Code Quality Assurance
(with a pinch of C# and PHP)

Peter Kofler, ‘Code Cop’
SEQIS, April 2011
Agenda

- Presentation
  - 30’ “Theory”
  - 1h “Practice”
- Break
- Workshop (2h)
  - Analysis of your Problems
  - Discussion of Solutions
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)
Der Pragmatische Programmierer
Robert C. Martin
(“Uncle Bob”)

[Signature]
Software
Craftsmanship
Craftsmanship

Engineering
Craftsmanship
Over Crap
suddenly “passion” became a buzzword!
Mindset and Passion
Prime Factors Kata
From Holy Bliss...

... To Epic Evil
Don’t Hurt Me!
The Requirements.

- Write a class named “PrimeFactors” that has one static method: Generate.
  - The Generate method takes an integer argument and returns a List<int>.
  - 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
  - .NET - NUnit, MSTest
  - Java - JUnit, TestNG
  - PHP - PHPUnit
  - C++, Groovy, Python, Ruby, Scala, etc.

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
A minute ago all their code worked
Test-Driven Development
By Example

Kent Beck
Testing is a mindset
You have to want it
Code Coverage

comprehensiveness of tests
Beware!

comprehensiveness ≠ quality!
Some Code Coverage Tools

- .NET - PartCover, (NCover, VS)
- Java - EMMA, Cobertura, Clover
- C++ - Covtool, gcov
- PHP - PHPUnit
- commercial products
Demo
Demo
Works on my machine
Daily Builds
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 and 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

- .NET - TFS, CruiseControl.NET, Jenkins
- Java - CruiseControl, Jenkins
- C++ - Jenkins (Shell/Make)
- PHP - Hudson, phpUnderControl, Arbit
- commercial products - TeamCity, ALA
CONTINUOUS INTEGRATION
IMPROVING SOFTWARE QUALITY AND REDUCING RISK

PAUL M. DUVALL
with
STEVE MATYAS
ANDREW GLOVER

Forewords by Martin Fowler and Paul Julius

The Addison-Wesley Signature Series

A MARTIN FOWLER SIGNATURE BOOK
Good Enough?
Demo
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

- .NET - FxCop, StyleCop (ReSharper)
- Java - Checkstyle, Findbugs, PMD
- C++ - (Sp)Lint
- PHP - PHPLint, PHP_CodeSniffer
- 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

Good code.

Bad code.
Thank You

FANATIC ABOUT CODE QUALITY
Links #1

**Mindset**
- [http://pragprog.com/the-pragmatic-programmer](http://pragprog.com/the-pragmatic-programmer)

**Software Craftsmanship**
Links #2

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

Katacasts C#
• http://urilavi.blogspot.com/2010/03/primes-kata.html
• http://www.rickardnilsson.net/post/2010/07/21/Prime-Factors-Kata.aspx

Unit Test
• http://en.wikipedia.org/wiki/Unit_testing
• http://en.wikipedia.org/wiki/Xunit
Links #3

- TDD
- Code Coverage
- Continuous Integration
  - http://jenkins-ci.org/
  - http://www.stevemcconnell.com/ieeesoftware/bp04.htm
Links #4

**Static Code Analysis**

**Code Review**
- http://en.wikipedia.org/wiki/Pair_programming
CC Images #1

- demo: http://www.flickr.com/photos/st3f4n/4109940538/
- list: http://www.flickr.com/photos/kylesteeeddesign/3724074594/
- spray face: http://www.flickr.com/photos/iangallagher/4115047191/
- eggs: http://www.flickr.com/photos/nickwheeleroz/2475011402/
- windows: http://www.flickr.com/photos/sketchglass/4281424410/
- shoe maker: http://www.flickr.com/photos/tbatty/1450209613/
- factory: http://www.flickr.com/photos/94693506@N00/4643248587/
- grail: http://www.flickr.com/photos/mr_t_in_dc/4183854194/
- evil: http://www.flickr.com/photos/legofenris/4476593087/
- puppy: http://www.flickr.com/photos/davdunc/3706558237/
CC Images #2

- fence: http://www.flickr.com/photos/30830597@N08/3630649274/
- Darth Vader: http://rubystammtisch.at/
- covered car: http://www.flickr.com/photos/paulk/3166328163/
- works: http://www.codinghorror.com/blog/archives/000818.html
- Agnes: http://www.youbrokethebuild.com/
- review: http://www.flickr.com/photos/smitty/2245445147/
- questions: http://www.flickr.com/photos/seandreilinger/2326448445/