How complete are your tests?

Code Coverage in Eclipse

Joachim Hofer
Outline

- Motivation
- Types of Code Coverage
- Case Study:
  - Testing TestBench
  - Tool Requirements
- Code Coverage Tools
Why Code Coverage? (1)

- Tests need goals!
  - Black Box:
    - Requirement Coverage
    - System Tests
  - White Box:
    - Code Coverage
    - Integration/Unit Tests
Why Code Coverage? (2)

- Not for optimizing yet another code metric!
  - Easy to increase in *all the wrong ways*...
  - False sense of security

- What can go wrong with developer tests?
  - ... don't test what they are intended to
  - ... won't get executed
  - ... can be elaborate in the wrong places

→ *Analyze their coverage!*
Types of Code Coverage

• Coverage Types
  • Statement Coverage
  • Branch Coverage
  • Condition Coverage
  • Path Coverage

• Instrumentation Types
  • Based on Source Code
  • Based on Bytecode

Not good enough!
Often good enough...
Difficult...
Usually impractical.
Usually recommended, but...
JVM multi-language support!
Case Study: Testing TestBench

- System Test (QF-Test, TestBench)
  - ~16k tests run every night
  - Takes 10 hours
  - Video capturing
    (due to popular request: done via vnc und vnc2flv)

- Integration/Unit Test (TestNG)
  - > 1000 tests run after each commit
  - Takes 10 minutes
  - Complemented by FindBugs
Case Study: Tool Requirements

- Measures Branch Coverage
- Available via Command Line for Build
- Integration into CI Server (Hudson et al)
- Eclipse Plug-in Available
- Based on Bytecode
- Free if possible...
# Code Coverage Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CodeCover</td>
<td>looks good, not bytecode-based, no CI integration</td>
</tr>
<tr>
<td>Emma / EclEmma</td>
<td>no branch coverage</td>
</tr>
<tr>
<td>Clover</td>
<td>looks good, not free</td>
</tr>
<tr>
<td>Cobertura</td>
<td>no Eclipse plug-in</td>
</tr>
</tbody>
</table>

→ eCobertura Eclipse plug-in yay! still pretty basic
Links

• Eclipse Plug-ins
  • eCobertura - http://ecobertura.johoop.de
  • EclEmma - http://eclemma.org/
  • CodeCover - http://codecover.org/
  • Clover - http://www.atlassian.com/software/clover/

• Command Line / Ant
  • Cobertura - http://cobertura.sourceforge.net/
  • Emma - http://emma.sourceforge.net/
  • JaCoCo - http://www.eclemma.org/jacoco/
Thanks!

Any questions?