ceJug
Ceará Java Users Group

Qualität ist kein Zufall*

***Qualidade não vem por acaso**

Alain Fagot Béarez

ceJug
Ceará Java Users Group

A new industry

- The software business is still so new that it has not yet come to maturity as an industry.
- Other industries mastered the production process creating higher quality products.
- Where is the production line when you produce one thing only one time?
- How do you ensure quality when one product is as different from the next as a television is different from a refrigerator?

ceJug
Ceará Java Users Group

Software production line

- The software production line exists in the transition of raw ideas into software products.
- Producing software does not require a traditional rigid production line but a sophisticated and flexible framework.

Ceará Java Users Group

Software development processes

- The problems with various software development processes and with certain quality control methods are threefold:
  - they are costly to implement,
  - they create vast amounts of documentation to simply certify that a company follows a written procedure for writing software,
  - they require enormous amounts of human labour to maintain and verify.

Quality control certification

- The processes do not guarantee that the end product is error free.
- Only that the human elements involved in the process are regulated in the hopes of reducing inefficiency.

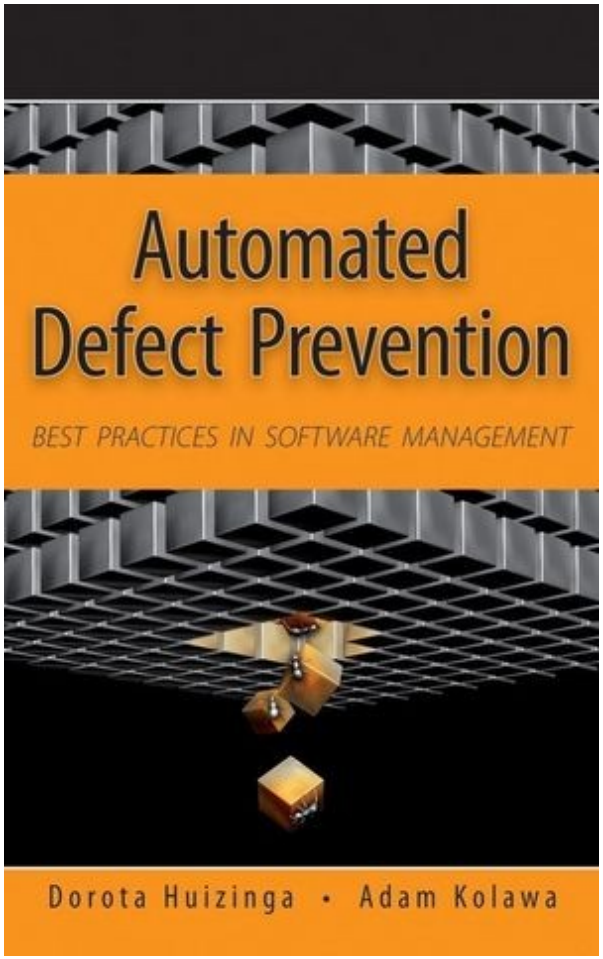
ceJug
Ceará Java Users Group

The ultimate generic goal

- In *CMMI for Development*, the ultimate generic goal is the "optimizing process".
  - "Process improvements that address common causes of process variation, **root causes of defects**, and other problems; and those that would measurably improve the organization's processes are identified, evaluated, and deployed as appropriate."

ceJug
Ceará Java Users Group

Methodology for Error Prevention



- Automated Defect Prevention: Best Practices in Software Management
- Dorota Huizinga, Adam Kolawa
- ISBN: 978-0-470-04212-0
- September 2007, Wiley-IEEE Computer Society Press

Elements of Error Prevention

- Coding Style
  - Coding Standards
  - Design by Contract
  - Defensive Programming
  - Code Reviews
- Test Infection
  - Unit Testing
  - Regression Testing
  - Load Testing
- Infrastructure Systems
  - Source Control Systems
  - Automated Nightly Builds
  - Bug Tracking Systems
  - Monitoring

ceJug
Ceará Java Users Group

Automation of Error Prevention

- Manually implementing these software development techniques does little to ensure their effectiveness.
- The automation of error prevention can solve the problem of quality in the software industry.
- Automatic error prevention tools in the software industry must be more sophisticated than their traditional production line counterparts.

ceJug
Ceará Java Users Group

Effectiveness of Error Prevention

- Effective automatic error prevention tools must adapt to any number of test subjects, and they must do so without human intervention.
- The difficulty in building automatic error prevention tools may explain why quality has historically been absent from the software creation process.

Culture for Error Prevention

- Code is the group's greatest asset because it is the main thing that they have to show for all of their work. It also serves as means of communication: developers exchange the majority of their ideas by reading and writing code.
- Build a culture where the developers' attitude towards the code reflects the code's importance. This prevents group members from doing anything that harms code quality.

Group Culture for Quality

- Where group members feel a strong investment in code quality, any developer who does not care about the code will alienate himself from the group.
- The point of egoless programming is that the group owns the code, and each developer takes responsibility for the code, but each developer should not take criticism of the code he wrote as a personal attack.

ceJug
Ceará Java Users Group

Automated Error Prevention in one picture

ceJug
Ceará Java Users Group

Automated Error Prevention

- Source Control System
- Bug Tracking System
- Web Application Staging Area
- Connectivity Verification
- Monitoring
- Data Pollution Identification
- Automated Builds
- Software Coding Standards
- Accessibility Testing
- Performance and Stress Testing
- Unit Testing
- Regression Testing
- Coverage Analysis
- Confidence Factors

ceJug
Ceará Java Users Group

Automated Builds

- Build an application at least every night.
- Run all available test cases and report any failures that occur.
- Ensure that the application continues to run as expected.

- Ant
- Maven
- Continuum
- CruiseControl
- LuntBuild
- Hudson

http://www-128.ibm.com/developerworks/java/library/j-ap09056/index.html

ceJug
Ceará Java Users Group

Software Coding Standards

- Reduce the probability of introducing errors into your applications.
- Ensure uniform coding practices, reducing oversight errors and the time spent in code reviews.

- CheckStyle
- FindBugs
- PMD
- Hammurapi
- Enerjy

ceJug
Ceará Java Users Group

Accessibility Testing

- Ensure that a Web application is accessible to people with disabilities.
- Access your application with screen readers, refreshable Braille displays, and alternative input devices.

- NSGMLS
- `http://validator.w3.org/check/referer`
- `http://jigsaw.w3.org/css-validator/check/referer`
- `http://www.w3.org/WAI/WCAG1AA-Conformance`

ceJug
Ceará Java Users Group

Performance and Stress Testing

- Determine what problems, in addition to slow load times and rates, might occur in different situations.
- Perform stress testing from different locations inside and outside the network.

- JUnitPerf
- JMeter
- Eclipse TPTP
- NetBeans Profiler
- The Grinder
- JCrawler

ceJug
Ceará Java Users Group

Unit Testing

- Isolate and test the structure and function of individual units to resolve and prevent errors.
- Test not only the functionality, but also to ensure that the code is structurally sound and robust.

- JUnit
- DBUnit
- Cactus
- TestNG
- EasyMock
- jMock

ceJug
Ceará Java Users Group

Regression Testing

- Run all existing test cases and verify that all test cases pass.
- Ensure that modifications did not introduce new errors into code.
- Check whether modifications eliminated existing errors.

- JUnit
- JMeter
- Jameleon
- Selenium
- Sahi

ceJug
Ceará Java Users Group

Coverage Analysis

- Coverage is typically measured either as
  - line coverage,
  - branch coverage,
  - or path coverage.
- Can be used
  - to monitor current coverage,
  - to increase coverage.

- Cobertura
- EMMA
- CodeCover

ceJug
Ceará Java Users Group

Confidence Factors

- Determine how successful your tests have been in analysing a project.
- Understand what types of tests may still need to be conducted.
- See an increase in all statistics of the confidence factors as the project matures.

Tooling for Automated Error Prevention

CeJug
Ceará Java Users Group

NSGMLS
W3C online checkers

JUnit
JMeter
Jameleon
Selenium
Sahi

Cobertura
EMMA
Code Cover

CheckStyle
FindBugs
PMD
Hammurapi

Ant
Maven
Continuum
CruiseControl
LuntBuild
Hudson

JUnit
DBUnit
Cactus
TestNG
EasyMock
jMock

JUnitPerf
JMeter
Eclipse TPTP
NetBeans Profiler
The Grinder
JCrawler

ceJug
Ceará Java Users Group

Una experiencia española

- Source Control System
  - CVS
  - SVN
- Bug Tracking System
  - none
- Web Application Staging Area
  - private
  - shared
- Connectivity Verification
  - none
- Monitoring
  - none
- Data Pollution Identification
  - none

ceJug
Ceará Java Users Group

Una experiencia española

- Automated Builds
  - Ant
- Software Coding Standards
  - CheckStyle
  - Hammurapi
- Accessibility Testing
  - none
- Performance and Stress Testing
  - JMeter
- Unit Testing
  - JUnit
  - DBUnit
- Coverage Analysis
  - none

ceJug
Ceará Java Users Group

Meu próximo ambiente?

NSGMLS
W3C online checkers

JUnit
JMeter
Jameleon
Selenium
Sahi

Cobertura
EMMA
Code Cover

CheckStyle
FindBugs
PMD
Hammurapi

Ant
Maven
Continuum
CruiseControl
LuntBuild
Hudson

JUnit
DBUnit
Cactus
TestNG
EasyMock
jMock

JUnitPerf
JMeter
Eclipse TPTP
NetBeans Profiler
The Grinder
JCrawler

ceJug
Ceará Java Users Group

Perguntas?

Questions?

¿Preguntas?

Vragen?

Fragen?

Demandoj?

Preguntes?

ceJug
Ceará Java Users Group

Obrigado!

Thank you!

Bedankt!

Danke schön!

Merci!

¡Gracias!

Dankon!