Software Inspection and Defect Management
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Rework is the cost of detection of defects, correction of defects, detection of regression defects and correction of regression defects.
Rework

- Phase – wise Distribution of Rework

  - Requirements : 1%
  - Preliminary Design : 4%
  - Detailed design : 8%
  - Code & Unit Test : 12%
  - Integration & System Test : 19%

Total Rework : 44%
Overview of Quality Management

- Reduce Rework to reduce time and costs of Projects
- Quality Assurance - Prevention of defects
- Quality Control - Detect defect early
- Testing can be static and dynamic
- Testing - Testing application.
Defect

Defect, fault, Problem, Error, Incident, Anomaly, Variance, Failure, Inconsistency, Feature, Bug

- The software does not do something that the product specifications says it should do
- The software does something that the product specification says it should not do
Potential Defects

- The software does something that the product specifications does not mention
- The software does not do something the specifications does not mention but should
- The software is difficult to understand, hard to use, is slow or – in the tester’s eyes – will be viewed by the end user as just plain not right.
Defects 4 Cs

- Clear
- Consistent
- Correct
- Complete
Causes of Defects

- **Omission**: I forgot something that I knew I had to do
- **Ignorance**: I forgot something, because I did not know, I had to do it
- **Commission**: I did something wrong although I knew how to do it right
- **Typography**: I typed something wrong though I knew how to do it right
Causes of Defects

- **Knowledge**: I did something wrong because I did not know how to do it.
- **Information**: I did something wrong because I did not have the right information or information was misleading.
- **External**: I did nothing wrong. The problem was somewhere else and the defect was introduced by some other person.
Defect classification

INSPECTION REPORT
- Major Defect
- Minor Defect
- Potential Defect (Investigate, Clarify)
- Q – to be sorted during third hour off-line

PROCESS ANALYSIS MEETING REPORT
- Process Improvement Suggestion
- Product Improvement Suggestion
Cost to fix Defects

- Reqs
- Design
- Code
- Testing
- Post Release
Defects Trends

- Requirements: 20
- Design: 40
- Code: 100
- Unit Test: 50
- Integration Test: 20
- System Test: 10

Defects Profile without Reviews
Defects Control

Requirements | Reviews |
--- | --- |
5 (20) |
Design | Reviews |
10 (40) |
Code | Reviews |
15 (100) |
Unit Test |
7 (50) |
Integration Test |
3 (20) |
System Test |
1 (10) |

Defects Profile with Reviews
Review - Inspection

- **Review:**
  - Presentation of each SW Component to the Group in each Development Phase
  - Discussion and Coordination with other components
  - Goal: Clarification and Accept/Reject Decision

- **Inspection:**
  - Quality Improvement Process to the software project
  - Goal: Defect Detection & Defect Prevention
What is Software Inspection/Review

- Review is a team process to identify defects in software work products early and efficiently.
- Review is a process where a group of people scrutinize a work product with the intention of finding defects.
- They find the defects, discuss and help eliminate the defects and the cause of defects.
- Review is a powerful, efficient and effective process for defect management.
Software Inspection Process

Requirement
Document Inspection
Design
Document Inspection
Implementation
Document Inspection
Applying Testing Tools
Code Inspection
Test Plan
Document Inspection
Test Implementation
Code Inspection
Inspection - Objectives

- Defect Detection
  - documents are checked for cleanness and consistency against rules

- Defect Prevention
  - learning from defects found
  - suggesting improvements
What is Software Inspection/Review (cont..)

- A simple process to *identify* defects
- Highly *structured* meeting
- Forum for independent evaluation
- Form of *static* analysis or *static* testing
- *Early, in-process* validation technique
- Form of *quality* and *reliability* engineering
- Performed by *software* engineering
Objectives of Software Inspection

- Identify as many defects as possible
- Identify defects in early stages of life cycle
- Identify defects before testing and fielding
- Identify defects cheaply and inexpensively
- Reduce development and maintenance costs
- Shorten development cycle time
- Quantitatively control quality and reliability
InFormal and Formal Inspection

- Informal Case Study
- Formal Case Study
# Formal Inspection Process

**Inspection Stage** | **Description**
--- | ---
Review Planning | Identifies work product to be inspected and sets the inspection schedule.
Overview Meeting | Optional phase where team members who are unfamiliar with the work product to be inspected receive orientation.
Individual Preparation | Team members inspect the work individually looking for defects in the work product.
Defect Logging Meeting | Log Bugs, agreed by all.
Process Analysis Meeting | Root cause analysis.
Rework | Action, Update the bug status.
Follow up | The rework is verified, final inspection data is collected and summarized, and the inspection is officially closed. - Baseline the doc.
The Formal Inspection Team

- **Author**
  - The individual that assumes the role of Author will be ultimately responsible for updating the work product after the inspection.
  - PM.

- **Moderator**
  - The Moderator is responsible for ensuring that the inspection procedures are performed throughout the entire inspection process.
  - Lead.

- **Reader**
  - The reader is responsible for leading the Inspection Team through the inspection meeting by reading aloud small logical units, paraphrasing where appropriate.

- **Recorder**
  - The Recorder will document all defects that arise from the inspection meeting.
  - This documentation will include where the defect was found.

- **Inspector**
  - All of the Inspection Team individuals are also considered to play the Inspector role, independent of other roles assigned.

- **Observers or Passive player or QA**
Benefits of Inspections

- IBM
  - Inspections Resulted in:
    - 23% Increase in coding Productivity
    - 38% Reduction in Defects detected after Unit test

- AT&T
  - Inspections Resulted in:
    - 14% Increase in Productivity
    - Tenfold Increase in Quality
  - Inspections are 20 times more effective than Testing

- HP
  - 80% of Defects detected by Inspections were unlikely to be detected by other means
Conclusions

Reviews prepare the ground and stabilize SDP
Adaptation of the inspection method for the Environment
Gain in quality and experience
Appreciated by authors and peers
Help for team building in a distributed environment