

Testing

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Today

- Testing with JUnit
- Test Driven Development (TDD)
- Mocking

What you should know (after)

- Why do we test?
- What levels of testing exist?
- What is a double/mock/stub/fake/spy/... ?
- Coverage (what is it and what does it say?)

Why do we test?

- Testing != Validation
- Increase confidence in our code
- Save time (= money)
- Can we test everything?

Levels of testing?

- Unit



- Integration

- System

- Acceptance

JUnit 4

- `@Test`
- `@Before`, `@After`
- `@BeforeClass`, `@AfterClass`
- `@Test(timeout = 500)`
- `@Test(expected = MyException.class)`

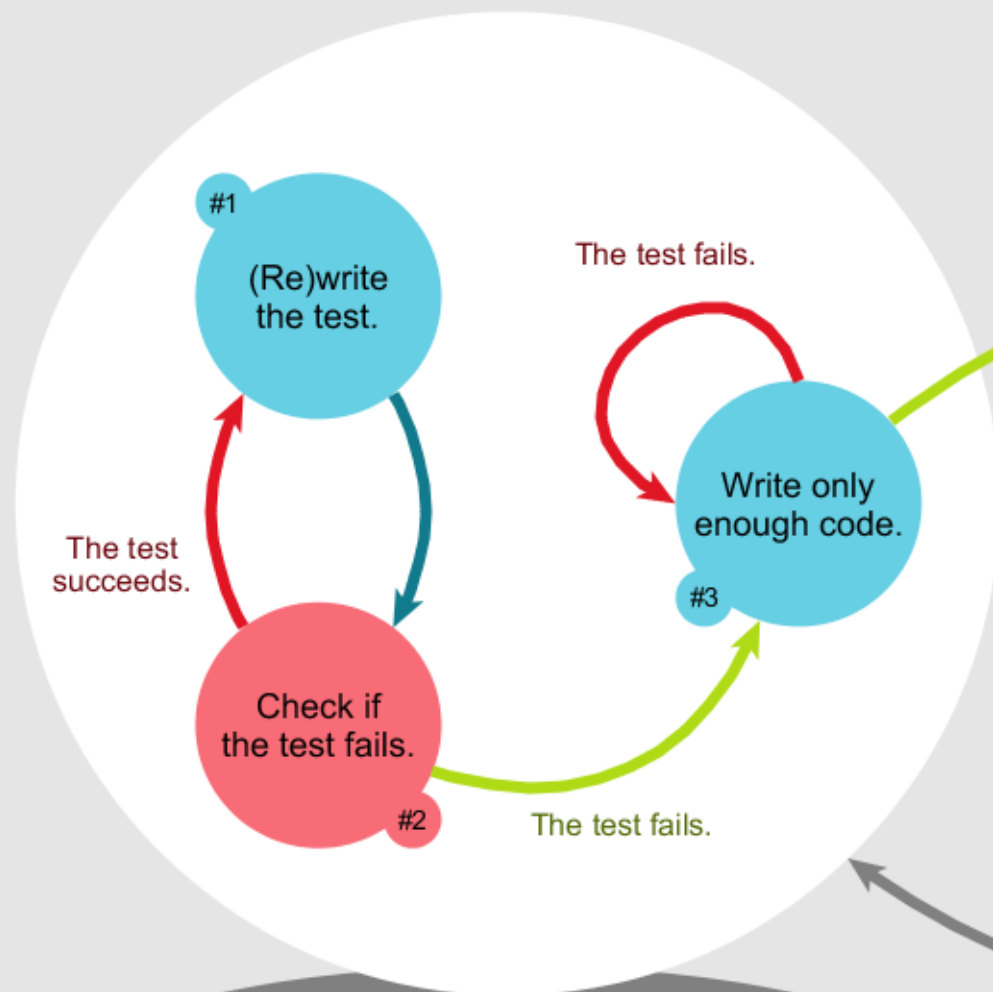
Exercise

- Person & PersonValidator
- Validate Name
- Validate Username

TDD

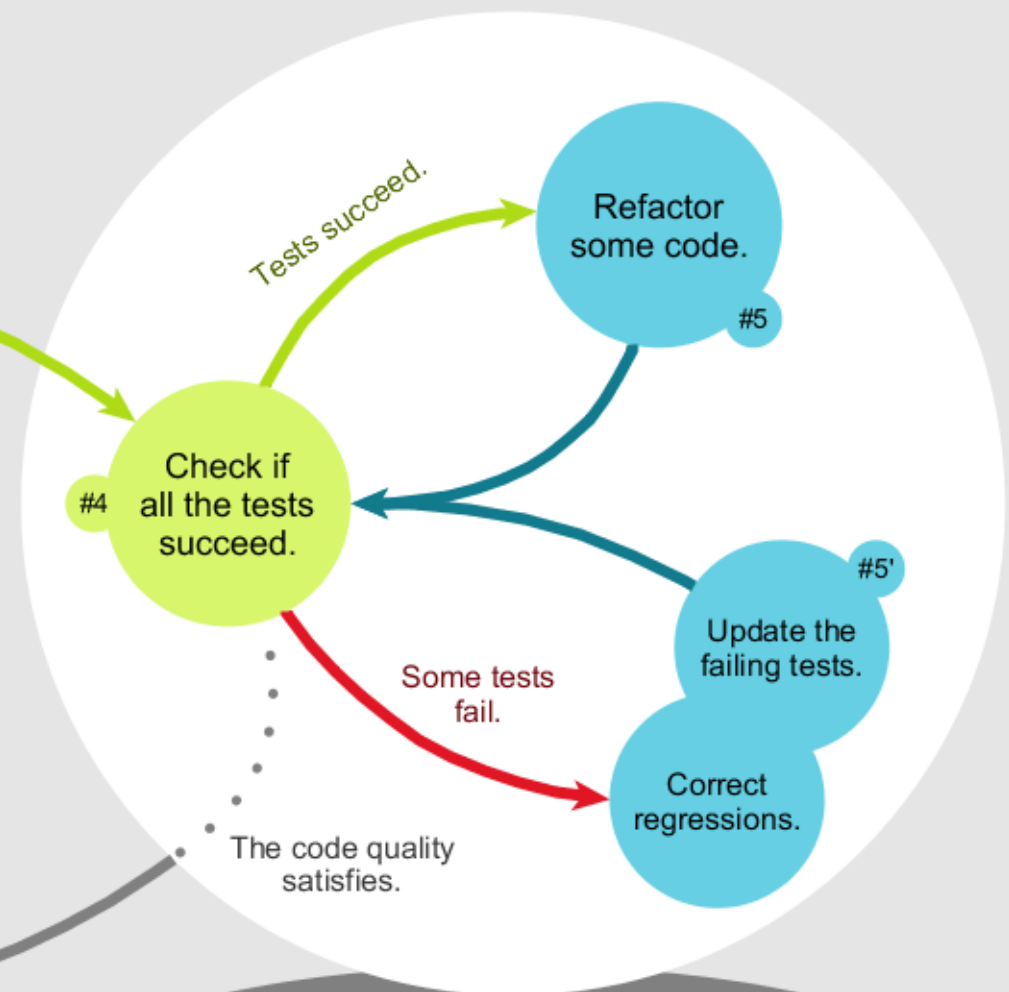
- specify the requirements (tests), then implement
- YAGNI
- when not to TDD?

TEST-FIRST DEVELOPMENT



focus
Completion of the contract
as defined by the test

REFACTORING



focus
Alignment of the design
with known needs

Iterate

Exercise - e-mail

local-part@domain

Local part:

- ASCII char set
- A-Z a-z 0-9
- !#\$%&'*+,-/=/?^_`{|}~
- Dot (.), not first, not last, no two dots

Domain:

- dot-separated labels
- A-Z a-z
- 63 char max.
- hyphen (not first or last char)

Test doubles ...

- Nobody is an island !
- Dummy, Fake, Stub, Spies, Mocks
- Test interaction with other classes
- Test un-available dependencies
- example with Mockito

Mockito

```
MyClass mock = mock(MyClass.class)
```

```
when(mock.func()) .thenReturn(value)
```

```
verify(mock).func()
```

Coverage

- How much testing is “enough”?
- a measure of which parts of the SC are executed
- Function / Branch / Statement / Condition
- MC/DC

Example

```
myFunction(a, b, c) {  
    if (a == 0) {  
        print("first condition")  
    }  
  
    if (b == 2 || c < 0) {  
        print("second condition")  
    }  
}
```

Exercises, Reading, etc.

! Use Testing in your project (from the start)

+ Learn JUnit + Mocking (now!)

+ What's a mock? What's a stub? What's the difference?

<https://martinfowler.com/articles/mocksArentStubs.html>

+ Coverage metrics & what they mean

~ How to Misuse Code Coverage - Brian Marick

<http://www.exampler.com/testing-com/writings/coverage.pdf>

~ TestCoverage

<https://martinfowler.com/bliki/TestCoverage.html>

/ Gerard Meszaros - XUnit Test Patterns