# M2GL V&V – Maven projects and test reports generation

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**Abstract**

This document describes how code projects are organized with Maven in the lab sessions, and how to annotate your tests in order to automatically produce test reports.

## 1 Eclipse version

For all your lab sessions, use the Eclipse provided in `/Extras/eclipseVV` (linux) or `d:\eclipseVV`.

## 2 Maven projects

For each lab session, you will download a Maven project archived in a zip file. To import it into your workspace, you must do this:

1. File → Import... → General → Existing projects into workspace
2. Select archive file (Browse) and pick your file
3. Click on Finish

The project is (almost always) completely configured with all required dependencies. Do not hesitate to be curious and to have a look in the `pom.xml` file! This is a good way to practice your Maven knowledge and training ☺.

## 3 Generating test reports

### 3.1 Test descriptions with Javadoc

You will have to comment very carefully each one of your JUnit test method using javadoc tags. Except for the `@see` tag, all of them are course-specific. In fact, these annotations are configured in the `pom.xml` file of each project (see Section 2). The tags to use are described in Figure 1. Figure 2 shows an example of how they should be used.

`@see` The tested method. In order for the link to work in the javadoc, use the following syntax (for which autocompletion works in Eclipse):

```
package.MyClass#methodName(type1 type2)
```

`@type` Either “Functionnal” or “Structural”

`@input` The input of the method (both the calling object and the parameters)

`@oracle` What is expected for the test to pass

`@passed` Whether the test passed or not

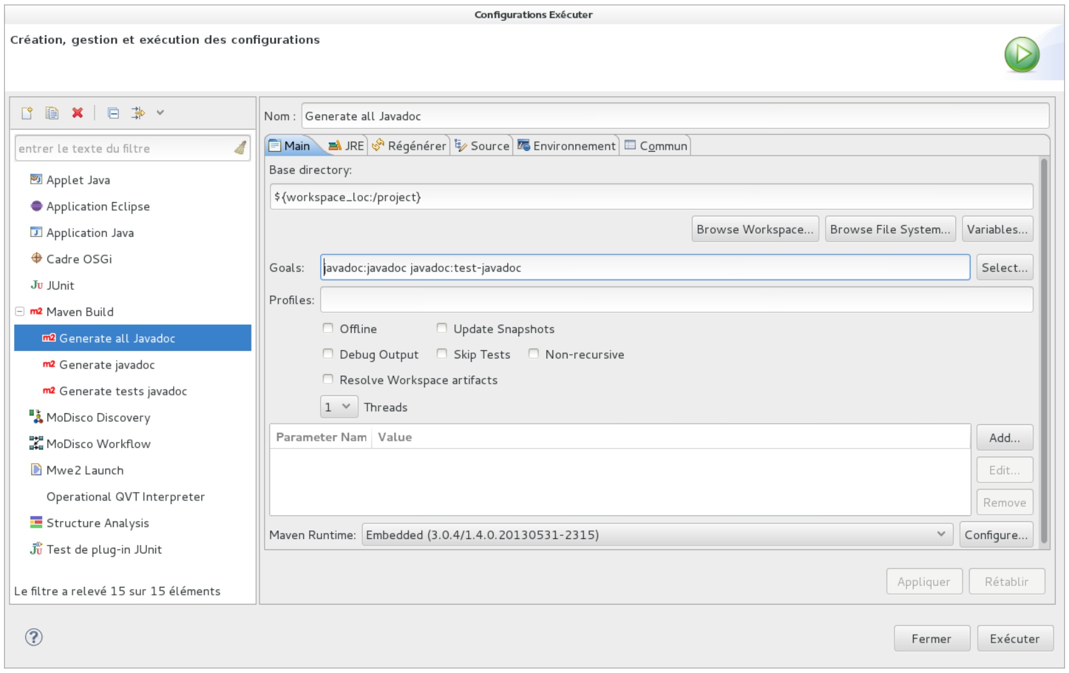
`@correction` If required, the applied patch. Be careful to use `<pre></pre>` to make it readable (see the example Figure 2).

Figure 1: List of all the annotations to use to comment the tests.

```java
public class testMyClass {

        /**
         * Tests the "doStuff" method normal behavior.
         * @see project.MyClass#doStuff(int)
         * @type Functional
         * @input 5
         * @oracle Must return "true"
         * @passed No
         * @correction
         * <pre>
         * l.9
         * - if (i > 5)
         * + if (i < 5)
         *
         * l.14
         * - value = i;
         * + value = i+2;
         * </pre>
         */
        @Test
        public void testDoStuff() {
                MyClass mc = new MyClass();
                assertFalse(mc.doStuff(5));
        }
}
```

Figure 2: Example of JUnit test case that uses the tags.



Configurations Exécuter

Création, gestion et exécution des configurations

Nom : Generate all Javadoc

Main | JRE | Régénérer | Source | Environnement | Commun

Base directory:
${workspace_loc:/project}

Goals: javadoc:javadoc javadoc:test-javadoc

Profiles:

- [ ] Offline
- [ ] Update Snapshots
- [ ] Debug Output
- [ ] Skip Tests
- [ ] Non-recursive
- [ ] Resolve Workspace artifacts

1 Threads

| Parameter Nam | Value |
|---|---|

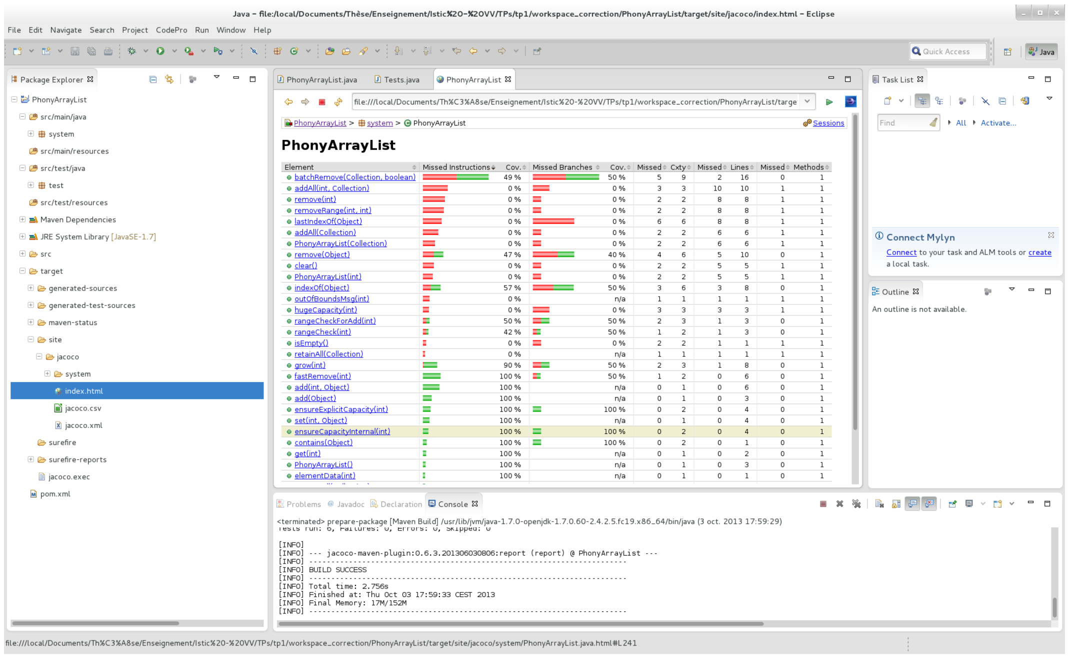
Maven Runtime: Embedded (3.0.4/1.4.0.20130531-2315)

entrer le texte du filtre

- Applet Java
- Application Eclipse
- Application Java
- Cadre OSGi
- JUnit
- Maven Build
  - Generate all Javadoc
  - Generate javadoc
  - Generate tests javadoc
- MoDisco Discovery
- MoDisco Workflow
- Mwe2 Launch
- Operational QVT Interpreter
- Structure Analysis
- Test de plug-in JUnit

Le filtre a relevé 15 sur 15 éléments

Figure 3: Eclipse run configuration with a Maven build to produce all the javadoc.



file:///local/Documents/Th%C3%A8se/Enseignement/Istic%20-%20VV/TPs/tp1/workspace_correction/PhonyArrayList/targe

PhonyArrayList > system > PhonyArrayList    Sessions

**PhonyArrayList**

| Element | Missed Instructions | Cov. | Missed Branches | Cov. | Missed | Cxty | Missed | Lines | Missed | Methods |
|---|---|---|---|---|---|---|---|---|---|---|
| batchRemove(Collection, boolean) | 🟥🟩 | 49 % | 🟥🟩 | 50 % | 5 | 9 | 2 | 16 | 0 | 1 |
| addAll(int, Collection) | 🟥 | 0 % | 🟥 | 0 % | 3 | 3 | 10 | 10 | 1 | 1 |
| remove(int) | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 8 | 8 | 1 | 1 |
| removeRange(int, int) | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 8 | 8 | 1 | 1 |
| lastIndexOf(Object) | 🟥 | 0 % | 🟥 | 0 % | 6 | 6 | 8 | 8 | 1 | 1 |
| addAll(Collection) | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 6 | 6 | 1 | 1 |
| PhonyArrayList(Collection) | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 6 | 6 | 1 | 1 |
| remove(Object) | 🟥🟩 | 47 % | 🟥🟩 | 40 % | 4 | 6 | 5 | 10 | 0 | 1 |
| clear() | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 5 | 5 | 1 | 1 |
| PhonyArrayList(int) | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 5 | 5 | 1 | 1 |
| indexOf(Object) | 🟥🟩 | 57 % | 🟥🟩 | 50 % | 3 | 6 | 3 | 8 | 0 | 1 |
| outOfBoundsMsg(int) | 🟥 | 0 % |  | n/a | 1 | 1 | 1 | 1 | 1 | 1 |
| hugeCapacity(int) | 🟥 | 0 % | 🟥 | 0 % | 3 | 3 | 3 | 3 | 1 | 1 |
| rangeCheckForAdd(int) | 🟥🟩 | 50 % | 🟥🟩 | 50 % | 2 | 3 | 1 | 3 | 0 | 1 |
| rangeCheck(int) | 🟥🟩 | 42 % | 🟥🟩 | 50 % | 1 | 2 | 1 | 3 | 0 | 1 |
| isEmpty() | 🟥 | 0 % | 🟥 | 0 % | 2 | 2 | 1 | 1 | 1 | 1 |
| retainAll(Collection) | 🟥 | 0 % |  | n/a | 1 | 1 | 1 | 1 | 1 | 1 |
| grow(int) | 🟥🟩 | 90 % | 🟥🟩 | 50 % | 2 | 3 | 1 | 8 | 0 | 1 |
| fastRemove(int) | 🟩 | 100 % | 🟥🟩 | 50 % | 1 | 2 | 0 | 6 | 0 | 1 |
| add(int, Object) | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 6 | 0 | 1 |
| add(Object) | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 3 | 0 | 1 |
| ensureExplicitCapacity(int) | 🟩 | 100 % | 🟩 | 100 % | 0 | 2 | 0 | 4 | 0 | 1 |
| set(int, Object) | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 4 | 0 | 1 |
| ensureCapacityInternal(int) | 🟩 | 100 % | 🟩 | 100 % | 0 | 2 | 0 | 4 | 0 | 1 |
| contains(Object) | 🟩 | 100 % | 🟩 | 100 % | 0 | 2 | 0 | 1 | 0 | 1 |
| get(int) | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 2 | 0 | 1 |
| PhonyArrayList() | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 3 | 0 | 1 |
| elementData(int) | 🟩 | 100 % |  | n/a | 0 | 1 | 0 | 1 | 0 | 1 |

```
<terminated> prepare-package [Maven Build] /usr/lib/jvm/java-1.7.0-openjdk-1.7.0.60-2.4.2.5.fc19.x86_64/bin/java (3 oct. 2013 17:59:29)
Tests run: 6, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- jacoco-maven-plugin:0.6.3.201306030806:report (report) @ PhonyArrayList ---
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 2.756s
[INFO] Finished at: Thu Oct 03 17:59:33 CEST 2013
[INFO] Final Memory: 17M/152M
[INFO] ------------------------------------------------------------------------
```

file:///local/Documents/Th%C3%A8se/Enseignement/Istic%20-%20VV/TPs/tp1/workspace_correction/PhonyArrayList/target/site/jacoco/system/PhonyArrayList.java.html#L241

Figure 4: Example of jacoco report.

To generate the HTML javadoc for the code, you can use the Maven goal `javadoc:javadoc`. For the tests you can use `javadoc:test-javadoc`. Since we make links from the tests towards the code (using `@see`), we need to produce both. A convenient way is to configure a new "Eclipse Run Configuration" of the type "Maven Build" with "`javadoc:javadoc javadoc:test-javadoc`" in the "Goals" field. The output is produced in the folder `target/site/testapidocs`. Figure 3 shows an example of Javadoc run configuration.

## 3.2 Test coverage report with Jacoco

To generate the jacoco HTML report for the test coverage, you can use the Maven goal "`prepare-package`". Again, a convenient way is to configure a new "Eclipse Run Configuration" of the type "Maven Build" with `prepare-package` in the "Goals" field. The output is produced in the folder `target/site/jacoco`. Figure 4 shows what the output looks like: in green the obtained coverage, in red the non-covered parts.