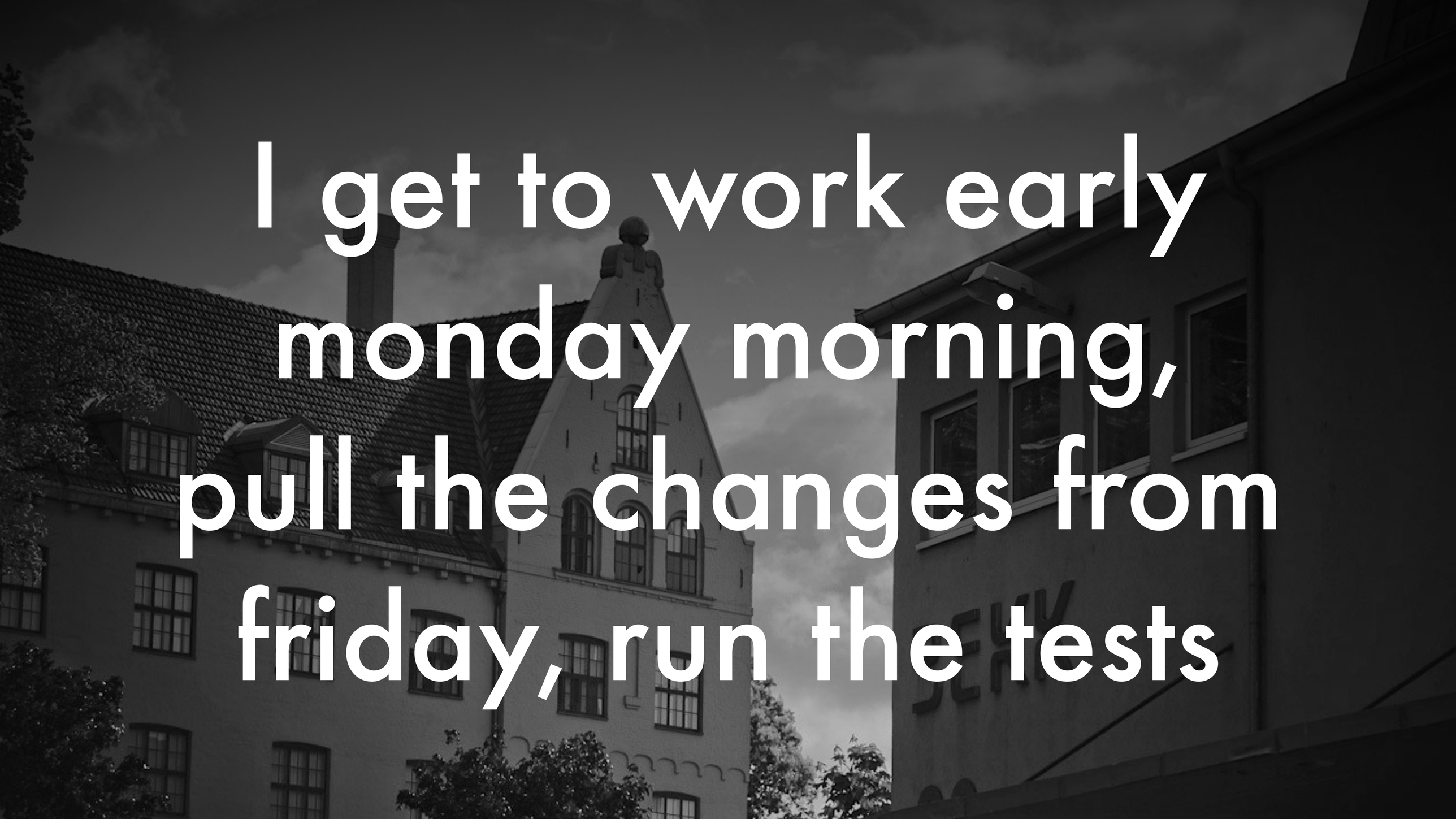
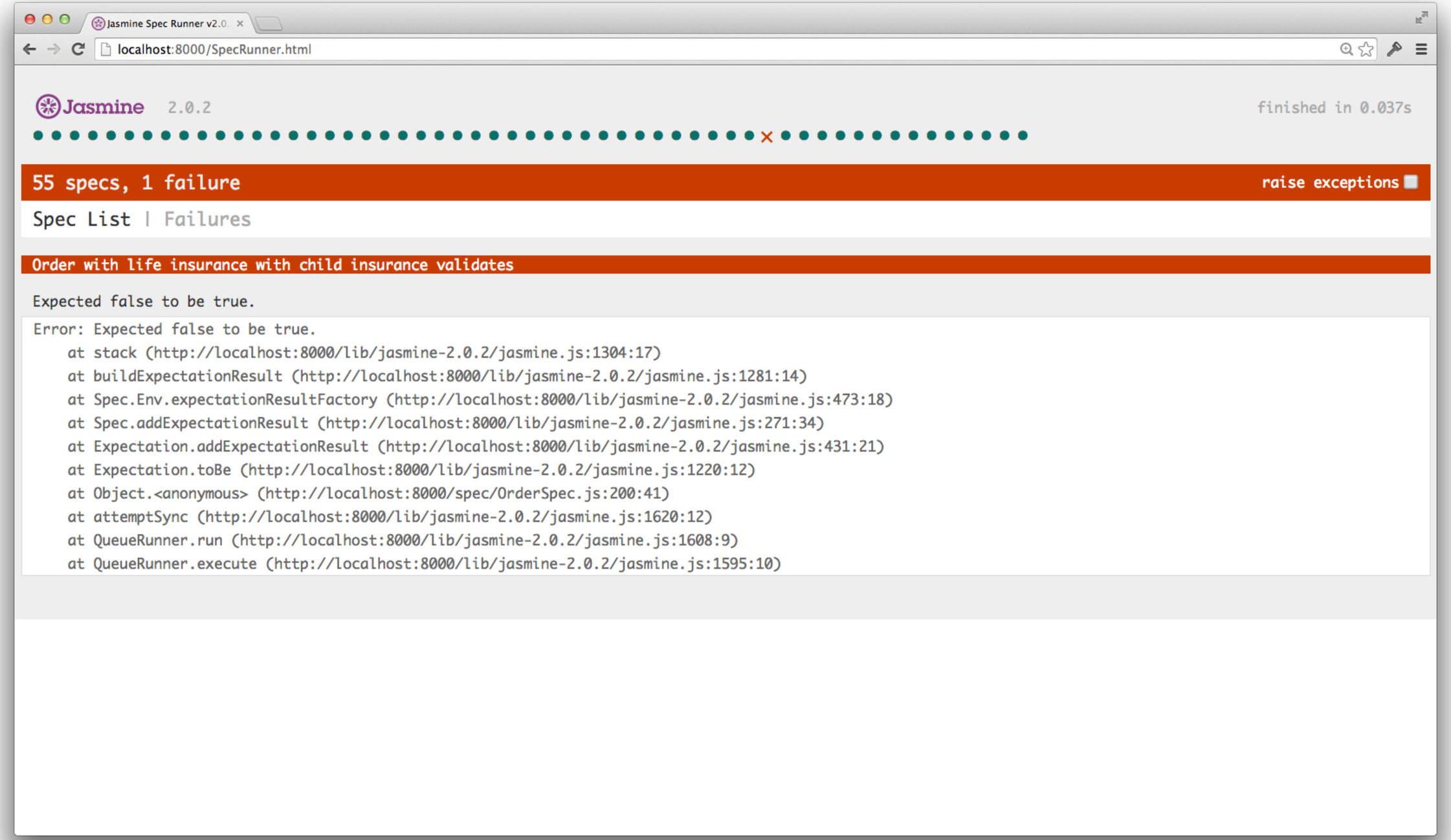
WRITING BEAUTIFUL JAVASCRIPT TESTS

@KIMJOAR


#exampletime


I get to work early
monday morning,
pull the changes from
friday, run the tests


Jasmine Spec Runner v2.0
localhost:8000/SpecRunner.html
Jasmine 2.0.2
finished in 0.037s
55 specs, 1 failure
raise exceptions
Spec List | Failures
Order with life insurance with child insurance validates
Expected false to be true.
Error: Expected false to be true.
at stack (http://localhost:8000/lib/jasmine-2.0.2/jasmine.js:1304:17)
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at QueueRunner.execute (http://localhost:8000/lib/jasmine-2.0.2/jasmine.js:1595:10)

Jasmine Spec Runner v2.0

localhost:8000/SpecRunner.html

Jasmine 2.0.2

finished in 0.037s

55 specs, 1 failure

raise exceptions

Spec List | Failures

WHO PUSHED A FAILING TEST!?

, however, is green

, however, is green

EXAMPLE OF WHAT A TEST MIGHT LOOK LIKE

```
describe('cart', function() {
    beforeEach(function() {
        // called before every test
        // (often called setup)
    });

    it('calculates correct total price', function() {
        var cart = new Cart();

        cart.addItem({ name: 'Sleeping bag', price: 299, quantity: 2 });
        cart.addItem({ name: 'Tent', price: 499, quantity: 1 });

        expect(cart.totalPrice()).toEqual(1097);
    });

    afterEach(function() {
        // called after every test
        // (often called teardown)
    });
});
```

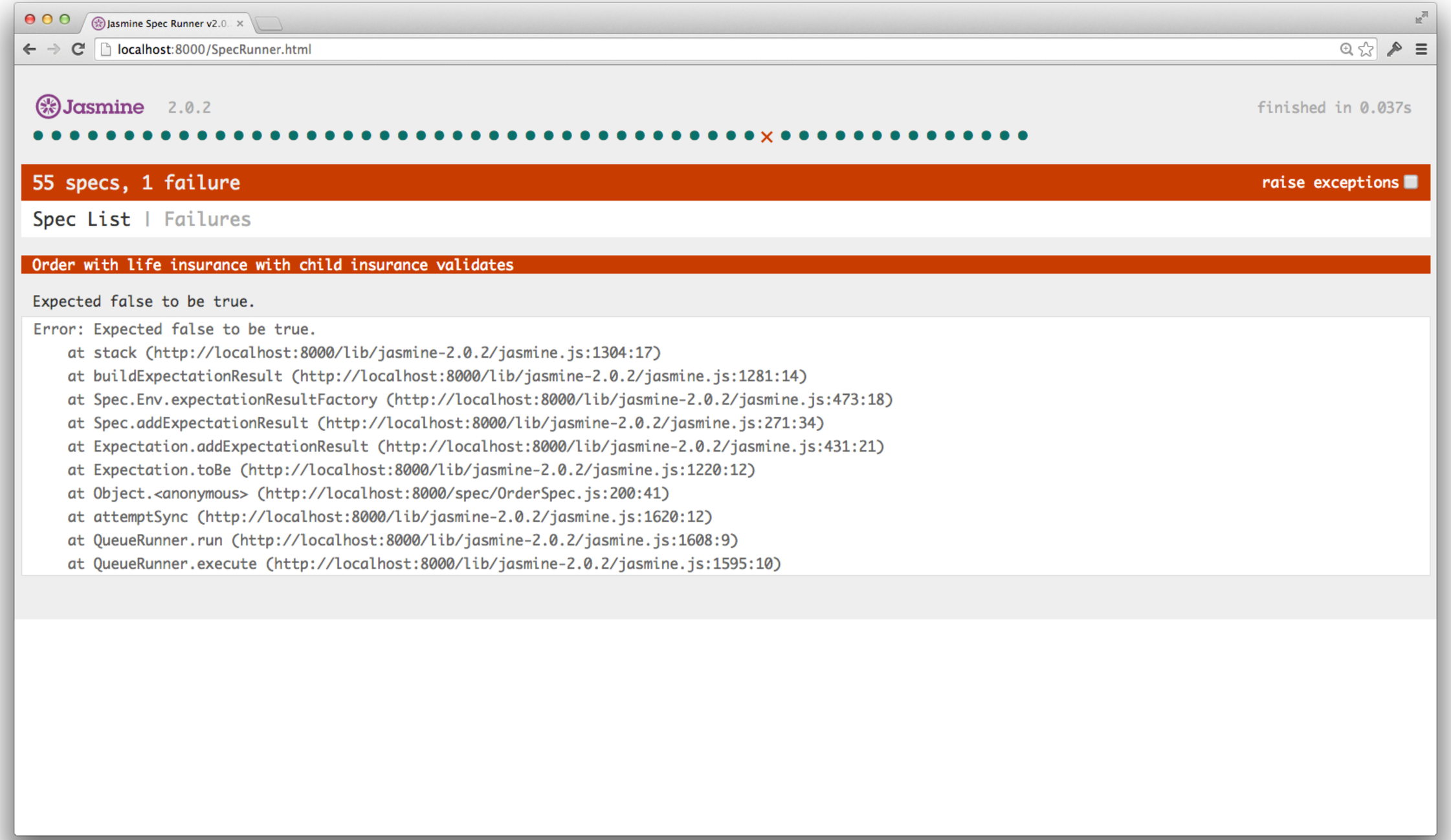
EXAMPLE OF WHAT A TEST MIGHT LOOK LIKE

```
describe('cart', function() {
    var cart;

    beforeEach(function() {
        cart = new Cart();
    });

    describe('with two orders', function() {
        beforeEach(function() {
            cart.addItem({ name: 'Sleeping bag', price: 299, quantity: 2 });
            cart.addItem({ name: 'Tent', price: 499, quantity: 1 });
        });

        it('calculates correct total price', function() {
            expect(cart.totalPrice()).toEqual(1097);
        });
    });
});
```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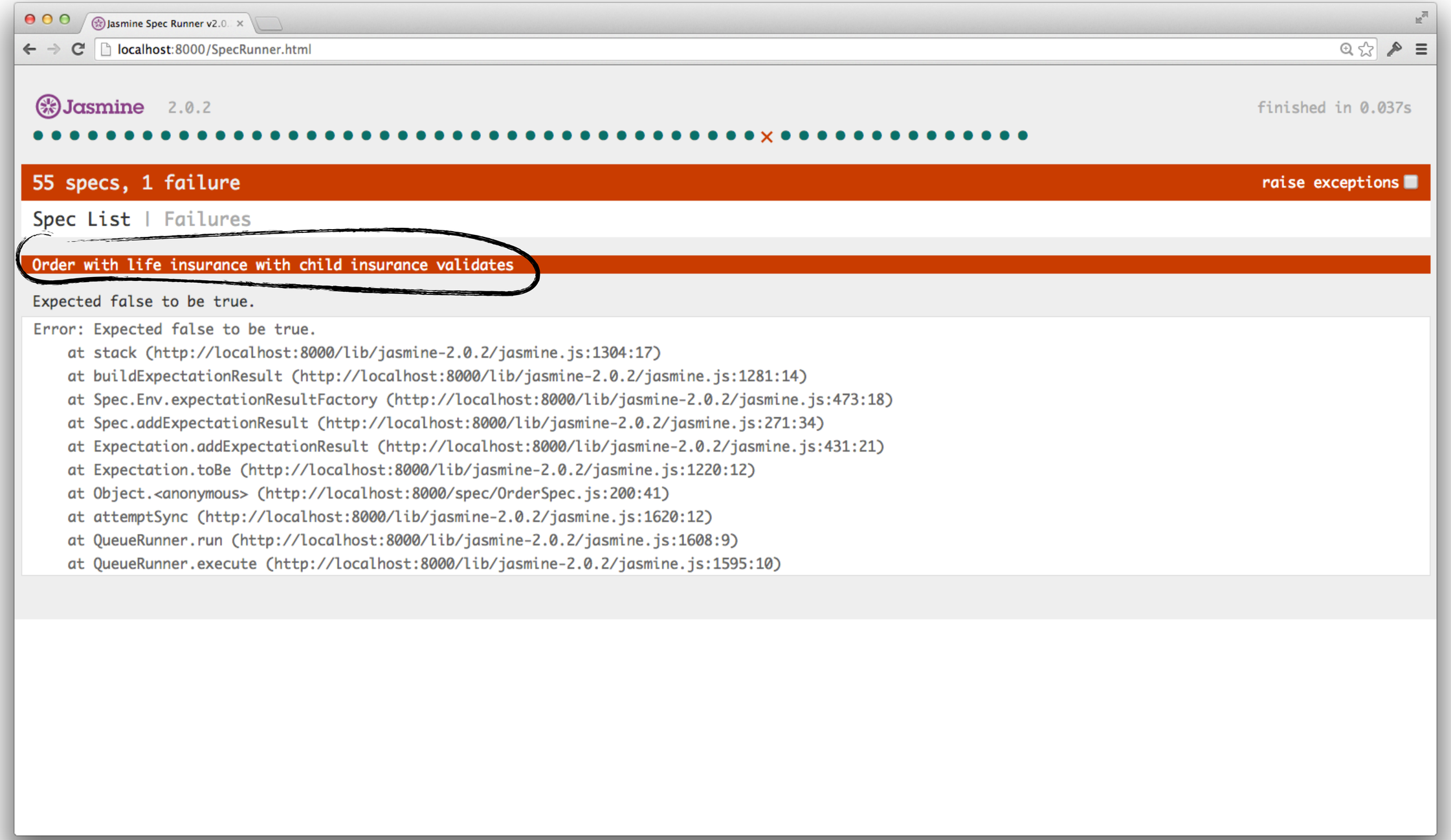
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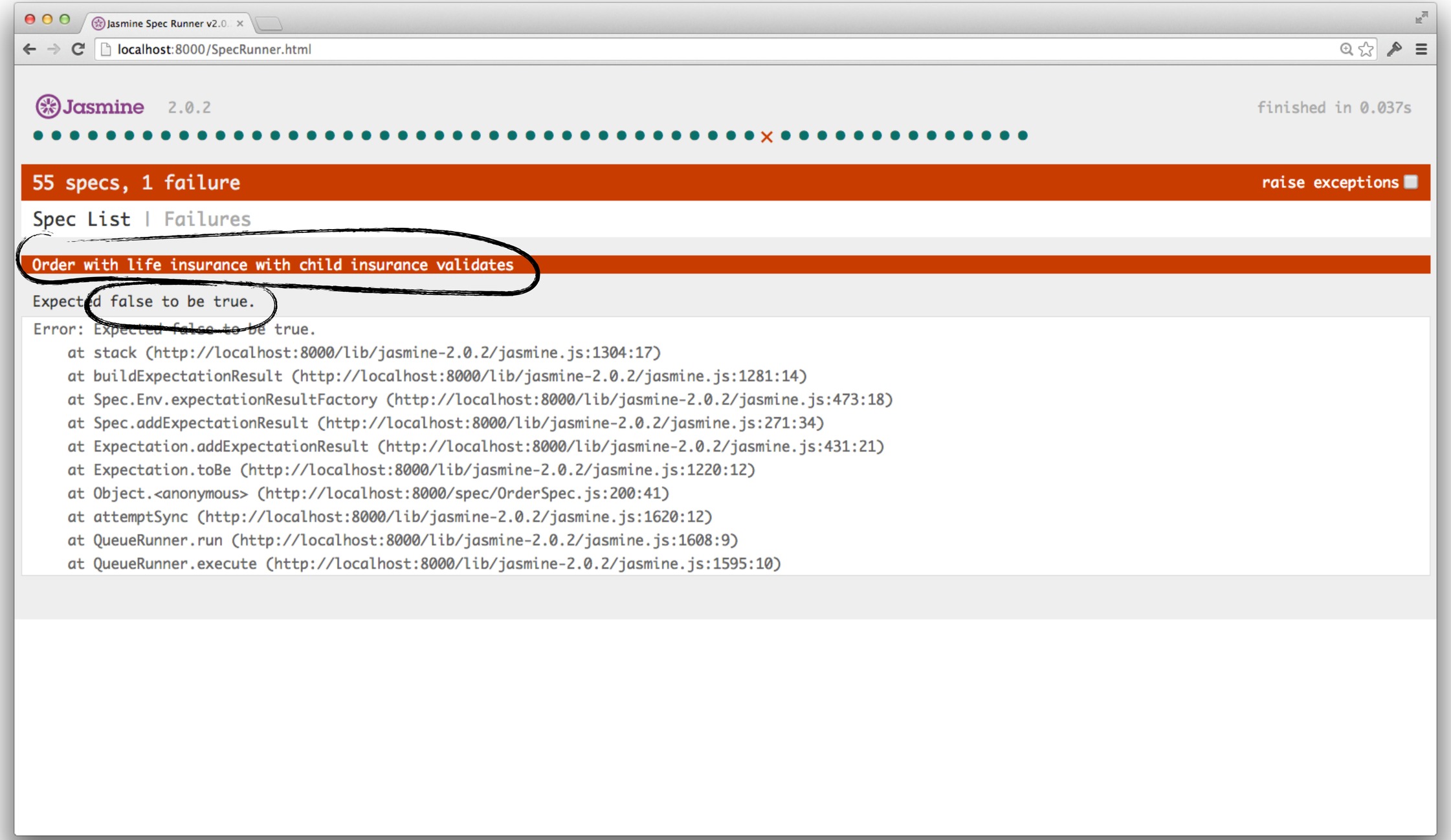
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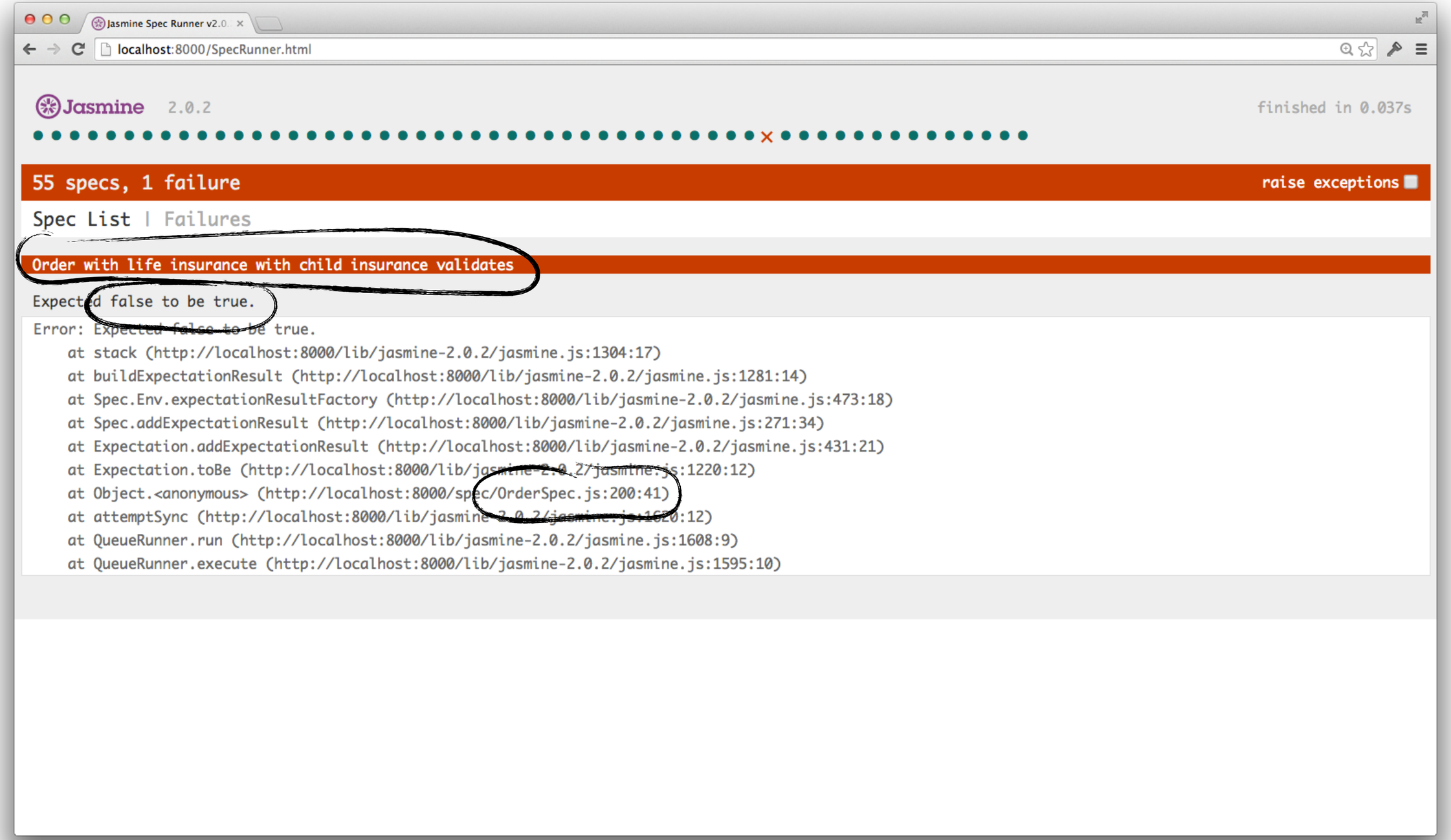
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```
it('validates', function() {
    expect(order.isValid()).toBe(true);
});
```

WHY DID IT FAIL?

WHY DID IT FAIL?

```
beforeEach(function() {
    var ci = new Product({
        type: 'CI',
        price: 105
    });
    cart.addItem(ci);
});
```

CHILD INSURANCE

DOES THIS CHANGE THE ORDER?

```
beforeEach(function() {
    beneficiary1.amount = 1500000;
    beneficiary2.amount = 500000;

    var li = new Product({
        type: 'LI',
        price: 399,
        amount: beneficiary1.amount
            + beneficiary2.amount
    });

    cart.addItem(li);
    order.setPolicyHolder(policyHolder2);
    order.addBeneficiary(beneficiary1);
    order.addBeneficiary(beneficiary2);
});
```

WHY DID IT FAIL?

```
beforeEach(function() {
    policyHolder1 = new PolicyHolder({
        name: "Ola Nordmann",
        ssn: 07099451429,
        telephoneNumber: "+4795732501",
        email: "me@example.org",
        address: {
            street: "Toftes gate 17",
            postCode: 0556,
            postalArea: "Oslo"
        }
    });
    policyHolder2 = new PolicyHolder({
        name: "Testy Testeson",
        ssn: 17099926629,
        telephoneNumber: "+4743032501",
        email: "me2@example.org",
        address: {
            street: "Ravnkollbakken 3",
            postCode: 0970,
            postalArea: "Oslo"
        }
    });

    beneficiary1 = {
        name: "Testy2",
        ssn: "04037335466"
    }
    beneficiary2 = {
        name: "Testy3",
        ssn: "18049938744"
    }
    beneficiary3 = {
        name: "Testy4",
        ssn: "21050682312"
    }

    cart = new Cart();

    order = new Order({
        cart: cart,
        policyHolder: policyHolder1,
        withdrawalDay: 15
    });
});
```

I HAVE NO IDEA

```
beforeEach(function() {
    // ...

    policyHolder2 = new PolicyHolder({
        name: "Testy Testeson",
        ssn: 17099926629,
        telephoneNumber: "+4743032501",
        email: "me2@example.org",
        address: {
            street: "Ravnkollbakken 3",
            postCode: 0970,
            postalArea: "Oslo"
        }
    });

    // ...
});
```

THE PROBLEM?

He got too old to have child insurance


You will,
at some point,
HATE your tests


We need to
learn more
about
writing tests


WHY DO
WE TEST?

because testing in production sucks

But seriously,

IT DEPENDS

HI! I'M @KIMJOAR

I'M A CONSULTANT AT BEKK IN OSLO, NORWAY
I WORK IN 5-10 PERSON TEAMS
FOR 3 MONTHS TO SEVERAL YEARS
FOR LARGE COMPANIES
ON INTERACTIVE AND COMPLEX APPS

TODAY:

PART PHILOSOPHY

PART TECHNIQUES

SHARING EXPERIENCES

BOTH GOOD AND BAD


WHY DO
I TEST?

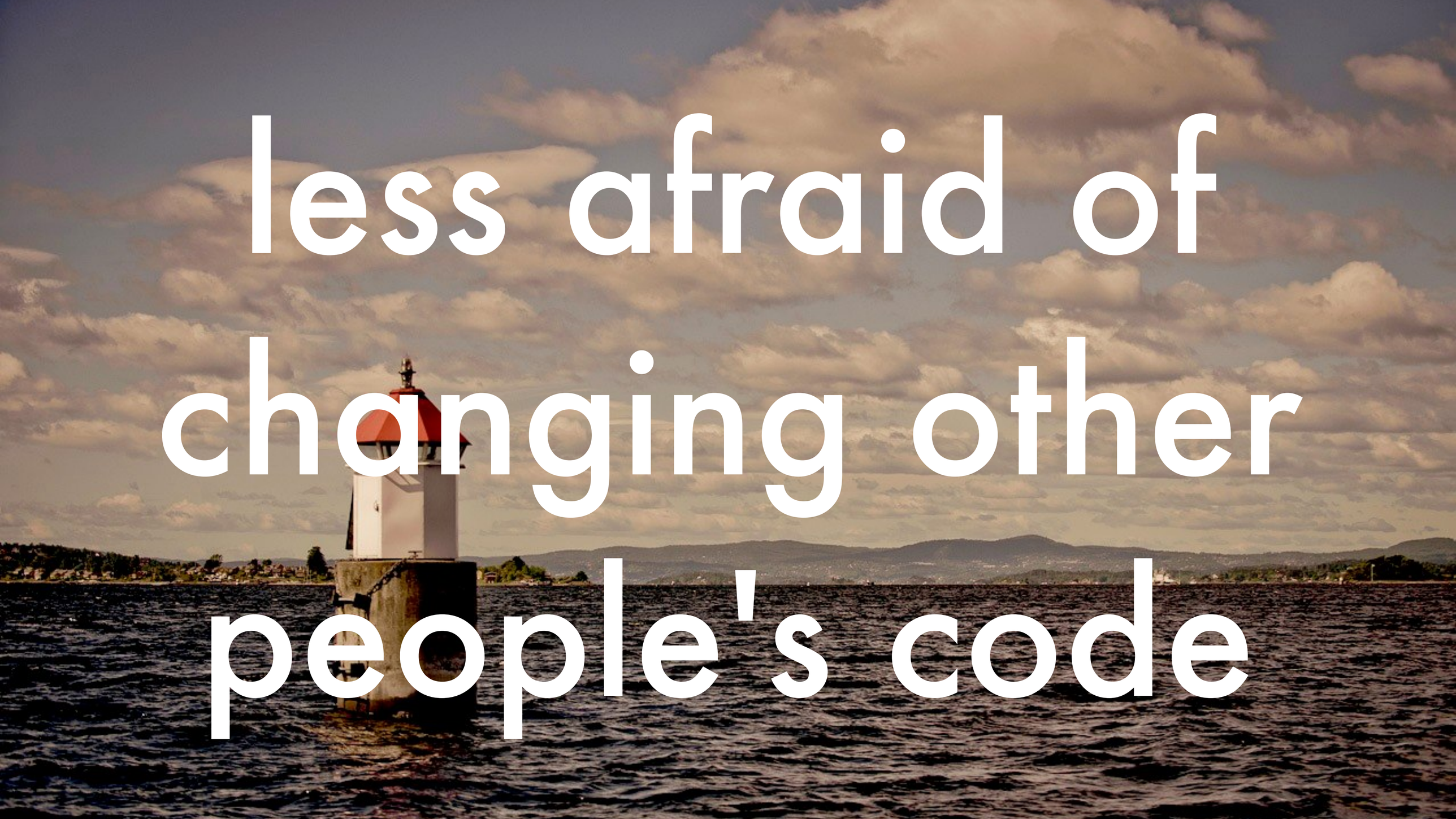

REGRESSIONS
COMMUNICATION
DESIGN

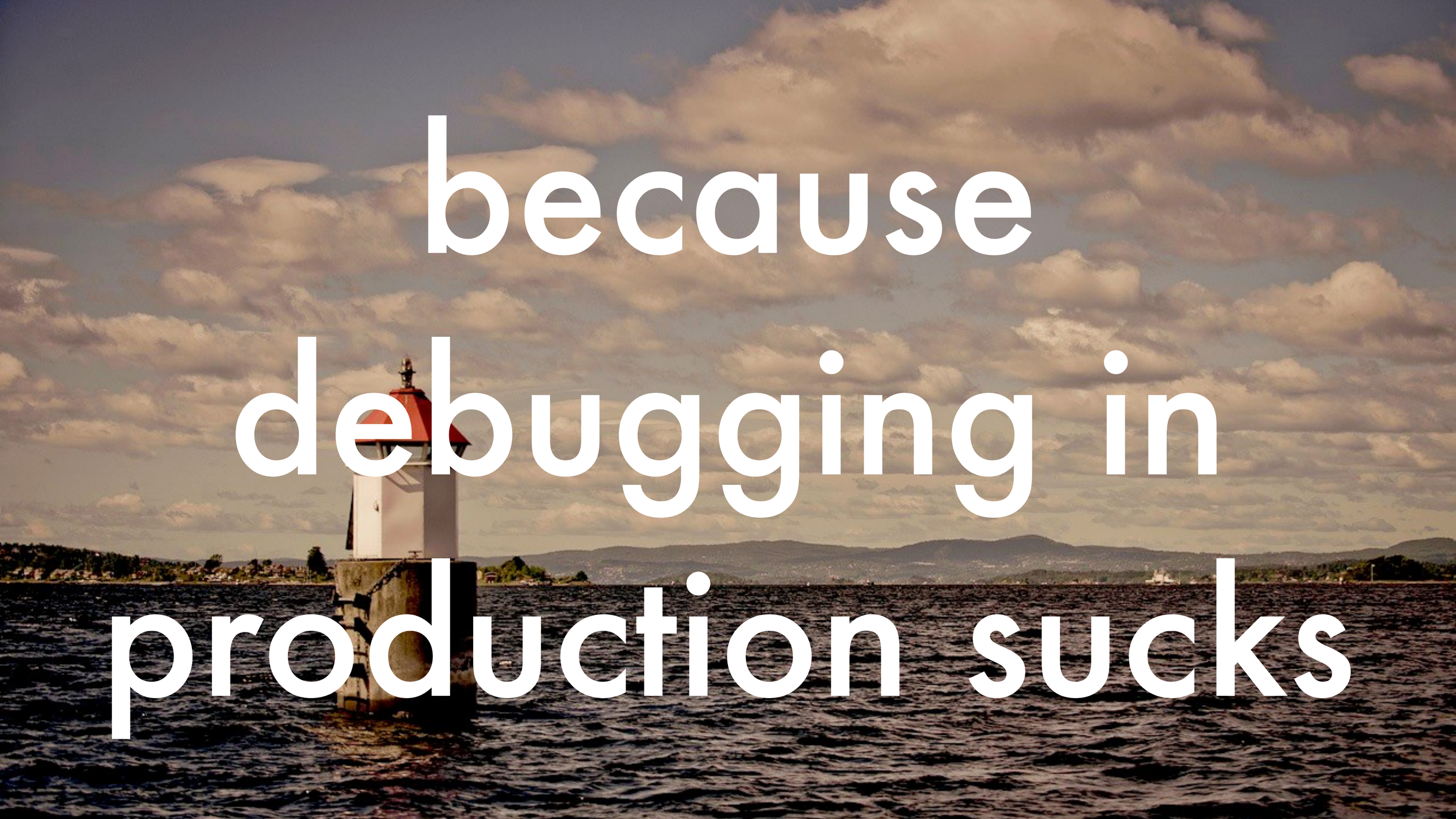

REGRESSIONS


we're building
more complex and
interactive apps


often in
larger teams

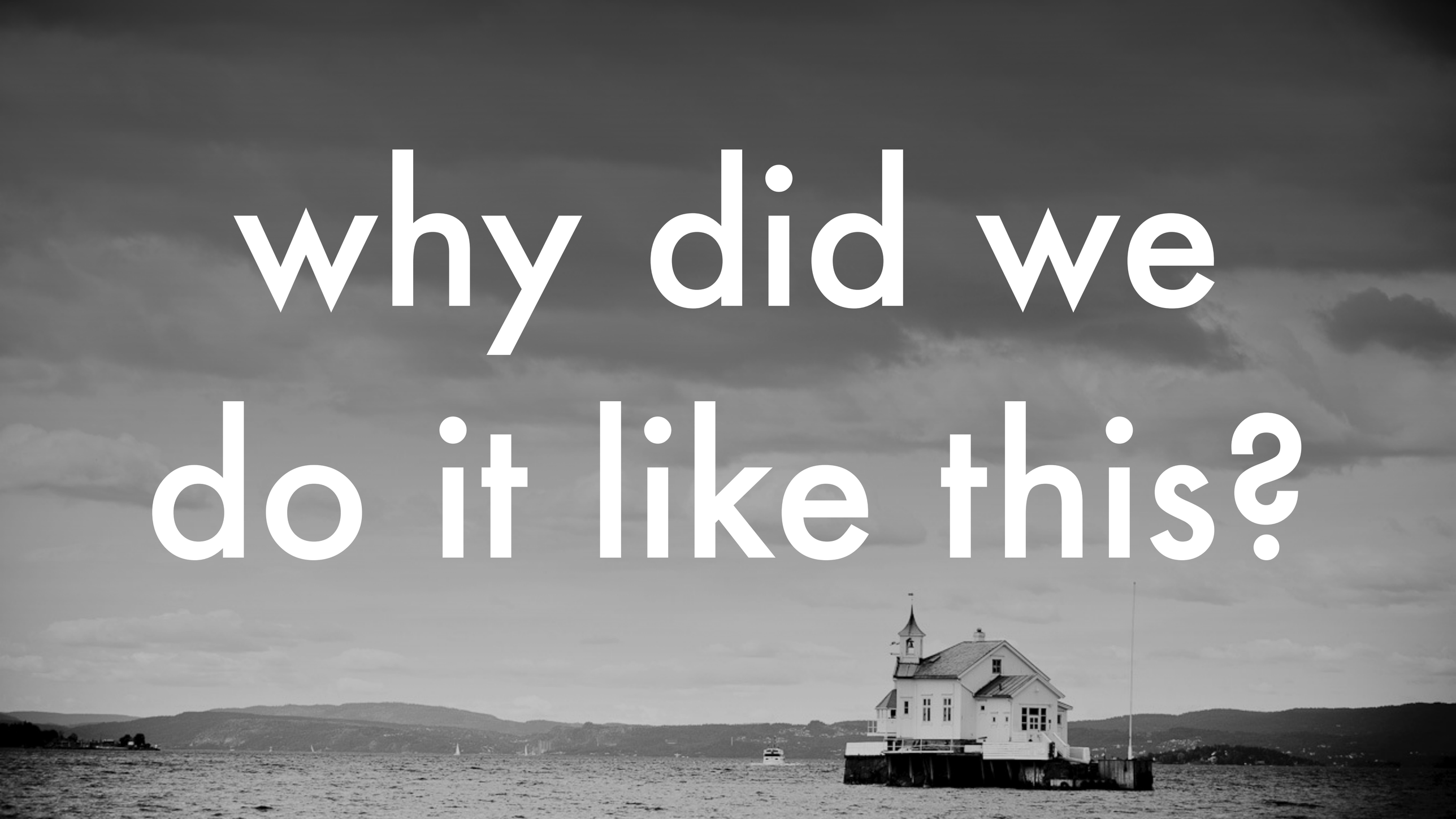

less afraid of
changing code


less afraid of
changing other
people's code


because
debugging in
production sucks


fix a bug once


COMMUNICATION


why did we
do it like this?

what should it do?


DESIGN


immediate
feedback


keep the
code simple

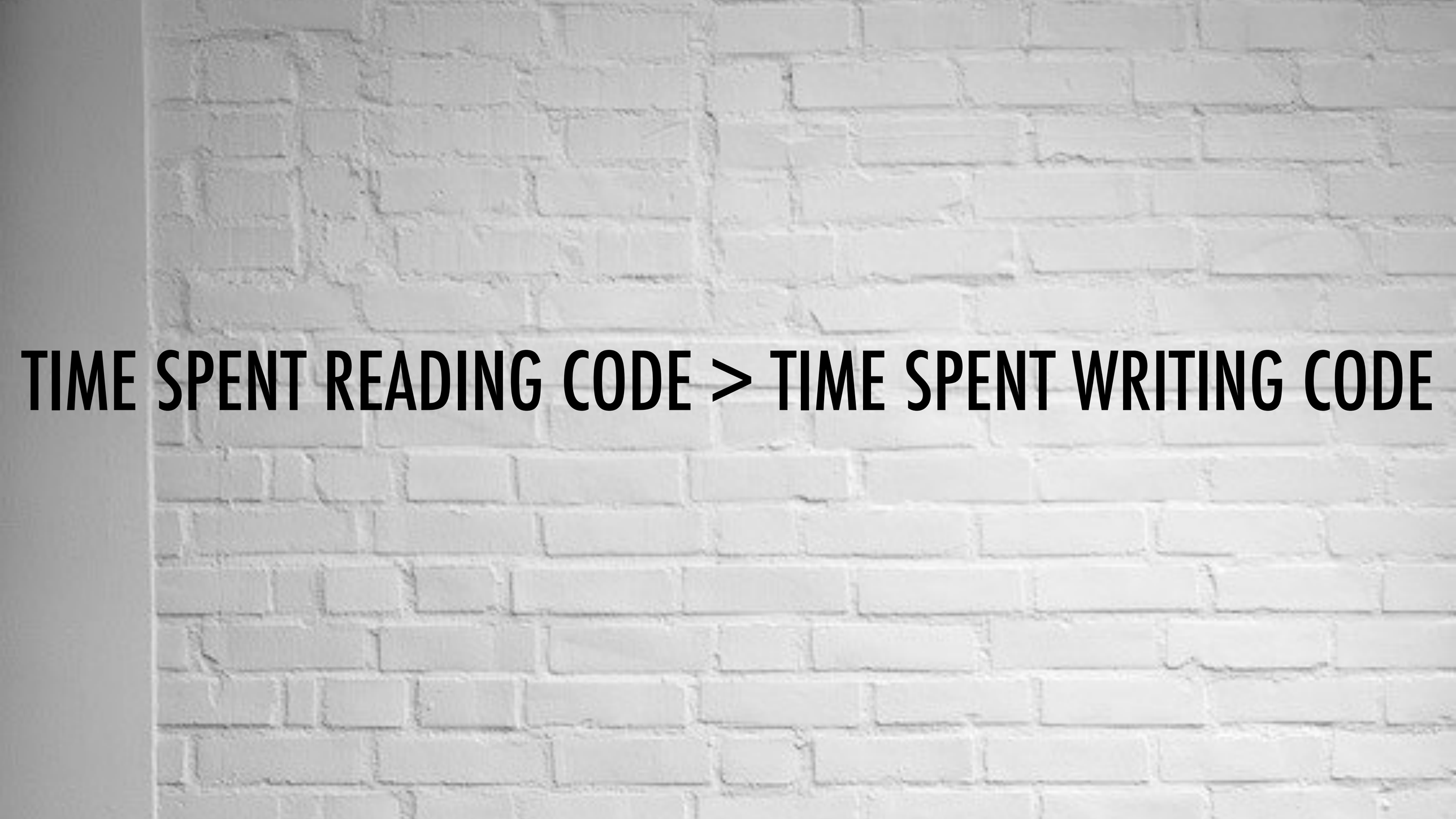

REGRESSIONS
COMMUNICATION
DESIGN

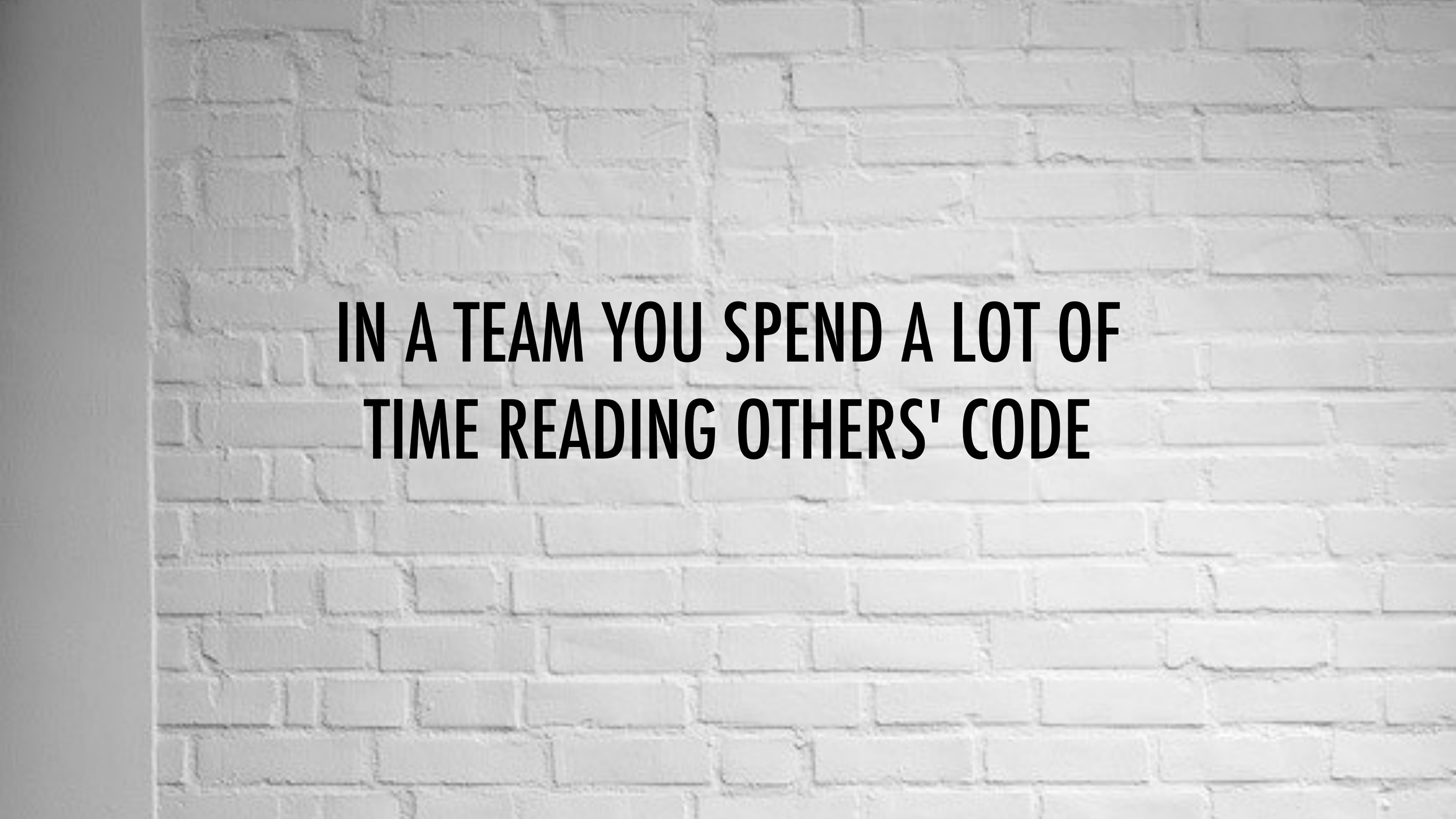

so .... what's
the problem?


it's easy to write
really bad tests


TRY TO
HOW I WRITE
MY TESTS

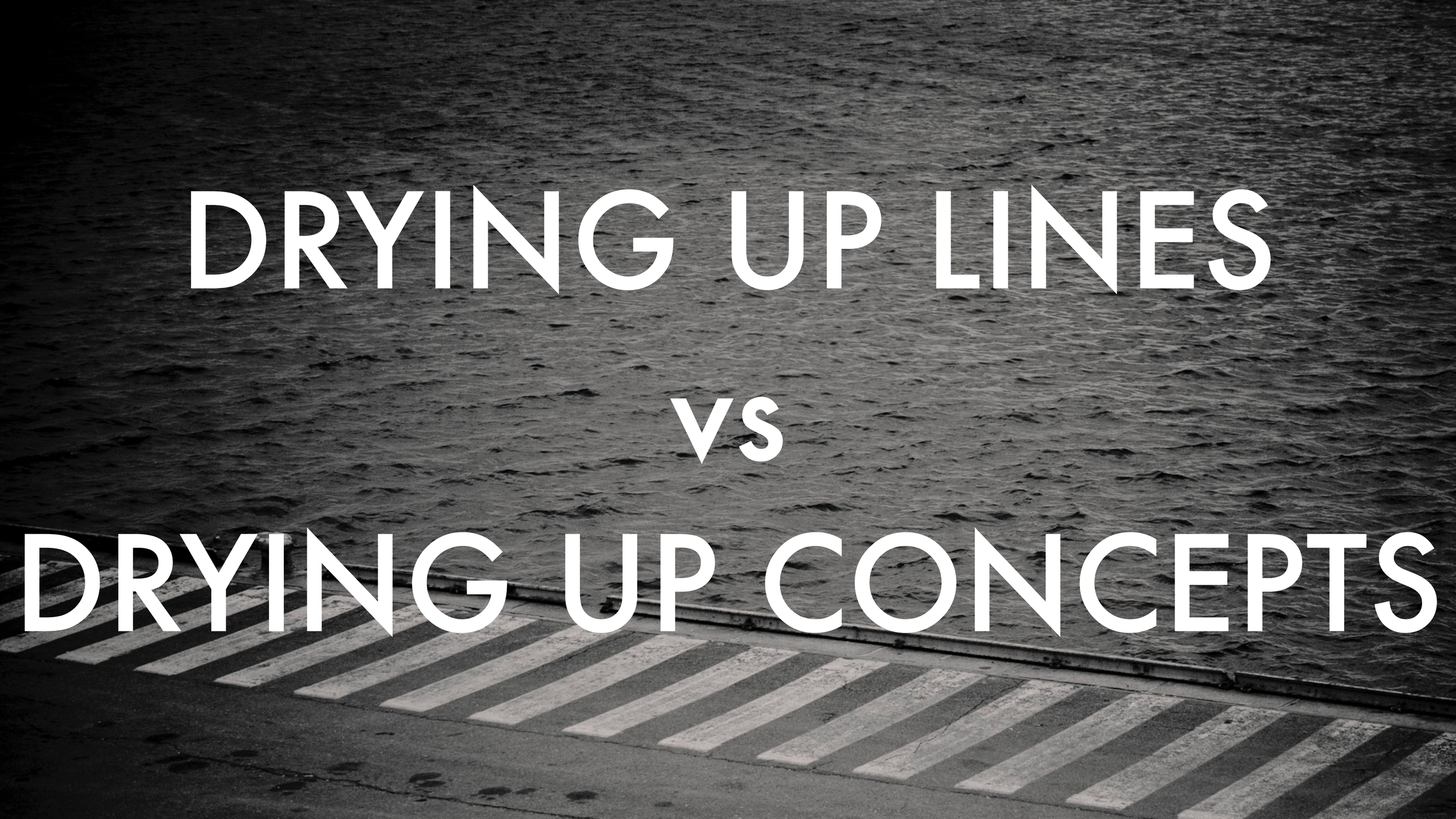

FOCUS ON
THE READER

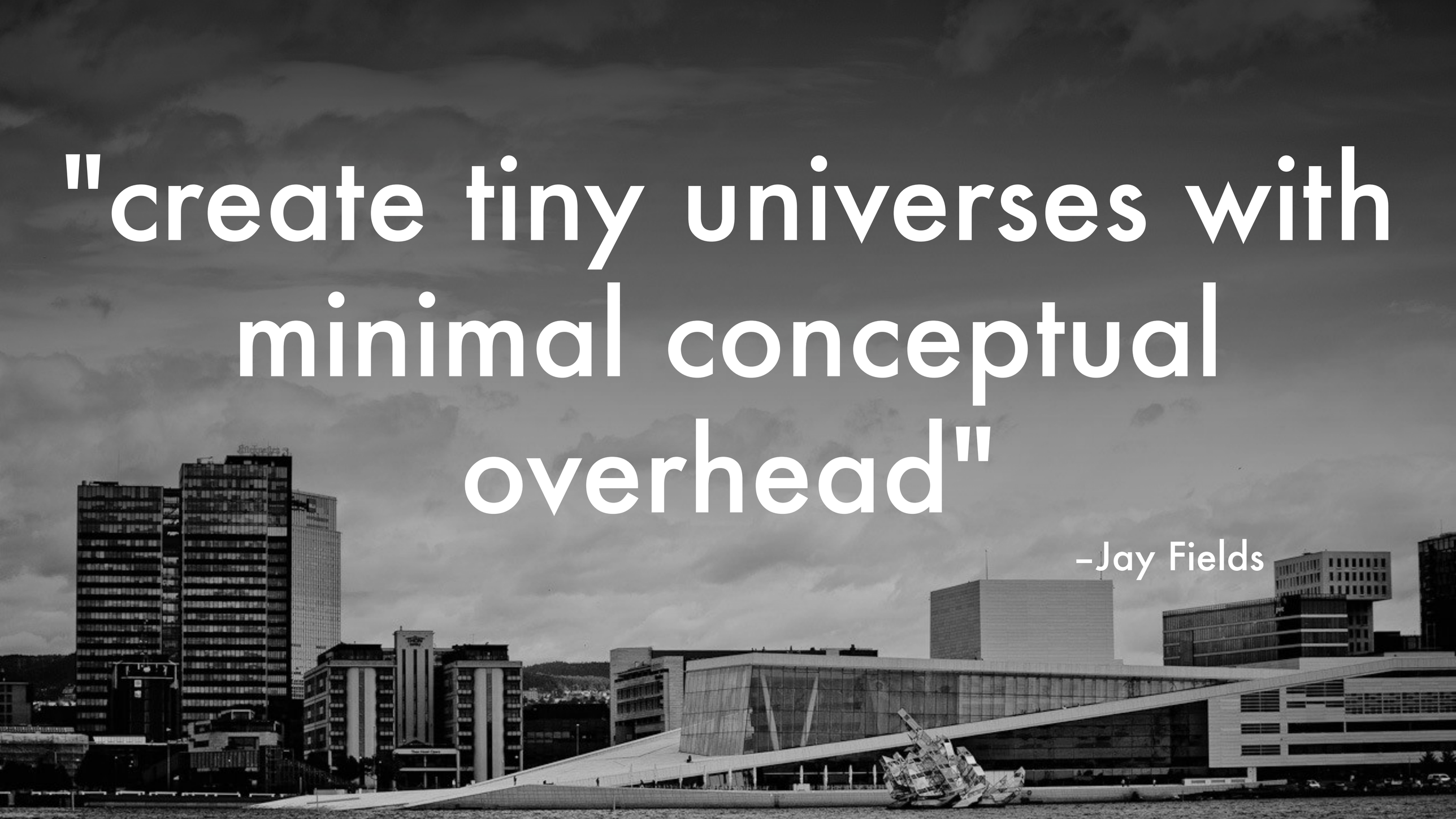

TIME SPENT READING CODE > TIME SPENT WRITING CODE


IN A TEAM YOU SPEND A LOT OF
TIME READING OTHERS' CODE


NO SETUP


DRY
ISN'T ALWAYS THE ANSWER


DRYING UP LINES
vs
DRYING UP CONCEPTS



"create tiny universes with minimal conceptual overhead"

–Jay Fields

CREATION HELPERS

```
it('is valid when policy holder is young enough', function() {
    var order = createOrder({
        cart: createCart([{ type: 'CI' }]),
        policyHolder: createPolicyHolder({ age: 14 })
    });

    expect(order.isValid()).toBe(true);
});
```

```
it('is not valid when policy holder is too old', function() {
    var order = createOrder({
        cart: createCart([{ type: 'CI' }]),
        policyHolder: createPolicyHolder({ age: 15 })
    });

    expect(order.isValid()).toBe(false);
});
```


CREATION
HELPERS
WITH GOOD DEFAULTS


REVEAL
INTENT

WHAT ARE WE TESTING HERE?

```
it('validates', function() {
    expect(order.isValid()).toBe(true);
});
```


REVEAL
INTENT
FOCUS ON WHY, NOT HOW


DETERMINISTIC

```
beforeEach(function() {
    policyHolder1 = new PolicyHolder({
        name: "Ola Nordmann",
        ssn: 07099451429,
        telephoneNumber: "+4795732501",
        email: "me@example.org",
        address: {
            street: "Toftes gate 17",
            postCode: 0556,
            postalArea: "Oslo"
        }
    });
    policyHolder2 = new PolicyHolder({
        name: "Testy Testeson",
        ssn: 17099926629,
        telephoneNumber: "+4743032501",
        email: "me2@example.org",
        address: {
            street: "Ravnkollbakken 3",
            postCode: 0970,
            postalArea: "Oslo"
        }
    });

    beneficiary1 = {
        name: "Testy2",
        ssn: "04037335466"
    }
    beneficiary2 = {
        name: "Testy3",
        ssn: "18049938744"
    }
    beneficiary3 = {
        name: "Testy4",
        ssn: "21050682312"
    }

    cart = new Cart();

    order = new Order({
        cart: cart,
        policyHolder: policyHolder1,
        withdrawalDay: 15
    });
});
```

REMEMBER THIS ONE?


NO
CONDITIONALS
NO FOR, IF OR WHILE


Midnight
12:01 am
1:00 am
11:00 am
Noon
12:01 pm
1:00 pm
11:59 pm

```
it("handles dates correctly", function() {
    for (var mins = 0; mins < 1440; mins++) {
        var d = new Date(2014, 1, 1, 0, 0, mins, 0)
        var event = new Event({ date: d });

        if (d.getHours() == 0 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Midnight");
        }
        else if (d.getHours() == 12 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Noon");
        }
        else {
            expect(event.date).toEqual(moment(d).format("h:mm a"));
        }
    }
});
```

```
it("handles dates correctly", function() {
    for (var mins = 0; mins < 1440; mins++) {
        var d = new Date(2014, 1, 1, 0, 0, mins, 0)
        var event = new Event({ date: d });

        if (d.getHours() == 0 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Midnight");
        }
        else if (d.getHours() == 12 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Noon");
        }
        else {
            expect(event.date).toEqual(moment(d).format("h:mm a"));
        }
    }
});
```

CAN YOU SPOT THE BUG?

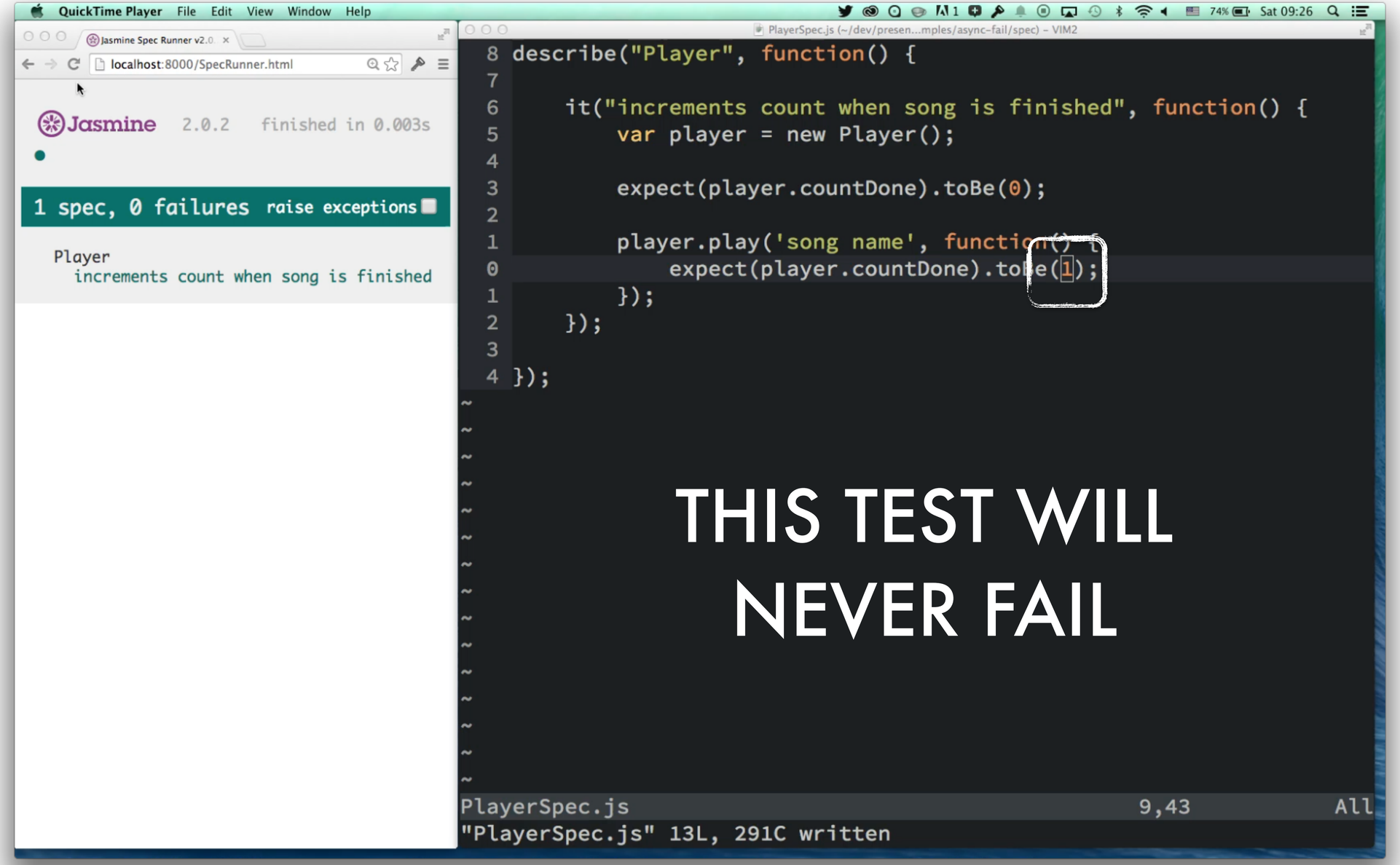
```
it("handles dates correctly", function() {
    for (var mins = 0; mins < 1440; mins++) {
        var d = new Date(2014, 1, 1, 0, 0, mins, 0)
        var event = new Event({ date: d });

        if (d.getHours() == 0 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Midnight");
        }
        else if (d.getHours() == 12 && d.getMinutes() == 0) {
            expect(event.date).toEqual("Noon");
        }
        else {
            expect(event.date).toEqual(moment(d).format("h:mm a"));
        }
    }
});
```

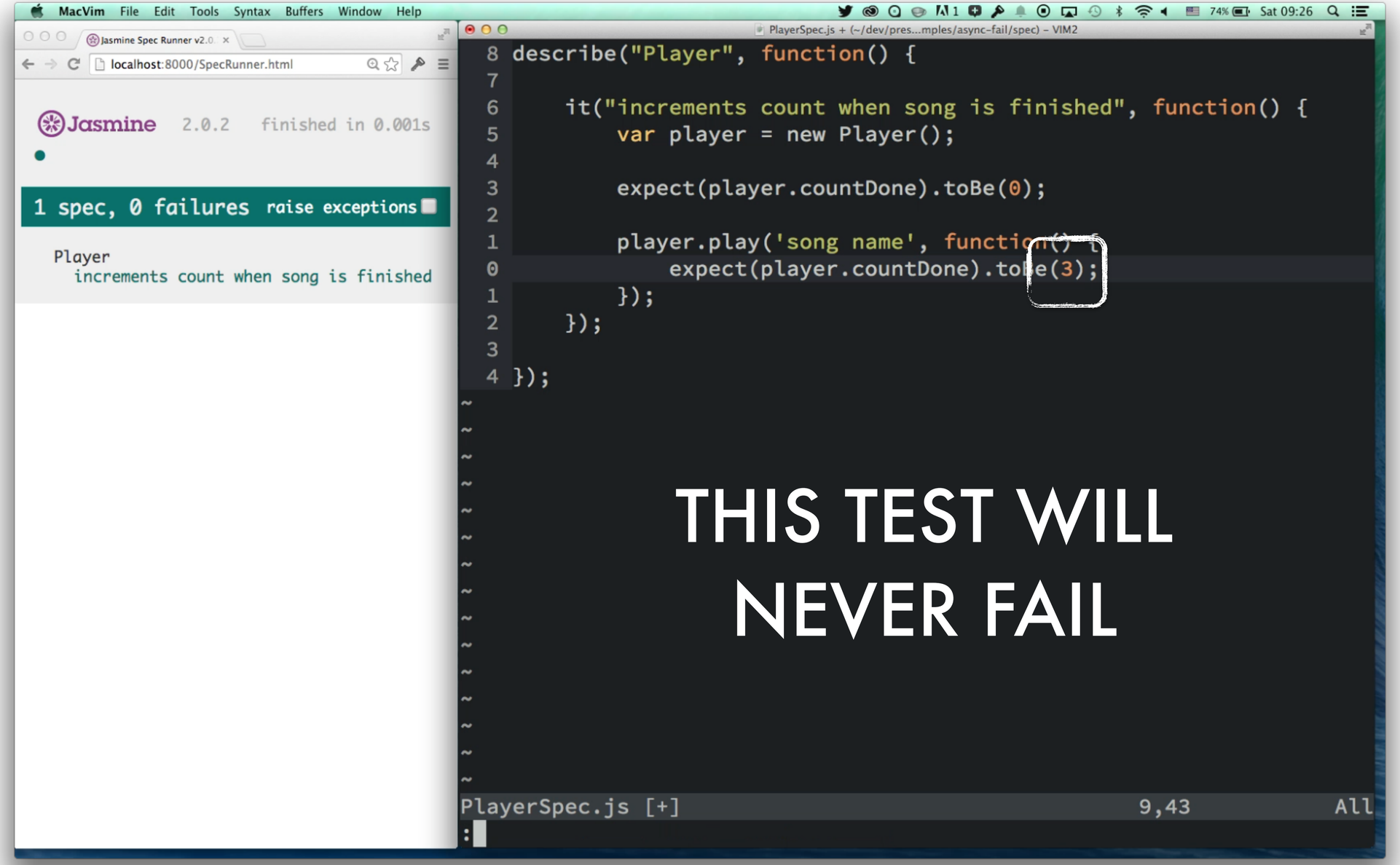
This is seconds, not minutes

CAN YOU SPOT THE BUG?

```
it("handles noon", function() {
    var event = new Event({
        date: createDate({ hours: 12, mins: 0 })
    });

    expect(event.date).toEqual("Noon");
});

it("handles midnight", function() {
    var event = new Event({
        date: createDate({ hours: 0, mins: 0 })
    });

    expect(event.date).toEqual('Midnight');
});
```


SEE IT FAIL
YOU DON'T WANT TO FAIL AT FAILING


QuickTime Player File Edit View Window Help
Jasmine Spec Runner v2.0
localhost:8000/SpecRunner.html
Jasmine 2.0.2 finished in 0.003s
1 spec, 0 failures raise exceptions
Player
increments count when song is finished
PlayerSpec.js (~/dev/presen...mples/async-fail/spec) - VIM2
describe("Player", function() {
it("increments count when song is finished", function() {
var player = new Player();
expect(player.countDone).toBe(0);
player.play('song name', function() {
expect(player.countDone).toBe(1);
});
});
});
PlayerSpec.js 9,43 All
"PlayerSpec.js" 13L, 291C written
THIS TEST WILL NEVER FAIL


MacVim File Edit Tools Syntax Buffers Window Help
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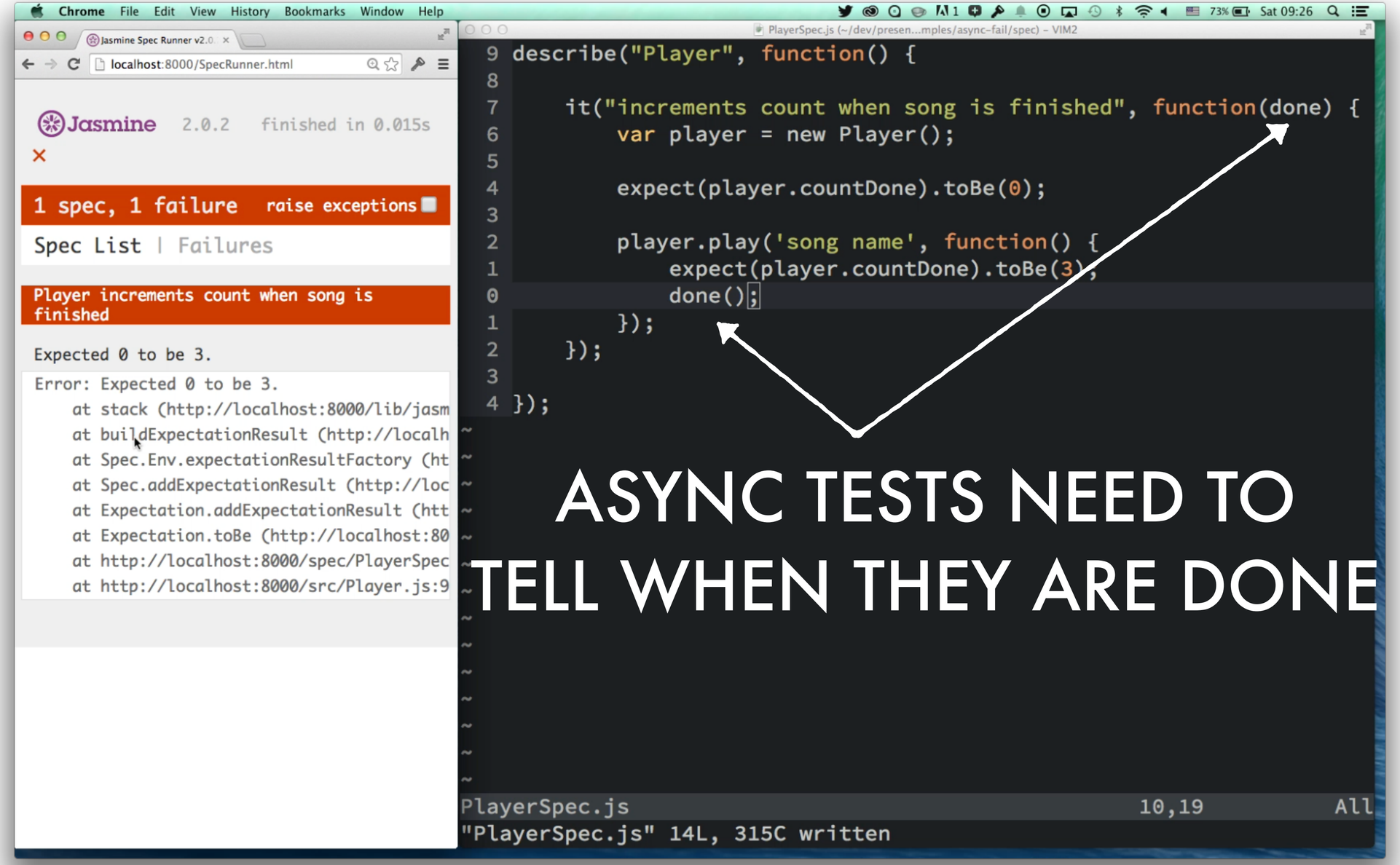
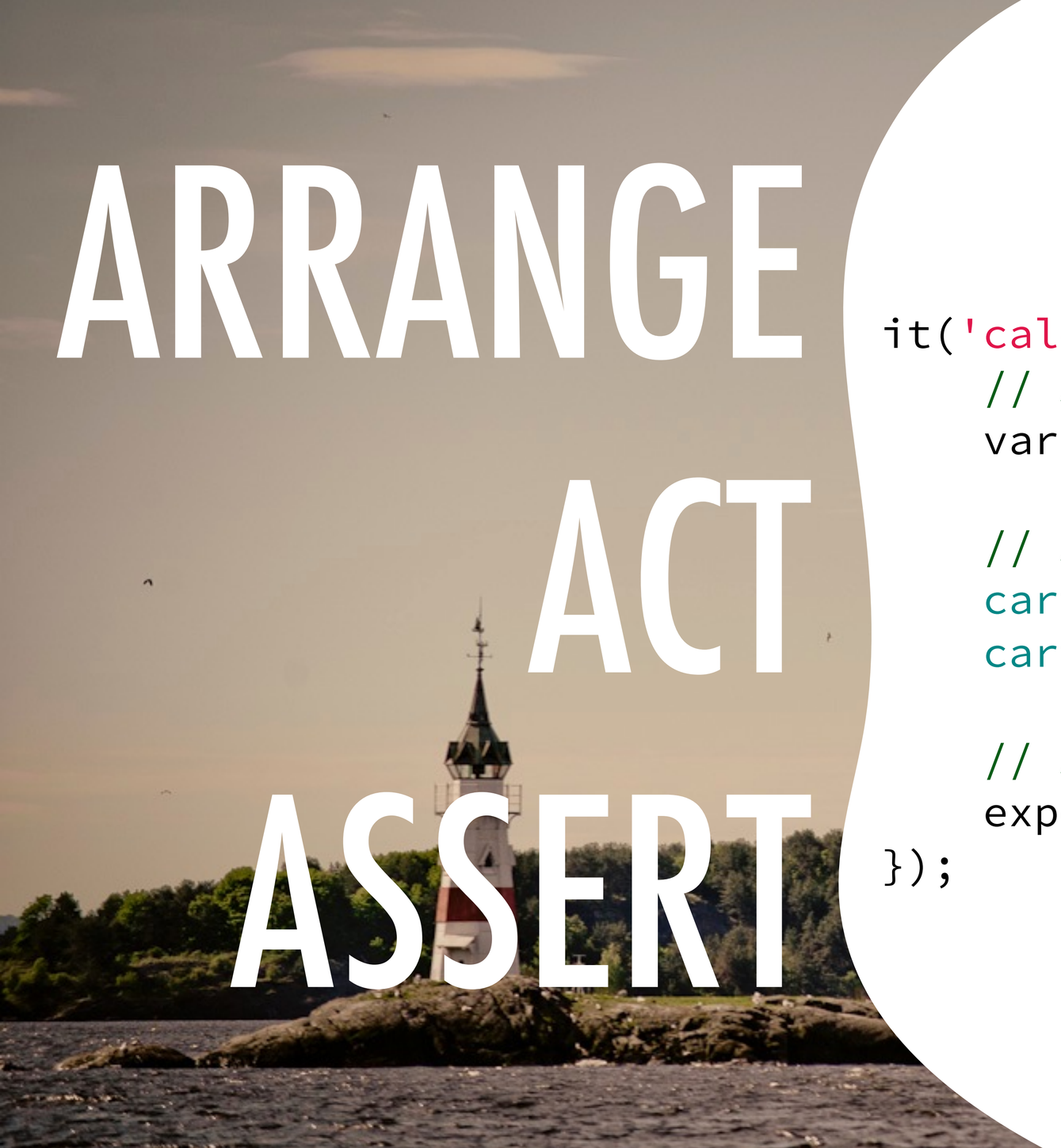
localhost:8000/SpecRunner.html
Jasmine 2.0.2 finished in 0.001s
1 spec, 0 failures raise exceptions
Player
increments count when song is finished
PlayerSpec.js + (~/dev/pres...mples/async-fail/spec) - VIM2
describe("Player", function() {
it("increments count when song is finished", function() {
var player = new Player();
expect(player.countDone).toBe(0);
player.play('song name', function() {
expect(player.countDone).toBe(3);
});
});
});
PlayerSpec.js [+] 9,43 All
THIS TEST WILL
NEVER FAIL


Chrome File Edit View History Bookmarks Window Help
Sat 09:26
Jasmine Spec Runner v2.0
localhost:8000/SpecRunner.html
Jasmine 2.0.2 finished in 0.015s
1 spec, 1 failure raise exceptions
Spec List | Failures
Player increments count when song is finished
Expected 0 to be 3.
Error: Expected 0 to be 3.
at stack (http://localhost:8000/lib/jasm
at buildExpectationResult (http://localh
at Spec.Env.expectationResultFactory (ht
at Spec.addExpectationResult (http://loc
at Expectation.addExpectationResult (htt
at Expectation.toBe (http://localhost:80
at http://localhost:8000/spec/PlayerSpec
at http://localhost:8000/src/Player.js:9
PlayerSpec.js (~/dev/presen...mples/async-fail/spec) - VIM2
describe("Player", function() {
it("increments count when song is finished", function(done) {
var player = new Player();
expect(player.countDone).toBe(0);
player.play('song name', function() {
expect(player.countDone).toBe(3);
done();
});
});
});
ASYNC TESTS NEED TO TELL WHEN THEY ARE DONE
PlayerSpec.js 10,19 All
"PlayerSpec.js" 14L, 315C written


Remember, the most important thing your tests do is
FAIL

BEWARE OF ASYNC

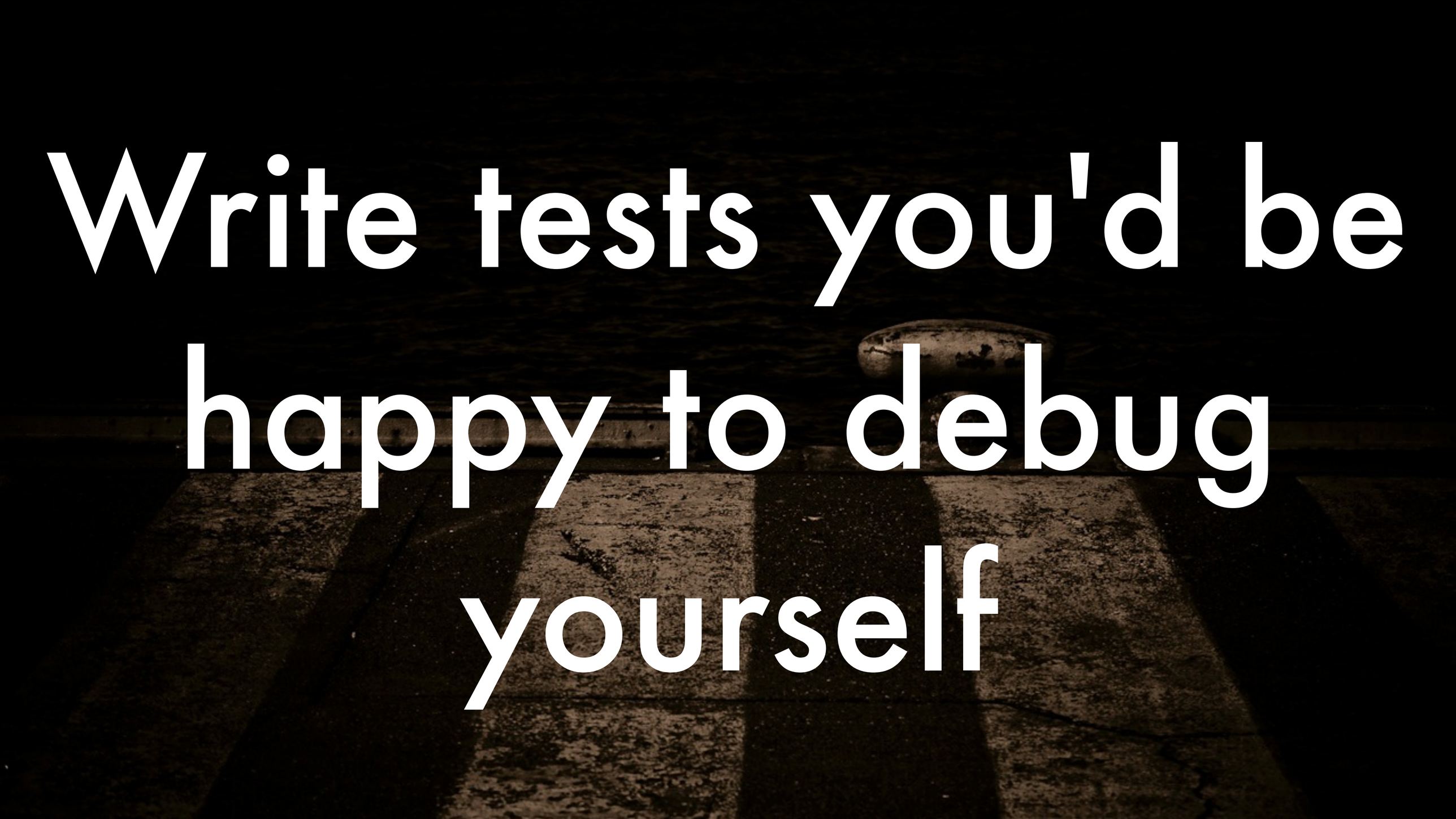



```
it('calculates total price', function() {
    // ARRANGE
    var cart = new Cart();

    // ACT
    cart.addItem(...);
    cart.addItem(...);

    // ASSERT
    expect(cart.totalPrice()).toEqual(1097);
});
```

and perhaps most importantly …


Tests SHOULD to
be stupidly
simple


What happens when
we don't understand
our tests?


Write tests you'd be
happy to debug
yourself

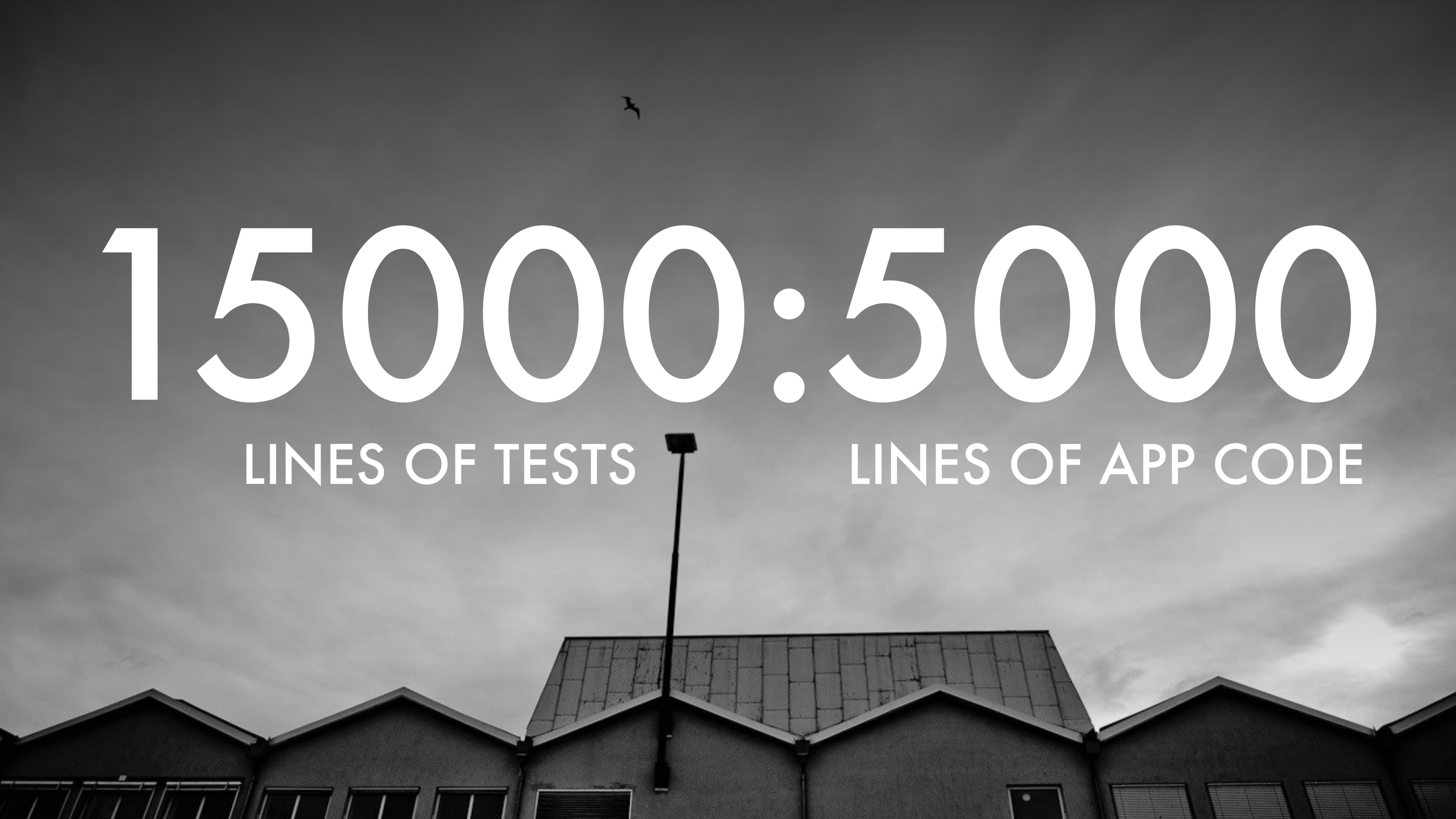

MAINTAINING
YOUR TESTS


POOR
QUALITY TESTS
CAN SLOW DEVELOPMENT
TO A CRAWL


FEEL THE PAIN
IF IT DOESN'T FEEL GOOD, FIX IT!

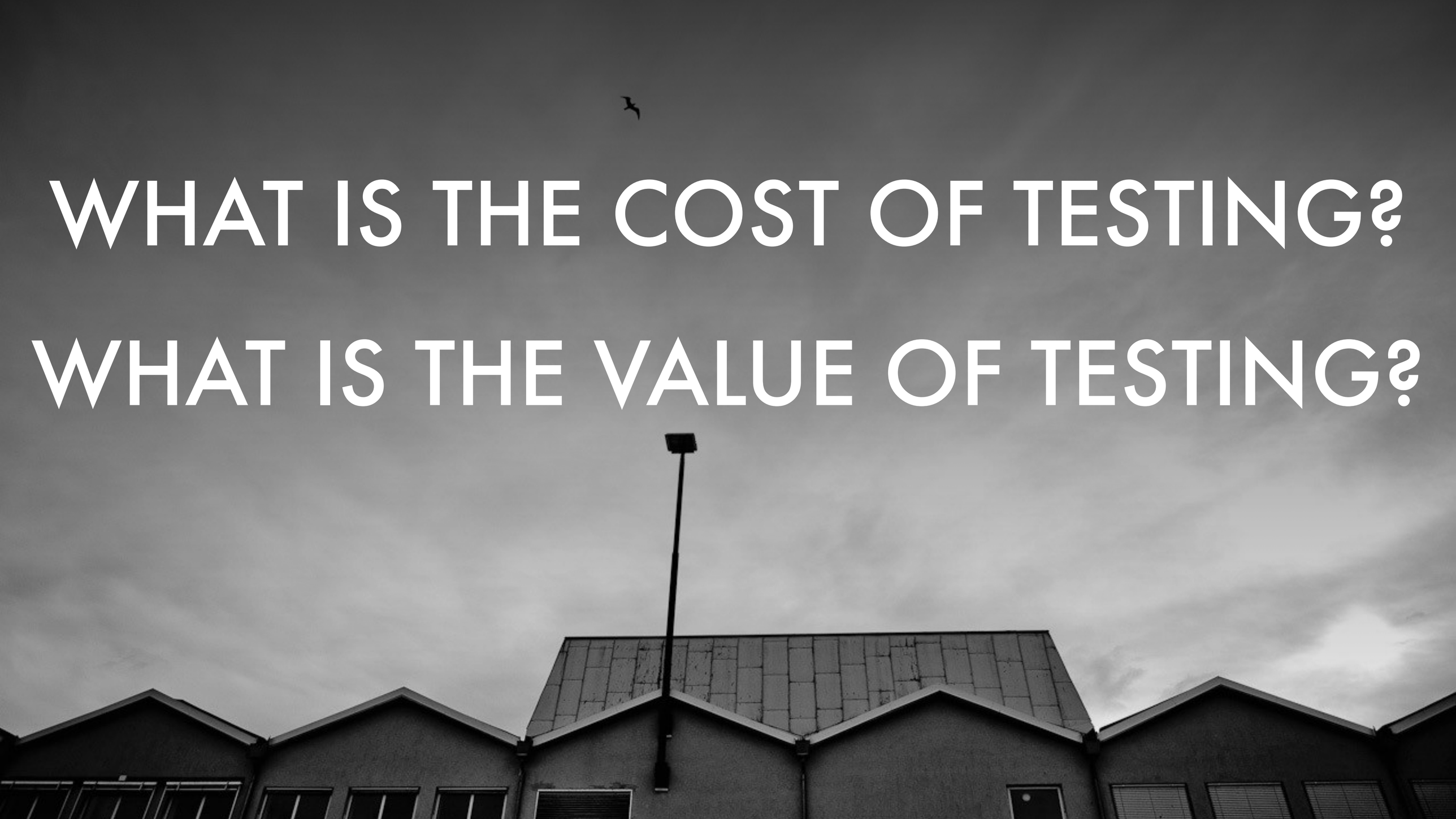

REFACTOR
YOUR TESTS


3:1


15000:5000
LINES OF TESTS
LINES OF APP CODE

"... test the areas that you are most worried about going wrong"

– Martin Fowler


WHAT IS THE COST OF TESTING?
WHAT IS THE VALUE OF TESTING?


LESS
DOGMA-DRIVEN
TESTING, PLEASE

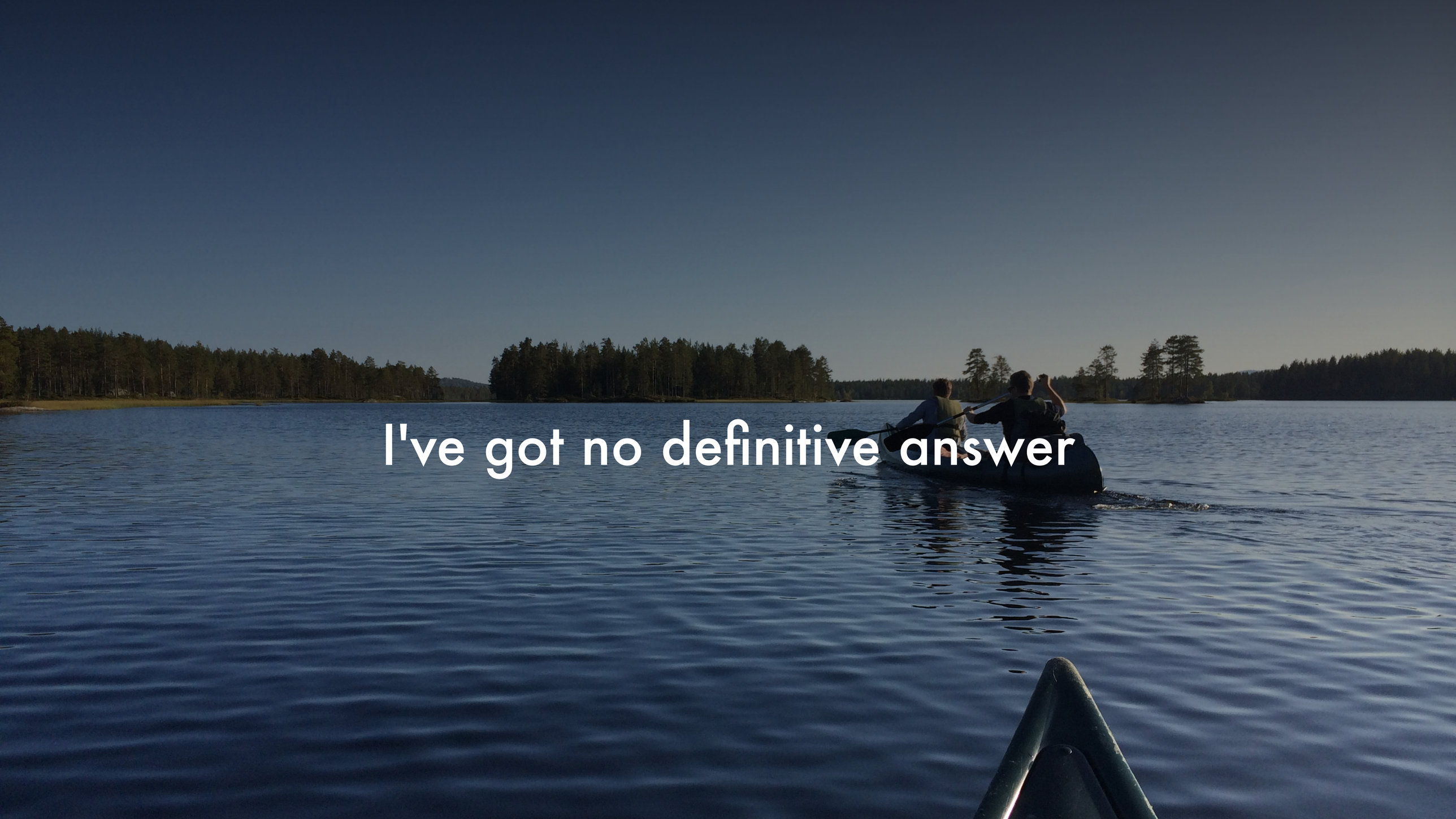

DON'T ACCEPT
INCOMPREHENSIBLE
TESTS

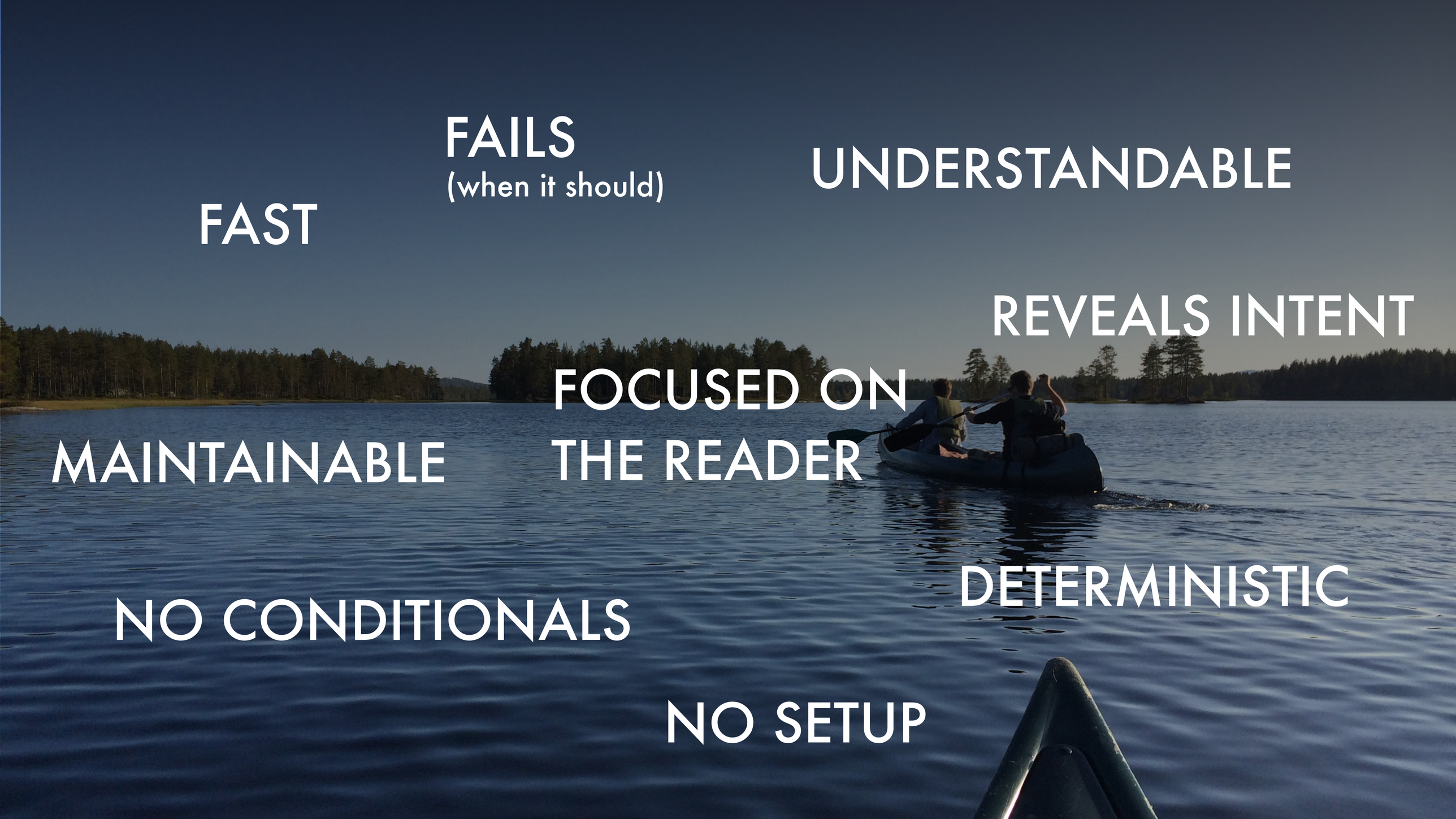

KEEP 'EM
SIMPLE


TESTS CAN
BE AWESOME

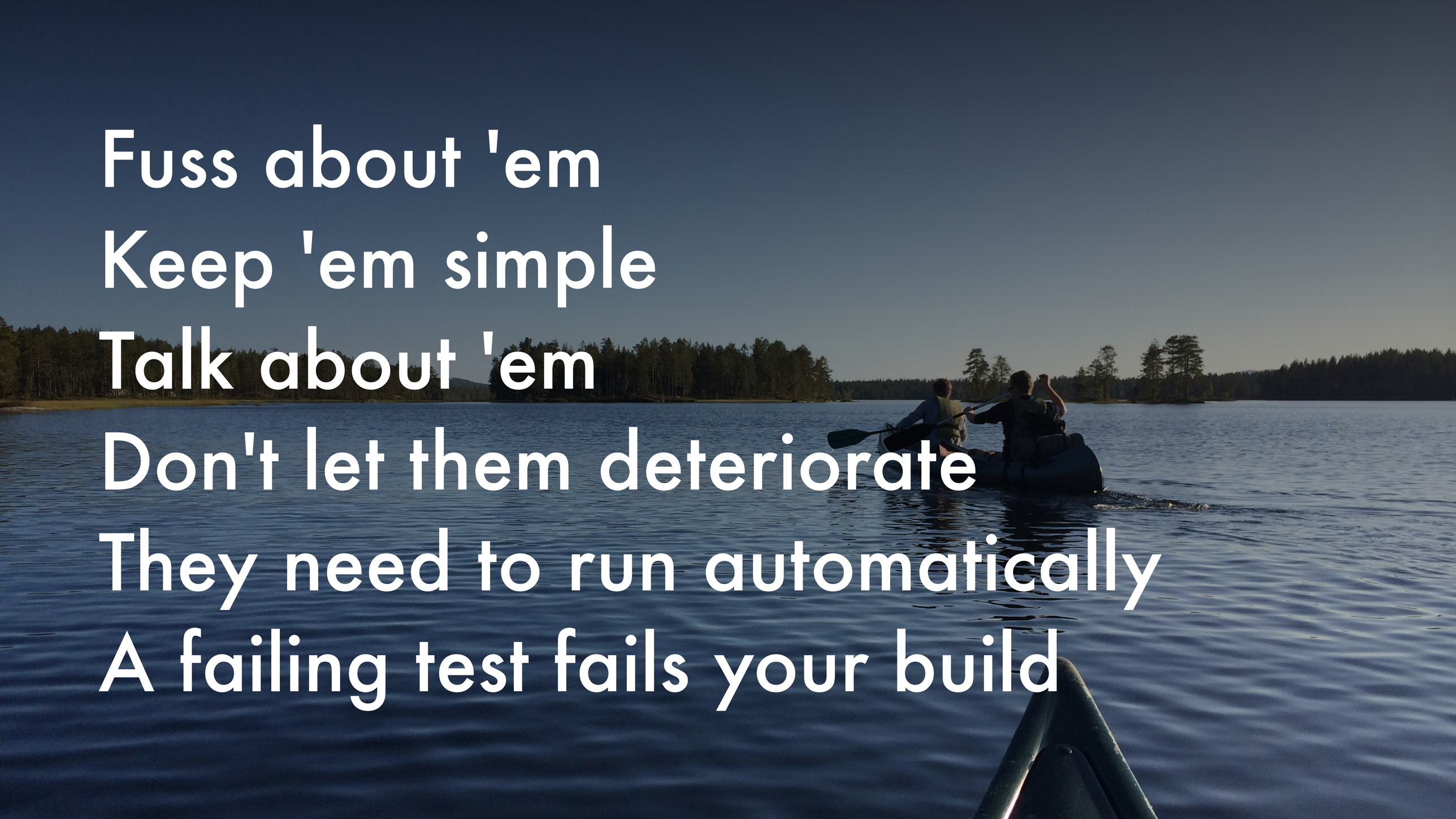

HOW CAN WE
INCREASE THE
VALUE?

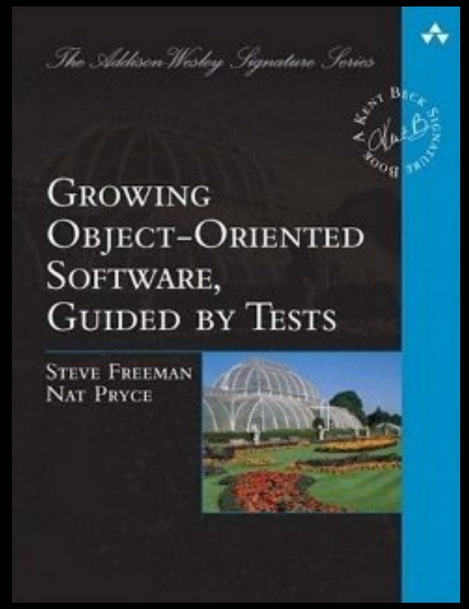

SO – WHAT IS A
BEAUTIFUL TEST?


I've got no definitive answer

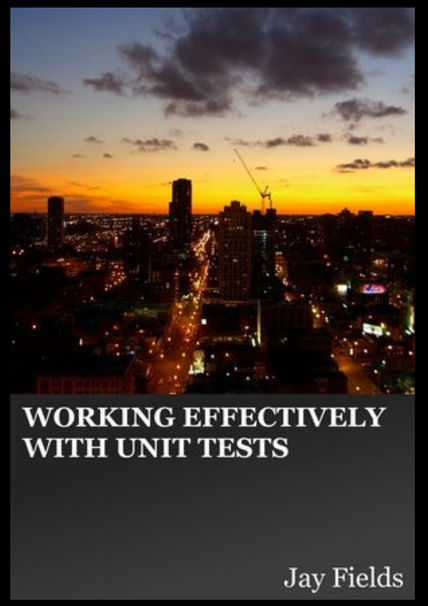

FAILS
(when it should)
UNDERSTANDABLE
FAST
REVEALS INTENT
FOCUSED ON
THE READER
MAINTAINABLE
DETERMINISTIC
NO CONDITIONALS
NO SETUP

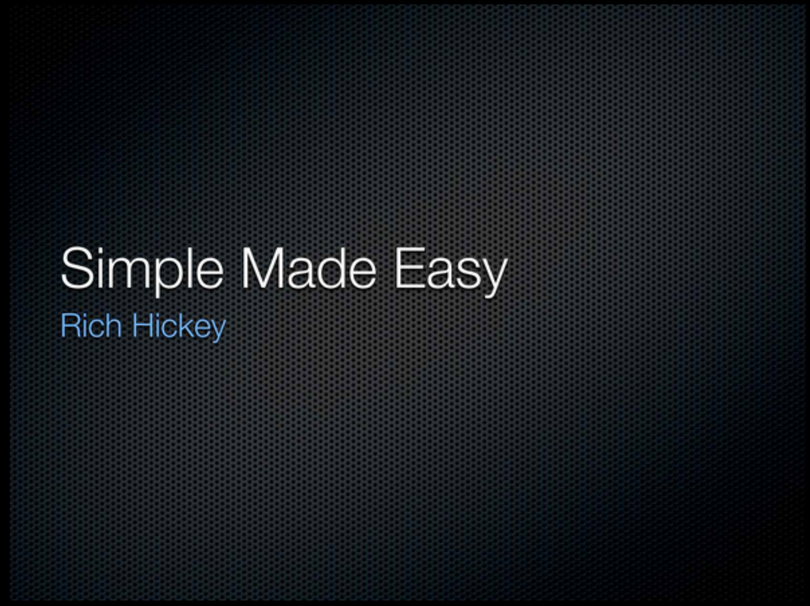

Focus on the craft, not the tools


Fuss about 'em
Keep 'em simple
Talk about 'em
Don't let them deteriorate
They need to run automatically
A failing test fails your build



WANT TO LEARN MORE?






THANK
YOU
I'm here until Sunday — let me know
if you want to talk JavaScript
kimjoar.net