Tools shaped our mind...

http://stephane.ducasse.free.fr
http://www.pharo.org

Inria

Université de Lille

cnrs

Tools

- Shape our mind…
- Get moldable tools so that you CAN adapt them to you and your process and not the inverse
- Build fast your own tools

Pharo has amazing moldable tools

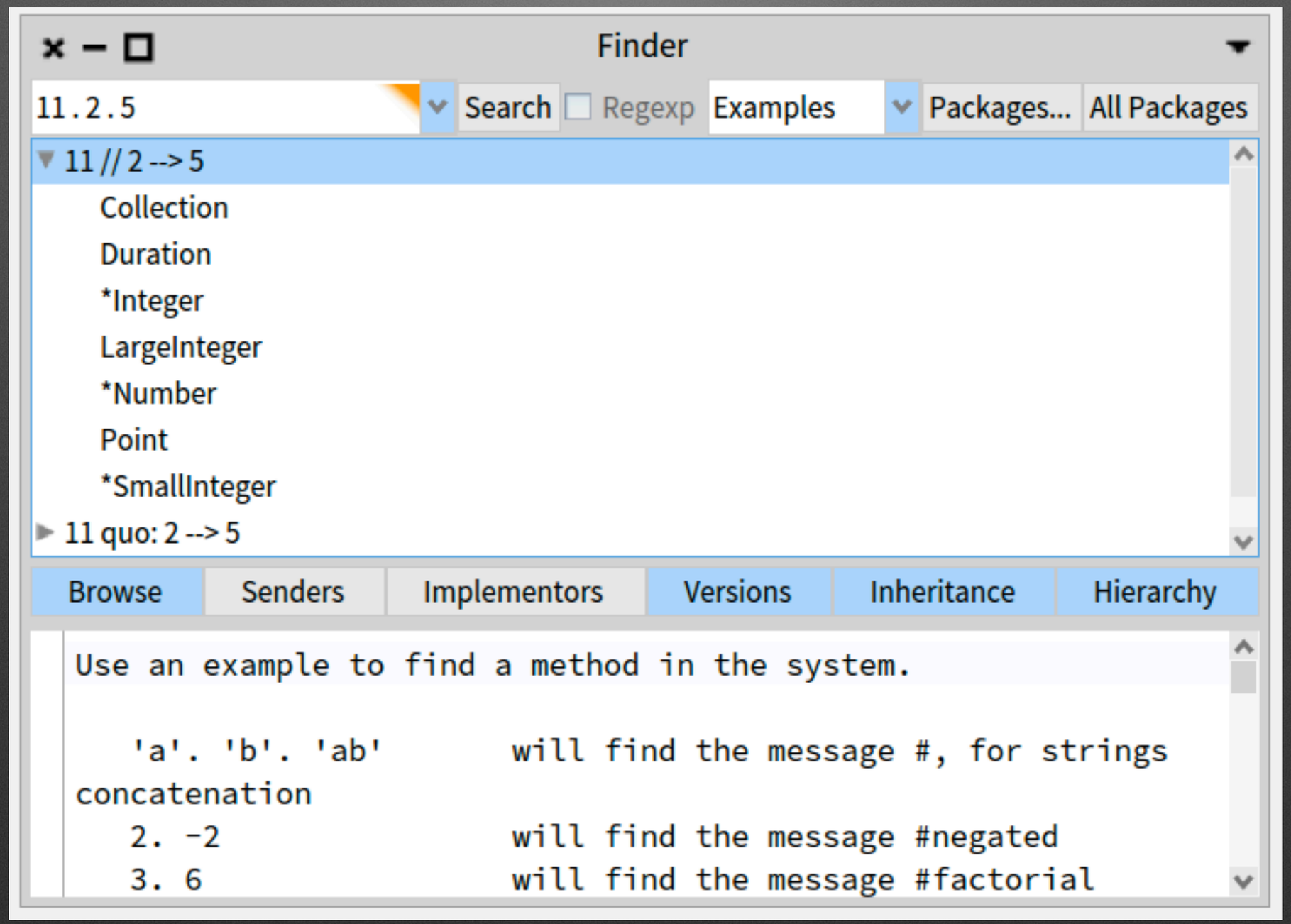
How to find information?

- Libraries are large
- You know what you want
- You do not know how to express it

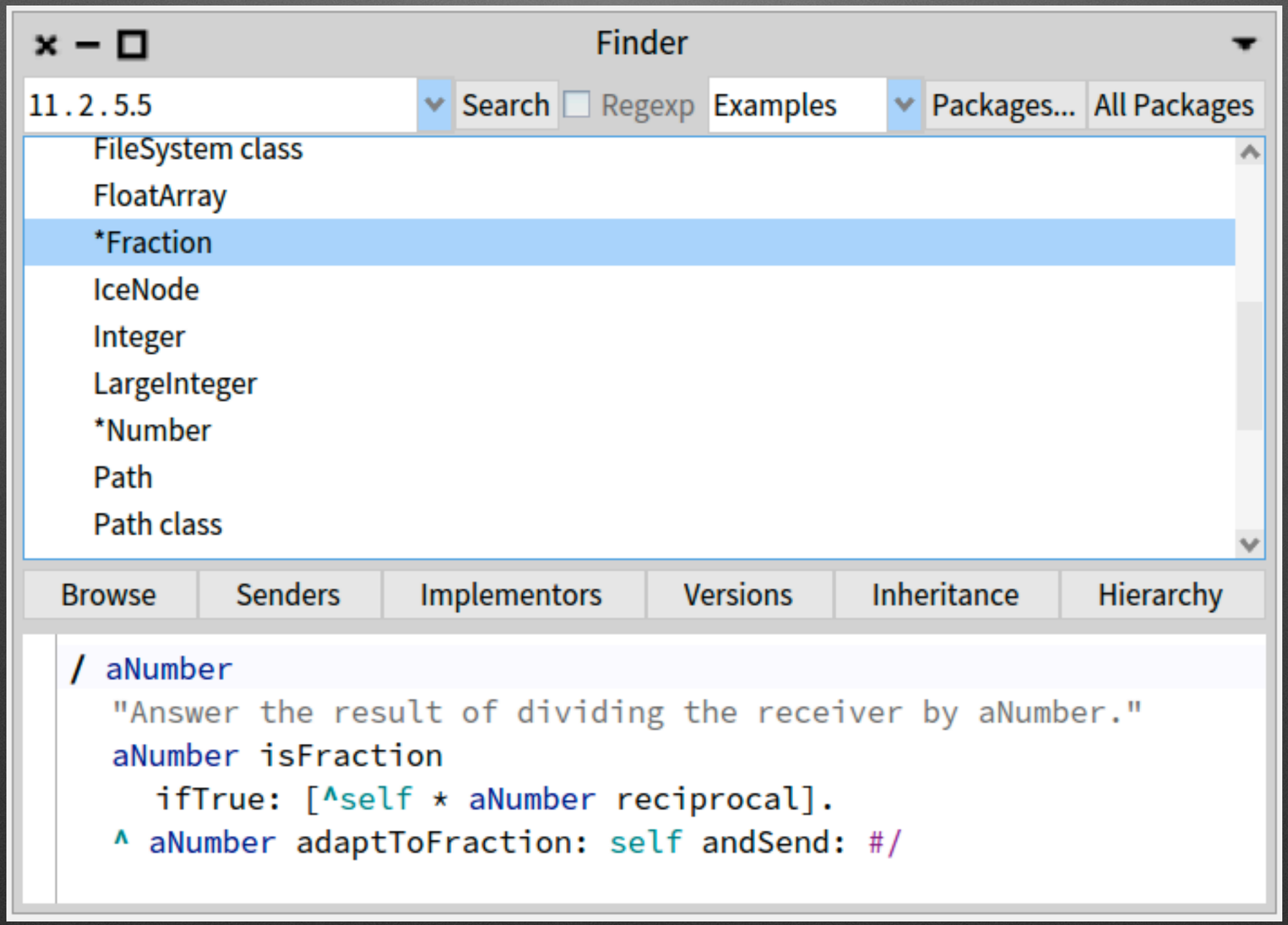
Ask Finder example-based queries

- Provide objects and results
- Get the messages that match

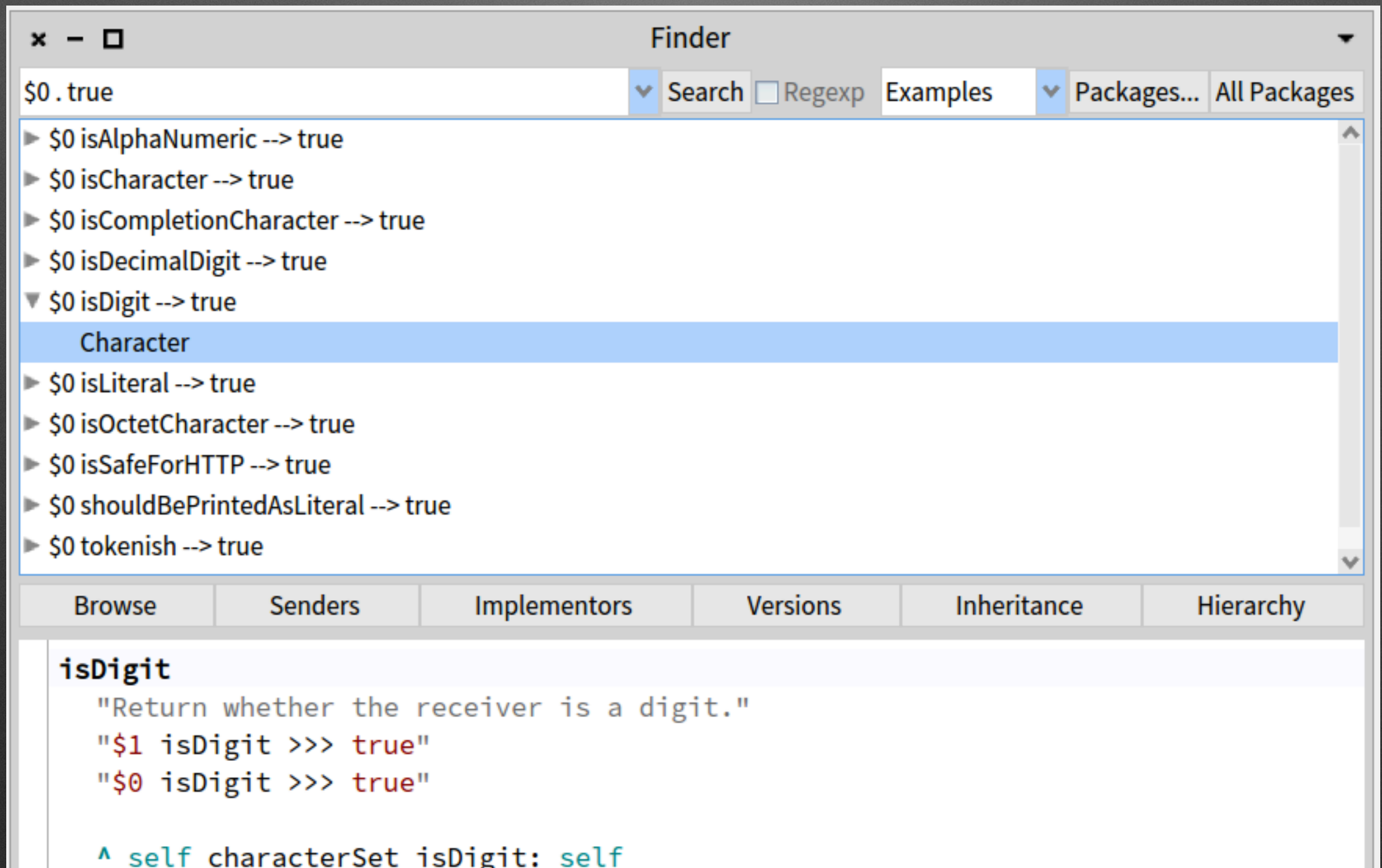
11 ??? 2 should give 5



111 ??? 2 should give 5.5

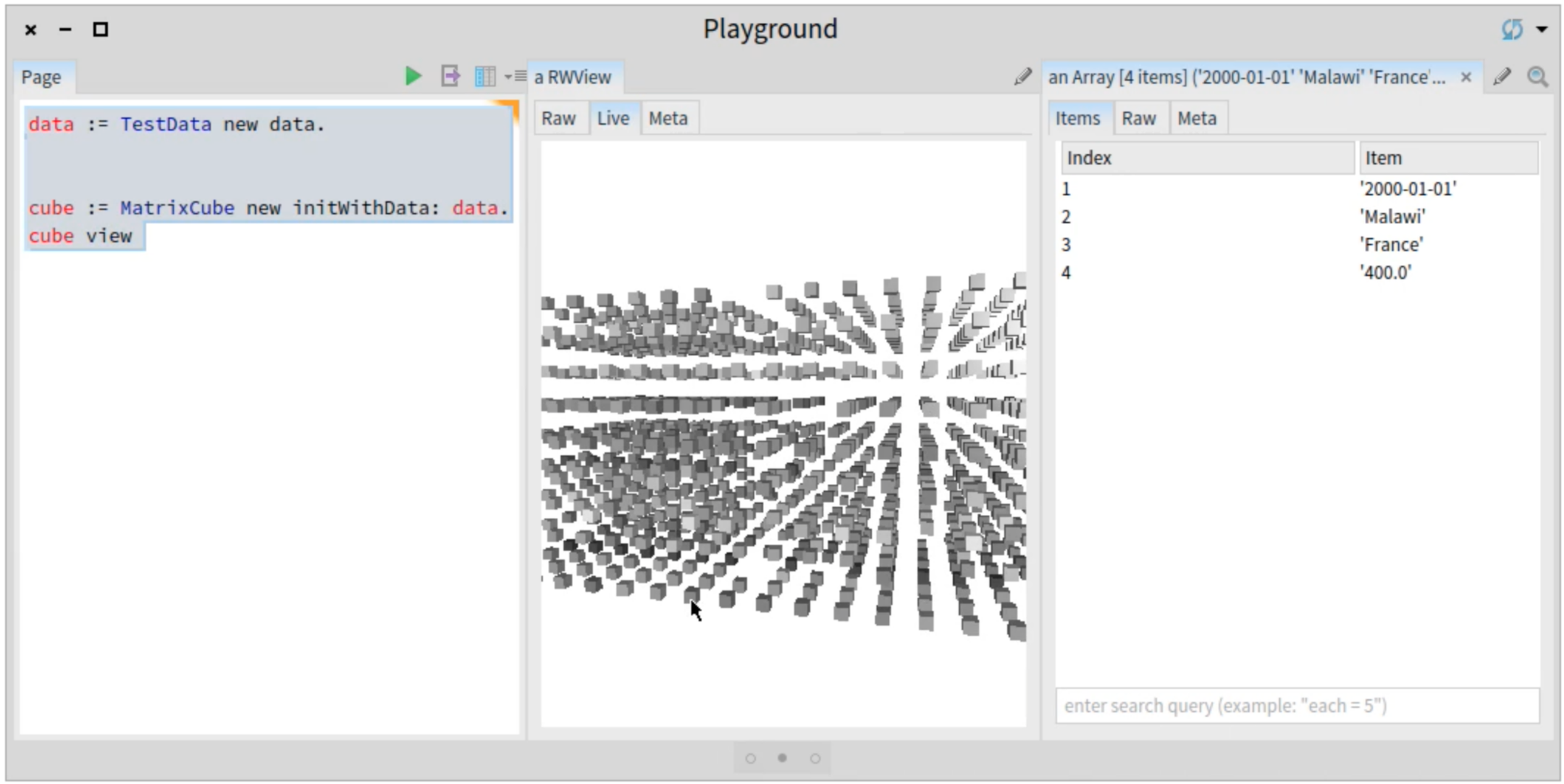


What are the messages send to $0 that return true



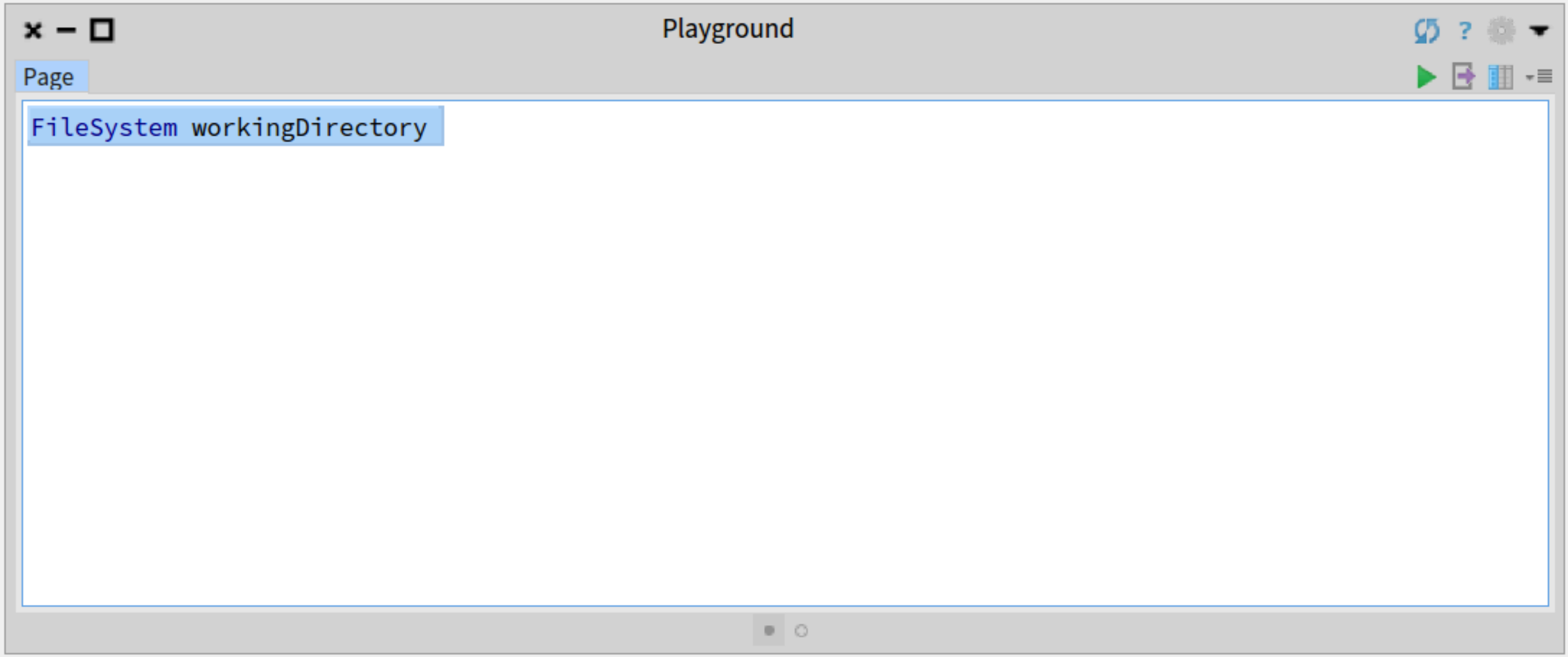
Customized object interaction/presentations

Inspecting Live a 3D object

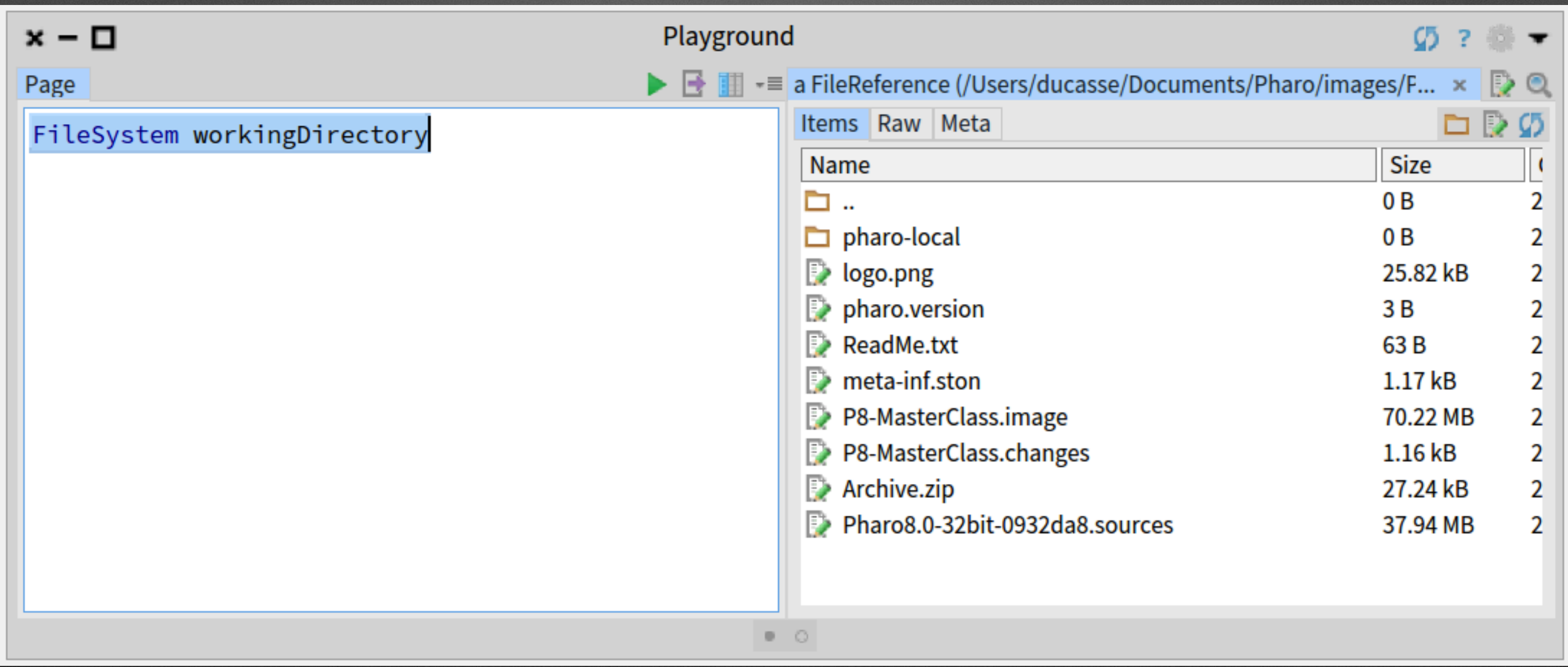


The views of a file reference

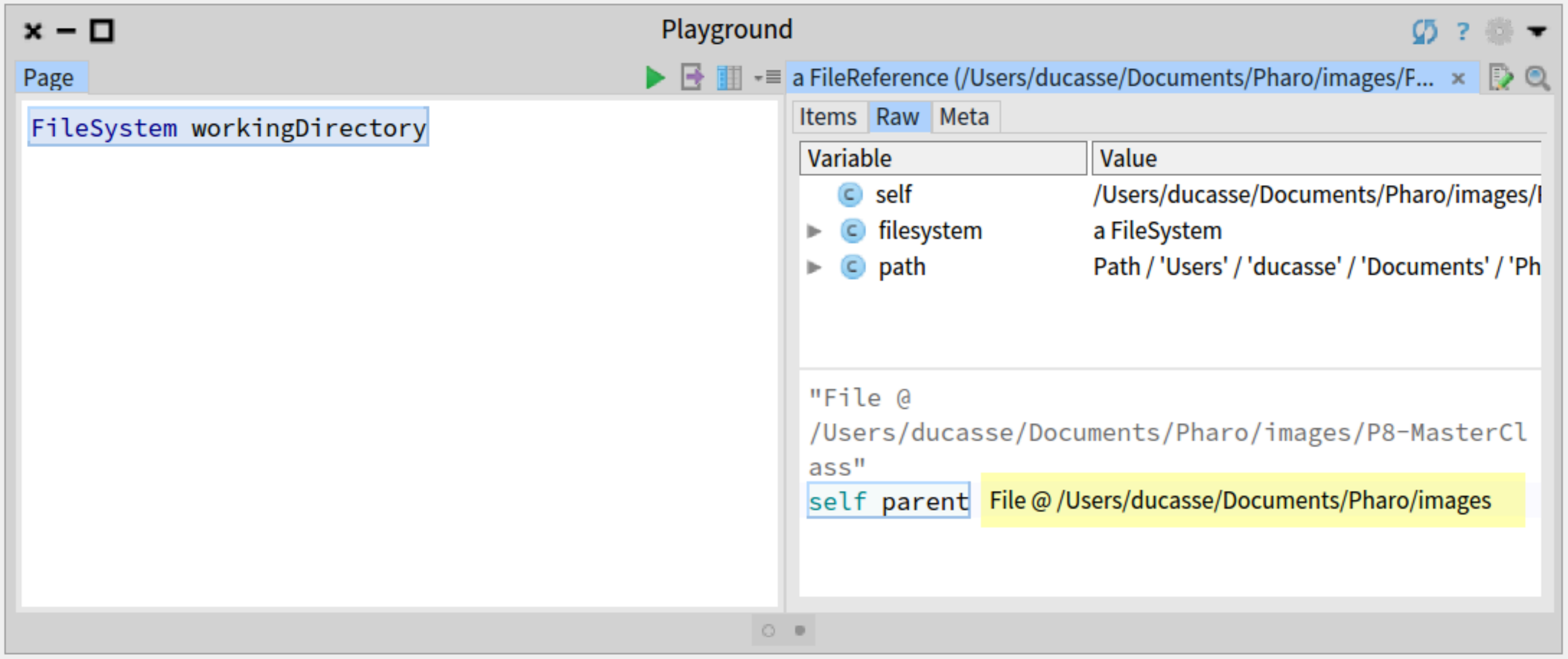
Looking at a file reference



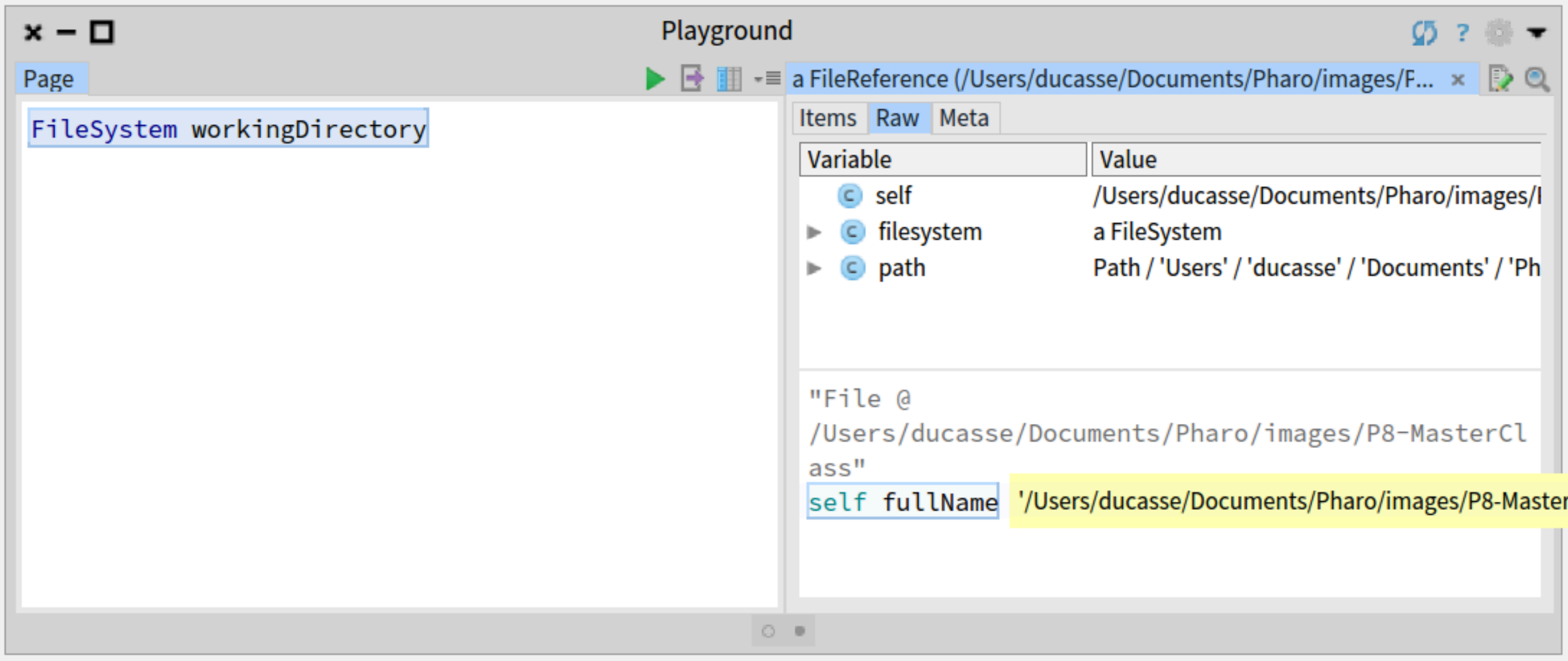
Oh! a file browser in my inspector!



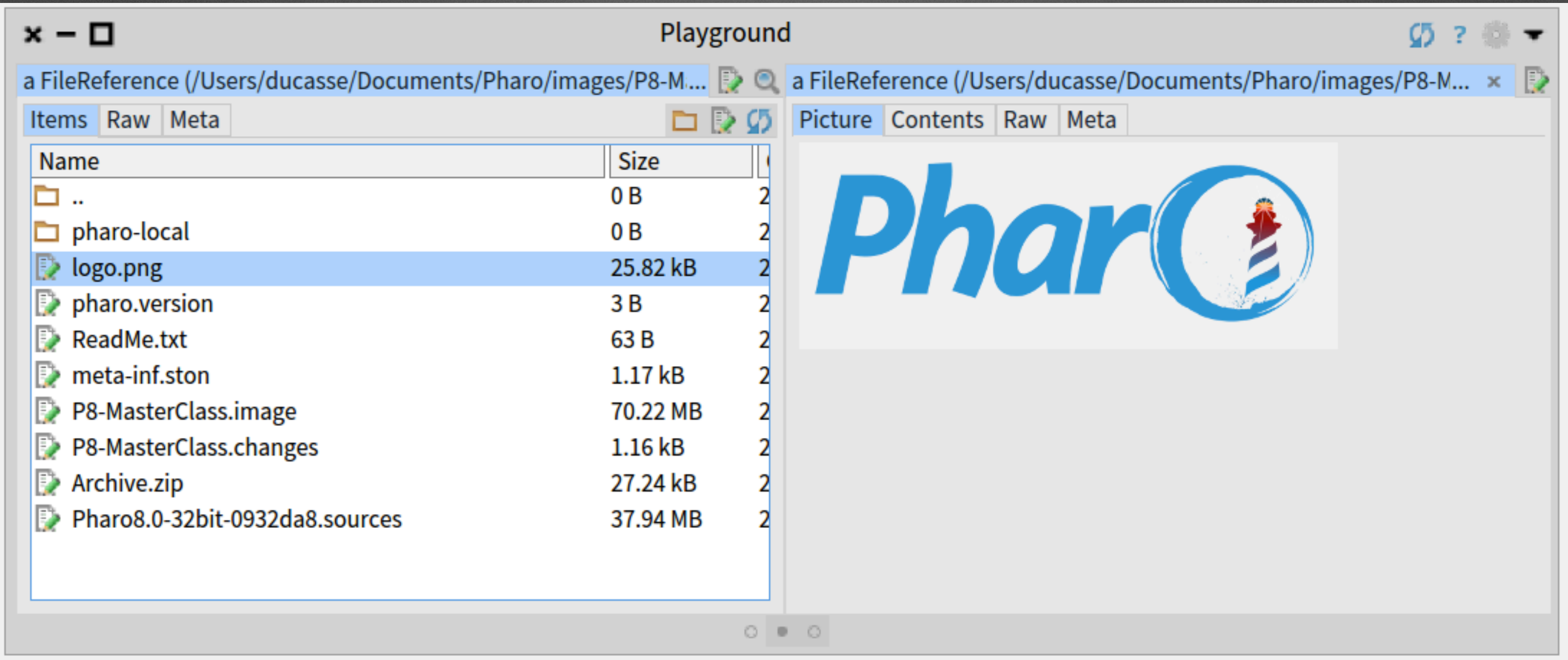
But I have a file reference: a dull object



Quite boring object



We can see the png ;)



Looking inside that PNG file

Playground

a FileReference (/Users/ducasse/Documents/Pharo/images/P8-M...

Items | Raw | Meta

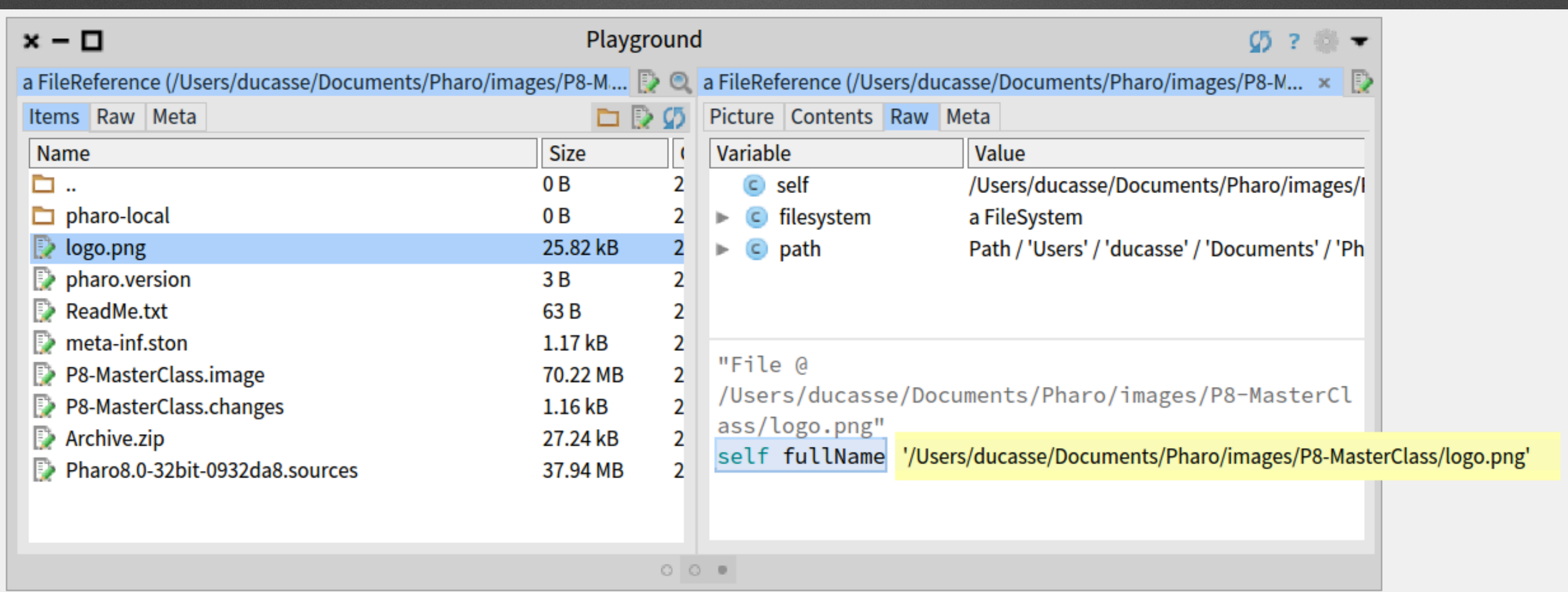
Name	Size	
..	0 B	2
pharo-local	0 B	2
logo.png	25.82 kB	2
pharo.version	3 B	2
ReadMe.txt	63 B	2
meta-inf.ston	1.17 kB	2
P8-MasterClass.image	70.22 MB	2
P8-MasterClass.changes	1.16 kB	2
Archive.zip	27.24 kB	2
Pharo8.0-32bit-0932da8.sources	37.94 MB	2

a FileReference (/Users/ducasse/Documents/Pharo/images/P8-M...

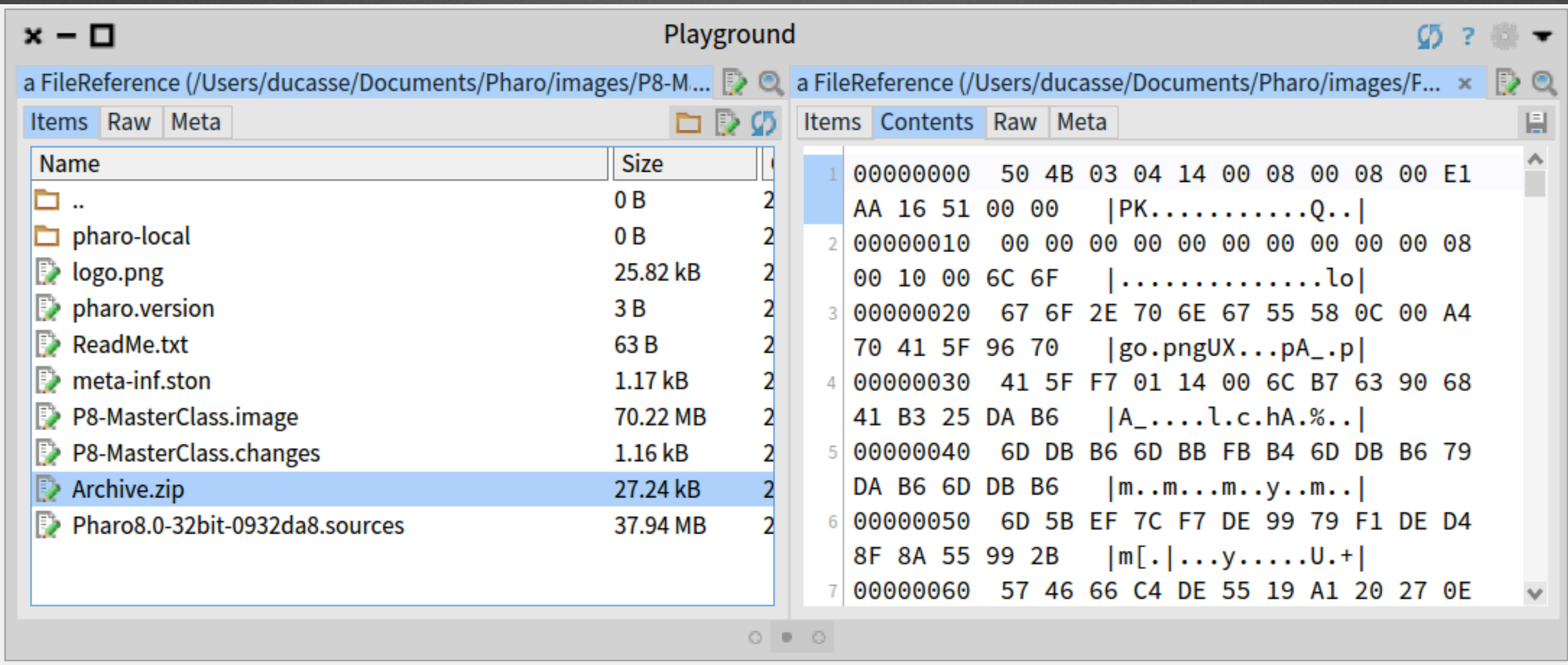
Picture | Contents | Raw | Meta

```
1 00000000  89 50 4E 47 0D 0A 1A 0A 00 00 00
  0D 49 48 44 52   |.PNG........IHDR|
2 00000010  00 00 01 77 00 00 00 90 08 06 00
  00 00 F3 F6 2B   |...w...........+|
3 00000020  70 00 00 0A D1 69 43 43 50 49 43
  43 20 50 72 6F   |p....iCCPICC Pro|
4 00000030  66 69 6C 65 00 00 48 89 95 97 07
  54 53 69 16 C7   |file..H....TSi..|
5 00000040  BF F7 D2 43 42 4B 08 45 4A E8 4D
  90 5E A5 84 1E   |...CBK.EJ.M.^...|
6 00000050  40 41 3A D8 08 49 48 42 09 21 05
  15 3B 32 38 02   |@A:..IHB.!..;28.|
7 00000060  23 8A 8A 08 96 01 1D 8A 28 38 16
```

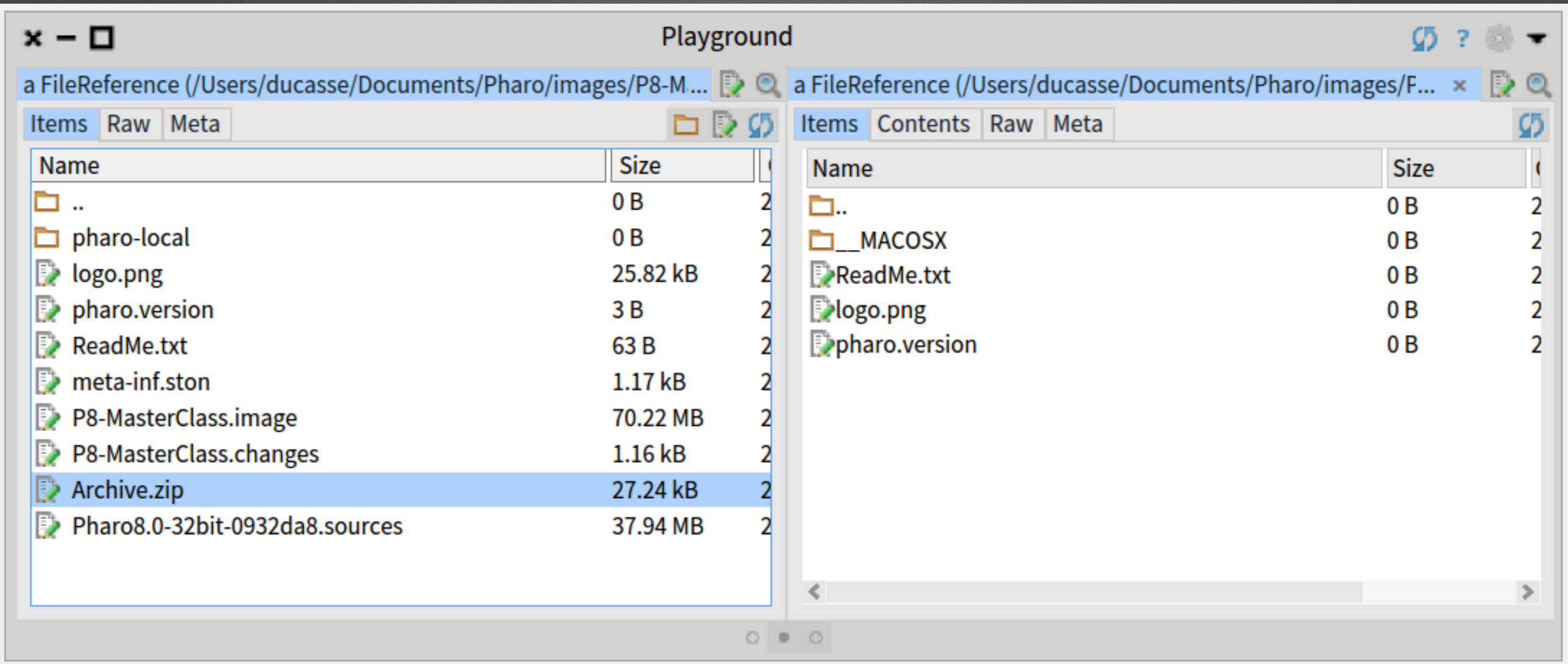
But still a file reference!



See! an archive ‘.zip’

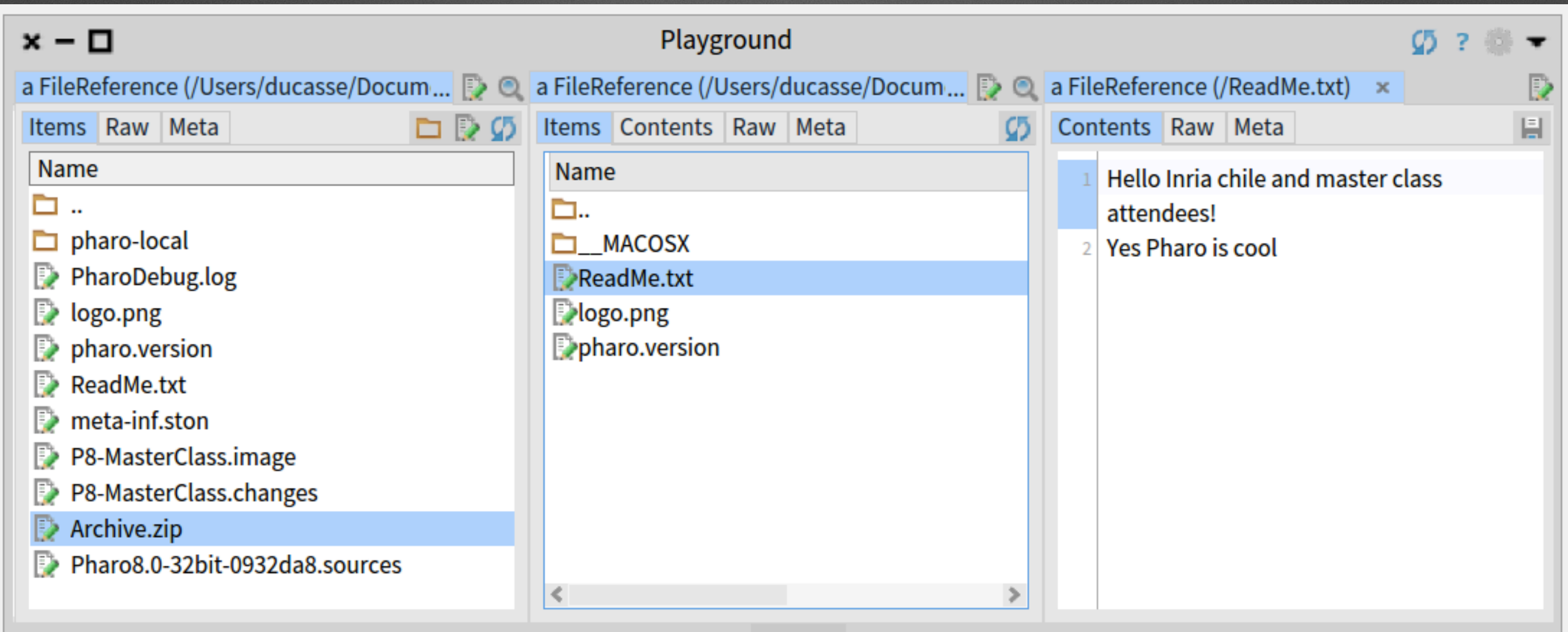


Kind of clear…



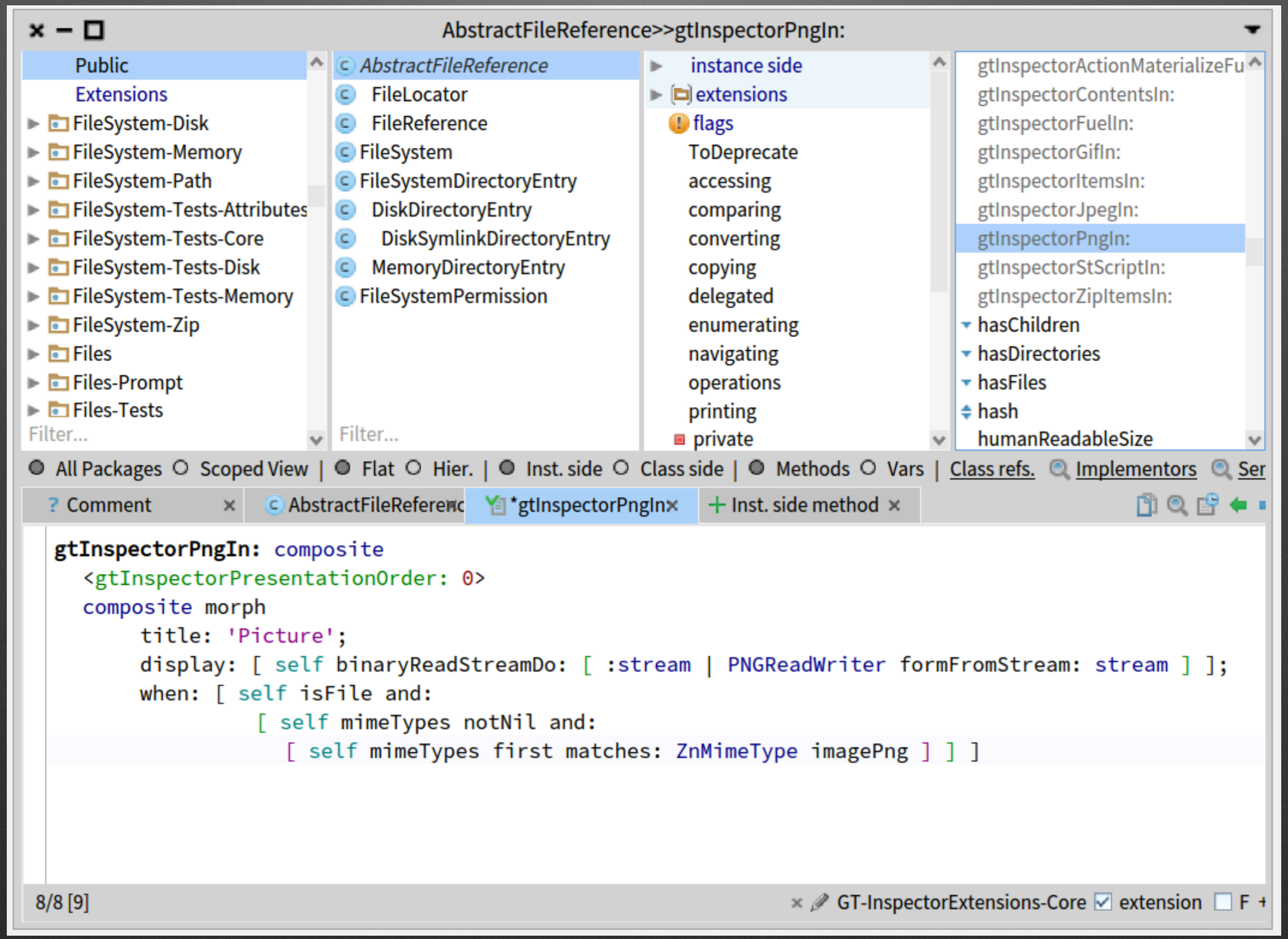
An object can expose multiple interactive views!

- You can use the best view for your task!
- You can add views to your domain objects



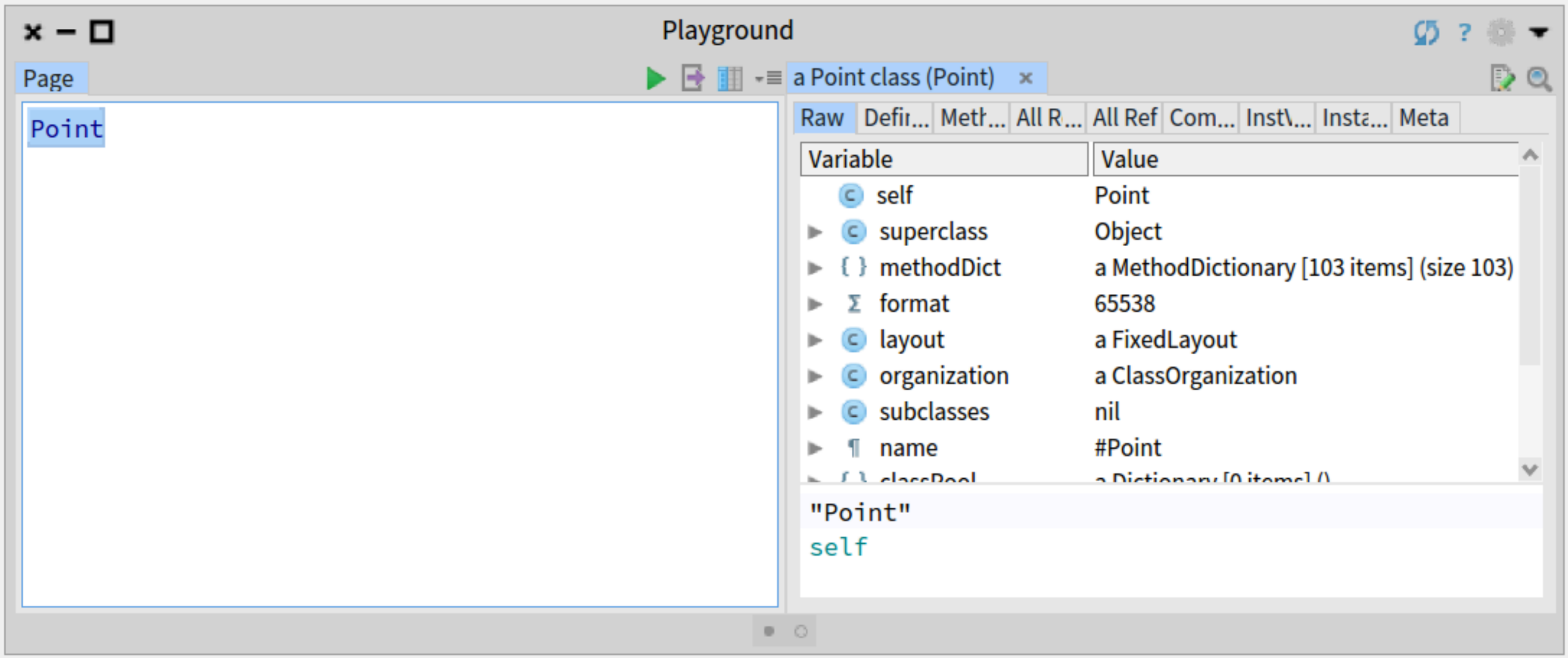
It is supra cool but it is not magic

Implementing a pane!

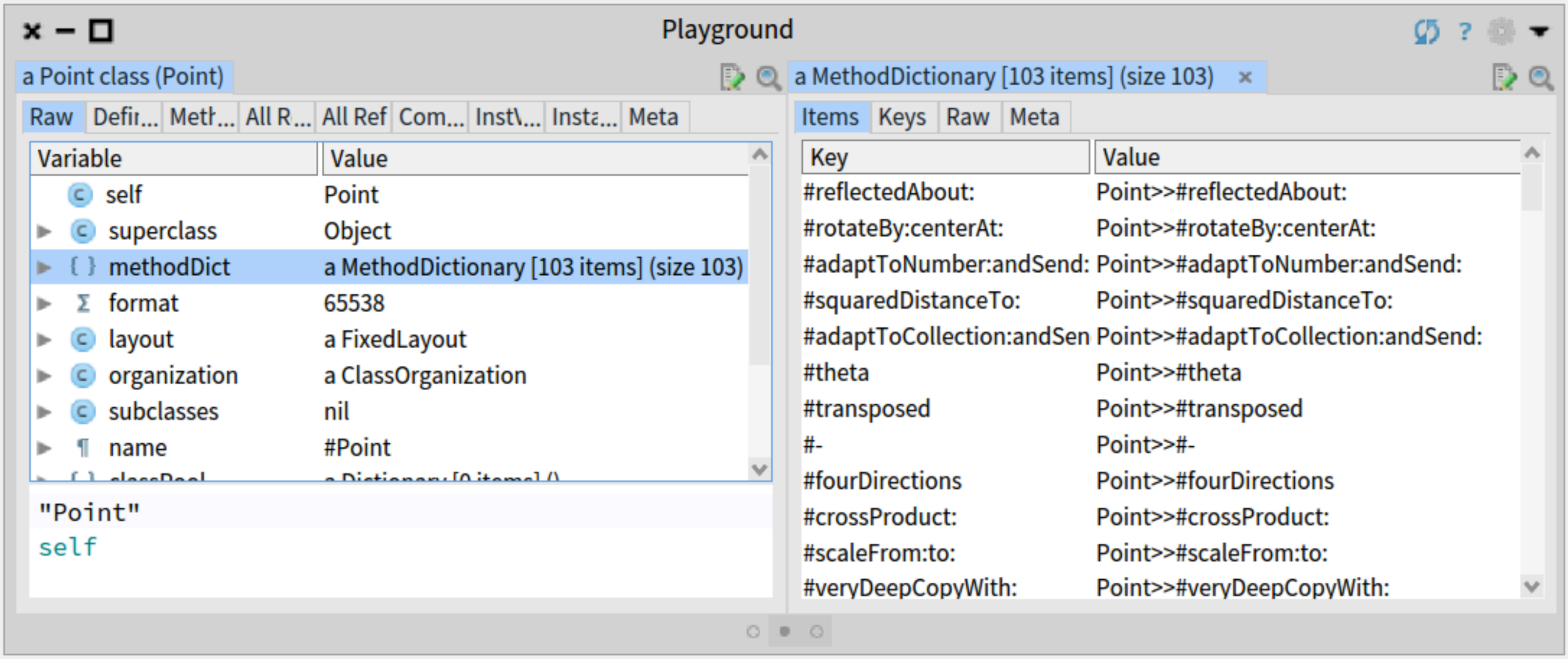


Ok files are boring…
What about *inside* the system?

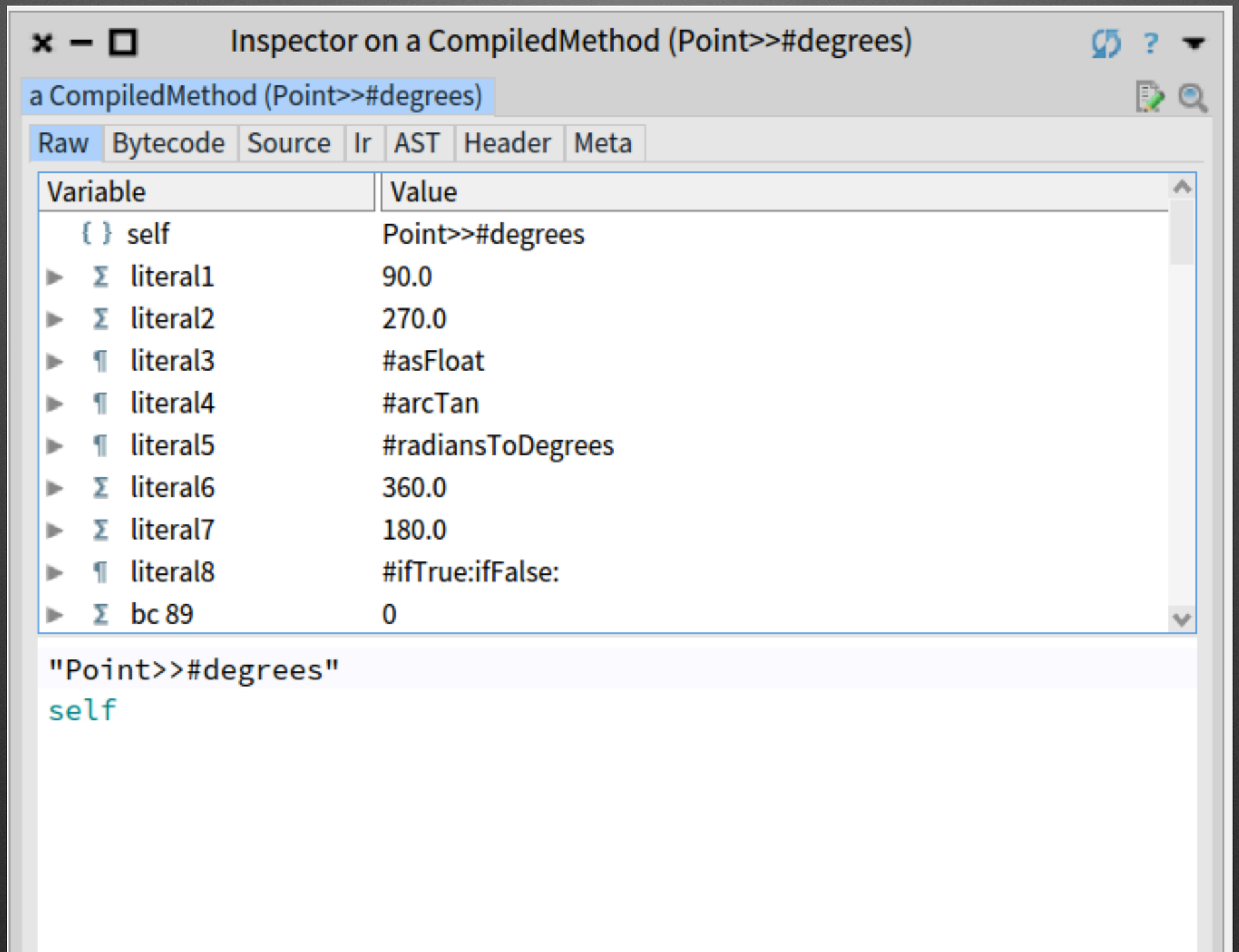
A class is an object we can inspect!



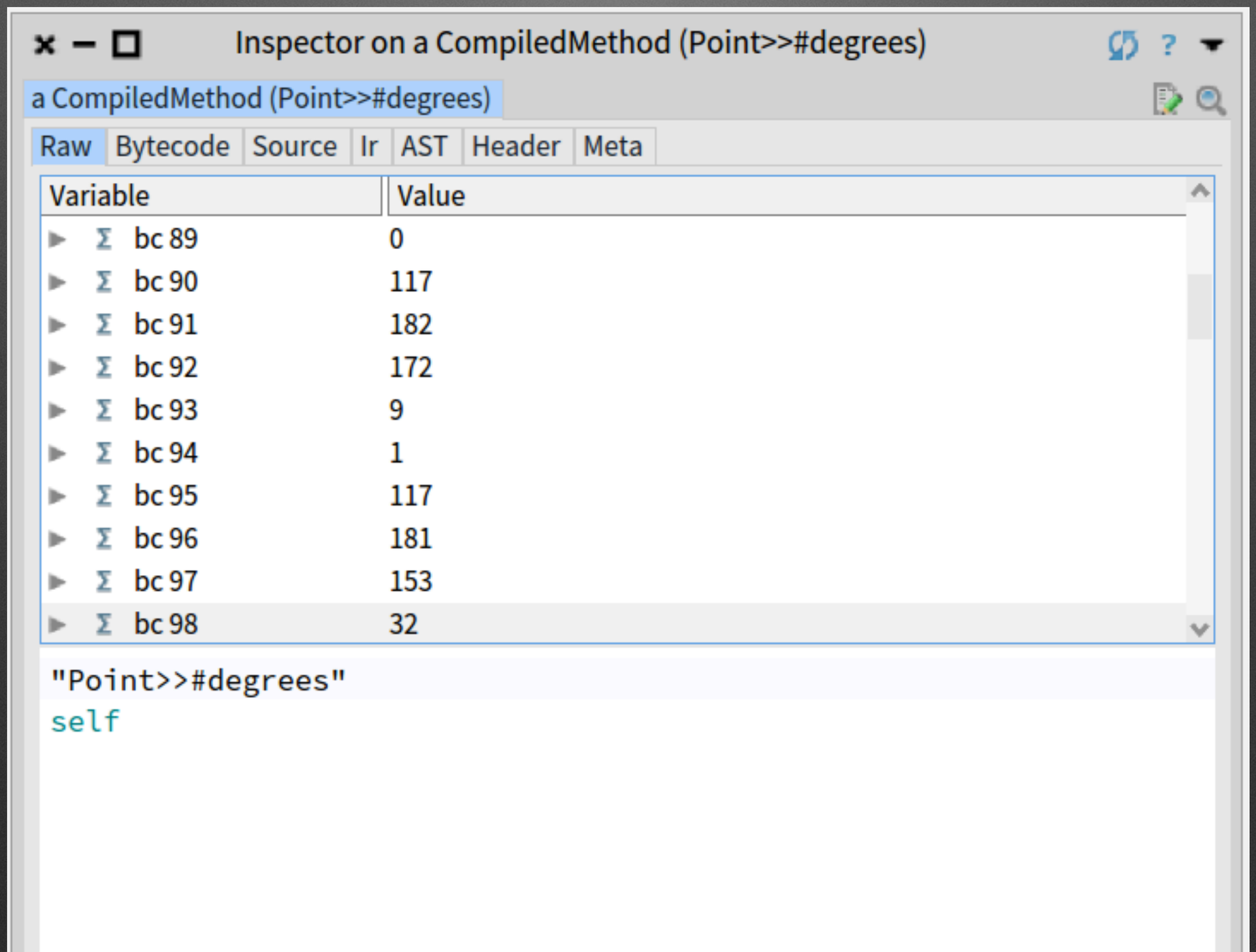
“A class has a method dictionary”
they said… let us verify



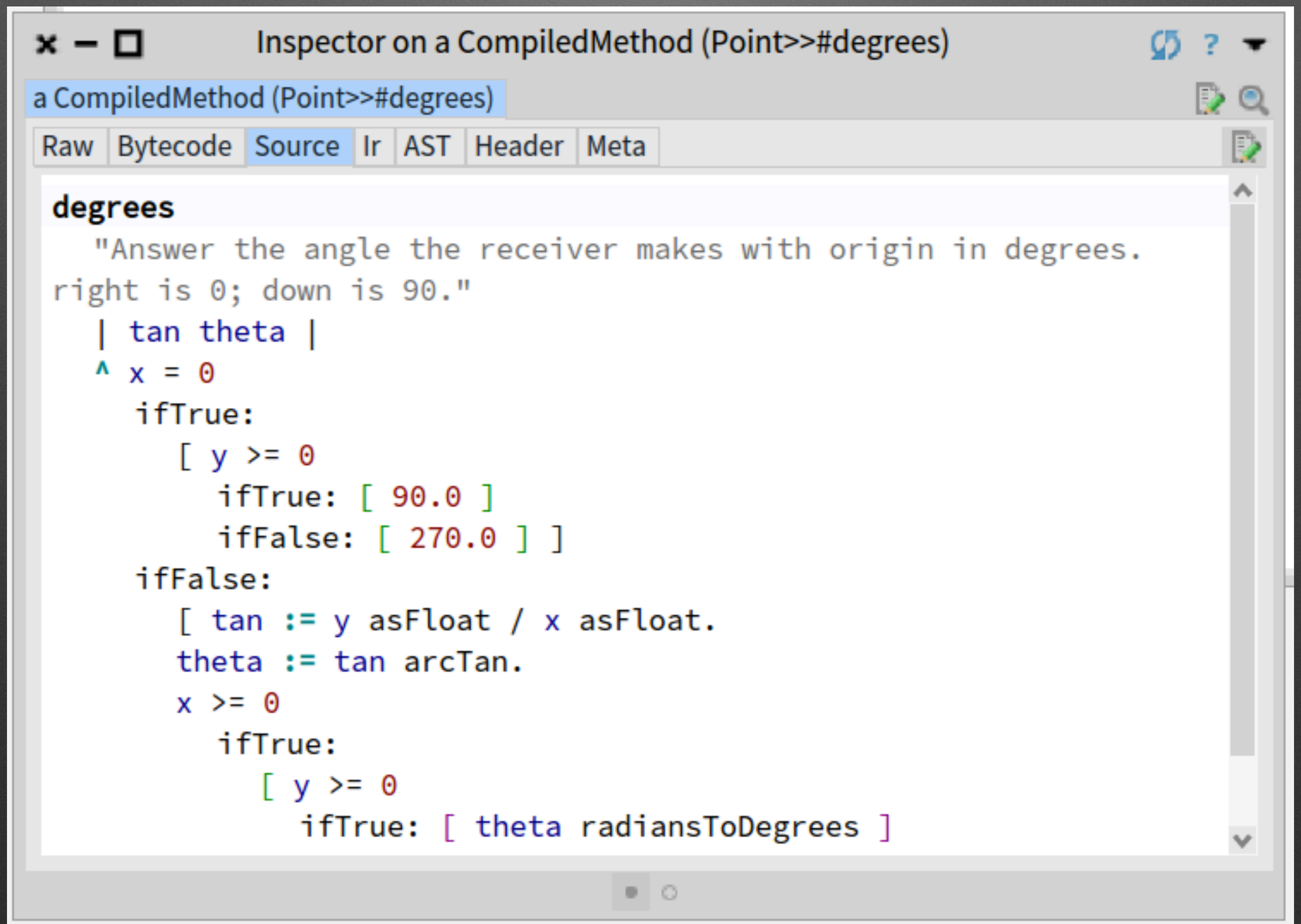
Dissecting one method object



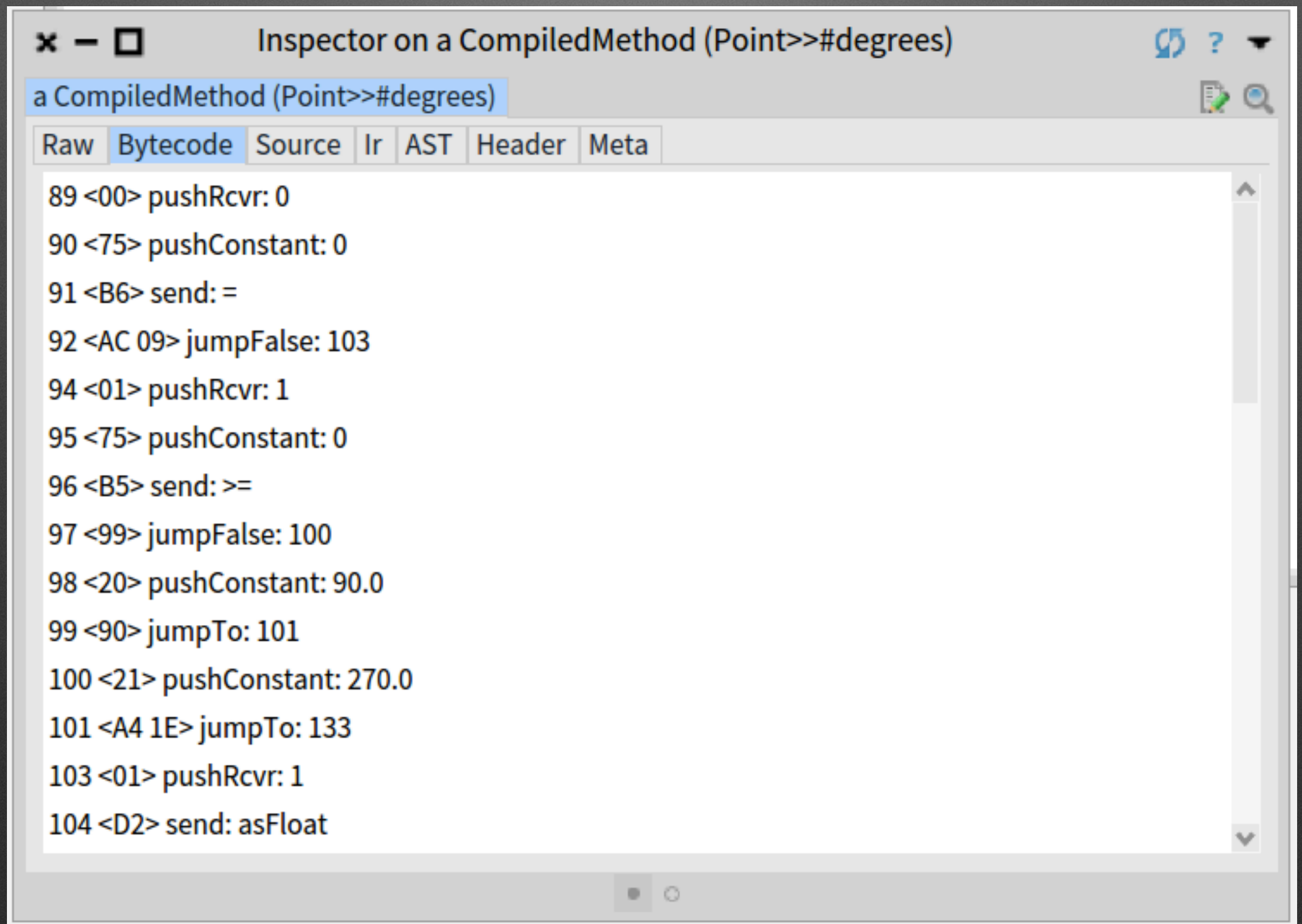
I do not want to be a compiler!



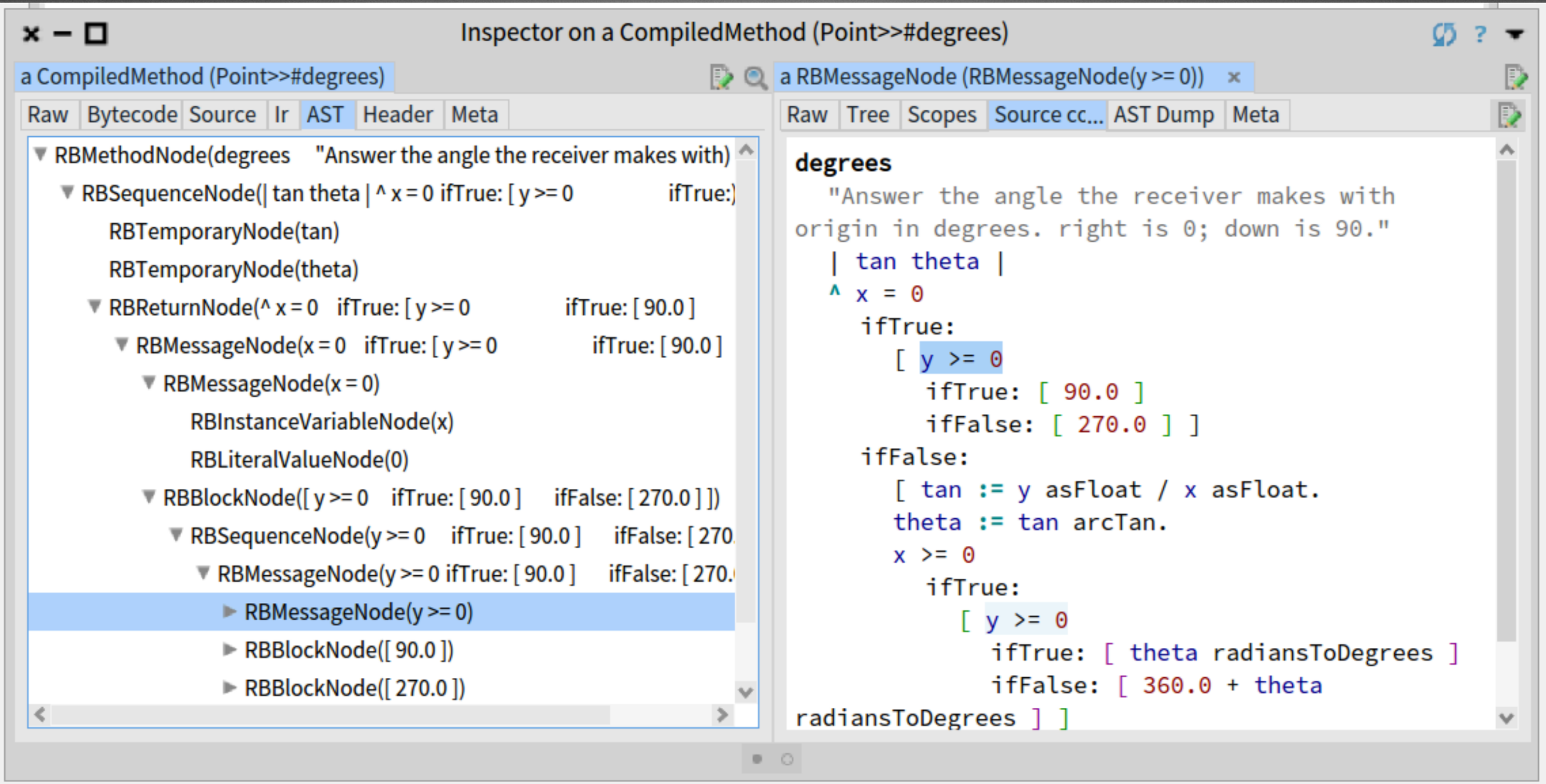
It looks like a method



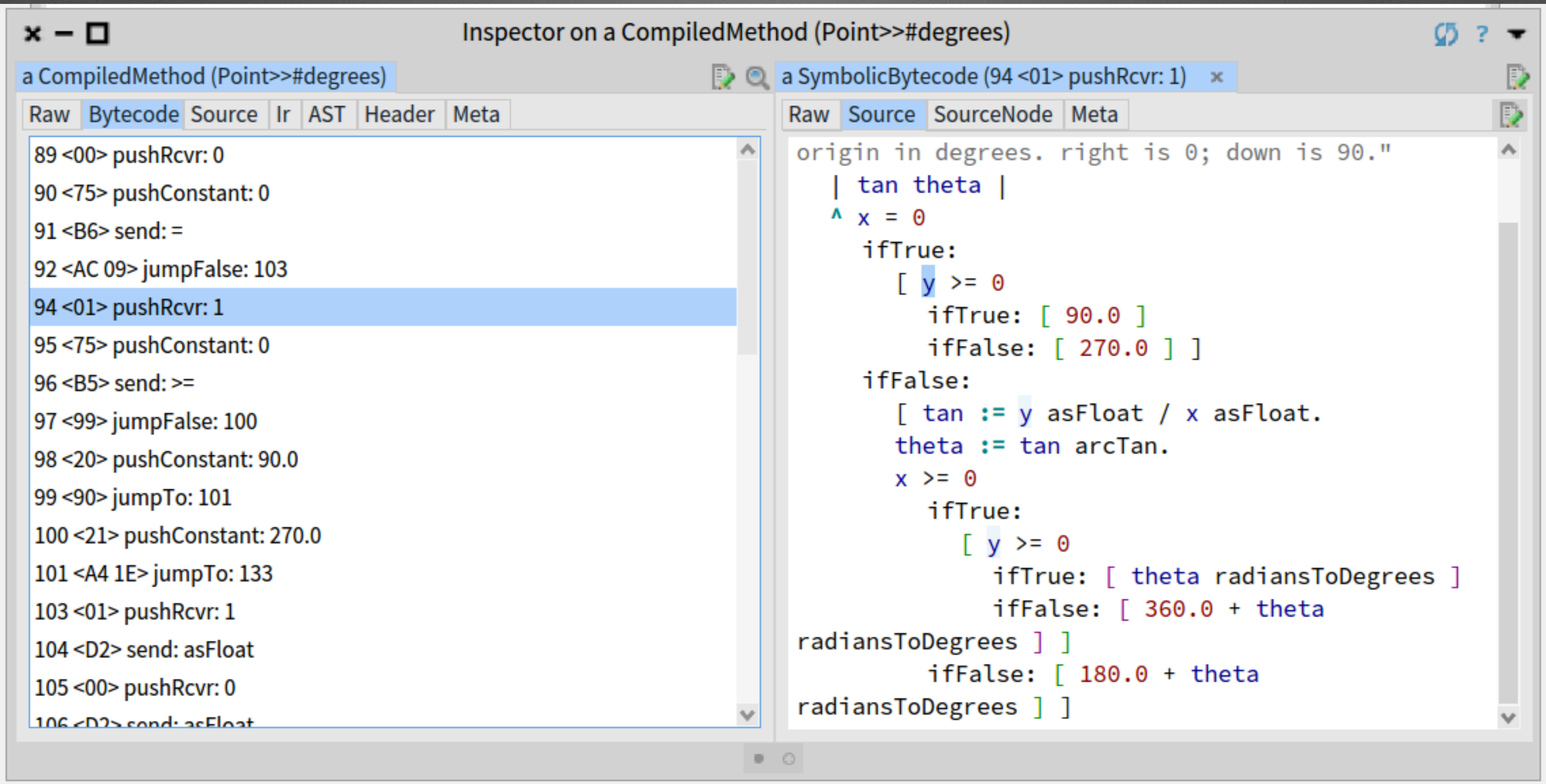
Numbers are not that obscure



And mapping them to the good abstraction helps



Yes pushRcvr: 1 means the second field!



Pharo Pro devs

- Get productivity boost
- Xtreme TDD
  - write test,
  - test fails and
  - code in debugger

Hot update on the fly customizable debugger

QuittanceGenerator class>>#exampleJustMonthAndRenter

Halt

Bytecode

Stack

Proceed Restart Into Over Through

PDFCellElement	getSubElementsWith:styleSheet:
PDFCellElement(PDFComposite)	generateCodeSegmentsCollectionWi
PDFCellElement(PDFComposite)	generateCodeSegmentWith:styleShe
PDFDataTableElement(PDFComposite)	generateCodeSegmentsCollectionWi [:aSubElement | aSubElement generateCodeSe
Array(SequenceableCollection)	collect:

Source

Where is? Browse

```
generateCodeSegmentsCollectionWith: aPDFGenerator styleSheet: compositeStyleSheet format: aFormat
    ^ (self getSubElementsWith: aPDFGenerator styleSheet: compositeStyleSheet)
        collect: [ :aSubElement |
            aSubElement
                generateCodeSegmentWith: aPDFGenerator
                styleSheet: (aSubElement buildCompositeStyleSheetFrom: compositeStyleSheet)
                format: aFormat ]
```

Variables

Type	Variable	Value
implicit	self	a PDFCellElement
parameter	aFormat	a PDFA4Format
parameter	aPDFGenerator	a PDFGenerator
parameter	compositeStyleSheet	a StyleSheet

```
        dimension: 80 mm @ 20 mm;
```

Halt in OCDBox>>name:

ack

Class	Method	Context
DBox	name:	UndefinedObject>>DoIt
definedObject	DoIt	CompiledMethod>>valueWithRec
mpiledMethod	valueWithReceiver:arguments:	[aCompiledMethod
bSmalltalkEditor	debug:receiver:in:	[self value.

ceed | Into | Over | Through | Run to | Restart | Return | Where is? | Create

lt

```
1 name: anObject
2     self halt.
3     name := anObject
```

Bytecode | Breakpoints | Sindarin

Type	Target	Method
Breakpoint	self	ReflectivityExamples>>exam
Breakpoint	self	OCDBox>>initialize
Breakpoint	self	OCDBox>>name:
Breakpoint	self	OCDBox>>name:
Halt	OCDBox	OCDBox>>name:
Breakpoint	OCDBox	OCDBox>>name:
Breakpoint	self	OCDBox>>removeElement:
Breakpoint	self	OrderedCollection>>removeI
Halt	StHaltCacheTest	StHaltCacheTest>>testInitial
Halt	StHaltCacheTest	StHaltCacheTest>>testInitial

```
1 name: anObject
2     self halt.
3     name := anObject
```

Specific view

Bytecode | Breakpoint | Sindarin

33 <4C> self
34 <80> send: halt
35 <D8> pop
36 <40> pushTemp: 0
37 <C9> popIntoRcvr: 1
38 <58> returnSelf

ceiver in: a StDebuggerContext (OCDBox>>name:)

an OCDBox

Variable	Value
[arg] anObject	'i'
self	an OCDBox
{ } elements	an OrderedCollection [0 items] ()
name	''
{ } Temps	a Dictionary [1 item] (#anObject->'i')
anObject	'i'
stackTop	an OCDBox

Raw | Breakpoints | Meta

Type	Target	Method
Halt	OCDBox	OCDBox>>name:

```
1
```

```
1 "an OCDBox"
2 self
```

Variable	Value
stackTop	an OCDBox
0 [anObject]	'i'
{ } rcvr: 0 [elements]	an OrderedCollection [0 iten
rcvr: 1 [name]	''

Receiver in: a StDebuggerContext (OCDBox>>name:)

an OCDBox

Variable	Value
[arg] anObject	'i'

Raw | Breakpoints | Meta

Variable	Value

debug it

Bytecode GT

Parser Stack | Through Action | Into Reduce | Next Token

Symbol	Value
Expression	a JSUnaryExpressionNode
")"	{)(238498,238498,#(23))}
"{"	{{(238499,238499,#(25))}
StatementList	an OrderedCollection(a JSExpressionStatementNode a JSI
"("	{((238678,238678,#(28))}
"function"	{function(238679,238686,#(53 82))}
Identifieropt	nil
"("	{((238687,238687,#(28))}
FormalParameterListopt	an Array(an OrderedCollection() an OrderedCollection())
")"	{)(238688,238688,#(23))}
"{"	{{(238689,238689,#(25))}
SourceElements	an OrderedCollection(a JSVariableStatementNode a JSVar
MemberExpression	a JSNameExpressionNode
"."	{.(274447,274447,#(38))}

Possible Actions

Symbol	Action
<identifier>	Shi
IdentifierName	Shi

GLR

1

A specific parser compiler debugger

Input | Step to Cur | Next Character

```
            return t._stash(this); // dojo.NodeList
        }

    });

    nl.events = [
        // summary:
        //          list of all DOM events used in NodeList
        "blur", "focus", "change", "click", "error", "keydown", "keypress",
        "keyup", "load", "mousedown", "mouseenter", "mouseleave", "mousemove",
        "mouseout", "mouseover", "mouseup", "submit"
    ];

    // FIXME: pseudo-doc the above automatically generated on-event functions

    // syntactic sugar for DOM events
    d.forEach(nl.events, function(evt){
```

Nam	Value
State	default

Stack | Proceed | Restart | Into | Over | Through

JSParser(SmaCCGLRParser)	performParsingStep	
JSParser(SmaCCGLRParser)	performParsingLoop	
JSParser(SmaCCParser)	parse	
JSParser class(SmaCCParser class)	parseStream:startingAt:	
JSParser class(SmaCCParser class)	parseFile:	[self parseStrean
BlockClosure	ensure:	
JSParser class(SmaCCParser class)	parseFile:	
UndefinedObject	DoIt	
CompiledMethod	valueWithReceiver:arguments:	
RubSmalltalkEditor	debug:receiver:in:	[aCompiledMethc
BlockClosure	newProcess	[self value.Proces

Source | Where is? | Browse

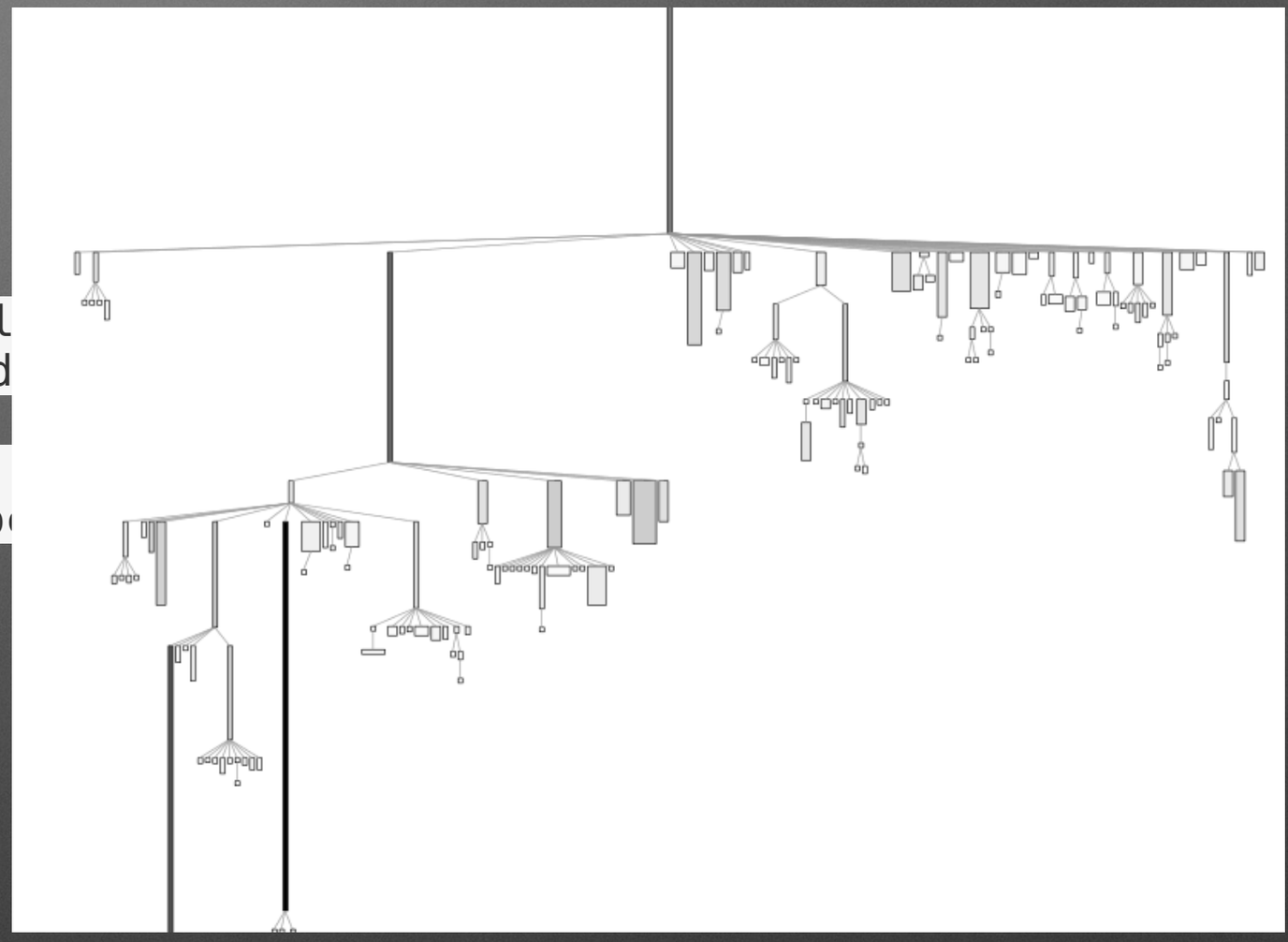
```
(tryAllStates and: [ self isEOFToken ])
    ifTrue: [ ^ self processEOFToken ].
currentToken isPattern
    ifTrue: [ ^ self splitForPatternToken ].
[ actions := self actionsForCurrentToken.
actions isEmpty
    ifTrue: [ self killState.
        currentToken := nil.
        ^ self ].
2 to: actions size do: [ :i | self splitWithAction: (actions at: i) ].
action := actions first.
action = self acceptAction
    or: [ self performAction: action.
        currentToken isNil ] ] whileFalse.
action = self acceptAction
    ifTrue: [ currentState markAccepted ]
```

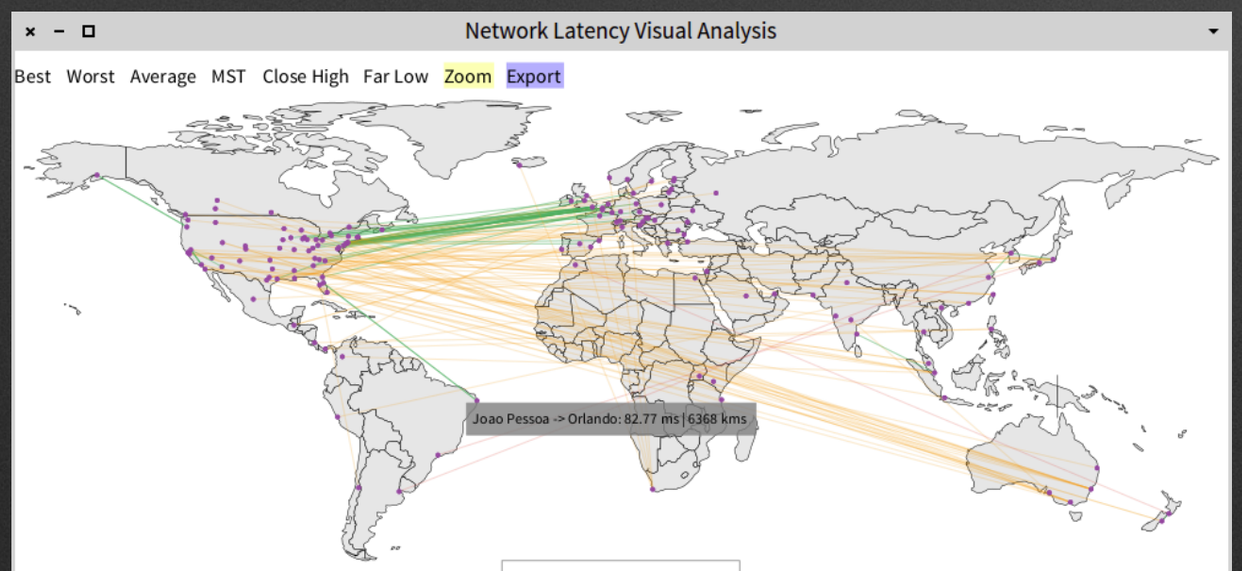
Live visualisation scripting

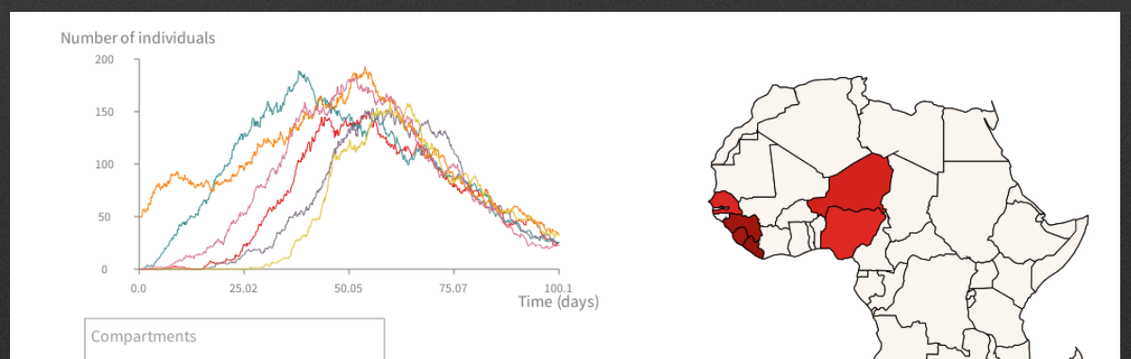
- The next level
- Roassal 30 by Prof. A. Bergel/Object Profile University of Chile at Santiago
- Simply gorgeous
- Check http://agilevisualization.com

Scripting visualisations

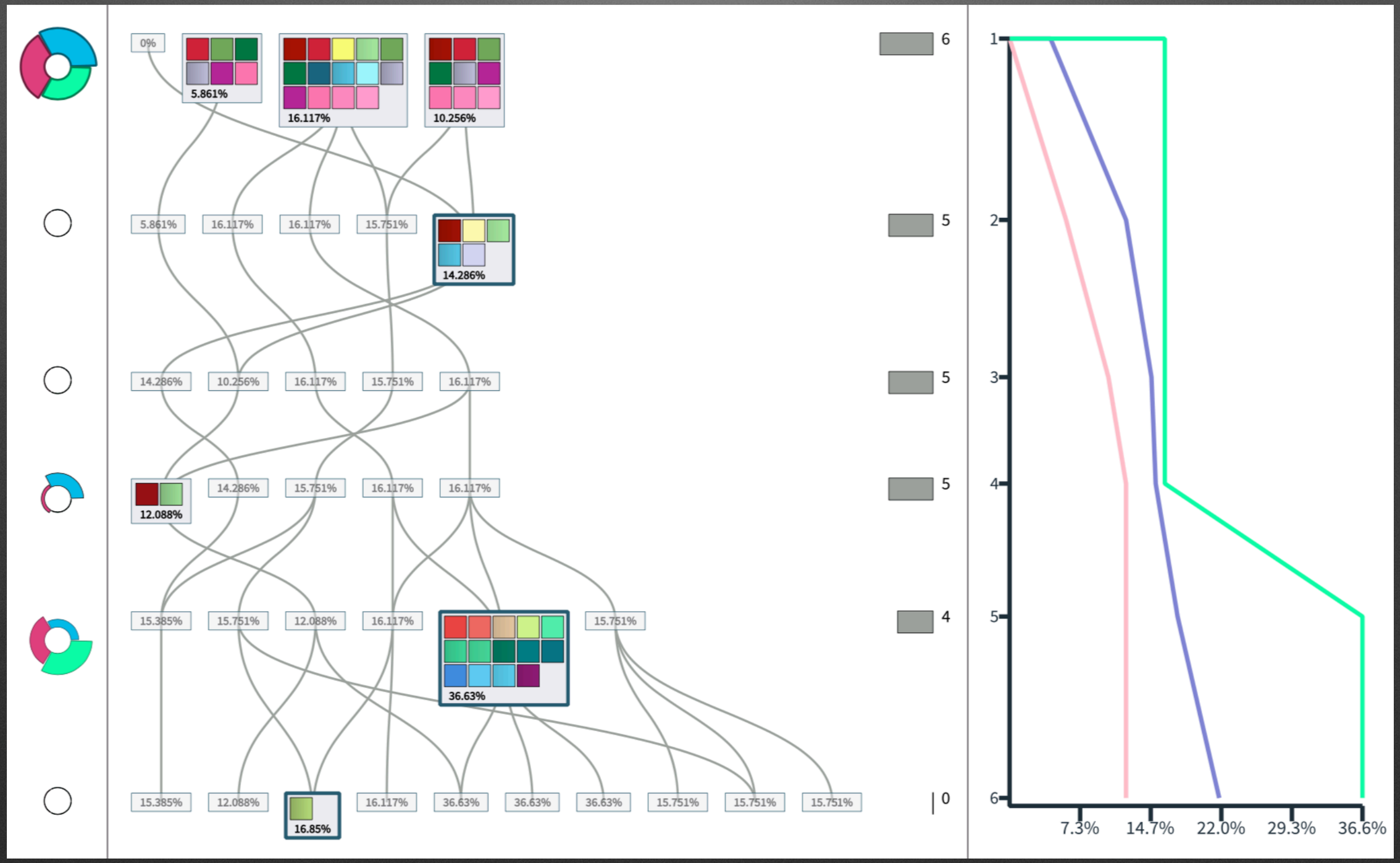
```
b := RTMondrian new.
    b shape rectangle
        withBorder;
        width: [ :cls | cls numberOfVariabl
        height: [ :cls | cls numberOfMethod

    b nodes: Collection withAllSubclasses.
    b edges connectToAll: [ :cls | cls sub
    b layout tree.
    b normalizer
        normalizeColorAsGray: [ :cls |
cls numberOfLinesOfCode ].
    b
```





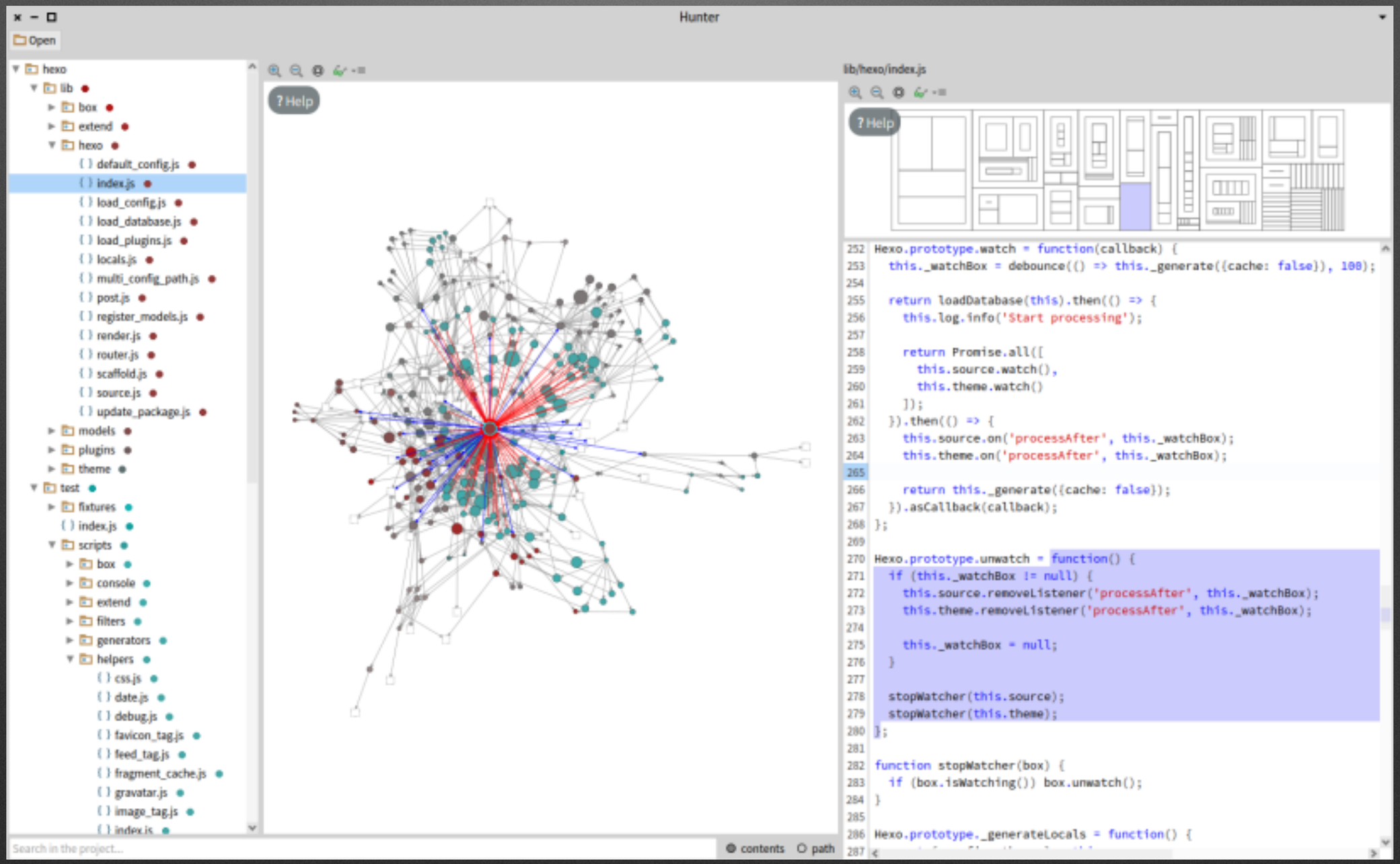


Execution of IA generating tests

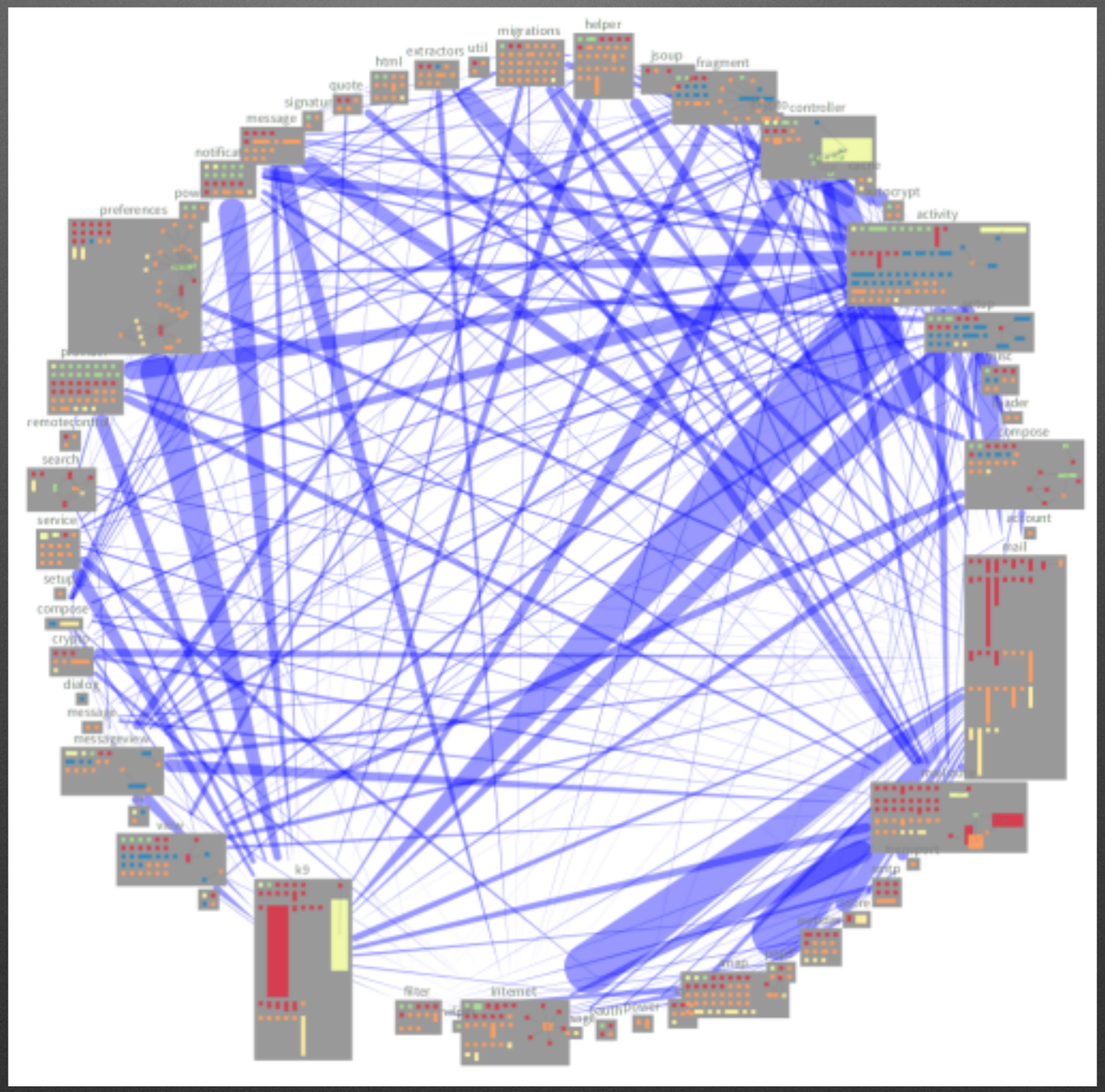


Building your own tool

- Javascript analysis

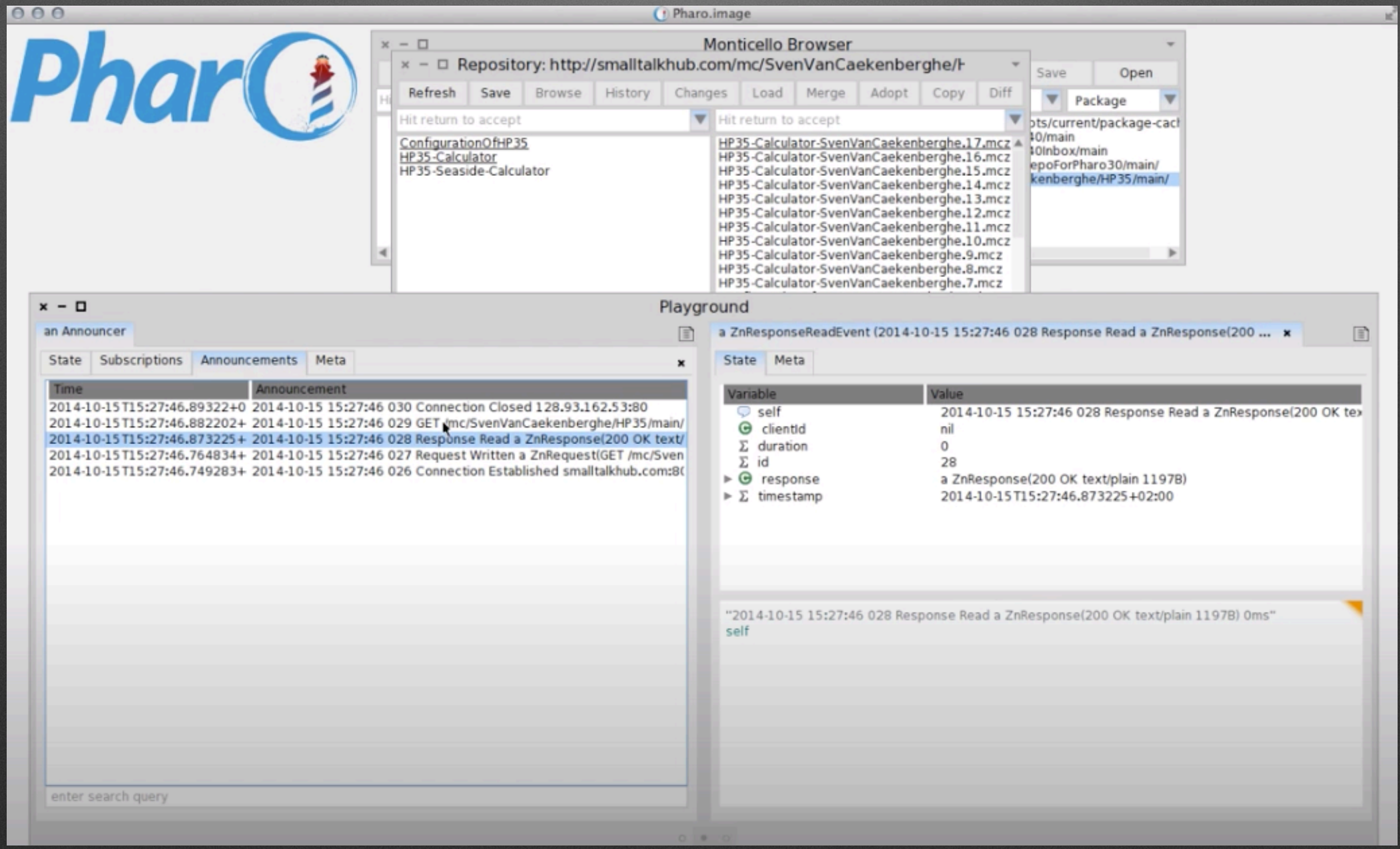


Analysis Android application



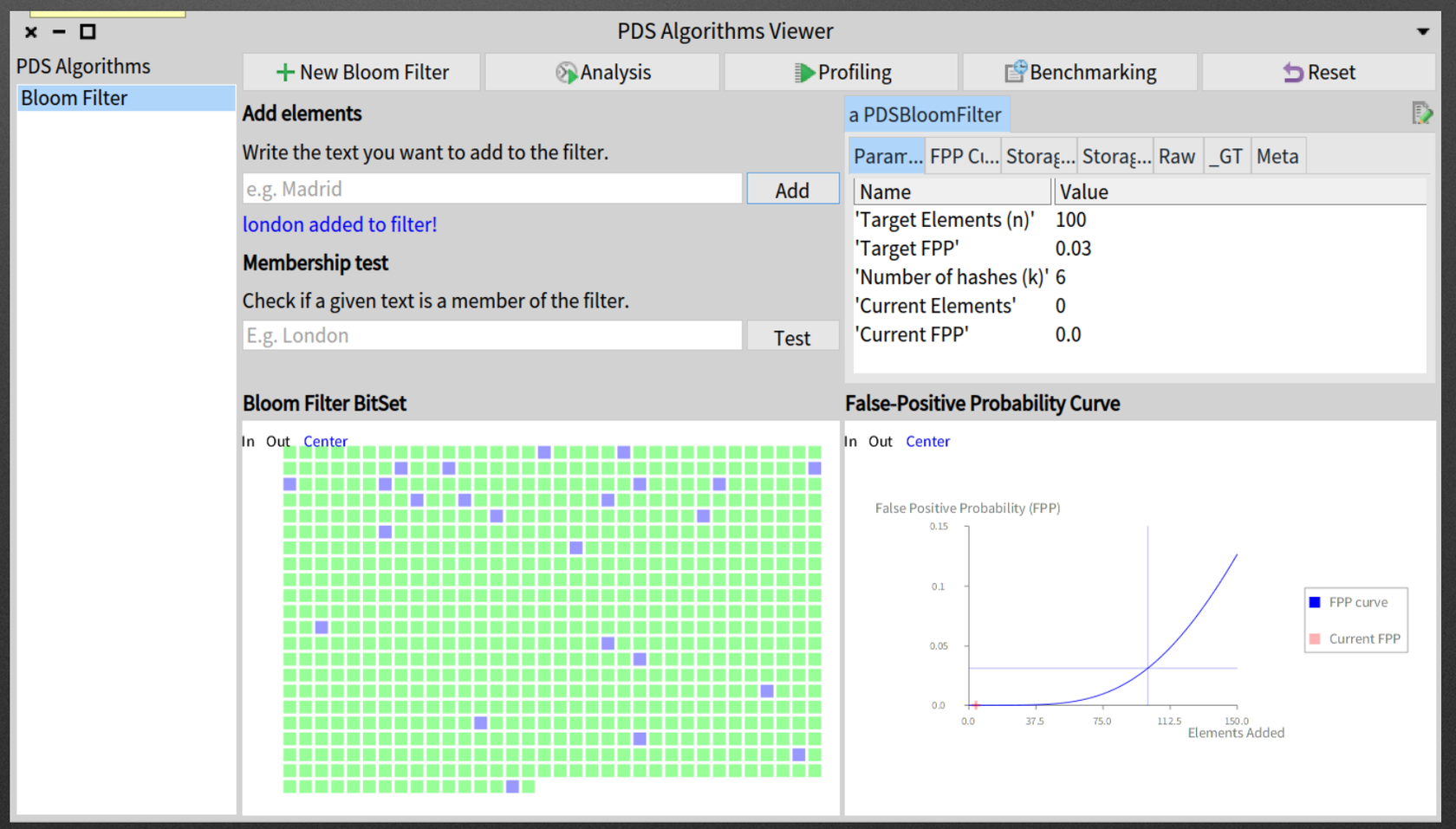
HTTP traffic analysis

- http://youtu.be/rIBbeMdFCys



Probabilistic Data Structure

- https://github.com/osoco/PharoPDS
- Defined new data structures
- And the analysis tools



Empowering is the right word

- Moldable tools are powerful
- Productivity boost
- Tried to give you my feeling
- But “The idea of experience does not replace experience.” Alain

There is a meta question

How to invent new things with the same tools than any body else?


WHAT ARE YOU DOING?! YOU'RE GOING TO BE LATE FOR SCHOOL! HURRY UP AND PUT YOUR CLOTHES ON RIGHT!
11-13


IT'S SAD HOW SOME PEOPLE CAN'T HANDLE A LITTLE VARIETY.