Automatic test anti-patterns

Ing. Jiří Kiml,
20/11/2013, ZCU

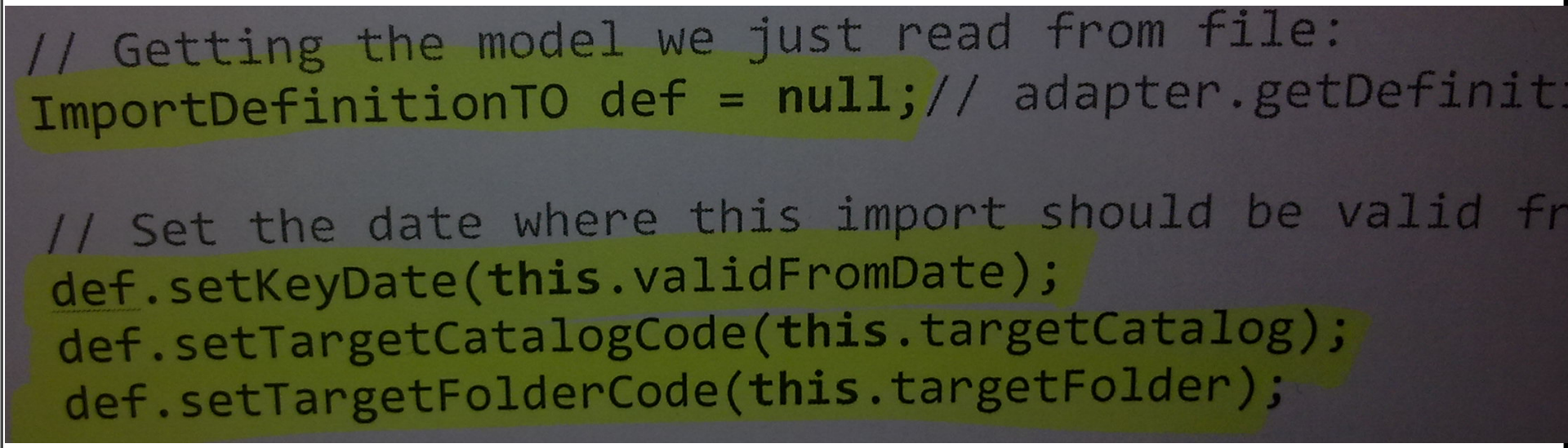
Agenda

- Motivation
- What is automatic test
- Anti-patterns catalog
- Basic mistakes
- Best practices
- Summary
- Questions

Motivation

Any fool can write code that a computer can understand.
Good programmers write code that humans can understand.
~Martin Fowler

- **Detect REAL bugs early**
- **Avoid boring regression tests**
- **Better design, api documentation**
- **Code quality**



```
// Getting the model we just read from file:
ImportDefinitionTO def = null;// adapter.getDefinit

// Set the date where this import should be valid fr
def.setKeyDate(this.validFromDate);
def.setTargetCatalogCode(this.targetCatalog);
def.setTargetFolderCode(this.targetFolder);
```

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What is automatic test

- **No definition in wiki ;-(**
- **….. example in eclipse**

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Anti-patterns catalog

The Liar, Excessive Setup, The Giant,
The Mockery, The Inspector, Generous
Leftovers, The Local Hero, The Nitpicker,
The Secret Catcher, The Dodger,
The Loudmouth, The Greedy Catcher
The Sequencer, Hidden Dependency
The Enumerator, The Stranger,
The Operating System Evangelist,
Success Against All Odds, The Free Ride
The One, The Peeping Tom
The Slow Poke

Anti-patterns catalog (2)

http://blog.james-carr.org/2006/11/03/tdd-anti-patterns/

http://stackoverflow.com/questions/3336822/tdd-anti-patterns-catalogue

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Basic mistakes

- No tests
- Manual (missing) Assertions
- Redundant Assertions
- Using the Wrong Assert
- Only Easy/Happy Path Tests
- Complex Tests
- External Dependencies
- Catching Unexpected Exceptions
- Mixing Production and Test Code

No tests

- **Still common in many companies**
- **“It is to expensive to write tests.”**
- **“We will write tests later”. (never)**
- **The Liar, Success Against All Odds**

No tests

```
// TODO: This tests need to be activated when nightly db-reset is done!
@Ignore
@Test
public void testXXX() {
        ...
}

@Test
public void testYYY() {
        // TODO implement me
}
```

Manual (missing) Assertions

- **Sysout instead of assert**
- **Why not just use a debugger?**
- **The Secret Catcher**

"Debugging is twice as hard as writing the code in the first place.
Therefore, if you write the code as cleverly as possible, you are, by definition, not smart enough to debug it."
Brian W. Kernighan

Manual (missing) Assertions

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public void testCalculation() {
        deepThought.calculate();
        assertEquals(42, deepThought.getResult());
}
```

Redundant Assertions

- **Always true or always false assertions**
- **Introduced by mistake or for debugging purposes**

Redundant Assertions

```
public void testSomething() {
        …….
        assertEquals(10.0, updatedEntity.getQuantity(), Double.MAX_VALUE);
        assertTrue(true);
}
```

```
public void testSomething() {
        …….
        assertTrue(existingServiceEntryTOs.size() == 0);
        assertNotNull(existingServiceEntryTOs);
}
```

Using the Wrong Assert

- **There is more than assertTrue**
- **java assert keyword**

Using the Wrong Assert

```
assertTrue("Objects must be the same", expected == actual);
assertTrue("Objects must be equal", expected.equals(actual));
assertTrue("Object must be null", actual == null);
assertTrue("Object must not be null", actual != null);
```

```
assertSame("Objects must be the same", expected, actual);
assertEquals("Objects must be equal", expected, actual);
assertNull("Object must be null", actual);
assertNotNull("Object must not be null", actual);
```

Only Easy/Happy Path Tests

- **Only expected behavior is tested**
- **Only easy to verify things are tested**
- **The Liar, The Dodger, Success Against All Odds**

Only Easy/Happy Path Tests

```
@Test
public void testGoodCase()
{
    Assert.assertEquals(2.0, Math.sqrt(4.0), 0.0);
}
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```
@Test
public void testInteger()
{
    Integer intToTest = new Integer(10);
    Assert.assertEquals(intToTest.intValue(), 10);
}
```

Complex Tests

- **Same rules like for production code**
- **Excessive Setup, The Giant, The Mockery, The Nitpicker, The Stranger, The Free Ride, The One, The Slow Poke**

Complex Tests

In general, you should refactor a test until it can be easily recognised to follow the general structure:

- **Set up**
- **Declare the expected results**
- **Excercise the unit under test**
- **Get the action results**
- **Assert that the actual results match the expected results**

(External) Dependencies

- External dependencies that code may need to rely on to work correctly.
- Dependencies between tests – one test prepares data for other one.
- Dependencies to object internal state
- The Inspector, Generous Leftovers, The Local Hero, The Operating System Evangelist, The Sequencer, Hidden Dependency, The Peeping Tom

Catching Unexpected Exceptions

- **Test succeeds even if an exception is thrown**
- **The Liar, The Greedy Catcher**

```
public void testCalculation() {
    try {
        deepThought.calculate();
        assertEquals("Calculation wrong", 42, deepThought.getResult());
    }
    catch(CalculationException ex) {
        Log.error("Calculation caused exception", ex);
    }
}
```

Catching Unexpected Exceptions

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public void testCalculation() {
    try {
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    }
    catch(CalculationException ex) {
        fail("Calculation caused exception");
    }
}
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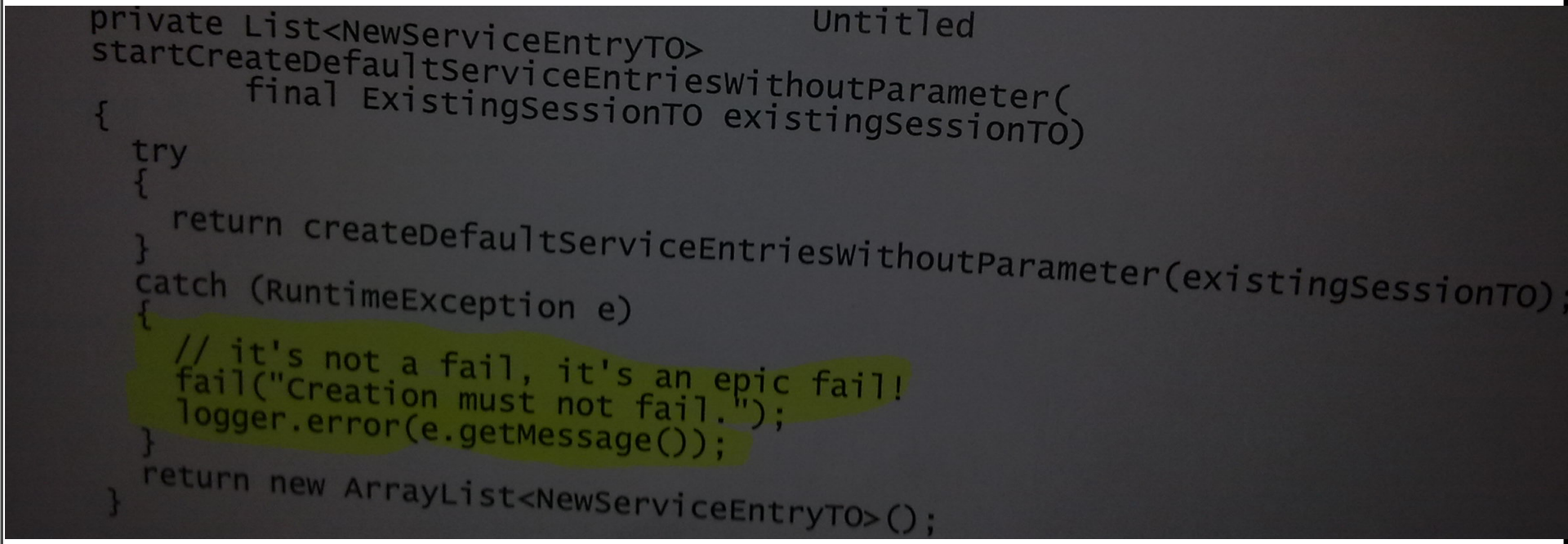
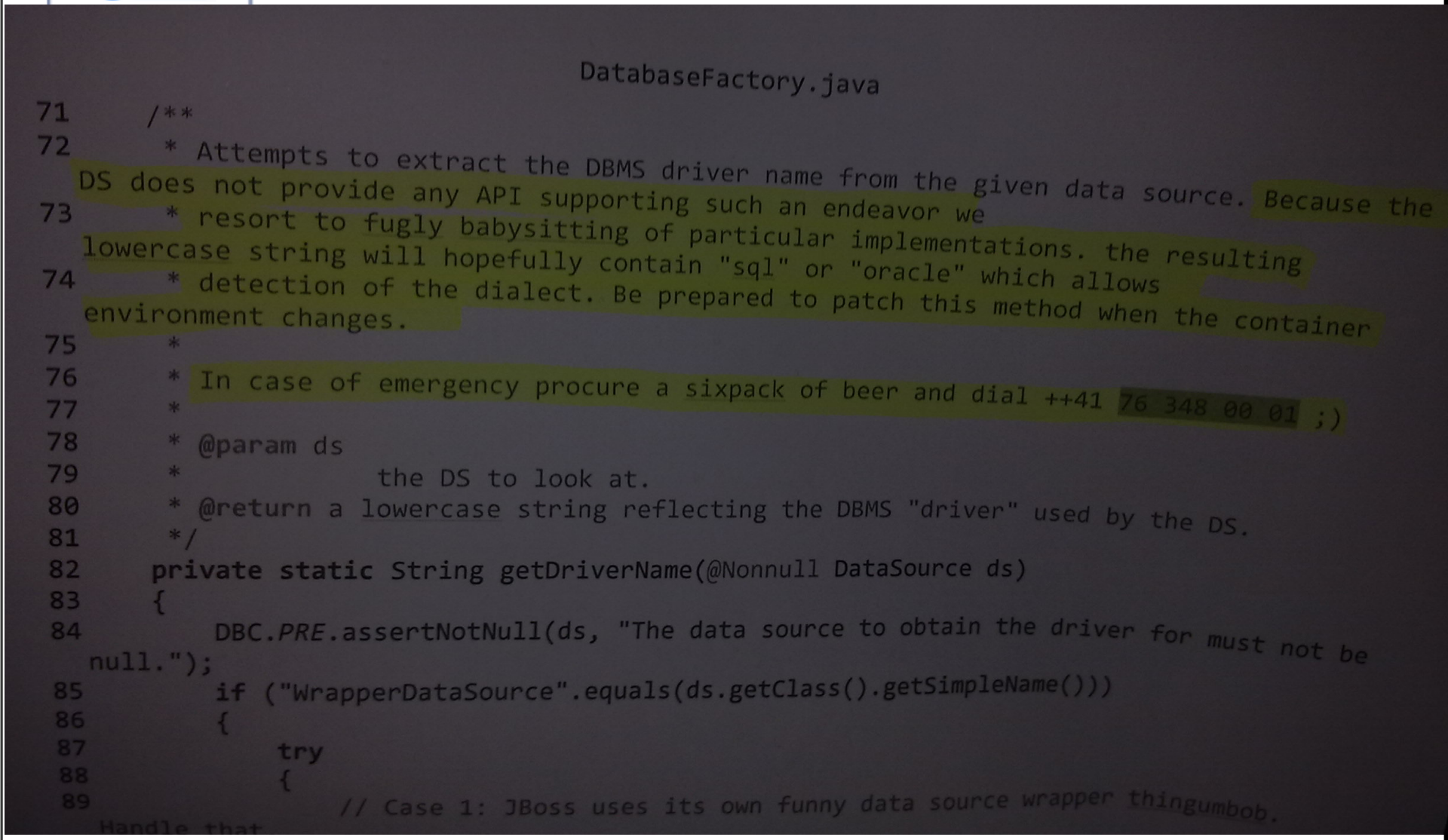

Untitled
private List<NewServiceEntryTO>
startCreateDefaultServiceEntriesWithoutParameter(
final ExistingSessionTO existingSessionTO)
{
try
{
return createDefaultServiceEntriesWithoutParameter(existingSessionTO);
}
catch (RuntimeException e)
{
// it's not a fail, it's an epic fail!
fail("Creation must not fail.");
logger.error(e.getMessage());
}
return new ArrayList<NewServiceEntryTO>();
}

Mixing Production and Test Code

- **More complex packaging**
- **Ability to test package private methods**

Programming is like sex. One mistake
and you have to support it for the rest of your life.
~Michael Sinz


DatabaseFactory.java
71 /**
72 * Attempts to extract the DBMS driver name from the given data source. Because the DS does not provide any API supporting such an endeavor we
73 * resort to fugly babysitting of particular implementations. the resulting lowercase string will hopefully contain "sql" or "oracle" which allows
74 * detection of the dialect. Be prepared to patch this method when the container environment changes.
75 *
76 * In case of emergency procure a sixpack of beer and dial ++41 76 348 00 01 ;)
77 *
78 * @param ds
79 * the DS to look at.
80 * @return a lowercase string reflecting the DBMS "driver" used by the DS.
81 */
82 private static String getDriverName(@Nonnull DataSource ds)
83 {
84 DBC.PRE.assertNotNull(ds, "The data source to obtain the driver for must not be null.");
85 if ("WrapperDataSource".equals(ds.getClass().getSimpleName()))
86 {
87 try
88 {
89 // Case 1: JBoss uses its own funny data source wrapper thingumbob. Handle that

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Best Practices

- **Same quality as production code**
- **Common sense**
- **No logger errors even from tests (The Loudmouth)**
- **Use test coverage tools**
- **Do NOT be afraid to rewrite/delete badly written complex tests**
- **TDD**

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Summary

- **Do NOT repeat mistakes**
- **Manual testing is boring but false alarms are pain as well**

A good programmer is someone who always looks both ways before crossing a one-way street. ~Doug Linder

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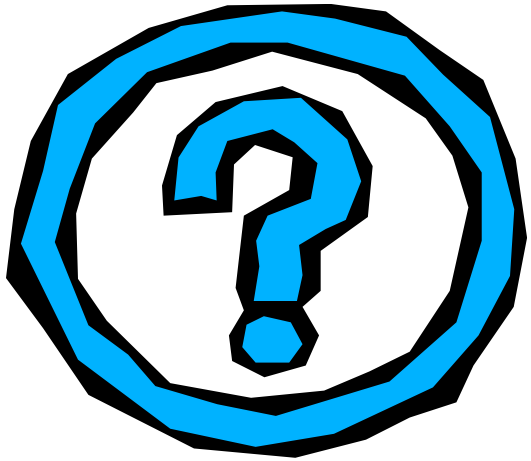
Links

- http://en.wikipedia.org/wiki/Software_testing
- http://www.exubero.com/junit/antipatterns.html
- http://blog.james-carr.org/2006/11/03/tdd-anti-patterns/

Questions ...

... and maybe answers



Thank you

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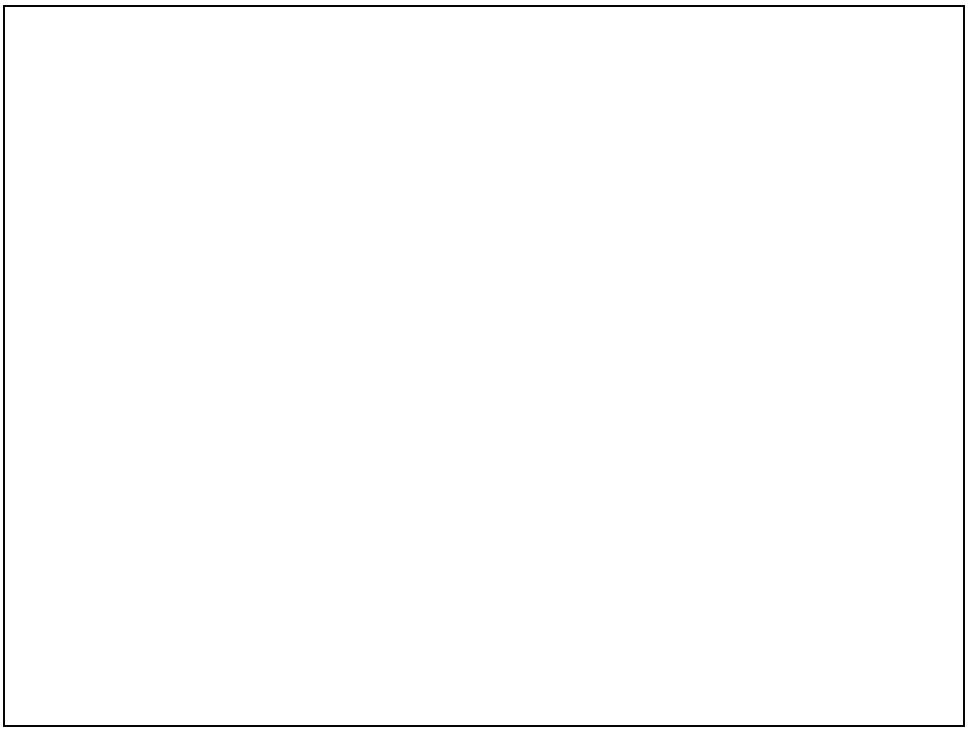

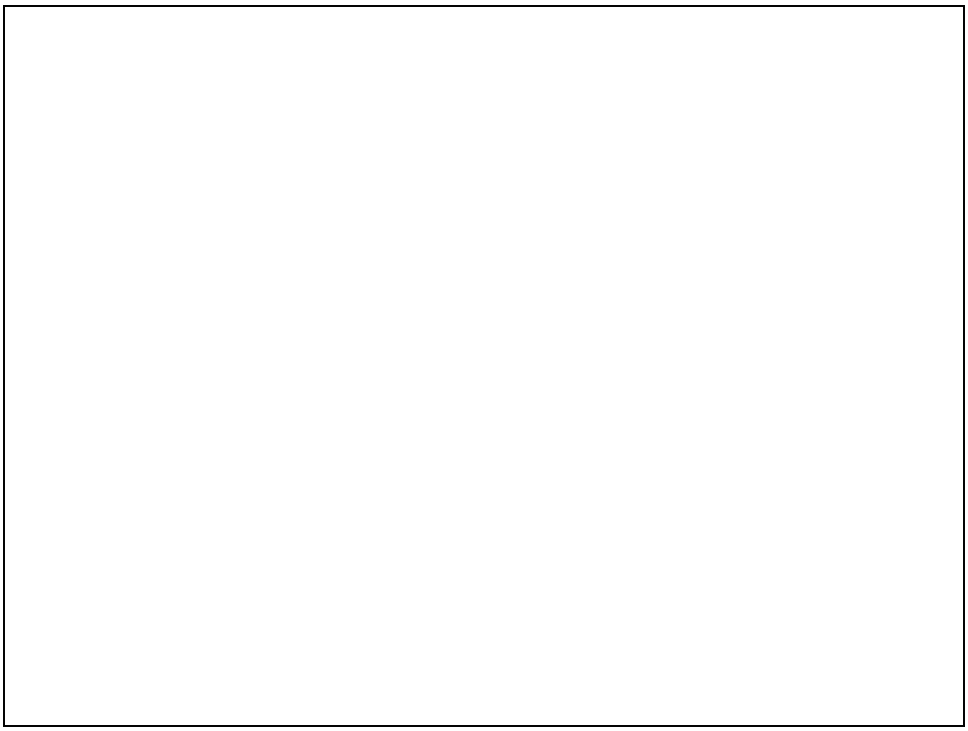

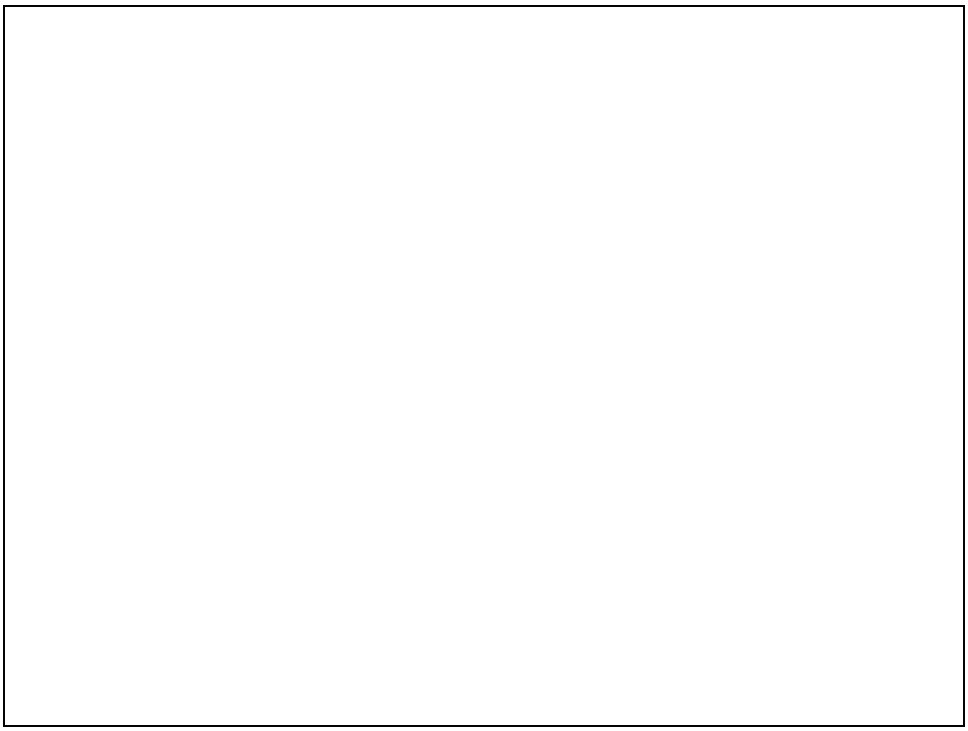

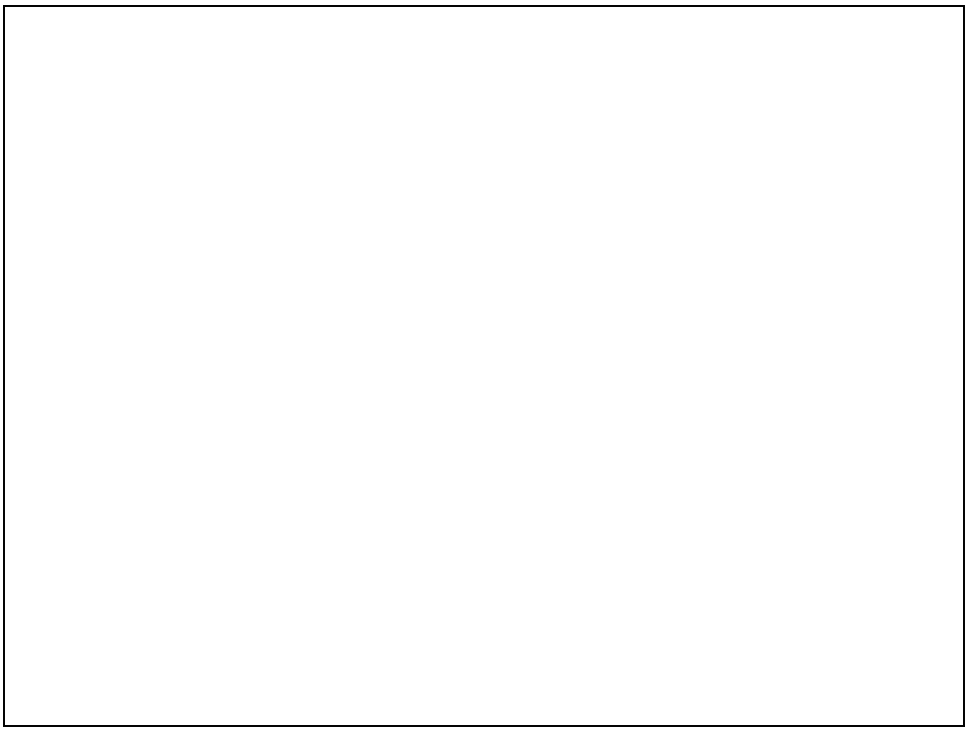

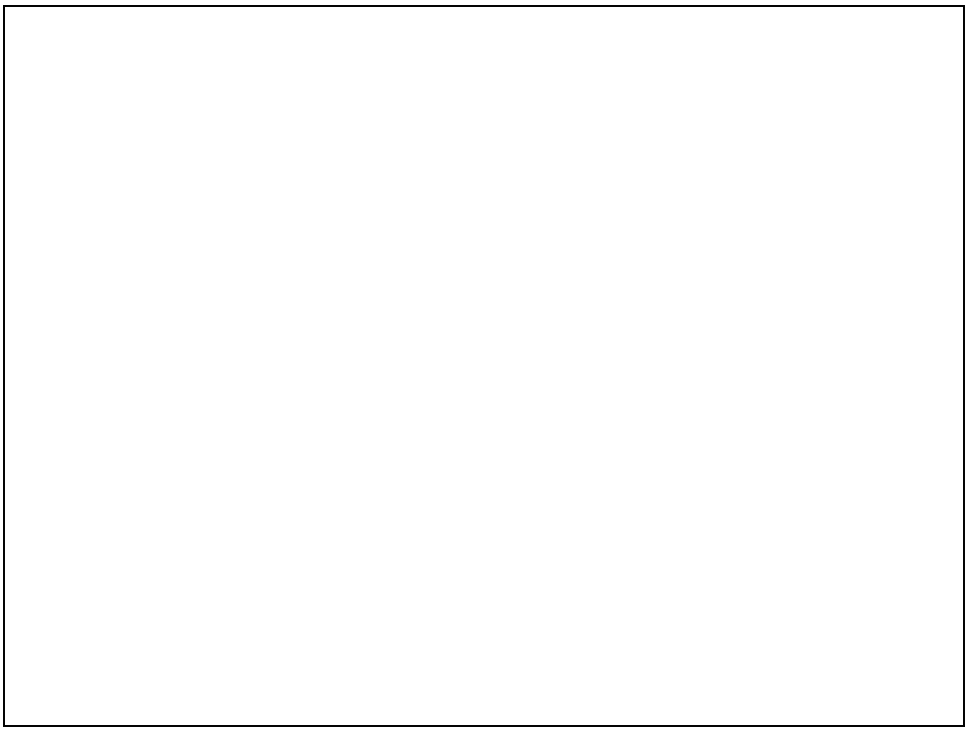

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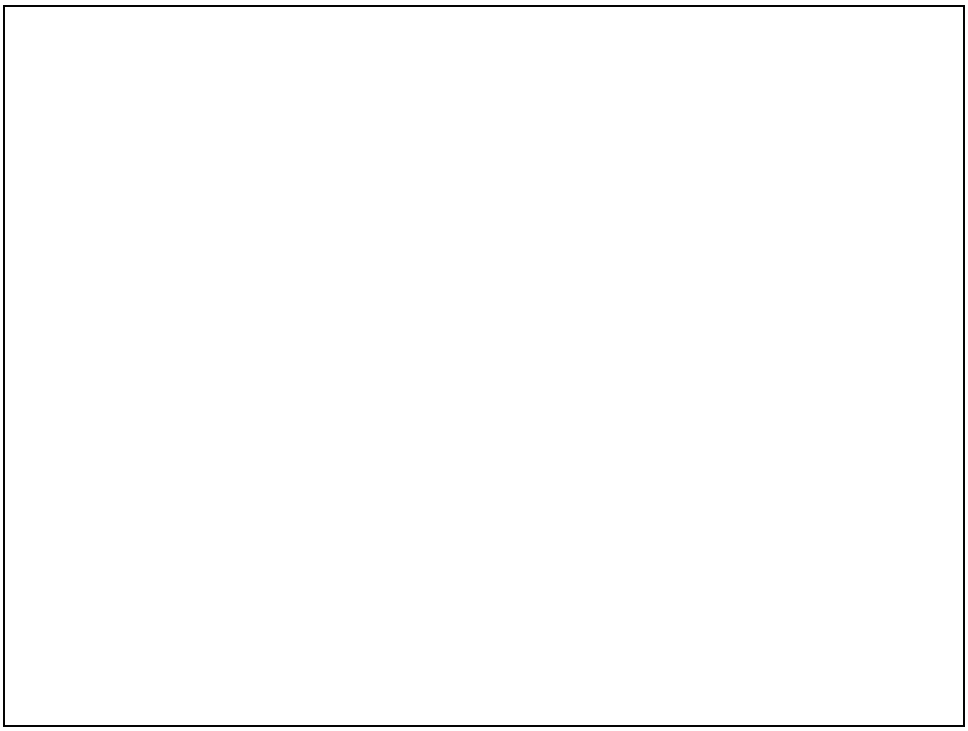

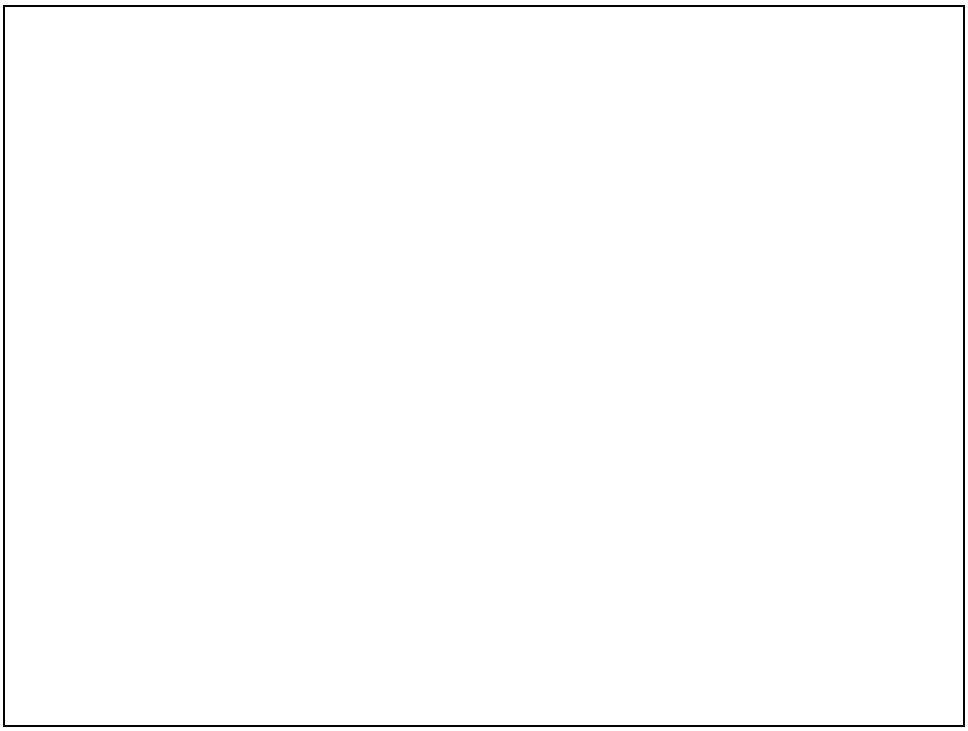

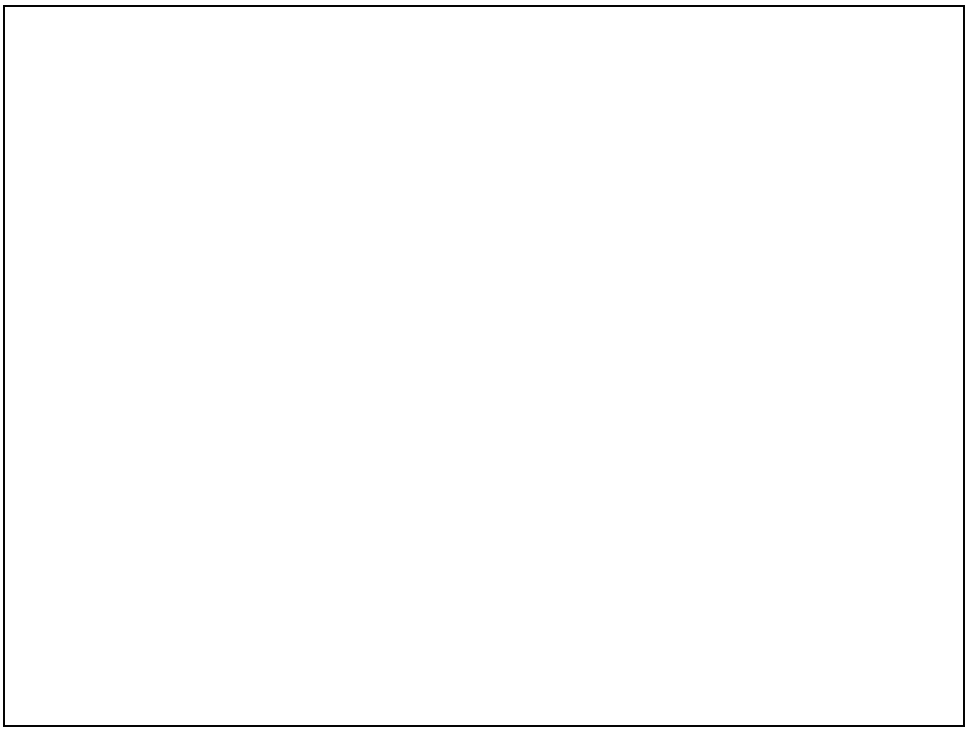

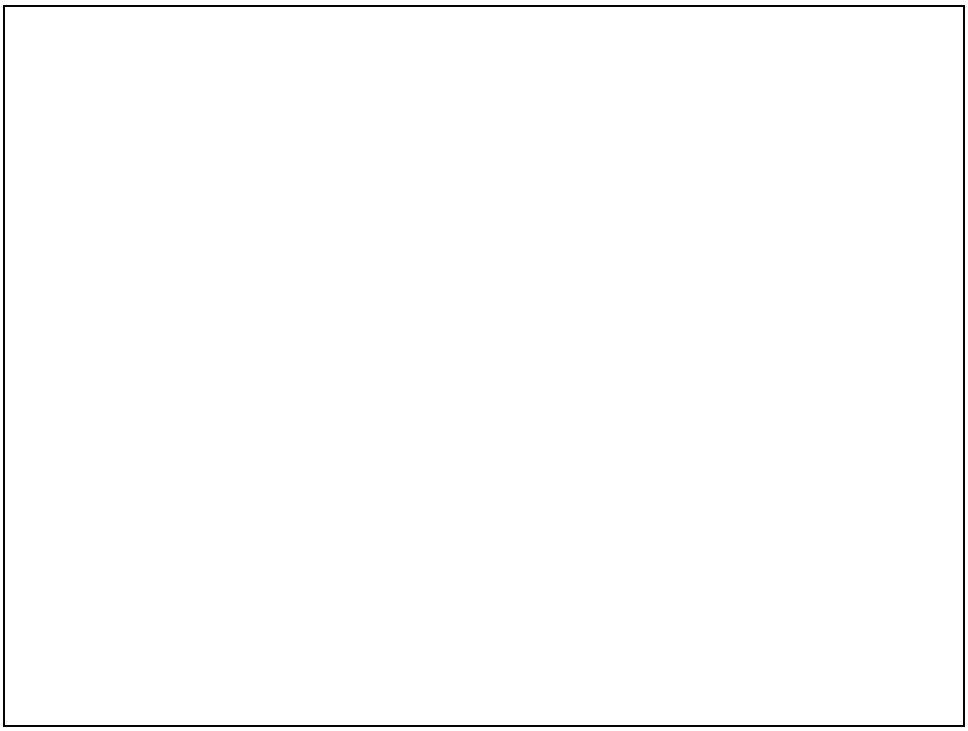


Querity
Basic mistakes
No tests
Manual (missing) Assertions
Redundant Assertions
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Complex Tests
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www.querity.cz

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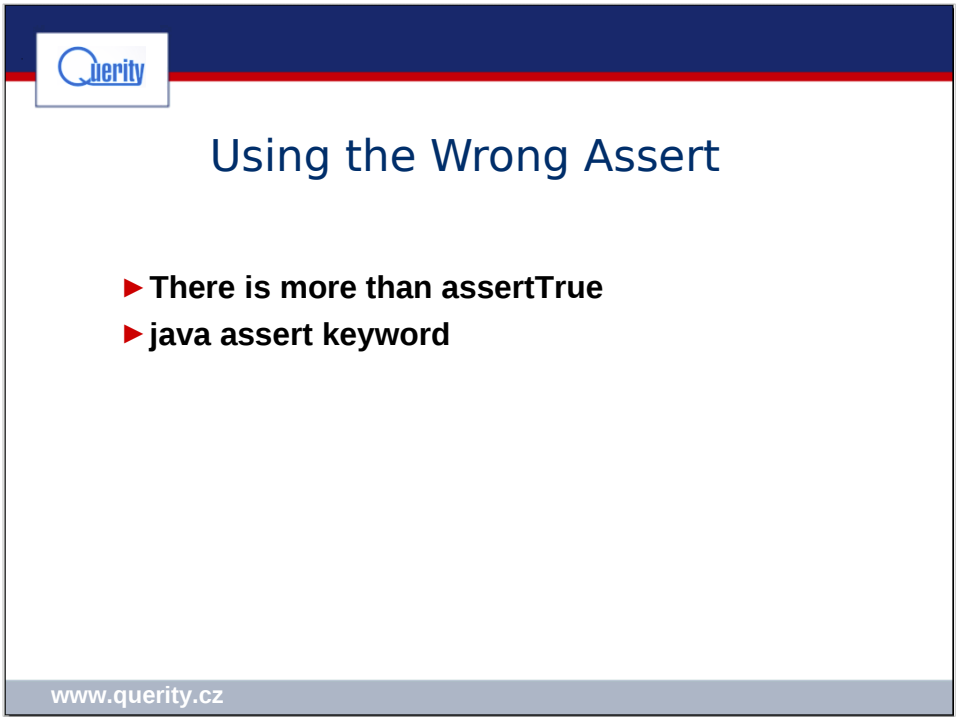
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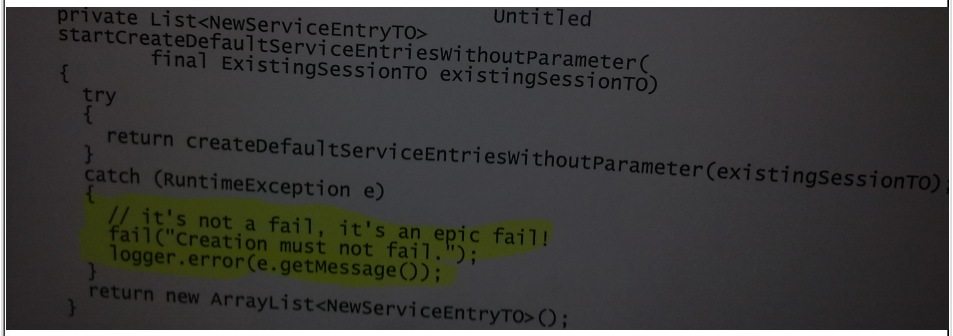
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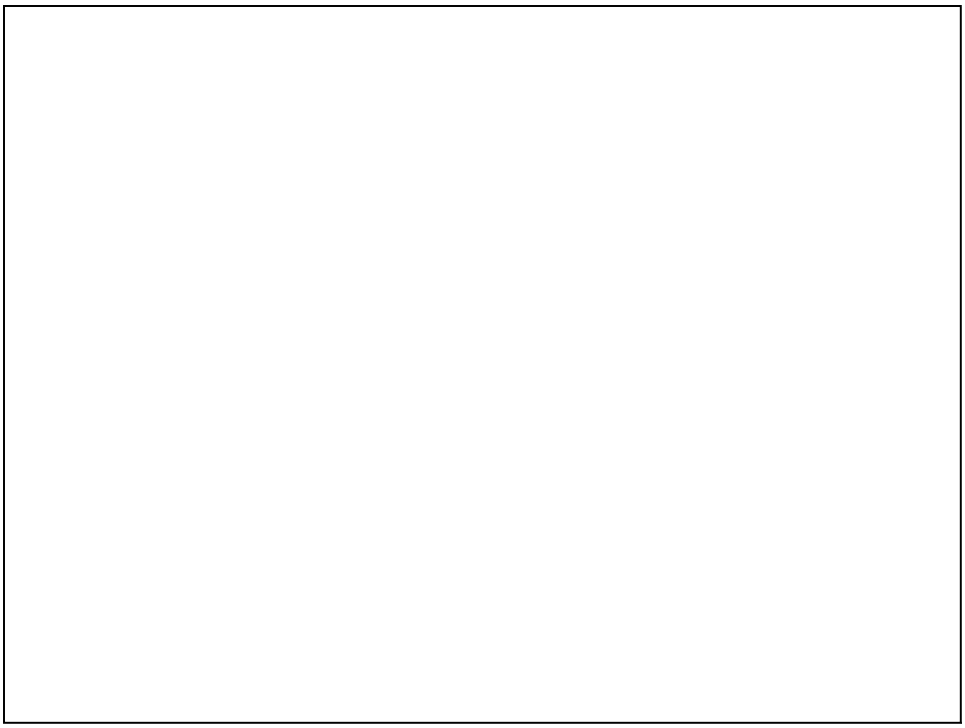

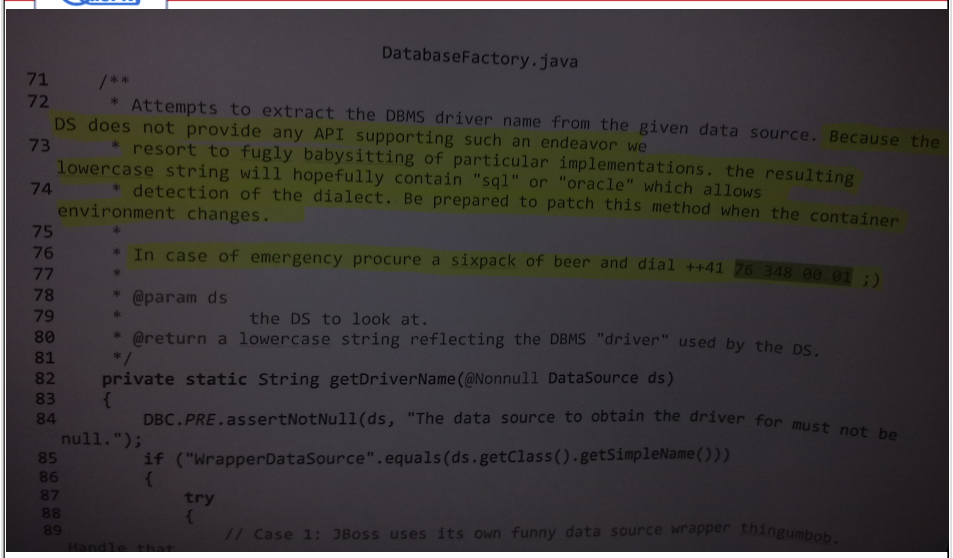

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