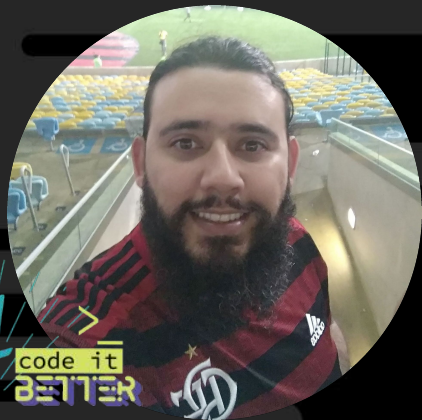




Fake News: Test Smells Não Existem

*Altieres de Matos
Software Architect*





ALTIERES DE MATOS

Automated Testing Enthusiast
Works with Development Since 2011
Works in 10+ different Teams
Software Architect at DB1 Global Software
OCJP and OCWCD by Oracle
CSM, CSD and CSP by Scrum Alliance
Mastering Student in Applied Computing with focus
on Test Driven Development (TDD) agile practice in
conjunction with Test Criteria at UTFPR-CP

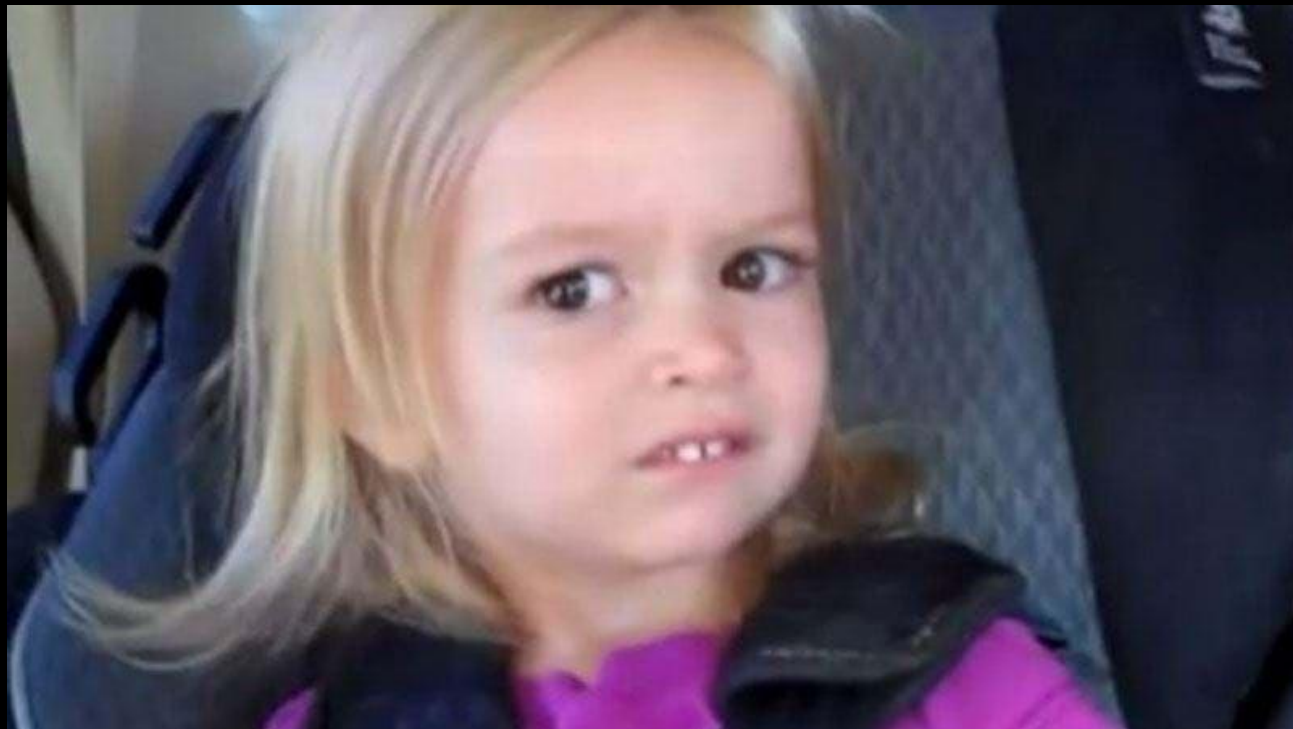


CONTEXT

- Clean Code ++
- Best Programming Practices ++
- Quality of Test Cases --
- Lack of Attention by Companies --



TEST SMELLS



TEST SMELLS IN ACTION

- Hard-to-Test Code
- Production Bugs
- Fragile Test
- Test Code Duplication
- Test Logic in Production
- Erratic Test
- Obscure Test
- Assertion Roulette
- Conditional Test Logic
- Slow Tests
- Developers Not Writing Tests



CANT GET BUGS



**IF YOU HARD CODE
EVERYTHING**

memegenerator.net



HARD-TO-TEST CODE

Code is difficult to test.

- Causes:
 - Highly Coupled Code
 - Asynchronous Code
 - Untestable Test Code





YOU WOULDN'T
CARRY A BABY
WITH ONE HAND,
WOULD YOU?

WHY TREAT
YOUR BEER
ANY DIFERENTLY?

BROUGHT TO YOU BY
BROKEN BEERS EVERYWHERE.
YOU BREAK IT, YOU BUY IT.
PLEASE CARRY RESPONSIBLY.
WWW.TS&TCARIBBEAN.COM/YOUBREAKITYOUBUYIT



FRAGILE TEST

A test fails to compile or run when the system under test (SUT) is changed in ways that do not affect the part the test is exercising.

- Causes:
 - Interface Sensitivity
 - Behavior Sensitivity
 - Data Sensitivity
 - Context Sensitivity
 - Overspecified Software
 - Sensitive Equality
 - Fragile Fixture



GOOGLE SAYS

**DUPLICATE CONTENT IS NOT
LOGICAL**

makeameme.org

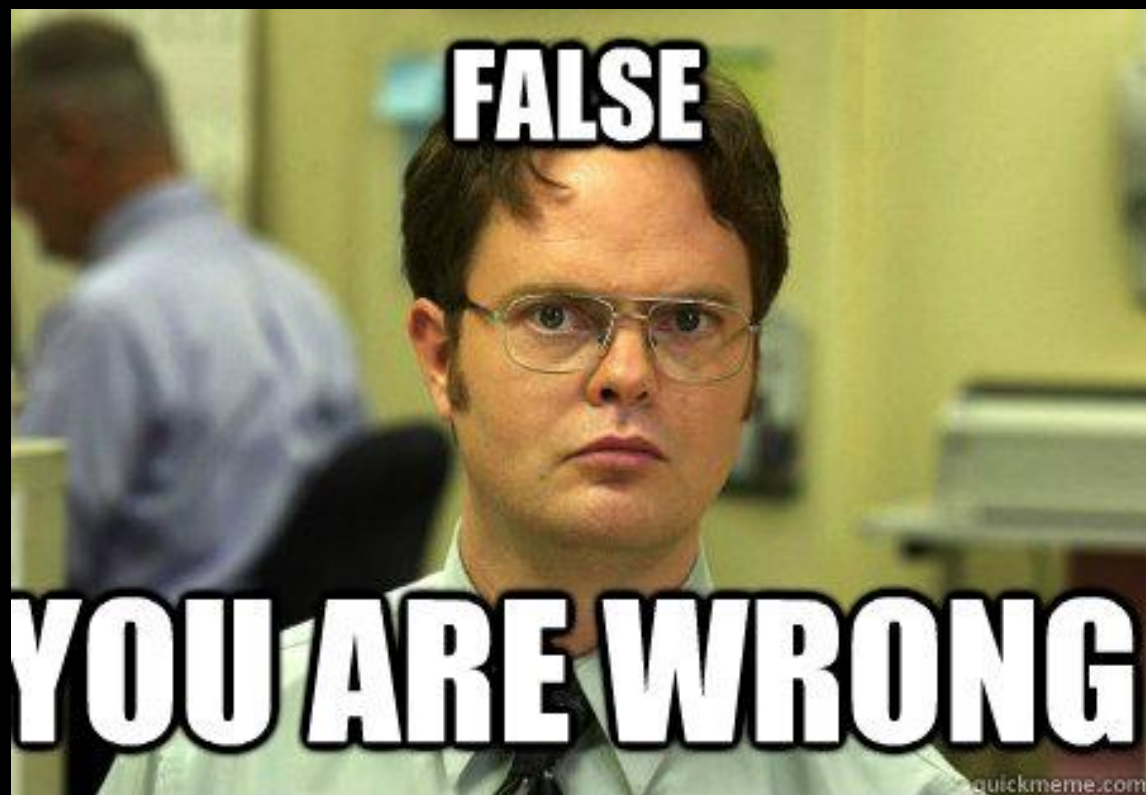


TEST CODE DUPLICATION

The same test code is repeated many times.

- Causes:
 - Cut-and-Paste Code Reuse
 - Reinventing the Wheel





ERRATIC TEST

One or more tests are behaving erratically; sometimes they pass and sometimes they fail.

- Causes:
 - Interacting Tests
 - Interacting Test Suites
 - Lonely Test
 - Resource Leakage
 - Resource Optimism
 - Unrepeatable Test
 - Test Run War
 - Nondeterministic Test





OBSCURE TEST

It is difficult to understand the test at a glance.

- Causes:
 - Eager Test
 - Mystery Guest
 - General Fixture
 - Irrelevant Information
 - Hard-Coded Test Data
 - Indirect Testing



EATING PIZZA WITH FRIENDS? LET'S SEE WHO HAS TO PAY...



ASSERTION ROULETTE

It is hard to tell which of several assertions within the same test method caused a test failure.

- Causes:
 - Eager Test
 - Missing Assertion Message





SLOW TEST

The tests take too long to run.

- Causes:
 - Slow Component Usage
 - General Fixture
 - Asynchronous Test
 - Too Many Tests





DEVELOPERS NOT WRITING TESTS

Developers aren't writing automated tests.

- Causes:
 - Not Enough Time
 - Hard to Test Code
 - Wrong Test Automation Strategy



SOFTWARE TESTING CRITERIA

- Structural
- Functional
- **Based on Error**



MUTATION TESTING



PIT - JAVA MUTATION TESTING FRAMEWORK



PIT - JAVA MUTATION TESTING FRAMEWORK

- Easy to Use
- Maven Support
- Very Efficient
- Multi Module Support
- Accepts Customizations
- Almost 30 Mutators
- Reports



```

public static DatasetSchema datasetSchemaFromJson(final Path filePath) throws ModelLoadingException {
85 1     if (!Files.isDirectory(filePath)) {
86         throw new ModelLoadingException("The path should be a directory");
87     }
88
89     final Path jsonFilePath = filePath.resolve(SCHEMA_IMPORT_MODEL);
90 1     if (!Files.exists(jsonFilePath)) {
91         throw new ModelLoadingException("There is no model.json file on the model path.");
92     }
93
94     try {
95         final String jsonContent = new String(Files.readAllBytes(jsonFilePath));
96
97         final ObjectMapper mapper = new ObjectMapper();
98         mapper.registerModule(new SerializersInModule());
99
100 1     return mapper.readValue(jsonContent, DatasetSchema.class);
101     } catch (final IOException e) {
102         final String msg = String.format("Could not load schema for model in path %s due to %s", filePath, e.toString());
103         logger.error(msg);
104         logger.trace(msg, e); // Avoid full stack trace as this may get invoked with incomplete path during user writing.
105         throw new ModelLoadingException(e.toString());
106     }
107 }
108
109 /**
110  * Gets a string that identifies the type of {@code valueSchema}.
111  *
112  * @param valueSchema The schema of the value.
113  * @return a string that identifies the type of the schema.
114  */
115 public static String getValueSchemaTypeToString(final AbstractValueSchema valueSchema) {
116 1     if (valueSchema instanceof CategoricalValueSchema) {
117         return CATEGORICAL;
118 1     } else if (valueSchema instanceof NumericValueSchema) {
119         return NUMERIC;
120     } else {
121         return STRING;
122     }
123 }
124 }

```

Mutations

```

85 1. negated conditional → KILLED
90 1. negated conditional → KILLED
100 1. mutated return of Object value for com/feedzai/openml/util/load/LoadSchemaUtils::datasetSchemaFromJson to ( if (x != null) null else throw new RuntimeException ) → KILLED
116 1. negated conditional → SURVIVED
117 1. mutated return of Object value for com/feedzai/openml/util/load/LoadSchemaUtils::getValueSchemaTypeToString to ( if (x != null) null else throw new RuntimeException ) → SURVIVED
118 1. negated conditional → NO_COVERAGE
119 1. mutated return of Object value for com/feedzai/openml/util/load/LoadSchemaUtils::getValueSchemaTypeToString to ( if (x != null) null else throw new RuntimeException ) → NO_COVERAGE
121 1. mutated return of Object value for com/feedzai/openml/util/load/LoadSchemaUtils::getValueSchemaTypeToString to ( if (x != null) null else throw new RuntimeException ) → NO_COVERAGE

```

CONCLUSION

- Do Not Fall Into **Fake News**
- **Test Smells** Exists
- **Write Good Tests**
- **Mutation Testing** is necessary
- Visit **<http://xunitpatterns.com>**



QUESTIONS





altieres.matos@db1.com.br
altitdb@gmail.com

DB1.COM.BR/CARREIRA

