Who is testing the mocks?

an assume-verify-approach

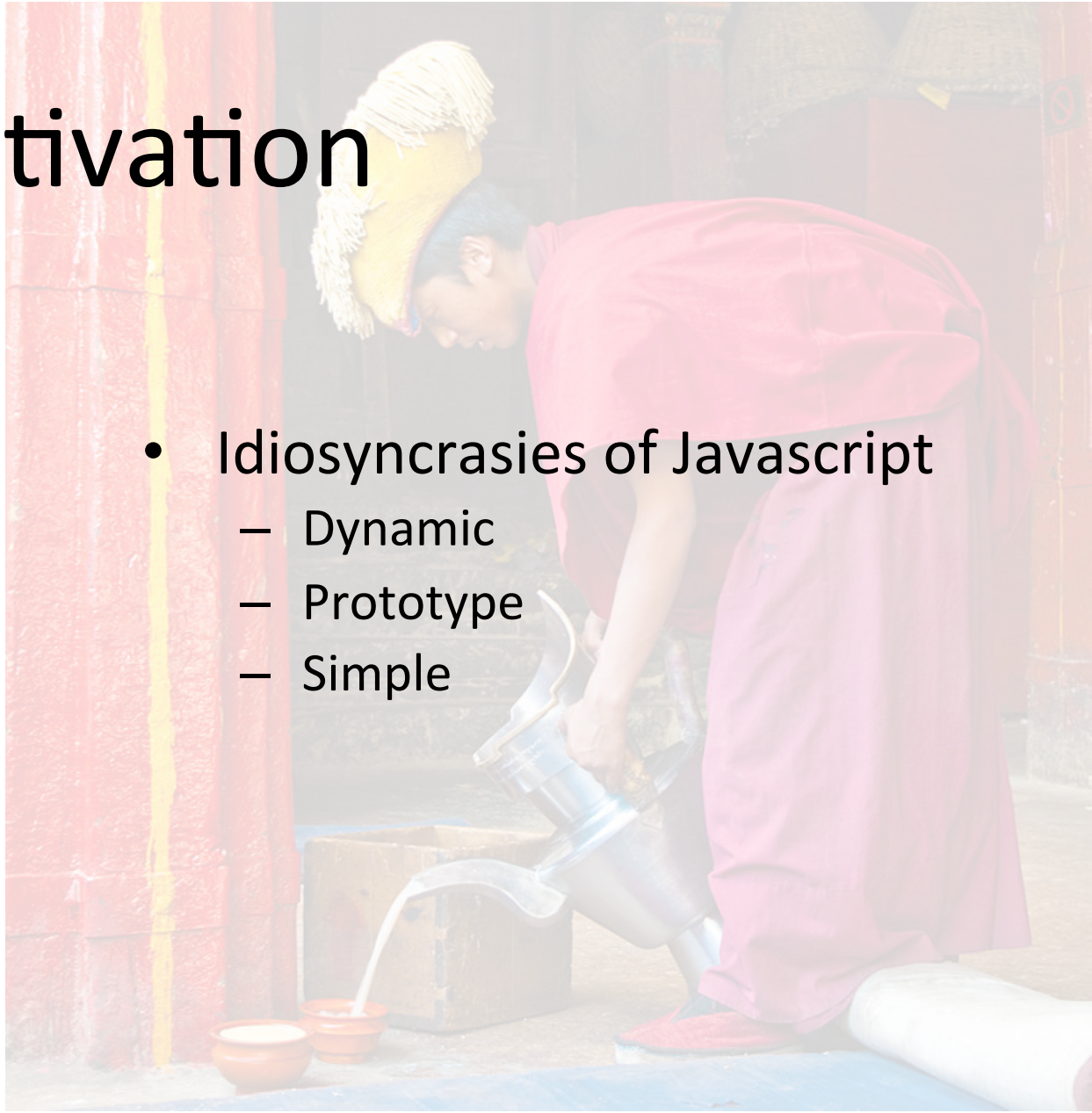
Andreas Leidig, Robin Danzinger

agenda

- Motivation
- Idiosyncrasies of Javascript
- Test Doubles
- Assume-Verify-Approach
- Chadojs
- Discussion

Motivation

- Test approach
  - London School
  - Integrated Tests
  - Unit Tests

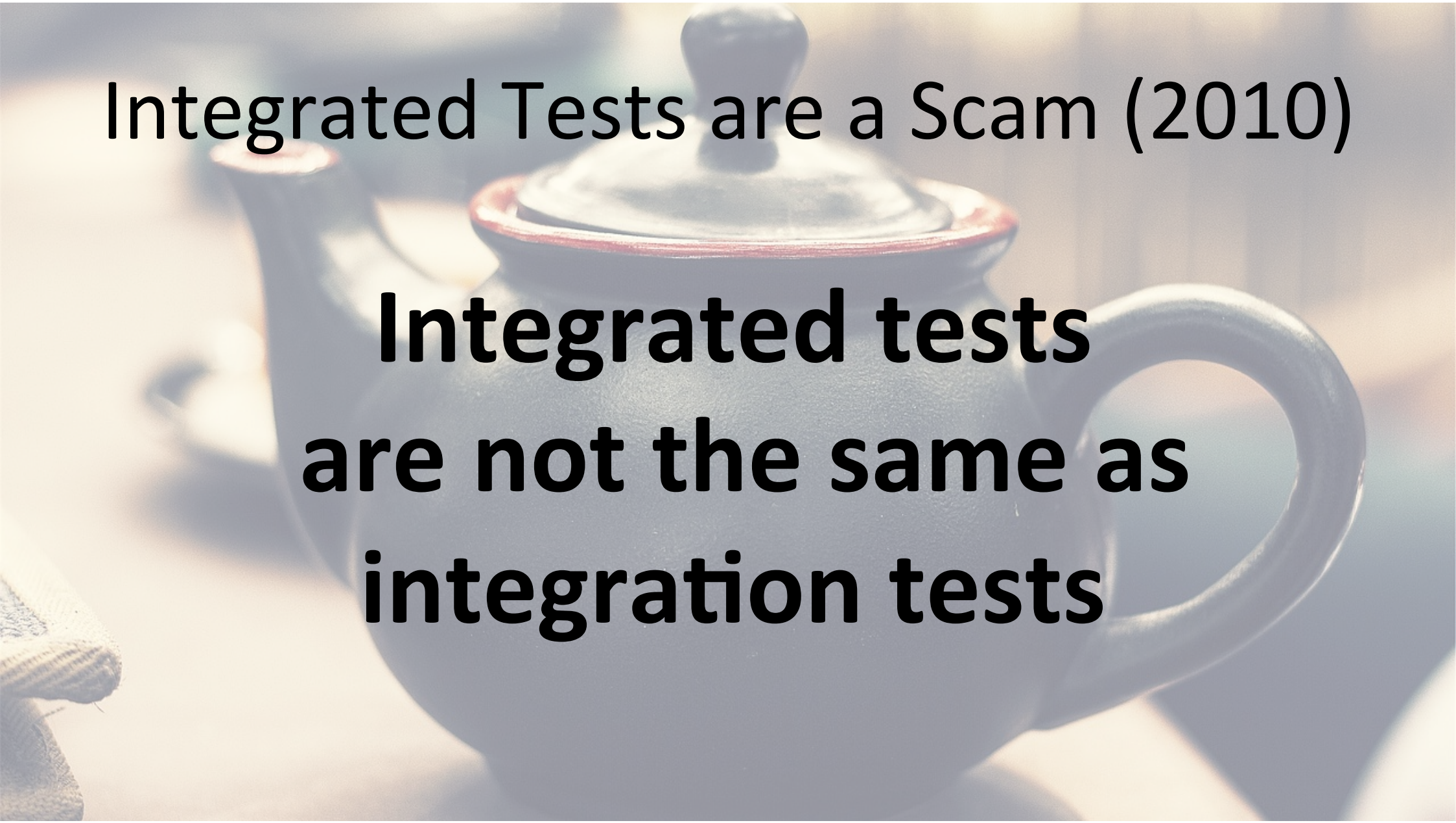


- Idiosyncrasies of Javascript
  - Dynamic
  - Prototype
  - Simple

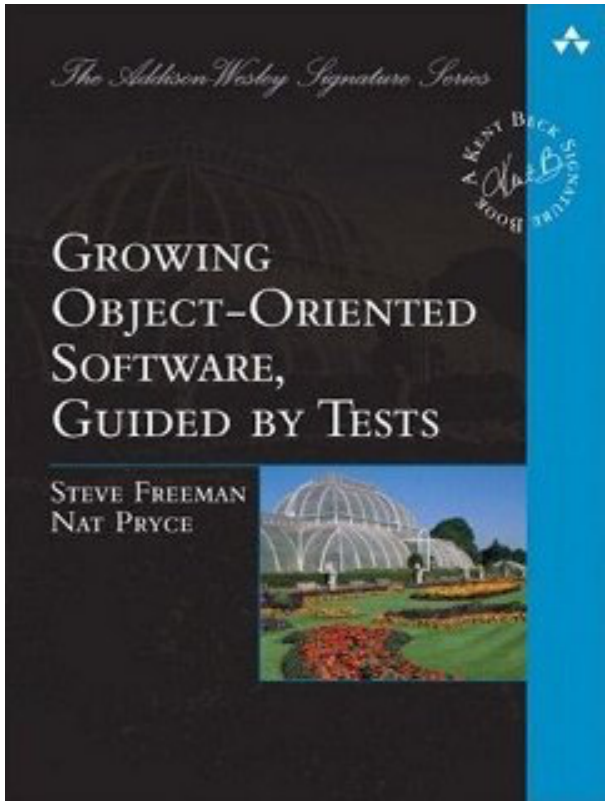
Integrated Tests are a Scam (2010)

„Integrated tests are a scam—a self-replicating virus that threatens to infect your code base, your project, and your team with endless pain and suffering.“

http://blog.thecodewhisperer.com/permalink/integrated-tests-are-a-scam


Integrated Tests are a Scam (2010)
Integrated tests
are not the same as
integration tests

Outside-In „London School“ (2009)



http://www.growing-object-oriented-software.com

Idiosyncrasies of Javascript

Mititei

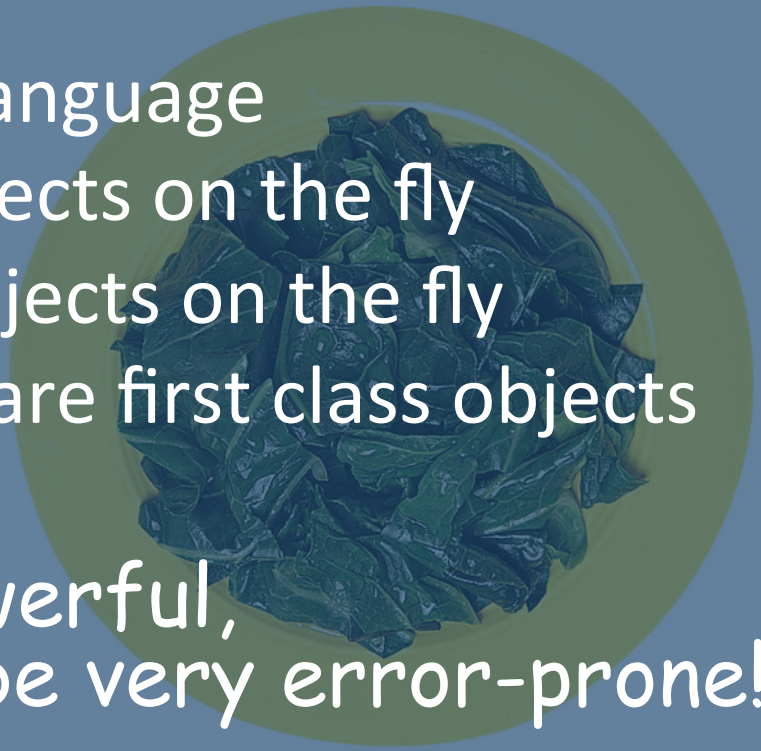
is much more wholesome,

if you replace it *right before* serving

with **spinach**.

Idiosyncrasies of Javascript

- dynamic language
- create objects on the fly
- change objects on the fly
- functions are first class objects



⇒ very powerful,
but can be very error-prone!

Idiosyncrasies of Javascript

Back to now

- we don‘t want integrated tests
- but integration tests
- we like London School
  - many isolated tests
  - „heavy mocking“

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- Motivation
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- **Test Doubles**
- Assume-Verify-Approach
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Test Doubles

- in everyday use often no precise distinction
- stub, fake, spy, mock

SUT (KlassA)

```
public class KlassA {

    private KlassB klassB;

    public KlassA(KlassB klassB) { this.klassB = klassB; }

    public boolean anInterestingMethod() {
        return this.klassB.helpDoTheWork() < 10;
    }
}
```

Stub

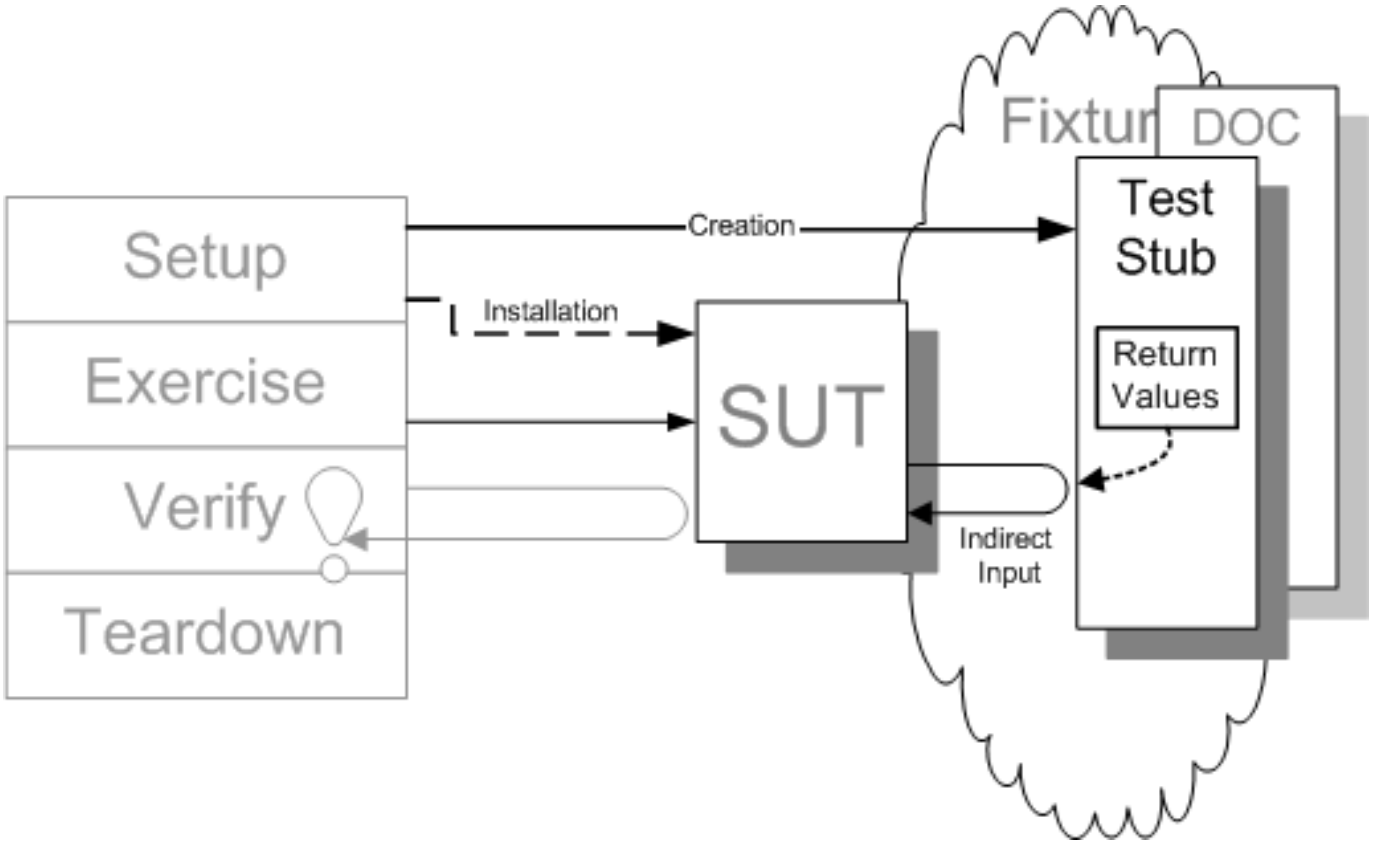


Image Source: http://xunitpatterns.com/Test%20Stub.html - With kind permission by Gerard Meszaros

Stub

```
@Test
public void withMockitoStub() {

    KlassB stub = Mockito.mock(KlassB.class);

    assertThat(new KlassA(stub).anInterestingMethod(), is(true));
}
```

Fake Object

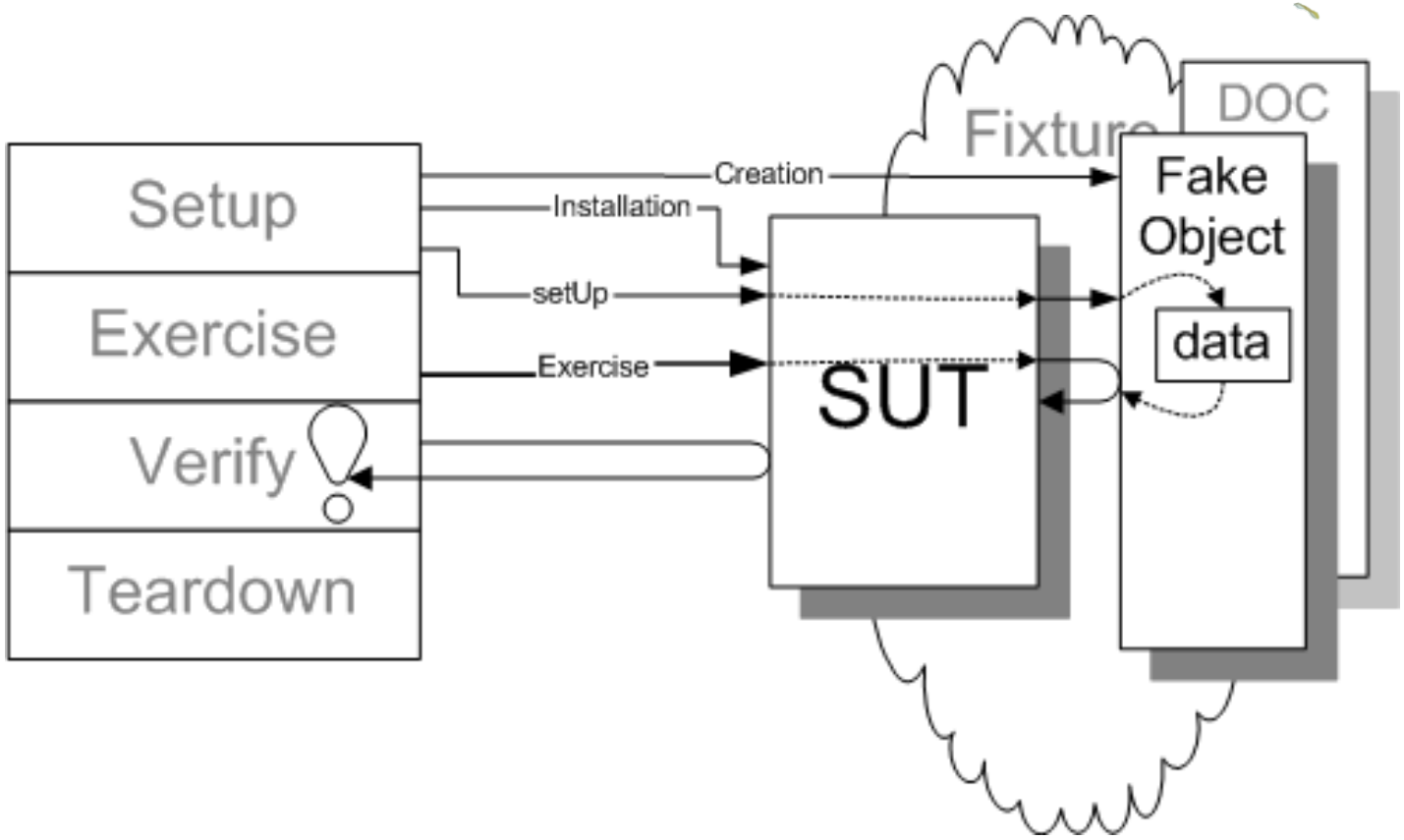


Image Source: http://xunitpatterns.com/Fake%20Object.html - With kind permission by Gerard Meszaros

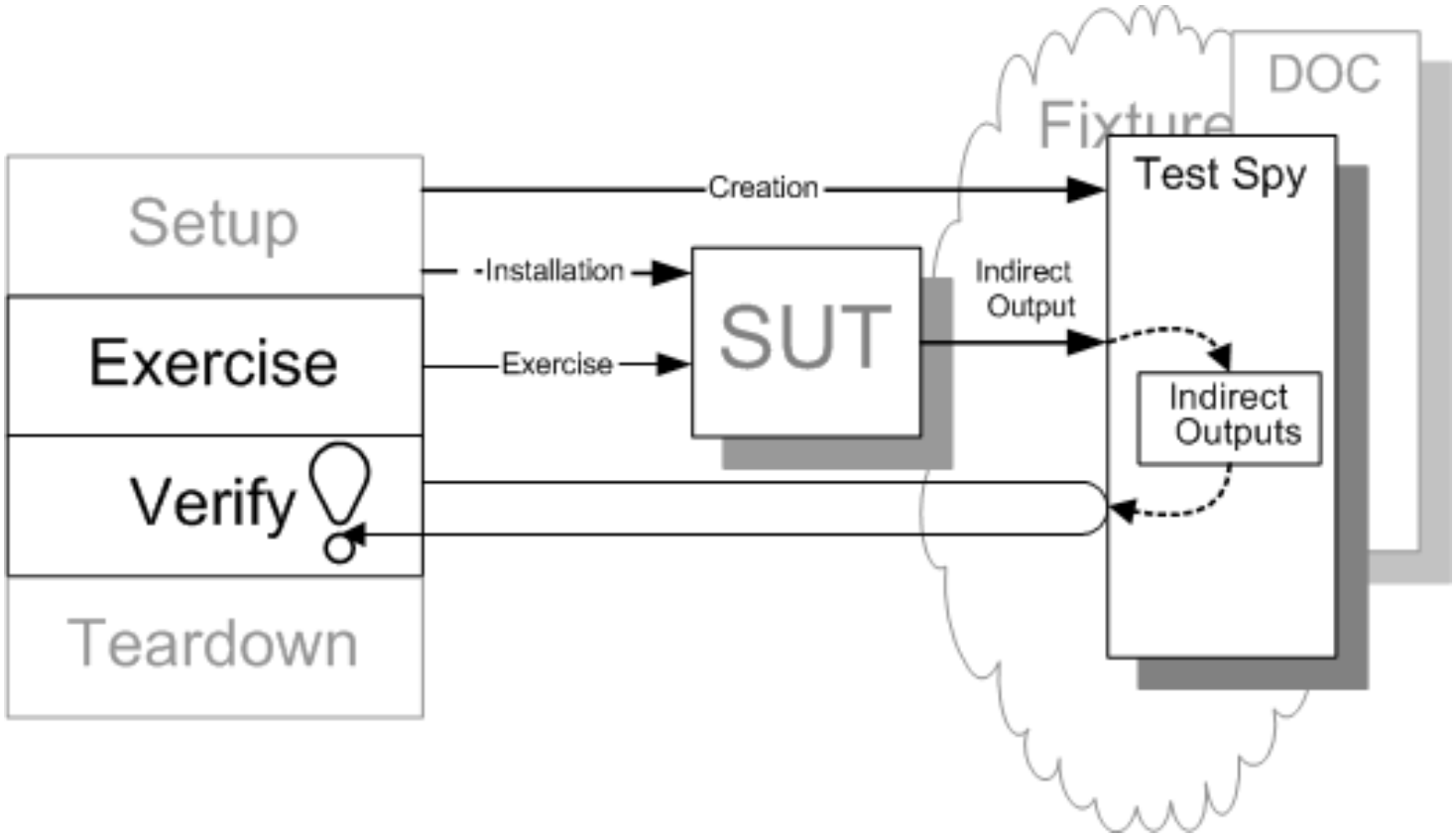
Fake Object

```
@Test
public void withFake() {

    KlassB fake = new KlassB() {
        @Override
        public int helpDoTheWork() { return 1; }
    };

    assertThat(new KlassA(fake).anInterestingMethod(), is(true));
}
```

Spy



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Spy

```
public static class Spy extends KlassB {
    int wasCalled;

    @Override
    public int helpDoTheWork() { this.wasCalled++; return 1; }
}

@Test
public void withManualSpy() {
    Spy spy = new Spy();
    new KlassA(spy).anInterestingMethod();
    assertThat(spy.wasCalled, is(1));
}
```

Mock

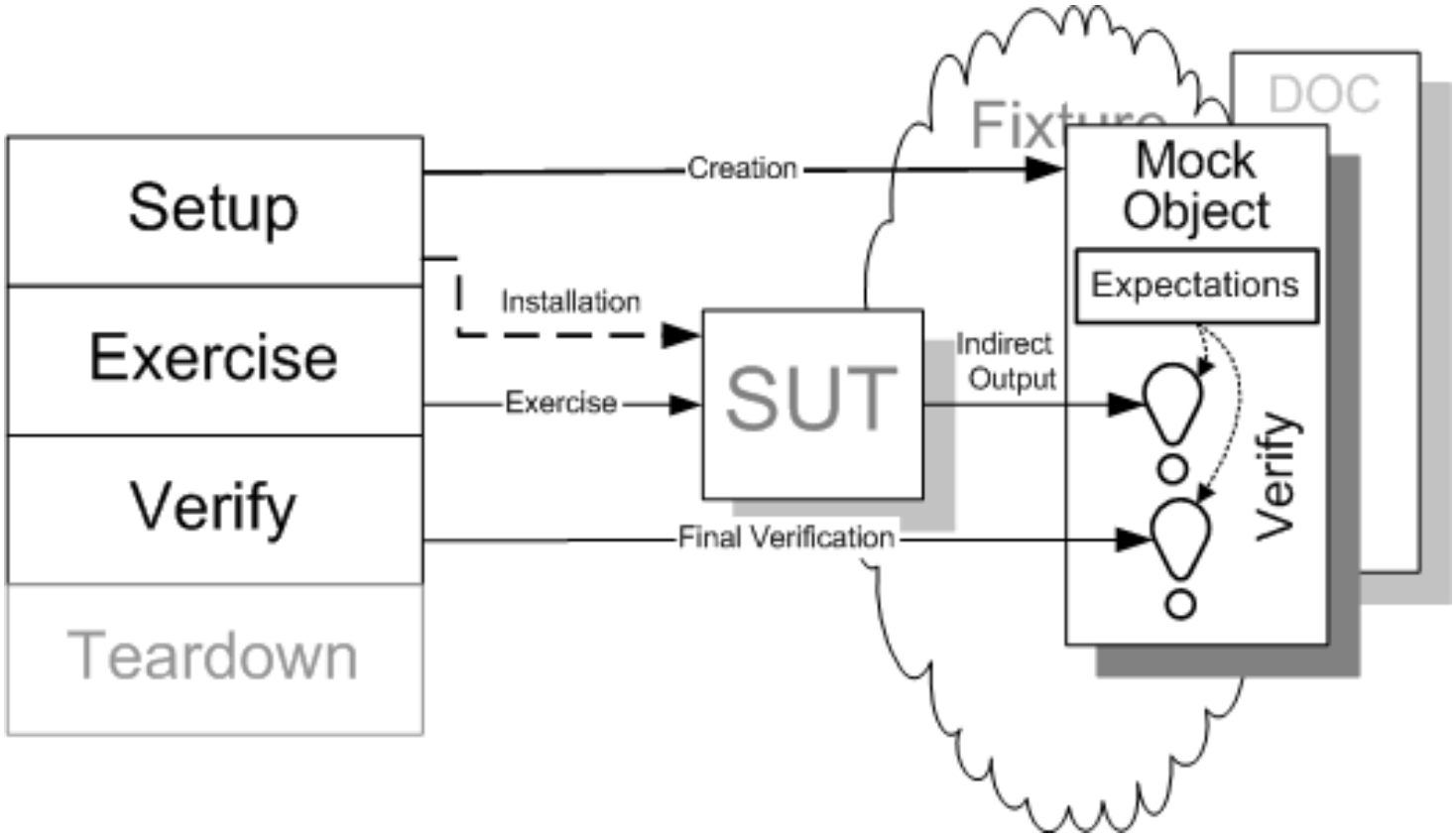


Image Source: http://xunitpatterns.com/Mock%20Object.html - With kind permission by Gerard Meszaros

Mock

```
@Test
public void withMockitoMock() {

    KlassB mock = Mockito.mock(KlassB.class);

    new KlassA(mock).anInterestingMethod();

    Mockito.verify(mock).helpDoTheWork();
}
```

Test Doubles

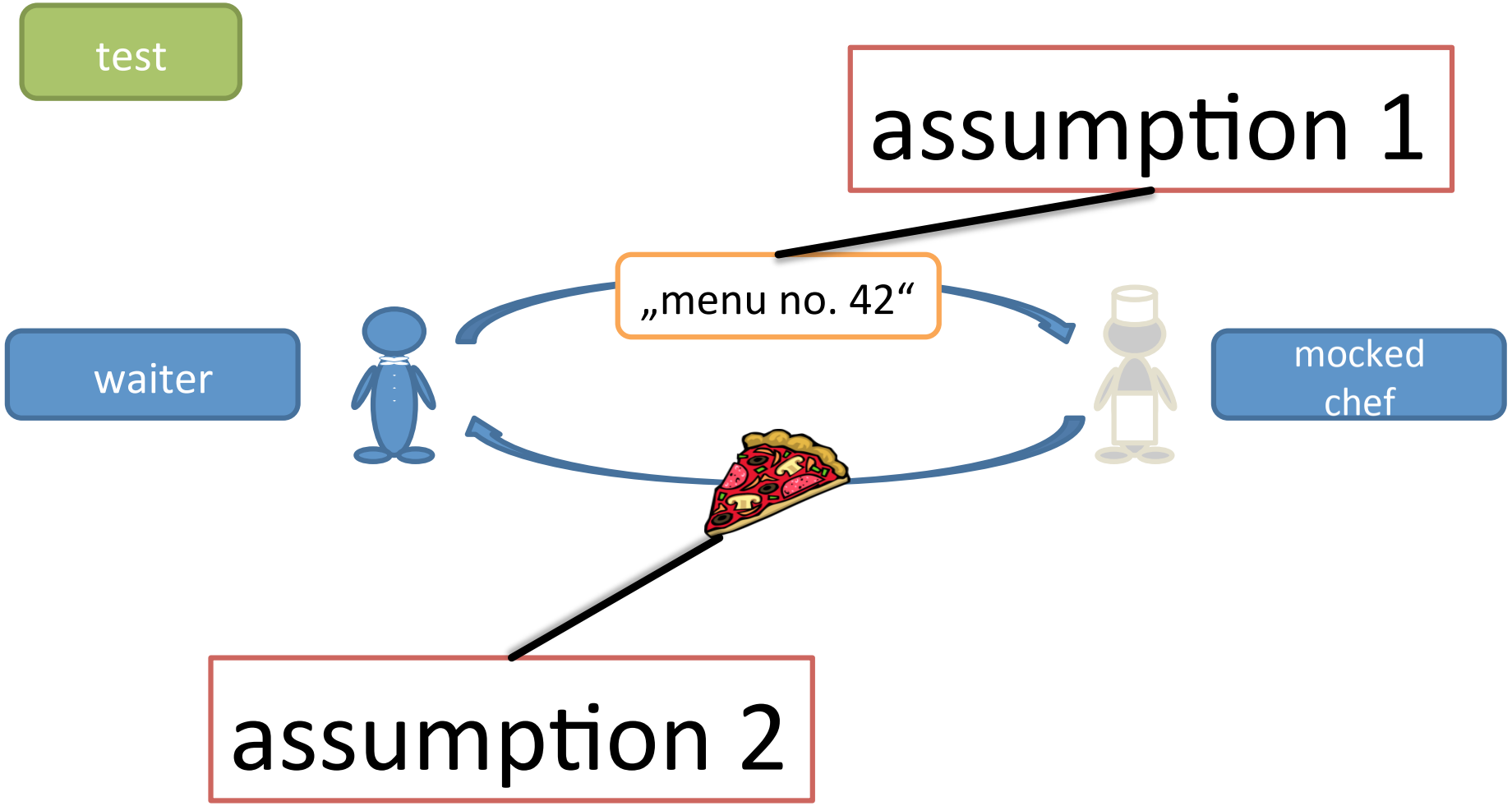
- stub, fake, spy, mock

How do you use test doubles?

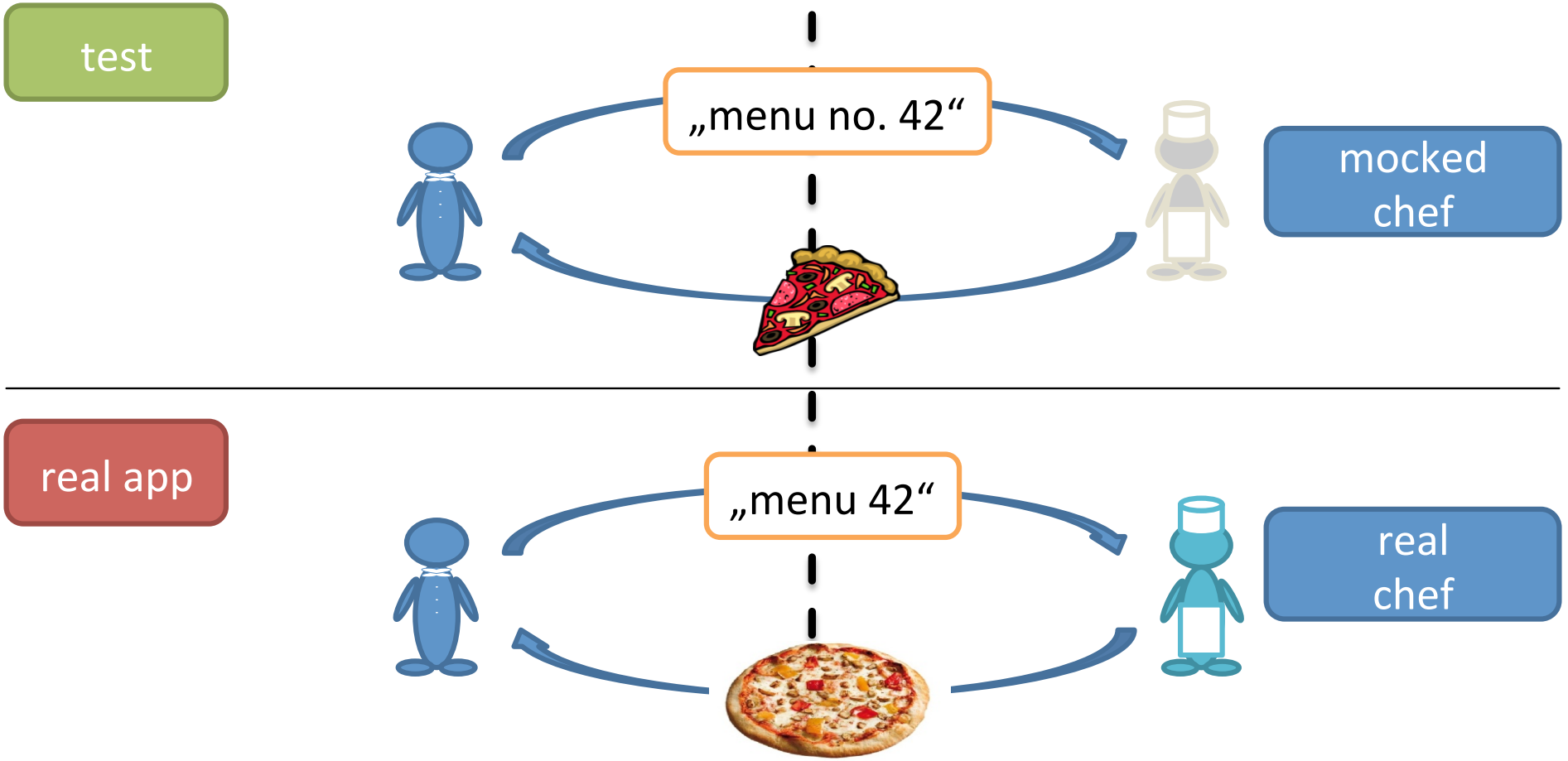
Useless Test

```
@Test
public void testTheMock() {

    KlassB klassB = Mockito.mock(KlassB.class);

    // bla bla bla
    // bla bla bla
    // bla bla bla

    assertThat(klassB.helpDoTheWork(), is(0))
}
```

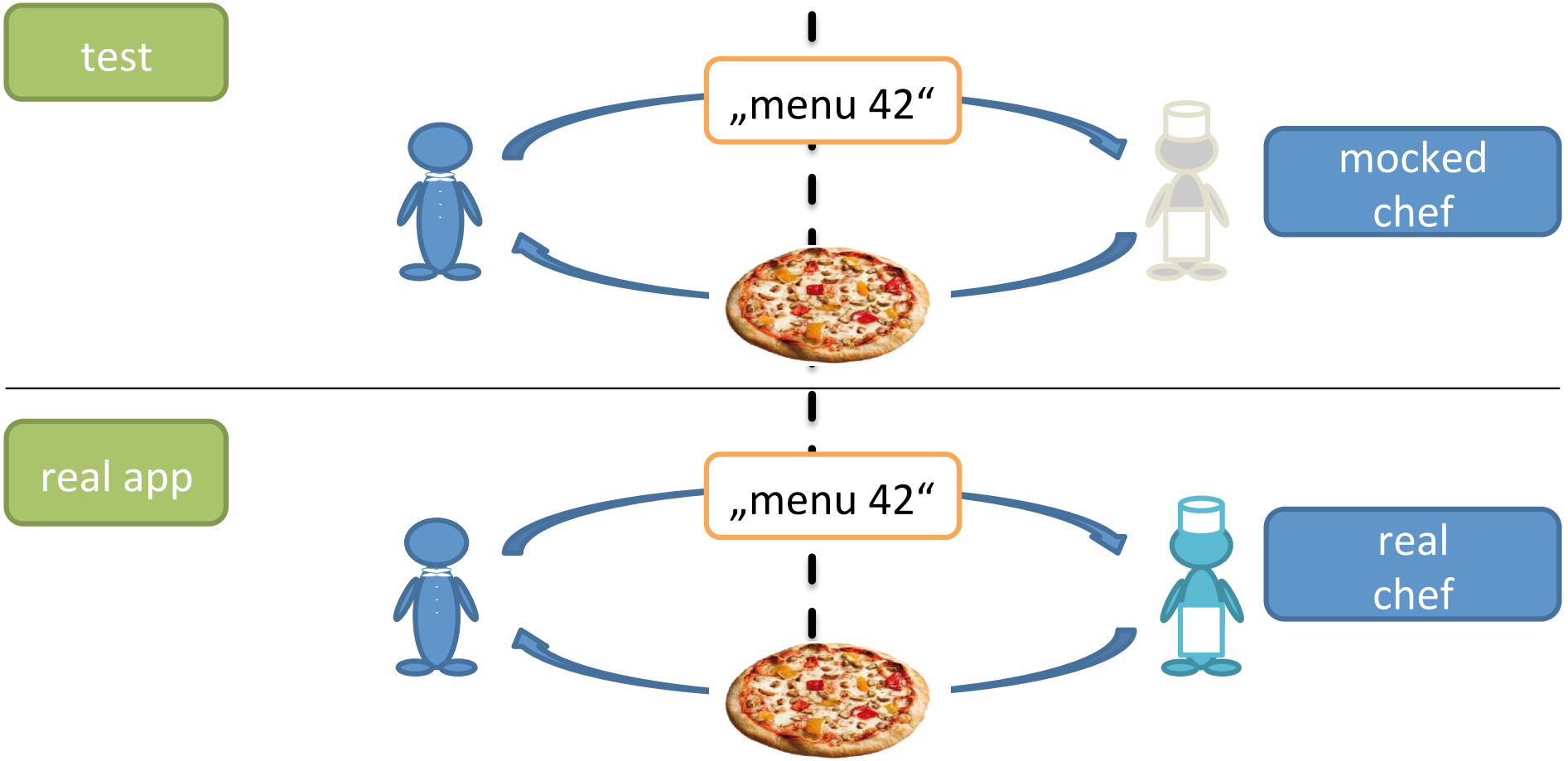
Test Doubles



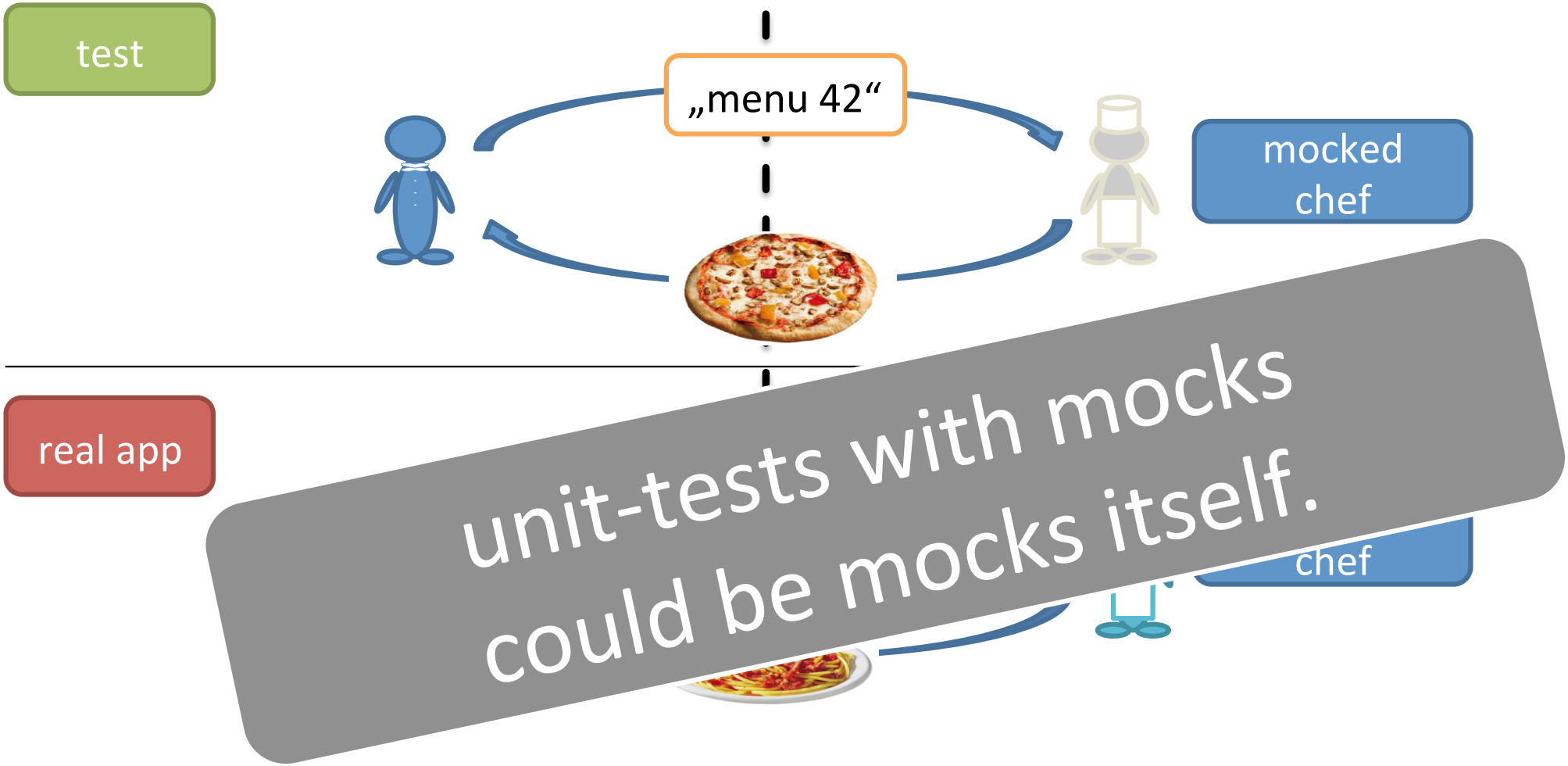
Test Doubles



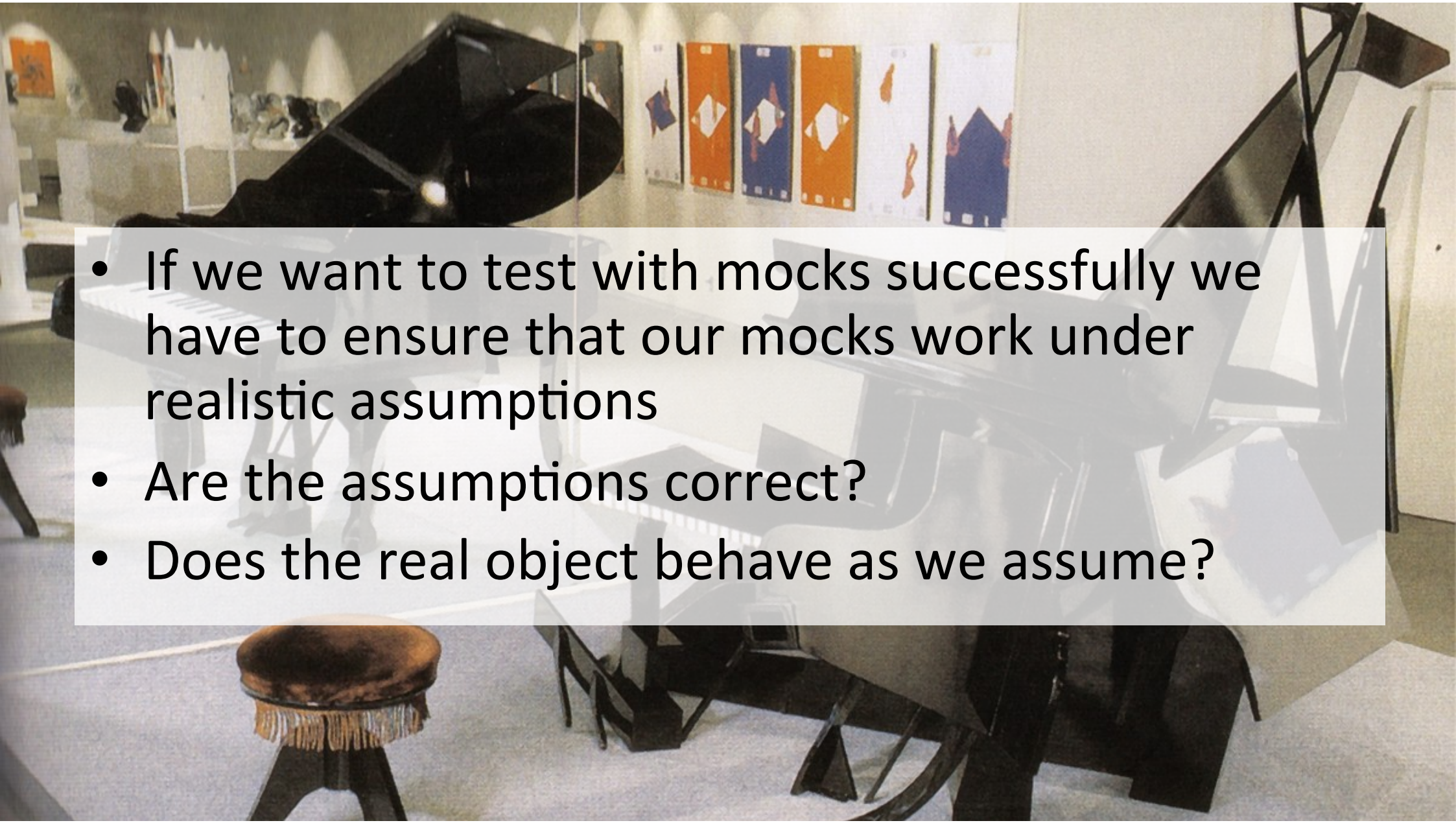
Test Doubles



Test Doubles



to mock = to mimic



- If we want to test with mocks successfully we have to ensure that our mocks work under realistic assumptions
- Are the assumptions correct?
- Does the real object behave as we assume?

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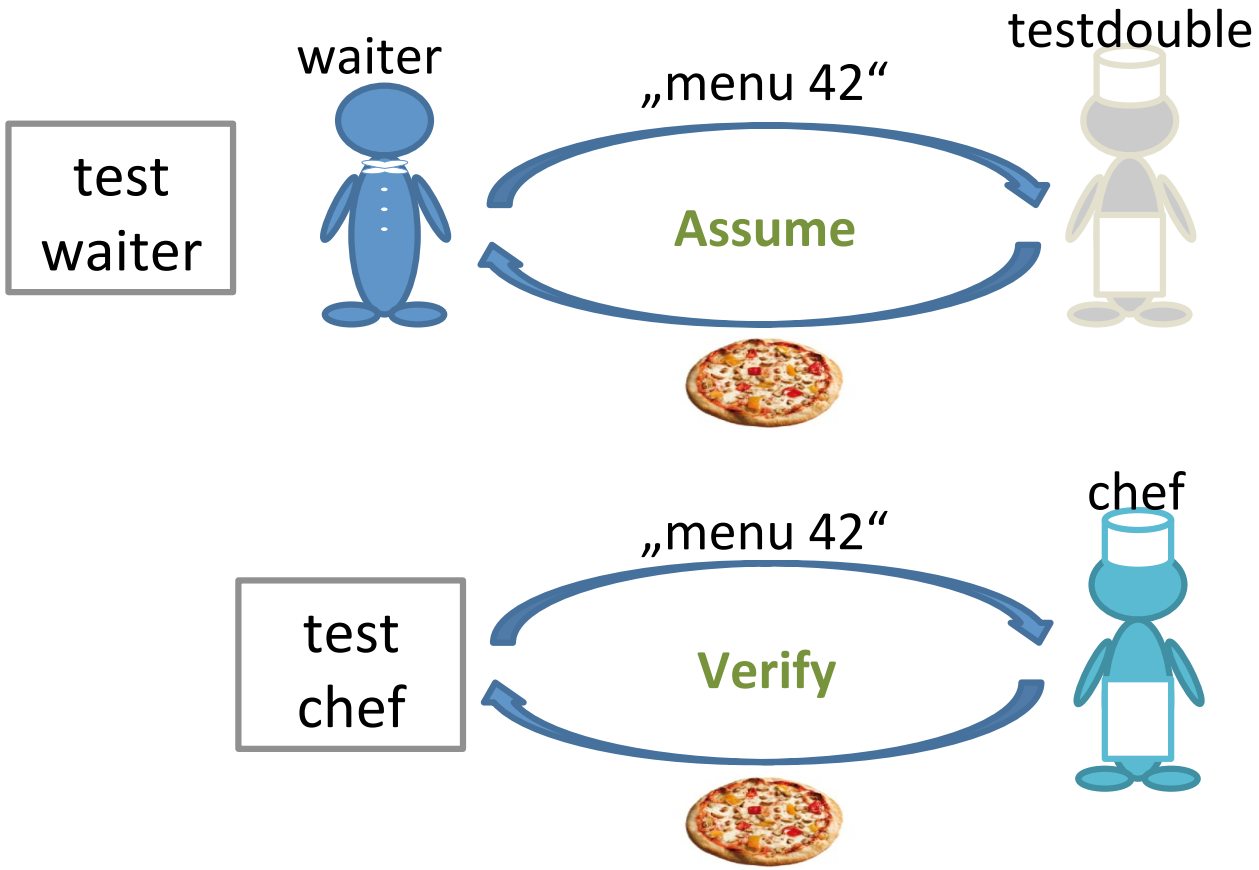
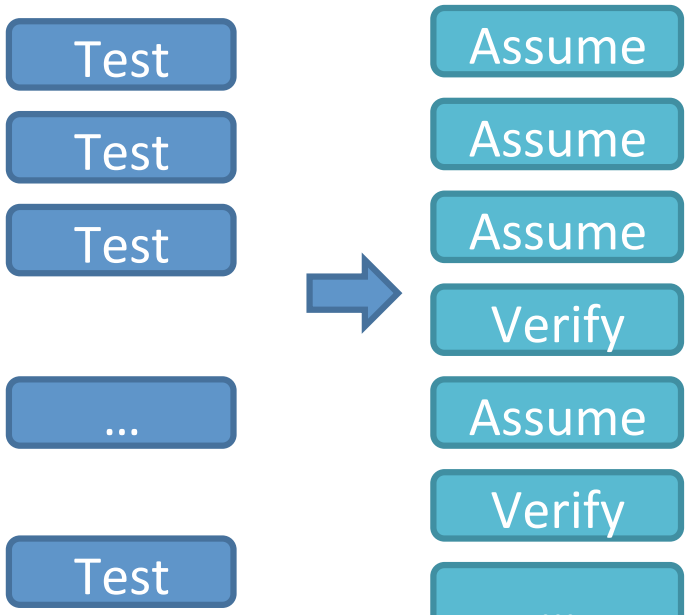
Assume-Verify-Approach



Assume-Verify-Approach

- Record all assumptions and verifications

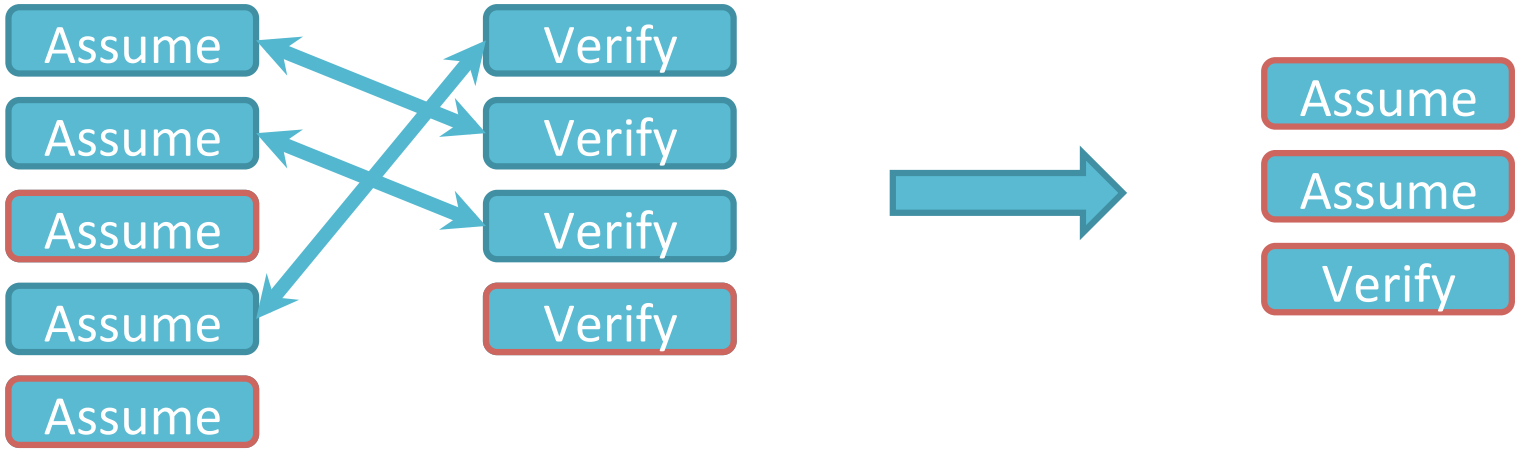


Assume-Verify-Approach

- Match all assumptions and verifications

  Does for every assumption exist at least one verification?

  Does for every verification exist at least one assumption?



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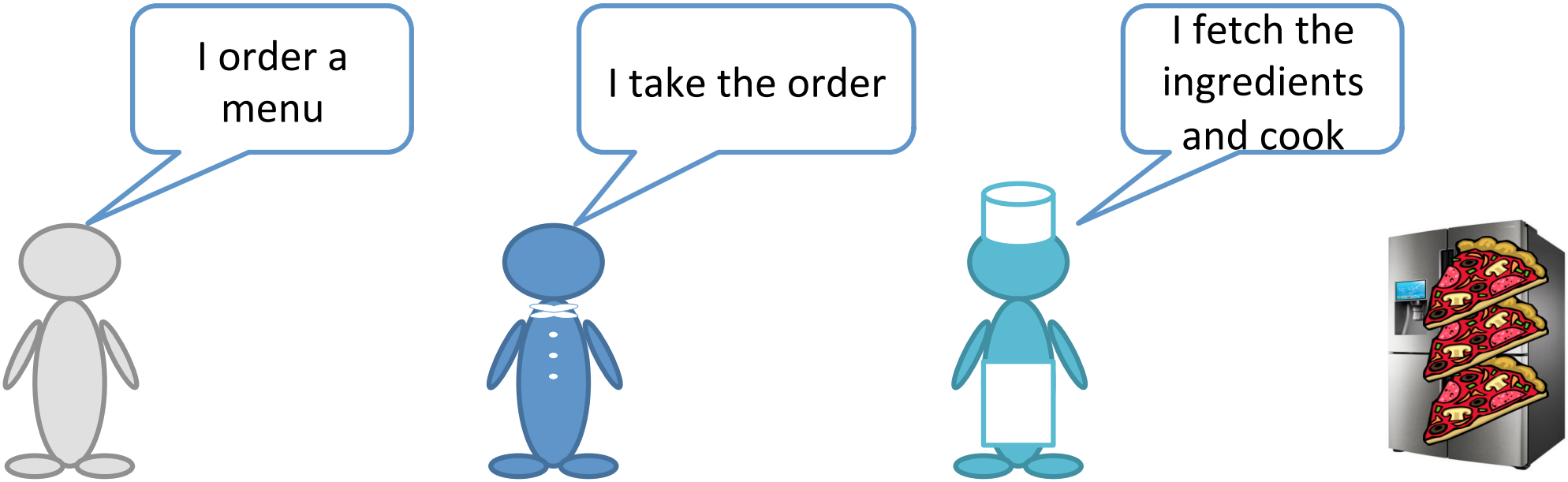
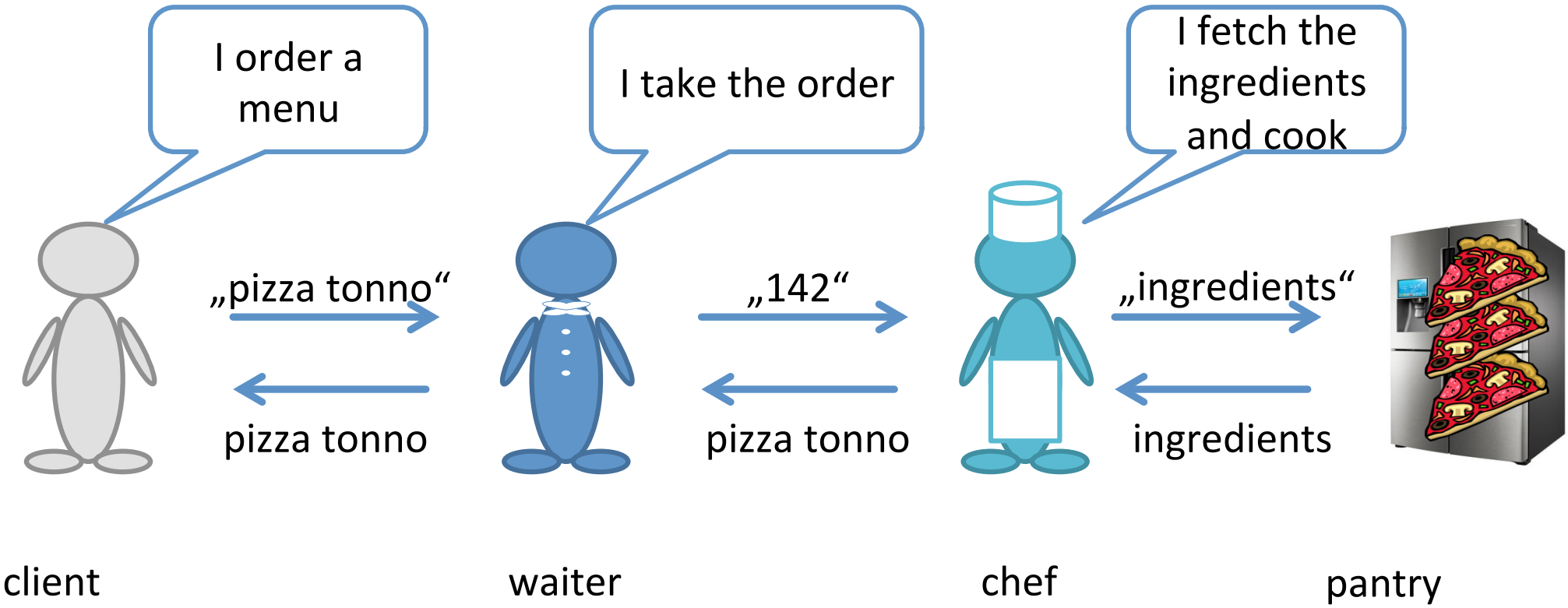
code example

Restaurant simulation



Restaurant simulation



code example

Summary

- high coverage by isolated tests
- interaction of units should be tested too
- pairwise integration

- assume-verify testing with chado

Links

- Chadojs on Github:

  https://github.com/robindanzinger/chadojs
- J.B.Rainsberger: Integrated tests are a scam:

  http://blog.thecodewhisperer.com/permalink/integrated-tests-are-a-scam
- bogus for ruby:

  https://github.com/psyho/bogus
- midje for clojure:

  https://github.com/marick/Midje

Sources

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