Testing in Java

San Gabriel Valley Java Users Group
http://www.sgvjug.org/
June 25, 2007
Motivate excellence in testing with concepts, practices, and tools
Scope

Testing

requirements
continous integration
debugging
profiling

quality assurance
static code analysis

concepts, practices, tools
Agenda

- Test-Driven Development
- Terminology
- Tools
- Application
- Discussion
Demo

A Taste of TDD
Test-Driven Development

Add test

Make small change

Commit changes

Fail
Pass
Pass

See also: http://www.agiledata.org/essays/tdd.html
Test-Driven Development

1. Add test
2. Fail
3. Fix bug
4. Pass
5. Commit changes
Test-Driven Development

Refactor Code

Commit changes

Add test

Make small change

Commit changes

Pass

Fail

Pass

Pass
Test-Driven Development

- Small steps
- Frequent check-ins
Test-Driven Development

- Deeper than “test first”
- Design for testability
Test-Driven Development

- Unit tests as example code
- Interface before implementation
  - Function drives form
Test-Driven Development

- Loose coupling
- Services with clear responsibilities
- Mock objects
Taste the soup!
Intent

Requirements, Architecture, Design

Reality

Implementation, Deployment
Intent

Requirements, Architecture, Design

Reality

Implementation, Deployment

Gap!
Intent  Accountability  Reality

Requirements, Architecture, Design  Testing, QA  Implementation, Deployment
Intent  Accountability  Reality

Requirements, Architecture, Design  Testing, QA  Implementation, Deployment

Reality Check!
Terminology

- QA – quality assurance
  - Do the right things
  - Do things right
  - Ensure quality standards
Test – success criteria
- Is it right?
- Is it done?
Terminology

- Test plan
- Test case
- Test suite
- Test report
- Test coverage
Terminology

- Unit test
- Functional test
- Integration test
- System test
- Acceptance test
- Regression test
Terminology

- Non-functional testing
- Performance test
- Load test
- Soak test
Terminology

- Continuous integration
## Tools

<table>
<thead>
<tr>
<th>Category</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mock Objects</td>
<td>jMock, EasyMock</td>
</tr>
<tr>
<td>Unit Tests</td>
<td>JUnit, TestNG</td>
</tr>
<tr>
<td>Build</td>
<td>Ant, Maven</td>
</tr>
<tr>
<td>IDE</td>
<td>Eclipse, NetBeans</td>
</tr>
<tr>
<td>Tools</td>
<td>Web Apps</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>Selenium, HttpUnit</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Acceptance</th>
<th>Selenium, FitNesse, Stiq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>JMeter, Eclipse TPTP</td>
</tr>
<tr>
<td>Coverage</td>
<td>Cobertura, Emma</td>
</tr>
</tbody>
</table>
Continuous Integration

Cruise Control, Continuum, Hudson
# Tools

<table>
<thead>
<tr>
<th>Continuous Integration</th>
<th>Cruise Control, Continuum, Hudson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance</td>
<td>Selenium, FitNesse, Stiq</td>
</tr>
<tr>
<td>Performance</td>
<td>JMeter, Eclipse TPTP</td>
</tr>
<tr>
<td>Coverage</td>
<td>Cobertura, Emma</td>
</tr>
<tr>
<td>Web Apps</td>
<td>Selenium, HttpUnit</td>
</tr>
<tr>
<td>JEE Servers</td>
<td>Cactus</td>
</tr>
<tr>
<td>Databases</td>
<td>DBUnit</td>
</tr>
<tr>
<td>Mock Objects</td>
<td>jMock, EasyMock</td>
</tr>
<tr>
<td>Unit Tests</td>
<td>JUnit, TestNG</td>
</tr>
<tr>
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</tr>
<tr>
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<td>Eclipse, NetBeans</td>
</tr>
</tbody>
</table>

Unit testing
Resources: SGV JUG

Web Site
http://sgvlug.net/mailman/listinfo/java-sig

Mailing List (Hosted by SGV Linux Users Group)
http://sgvlug.net/mailman/listinfo/java-sig
java-sig@sgvlug.net
Resources: TDD

Articles

http://www.agiledata.org/essays/tdd.html
http://en.wikipedia.org/wiki/Test_driven_development
http://www.testdriven.com/modules/xoopsfaq/
http://www.artima.com/intv/testdriven.html
http://www.google.com/search?hl=en&q=test+driven+development (really!)
Eclipse IDE
   http://www.eclipse.org/

NetBeans IDE
   http://www.netbeans.org/

Ant
   http://ant.apache.org/

Maven 2
   http://maven.apache.org/
   http://www.devzuz.com/web/guest/products/resources#BBWM

Maven & Eclipse
   http://m2eclipse.codehaus.org/

Maven & Netbean
Resources: Unit Testing

JUnit Framework
http://junit.org/

JUnit FAQ
http://junit.sourceforge.net/doc/faq/faq.htm

JUnit with Ant
http://ant.apache.org/manual/OptionalTasks/junit.html
http://ant.apache.org/manual/OptionalTasks/junitreport.html

JUnit with Maven
http://maven.apache.org/plugins/maven-surefire-plugin/

TestNG Framework
http://testng.org/doc/

Jester – Mutation Testing
http://jester.sourceforge.net/
Resources: Mock Objects

Mock Objects Blog
http://mockobjects.com/

EasyMock Library
http://easymock.org/

jMock Library
http://jmock.org/
Resources: Unit & Functional

XmlUnit Library
   http://xmlunit.sourceforge.net/

DBUnit Library
   http://dbunit.sourceforge.net/

HttpUnit Library
   http://httpunit.sourceforge.net/

Cactus for JEE Server Code
   http://jakarta.apache.org/cactus/

Cargo for JEE Server Code
   http://cargo.codehaus.org/
Resources: Test Coverage

**Cobertura**

http://cobertura.sourceforge.net/


**Cobertura with Ant**

http://cobertura.sourceforge.net/anttaskreference.html

**Cobertura with Maven**

http://mojo.codehaus.org/cobertura-maven-plugin/usage.html

**Emma**

http://emma.sourceforge.net/
Resources: Perf. & Load

JUnitPerf
   http://clarkware.com/software/JUnitPerf.html

JMeter
   http://jakarta.apache.org/jmeter/

Eclipse TPTP (Test & Performance Tools Platform)
   http://www.eclipse.org/tptp/

Netbeans Profiler
   http://profiler.netbeans.org/
Resources: Acceptance Tests

Selenium for Web Apps
http://www.openqa.org/selenium/
http://www.openqa.org/selenium-ide/download.action

Automating Selenium ("Remote Control")
http://www.openqa.org/selenium-rc/
http://wiki.openqa.org/display/SRC/Selenium-RC+and+Continuous+Integration

Selenium & Maven
http://raibledesigns.com/rd/entry/selenium_plugin_for_maven

FitNesse
http://fitnesse.org/

Stiq
http://storytestiq.sourceforge.net/
Resources: Cont. Integration

Cruise Control
http://cruisecontrol.sourceforge.net/

Continuum
http://maven.apache.org/continuum/

Hudson
https://hudson.dev.java.net/
Open Source Medical Record System

http://www.openmrs.org/

Prerequisites: SVN, MySQL 5, Tomcat 5

http://subclipse.tigris.org/update_1.2.x
http://mysql.org/
http://tomcat.apache.org/

SVN Repository

http://svn.openmrs.org/openmrs/branches/alpha

Installation

Edit build.properties and properties.xml to set tomcat.user/password, or add test/test to $CATALINA_HOME/conf/tomcat-users.xml file.
Edit build.properties and/or properties.xml to set tomcat.home file.
Comment out creation of "test" MySQL user in schema if it already exists.
Default username/password is admin/test.
Thank you
To all who participated!