

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: 0x0000000100002f77 WallpaperBrowser`-[MainViewController goTapped:]  
(...) + 39 at MainViewController.m:66  
  ...  
thread #2: ...  
  frame #0: 0x000000010211e662 libsystem_kernel.dylib`kevent64 + 10  
  frame #1: 0x0000000101d88548 libdispatch.dylib`_dispatch_mgr_invoke + 239  
thread #3: ...  
  frame #0: 0x000000010211de6a 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, lldb 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

```
* thread #1: tid = 0xc2fe33, ... WallpaperBrowser`-[MainViewController goTapped:]  
(...) + 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: 0x0000000100002f77 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