Code Quality Assurance

Peter Kofler, ‘Code Cop’
FH Technikum Wien, Dec. 2011
Peter Kofler

- Ph.D. (Appl. Math.)
- Professional Software Developer for 11 years
- Lead Developer at IBM
- “fanatic about code quality”
The opinions expressed here are my own and do not necessarily represent those of current or past employers.
Zero-Defect Mindset (MSF)
Boy Scout Rule
Software Craftsmanship
Craftsmanship

Engineering

FANATIC ABOUT CODE QUALITY
Craftsmanship
Over Crap
Suddenly "passion" became a buzzword!
Mindset and Passion
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
Global Day of CodeRetreat (3.12.2011)

http://coderetreat.coachcamp.org/
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
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
TDD → BDD
Testing is a mindset
You

have to want it
Code Coverage

comprehensiveness of tests
Beware!

comprehensiveness ≠ quality!
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
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
Many, Many Tools
Good Enough?
(Probably Not)
Lessons Learned

(!) Boy Scout Rule

(!) Do TDD/BDD

(!) Use the Tools

(Coverage, CI, Static Analysis)
Thank You
www.code-cop.org

@codecopkofler
Links #1

**Mindset**
- http://pragprog.com/the-pragmatic-programmer

**Software Craftsmanship**
- http://clean-code-developer.de/
Links #2

Kata
- http://hg.code-cop.org/primefactors/ (Kata Source Code)

Unit Test
- http://en.wikipedia.org/wiki/Unit_testing

TDD

BDD
Links #3

**Code Coverage**

**Continuous Integration**
- [http://www.stevemcconnell.com/ieeesoftware/bp04.htm](http://www.stevemcconnell.com/ieeesoftware/bp04.htm)
- [http://www.joelonsoftware.com/articles/fog0000000023.html](http://www.joelonsoftware.com/articles/fog0000000023.html)

**Static Code Analysis**
CC Images

- spray face: http://www.flickr.com/photos/iangallagher/4115047191/
- Judge Dredd: http://www.flickr.com/photos/eldave/6169431454/
- broken egg: http://www.flickr.com/photos/nickwheeleroz/2475011402/
- broken 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/
- red-green: 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/
- questions: http://www.flickr.com/photos/seandreilinger/2326448445/