The Tale of Two Source-code Analysis Tools

Learning and experiences

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Tools

Augur
A change impact analysis tool

Designite
A software design quality assessment tool
(http://www.designite-tools.com)
Tools

Augur
A change impact analysis tool

Designite
A software design quality assessment tool
Features

- **Change impact analysis with multiple granularity support**
  - Cutting across projects, namespaces, classes, methods, fields, and statements

- **Intra-granular queries**
  - Supporting a query where a change and the associated impact could be on different granularities
• Change Impact Query Language (CIQL)
  o For large scale batch querying – opening a new set of applications of CIA

CIQL::get “<Granularity (Impact)>”
[within “<Scope>”]
[with “<Depth>”] where
“<Entity>” is
“<Granularity>”.
Features

- Support for extended dependencies
  - Data
  - Control
  - Semantic
  - Environment
Architecture

Query Processor

UDG Source Model

Rule base

CIA Framework

Code Parser

Change Impact Query (CIQ)

Potential Impacted Entities
Tools

**Augur**
A change impact analysis tool

**Designite**
A software design quality assessment tool
Features

- Supports detection of 19 design smells and 11 implementation smells
Features

- Supports computation of various metrics with custom thresholds

**WMC - Weighted Method per Class**

Distribution of types based on metric thresholds

- Types honoring the metric threshold - 13
- Types slightly above the metric threshold - 4
- Types quite above the metric threshold - 5
- Types dangerously above the metric threshold - 2

- Green threshold: 80.00
- Yellow threshold: 100.00
- Orange threshold: 150.00

Select metric:
- DIT
- Fan-in
- Fan-out
- LCOM
- LOC
- NC
- NOF
- NOM
- NOPF
- NOPM
- NOP
- WMC
Features

- Provides Dependency Structure Matrix
Features

• Performs Trend Analysis
Learning and experiences
The Big Gap
between Academics and Industry

Proposing a new research program in a corporate research organization is not easy!
The Big Gap between Academics and Industry

Learning (as a researcher)
- Make sure the availability of artifacts and their broader applicability
Parsing mechanism

Various options for collecting source code information
• String manipulation
• Reflection
• AST
• Byte code analysis
Which AST library?

CSParser
Metaspec
MS Roslyn  #Recognize!
NRefactory
Parsing mechanism

Selection criteria

- License
- Features
- Cost
- Community support
- Future proof-ness
Architecture

Plug-in
or
Independent application
Options
• Use conditional compilation (using ConditionalAttribute)
• Duplicate the code-base
• Perform architecture refactoring
Experience:
- Architecture refactoring is expensive but effective!
- Support for architecture refactoring within IDEs is not sufficient
Extensibility

Smell detection logic must be extensible
  i.e. new rules can be added without any change in source code analysis logic and user interface

Learning:
  - The role of appropriate design is important
Information dissemination

Producing useful information is desirable; presenting it well to the user is the extra mile.
Information dissemination

Different types of users, different requirements.
Paying attention to user requirements

WMC - Weighted Method per Class

Distribution of types based on metric thresholds

- Types honoring the metric threshold: 13
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Reset thresholds
- Green threshold: 80.00
- Yellow threshold: 100.00
- Orange threshold: 150.00

Select metric
- DIT
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- WMC
Paying attention to user requirements
References


Thank you!!

CHANGE YOURSELF...

\[ \frac{d\Delta}{dt} > 0 \]

FOR THE BETTER!

Courtesy: spikedmath.com

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