Debugging in Xcode 6

Session 413
Han Ming Ong
Debugger UI Engineer

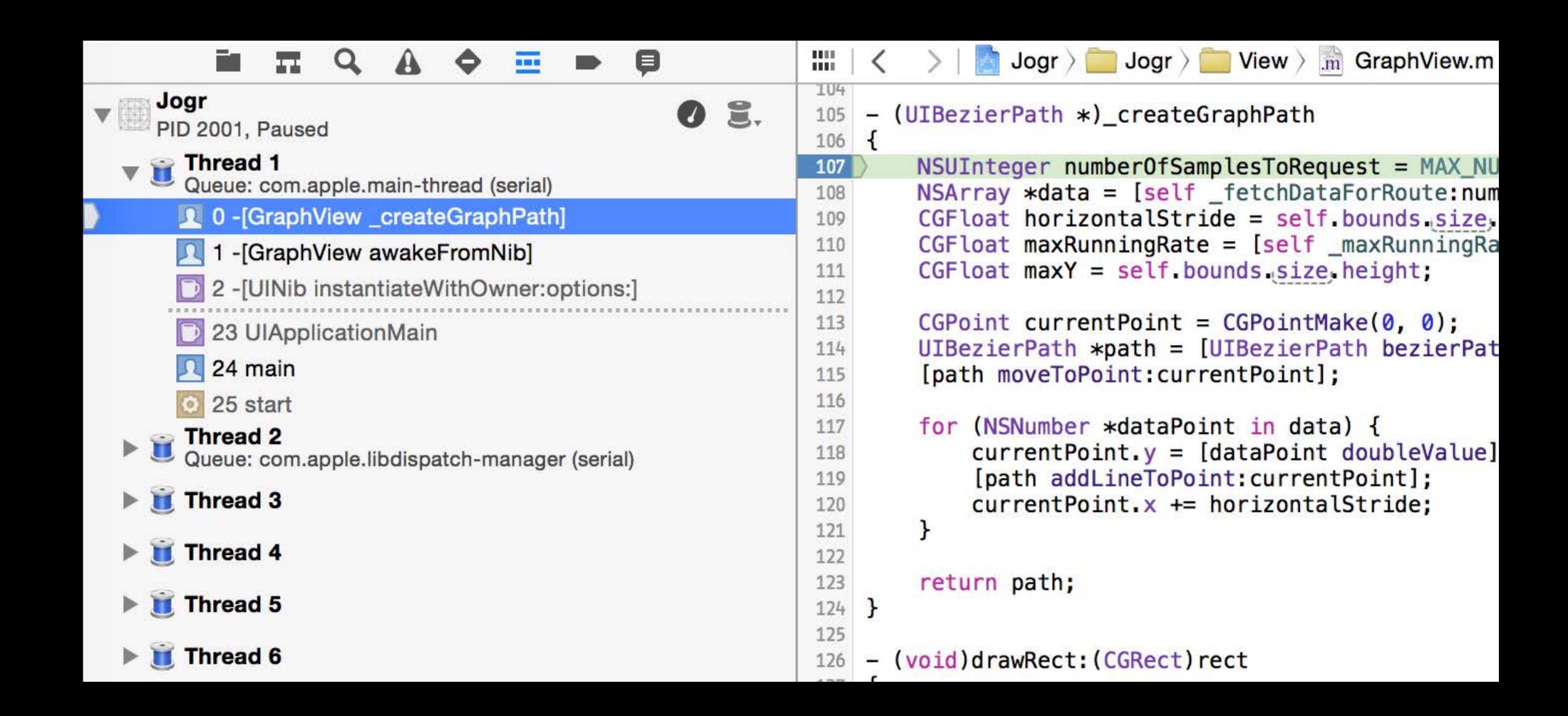
Agenda

Debugging GCD more effectively

Exploring your user interface

Integrating Quick Look Preview into your class

Backtraces



Time

```
dispatch_async(queue,
\ {
    // my block
});
                                   • • •
```

Time

```
dispatch_async(queue,
    // my block
});
                                   • • •
                                             \ {
                                                 // my block
```

Time

```
Jogr > Wiew > m GraphView.m
                                                             (UIImage *)_cachedGraphImage
 Thread 14
                                                       150
                                                               if (_graphImage == NULL) {
                                                       151
  Thread 15
                                                       152
                                                                   CGFloat imageScale = [[UIScreen mainScre
                                                       153
     Thread 16
    Queue: graph serial queue (serial)
                                                                   CGRect imageRect = [self _imageRect];
                                                       154
                                                                   UIGraphicsBeginImageContextWithOptions(i
                                                       155
    0 -[GraphView _drawGraphPath]
    1 __30-[GraphView _cachedGraphImage]_block_invoke
                                                       157
                                                                   UIColor *backgroundColor = [UIColor colo
                                                                    [backgroundColor set];
      2 _dispatch_call_block_and_release
                                                       158
                                                                    [[UIBezierPath bezierPathWithRect:imageR
                                                       159
    9 start_wqthread
                                                       160
                                                                   dispatch_async(_graph_serial_queue, ^ {
                                                       161
Thread 17
                                                                        [self _drawGraphPath];
                                                       162
                                                                   });
                                                       163
 Thread 18
                                                       164
                                                       165
                                                                   CGContextRef context = UIGraphicsGetCurr
 Thread 19
                                                                   CGImageRef cgImage = CGBitmapContextCrea
                                                       166
                                                       167
    Thread 20
                                                                   _graphImage = [UIImage imageWithCGImage:
                                                                       UIImageOrientationUp];
  Thread 21
                                                       169
                                                                   UIGraphicsEndImageContext();
                                                       170
▶ ji Thread 22
                                                       171
                                                       172
    Thread 23
                                                       173
                                                               return _graphImage;
```

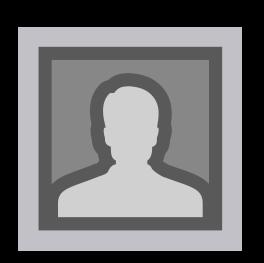
```
Jogr > View > m GraphView.m
                                                     165
                                                         - (void)_drawGraphPath
▶ Thread 16
                                                     167
    Thread 17
                                                              CGRect bounds = [self bounds];
                                                     168
    Queue: com.apple.root.default-qos (concurrent)
                                                              CGContextRef graphicsContext = UIGraphicsGet
                                                     169
    0 - [GraphView _drawGraphPath]
                                                              CGContextSaveGState(graphicsContext);
                                                     170
                                                              CGContextTranslateCTM(graphicsContext, 0.0,
    1 __30-[GraphView _cachedGraphImage]_block_invoke
                                                              CGContextScaleCTM(graphicsContext, 1.0, -1.0
                                                     172
      2 _dispatch_call_block_and_release
                                                     173
                                                              CGColorRef topColor = [UIColor colorWithWhit
                                                     174
      7 start_wqthread
                                                              CGColorRef bottomColor = [UIColor colorWithW
                                                     175
                                                              NSArray *colors = @[(__bridge id)bottomColor
▶ Thread 18
                                                     176
                                                     177
                                                              CGGradientRef gradient = CGGradientCreateWit
Thread 19
                                                      178
                                                              CGContextSaveGState(graphicsContext);
                                                     179
                                                              CGContextSetStrokeColorWithColor(graphicsCon
Thread 20
                                                              CGFloat lengths[2] = \{ 2.0, 2.0 \};
                                                     181
                                                              CGContextSetLineDash(graphicsContext, 0, len
Thread 21
                                                     182
                                                              CGContextSetLineWidth(graphicsContext, 0.75)
                                                              for (CGFloat y = 20.0; y < bounds.size.heigh
Thread 22
                                                                  CGPoint points[2];
                                                                  points[0] = (CGPoint)\{0.0, y\};
 Thread 23
                                                                  points[1] = (CGPoint){bounds.size.width,
                                                      187
                                                                  CGContextStrokeLineSegments(graphicsCont
▶ Thread 24
                                                      188
                                                      189
                                                              CGContextRestoreGState(graphicsContext);
Thread 25
                                                      190
                                                      101
```

```
Jogr > View > m GraphView.m
                                                       137
 Thread 16
                                                              (UIImage *)_cachedGraphImage
                                                       139
     Thread 17
                                                                if (_graphImage == NULL) {
                                                       140
    Queue: com.apple.root.default-qos (concurrent)
                                                       141
    0 - [GraphView _drawGraphPath]
                                                                    CGFloat imageScale = [[UIScreen mainScre
                                                       142
    1 __30-[GraphView _cachedGraphImage]_block_invoke
                                                                    CGRect imageRect = [self _imageRect];
                                                       143
                                                                    UIGraphicsBeginImageContextWithOptions(i
                                                       144
    2 _dispatch_call_block_and_release
                                                       145
    Enqueued from com.apple.main-thread (Thread 1)
                                                                    UIColor *backgroundColor = [UIColor colo
                                                       146
                                                                    [backgroundColor set];
    0 _dispatch_async_f_slow
                                                       147
                                                                    [[UIBezierPath bezierPathWithRect:imageR
                                                       148
    1 -[GraphView _cachedGraphImage]
                                                       149
    2 -[GraphView drawRect:]
                                                       150
                                                                    dispatch_async(dispatch_get_global_queue
                                                                         [self _drawGraphPath];
                                                       151
    3 -[UIView(CALayerDelegate) drawLayer:inContext:]
                                                                         [self _drawGraphTitle];
                                                       152
       18 UIApplicationMain
                                                                    });
                                                       153
                                                       154
    19 main
                                                                    CGContextRef context = UIGraphicsGetCurr
                                                       155
    20 start
                                                                    CGImageRef cgImage = CGBitmapContextCrea
                                                       156
  Thread 21
                                                                    _graphImage = [UIImage imageWithCGImage:
                                                       158
                                                       159
▶ Thread 22
                                                                    UIGraphicsEndImageContext();
                                                       160
                                                       161
Thread 25
                                                       162
```

```
Jogr > ___ Jogr > ___ View > _m GraphView.m
                                                        137
    Thread 16
                                                        138 - (UIImage *)_cachedGraphImage
                                                        139 {
        ead 17
                                                                if (_graphImage == NULL) {
                                                        140
        ue: com.apple.root.default-qos (concurrent)
                                                        141
         -[GraphView _drawGraphPath]
                                                                    CGFloat imageScale = [[UIScreen mainScre
                                                        142
          _30-[GraphView _cachedGraphImage]_block_invoke
                                                                    CGRect imageRect = [self _imageRect];
                                                        143
                                                                    UIGraphicsBeginImageContextWithOptions(i
                                                        144
         _dispatch_call_block_and_release
   ....
                                                        145
        eued from com.apple.main-thread (Thread 1)
                                                                    UIColor *backgroundColor = [UIColor colo
                                                        146
                                                                     [backgroundColor set];
                                                        147
         _dispatch_async_f_slow
                                                                     [[UIBezierPath bezierPathWithRect:imageR
                                                        148
       1 -[GraphView _cachedGraphImage]
                                                        149
    2 -[GraphView drawRect:]
                                                                    dispatch_async(dispatch_get_global_queue
                                                        150
                                                                         [self _drawGraphPath];
                                                        151
    3 -[UIView(CALayerDelegate) drawLayer:inContext:]
                                                                         [self _drawGraphTitle];
                                                        152
    18 UIApplicationMain
                                                                    });
                                                        153
                                                        154
    19 main
                                                                    CGContextRef context = UIGraphicsGetCurr
                                                        155
    20 start
                                                                    CGImageRef cgImage = CGBitmapContextCrea
                                                        156
Thread 21
                                                                     _graphImage = [UIImage imageWithCGImage:
                                                        158
                                                        159
▶ Thread 22
                                                                    UIGraphicsEndImageContext();
                                                        160
                                                        161
Thread 25
                                                        162
```

```
Jogr > ___ Jogr > ___ View > _m GraphView.m
                                                        137
▶ II Thread 16
                                                         138 - (UIImage *)_cachedGraphImage
                                                         139 {
     Thread 17
                                                                 if (_graphImage == NULL) {
                                                         140
     Queue: com.apple.root.default-gos (concurrent)
                                                         141
    0 - [GraphView _drawGraphPath]
                                                                     CGFloat imageScale = [[UIScreen mainScre
                                                         142
    1 __30-[GraphView _cachedGraphImage]_block_invoke
                                                                     CGRect imageRect = [self _imageRect];
                                                                     UIGraphicsBeginImageContextWithOptions(i
                                                         144
    2 _dispatch_call_block_and_release
                                                         145
         eued from com.apple.main-thread (Thread 1)
                                                                     UIColor *backgroundColor = [UIColor colo
                                                        146
                                                                      [backgroundColor set];
                                                         147
         _dispatch_async_f_slow
                                                                      [[UIBezierPath bezierPathWithRect:imageR
                                                         148
         -[GraphView _cachedGraphImage]
                                                         149
         -[GraphView drawRect:]
                                                                     dispatch_async(dispatch_get_global_queue
                                                         150
                                                                          [self _drawGraphPath];
                                                         151
         -[UIView(CALayerDelegate) drawLayer:inContext:]
                                                                          [self _drawGraphTitle];
                                                         152
   8 UlApplicationMain
                                                                     });
                                                         153
                                                         154
        9 main
                                                                     CGContextRef context = UIGraphicsGetCurr
                                                         155
         0 start
                                                                      CGImageRef cgImage = CGBitmapContextCrea
                                                         156
        ead 21
                                                                      _graphImage = [UIImage imageWithCGImage:
                                                        158
   District Co.
                                                        159
► Thread 22
                                                                     UIGraphicsEndImageContext();
                                                        160
                                                        161
Thread 25
                                                        162
```

Why Are the Icons Gray?

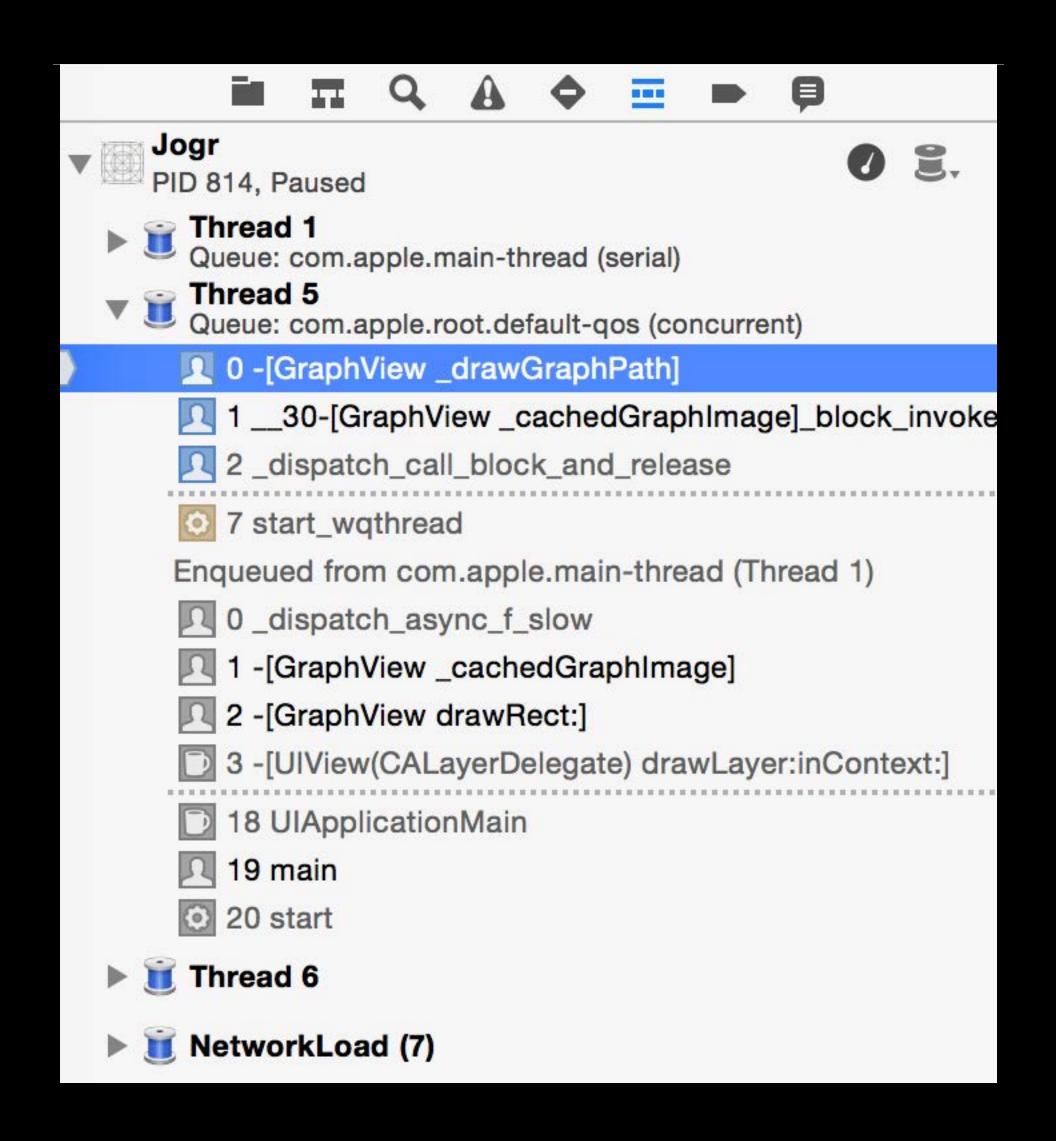


Historical

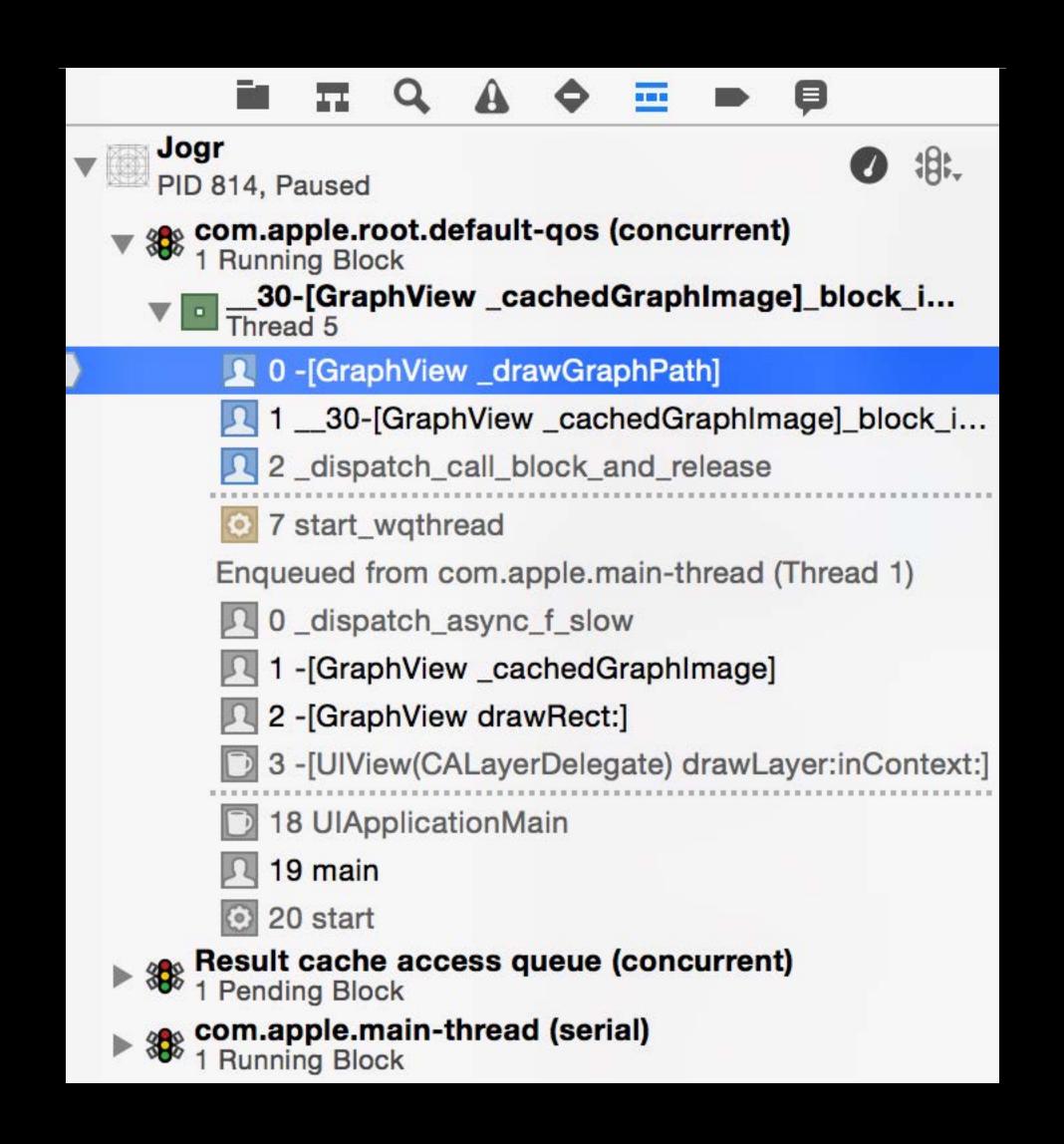
No console interaction

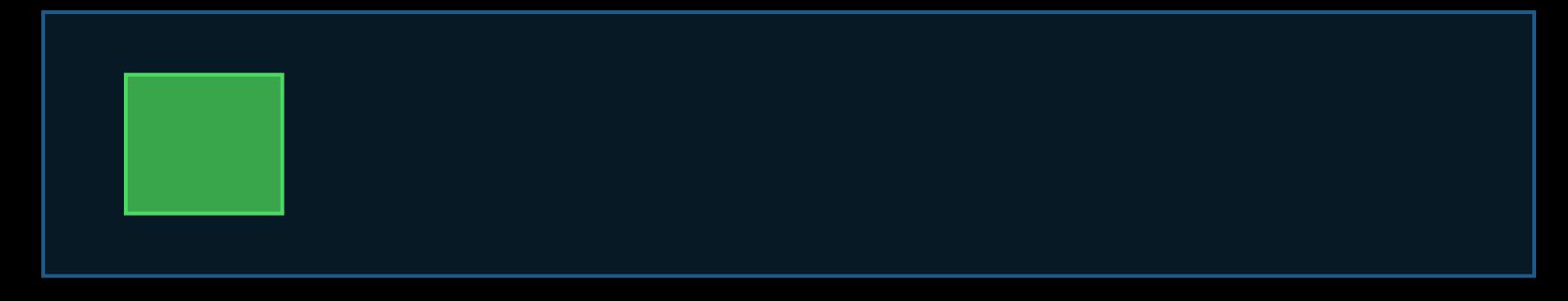
No frame variables

Queues View

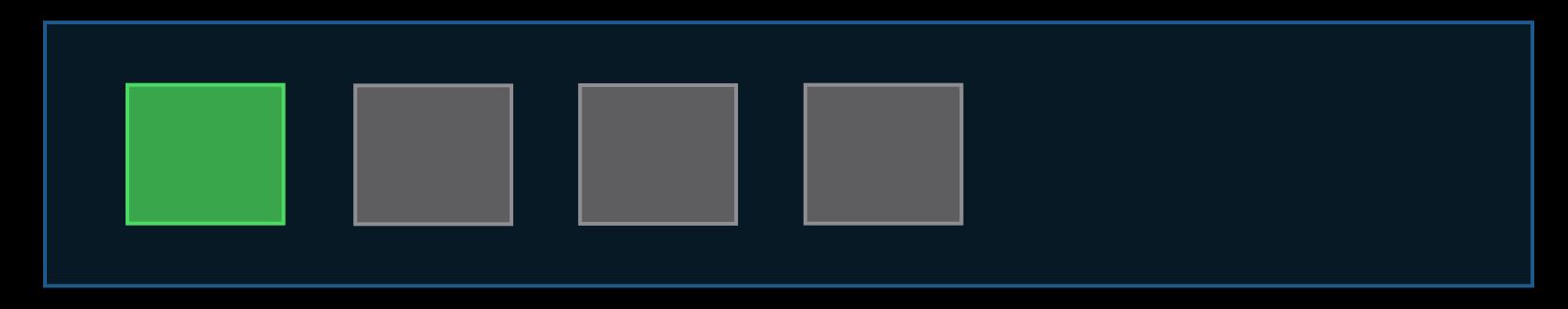


Queues View

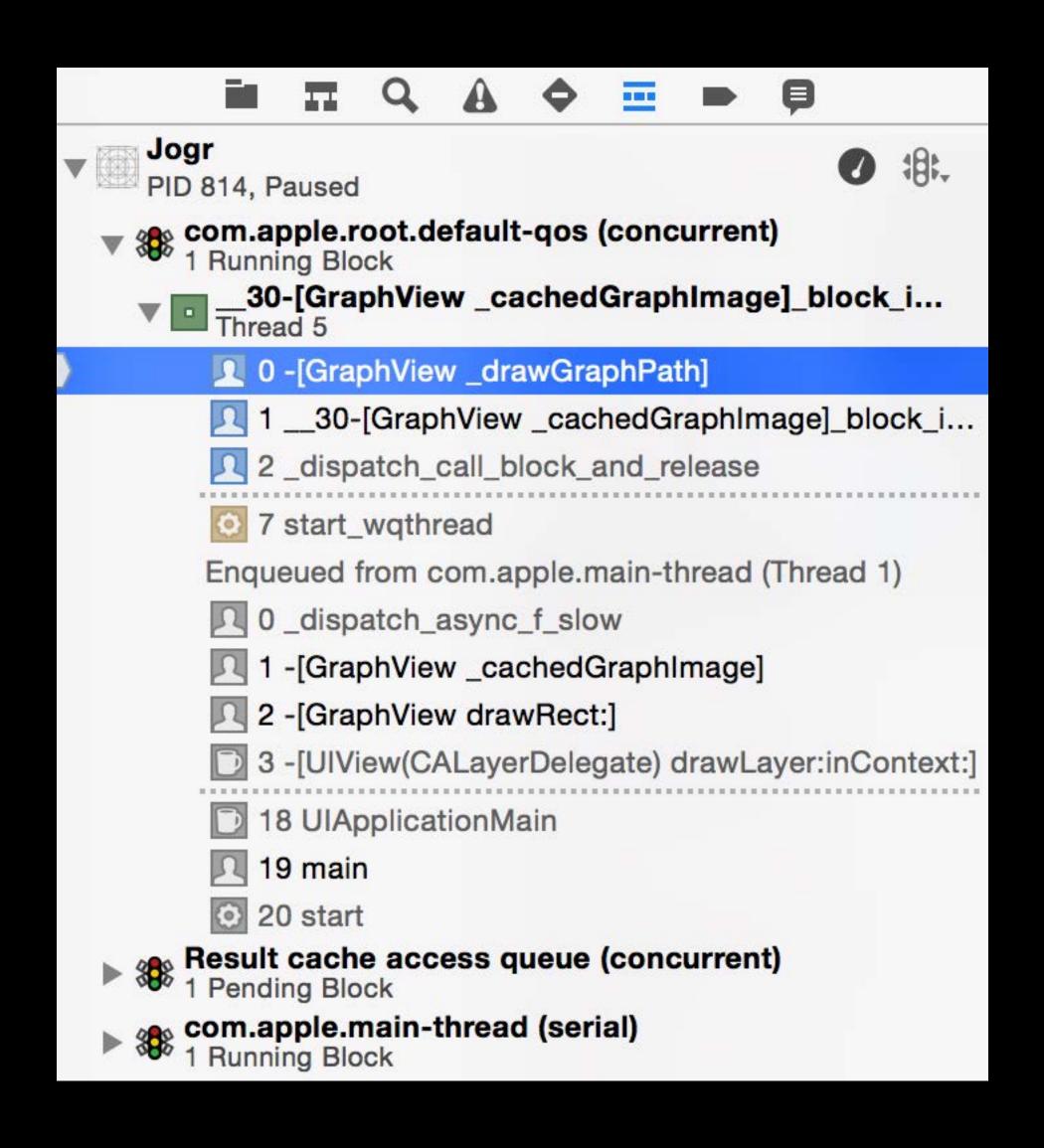


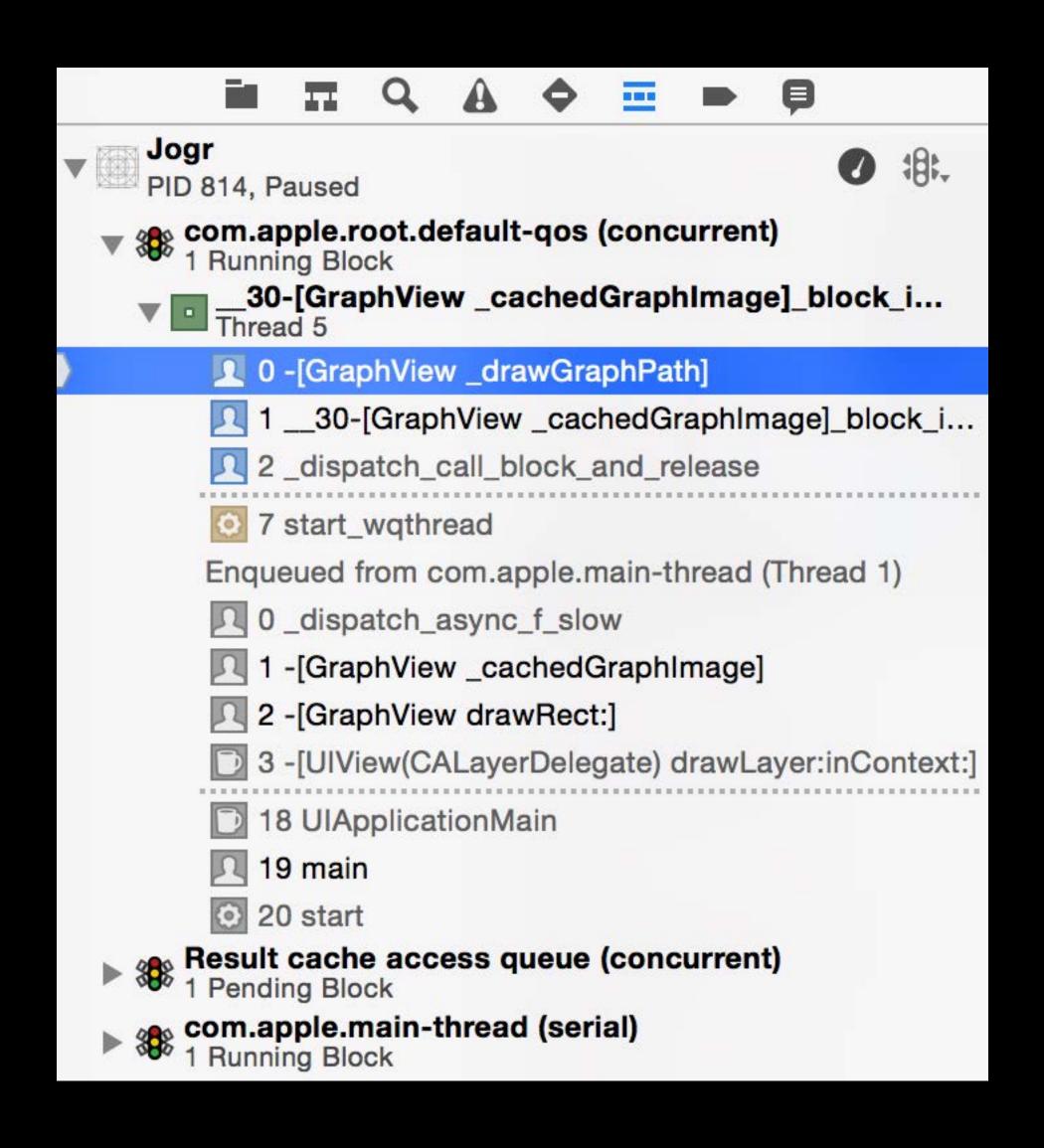


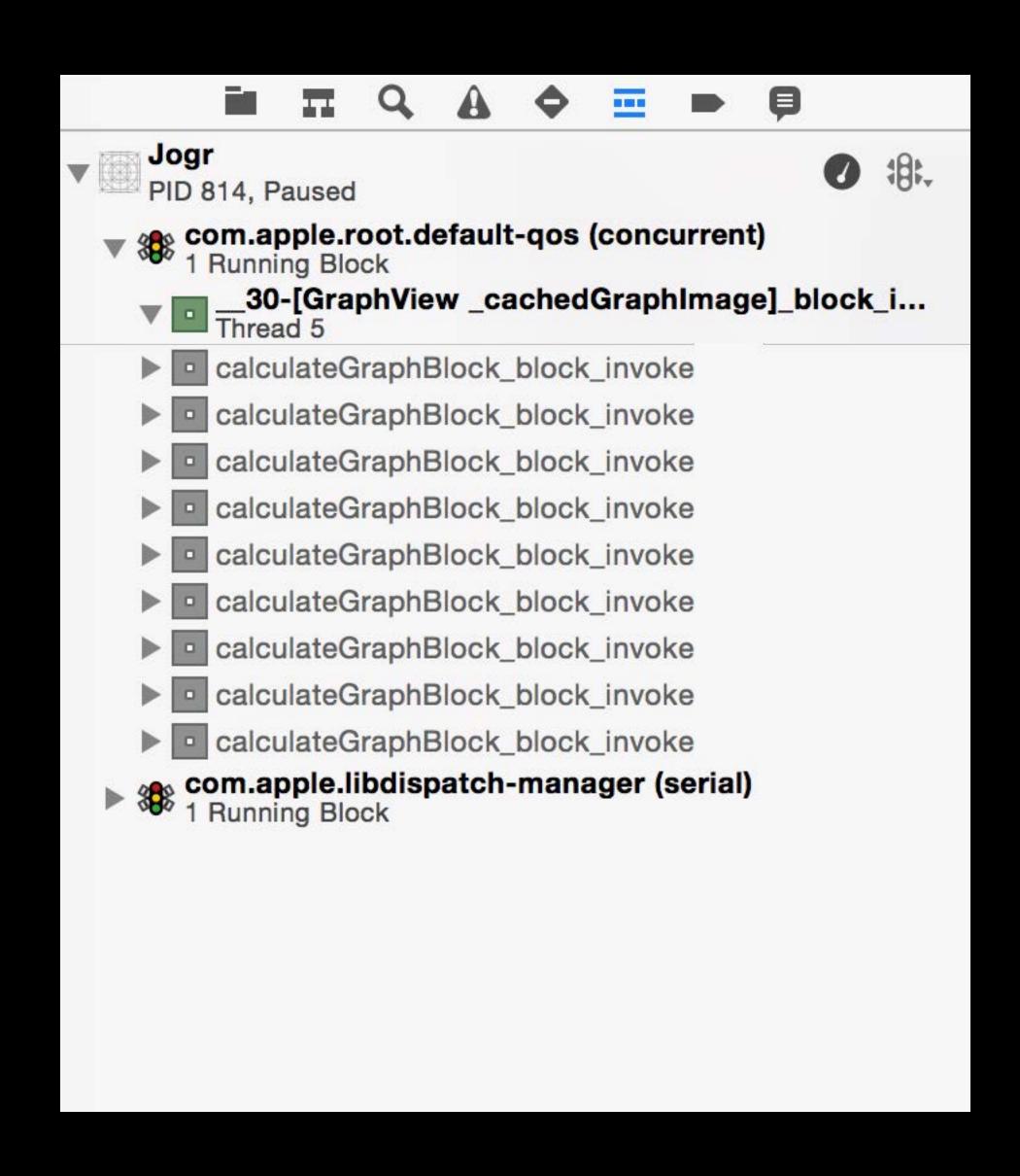
Serial Queue

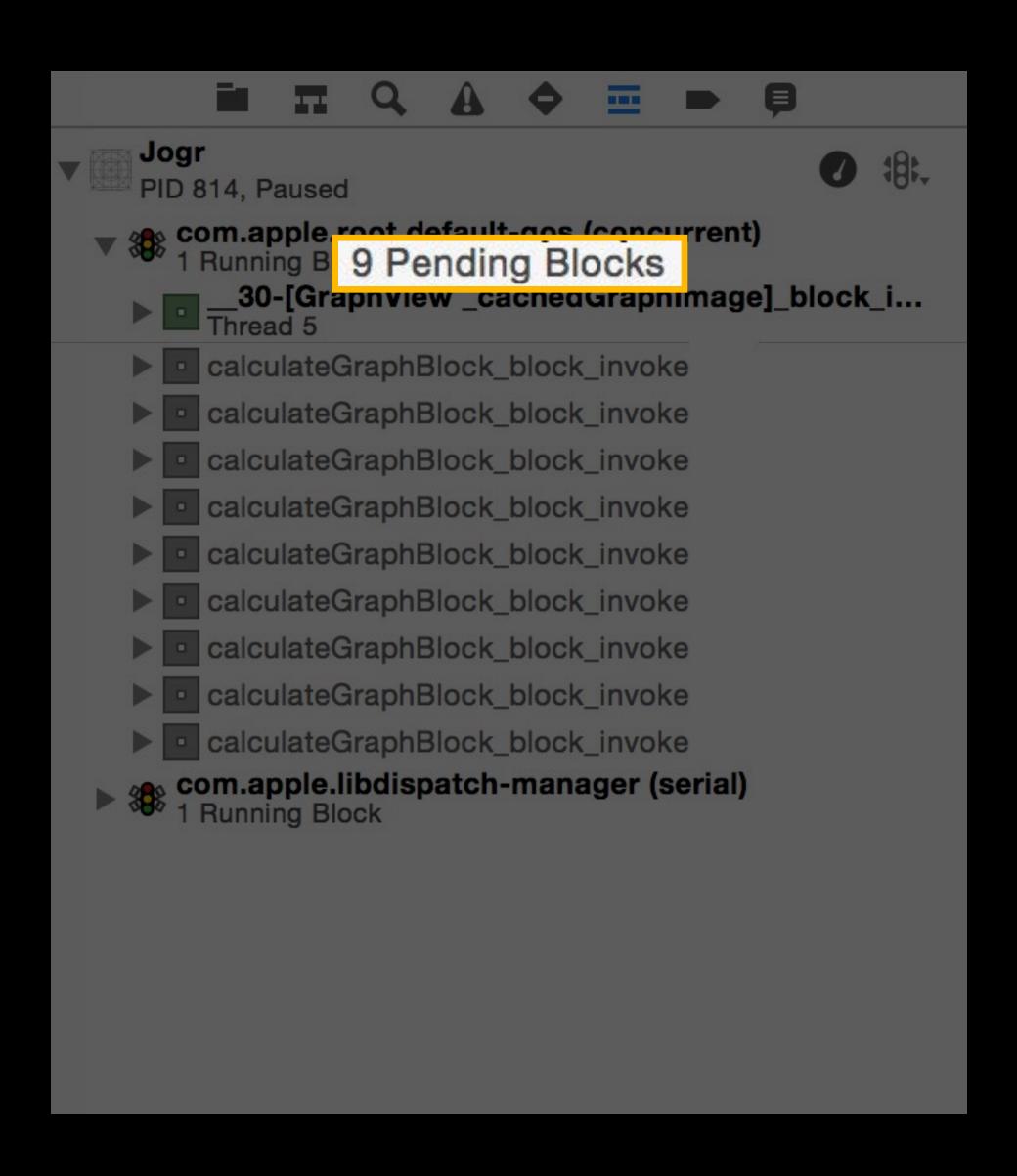


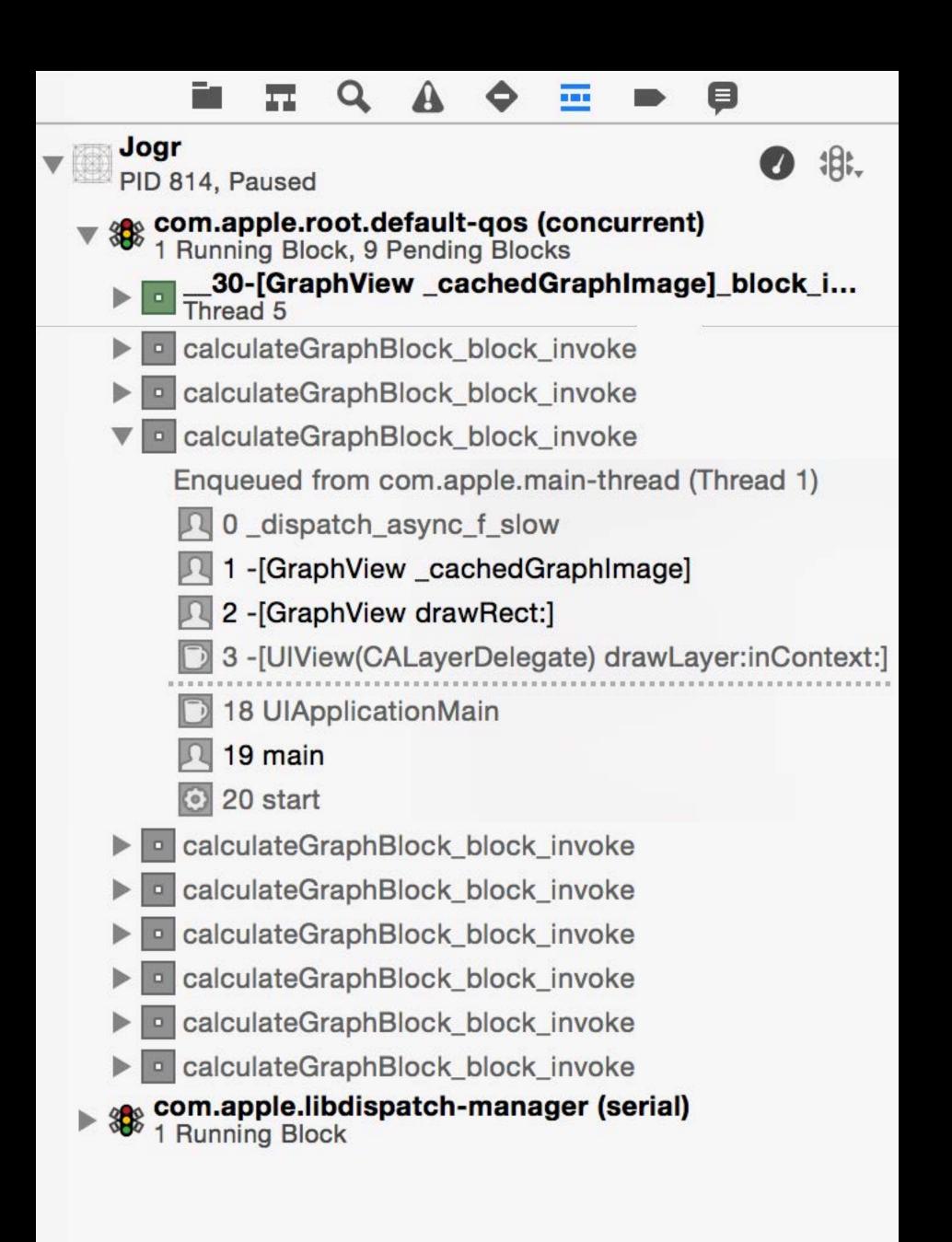
Serial Queue











Demo

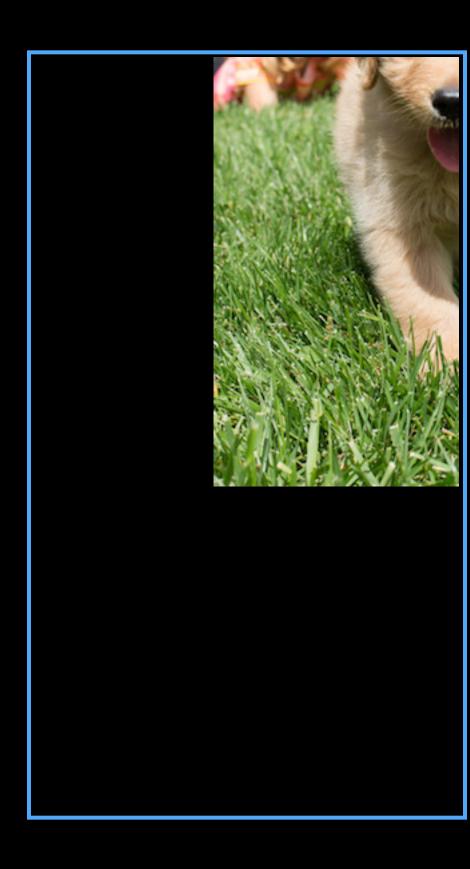
Queues Debugging

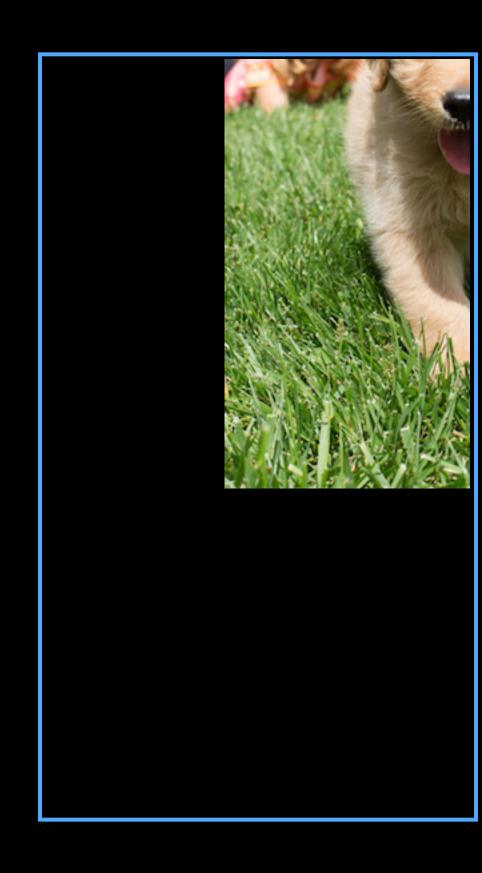
Queue Debugging

Recorded backtraces

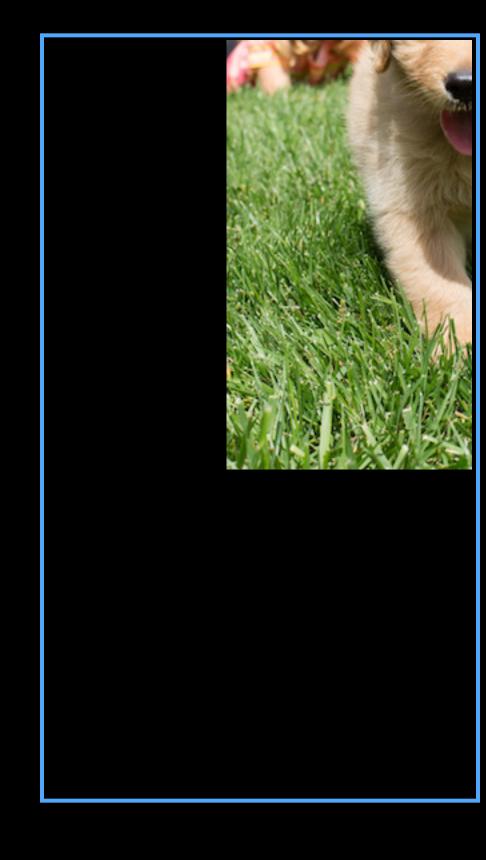
Debugging User Interfaces in Xcode

Troy Koelling
Debugger UI Engineer

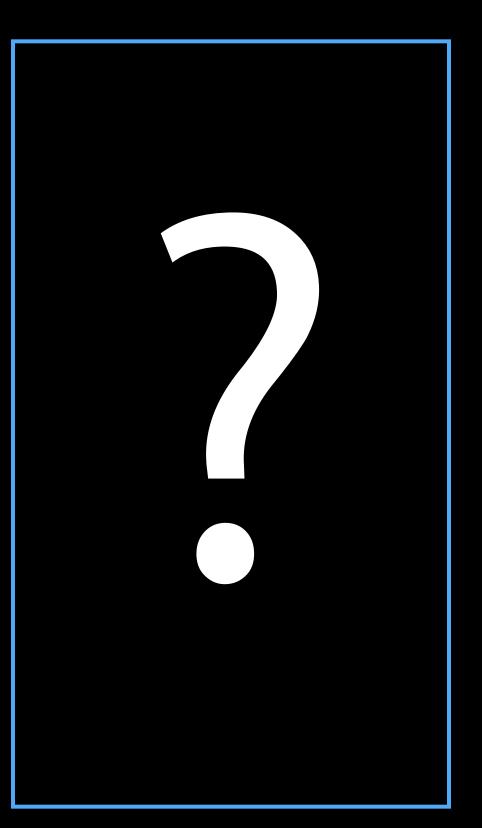


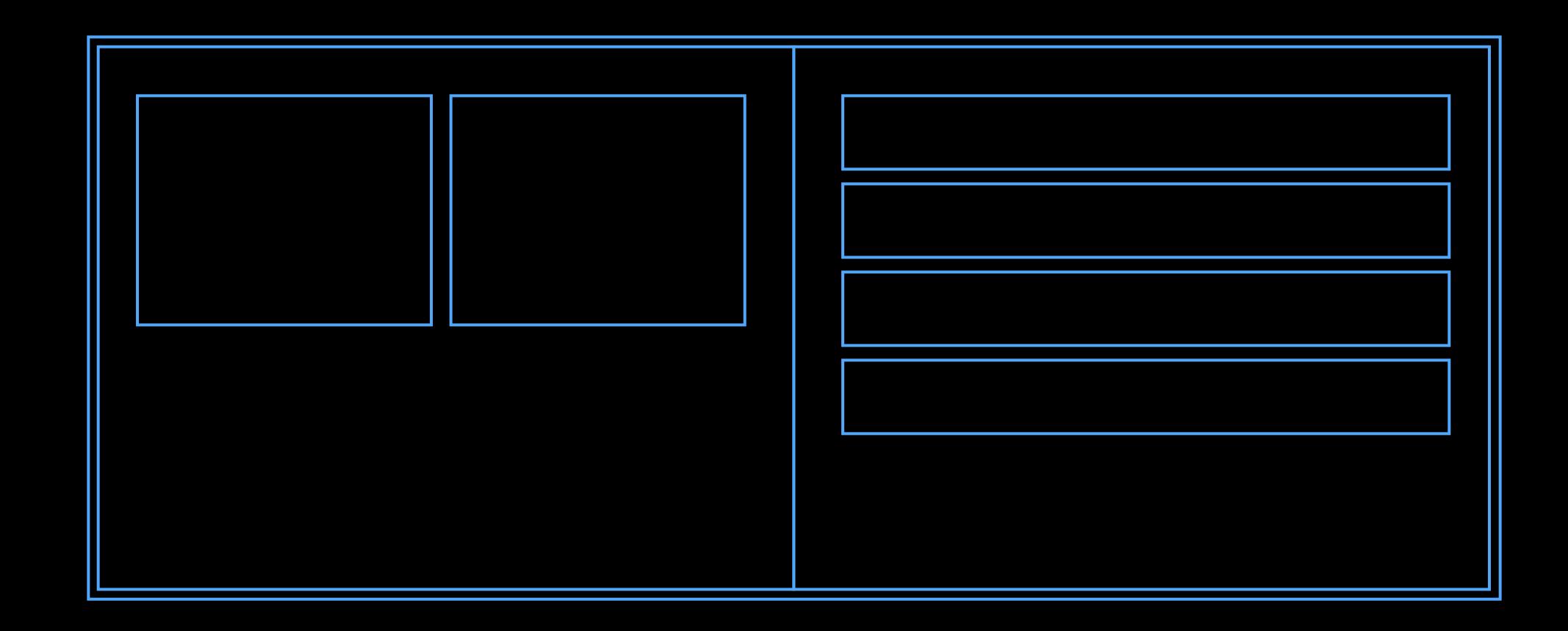


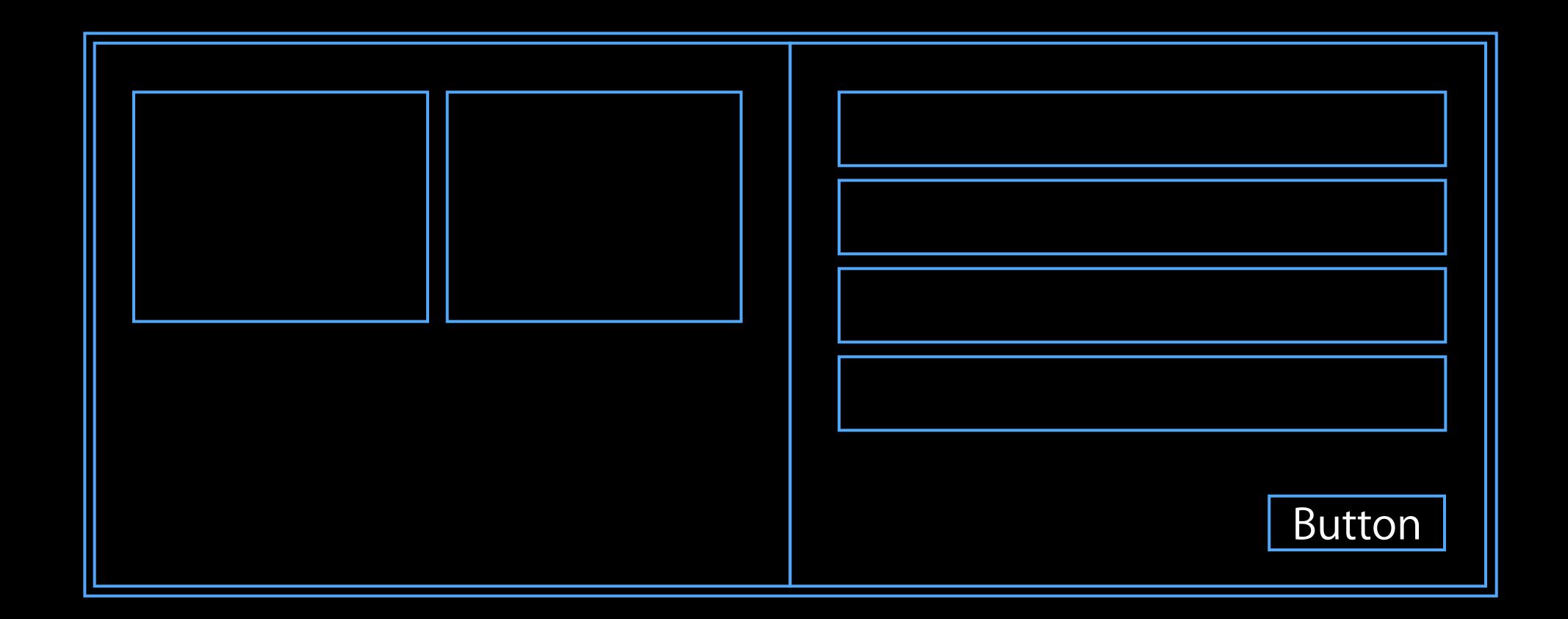


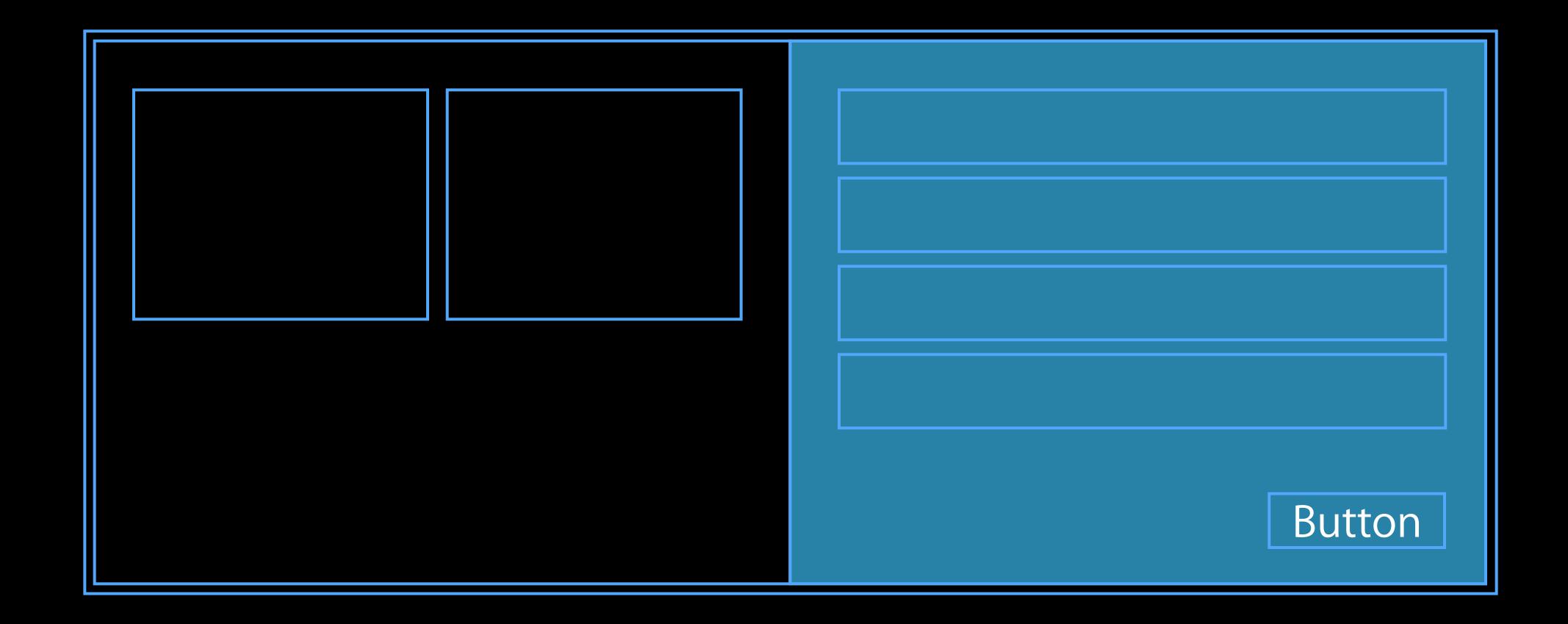




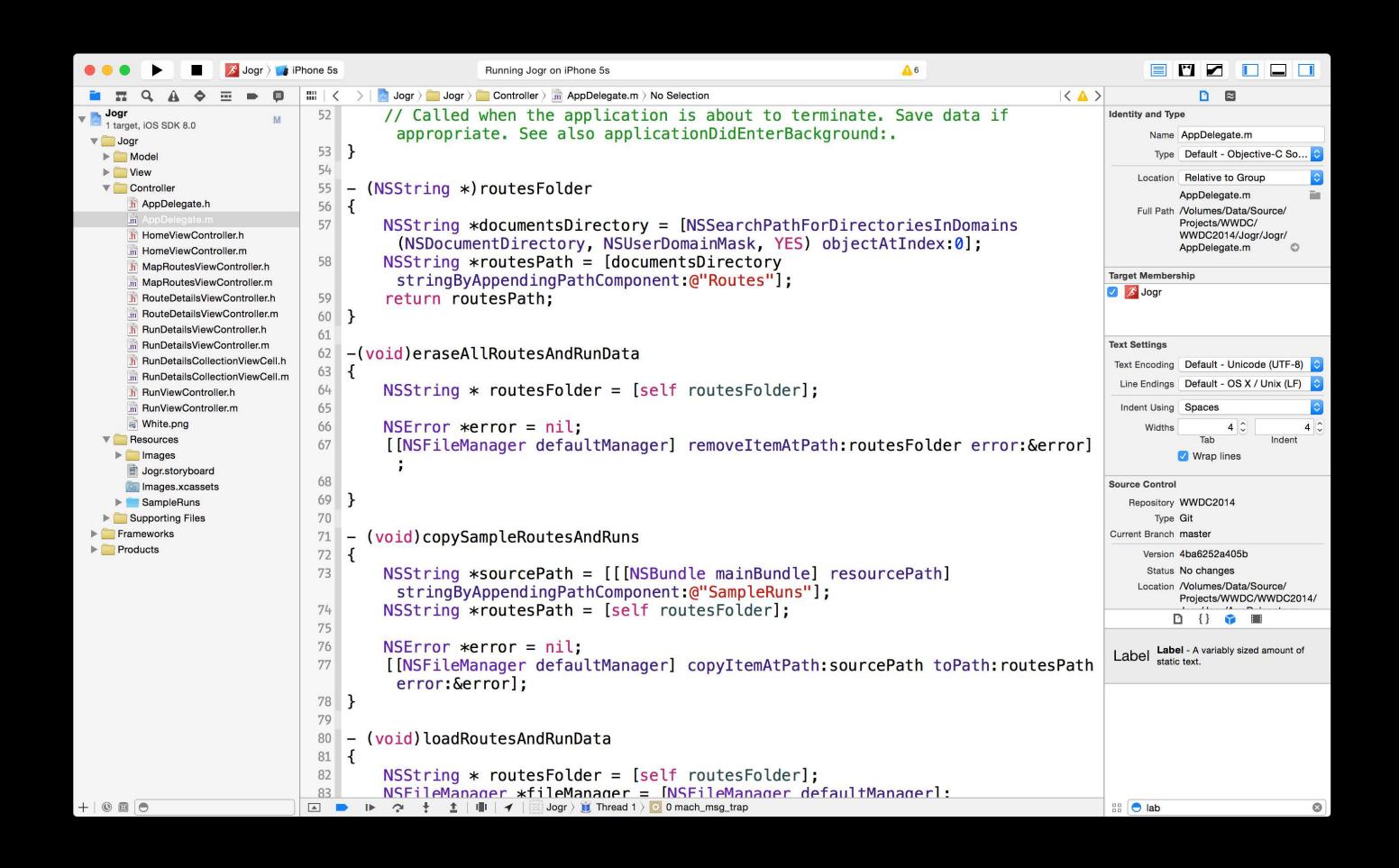




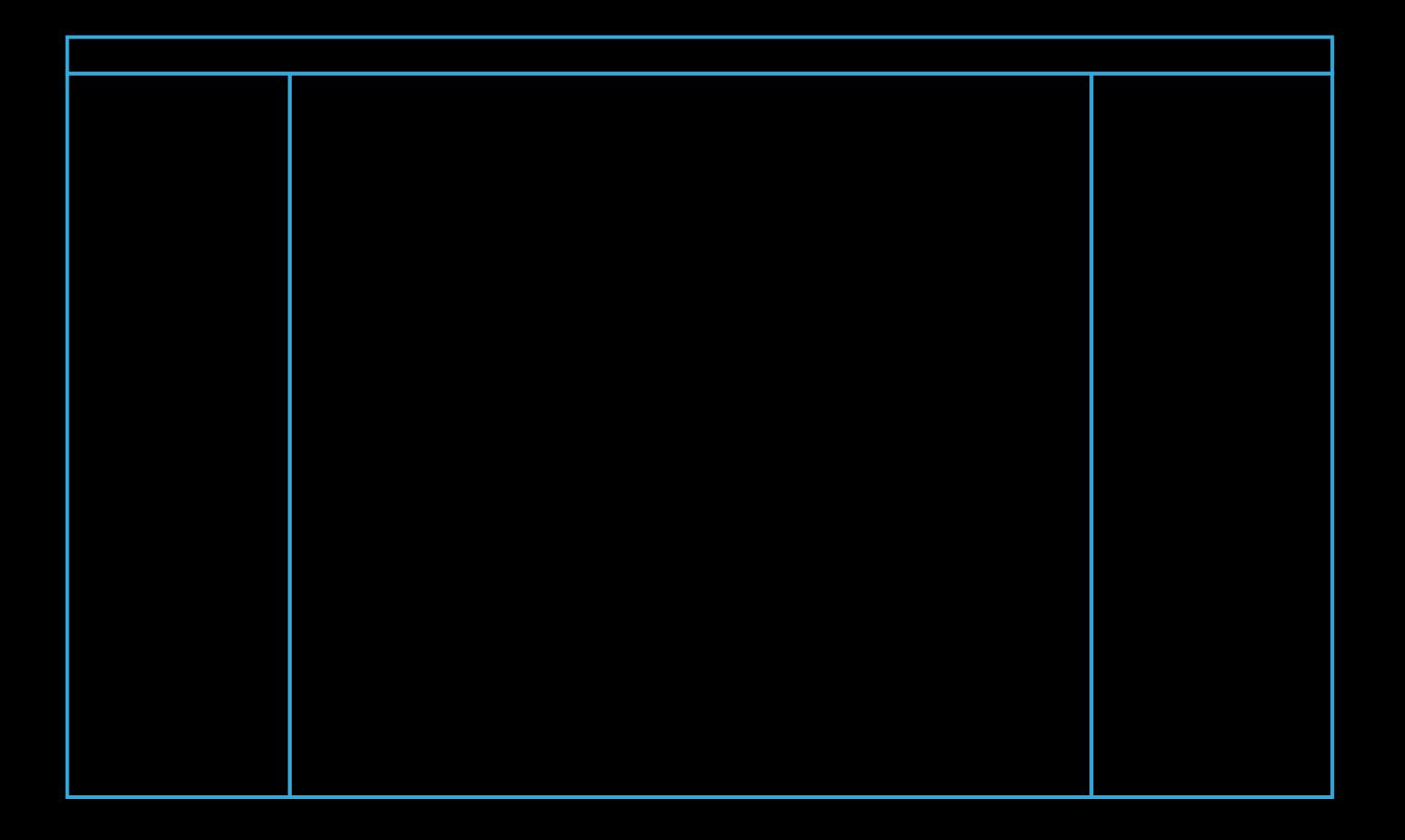


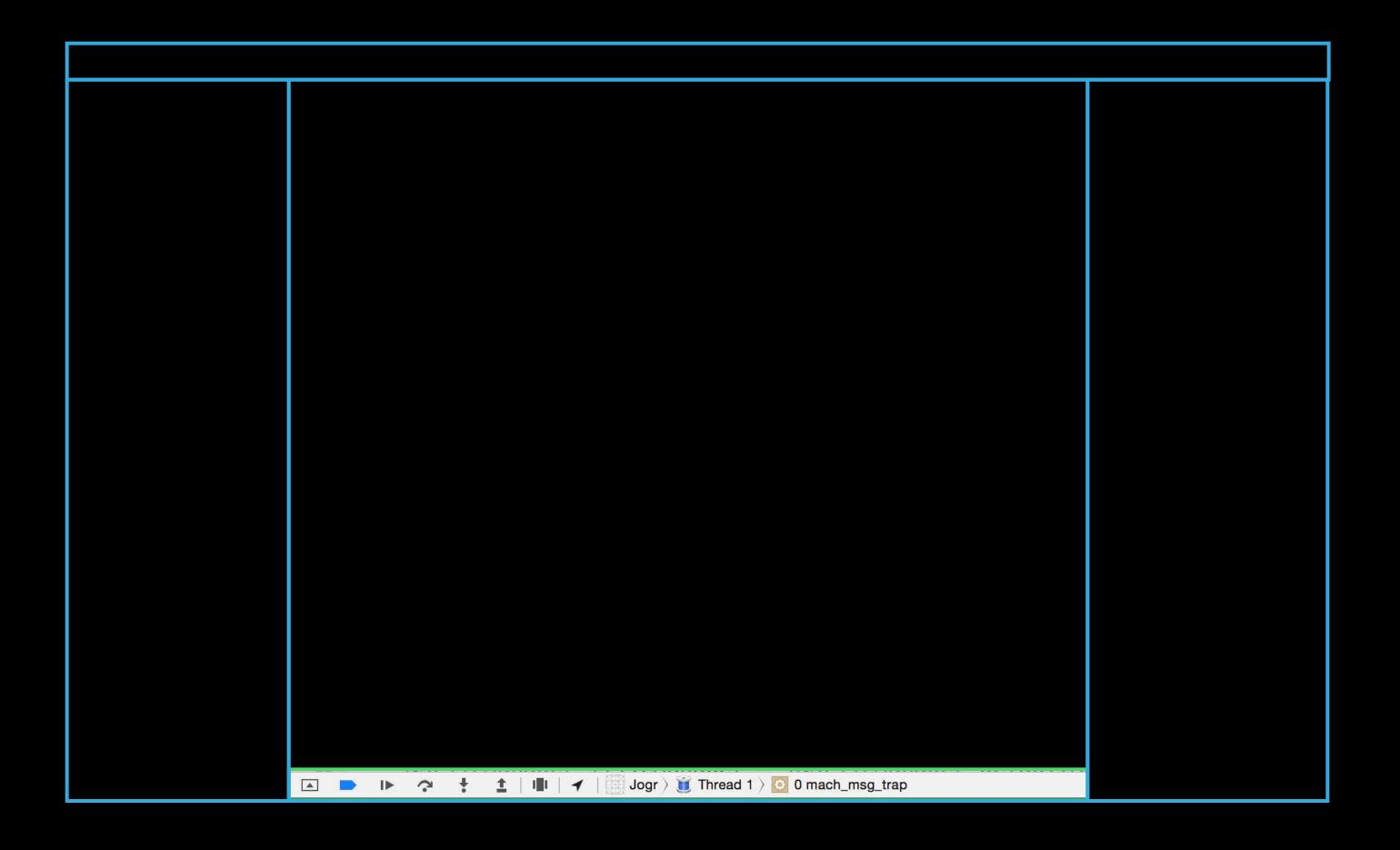


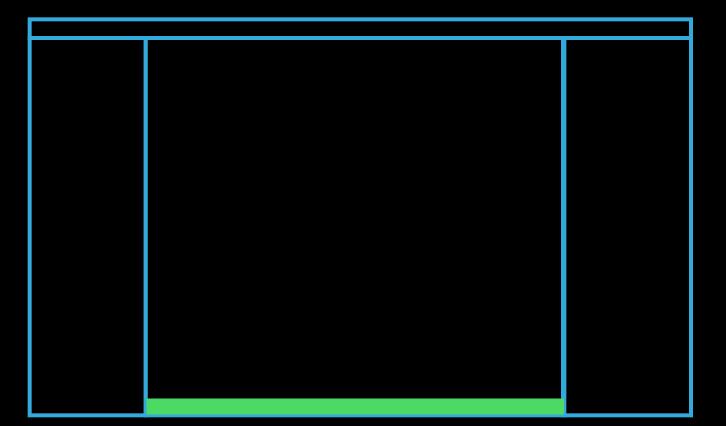
Xcode



Xcode



















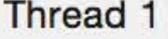






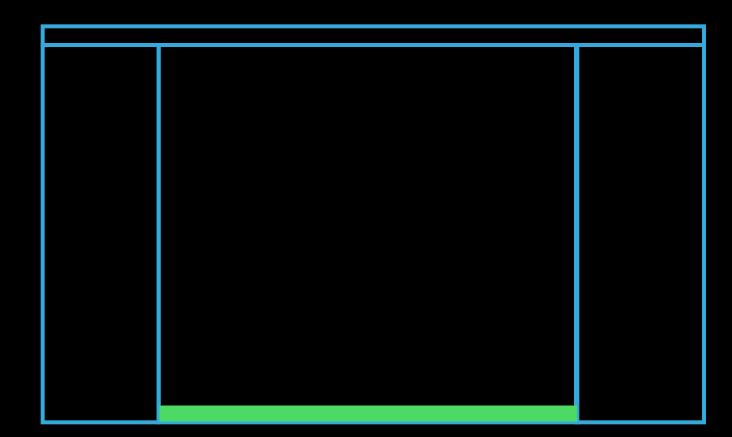






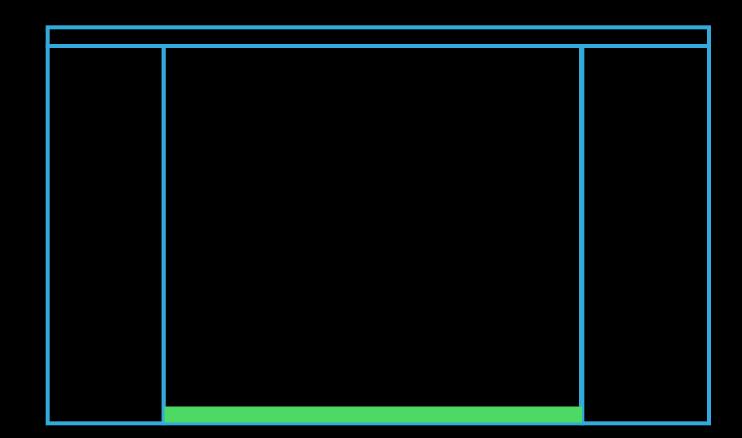


Jogr > ii Thread 1 > iii 0 mach_msg_trap





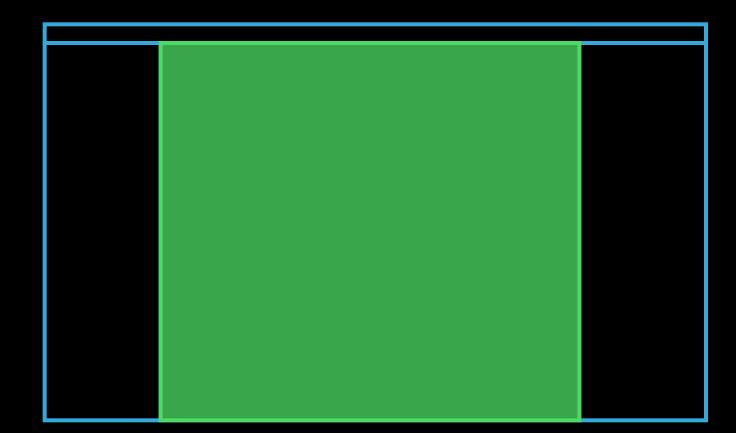
Debug View Hierarchy

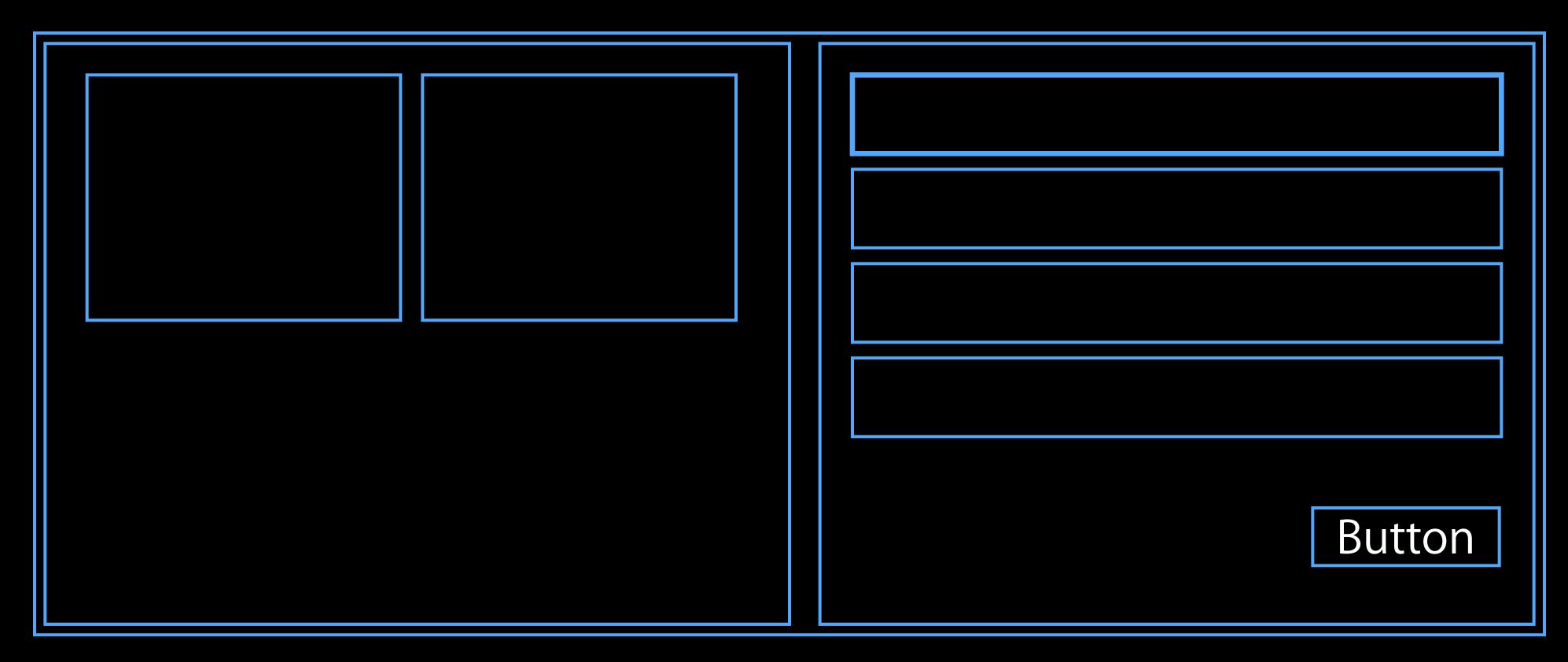




Debug View Hierarchy

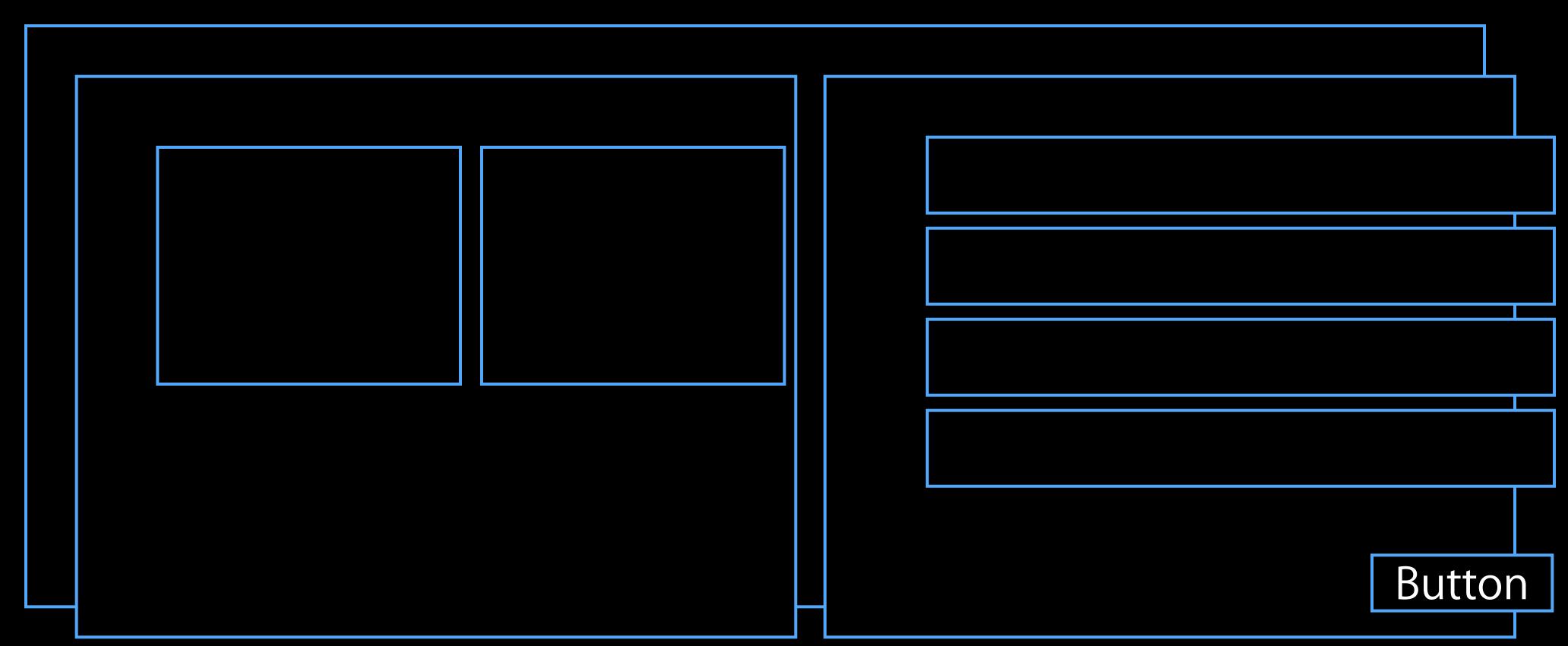
Viewer

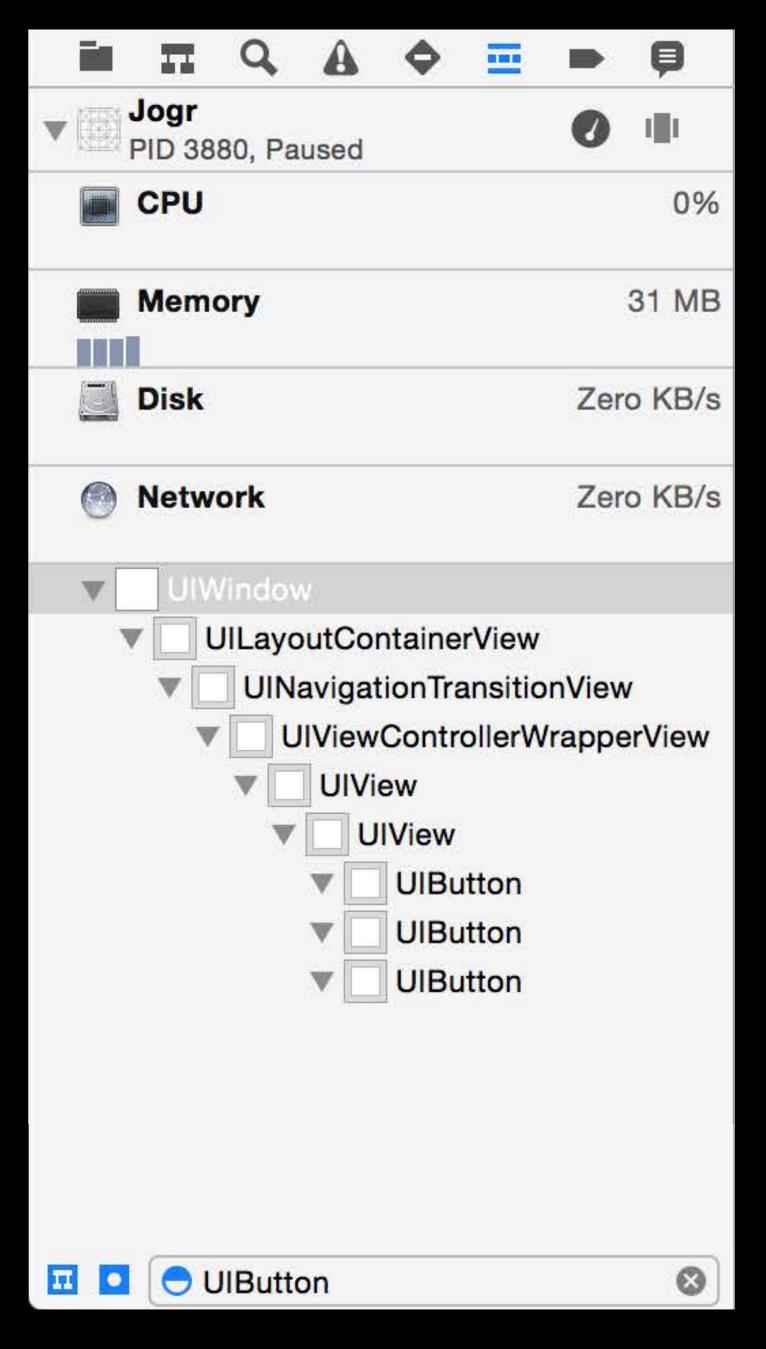


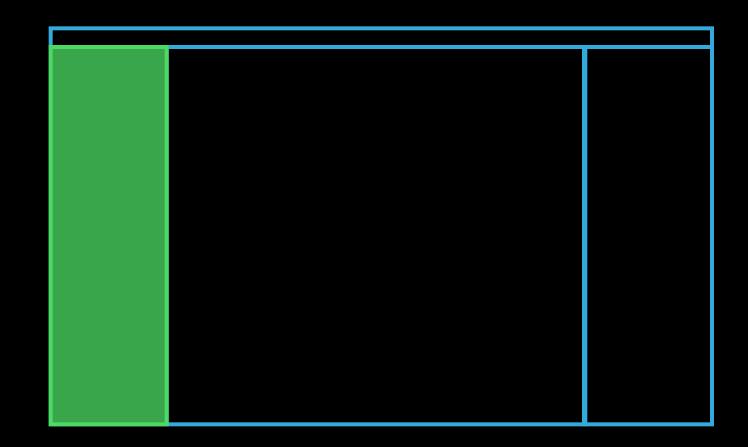


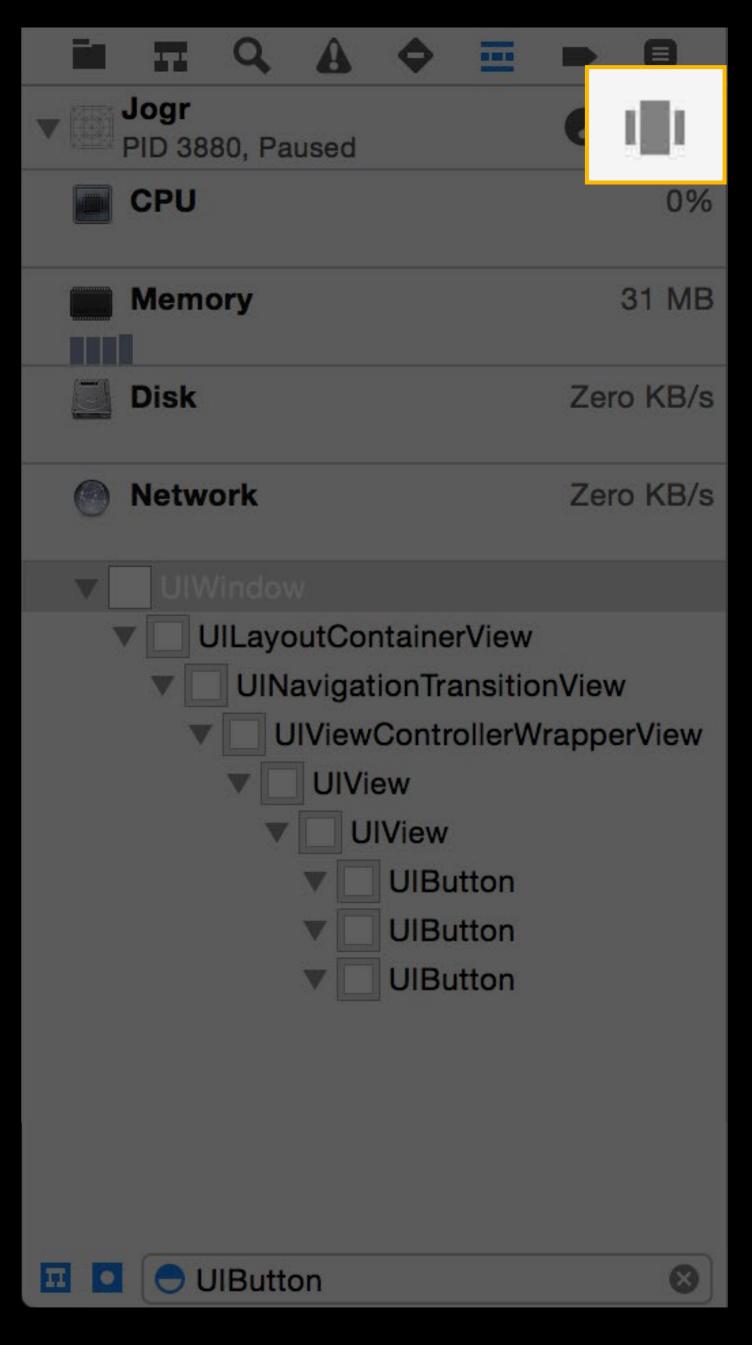
Viewer

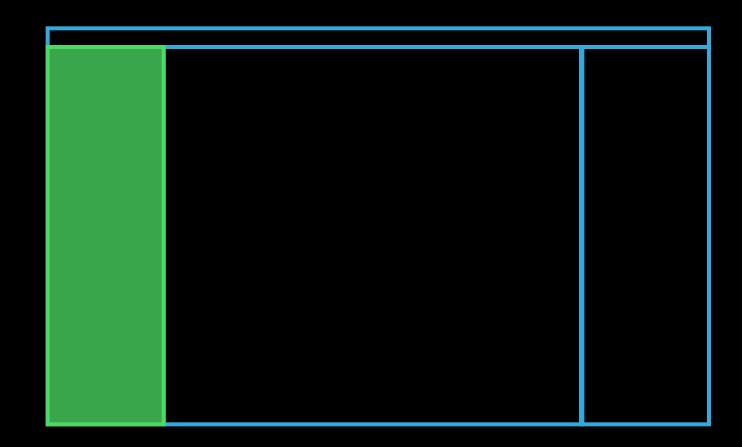


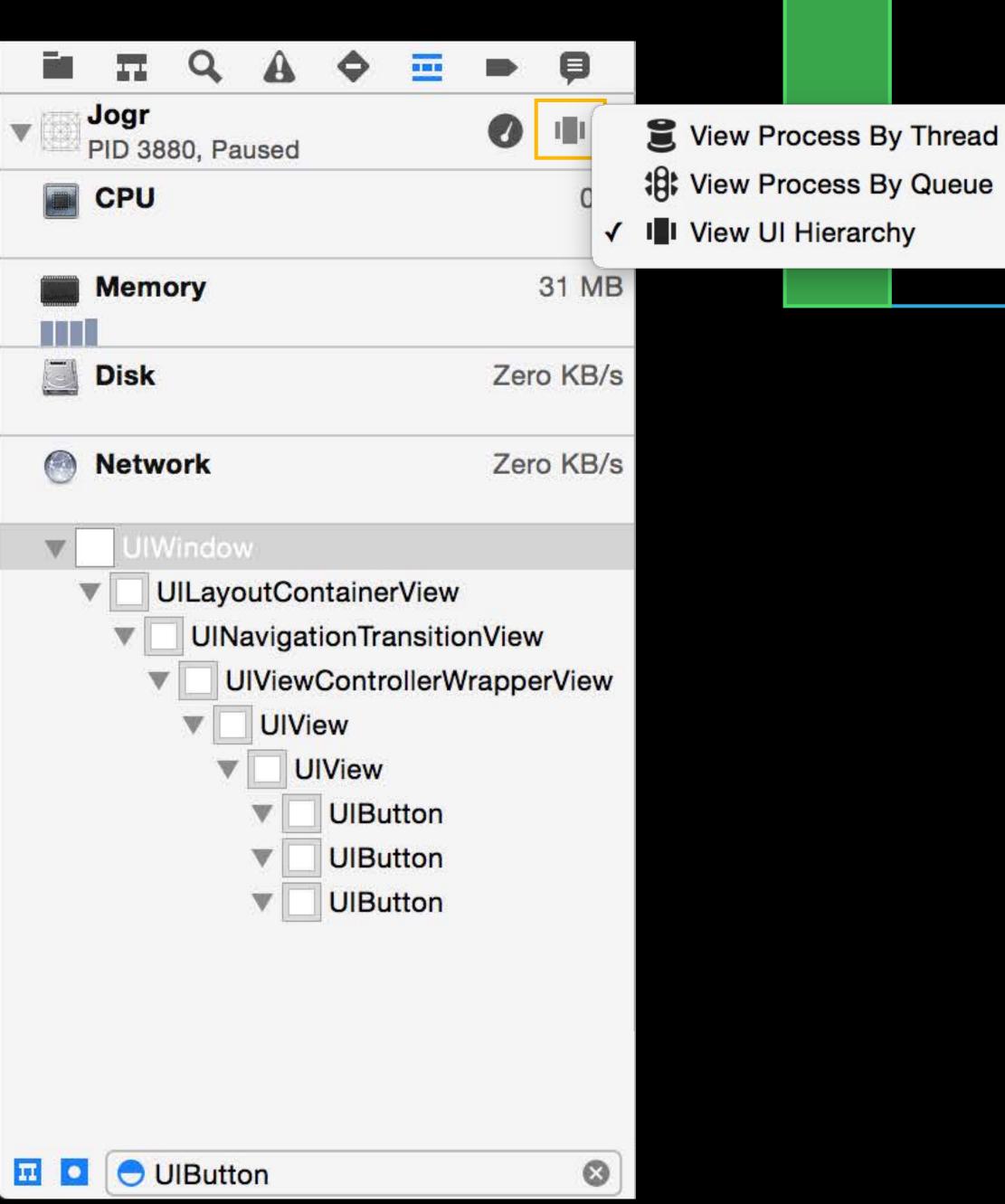


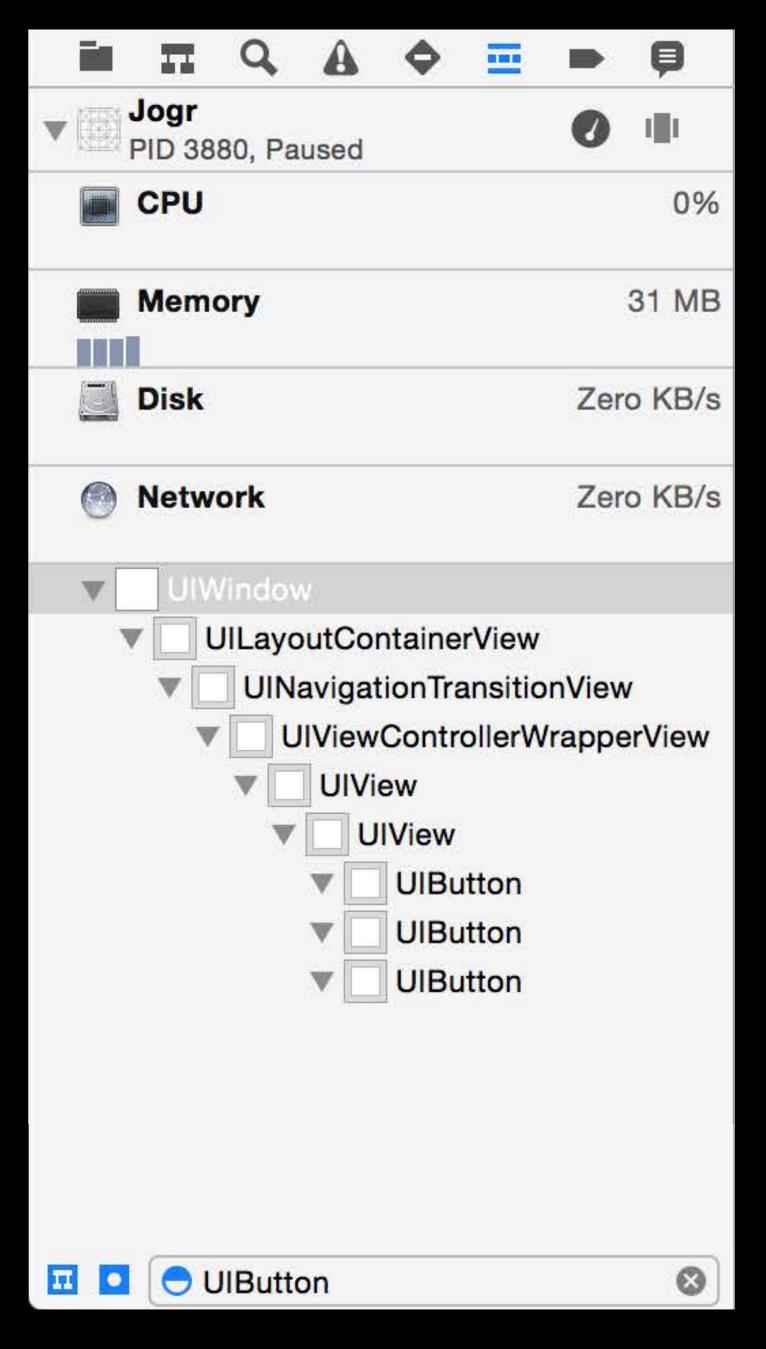


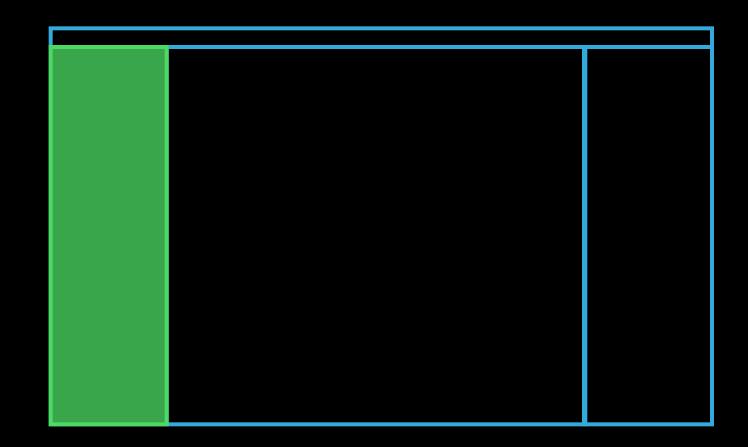


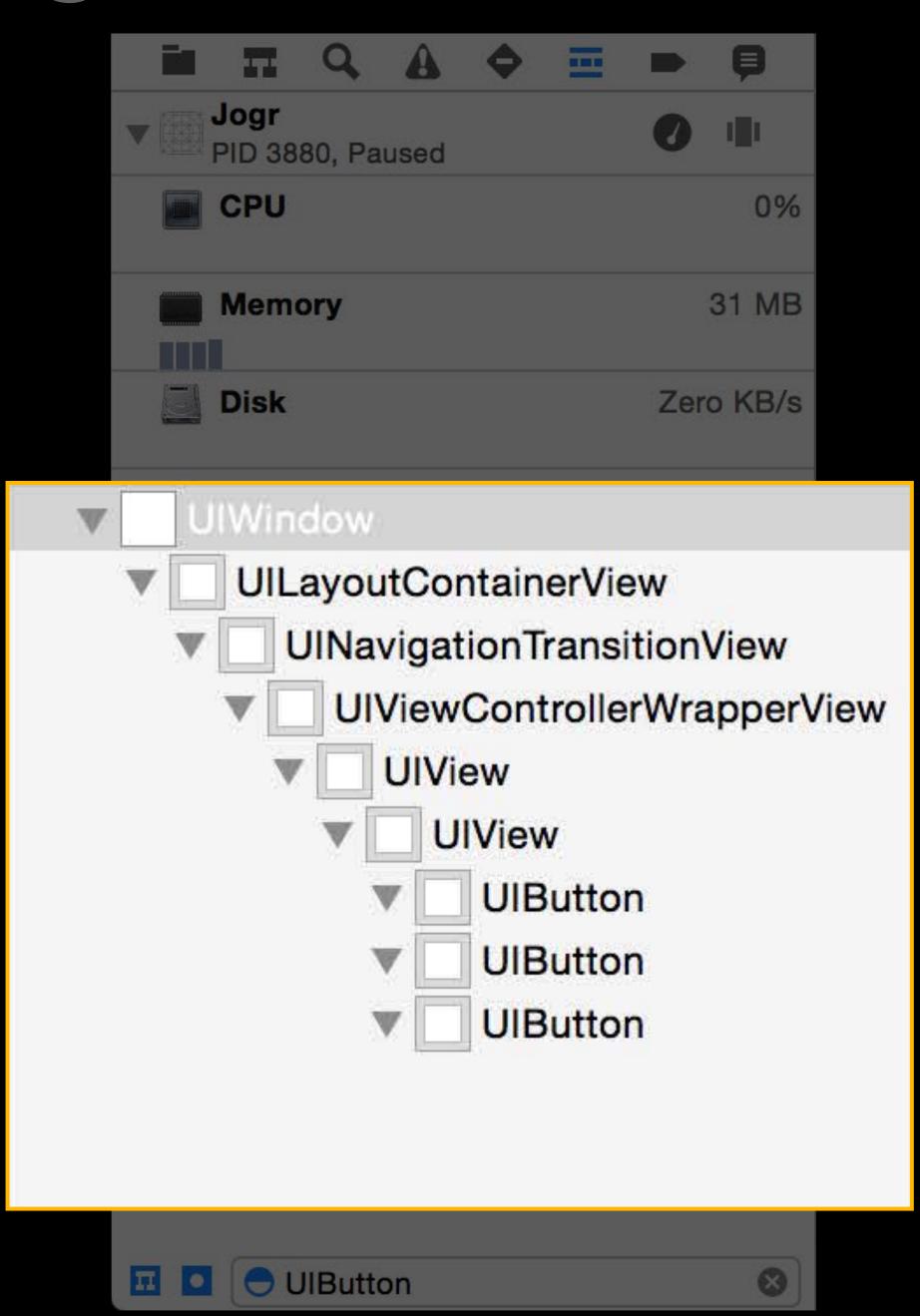


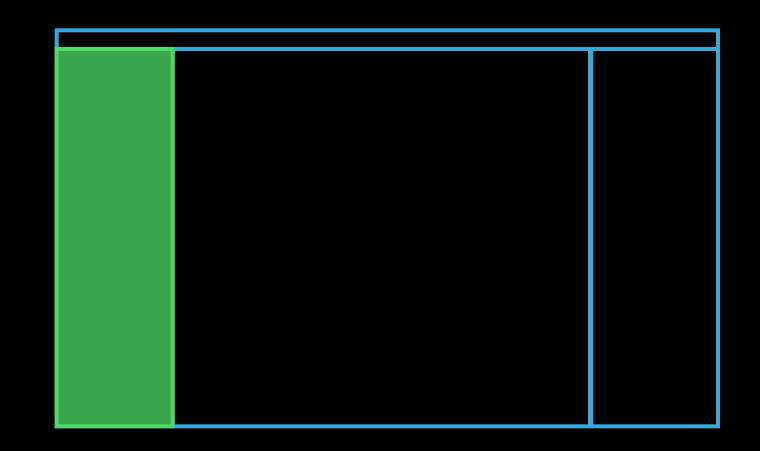


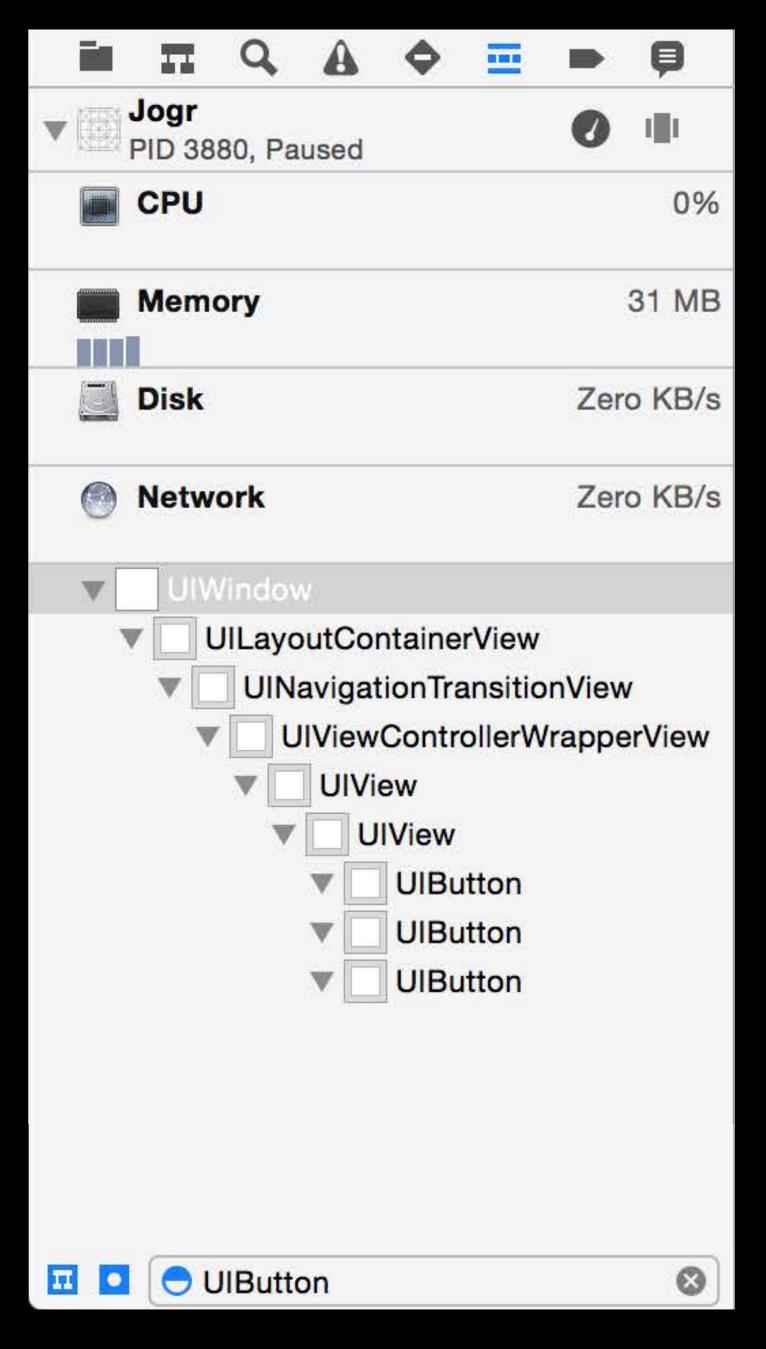


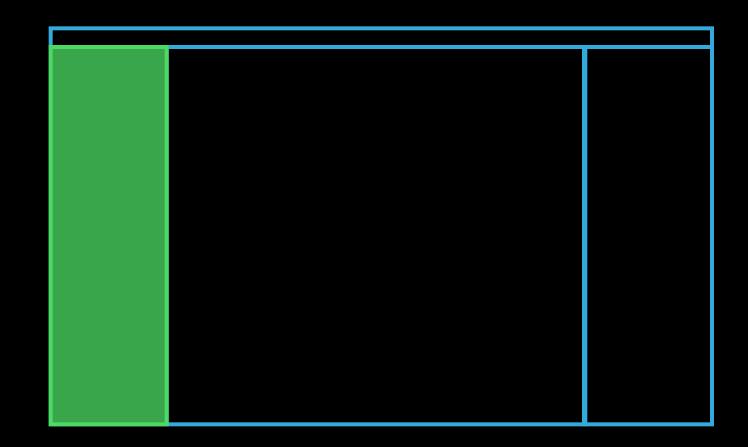




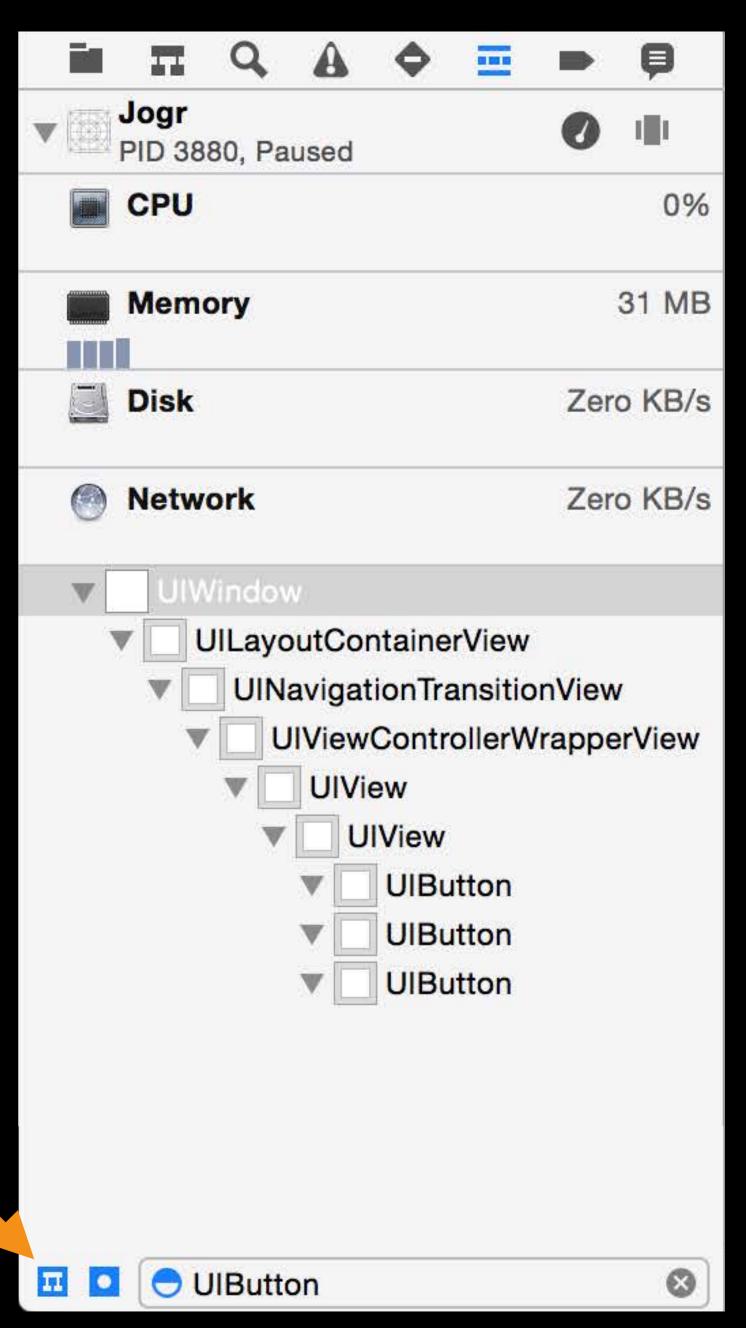


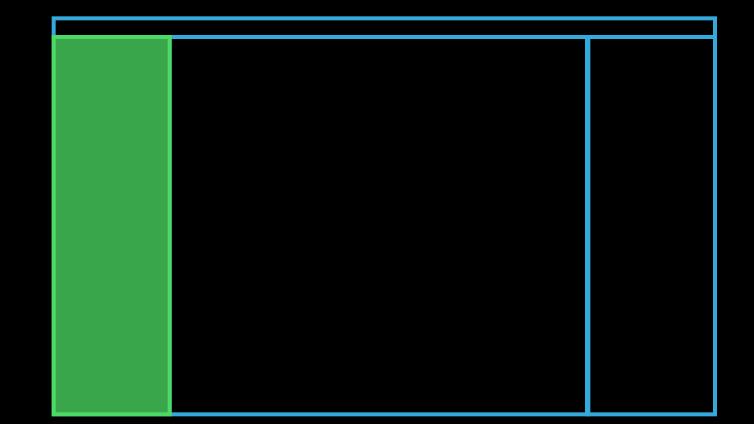


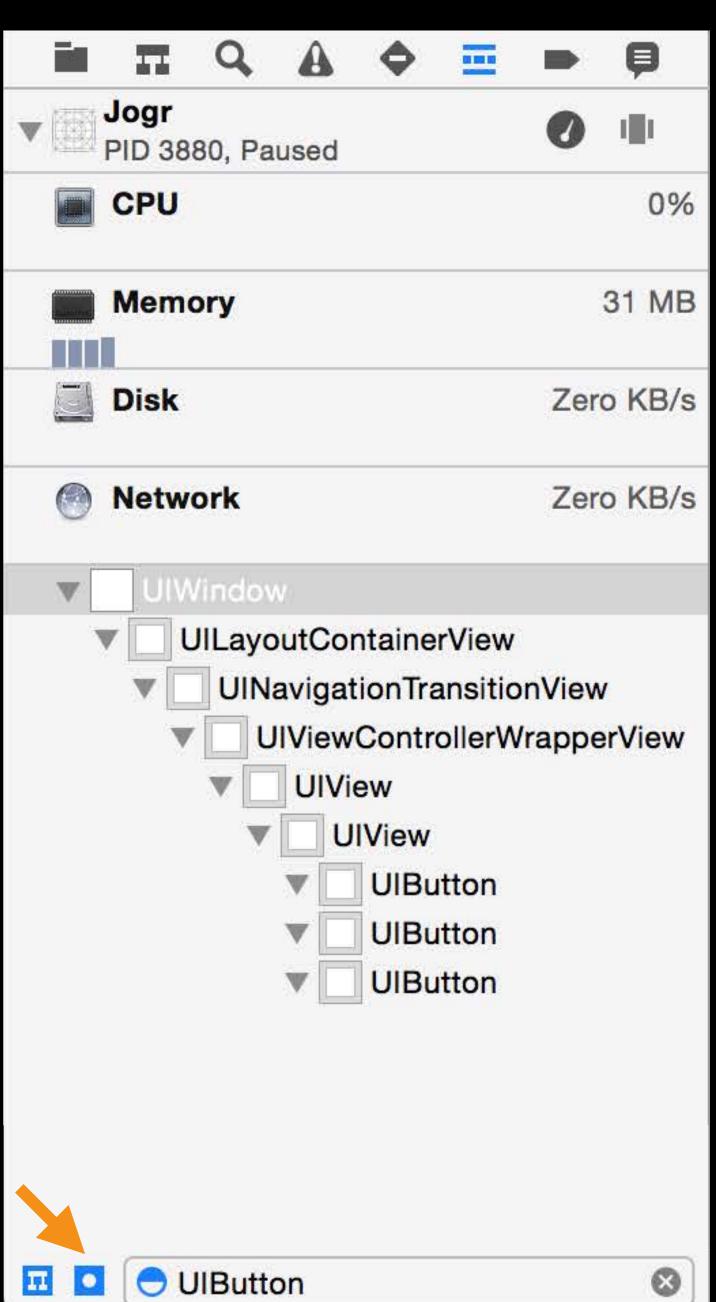




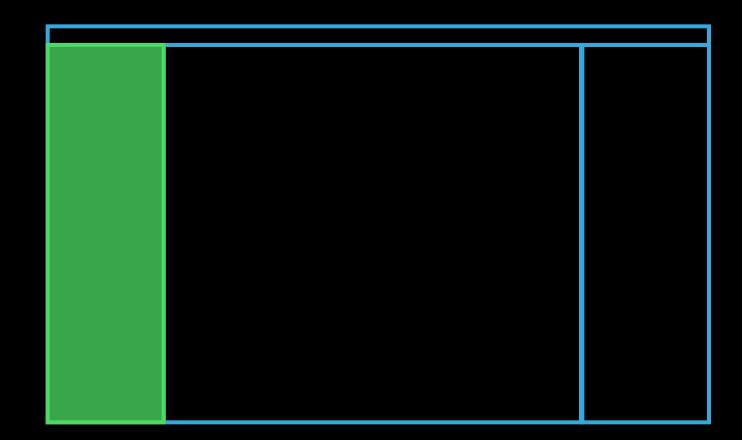
Show primary views



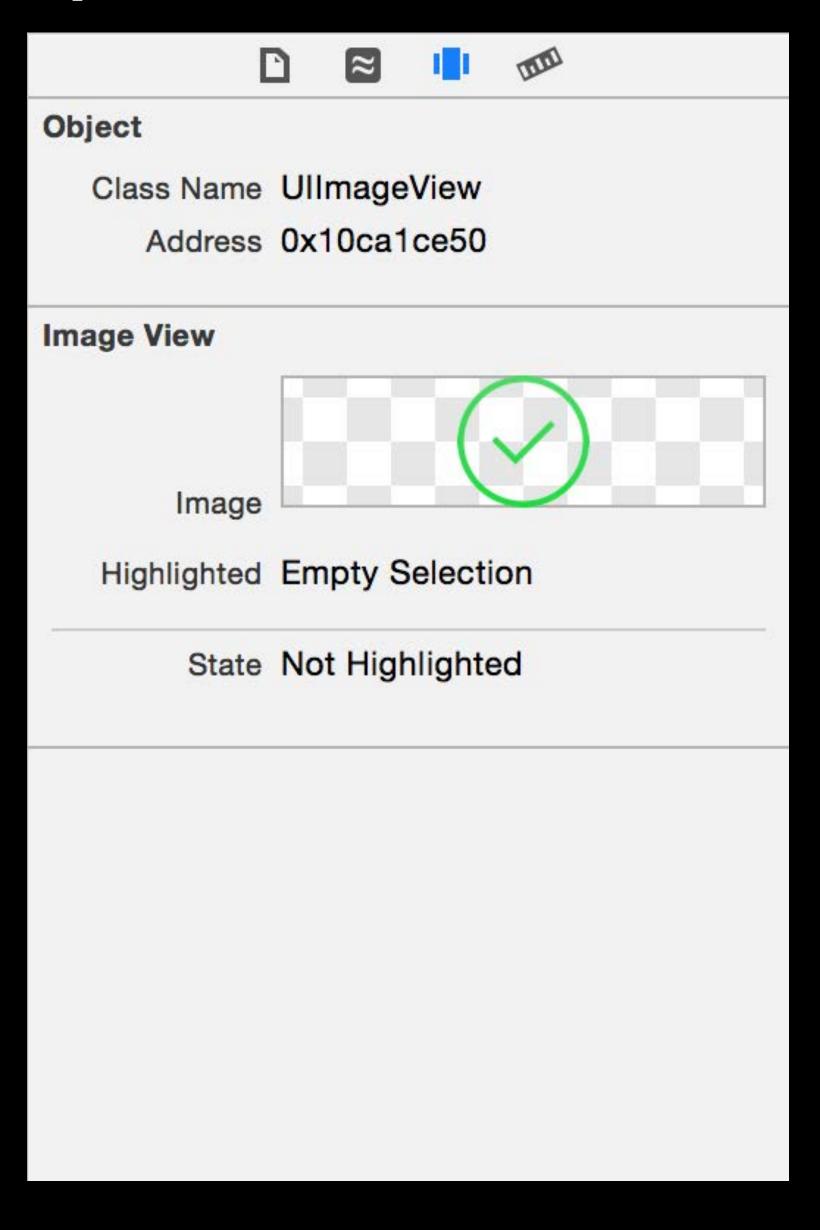


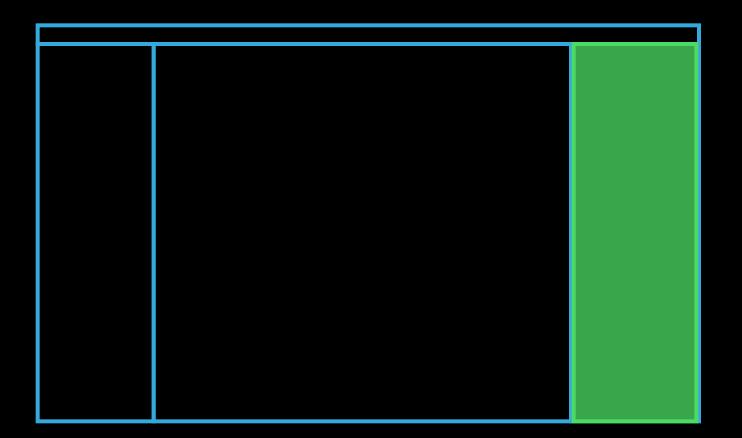


Show only displayed views

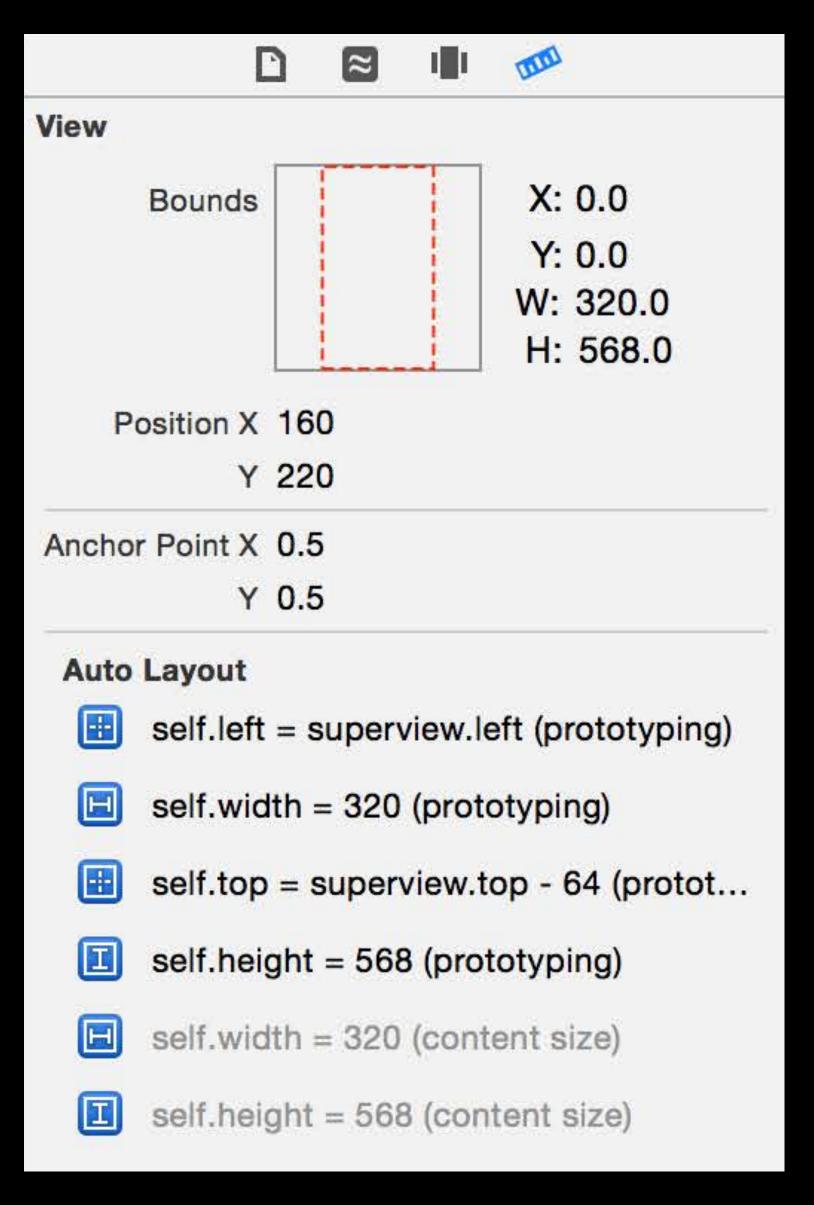


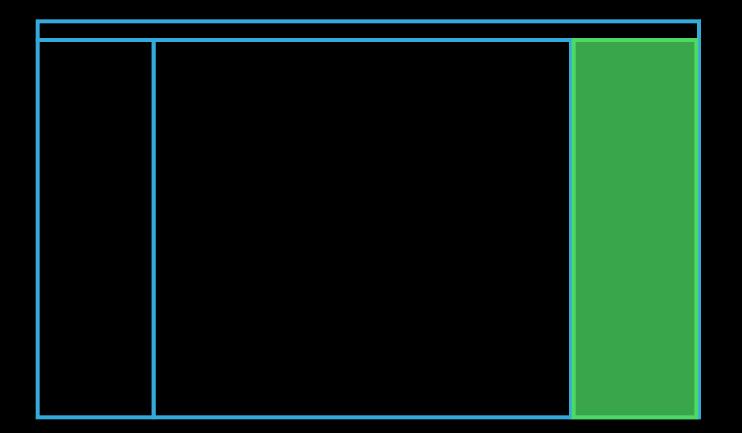
Attributes Inspector



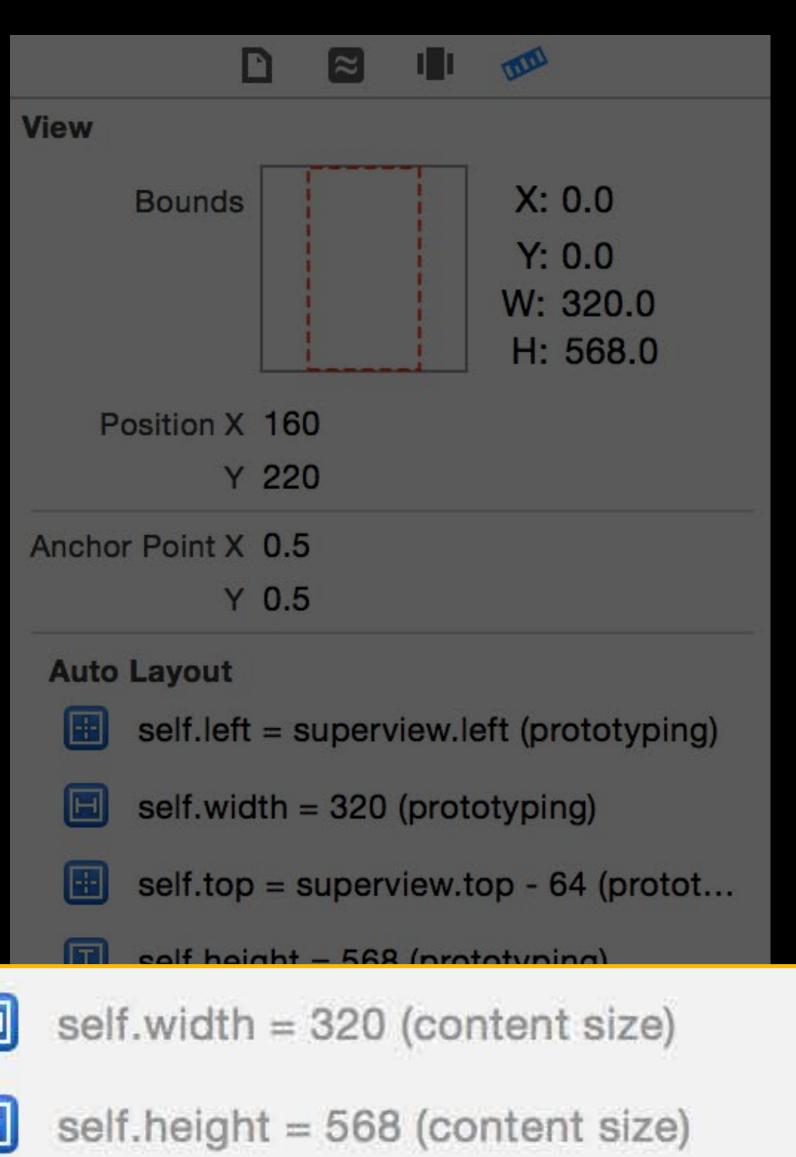


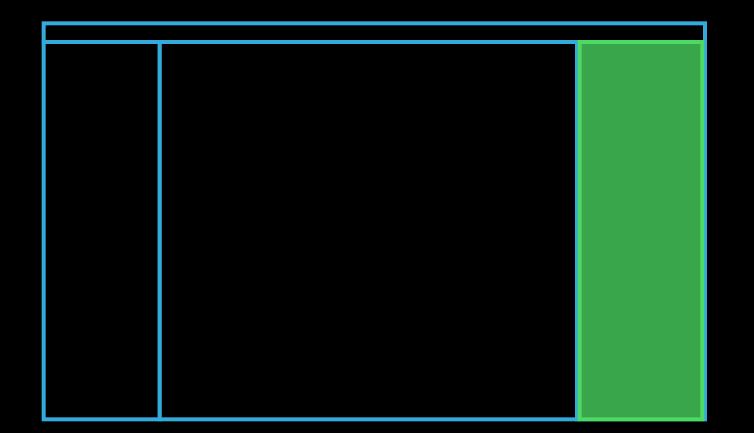
Size Inspector





Size Inspector





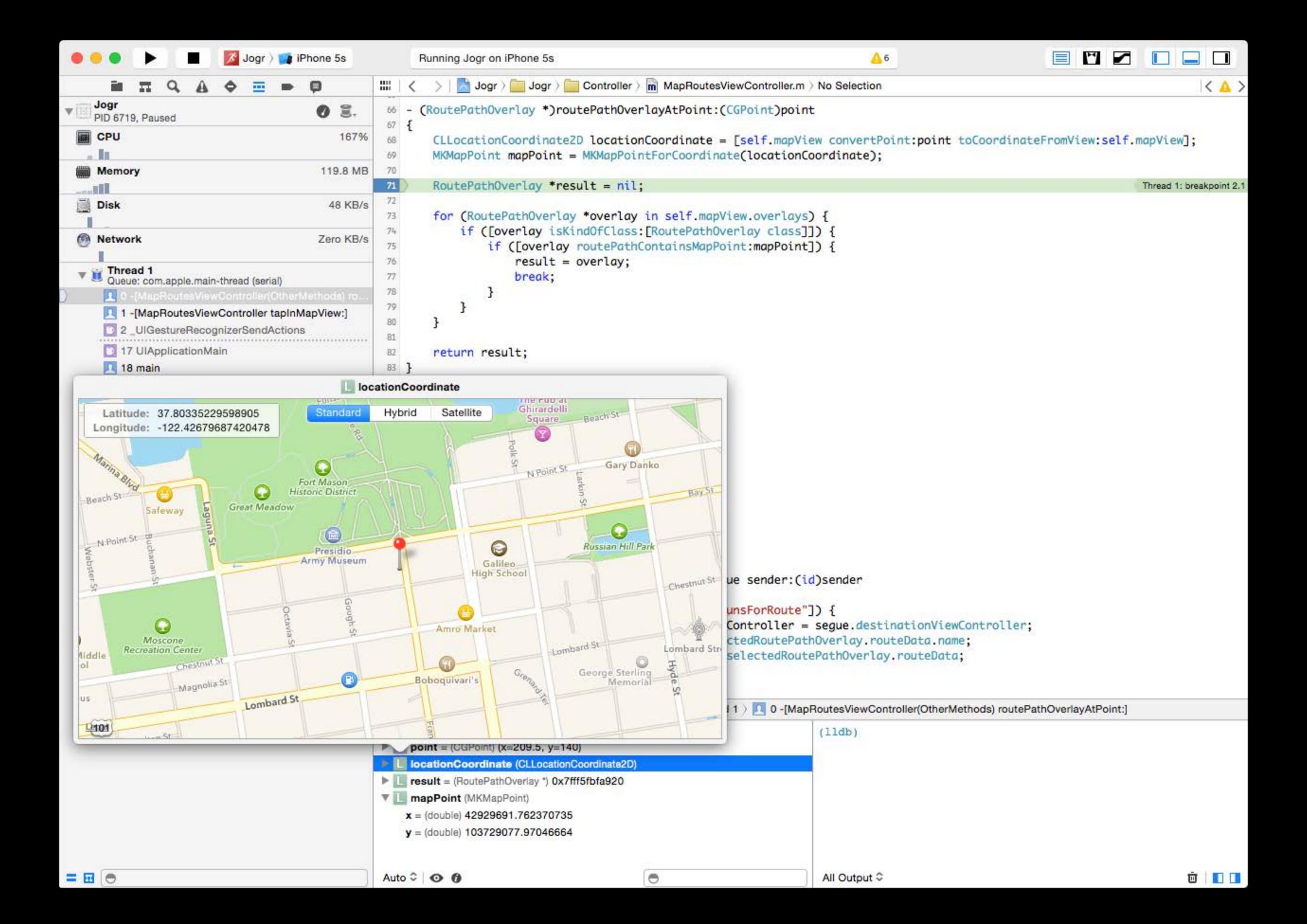
Demo

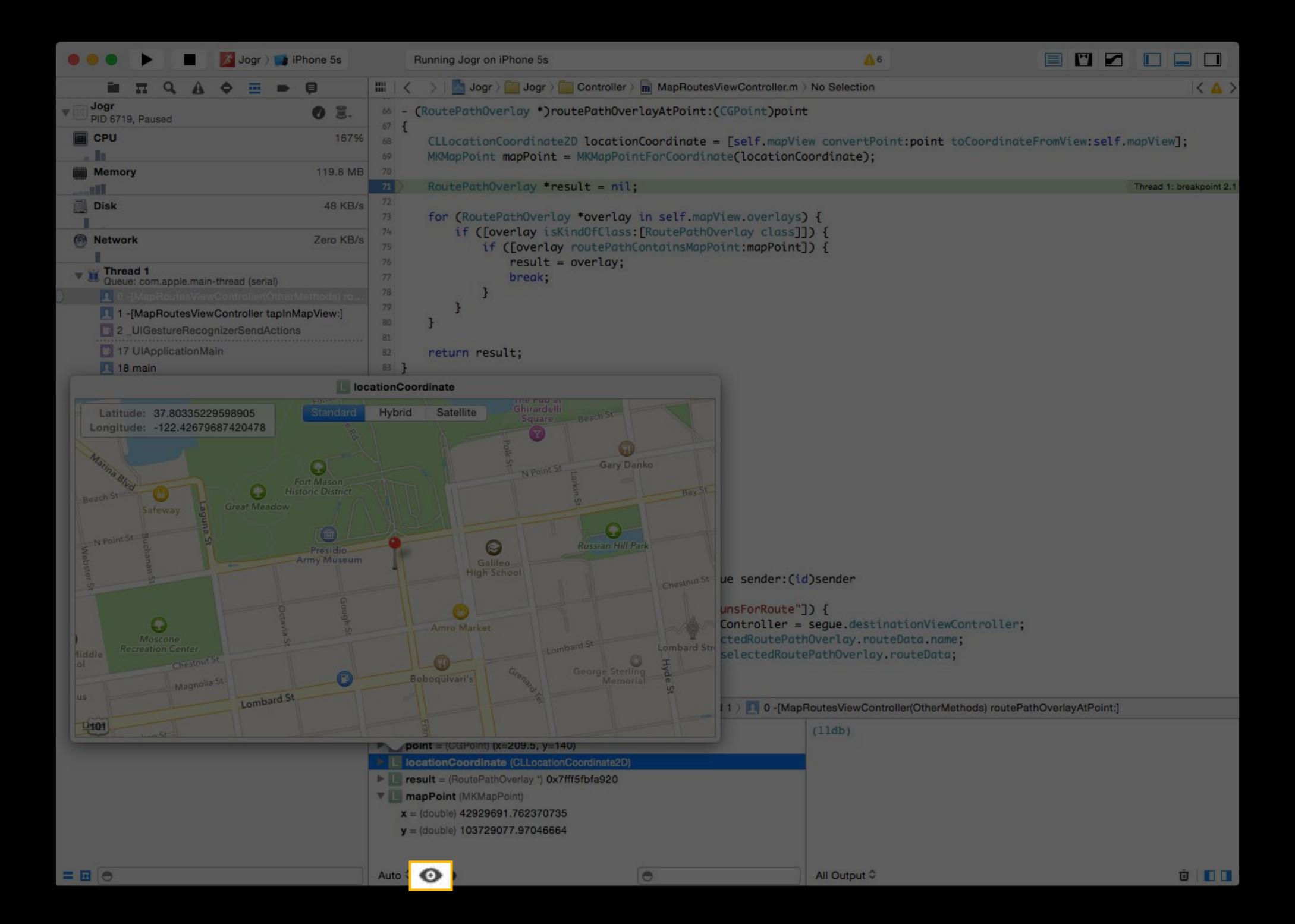
Fixing a layout problem

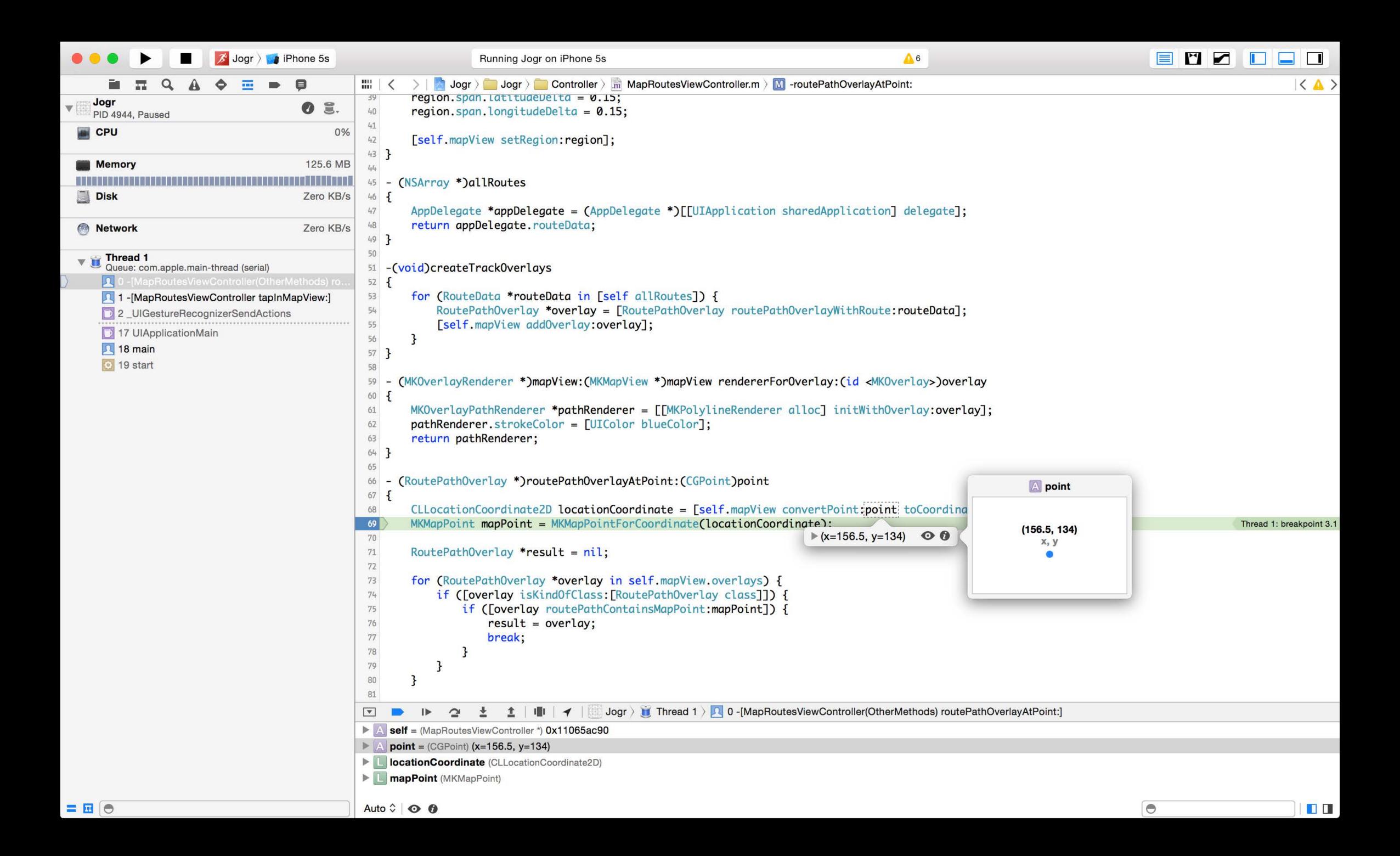
Xcode Helps You Debug Your View Hierarchy

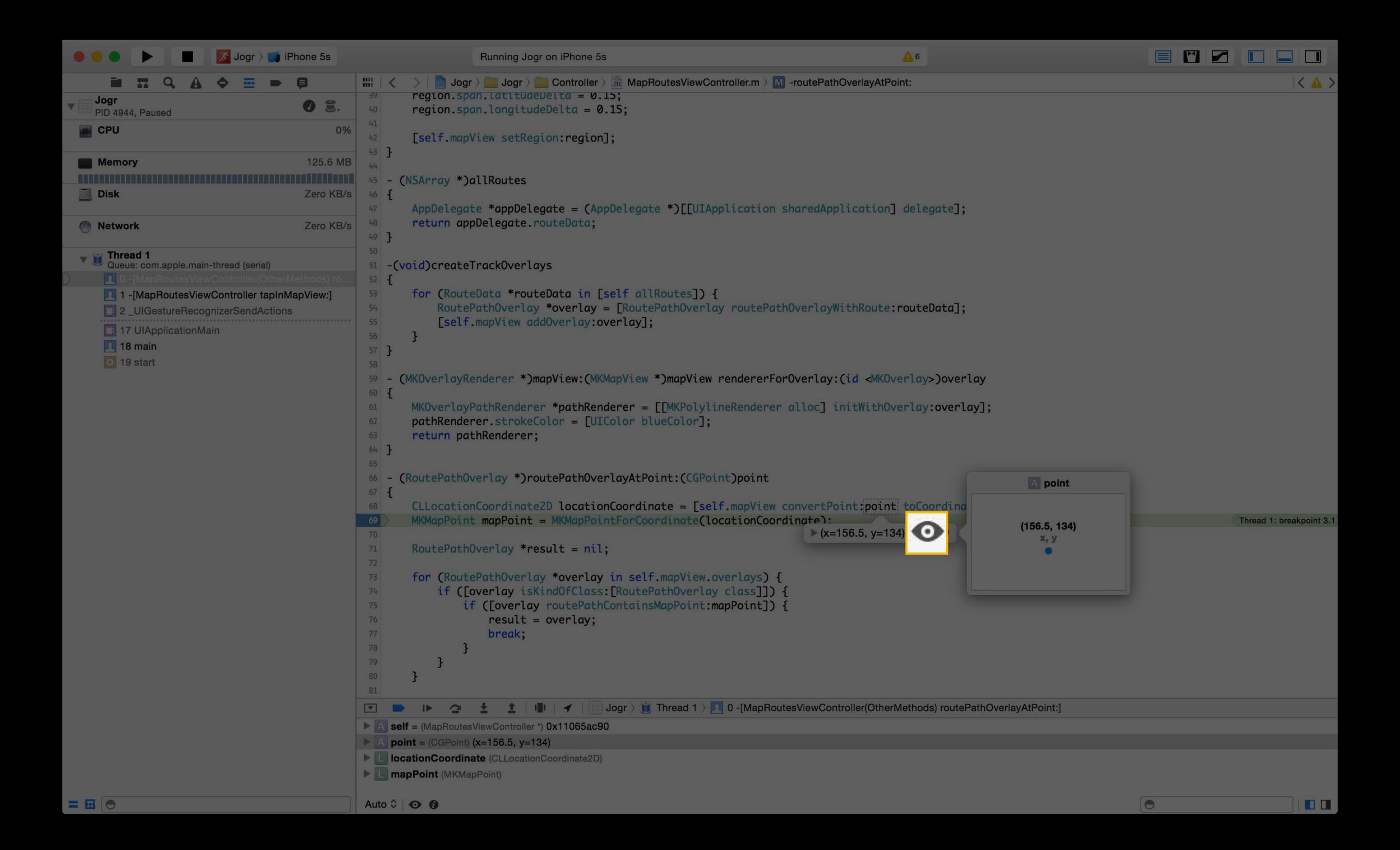
Integrating with Quick Look

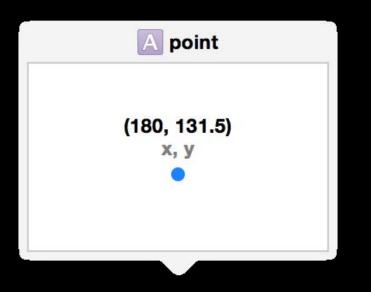
Kerry Hazelgren Debugger UI Engineer



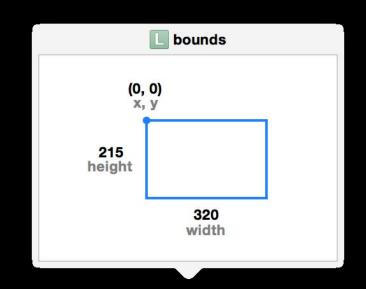








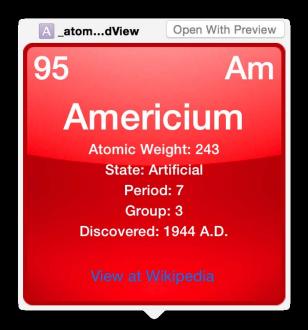
Points



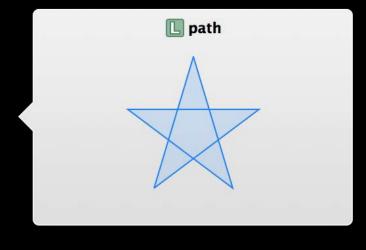
Sizes



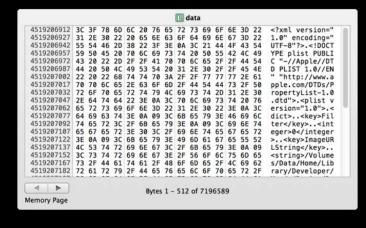
Colors



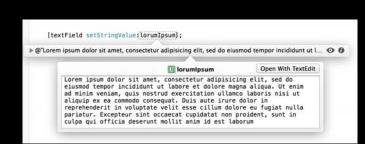
Images



Paths



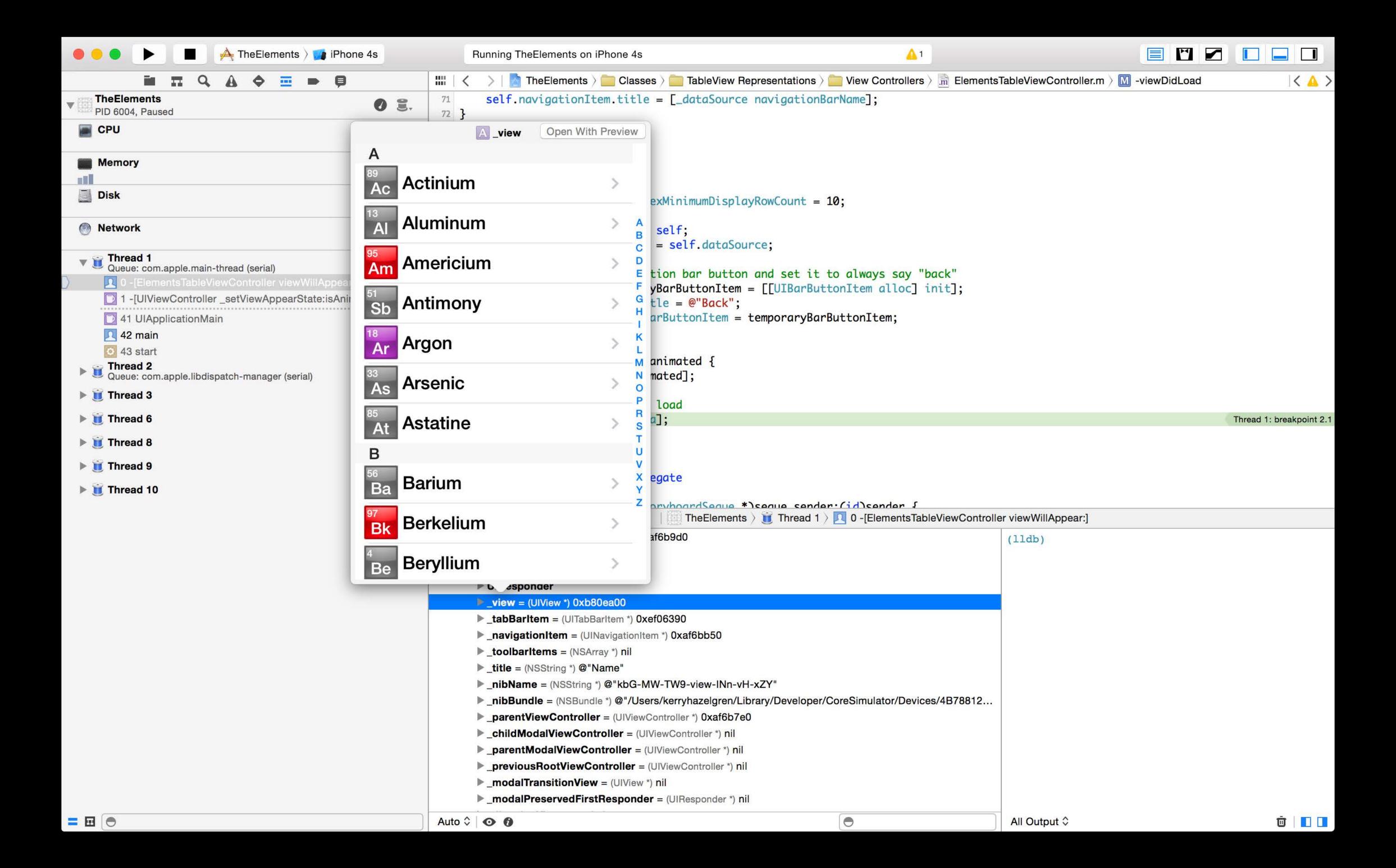
Data



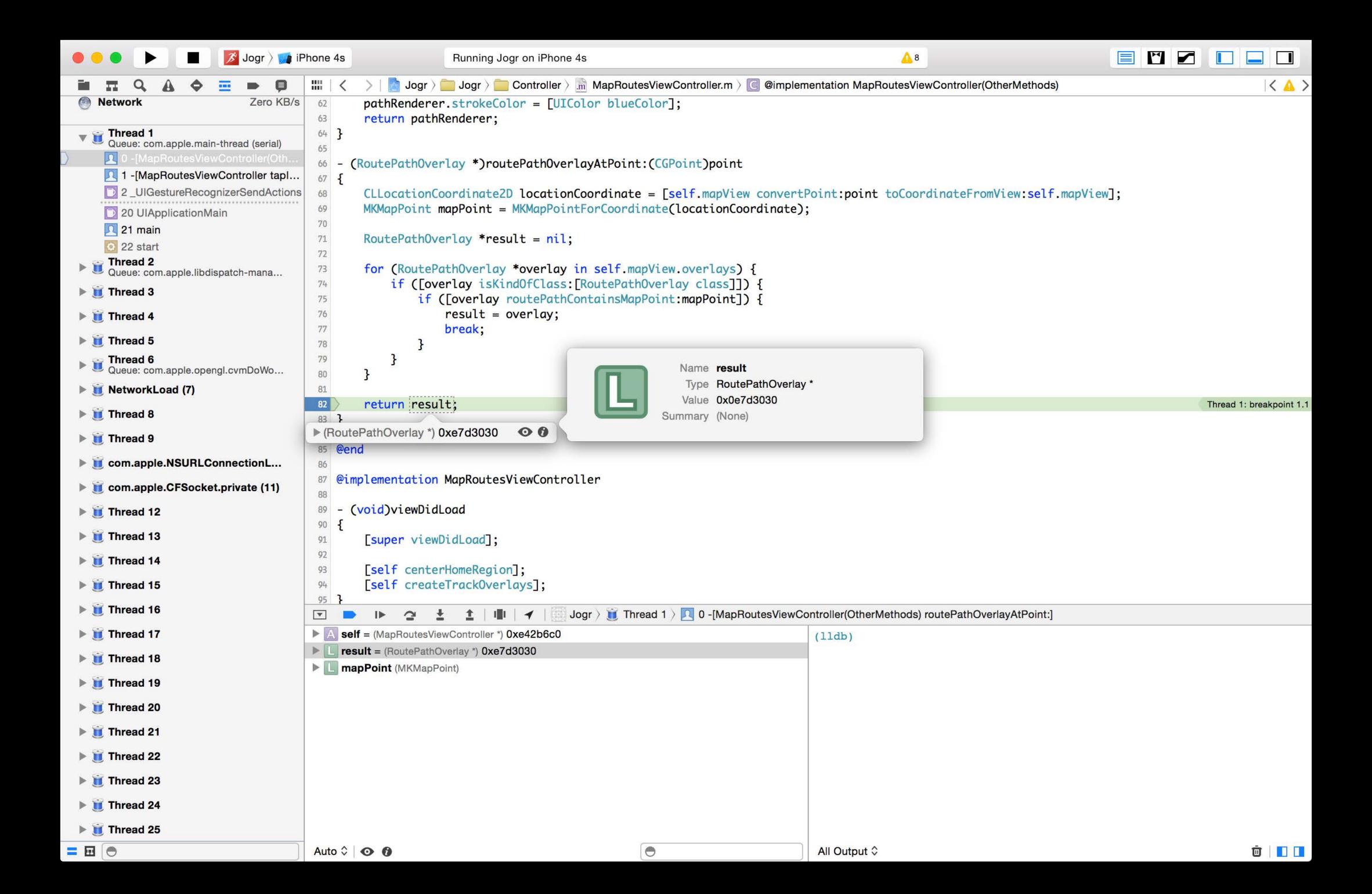
Strings Locations



URLs







Enabling Quick Look

```
- (id)debugQuickLookObject
{
   return self.reallyGreatCustomImage;
}
```

Demo

Summary

Debug blocks and queues more effectively Explore your app's user interface Add Quick Look support for your classes

Views are now also supported

More Information

Dave DeLong
Developer Tools Evangelist
delong@apple.com

Documentation

Quick Look for Custom Types in the Xcode Debugger https://developer.apple.com/library/ios/documentation/IDEs/Conceptual/CustomClassDisplay_in_QuickLook/Introduction/Introduction.html

Apple Developer Forums http://devforums.apple.com

Related Sessions

 Creating Extensions for iOS and OS X, Part 1 	Mission	Tuesday 2:00PM
 Creating Extensions for iOS and OS X, Part 2 	Mission	Wednesday 11:30PM
 What's New in Interface Builder 	Mission	Wednesday 3:15PM
 Introduction to LLDB and the Swift REPL 	Mission	Thursday 10:15AM
 Advanced Swift Debugging in LLDB 	Mission	Friday 9:00AM

Labs

LLDB & Xcode Debugging Lab

Tools Lab C

Wednesday 2:00PM

WWDC14