Code Quality Assurance

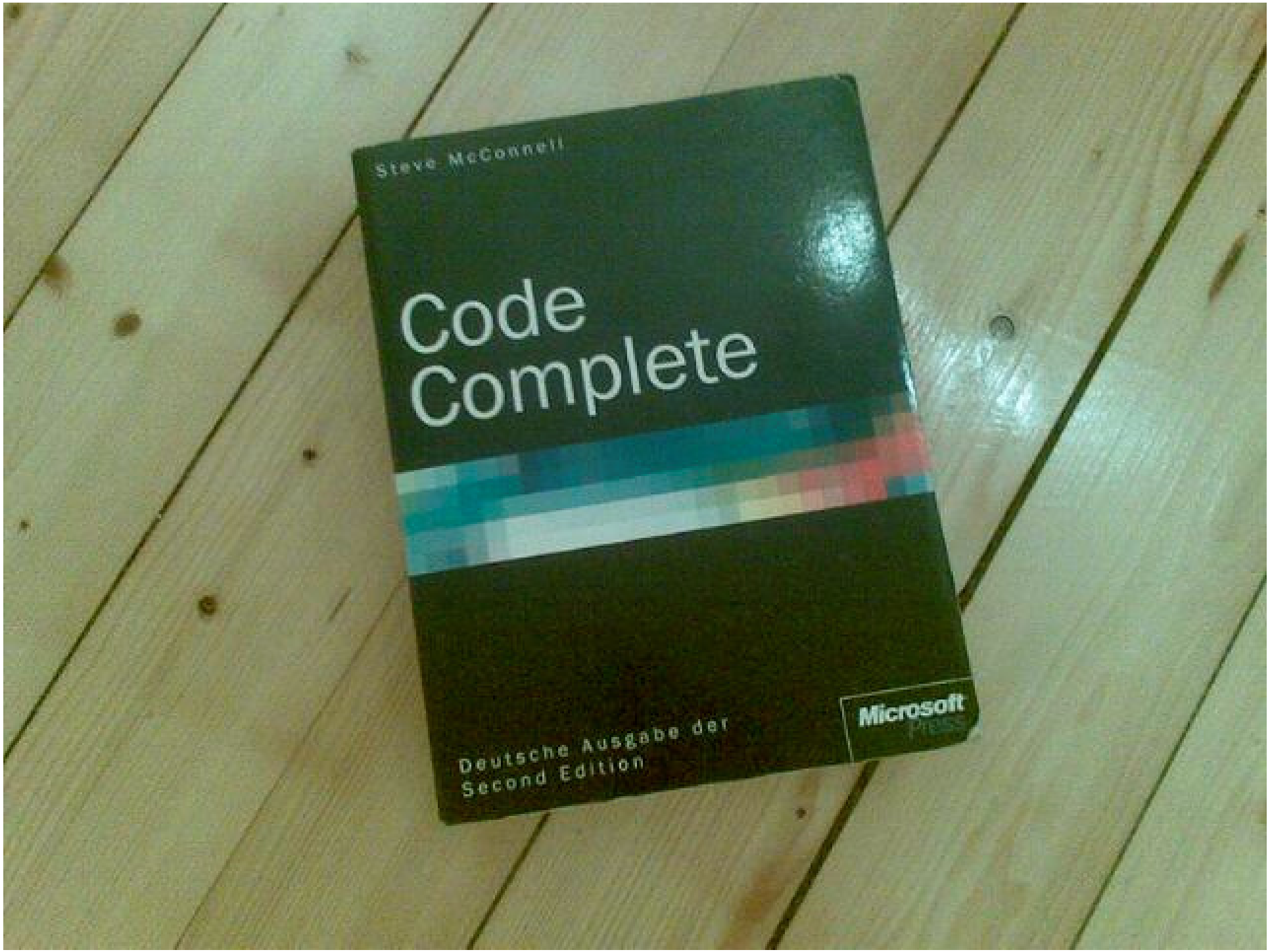
Peter Kofler, ‘Code Cop’
FH Technikum Wien, February 2010

562
564

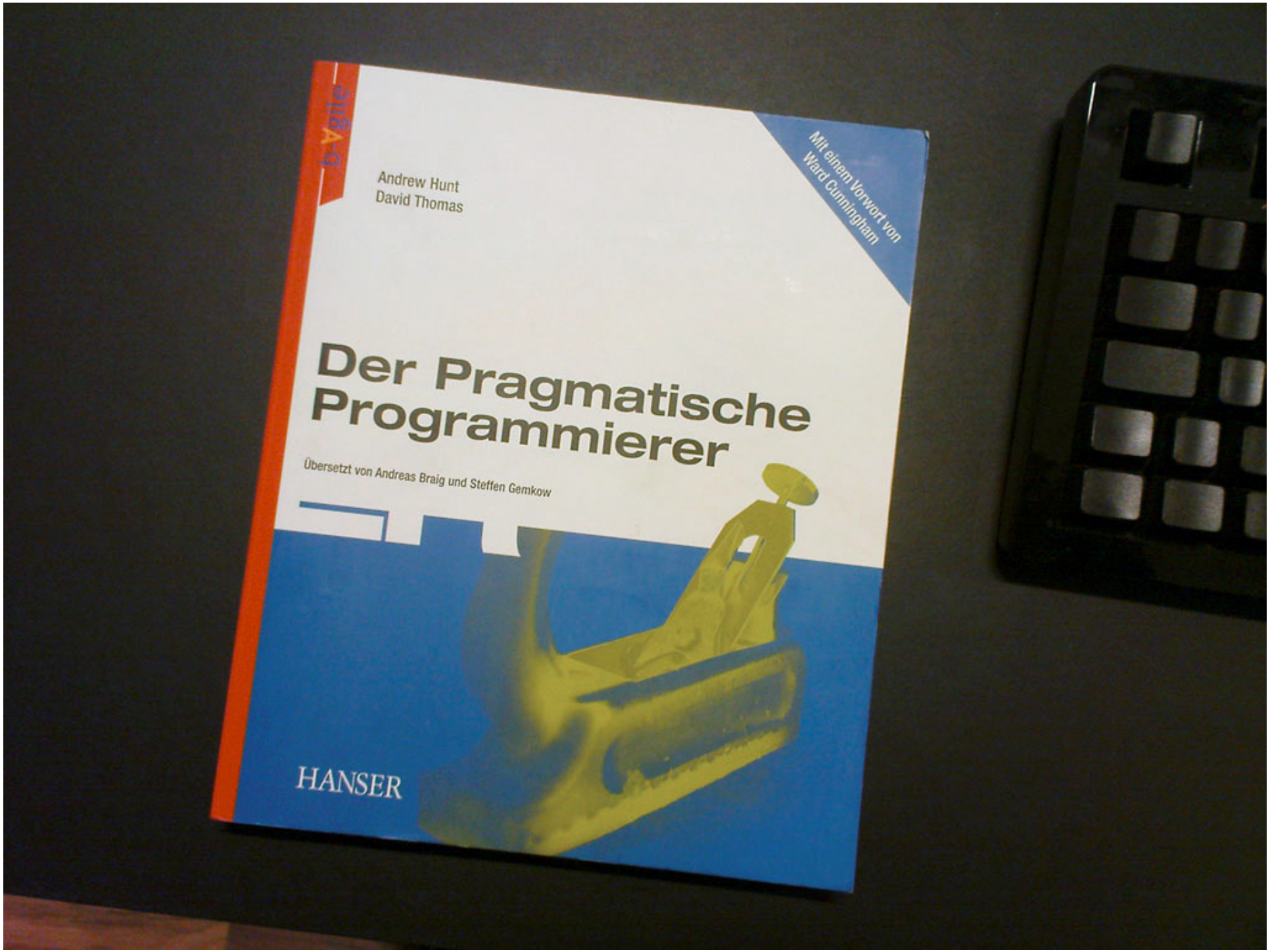
Peter Kofler

- Ph.D. (Appl. Math.)
- Professional Software Developer for 11 years
- Lead Developer at System One
- fanatic about code quality

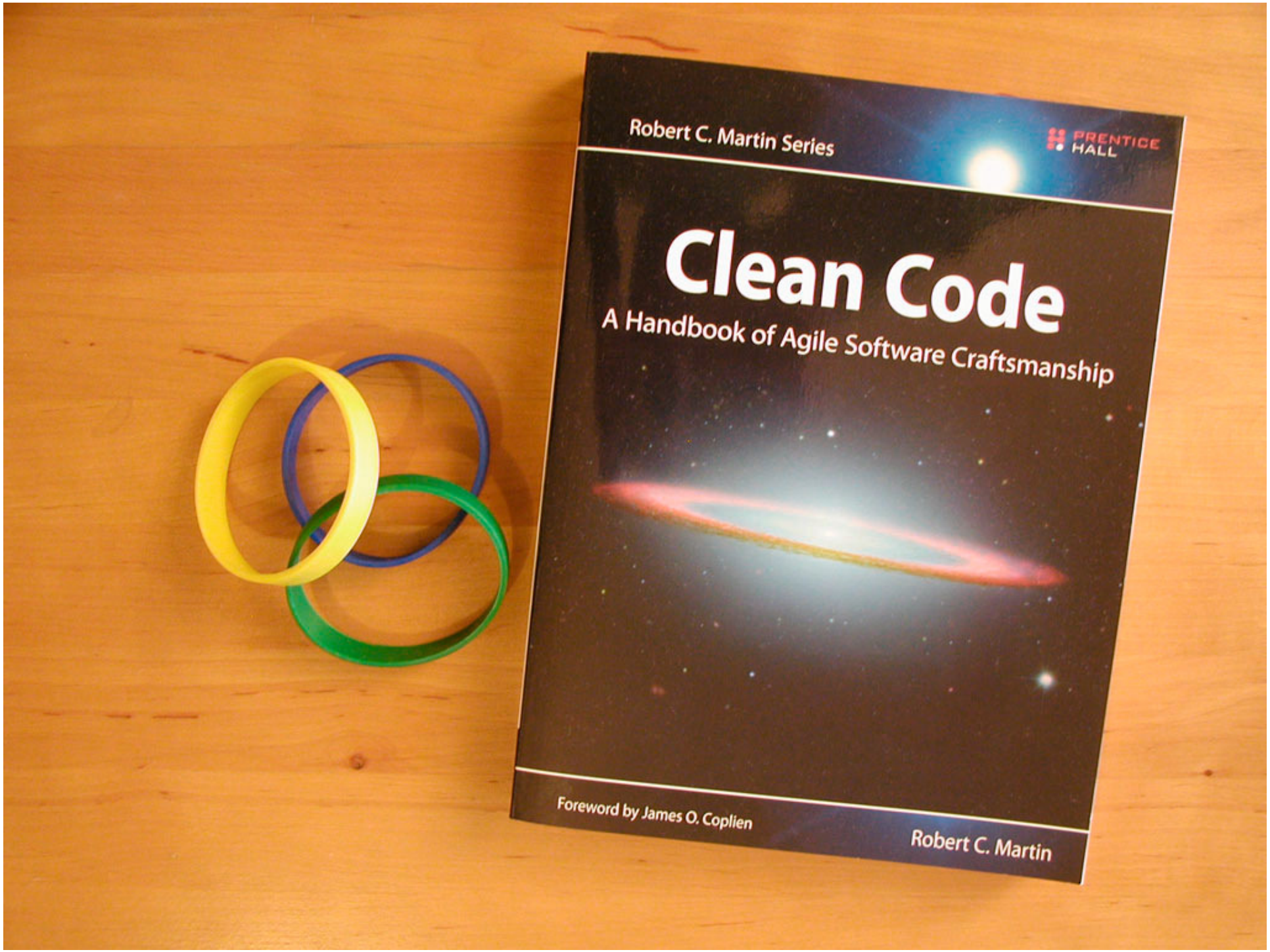
Zero-Defect Mindset (MSF)


Steve McConnell
Code Complete
Deutsche Ausgabe der
Second Edition
Microsoft
PRESS

GET
Inc
Oliver
CROPS
SWL
epc
yeah


b-agile
Andrew Hunt
David Thomas
Mit einem Vorwort von Ward Cunningham
Der Pragmatische Programmierer
Übersetzt von Andreas Braig und Steffen Gemkow
HANSER

Robert C. Martin
(“Uncle Bob”)


Robert C. Martin Series
PRENTICE HALL
Clean Code
A Handbook of Agile Software Craftsmanship
Foreword by James O. Coplien
Robert C. Martin

Software Craftsmanship

Craftsmanship Over Crap

The Prime Factors Kata

The Requirements.

- Write a class named “PrimeFactors” that has one static method: generate.
  - The generate method takes an integer argument and returns a List<Integer>.
  - That list contains the prime factors in numerical sequence.

http://butunclebob.com/ArticleS.UncleBob.ThePrimeFactorsKata

Demo

Keep the bar green to keep the code clean

Unit Testing

- test individual units
- isolate each part
- show that the individual parts are correct
- regression testing
- sort of living documentation
- executed within a framework

http://en.wikipedia.org/wiki/Unit_testing

xUnit Frameworks

- e.g.
- Smalltalk - SUnit
- Java - JUnit, TestNG
- .NET - NUnit, Typemock
- C++ - CppUTest
- Groovy, PHP, Python, Ruby, Scala, etc.

http://en.wikipedia.org/wiki/List_of_unit_testing_frameworks

TESTING

I FIND YOUR LACK OF TESTS DISTURBING.

Test-Driven Development

- add a test
- run all tests and see if the new one fails
- write some code
- run all tests and see them succeed
- refactor code
- „Red Green Refactor“

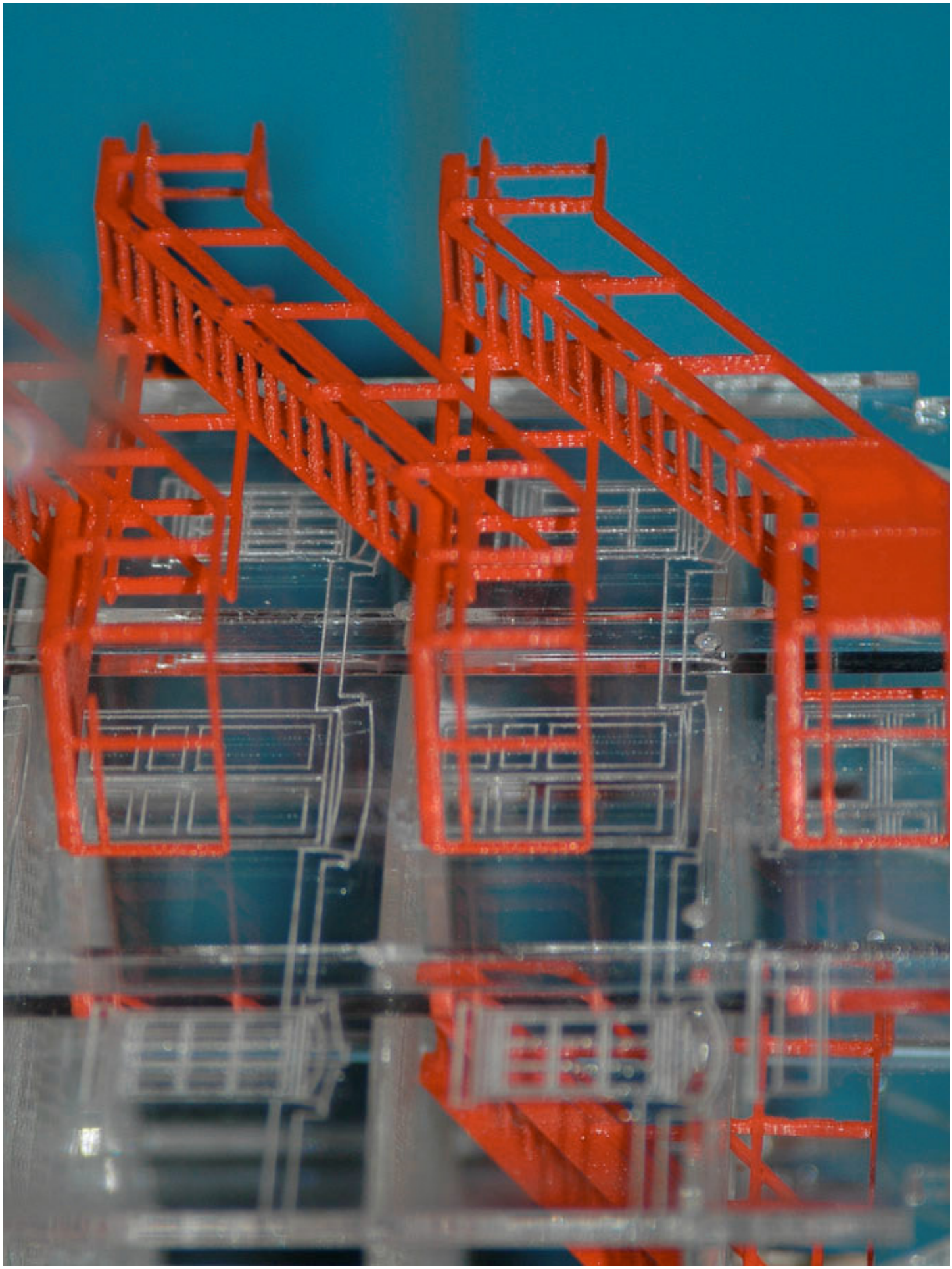
http://en.wikipedia.org/wiki/Test_Driven_Development

The Three Laws of TDD

- You are not allowed to write any production code unless to make a failing unit test pass.
- You are not allowed to write any more of a unit test than is sufficient to fail; and compilation failures are failures.
- You are not allowed to write any more production code than is sufficient to pass the one failing unit test.

http://butunclebob.com/ArticleS.UncleBob.TheThreeRulesOfTdd

“A minute ago all their code worked!”



Erich Gamma
Richard Helm
Ralph Johnson
John Vlissides
Entwurfsmuster
Elemente wiederverwendbarer objektorientierter Software
ADDISON-WESLEY
The Addison Wesley Signature Series
A Kent Beck Book Signature
Test-Driven Development
By Example
Kent Beck
Refacto
Wie Sie das Design vorhandener Softw verbessern
Erich Gamma
119

Testing is a mindset.

You have to want it.

مكتبة الإيمان
٢٦٢٤٦٨٩/٥
الجمعية الشرعية للتقوية
الرياضيات
التاريخ

Code Coverage

comprehensiveness of tests

Beware!

comprehensiveness ≠ quality!

Some Code Coverage Tools

- Java - EMMA, Cobertura, Clover
- .NET - NCover, PartCover
- C++ - Covtool, gcov
- Ruby - rcov
- commercial products

Demo

Demo

works on
my
machine

Daily/Nightly Builds

Continuous Integration

Continuous Integration

- Maintain a code repository
- Automate the build
- Make the build self-testing
- Everyone commits every day
- Every commit should be built
- Keep the build fast
- Everyone can see the results of the build

http://en.wikipedia.org/wiki/Continuous_integration

Immediate Feedback & Early Warning

YOU BROKE THE BUILD!
This is Agnes and she's none too pleased with you, Bub.
You broke the build. You should have known that you were
making breaking changes, but you checked them in anyway.
If you start using continuous integration, Agnes
won't have to come back.
www.YouBrokeTheBuild.com

Some CI Servers

- Java - CruiseControl, Hudson
- .NET - CruiseControl.NET, Hudson (NAnt)
- C++ - Hudson (Shell/Make)
- Ruby - CruiseControl.rb
- commercial products - TeamCity, ALA

Book
“Continuous Integration”
(Paul Duvall)

Good Enough?

Demo

44 40 32

Check What?

- Lexical analysis
  - naming, coding conventions, design idioms
- Flow/path analysis
  - null-pointer, dead code (conditional)
- Dependency analysis
  - architectural/design flaws
- Verification
  - mathematical proof of correctness

Some Static Analysis Tools

- Java - Checkstyle, Findbugs, PMD
- .NET - FxCop, (ReSharper, NDepend)
- C++ - (Sp)Lint
- Ruby - Roodi, Dust, Flog, Saikuro
- commercial products

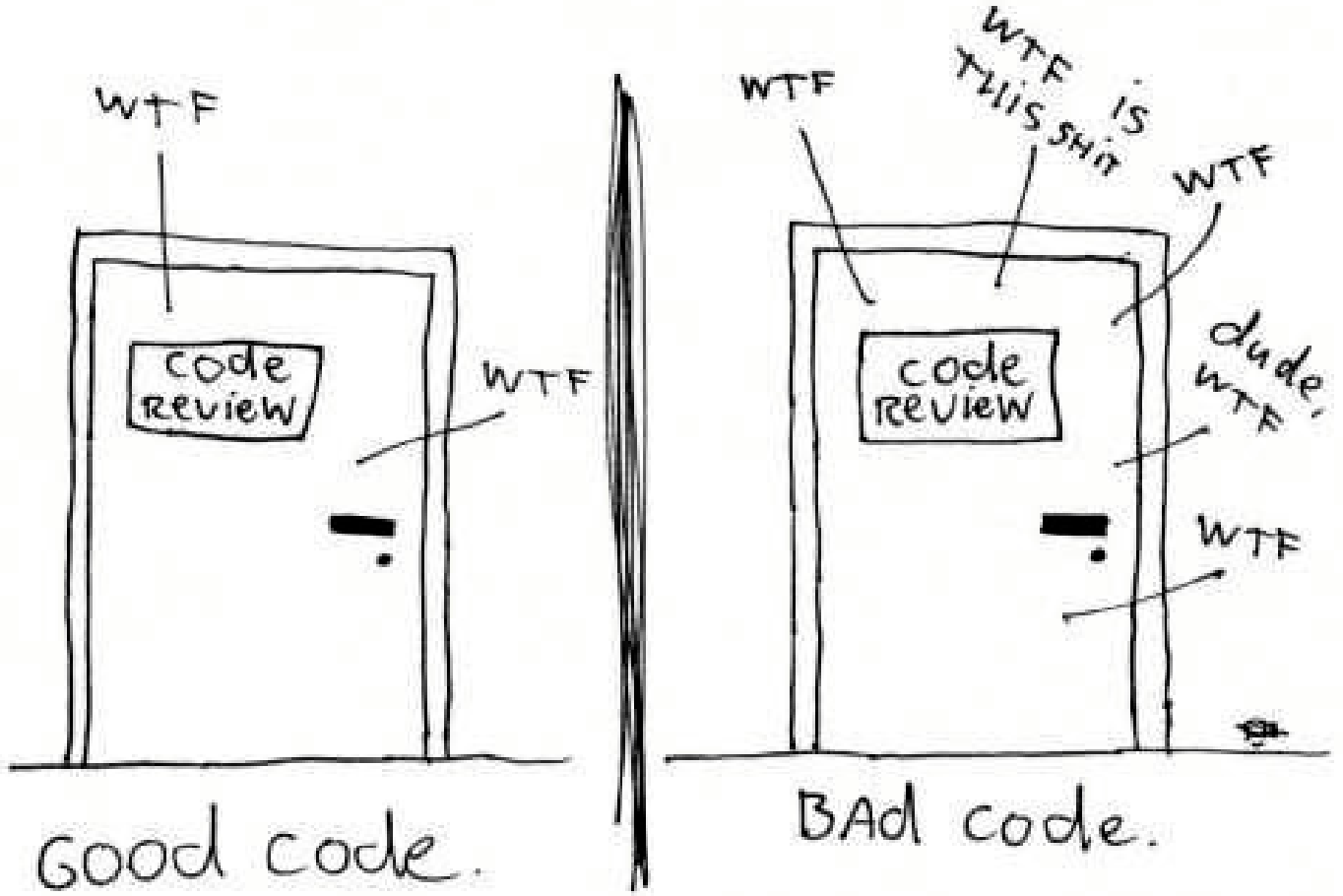
Good Enough?

Demo

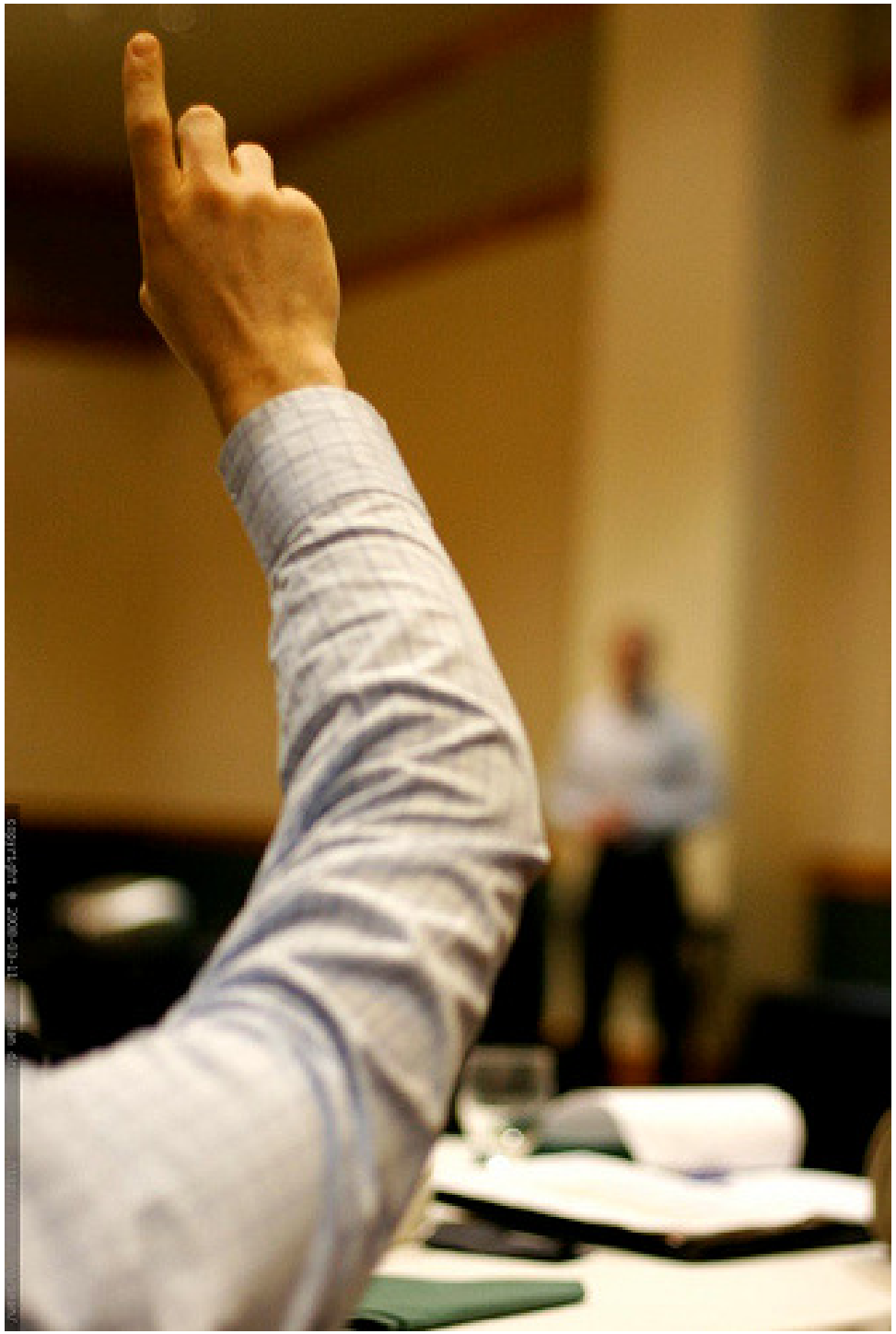
Some Code Review Tools

- Your peer (Pair Programming)
- Your version control system
- Your IDE (e.g. ReviewClipse)
- commercial products

The ONLY VALID MEASUREMENT OF Code QUALITY: WTFs/MINUTE



(c) 2008 Focus Shift



Thank You

http://www.code-cop.org/

Links #1

Mindset

- http://codebetter.com/blogs/darrell.norton/archive/2003/12/03/4222.aspx (Zero-Defect Mindset)
- http://www.sqnz.org.nz/documents/ShipHappens/Software%20Quality%20Group%20Presentation_frame.htm (Zero-Defect Mindset)
- http://en.wikipedia.org/wiki/Fixing_Broken_Windows
- http://pragprog.com/the-pragmatic-programmer
- http://en.wikipedia.org/wiki/Robert_Cecil_Martin
- http://www.clean-code-developer.de/
- http://en.wikipedia.org/wiki/Software_craftsmanship

Test

- http://butunclebob.com/ArticleS.UncleBob.ThePrimeFactorsKata
- http://en.wikipedia.org/wiki/Kata_(programming)

Links #2

Test

- http://en.wikipedia.org/wiki/Unit_testing
- http://en.wikipedia.org/wiki/XUnit
- http://en.wikipedia.org/wiki/List_of_unit_testing_frameworks
- http://en.wikipedia.org/wiki/Test_Driven_Development
- http://butunclebob.com/ArticleS.UncleBob.TheThreeRulesOfTdd

Code Coverage

- http://en.wikipedia.org/wiki/Code_coverage
- http://www.ibm.com/developerworks/java/library/j-cq01316/

Continuous Integration

- http://hudson-ci.org/
- http://www.codinghorror.com/blog/archives/000818.html

Links #3

Continuous Integration

- http://www.stevemcconnell.com/ieeesoftware/bp04.htm
- http://www.joelonsoftware.com/articles/fog0000000023.html
- http://en.wikipedia.org/wiki/Continuous_integration

Static Code Analysis

- http://en.wikipedia.org/wiki/Static_code_analysis
- http://en.wikipedia.org/wiki/List_of_tools_for_static_code_analysis

Code Review

- http://en.wikipedia.org/wiki/Code_review
- http://en.wikipedia.org/wiki/Pair_programming

Images

- spray face: http://www.flickr.com/photos/iangallagher/4115047191/
- broken egg: http://www.flickr.com/photos/nickwheeleroz/2475011402/
- windows: http://www.flickr.com/photos/sketchglass/4281424410/
- red-green: http://www.flickr.com/photos/30830597@N08/3630649274/
- Darth Vader: http://rubystammtisch.at/
- Model http://www.flickr.com/photos/cabfablab/3855825945/
- covered car: http://www.flickr.com/photos/paulk/3166328163/
- works: http://www.codinghorror.com/blog/archives/000818.html
- Agnes: http://www.youbrokethebuild.com/
- microscope: http://www.flickr.com/photos/gonzales2010/8632116/
- code review: http://www.flickr.com/photos/seandreilinger/2326448445/
- questions: http://www.flickr.com/photos/seandreilinger/2326448445/