Using Instruments and Shark to analyse and improve stability and performance in software development

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Background

- More code ... more buggs
- Measuring performance
  - Statistical profiling
  - Instrumenting

Statistical profiling

- Not ”exact”
- Very low overhead
- Precise in reality

Statistical profiling

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- Precise in reality

DTrace

- Enables/Disables probes in *safe* places
- Probes fires and executes some action
- Can find very specific things
- Can be used in shipped ennvironments

```
provider : module : function : name
/ condition /
{
    ...
}
```

Problem?

How can modern analysis tools help developers track down bugs and write better code?

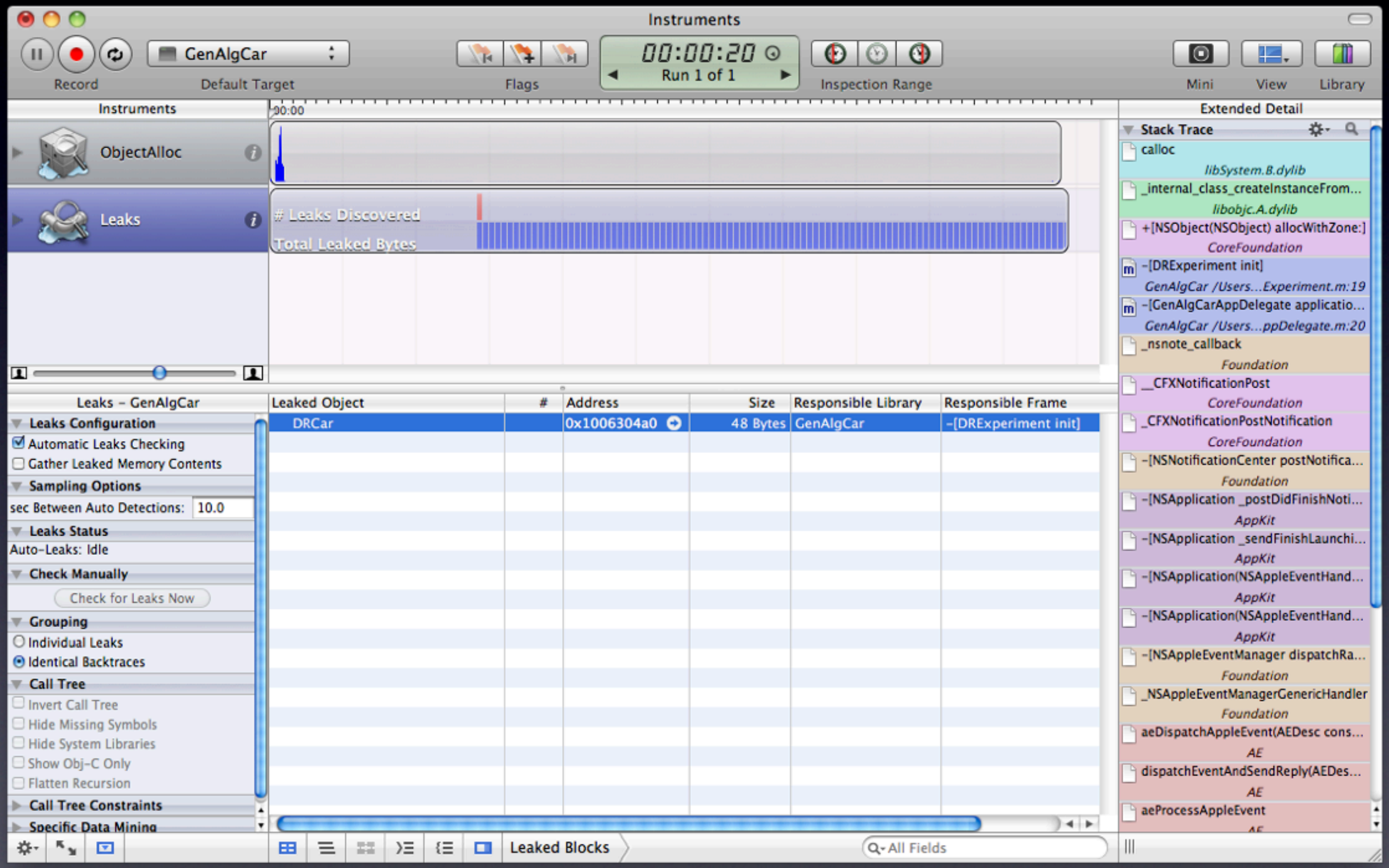
Plan

- Read about performance monitoring and these tools (all the time)
- Develop a small program (≤ 2 weeks)
- Use tools *during* development
- Fine-tune *after* development (≈1 week)

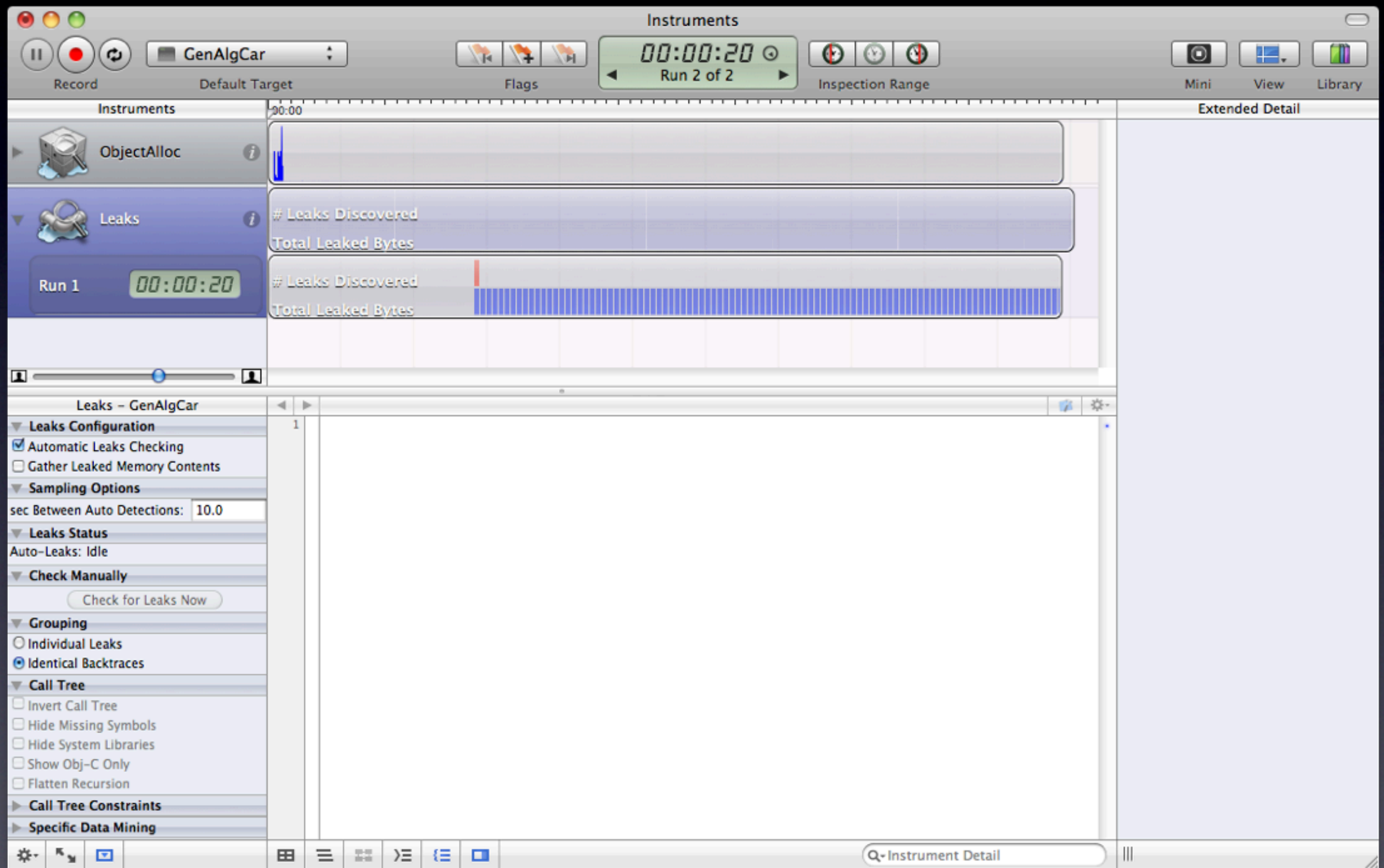
Progress ...

- Code in progress
- Leaks
- Performance

Leaks


Instruments
Record
GenAlgCar
Default Target
Flags
00:00:20
Run 1 of 1
Inspection Range
Mini
View
Library
Instruments
ObjectAlloc
Leaks
Leaks Discovered
Total Leaked Bytes
Extended Detail
Stack Trace
calloc
libSystem.B.dylib
_internal_class_createInstanceFrom...
libobjc.A.dylib
+[NSObject(NSObject) allocWithZone:]
CoreFoundation
-[DRExperiment init]
GenAlgCar /Users...Experiment.m:19
-[GenAlgCarAppDelegate applicatio...
GenAlgCar /Users...ppDelegate.m:20
_nsnote_callback
Foundation
__CFXNotificationPost
CoreFoundation
_CFXNotificationPostNotification
CoreFoundation
-[NSNotificationCenter postNotifica...
Foundation
-[NSApplication _postDidFinishNoti...
AppKit
-[NSApplication _sendFinishLaunchi...
AppKit
-[NSApplication(NSAppleEventHand...
AppKit
-[NSApplication(NSAppleEventHand...
AppKit
-[NSAppleEventManager dispatchRa...
Foundation
_NSAppleEventManagerGenericHandler
Foundation
aeDispatchAppleEvent(AEDesc cons...
AE
dispatchEventAndSendReply(AEDes...
AE
aeProcessAppleEvent
Leaks - GenAlgCar
Leaks Configuration
Automatic Leaks Checking
Gather Leaked Memory Contents
Sampling Options
sec Between Auto Detections: 10.0
Leaks Status
Auto-Leaks: Idle
Check Manually
Check for Leaks Now
Grouping
Individual Leaks
Identical Backtraces
Call Tree
Invert Call Tree
Hide Missing Symbols
Hide System Libraries
Show Obj-C Only
Flatten Recursion
Call Tree Constraints
Specific Data Mining
Leaked Object
#
Address
Size
Responsible Library
Responsible Frame
DRCar
0x1006304a0
48 Bytes
GenAlgCar
-[DRExperiment init]
Leaked Blocks
All Fields

Leaks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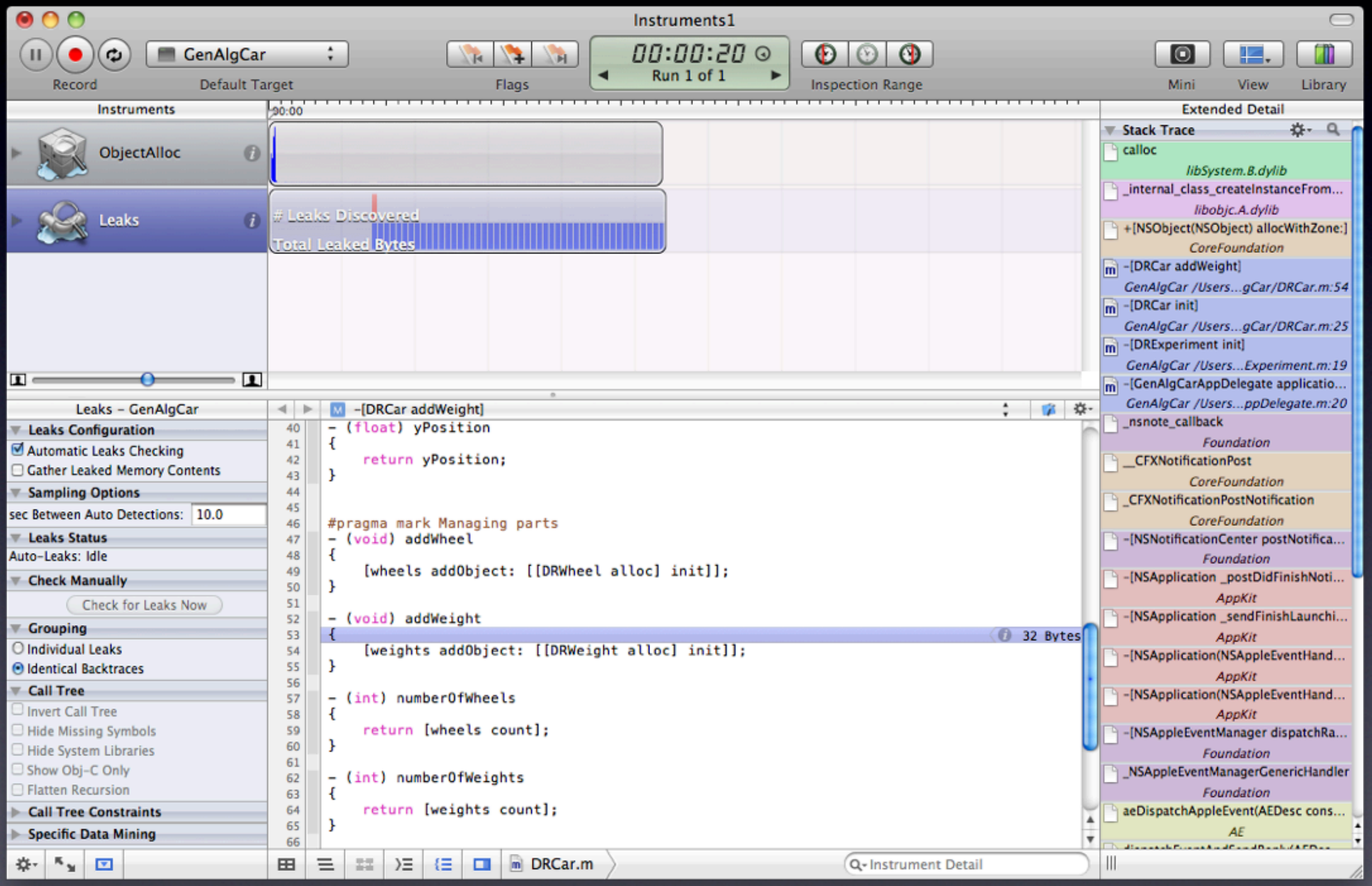
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GenAlgCar /Users...gCar/DRCar.m:25
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AppKit
-[NSApplication _sendFinishLaunchi...
AppKit
-[NSApplication(NSAppleEventHand...
AppKit
-[NSAppleEventManager dispatchRa...
Foundation
_NSAppleEventManagerGenericHandler
Foundation
aeDispatchAppleEvent(AEDesc cons...
AE
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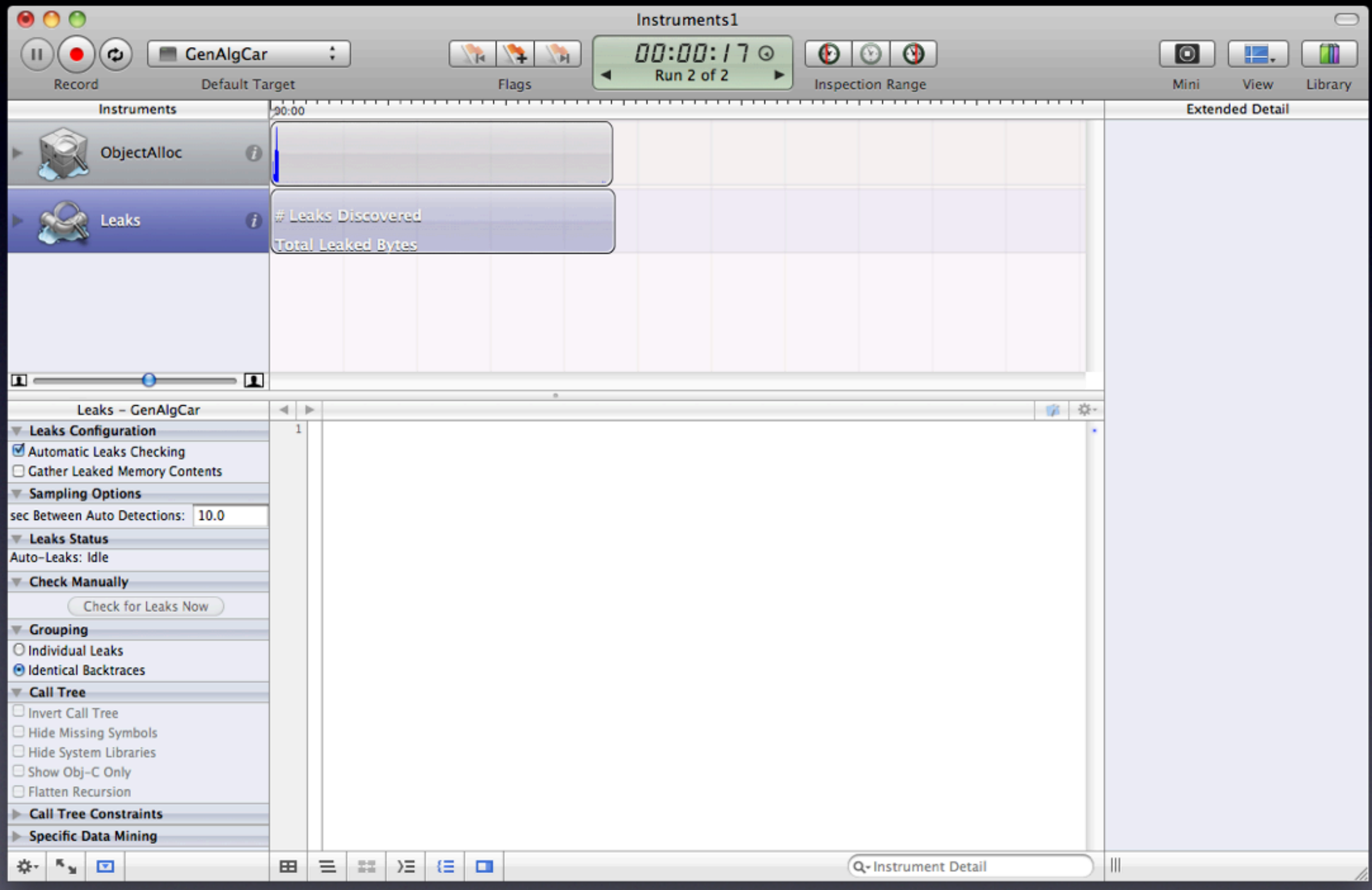
Specific Data Mining
-[DRCar addWeight]
40 - (float) yPosition
41 {
42 return yPosition;
43 }
44
45
46 #pragma mark Managing parts
47 - (void) addWheel
48 {
49 [wheels addObject: [[DRWheel alloc] init]];
50 }
51
52 - (void) addWeight
53 {
32 Bytes
54 [weights addObject: [[DRWeight alloc] init]];
55 }
56
57 - (int) numberOfWheels
58 {
59 return [wheels count];
60 }
61
62 - (int) numberOfWeights
63 {
64 return [weights count];
65 }
66
DRCar.m
Instrument Detail

Leaks

```
43
44  #pragma mark Managing parts
45  - (void) addWheel
46  {
47      [wheels addObject: [[DRWheel alloc] init]];
                  Method returns an Objective-C object with a +1 retain count (owning reference)
48  }             Object allocated on line 47 is no longer referenced after this point and has a retain count of +1 (object leaked)
49
```

```
43
44  #pragma mark Managing parts
45  - (void) addWheel
46  {
47      [wheels addObject: [[[DRWheel alloc] init] autorelease]];
48  }
49
```

Leaks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Just keep working...