

# Pharo for Scientists

<http://stephane.ducasse.free.fr>

<http://www.pharo.org>



JPMORGAN  
CHASE & CO.



feenk



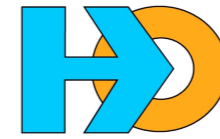
ZWEIDENKER



THALES

projector  
software

BetaNine  
software engineering



inspired!

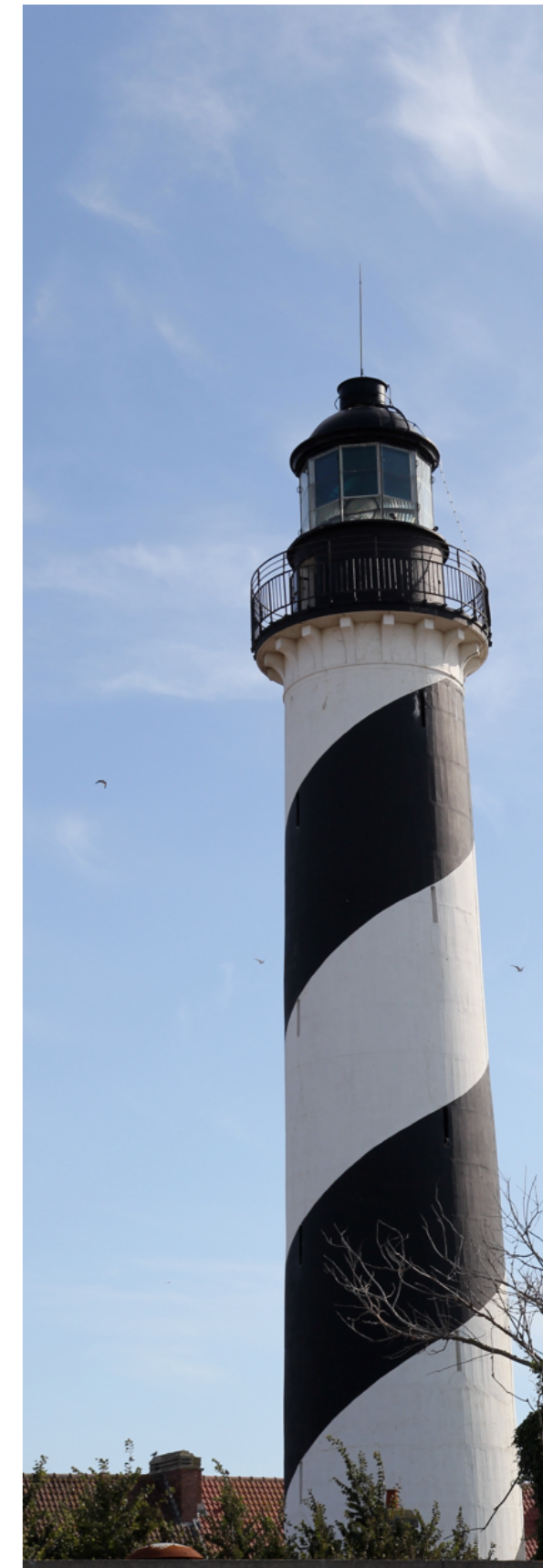
SORABITO

knowroaming

TA MÈRE<sup>SCRL</sup>  
BADASS MOBILE DEVELOPMENT



Systems that make sense  
Sensus





### Epicea - Code Changes

Pharo.ukuxow01byex@vycsucmc3if *	+ ReferenceFinder - startFrom: Today, 2:24 pm
Pharo.ukuxowhinqostill1cfg38ya Today	+ ReferenceFinder - searchVariablesIn: Today
Pharo.ukuxov6wgcbdg3w2gkuvo08r Today	+ ReferenceFinder - searchIndicesIn: Today
Pharo.70xz09swnu55q51x76u9ij96h Today	+ ReferenceFinder - searchForObject: Today
	+ ReferenceFinder - searchForMethod: Today

### Iceberg repositories

New repository Clone repository Add local repository Fetch all

Name	Current branch	Loaded version	Status
iceberg	dev-0.4	f9c63ee (15 May 2017)	Up to date
libgit2-pharo-bindings	master	1f582be (18 April 2017)	Up to date

### General

Name	Value
Origin	https://github.com
Remote User	
Remote host	github.com
Repo Owner	pharo-vcs
Location	/tmp/src/te
Cloning from	origin

### Branch browser

Date & time	Id	Parents	Author	Comment
2017-05-13 18:16	ec0389	64dd53e	Esteban Lorenz	
2017-05-13 16:22	64dd53e	ee52967	Esteban Lorenz	
2017-05-12 22:47	ee52967	883763d	Esteban Lorenz	
2017-05-12 17:11	883763d	9880fcb	Esteban Lorenz	
2017-05-12 14:24	9880fcb	fefadb2	Esteban Lorenz	
2017-05-12 09:40	fefadb2	7969c6c	GitHub	
2017-05-12 09:32	7969c6c	535238f	Max Leske	
2017-05-11 15:18	535238f	5382135	Esteban Lorenz	
2017-05-10 10:47	5382135	422644a	Esteban Lorenz	
2017-05-10 10:42	422644a			

### Commit info

Date & time	2017-05-13 16:22
Commit Id	64dd53ea288990466e2b94095d33fa25764c7100 [64dd53e]
Parent(s)	ee52967
Author	Esteban Lorenz
Comment	remove not used method

### AssertionFailure: Assertion failed

Stack

- evaluateAndDo
- highlightValueAndDo
- GLMorphicPharoScriptRenderer(GLMorphicPharoCr actOnHighlightedValue
- handleEdit
- WorldState
- WorldMorph
- doOneCycleNowFor: World

Source

```
doOneCycleNowFor: World  
"Immediately do one cycle of the interaction loop.  
This should not be called directly, but only via doOneCycleNowFor: World"
```

### Variables

Type	Variable	Value
self	self	aWorldState
WorldMorph	WorldMorph	aWorldMorph
WorldState	WorldState	aWorldState
WorldMorph	WorldMorph	aWorldMorph
WorldState	WorldState	aWorldState

### Pharo

# Pharo?



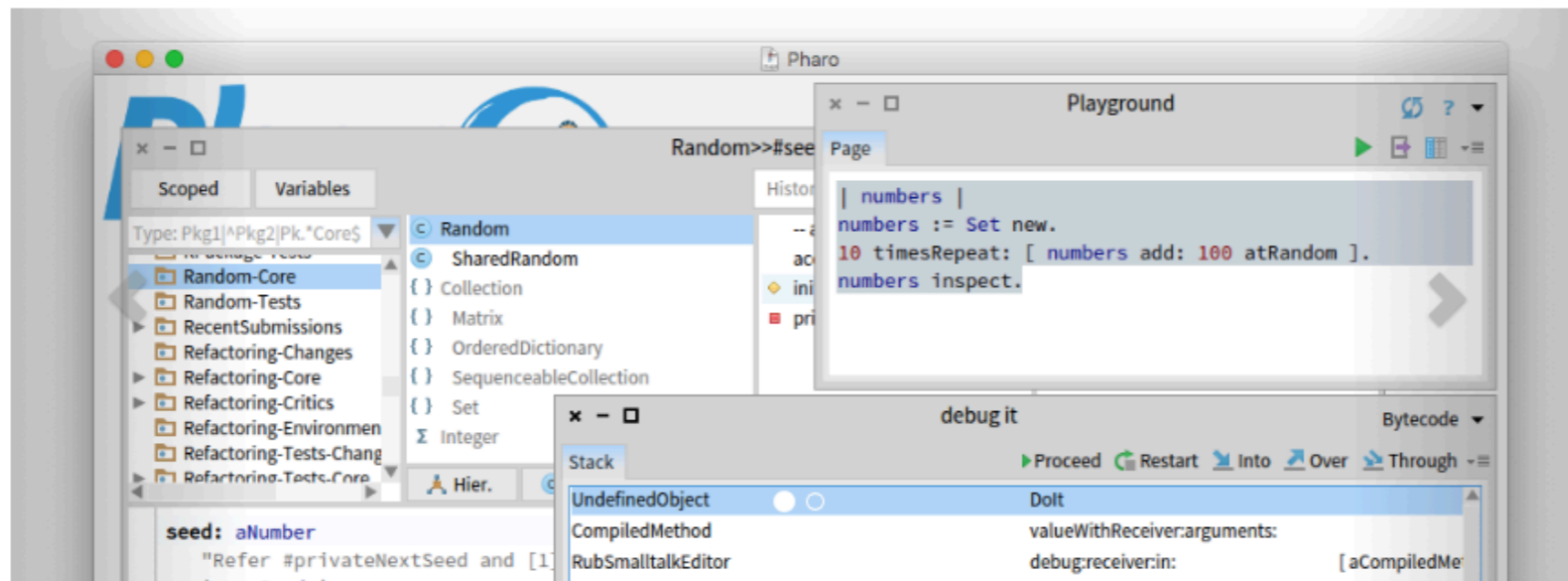
# Pharo!

- System: Pure object language + full IDE
- Powerful, elegant and fun to program
- Great community / industrial consortium
- Living system under your fingers
- Works on Mac OSX, Linux, iOS, *Android*, Windows, Pi - 100% MIT



## The immersive programming experience

Pharo is a pure object-oriented programming language *and* a powerful environment, focused on simplicity and immediate feedback (think IDE and OS rolled into one).



### Pharo 90

- ~740 packages
- 9 000 classes
- 120 000 methods

250 forks sur Github  
up to 100 contributors

30 regulars

- 8 sub projets
  - graphics
  - vcs
  - tools

### Consortium

- ~ 28 companies
- ~ 25 academic

Discover

Learn more about Pharo's key features and elegant design.

Download

Download latest version (8.0)!  
Read more about [here](#)

Learn

Access the Pharo Moco!  
3000 people registered and follow the Pharo Moco. You can find it [here](#).  
Watch the [teaser!](#)

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# Elegant!

- Full syntax on a postcard
- Simple and powerful object model

method name  
parameter  
**exampleWithNumber: x**

pragma  
comment  
<syntaxOn: #postcard>  
"A "complete" Pharo syntax"

local variable  
binary message  
unary message  
boolean literals  
nil literal  
block  
| y |  
true & false not & (nil isNil)  
ifFalse: [ self perform: #add: with: x ].

assignment  
pseudo variables  
keyword message  
y := thisContext stack size + super size.

instance variable  
integer literals  
byte array  
byteArray := #[2 2r100 8r20 16rFF].

array generated at runtime  
literal array  
{ -42 . #(\$a #a #'I''m' 'a' 1.0 1.23e2 3.14s2 1) }  
do: [ :each |  
symbols  
character  
string  
floating point  
scaled decimal

local block variable  
block parameter  
global variable  
cascade  
| var |  
var := Transcript  
show: each class name;  
show: each printString ].

keyword message  
^ x < y  
return instruction

other method definition examples:  
unary  
+ binaryMessageArgument  
keyword: arg  
keyword: arg1 withTwo: arg2

# Full Syntax!

<https://www.pharo.org>

**Mainly objects,  
messages and lexical  
closures**



# Temp declaration, assignment, separator and return

| a |

a := 40 + 2.

^ a

# Lexical closures: Blocks

## Unary messages

Date today, 9 squared

## “Operators” Binary

4 + 3

‘Black ’, ‘Chocolate ’, ‘is good’

## Keywords messages

2 between: 0 and: 10

2.betweenAnd(0, 10)

# Lexical closures: Blocks

- closure definition

`[:x | x + 5]`

- closure execution

`[:x | x + 5] value: 37`

`>>> 42`

# Control flow ops are messages

Weather today isRaining

ifTrue: [ self takeUmbrella]

ifFalse: [ self takeSunglasses]

*Yes we send messages to Boolean objects*

# Iterators

```
#( 1 -2 -3 4 -5) collect: [:each | each abs]
```

```
>>> #( 1 2 3 4 5)
```

*Yes we send messages to collection to do loops*

# Class / Method definition

```
Object << #Point  
  slots: { #x . #y };  
  package: 'Kernel'
```

```
<= aPoint
```

"Answer whether the receiver is neither below nor to the right of aPoint."

```
^ x <= aPoint x and: [y <= aPoint y]
```

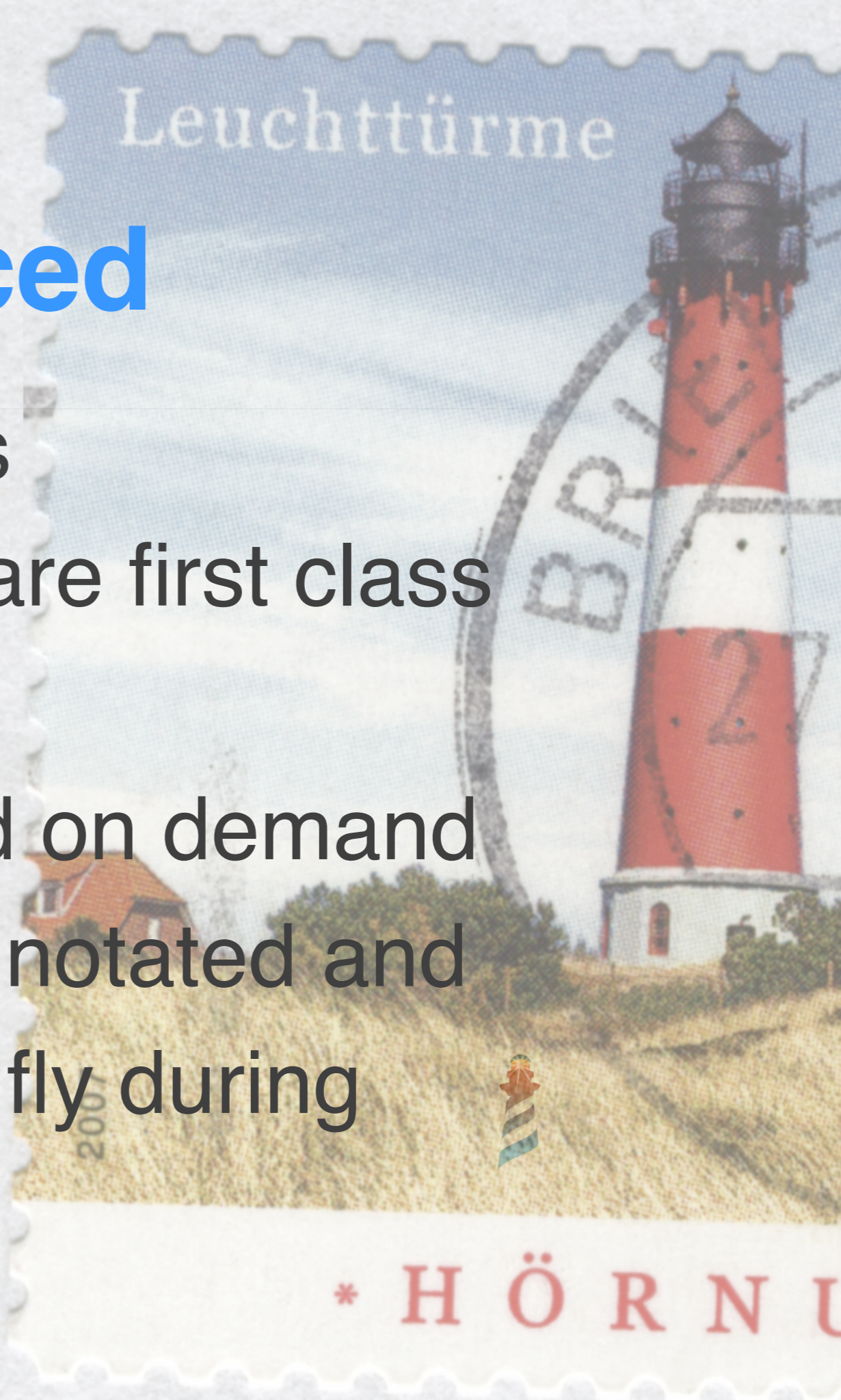
# Full Model!

- \* Dynamically typed
- \* Everything is an instance of a class
- \* All methods are public virtual
- \* All attributes are protected
- \* Single inheritance
- \* Stateful Traits
- \* Closures everywhere



# For the advanced

- \* Classes are objects
- \* Instance variables are first class
- \* MOP for read/write
- \* Stack can be reified on demand
- \* AST can be fully annotated and transformed on the fly during execution





**Focus on intrinsic complexity**

**Eliminate accidental  
complexity**

A hand holding a red pencil is shown writing on a piece of paper. The hand is positioned at the top of the frame, and the pencil is angled downwards. The paper is white, and the red pencil has just finished writing a large, stylized red letter 'P' that is partially visible on the left side of the page. The background is a plain, light-colored surface.

**Fully Written in Itself**

**Everything is written in Pharo  
One simple syntax to rule  
them all**

**Learn**  
**Adapt**  
**Modify**

**Pharo is highly  
immersive**

**Most languages do not  
expose much of their  
internals**



# Looking inside

- \* Introspection is a first step
- \* Pharo is fully inspectable and reflective

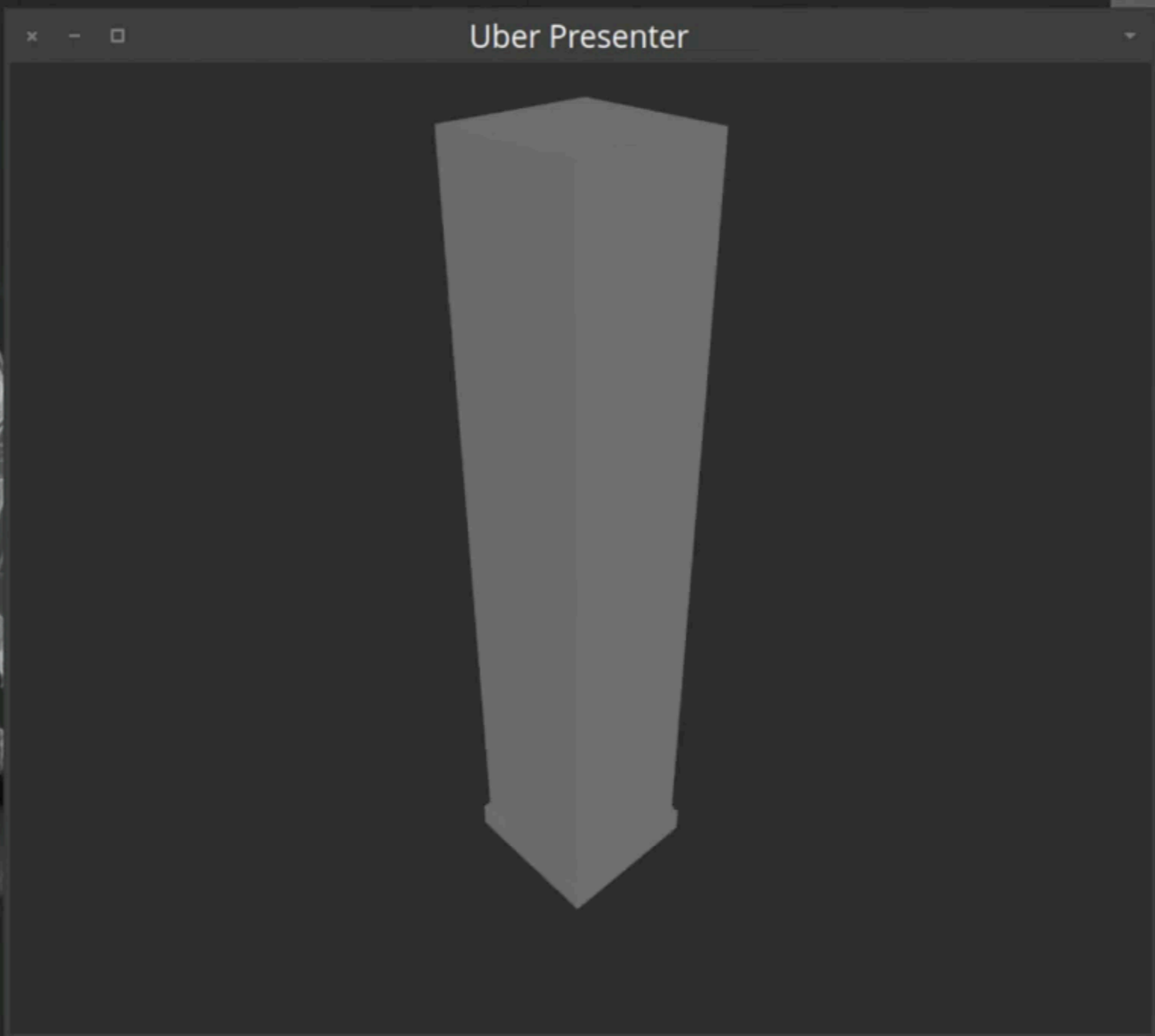


# Immersed and interacting

- \* You interact with objects
- \* You modify objects life

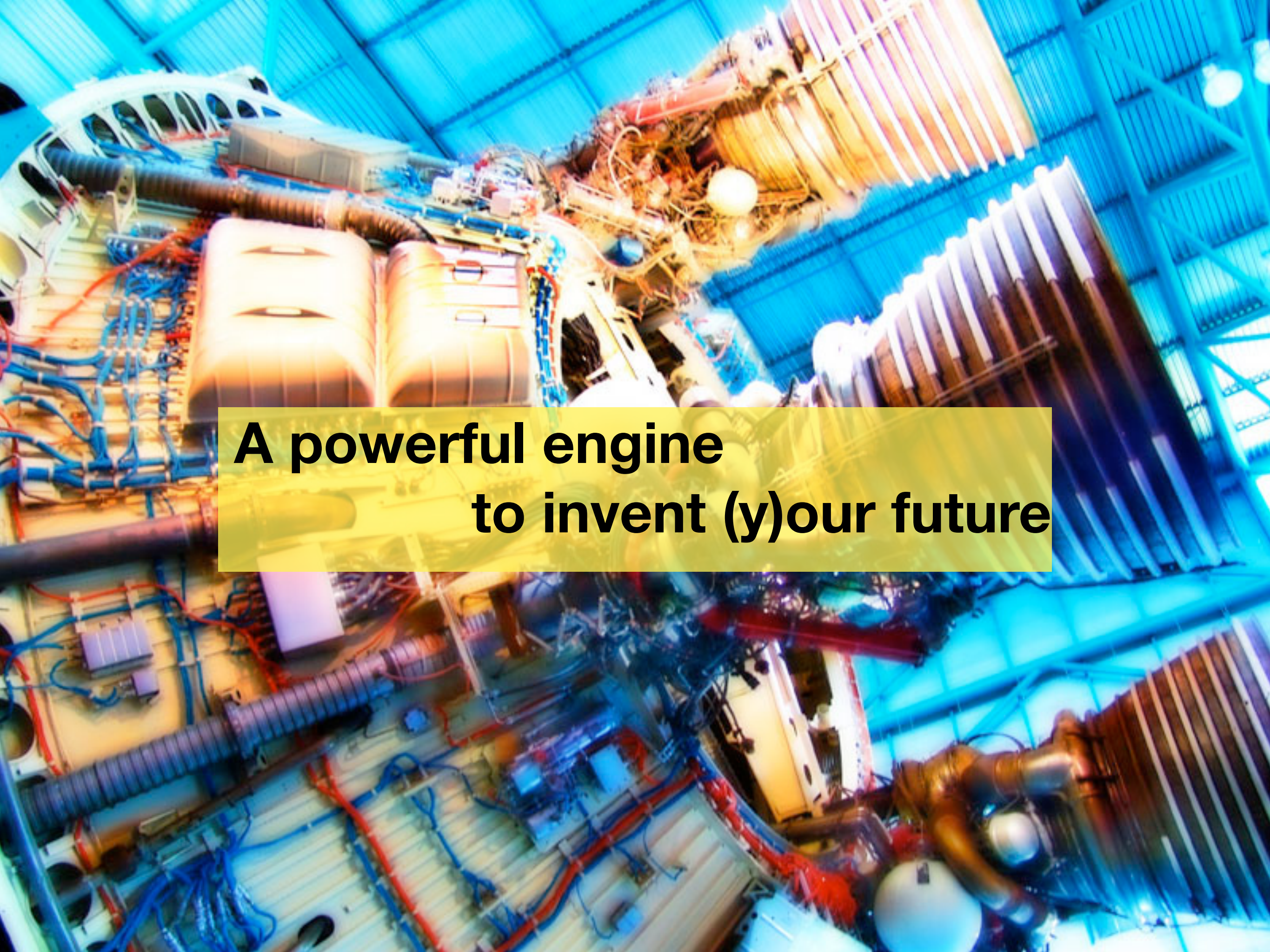


```
Workspace  
| elements lay |  
  
elements := (1 to: 5) collect: [ :ob |  
    (R3CubeShape new) elementOn: ob ].  
    I  
  
lay := R3WallLayout new.  
lay on: elements.  
  
UberPresenter present: elements
```




**We can do the same  
with web app, sockets,  
networks, sensors,  
living programming.....**

**Pharo's goal...**

The image shows a large, complex industrial machine, likely a particle accelerator or fusion reactor, with a central yellow text overlay. The machine is composed of various components, including large cylindrical tanks, pipes, and a dense network of blue and red cables. The background is a blue, corrugated metal structure, possibly a ceiling or wall. The overall scene is brightly lit, with a strong blue and yellow color palette.

**A powerful engine  
to invent (y)our future**



**An ecosystem where  
innovation/business bloom**

**trentosur**

Soluciones móviles para retail y trade marketing

Nos enfocamos en lo que importa del negocio sin perder de vista los detalles de su implementación.

Primero móvil, Plataforma Android, En la nube

**PharoCloud**

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Pharo platform as a Service: put your Smalltalk web-application online at Pharocloud in just 3 clicks

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Web-To-Print Solution

- Design and create individual printed matter
- eShop with credit card payment
- High quality PDF output with Printing Process integration
- Thousands of orders for seven Swiss printing companies

**Quuve**

# Some Success Stories

Dedicated and cost-effective tools for software evolution

Dedicated Analyses, Dedicated tools, Decision making

**Yesplan is veelzijdige software voor het efficiënt plannen van evenementen.**

Yesplan is uiterst gebruiksvriendelijk, flexibel en makkelijk te koppelen met andere software.

**NTed: disaster scenario recovery**

**HORIZON-COM**

The world's first online platform fully supporting cloud-based management

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**CSOB**

**airflowing**

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Sales, tasks and finances: your team and all that's essential in one place

Plans and Pricing

Manage your simple way

**OBJECT PROFILE**

**CMSBOX**

Das Content Management mit System

100% Inline-Editor

Drag & Drop, Copy / Paste

**2denker**

Continuous API Testing

keep your services under control 24/7

**t3**

**trentosur**

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- Plataforma Android
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**PharoCloud**

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**Romax TECHNOLOGY**

Wind Energy

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**WEBDRUCK.CH**  
Web-To-Print Solution

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**Quuve**

**iBizLog** - <http://www.ibizlog.com>

A product by Smallworks

**SpiesenFacts**

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- Dedicated Analyses
- Dedicated tools
- Decision making

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**Pharo.org**

Need a disaster scenario recovery?

**Pinesoft MBagger**

**HORIZON-COM**

BETTER FASTER CHEAPER

**CSOB**

**airflowing**

Organize your creative work

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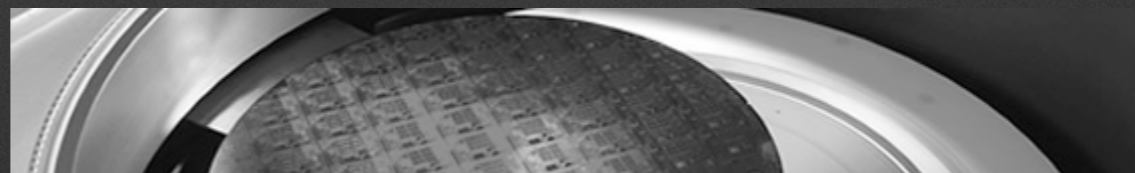
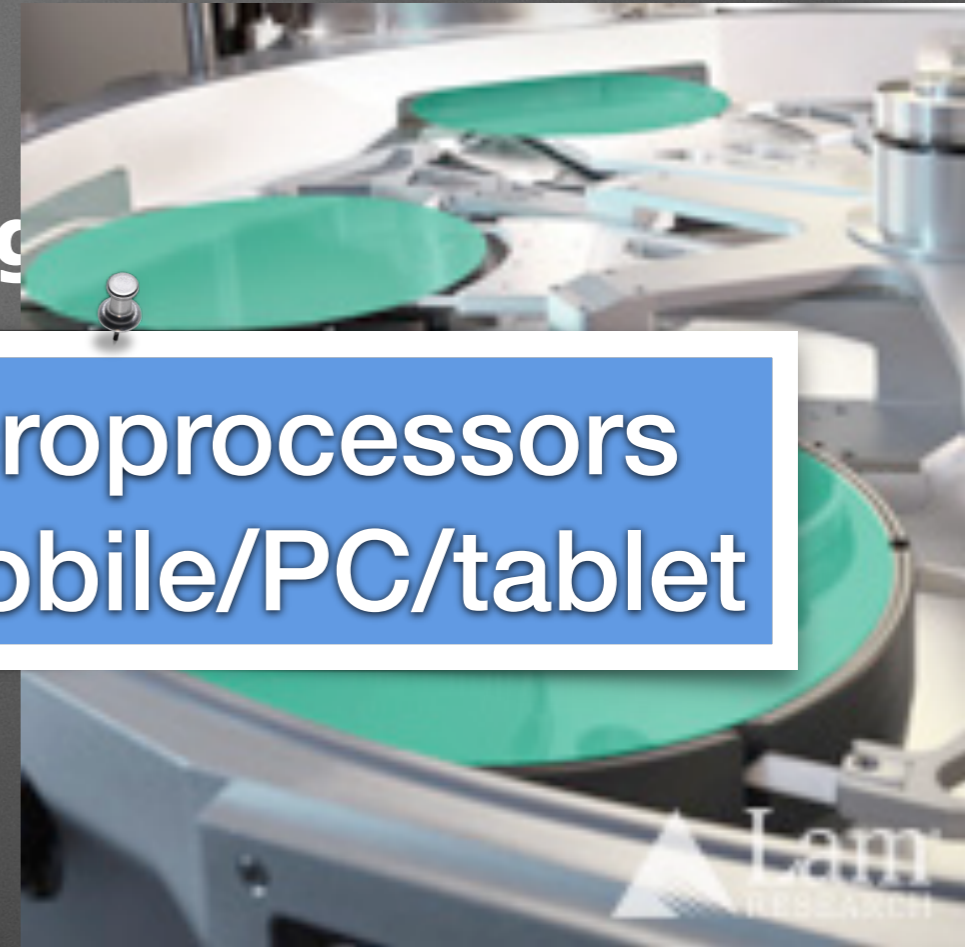
Check  
<http://pharo.org/>  
 success

# LAMRC

Back-End Wafer-Level Packaging

50% microprocessors  
of your mobile/PC/tablet

Your mobile hardware as  
*a high-chance* to have  
been produced by a robot  
controlled via a smalltalk



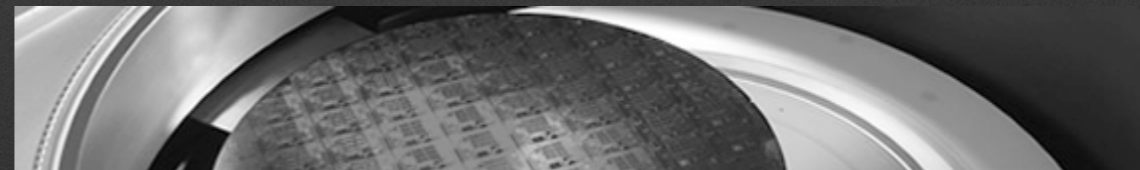


# LAMRC

Back-End Wafer-Level Packaging

Started to experiment  
with Pharo

Your mobile hardware as  
a high-chance to have  
been produced by a robot  
controlled via a smalltalk



# LifeWare



800

thousand

policies currently managed by our solution

25

€ billion

assets under management

15

satisfied customers

90

thousand

page per views per day

130

thousand

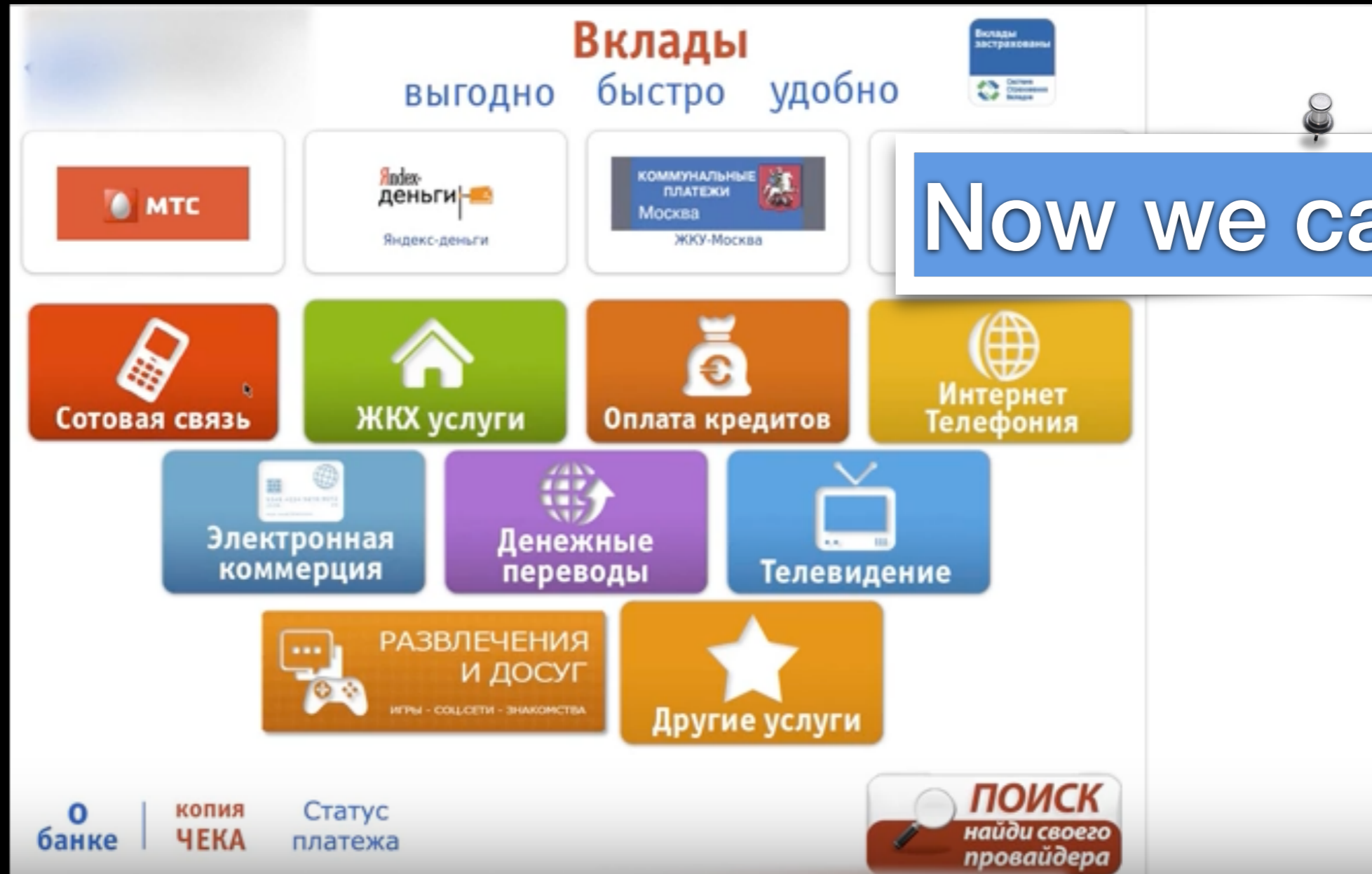
authorized users

Migrating to  
Pharo

30 Millions lines of code...

Kent Beck is one of the  
founders

# Pharo in ATM like Device in Moscow



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**Find Machines**

**Q Search by Category**

**Construction Machinery**

 Mini Excavators	 Excavators	 Wheel Loaders	 Dozers	
 Cranes	 Rollers	 Graders	 Finishers	
 Generators	 Welders	 Compressors	 Small Items	 Other Construction Machinery

**Material Handling**

 Forklifts
---------------

**Farm Machinery**

 Tractors
--------------

**Vehicles**

 Dumps	 Trucks	 Other Vehicles
-----------	------------	--------------------

**Others**

 Attachments	 Parts	 Others
-----------------	-----------	------------

**Q Search by Keyword**

Enter a keyword (e.g. KOMATSU PC200)

**New Machines**

Updated on: 2016/09/13 17:46:18 (JST)

[See More >](#)

 HOKUETSU PDS175S 400,000 JPY 4573	 KUBOTA U-55-6 3,500,000 JPY 2015 330	 OTHER MGR2500 133,100 JPY	 ISEKI HL407G 198,000 JPY	 OTHER MR6500 143,000 JPY	 OTHER GH250-GML 165,000 JPY
--	---	-------------------------------------	------------------------------------	------------------------------------	---------------------------------------

**Full Stack in  
Pharo  
Online  
marketplace  
raised 4.7 M\$**

# Network Monitoring for small ISPs

The image displays a comprehensive network monitoring solution for small ISPs, presented across multiple devices and interface views.

- Dashboard Overview:** The top-left screenshot shows a central dashboard with a map, a '95% CAPACITE - 800 Mbps' gauge, and status indicators for CMTS (warning), Switch (OK), Modems (99%), Router (OK), and Server (OK).
- Mobile App:** A Samsung smartphone in the center displays the 'Supervision HFC' app, showing a green checkmark and the message 'Tout est en ordre avec Supervision Talange'.
- Data Table:** The top-right screenshot shows a table with columns for device ID, IP, and various performance metrics, with cells colored in green, yellow, and orange to indicate status.
- Temperature Monitoring:** The bottom-left screenshot shows a table titled 'Température du CMTS' with columns for condition, status, and temperature for various components like MPPE and CPU.
- Device Configuration:** The bottom-right screenshot shows a detailed configuration page for a CMTS device, including a rack diagram and a list of components like 'Cable Ethernet', 'Cable HFC 1', and 'Cable HFC 2'.



pharocloud

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on the cloud in 3 min**



CMSBOX Bearbeiten Hinzufügen Clipboard Aktionen Diese Seite sofort Publizieren

cmsbox

Neue Seite  
Artikel  
Formular  
Tabelle

# CMS with full history

## Das Content Management System

### 100% Inline-Editor

Die cmsbox ist ein Content Management System der nächsten Generation. Die Benutzeroberfläche ist nahtlos in die Webseite integriert: Alle Texte werden direkt auf die Seite geschrieben!

#### Drag & Drop

Handlich: Boxen und Elemente frei auf der Seite positionieren.  
✉ [mail@cmsbox.com](mailto:mail@cmsbox.com)

#### Copy / Paste

Elemente ausschneiden oder kopieren und irgendwo auf der Webseite wieder einfügen.

Text einfügen

SYSTEM

WEBSEITE

Bearbeiten

Metatags

Statistik

Archiv

BENUTZER

SUPPORT

Eigene Bilder und Videos direkt auf die Webseite laden

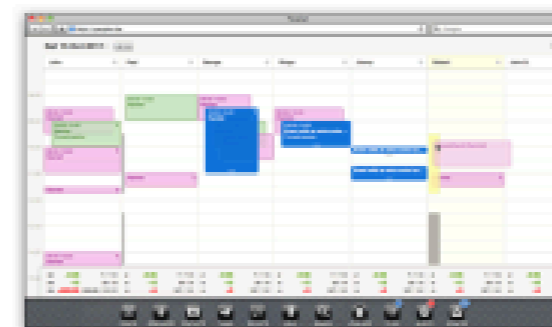
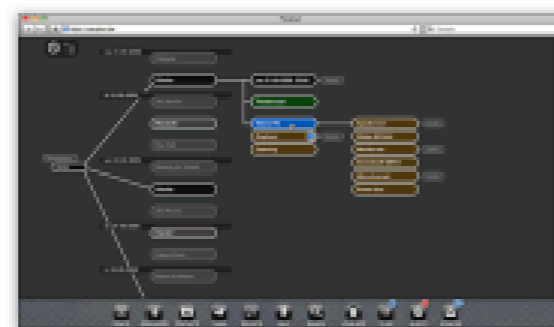
CMSBOX GMBH · TERRASSENWEG 18 · CH-3012 BERN · +41 (0)31 356 42 52

Suchen...

## Yesplan is veelzijdige software voor het efficiënt plannen van evenementen.

Yesplan is uiterst gebruiksvriendelijk, flexibel en makkelijk te koppelen met andere software.

Distributed  
Resources  
Management







eMCee  
interfacetesting

# Server Testing

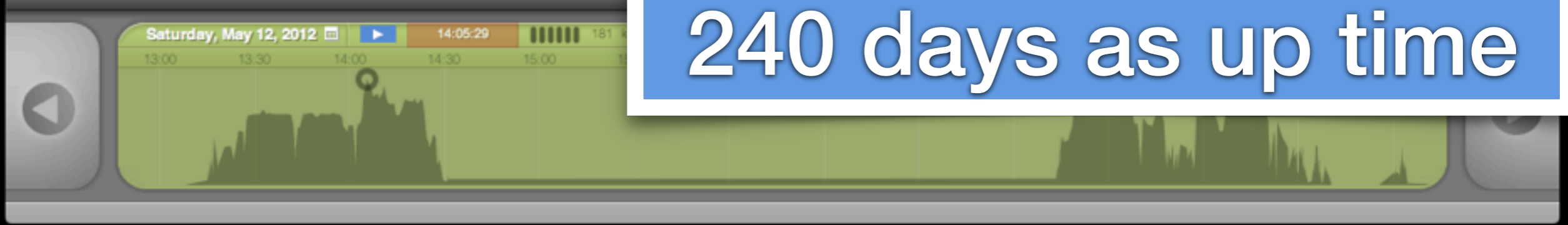
**Continuous API Testing**  
keep your services under control 24/7



[www.2denker.de](http://www.2denker.de)



Truck fleet monitoring  
Pharo as a server  
240 days as up time



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- 2 Art der Ausführung bestimmen
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- 4 Gut zum Druck
- 5 Kasse

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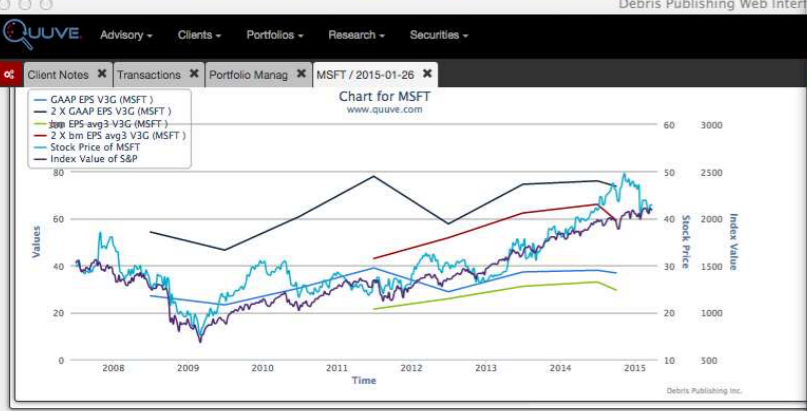
Karten Hochzeitskarten Hochzeitskarten gefalzt Geburtsanzeigen Geburtsanzeigen gefalzt Postkarten Karten Karten gefalzt Visitenkarten

Geschenke Monatskalender Memo-Spiele Puzzles Tischsets Poster

Geschäftsdrucksachen Briefpapier Kuverts Visitenkarten Blocks Happen

Werbung Memo-Spiele Postkarten Fotosteller Poster Tischsets Monatskalender





Year	2008	2009	2010	2011	2012	2013	2014	2014
Period End Date	06/30/2008	06/30/2009	06/30/2010	06/30/2011	06/30/2012	06/30/2013	06/30/2014	09/30/2014
Period Duration (Years)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.25
Price High	35.96	31.50	31.58	29.46	32.95	38.98	50.05	
Price Low	17.50	14.87	22.73	23.65	26.26	26.28	34.63	
Price / sh	47.2							
Excess Cash / sh	2.41	3.38	4.03	6.05	7.33	8.98	10.09	10.53
Revenue Growth %	-3.28	6.93	11.94	5.40	5.60	11.54	5.38	
Gross Margin %	80.80	79.20	80.16	77.73	76.22	73.99	68.98	67.11
Leverage	2.01	1.97	1.86	1.90	1.83	1.90	1.92	1.88
Common Shares Outstanding	9328.00	8945.00	8813.00	8490.00	8366.00	8375.00	8299.00	8249.00
GAAP Dil. Cont. EPS VNG	18.70	16.20	21.00	26.90	20.00	25.80	26.30	25.50
GAAP EPS VNG	19.00	16.30	21.30	27.30	20.20	26.10	26.60	25.80
GAAP EPS V3G	27.14	23.29	30.43	39.00	28.86	37.29	38.00	36.86
2 X GAAP EPS V3G	54.29	46.57	60.86	78.00	57.71	74.57	76.00	73.71
EPS VNG	18.95	16.29	21.29	27.27	20.22	26.11	26.60	25.91
EPS avg5 VNG								
EBIT / sh VNG	25.53	22.16	28.38	33.06	26.52	32.30	33.52	33.10
bm EPS VNG	10.52	13.37	21.24	19.81	24.42	25.13	12.82	
bm EPS V3G	15.03	19.10	30.34	28.29	34.89	35.89	18.03	
bm EPS VNG	9.67	13.94	20.92	15.70	23.04	13.64	12.83	
bm EPS avg3 V3G								
2 X bm EPS avg3 V3G								
bm EPS avg5 VNG								
bm EPS avg5 V3G								
Fair Price bm ROE3				21.55	26.34	31.90	31.46	25.82
Fair Price bm ROE5						29.59	34.38	31.29
Fair Price bm ROE7								31.32
Fair Price bm ROE5								31.70
Fair Price via NetMargin7 with 3% Growth								41.39
F8 Trend Score V1	(3/3)	(0/7)	(8/9)	(7/9)	(5/9)	(7/9)	(4/9)	(6/9)
Financial Strength Score V2	(14/19)	(19/24)	(26/29)	(27/30)	(26/30)	(27/30)	(27/30)	

Year	2008	2009	2010	2011	2012	2013	2014	2014
Gross Margin %								
EBIT Margin %								
Net Margin %								
ROSA (tt) %								
ROSTA (tt) %								
ROSTDA (tt) %								
ROSC %								
ROSC Avg5 %								
ROSCCE %								
ROSTCE Avg5 %								
ROSTCE %								
bm Ret. EPS %								
bm ROSCE1 %								
bm ROSCE3 %								
bm ROSCE5 %								
bm ROSTCE1 %								
bm ROSTCE3 %								
bm ROSTCE5 %								
Common Sh. Gr								

Portfolios Over Clients: ACL001 Company Report Portfolio: All Clients

Portfolio - Subscribers: All Clients 9 items selected

View Config: Default New Copy Manage

Use Event Date if View Date: 2015-03-25 Apply <<< << >> >>>

Balance summary as of 03/25/2015

Quuve Cash & Equivs	Quuve Total Value	Custodian Cash & Equivs	Custodian Total Value
\$10,985,154.10 (61.2%)	\$17,938,986.95		

Overview Positions Prices Errors Events Special CSV Reports Historical Verification Balances

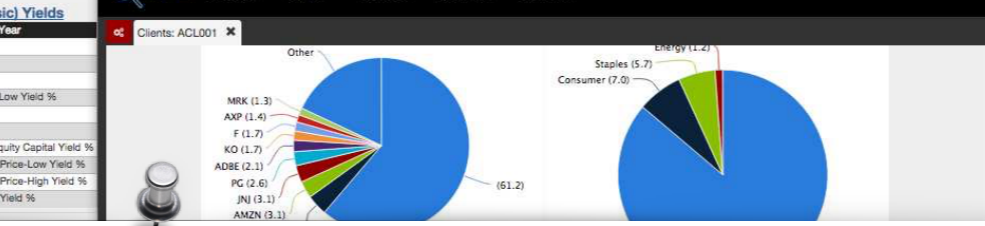
Actions	Subtotal Name	Asset Description	Ticker Symbol	Account Name	Num Units	Price Paid / sh	Cost / sh	Price / sh	Cost	Mid Value	Net Gain	Gain/Loss %	% of Holdings	ACL001: % of Holdings	ACL001: Net shares to buy	ACL002: % of Holdings	ACL002: Net shares to buy	ACL003: % of Holdings	ACL003: Net shares to buy	BCL005: % of Holdings	BCL005: Net shares to buy	BCL006: % of Holdings	BCL006: Net shares to buy	BCL007: % of Holdings	BCL007: Net shares to buy	ACL023: % of Holdings	ACL023: Net shares to buy	BCL026: % of Holdings	BCL026: Net shares to buy
show	Total ...				11,109,129.10	1.36			15,089,382.1	17,938,986.95	2,849,604.87	18.9	100.0	100.0	0.00	100.0	0.00	100.0	0.00	100.0	0.00	100.0	0.00	100.0	0.00	100.0	0.00	100.0	0.00

Marketing ... / Electronic Equipment 7,000.00 24.359 24.36 170,540.00 176,890.00 6,350.03 3.7 1.0 1.0 0.00 0.4 0.00 1.5 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00

Marketing ... / Information Technology 1,070.00 155.259 155.31 166,177.00 174,410.00 8,233.05 5.0 1.0 1.0 0.00 0.5 0.00 6.5 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00 0.0 0.00

All reports are automatically generated

Year	2008	2009	2010	2011	2012	2013	2014	2014
E-Yield %								
Div. Yield %								
LCF Yield %								
LCF Avg2 Price-Low Yield %								
NCF Yield %								
SFCF Yield %								
Non-Common Equity Capital Yield %								
Common Equity Price-Low Yield %								
Common Equity Price-High Yield %								
Common Equity Yield %								



Clients Overview Portfolio: none Clients

Client Name	Advisor	Is Employee Portfolio	Account Owners	Accounts	Benchmark Portfolio	Actions
001	Founding Fathers Investment Advisors, Inc.	false	AO-002, AO-001	CL001 ET0002, CL001 ET0001, CL001 ET0003	CS - Demo - Single Stock Trade Model1 (model)	Actions
002	Founding Fathers Investment Advisors, Inc.	false	AO-003, AO-004, AO-001	CL002 ET0001, CL002 ET0002, CL002 ET0003, CL001 ET0001, CL001 ET0003		Actions
003	Founding Fathers Investment Advisors, Inc.	false	AO-005, AO-006	ET xxxx-0010 IRA Traditional, CL003 ET0011, CL003 ET0012		Actions
023	Founding Fathers Investment Advisors, Inc.	false	AO-037, AO-038			Actions
006	Founding Fathers Investment Advisors, Inc.	false	AO-011, AO-010			Actions
007	Founding Fathers Investment Advisors, Inc.	false	AO-012			Actions
026	Founding Fathers Investment Advisors, Inc.	false	AO-042, AO-041			Actions
027	Founding Fathers Investment Advisors, Inc.	false	AO-043			Actions
029	Founding Fathers Investment Advisors, Inc.	false	CL009	CL009 ET0123		Actions

Quuve: Investment Portfolio  
<http://debrispublishing.com>

# Free Software Mobile Communication solutions

```
plan: SCCPGlob
addr: destGT;
translation: 0;
yourself);

yourself.

forwardSM := ASN1Dictionary new
at: 'sm-RP-DA' put: (ASN1Dictionary
at: 'imsi' put: destIMSI toTBCD
yourself);
at: 'sm-RP-OA' put: (ASN1Dictionary
at: 'serviceCentreAddressOA'
yourself);
at: 'sm-RP-UI' put: (ByteArray readHexFrom: '240c9194814813654700005110712195534010c8370hfd0600a5af3'
yourself.
operationName := 'forwardSM'.

dialogue := ZHLR endPoint newDialogue.

invoke := dialogue
requestTcInvokeNamed: operationName parameters: for
class: 1 timeout: 500.

invoke
onReturn: [ ];
onError: [ ];
onReject: [ ];
onReturnLast: [:result | ].

dialogue
requestTcBeginDestinationAddress: imsiAddr
originatingAddress: mscAddr
applicationContextName: '0.4.0.0.1.0.25.2' asAsn1Oid .
```

MobileTerminated ForwardSM

Undo

Apply a display filter ... <E/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	6	2000	GSM S...	236	invoke forwardSM

Frame 1: 236 bytes on wire (1888 bits), 236 bytes captured (1888 bits)

- Linux cooked capture
- Internet Protocol Version 4, Src: 208.208.208.208, Dst: 208.208.208.208
- Stream Control Transmission Protocol, Src Port: 2985 (2985), Dst Port: 2985 (2985)
- MTP 3 User Adaptation Layer
- Signalling Connection Control Part
- Transaction Capabilities Application Part
- GSM Mobile Application
- GSM SMS TPOU (GSM 03.40) SMS-DELIVER
  - 0... .. = TP-RP: TP Reply Path parameter is not set in this SMS SUBMIT/DELIVER
  - .0... .. = TP-UDHI: The TP UD field contains only the short message
  - ..1... .. = TP-SRI: A status report shall be returned to the SME
  - .... 0... = TP-LP: The message has not been forwarded and is not a spawned message
  - .... .1.. = TP-MMS: No more messages are waiting for the MS in this SC
  - .... ..00 = TP-MTI: SMS-DELIVER (0)
- TP-Originating-Address - (491884315624)
- TP-PID: 0
- TP-DCS: 0
- TP-Service-Centre-Time-Stamp
- TP-User-Data-length: (16) depends on Data-Coding-Scheme
- TP-User-Data
  - SMS text: Hello from Pharo

```
0000 62 89 40 84 01 00 00 09 6b 1e 20 1c 06 07 00 11  bin.....k.(.....
0008 85 85 01 01 01 a8 11 60 0f 80 02 07 80 a1 09 06  .....
0016 07 84 00 00 01 00 19 02 6c 41 a1 3f 02 01 01 02  .....TA.?.
0024 01 2e 30 37 00 00 02 02 43 08 10 91 50 f9 84 08  ..07..b.Ch.P...
0032 91 94 51 97 10 00 00 00 04 21 24 0c 91 94 81 48  ..0.....!S....H
0040 13 65 42 00 00 51 10 71 21 95 53 48 10 c8 32 9b  -eB..U.q i..50..2.
0048 fd 05 99 a5 ef 36 00 0a 0e cb df 00  ....6.....
```

# Programming environment for Programmable Logic Controllers

The screenshot displays the IDE4PLC software interface, which is powered by Pharos. The main window shows a hardware selection screen for the EDU-CIAA-NXP board. Below this, there are two tables for variable declarations and a ladder logic editor.

**POU Variable Declarations Editor**

Category	Name	Datatype
VAR_INPUT	TEC1	BOOL
VAR_INPUT	TEC2	BOOL
VAR_INPUT	TEC3	BOOL

Category	Name	Datatype
VAR	var0	BOOL
VAR	var1	INT
VAR	var2	TIME

**Program Organization Units (POU) editor**

Network 1

```
graph LR
    TEC1[TEC1] --- AND1(( ))
    TEC2[TEC2] --- AND1
    AND1 --- TEC3[TEC3]
    TEC3 --- TON[TON TIME]
    TON -- IN --> AND1
    TON -- ET --> var0[var0]
    var0 --- LEDB[LEDB]
    var0 --- MUL[MUL INT]
    MUL -- EN --> AND2(( ))
    var1[var1] --- AND2
    var2[var2] --- AND2
    MUL -- ENO --> var1
    var1 --- EQ[EQ INT]
    EQ -- EN --> AND3(( ))
    var1 --- AND3
    EQ -- ENO --> LED2[LED2]
```



# NTed: disaster scenario recovery

**NTed**

**Darsteller**

- Interaktionsschema
- Verbindungsstatus
- Events
- Nachrichten

**Darsteller** +Neuer Darsteller

Darsteller	Verletzungsmuster	Interaktionsschema	tags	PIN	
Patient 1	Inhalationstrauma	Inhalationstrauma	SK I	EEGB	   
Patient 2	Verbrennungen 3. Grad	Verbrennungen 3. Grad	SK I	0MTH	   
Patient 3	Verbrennungen 3. Grad	Verbrennungen 3. Grad	SK I	VYW6	   
Patient 4	Offener Oberschenkel#	Offener Oberschenkel#	SK I	Z19K	   
Patient 5	KoplaWu + SHT 1°	KoplaWu + SHT 1°	SK II	G7DE	   
Patient 6	Verbrennungen 2°	Verbrennungen 2°	SK II	WM4G	   

**To simulate disaster response**

Patient 11	Betroffener	Betroffener	SK III	W5UR	   
------------	-------------	-------------	--------	------	---

# iBizLog - <http://www.ibizlog.com>



Full system developed  
in 5 months one developer  
(discontinued)

A product by Smartworks



Google play

drgeo



Apps

Search Android Apps All prices

My apps

Shop

Games

Editors' Choice

My wishlist

Redeem

Apps



Dr. Geo free  
Hilaire Fernandes & Dimi



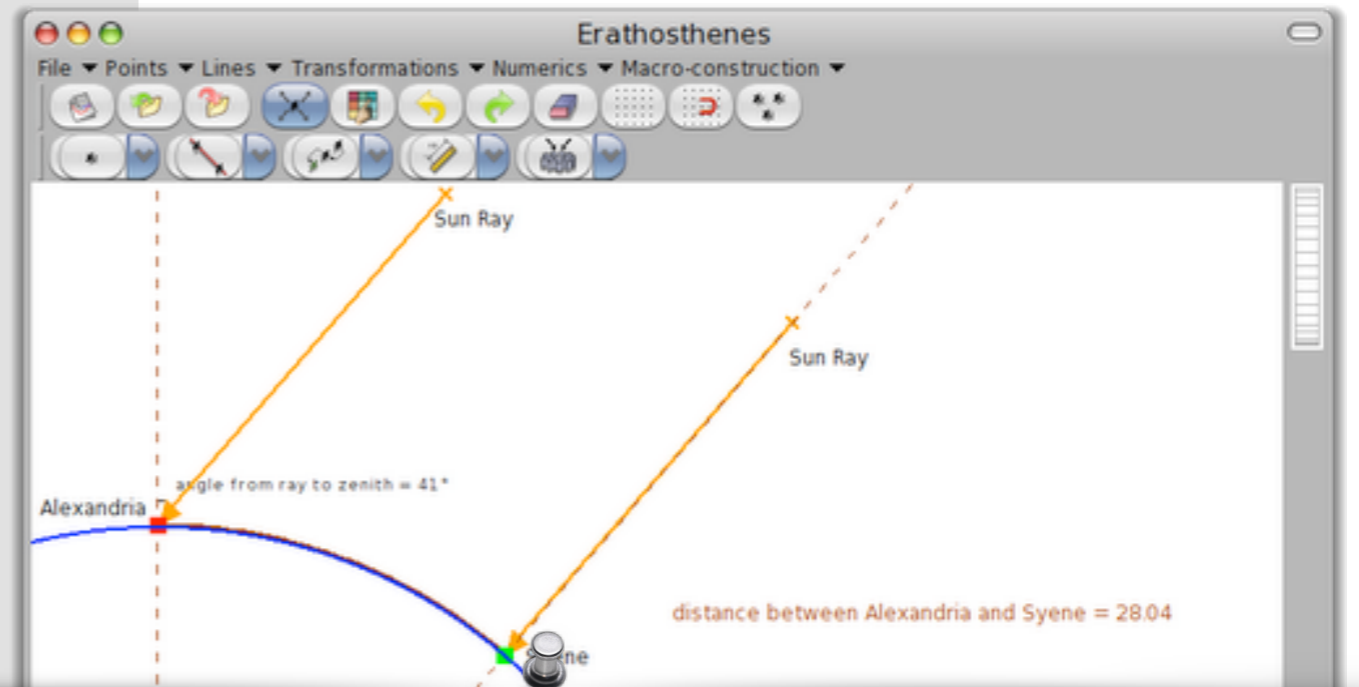
FREE



Dr. Geo  
Hilaire Fernandes & Dimi



AR\$28.70



Works on linux, mac, windows,  
android, OLPC

Select and move an object.

Moose technology: Home

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**Moose is a platform for software and data analysis.**

It is an open source project since 1996. It is supported by several research groups around the world, and it is increasingly adopted in industrial projects.

[Download 4.7](#)

 enables 

[Call for help: webpage redesign](#)  
29 April 2013  
We are starting a project to redesign the Moose webpage. The initial goals of the redesign are: \* ...

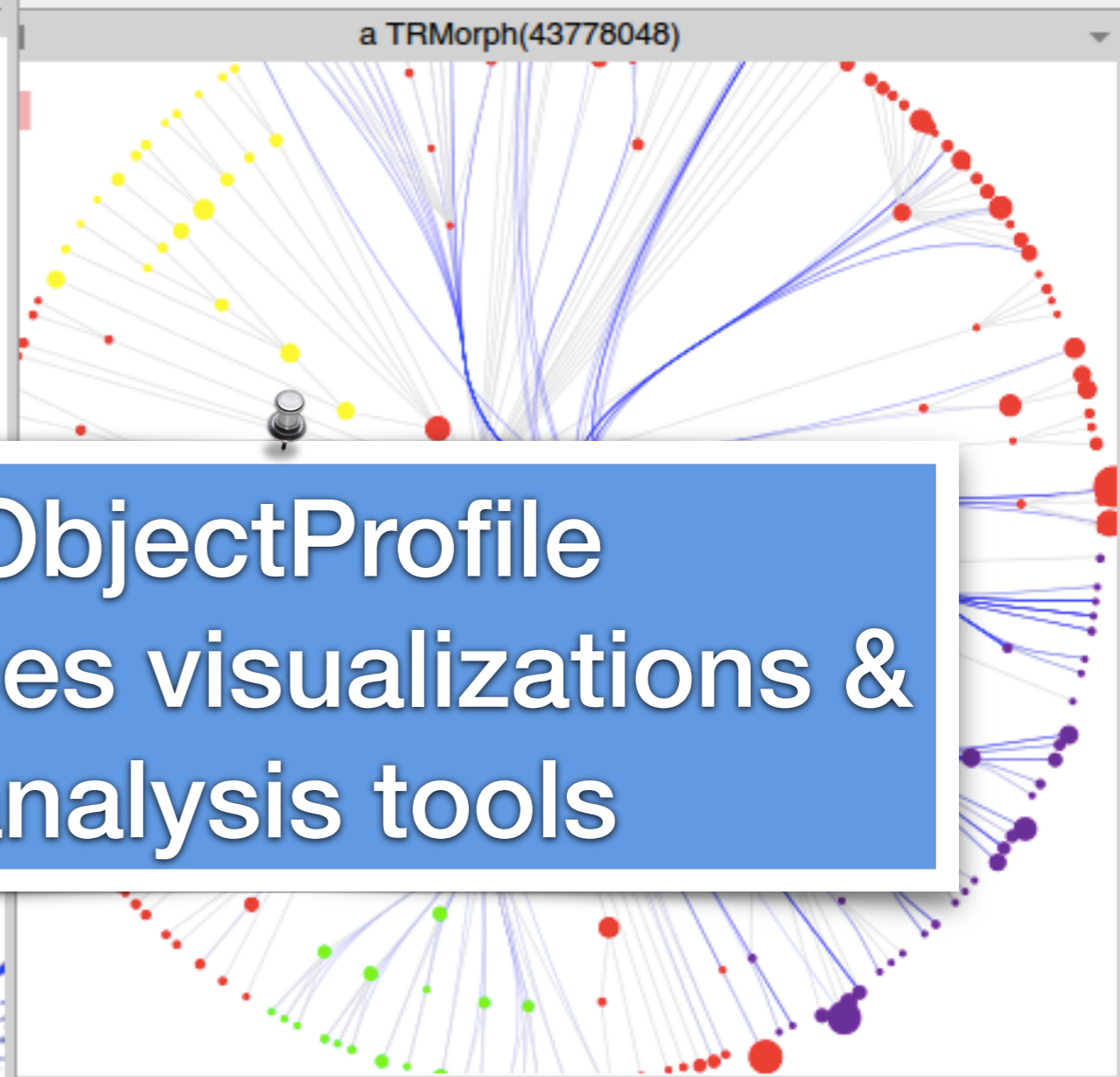
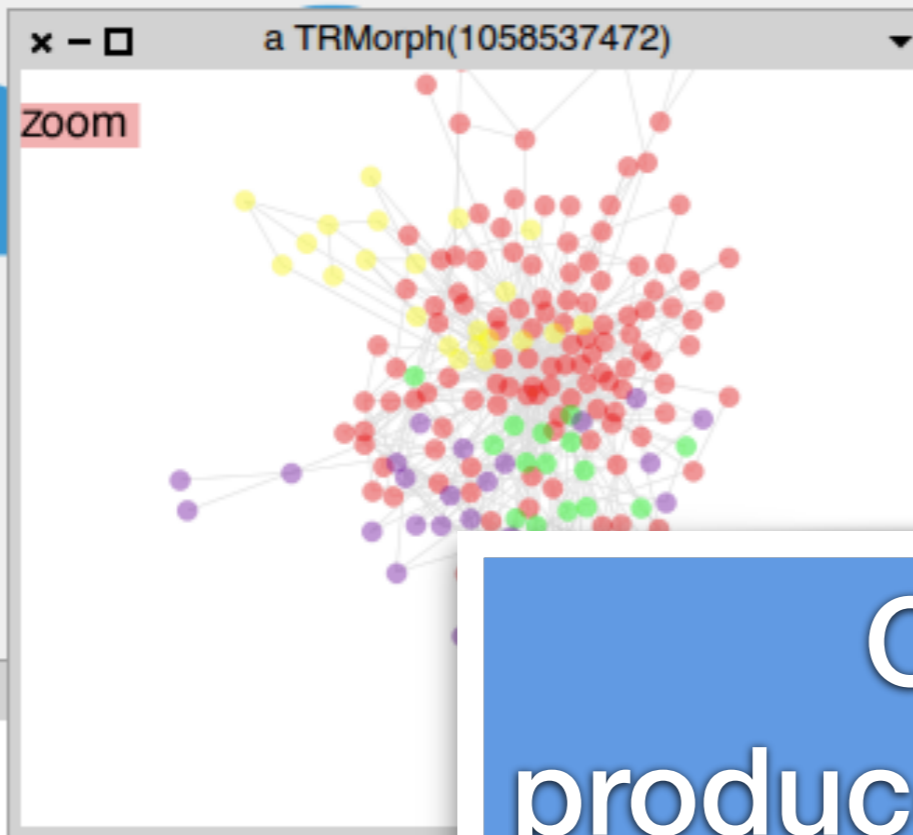
[Moose 5.0 roadmap](#)  
13 April 2013  
A summary of the talk laying out the Moose 5.0 roadmap can be found at: <http://www.humane-assessment...>

[Moose 4.8 development: 4045 green tests](#)

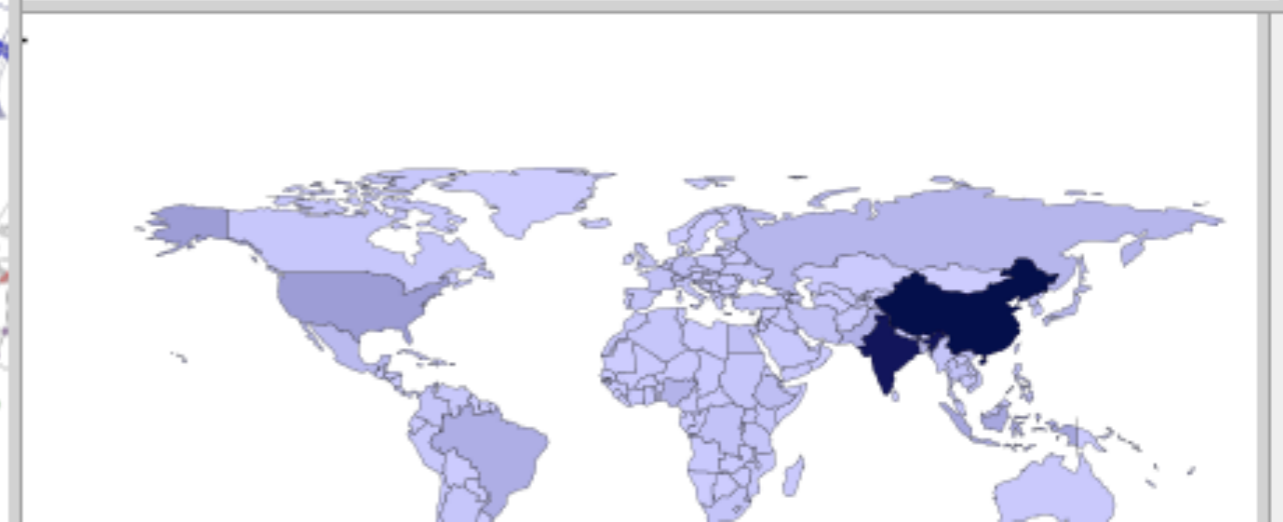
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analysis tools



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**NORIZZK.COM** is the fastest way to compose your master and detailed test plan. It comes with a predefined knowledge base containing best practices for building your test plan, thus giving you a head start.

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### 3 CHEAPER








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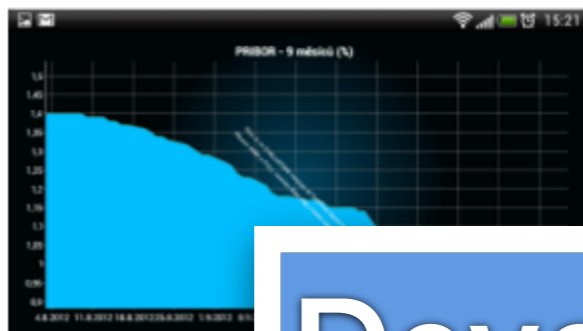
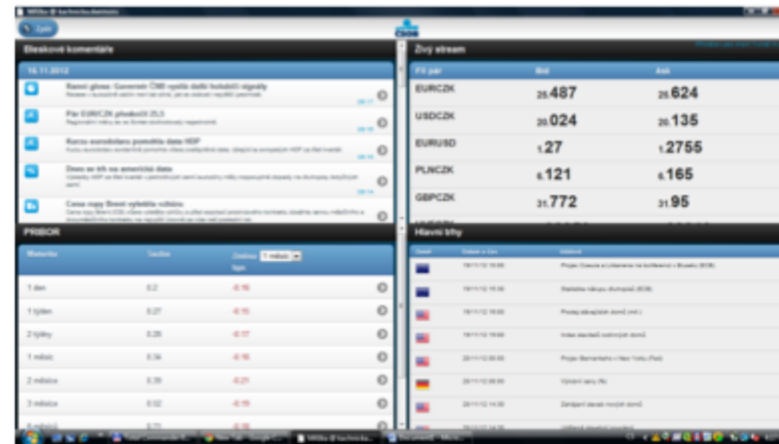
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## COMPONENTS

 <p><b>Risk Assessment</b></p> <p>Identify, categorize, prioritize and mitigate your risks with one single tool.</p>	 <p><b>Test strategy</b></p> <p>Write your master and detailed test plan in a faster way.</p>	 <p><b>Test Estimations</b></p> <p>Estimate all the required testing effort on one single page.</p>	 <p><b>Test Results</b></p> <p>Capture all the test results to monitor the progress.</p>
 <p><b>Reporting</b></p> <p>Monitor the progress using the Risk</p>	 <p><b>Export</b></p> <p>Export your test plan to a docx file.</p>	 <p><b>Business Intelligence</b></p> <p>Discover intelligence in your testing</p>	<p>▶ LEARN MORE</p>



Měnový pár	bid	ask	Deviz. sazba
EURAUD	1.5000	1.5000	1%
EURCHF	1.0000	1.0000	1%
EURCZK	26.1400	26.2700	1%
EURDKK	1.4660	1.4700	1%
EURGBP	0.6914	0.6900	1%
EURHUF	100.7000	100.2000	1%
EURISK	1.0000	1.0000	1%
EURJPY	100.7000	100.2000	1%
EURKRW	1.0000	1.0000	1%
EURPLN	1.0000	1.0000	1%



FX pár	bid	ask
EURCZK	26.407	26.539
USDZCZK	19.746	19.856
EURUSD	1.2836	1.2893
PLNCZK	€168	€212
GBPCZK	31.494	31.67
HUFZCZK	€09075	€09141
CHFZCZK	21.082	21.206
AUDCZK	20.471	20.593
AUDUSD	1.0323	1.0415
CADCZK	19.816	19.926
DKKZCZK	3.407	3.424
EURAUD	1.2325	1.249

Developed in 3 months one dev  
Sold to Belgium bank  
Java team estimated 2 years



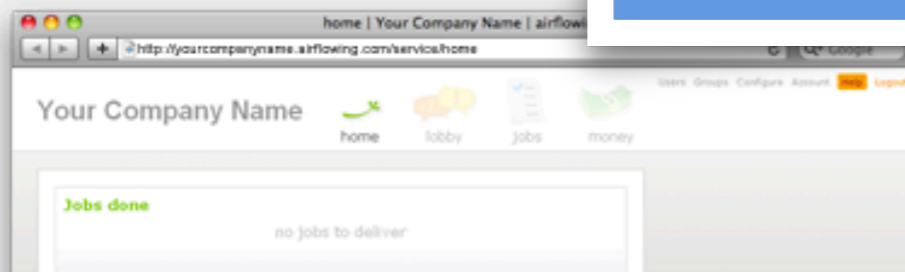
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## Wind Energy

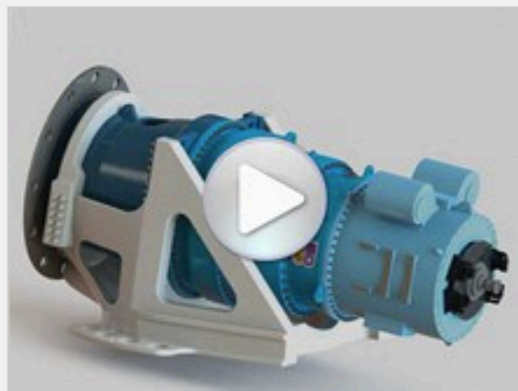
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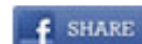
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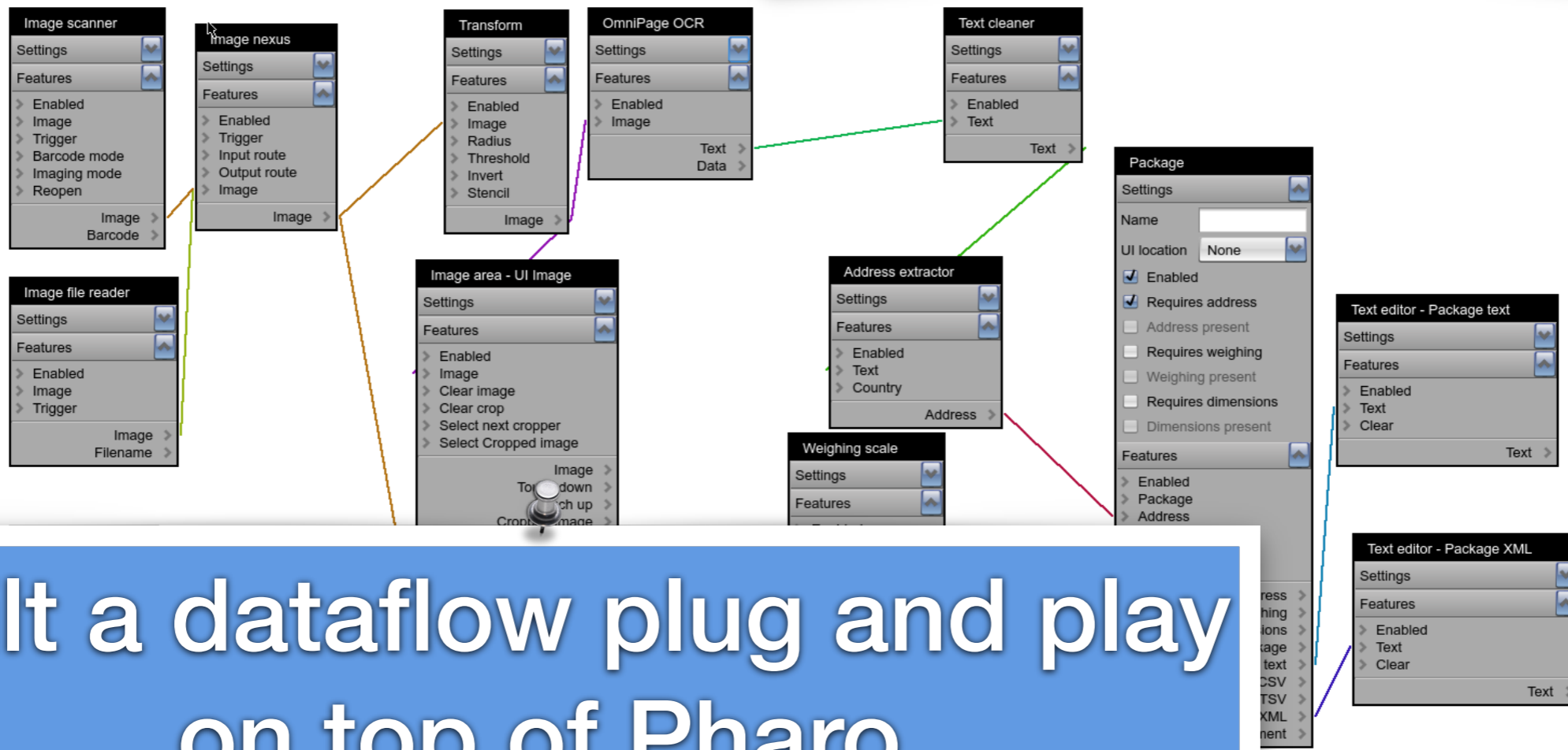


[Wind industry solutions](#)

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# Handle return mails in Switzerland



# Built a dataflow plug and play on top of Pharo

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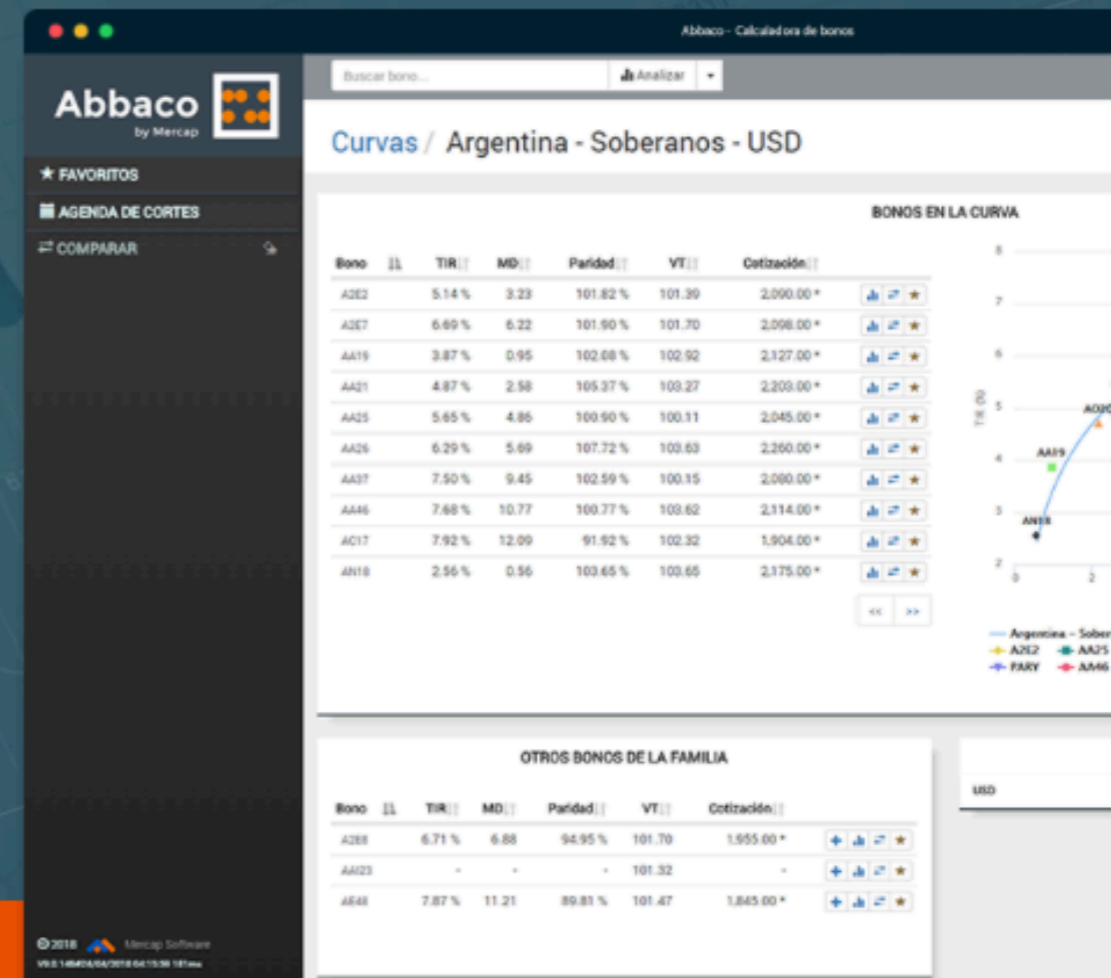
Bonus WhatsApp data usage

4G LTE coverage

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from Argentina



Abbaco - Calculadora de bonos

Buscar bono... Analizar

Curvas / Argentina - Soberanos - USD

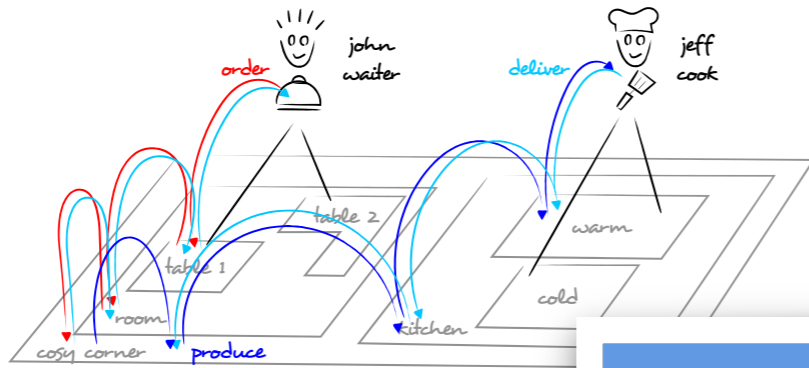
BONOS EN LA CURVA

Bono	TIR	MD	Paridad	VT	Cotización
A2E2	5.14%	3.23	101.82%	101.39	2,090.00*
A2E7	6.69%	6.22	101.90%	101.70	2,098.00*
AA19	3.87%	0.95	102.08%	102.92	2,127.00*
AA21	4.87%	2.58	105.37%	100.27	2,200.00*
AA25	5.65%	4.86	100.90%	100.11	2,045.00*
AA26	6.29%	5.69	107.72%	100.63	2,260.00*
AA27	7.50%	9.45	102.59%	100.15	2,080.00*
AA46	7.68%	10.77	100.77%	103.62	2,114.00*
AC17	7.92%	12.09	91.92%	102.32	1,904.00*
AN18	2.56%	0.56	103.65%	100.65	2,175.00*

OTROS BONOS DE LA FAMILIA

Bono	TIR	MD	Paridad	VT	Cotización
A2E8	6.71%	6.88	94.95%	101.70	1,955.00*
AA23	-	-	-	101.32	-
AE48	7.87%	11.21	89.81%	101.47	1,845.00*

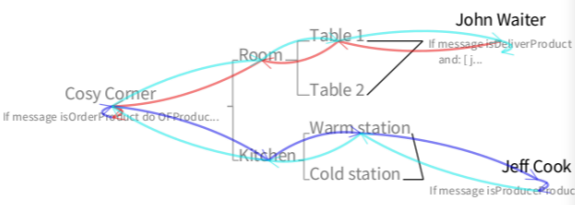
USD



# Help growing startups Get back control on software

```

"CONTRIBUTORS"
jeffCook := OFCookActor new name: 'Jeff Cook'.
johnWaiter := OFWaiterActor new name: 'John Waiter'.
"AREAS"
cosyCorner := OFVenueActor new name: 'Cosy Corner'.
kitchen := OFRoomActor new name: 'Kitchen'; parentArea: cosyCorner.
warmStation := OFKitchenActor new name: 'Warm station'; parentArea: kitchen; addContributor: jeffCook.
coldStation := OFKitchenActor new name: 'Cold station'; parentArea: kitchen; addContributor: jeffCook.
room := OFRoomActor new name: 'Room'; parentArea: cosyCorner.
table1 := OFTableActor new name: 'Table 1'; parentArea: room; addContributor: johnWaiter.
table2 := OFTableActor new name: 'Table 2'; parentArea: room; addContributor: johnWaiter.
"PRODUCTS"
steak := OFProduct new name: 'Steak'; characteristics: {OFFWarm}.
sandwich := OFProduct new name: 'Sandwich'; characteristics: {OFFCold}.
cosyCorner products: { steak . sandwich }.
"MESSAGE HANDLERS"
cosyCorner addScriptedMessageHandler
when: [ :message | message isOrderProduct ];
execute: [:message :handler | OFProduceProductMessage new ].
jeffCook addScriptedMessageHandler
when: [ :message | message isProduceProduct ];
execute: [ :message :handler |
handler
queue: message
to: [OFDeliverProductMessage new to: handler actor areas anyOne] ].
johnWaiter addScriptedMessageHandler
when: [ :message |
message isDeliverProduct and: [
johnWaiter areas includes: message initialReason receiver ] ];
execute: [:message :handler |
handler
queue: message
to: [ self inform: message product gtDisplayString, ' delivered!' ] ].
"ORDERS"
orderSteak := OFOrderProductMessage new product: steak; sendBy: johnWaiter to: table1.
orderSandwich := OFOrderProductMessage new product: sandwich; sendBy: johnWaiter to: table1.
cosyCorner
  
```



# Thales prototyping VR



Playground

tmp

craftCarrier open.

OVRWDemoAircraftCarrier

Scoped Variables

- Type: Pkg1/\*Pkg2/Pk...
- OpenVR
- OpenVR-Woden
- OpenVR-Woden-
- Pharo-Help
- Polymorph-Task
- Polymorph-Widg
- PragmaCollector
- ProfStef-Core
- ProfStef-Help
- ProfStef-Tests
- ProtoObject
- Object
- WApplication
- WDFPSExample
- OVRWEmptyExamp
- OVRWExample
- OVRWDemoAircra
- OVRWDemoPickir
- OVRWExampleCol
- Hier. Class Com.

History Navigator

- all --
- event handling
- initialize
- menu
- scene content
- updating
- addAbeilleBourbon
- addBarrel
- addBoxes
- addCargo
- addCharlesDeGaulle
- addHawkeye
- addHelicopter
- addObjectAt:orientation:s
- addPlayableAreaToScene
- addRadar

```
OVRWExample subclass:  
#OVRWDemoAircraftCarrier  
instanceVariableNames:  
'flyingRafaleNode teleportLocations  
scrollGestureListener menu  
operationQueue waterMaterial  
dynamicsWorld'  
classVariableNames: ''  
package:
```

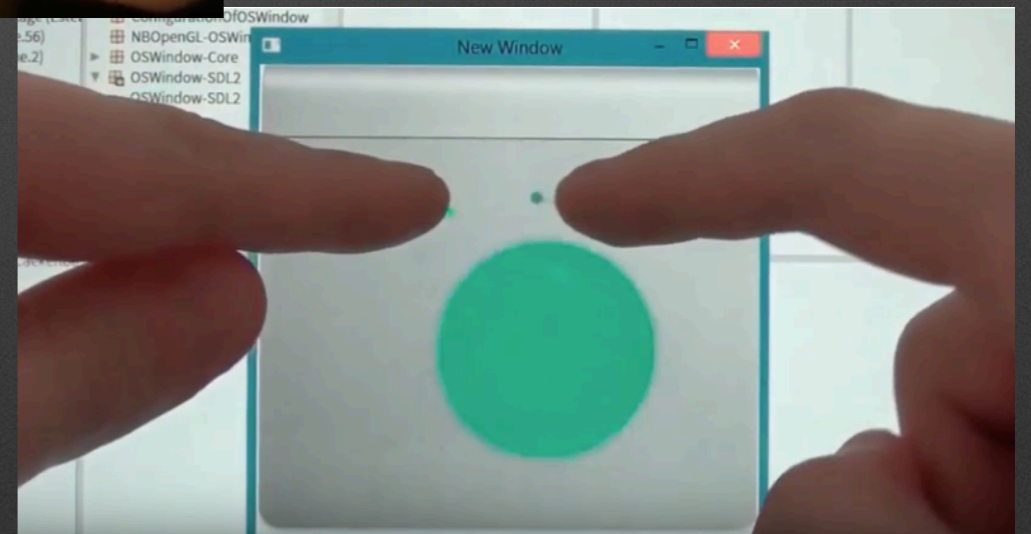
Controls:  
- Big front button for teleportation  
- Menu button to change the color of the sea

1/11 [2] -- 1/11 [25]  Format as you read W +L 1/3 [1]  
Class not referenced ? X  
[dynamicsWorld] Instance variables not read AND written ? X  
[dynamicsWorld] Variables not referenced ? X

Helpful?     
Helpful?     
Helpful?

OVRWDemoAircraftCarrier Playground

# Thales prototypes advanced interaction design



# Mobility Map: a broker for mobility services

## multi-modal routing search

### docker running dozens of pharos

Departure: 29. Sep until 17:10

**Vehicle Options:**

- smart forfour (AIRBUS) 29. Sep 2018 15:00 until 29. Sep 2...
- smart forfour (AIRBUS) 29. Sep 2018 15:00 until 29. Sep 2...
- Opel Astra Kombi (AIRBUS) 28. Sep 2018 08:45 until 28. Sep 2...

**Navigation:** Search (Plan Trip), My Bookings (Add and send tickets), My Account (Manage linked accounts), Help and Information (FAQ, Service and Contact)

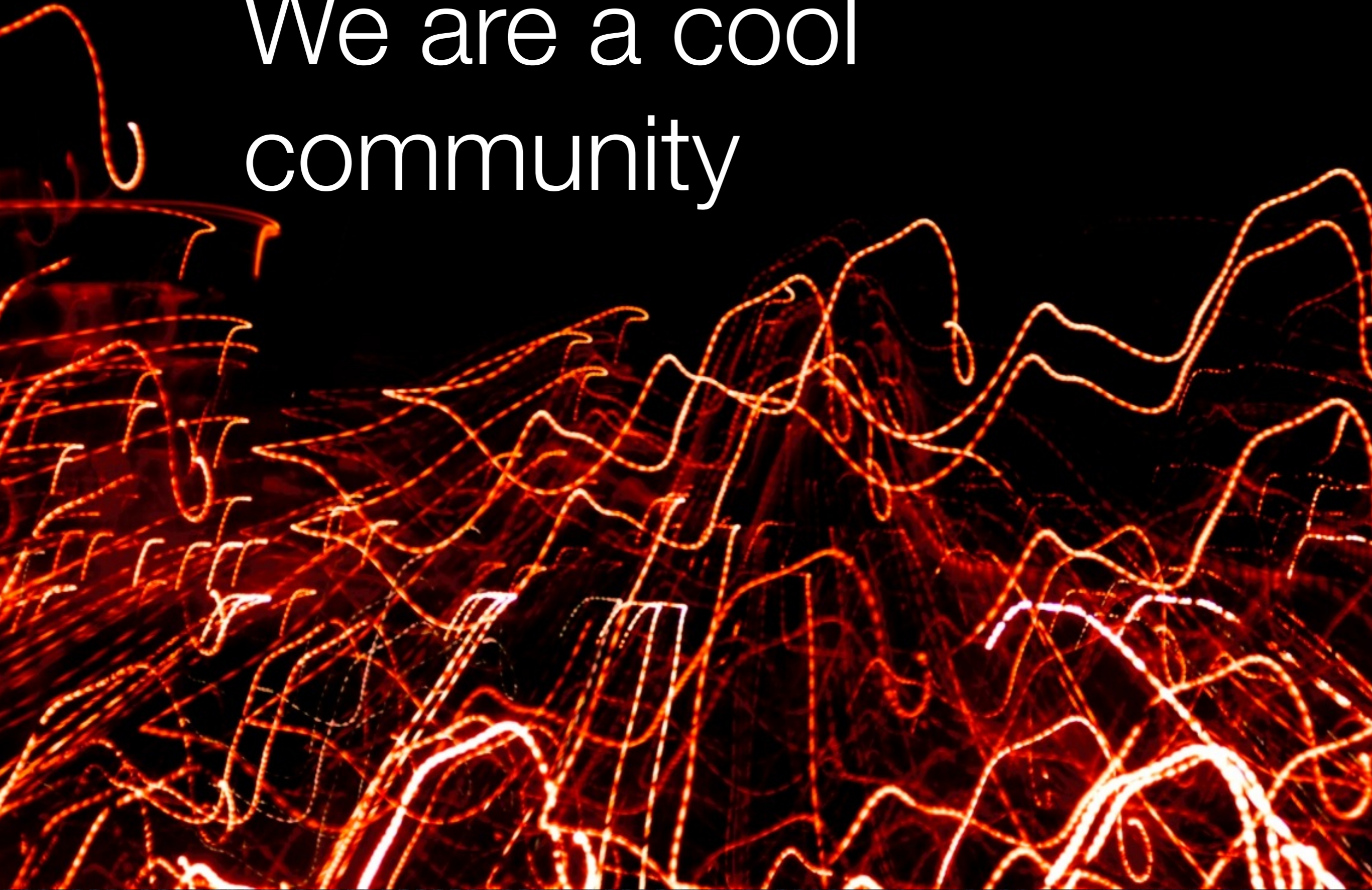
**Language:** en de

**Routing Results:**

- 13:30 Shuttle bus 1004 Bus Finkenwe...
- 15:10 Ridesharing H. 9
- 15:15
- 16:28
- 16:45 Shuttle bus 1006 Bus Finkenwe...
- 16:39 CarPool A (Kleinwagen) H. 62
- 16:34 CarPool A (Kleinwagen) H. 9
- 16:32 CarPool A (Kleinwagen) H. 14 W [OW-N]
- 16:23 CarPool A (Kleinwagen) H. 214
- 17:06 CarPool A (Kleinwagen) H. 50/51



We are a cool  
community



# Some Pharo's Teachers

- Univ. of NoviSad • Uni. of Buenos Aires • Uni. of Bern • Uni. of Maroua • Uni. of Brussels • Ecole des Mines de Douai • Uni. de Savoie • Ivan Franko Nat. Uni. • Czech Technical Uni. • CULS Prague • Uni. of Quilmes • Uni. of La Plata • Northern Michigan Uni. • Uni. Technologica Nacional (UTN) • Uni. Catholic of Argentina • Uni. of Santiago • Uni. Policnica de Catalunya • Uni. de Bretagne Occidentale • Uni. of Tomsk • Uni. of Fernhagen • IT University of Copenhagen • Uni. of Yaounde • Uni. Lille • INFTI • Uni. of Lyon •

# Some Research Groups

Lafhis (AR)

CAR (FR)

RMOD (FR)

Ummisco (IRD)

Reveal (CH)

Lysic (FR)

CEA-List (FR)

Uqbar (AR)

OC (FR)

CCMI-FIT (CZ)

ASEREG (BR)

Pleiad (CL)

SoftQual(Serb)

SRA (Jap)

GL (Bol)

UFMG (Br)

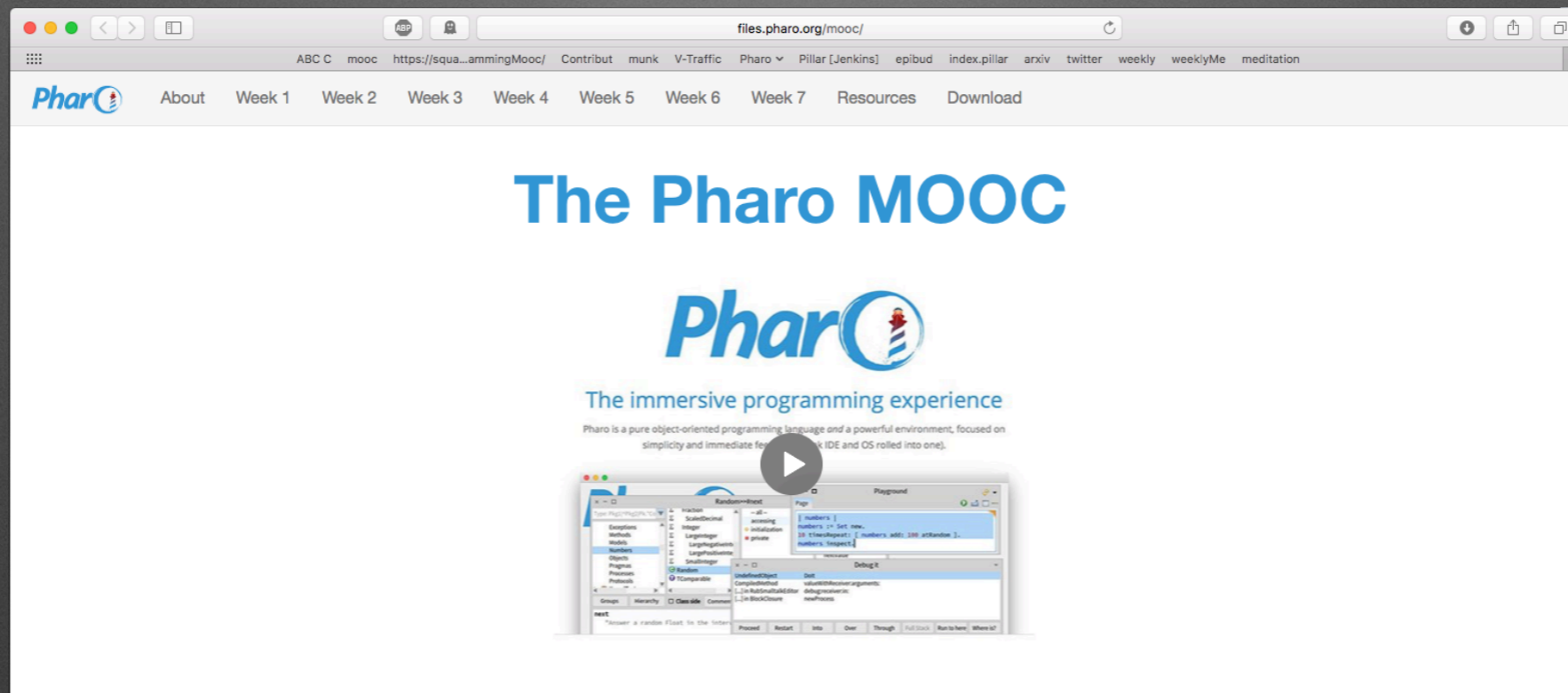
ETS (Can)

U.Chi (Can)

Soft (Be)

...

# <http://mooc.pharo.org>



## About this course

If you are either a beginner or an expert in object-oriented programming, this MOOC will change the way you program with objects: come and learn or rediscover object-oriented programming with Pharo!

Pharo is a pure object-oriented programming language in the tradition of Smalltalk. It offers a unique developing experience in constant interaction with live objects. Pharo is elegant, fun to use and very powerful. It is very easy to learn and enables to understand advanced concept in a natural way. When programming in Pharo, you are immersed in a world of live objects. You have immediate feedback at any moment of your development on objects representing web applications, code itself, graphics, network. [More...](#)

## Obtaining the MOOC

We strongly suggest to follow the MOOC during the next session on [France Université Numérique](#) that will start **October 16th, 2017** because you will have support from the teaching team.

Join the discord channel mooc on the Pharo community (Invitation at <http://discord.gg/Sj2rhxn>)

But, you can also access all ressources of this MOOC offline on:

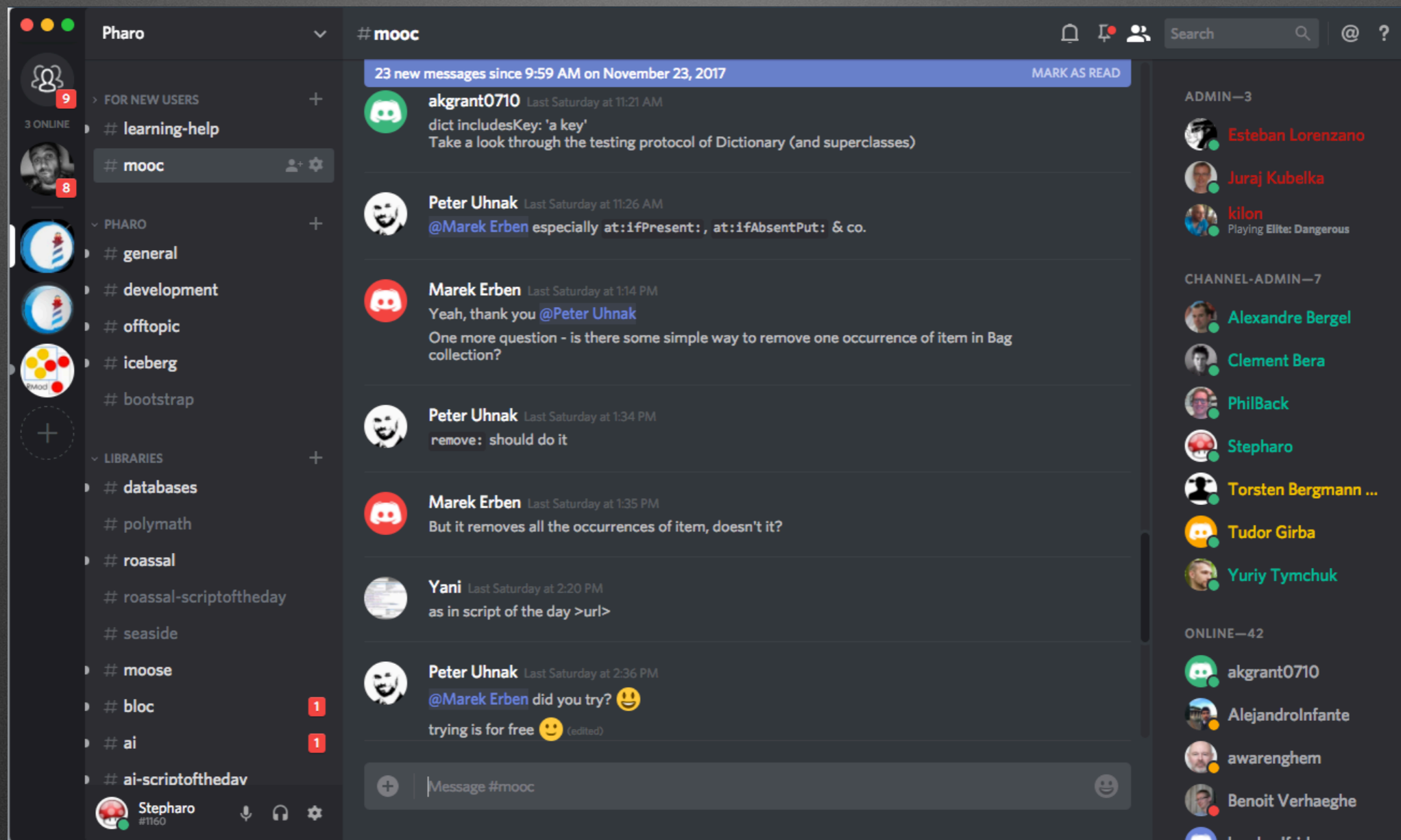
- [WebPortal](#): full online lecture with all videos and exercises,
- [CanalU](#): one of the key website that delivers ressources for teaching and research.

## How to follow this MOOC?

We propose five profiles to follow this MOOC at different speed and levels. The Mooc sequences will be tagged according to these profiles. The profiles are not exclusive: to become a pharo expert you need to start as a newbie and grow up. Of course, you can also follow the full MOOC.

- **Total newbies [Newbies]** 🧑‍🎓 Focus on the beginning of the lectures, you can skip the Seaside/Mongo and tinyBlog exercises. Follow the end of the Mooc but without trying to understand everything. Take it easy and spend time understanding that the system is written in itself. Focus on the navigation tools (senders and implementors).
- **Looking for Web [Web]** 🌐 For those that focus on web development, we suggest to get started with the syntax (since we really love this lecture you should really watch the not implementation

# http://discord.gg/Sj2rhxn



<http://books.pharo.org>

## Pharo Books

Pharo is a clean, innovative, open-source, live-programming environment.

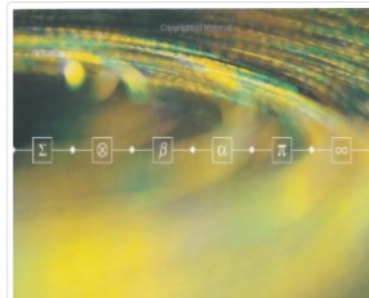
Contribute to the SquareBracketsAssociates community free books  
<https://github.com/SquareBracketAssociates/>

Access [the book compilation farm!](#)



*Pharo by Example*, intended for both students and developers, will guide you gently through the Pharo language and environment by means of a series of examples and exercises.

[View details »](#)



*Deep into Pharo* is the second volume of a series of books covering Pharo. Whereas the first volume is intended for newcomers, this second volume covers deeper topics.

[View details »](#)



*Enterprise Pharo* is the third volume of the series. This book covers libraries and frameworks for enterprises, and in particular those doing web development.

[View details »](#)



TinyBlog: Un Tutorial Web en Pharo

# https:// pharoweekly.wordpress.com

The screenshot shows a web browser window with the URL <https://pharoweekly.wordpress.com>. The page title is "WEEKLY NEWS ABOUT PHARO". Below the title is a subtitle: "Everything you wanted to know about <http://www.pharo.org> without being forced to read 1000 mails". A navigation menu includes "HITCHHIKER'S GUIDE TO ...", "SMALLTALK, TIPS'N TRICKS", "COG BLOG", and "ABOUT". The main content area displays two posts:

- NOV 25 2017**  
**WHAT ABOUT CONTRIBUTING?**  
UNSORTED  
EDIT  
Here is the testimony of Astares regularly contributing to Pharo 70. What is not visible in the list are the many enhancements happening also on Calypso, Bloc, Grease and many many others. Nonetheless the core image still needs love from more people. Remember even the smallest change can make a difference and shape the future. Also "a contribution per day keeps bad systems away". Even one contribution per week or month. So jump in – the water is just fine! Bye T. (aka astares)
- NOV 23 2017**  
**[PHARO 7.0A] NEXT ENHANCEMENTS 2**  
UNSORTED  
EDIT  
eport period: 5 November 2017 to 23 November 2017  
November 2017  
\* 20739-Remove-dead-stream-primitives >> <https://pharo.fogbugz.com/f/cases/20739/Remove-dead-stream-primitives>  
Issue URL: <https://pharo.fogbugz.com/f/cases/20739> PR URL: <https://github.com/pharo-project/pharo/pull/524> Diff URL: <https://github.com/pharo-project/pharo/pull/524/files>  
Thanks to clementbera  
\* 20645-Windows-rebuildFieldAccessors-problem >> Fixing the creation of anonymous classes



**Pharo is our vehicle  
We improve it  
everyday**



**For us Pharo is the  
beginning of the journey and  
we are building the road**

**Pharo is  
research friendly**

**We are ready  
to help you  
validate  
your ideas**

**We can be  
guinea pigs**

# Actively supporting research

The screenshot shows the Pharo IDE's Spotter search interface. At the top, there is a search bar with the text "Search" and icons for settings, help, and close. Below the search bar, a list of search results is displayed, including "#Menu 15/62", "System Browser", "Playground", "Test Runner", "Spotter", "Iceberg", and "Monticello Browser". The "System Browser" result is highlighted with a green checkmark and a blue arrow. At the bottom of the interface, there is a pink notification box with the text: "No diagnostic and usage data is being sent. Would you like to send diagnostic and usage data to help us improve Pharo?" and a "Go to settings" button.

The screenshot shows the Pharo IDE's NumberParser class inspector. The title bar reads "NumberParser". The interface is divided into several sections: "Scoped" and "Variables" tabs, a "History Navigator" on the right, and a main area displaying the class's metadata. The "History Navigator" lists various methods: "-- all --", "accessing", "error", "initialize-release", "parsing-large int", "parsing-private", and "parsing-public". The main area displays the following metadata for the NumberParser class:

```
Object subclass: #NumberParser
  instanceVariableNames: 'sourceStream base neg integerPart fraction
nDigits lastNonZero requestor failBlock'
  classVariableNames: ''
  package: 'AST-Core-Parser'
```

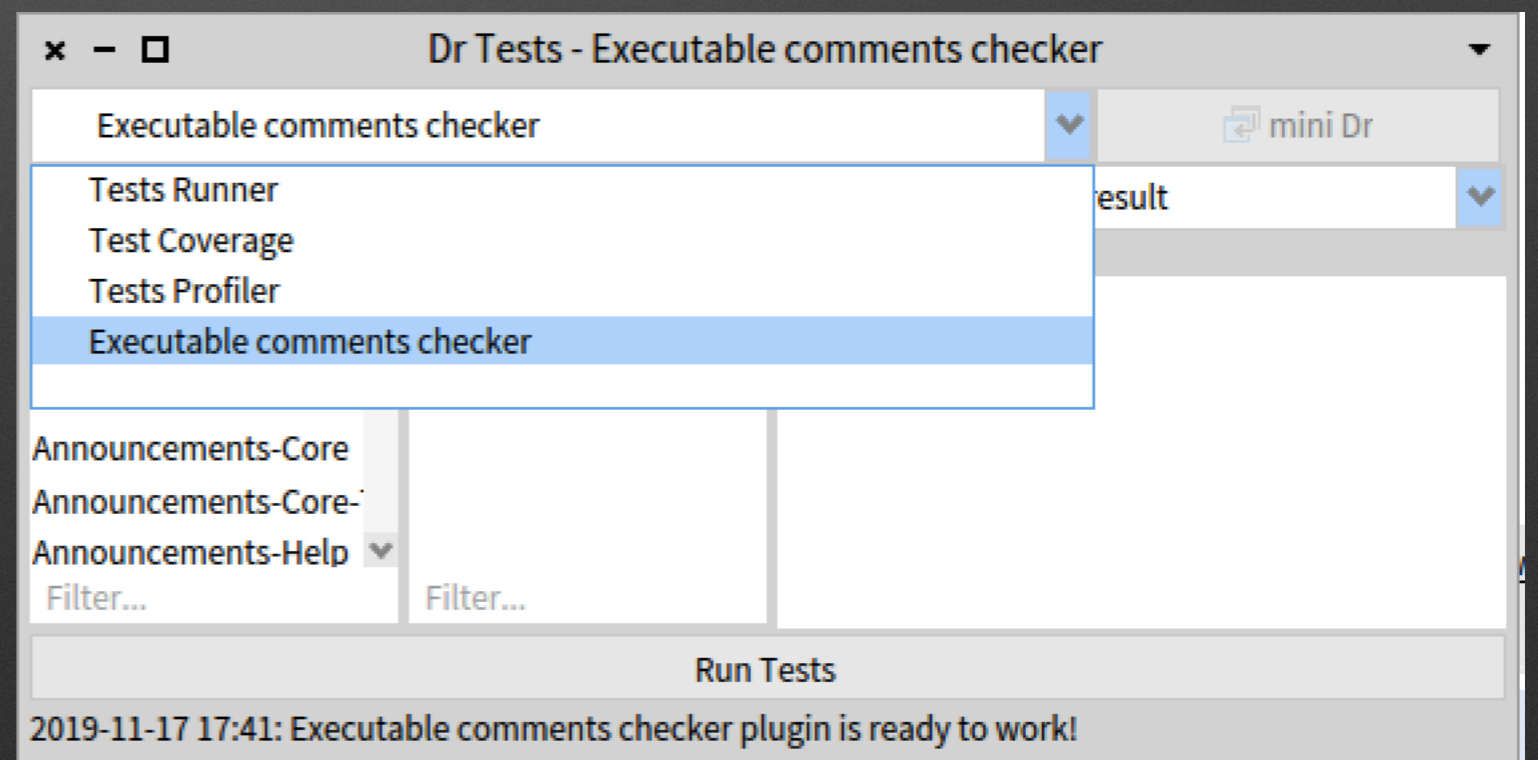
Below the metadata, there is a pink notification box with the text: "No diagnostic and usage data is being sent. Would you like to send diagnostic and usage data to help us improve Pharo?"

The screenshot shows the Pharo IDE's Utility methods window. The title bar reads "Utility methods" and includes icons for help, close, and a "Helpful?" button with thumbs up and thumbs down icons. The main area of the window is currently empty.

# **Best Paper Award @ ICPC'19**

**Kubelka, Bergel, Robbes,  
“Live Programming and Software Evolution:  
Questions during a Programming Change Task”**

# DrTests: a plugin-based architecture to plug test analyses...



**We validated our 25000  
tests for Rotten Green  
Tests (ICSE'19)**




# **Test Amplification**

**by S. Demeyer, H. Rocha, M. Abdi**

# Code Review

by A. Bachelli, ObjectProfile



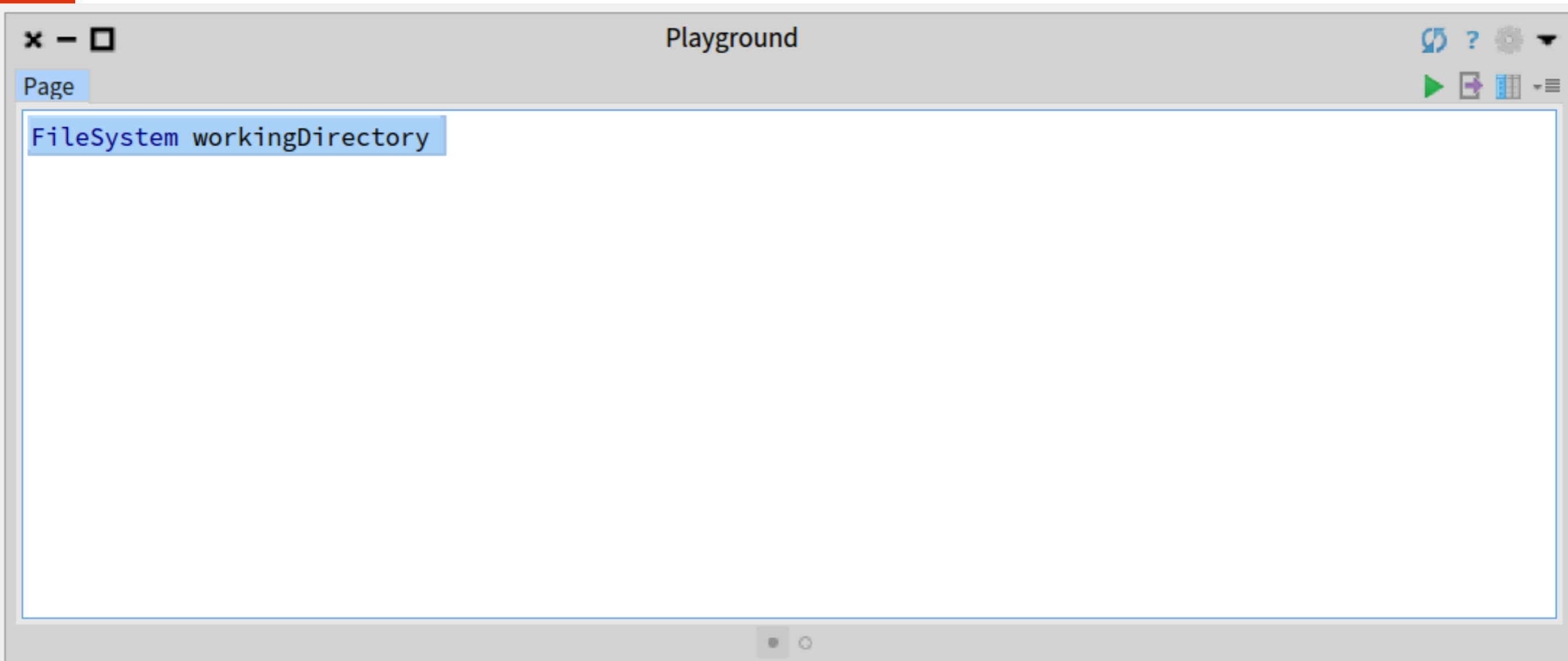
**What about adapting  
tools to our problem  
instead of the inverse?**

# Not so dull example!

**The views of a file reference**



# Looking at a file reference



# Oh! a file browser in my inspector!

The screenshot shows a web browser window titled "Playground". The developer console on the left displays the text "FileSystem workingDirectory". On the right, a file browser interface is open, showing a list of files and folders. The browser's address bar shows a file path: "a FileReference (/Users/ducasse/Documents/Pharo/images/F...".

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

# But I have a file reference: a dull object

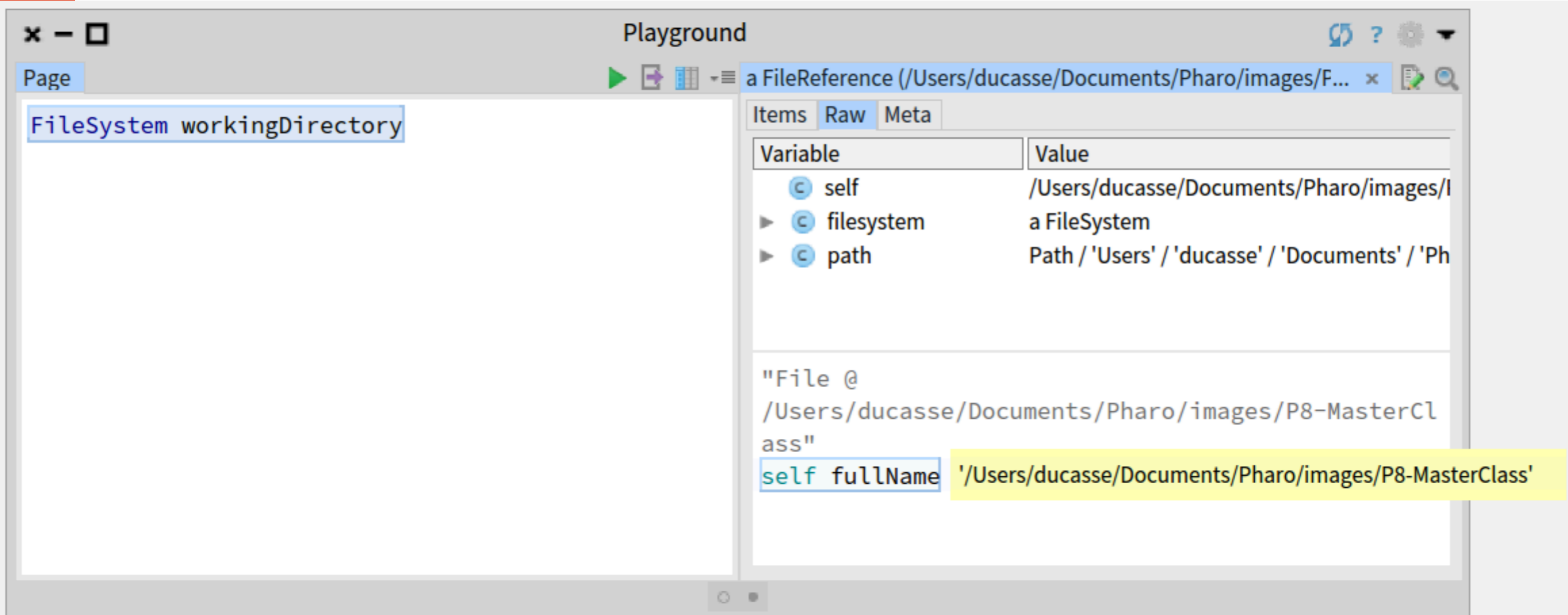
The screenshot shows a Playground IDE window with a code editor on the left and an object inspector on the right. The code editor contains the text `FileSystem workingDirectory`. The object inspector shows a `FileReference` object with the following details:

Variable	Value
self	/Users/ducasse/Documents/Pharo/images/I
filesystem	a FileSystem
path	Path / 'Users' / 'ducasse' / 'Documents' / 'Ph

Below the table, the object's class and parent information are displayed:

```
"File @  
/Users/ducasse/Documents/Pharo/images/P8-MasterCl  
ass"  
self parent File @ /Users/ducasse/Documents/Pharo/images
```

# Quite boring object



The screenshot shows a 'Playground' window with a code editor on the left and an object inspector on the right. The code editor contains the text `FileSystem workingDirectory`. The object inspector shows a `FileReference` object with the following details:

- Variable: `self`, Value: `/Users/ducasse/Documents/Pharo/images/I`
- Variable: `filesystem`, Value: `a FileSystem`
- Variable: `path`, Value: `Path / 'Users' / 'ducasse' / 'Documents' / 'Ph`

Below the table, the object's class and full name are displayed:

```
"File @  
/Users/ducasse/Documents/Pharo/images/P8-MasterCl  
ass"  
self fullName '/Users/ducasse/Documents/Pharo/images/P8-MasterClass'
```



# Ah this is this png ;)


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

Picture Contents Raw Meta



The image shows a screenshot of a web browser window titled "Playground". The address bar shows a file reference path: "/Users/ducasse/Documents/Pharo/images/P8-M...". The page content is divided into two main sections. On the left, there is a file explorer view with tabs for "Items", "Raw", and "Meta". The "Items" tab is active, displaying a list of files and folders. The file "logo.png" is highlighted. On the right, there is a "Picture" tab active, showing a large blue logo for "Pharo". The logo consists of the word "Pharo" in a blue, sans-serif font, followed by a circular emblem containing a stylized lighthouse with a red top and a white body with blue stripes.

# Looking inside that PNG

The image shows a software interface with two main panes. The left pane is a file explorer titled 'Playground' showing a directory listing. The right pane is a hex editor showing the raw data of a selected file, 'logo.png'.

**File Explorer (Left Pane):**

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

**Hex Editor (Right Pane):**

The hex editor shows the raw data of the selected file, 'logo.png'. The data is displayed in hexadecimal and ASCII format. The first few lines of data are:

```
1 00000000 89 50 4E 47 0D 0A 1A 0A 00 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!

The screenshot shows a Playground window with two panes. The left pane displays a file system view with a table of files. The right pane shows the internal structure of a FileReference object, including variables and a full name string.

Name	Size	Count
..	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

Variable	Value
self	/Users/ducasse/Documents/Pharo/images/...
filesystem	a FileSystem
path	Path / 'Users' / 'ducasse' / 'Documents' / 'Ph...

"File @  
/Users/ducasse/Documents/Pharo/images/P8-MasterCl  
ass/logo.png"  
self fullName '/Users/ducasse/Documents/Pharo/images/P8-MasterClass/logo.png'

# See! an archive '.zip'

The image shows a software interface with two windows. The left window is a file explorer titled 'Playground' showing a directory listing. The right window is a hex editor showing the raw contents of a file, with the 'Contents' tab selected. The hex editor displays a zip file signature starting with 'PK...'.

**File Explorer (Left Window):**

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

**Hex Editor (Right Window):**

Offset	Hex	ASCII
1	00000000 50 4B 03 04 14 00 08 00 08 00 E1	
2	AA 16 51 00 00  PK.....Q..	PK.....Q..
3	00000010 00 00 00 00 00 00 00 00 00 00 08	
4	00 10 00 6C 6F  .....lo	.....lo
5	00000020 67 6F 2E 70 6E 67 55 58 0C 00 A4	
6	70 41 5F 96 70  go.pngUX...pA_.p	go.pngUX...pA_.p
7	00000030 41 5F F7 01 14 00 6C B7 63 90 68	
8	41 B3 25 DA B6  A_....l.c.hA.%..	A_....l.c.hA.%..
9	00000040 6D DB B6 6D BB FB B4 6D DB B6 79	
10	DA B6 6D DB B6  m..m...m..y..m..	m..m...m..y..m..
11	00000050 6D 5B EF 7C F7 DE 99 79 F1 DE D4	
12	8F 8A 55 99 2B  m[.  ...y.....U.+	m[.  ...y.....U.+
13	00000060 57 46 66 C4 DE 55 19 A1 20 27 0E	

# Kind of clear...

The screenshot shows a 'Playground' application window with two file browser panes. The left pane displays a directory listing with the following items:

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

The right pane displays a similar directory listing with the following items:

Name	Size	...
..	0 B	2
__MACOSX	0 B	2
ReadMe.txt	0 B	2
logo.png	0 B	2
pharo.version	0 B	2

# An object can expose multiple interactive views!

Users get the best view for your task!

Users can add views to your domain objects

The screenshot shows a 'Playground' application window with three tabs, each displaying a different view of a FileReference object. The first tab, titled 'a FileReference (/Users/ducasse/Docum...', shows a file browser view with tabs for 'Items', 'Raw', and 'Meta'. The 'Items' view lists files and folders: '..', 'pharo-local', 'PharoDebug.log', 'logo.png', 'pharo.version', 'ReadMe.txt', 'meta-inf.ston', 'P8-MasterClass.image', 'P8-MasterClass.changes', 'Archive.zip', and 'Pharo8.0-32bit-0932da8.sources'. The second tab, also titled 'a FileReference (/Users/ducasse/Docum...', shows a file browser view with tabs for 'Items', 'Contents', 'Raw', and 'Meta'. The 'Contents' view lists: '..', '\_\_MACOSX', 'ReadMe.txt', 'logo.png', and 'pharo.version'. The third tab, titled 'a FileReference (/ReadMe.txt)', shows a text editor view with tabs for 'Contents', 'Raw', and 'Meta'. The 'Contents' view displays the text of the file: '1 Hello Inria chile and master class attendees!' and '2 Yes Pharo is cool'.

# **It is cool but it is not magic**

**Yes you can define your own!**

*Inria*

# Implementing a pane!

The screenshot shows the GT-Inspector IDE interface. The title bar reads "AbstractFileReference>>gtInspectorPngIn:". The interface is divided into several panes:

- Left Pane:** A tree view showing the package structure. The "Public" package is selected, and its sub-packages are listed, including "Extensions" and various "FileSystem-\*" packages.
- Center Pane:** A list of classes and methods. "AbstractFileReference" is selected, and its subclasses are listed, including "FileLocator", "FileReference", "FileSystem", "FileSystemDirectoryEntry", "DiskDirectoryEntry", "DiskSymlinkDirectoryEntry", "MemoryDirectoryEntry", and "FileSystemPermission".
- Right Pane:** A list of methods and flags. "instance side" and "extensions" are selected. The "extensions" list includes "flags", "ToDeprecate", "accessing", "comparing", "converting", "copying", "delegated", "enumerating", "navigating", "operations", "printing", and "private".
- Bottom Pane:** A code editor showing the implementation of the "gtInspectorPngIn" pane. The code is as follows:

```
gtInspectorPngIn: composite
  <gtInspectorPresentationOrder: 0>
  composite morph
    title: 'Picture';
    display: [ self binaryReadStreamDo: [ :stream | PNGReadWriter formFromStream: stream ] ];
    when: [ self isFile and:
      [ self mimeTypes notNil and:
        [ self mimeTypes first matches: ZnMimeType imagePng ] ] ]
```

The bottom status bar shows "8/8 [9]" on the left and "GT-InspectorExtensions-Core extension F + ia" on the right.



Files are boring...  
What about *inside* the system?



# A class is an object we can inspect!

The screenshot shows a 'Playground' window with a code editor on the left containing the word 'Point' and a variable inspection panel on the right. The panel is titled 'a Point class (Point)' and shows a table of variables and their values.

Variable	Value
self	Point
superclass	Object
methodDict	a MethodDictionary [103 items] (size 103)
format	65538
layout	a FixedLayout
organization	a ClassOrganization
subclasses	nil
name	#Point
classPool	a Dictionary [0 items] /

Below the table, the string representation of the object is shown as '"Point"' and the variable 'self' is listed below it.

***“A class has a method dictionary” they said***

The screenshot shows a Ruby Playground interface with two panes. The left pane displays the class structure of `Point`, and the right pane displays the contents of its `methodDict`.

**Left Pane: a Point class (Point)**

Variable	Value
self	Point
superclass	Object
methodDict	a MethodDictionary [103 items] (size 103)
format	65538
layout	a FixedLayout
organization	a ClassOrganization
subclasses	nil
name	#Point
classPool	a Dictionary [0 items] {}

Code snippet: `"Point"`  
`self`

**Right Pane: a MethodDictionary [103 items] (size 103)**

Key	Value
#reflectedAbout:	Point>>#reflectedAbout:
#rotateBy:centerAt:	Point>>#rotateBy:centerAt:
#adaptToNumber:andSend:	Point>>#adaptToNumber:andSend:
#squaredDistanceTo:	Point>>#squaredDistanceTo:
#adaptToCollection:andSend:	Point>>#adaptToCollection:andSend:
#theta	Point>>#theta
#transposed	Point>>#transposed
#-	Point>>#-
#fourDirections	Point>>#fourDirections
#crossProduct:	Point>>#crossProduct:
#scaleFrom:to:	Point>>#scaleFrom:to:
#veryDeepCopyWith:	Point>>#veryDeepCopyWith:

# Dissecting one method

Inspector on a CompiledMethod (Point>>#degrees)

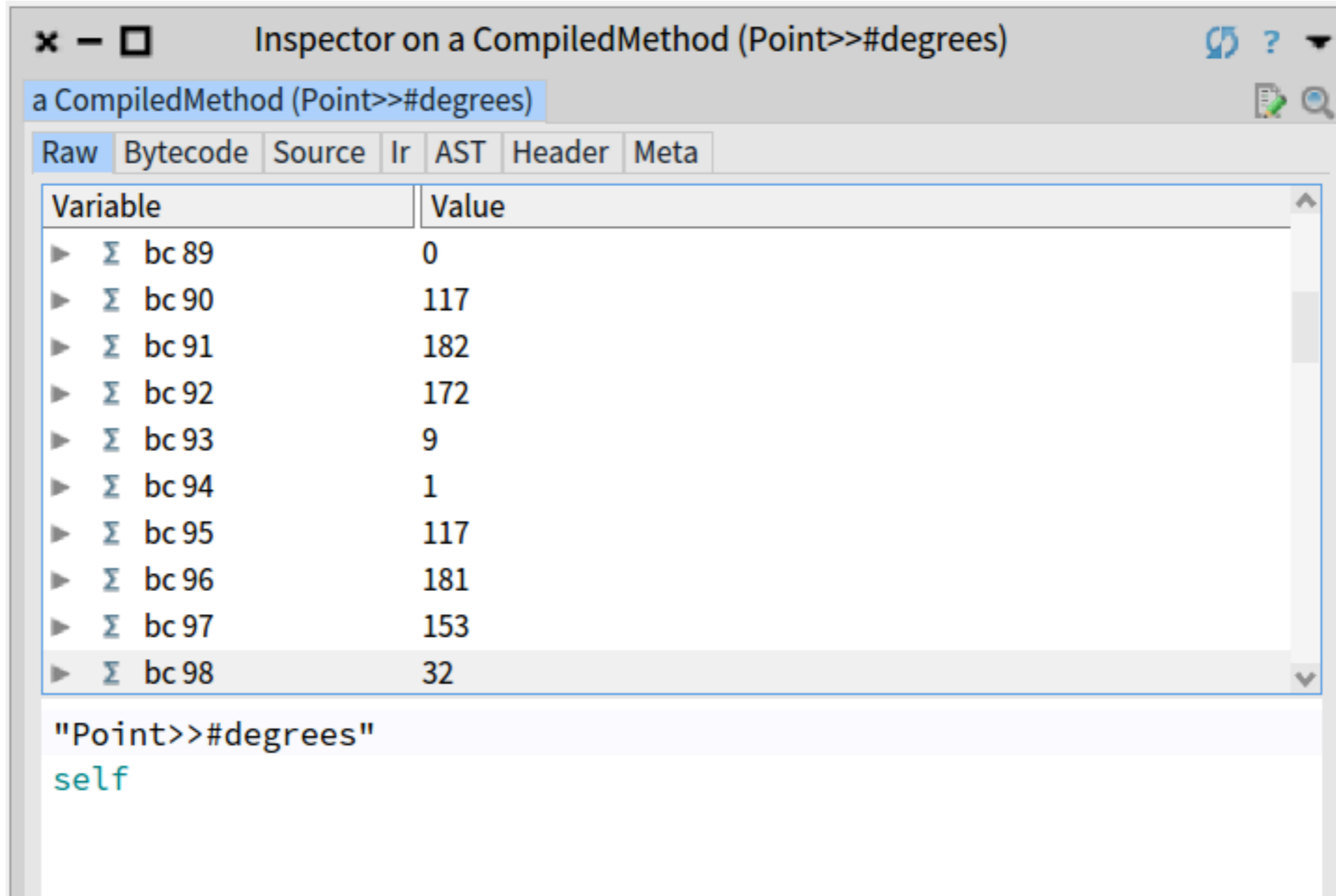
a CompiledMethod (Point>>#degrees)

Raw Bytecode Source Ir AST Header Meta

Variable	Value
{ } self	Point>>#degrees
▶ Σ literal1	90.0
▶ Σ literal2	270.0
▶ ¶ literal3	#asFloat
▶ ¶ literal4	#arcTan
▶ ¶ literal5	#radiansToDegrees
▶ Σ literal6	360.0
▶ Σ literal7	180.0
▶ ¶ literal8	#ifTrue:ifFalse:
▶ Σ bc 89	0

```
"Point>>#degrees"  
self
```

# I do not want to be a decompiler!



Inspector on a CompiledMethod (Point>>#degrees)

a CompiledMethod (Point>>#degrees)

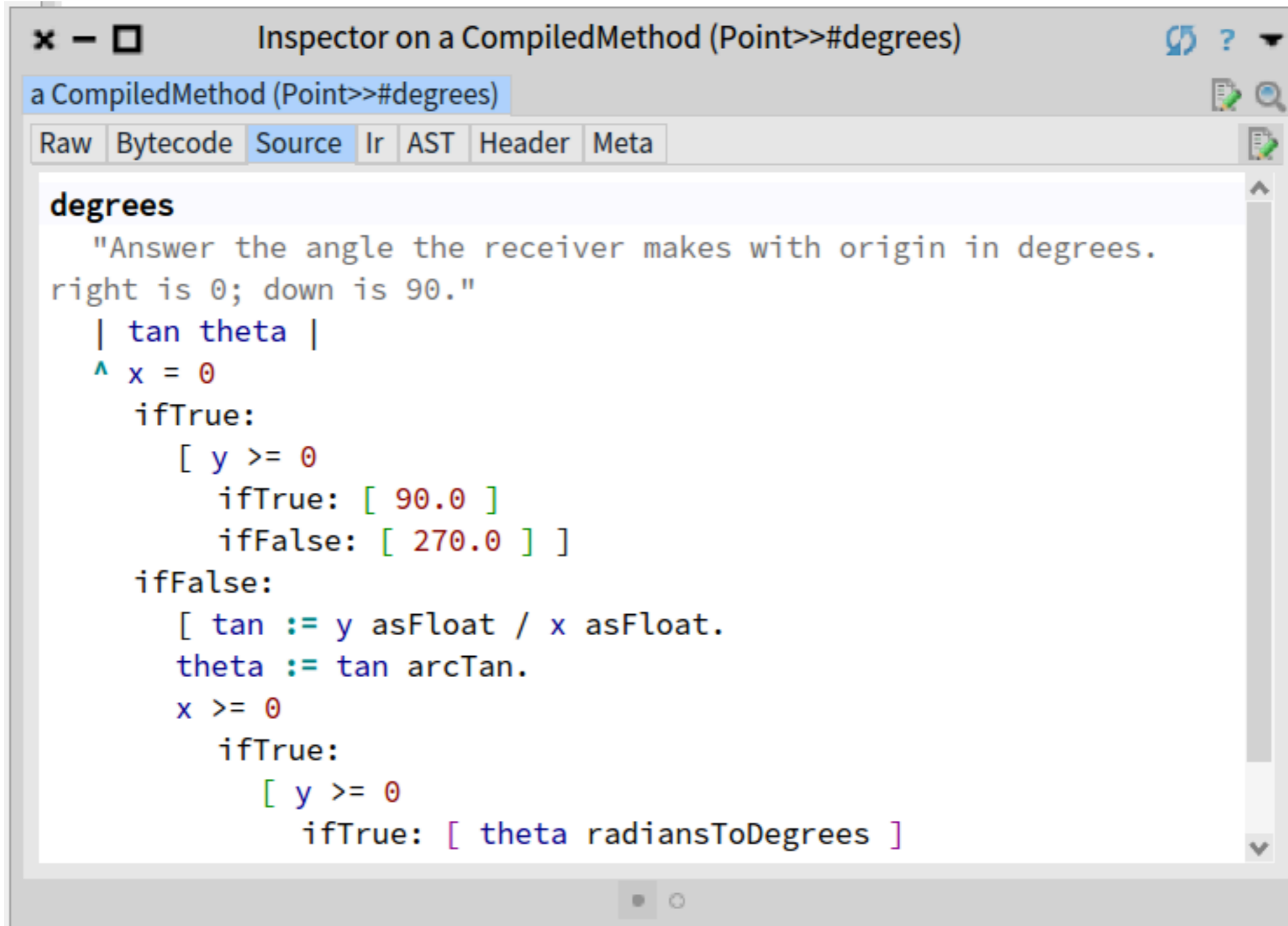
Raw Bytecode Source Ir AST Header Meta

Variable	Value
▶ Σ bc 89	0
▶ Σ bc 90	117
▶ Σ bc 91	182
▶ Σ bc 92	172
▶ Σ bc 93	9
▶ Σ bc 94	1
▶ Σ bc 95	117
▶ Σ bc 96	181
▶ Σ bc 97	153
▶ Σ bc 98	32

"Point>>#degrees"

self

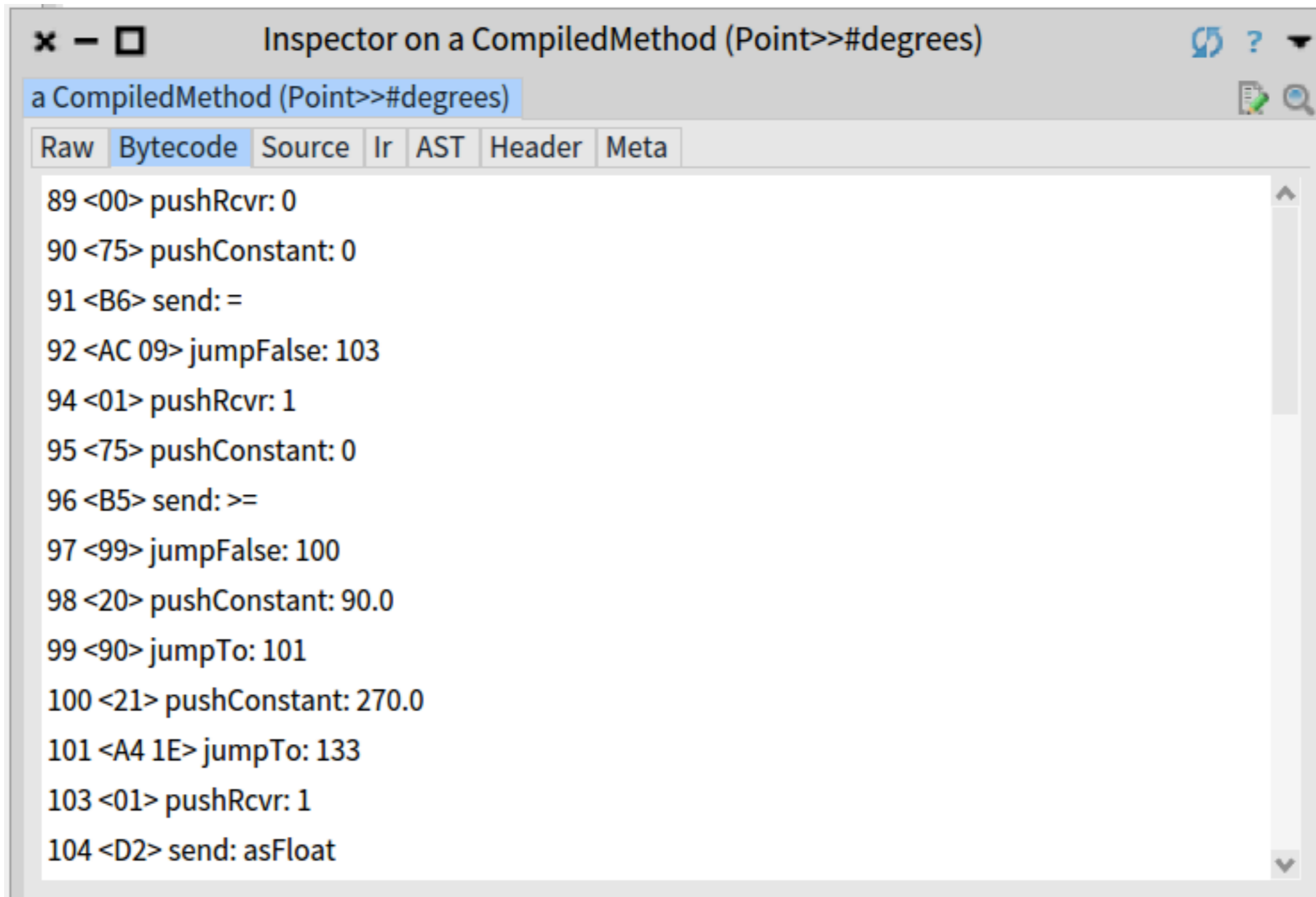
# It looks like a method



The screenshot shows a debugger window titled "Inspector on a CompiledMethod (Point>>#degrees)". The window displays the source code for the method "degrees". The code is as follows:

```
degrees
  "Answer the angle the receiver makes with origin in degrees.
  right is 0; down is 90."
  | tan theta |
  ^ x = 0
  ifTrue:
    [ y >= 0
      ifTrue: [ 90.0 ]
      ifFalse: [ 270.0 ] ]
  ifFalse:
    [ tan := y asFloat / x asFloat.
      theta := tan arcTan.
      x >= 0
        ifTrue:
          [ y >= 0
            ifTrue: [ theta radiansToDegrees ]
```

# Numbers are not that obscure finally



```
Inspector on a CompiledMethod (Point>>#degrees)
a CompiledMethod (Point>>#degrees)
Raw Bytecode Source Ir AST Header Meta
89 <00> pushRcvr: 0
90 <75> pushConstant: 0
91 <B6> send: =
92 <AC 09> jumpFalse: 103
94 <01> pushRcvr: 1
95 <75> pushConstant: 0
96 <B5> send: >=
97 <99> jumpFalse: 100
98 <20> pushConstant: 90.0
99 <90> jumpTo: 101
100 <21> pushConstant: 270.0
101 <A4 1E> jumpTo: 133
103 <01> pushRcvr: 1
104 <D2> send: asFloat
```

# And mapping them to the right abstraction helps

Inspector on a CompiledMethod (Point>>#degrees)

a CompiledMethod (Point>>#degrees)

Raw Bytecode Source Ir AST Header Meta

- ▼ RBMethodNode(degrees "Answer the angle the receiver makes with)
  - ▼ RBSequenceNode(| tan theta | ^ x = 0 ifTrue: [ y >= 0 ifTrue:)
    - RBTemporaryNode(tan)
    - RBTemporaryNode(theta)
  - ▼ RBReturnNode(^ x = 0 ifTrue: [ y >= 0 ifTrue: [ 90.0 ])
    - ▼ RBMessageNode(x = 0 ifTrue: [ y >= 0 ifTrue: [ 90.0 ])
      - ▼ RBMessageNode(x = 0)
        - RBInstanceVariableNode(x)
        - RBLiteralValueNode(0)
      - ▼ RBBlockNode([ y >= 0 ifTrue: [ 90.0 ] ifFalse: [ 270.0 ]])
        - ▼ RBSequenceNode(y >= 0 ifTrue: [ 90.0 ] ifFalse: [ 270.0 ])
          - ▼ RBMessageNode(y >= 0 ifTrue: [ 90.0 ] ifFalse: [ 270.0 ])
            - ▶ RBMessageNode(y >= 0)
            - ▶ RBBlockNode([ 90.0 ])
            - ▶ RBBlockNode([ 270.0 ])

a RBMessageNode (RBMessageNode(y >= 0))

Raw Tree Scopes Source cc... AST Dump Meta

```
degrees
  "Answer the angle the receiver makes with
  origin in degrees. right is 0; down is 90."
  | tan theta |
  ^ x = 0
  ifTrue:
    [ y >= 0
      ifTrue: [ 90.0 ]
      ifFalse: [ 270.0 ] ]
  ifFalse:
    [ tan := y asFloat / x asFloat.
      theta := tan arcTan.
      x >= 0
        ifTrue:
          [ y >= 0
            ifTrue: [ theta radiansToDegrees ]
            ifFalse: [ 360.0 + theta
              radiansToDegrees ] ] ]
```



# Yes pushRcvr: 1 means the second field!

The image shows a debugger window titled "Inspector on a CompiledMethod (Point>>#degrees)". It contains two panes. The left pane, titled "a CompiledMethod (Point>>#degrees)", shows a list of bytecode instructions. The instruction at index 94, "94 <01> pushRcvr: 1", is highlighted. The right pane, titled "a SymbolicBytecode (94 <01> pushRcvr: 1)", shows the corresponding source code snippet. The source code is a string: "origin in degrees. right is 0; down is 90." followed by a block of code that calculates the angle theta based on the x and y coordinates. The code uses conditional logic to determine the angle based on the signs of x and y.

```
Inspector on a CompiledMethod (Point>>#degrees)
```

a CompiledMethod (Point>>#degrees)

Raw	Bytecode	Source	Ir	AST	Header	Meta
89	<00>	pushRcvr: 0				
90	<75>	pushConstant: 0				
91	<B6>	send: =				
92	<AC 09>	jumpFalse: 103				
94	<01>	pushRcvr: 1				
95	<75>	pushConstant: 0				
96	<B5>	send: >=				
97	<99>	jumpFalse: 100				
98	<20>	pushConstant: 90.0				
99	<90>	jumpTo: 101				
100	<21>	pushConstant: 270.0				
101	<A4 1E>	jumpTo: 133				
103	<01>	pushRcvr: 1				
104	<D2>	send: asFloat				
105	<00>	pushRcvr: 0				
106	<D2>	send: asFloat				

a SymbolicBytecode (94 <01> pushRcvr: 1)

Raw	Source	SourceNode	Meta
	origin in degrees. right is 0; down is 90."		
	tan theta		
	^ x = 0		
	ifTrue:		
	[ y >= 0		
	ifTrue: [ 90.0 ]		
	ifFalse: [ 270.0 ] ]		
	ifFalse:		
	[ tan := y asFloat / x asFloat.		
	theta := tan arctan.		
	x >= 0		
	ifTrue:		
	[ y >= 0		
	ifTrue: [ theta radiansToDegrees ]		
	ifFalse: [ 360.0 + theta		
	radiansToDegrees ] ]		
	ifFalse: [ 180.0 + theta		
	radiansToDegrees ] ]		



# Examples of developer' extensions

# E.g. Inspecting live a 3D object

Playground

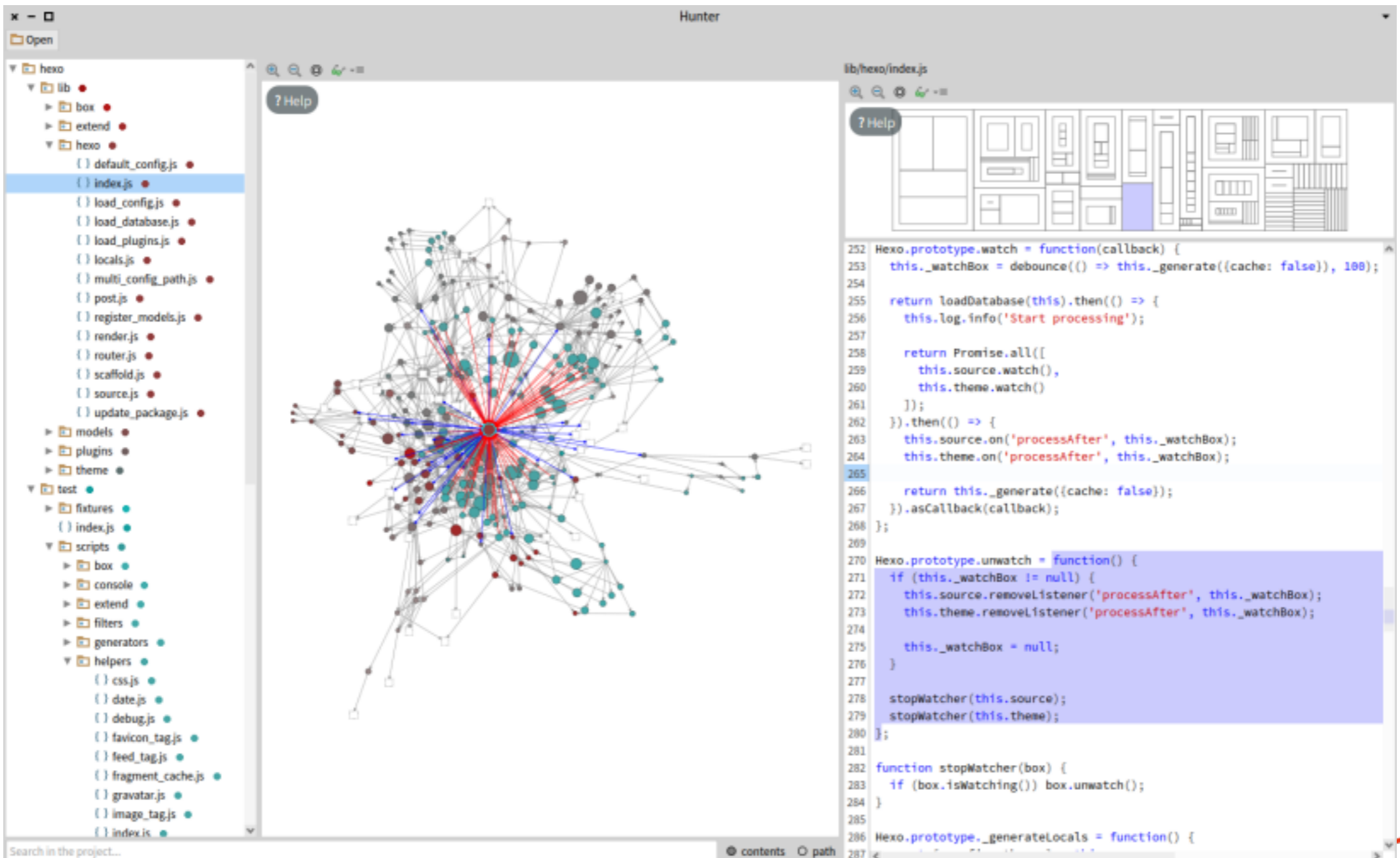
```
data := TestData new data.  
  
cube := MatrixCube new initWithData: data.  
cube view
```

an Array [4 items] ('2000-01-01' 'Malawi' 'France'...

Index	Item
1	'2000-01-01'
2	'Malawi'
3	'France'
4	'400.0'

enter search query (example: "each = 5")

# Javascript analysis



The image shows the Hunter tool interface, which is used for JavaScript analysis. The interface is divided into three main sections:

- File Tree (Left):** A hierarchical view of the project files. The 'hexo' directory is expanded, showing sub-directories like 'lib', 'test', and 'helpers', along with various JavaScript files such as 'index.js', 'load\_config.js', and 'update\_package.js'.
- Network Graph (Center):** A complex network graph representing the relationships between code elements. Nodes are represented by colored circles (red, blue, green, grey) and are interconnected by lines. A central node is highlighted in red, with many lines radiating outwards to other nodes.
- Code Editor (Right):** A window displaying the source code for 'lib/hexo/index.js'. The code is shown with line numbers (252-287) and includes functions like 'Hexo.prototype.watch', 'Hexo.prototype.unwatch', and 'stopWatcher'. The code is syntax-highlighted, and a blue selection box highlights the 'unwatch' function and its associated 'stopWatcher' function.

The Hunter tool provides a visual and interactive way to analyze JavaScript code, allowing users to explore the structure of a project and understand the relationships between different code elements.

# Probabilistic Data Structure

<https://github.com/osoco/PharoPDS>

Defined new data structure

And tools

The screenshot displays the 'PDS Algorithms Viewer' interface. The main window is titled 'PDS Algorithms Viewer' and contains several panels and controls:

- Top Bar:** Includes buttons for '+ New Bloom Filter', 'Analysis', 'Profiling', 'Benchmarking', and 'Reset'.
- Left Panel:** A sidebar with 'PDS Algorithms' and 'Bloom Filter' selected.
- Center Panel:**
  - Add elements:** A section for adding items to the filter. It includes a text input field with 'e.g. Madrid', an 'Add' button, and a confirmation message 'london added to filter!'.
  - Membership test:** A section for testing membership. It includes a text input field with 'E.g. London' and a 'Test' button.
  - Bloom Filter BitSet:** A grid visualization of the filter's state. The grid is 15 columns wide and 15 rows high. Most cells are green, but several cells are blue, indicating they are set. The grid is labeled 'In Out Center'.
- Right Panel:**
  - a PDSBloomFilter:** A configuration table for the filter.

Name	Value
'Target Elements (n)'	100
'Target FPP'	0.03
'Number of hashes (k)'	6
'Current Elements'	0
'Current FPP'	0.0
  - False-Positive Probability Curve:** A graph showing the relationship between the number of elements added and the False-Positive Probability (FPP). The x-axis is labeled 'Elements Added' (0.0 to 150.0) and the y-axis is 'False Positive Probability (FPP)' (0.0 to 0.15). A blue curve represents the 'FPP curve', and a red horizontal line represents the 'Current FPP' at 0.0.

# HTTP traffic analysis

<http://youtu.be/rIBbeMdFCys>

The screenshot shows the Pharo IDE interface. At the top left is the Pharo logo. In the center, a 'Monticello Browser' window displays a repository of packages from 'http://smalltalkhub.com/mc/SvenVanCaekenberghe/'. The package list includes 'HP35-Calculator-SvenVanCaekenberghe.17.mcz' through '7.mcz'. Below this, a 'Playground' window shows a log of network events. The log entry for '2014-10-15 15:27:46 028 Response Read a ZnResponse(200 OK text/plain 1197B)' is selected, and its details are shown in a table below.

Variable	Value
self	2014-10-15 15:27:46 028 Response Read a ZnResponse(200 OK text/plain 1197B)
clientid	nil
duration	0
id	28
response	a ZnResponse(200 OK text/plain 1197B)
timestamp	2014-10-15 15:27:46.873225+02:00

Below the table, a message box shows: "2014-10-15 15:27:46 028 Response Read a ZnResponse(200 OK text/plain 1197B) 0ms" self

2

# Handling data

The screenshot displays the Pharo IDE's Inspector window for a DataFrame with 150 items. The main view shows a table of data with columns for sepal length (cm), sepal width (cm), petal length (cm), petal width (cm), and species. The species column contains the value 'setosa' for all items.

sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	species
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7000000000000002	0.4	setosa
4.6	3.4	1.4	0.30000000000000004	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.0	2.1	1.5	0.1	setosa

Below the data table, a statistics table provides summary values for each column:

Statistic	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	species
1st Quartile	5.1	2.8	1.6	0.30000000000000004	0
3rd Quartile	6.4	3.3	5.1	1.8	0
Median	5.8	3.0	4.35	1.3	0
Minimum	4.3	2.0	1.0	0.1	0
Maximum	7.9	4.4	6.9	2.5	0
Variance	0.6856935123042504	0.18997941834451895	3.1162778523489942	0.5810062639821028	0
Standard deviation	0.8280661279778628	0.43586628493669816	1.7652982332594667	0.7622376689603465	0

At the bottom, four histograms show the distribution of values for the numerical columns: sepal length (cm), sepal width (cm), petal length (cm), and petal width (cm). The histograms for sepal length and sepal width show a right-skewed distribution, while the histograms for petal length and petal width show a more symmetric distribution.

The Inspector also displays the following metadata:

- Type: DataFrame
- Dimensions: (150@5)
- Has categorical: true
- Has nil: false

# Stepping assembly :)

The screenshot shows a disassembler window titled "Untitled window". The window is divided into several sections:

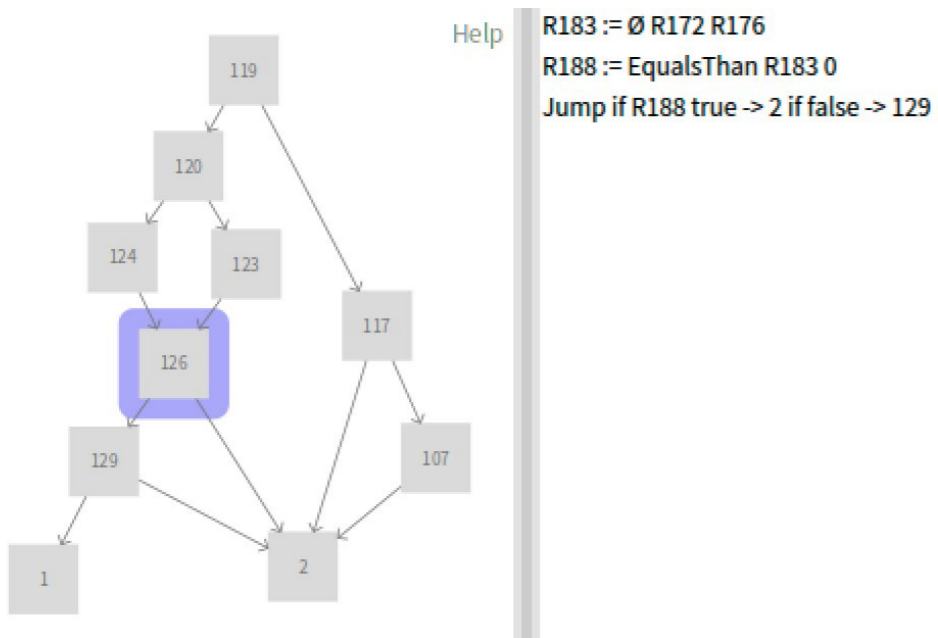
- Assembly List:** A table of assembly instructions with their addresses, mnemonics, and operands. The instruction at address 16r418 is highlighted.
- Registers:** A list of registers (lr, pc, sp, fp, x0-x5) and their current values. Some registers have symbolic names like "classRegister" and "receiverRegister".
- Memory:** A list of memory addresses and their corresponding values, ranging from 16r151E40 to 16r151ED8.
- Control:** A "Step" button and a "Disassemble at PC" button.

Address	Mnemonic	Operand	Register	Value
16r400	mov	x0, x29	lr	'16r0'
16r404	ret		pc	'16r0'
16r408	mov	x0, x28	sp	'16r0'
16r40C	ret		fp	'16r151E50'
16r410	str	x10, [x28, #-8]!	x0	'16r0'
16r414	ldr	x10, #36	x1	'16r0'
16r418	ldr	x12, #40	x2	'16r0'
16r41C	str	x29, [x12]	x3	'16r0'
16r420	mov	x1, x28	x4	'16r0'
16r424	adds	x1, x1, #8	x5	'16r0'
16r428	ldr	x12, #32		'16r0'
16r42C	str	x1, [x12]		'16r0'
16r430	ldr	x10, [x28], #8		'16r0'
16r434	ret			'16r0'

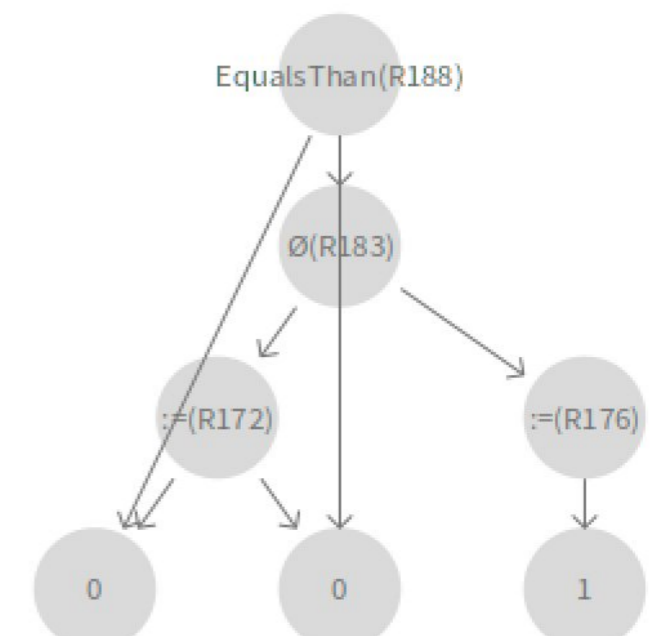
Address	Value
16r151E40	16r0
16r151E48	16r0
16r151E50	16r0
16r151E58	16r0
16r151E60	16r0
16r151E68	16r0
16r151E70	16r151E50
16r151E78	16r151E40
16r151E80	16r0
16r151E88	16r0
16r151E90	16r0
16r151E98	16r0
16r151EA0	16r0
16r151EA8	16r0
16r151EB0	16r0
16r151EB8	16r0
16r151EC0	16r0
16r151EC8	16r0
16r151ED0	16r0
16r151ED8	16r0



# Better than reading Basic Blocks in assembly



R183 :=  $\emptyset$  R172 R176  
R188 := EqualsThan R183 0  
Jump if R188 true -> 2 if false -> 129



# Other tools

Hot update on the fly  
**customizable** debugger

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

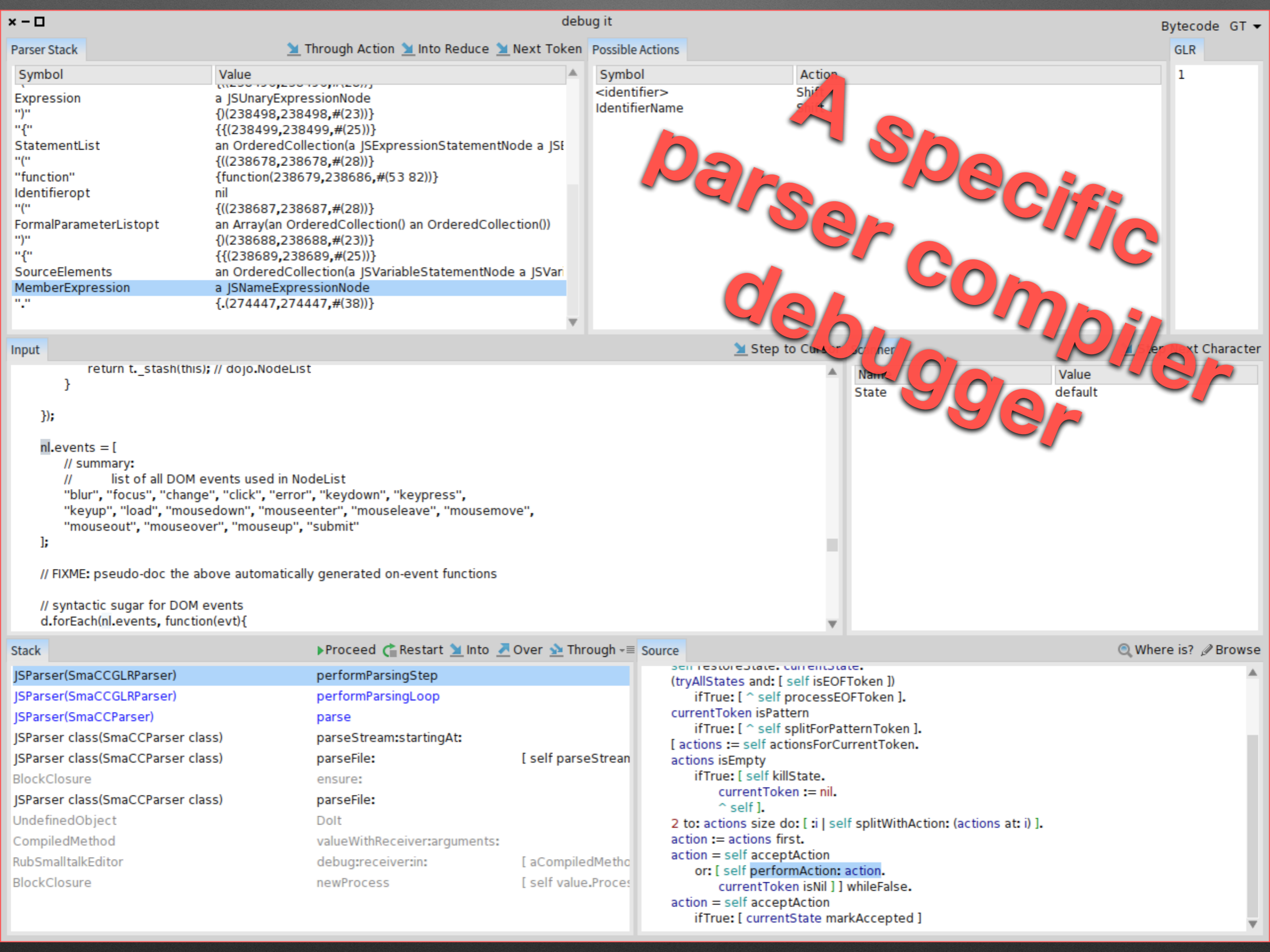
Where is? Browse

```
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;



A specific  
parser compiler  
debugger

Symbol	Value
Expression	a JSUnaryExpressionNode
"{"	{(238498,238498,#(23))}
"{"	{{(238499,238499,#(25))}
StatementList	an OrderedCollection(a JSExpressionStatementNode a JS
"{"	{{(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 JSVari
MemberExpression	a JSNameExpressionNode
"."	.(274447,274447,#(38))

Symbol	Action
<identifier>	Shift
IdentifierName	Shift

```
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){
```

Name	Value
State	default

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

```
self restoreState: currentState.
(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 ]
```

Halt in OCDBox>>name:

Type	Target	Method
<input type="checkbox"/>	Breakpoint self	Reflecting
<input checked="" type="checkbox"/>	Breakpoint self	OCDBox>>initialize
<input checked="" type="checkbox"/>	Breakpoint self	OCDBox>>name:
<input checked="" type="checkbox"/>	Breakpoint self	OCDBox>>name:
<input checked="" type="checkbox"/>	Halt OCDBox	OCDBox>>name:
<input type="checkbox"/>	Breakpoint OCDBox	OCDBox>>name:
<input type="checkbox"/>	Breakpoint self	OCDBox>>removeElement:
<input type="checkbox"/>	Breakpoint self	OrderedCollection>>remove
<input type="checkbox"/>	Halt StHaltCacheTest	StHaltCacheTest>>testInitial
<input checked="" type="checkbox"/>	Halt StHaltCacheTest	StHaltCacheTest>>testInitial

```

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

**Specific view**

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

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

Type	Target	Method
<input checked="" type="checkbox"/>	Halt OCDBox	OCDBox>>name:

```

1 "an OCDBox"
2 self
  
```

Bytecode Breakpoints Sindarin

```

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

Variable	Value
stackTop	an OCDBox
0 [anObject]	'i'
rcvr: 0 [elements]	an OrderedCollection [0 items]
rcvr: 1 [name]	"

**object centric +  
adv scripting (AST + call stack)**

Variable	Value
[arg] anObject	'i'

Variable	Value
self	an OCDBox

**A little moment of  
grace...**

# Requirements

**I want my breakpoint to only stop**

**when called from THAT test called**

**testMe!**

**Basically a control flow breakpoint**

**E.g.**

**mycode**

**self haltlf: #testMe**

...



# Implementation

Use stack reification

Walk it

Halt if needed

(in 5 lines)

```
haltIf: aSelector  
| cntxt |  
cntxt := thisContext.  
[ cntxt isNil ] whileFalse: [  
    cntxt selector = aSelector  
    ifTrue: [ self halt ].  
    cntxt := cntxt sender ]
```

# Pharo

**Simple and powerful**

**Productive**

**Adaptable**