Everyday Aspects

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University of British Columbia
Tasktop Technologies

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confessions of a (failed)
software engineer
what is modularity?
undergraduate student...

contiguous code with data hiding and interfaces
industrial software engineer...

ownership
graduate student...

unit of work
now...

fluid and task-oriented
contiguous code with data hiding and interfaces

ownership

unit of work

fluid and task-specific

humans working to “make” modules

modules “working” for humans
tale of 4 projects

informal

formal

explicit

implicit

conceptual modules

concern graphs

reflexion models

prog. lang.

mylyn
reflexion models

[ file=\(^\text{shtreal}\).c  mapTo=Sheet ]

[ file=\(^\text{text1[ez]}\).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

contiguous code with data hiding and interfaces (ownership)

task-oriented

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reflexion models

informal

formal

explicit

implicit

prog. lang.
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=xtmpopen( 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 218, etc.

Baniassad and Murphy (1998)
conceptual modules for reengineering

interface analysis module relationships
conceptual modules

contiguous code with data hiding and interfaces (ownership)

task-oriented
informal

formal

explicit

implicit

Conceptual models

Reflexion modules

Programmable language
humans working
to “make” modules

modules “working”
for humans

conceptual modules

reflexion modules
concern graphs

Robillard and Murphy, 2002

```java
public boolean load(View view, boolean reload) {
    ...
    if(!reload && autosaveFile != null && autosaveFile.exists())
        loadAutosave = recoverAutosave(view);
```
concern graphs
concern graphs
for concern documentation

Version 1

Concern Graph
E.g., Notes Feature

Version 2

?
concern graphs

contiguous code with data hiding and interfaces

(fluid) (ownership)
informal

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explicit

implicit

concern graphs

conceptual modules

reflexion models

prog. lang.
humans working to “make” modules

- conceptual modules
- reflexion modules
- concern graphs

modules “working” for humans
Eclipse mylyn

Kersten and Murphy (2005+)
public static InteractionEvent makePreference(String kind, String structureKind, String handle, String originId, String nullKind) {
    return new InteractionEvent(InteractionEvent.Kind.PREFERENCE, kind, structureKind, handle, originId, nullKind);
}

/**
 * For parameter description see this class's getter.
 */

public InteractionEvent(Kind kind, String structureKind, String handle, String originId, String nullKind) {
    this(kind, structureKind, handle, originId, "nullKind");
}

/**
 * For parameter description see this class's getter.
 */

public InteractionEvent(Kind kind, String structureKind, String handle, String originId, String nullKind, String... delta) {
    this(kind, structureKind, handle, originId, nullKind);
    String delta = ((String) delta[0]);
}
mylyn
for overload
for collaboration
for recommendations

run unit test cases related to task context
mylyn
for overload
for collaboration
for recommendations

search for likely useful elements related to task context
mylyn

unit of work
fluid and task-oriented

task (bug) #1
task (bug) #2
informal

formal

explicit

implicit

conceptual modules

reflexion models

concern graphs

mylyn

prog. lang.
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
knowledge worker field study (early Mylyn)

<table>
<thead>
<tr>
<th>average path length</th>
<th>average directory density</th>
<th>scattering ratio</th>
<th>tagging ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>0.1</td>
<td>1.5</td>
<td>0.3</td>
</tr>
<tr>
<td>2.7</td>
<td>0.2</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>3</td>
<td>0.1</td>
<td>1.4</td>
<td>0.4</td>
</tr>
<tr>
<td>2</td>
<td>0.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0.01</td>
<td>1</td>
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folder nesting
knowledge worker field study (early Mylyn)

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ratio of interesting files in directory
### knowledge worker field study (early Mylyn)

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**distance to common parent**
knowledge worker field study (early Mylyn)

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Tasktop (Mylyn to the desktop)
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 & the Chocolate Factory*. 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
izzard 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