IFIP Working Group 2.16 on Language Design
February 27, 2012 (Imperial College, London, UK)

(Programming)

Design Research and Software Development

Design Thinking . Ideas . Prototypes

Hasso-Plattner-Institut Potsdam
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2012-02-27

(Programming)

Design Research and Software Development

Design Thinking . Research . Prototypes

HPI School of Design Thinking

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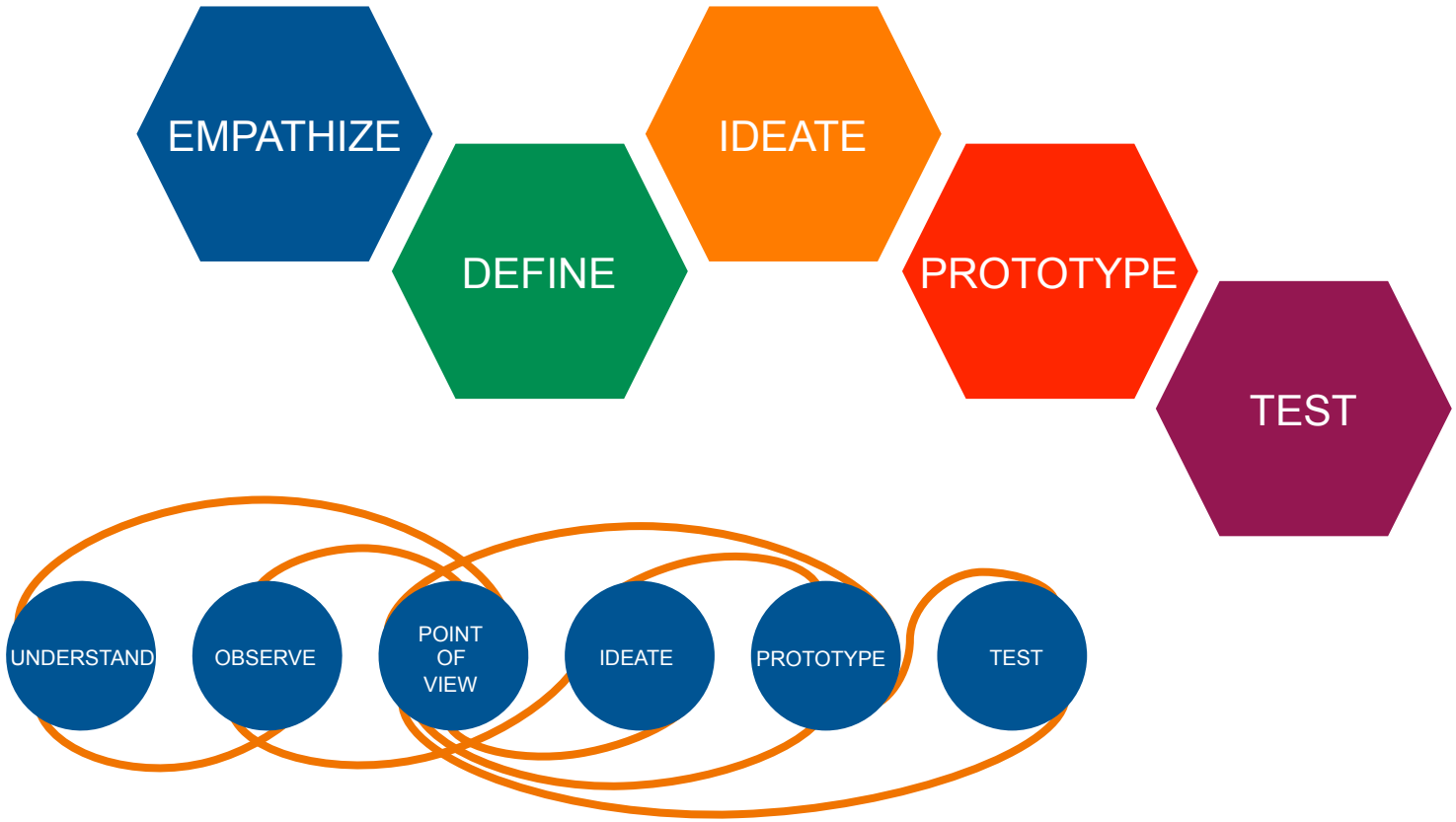
d.school

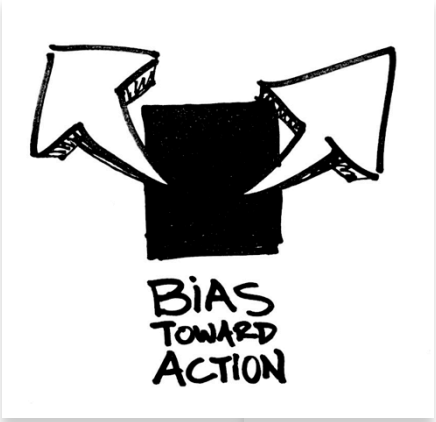
http://bettertastethansorry.com/2010/06/d-school-potsdam/

DT Process


EMPATHIZE
DEFINE
IDEATE
PROTOTYPE
TEST
UNDERSTAND
OBSERVE
POINT OF VIEW
IDEATE
PROTOTYPE
TEST

DT Mindsets

Corey Ford. An Introduction to Design Thinking. dschool 2009
https://dschool.stanford.edu/groups/k12/wiki/c739e/attachments/5ba7d/An%20Intro%20to%20Design%20Thinking%2007_10_09.pdf



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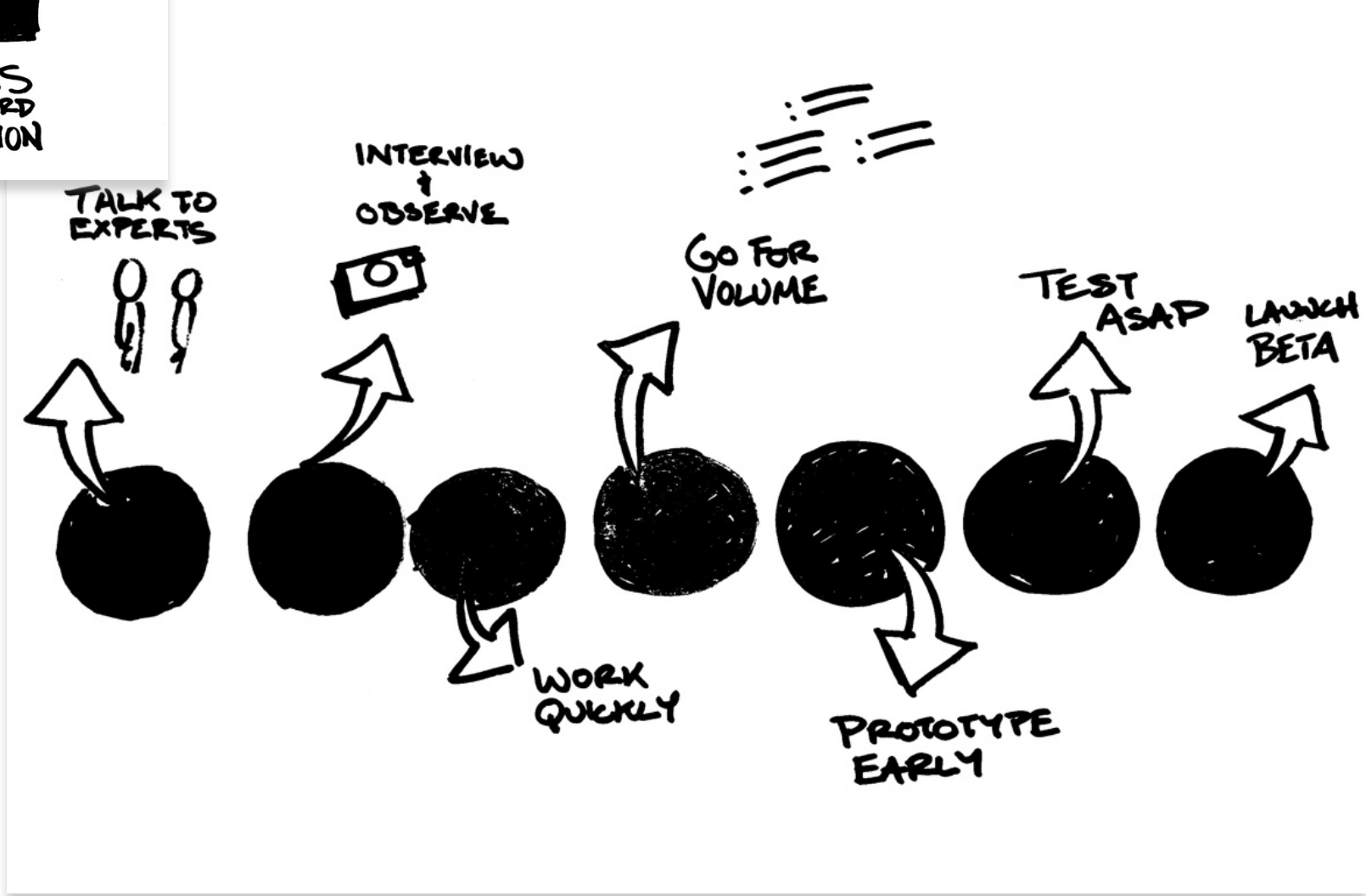

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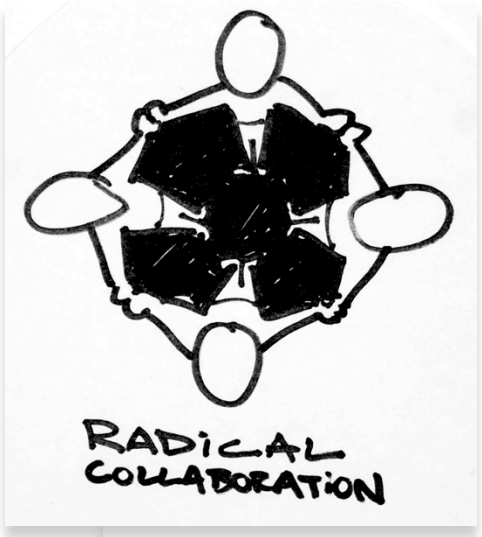

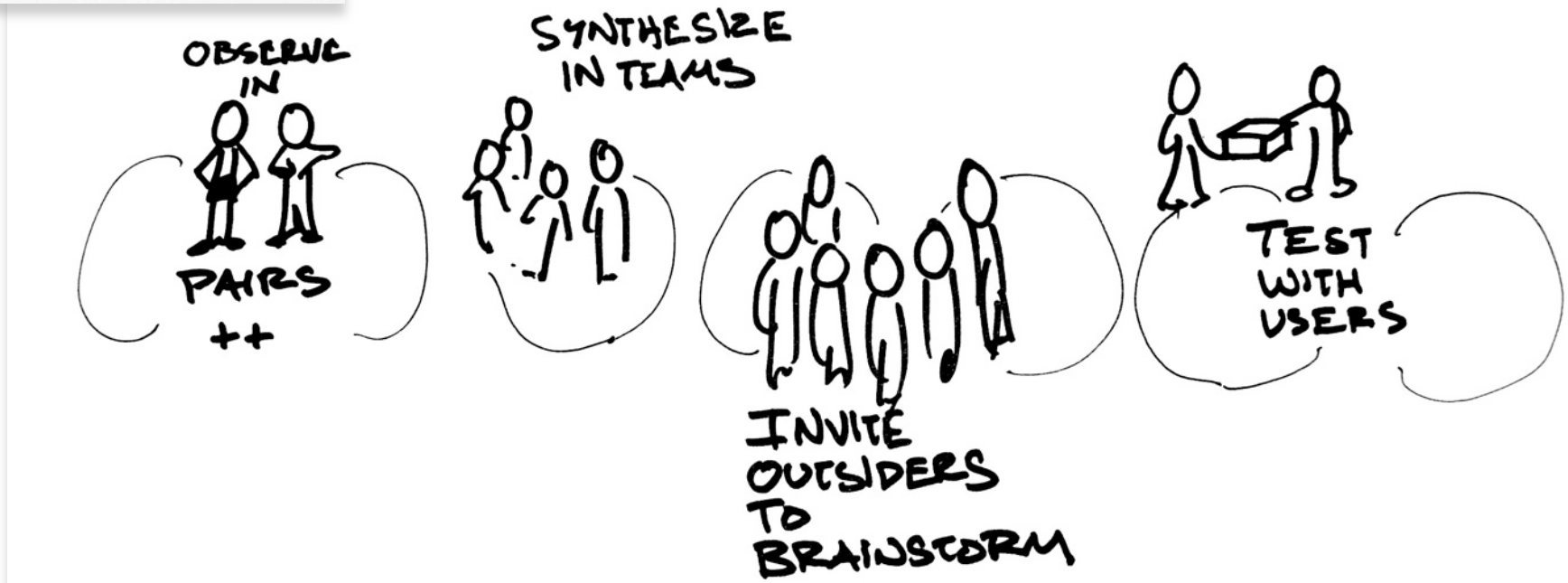

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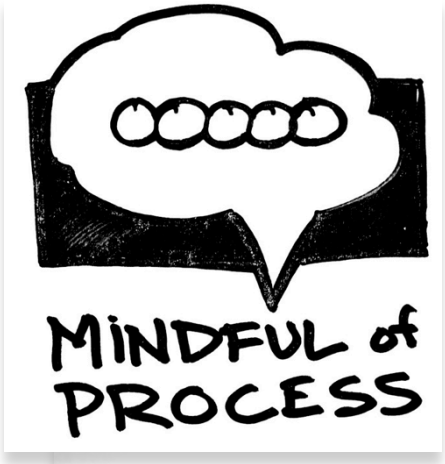

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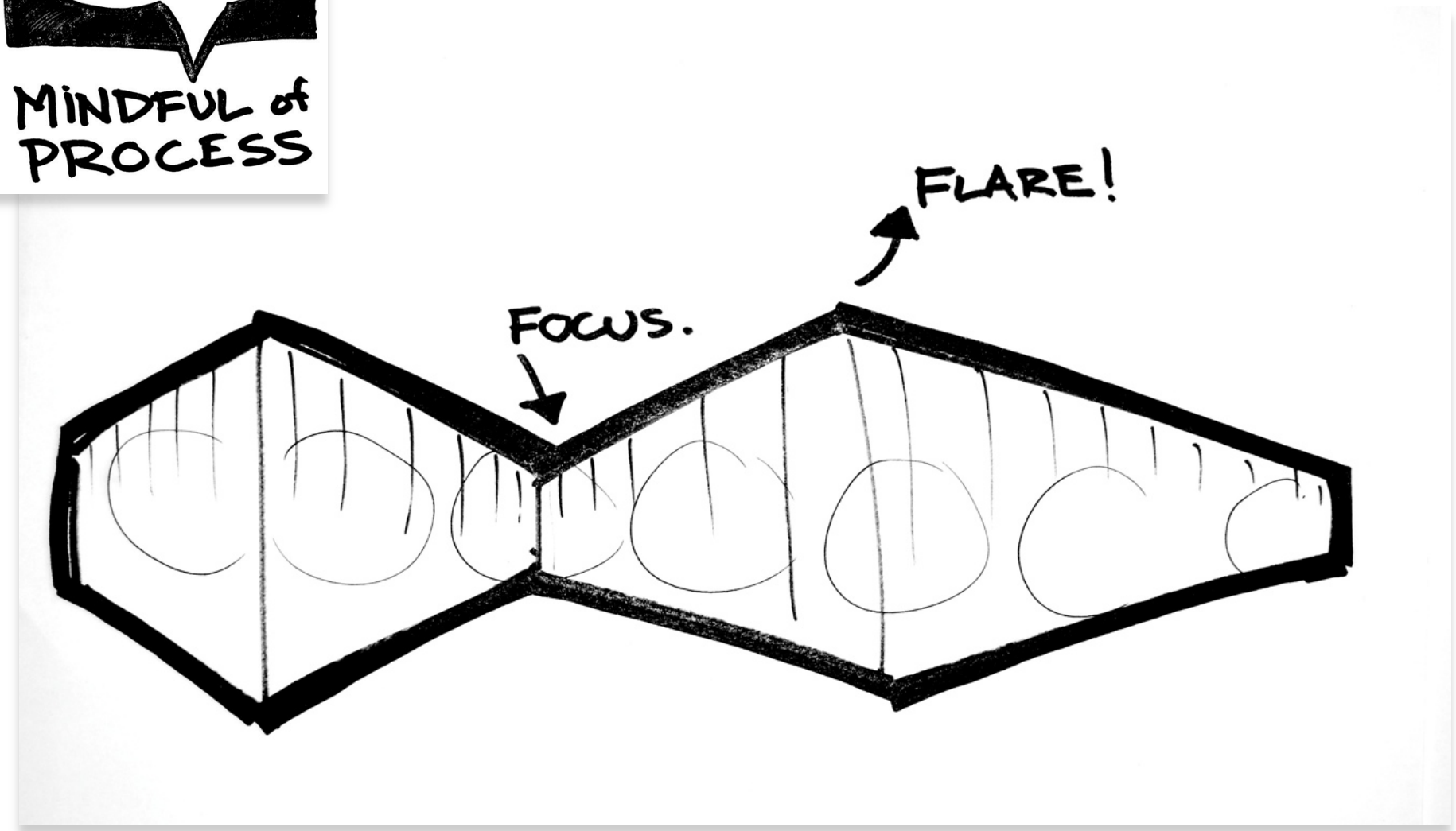

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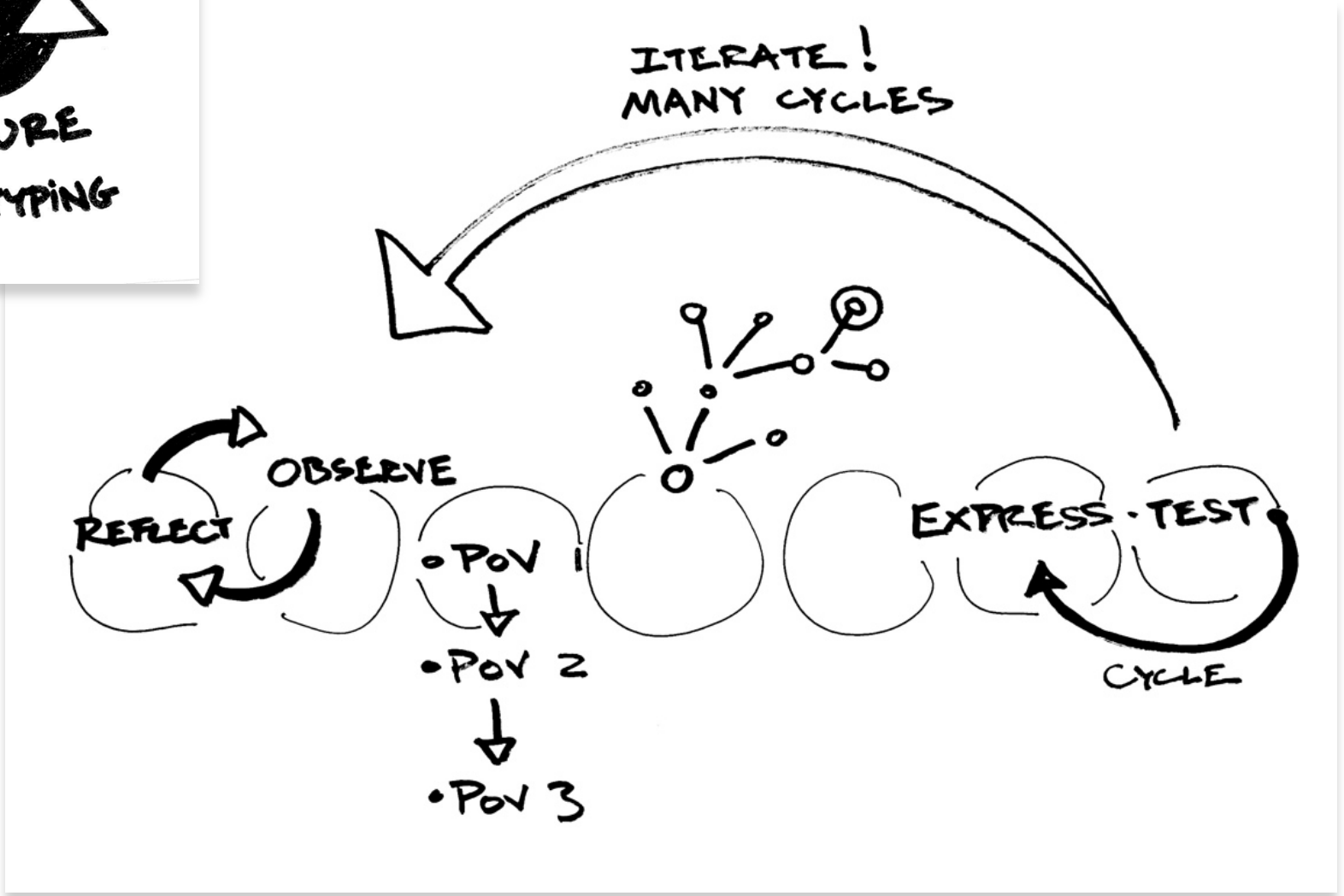

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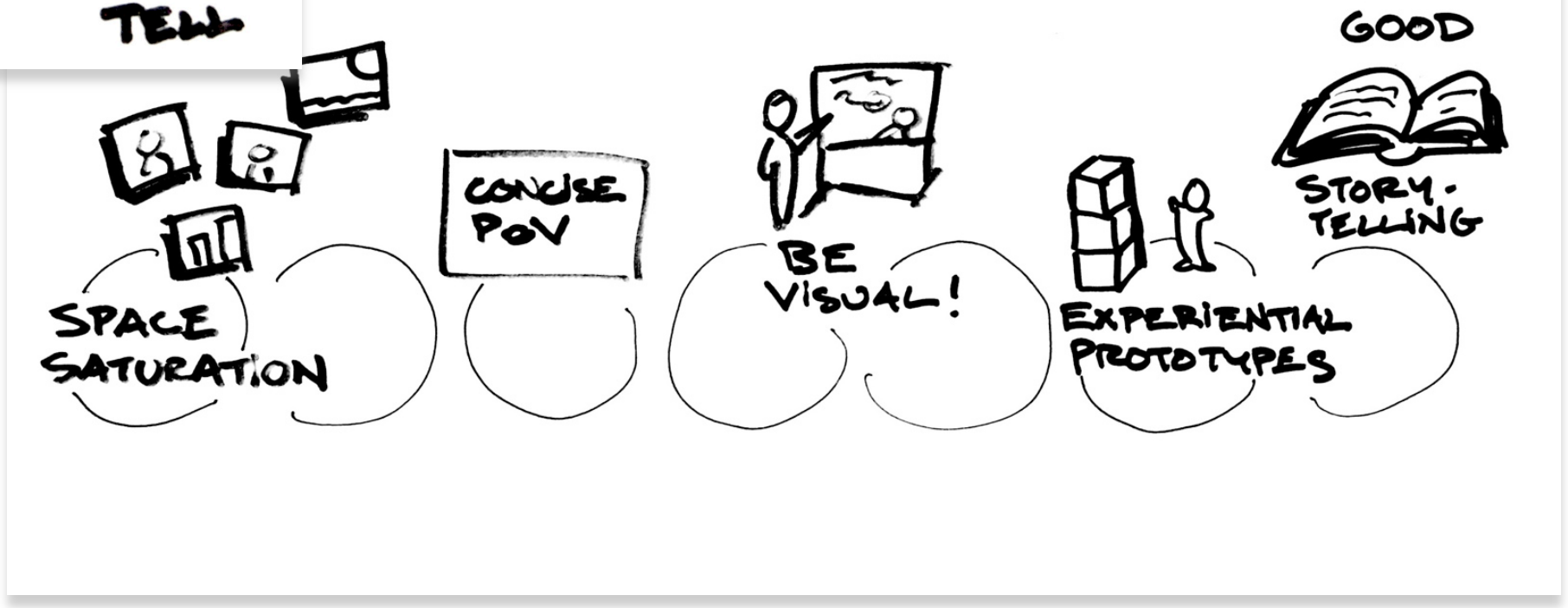

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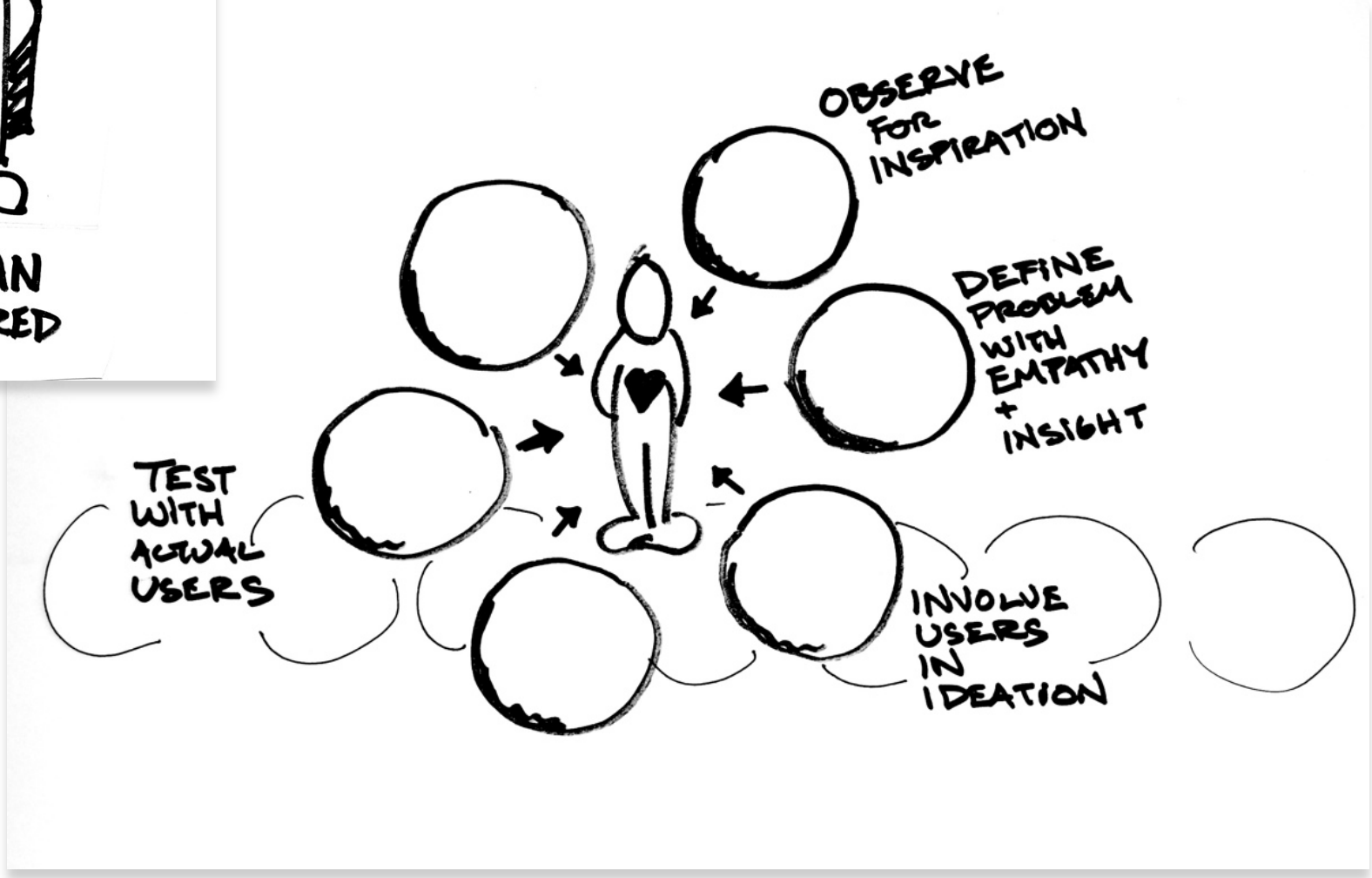

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(Programming)

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Design Thinking Research Program

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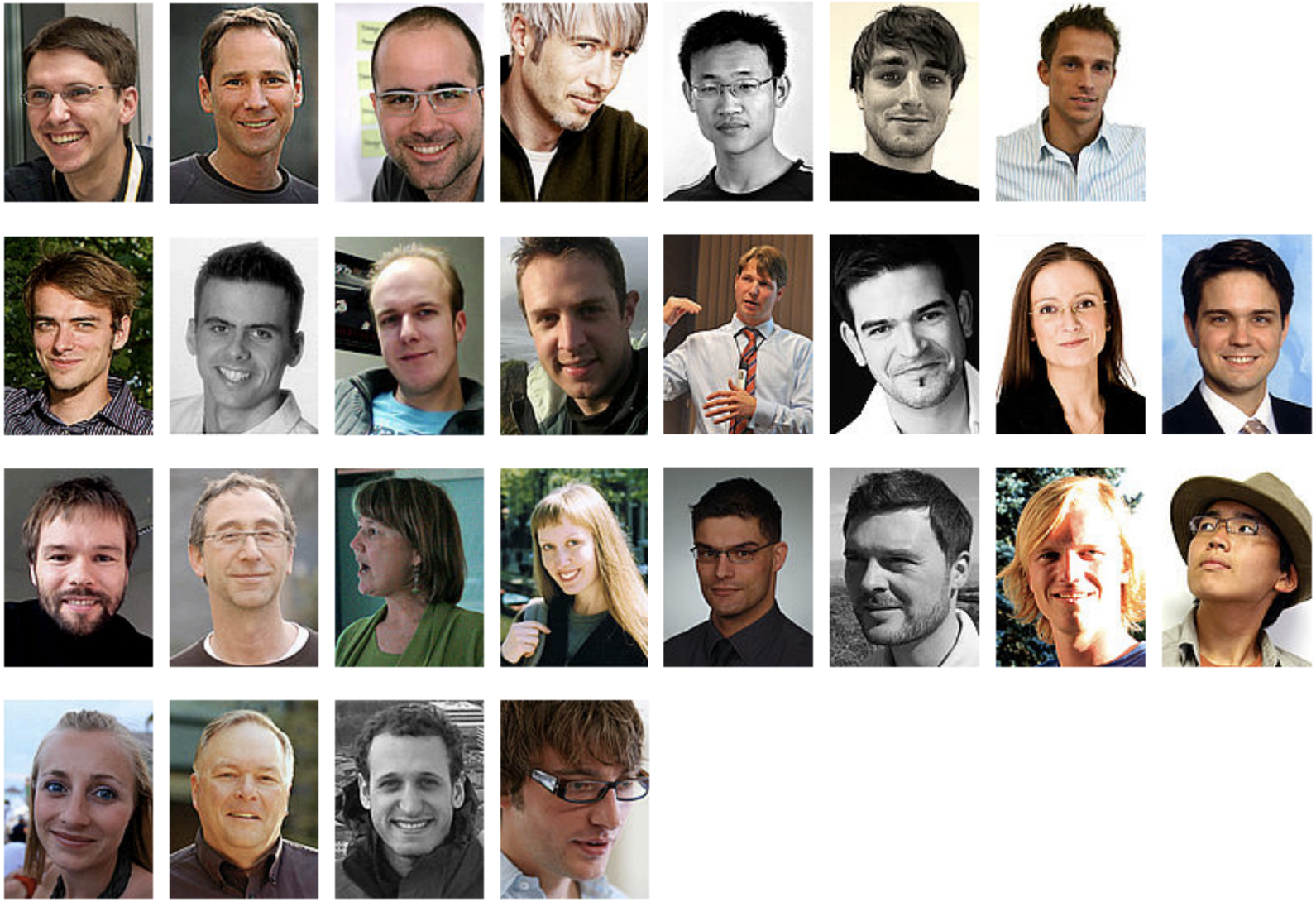
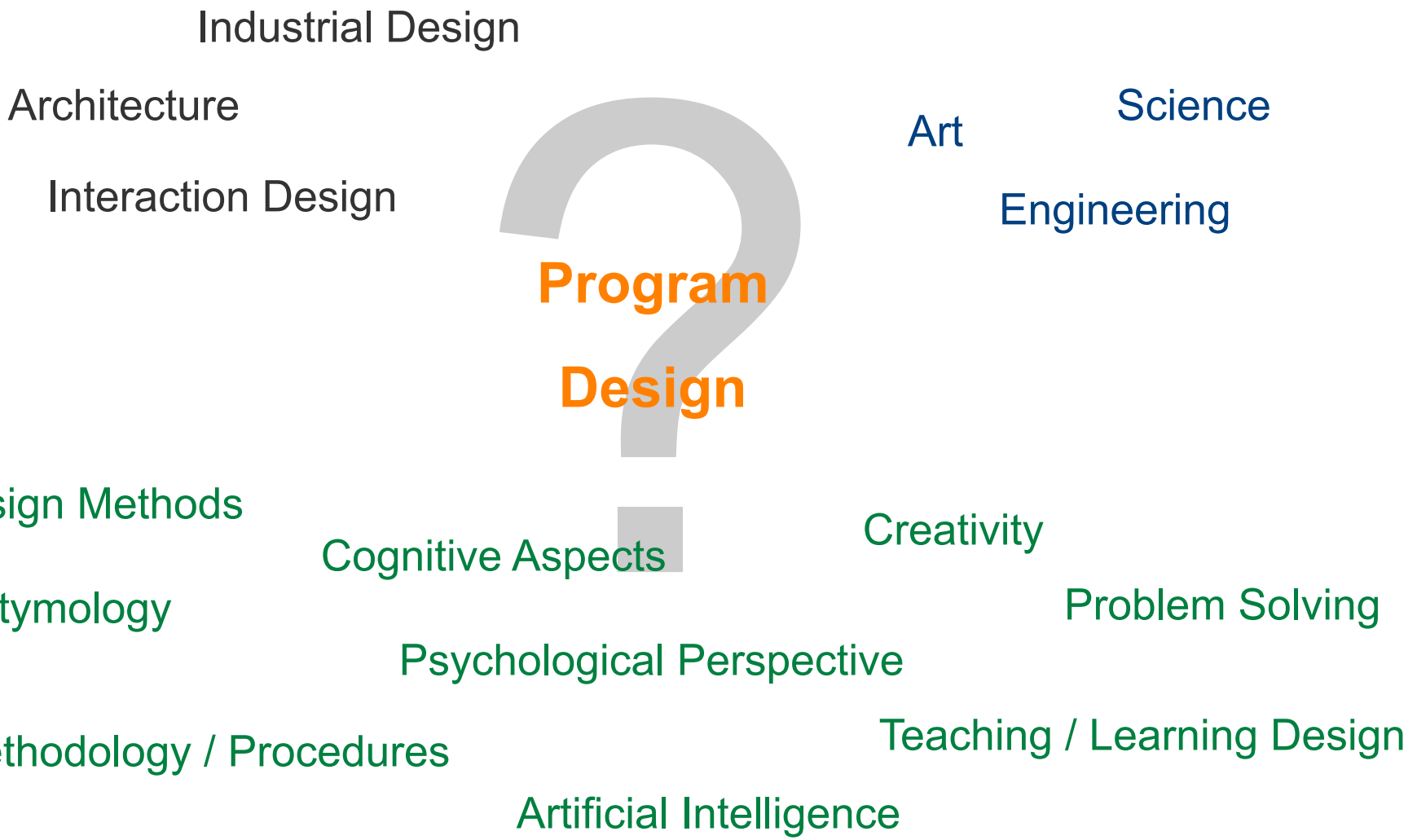


HPI Hasso Plattner Institut

Design Thinking Research Program

Biomimetics and Dexterous Manipulation Lab (Cutkosky)
Business Process Technology Group (Weske)
Center for Design Research, School of Engineering (Leifer)
Center for Work, Technology, and Organization Management (Hinds)
d.School, School of Engineering (Roth)
Enterprise Platform and Integration Concepts (Plattner)
Human Computer Interaction (Klemmer)
Internet Technologies and Systems (Meinel)
Management Science and Engineering (Katila)
Psychology and Neuroscience (Knutson)
Software Architecture Group (Hirschfeld)
System Engineering and Modeling Group (Giese)
…

Software Architecture Group



Bastian Steinert and Robert Hirschfeld. **Applying Design Knowledge to Programming.** In Hasso Plattner, Christoph Meinel, and Larry Leifer (eds.). Design Thinking Research: Studying Co-creation in Practice. pages 259-277, Springer 2011.

Software Architecture Group

To design “a complex structure, one powerful technique is to discover viable ways of decomposing it into semi-independent components corresponding to its many functional parts. The design of each component can then be carried out with some degree of independence of the design of others, since each will affect the others largely through its function and independently of the details of the mechanisms that accomplish the function.”, p. 128

“Everyone designs who devise courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state”, p. 130

(Herbert A. Simon. The Science of the Artificial, 3rd edition. MIT Press, 1996)

Software Architecture Group

- Externalizing thoughts (GTD…)
- Divergent and convergent thinking
- Personas
- Prototypes
- Low resolution
- Tangibility
- Concreteness
- Juxtaposition
- Embrace failure
- …

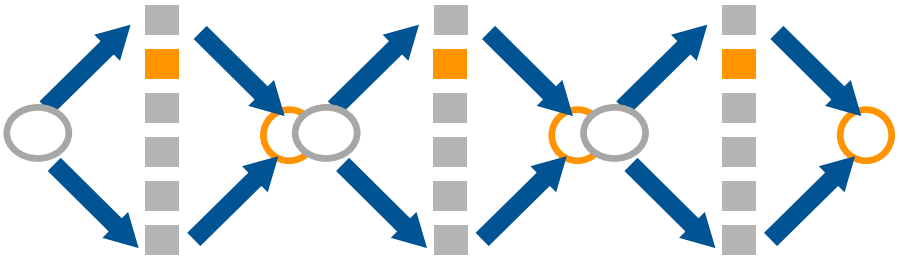
XPforums

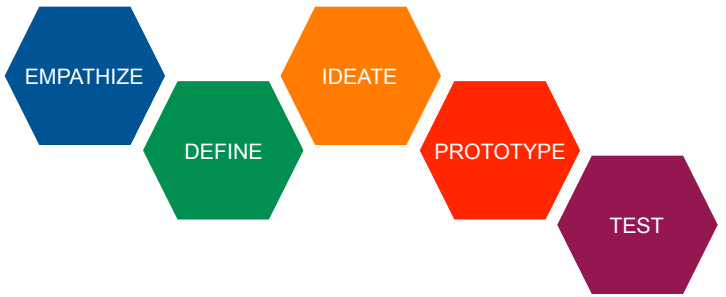
SightDynamic

CoExist

CodeTalk

ContextJS





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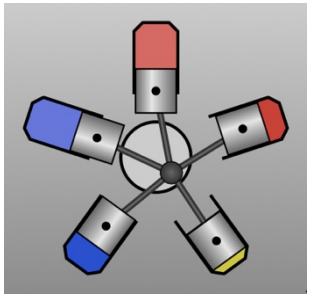
Design Research and Software Development

Design Thinking . Ideas . Prototypes



(Programming)

Design Research and Software Development

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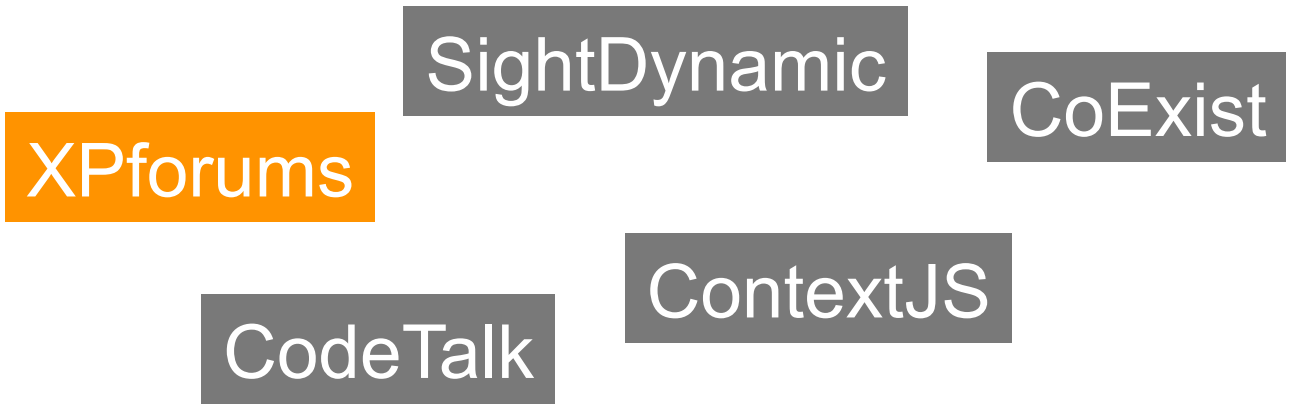
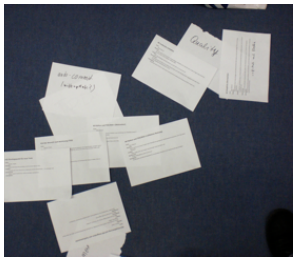
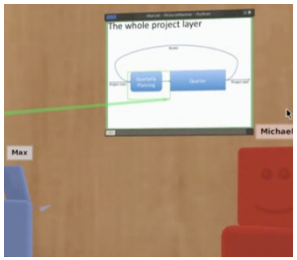
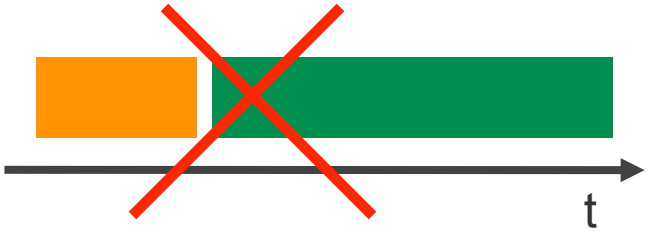
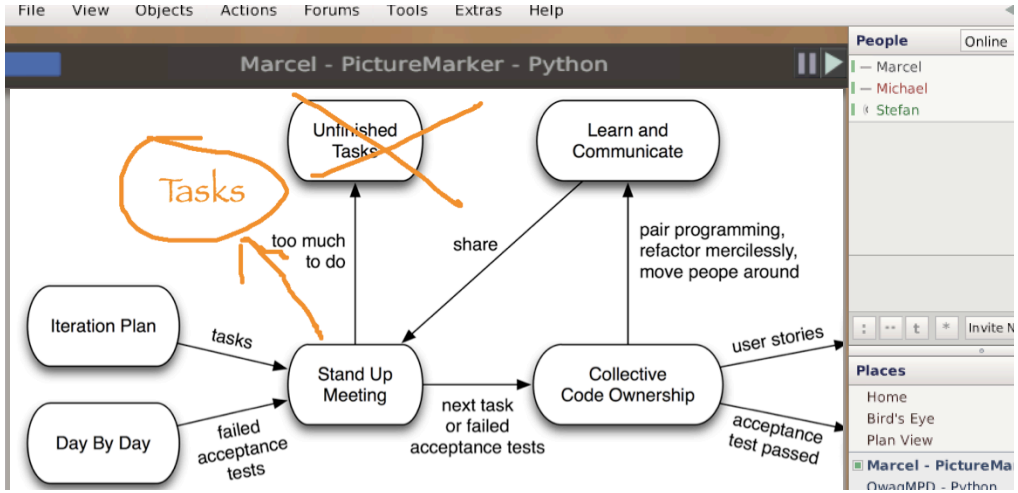


Design Practices and XP



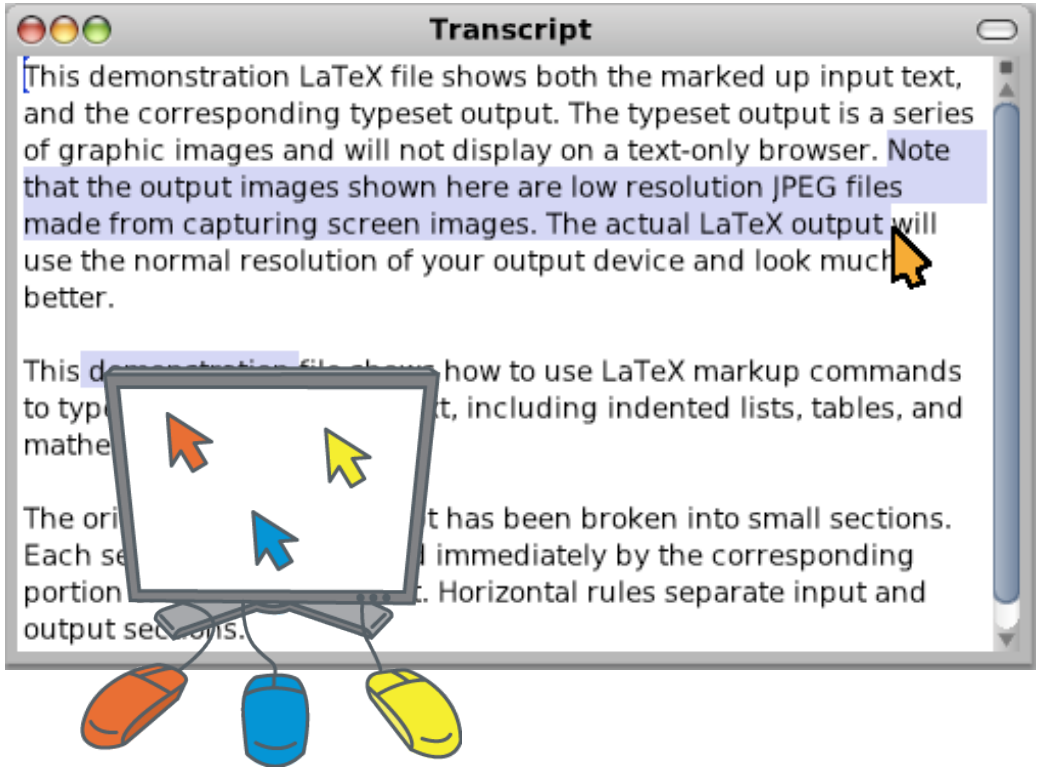



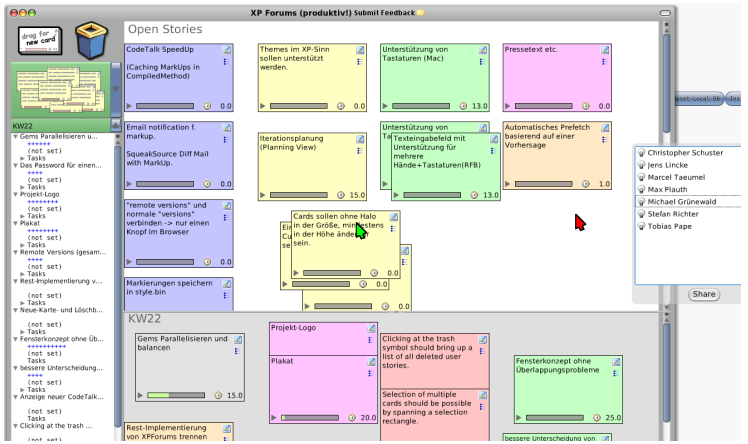




Robert Hirschfeld, Bastian Steinert, and Jens Lincke. **Agile Software Development in Virtual Collaboration Environments.** In Hasso Plattner, Christoph Meinel, and Larry Leifer (eds.). Design Thinking: Understand-Improve-Apply. pages 197-218, Springer 2011.

Design Practices and XP





Bastian Steinert, Michael Grunewald, Stefan Richter, Jens Lincke, and Robert Hirschfeld. **Multi-user Multi-account Interaction in Groupware Supporting Single-display Collaboration.** In Proceedings of the International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom) 2009, Crystal City, Washington D.C., USA, November 11-14, 2009, IEEE.

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(Programming)

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Design Thinking . Ideas . Prototypes

SightDynamic

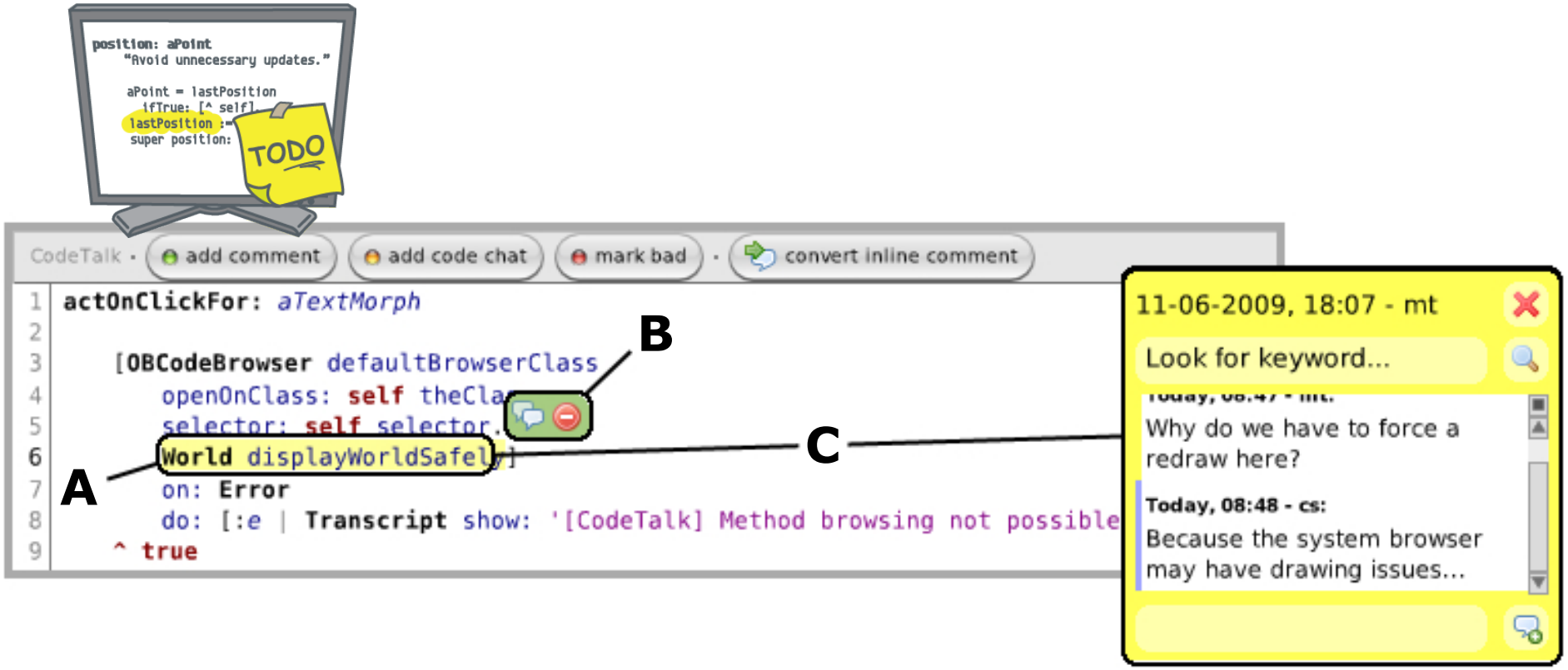
CoExist

XPforums

ContextJS

CodeTalk

Externalizing Thoughts



Bastian Steinert, Marcel Taeumel, Jens Lincke, Tobias Pape, and Robert Hirschfeld. **CodeTalk-Conversations About Code.** In Proceedings of the Conference on Creating, Connecting and Collaborating through Computing (C5) 2010, pages 11-18, San Diego, California, USA, January 25-27, 2010, IEEE.

(Programming)

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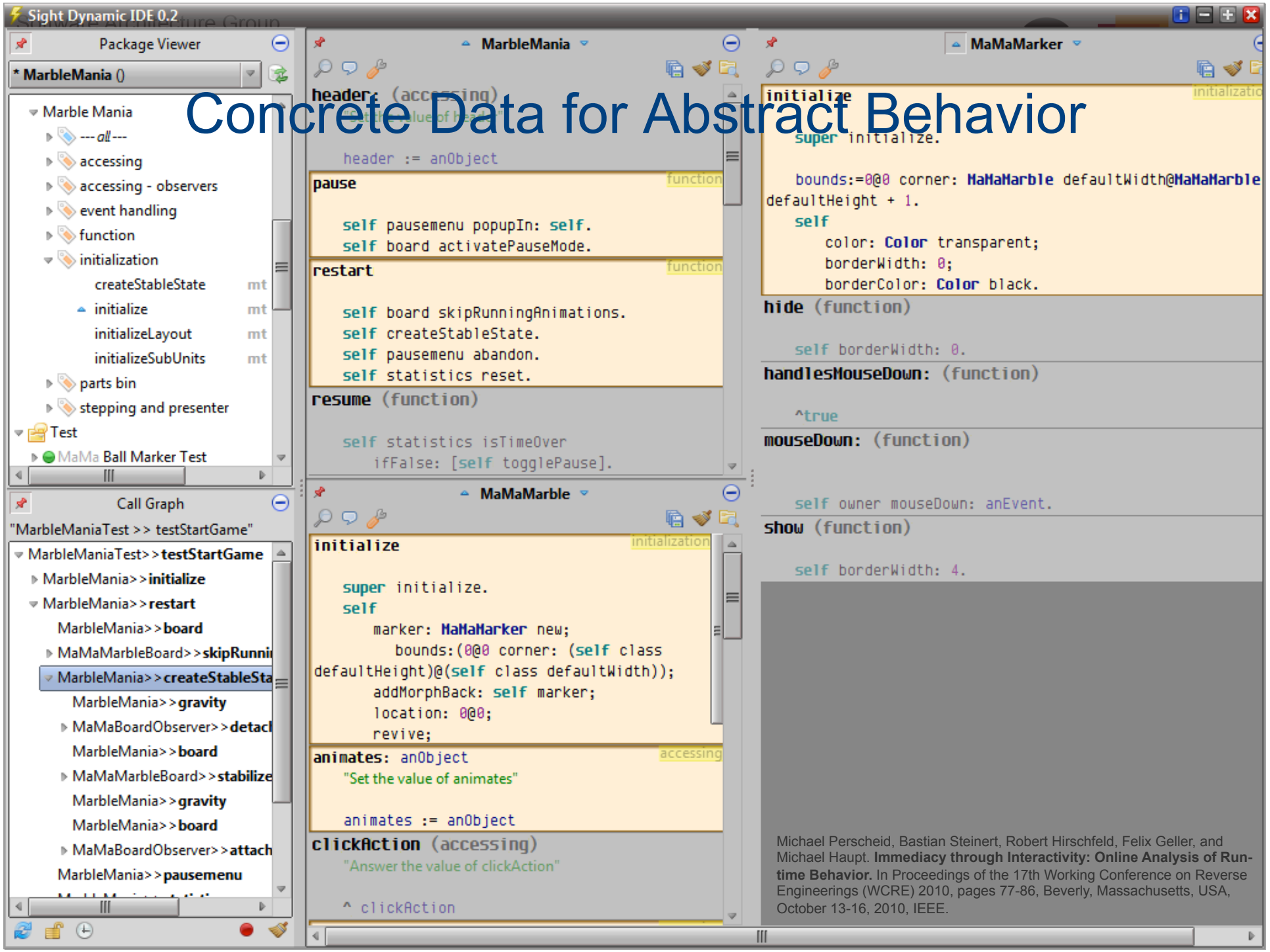
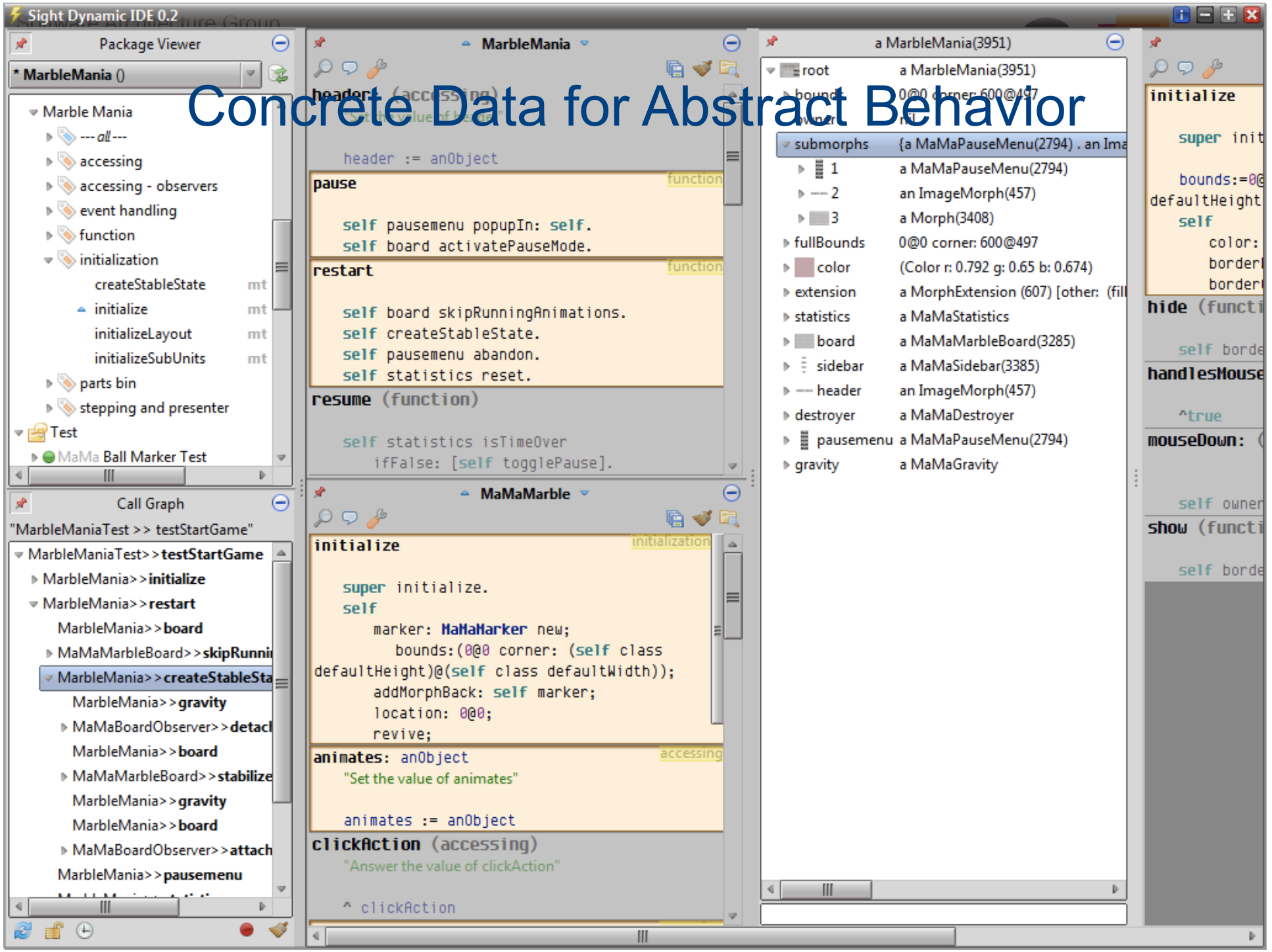
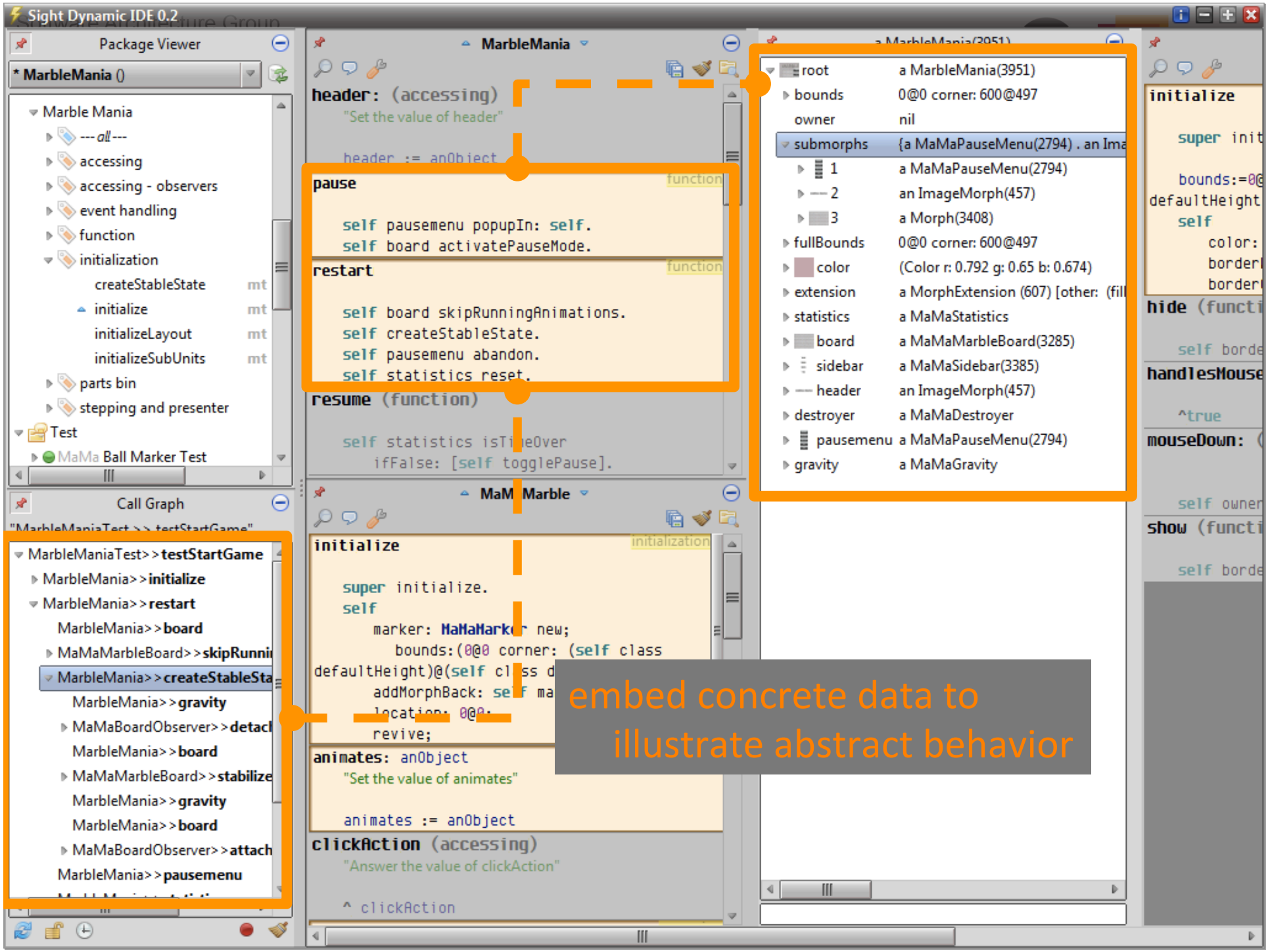


Concrete Data for Abstract Behavior

Michael Perscheid, Bastian Steinert, Robert Hirschfeld, Felix Geller, and Michael Haupt. **Immediacy through Interactivity: Online Analysis of Runtime Behavior.** In Proceedings of the 17th Working Conference on Reverse Engineerings (WCRE) 2010, pages 77-86, Beverly, Massachusetts, USA, October 13-16, 2010, IEEE.



Concrete Data for Abstract Behavior


Sight Dynamic IDE 0.2
Package Viewer
* MarbleMania ()
Marble Mania
---all---
accessing
accessing - observers
event handling
function
initialization
createStableState
initialize
initializeLayout
initializeSubUnits
parts bin
stepping and presenter
Test
MaMa Ball Marker Test
Call Graph
MarbleManiaTest>>testStartGame
MarbleMania>>initialize
MarbleMania>>restart
MarbleMania>>board
MaMaMarbleBoard>>skipRunni
MarbleMania>>createStableSta
MarbleMania>>gravity
MaMaBoardObserver>>detach
MarbleMania>>board
MaMaMarbleBoard>>stabilize
MarbleMania>>gravity
MarbleMania>>board
MaMaBoardObserver>>attach
MarbleMania>>pausemenu
MarbleMania
header: (accessing)
"Set the value of header"
header := anObject
pause
function
self pausemenu popupIn: self.
self board activatePauseMode.
restart
function
self board skipRunningAnimations.
self createStableState.
self pausemenu abandon.
self statistics reset.
resume (function)
self statistics isTimeOver
ifFalse: [self togglePause].
MaMa Marble
initialize
initialization
super initialize.
self
marker: MaMaMarker new;
bounds:(0@0 corner: (self class
defaultHeight)@(self class
addMorphBack: self
location: 0@0;
revive;
animates: anObject
"Set the value of animates"
animates := anObject
clickAction (accessing)
"Answer the value of clickAction"
^ clickAction
root a MarbleMania(3951)
bounds 0@0 corner: 600@497
owner nil
submorphs {a MaMaPauseMenu(2794) . an Ima
1 a MaMaPauseMenu(2794)
2 an ImageMorph(457)
3 a Morph(3408)
fullBounds 0@0 corner: 600@497
color (Color r: 0.792 g: 0.65 b: 0.674)
extension a MorphExtension (607) [other: (fill
statistics a MaMaStatistics
board a MaMaMarbleBoard(3285)
sidebar a MaMaSidebar(3385)
header an ImageMorph(457)
destroyer a MaMaDestroyer
pausemenu a MaMaPauseMenu(2794)
gravity a MaMaGravity
initialize
super init
bounds:=0@
defaultHeight
self
color:
borderI
borderI
hide (functi
self borde
handlesMouse
^true
mouseDown: (
self owner
show (functi
self borde
embed concrete data to
illustrate abstract behavior

(Programming)

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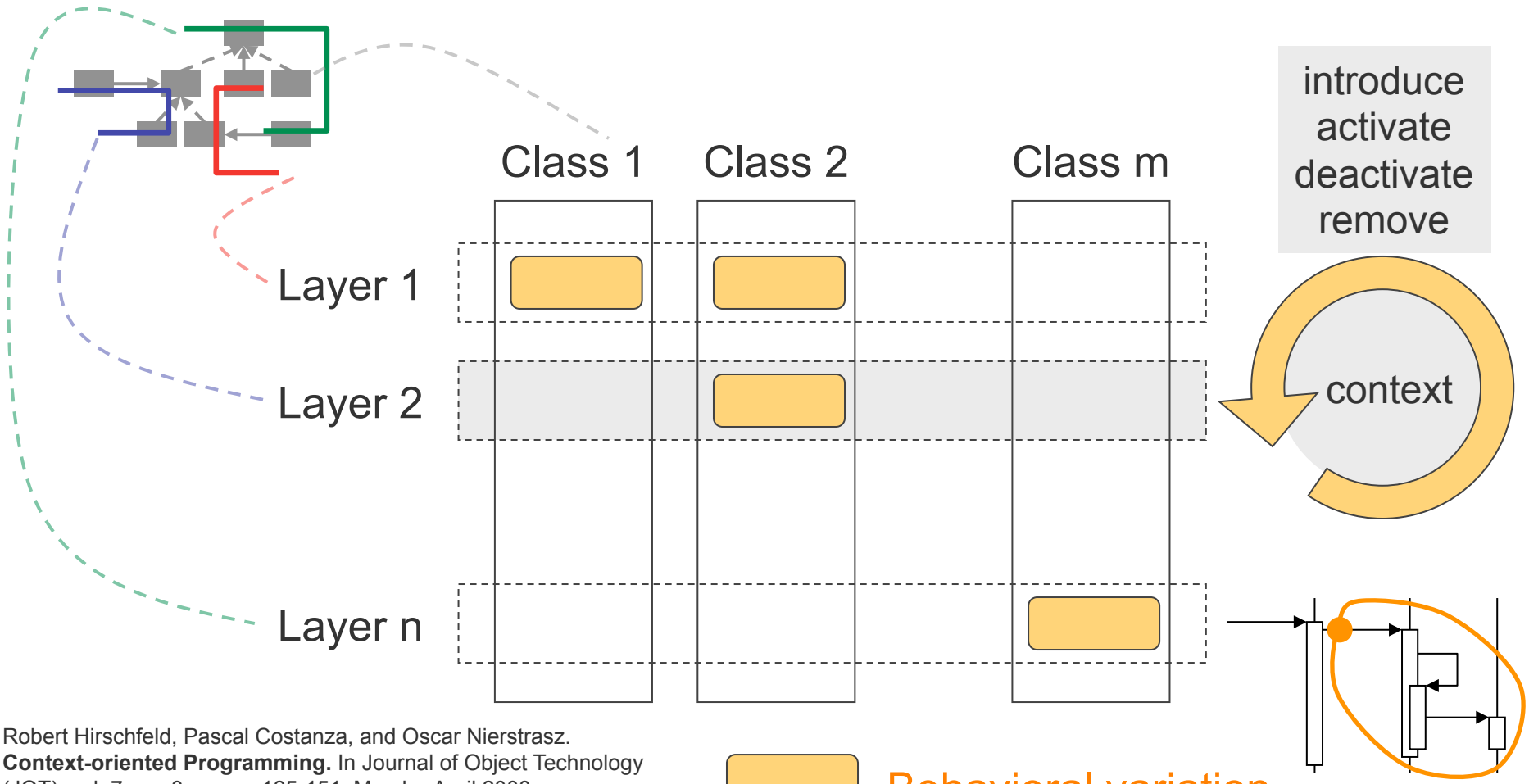
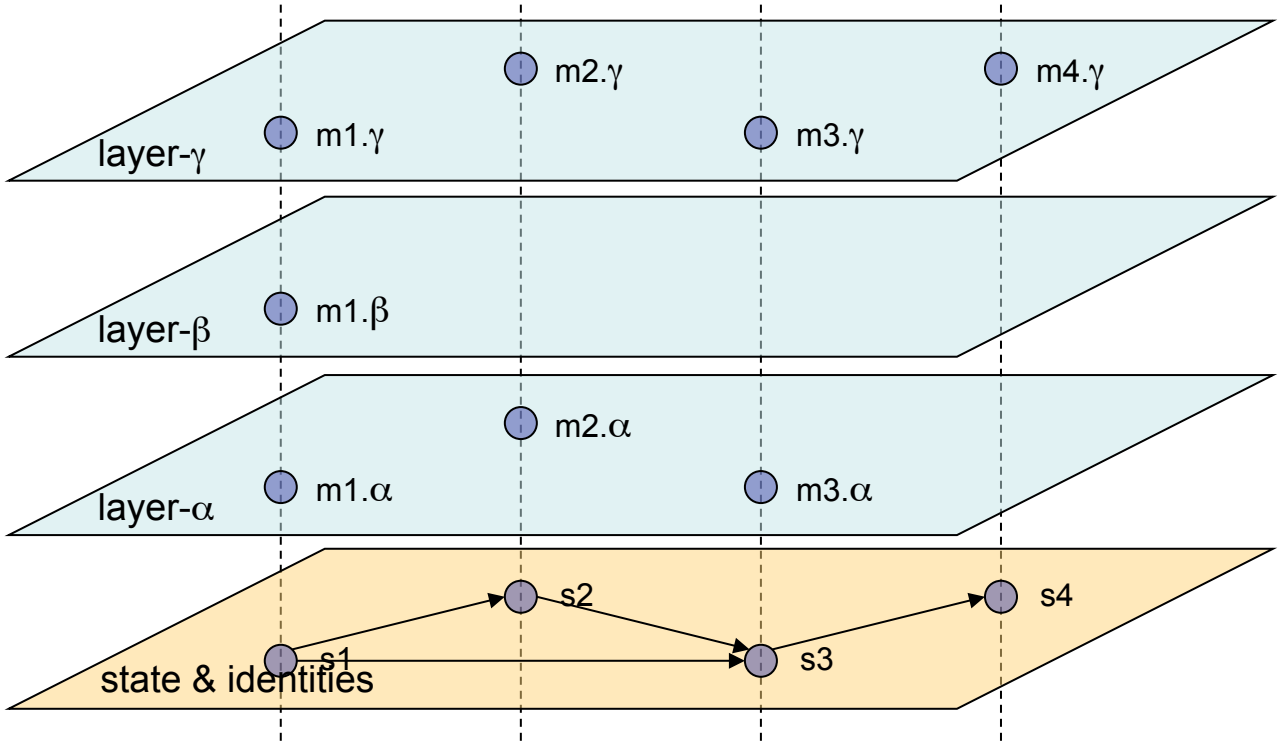
COP Layers for System Exploration



Robert Hirschfeld, Pascal Costanza, and Oscar Nierstrasz. **Context-oriented Programming.** In Journal of Object Technology (JOT), vol. 7, no. 3, pages 125-151, March - April 2008.

Jens Lincke, Malte Appeltauer, Bastian Steinert, and Robert Hirschfeld. **An Open Implementation for Context-oriented Layer Composition in ContextJS.** In Elsevier Journal on Science of Computer Programming, Special Issue on Software Evolution, 2011.

COP Layers for System Exploration



Robert Hirschfeld, Michael Perscheid, and Michael Haupt. **Explicit Use-case Representation in Object-oriented Programming Languages.** In Proceedings of the Dynamic Languages Symposium (DLS) 2011, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA) 2011, pages 51-60, Portland, Oregon, USA, October 24, 2011, ACM DL.

Robert Krahn, Dan Ingalls, Robert Hirschfeld, Jens Lincke, and Krzysztof Palacz. **Lively Wiki - A Development Environment for Creating and Sharing Active Web Content.** In Proceedings of the International Symposium on Wikis and Open Collaboration (WikiSym) 2009, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA) 2009, Disney's Contemporary Resort, Orlando, Florida, USA, October 25-27, 2009, ACM DL.

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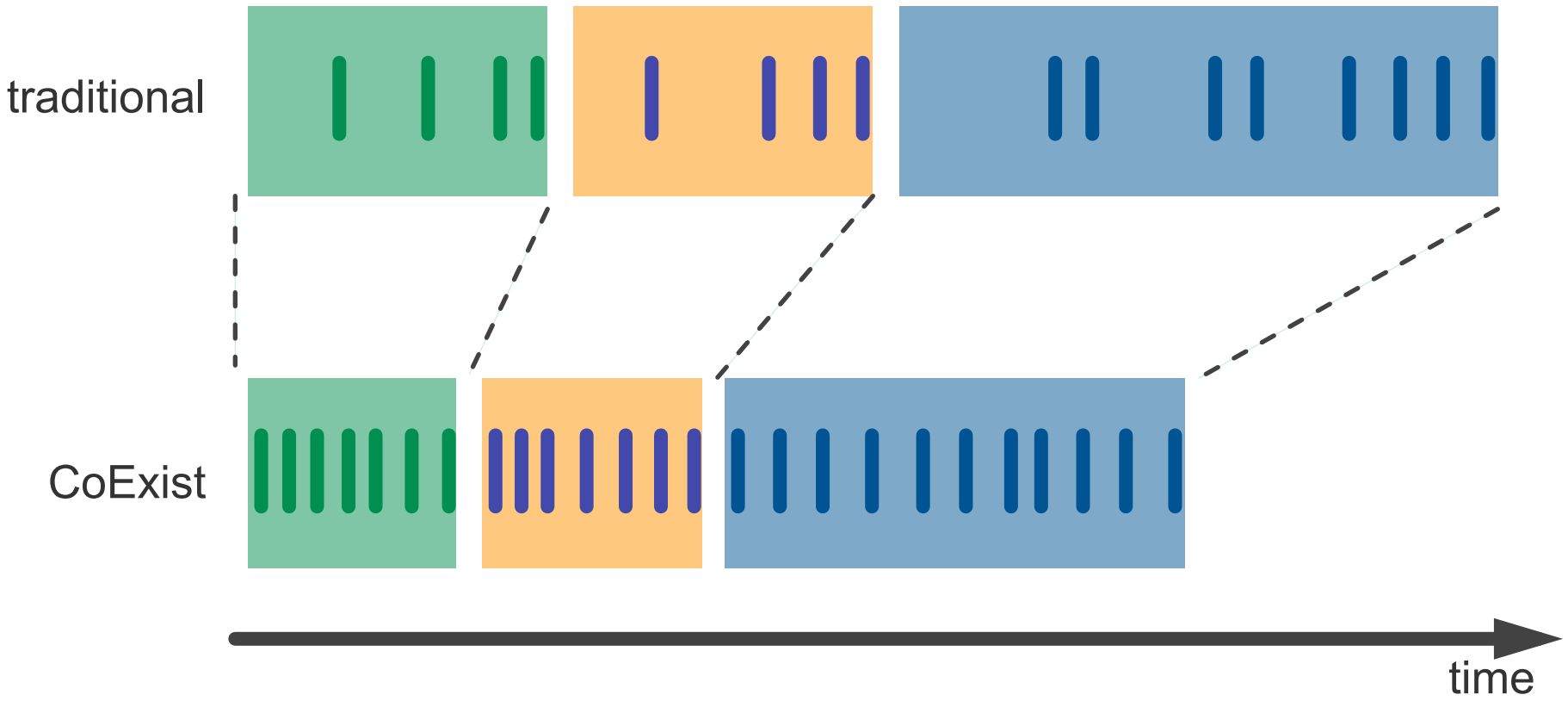
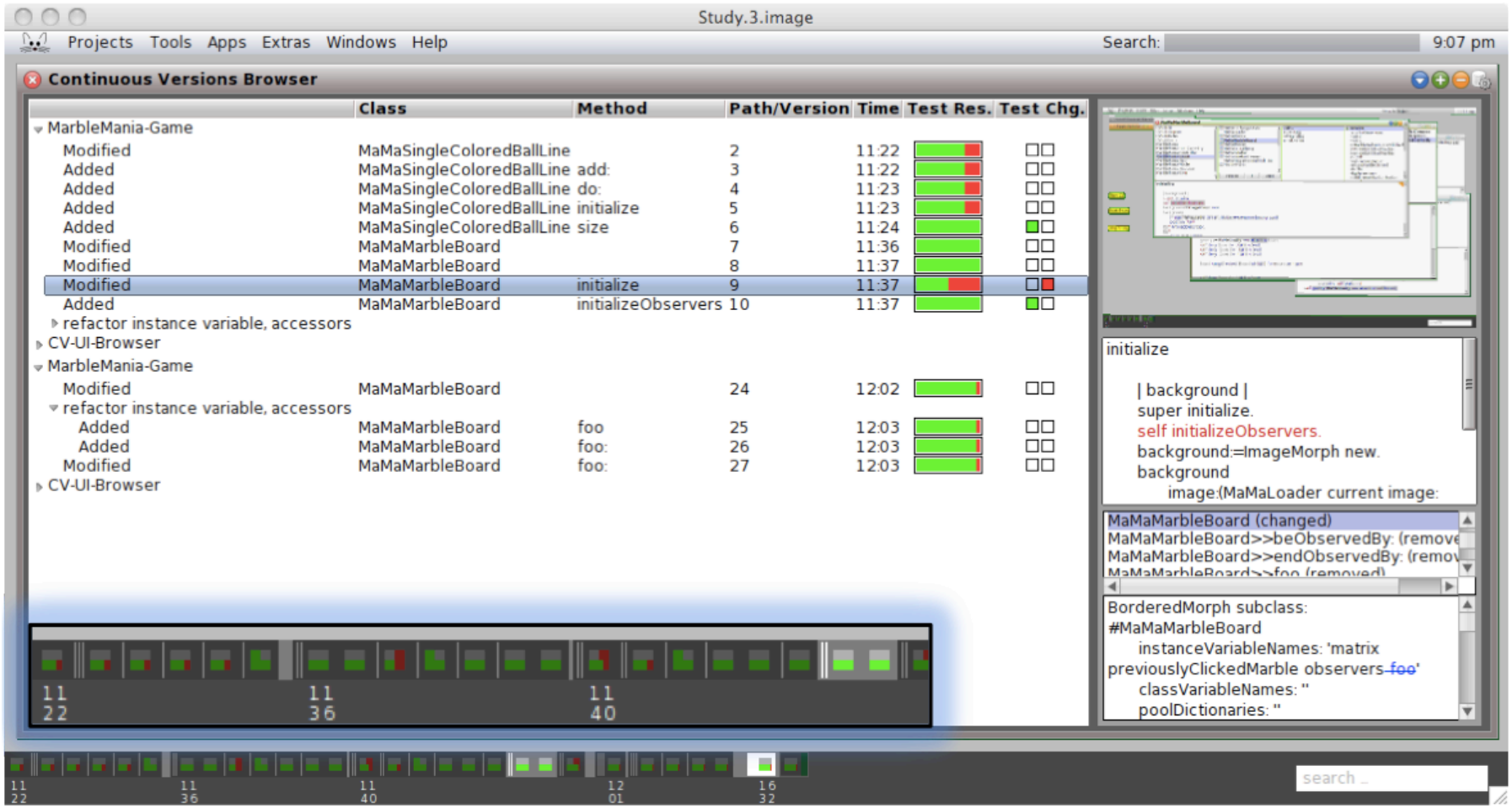
Defensive Risk Assessments vs. Graceful Failure Recovery



Bastian Steinert, Damien Cassou, and Robert Hirschfeld.
The CoExistence of Program Versions Encouraging a Trying-out Approach to Program Design. (submitted...)

Continuous Versioning



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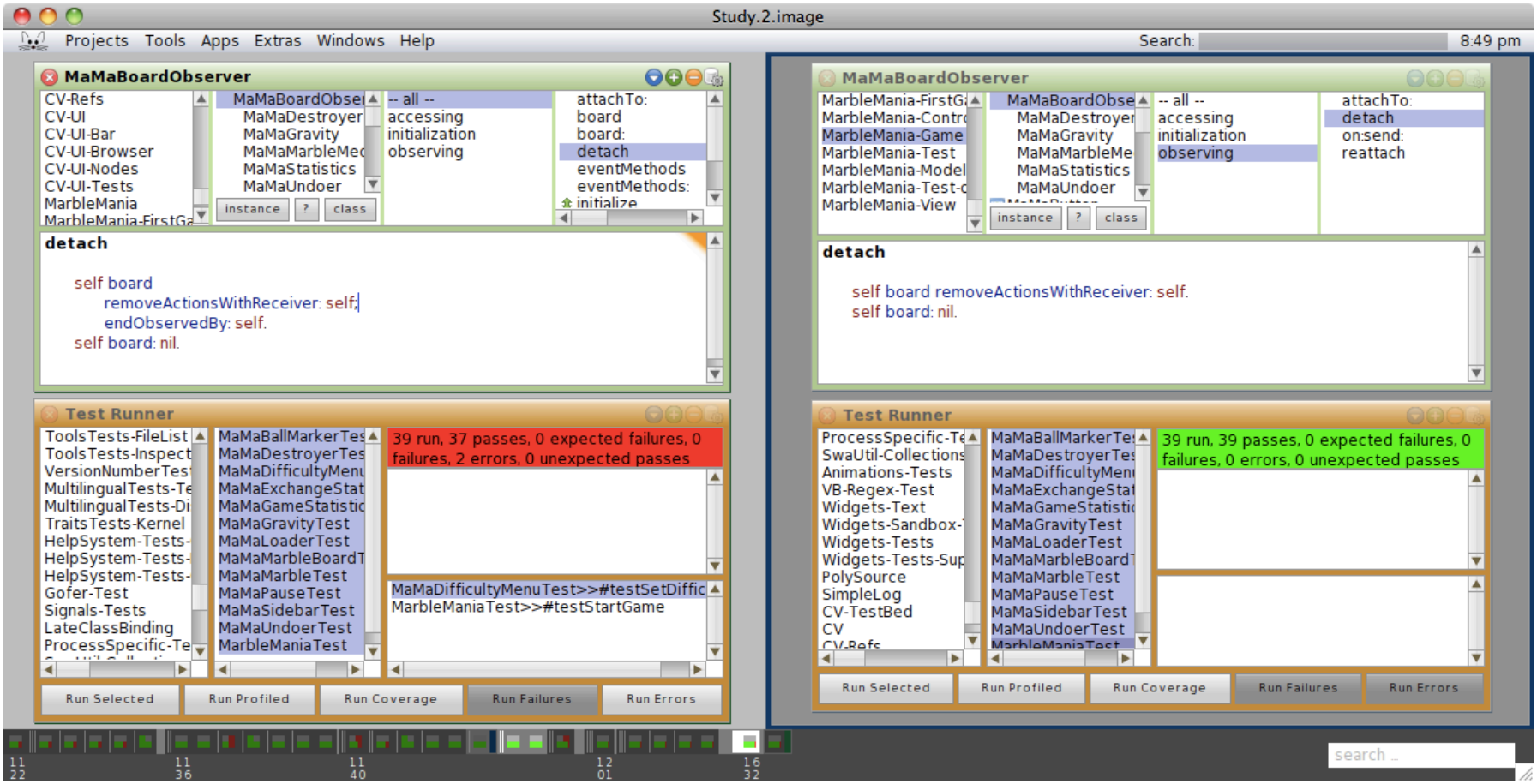
Juxtaposing of Both Abstraction and Execution



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Program

Design

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2012-02-27