
16
17 - (void)viewDidLoad {
18 [super viewDidLoad];
19 // Do any additional setup after loading the view, typically from a nib.
20 }
21
22 - (void)didReceiveMemoryWarning {
23 [super didReceiveMemoryWarning];
24 // Dispose of any resources that can be recreated.
25 }
26
27 @end
28
See all breakpoints

LOGGING


Memory 16.6 MB
Disk Zero KB/s
Network Zero KB/s
// !!!: pay attention
// TODO: Do this message
- (void)viewDidLoad {
[super viewDidLoad];
self.hearts = [NSMutableArray arrayWithCapacity:255];
for (int i=0; i<255; i++) {
CGRect frame = CGRectMake(i+5, i+5, 20, 20);
// Create a heart object and store th
Heart *heart = [[Heart alloc] initWit
heart.backgroundColor = RGB(i, 0, 0);
heart.tag = i;
[self.hearts addObject:heart];
}
}
- (void)viewDidAppear:(BOO animated
{
// Add the heart
for (Heart *heart in self.hearts) {
[self.view addSubview:heart];
}
Skip
ViewController.m:63
Condition
Ignore 10 times before stopping
MPCS51030-2015-Winter-BrokenHeart

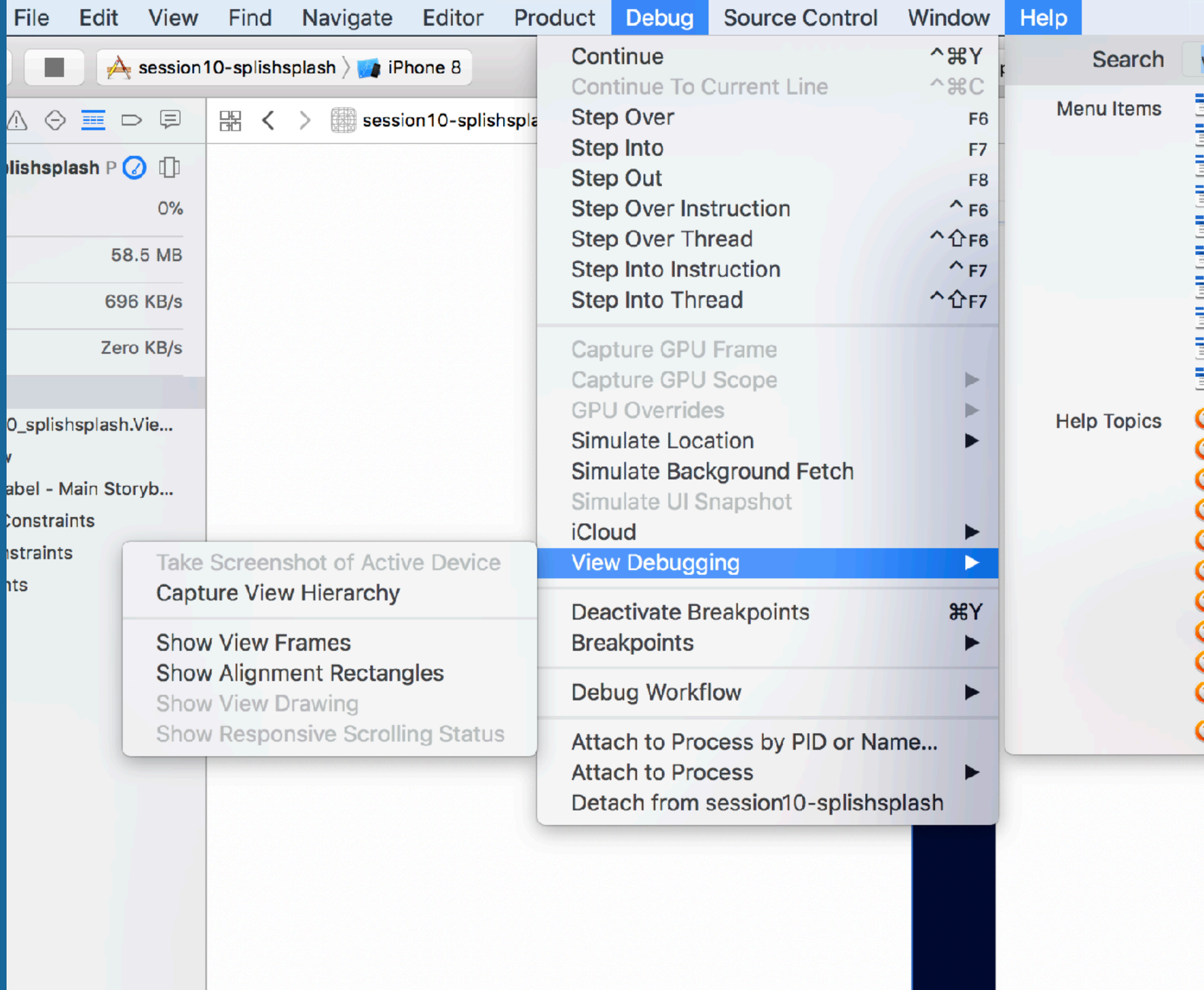
LOGGING


MPCS51030-2015-Winter-...
PID 46799, Running
CPU 0%
Memory 16.6 MB
Disk Zero KB/s
Network Zero KB/s
MPCS51030-2015-Winter-BrokenHeart
MPCS51030-2015-Winter-BrokenHeart
ViewController.m
-viewDidAppear:
// FIXME: fix me
// ???: what is this?
// !!!: pay attention
// TODO: Do this message
- (void)viewDidLoad {
[super viewDidLoad];
MPCS51030-2015-Winter-BrokenHeart
@viewDidLoad
11 Count
12 Count
13 Count
14 Count
15 Count
16 Count
17 Count
18 Count
19 Count
20 Count
21 Count

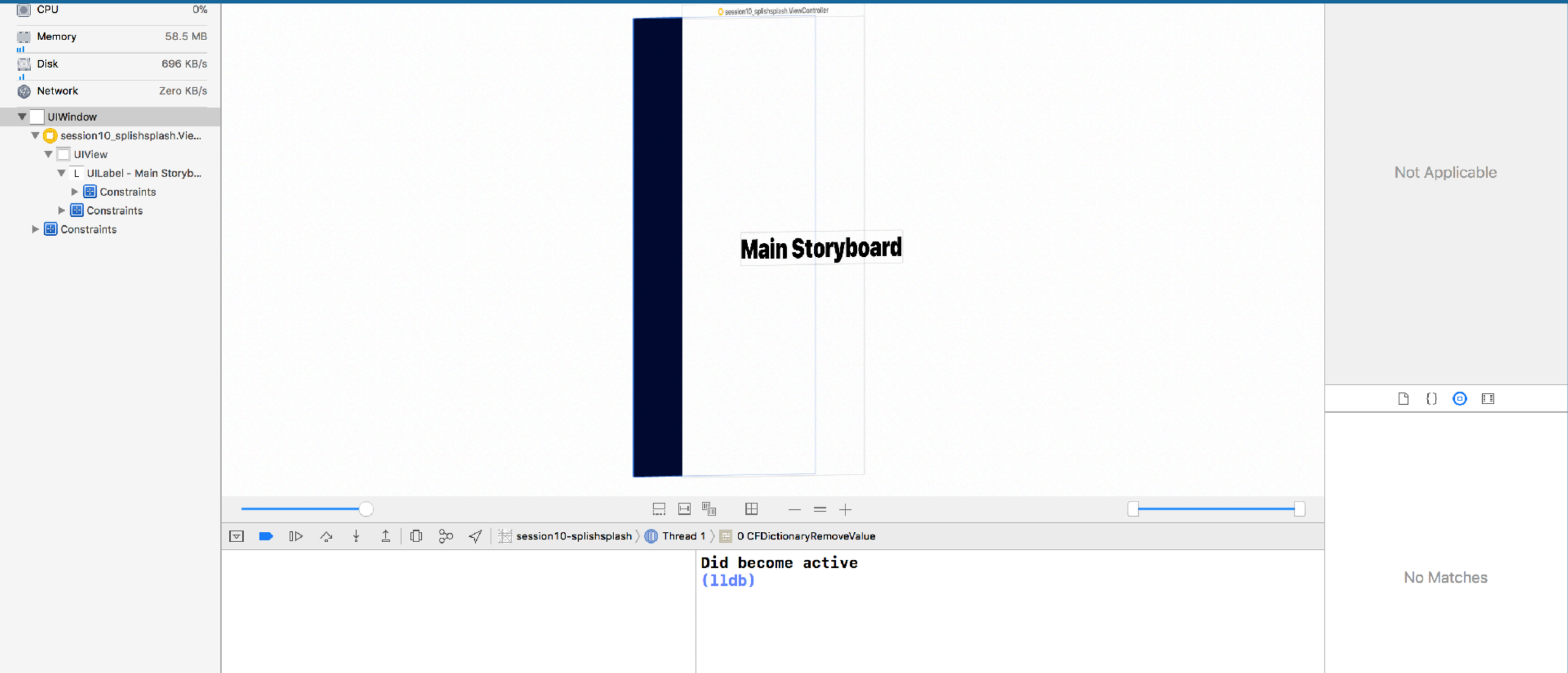
RUNTIME DEBUGGING

RUNTIME DEBUGGING

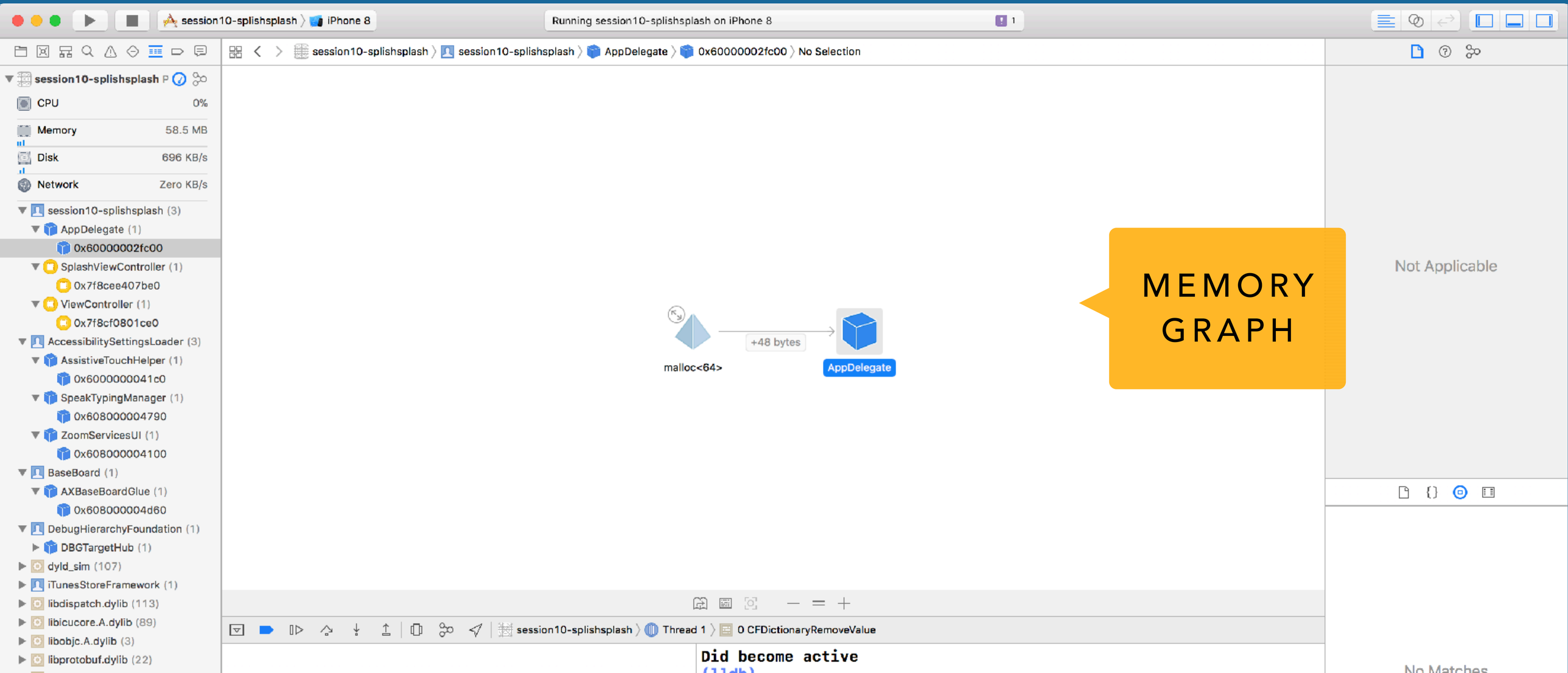
- Add a breakpoint
- When stopped, capture the view hierarchy



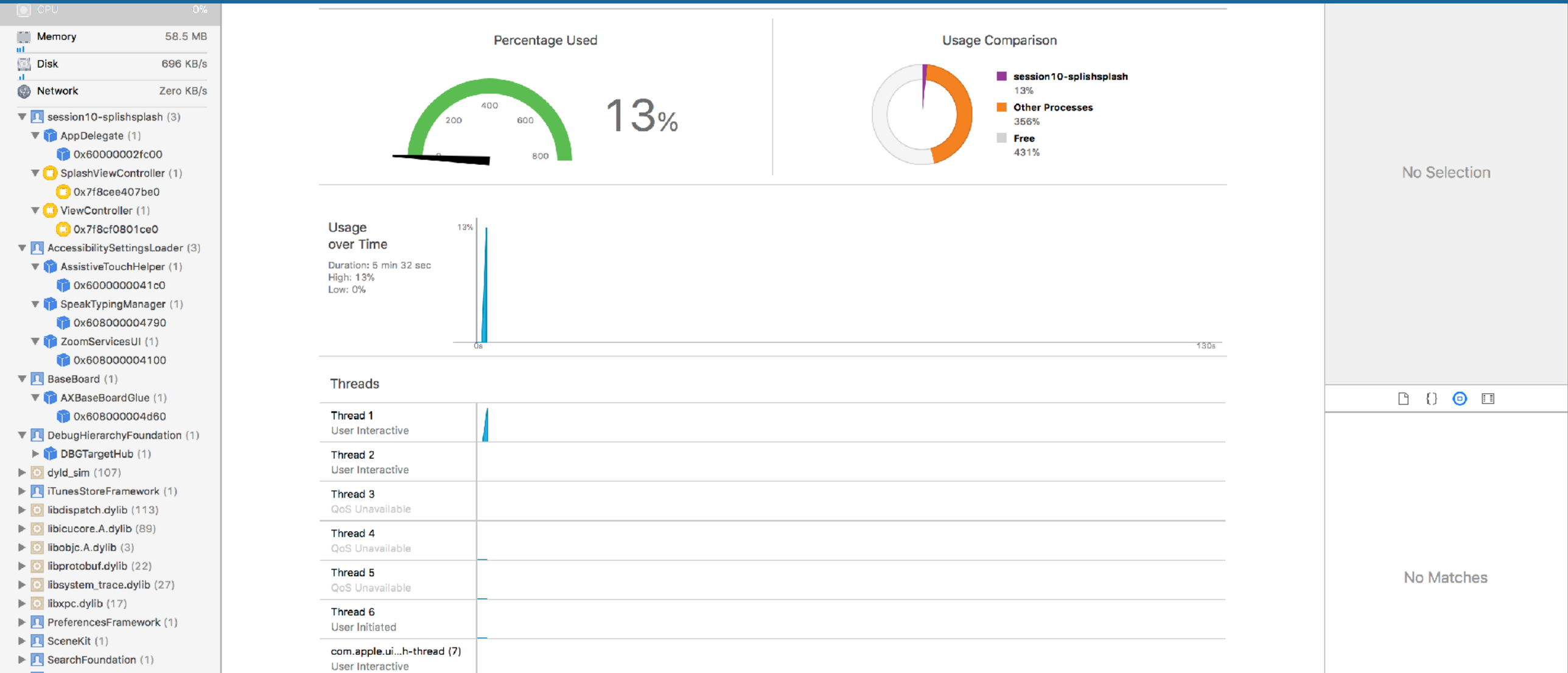
RUNTIME DEBUGGING



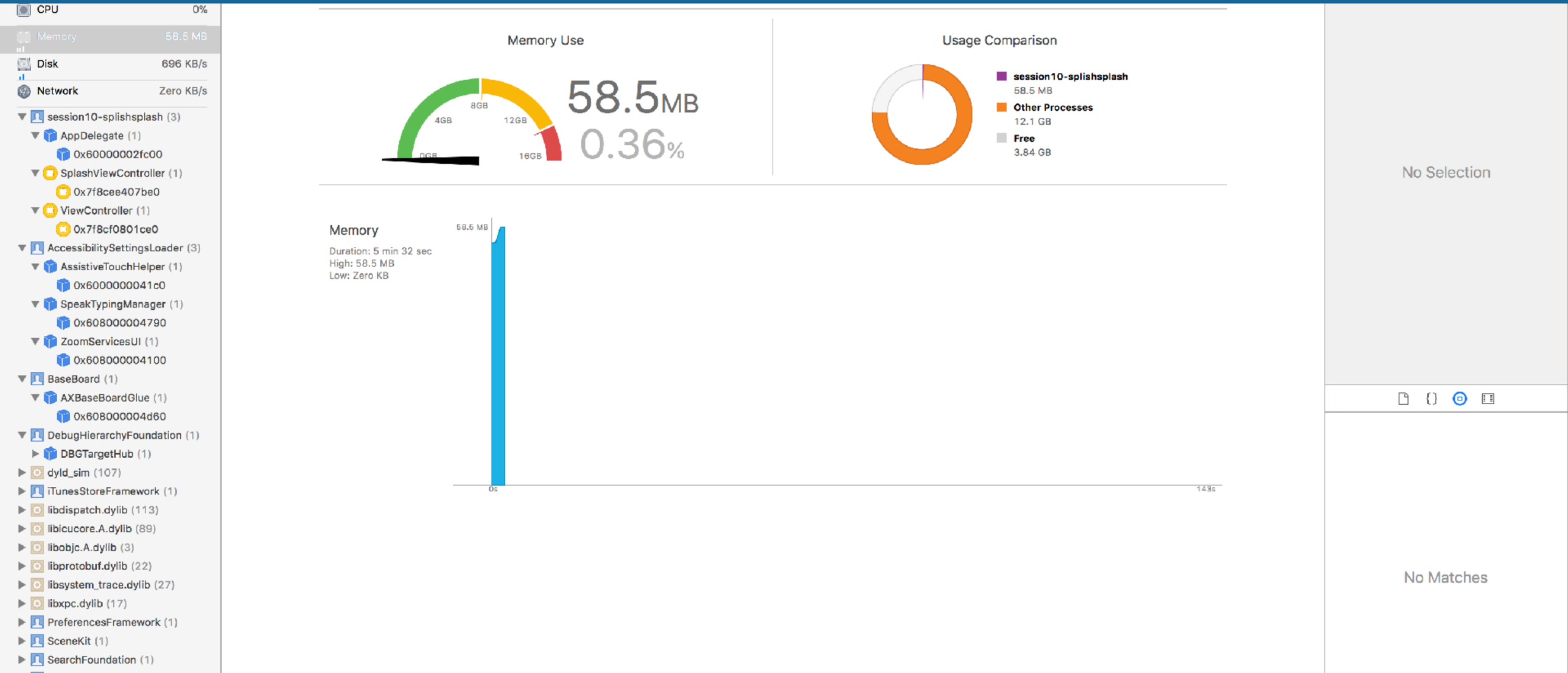
RUNTIME DEBUGGING



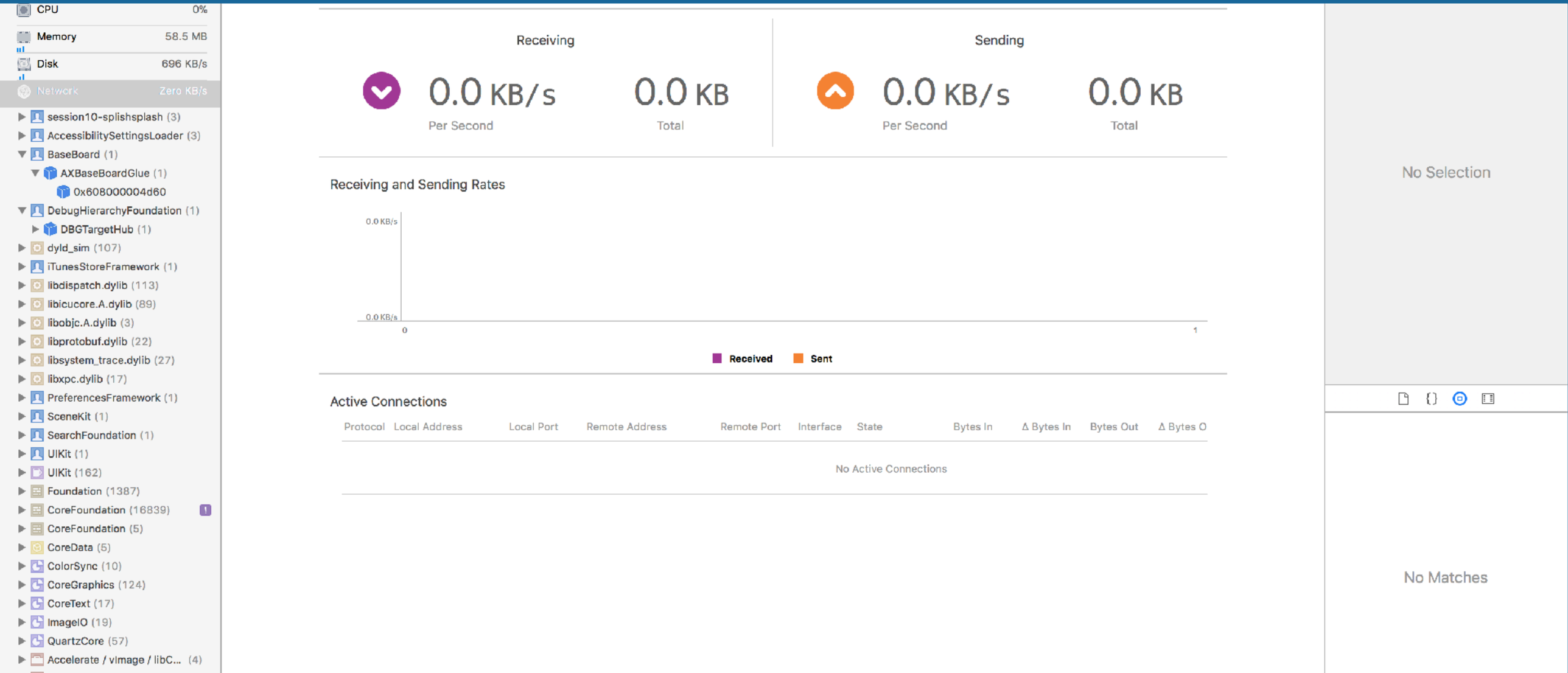
RUNTIME DEBUGGING



RUNTIME DEBUGGING



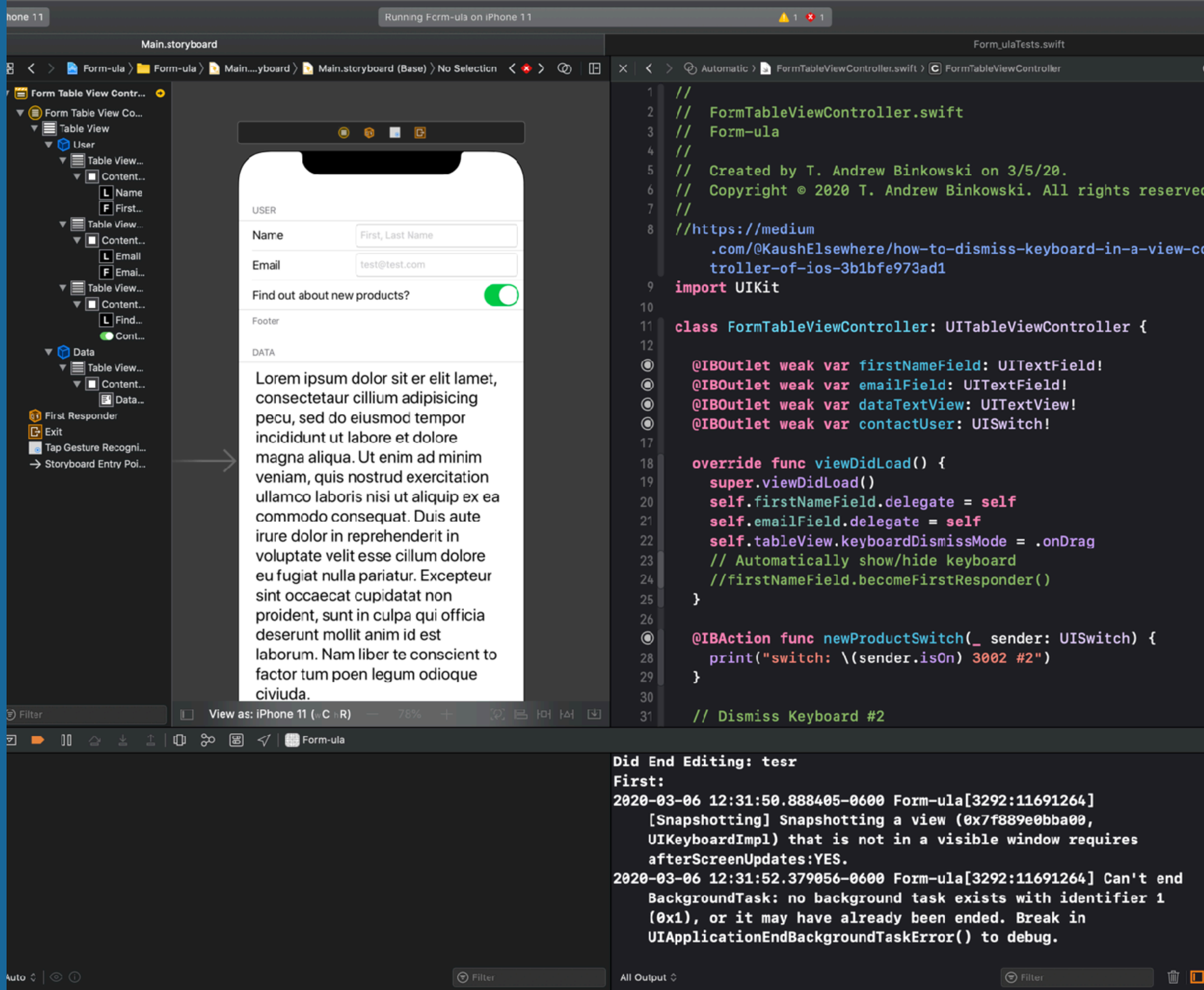
RUNTIME DEBUGGING



STATIC TABLES & FORMS

FORM

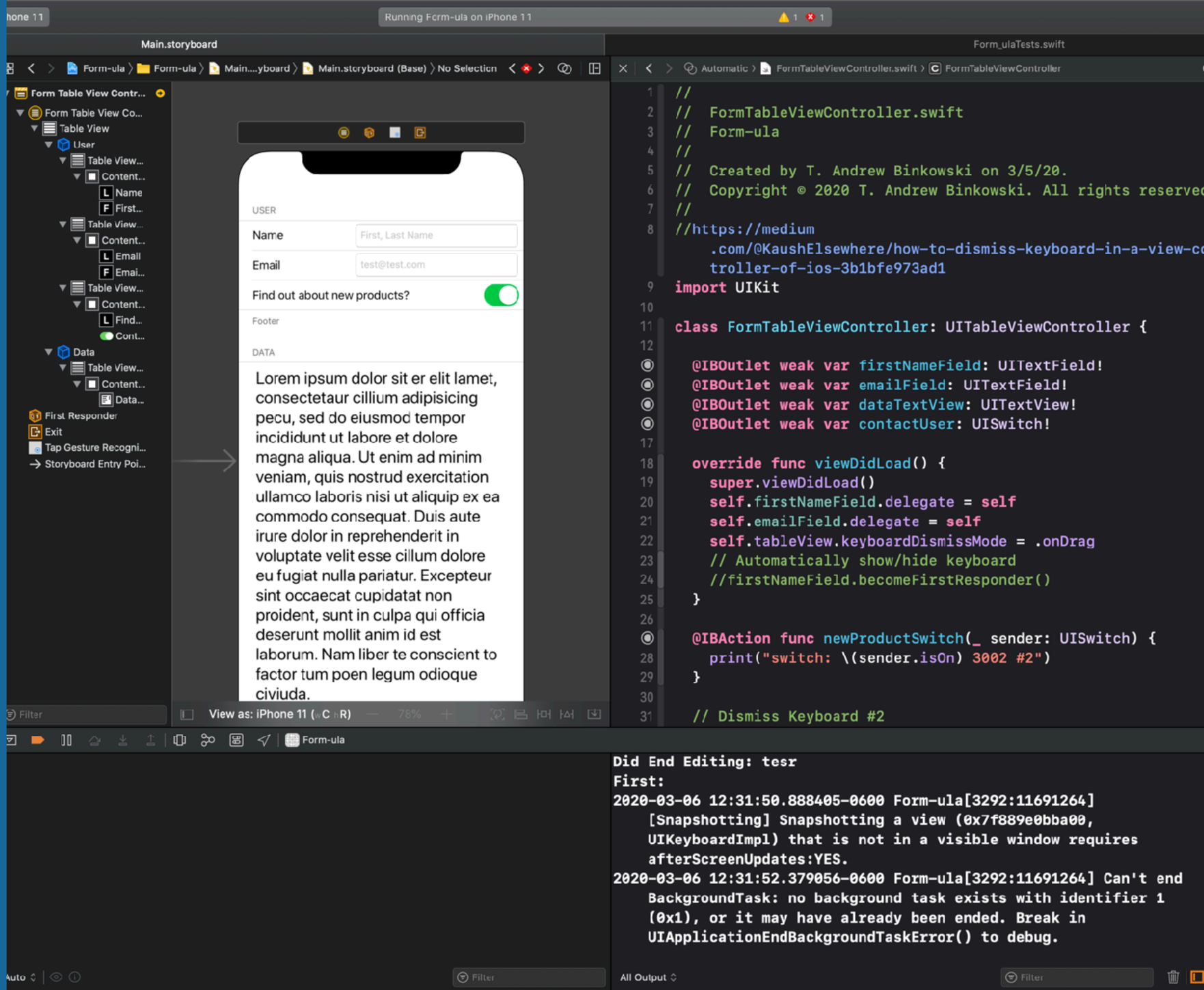
- Static Table Demo



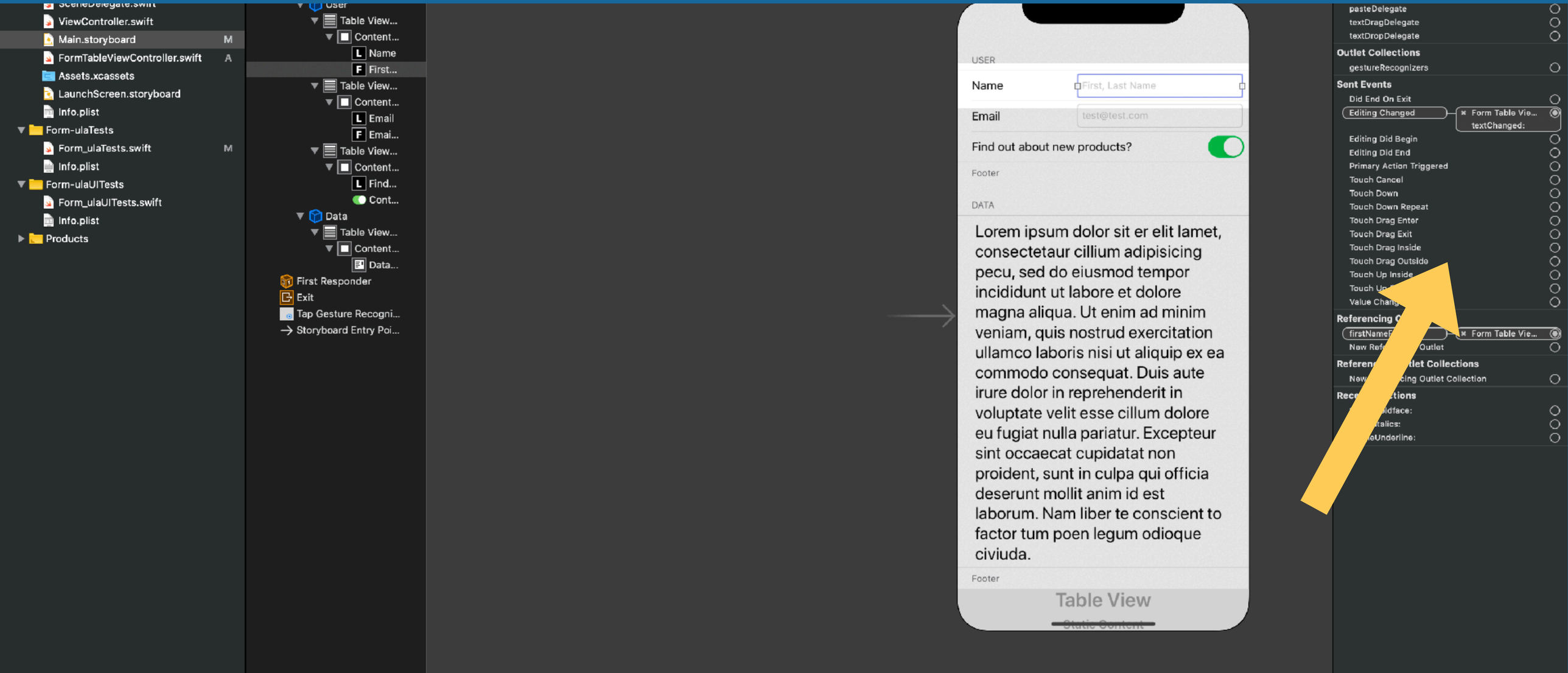
A FORM

FORM

- Form
  - UITableViewCo ntroller
  - Static table
  - UIControls



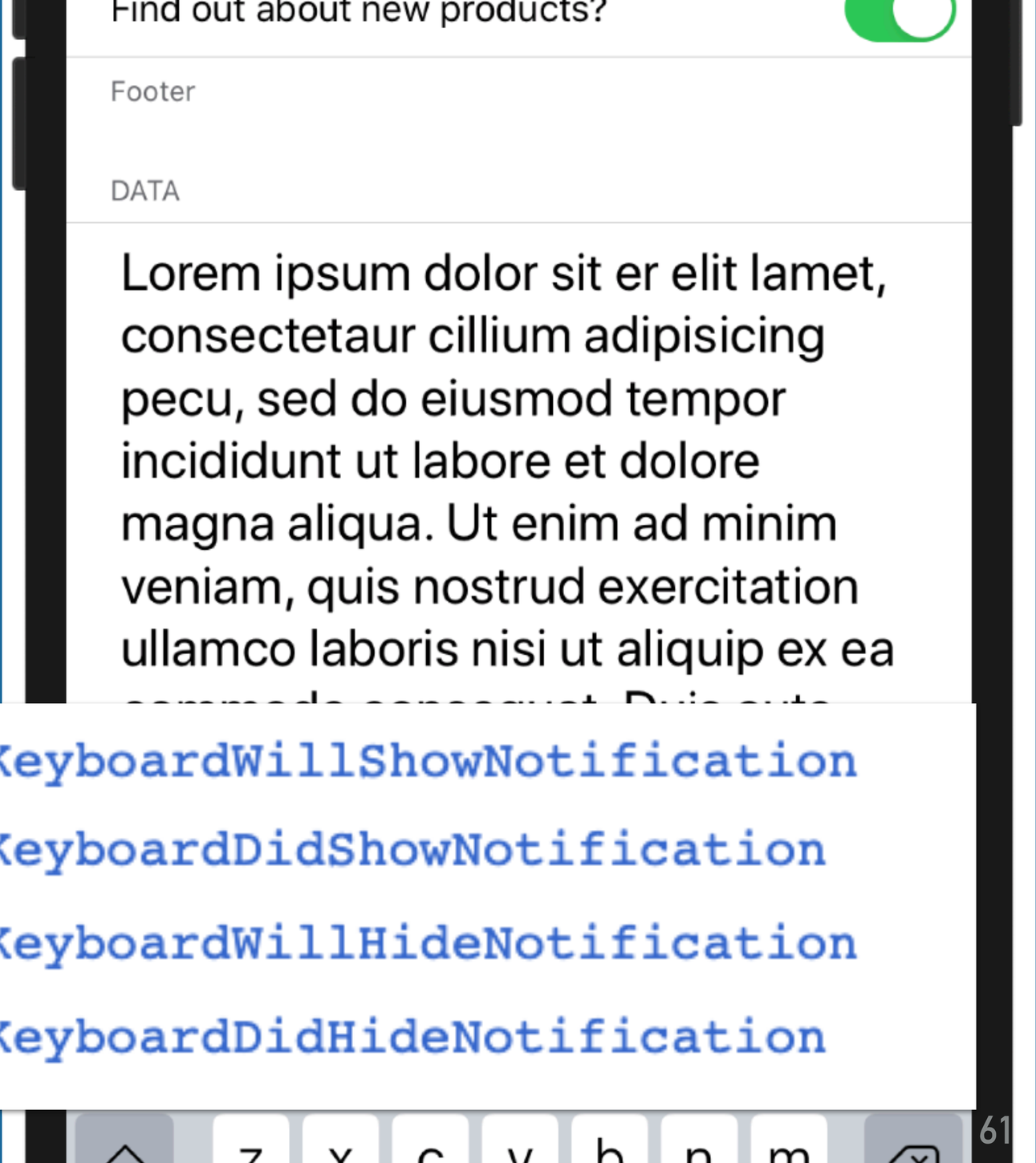
FORM


ViewController.swift
Main.storyboard M
FormTableViewController.swift A
Assets.xcassets
LaunchScreen.storyboard
Info.plist
Form-ulaTests
Form_ulaTests.swift M
Info.plist
Form-ulaUITests
Form_ulaUITests.swift
Info.plist
Products
Table View...
Content...
Name
First...
Email
Emai...
Find...
Cont...
Data
Data...
First Responder
Exit
Tap Gesture Recogni...
Storyboard Entry Poi...
USER
Name
First, Last Name
Email
test@test.com
Find out about new products?
Footer
DATA
Lorem ipsum dolor sit er elit lamet, consectetaur cillium adipisicing pecu, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum. Nam liber te conscient to factor tum poen legum odioque civiuda.
Footer
Table View
pasteDelegate
textDragDelegate
textDropDelegate
Outlet Collections
gestureRecognizers
Sent Events
Did End On Exit
Editing Changed
Form Table Vie...
textChanged:
Editing Did Begin
Editing Did End
Primary Action Triggered
Touch Cancel
Touch Down
Touch Down Repeat
Touch Drag Enter
Touch Drag Exit
Touch Drag Inside
Touch Drag Outside
Touch Up Inside
Referencing
Form Table Vie...
Outlet
Outlet Collections
Outlet Collection

FORM

SUBTITLE

- Keyboard can obscure the fields
  - Resize the view by listening for notifications



FORM

UIKeyboardWillShowNotification
UIKeyboardDidShowNotification
UIKeyboardWillHideNotification
UIKeyboardDidHideNotification

```
let center = NotificationCenter.default

center.addObserver(self,
  selector:  selector(keyboardWillBeShown(note:)),
  name: Notification.Name.UIKeyboardWillShow, object: nil)

center.addObserver(self,
 selector:  selector(keyboardWillBeHidden(note:)),
 name: Notification.Name.UIKeyboardWillHide, object: nil)
```

FORM

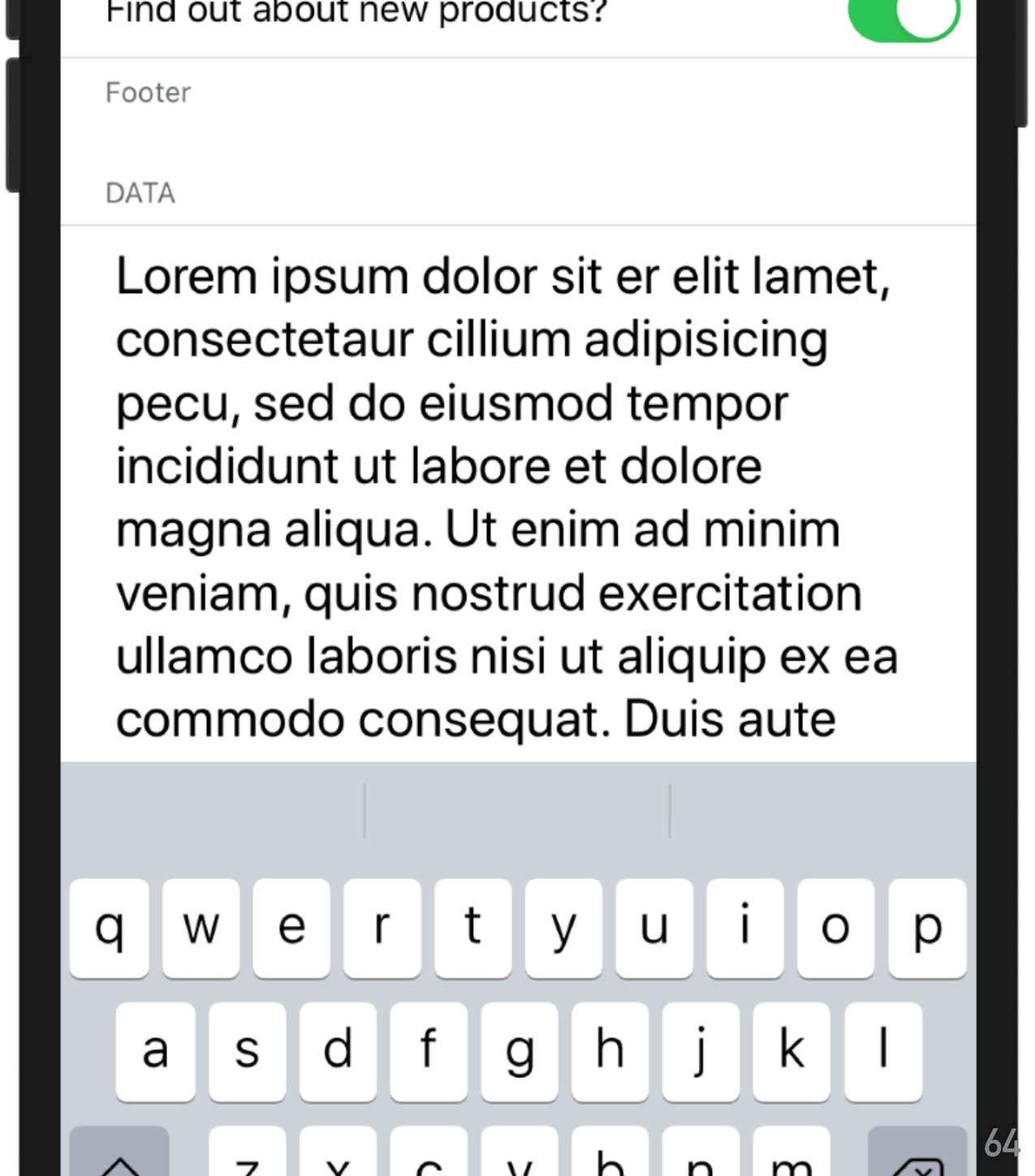
Change the view

```
func keyboardWillBeShown(note: Notification) {
    let userInfo = note.userInfo
    let keyboardFrame = userInfo?
                    [UIKeyboardFrameEndUserInfoKey] as! CGRect
    let contentInset = UIEdgeInsetsMake(0.0, 0.0,
                     keyboardFrame.height, 0.0)
    scrollView.contentInset = contentInset
    scrollView.scrollIndicatorInsets = contentInset
    scrollView.scrollRectToVisible(textField.frame, animated: true)
}
```

FORM

SUBTITLE

- Keyboard can obscure the fields
  - UITableViewController automatically adjusts



THE UNIVERSITY OF CHICAGO

ADVANCED iOS APPLICATION DEVELOPMENT

MPCS 51032 • SPRING 2020 • SESSION 8