

Professional Issues II

Unit 4: blackbox testing

Lab preparation

Markus Roggenbach

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Test automation with JUnit

Reminder of the different test activities

1. Design of a Test Suite
(choosing test inputs & determining the expected results)
2. Execution of the Test Suite
(obtaining the actual results)
3. Test evaluation (determining pass / fail for each test case,
and for the Test Suite as a whole)
4. Test documentation
(document execution and evaluation)

JUnit

JUnit is a simple framework to write repeatable tests, see <http://junit.org/index.html>

JUnit automatises test execution & test evaluation.

Cost: one needs to encode test suites into a special format.

Encoding of single test cases in JUnit

Specification

Input: integer

Output: string “Hugo” if i is 1, Erna otherwise.

Test-Suite:	Name	Input	Expected Output
	test1	1	“Hugo”
	test2	2	“Erna”

SUT:

```
public static String produceHugo(int i) {return "Hugo";}
```

Encoding of the Test-Suite in JUnit

Test-Suite:	Name	Input	Expected Output
	test1	1	"Hugo"
	test2	2	"Erna"

One possible encoding in JUnit:

@Test

```
public void test1ProduceHugo(){  
    assertEquals("Hugo", Hugo.produceHugo(1));}
```

@Test

```
public void test2ProduceHugo() {  
    assertEquals("Erna", Hugo.produceHugo(2));}
```

JUnit “infrastructure”

Mark-up “@Test” stands for:
The following methods are tests.

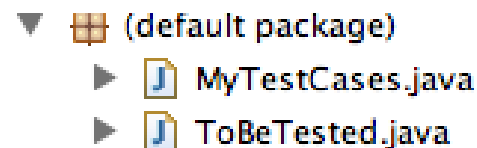
Method assertEquals:

- first parameter: expected output
- second parameter: call the SUT with the input value(s) as actual parameters

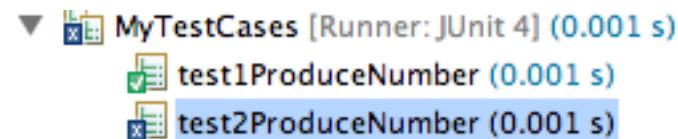
~> Tool-Demo

JUnit in Eclipse

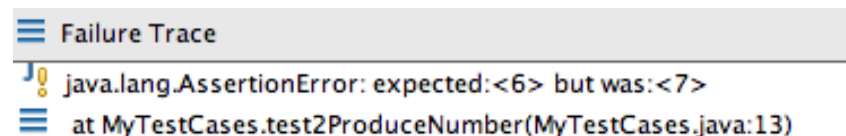
File Structure: SUT file and test case file on the same level.



Test Execution via run-button also yields test evaluation:



There is information about the error:



Further asserts of JUnit include

`assertFalse(boolean condition)`

Asserts that a condition is false.

`assertNotNull(Object object)`

Asserts that an object isn't null.

`assertNotSame(Object unexpected, Object actual)`

Asserts that two objects do not refer to the same object.

`assertNull(Object object)`

Asserts that an object is null.

`assertSame(Object expected, Object actual)`

Asserts that two objects refer to the same object.

`assertTrue(boolean condition)`

Asserts that a condition is true.

Further reading

Jump into JUnit 4:

<http://www.ibm.com/developerworks/java/tutorials/j-junit4/>

Kent Beck: JUnit Pocket Guide. O'Reilly, 2004.

Specifically it [this book] will appeal to programmers and developers of any level that use JUnit to do their unit testing in test-driven development under agile methodologies such as Extreme Programming (XP).