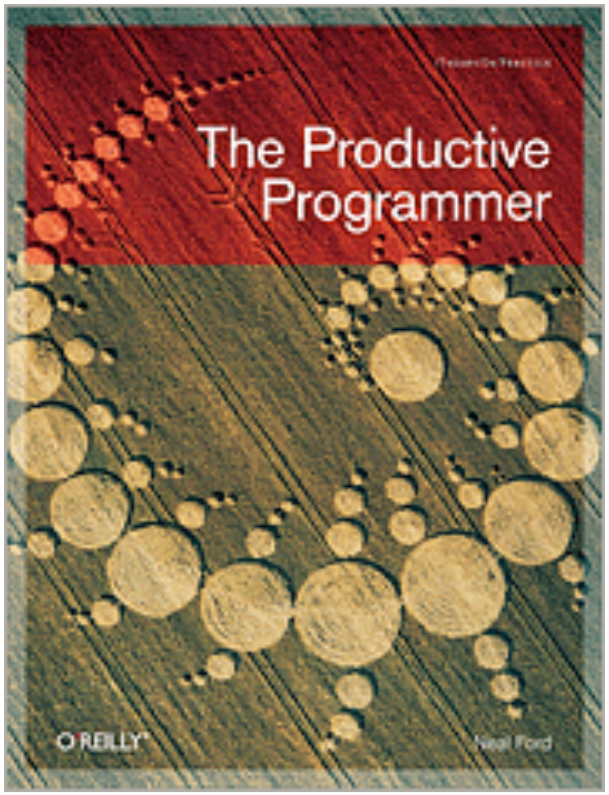
the productive programmer



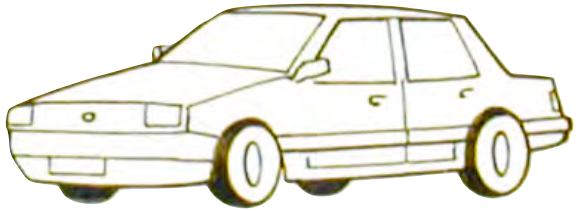
NEAL FORD software architect / meme wrangler

ThoughtWorks

nford@thoughtworks.com
3003 Summit Boulevard, Atlanta, GA 30319
www.nealford.com
www.thoughtworks.com
memeagora.blogspot.com

where did this topic come from?

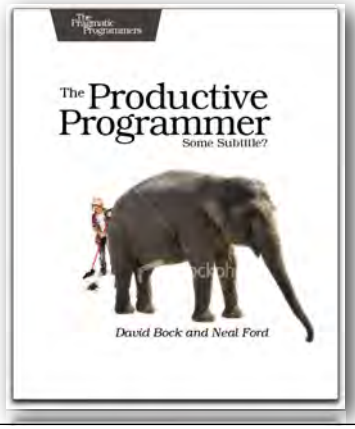
?



where did this topic come from?

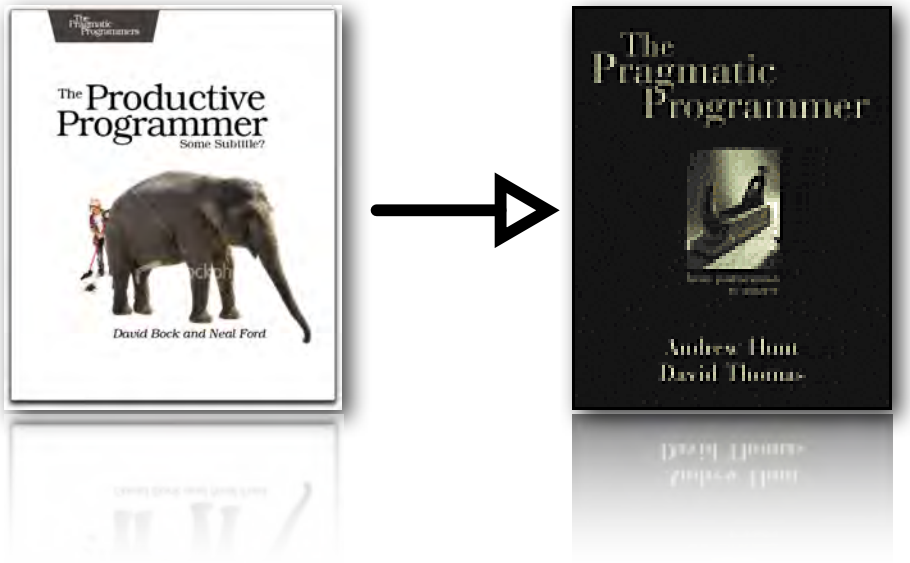
screen shots

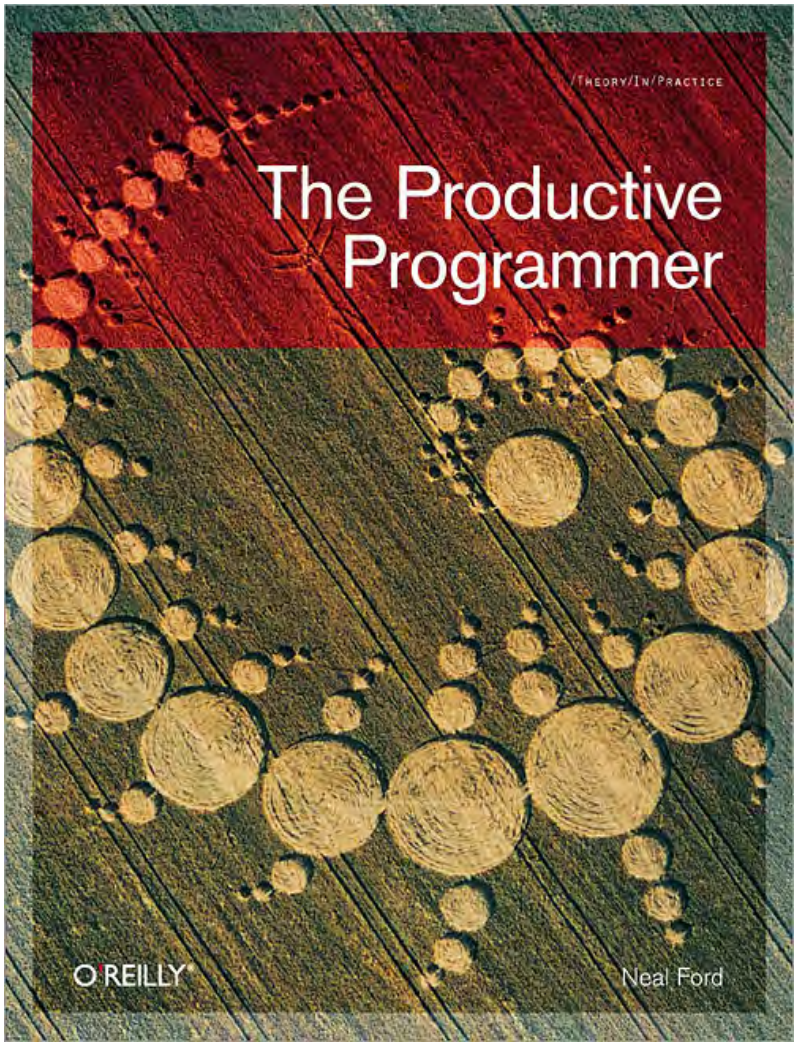
```
[nealford| ~ ]=> ls
2print                                  Video
Applications                            archive_of_docs.zip
Archive                                 bin
Desktop                                 crypt.sparseimage
Documents                               derby.log
Downloads                               dev
Images                                  docbook
Library                                 docs
Mingle                                  en_windows_vista_x86_dvd_X12-34293.iso
Movies                                  nfjs
Music                                   print
Neal_Ford-LOP_Shifting_Paradigms-slides.pdf reference
NetBeansProjects                        software installs.sparseimage
Notes702Mac.dmg                         talks
PDFs                                    temp
PartitionMagic805AllWin_English.ZIP     virtual machines
Pictures                                vista keys.txt
Public                                  web
Sites                                   work
[nealford| ~ ]=> cd ~/work/nealford/
[nealford| ~/work/nealford ]=>  svn st | grep '^\?' | tr '^\?' ' ' | sed 's/[ ]*//' | se
d 's/[ ]/\\ /g' | xargs svn add
```



CodeSherpas

where did this topic come from?





part 1: mechanics

acceleration

- doing stuff faster

focus

- killing distractions

automation

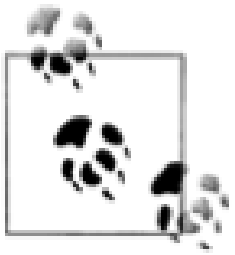
- getting your computer to work harder

canonicality

- applying the **dry** principle

acceleration

typing is faster than navigation



o/s accelerators

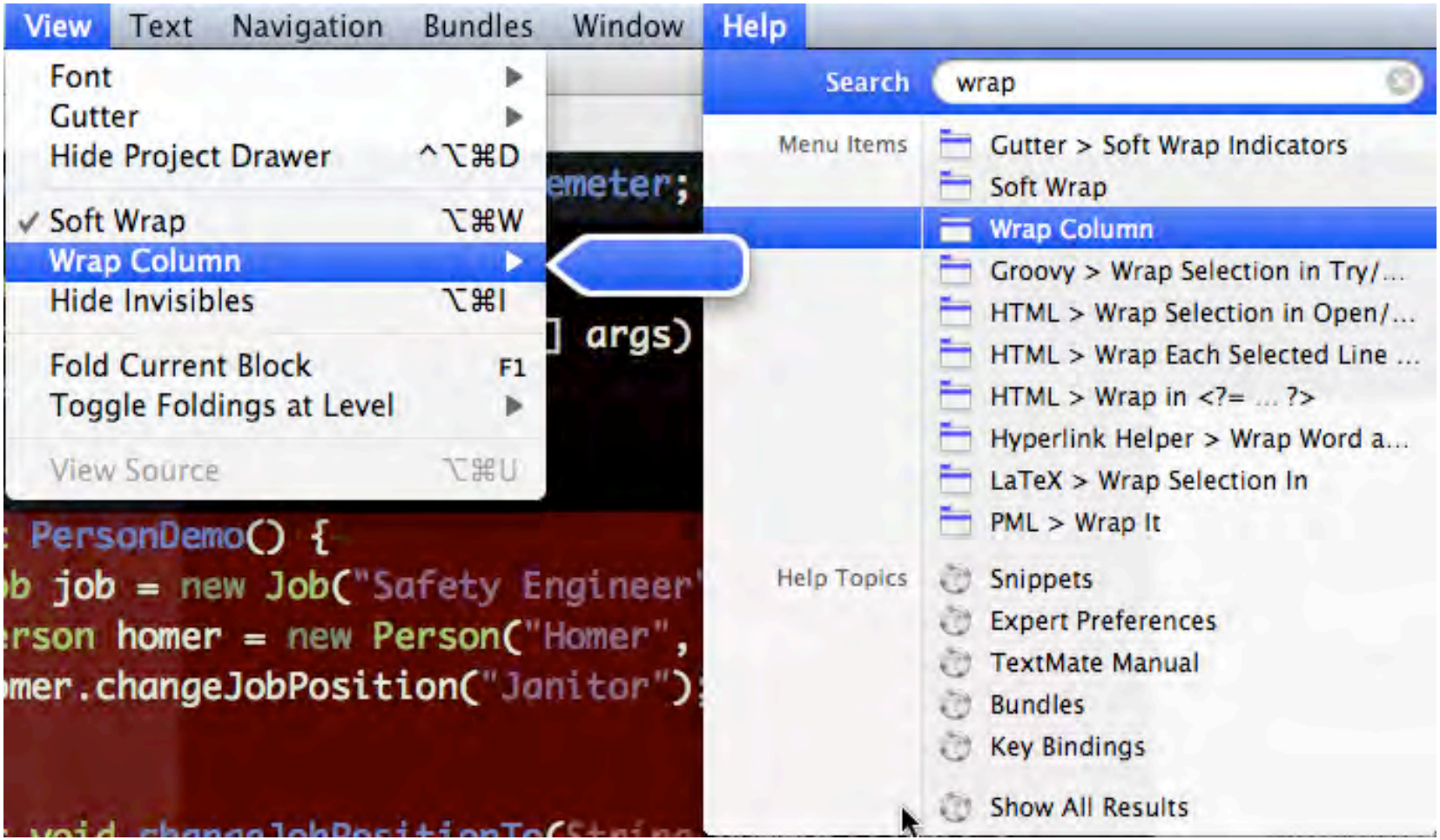
windows explorer address bar (**`alt-d`**)

finder (**`apple-shift-g`**)

firefox

- / searching
- number-fox plugin

leopard smart help



clipboards

why do operating systems have only 1 clipboard with 1 entry????

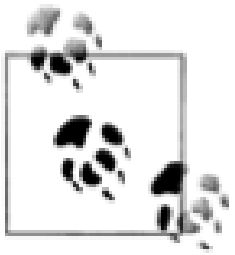
clcl 

iClip ($$)

jump cut

mac os x : jumpcut demo

context switching eats time



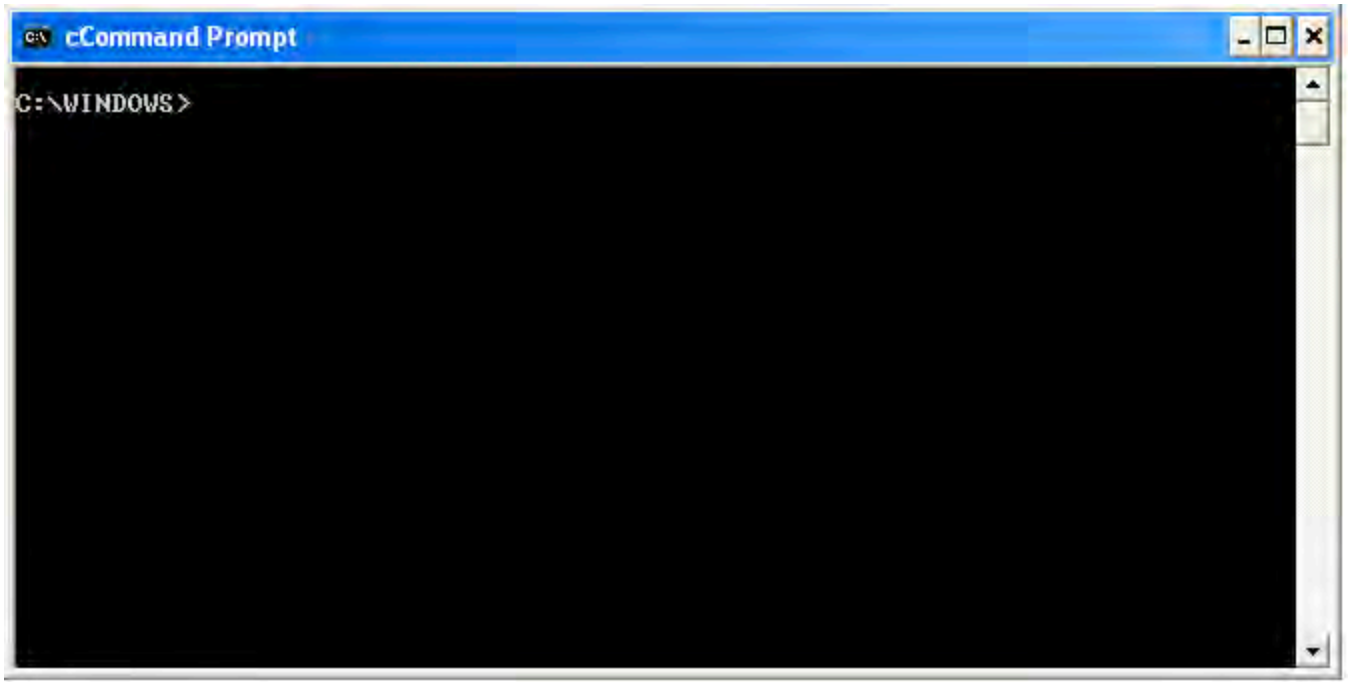
there and back

pushd pushes a directory on the stack

popd pops it back off

```
C:\temp>pushd \MyDocuments\Documents\dev\haskell

C:\MyDocuments\Documents\dev\haskell>dir
02/13/2006  12:12 AM    <DIR>          .
02/13/2006  12:12 AM    <DIR>          ..
02/13/2006  12:12 AM    <DIR>          nfjs_functionallangs_haskell
               0 File(s)              0 bytes
               3 Dir(s)  11,743,178,752 bytes free

C:\MyDocuments\Documents\dev\haskell>popd
```

pushd/popd



command prompts

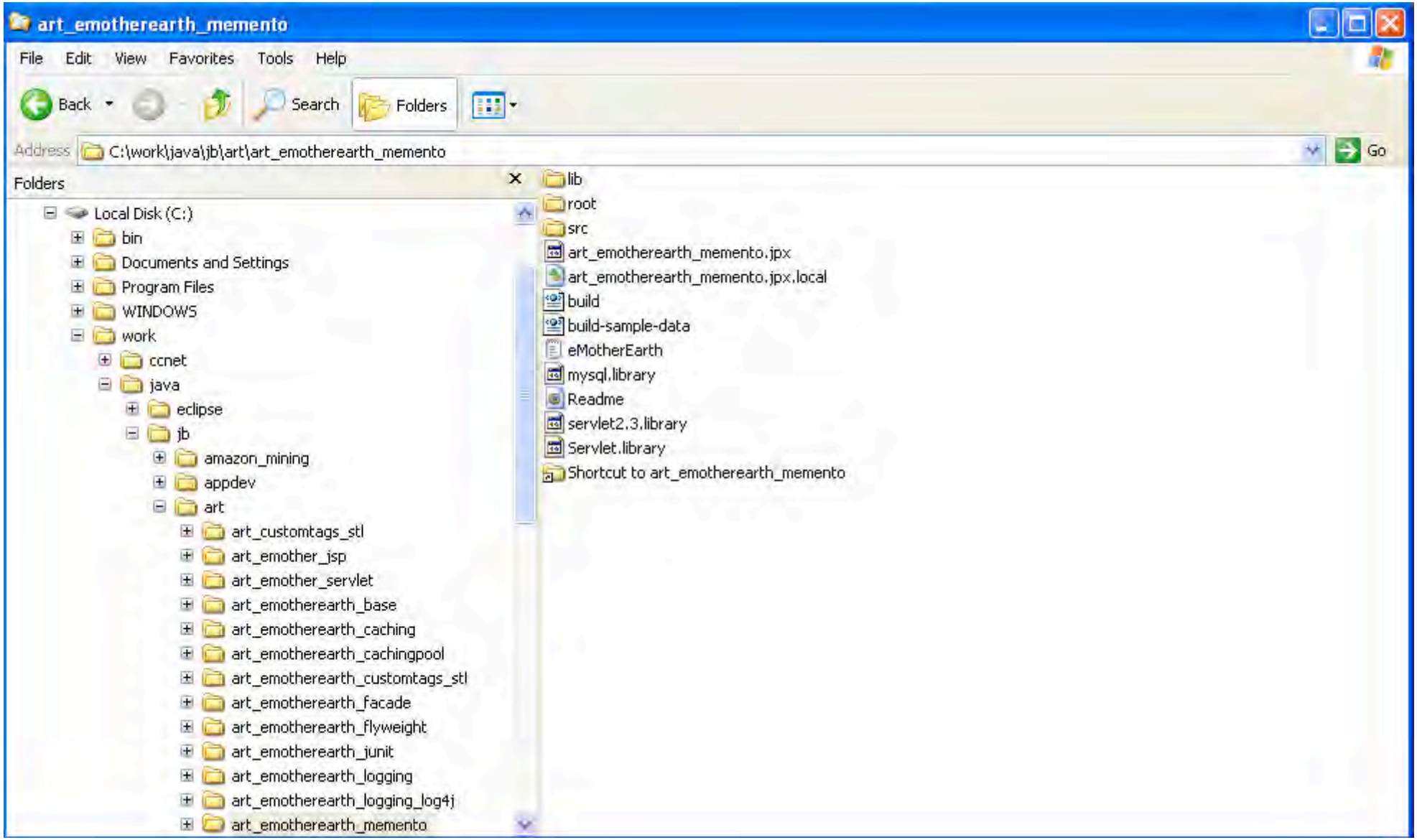
graphical explorers better for some things....

...command line better for others

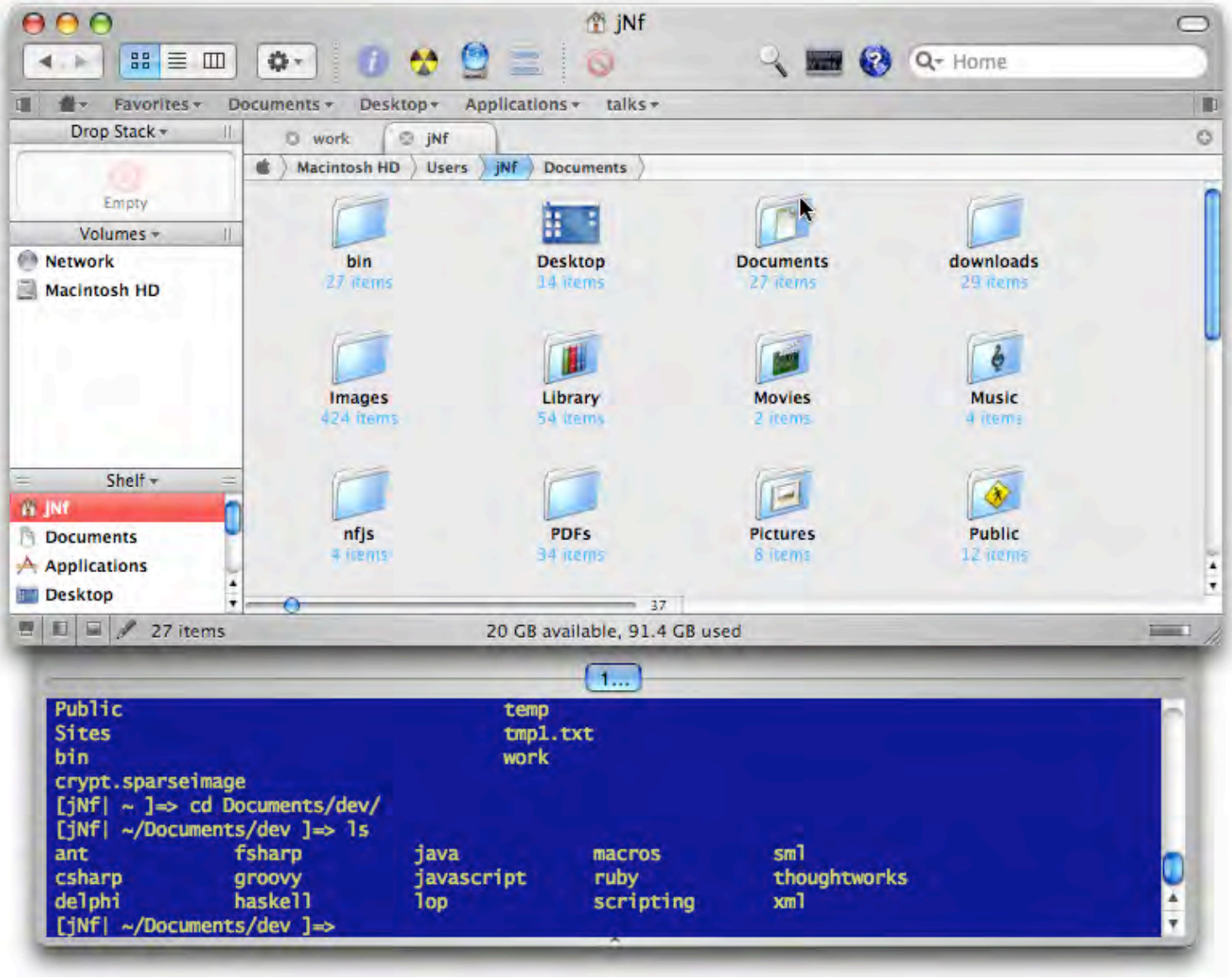
command prompt here power toy

bash here (cygwin)

cmd prompt explorer bar

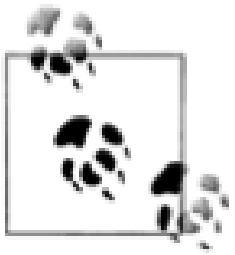


path finder


jNf
Home
Favorites
Documents
Desktop
Applications
talks
Drop Stack
Empty
Volumes
Network
Macintosh HD
work
jNf
Macintosh HD
Users
jNf
Documents
bin
27 items
Desktop
14 items
Documents
27 items
downloads
29 items
Images
424 items
Library
54 items
Movies
2 items
Music
4 items
nfjs
4 items
PDFs
34 items
Pictures
8 items
Public
12 items
Shelf
jNf
Documents
Applications
Desktop
27 items
20 GB available, 91.4 GB used
1...
Public
Sites
bin
crypt.sparseimage
temp
tmp1.txt
work
[jNf| ~]=> cd Documents/dev/
[jNf| ~/Documents/dev]=> ls
ant
csharp
delphi
fsharp
groovy
haskell
java
javascript
lop
macros
ruby
scripting
sml
thoughtworks
xml
[jNf| ~/Documents/dev]=>

how many of you have written an application for heads-down data entry personnel?

when coding, always prefer keyboard to mouse

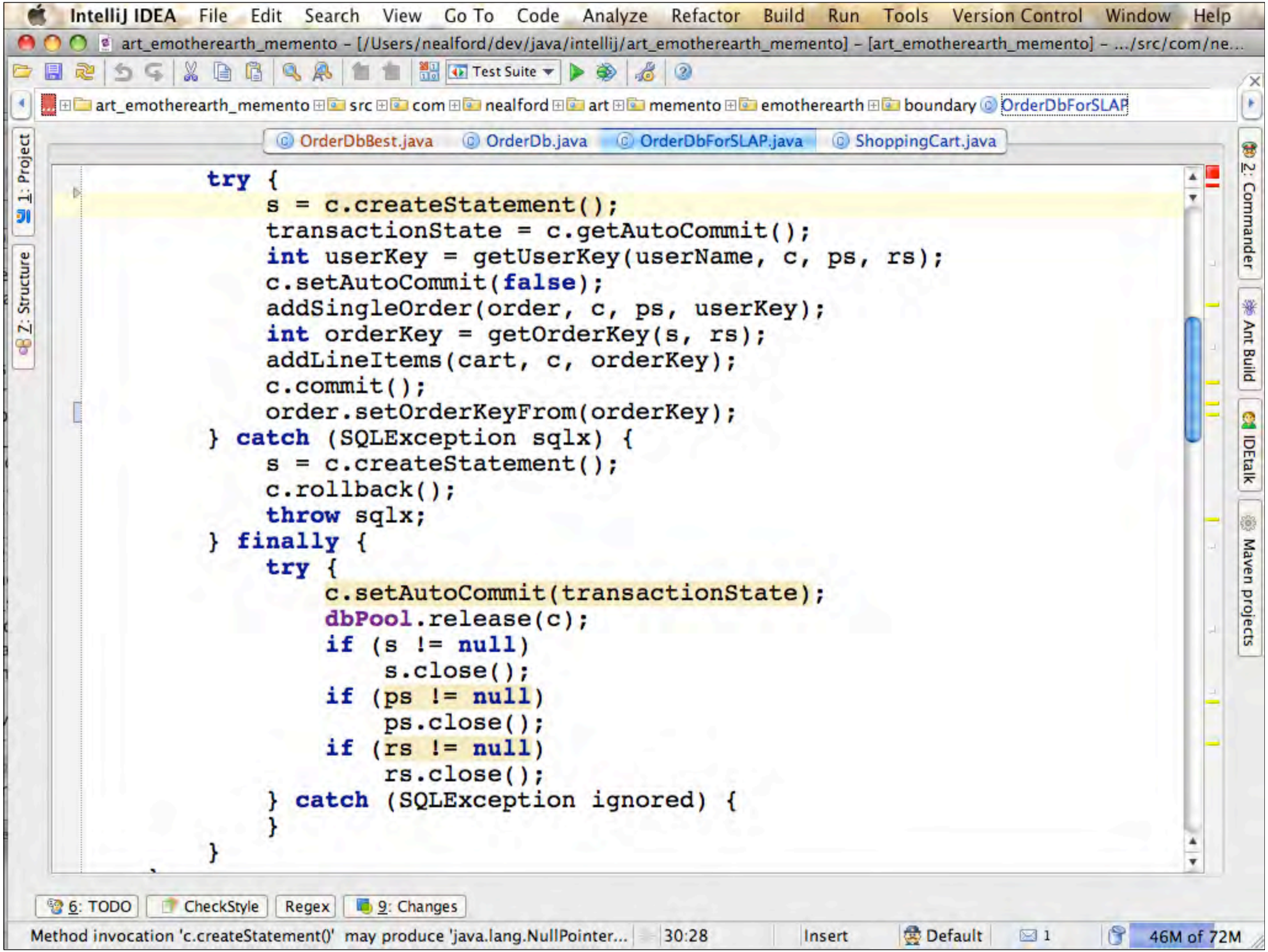


learning shortcuts

make yourself use the shortcut even if you've gotten there another way

have someone/something pester you about it

- pair programmer
- key promoter plug-in for intellij
- mousefeed for eclipse

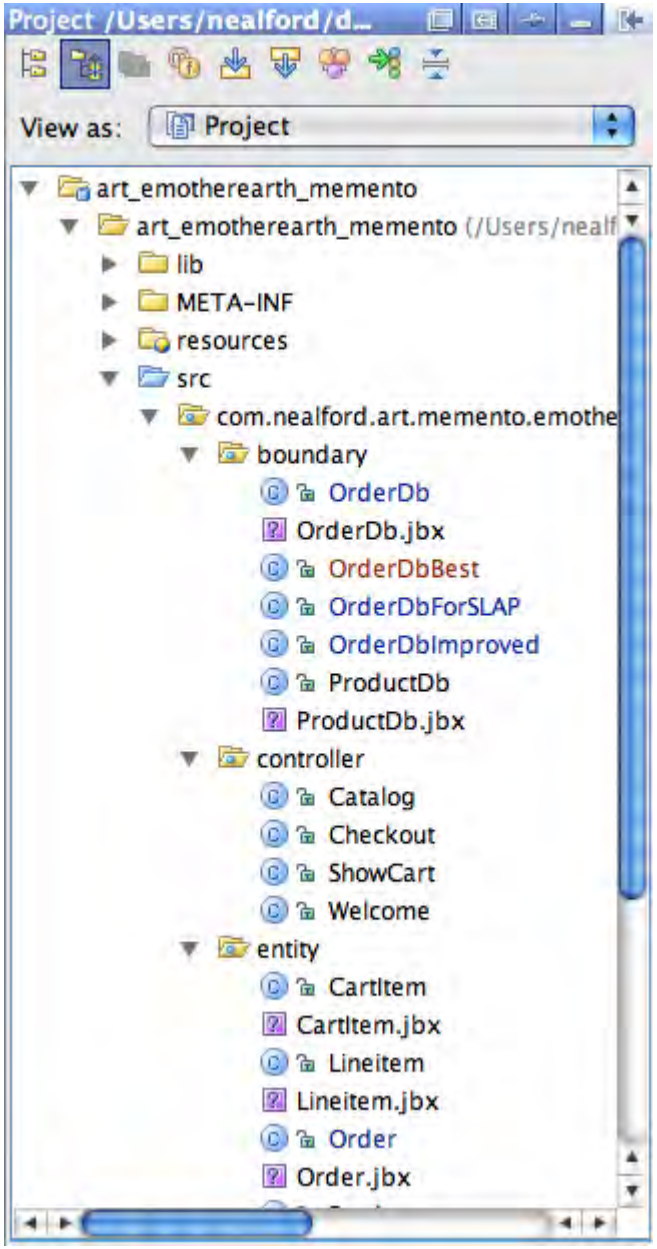

IntelliJ IDEA File Edit Search View Go To Code Analyze Refactor Build Run Tools Version Control Window Help
art_emotherearth_memento - [/Users/nealford/dev/java/intellij/art_emotherearth_memento] - [art_emotherearth_memento] - .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth boundary OrderDbForSLAP
OrderDbBest.java OrderDb.java OrderDbForSLAP.java ShoppingCart.java
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
try {
s = c.createStatement();
transactionState = c.getAutoCommit();
int userKey = getUserKey(userName, c, ps, rs);
c.setAutoCommit(false);
addSingleOrder(order, c, ps, userKey);
int orderKey = getOrderKey(s, rs);
addLineItems(cart, c, orderKey);
c.commit();
order.setOrderKeyFrom(orderKey);
} catch (SQLException sqlx) {
s = c.createStatement();
c.rollback();
throw sqlx;
} finally {
try {
c.setAutoCommit(transactionState);
dbPool.release(c);
if (s != null)
s.close();
if (ps != null)
ps.close();
if (rs != null)
rs.close();
} catch (SQLException ignored) {
}
}
6: TODO
CheckStyle
Regex
9: Changes
Method invocation 'c.createStatement()' may produce 'java.lang.NullPointer...
30:28
Insert
Default
1
46M of 72M

learning shortcuts

repeat them to yourself

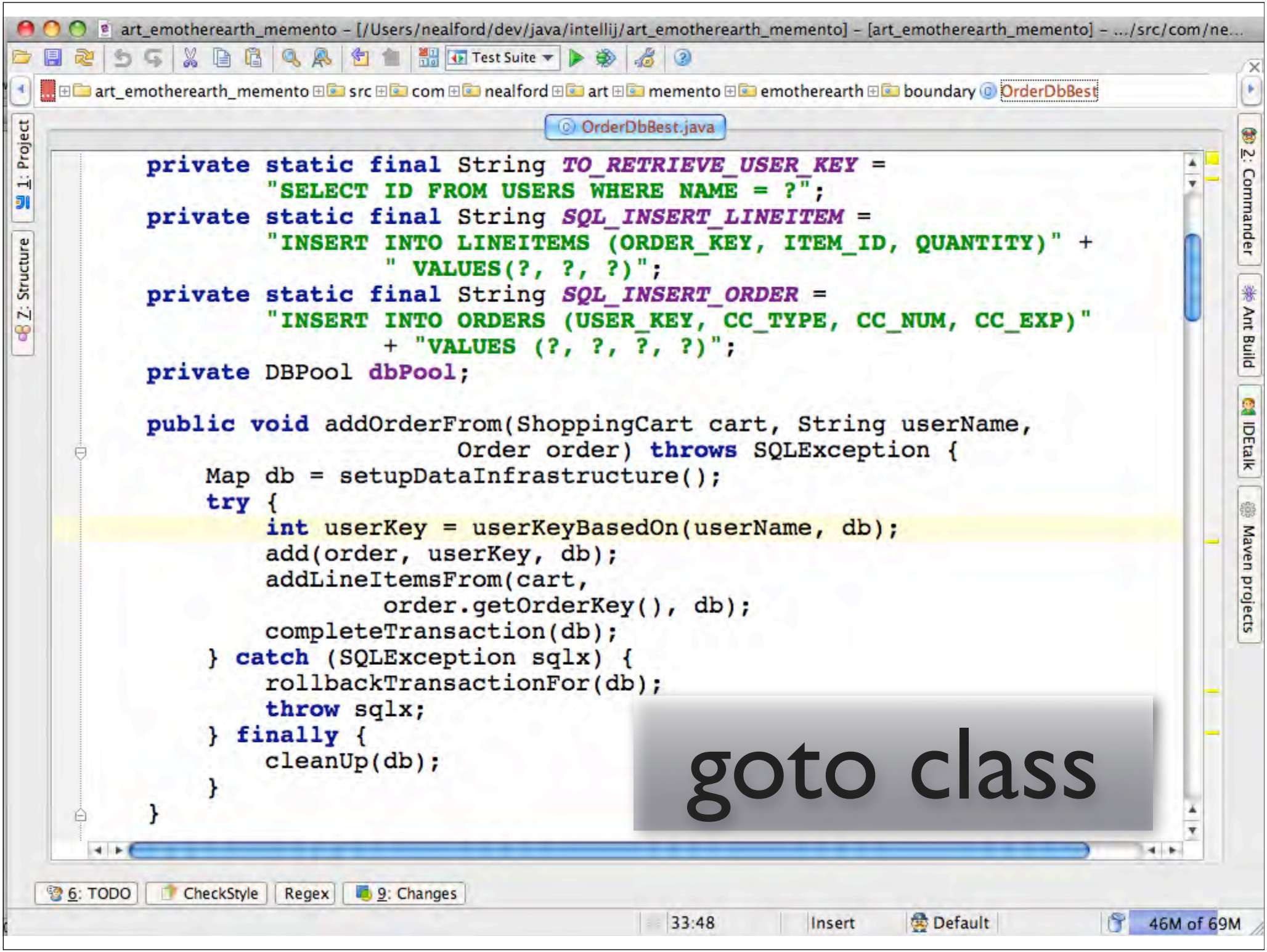
flash cards

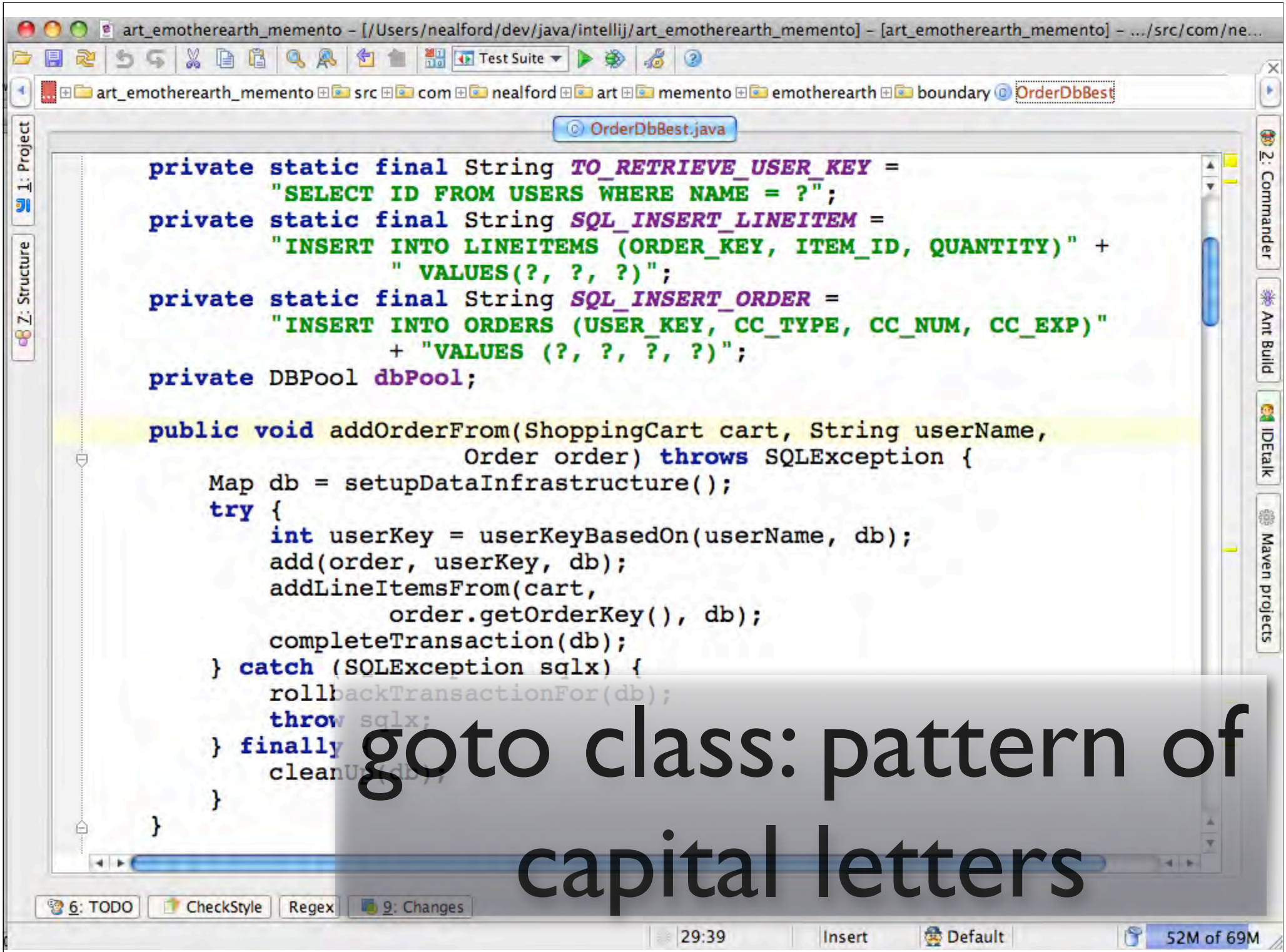
create a “cheat sheet”

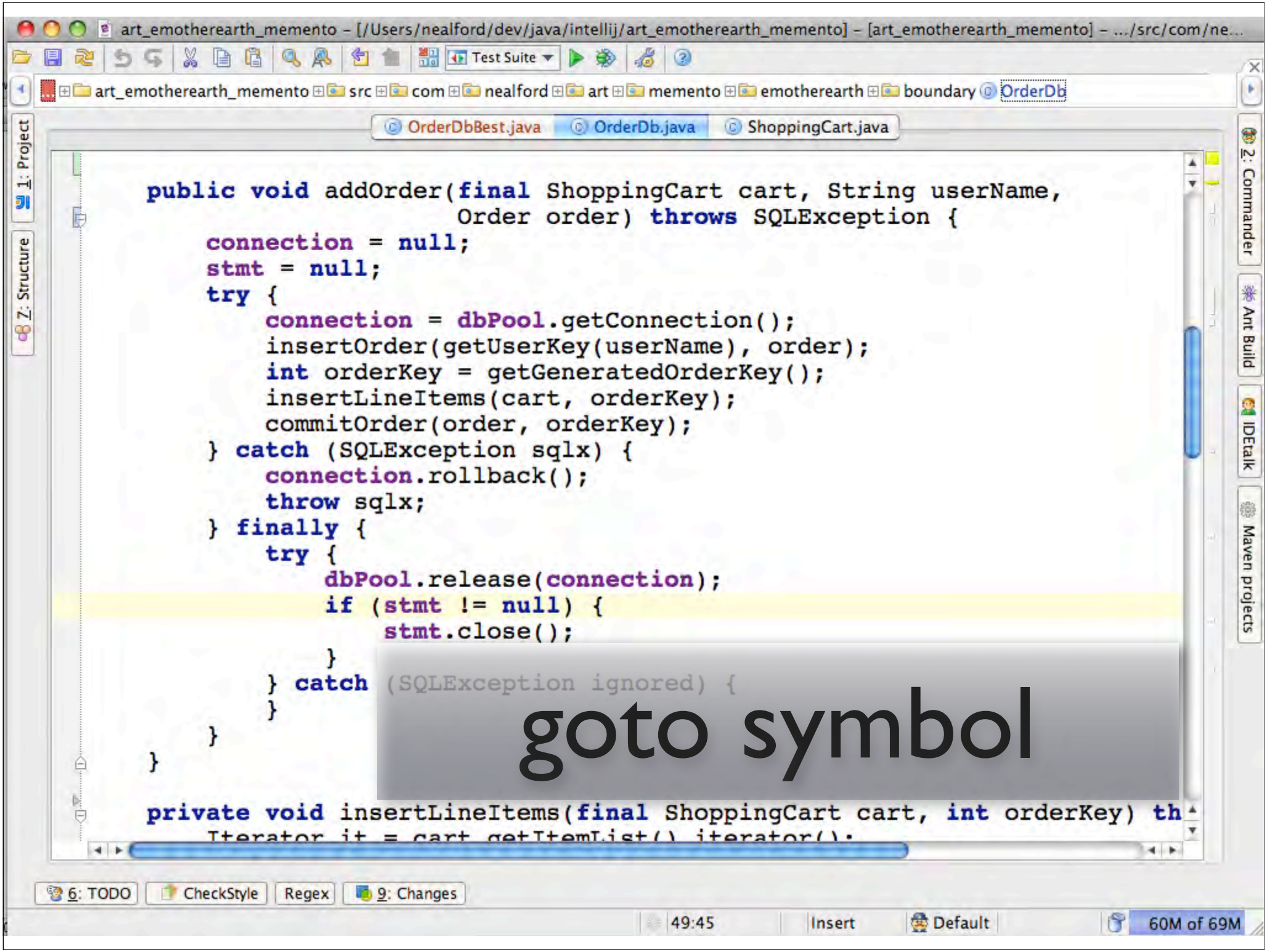


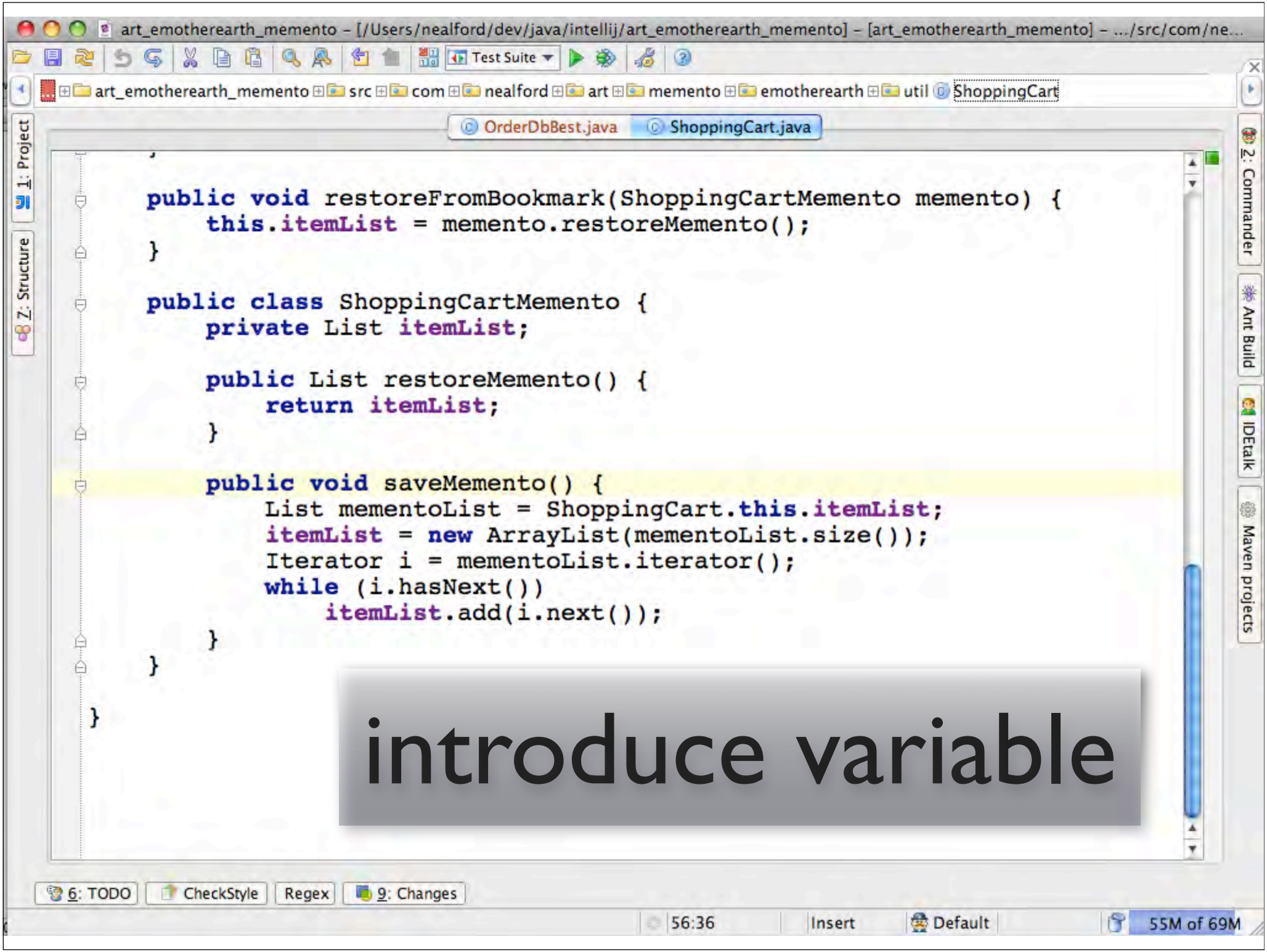
all our hierarchies are too deep:

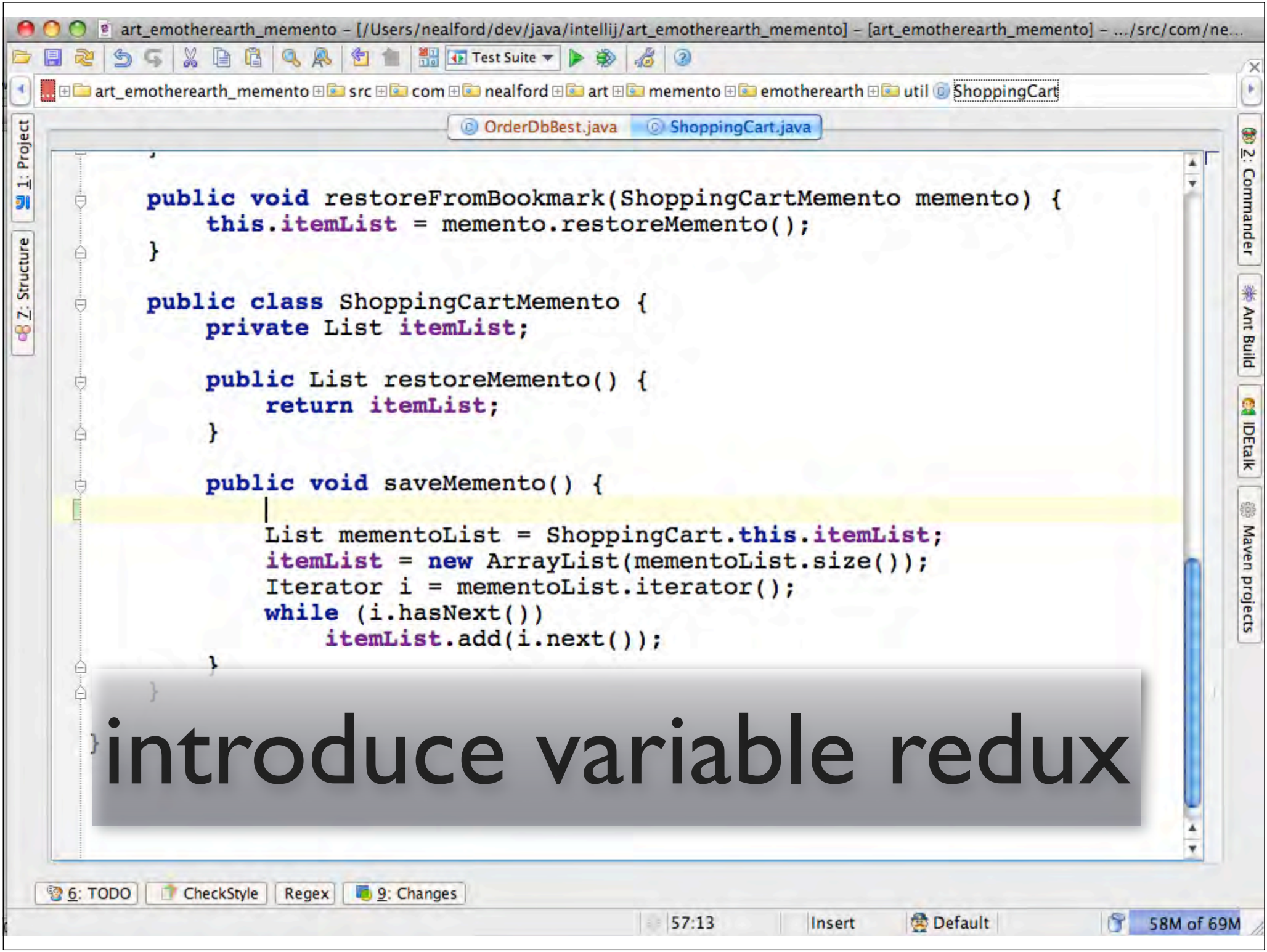
file system packages

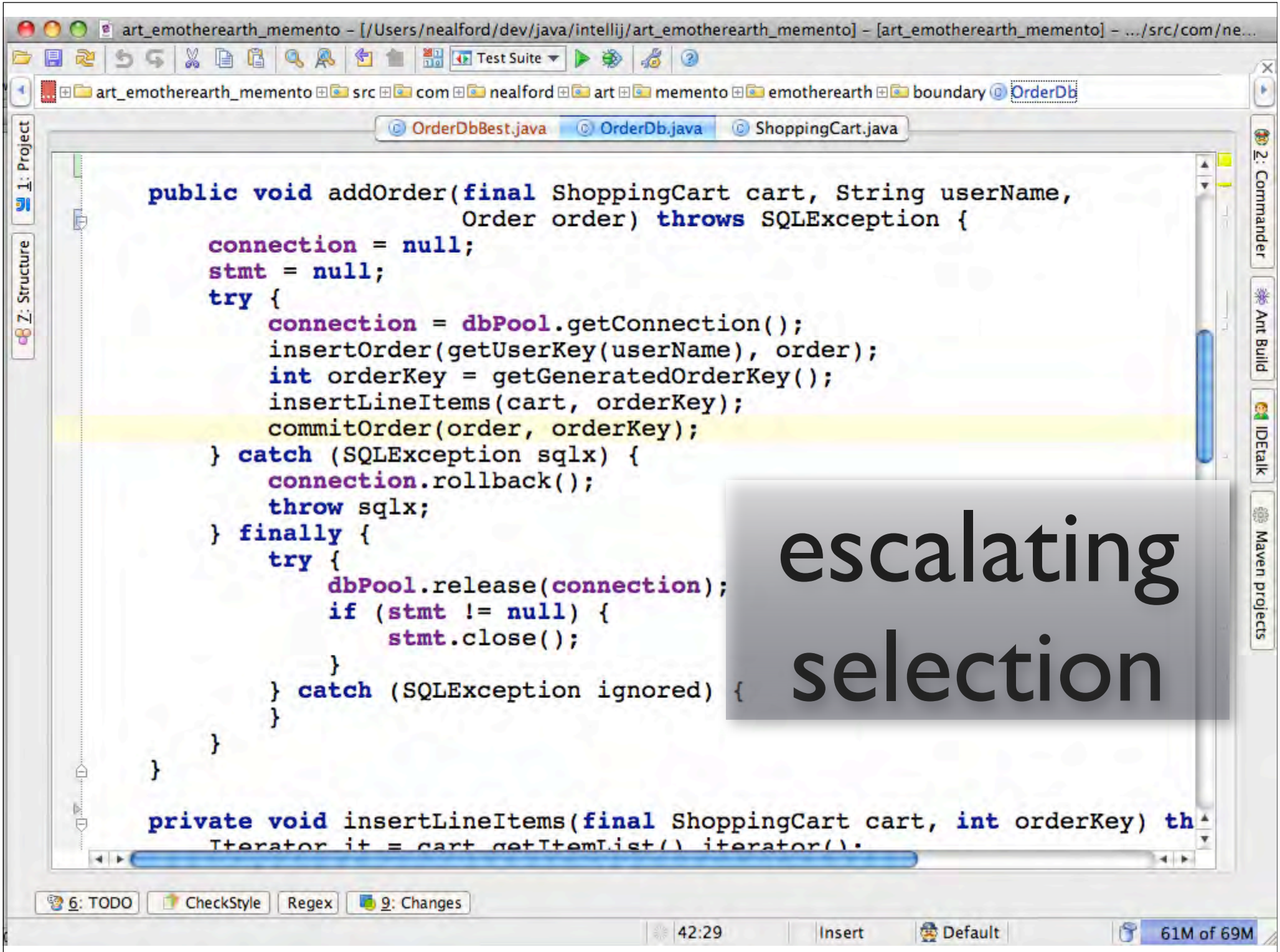

art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento
src
com
nealford
art
memento
emotherearth
boundary
OrderDbBest
OrderDbBest.java
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
private static final String TO_RETRIEVE_USER_KEY =
"SELECT ID FROM USERS WHERE NAME = ?";
private static final String SQL_INSERT_LINEITEM =
"INSERT INTO LINEITEMS (ORDER_KEY, ITEM_ID, QUANTITY)" +
" VALUES(?, ?, ?)";
private static final String SQL_INSERT_ORDER =
"INSERT INTO ORDERS (USER_KEY, CC_TYPE, CC_NUM, CC_EXP)"
+ "VALUES (?, ?, ?, ?)";
private DBPool dbPool;
public void addOrderFrom(ShoppingCart cart, String userName,
Order order) throws SQLException {
Map db = setupDataInfrastructure();
try {
int userKey = userKeyBasedOn(userName, db);
add(order, userKey, db);
addLineItemsFrom(cart,
order.getOrderKey(), db);
completeTransaction(db);
} catch (SQLException sqlx) {
rollbackTransactionFor(db);
throw sqlx;
} finally {
cleanUp(db);
}
}
goto class
6: TODO
CheckStyle
Regex
9: Changes
33:48
Insert
Default
46M of 69M


art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth boundary OrderDbBest
OrderDbBest.java
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
private static final String TO_RETRIEVE_USER_KEY =
"SELECT ID FROM USERS WHERE NAME = ?";
private static final String SQL_INSERT_LINEITEM =
"INSERT INTO LINEITEMS (ORDER_KEY, ITEM_ID, QUANTITY)" +
" VALUES(?, ?, ?)";
private static final String SQL_INSERT_ORDER =
"INSERT INTO ORDERS (USER_KEY, CC_TYPE, CC_NUM, CC_EXP)"
+ "VALUES (?, ?, ?, ?)";
private DBPool dbPool;
public void addOrderFrom(ShoppingCart cart, String userName,
Order order) throws SQLException {
Map db = setupDataInfrastructure();
try {
int userKey = userKeyBasedOn(userName, db);
add(order, userKey, db);
addLineItemsFrom(cart,
order.getOrderKey(), db);
completeTransaction(db);
} catch (SQLException sqlx) {
} finally
}
}
goto class: pattern of capital letters
6: TODO
CheckStyle
Regex
9: Changes
29:39
Insert
Default
52M of 69M


art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth boundary OrderDb
OrderDbBest.java
OrderDb.java
ShoppingCart.java
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
public void addOrder(final ShoppingCart cart, String userName,
Order order) throws SQLException {
connection = null;
stmt = null;
try {
connection = dbPool.getConnection();
insertOrder(getUserKey(userName), order);
int orderKey = getGeneratedOrderKey();
insertLineItems(cart, orderKey);
commitOrder(order, orderKey);
} catch (SQLException sqlx) {
connection.rollback();
throw sqlx;
} finally {
try {
dbPool.release(connection);
if (stmt != null) {
stmt.close();
}
} catch (SQLException ignored) {
}
}
}
goto symbol
private void insertLineItems(final ShoppingCart cart, int orderKey) th
6: TODO
CheckStyle
Regex
9: Changes
49:45
Insert
Default
60M of 69M


art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth util ShoppingCart
OrderDbBest.java
ShoppingCart.java
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
public void restoreFromBookmark(ShoppingCartMemento memento) {
this.itemList = memento.restoreMemento();
}
public class ShoppingCartMemento {
private List itemList;
public List restoreMemento() {
return itemList;
}
public void saveMemento() {
List mementoList = ShoppingCart.this.itemList;
itemList = new ArrayList(mementoList.size());
Iterator i = mementoList.iterator();
while (i.hasNext())
itemList.add(i.next());
}
}
}
introduce variable
6: TODO
CheckStyle
Regex
9: Changes
56:36
Insert
Default
55M of 69M


art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth util ShoppingCart
OrderDbBest.java
ShoppingCart.java
public void restoreFromBookmark(ShoppingCartMemento memento) {
this.itemList = memento.restoreMemento();
}
public class ShoppingCartMemento {
private List itemList;
public List restoreMemento() {
return itemList;
}
public void saveMemento() {
List mementoList = ShoppingCart.this.itemList;
itemList = new ArrayList(mementoList.size());
Iterator i = mementoList.iterator();
while (i.hasNext())
itemList.add(i.next());
}
introduce variable redux
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
6: TODO
CheckStyle
Regex
9: Changes
57:13
Insert
Default
58M of 69M


art_emotherearth_memento – [/Users/nealford/dev/java/intellij/art_emotherearth_memento] – [art_emotherearth_memento] – .../src/com/ne...
Test Suite
art_emotherearth_memento src com nealford art memento emotherearth boundary OrderDb
OrderDbBest.java
OrderDb.java
ShoppingCart.java
public void addOrder(final ShoppingCart cart, String userName,
Order order) throws SQLException {
connection = null;
stmt = null;
try {
connection = dbPool.getConnection();
insertOrder(getUserKey(userName), order);
int orderKey = getGeneratedOrderKey();
insertLineItems(cart, orderKey);
commitOrder(order, orderKey);
} catch (SQLException sqlx) {
connection.rollback();
throw sqlx;
} finally {
try {
dbPool.release(connection);
if (stmt != null) {
stmt.close();
}
} catch (SQLException ignored) {
}
}
}
private void insertLineItems(final ShoppingCart cart, int orderKey) th
escalating selection
1: Project
7: Structure
2: Commander
Ant Build
IDEtalk
Maven projects
6: TODO
CheckStyle
Regex
9: Changes
42:29
Insert
Default
61M of 69M

some choice shortcuts

	intelliJ	***eclipse***
goto class	ctrl-n	ctrl-shift-t
introduce variable	ctrl-alt-v	alt-shift-l
escalating selection	ctrl-w	alt-shift-up
recently edited files	ctrl-e	n/a (ctrl-e)
symbol list	alt-ctrl-shift-n	ctrl-o
incremental search	alt-f3	ctrl-j

live templates

all major ide's and coding text editors

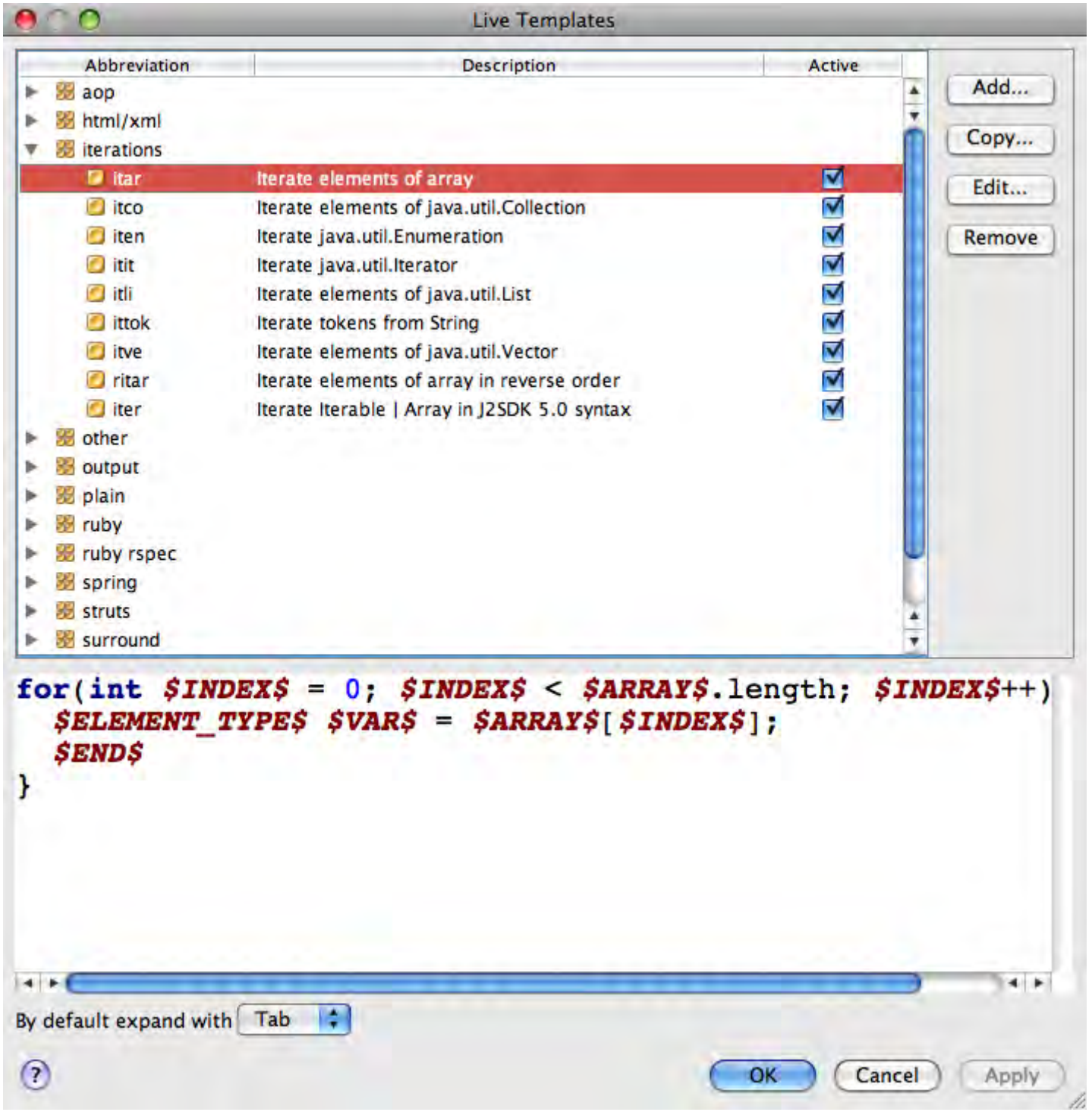
parameter substitution, default values, repeating values

learn the language of your template engine

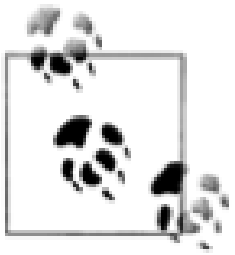
- velocity in intellij

- bash for textmate/e editor

intellij templates



every time you type
something for the 3rd time,
templatize it



key macro tools

live templates at the o/s level

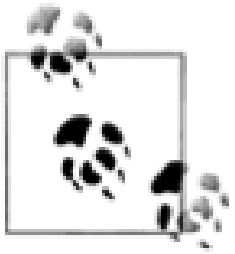
auto-hot key 

textexpander

typinator

textexpander

don’t type the same
commands over and over




focus

simple stuff

get a comfortable chair!

dual monitors...

...sitting immediately in front of you

administrator privilege for the o/s

good keyboard

insidious distractions

modern office environments are terrible for knowledge workers

too much out of context noise

how many people here work in cube land?

war rooms

locus of attention

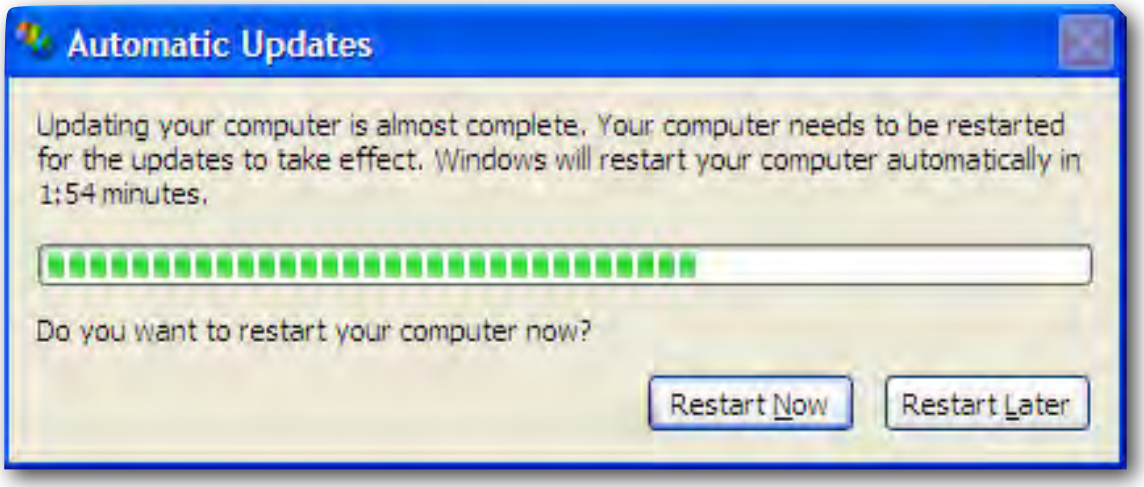
in *the humane interface*, jef raskin describes *locus of attention*

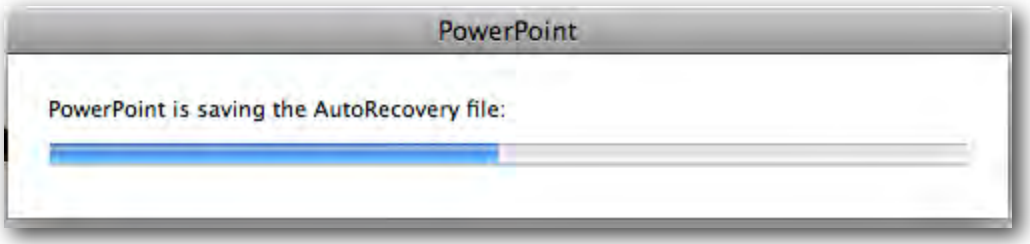
anything that happens outside your locus of attention breaks *flow*

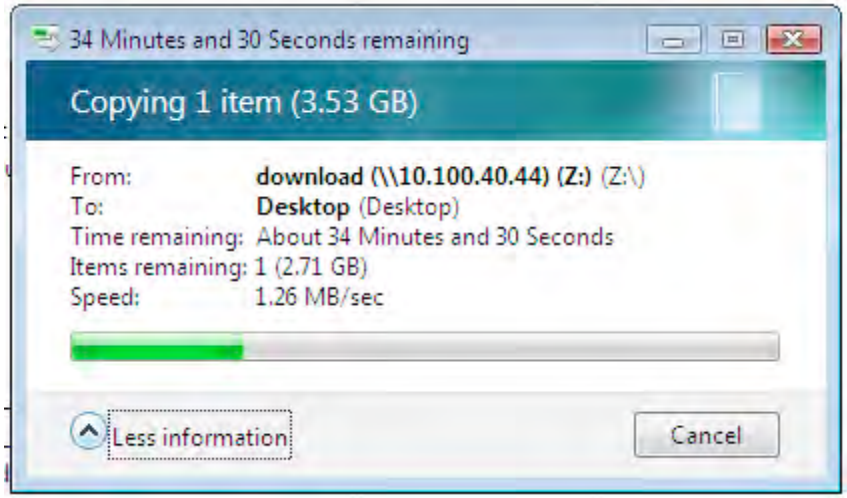
in *flow*, michael csikszentmihalyi describes flow state

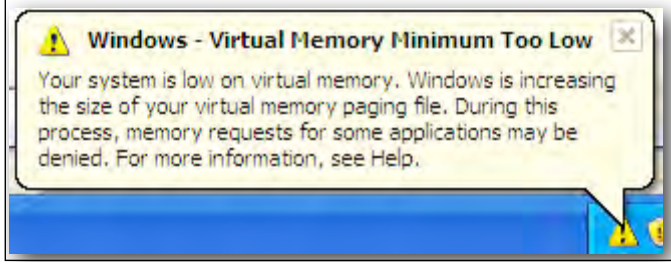
total concentration

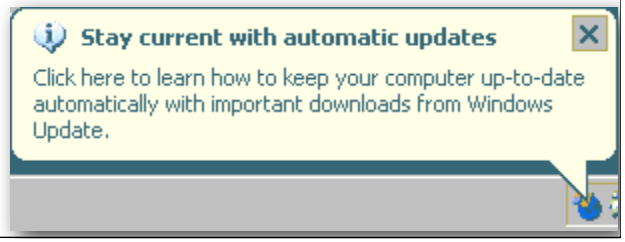
time disappears


Automatic Updates
Updating your computer is almost complete. Your computer needs to be restarted for the updates to take effect. Windows will restart your computer automatically in 1:54 minutes.
Do you want to restart your computer now?
Restart Now
Restart Later

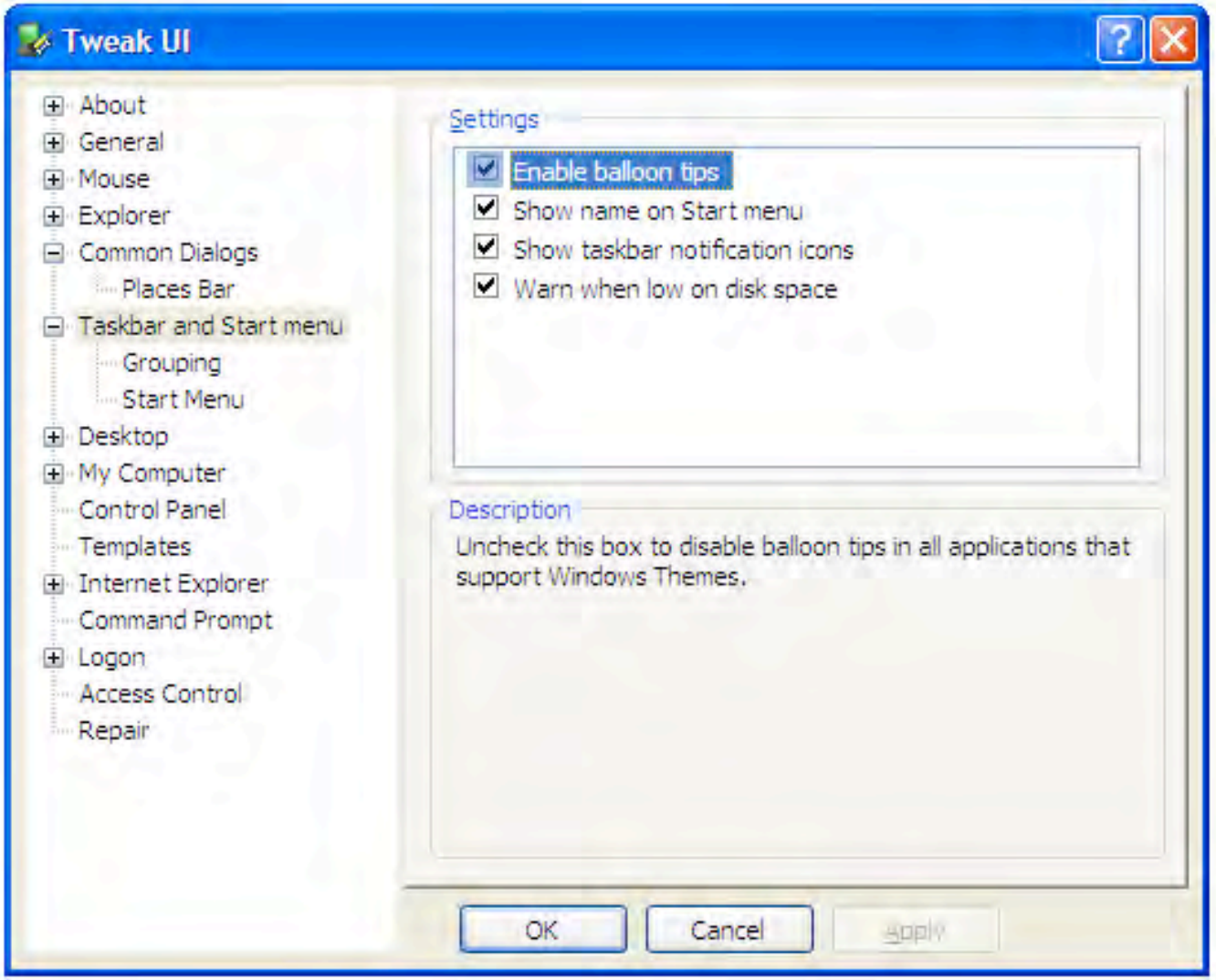

PowerPoint
PowerPoint is saving the AutoRecovery file:


34 Minutes and 30 Seconds remaining
Copying 1 item (3.53 GB)
From: download (\\10.100.40.44) (Z:) (Z:\)
To: Desktop (Desktop)
Time remaining: About 34 Minutes and 30 Seconds
Items remaining: 1 (2.71 GB)
Speed: 1.26 MB/sec
Less information
Cancel


Windows - Virtual Memory Minimum Too Low
Your system is low on virtual memory. Windows is increasing the size of your virtual memory paging file. During this process, memory requests for some applications may be denied. For more information, see Help.


Stay current with automatic updates
Click here to learn how to keep your computer up-to-date automatically with important downloads from Windows Update.

killing balloon tips



screen dimmers

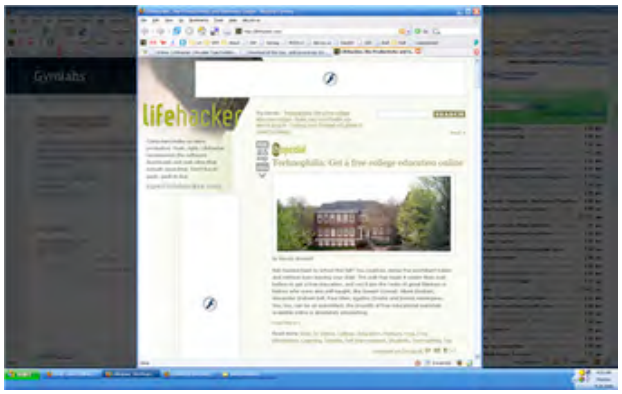
automatically makes your background dark after a set time

jedi concentrate 

doodim 

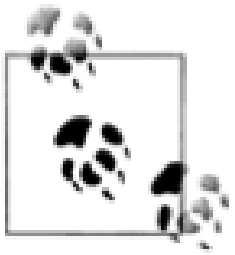
internet blockers

http://getconcentrating.com/



http://www.gyrolabs.com/2006/09/25/jediconcentrate-mod/

the higher the level of concentration, the denser the ideas



the easy stuff

turn off notifications

don't keep email open

turn off instant messaging

put on headphones

create office "quiet time"


Puma Productivity
Pants™

focus techniques

search > navigation

all developer hierarchies are too deep

file system

package/namespace

documentation

what worked well with 20 mb hard drives fails with 200 gb

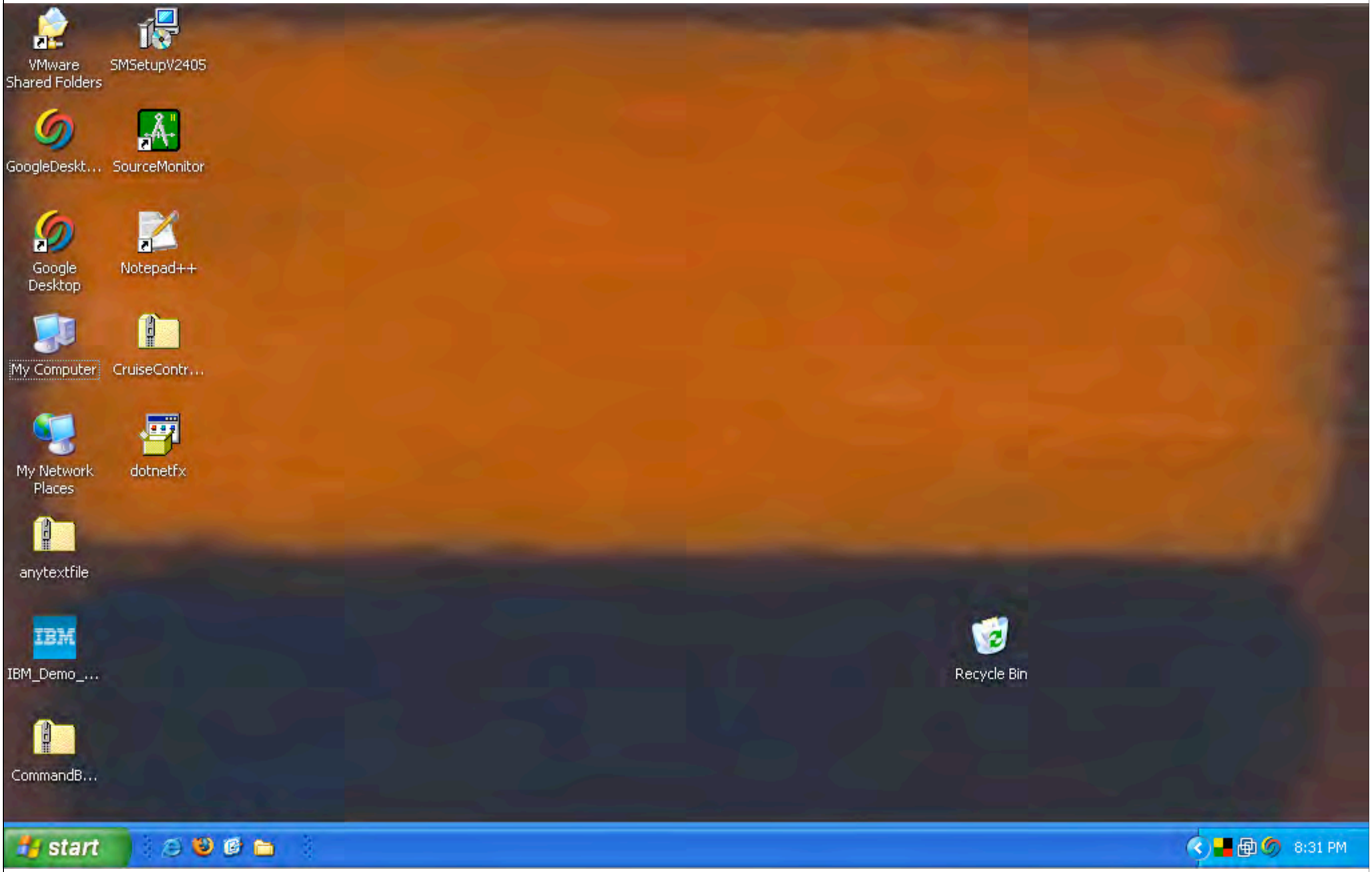
desktop search

built into modern operating systems

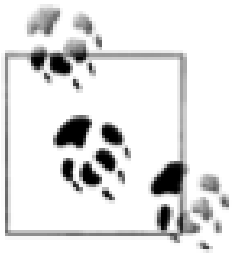
retro-fittable in older ones

google desktop search

larry's "any text file" indexer


VMware Shared Folders
SMSetupV2405
GoogleDeskt...
SourceMonitor
Google Desktop
Notepad++
My Computer
CruiseContr...
My Network Places
dotnetfx
anytextfile
IBM_Demo_...
Recycle Bin
CommandB...
start
8:31 PM

replace file hierarchy
navigation with search



rooted views

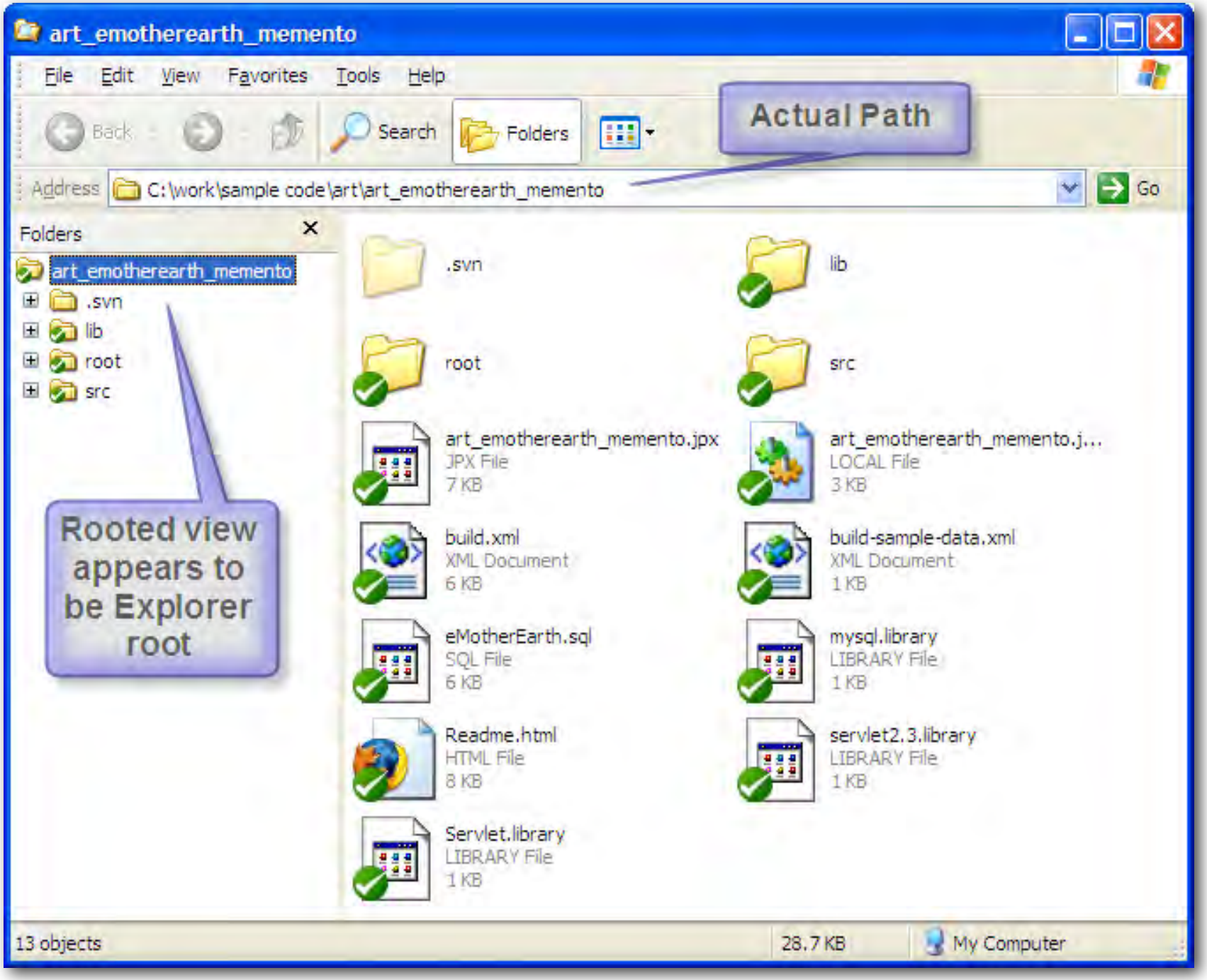
specialized explorer view

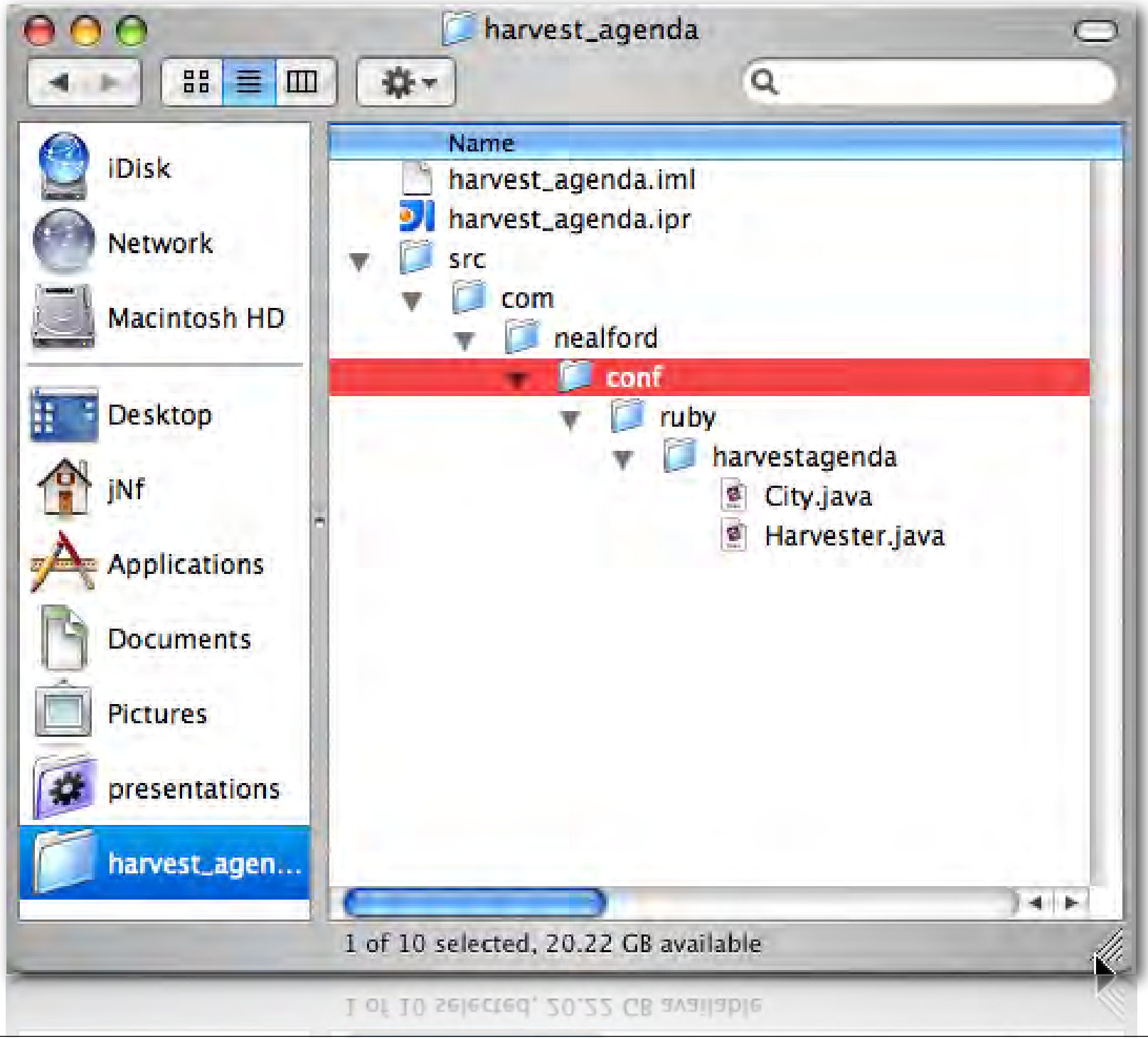
especially good for directory-based version control

rooted view == project explorer

create a shortcut:

```
C:\WINDOWS\explorer.exe /e,/root,c:\work\project
```


art_emotherearth_memento
File Edit View Favorites Tools Help
Back
Search
Folders
Actual Path
Address C:\work\sample code\art\art_emotherearth_memento
Go
Folders
art_emotherearth_memento
.svn
lib
root
src
Rooted view appears to be Explorer root
.svn
lib
root
src
art_emotherearth_memento.jpx
JPX File
7 KB
art_emotherearth_memento.j...
LOCAL File
3 KB
build.xml
XML Document
6 KB
build-sample-data.xml
XML Document
1 KB
eMotherEarth.sql
SQL File
6 KB
mysql.library
LIBRARY File
1 KB
Readme.html
HTML File
8 KB
servlet2.3.library
LIBRARY File
1 KB
Servlet.library
LIBRARY File
1 KB
13 objects
28.7 KB
My Computer

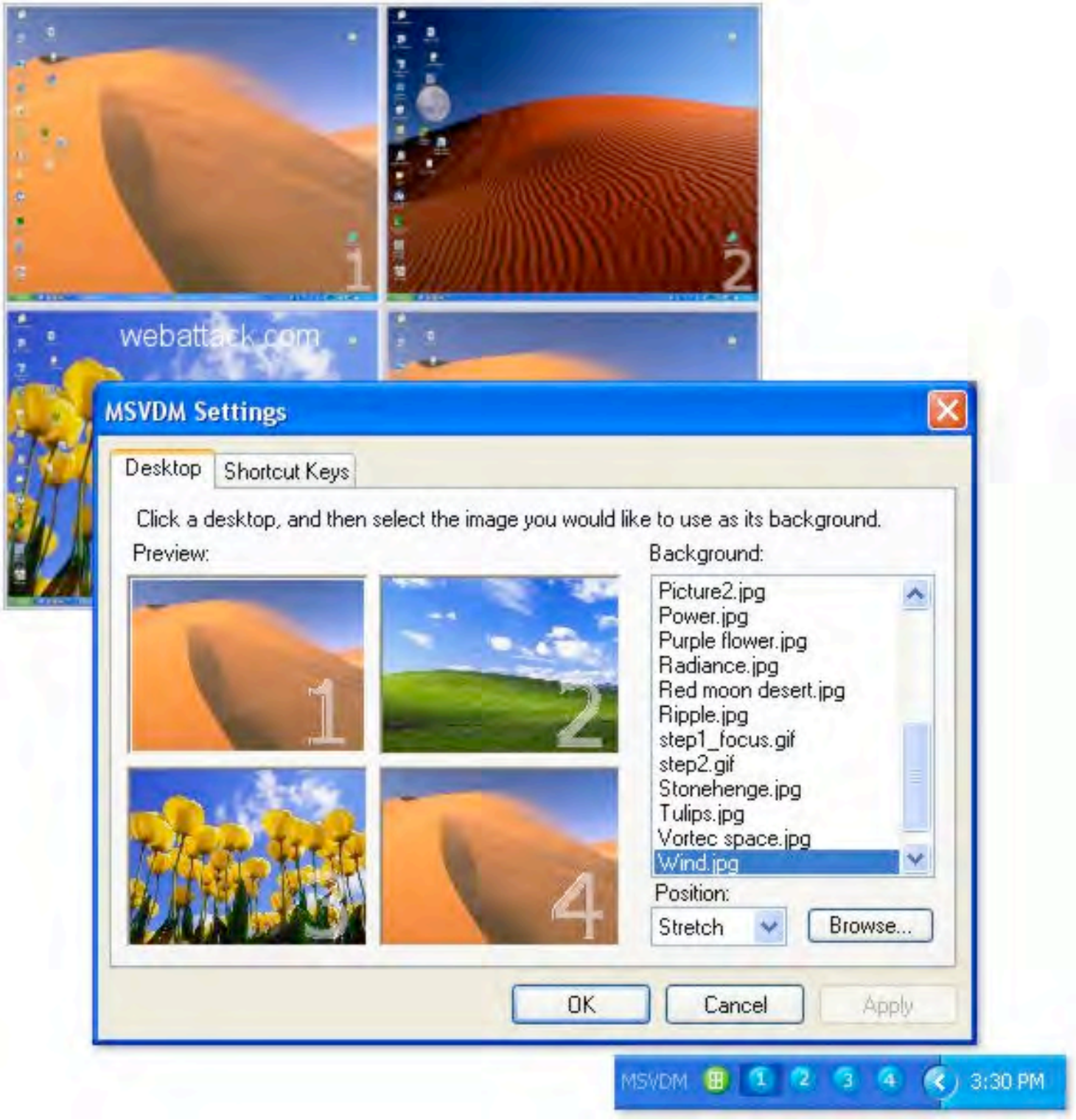

harvest_agenda
iDisk
Network
Macintosh HD
Desktop
jNf
Applications
Documents
Pictures
presentations
harvest_agen...
Name
harvest_agenda.iml
harvest_agenda.ipr
src
com
nealford
conf
ruby
harvestagenda
City.java
Harvester.java
1 of 10 selected, 20.22 GB available

use virtual desktops

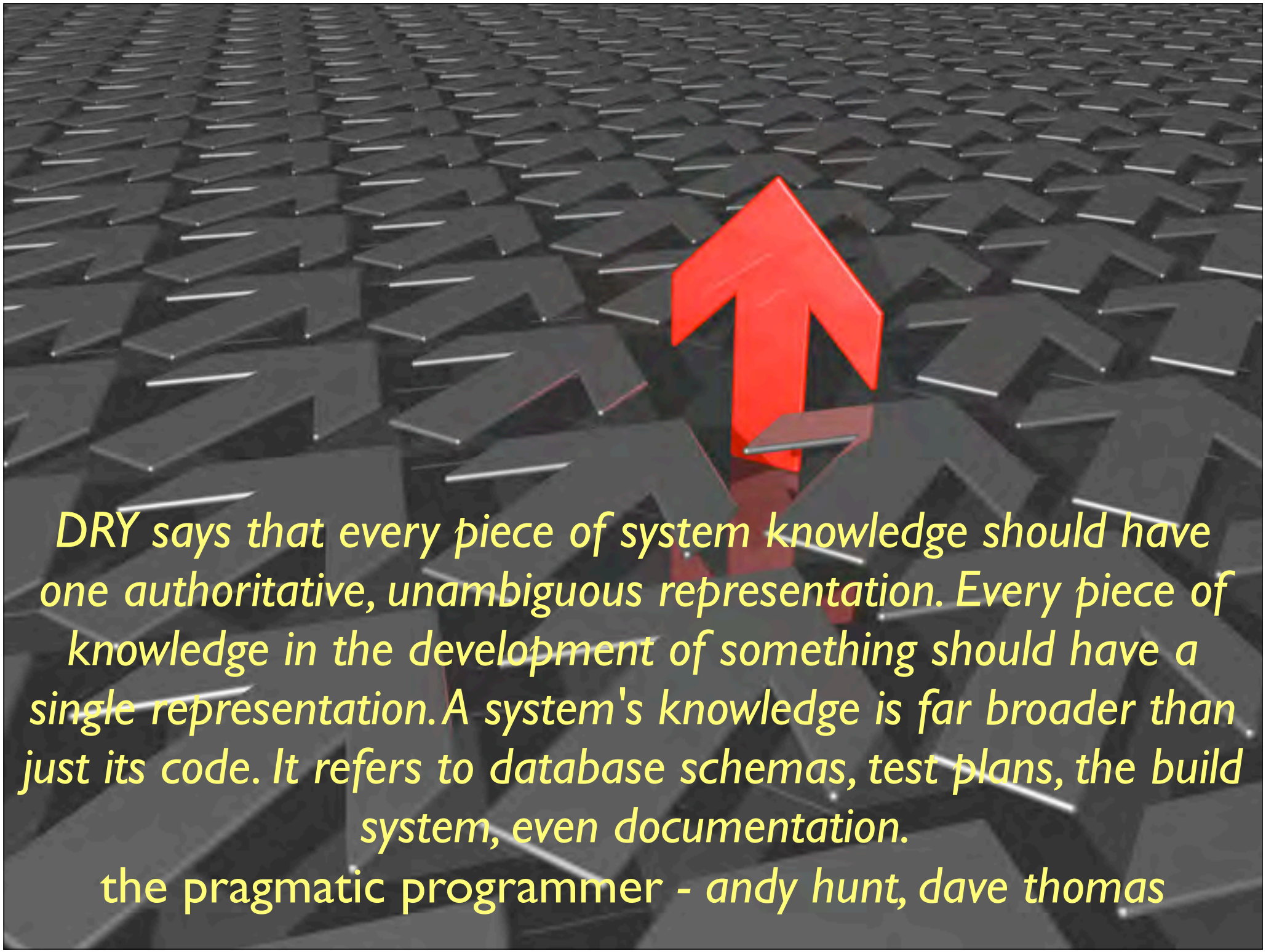
virtual desktop manager power toy

http://virtuawin.sourceforge.net/

spaces (in leopard)


webattack.com
MSVDM Settings
Desktop
Shortcut Keys
Click a desktop, and then select the image you would like to use as its background.
Preview:
Background:
Picture2.jpg
Power.jpg
Purple flower.jpg
Radiance.jpg
Red moon desert.jpg
Ripple.jpg
step1_focus.gif
step2.gif
Stonehenge.jpg
Tulips.jpg
Vortec space.jpg
Wind.jpg
Position:
Stretch
Browse...
OK
Cancel
Apply
MSVDM
1
2
3
4
3:30 PM


canonicality


DRY says that every piece of system knowledge should have one authoritative, unambiguous representation. Every piece of knowledge in the development of something should have a single representation. A system's knowledge is far broader than just its code. It refers to database schemas, test plans, the build system, even documentation.
the pragmatic programmer - *andy hunt, dave thomas*

dry o/r

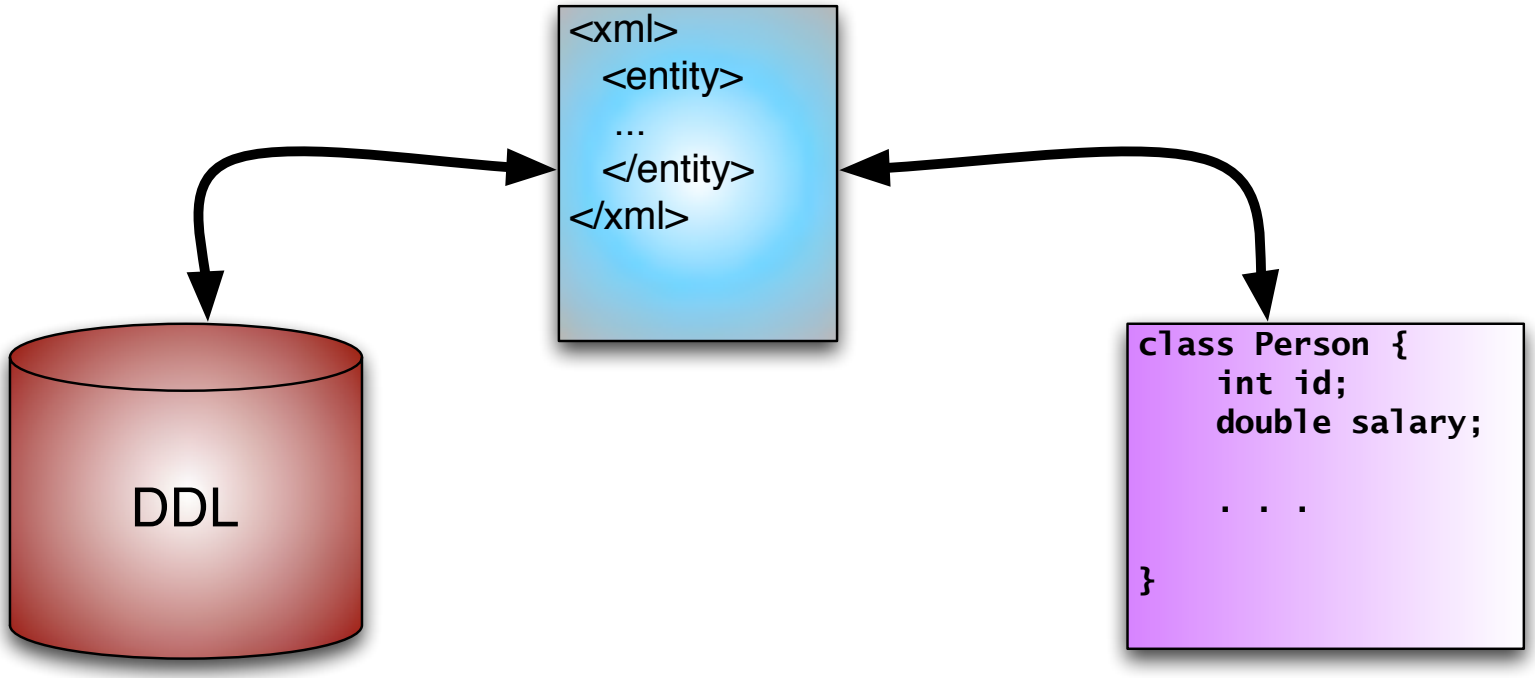
object-relational mapping is one of the most common dry violations

database schema + xml configuration + pojo > 1

decide on the canonical representation

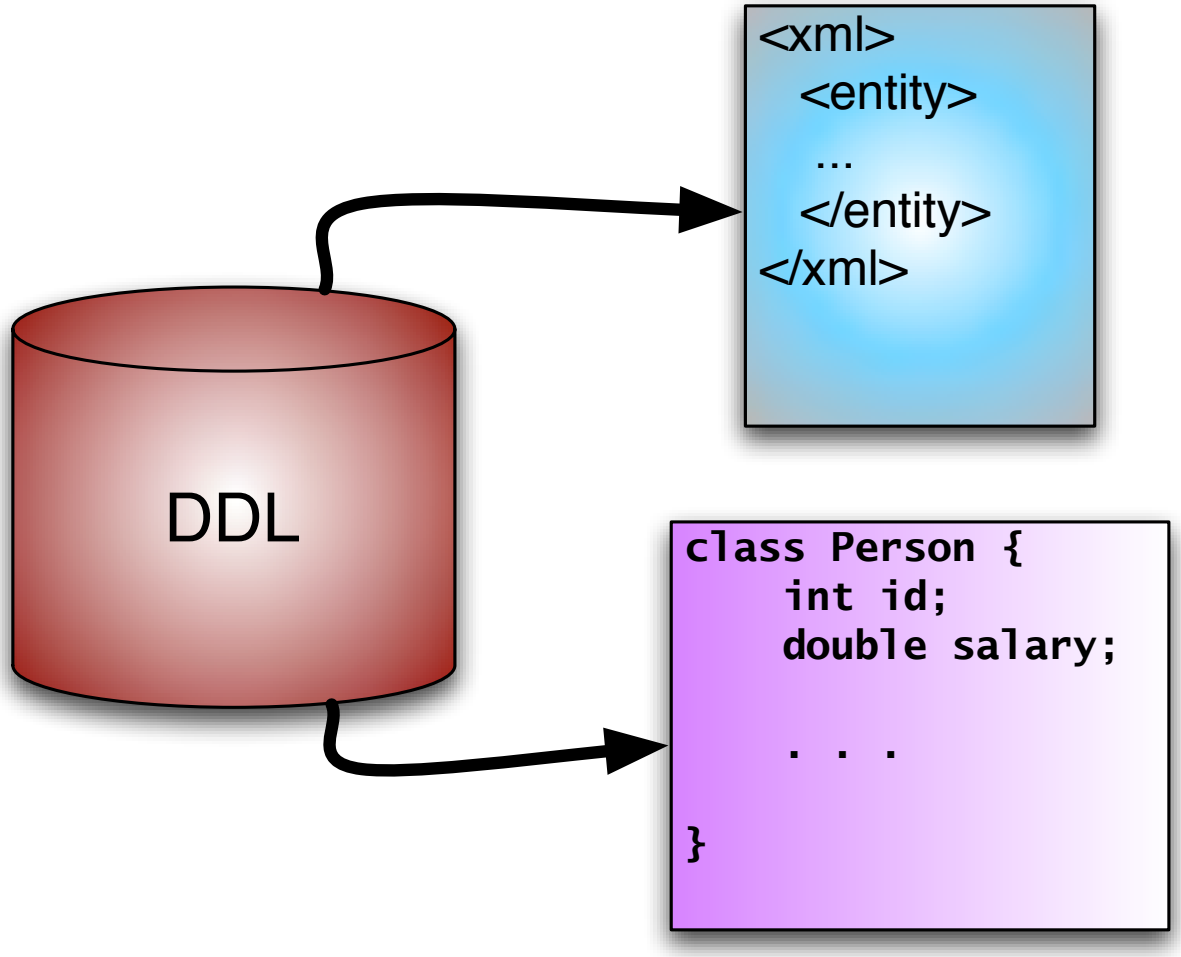
generate the others

the scenario



where's the information?

canonical representation



the target

```
<sqlMap namespace='event'>
  <typeAlias type='com.nealford.conf.canonicality.Event' alias='Event' />
  <resultMap id='eventResult' class='Event'>
    <result property='description' column='DESCRIPTION' />
    <result property='eventKey' column='EVENT_KEY' />
    <result property='start' column='START' />
    <result property='eventType' column='EVENT_TYPE' />
    <result property='duration' column='DURATION' />
  </resultMap>
  <select resultMap='eventResult' id='getEvents'>select * from event where id = ?</select>
  <select resultClass='com.nealford.conf.canonicality.Event' id='getEvent'>
      select * from event where id = #value#
  </select>
</sqlMap>
```

build event sql map

```
class GenerateEventSqlMap {
    static final SQL =
        ["sqlUrl":"jdbc:derby:/Users/jNf/work/derby_data/schedule",
            "driverClass":"org.apache.derby.jdbc.EmbeddedDriver"]
    def _file_name
    def types = [:]

    def GenerateEventSqlMap(file_name) {
        _file_name = file_name
    }
```

```
def columnNames() {
    Class.forName(SQL["driverClass"])
    def rs = DriverManager.getConnection(SQL["sqlUrl"]).createStatement().
        executeQuery("select * from event where 1=0")

    def rsmd = rs.getMetaData()
    def columns = []
    for (index in 1..rsmd.getColumnCount()) {
        columns << rsmd.getColumnName(index)
        types.put(camelize(rsmd.getColumnName(index)),
            rsmd.getColumnTypeName(index))
    }
    return columns
}
```

```
def create_mapping_file() {
    def writer = new StringWriter()
    def xml = new MarkupBuilder(writer)
    xml.sqlMap(namespace:'event') {
        typeAlias(alias:'Event',
            type:'com.nealford.conf.canonicality.Event')
        resultMap(id:'eventResult', class:'Event') {
            columnMap().each() {key, value ->
                result(property:"${key}", column:"${value}")
        }}
        select(id:'getEvents', resultMap:'eventResult',
                'select * from event where id = ?')
        select(id:"getEvent",
            resultClass:"com.nealford.conf.canonicality.Event",
                "select * from event where id = #value#")
    }

    new File(_file_name).withWriter { w ->
        w.writeLine("${writer.toString()}")
    }
}
```

generated sql map

```
<sqlMap namespace='event'>
  <typeAlias type='com.nealford.conf.canonicality.Event' alias='Event' />
  <resultMap id='eventResult' class='Event'>
    <result property='description' column='DESCRIPTION' />
    <result property='eventKey' column='EVENT_KEY' />
    <result property='start' column='START' />
    <result property='eventType' column='EVENT_TYPE' />
    <result property='duration' column='DURATION' />
  </resultMap>
  <select resultMap='eventResult' id='getEvents'>select * from event where id = ?</select>
  <select resultClass='com.nealford.conf.canonicality.Event' id='getEvent'>
      select * from event where id = #value#
  </select>
</sqlMap>
```

step 2: class builder

```
class ClassBuilder {
    def imports = []
    def fields = [:]
    def file_name
    def package_name

    def ClassBuilder(imports, fields, file_name, package_name) {
        this.imports = imports
        this.fields = fields
        this.file_name = file_name
        this.package_name = package_name
    }

    def write_imports(w) {
        imports.each { i ->
            w.writeLine("import ${i};")
        }
        w.writeLine("")
    }
```

```
def write_classname(w) {
    def class_name_with_extension = file_name.substring(
        file_name.lastIndexOf("/") + 1, file_name.length());
    w.writeLine("public class " +
        class_name_with_extension.substring(0,
            class_name_with_extension.length() - 5) + " {")
}

def write_fields(w) {
    fields.each { name, type ->
        w.writeLine("\t${type} ${name};");
    }
    w.writeLine("")
}
```

```
public class Event {
    String description;
    int eventKey;
    String start;
    int eventType;
    int duration;
```

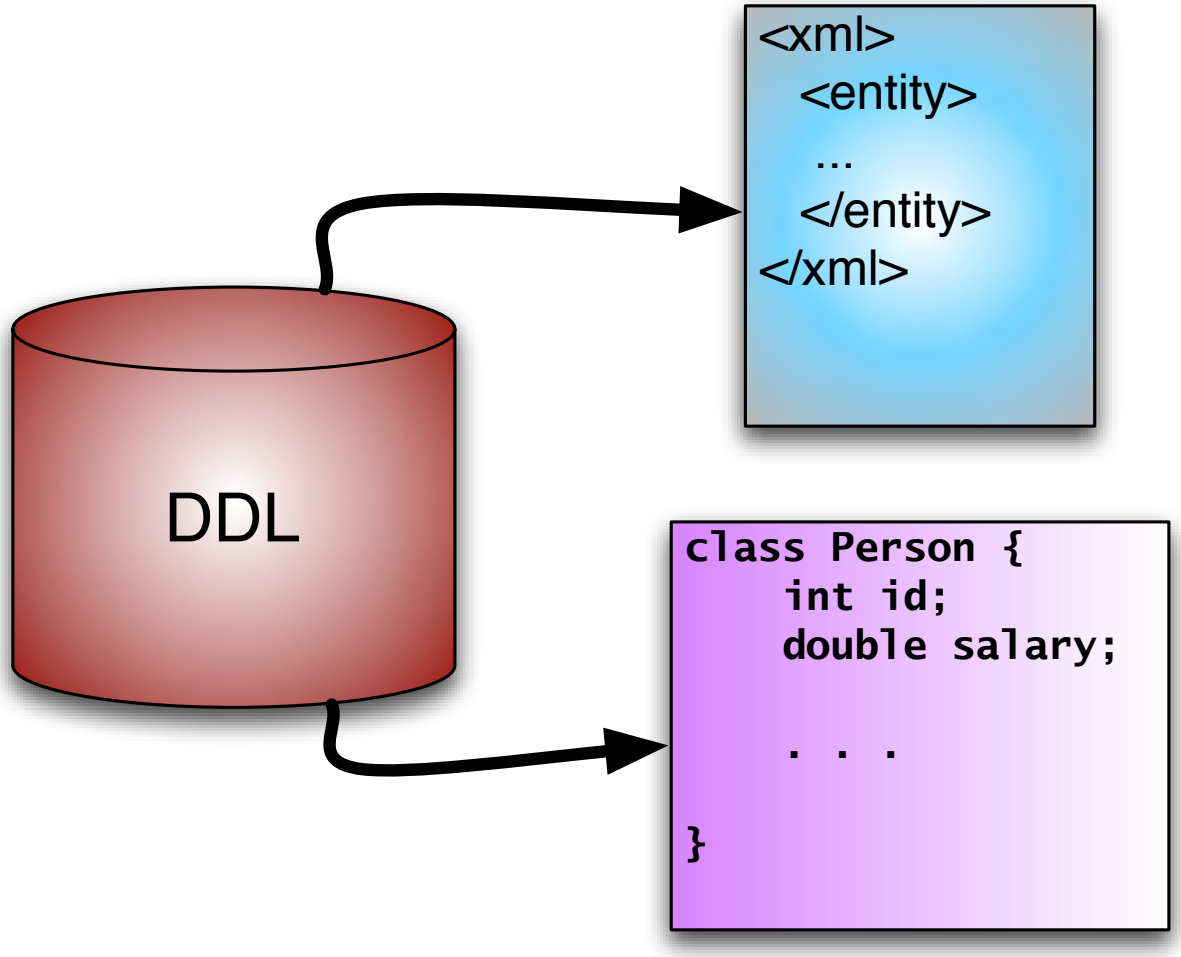
```
def write_properties(w) {
    fields.each { name, type ->
        def cap_name = name.charAt(0).toString().toUpperCase() +
            name.substring(1)
        w.writeLine("\tpublic ${type} get${cap_name}() {")
        w.writeLine("\t\treturn ${name};\n\t}\n");

        w.writeLine("\tpublic void set${cap_name}(${type} ${name}) {")
        w.writeLine("\t\tthis.${name} = ${name};\n\t}\n")
    }
}
```

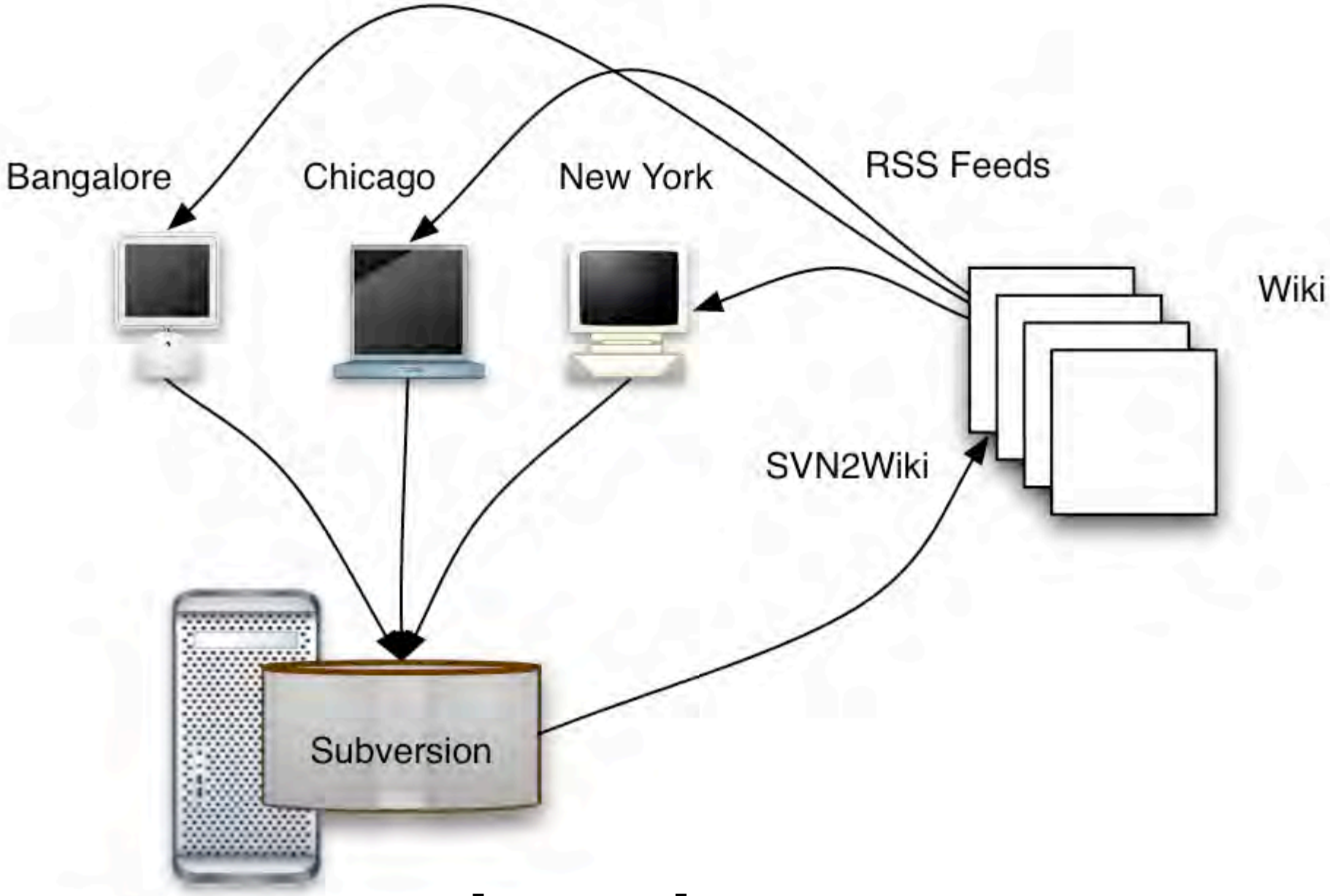
```
    return description;
}

public void setDescription(String description) {
    this.description = description;
}

// . . .
```

```
def generate_class_file() {
    new File(file_name).withWriter { w ->
        w.writeLine("package ${package_name};\n")
        write_imports(w)
        write_classname(w)
        write_fields(w)
        write_properties(w)
        w.writeLine("}")
    }
}
```

```
public class Event {
    String description;
    int eventKey;
    String start;
    int eventType;
    int duration;

    public String getDescription() {
        return description;
    }

    public void setDescription(String description) {
        this.description = description;
    }

    public int getEventKey() {
        return eventKey;
    }

    public void setEventKey(int eventKey) {
```

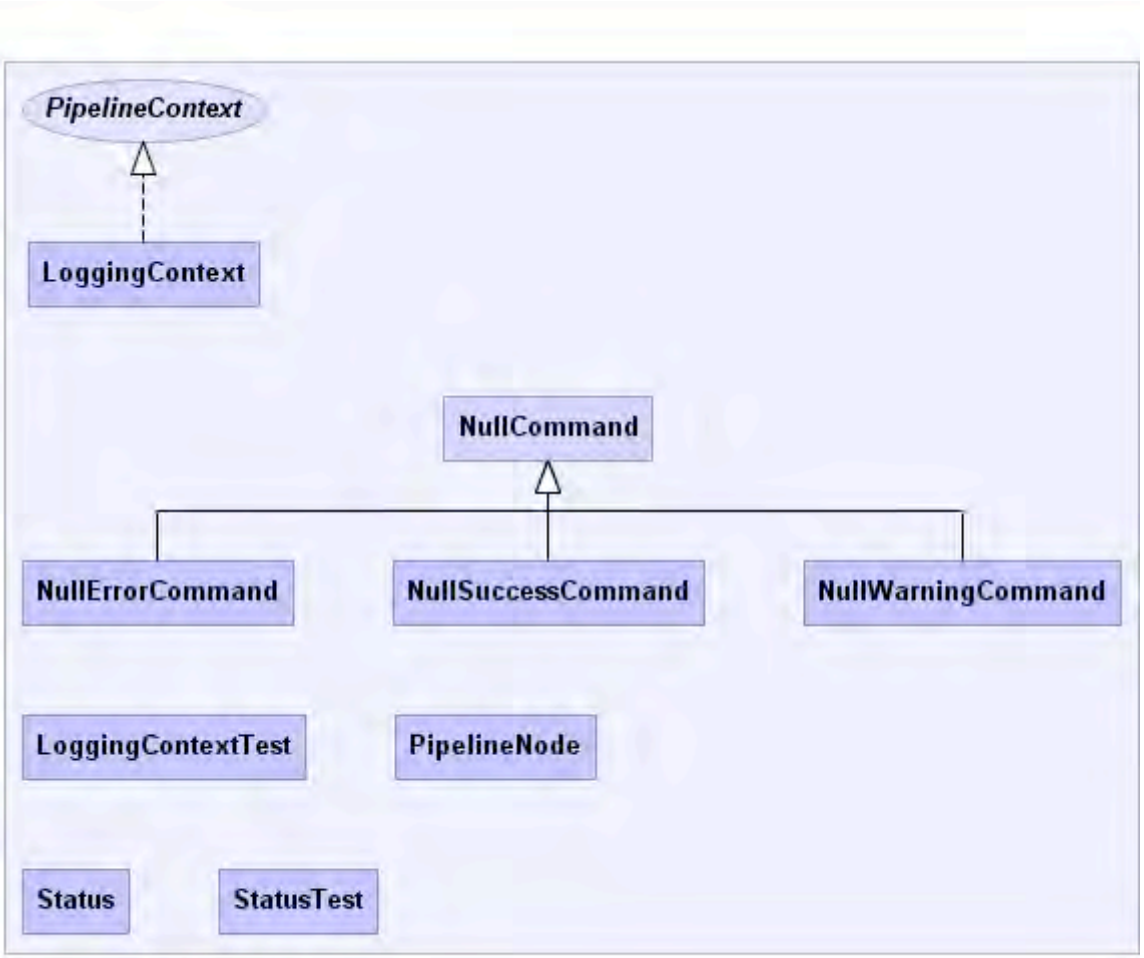
canonical representation





dry documentation

dry diagrams



dry schemas

the requirement: entity-relationship diagrams for each iteration

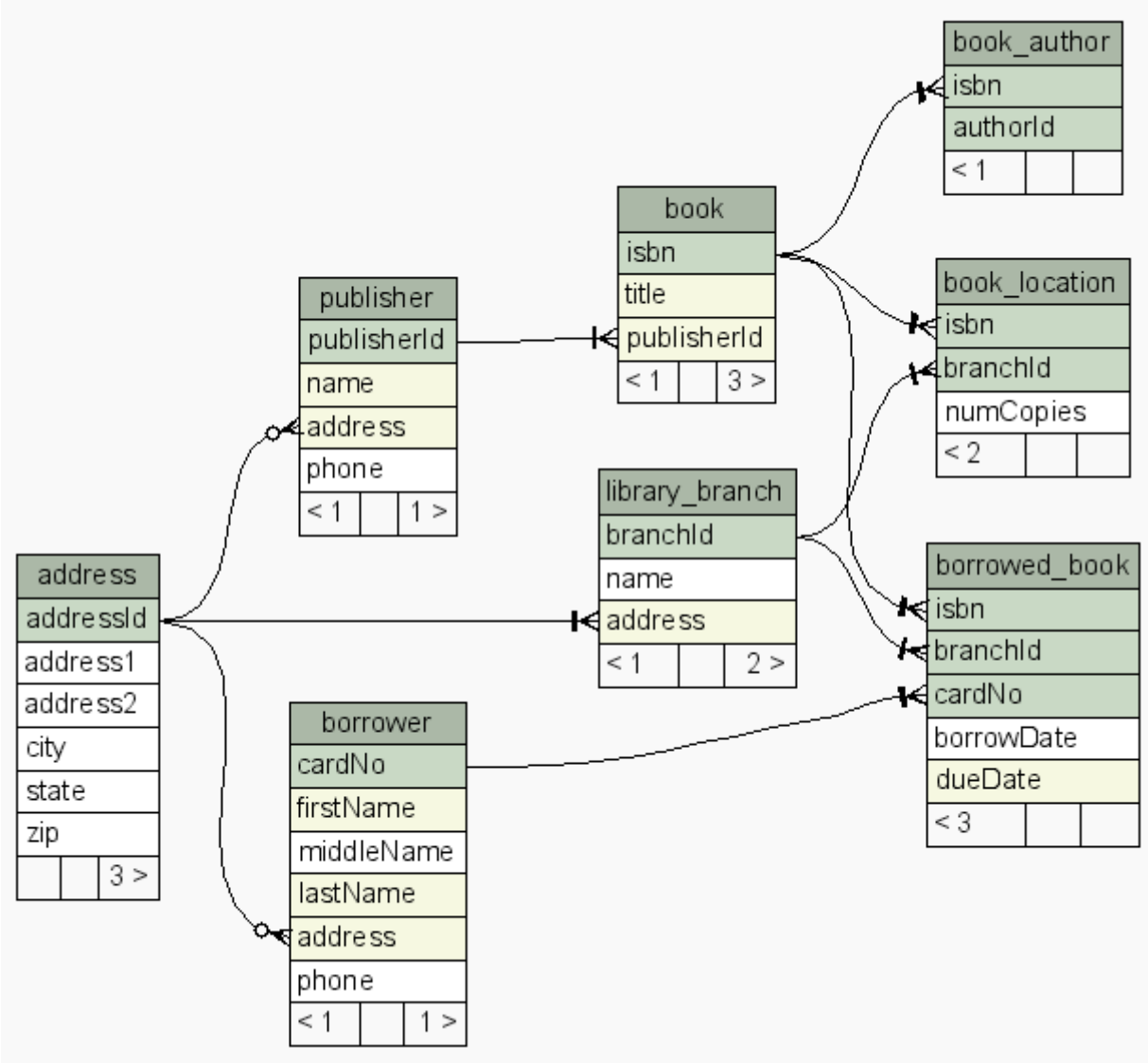
schemaspy

open source schema diagrammer

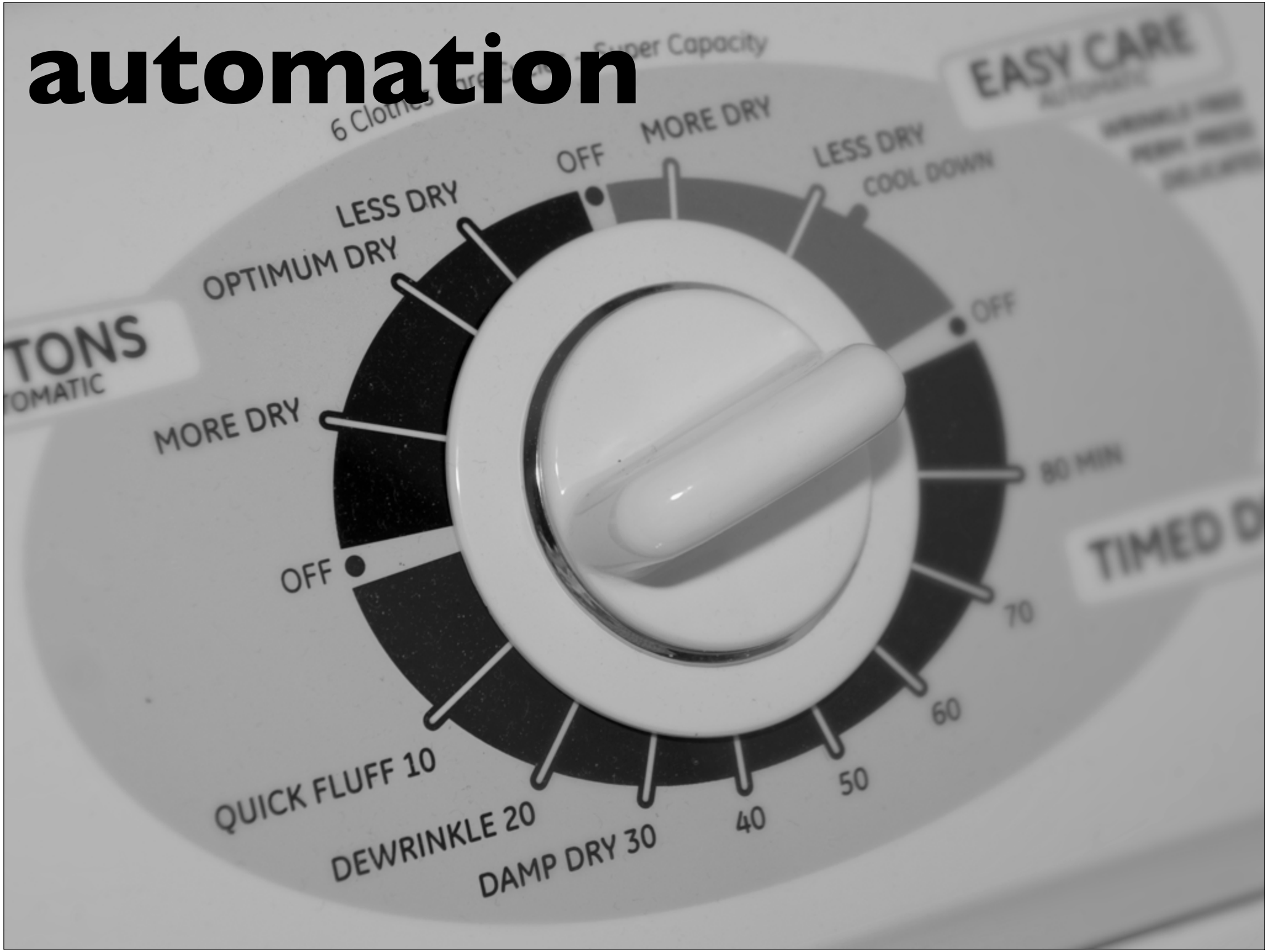
written in java

generates acceptable html

dry schemas


book_author
isbn
authorId
< 1
book
isbn
title
publisherId
< 1
3 >
book_location
isbn
branchId
numCopies
< 2
publisher
publisherId
name
address
phone
< 1
1 >
library_branch
branchId
name
address
< 1
2 >
address
addressId
address1
address2
city
state
zip
3 >
borrowed_book
isbn
branchId
cardNo
borrowDate
dueDate
< 3
borrower
cardNo
firstName
middleName
lastName
address
phone
< 1
1 >

automation


EASY CARE
OFF
MORE DRY
LESS DRY
COOL DOWN
OFF
80 MIN
70
60
50
40
DAMP DRY 30
DEWRINKLE 20
QUICK FLUFF 10
OFF
MORE DRY
OPTIMUM DRY
LESS DRY

obvious automatables

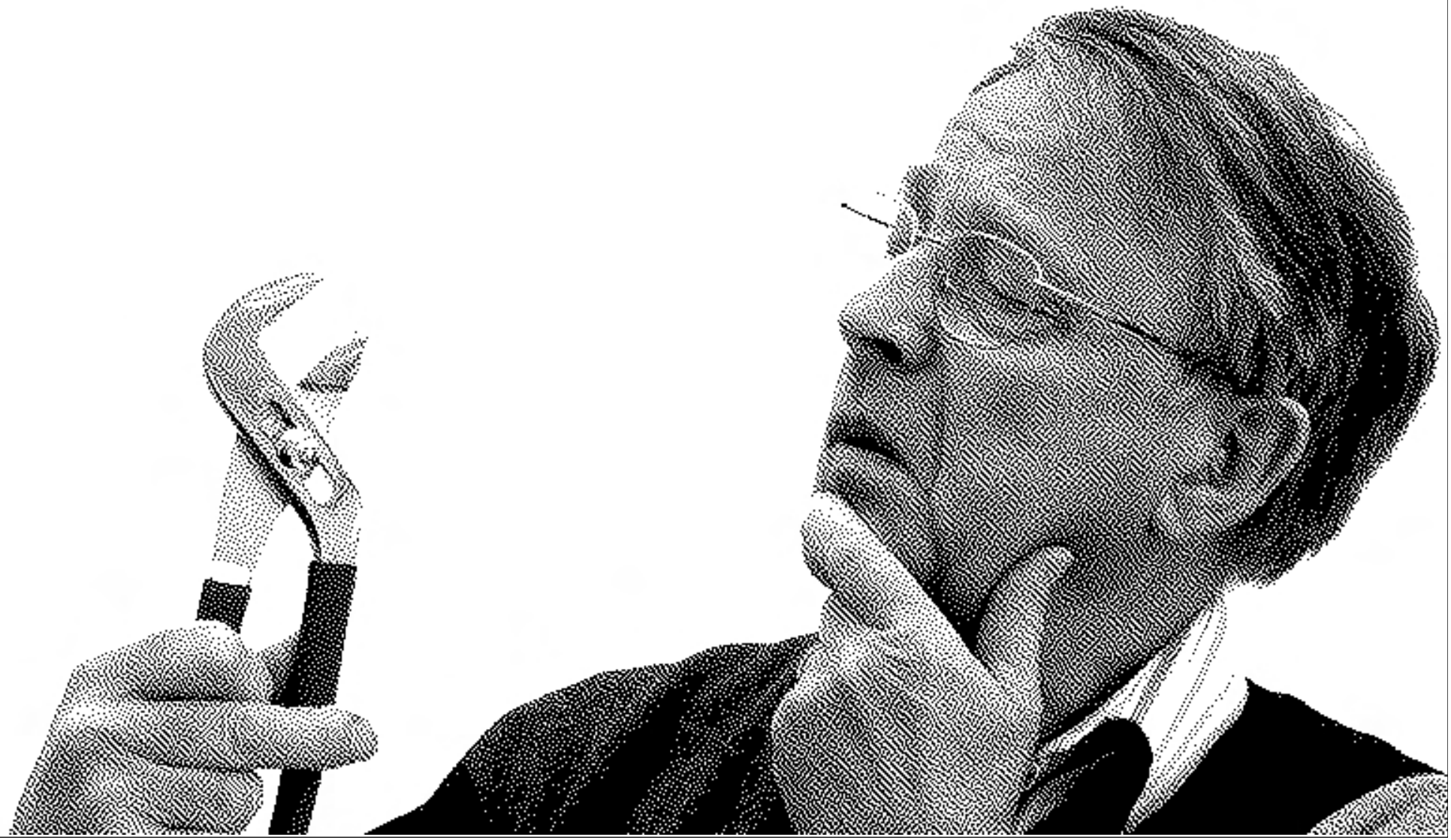
one-command build

continuous integration

version control (!)

documentation

subverting other tools



selenium

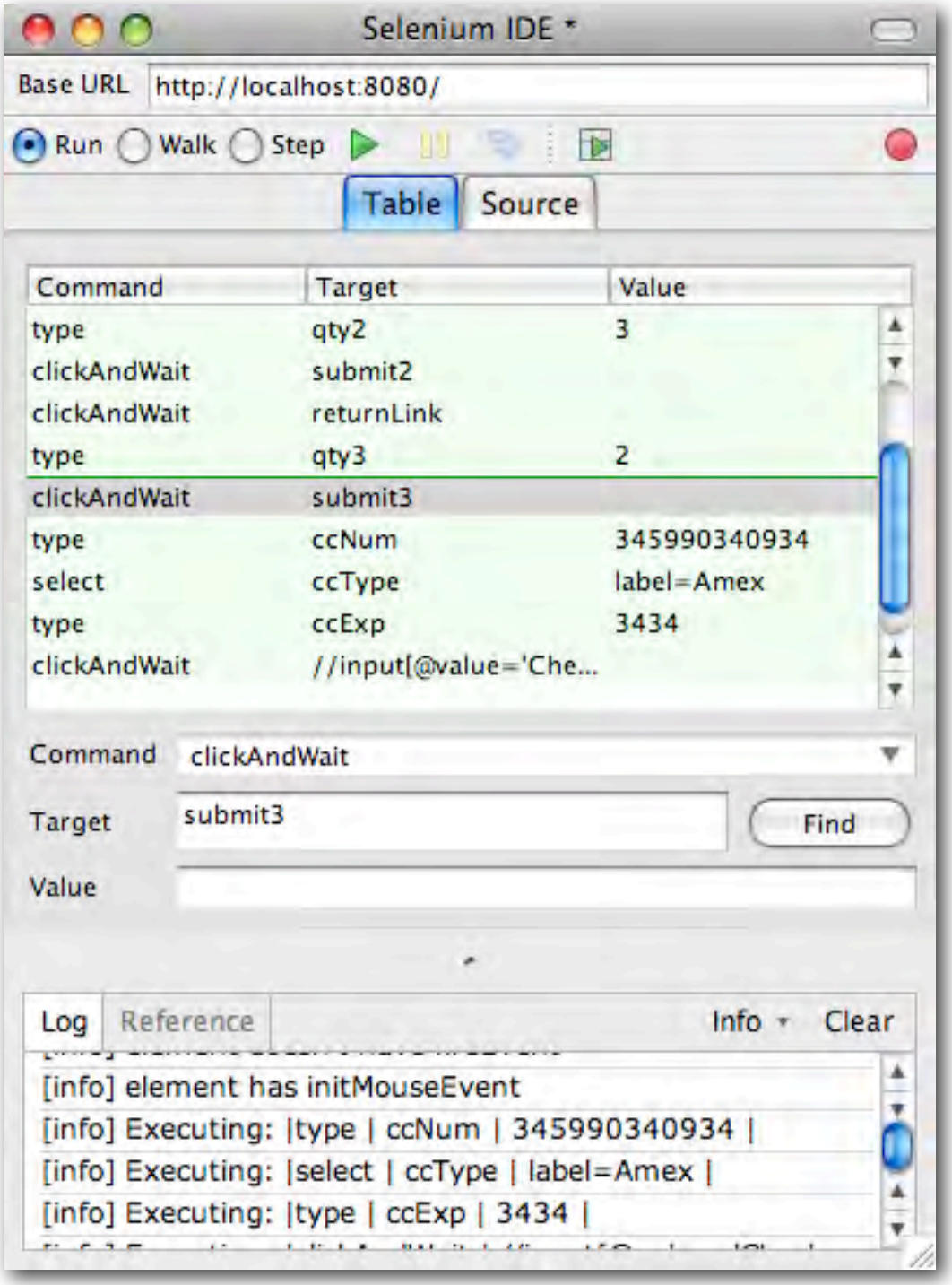
open source tool for user acceptance testing of web applications

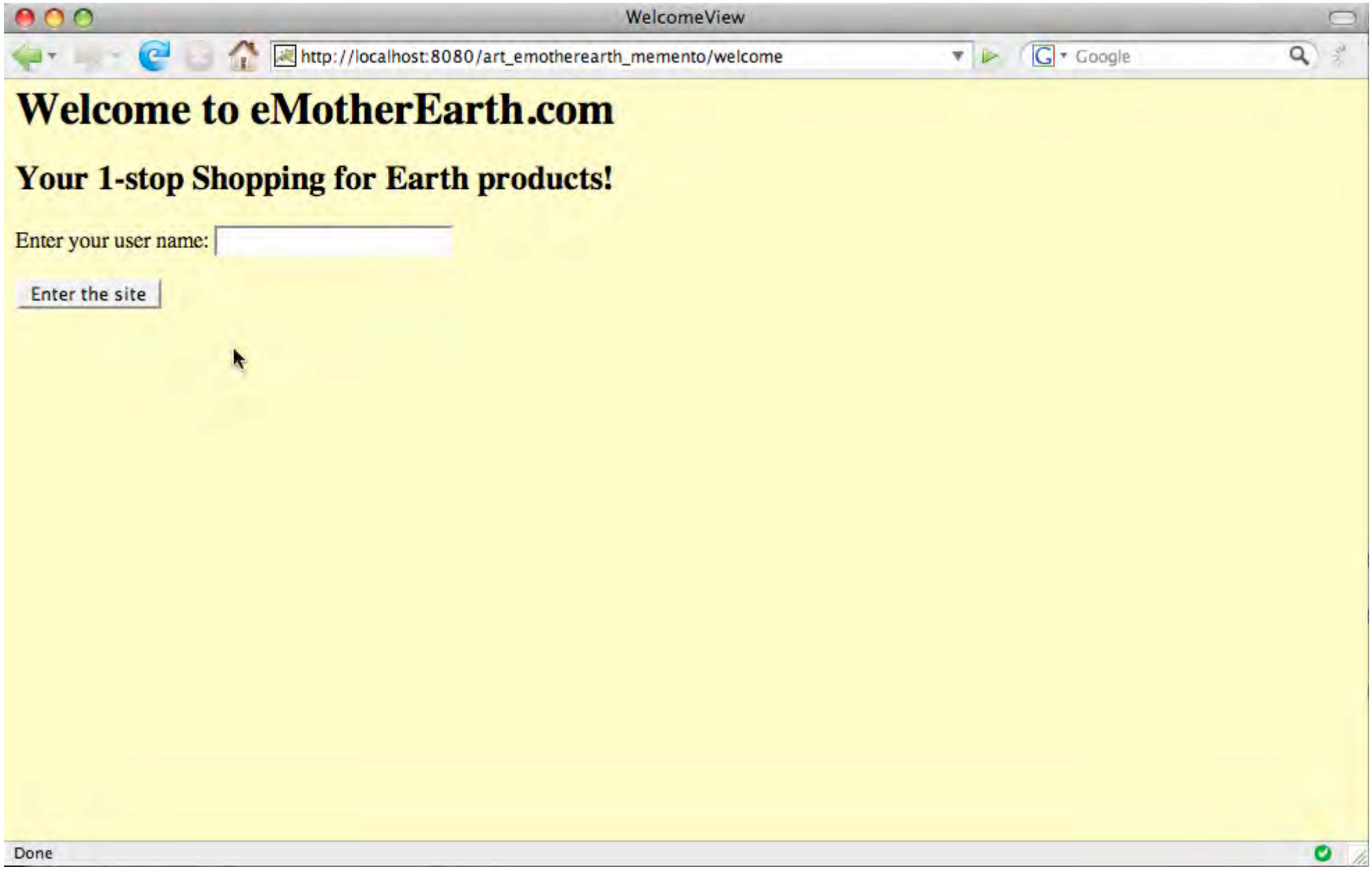
includes a side-project called selenium ide

allows you to automate debugging “wizard”-style web applications

you always think “this is the last time”...

...but it never is!


Selenium IDE *
Base URL
http://localhost:8080/
Run
Walk
Step
Table
Source
Command
Target
Value
type
qty2
3
clickAndWait
submit2
clickAndWait
returnLink
type
qty3
2
clickAndWait
submit3
type
ccNum
345990340934
select
ccType
label=Amex
type
ccExp
3434
clickAndWait
//input[@value='Che...
Command
clickAndWait
Target
submit3
Find
Value
Log
Reference
Info
Clear
[info] element has initMouseEvent
[info] Executing: |type | ccNum | 345990340934 |
[info] Executing: |select | ccType | label=Amex |
[info] Executing: |type | ccExp | 3434 |


WelcomeView
http://localhost:8080/art_emotherearth_memento/welcome
Google
Welcome to eMotherEarth.com
Your 1-stop Shopping for Earth products!
Enter your user name:
Enter the site
Done

New Test		
open	/art_emotherearth_memento/welcome	
type	userName	Homer
clickAndWait	submitButton	
type	qty2	3
clickAndWait	submit2	
clickAndWait	returnLink	
type	qty6	4
clickAndWait	submit6	
type	ccNum	234234234234
select	ccType	label=MC
type	ccExp	2323
clickAndWait	//input[@value='Check out']	

```
public class NewTest extends SeleneseTestCase {
    public void testNew() throws Exception {
        selenium.open("/art_emotherearth_memento/welcome");
        selenium.type("userName", "Homer");
        selenium.click("submitButton");
        selenium.waitForPageToLoad("30000");
        selenium.type("qty2", "3");
        selenium.click("submit2");
        selenium.waitForPageToLoad("30000");
        selenium.click("returnLink");
        selenium.waitForPageToLoad("30000");
        selenium.type("qty6", "4");
        selenium.click("submit6");
        selenium.waitForPageToLoad("30000");
        selenium.type("ccNum", "234234234234");
        selenium.select("ccType", "label=MC");
        selenium.type("ccExp", "2323");
        selenium.click("//input[@value='Check out']");
        selenium.waitForPageToLoad("30000");
    }
}
```

```
class NewTest < Test::Unit::TestCase
  def setup
    @verification_errors = []
    if $selenium
      @selenium = $selenium
    else
      @selenium = Selenium::SeleneseInterpreter.new(
          "localhost", 4444, "*firefox", "http://localhost:4444", 10000);
      @selenium.start
    end
    @selenium.set_context("test_new", "info")
  end

  def teardown
    @selenium.stop unless $selenium
    assert_equal [], @verification_errors
  end

  def test_new
    @selenium.open "/art_emotherearth_memento/welcome"
    @selenium.type "userName", "Homer"
    @selenium.click "submitButton"
    @selenium.wait_for_page_to_load "30000"
    @selenium.type "qty2", "3"
    @selenium.click "submit2"
    @selenium.wait_for_page_to_load "30000"
    @selenium.click "returnLink"
    @selenium.wait_for_page_to_load "30000"
    @selenium.type "qty6", "4"
    @selenium.click "submit6"
    @selenium.wait_for_page_to_load "30000"
    @selenium.type "ccNum", "234234234234"
    @selenium.select "ccType", "label=MC"
    @selenium.type "ccExp", "2323"
    @selenium.click "//input[@value='Check out']"
    @selenium.wait_for_page_to_load "30000"
  end
end
```

automated interaction

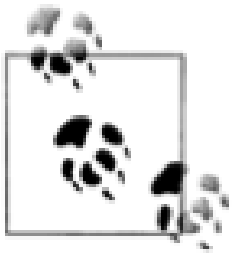
record your interaction the 1st time you walk through the page

literally cuts hours off debugging time

selenium defines an interaction api for web applications

have your q/a department record bug discoveries

don’t spend time doing by
hand what you can automate



build your own tools

you almost never do anything just once

work like a craftsman, not a laborer

build shims & jigs

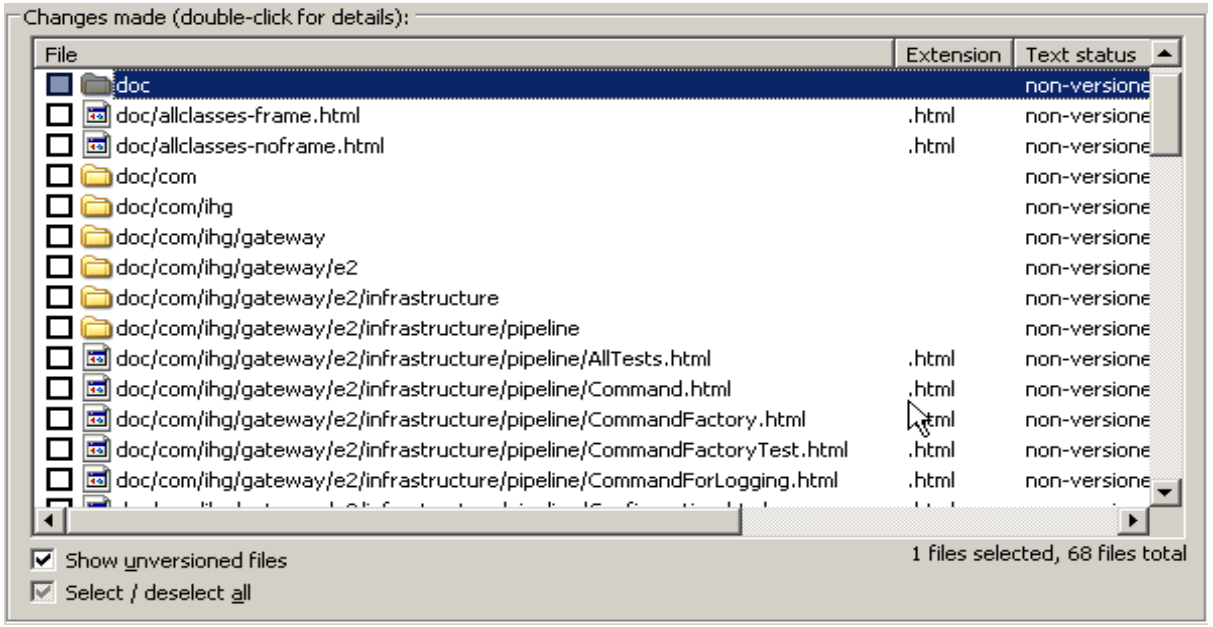
building a tool takes a little longer than brute force...

...but you build assets

bash-fu

adding new files to subversion repository

tortoise (on windows), but with limits



svnAddNew

```
svn st | grep '^\?' | tr '^\?' ' ' |
sed 's/ [ ]*//' | sed 's/[ ]/\\ /g' | xargs svn add
```

`svn st`	get svn status (new files start with “?”)
`grep '^\?'`	find all new files
`tr '^\?' ' '`	translate the “?” into a space
`sed 's/[ ]*//'`	substitute spaces to nothing
`sed 's/[ ]/\\ /g'`	escape embedded spaces
`xargs svn add`	pipe the improved arguments into svn

more bash-fu

the problem: 2 gb of log files / week

need to know the count of each exception type

by hand?!?

automate with a bash script

get all exception types from log file

sort them

```
#!/bin/bash
for X in $(egrep -o "[A-Z]\w*Exception" genesis_week.txt | sort | uniq) ;
do
    echo -n -e "$X\t"
    grep -c "$X" genesis_week.txt
done
```

get unique list

get counts of each exception

automating com

```
def open_daily_logs
  excel = WIN32OLE.new("excel.application")

  workbooks = excel.WorkBooks
  excel.Visible = true
  doc_list.each do |f|
    begin
      workbooks.Open(@@Home_Dir + f, true)
    rescue
      puts "Cannot open workbook:", @@Home_Dir + f
    end
  end
  excel.Windows.Arrange(7)
end
```

scripting rationale

examples in lots of different languages/tools

which one do I use for this problem?

use a *real* language for scripting

sql splitter

the problem: split a 38,000 line sql file into 1000 line chunks

each chunk must be syntactically correct

“we can do it by hand in 10 minutes...”

automate instead

after 50 minutes:

```ruby
SQL_FILE = "./GeneratedTestData.sql"
OUTPUT_PATH = "./chunks of sql/"

line_num = 1
file_num = 0
Dir.mkdir(OUTPUT_PATH) unless File.exists? OUTPUT_PATH
file = File.new(OUTPUT_PATH + "chunk " + file_num.to_s + ".sql",
    File::CREAT|File::TRUNC|File::RDWR, 0644)

done, seen_1k_lines = false
IO.readlines(SQL_FILE).each do |line|
  file.puts(line)
  seen_1k_lines = (line_num % 1000 == 0) unless seen_1k_lines
  line_num += 1
  done = (line.downcase =~ /^\W*go\W*$/ or
          line.downcase =~ /^\W*end\W*$/) != nil
  if done and seen_1k_lines
    file_num += 1
    file = File.new(OUTPUT_PATH + "chunk " + file_num.to_s + ".sql",
          File::CREAT|File::TRUNC|File::RDWR, 0644)
    done, seen_1k_lines = false
  end
end
```

time spent automating

it took us 5 times longer to automate it

we've had to do it numerous times since

it "accidentally" became an important part of our project

using a real language allowed us to refactor it...

...so that we could write unit tests

```ruby
def test_mocked_out_dir
  ss = SqlSplitter.new("dummy_path", "dummy_file")
  Dir.expects(:mkdir).with("dummy_path")
  ss.make_a_place_for_output_files
end

def test_that_output_directory_is_created_correctly
  ss = SqlSplitter.new(OUTPUT_PATH, nil)
  ss.make_a_place_for_output_files
  assert File.exists? OUTPUT_PATH
end

def test_that_lines_o_sql_has_lines_o_sql
  lines = %w{Lorem ipsum dolor sit amet consectetur}
  ss = SqlSplitter.new(nil, nil)
  ss.sql_lines = lines
  assert ss.lines_o_sql.size > 0
  assert_same ss.lines_o_sql, lines
end

def test_generate_sql_chunks
  ss = SqlSplitter.new(OUTPUT_PATH, nil)
  ss.sql_lines = lots_o_fake_data
  ss.generate_sql_chunks
  assert File.exists? OUTPUT_PATH
  assert Dir.entries(OUTPUT_PATH).size > 0
  Dir.entries(OUTPUT_PATH).each do |f|
    assert f.size > 0
  end
end
```

using real languages

allow throw-aways to grow into assets

allows unit testing, refactoring, ide support

if you start by treating it as a 1st class problem, you'll build better solutions

time savings

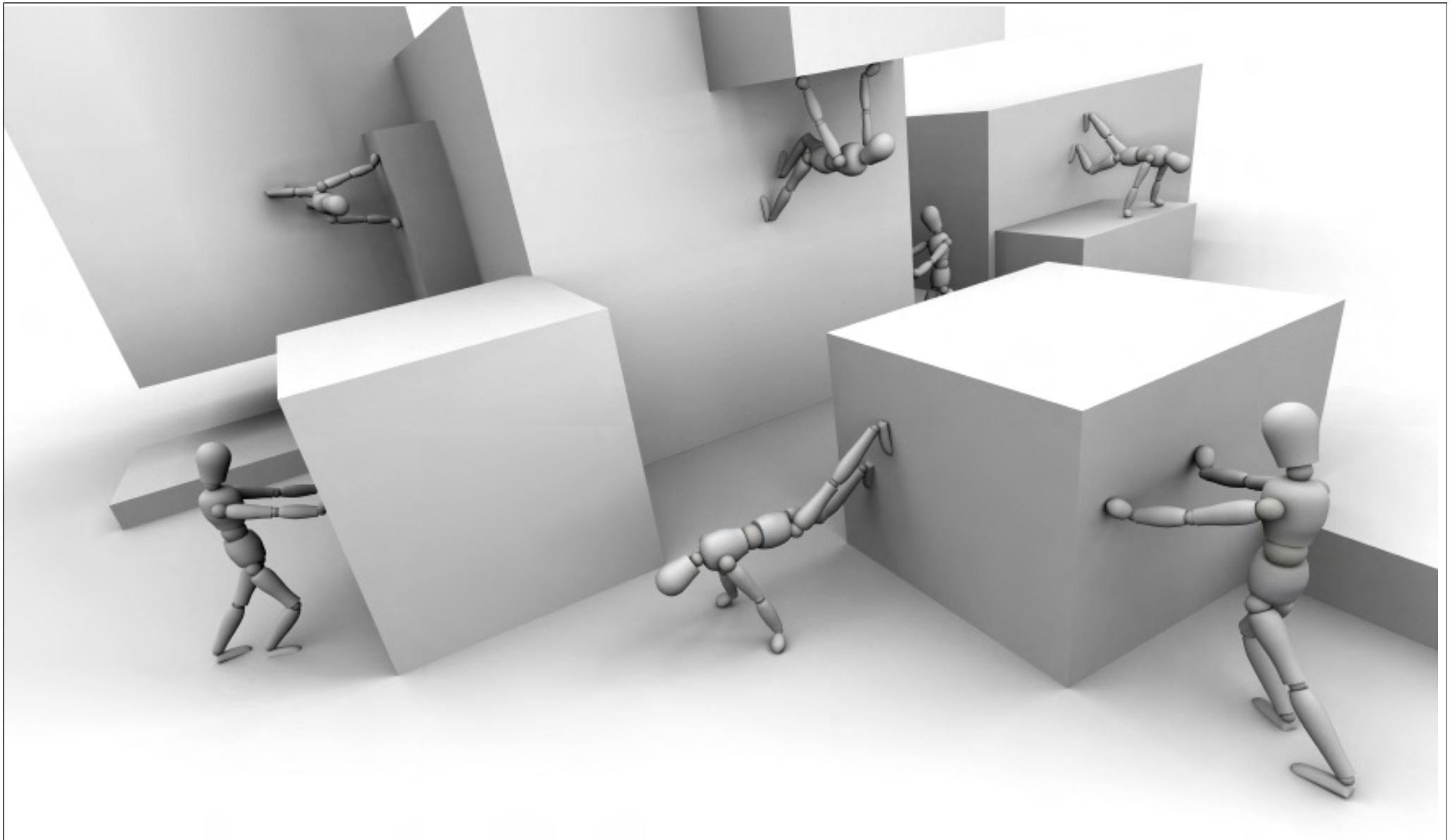
solving problems by hand makes you dumber

steals concentration

squanders focus

automating makes you smarter

figure out clever ways to solve problems



justifying automation

timebox

set a reasonable time to see if it's possible

evaluate at the end of the box

decide if you want to go forward

or create another time box

or abandon the effort

analyze the r.o.i.

how long does it take now X # of times we must do it?

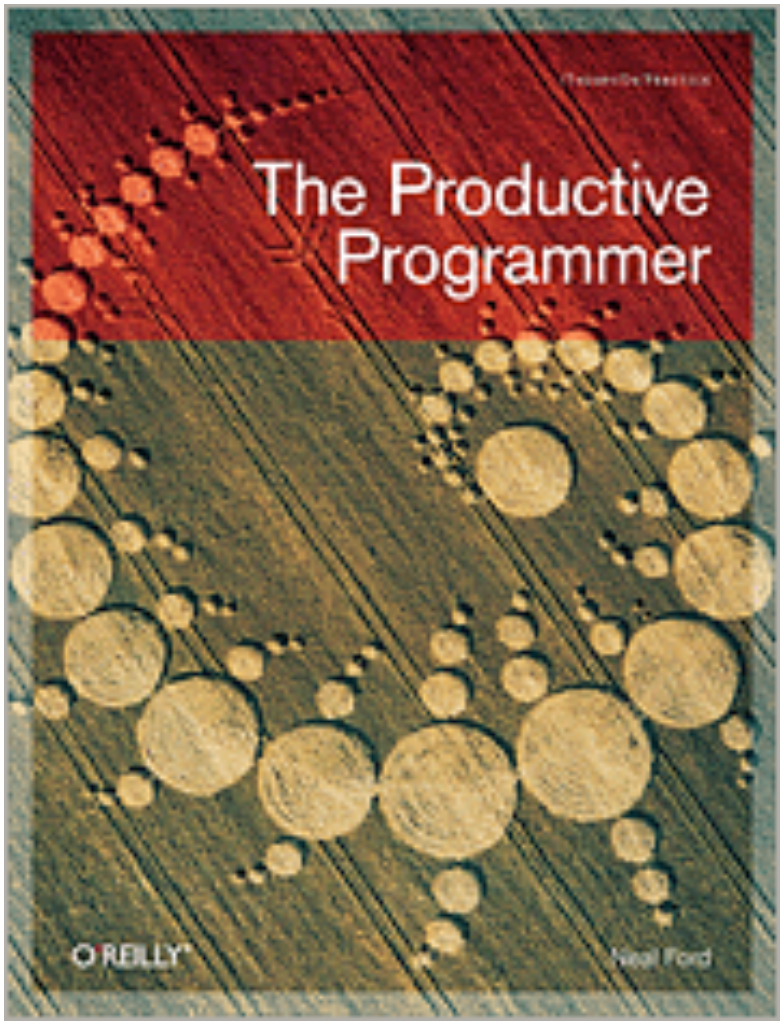
what are the consequences of doing it wrong 1 time?

automation is about

time savings

risk mitigation


don’t shave yaks!



end of part 1:
mechanics

next: practice

NEAL FORD software architect / meme wrangler

ThoughtWorks

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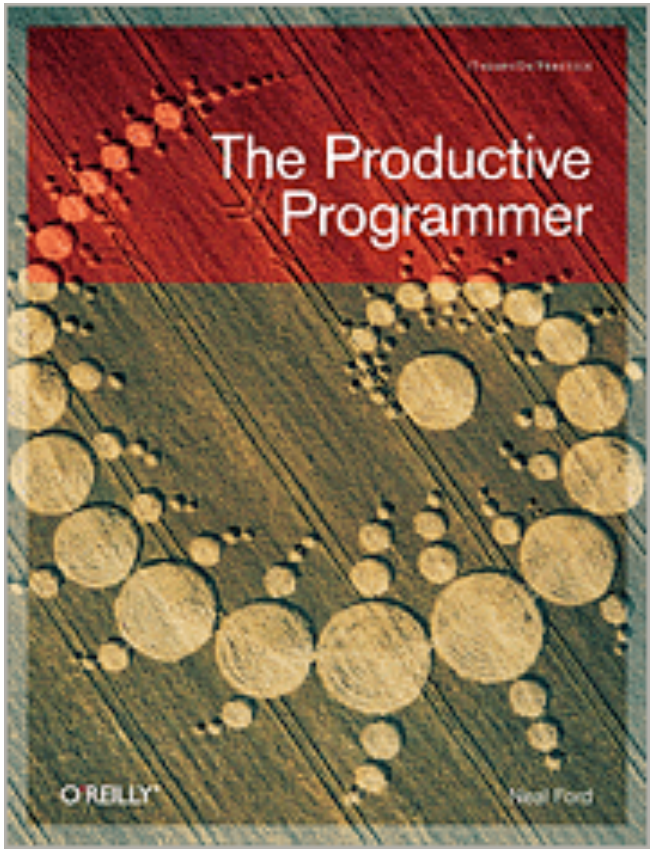
3003 Summit Boulevard, Atlanta, GA 30319
www.nealford.com
www.thoughtworks.com
memeagora.blogspot.com

10 ways to improve your code



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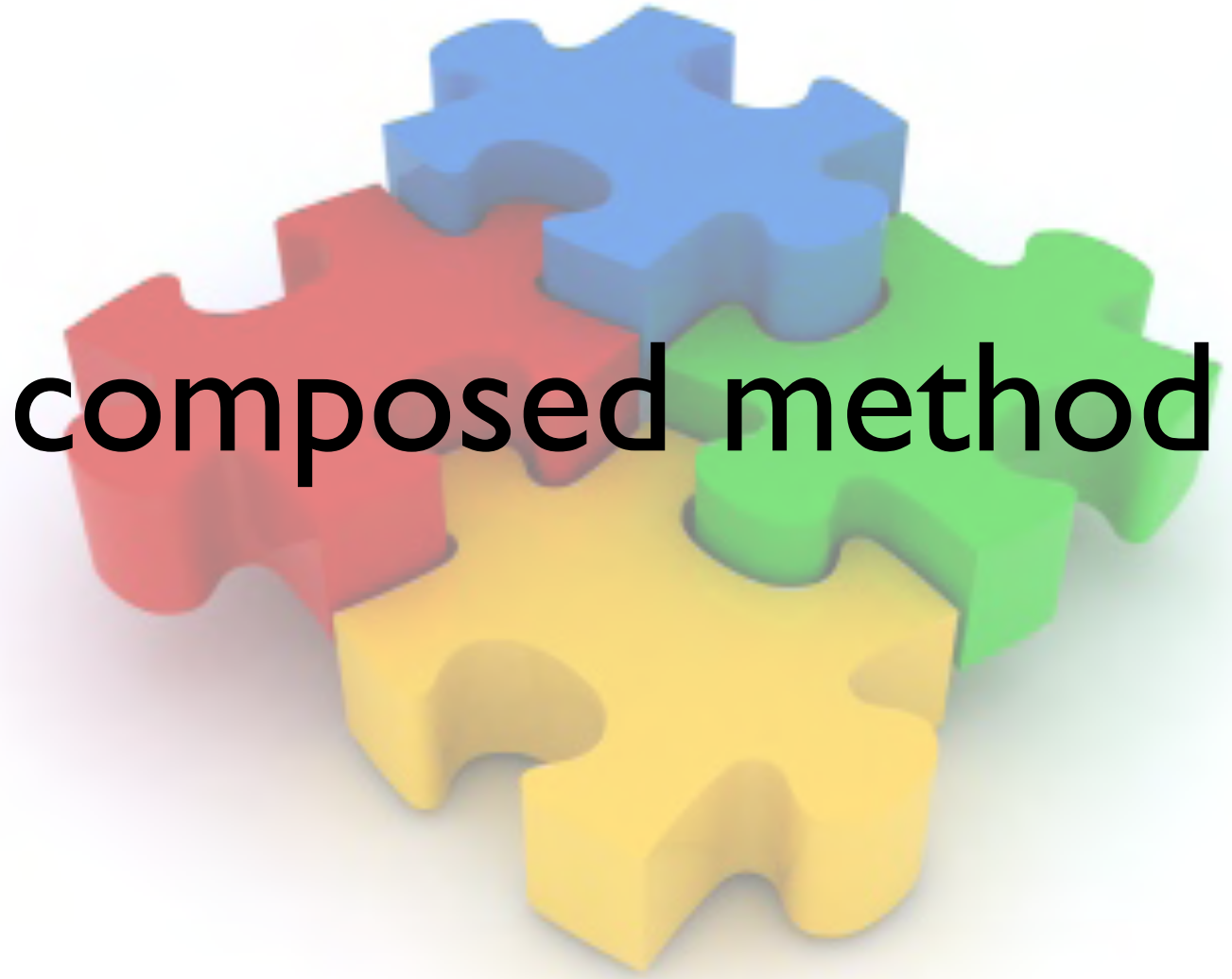
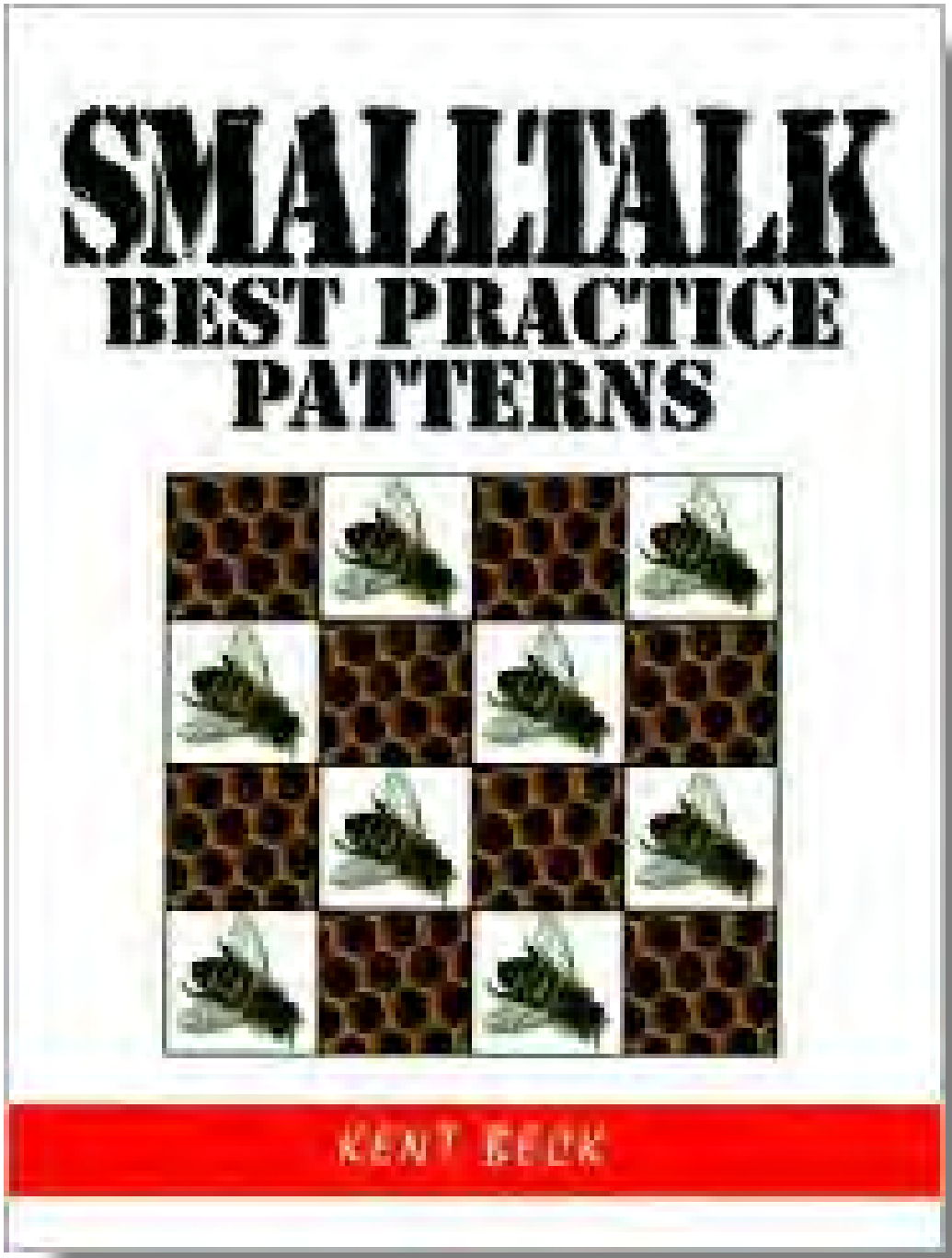
1



composed method


SMALLTALK
BEST PRACTICE
PATTERNS
KENT BECK

composed method

Divide your program into methods that perform one identifiable task.

Keep all of the operations in a method at the same level of abstraction.

This will naturally result in programs with many small methods, each a few lines long.

refactoring to composed method

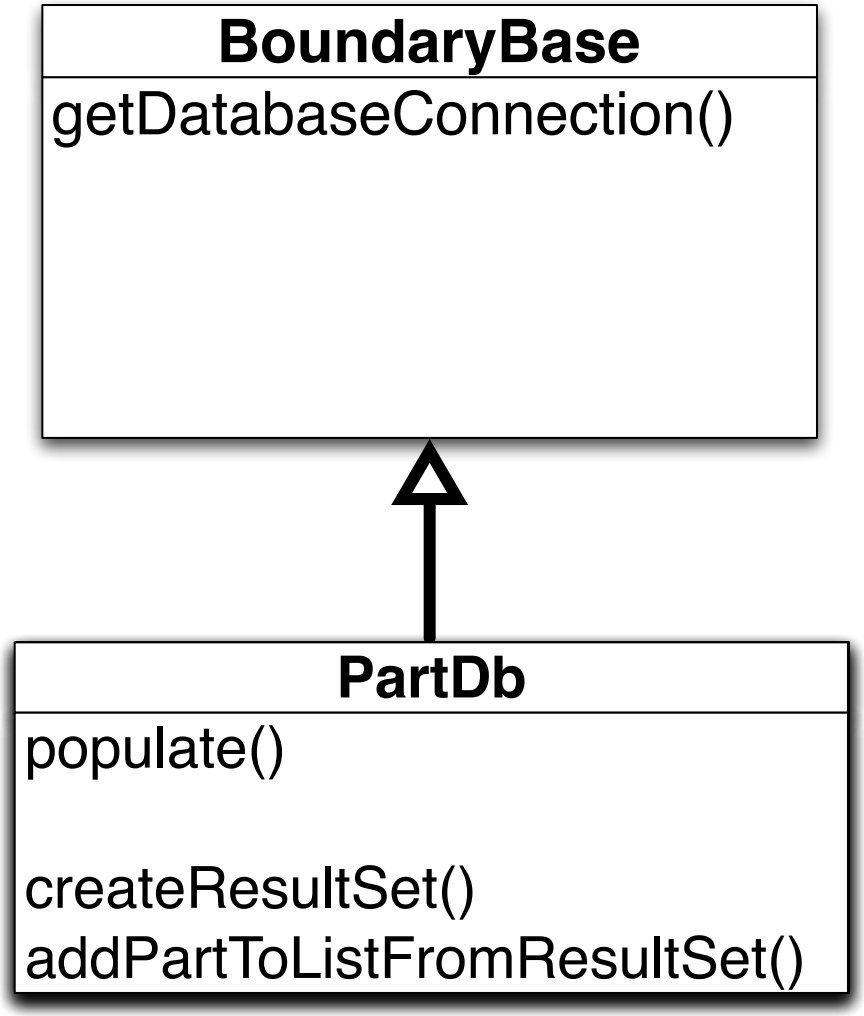
```
public void populate() throws Exception  {
    Connection c = null;
    try {
        Class.forName(DRIVER_CLASS);
        c = DriverManager.getConnection(DB_URL, USER, PASSWORD);
        Statement stmt = c.createStatement();
        ResultSet rs = stmt.executeQuery(SQL_SELECT_PARTS);
        while (rs.next()) {
            Part p = new Part();
            p.setName(rs.getString("name"));
            p.setBrand(rs.getString("brand"));
            p.setRetailPrice(rs.getDouble("retail_price"));
            partList.add(p);
        }
    } finally {
        c.close();
    }
}
```

```
private void addPartToListFromResultSet(ResultSet rs)
        throws SQLException {
    Part p = new Part();
    p.setName(rs.getString("name"));
    p.setBrand(rs.getString("brand"));
    p.setRetailPrice(rs.getDouble("retail_price"));
    partList.add(p);
}
```

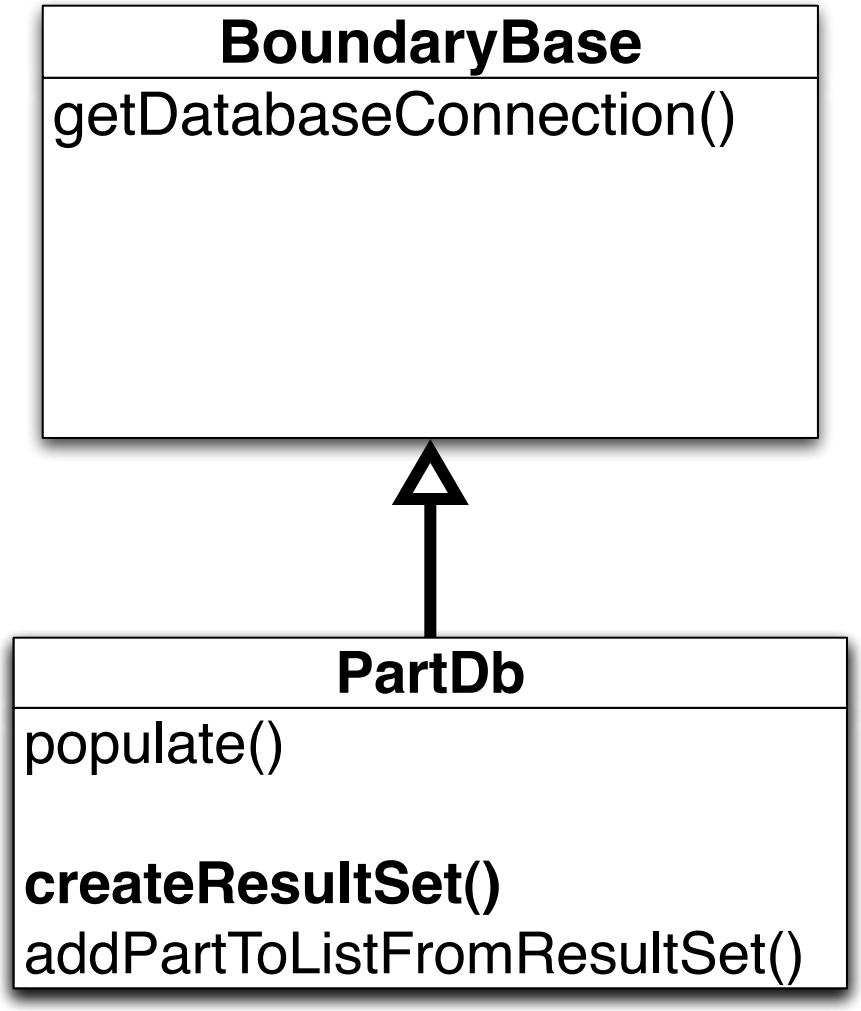
```
public void populate() throws Exception {
    Connection c = null;
    try {
        c = getDatabaseConnection();
        ResultSet rs = createResultSet(c);
        while (rs.next())
            addPartToListFromResultSet(rs);
    } finally {
        c.close();
    }
}
```

```
private ResultSet createResultSet(Connection c)
        throws SQLException {
    return c.createStatement().
            executeQuery(SQL_SELECT_PARTS);
}
```

```
private Connection getDatabaseConnection()
        throws ClassNotFoundException, SQLException {
    Connection c;
    Class.forName(DRIVER_CLASS);
    c = DriverManager.getConnection(DB_URL,
            "webuser", "webpass");
    return c;
}
```




```
private Connection getDatabaseConnection()
        throws ClassNotFoundException, SQLException {
    Connection c;
    Class.forName(DRIVER_CLASS);
    c = DriverManager.getConnection(DB_URL,
            "webuser", "webpass");
    return c;
}
```




```
private ResultSet createResultSet(Connection c)
        throws SQLException {
    return c.createStatement().
            executeQuery(SQL_SELECT_PARTS);
}
```

BoundaryBase

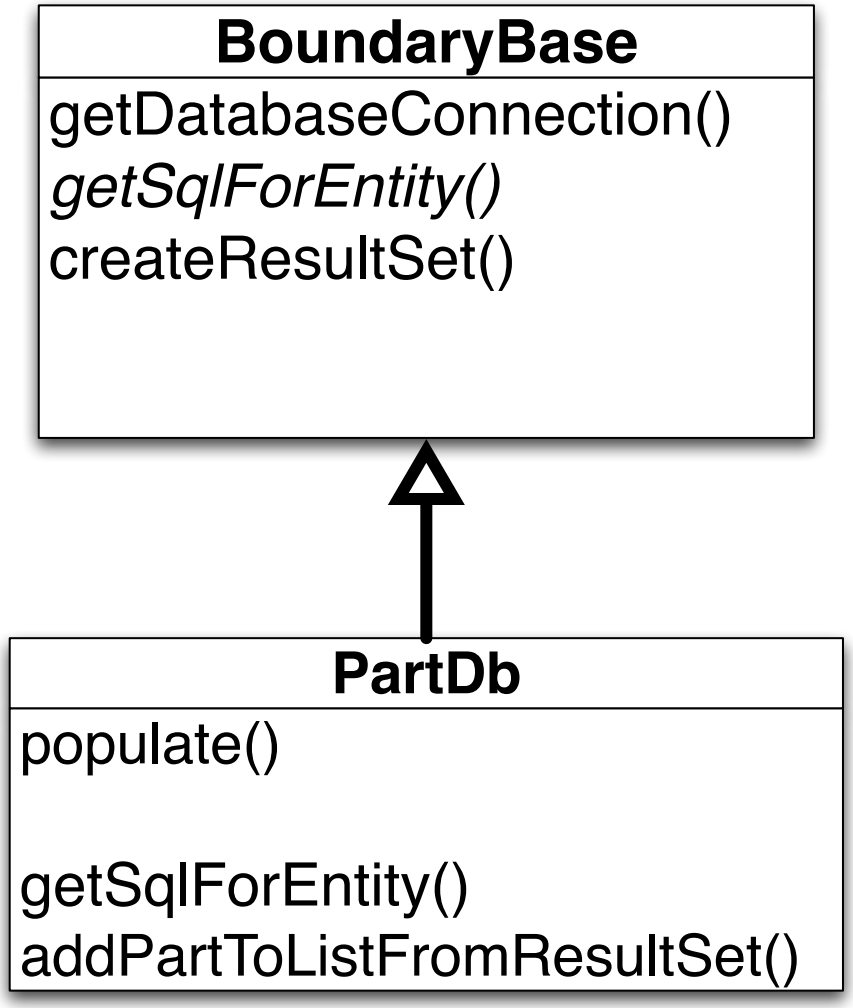
```
abstract protected String getSqlForEntity();

protected ResultSet createResultSet(Connection c) throws SQLException {
    Statement stmt = c.createStatement();
    return stmt.executeQuery(getSqlForEntity());
}
```

```
private ResultSet createResultSet(Connection c)
        throws SQLException {
    return c.createStatement().
            executeQuery(SQL_SELECT_PARTS);
}
```

PartDb

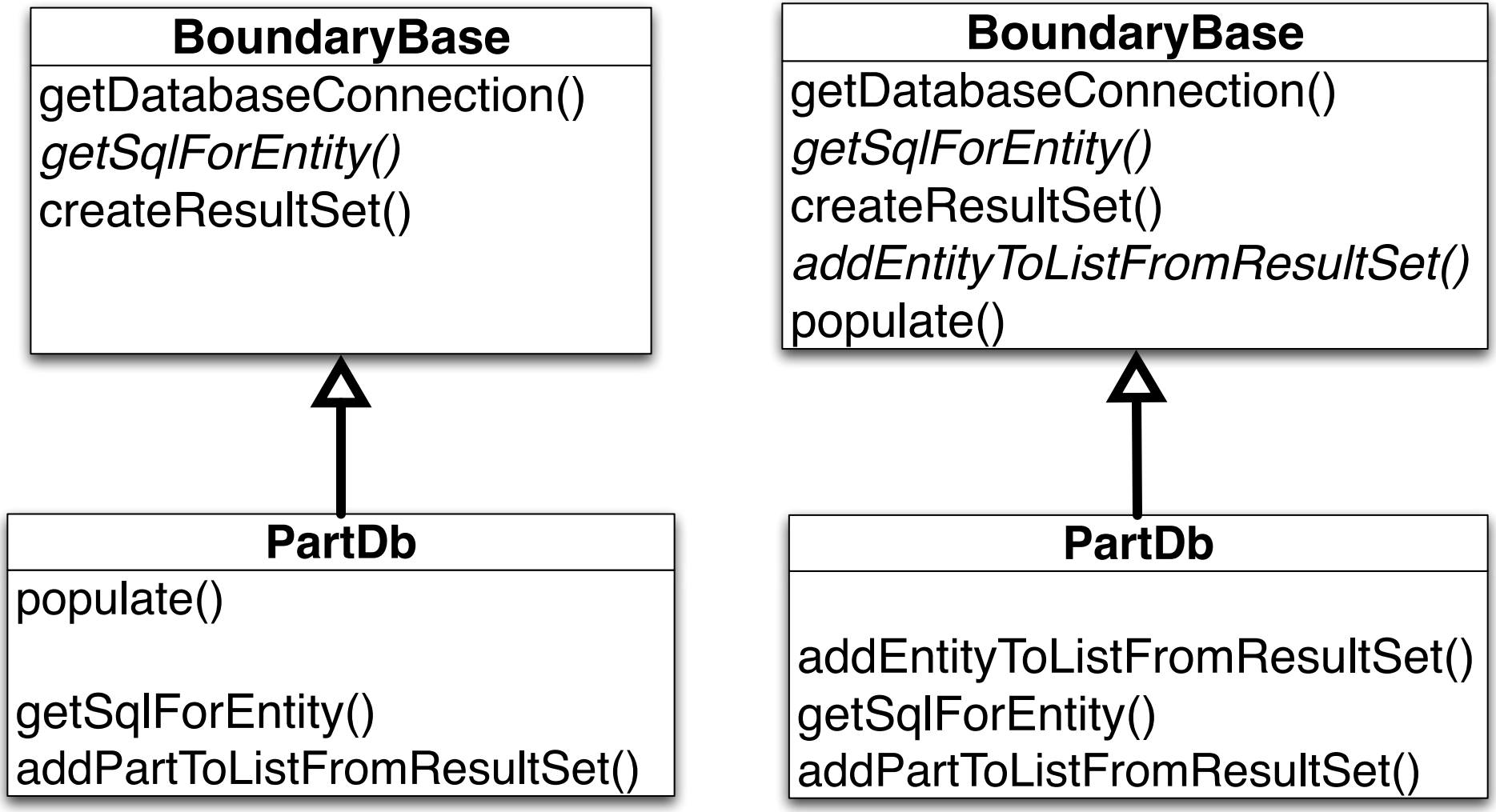
```
protected String getSqlForEntity() {
    return SQL_SELECT_PARTS;
}
```


BoundaryBase
getDatabaseConnection()
getSqlForEntity()
createResultSet()
PartDb
populate()
getSqlForEntity()
addPartToListFromResultSet()

```
public void populate() throws Exception {
    Connection c = null;
    try {
        c = getDatabaseConnection();
        ResultSet rs = createResultSet(c);
        while (rs.next())
            addPartToListFromResultSet(rs);
    } finally {
        c.close();
    }
}
```

```
abstract protected void addEntityToListFromResultSet(ResultSet rs)
        throws SQLException;

public void populate() throws Exception {
    Connection c = null;
    try {
        c = getDatabaseConnection();
        ResultSet rs = createResultSet(c);
        while (rs.next())
            addEntityToListFromResultSet(rs);
    } finally {
        c.close();
    }
}
```


BoundaryBase
getDatabaseConnection()
getSqlForEntity()
createResultSet()
PartDb
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BoundaryBase
getDatabaseConnection()
getSqlForEntity()
createResultSet()
addEntityToListFromResultSet()
populate()
PartDb
addEntityToListFromResultSet()
getSqlForEntity()
addPartToListFromResultSet()

```
protected Connection getDatabaseConnection() throws ClassNotFoundException,
        SQLException {
    Connection c;
    Class.forName(DRIVER_CLASS);
    c = DriverManager.getConnection(DB_URL, "webuser", "webpass");
    return c;
}

abstract protected String getSqlForEntity();

protected ResultSet createResultSet(Connection c) throws SQLException {
    Statement stmt = c.createStatement();
    return stmt.executeQuery(getSqlForEntity());
}

abstract protected void addEntityToListFromResultSet(ResultSet rs)
        throws SQLException;

public void populate() throws Exception {
    Connection c = null;
    try {
        c = getDatabaseConnection();
        ResultSet rs = createResultSet(c);
        while (rs.next())
            addEntityToListFromResultSet(rs);
    } finally {
        c.close();
    }
}
```

BoundaryBase

PartDb

```
public Part[] getParts() {
    return (Part[]) partList.toArray(TEMPLATE);
}

protected String getSqlForEntity() {
    return SQL_SELECT_PARTS;
}

protected void addEntityToListFromResultSet(ResultSet rs) throws SQLException {
    Part p = new Part();
    p.setName(rs.getString("name"));
    p.setBrand(rs.getString("brand"));
    p.setRetailPrice(rs.getDouble("retail_price"));
    partList.add(p);
}
```

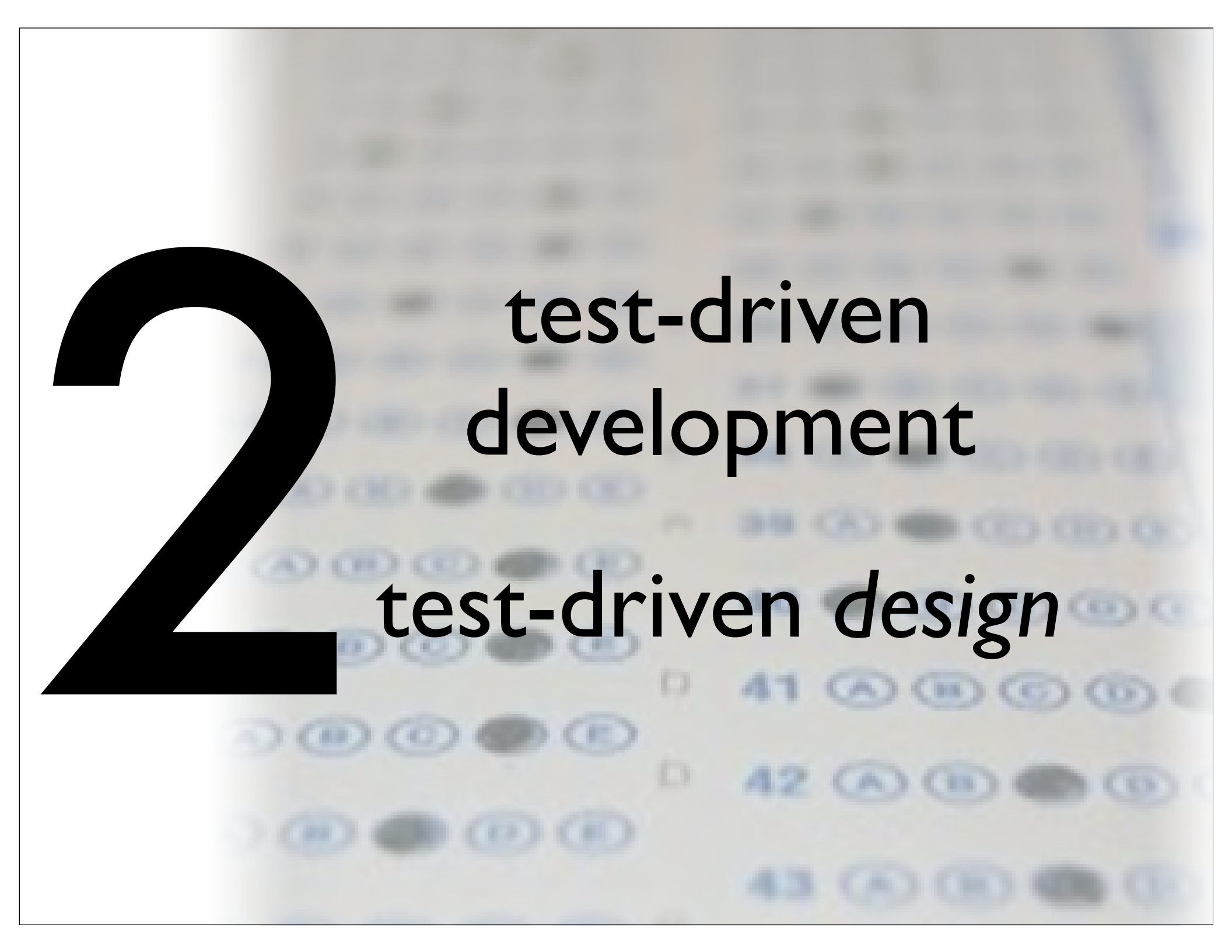
benefits of composed method

shorter methods easier to test

method names become documentation

large number of very cohesive methods

discover reusable assets that you didn't know were there



2 test-driven development

test-driven *design*

design benefits of tdd

first consumer

think about how the rest of the world uses this class

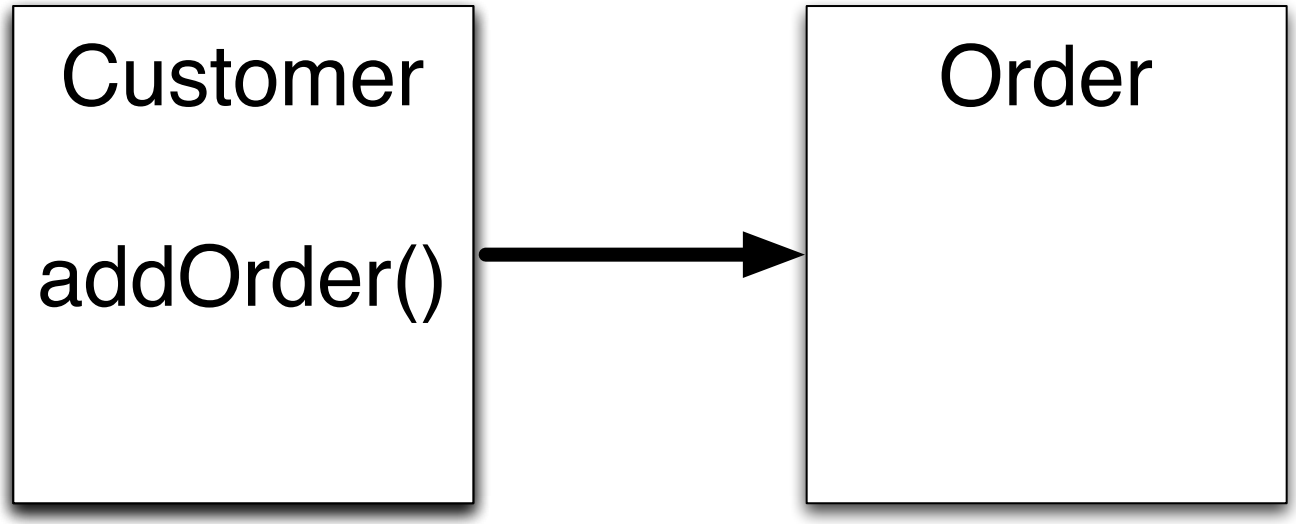
creates *consumption awareness*

design benefits of tdd

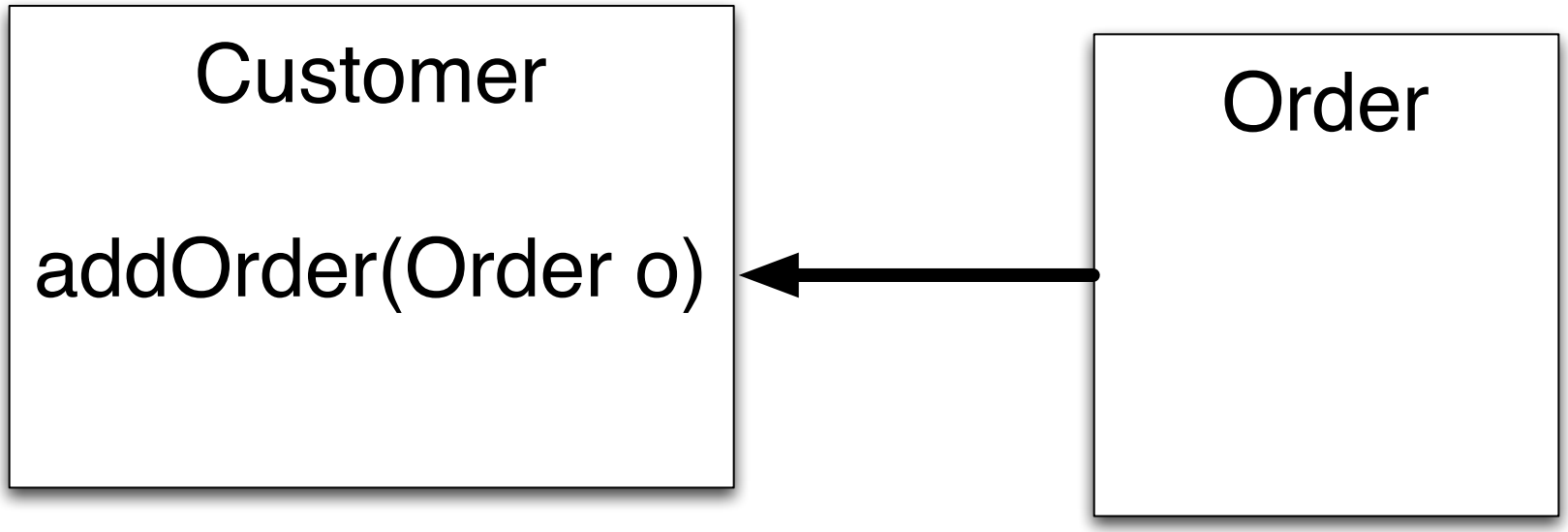
forces mocking of dependent objects

naturally creates composed method

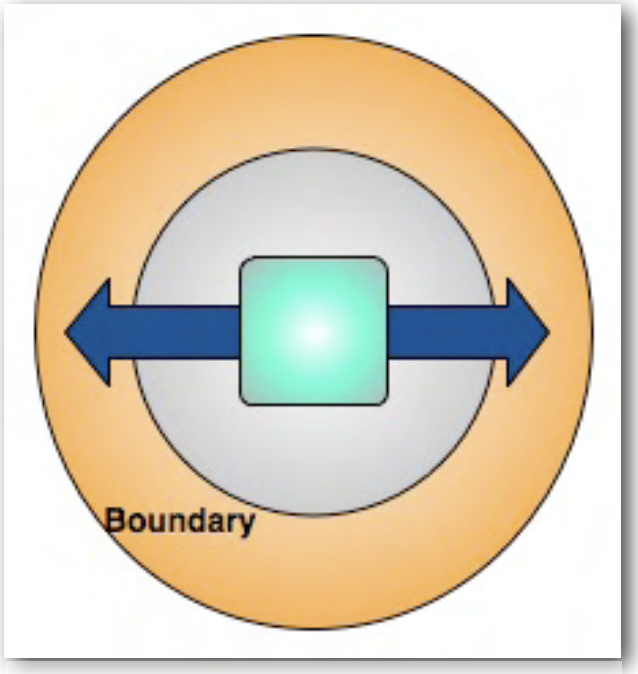
cleaner metrics

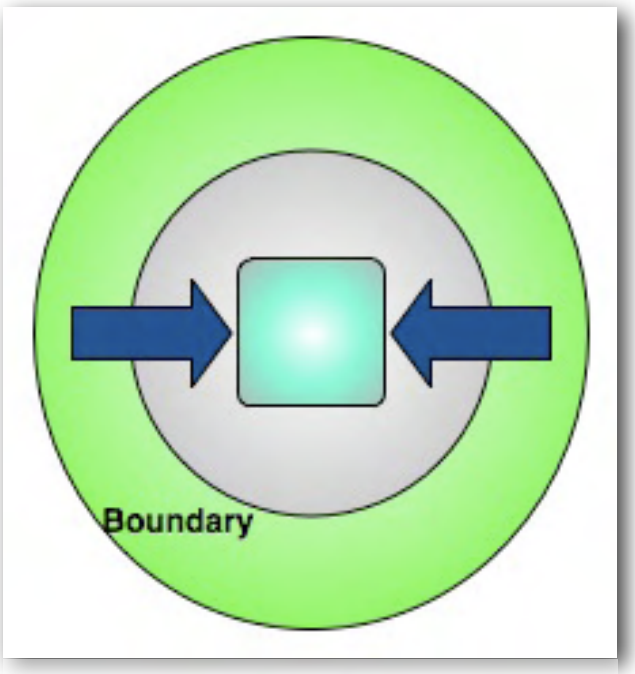


extroverted object



introverted object





extroverted objects

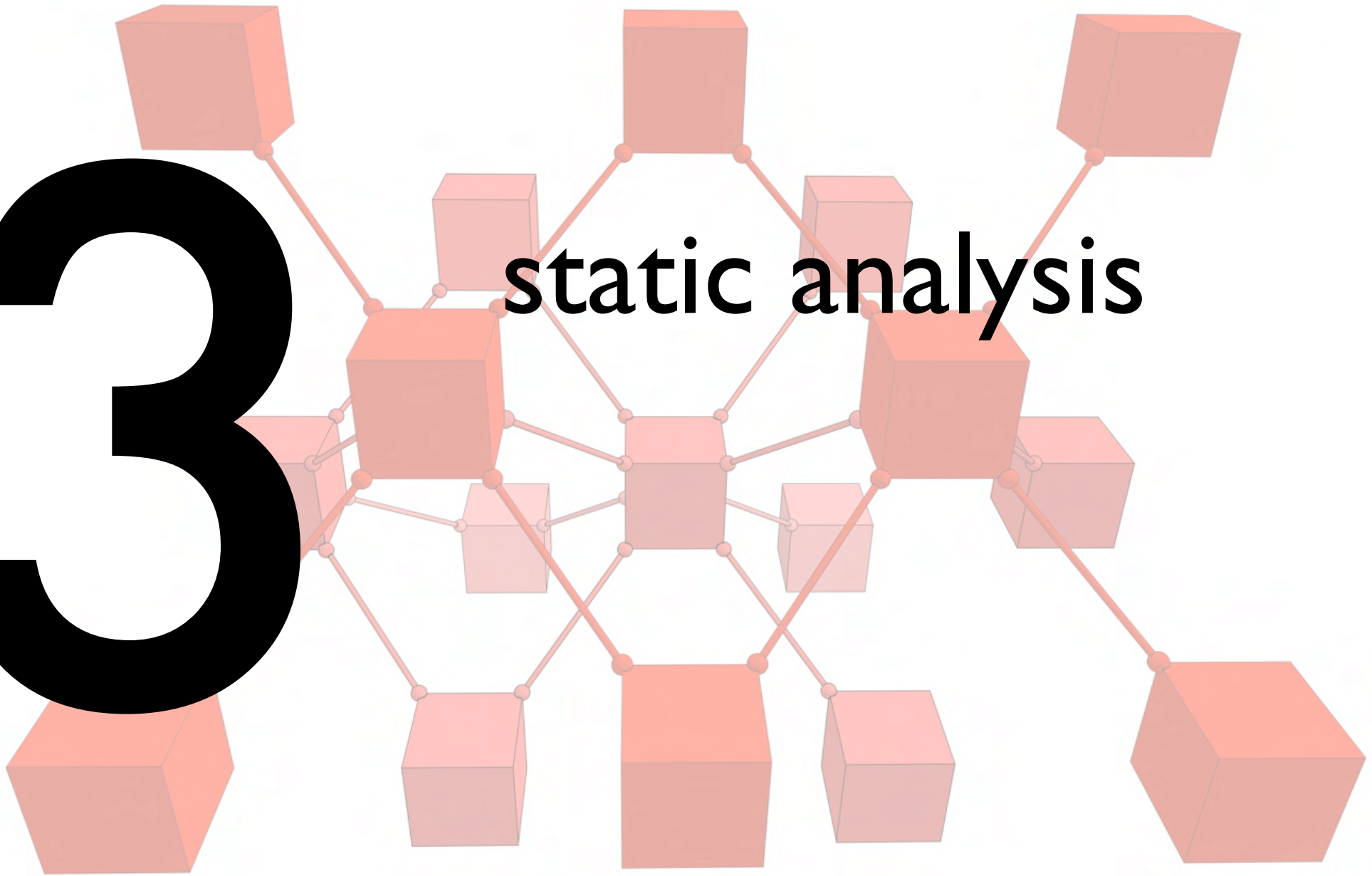
introverted objects

"reach out" to create objects

cleaner dependencies

ad hoc creation

moves object construction to a few simple places



3 static analysis

byte-code analysis: findbugs

bug categories

correctness

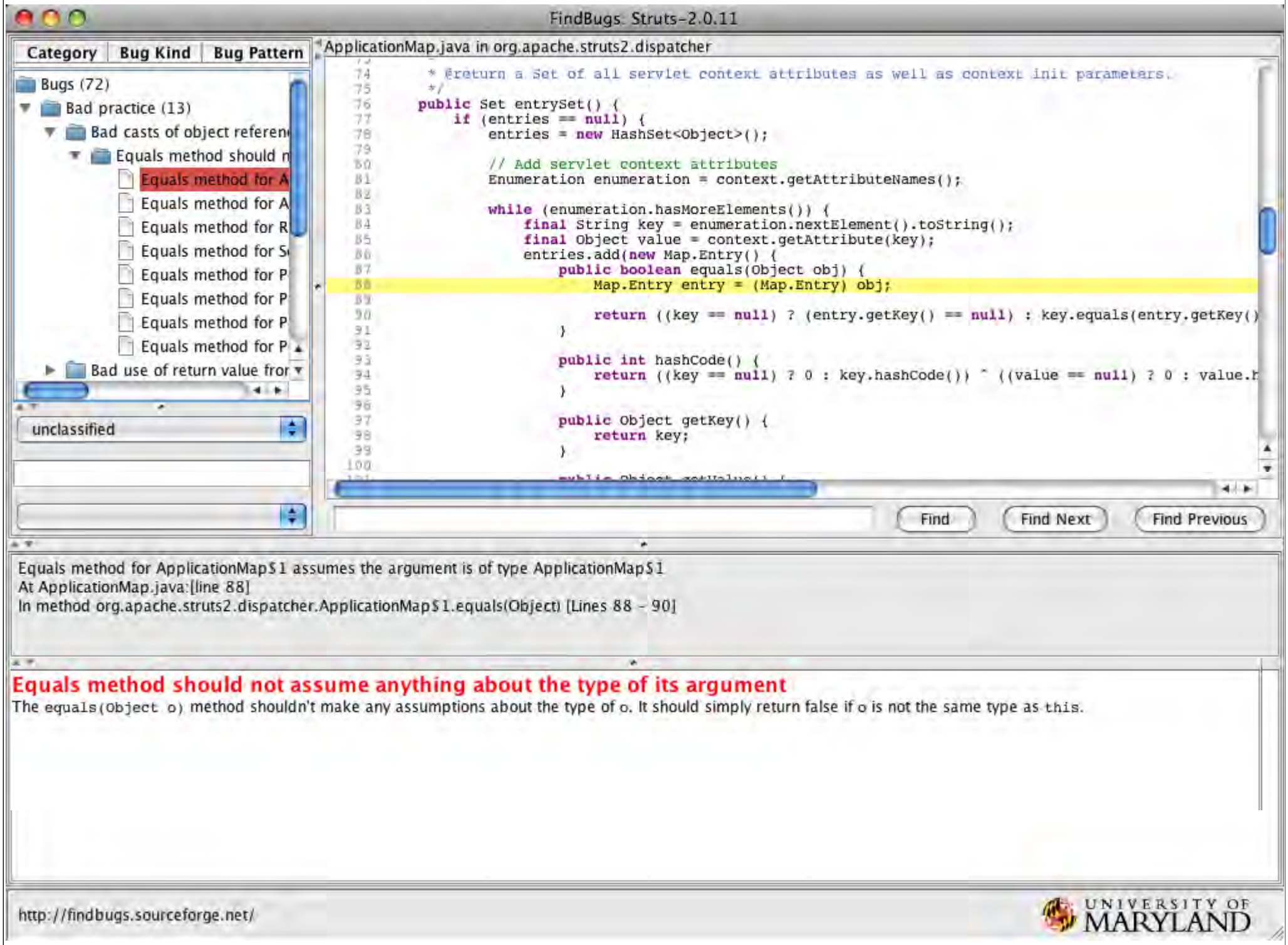
- probable bug

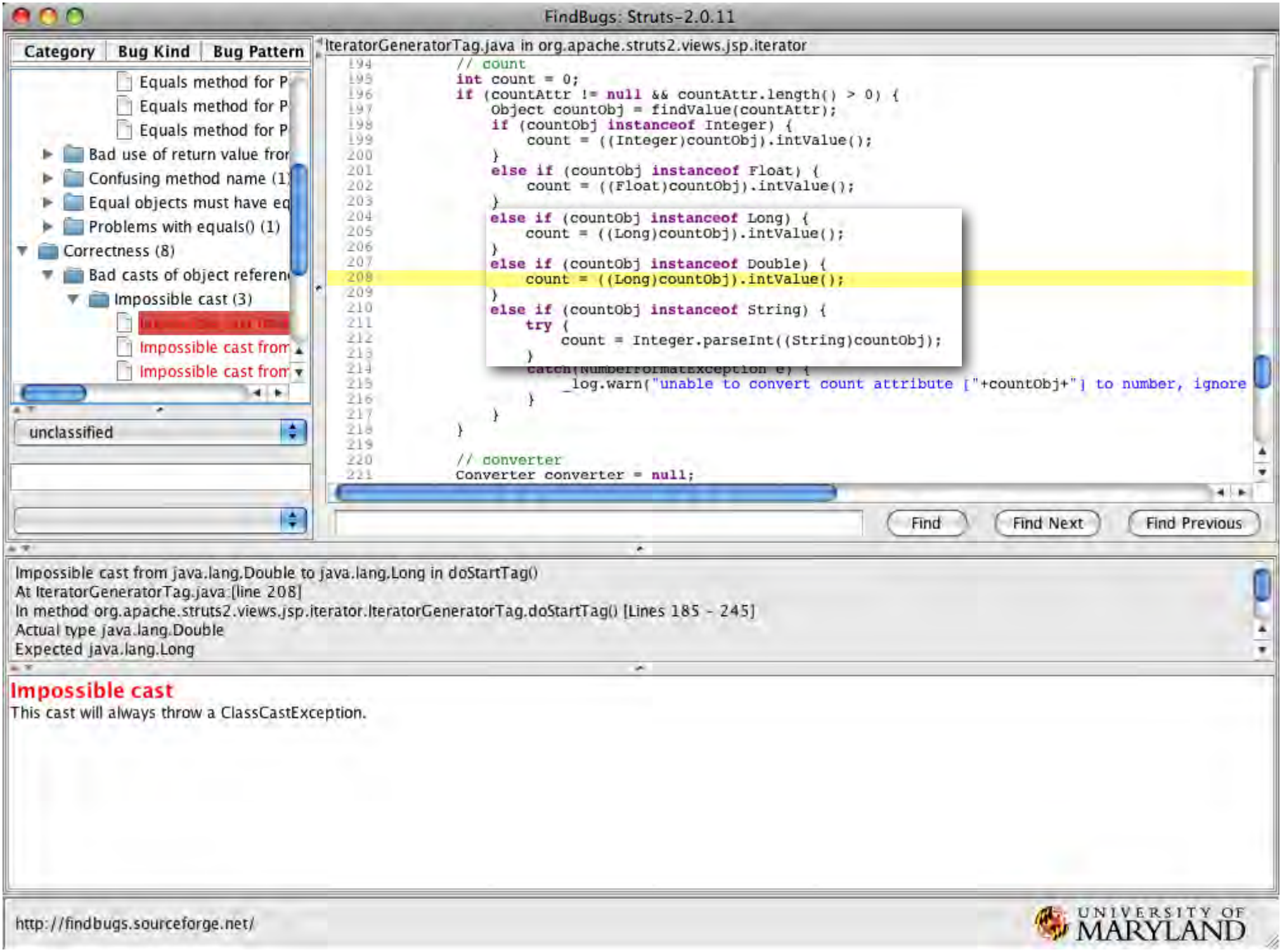
bad practice

- violation of recommended & essential coding practice

dodgy

- confusing, anomalous, written poorly


FindBugs: Struts-2.0.11
Category
Bug Kind
Bug Pattern
Bugs (72)
Bad practice (13)
Bad casts of object referen
Equals method should n
Equals method for A
Equals method for A
Equals method for R
Equals method for S
Equals method for P
Equals method for P
Equals method for P
Equals method for P
Bad use of return value fror
unclassified
ApplicationMap.java in org.apache.struts2.dispatcher
* @return a Set of all servlet context attributes as well as context init parameters.
*/
public Set entrySet() {
if (entries == null) {
entries = new HashSet<Object>();
// Add servlet context attributes
Enumeration enumeration = context.getAttributeNames();
while (enumeration.hasMoreElements()) {
final String key = enumeration.nextElement().toString();
final Object value = context.getAttribute(key);
entries.add(new Map.Entry() {
public boolean equals(Object obj) {
Map.Entry entry = (Map.Entry) obj;
return ((key == null) ? (entry.getKey() == null) : key.equals(entry.getKey()
}
public int hashCode() {
return ((key == null) ? 0 : key.hashCode()) ^ ((value == null) ? 0 : value.h
}
public Object getKey() {
return key;
}
Find
Find Next
Find Previous
Equals method for ApplicationMap$1 assumes the argument is of type ApplicationMap$1
At ApplicationMap.java:[line 88]
In method org.apache.struts2.dispatcher.ApplicationMap$1.equals(Object) [Lines 88 - 90]
Equals method should not assume anything about the type of its argument
The equals(Object o) method shouldn't make any assumptions about the type of o. It should simply return false if o is not the same type as this.
http://findbugs.sourceforge.net/
UNIVERSITY OF MARYLAND


FindBugs: Struts-2.0.11
Category
Bug Kind
Bug Pattern
Equals method for P
Equals method for P
Equals method for P
Bad use of return value fror
Confusing method name (1
Equal objects must have eq
Problems with equals() (1)
Correctness (8)
Bad casts of object referen
Impossible cast (3)
Impossible cast from
Impossible cast from
unclassified
IteratorGeneratorTag.java in org.apache.struts2.views.jsp.iterator
// count
int count = 0;
if (countAttr != null && countAttr.length() > 0) {
Object countObj = findValue(countAttr);
if (countObj instanceof Integer) {
count = ((Integer)countObj).intValue();
}
else if (countObj instanceof Float) {
count = ((Float)countObj).intValue();
}
else if (countObj instanceof Long) {
count = ((Long)countObj).intValue();
}
else if (countObj instanceof Double) {
count = ((Long)countObj).intValue();
}
else if (countObj instanceof String) {
try {
count = Integer.parseInt((String)countObj);
}
catch(NumberFormatException e) {
_log.warn("unable to convert count attribute ["+countObj+"] to number, ignore
}
}
}
// converter
Converter converter = null;
Find
Find Next
Find Previous
Impossible cast from java.lang.Double to java.lang.Long in doStartTag()
At IteratorGeneratorTag.java:[line 208]
In method org.apache.struts2.views.jsp.iterator.IteratorGeneratorTag.doStartTag() [Lines 185 - 245]
Actual type java.lang.Double
Expected java.lang.Long
Impossible cast
This cast will always throw a ClassCastException.
http://findbugs.sourceforge.net/
UNIVERSITY OF MARYLAND

source analysis & pmd

pmd targets

possible bugs

empty try/catch blocks

dead code

unused local variables
parameters
private variables

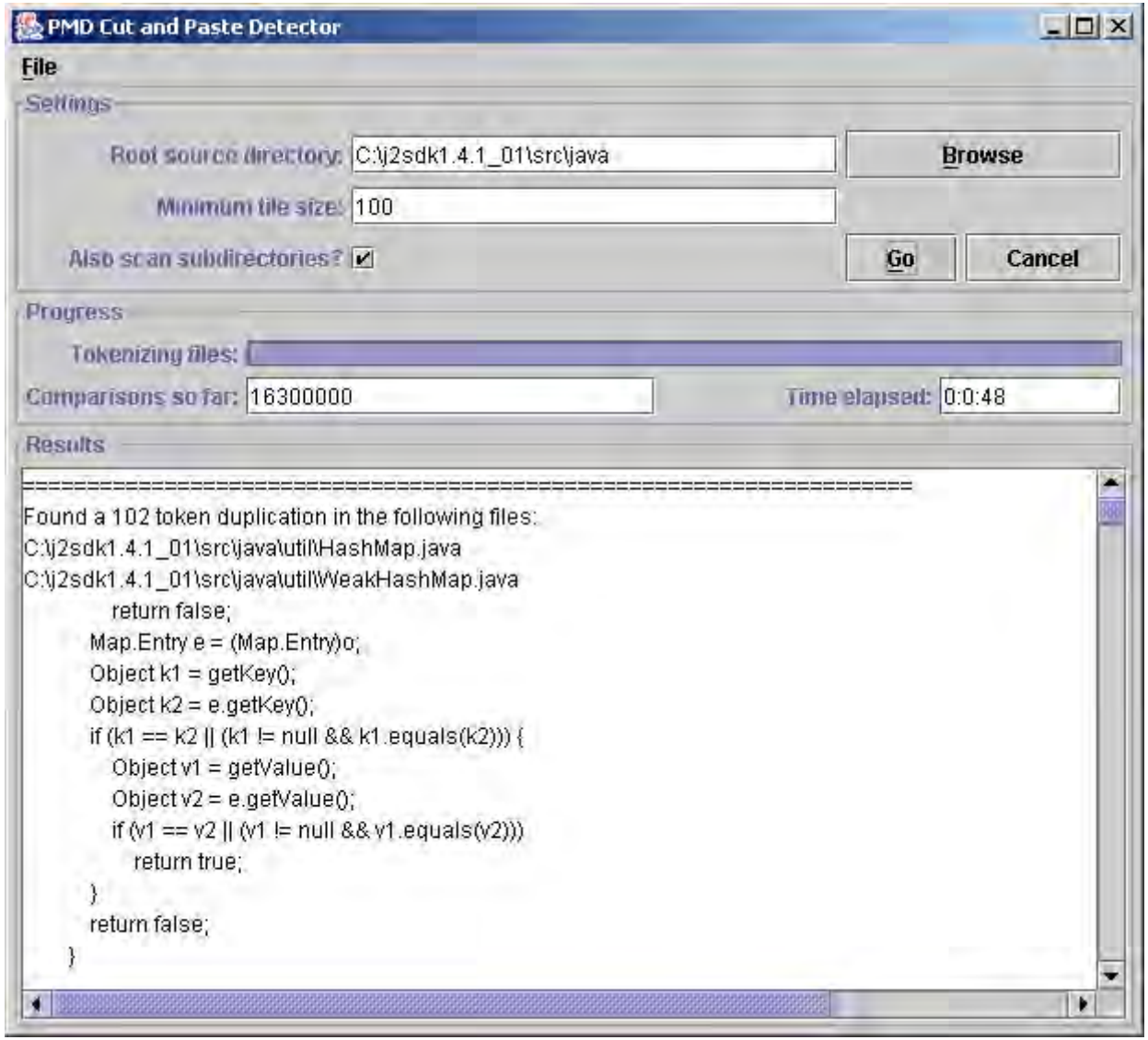
suboptimal code

wasteful string usage

overcomplicated expressions

31	hibernate/query/QueryTranslator.java	401	Avoid unused private fields such as 'NO_INTS'
32	hibernate/query/WhereParser.java	134	Avoid unused private fields such as 'quoted'
33	hibernate/query/WhereParser.java	136	Avoid unused private fields such as 'bracketsSinceFunction'
34	hibernate/test/Child.java	38	Avoid unused formal parameters such as 'id'
35	hibernate/test/Child.java	38	Avoid unused private methods such as 'setId(long)'
36	hibernate/test/FooComponent.java	76	Avoid unused private methods such as 'getNull()'
37	hibernate/test/FooComponent.java	79	Avoid unused private methods such as 'setNull(String)'
38	hibernate/test/Fum.java	46	Avoid unused private methods such as 'setId(FumCompositeID)'
39	hibernate/test/Qux.java	78	Avoid unused private methods such as 'setCreated(boolean)'
40	hibernate/test/Qux.java	86	Avoid unused private methods such as 'setDeleted(boolean)'
41	hibernate/test/Qux.java	93	Avoid unused private methods such as 'setLoaded(boolean)'
42	hibernate/test/Qux.java	100	Avoid unused private methods such as 'setStored(boolean)'
43	hibernate/test/Qux.java	108	Avoid unused private methods such as 'setKey(long)'
44	hibernate/test/Qux.java	149	Avoid unused private methods such as 'getChildKey()'
45	hibernate/test/Qux.java	153	Avoid unused private methods such as 'setChildKey(Long)'
46	hibernate/tools/SchemaExport.java	191	Avoid unused private methods such as 'format(String)'
47	hibernate/tools/SchemaExportTask.java	56	Avoid unused private fields such as 'formatSQL'
48	hibernate/tools/SchemaExportTask.java	59	Avoid unused private fields such as 'delimiter'
49	hibernate/tools/codegen/ClassMapping.java	399	Avoid unused private methods such as 'addImport(String)'
50	hibernate/tools/reflect/ReflectedClass.java	263	Avoid unused private methods such as 'capitalize(String)'
51	hibernate/tools/reverse/MapGui.java	548	Avoid unused formal parameters such as 'evt'
52	hibernate/tools/reverse/MapGui.java	560	Avoid unused formal parameters such as 'evt'
53	hibernate/tools/reverse/MapGui.java	570	Avoid unused formal parameters such as 'evt'
54	hibernate/tools/reverse/MapGui.java	606	Avoid unused formal parameters such as 'evt'
55	hibernate/tools/reverse/MapGui.java	612	Avoid unused formal parameters such as 'evt'
56	hibernate/tools/reverse/MapGui.java	617	Avoid unused formal parameters such as 'evt'
57	hibernate/tools/reverse/MapGui.java	641	Avoid unused formal parameters such as 'evt'
58	hibernate/tools/reverse/MapGui.java	651	Avoid unused formal parameters such as 'evt'
59	hibernate/tools/reverse/MapGui.java	709	Avoid unused formal parameters such as 'evt'
60	hibernate/tools/reverse/MapGui.java	737	Avoid unused private fields such as 'buttonGroup1'
61	hibernate/tools/reverse/ParamsPanel.java	142	Avoid unused formal parameters such as 'evt'
62	hibernate/tools/reverse/ParamsPanel.java	149	Avoid unused formal parameters such as 'evt'
63	hibernate/tools/reverse/ParamsPanel.java	158	Avoid unused formal parameters such as 'evt'
64	hibernate/tools/reverse/ParamsPanel.java	167	Avoid unused formal parameters such as 'evt'
65	hibernate/type/ArrayType.java	19	Avoid unused private fields such as 'elementClass'
66	hibernate/type/ComponentType.java	31	Avoid unused private fields such as 'parentProperty'

cpd


PMD Cut and Paste Detector
File
Settings
Root source directory: C:\j2sdk1.4.1_01\src\java
Browse
Minimum tile size: 100
Also scan subdirectories?
Go
Cancel
Progress
Tokenizing files:
Comparisons so far: 16300000
Time elapsed: 0:0:48
Results
Found a 102 token duplication in the following files:
C:\j2sdk1.4.1_01\src\java\util\HashMap.java
C:\j2sdk1.4.1_01\src\java\util\WeakHashMap.java
return false;
Map.Entry e = (Map.Entry)o;
Object k1 = getKey();
Object k2 = e.getKey();
if (k1 == k2 || (k1 != null && k1.equals(k2))) {
Object v1 = getValue();
Object v2 = e.getValue();
if (v1 == v2 || (v1 != null && v1.equals(v2)))
return true;
}
return false;
}


4
good citizenship

getters & setters != encapsulation

accessors/mutators

knee-jerk creating getters/setters voids encapsulation

create atomic mutators for dependent fields

“should I unit test my getters & setters?”

the new strategy

only create getters & setters when you need them for other methods

testing:

shouldn't have to tdd them

they will get code coverage automatically

as easy upon use as upon creation

constructors

specific contract for how to create valid objects

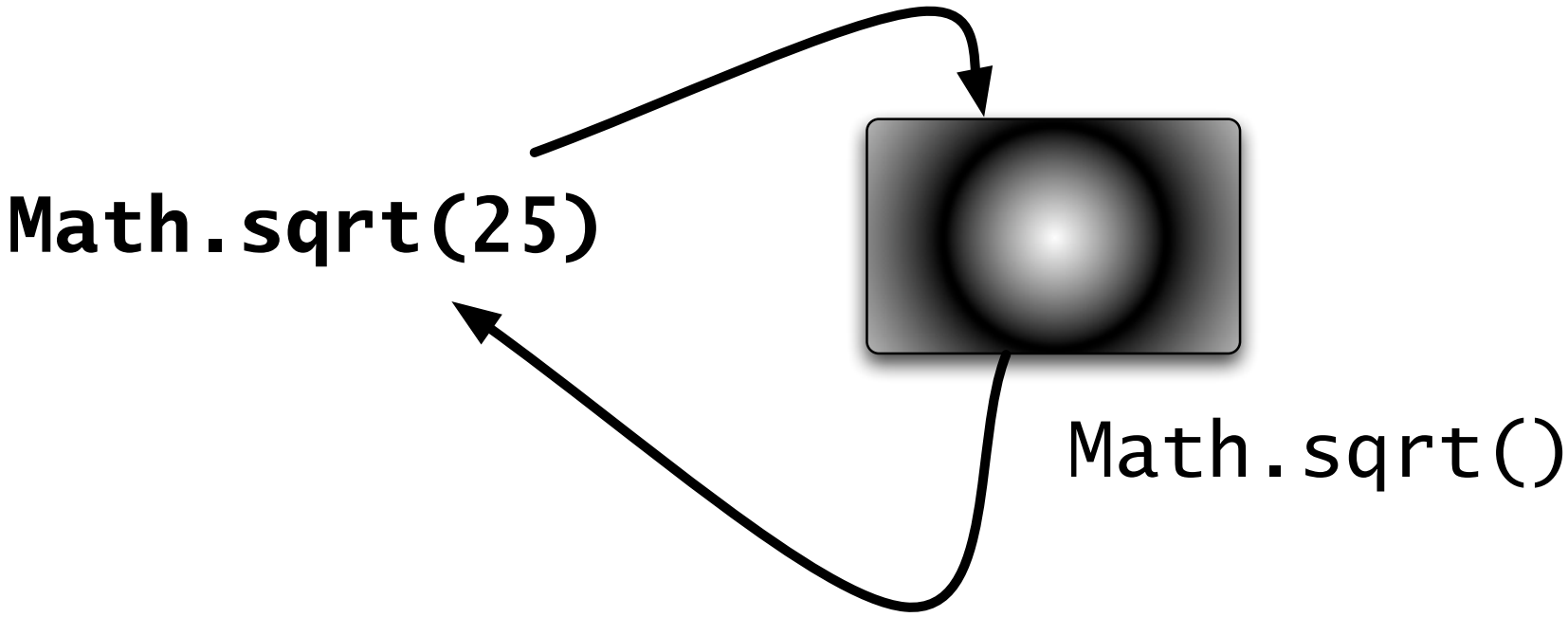
how often is a blank object valid?

never!

don't provide default constructors for domain objects

push back on frameworks that require this

static methods



mixing static + state

singleton

singleton is bad because:

mixes responsibilities

untestable

the object version of global variables

avoiding singletons

1. create a pojo for the business behavior

   simple

   testable!

2. create a factory to create the pojo

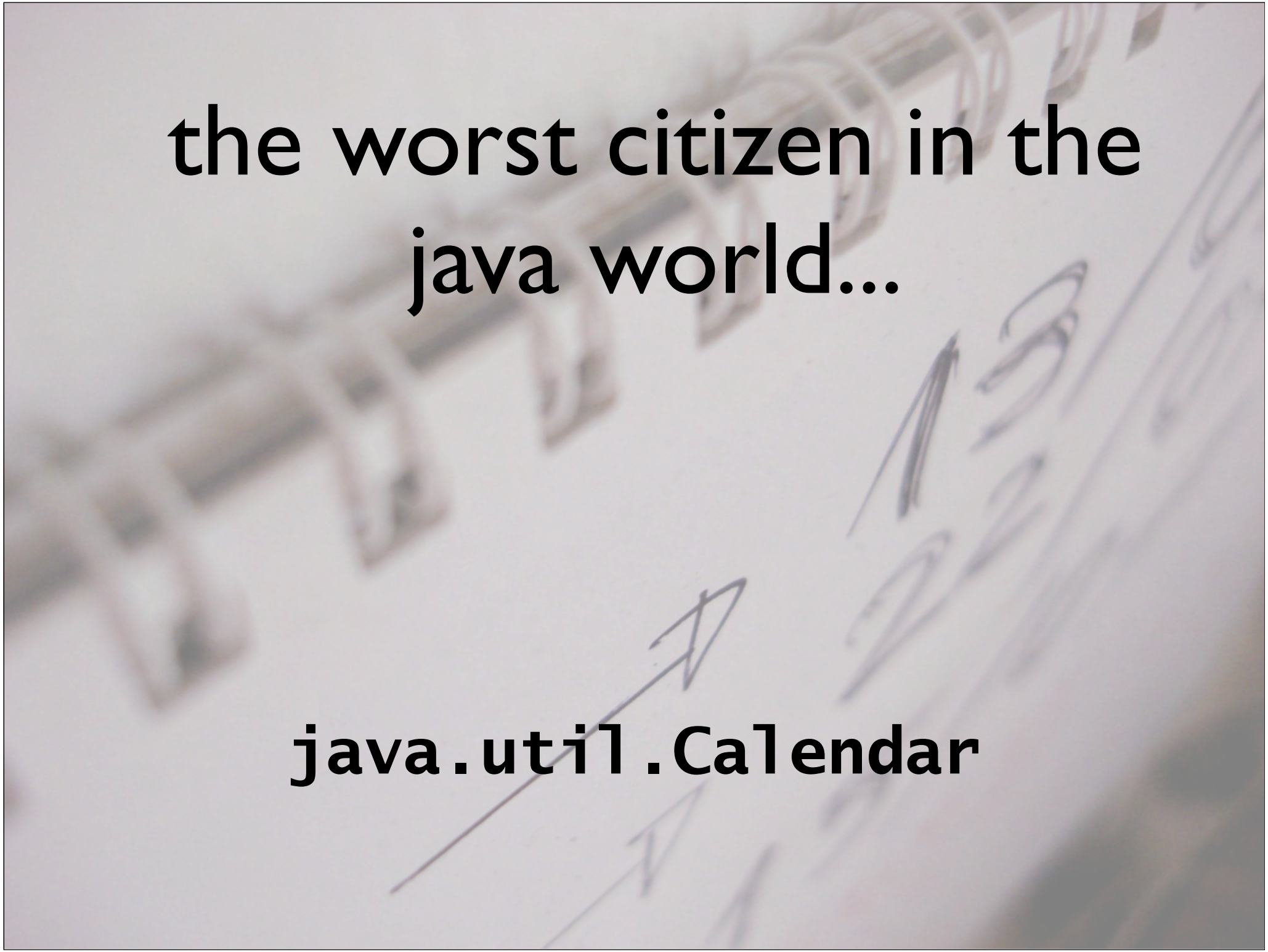
   also testable

```
public class ConfigSingleton {
    private static ConfigSingleton myInstance;
    private Point _initialPosition;

    public Point getInitialPosition() {
        return _initialPosition;
    }

    private ConfigSingleton() {
        Dimension screenSize =
                Toolkit.getDefaultToolkit().getScreenSize();
        _initialPosition = new Point();
        _initialPosition.x = (int) screenSize.getWidth() / 2;
        _initialPosition.y = (int) screenSize.getHeight() / 2;
    }

    public static ConfigSingleton getInstance() {
        if (myInstance == null)
            myInstance = new ConfigSingleton();
        return myInstance;
    }
}
```

```
public class Configuration {
    private Point _initialPosition;

    private Configuration(Dimension screenSize) {
        _initialPosition = new Point();
        _initialPosition.x = (int) screenSize.getWidth() / 2;
        _initialPosition.y = (int) screenSize.getHeight() / 2;
    }

    public int getInitialX() {
        return _initialPosition.x;
    }

    public int getInitialY() {
        return _initialPosition.y;
    }
}
```

```
public class ConfigurationFactory {
    private static Configuration myConfig;

    public static Configuration getConfiguration() {
        if (myConfig == null) {
            try {
                Constructor cxtor[] =
                    Configuration.class.getDeclaredConstructors();
                cxtor[0].setAccessible(true);
                myConfig = (Configuration) cxtor[0].newInstance(
                        Toolkit.getDefaultToolkit().getScreenSize());
            } catch (Throwable e) {
                throw new RuntimeException("can't construct Configuration");
            }
        }
        return myConfig;
    }
}
```

```
public class TestConfigurationFactory extends TestCase {

    public void test_Creation_creates_a_single_instance() {
        Configuration config1 = ConfigurationFactory.getConfiguration();
        assertNotNull(config1);
        Configuration config2 = ConfigurationFactory.getConfiguration();
        assertNotNull(config2);
        assertSame(config1, config2);
    }
}
```


the worst citizen in the java world...
java.util.Calendar

5

yagni

you ain't gonna need it

discourages gold plating

build the simplest thing that we need *right now*

don't indulge in speculative development

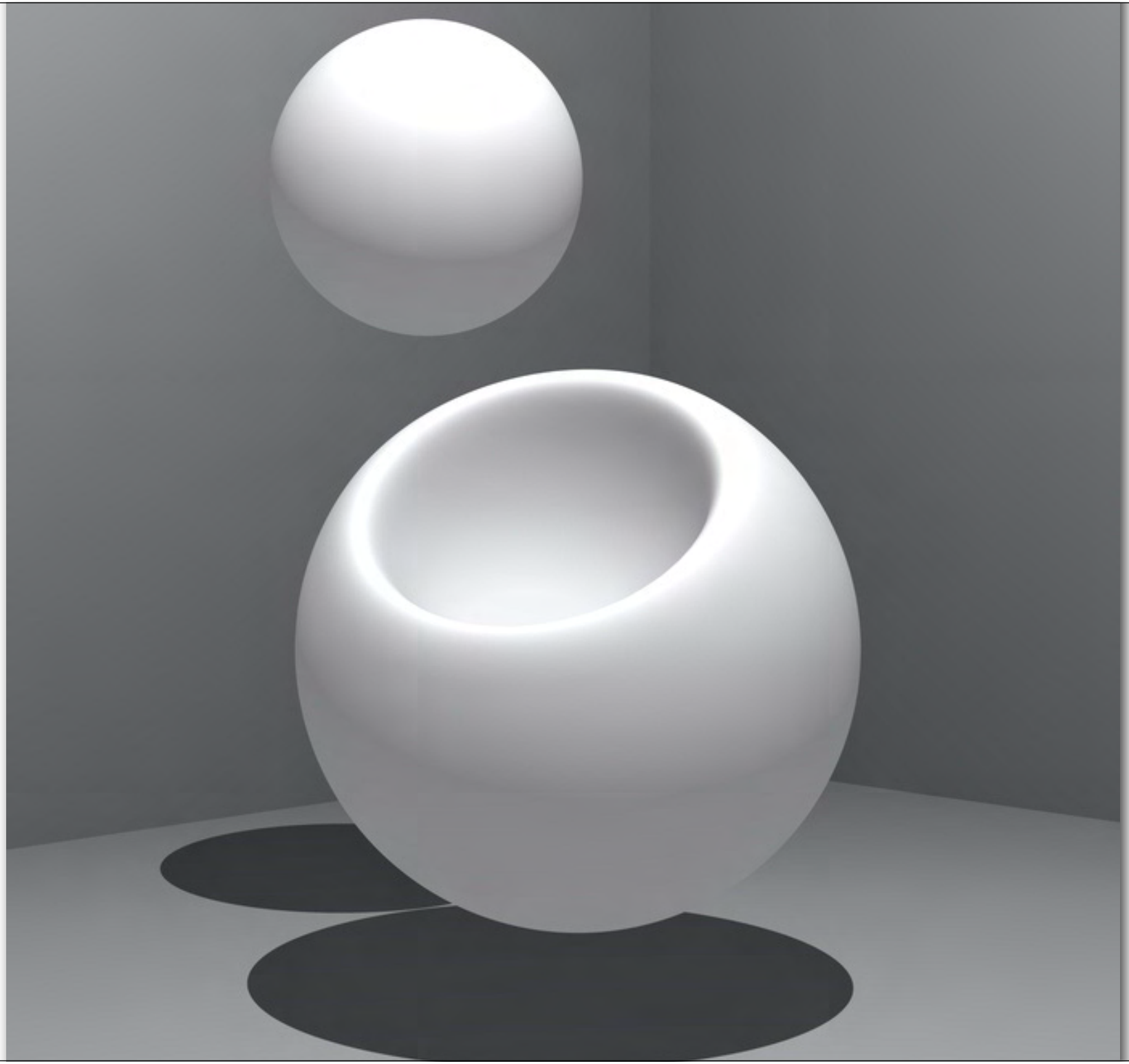
- increases *software entropy*
- only saves time if you can guarantee you won't have to change it later
- leads to *frameworks*

a public plea to the java community:

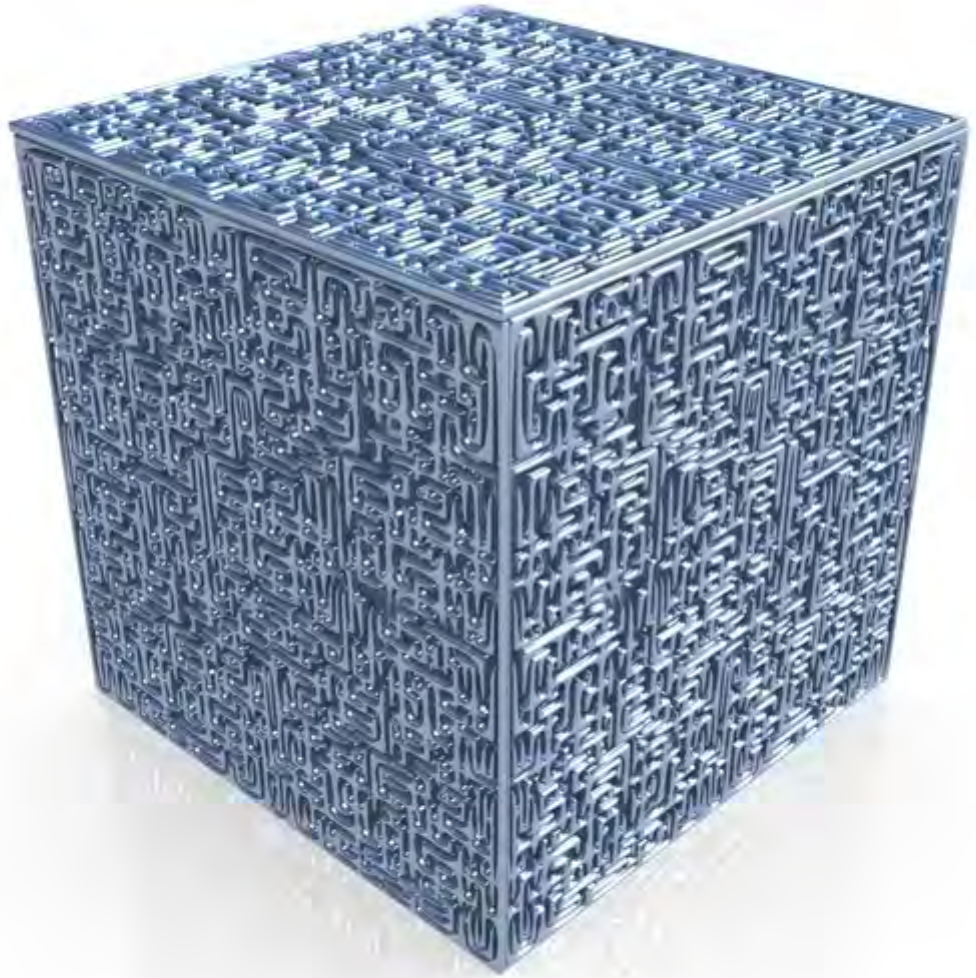
please stop building frameworks!


It looks like you're trying to write a framework.
Would you like to...
discard code?
find an open source framework instead?
find a new job?
YAGNI


This is just what they need!

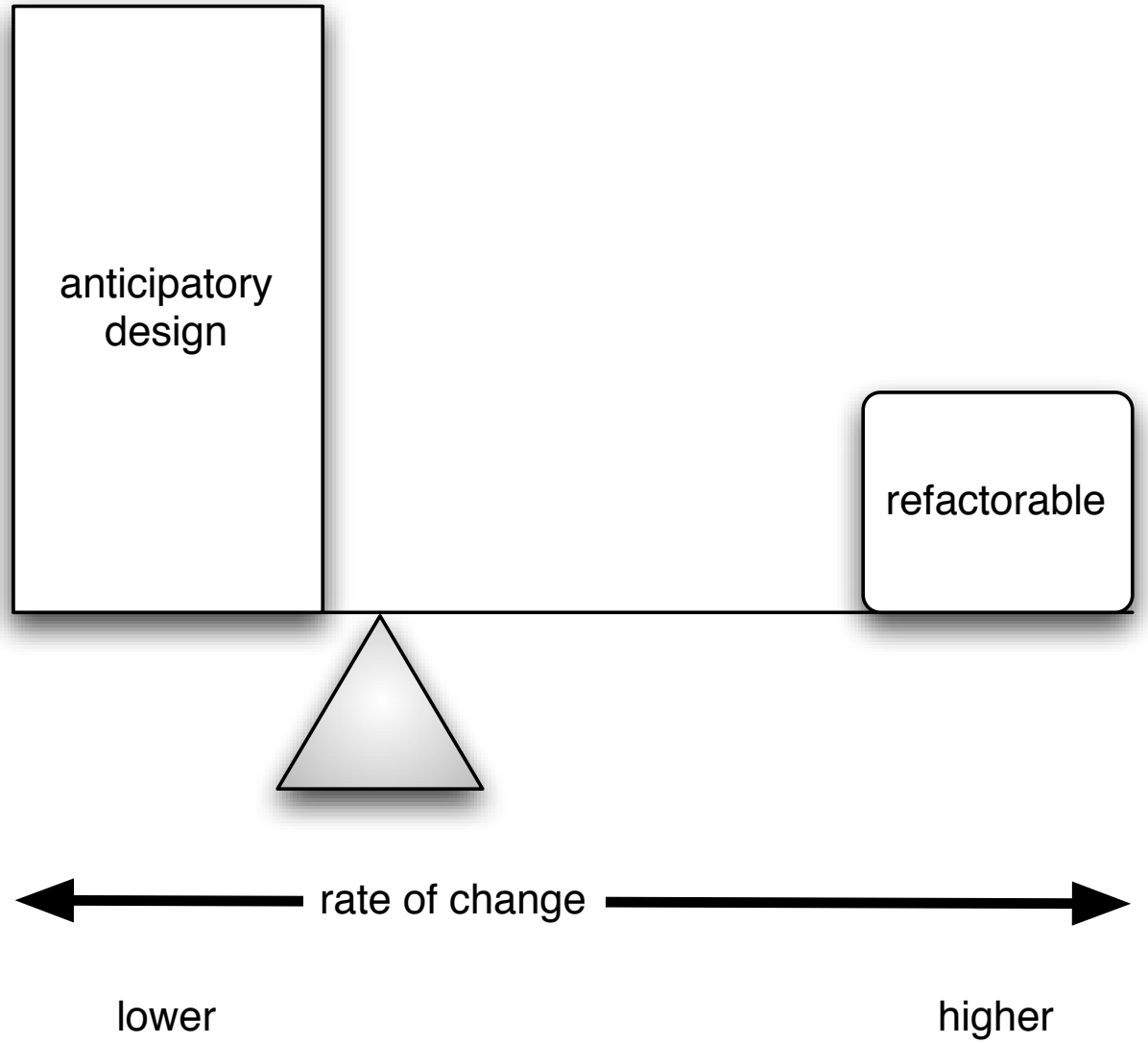


a cautionary tale



building a simple framework

changeability



corporate code smells

6. We have an Architect who reviews all code pre-checkin and decides whether or not to allow it into version control.

7. We can't use any open source code because our lawyers say we can't.

8. We use WebSphere because...(I always stop listening at this point)

9. We bought the entire tool suite (even though we only needed about 10% of it) because it was cheaper than buying the individual tools.

10. We invented our own web/persistence/ messaging/caching framework because none of the existing ones was good enough.

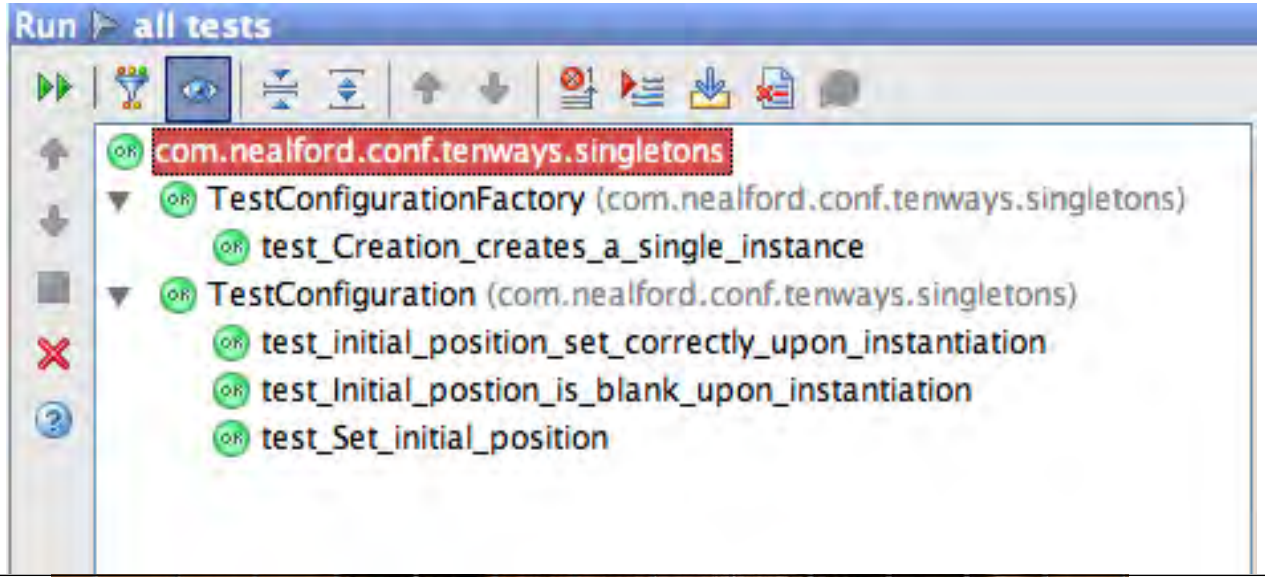
1. There is a reason that WSAD isn't called WHAPPY.
2. The initial estimate must be within 15% of the final cost, the post-analysis estimate must be within 10%, and the post-design estimate must be with 5%
3. We don't have time to write unit tests (we're spending too much time debugging)
4. We keep all of our business logic in stored procedures...for performance reasons.
5. The only JavaDoc is the Eclipse message explaining how to change your default JavaDoc template.


6
question authority


angry monkeys &
christmas roasts

test names

```
testUpdateCacheAndVerifyThatItemExists() {

}

test_Update_cache_and_verify_that_item_exists() {

}
```



api's

```
Car car = new CarImpl();
MarketingDescription desc = new
    MarketingDescriptionImpl();
desc.setType("Box");
desc.setSubType("Insulated");
desc.setAttribute("length", "50.5");
desc.setAttribute("ladder", "yes");
desc.setAttribute("lining type", "cork");
car.setDescription(desc);
```

fluent interfaces

```
Car car = Car.describedAs()
              .box()
              .length(12)
              .includes(Equipment.LADDER)
              .has(Lining.CORK);
```

what stands in the way?

the javabean specification!

what's bad about beans?

forces you to create default constructors

creates bad citizens

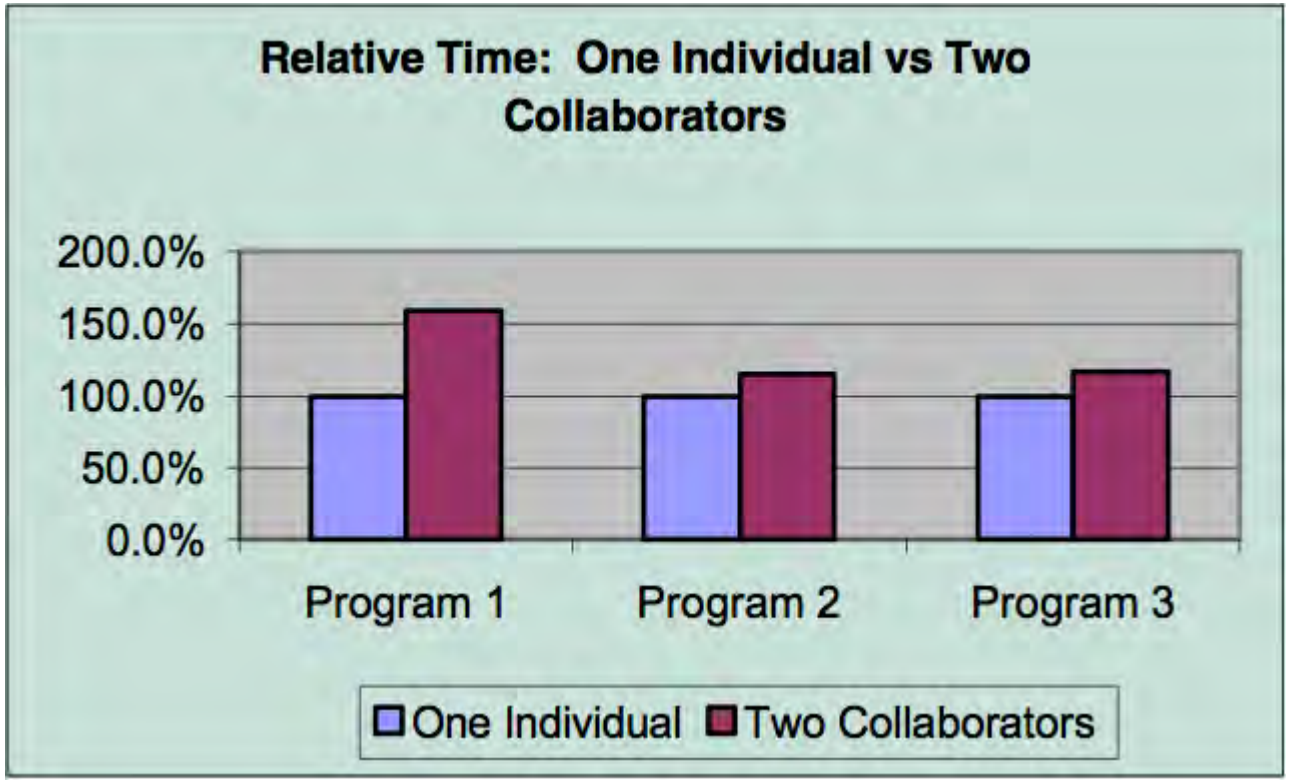
harms constructor as specification

setXXX() methods return void

can't use beans for fluent interfaces

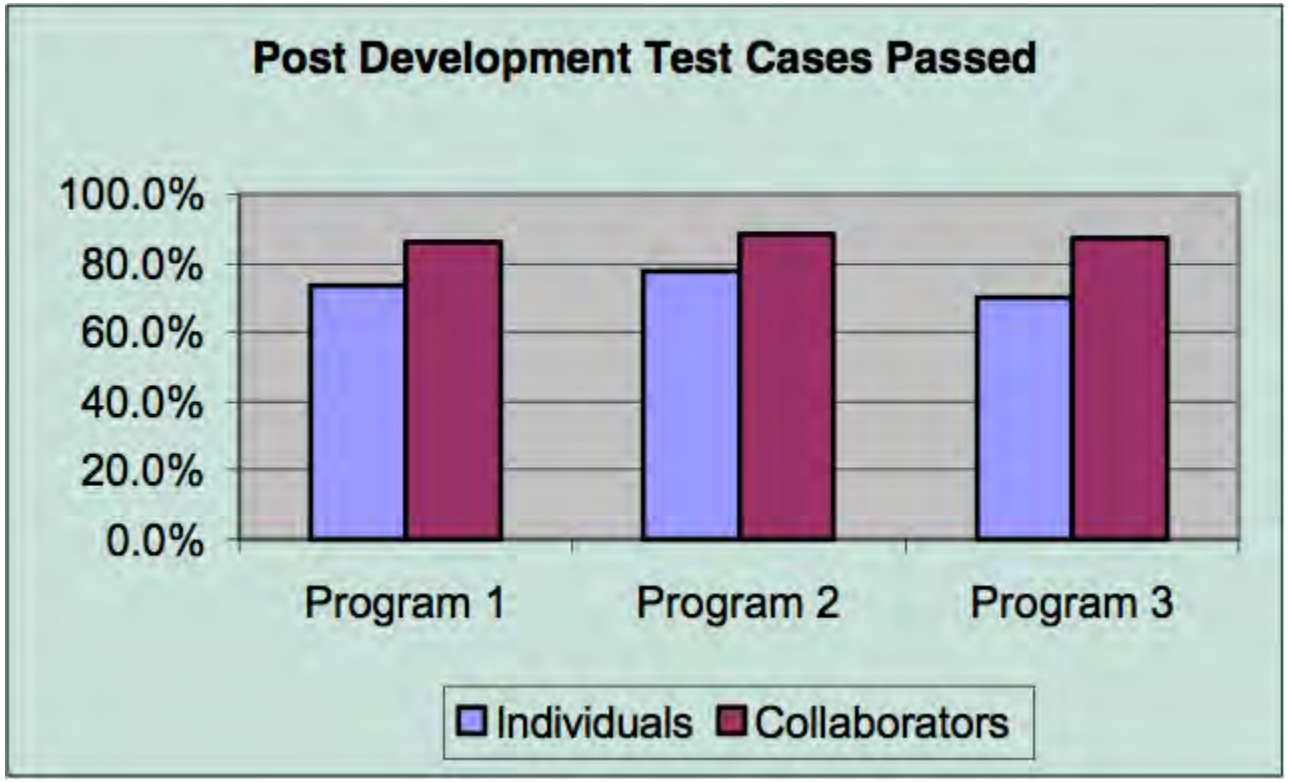
non-intuitive

pair programming studies



after adjusting, pairs produced code 15% more slowly than individuals...

pair programming studies



...with 15% fewer defects

7

slap

single level of abstraction principle

s l a p

keep all lines of code in a method at the same level of abstraction

jumping abstraction layers makes code hard to understand

composed method => slap

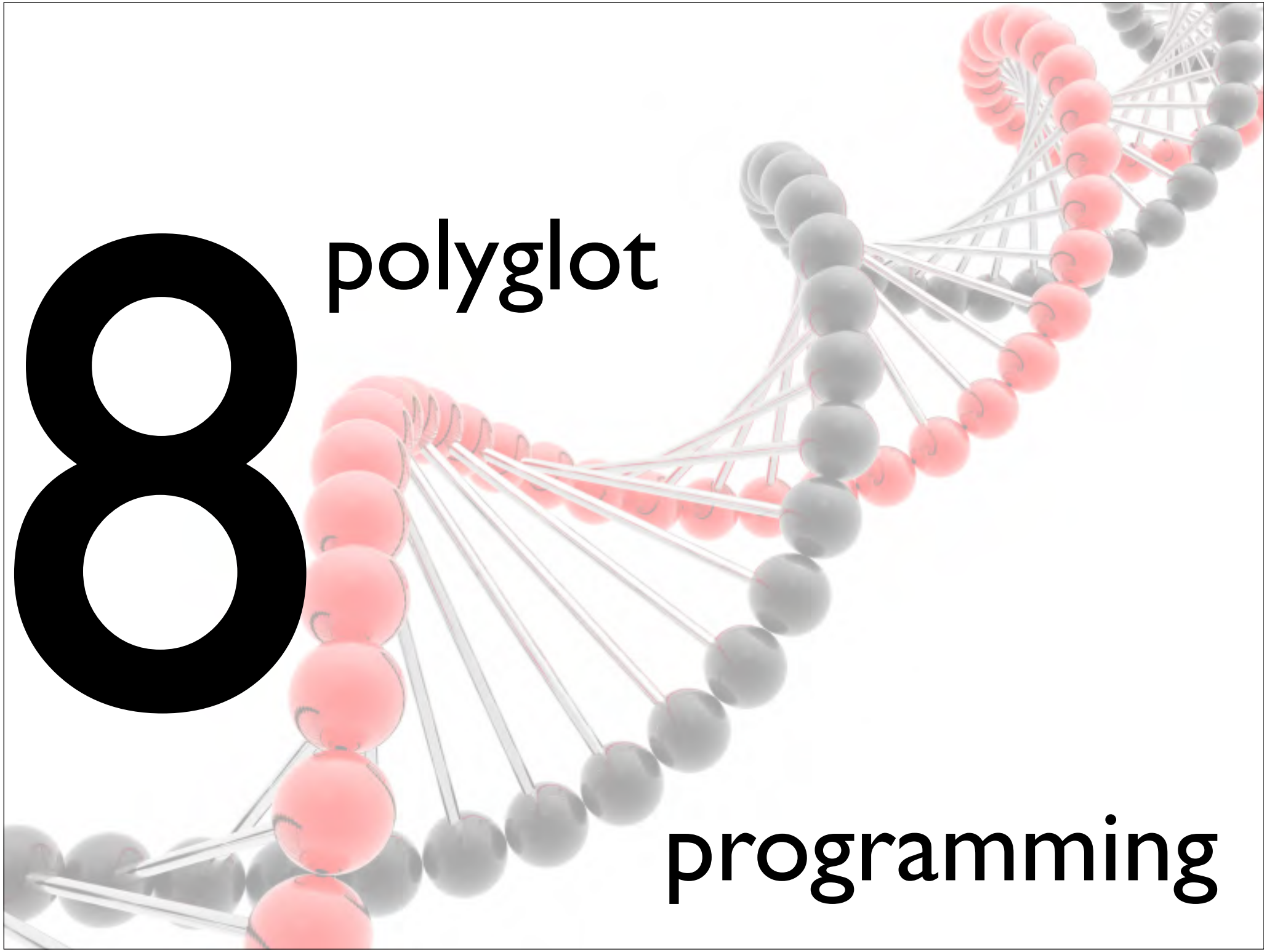
refactor to slap

even if it means single-line methods

```
public void addOrder(final ShoppingCart cart, String userName,
                     Order order) throws SQLException {
    Connection c = null; PreparedStatement ps = null;
    Statement s = null; ResultSet rs = null;
    boolean transactionState = false;
    try {
        c = dbPool.getConnection();
        s = c.createStatement();
        transactionState = c.getAutoCommit();
        int userKey = getUserKey(userName, c, ps, rs);
        c.setAutoCommit(false);
        addSingleOrder(order, c, ps, userKey);
        int orderKey = getOrderKey(s, rs);
        addLineItems(cart, c, orderKey);
        c.commit();
        order.setOrderKey(orderKey);
    } catch (SQLException sqlx) {
        s = c.createStatement();
        c.rollback();
        throw sqlx;
    } finally {
        try {
            c.setAutoCommit(transactionState);
            dbPool.release(c);
            if (s != null)  s.close();
            if (ps != null) ps.close();
            if (rs != null) rs.close();
        } catch (SQLException ignored) {
        }
    }
}
```

```
public void addOrder(final ShoppingCart cart, String userName,
                     Order order) throws SQLException {
    Connection connection = null; PreparedStatement ps = null;
    Statement statement = null; ResultSet rs = null;
    boolean transactionState = false;
    try {
        connection = dbPool.getConnection();
        statement = connection.createStatement();
        transactionState = setupTransactionStateFor(connection, transactionState);
        addSingleOrder(order, connection, ps, userKeyFor(userName, connection));
        order.setOrderKey(generateOrderKey(statement, rs));
        addLineItems(cart, connection, order.getOrderKey());
        completeTransaction(connection);
    } catch (SQLException sqlx) {
        rollbackTransactionFor(connection);
        throw sqlx;
    } finally {
        cleanUpDatabaseResources(connection, transactionState, statement, ps, rs);
    }
}
```

8 polyglot programming



leveraging existing *platforms* with *languages* targeted at specific problems and applications

why do this?

looming problems/ opportunities

massively parallel threading

- use a functional language: jaskell, scala

schedule pressure

- jruby on rails, grails

looming problems/ opportunities

everyday coding

groovy, ruby

stop banging rocks together & get some work done!

face it:

EBXL™

looming problems/ opportunities

writing more declarative code via **dsl**s

build fluent interfaces

complexity

doesn't polyglot programming add complexity?

In the past, language == platform

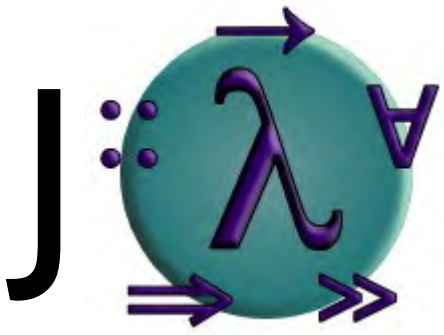
now, language != platform

```
public class LineNumbers {
    public LineNumbers(String path) {
        File file = new File(path);
        LineNumberReader reader = null;
        try {
            reader = new LineNumberReader(new FileReader(file));
            while (reader.ready()) {
                out.println(reader.getLineNumber() + ":"
                        + reader.readLine());
            }
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        } finally {
            try {
                reader.close();
            } catch (IOException ignored) {
            }
        }
    }

    public static void main(String[] args) {
        new LineNumbers(args[0]);
    }
}
```

```groovy
def number=0
new File (args[0]).eachLine { line ->
    number++
    println "$number: $line"
}
```

```
class SafeArray{
    private final Object[] _arr;
    private final int _begin;
    private final int _len;

    public SafeArray(Object[] arr, int len){
        _arr = arr;
        _begin = begin;
        _len = len;
    }

    public Object at(int i){
        if(i < 0 || i >= _len){
            throw new ArrayIndexOutOfBoundsException(i);
        }
        return _arr[_begin + i];
    }

    public int getLength(){
        return _len;
    }
}
```

```
newSafeArray arr begin len = {
  length = len;
  at i = if i < begin || i >= len then
           throw $ ArrayIndexOutOfBoundsException.new[i]
         else
           arr[begin + i];
}
```




9
every nuance

java's back alleys

reflection

"reflection is slow"

no longer true

elegant solutions to problems

```
public class Configuration {
    private Point _initialPosition;

    private Configuration(Dimension screenSize) {
        _initialPosition = new Point();
        _initialPosition.x = (int) screenSize.getWidth() / 2;
        _initialPosition.y = (int) screenSize.getHeight() / 2;
    }

    public int getInitialX() {
        return _initialPosition.x;
    }

    public int getInitialY() {
        return _initialPosition.y;
    }
}
```

```
@Before public void setUp() {
    try {
        Constructor cxtor[] =
                Configuration.class.getDeclaredConstructors();
        cxtor[0].setAccessible(true);
        c = (Configuration) cxtor[0].newInstance(
                Toolkit.getDefaultToolkit().getScreenSize());
    } catch (Throwable e) {
        fail();
    }
}
```

```
@Test
public void initial_position_set_correctly_upon_instantiation() {
    Configuration specialConfig = null;
    Dimension screenSize = null;
    try {
        Constructor cxtor[] =
                Configuration.class.getDeclaredConstructors();
        cxtor[0].setAccessible(true);
        screenSize = new Dimension(26, 26);
        specialConfig = (Configuration) cxtor[0].newInstance(screenSize);
    } catch (Throwable e) {
        fail();
    }

    Point expected = new Point();
    expected.x = (int) screenSize.getWidth() / 2;
    expected.y = (int) screenSize.getHeight() / 2;
    assertEquals(expected.x, specialConfig.getInitialX());
    assertEquals(expected.y, specialConfig.getInitialY());
}
```

regular expressions &

learn the nuances of java...

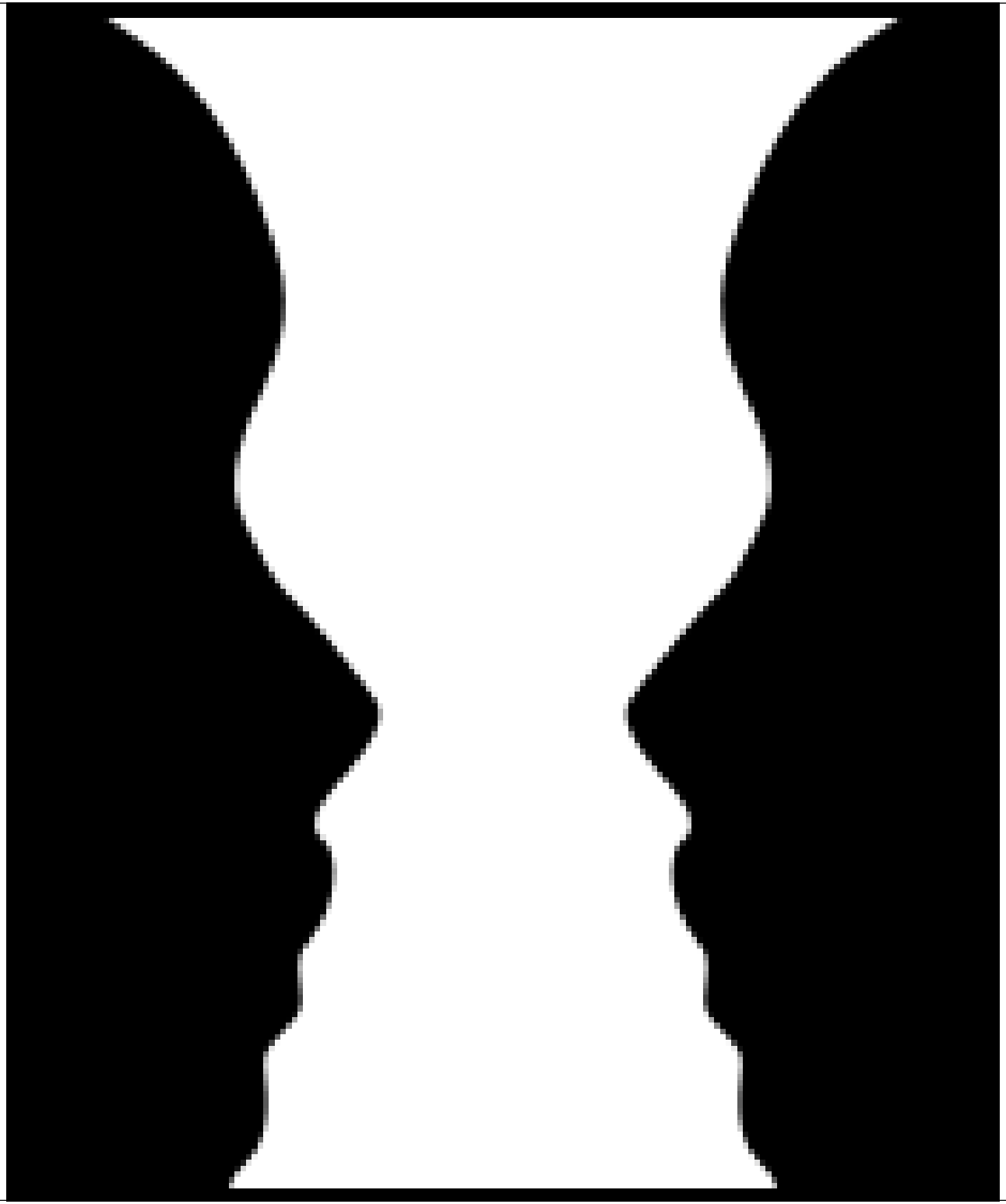
...then tell the other people on your project

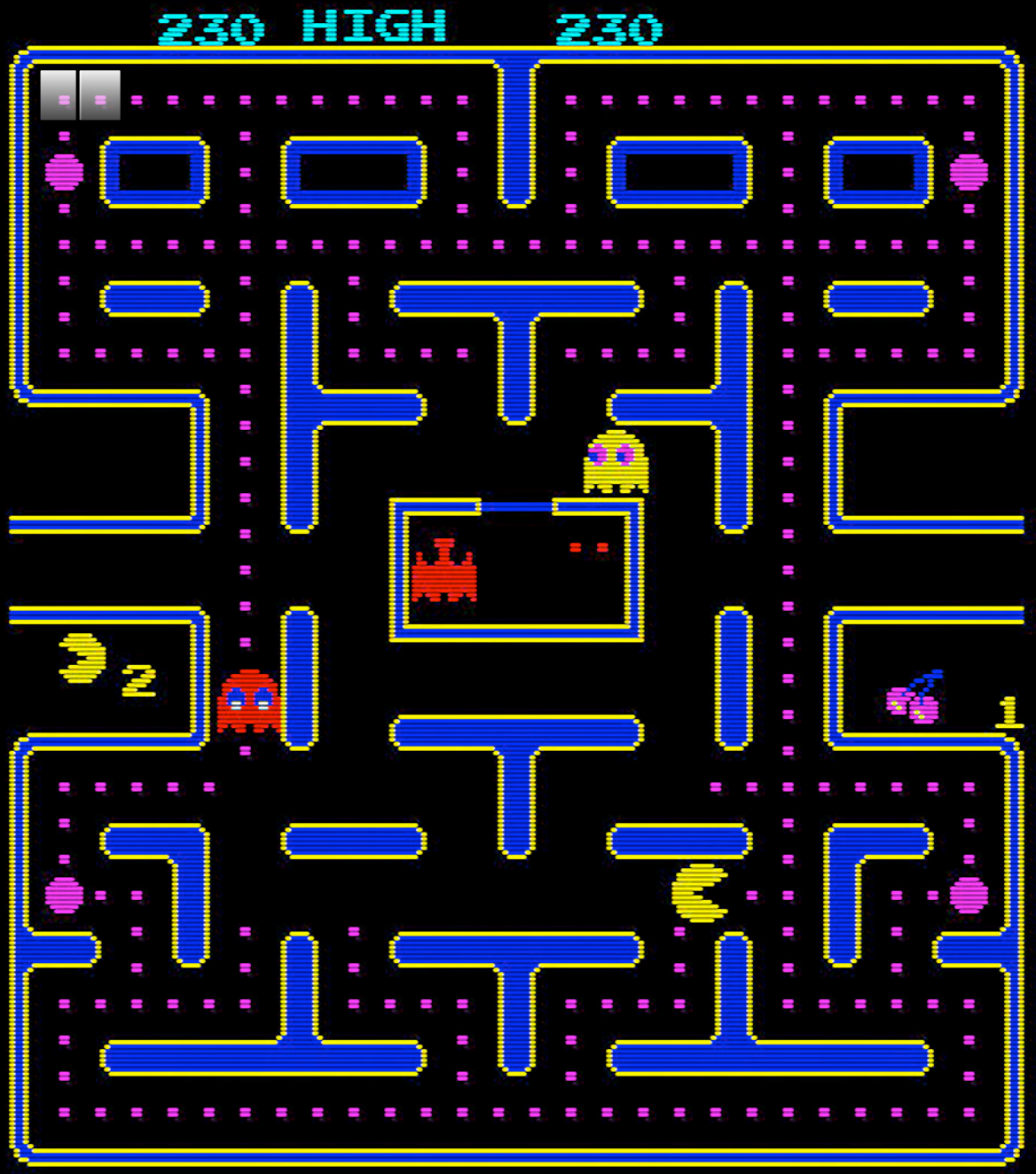

10
anti-objects

collaborative diffusion

"The metaphor of objects can go too far by making us try to create objects that are too much inspired by the real world."

"...an antiobject is a kind of object that appears to essentially do the opposite of what we generally think the object should be doing."




230 HIGH 230
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questions?

please fill out the session evaluations
slides & samples available at nealford.com

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resources

An Initial Investigation of Test Driven Development in Industry -
Laurie Williams, Boby George
http://collaboration.csc.ncsu.edu/laurie/Papers/TDDpaperv8.pdf

findbugs
http://findbugs.sourceforge.net/

pmd/cpd
http://pmd.sourceforge.net/

The legend of the leaning tower
http://physicsworld.com/cws/article/print/16806

AntiPatterns Catalog
http://c2.com/cgi/wiki?AntiPatternsCatalog

resources

Smalltalk Best Practice Patterns Kent Beck
Prentice Hall PTR (October 13, 1996)
ISBN-10: 013476904X

Polyglot Programming
http://memeagora.blogspot.com/2006/12/polyglot-programming.html

Optical Illusions
http://en.wikipedia.org/wiki/Optical_illusion

Collaborative Diffusion: Programming Anti-objects - A Repenning
http://www.cs.colorado.edu/~ralex/papers/PDF/OOPSLA06antiobjects.pdf

resources
pair programming

http://c2.com/cgi/wiki?PairProgramming

http://www.xprogramming.com/Practices/PracPairs.html

http://collaboration.csc.ncsu.edu/laurie/Papers/XPSardinia.PDF

http://www.cs.utah.edu/~lwilliam/Papers/ieeeSoftware.PDF

resources

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