

Reproducible moldable interactions

Master Thesis

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Motivation

DEMO

Motivation

Sessions are lost on closing

Sessions cannot be replayed

Code has to be manually
extracted from a session

Sharing a session requires
external tool support

Motivation

Persist inspection sessions

Replay sessions

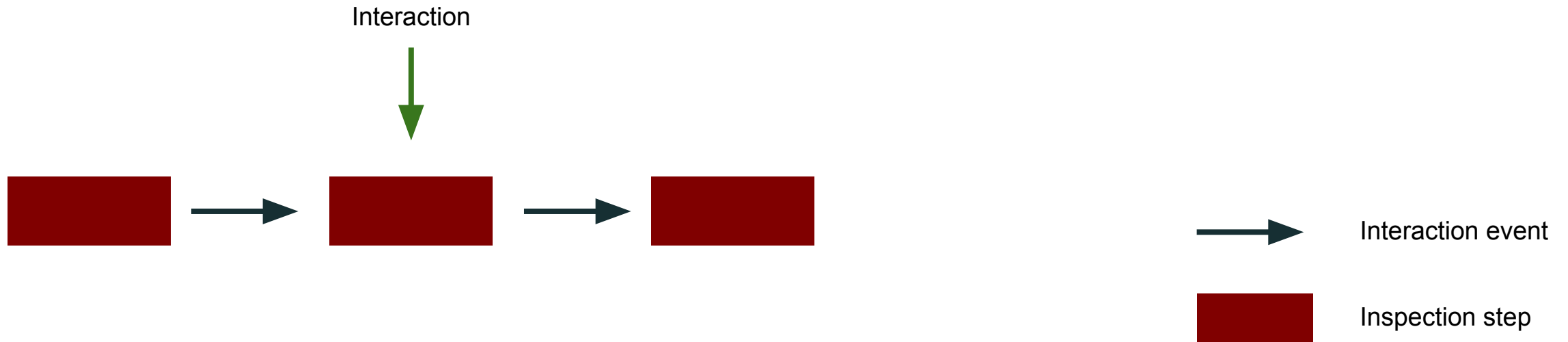
Generate code from a session

Share a session with
someone else

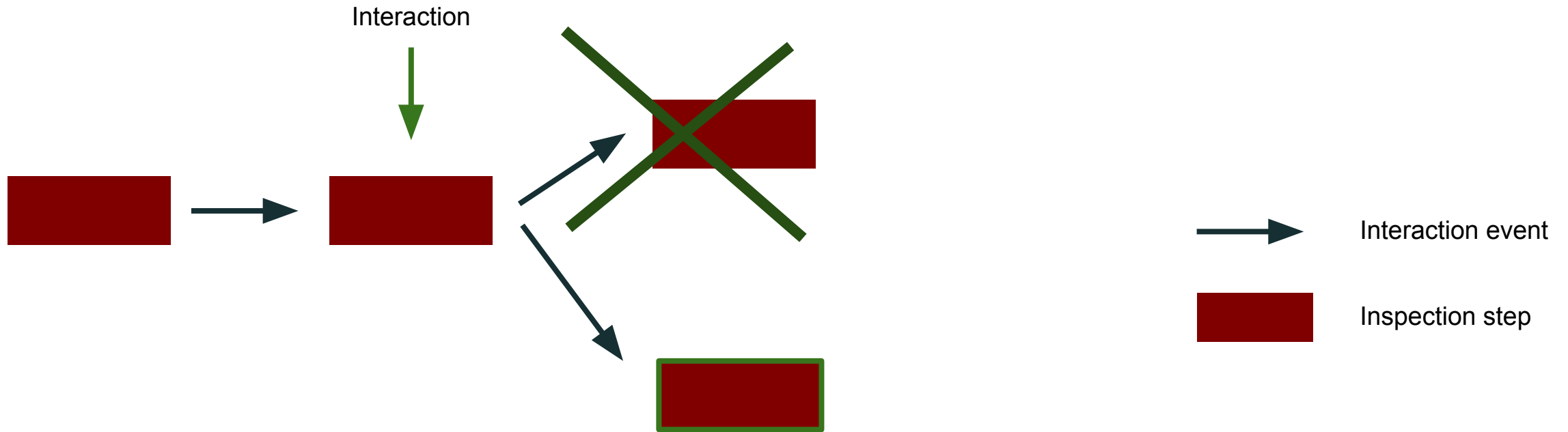
Challenge

Uniform inspector model

Now: linear inspection session



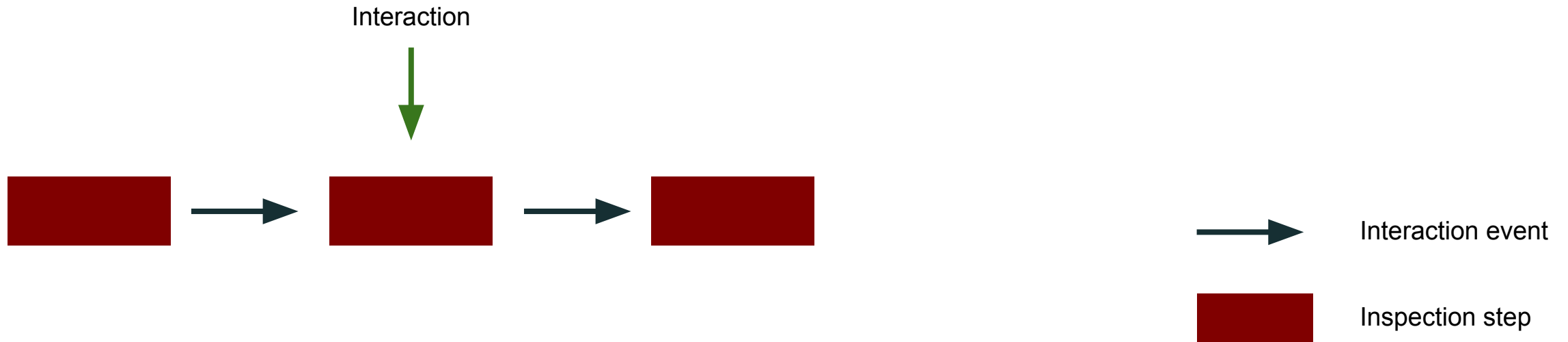
Now: linear inspection session



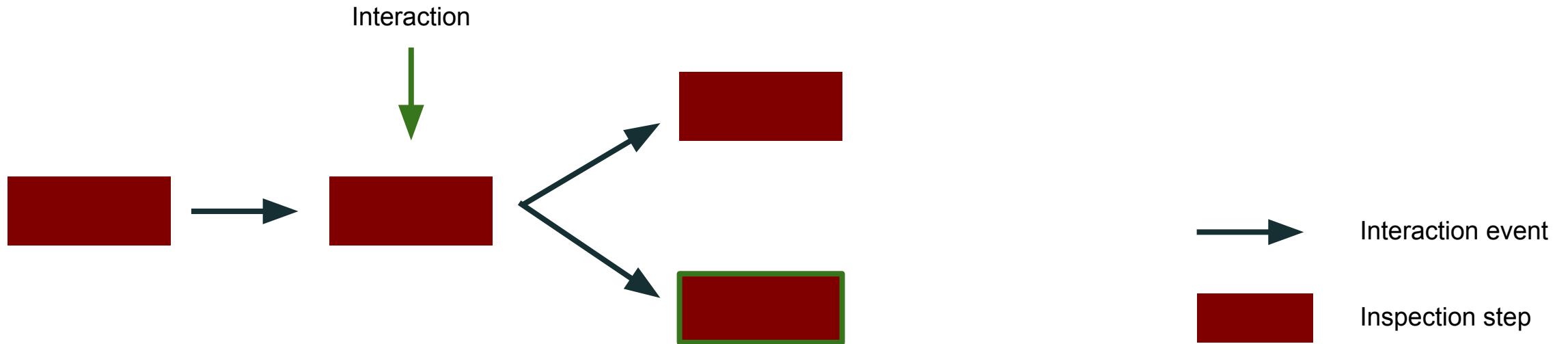
Now: linear inspection session



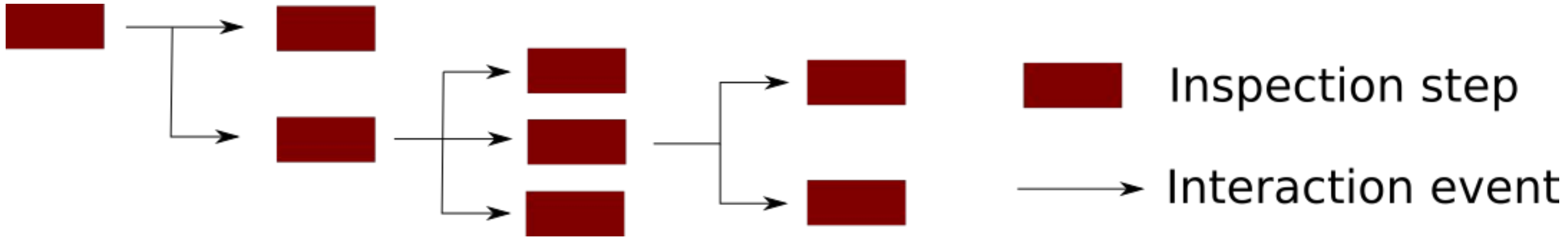
New: tree inspection session



New: tree inspection session



New: tree inspection session

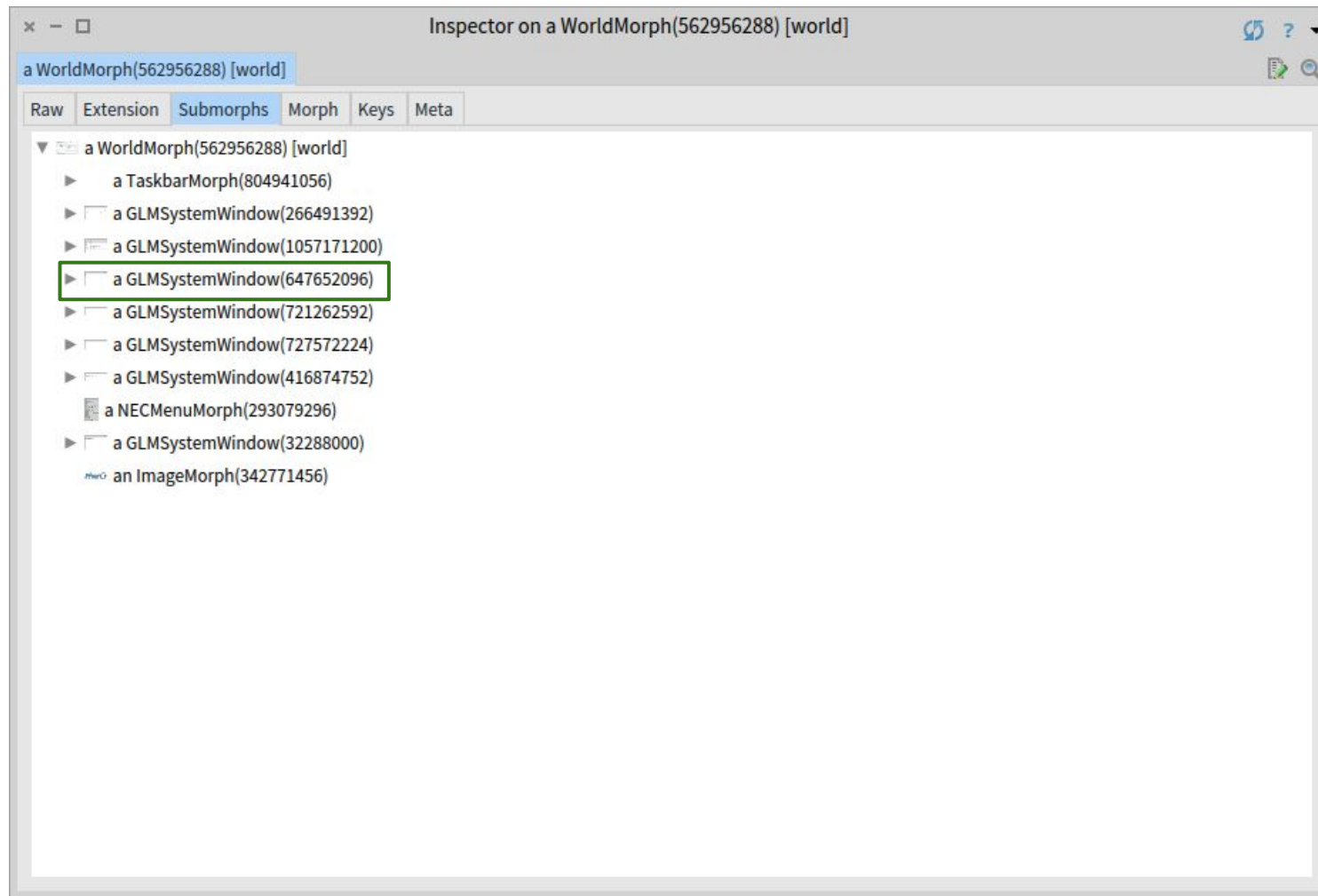


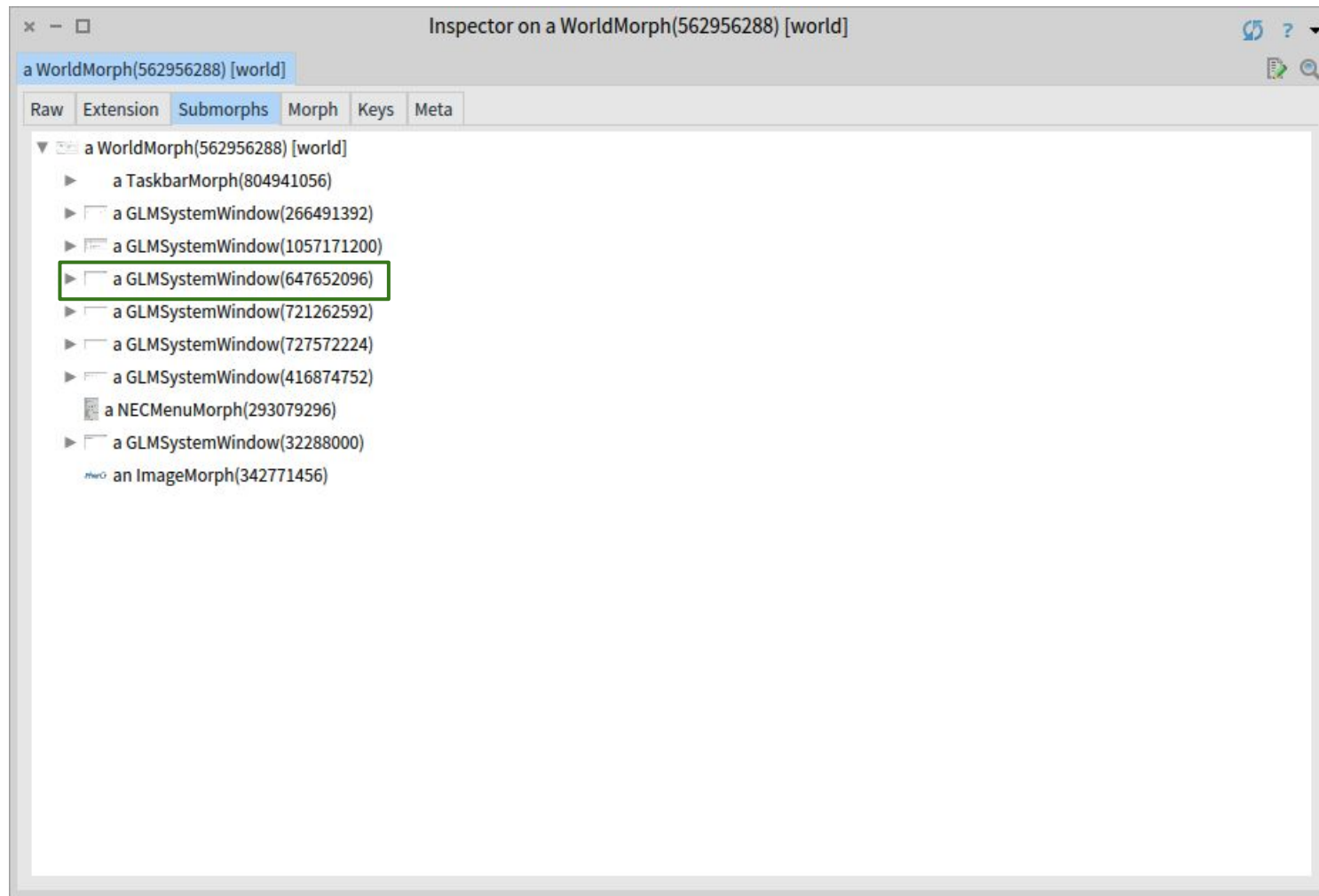
Recording interaction - a moldable approach

Recording interaction - a moldable approach

**Let the widget decide how
it wants to be recorded**

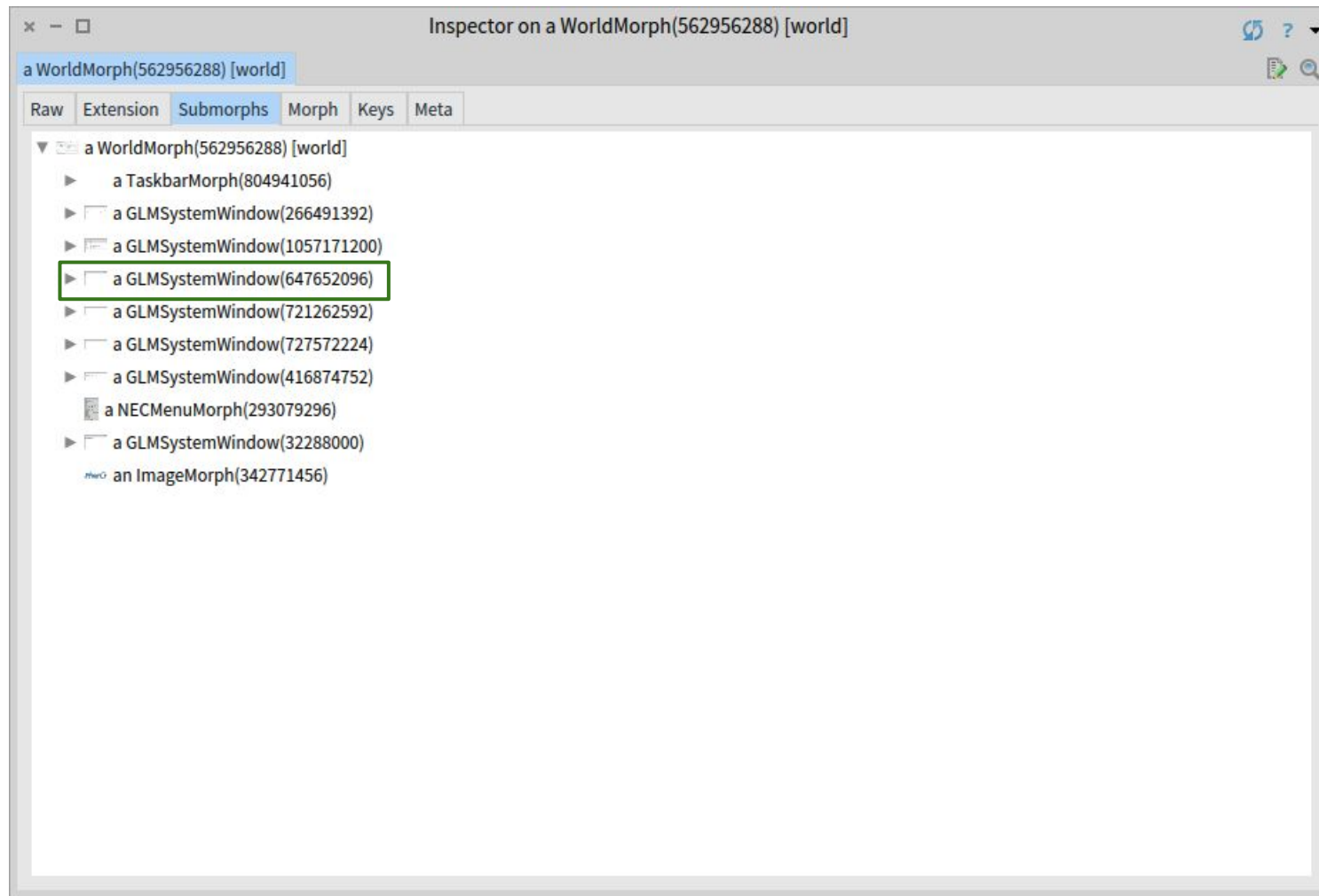
Record click on graphical
element





Record click on graphical element

How to identify the graphical element?

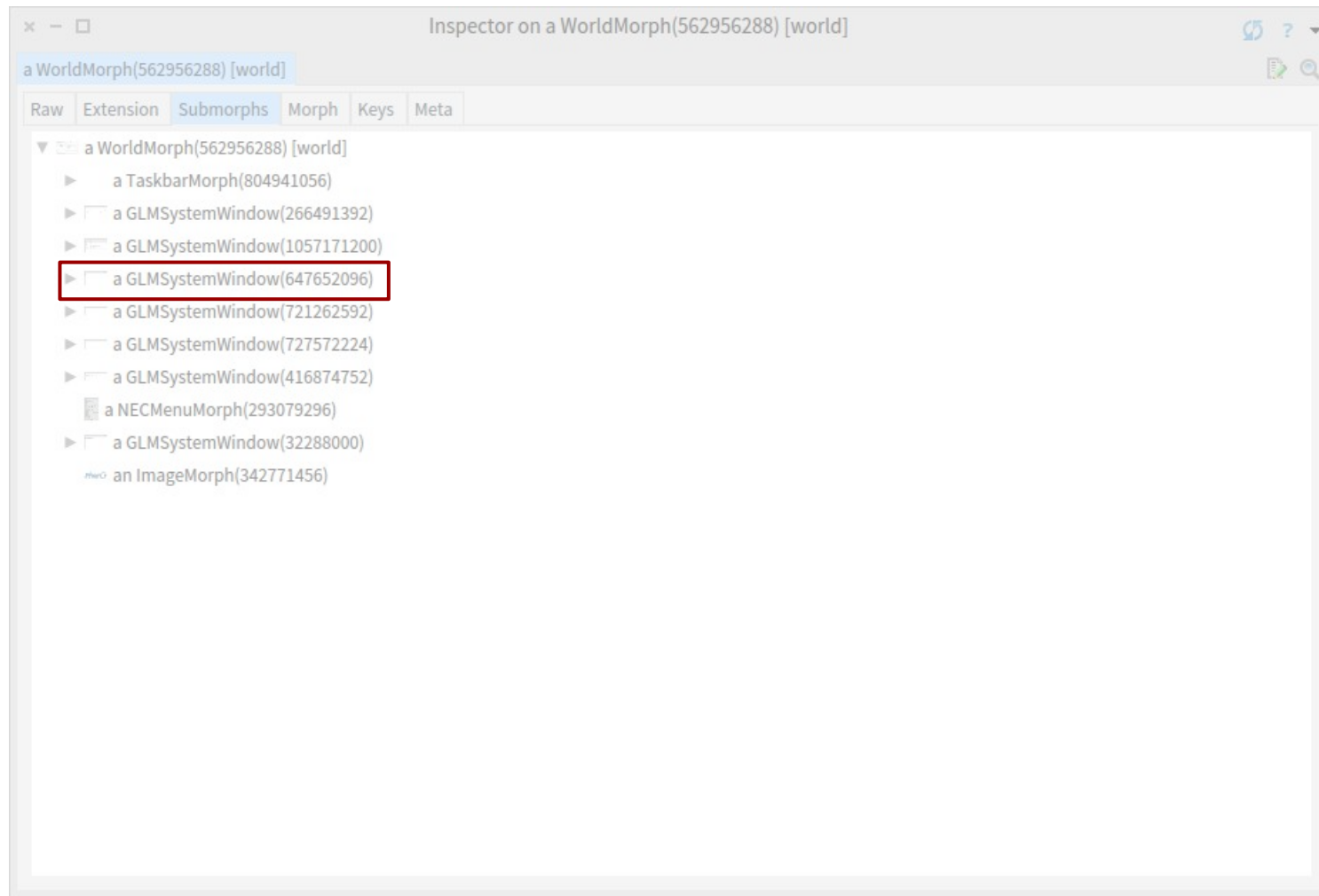


Record click on graphical
element

How to identify the
graphical element?

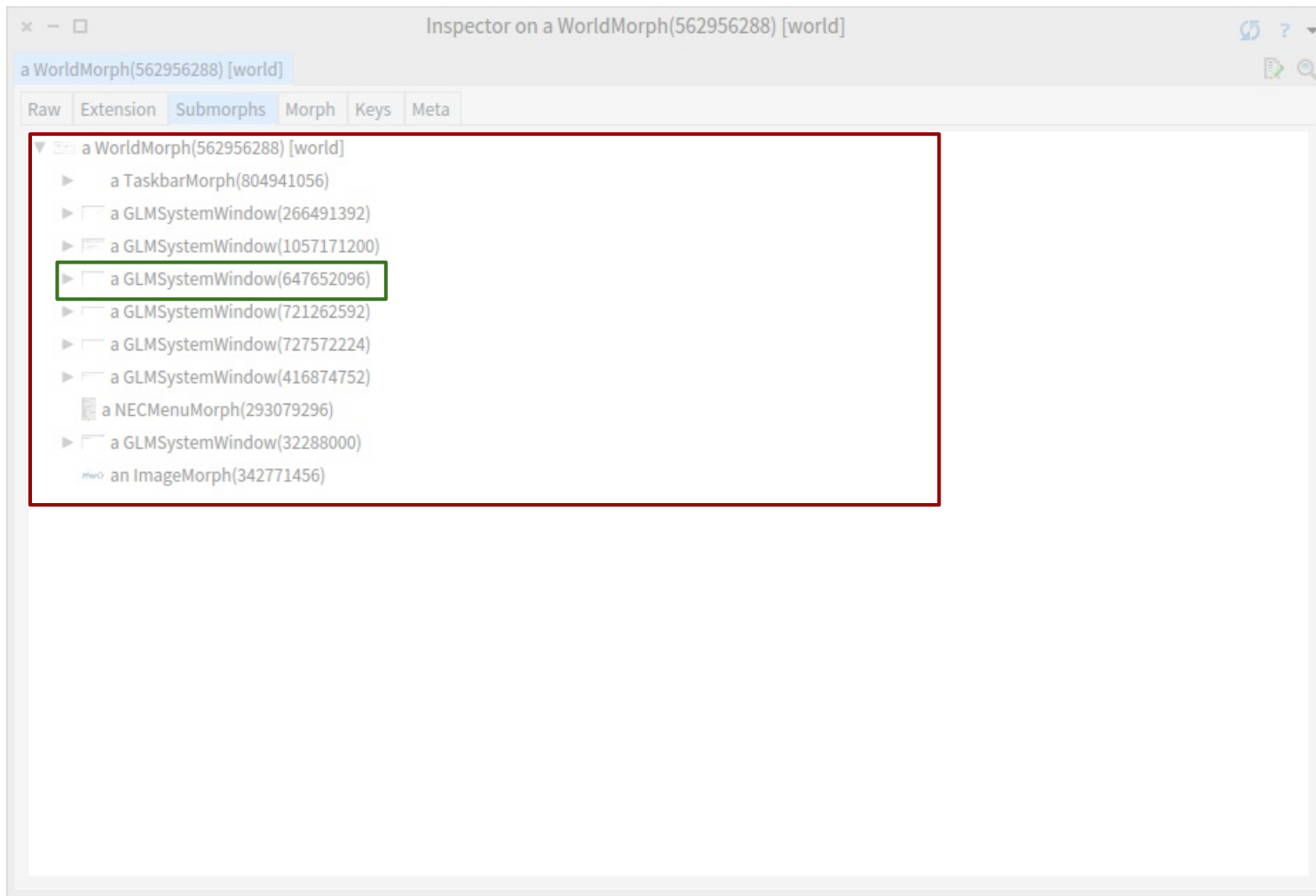
by position?

Record click: 150@300



Click events

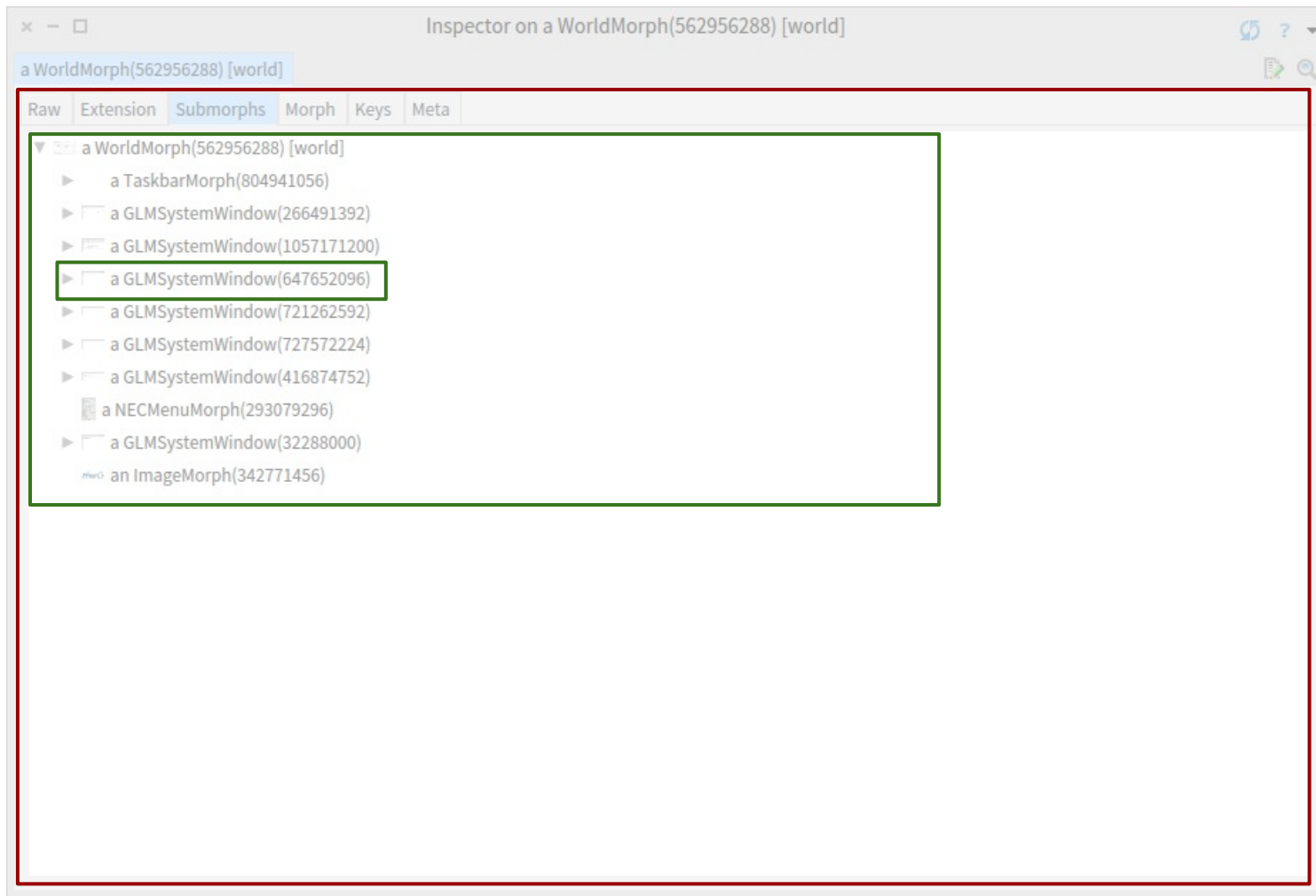
childAt: 4



Click events

childAt: 4

childAt: 1

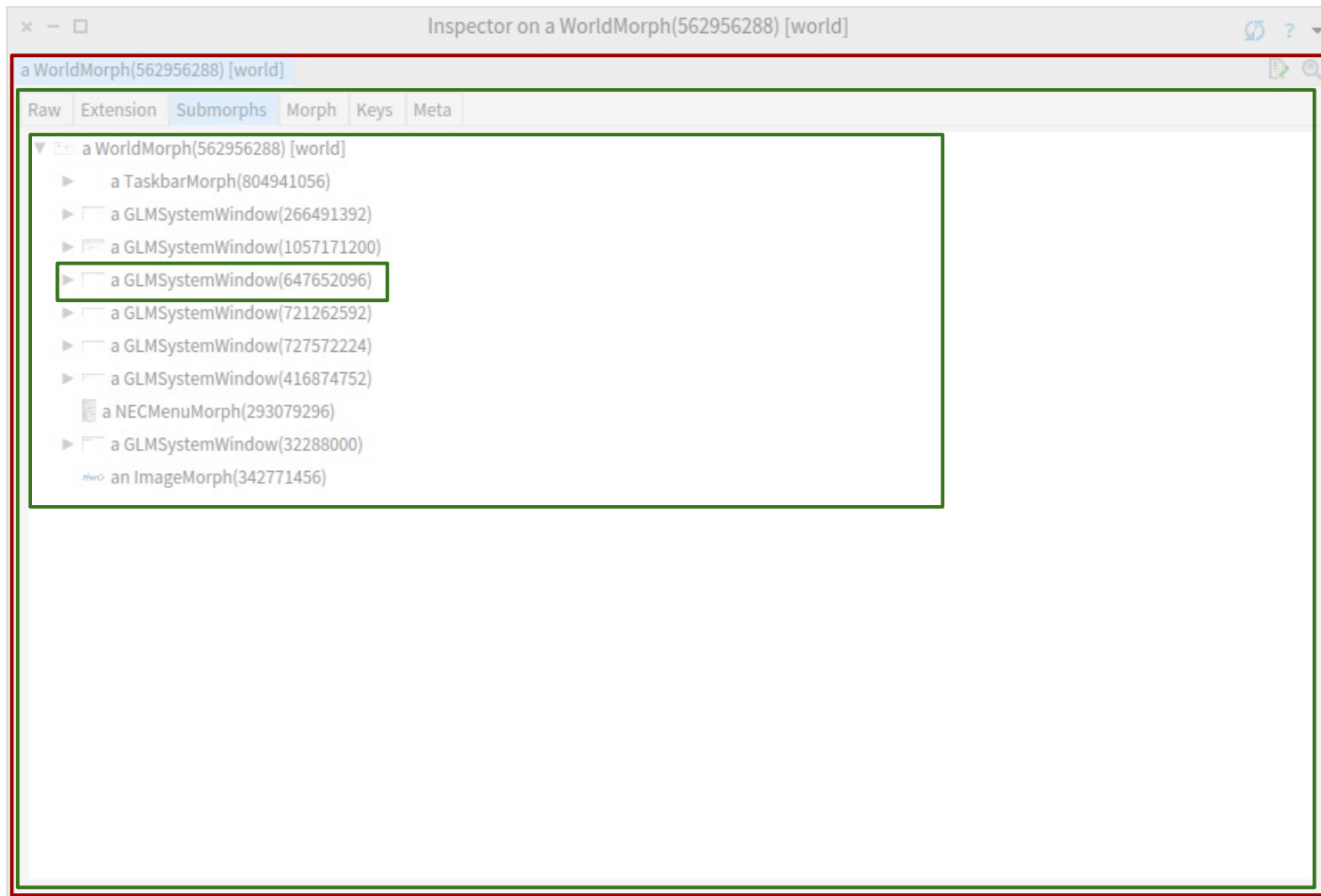


Click events

childAt: 4

childAt: 1

childAt: 3



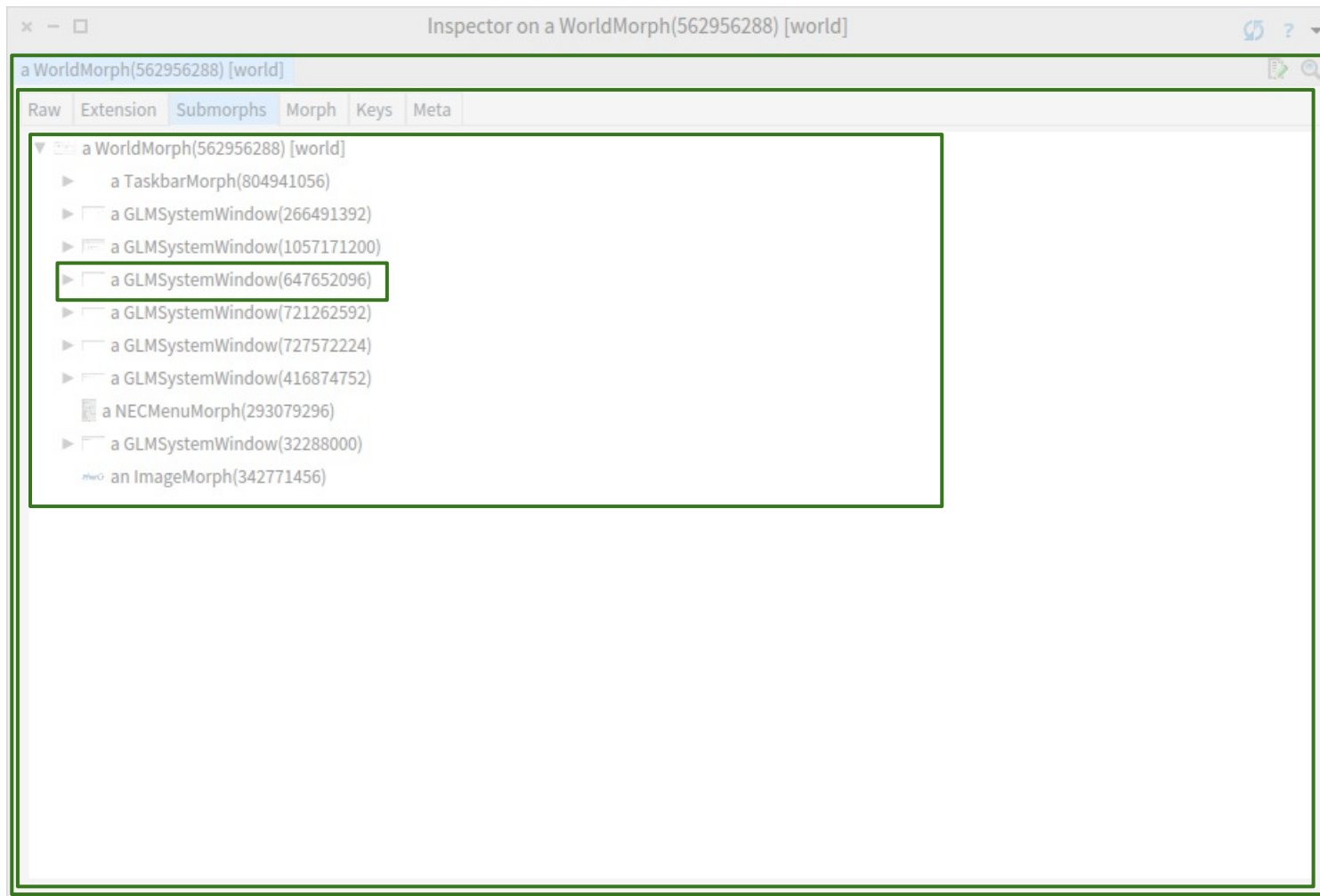
Click events

childAt: 4

childAt: 1

childAt: 3

childAt: 1



Click events

childAt: 4

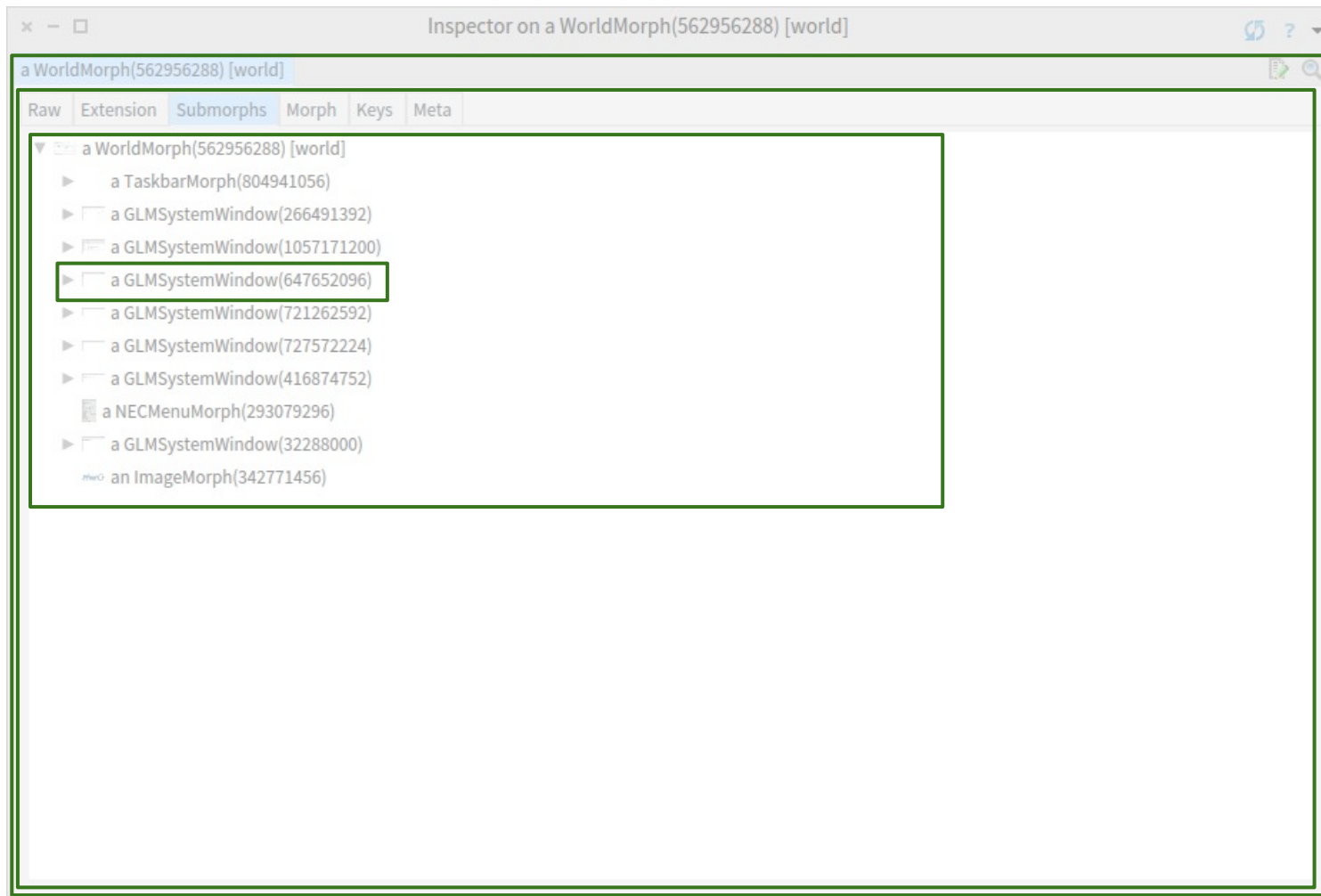
childAt: 1

childAt: 3

childAt: 1



UI
element path



Click events

childAt: 4

childAt: 1

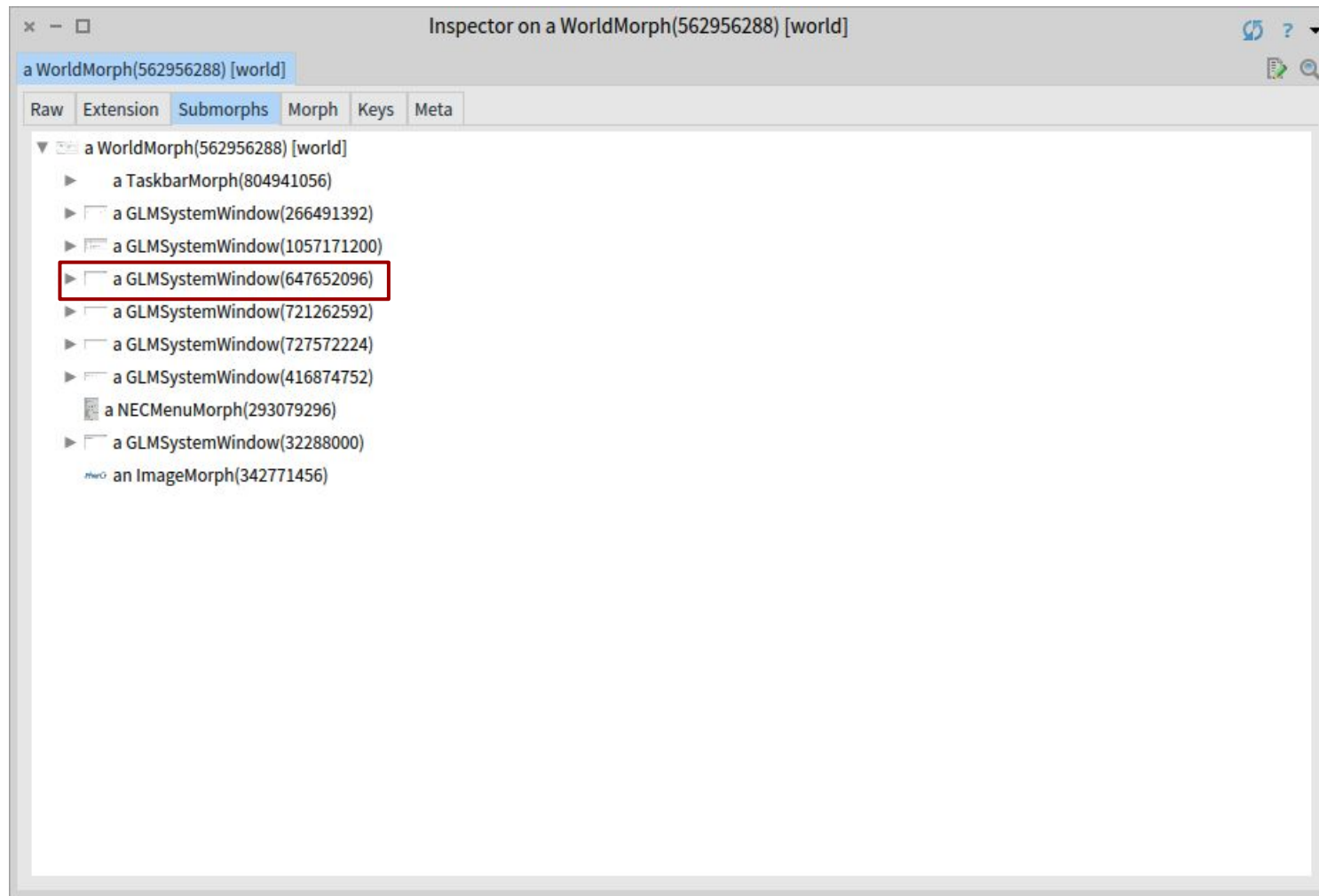
childAt: 3

childAt: 1

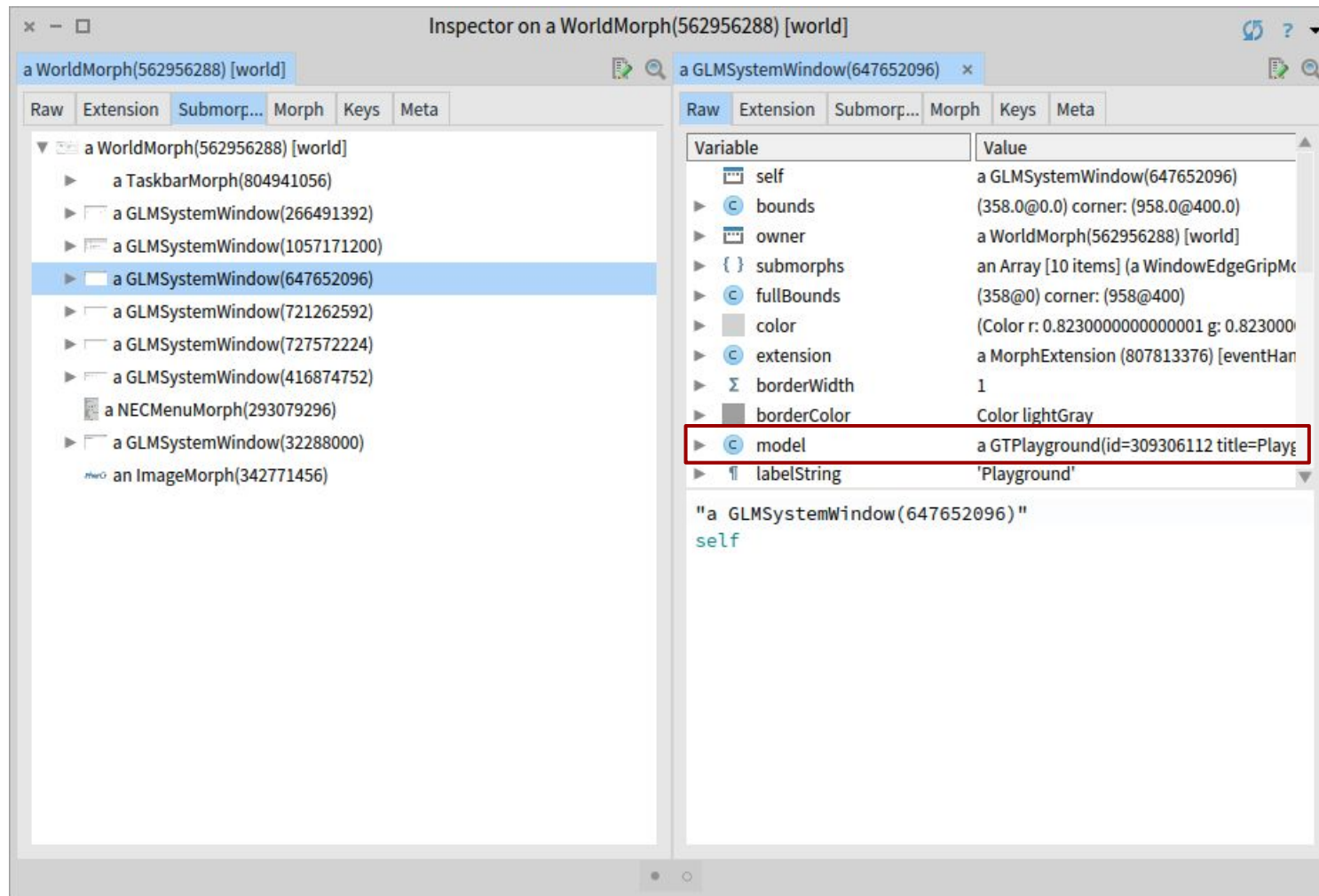


**Persist UI
element path**

.....> *CSS: n-th child*

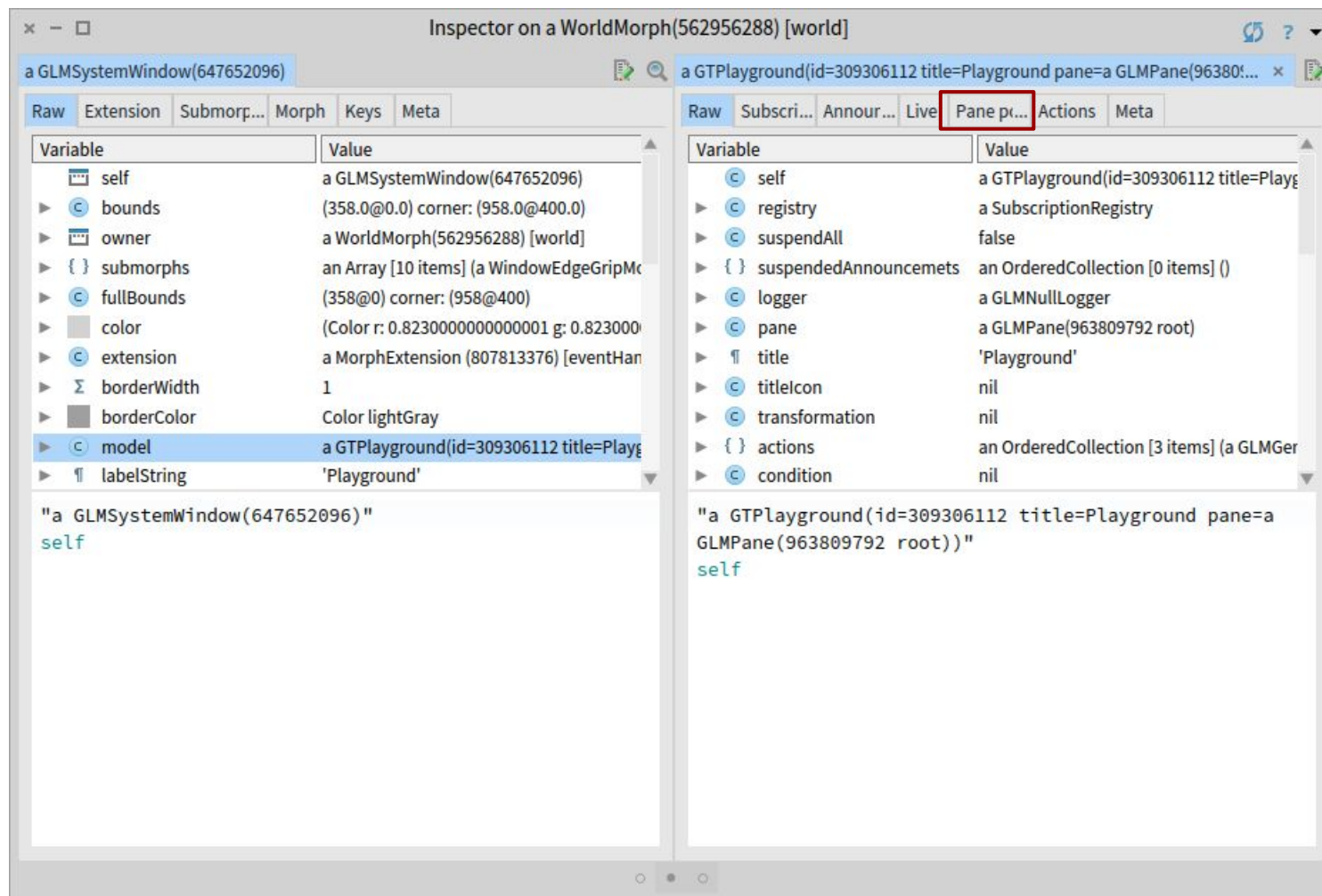


SubmorphSelection: 4



SubmorphSelection: 4

AttributeSelection: #model



SubmorphSelection: 4

AttributeSelection: #model

PresentationSelection: 'Ports'

Inspector on a WorldMorph(562956288) [world]

a GLMSystemWindow(647652096)

Raw Extension Submorph... Morph Keys Meta

Variable	Value
self	a GLMSystemWindow(647652096)
bounds	(358.0@0.0) corner: (958.0@400.0)
owner	a WorldMorph(562956288) [world]
submorphs	an Array [10 items] (a WindowEdgeGripM...
fullBounds	(358@0) corner: (958@400)
color	(Color r: 0.8230000000000001 g: 0.8230000...
extension	a MorphExtension (807813376) [eventHan
borderWidth	1
borderColor	Color lightGray
model	a GTPlayground(id=309306112 title=Playg
labelString	'Playground'

"a GLMSystemWindow(647652096)"

self

a GTPlayground(id=309306112 title=Playground pane=a GLMPane(963801... x

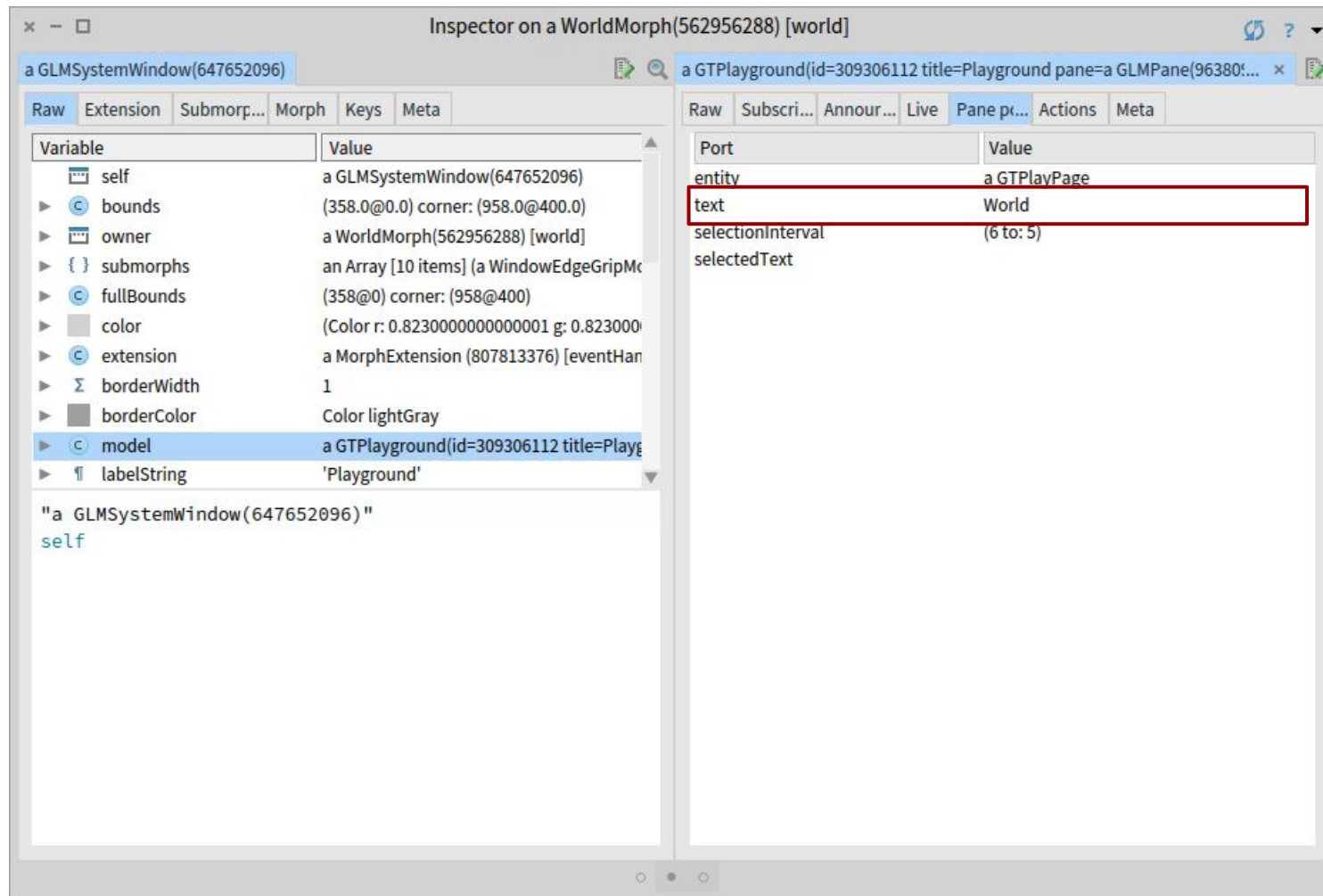
Raw Subscri... Annour... Live Pane p... Actions Meta

Port	Value
entity	a GTPlayPage
text	World
selectionInterval	(6 to: 5)
selectedText	

SubmorphSelection: 4

AttributeSelection: #model

PresentationSelection: 'Ports'

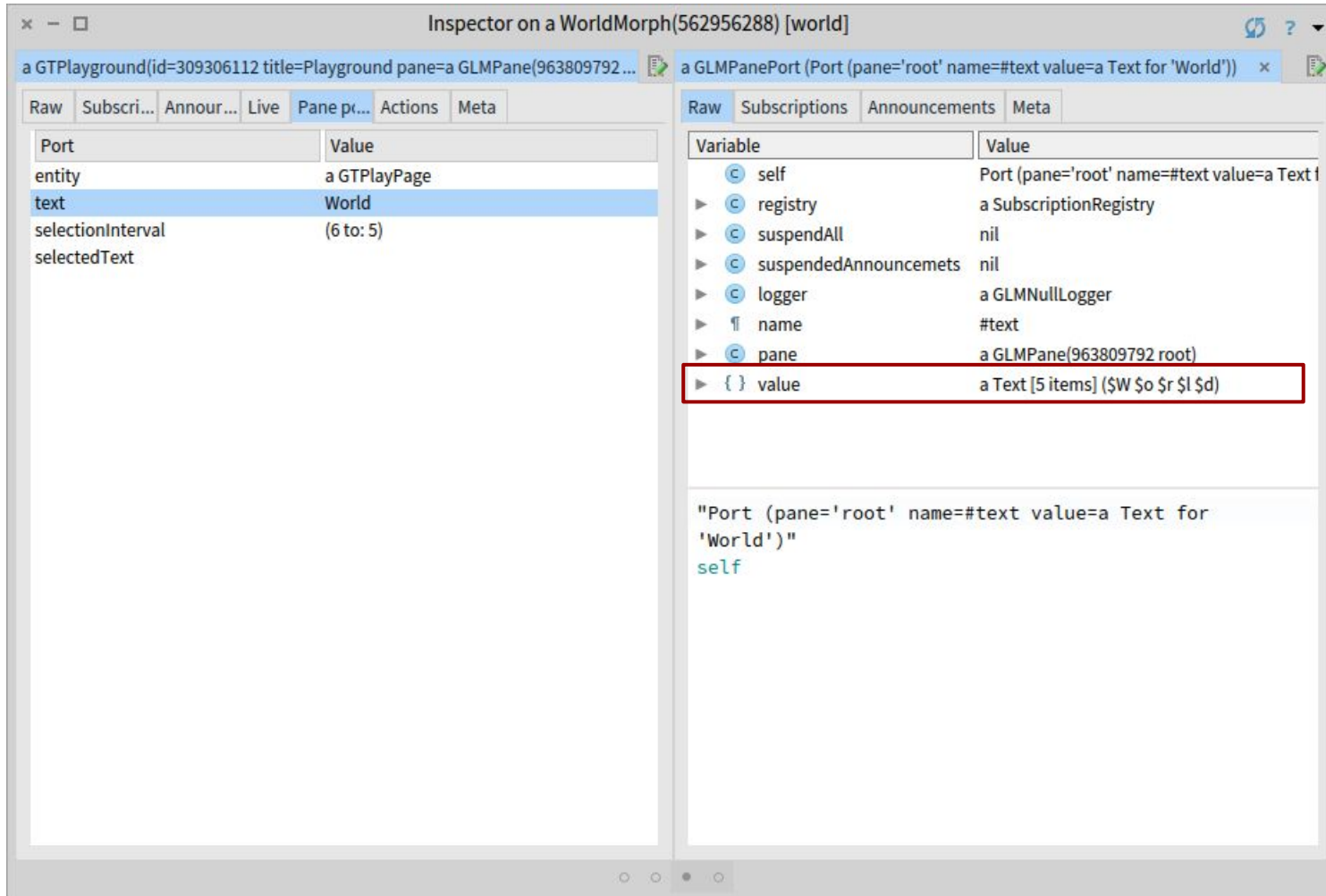


SubmorphSelection: 4

AttributeSelection: #model

PresentationSelection: 'Ports'

PortSelection: #text



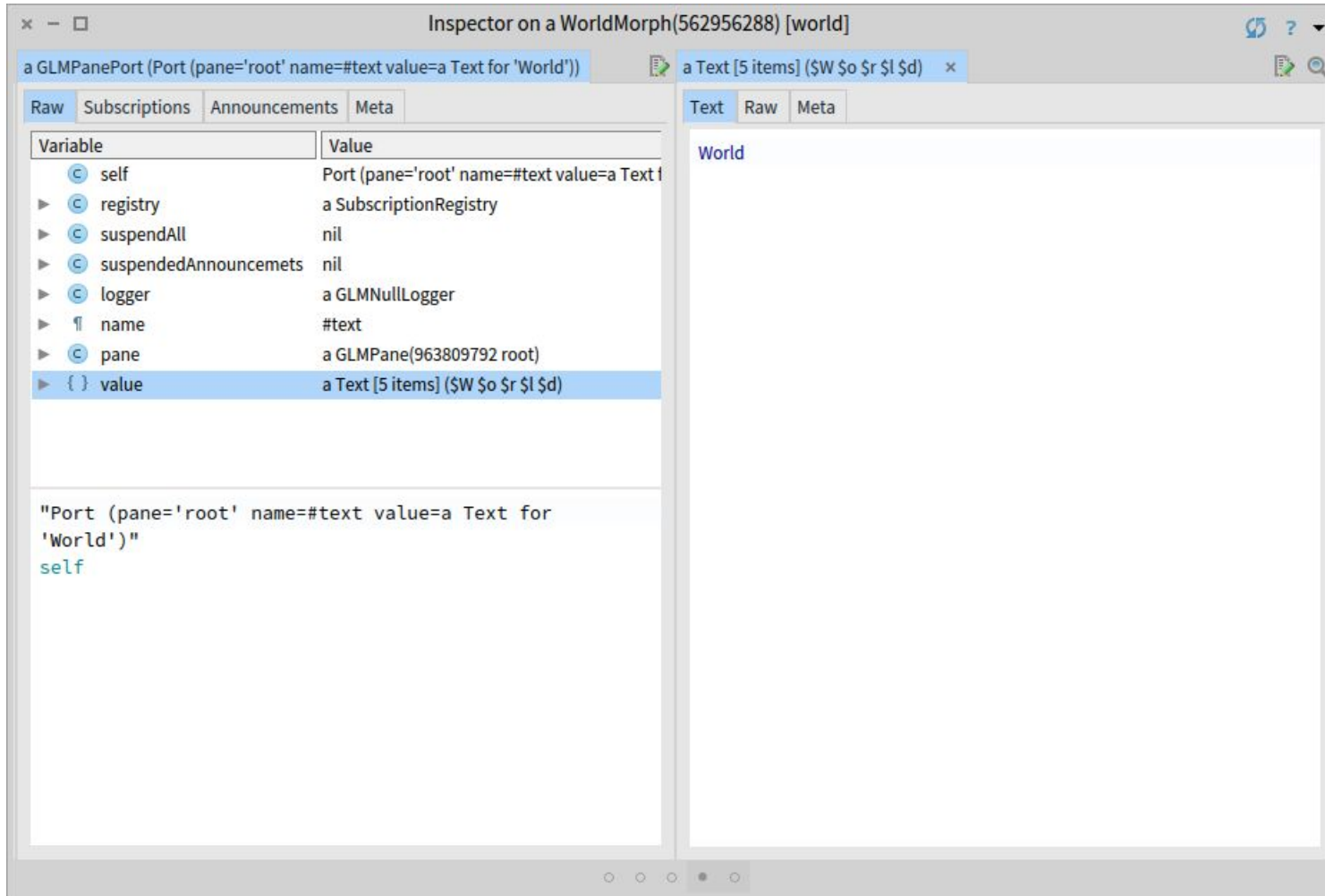
SubmorphSelection: 4

AttributeSelection: #model

PresentationSelection: 'Ports'

PortSelection: #text

AttributeSelection: #value



SubmorphSelection: 4

AttributeSelection: #model

PresentationSelection: 'Ports'

PortSelection: #text

AttributeSelection: #value

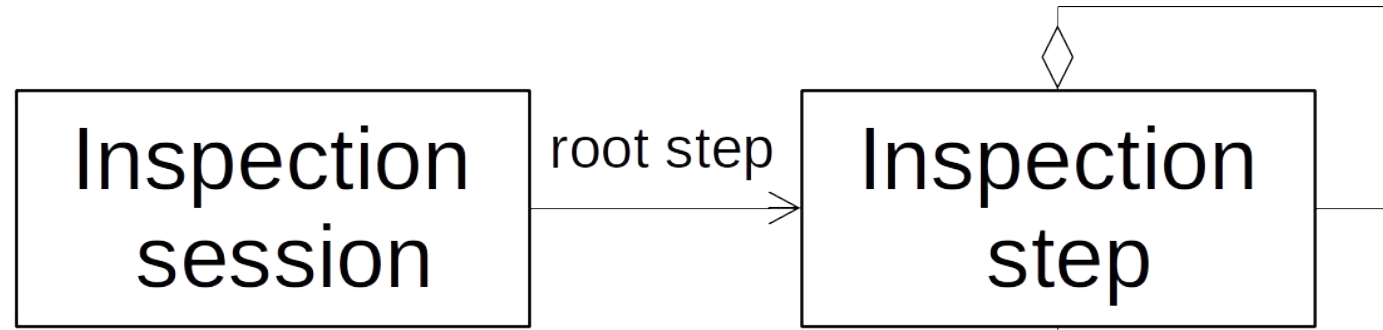


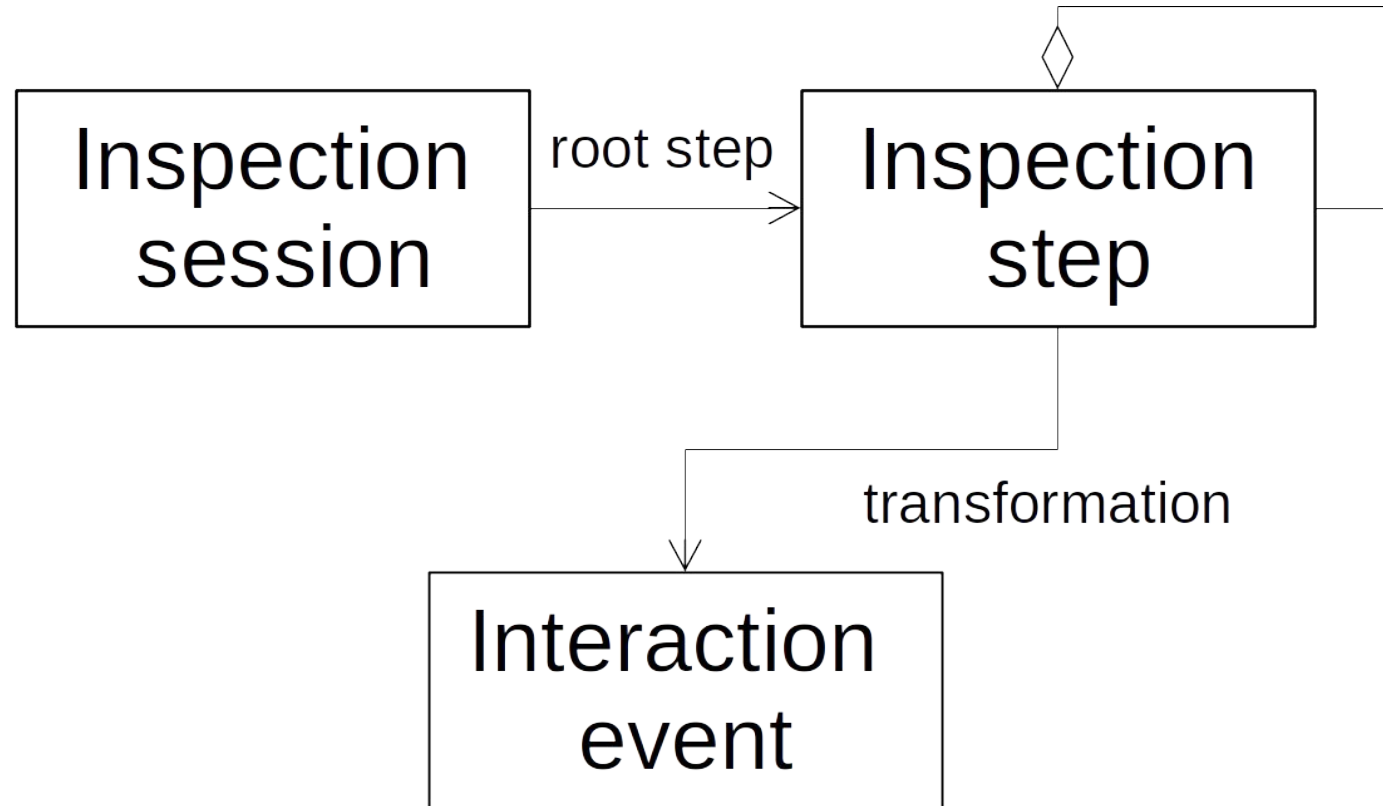
**Customized UI
element path**

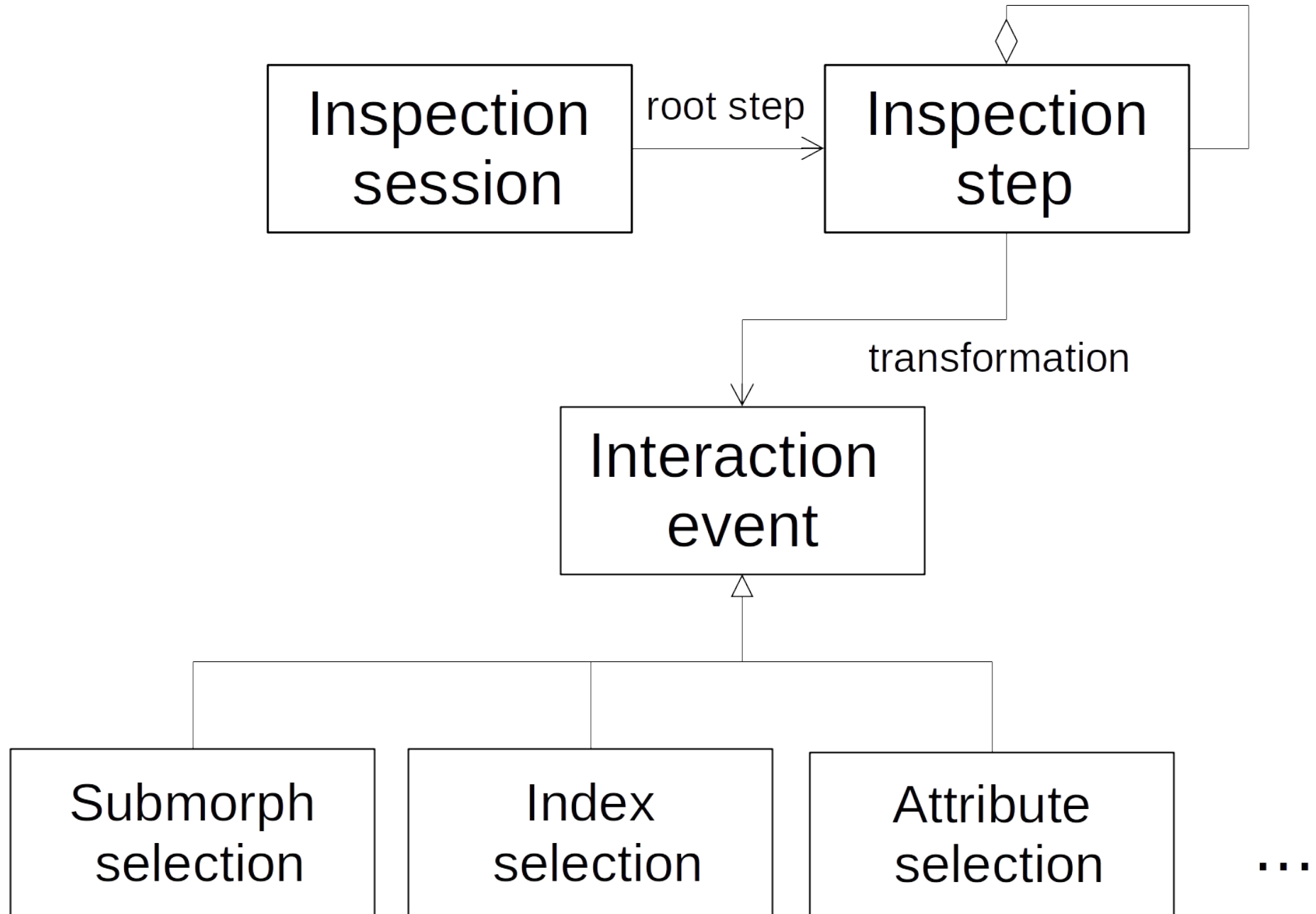


*fallback to child selection if no
customization available*

Inspection
session







SubmorphSelection: 4

AttributeSelection: #model

The screenshot shows the Inspector on a WorldMorph(562956288) [world]. The left panel shows a tree view of the WorldMorph's submorphs, with a GLMSystemWindow(647652096) selected. The middle panel shows the GLMSystemWindow's attributes, with the 'model' attribute selected. The right panel shows the GTPlayground's attributes, with the 'text' attribute selected.

Variable	Value
self	a GLMSystemWindow(647652096)
bounds	(358.0@0.0) corner: (958.0@400)
owner	a WorldMorph(562956288) [world]
submorphs	an Array [10 items] (a WindowMorph, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow, a GLMSystemWindow)
fullBounds	(358@0) corner: (958@400)
color	(Color r: 0.8230000000000000)
extension	a MorphExtension (80781337)
borderWidth	1
borderColor	Color lightGray
model	a GTPlayground(id=309306112 title=Playground pane=a GLMPan...)
labelString	'Playground'

Port	Value
entity	a GTPlayPage
text	World
selectionInterval	(6 to: 5)
selectedText	

PresentationSelectionAction
CollapseAction

HideAction

PresentationSelectionAction

gtInspectorItemsIn: composite

<gtInspectorPresentationOrder: 0>

^ composite table

title: 'Items';

column: 'Index' evaluated: [:value :index | index asString];

column: 'Item' evaluated: [:value | value printString];

rowSelectAction: [:value :index | (IndexSelectionAction withIndex: index)].

DEMO

Inspector model



UI recording

Tool model



UI recording

Future work

More custom recording steps

Add features to new inspector

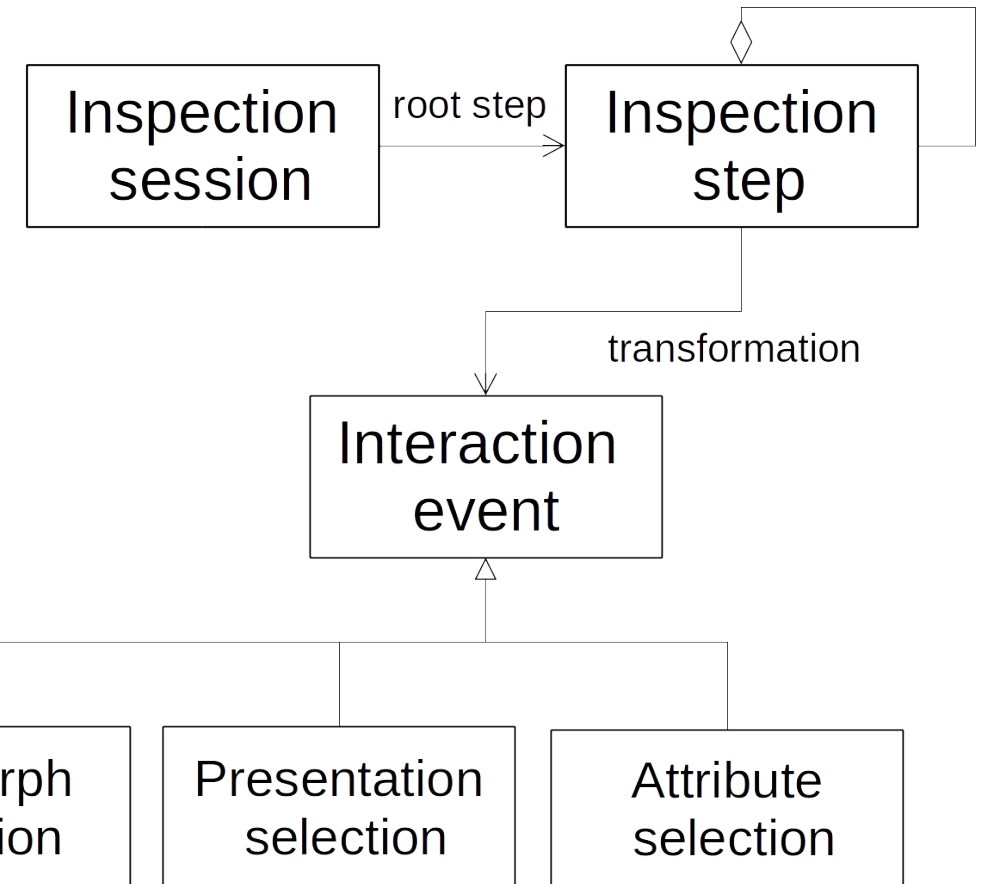
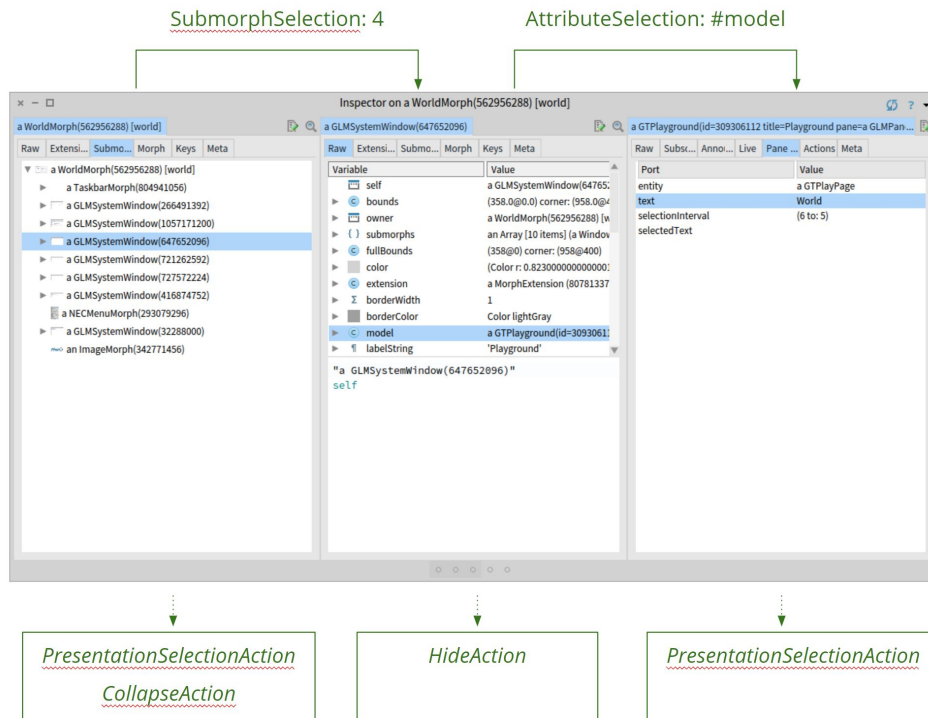
More custom presentations

Improve code generation

Summary

Manually redoing inspection sessions makes developers waste time during development

Allow graphical objects to decide how interactions will be recorded (fall back to #childAt:)



FolderSelection: main

ArchiveSelection: archive.zip

FileInArchiveSelection:
pharo-city.png

Inspector on a FileReference (/data)

a FileReference (/data)

Name	Size
archive	224 B
web	64 B
image	160 B
current	288 B
stash	64 B
scripts	128 B
main	288 B
images.zip	577 B
pharo-ui	371 B
photos.zip	157.78 kB
.DS_Store	12.29 kB
web.zip	569 B
script.st	56 B
pharo-city.png	136.55 kB
Workspace.st	73 B
pharo	382 B
graph.png	18.62 kB
files.st	358 B
vizualization.png	5.88 kB
img2.png	8.62 kB
Debug.log	1.41 MB
flower.png	11.09 kB

a FileReference (/data/main)

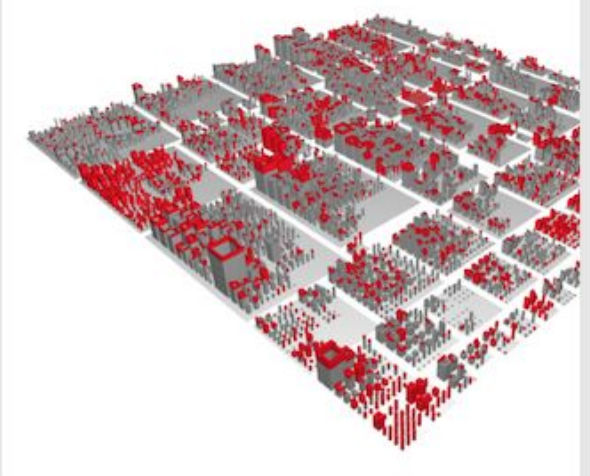
Name	Size
..	992 B
cache	64 B
current	288 B
.DS_Store	6.15 kB
files.st	358 B
Debug.log	1.41 MB
cache.zip	577 B
archive.zip	160.44 kB

a FileReference (/data/main/archive.zip)

Name	Size
..	288 B
__MACOSX	0 B
README.txt	0 B
flower.png	0 B
pharo-city.png	0 B
pharo-graph.png	0 B
sample-xml.xml	0 B

a FileReference (/pharo-city.png)

Picture Contents Raw Meta



ModelSelection:
Glamour

Query::
#allClasses

ClassSelection:
GLMAAction

CodeQuery

Moose Panel

Models

GlamourModel

GlamourModel (MooseModel)

All model classes (473) (FAMIXClassGroup)

Smalltalk::GLMAAction (FAMIXClass)

an OrderedCollection [24 items] (GLMAAction>>ci...

All attributes - All famixattributes (2038)

All classes - All famixclasses (851)

All comments - All famixcomments (1413)

All global variables - All famixglobalvariable

All implicit variables - All famiximplicitvarial

All inheritances - All famixinheritances (850)

All invocations - All famixinvocations (33840)

All local variables - All famixlocalvariables (:

All methods - All famixmethods (5333)

All model classes - All model classes (473)

All model methods - Group (5249)

All model namespaces - Smalltalk

All model packages - All model packages (2)

All model types - All model types (488)

All namespaces - All famixnamespaces (2)

All packages - All famixpackages (109)

All parameters - All famixparameters (3066)

All references - All famixreferences (2972)

Smalltalk::AthensBalloonGradientPaint

Smalltalk::AthensBalloonImagePaint

Smalltalk::AthensBalloonLinearGradient

Smalltalk::AthensBalloonPaint

Smalltalk::AthensBalloonPath

Smalltalk::AthensBalloonRadialGradient

Smalltalk::AthensBalloonSolidColorPaint

Smalltalk::AthensBalloonStrokePaint

Smalltalk::AthensBalloonSurface

Smalltalk::FT2GlyphRenderer

Smalltalk::GLMAbstractWizardStep

Smalltalk::GLMAccordionArrangement

Smalltalk::GLMAccumulator

Smalltalk::GLMAccumulatorMorphicTest

Smalltalk::GLMAccumulatorTest

Smalltalk::GLMAAction

Smalltalk::GLMAActionAnnouncement

Smalltalk::GLMAActionBrickDarkThemer

Smalltalk::GLMAActionBrickPopupThemer

Smalltalk::GLMAActionBrickThemer

Smalltalk::GLMAActionButtonBrick

Smalltalk::GLMAActionListPresentation

```
self methods select: [ :m |  
  m outgoingInvocations size > 0 ]
```

Smalltalk::GLMAAction.condition()

Smalltalk::GLMAAction.installKeyCombinatic

Smalltalk::GLMAAction.separatorBefore()

Smalltalk::GLMAAction.hasTitle()

Smalltalk::GLMAAction.shortcutAsString()

Smalltalk::GLMAAction.gtDisplayOn:(Object)

Smalltalk::GLMAAction.separatorAfter()

Smalltalk::GLMAAction.hasShortcut()

Smalltalk::GLMAAction.shortcut()

Smalltalk::GLMAAction.shortcut:(Object)

Smalltalk::GLMAAction.iconName:(Object)

Smalltalk::GLMAAction.isMenu()

Smalltalk::GLMAAction.isCategorized()

Smalltalk::GLMAAction.actOn:(Object)

Smalltalk::GLMAction.isAvailableOn:(Object)

Smalltalk::GLMAAction.withSeparatorBefore

Smalltalk::GLMAAction.enabledCondition()

Smalltalk::GLMAAction.isEnabledOn:(Object)

A selection boolean statement using 'each' to ref

CategorySelection:
Mondrian

ExampleSelection:
InnerAndPopup

MethodSelection:
RTArc>>#initialize

Roassal examples browser

Dynamic stack grapher
Experimental
Explora
Geographical maps
Gradient and multi colored lines
Grapher - Bar charts
Grapher - Decoration
Grapher - Overall
Grapher - Scatterplots
Interaction
Kiviat (Radar)
Layout
Legend
Line decoration
Map location
Mondrian
Name cloud
OpenStreetMap Integration
Pie chart
Plain Roassal
SVG
Selection Elements
Sparkline
Spectrograph

a RTMondrianExample

Examples Raw Meta

a RTExampleSelection (RTMondrianExamp...

Canvas Playground Raw

a CompiledMethod (RTArc>>#initialize)

Raw Byte... Source Ir AST Head... Meta

```
initialize
  super initialize.
  self alphaAngle: 0.
  self betaAngle: 35.
  self innerRadius: 30.
  self externalRadius: 50.
```

Models

GlamourModel

GlamourModel (MooseModel)

All model classes (473) (FAMIXClassGroup)

Smalltalk::GLMAAction (FAMIXClass)

an OrderedCollection [24 items] (GLMAAction>>ci...)

```

glamourModel := MooseModel root allModels detect: [ :each |
    each name = 'GlamourModel' ].
actionClass := glamourModel allModelClasses detect: [ :each |
    each name = 'GLMAAction' ].
methods := actionClass methods select: [ :m |
    m outgoingInvocations size > 0 ]

```

All methods - All famixmethods (5333)

All model classes - All model classes (473)

All model methods - Group (5249)

All model namespaces - Smalltalk

All model packages - All model packages (2)

All model types - All model types (488)

All namespaces - All famixnamespaces (2)

All packages - All famixpackages (109)

All parameters - All famixparameters (3066)

All references - All famixreferences (2972)

Smalltalk::GLMAbstractWizardStep

Smalltalk::GLMAccordionArrangement

Smalltalk::GLMAccumulator

Smalltalk::GLMAccumulatorMorphicTest

Smalltalk::GLMAccumulatorTest

Smalltalk::GLMAAction

Smalltalk::GLMAActionAnnouncement

Smalltalk::GLMAActionBrickDarkThemer

Smalltalk::GLMAActionBrickPopupThemer

Smalltalk::GLMAActionBrickThemer

Smalltalk::GLMAActionButtonBrick

Smalltalk::GLMAActionListPresentation

LMAction.condition()

LMAction.installKeyCombinatic

LMAction.separatorBefore()

LMAction.hasTitle()

LMAction.shortcutAsString()

LMAction.gtDisplayOn:(Object)

LMAction.separatorAfter()

LMAction.hasShortcut()

LMAction.shortcut()

Smalltalk::GLMAAction.shortcut:(Object)

Smalltalk::GLMAAction.iconName:(Object)

Smalltalk::GLMAAction.isMenu()

Smalltalk::GLMAAction.isCategorized()

Smalltalk::GLMAAction.actOn:(Object)

Smalltalk::GLMAAction.isAvailableOn:(Object)

Smalltalk::GLMAAction.withSeparatorBefore

Smalltalk::GLMAAction.enabledCondition()

Smalltalk::GLMAAction.isEnabledOn:(Object)

A selection boolean statement using 'each' to ref