

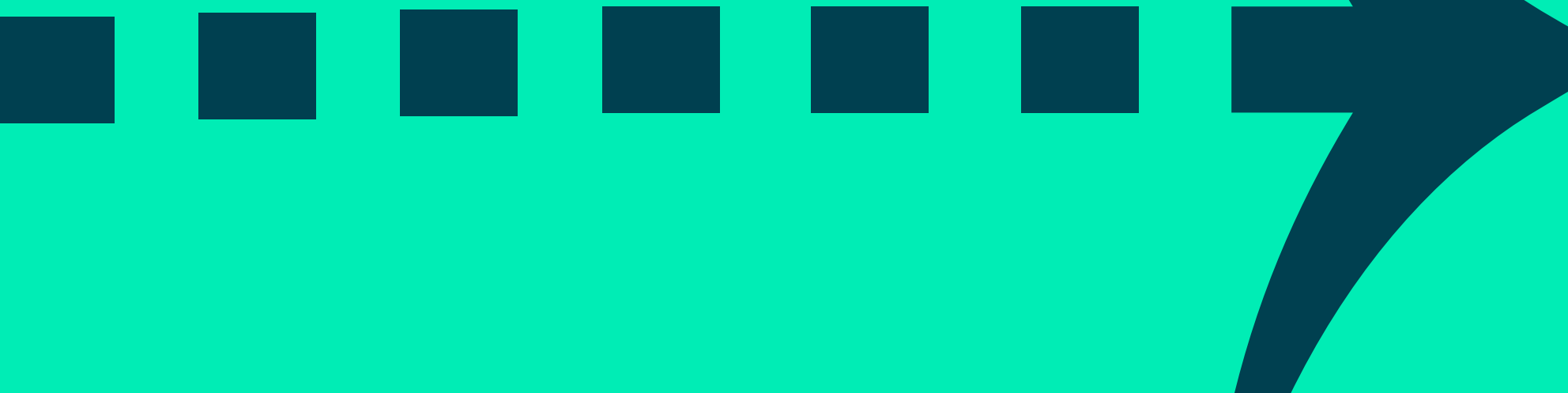


TESTING






CODE COVERAGE



QA 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	2	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 does not guarantee that your application is 100% tested'

– Massol

- **Test generation tools** which auto-generate unit tests with 100% coverage, but the tests are worthless
- Test class **full of trivial Get / Set methods** which make it hard to see where the tests with real value are
- Use as a helper to 'get things set up' and delete it when it's served that purpose and detect regions of code which are not tested
- **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/>)

Progress

```
qa\td\junitintro\Person.java - changed source on line 20 (char index=570) from if ( to if (false &&  
compareTo(Object other_) {  
    >>>if (! (other_ instanceof Person)) throw new C
```

- Slow, so use it in a targeted manner
- Produces false positives



LAB

"Code Coverage" Lab

