Using LLDB in iOS

Backtrace, Thread, and Frame

backtrace

```
(lldb) bt
* thread #1: tid = 0xc2fe33, ... WallpaperBrowser`-[MainViewController goTapped:]
(...) + 39 at MainViewController.m:66, queue = 'com.apple.main-thread', stop
reason = breakpoint 2.1
  * frame #0: 0x0000000100002f77 WallpaperBrowser`-[MainViewController goTapped:]
(...) + 39 at MainViewController.m:66
    frame #1: 0x000000010025bf06 UIKit`-[UIApplication
sendAction:to:from:forEvent:] + 80
    frame #2: 0x000000010025beb4 UIKit`-[UIApplication
sendAction:toTarget:fromSender:forEvent:] + 17
    frame #3: 0x0000000100338880 UIKit`-[UIControl
_sendActionsForEvents:withEvent:] + 203
    frame #4: 0x0000000100337dc0 UIKit`-[UIControl touchesEnded:withEvent:] + 530
    frame #5: 0x0000000100292d05 UIKit`-[UIWindow _sendTouchesForEvent:] + 701
```

backtrace (cont'd)

```
(lldb) bt all
* thread #1: tid = 0xc2fe33, ... WallpaperBrowser`-[MainViewController goTapped:]
(...) + 39 at MainViewController.m:66, queue = 'com.apple.main-thread', stop
reason = breakpoint 2.1
 * frame #0: 0x00000000100002f77 WallpaperBrowser`-[MainViewController goTapped:]
(...) + 39 at MainViewController.m:66
thread #2: ...
    frame #0: 0x0000000010211e662 libsystem_kernel.dylib`kevent64 + 10
    frame #1: 0x0000000101d88548 libdispatch.dylib`_dispatch_mgr_invoke + 239
  thread #3: ...
    frame #0: 0x0000000010211de6a libsystem_kernel.dylib`__workq_kernreturn + 10
   frame #1: 0x00000001020e2f08 libsystem_pthread.dylib`_pthread_wqthread + 330
```

thread

- You can only operate on one thread at a time (eventually, you will be able to have some threads paused while other threads resuming)
- Once you've paused, Ildb will choose the thread that was "stopped for a reason".
- Gives you the ability to change the return value of a method during runtime

thread (cont'd)

(lldb) thread backtrace

```
(...) + 39 at MainViewController.m:66, queue = 'com.apple.main-thread', stop
reason = breakpoint 2.1 ...

(lldb) thread backtrace all

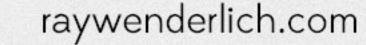
thread #1: tid = 0xc2fe33, ... WallpaperBrowser`-[MainViewController goTapped:]
(...) + 39 at MainViewController.m:66, queue = 'com.apple.main-thread', stop
reason = breakpoint 2.1
  * frame #0: 0x000000100002f77 WallpaperBrowser`-[MainViewController goTapped:]
```

* thread #1: tid = 0xc2fe33, ... WallpaperBrowser`-[MainViewController goTapped:]

thread (cont'd)

```
(lldb) thread list
* thread #1: tid = 0xc2fe33, 0x0000000100002f77 WallpaperBrowser`-
[MainViewController goTapped:](self=0x0000000109619e70, _cmd=0x000000010000484c,
sender=0x00000001097135a0) + 39 at MainViewController.m:66, queue =
'com.apple.main-thread', stop reason = breakpoint 2.1
    thread #2: tid = 0xc2fe85, 0x000000010211e662 libsystem_kernel.dylib`kevent64 +
10, queue = 'com.apple.libdispatch-manager'
    thread #3: tid = 0xc2fe86, 0x000000010211de6a
libsystem_kernel.dylib`__workq_kernreturn + 10
```

(lldb) thread select 1



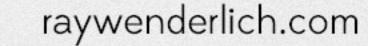
thread (cont'd)

Continue a certain line (much like a breakpoint)

```
(lldb) thread until 100
```

Return from function with custom value

```
(lldb) thread return @"Custom Return String"
```



frame

Inspect local variables in realtime

```
(lldb) frame variable
(MainViewController *const) self = 0x000000010921cca0
(SEL) _cmd = "doSomething"
(NSString *) value = nil
```

```
(lldb) frame variable self
(MainViewController *const) self = 0x000000010921cca0
```

"frame variable" is not a full expression parser but does support operations like &, *, [], ->

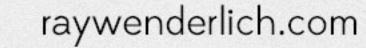
frame (cont'd)

Select another frame

```
(lldb) frame select 2
frame #2: .. UIKit`-[UIViewController loadViewIfRequired] + 562
UIKit`-[UIViewController loadViewIfRequired] + 562:
-> 0x10035059e: movl $0x10, %edi
```

Select frame by relative a relative frame

```
(lldb) frame select -relative -1
frame #1: ... WallpaperBrowser`-[MainViewController viewDidLoad](...) + 43 at
MainViewController.m:29
```



Demo: Revealing the Data

- Show backtrace
- Demonstrate switching threads, return custom value from thread
- Inspect variables with the frame command and demonstrate switching frames



Challenge Time

Principal Amount:

10000.00

Interest Rate:

0.095

Total Years

6

Calculate Interest

