Everyday Aspects

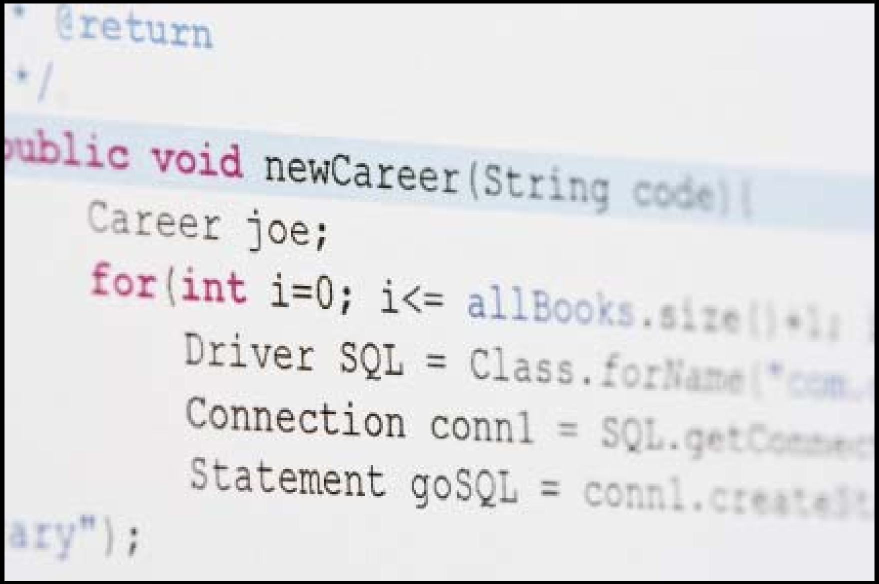
Gail Murphy

University of British Columbia
Tasktop Technologies

confessions of a (failed) software engineer

what is modularity?

undergraduate student…



```
* @return
*/
ublic void newCareer(String code){
    Career joe;
    for(int i=0; i<= allBooks.size()+1;
        Driver SQL = Class.forName("com.
        Connection conn1 = SQL.getConnec
        Statement goSQL = conn1.createSt
ary");
```

contiguous code with
data hiding and interfaces

industrial software engineer…

ownership

graduate student…

unit of work

now…

fluid and task-oriented

humans working
to “make” modules

contiguous code with
data hiding and interfaces

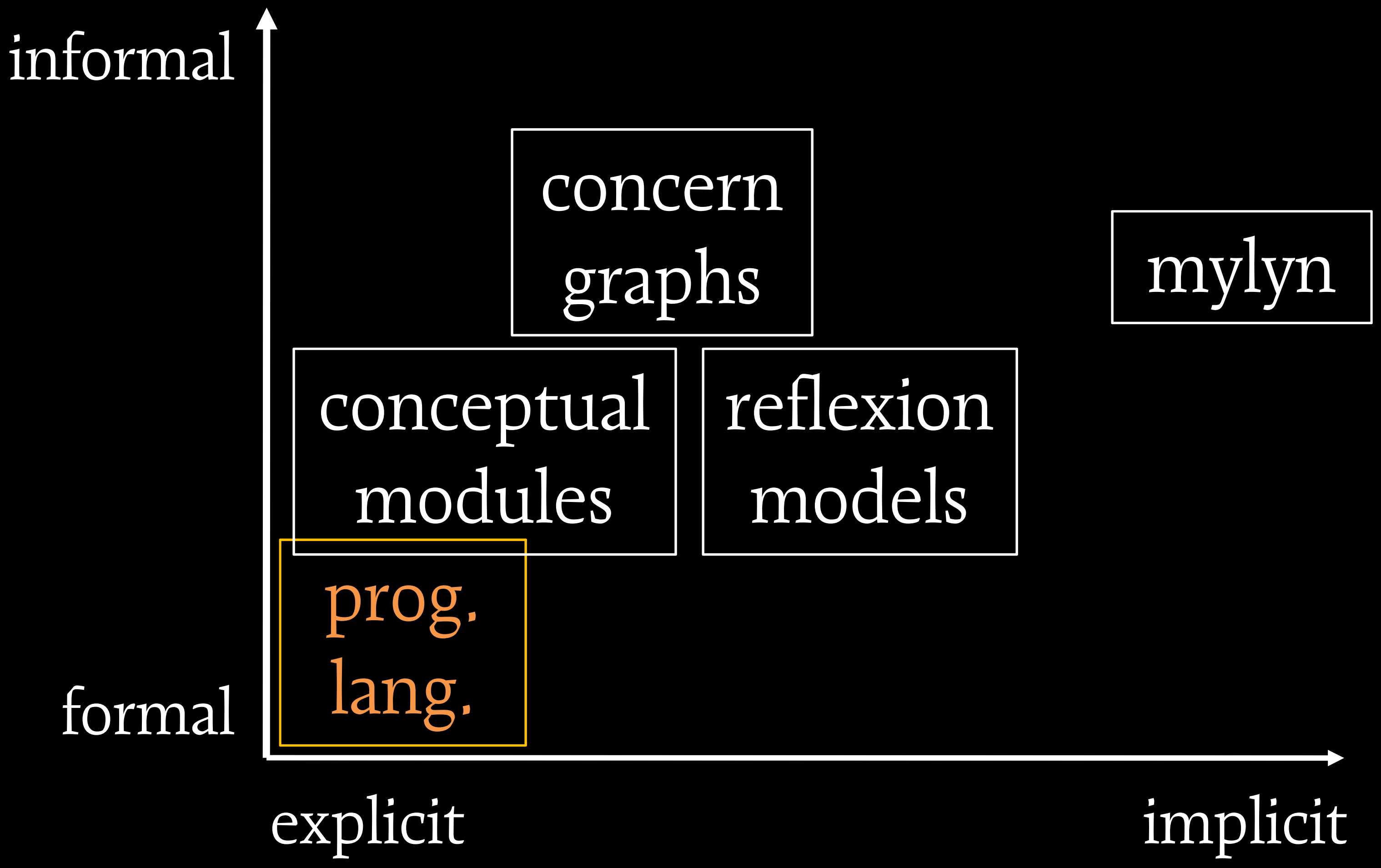
ownership

unit of work

fluid and task-specific

modules “working”
for humans

tale of 4 projects



informal

concern graphs

mylyn

conceptual modules

reflexion models

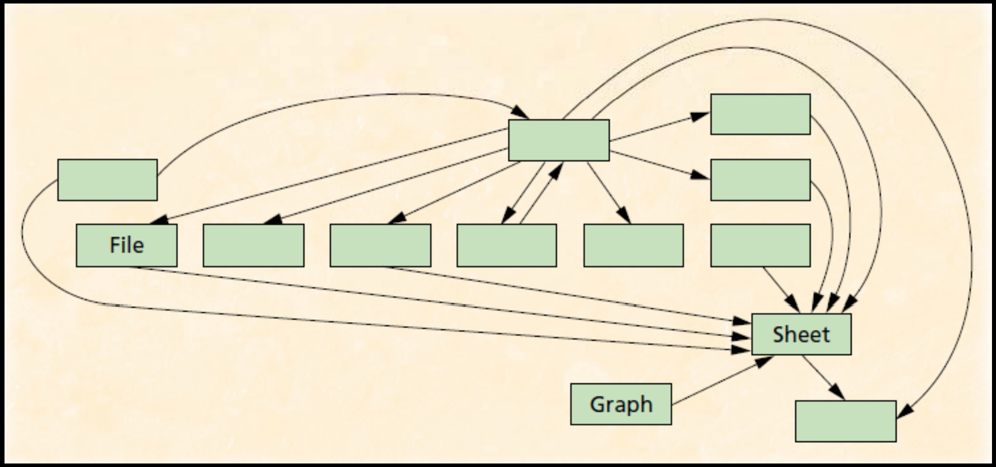
prog. lang.

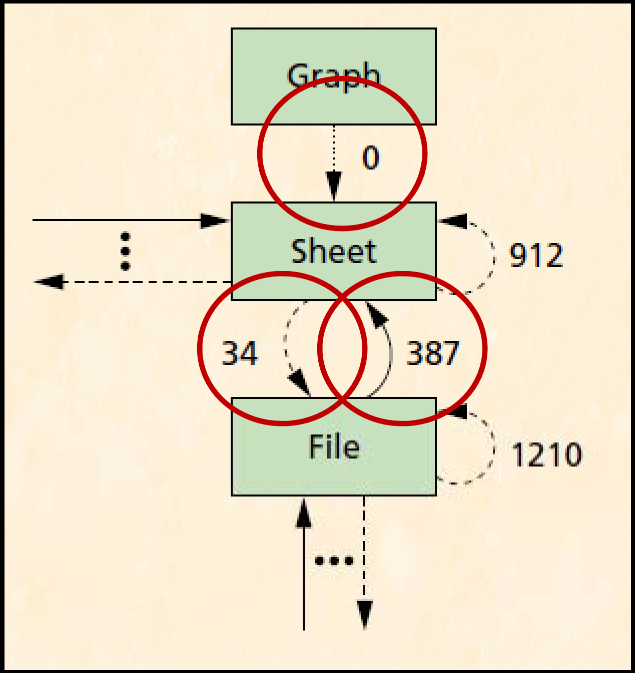
formal

explicit

implicit

reflexion models





```
[  file=^shtreal\.c      mapTo=Sheet ]
[  file=^text1[ez]\.c$  mapTo=File]
```

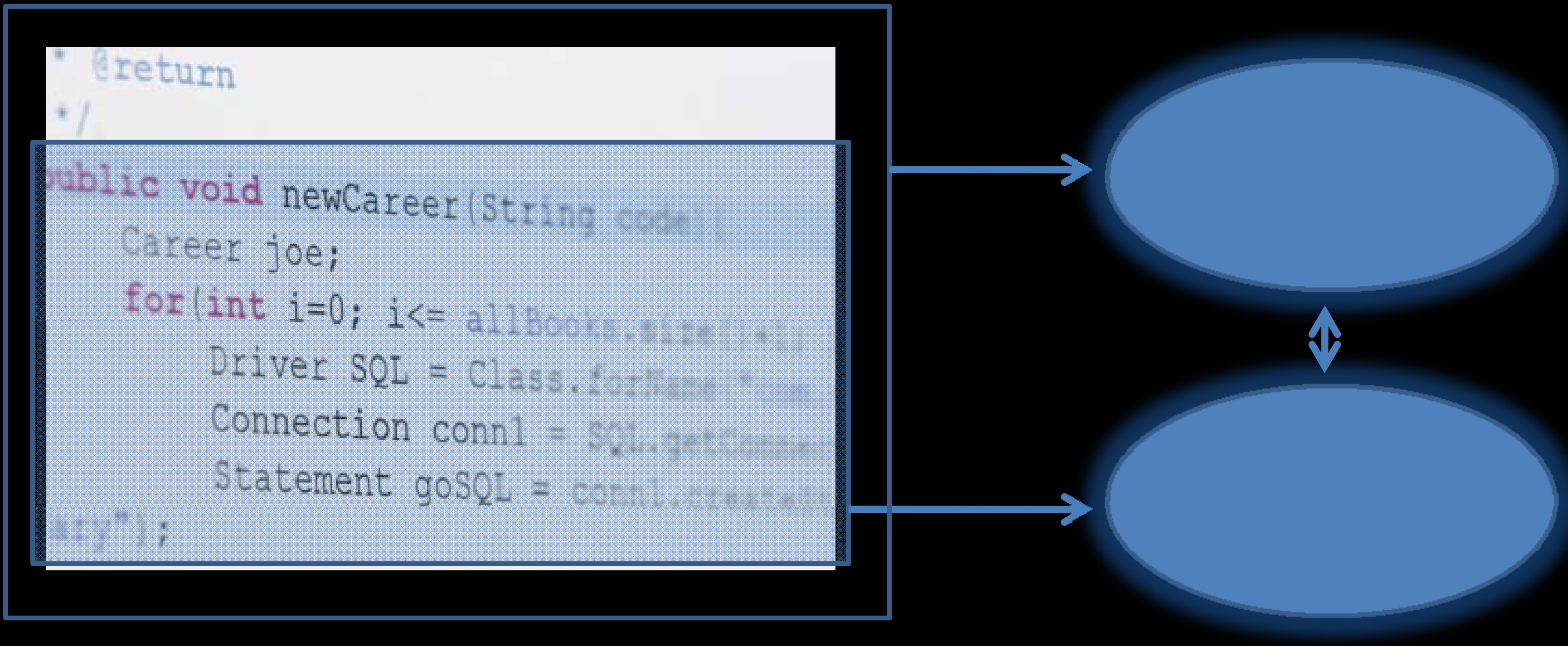
Murphy, Notkin, and Sullivan (1996+)

reflexion models
for experimental reengineering of Excel

```
[  function=^ExplodeMergeCells$   mapTo=Sheet    ]
[  file = fdefs\.c    mapTo=UI ]
```

170 entries grew to > 1000 entries
used map to automate exp. reengineering

reflexion models



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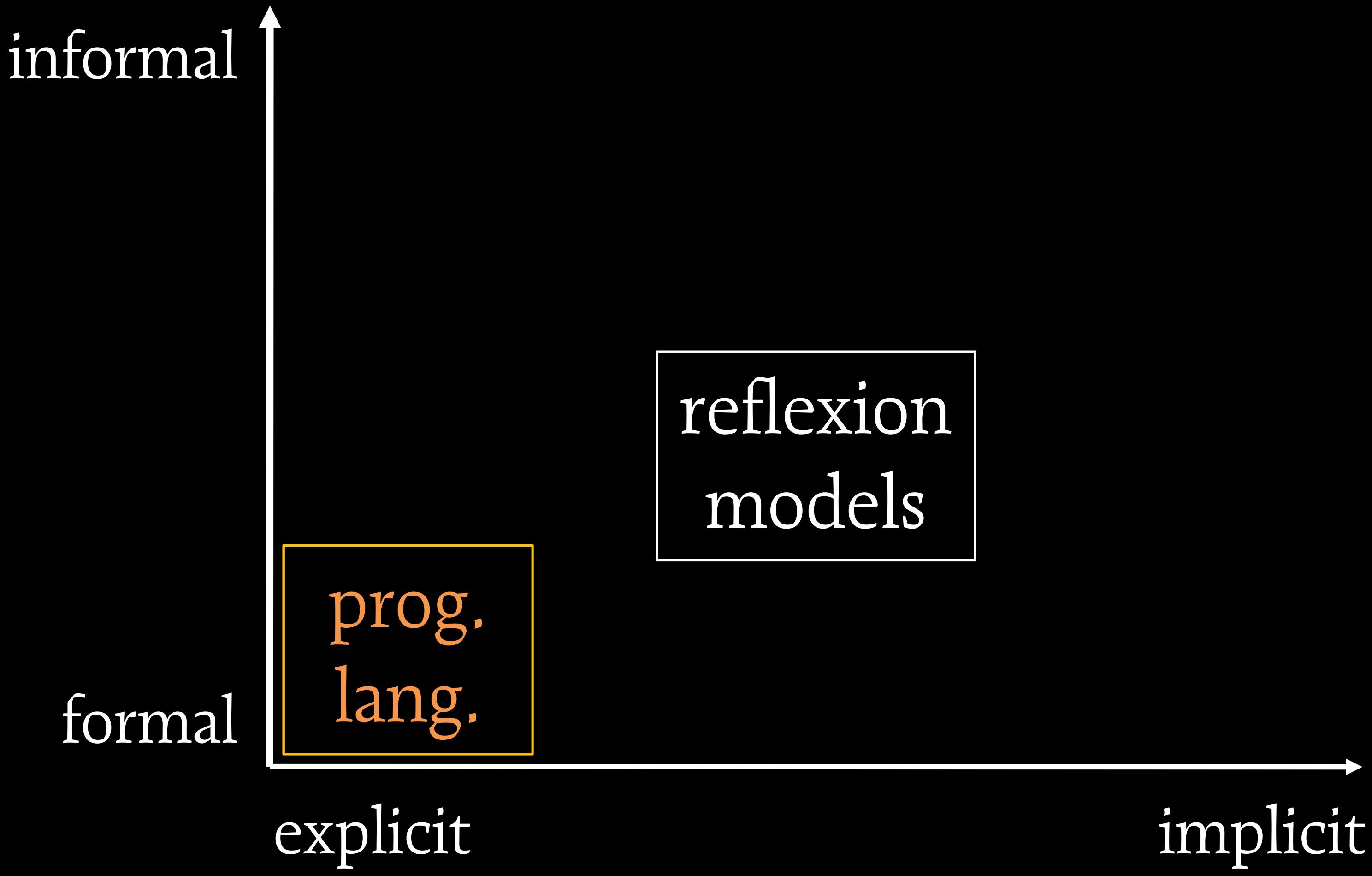
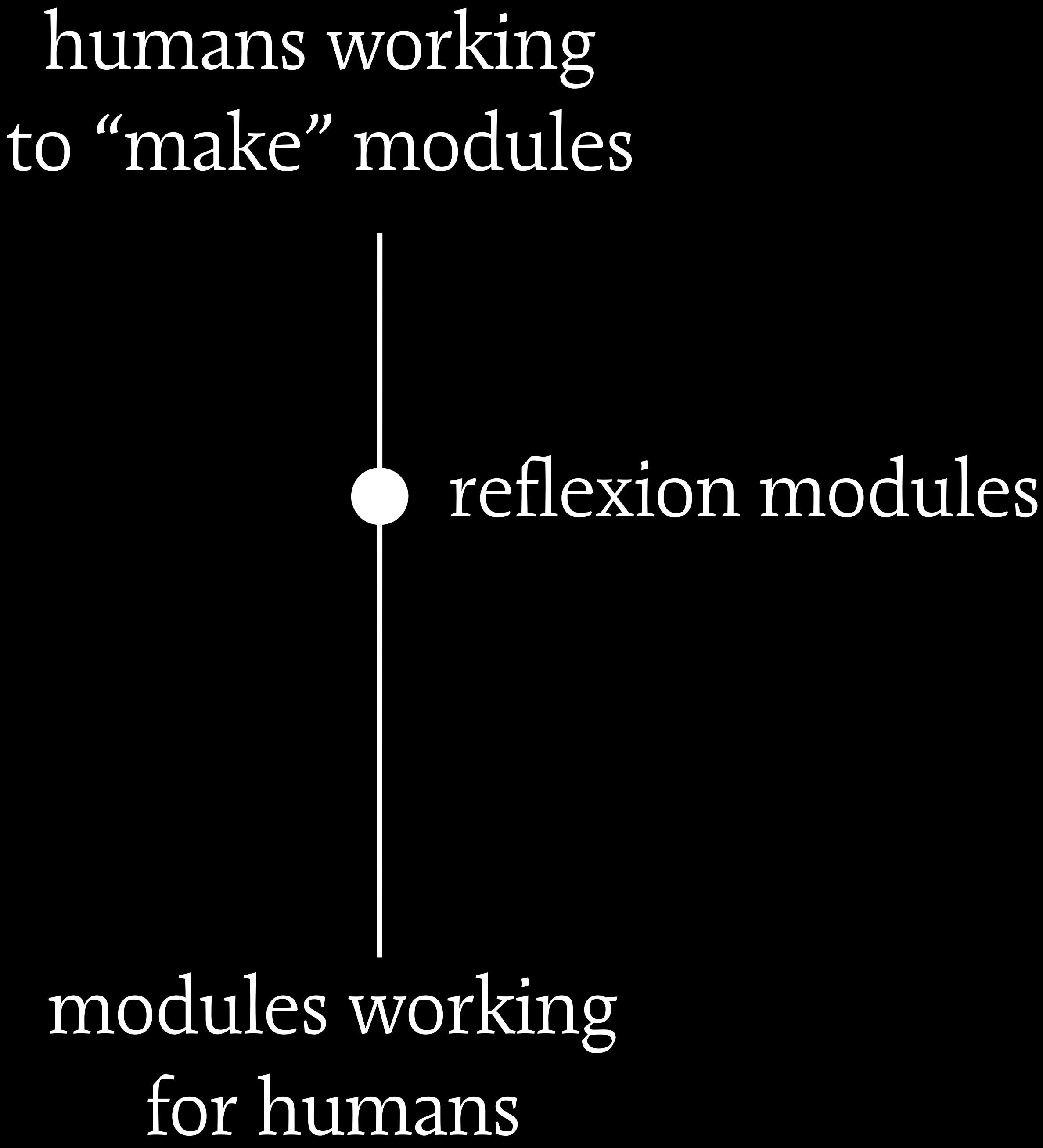
contiguous code with
data hiding and interfaces
(ownership)

task-oriented


informal
reflexion models
prog. lang.
formal
explicit
implicit

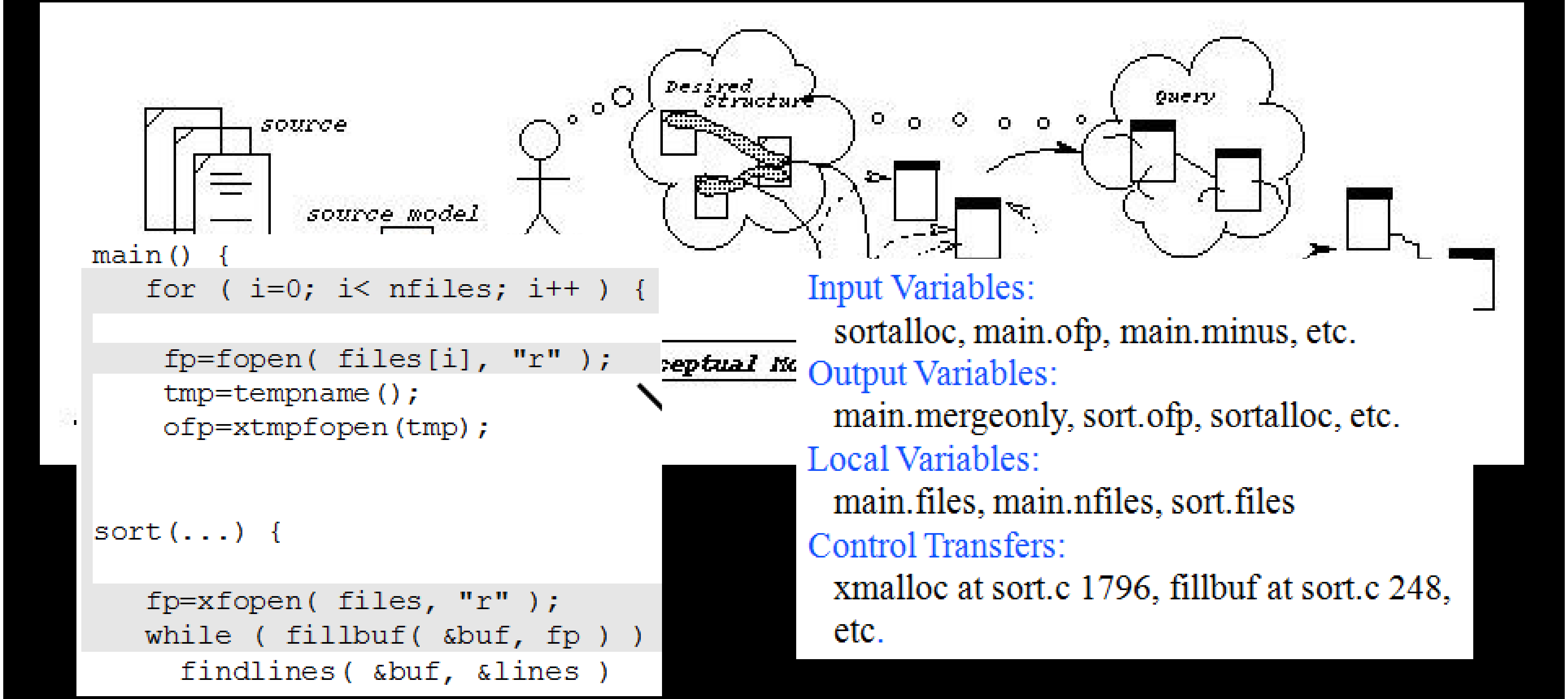


humans working
to “make” modules

reflexion modules

modules working
for humans

conceptual modules



```
main() {
   for ( i=0; i< nfiles; i++ ) {

      fp=fopen( files[i], "r" );
      tmp=tempname();
      ofp=xtmpfopen(tmp);


sort(...) {

   fp=xfopen( files, "r" );
   while ( fillbuf( &buf, fp ) )
      findlines( &buf, &lines )
```

Input Variables:
sortalloc, main.ofp, main.minus, etc.

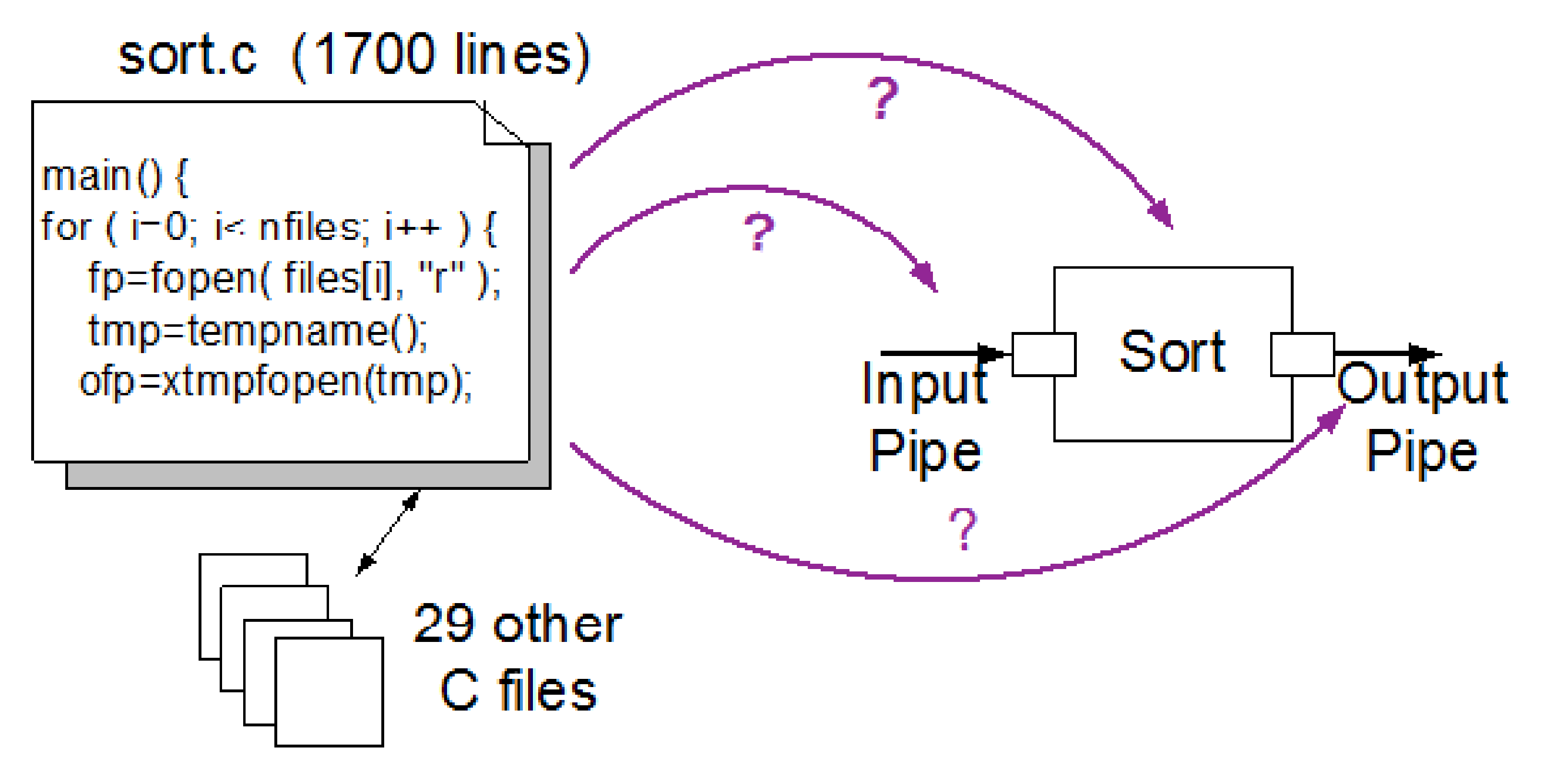
Output Variables:
main.mergeonly, sort.ofp, sortalloc, etc.

Local Variables:
main.files, main.nfiles, sort.files

Control Transfers:
xmalloc at sort.c 1796, fillbuf at sort.c 248, etc.

Baniassad and Murphy (1998)

conceptual modules
for reengineering



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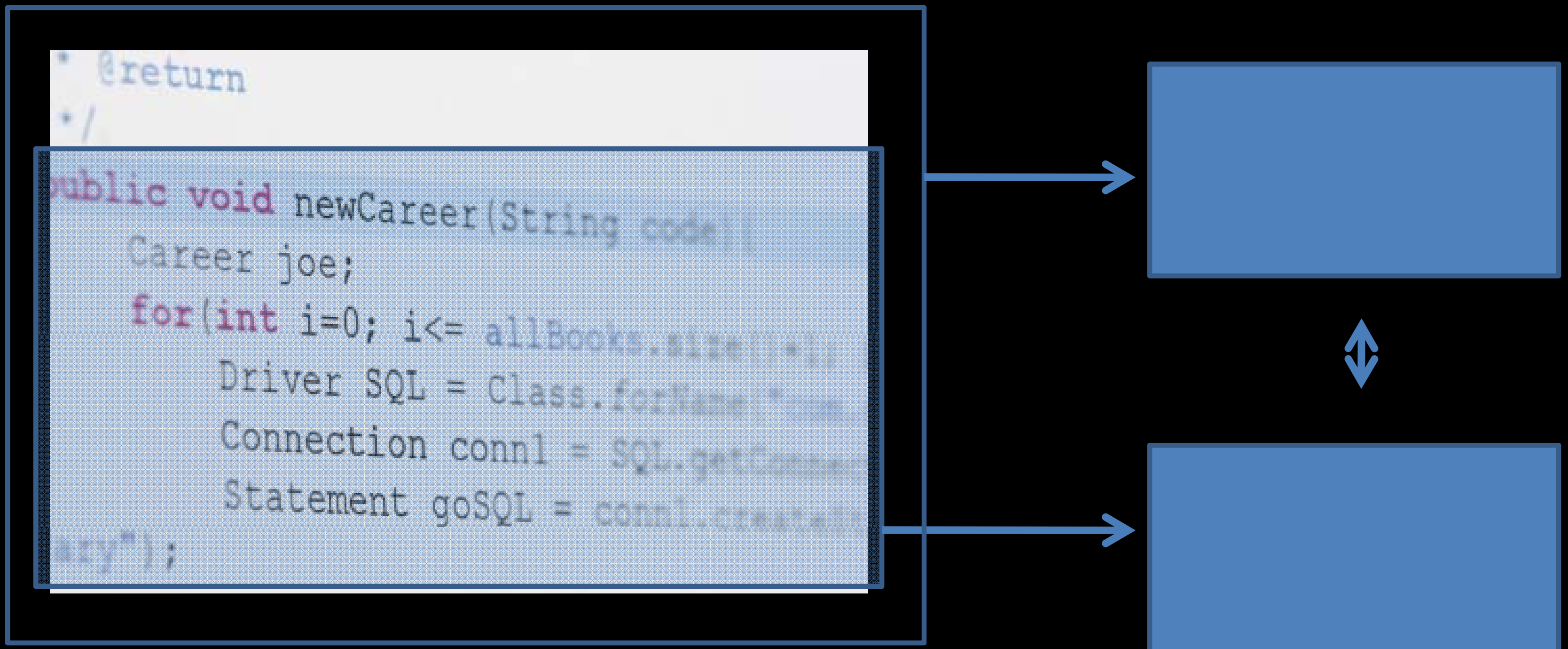
main() {
for ( i=0; i< nfiles; i++ ) {
    fp=fopen( files[i], "r" );
    tmp=tempname();
   ofp=xtmpfopen(tmp);
```

interface analysis

module relationships

conceptual modules



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```

contiguous code with data hiding and interfaces (ownership)

task-oriented

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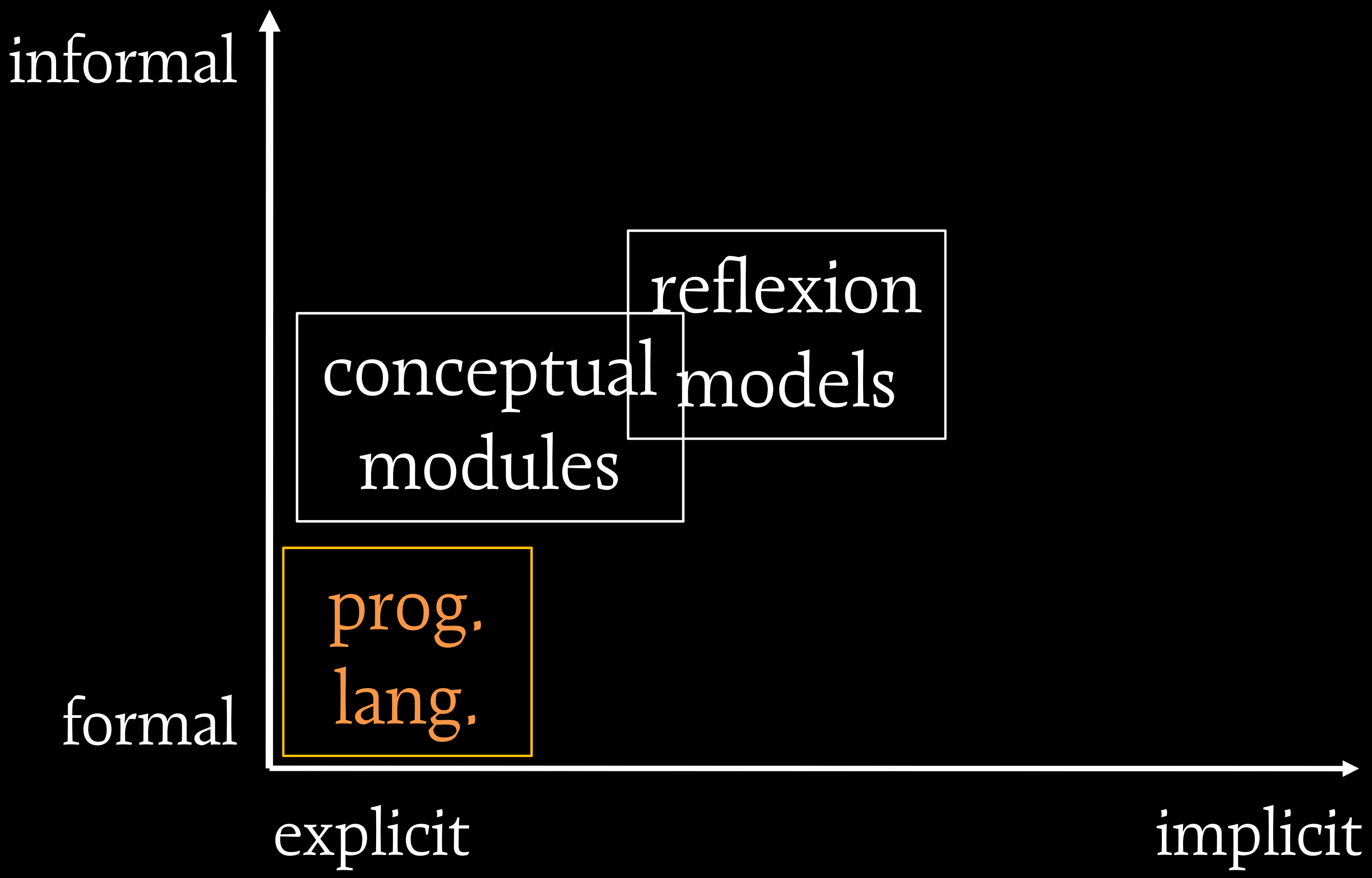


informal

formal

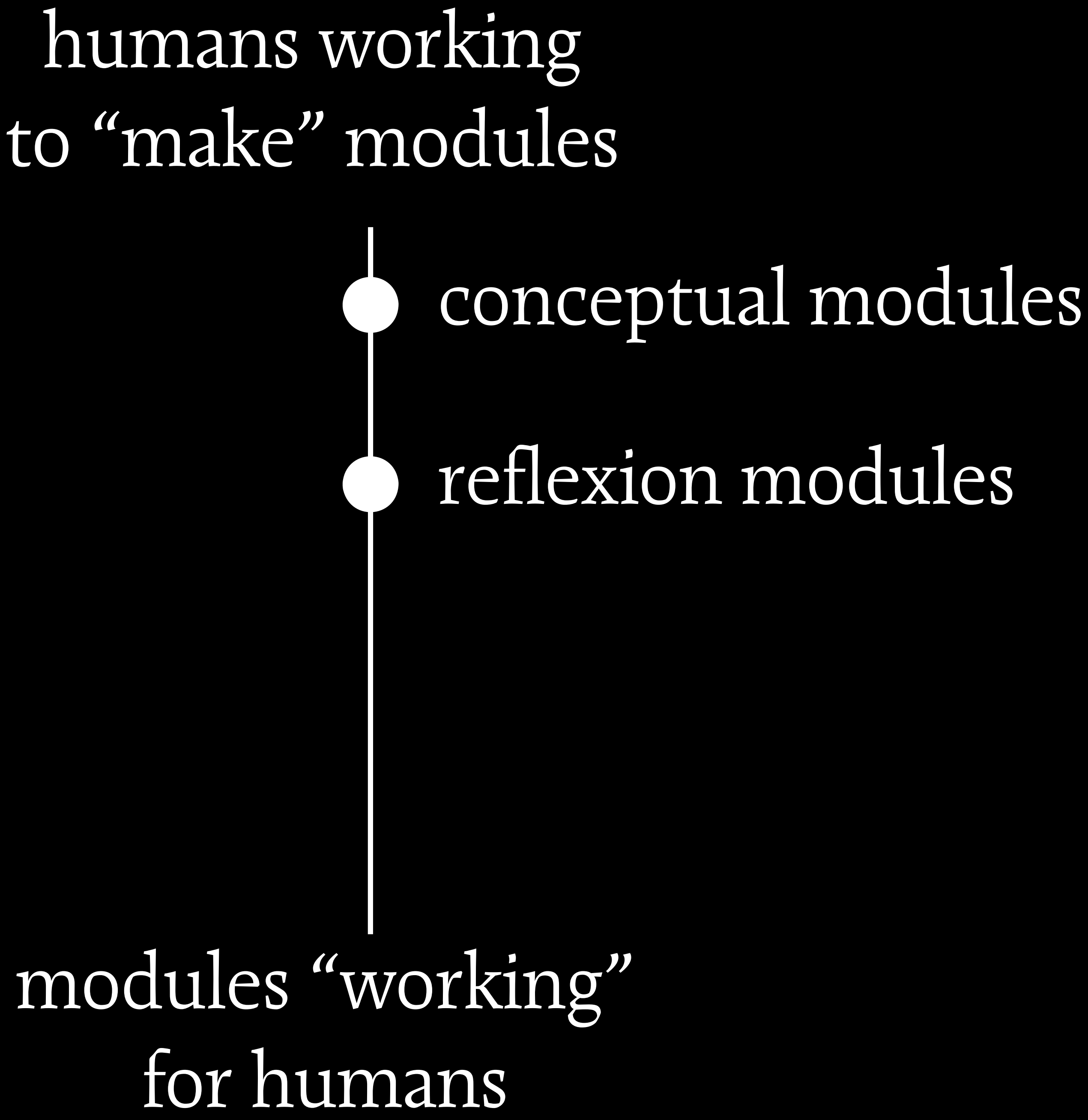
explicit

implicit

prog. lang.

conceptual modules

reflexion models



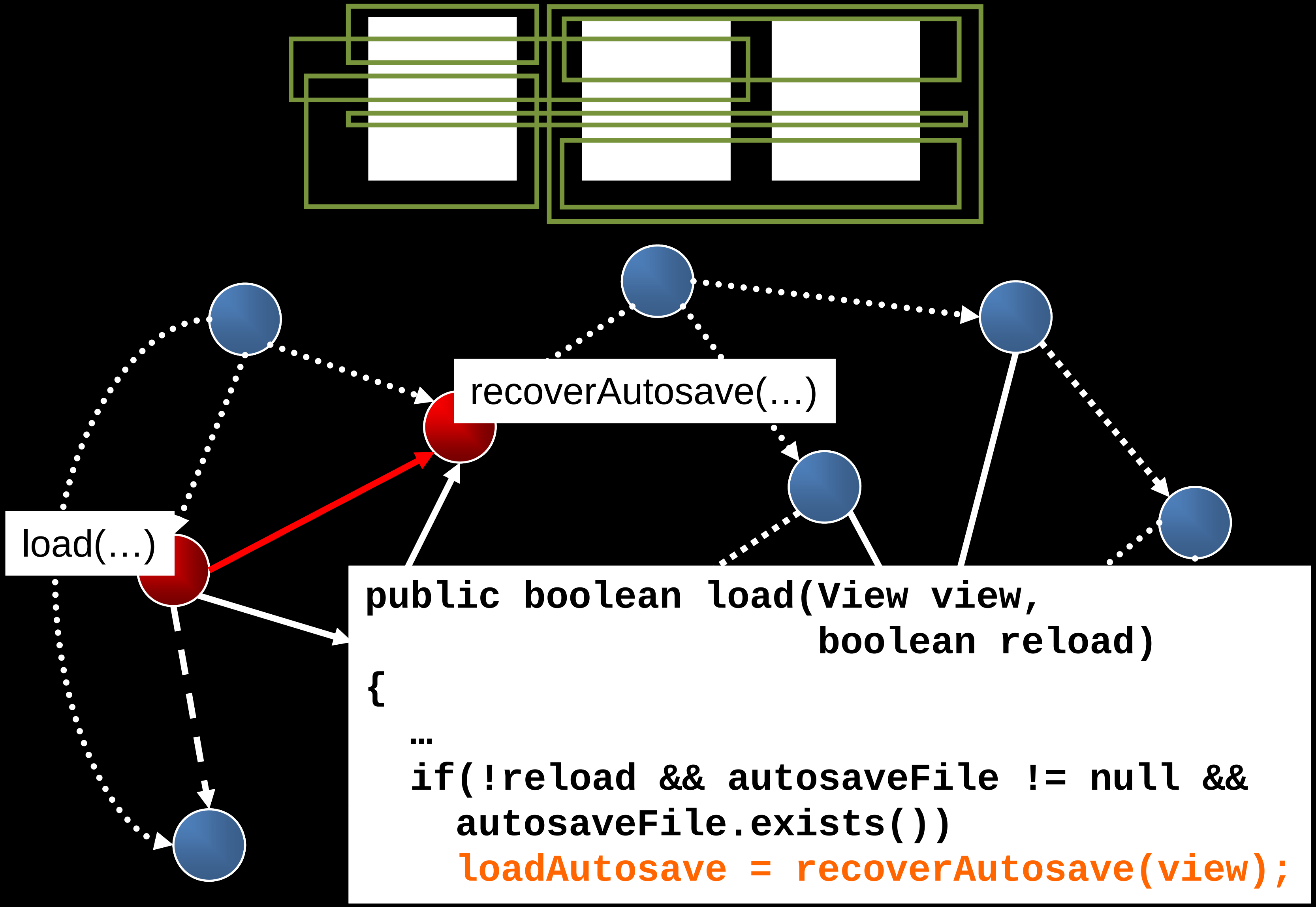
humans working
to “make” modules

conceptual modules

reflexion modules

modules “working”
for humans

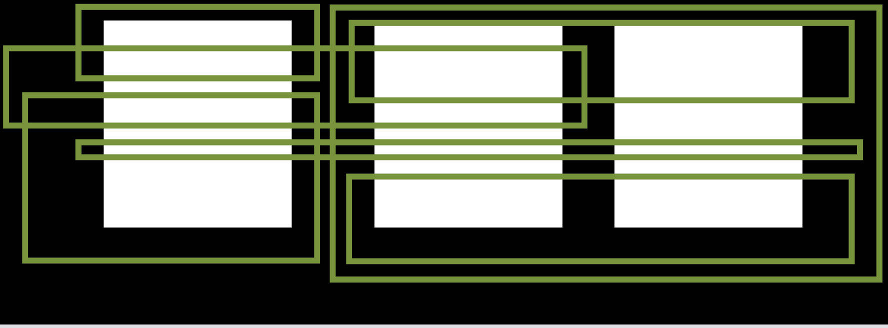
concern graphs

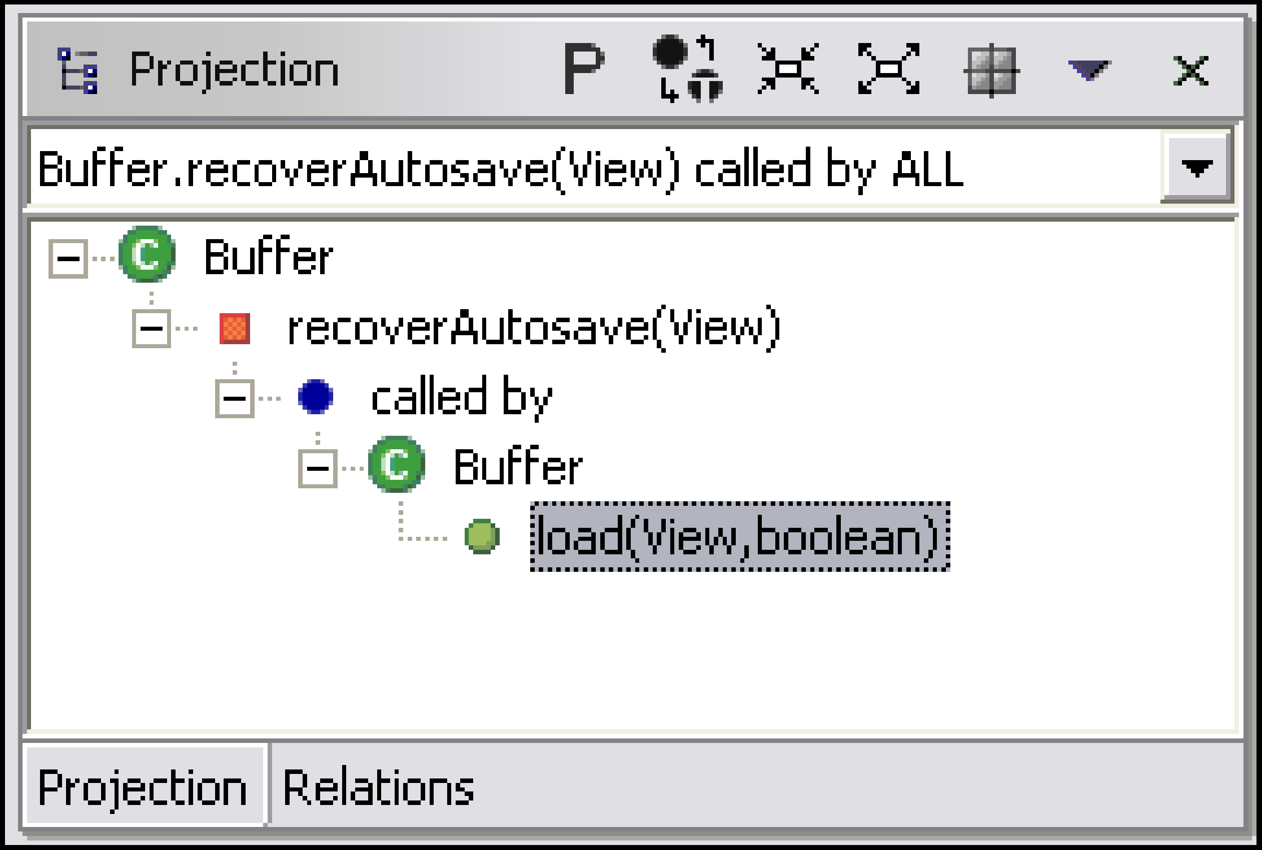


```
public boolean load(View view,
                    boolean reload)
{
  …
  if(!reload && autosaveFile != null &&
    autosaveFile.exists())
    loadAutosave = recoverAutosave(view);
```

Robillard and Murphy, 2002

concern graphs

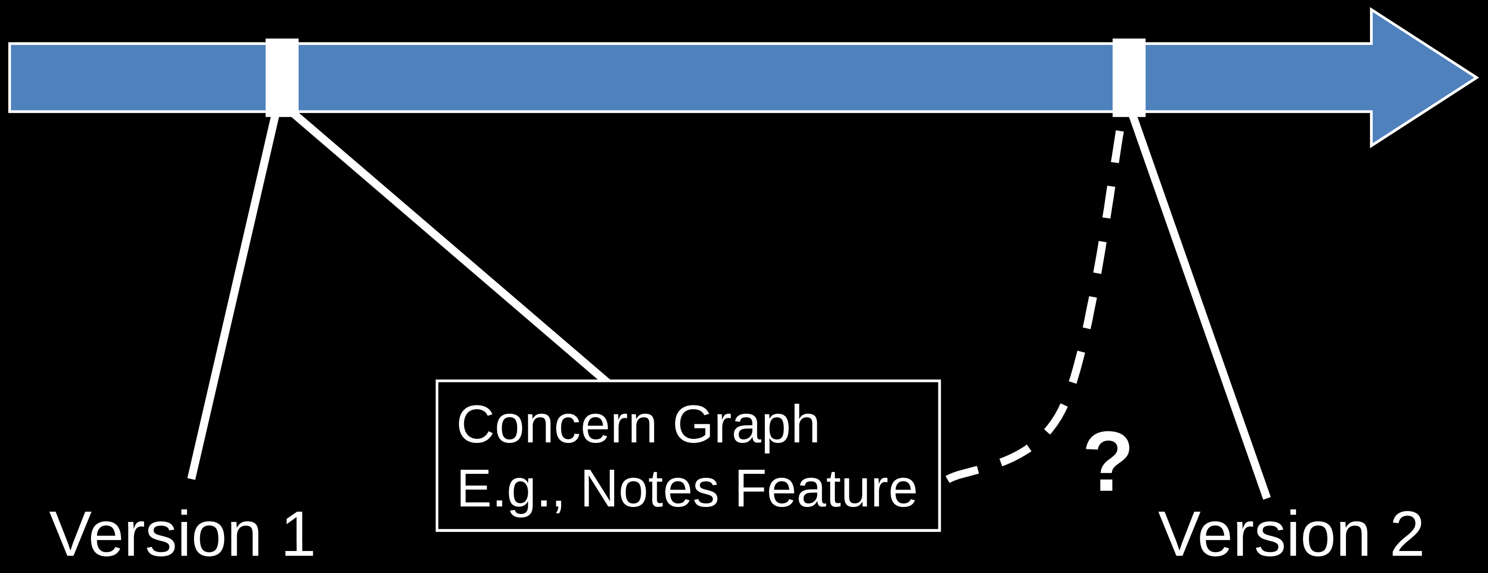




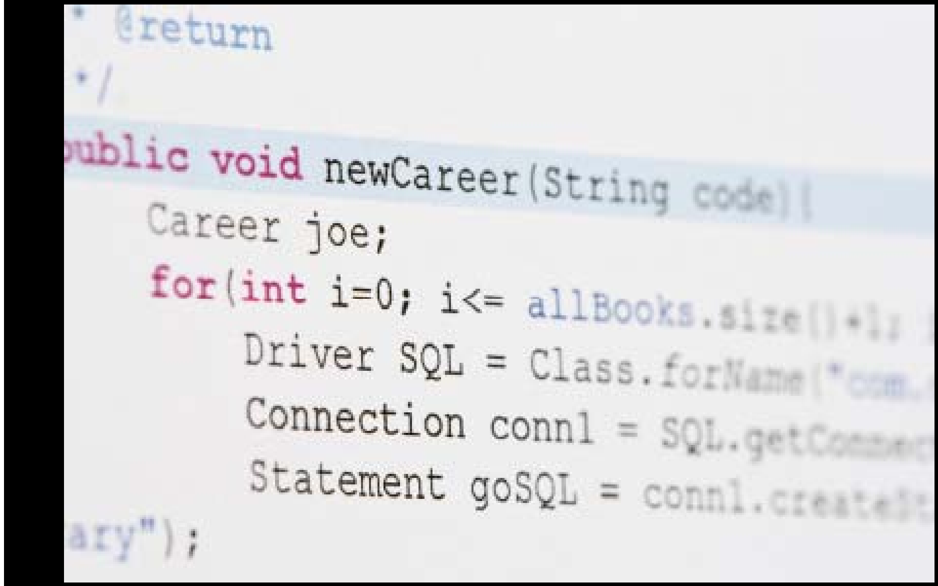
Buffer.recoverAutosave(View) called by ALL

- Buffer
  - recoverAutosave(View)
    - called by
      - Buffer
        - load(View,boolean)

concern graphs
for concern documentation



concern graphs



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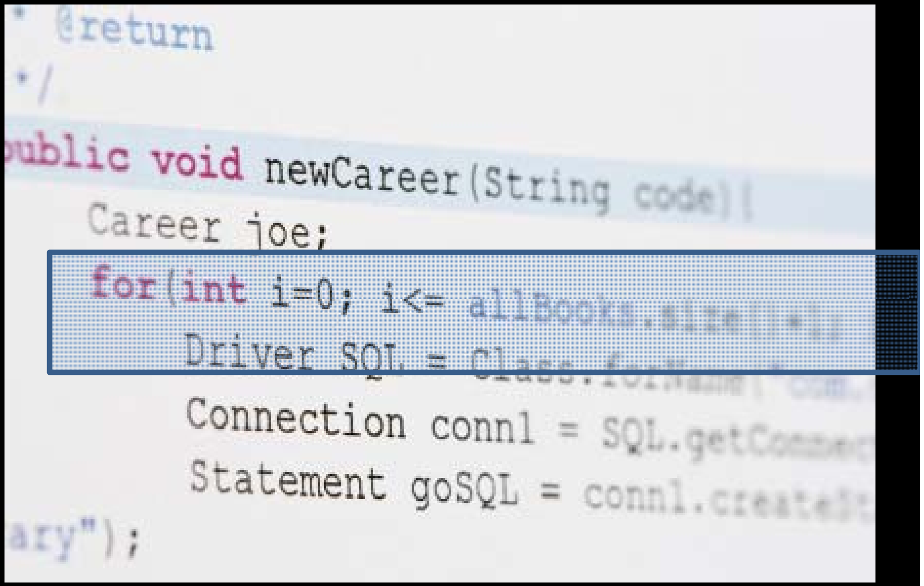
contiguous code with
data hiding and interfaces
(ownership)



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        Connection conn1 = SQL.getConnec
        Statement goSQL = conn1.createSt
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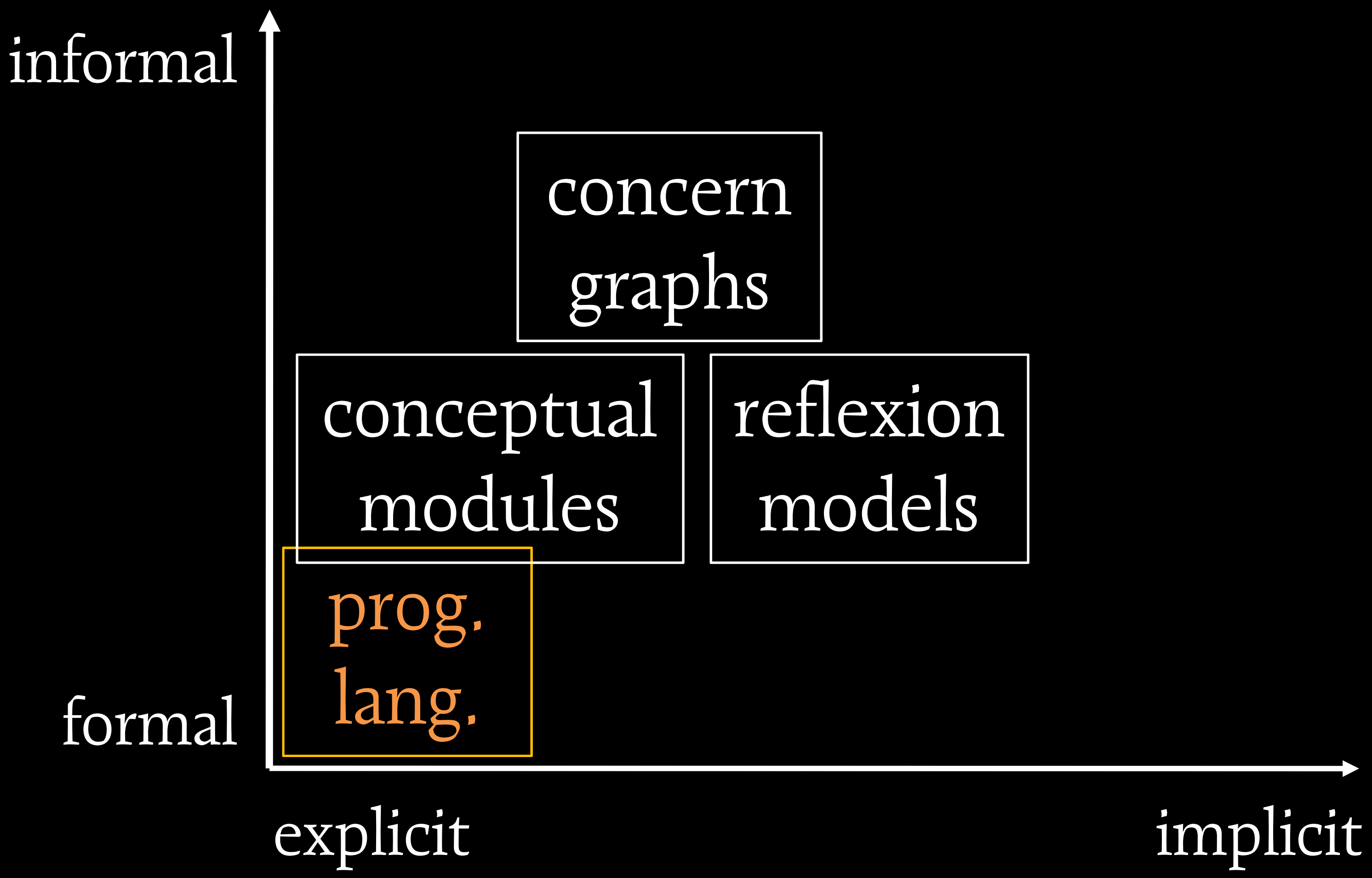
```

(fluid)
(ownership)



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humans working
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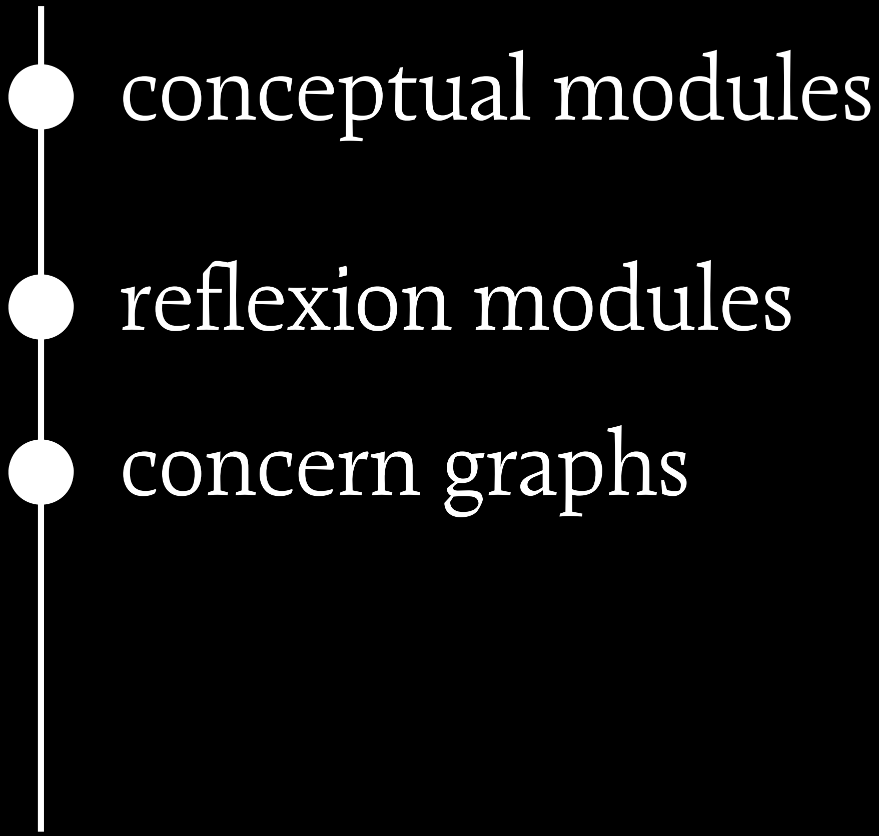


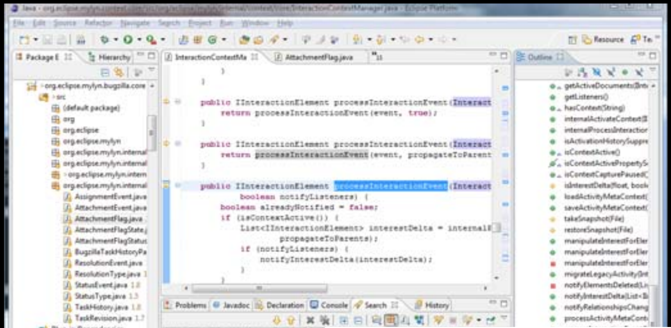
conceptual modules

reflexion modules

concern graphs

modules “working”
for humans

Eclipse mylyn



Package E | Hierarchy

- org.eclipse.mylyn.bugzilla.core
  - src
    - (default package)
    - org
    - org.eclipse
    - org.eclipse.mylyn
    - org.eclipse.mylyn.internal
    - org.eclipse.mylyn.internal
    - org.eclipse.mylyn.intern
    - org.eclipse.mylyn.internal
      - AssignmentEvent.java
      - AttachmentEvent.java
      - AttachmentFlag.java
      - AttachmentFlagState.j
      - AttachmentFlagStatus
      - BugzillaTaskHistoryPa
      - ResolutionEvent.java
      - ResolutionType.java
      - StatusEvent.java 1.8
      - StatusType.java 1.3
      - TaskHistory.java 1.8
      - TaskRevision.java 1.7
  - Plug-in Dependencies
  - JRE System Library [J2SE-1.3]
  - Referenced Libraries
  - .refactorings
  - .settings
  - META-INF
  - schema

InteractionContextMa | AttachmentFlag.java

```
        }
    }

    public IInteractionElement processInteractionEvent(Interact
        return processInteractionEvent(event, true);
    }

    public IInteractionElement processInteractionEvent(Interact
        return processInteractionEvent(event, propagateToParent
    }

    public IInteractionElement processInteractionEvent(Interact
            boolean notifyListeners) {
        boolean alreadyNotified = false;
        if (isContextActive()) {
            List<IInteractionElement> interestDelta = internalP
                    propagateToParents);
            if (notifyListeners) {
                notifyInterestDelta(interestDelta);
            }
        }
```

Problems | Javadoc | Declaration | Console | Search | History

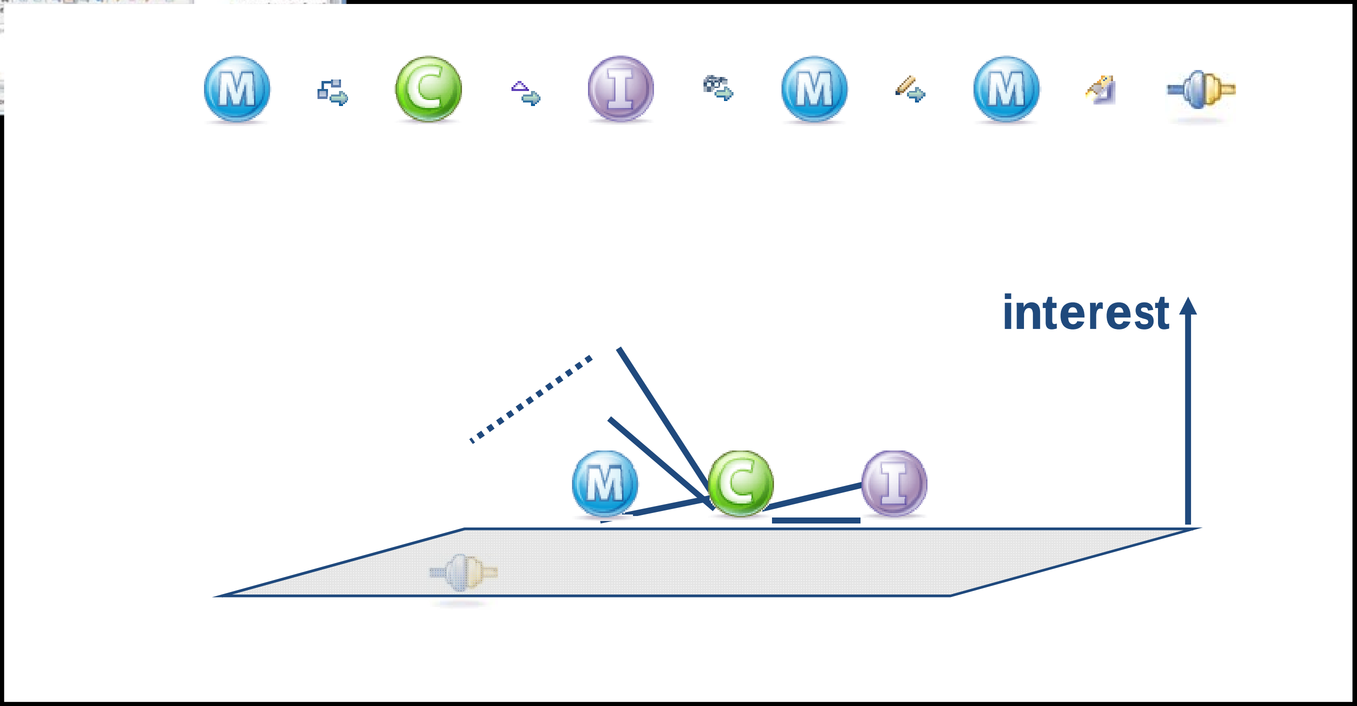
'org.eclipse.mylyn.monitor.core.InteractionEvent
filtered from view)

- org.eclipse.mylyn.context.core
  - IDegreeOfInterest 1.8
    - getEvents()
  - InteractionContext 1.13
  - InteractionContextManager 1.12

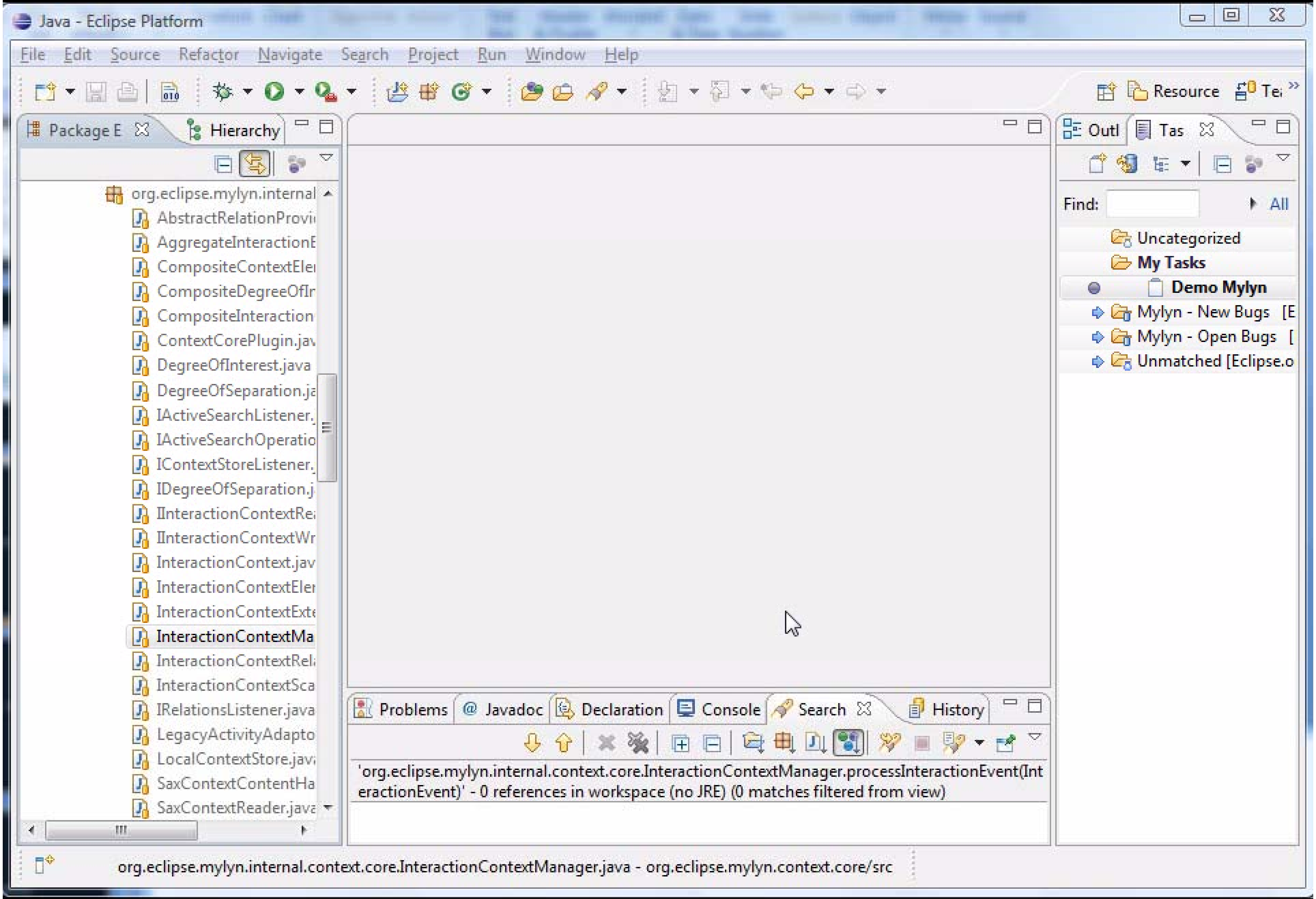
Outline

- getActiveDocuments(IInte
- getListeners()
- hasContext(String)
- internalActivateContext(I
- internalProcessInteraction
- isActivationHistorySuppre
- isContextActive()
- isContextActivePropertyS
- isContextCapturePaused(
- isInterestDelta(float, boole
- loadActivityMetaContext(
- saveActivityMetaContext(
- takeSnapshot(File)
- restoreSnapshot(File)
- manipulateInterestForEler
- manipulateInterestForEler
- manipulateInterestForEler
- migrateLegacyActivity(Int
- notifyElementsDeleted(Li
- notifyInterestDelta(List<I
- notifyRelationshipsChang
- processActivityMetaCont

org.eclipse.mylyn.internal.context.core.InteractionContextManag...ars) : Interactio



Kersten and Murphy (2005+)



org.eclipse.mylyn.internal
AbstractRelationProvi
AggregateInteractionE
CompositeContextEle
CompositeDegreeOfIr
CompositeInteraction
ContextCorePlugin.jav
DegreeOfInterest.java
DegreeOfSeparation.ja
IActiveSearchListener.
IActiveSearchOperatio
IContextStoreListener.
IDegreeOfSeparation.j
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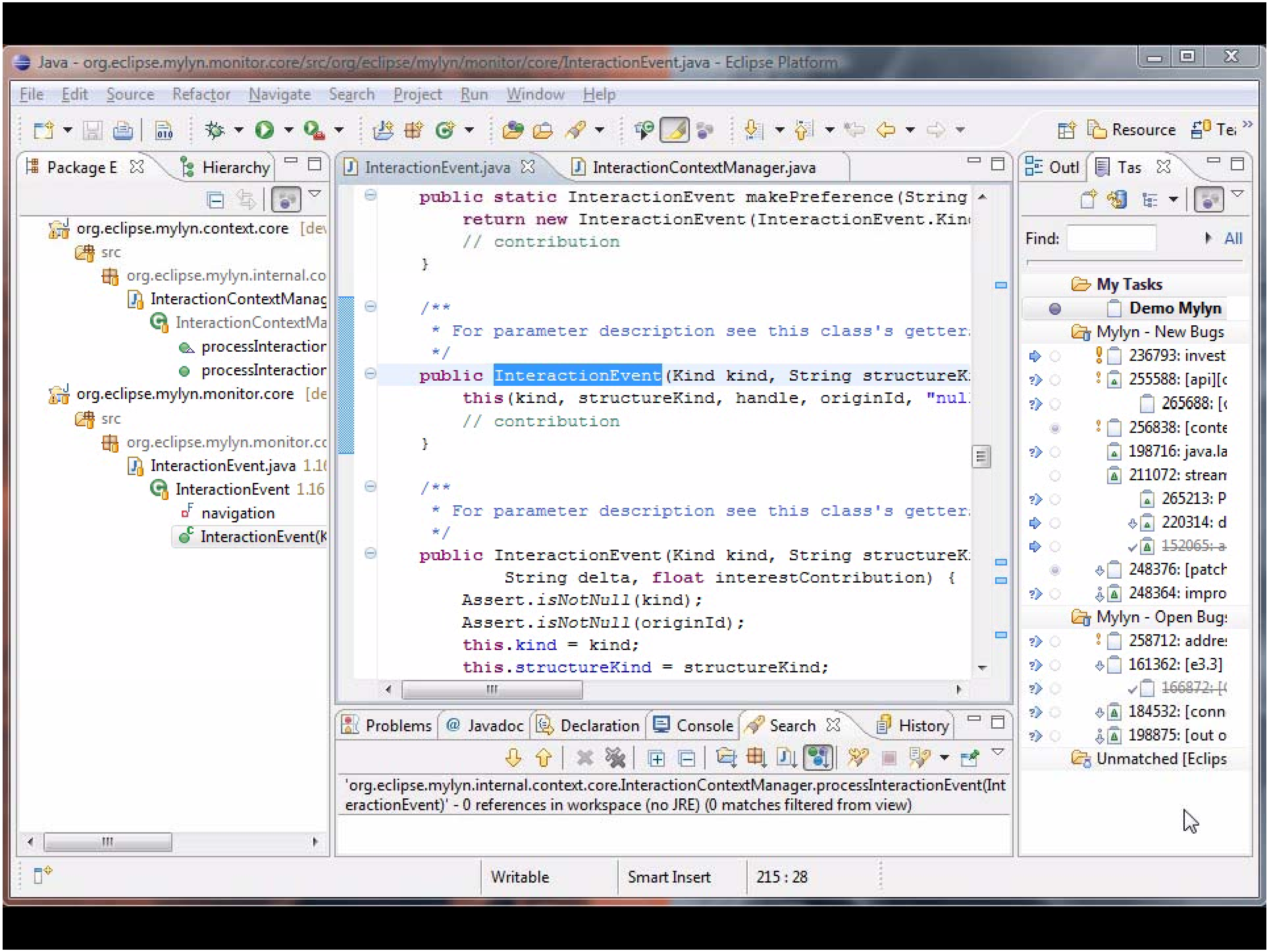
IInteractionContextWr
InteractionContext.jav
InteractionContextEle
InteractionContextExte
InteractionContextMa
InteractionContextRel
InteractionContextSca
IRelationsListener.java
LegacyActivityAdapto
LocalContextStore.jav
SaxContextContentHa
SaxContextReader.java

Uncategorized
My Tasks
Demo Mylyn
Mylyn - New Bugs [E
Mylyn - Open Bugs [
Unmatched [Eclipse.o

'org.eclipse.mylyn.internal.context.core.InteractionContextManager.processInteractionEvent(InteractionEvent)' - 0 references in workspace (no JRE) (0 matches filtered from view)

org.eclipse.mylyn.internal.context.core.InteractionContextManager.java - org.eclipse.mylyn.context.core/src



org.eclipse.mylyn.context.core [de
src
org.eclipse.mylyn.internal.co
InteractionContextManag
InteractionContextMa
processInteraction
processInteraction
org.eclipse.mylyn.monitor.core [de
src
org.eclipse.mylyn.monitor.cc
InteractionEvent.java 1.1
InteractionEvent 1.16
navigation
InteractionEvent(K

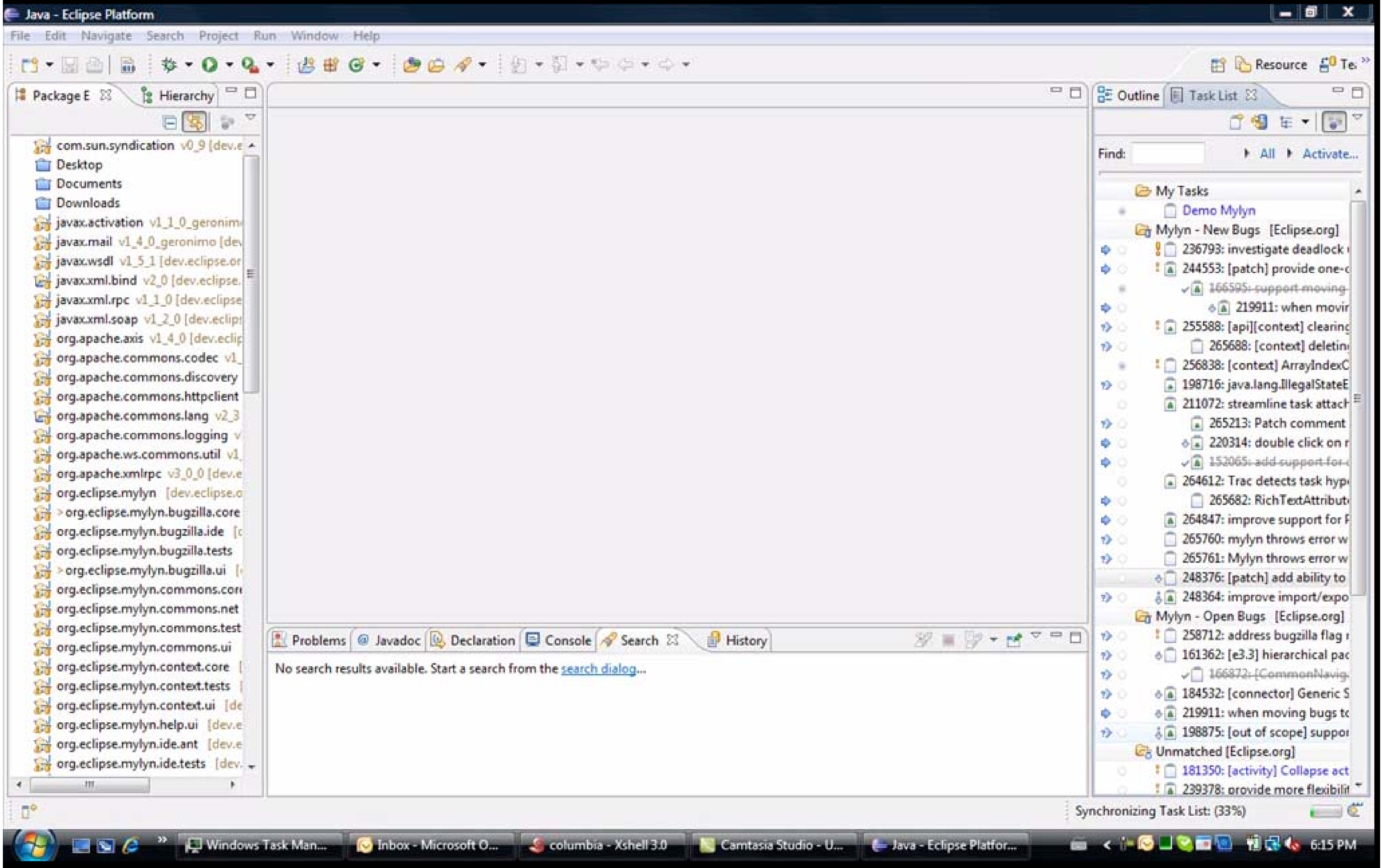
```
    public static InteractionEvent makePreference(String
        return new InteractionEvent(InteractionEvent.Kin
        // contribution
    }

    /**
     * For parameter description see this class's getter
     */
    public InteractionEvent(Kind kind, String structureK
        this(kind, structureKind, handle, originId, "nul
        // contribution
    }

    /**
     * For parameter description see this class's getter
     */
    public InteractionEvent(Kind kind, String structureK
            String delta, float interestContribution) {
        Assert.isNotNull(kind);
        Assert.isNotNull(originId);
        this.kind = kind;
        this.structureKind = structureKind;
```

'org.eclipse.mylyn.internal.context.core.InteractionContextManager.processInteractionEvent(InteractionEvent)' - 0 references in workspace (no JRE) (0 matches filtered from view)

My Tasks
Demo Mylyn
Mylyn - New Bugs
236793: invest
255588: [api][c
265688: [
256838: [conte
198716: java.la
211072: strean
265213: P
220314: d
~~152065: a~~
248376: [patch
248364: impro
Mylyn - Open Bug:
258712: addre:
161362: [e3.3]
~~166872: [~~
184532: [conn
198875: [out o
Unmatched [Eclips



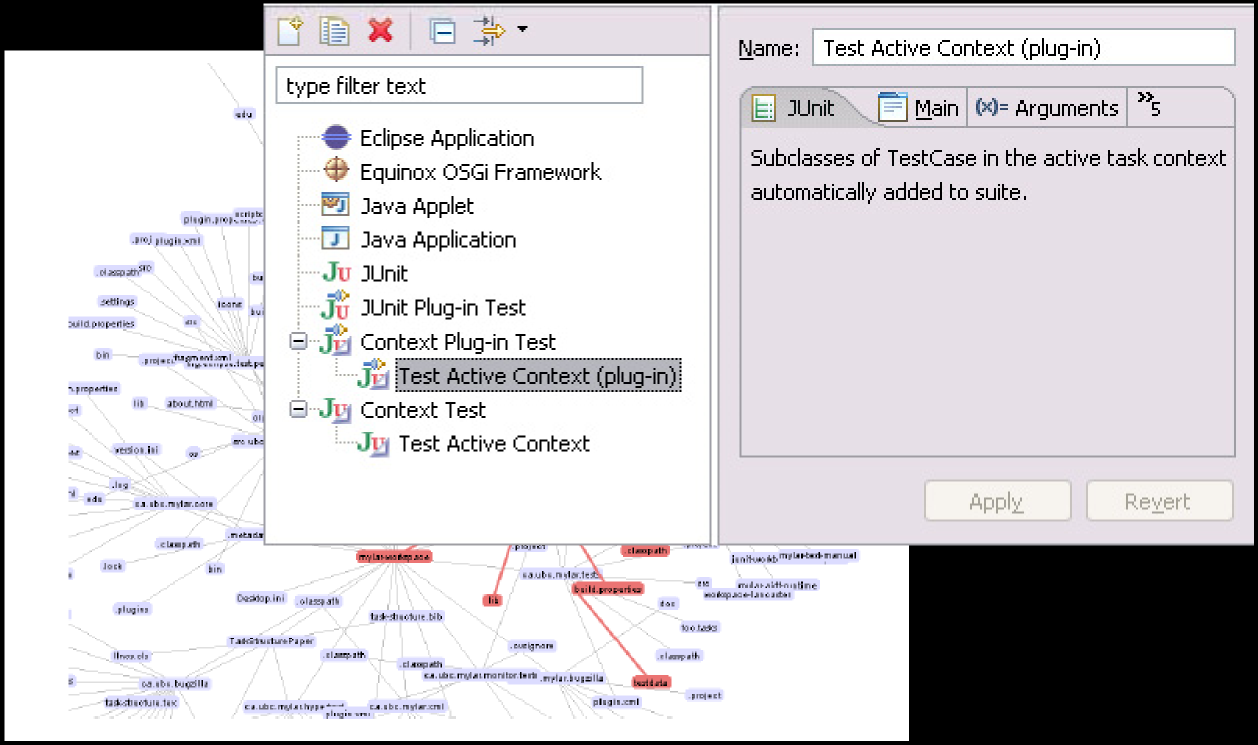
com.sun.syndication v0_9 [dev.e
Desktop
Documents
Downloads
javax.activation v1_1_0_geronim
javax.mail v1_4_0_geronimo [dev
javax.wsdl v1_5_1 [dev.eclipse.or
javax.xml.bind v2_0 [dev.eclipse.
javax.xml.rpc v1_1_0 [dev.eclipse
javax.xml.soap v1_2_0 [dev.eclip
org.apache.axis v1_4_0 [dev.eclip
org.apache.commons.codec v1_
org.apache.commons.discovery
org.apache.commons.httpclient
org.apache.commons.lang v2_3
org.apache.commons.logging v
org.apache.ws.commons.util v1_
org.apache.xmlrpc v3_0_0 [dev.e
org.eclipse.mylyn [dev.eclipse.o
> org.eclipse.mylyn.bugzilla.core
org.eclipse.mylyn.bugzilla.ide [c
org.eclipse.mylyn.bugzilla.tests
> org.eclipse.mylyn.bugzilla.ui [
org.eclipse.mylyn.commons.core
org.eclipse.mylyn.commons.net
org.eclipse.mylyn.commons.test
org.eclipse.mylyn.commons.ui
org.eclipse.mylyn.context.core [
org.eclipse.mylyn.context.tests [
org.eclipse.mylyn.context.ui [de
org.eclipse.mylyn.help.ui [dev.e
org.eclipse.mylyn.ide.ant [dev.e
org.eclipse.mylyn.ide.tests [dev.

My Tasks
Demo Mylyn
Mylyn - New Bugs [Eclipse.org]
236793: investigate deadlock
244553: [patch] provide one-
~~166595: support moving~~
219911: when movir
255588: [api][context] clearinc
265688: [context] deletin
256838: [context] ArrayIndexC
198716: java.lang.IllegalStateE
211072: streamline task attach
265213: Patch comment
220314: double click on r
~~152065: add support for~~
264612: Trac detects task hyp
265682: RichTextAttribut
264847: improve support for F
265760: mylyn throws error w
265761: Mylyn throws error w
248376: [patch] add ability to
248364: improve import/expo
Mylyn - Open Bugs [Eclipse.org]
258712: address bugzilla flag
161362: [e3.3] hierarchical pac
~~166872: [CommonNavig~~
184532: [connector] Generic S
219911: when moving bugs to
198875: [out of scope] suppor
Unmatched [Eclipse.org]
181350: [activity] Collapse act
239378: provide more flexibilit

No search results available. Start a search from the search dialog...

Synchronizing Task List: (33%)

mylyn
for overload
for collaboration
for recommendations



type filter text

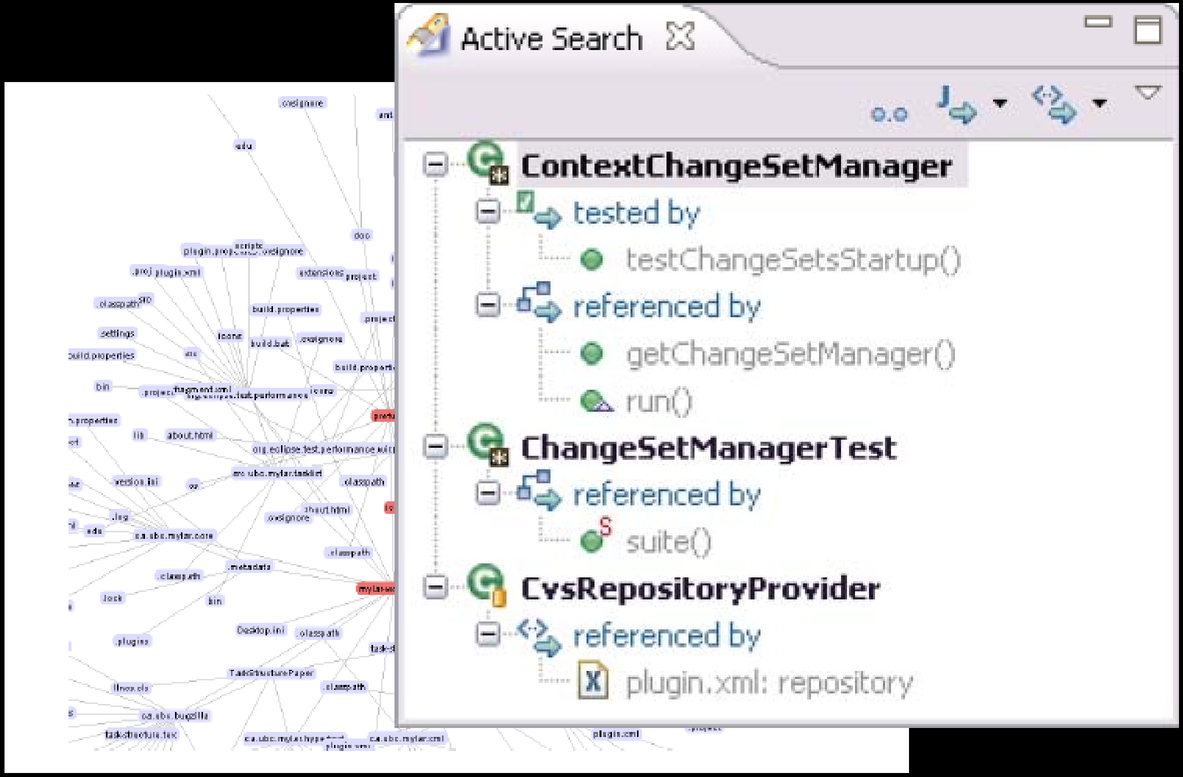
- Eclipse Application
- Equinox OSGi Framework
- Java Applet
- Java Application
- JUnit
- JUnit Plug-in Test
- Context Plug-in Test
  - Test Active Context (plug-in)
- Context Test
  - Test Active Context

Name: Test Active Context (plug-in)

Subclasses of TestCase in the active task context automatically added to suite.

run unit test cases related to task context

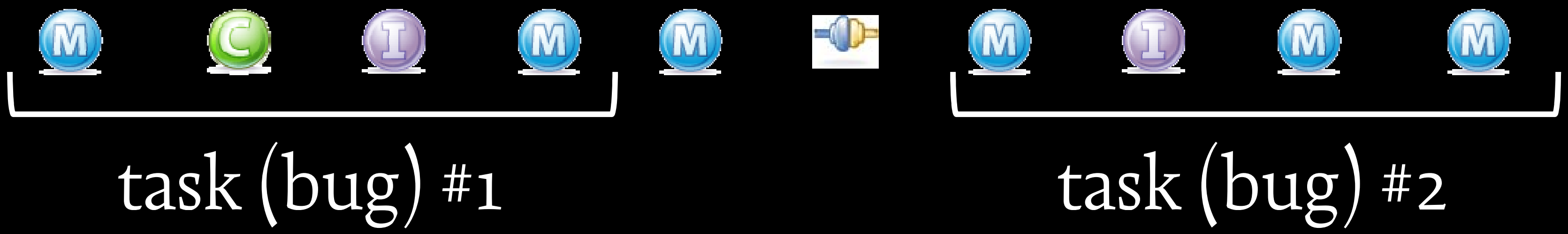
mylyn
for overload
for collaboration
for recommendations



- ContextChangeSetManager
  - tested by
    - testChangeSetsStartup()
  - referenced by
    - getChangeSetManager()
    - run()
- ChangeSetManagerTest
  - referenced by
    - suite()
- CvsRepositoryProvider
  - referenced by
    - plugin.xml: repository

search for
likely
useful
elements
related to
task context

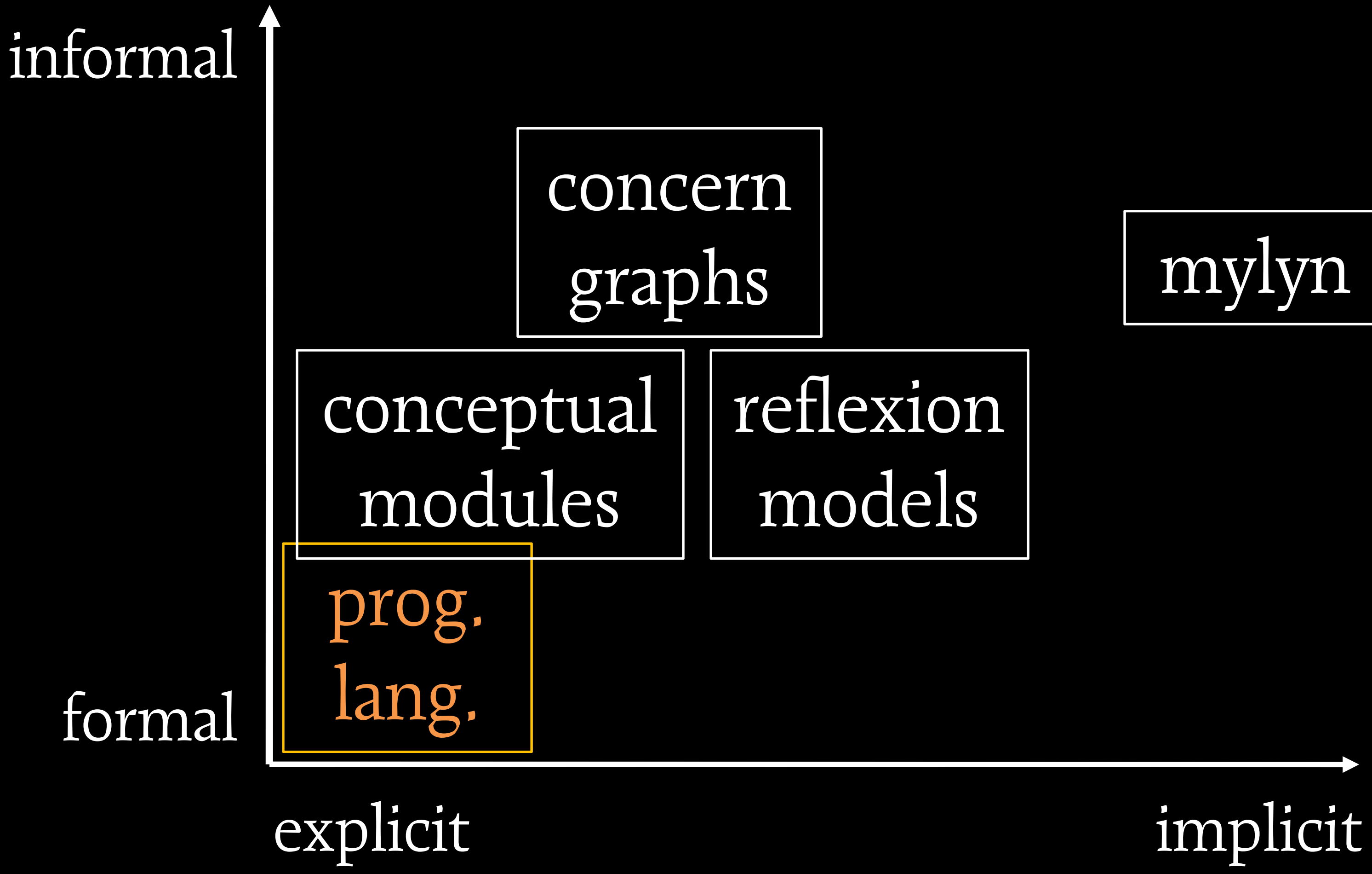
mylyn



task (bug) #1

task (bug) #2

unit of work
fluid and task-oriented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concern graphs
mylyn
conceptual modules
reflexion models
prog. lang.
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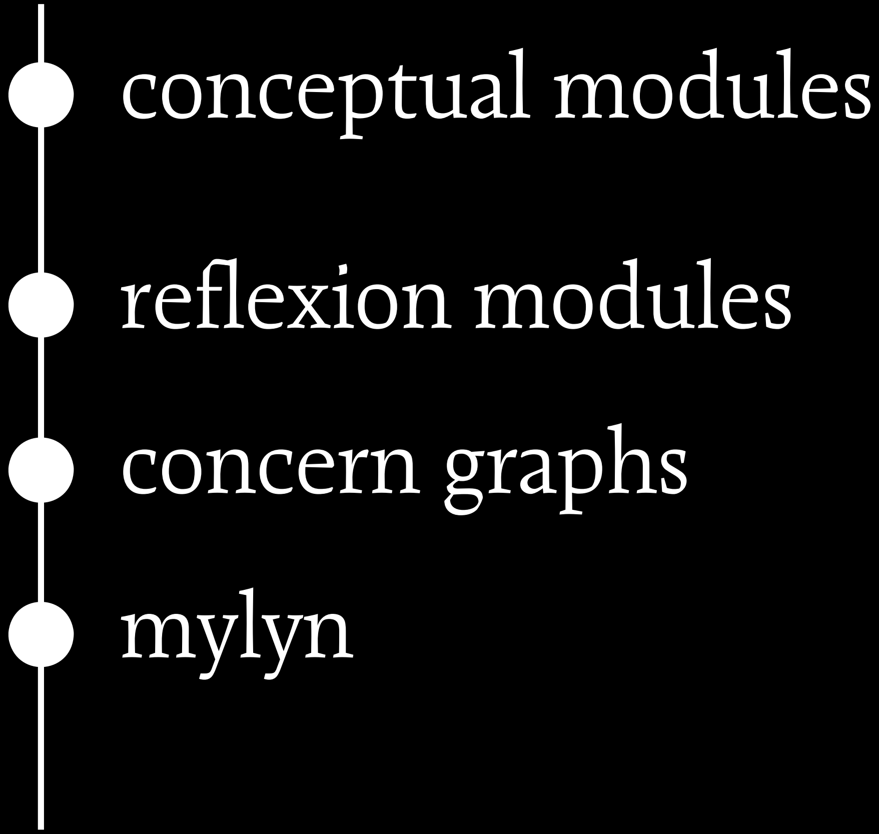
implicit

humans working
to “make” modules



conceptual modules

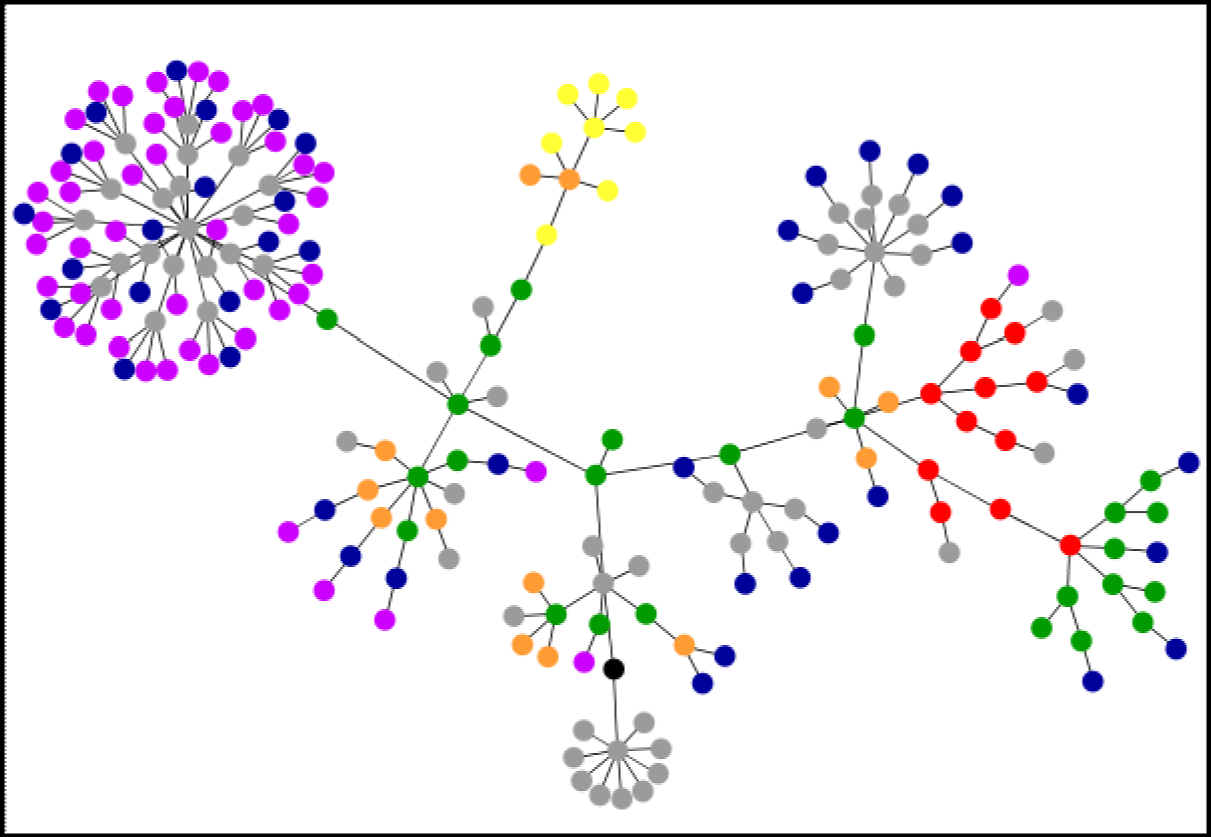
reflexion modules

concern graphs

mylyn

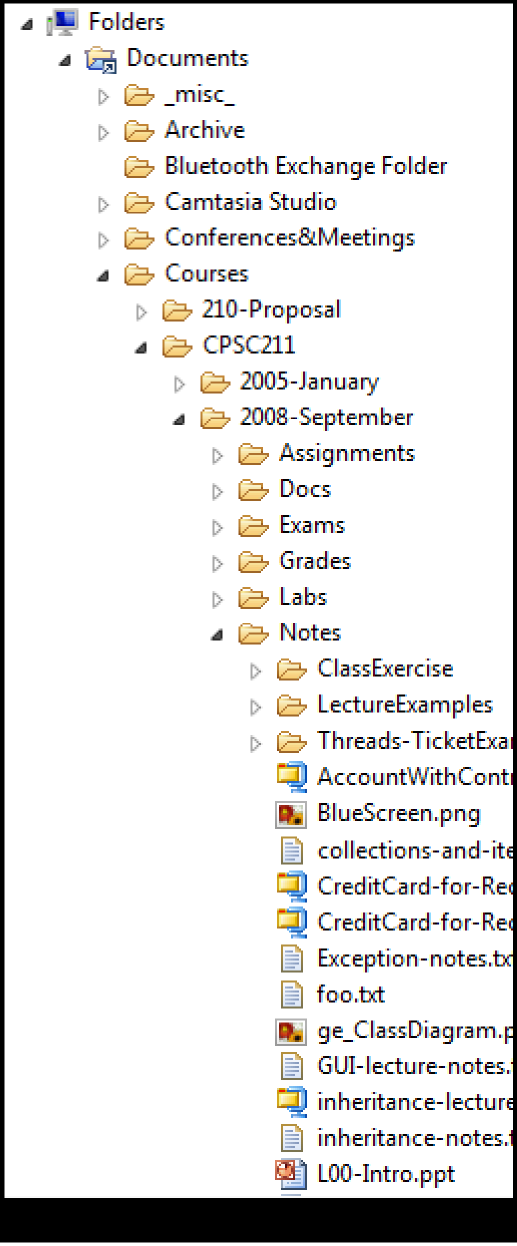
modules “working”
for humans

aosd.net web page



http://www.aharef.info/static/htmlgraph/

file systems



- Folders
  - Documents
    - _misc_
    - Archive
    - Bluetooth Exchange Folder
    - Camtasia Studio
    - Conferences&Meetings
    - Courses
      - 210-Proposal
      - CPSC211
        - 2005-January
        - 2008-September
          - Assignments
          - Docs
          - Exams
          - Grades
          - Labs
          - Notes
            - ClassExercise
            - LectureExamples
            - Threads-TicketExa
            - AccountWithCont
            - BlueScreen.png
            - collections-and-ite
            - CreditCard-for-Re
            - CreditCard-for-Re
            - Exception-notes.tx
            - foo.txt
            - ge_ClassDiagram.p
            - GUI-lecture-notes.
            - inheritance-lecture
            - inheritance-notes.
            - L00-Intro.ppt

knowledge worker field study (early Mylyn)

average path length	average directory density	scattering	tagging ratio
5.5	0.1	1.5	0.3
2.7	0.2	1.1	0.9
3	0.1	1.4	0.4
2	0.3	0	0
1	0.01	1	0.4

folder nesting

knowledge worker field study (early Mylyn)

average path length	average directory density	scattering	tagging ratio
5.5	0.1	1.5	0.3
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3	0.1	1.4	0.4
2	0.3	0	0
1	0.01	1	0.4

ratio of interesting files in directory

knowledge worker field study (early Mylyn)

average path length	average directory density	scattering	tagging ratio
5.5	0.1	1.5	0.3
2.7	0.2	1.1	0.9
3	0.1	1.4	0.4
2	0.3	0	0
1	0.01	1	0.4

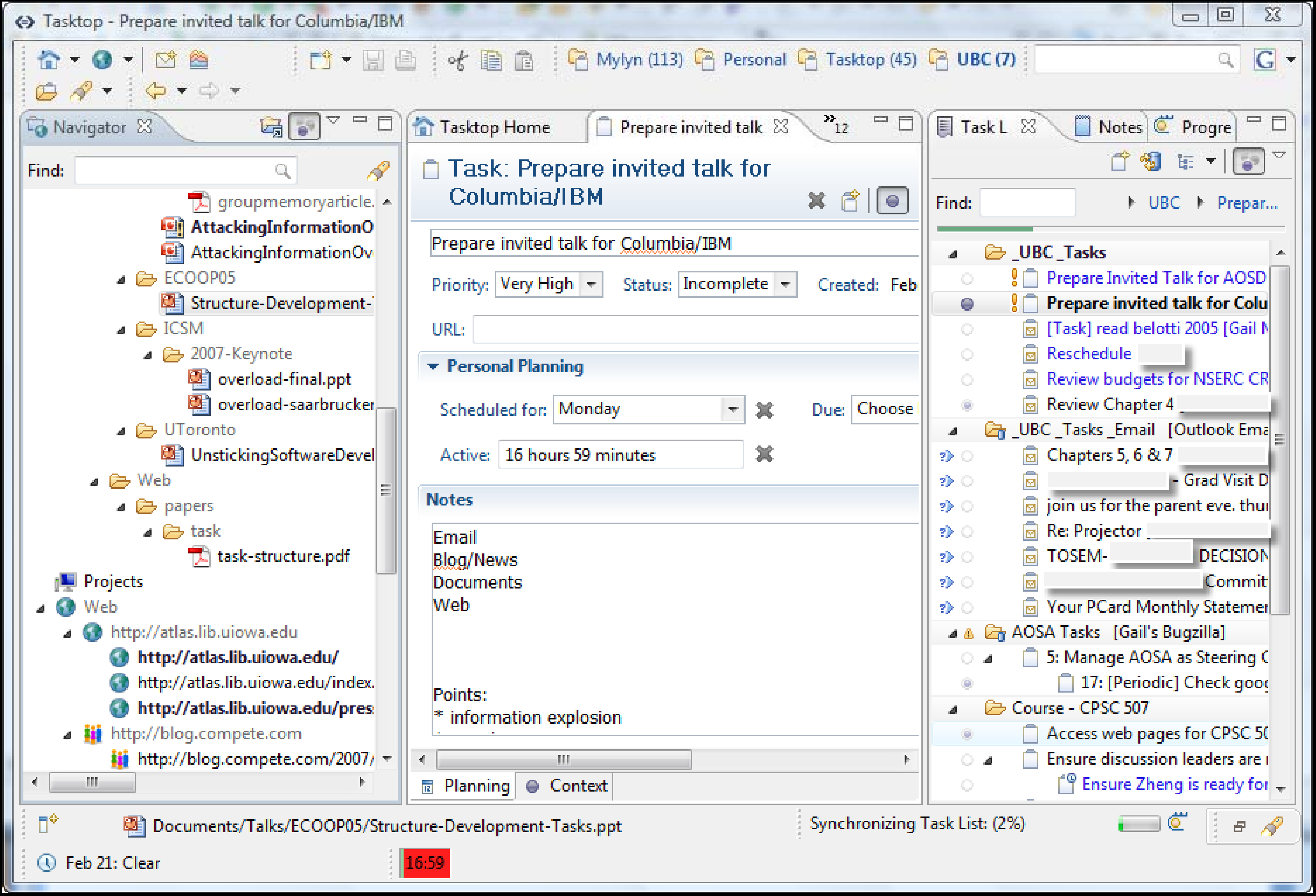
distance to common parent

knowledge worker field study (early Mylyn)

average path length	average directory density	scattering	tagging ratio
5.5	0.1	1.5	0.3
2.7	0.2	1.1	0.9
3	0.1	1.4	0.4
2	0.3	0	0
1	0.01	1	0.4

common substring

Tasktop (Mylyn to the desktop)



Tasktop - Prepare invited talk for Columbia/IBM

Mylyn (113) Personal Tasktop (45) UBC (7)

Navigator

Find:

- groupmemoryarticle.
- **AttackingInformationO**
- AttackingInformationOv
- ECOOP05
  - Structure-Development-
- ICSM
  - 2007-Keynote
    - overload-final.ppt
    - overload-saarbrucker
- UToronto
  - UnstickingSoftwareDevel
- Web
  - papers
    - task
      - task-structure.pdf
- Projects
- Web
  - http://atlas.lib.uiowa.edu
    - **http://atlas.lib.uiowa.edu/**
    - http://atlas.lib.uiowa.edu/index.
    - **http://atlas.lib.uiowa.edu/pres**
  - http://blog.compete.com
    - http://blog.compete.com/2007/

Tasktop Home | Prepare invited talk | »12

Task: Prepare invited talk for Columbia/IBM

Prepare invited talk for Columbia/IBM

Priority: Very High Status: Incomplete Created: Feb

URL:

Personal Planning

Scheduled for: Monday Due: Choose

Active: 16 hours 59 minutes

Notes

Email
Blog/News
Documents
Web

Points:
* information explosion

Planning | Context

Task L | Notes | Progre

Find: ▸ UBC ▸ Prepar...

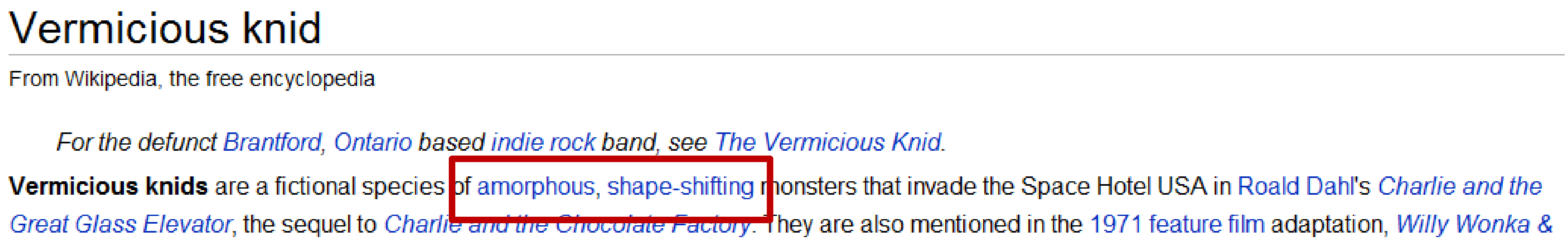
- _UBC _Tasks
  - Prepare Invited Talk for AOSD
  - **Prepare invited talk for Colu**
  - [Task] read belotti 2005 [Gail M
  - Reschedule [redacted]
  - Review budgets for NSERC CR
  - Review Chapter 4 [redacted]
- _UBC _Tasks _Email [Outlook Ema
  - Chapters 5, 6 & 7 [redacted]
  - [redacted] - Grad Visit D
  - join us for the parent eve. thu
  - Re: Projector [redacted]
  - TOSEM- [redacted] DECISION
  - [redacted] Commit
  - Your PCard Monthly Statemer
- AOSA Tasks [Gail's Bugzilla]
  - 5: Manage AOSA as Steering C
    - 17: [Periodic] Check goo
- Course - CPSC 507
  - Access web pages for CPSC 50
  - Ensure discussion leaders are
    - Ensure Zheng is ready for

Documents/Talks/ECOOP05/Structure-Development-Tasks.ppt

Synchronizing Task List: (2%)

Feb 21: Clear

16:59

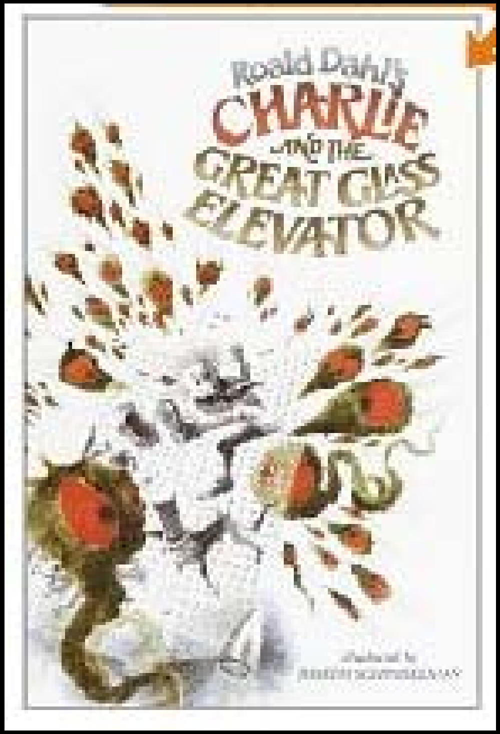


Vermicious knid

From Wikipedia, the free encyclopedia

For the defunct Brantford, Ontario based indie rock band, see The Vermicious Knid.

Vermicious knids are a fictional species of amorphous, shape-shifting monsters that invade the Space Hotel USA in Roald Dahl's *Charlie and the Great Glass Elevator*, the sequel to *Charlie and the Chocolate Factory*. They are also mentioned in the 1971 feature film adaptation, *Willy Wonka &*



get a handle on one perspective from another

Intentional Views
[Mens et al]

Fluid AOP
[Hon and Kiczales]

…

TaskTracer/Smart Desktop
[Herlocker et al]

Keeping Found Things Found
[Jones et al]

better ways to identify task-oriented modules

better ways to
analyze
operate on
manipulate task-oriented modules

better ways to move between representations

better understanding of tasks

john anvik
elisa baniassad
wesley coelho
davor cubranic
brian de alwis
rob elves
thomas fritz
jan hannemann
lyndon hiew
reid holmes
mik kersten
seonah lee
shawn minto
martin robillard
izzet safer
david shepherd
ducky sherwood
annie ying
trevor young
robert walker
and others!

what is modularity?

what is modularity?

subsets of “stuff” that can be operated upon?

what is modularity?

varying forms for varying purposes

www.cs.ubc.ca/~murphy
www.tasktop.com