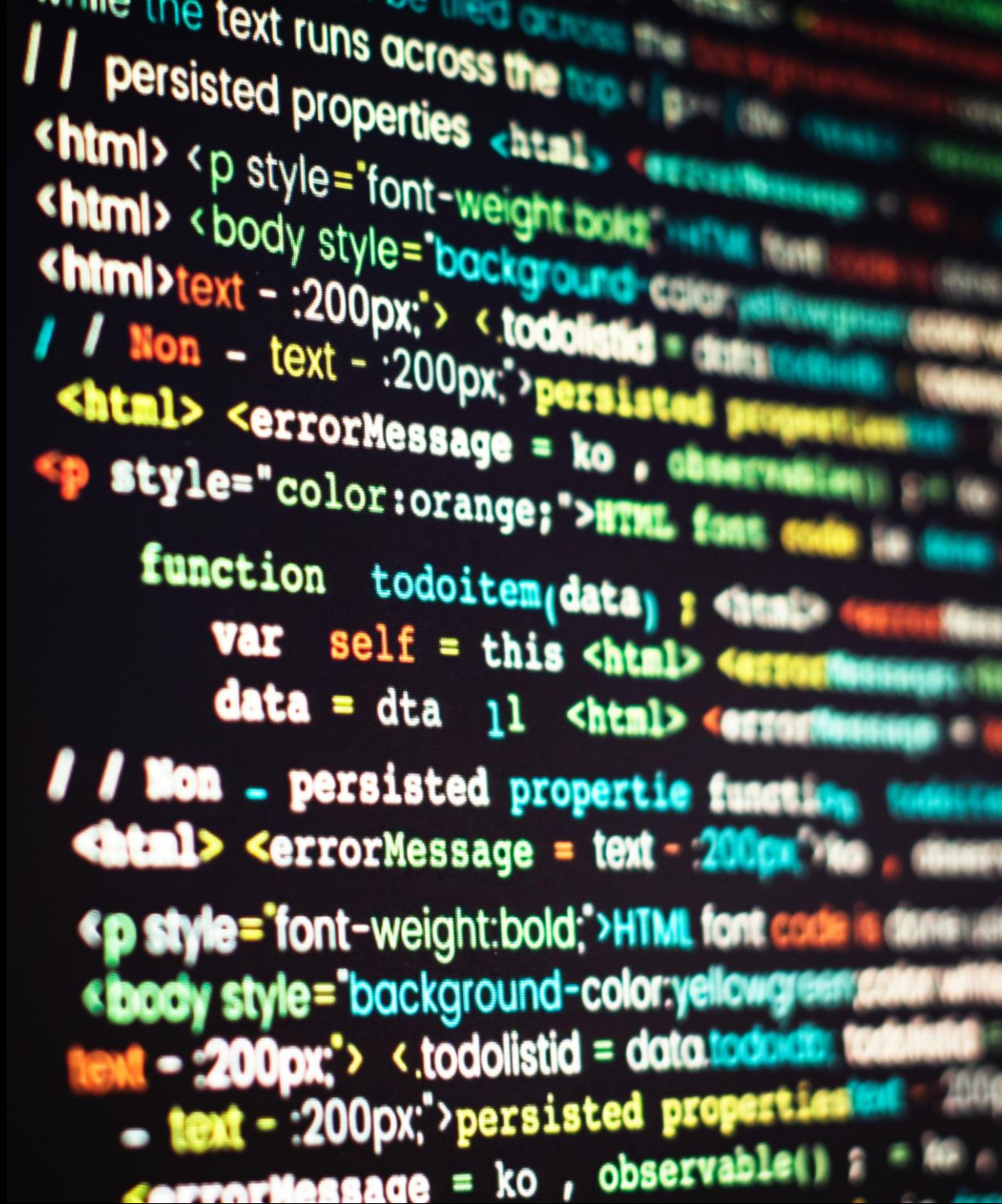
Testing code

Code coverage

QA

Learn. To Change.



Objective

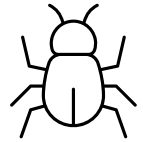
Is to explore:

- What is code coverage
- How it is measured and
- Why it is important

What is Code Coverage?

Is to measure how much of the code is tested

if your tests only cover 50% of your code, there could be bugs hiding in the untested parts.



```
public int divide(int a, int b) {
        if (b == 0)
                throw new IllegalArgumentException ("Cannot divide by zero");
        return a / b;
}
```

Just testing **divide(4,2)** means you have partial coverage
Test **divide(4,0)** also to ensure all paths are covered.

Higher code coverage reduces bugs.

What is Code Coverage?

How well do the tests cover the code base?

- **White box tests** – you should cover every line of code
- **Tools**: Clover and Istanbul
- **Acceptable percentage of coverage**
  - **Ordinary development:** struggle to get to 90%
  - **TDD:** should naturally be at least 90%

Aggregate Packages	Packages	Average Method Complexity	TOTAL Coverage	
org.easymock.tests	1	1,46	91%	
org.easymock	2	1,46	92,4%	
org	3	1,46	92,4%	

COVERAGE METRICS

1. **Method coverage**
   - % of **methods** covered
   - Very coarse-grained, i.e. inaccurate
2. **Symbol coverage**
   - % of sequence points (**statements**) that have been exercised
   - doesn’t show if both sides to an ‘if’ condition have been covered.
3. **Branch coverage**
   - % of completely executed blocks in a method
   - Both side of an IF statement is covered
4. **Cyclomatic complexity**
   - How many linearly independent paths through the code
   - Reflects the number of tests to get 100% coverage
   - Refactor If over 15 in a method

percentage isn't everything

‘100% test coverage doesn't guarantee that your app is 100% tested’
– Massol

- **Test generation tools** which auto-generate unit tests with 100% coverage, but the tests are worthless
- Detects regions of code which are not tested

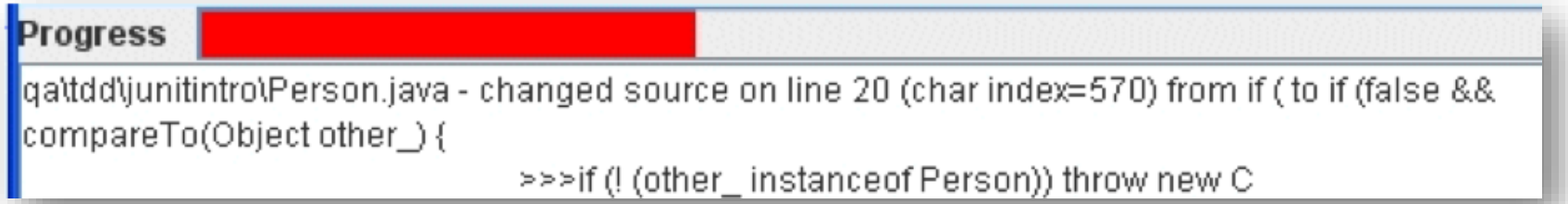
- Test class **full of trivial Get / Set methods** which make it hard to see where the tests with real value are.
  your tests must challenge your code to be meaningful!

- **Failing test** counts towards coverage the same as passing test

Quality over quantity

'The more tests you have, the better' – FALSE!

- Jester – JUnit test tester (http://jester.sourceforge.net/)



- May produce false positives

Lab

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