Concept-Centric Coding (C3) for Software Evolution in an Agile Context

Dr. Dirk Deridder
Vrije Universiteit Brussel - System and Software Engineering Lab

MoVES - Kickoff Event
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Software Variability in Agile Context

- Agile context? e.g. iMedia Software Development
Software Variability in Agile Context

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**Software Malleability**

- Delay binding as late as possible

- 60% of developer time is actually spent on program comprehension!

- Importance of connected domain knowledge...
Concept-Centric Coding (C3)

- **IMPLICIT** domain knowledge
- **DETACHED** domain knowledge
- **PASSIVE** domain knowledge
- **OVERHEAD**
- **EXPLICIT** domain knowledge
- **COUPLED** domain knowledge
- **ACTIVE** domain knowledge
- **TRANS-PARENCY**
Concept-Centric Coding (C3)

Concept-Centric Environment = COUPLED domain knowledge + EXPLICIT domain knowledge + ACTIVE domain knowledge + TRANSPARENCY
Concept-Centric Coding (C3)

Smalltalk

Program 1

... 

Program n

CoBro-CML

CoBro Kernel

CoBro-Nav

CoBro-Star

Concept Locator

Basic Editor

Basic Viewer

Statistics

...

ConceptBase Facility

ConceptBase
Example: a Configurable Media Library

Different Configurations
Media Library: Configurations

- MediaLibrary
  - Game
  - DVD
  - Book
  - MediaItem
  - CD
  - *1 Code
  - Level
  - itemChoices

Code
Level
Media Library: Configurations

#(MediaConfigurationA)

supportsMediaItems

supportsMediaItems

supportsMediaItems

supportsMediaItems

mediaConfiguration

Domain

Meta Level

Code Level

MediaLibrary

1 itemChoices

* MediaItem

Game

DVD

CD

Deified Code Entities

Code Entities

Library Manager

Select item type

Digital Video Disc

Book

Composed Disc

Game

File

Game

Movie Title

Platform

RATING

Game Title

Add

Media Item

Director

Doctor

Movie Title

ARTIST

Album Title

Year

Price

Save

Save

Save

Save

Book

Book Title

Softcover

Hardcover

Save

Save

Save

Save
Up/Down and Symbiosis in Action

*self class asConcept
mediaConfiguration
supportsMediaItems
first asSmalltalk

Domain
Meta Level

MediaLibrary

* itemChoices

1

mediaConfiguration

2

3

SupportsMediaItems

SupportsMediaItems

4

5

Code
Level

Game

DVD

CD

Book

EXPLICIT

COUPLED

ACTIVE

TRANSPARENCY

EXPLICIT
Adding Configurations

Run-time Malleability

MediaLibrary
Game DVD Book
MediaItem
CD
*1 Code
Level
itemChoices

Concept
Level
#{MediaConfigurationA}
supportsMediaItems
supportsMediaItems
supportsMediaItems
supportsMediaItems
mediaConfiguration

#{MediaConfigurationB}
supportsMediaItems
supportsMediaItems

Domain Meta Level

Code Level

Library Manager

File
Library Item
Select item type
Add

Digital Video Disc
Book
Compact Disc
Game
But what about...

• Consistency?
• Querying?
• Debugging?
• Security?
• Meta Modeling Support?
• ...

Partial Metacircularity

• CoBro-Nav node visualisations, line colors, ...
• CoBro value interpreters, core caching, ...
“A media configuration can only support media items that are implemented as subclasses of the MediaItem class.”
Concepts.MediaConfiguration

configurationValidator:

`[:config |
  config supportsMediaItems reject:
    [:each | each asSmalltalk
      inheritsFrom: MediaItem]]’ ;

save.
Media Library: Configuration Validation

Concepts.MediaConfiguration
configurationValidator:
’[[:config |
config supportsMediaItems reject:
[:each | each asSmalltalk
inheritsFrom: MediaItem]]’;
**Context:** Software Evolution / Variability / Malleability

- Explore C3 Guidelines, Patterns, Considerations, ...
  - WP >> Modelling Languages, Restructuring, Co-Evolution

- Explore C3 for Concept-based Pointcuts
  - WP >> Programming Languages, (De/Re)Composition

- Explore C3 for Model-Driven Development
  - WP >> Programming, Modelling Languages, (De/Re)Composition
Questions?

Vrije Universiteit Brussel
Faculty of Sciences
Department of Computer Science
System and Software Engineering Lab
Dirk Deridder

Pleinlaan 2
B-1050 Brussel
Belgium

Office 4K208
Campus Etterbeek - Building K

Tel: +32 2 629 29 65
Fax: +32 2 629 28 70
Dirk.Deridder@vub.ac.be
http://ssel.vub.ac.be/