Software reviews

Software Engineering Theory

Kristian Sandahl

Department of Computer and Information Science

2014-10-07
Requirements

System Design (Architecture, High-level Design)

Module Design (Program Design, Detailed Design)

Implementation of Units (classes, procedures, functions)

Unit testing

Module Testing (Integration testing of units)

System Testing (Integration testing of modules)

Acceptance Test (Release testing)

Maintenance

Project Management, Software Quality Assurance (SQA), Supporting Tools, Education

Validate Requirements, Verify Specification

Verify System Design

Verify Module Design

Verify Implementation
What is inspection?

Goal

- Find defects (anomalies)
- Improve software development process

Is and is not

- It is systematic peer examination of software products/artifacts.
- It is not testing. Can be performed early on partially finished parts.

Several sources with proven history

- First introduced by Fagan at IBM (1976)
- Several scientific studies show that defects are found using inspection, approx. 60-90% of total defects (Pfleeger & Atlee, 2010)
What can be inspected:

- Requirements Specifications
- Architecture Descriptions
- Design documents
- Source code
- Unit testing
- System Build Procedures
- Development Process Descriptions
- Maintenance manuals
- Installation Procedures
- Acceptance Test (Release Notes)
- System Testing (Integration testing of modules)
- Module Testing (Integration testing of units)
- Release Notes
- Test Documents

System Design
- (Architecture, High-level Design)
- Module Design
- (Program Design, Detailed Design)
- Implementation of Units (classes, procedures, functions)

(IEEE Std 1028-2008)
Who participates in an inspection?

**Inspection: 2-6 participants  (IEEE Std 1028-2008)**

**Roles**

- **Recorder**
- **Reader**
- **Author**
- **Inspection leader (Moderator)**
- **Inspector**
Who participates in an inspection?

**Inspection: 2-6 participants (IEEE Std 1028-2008)**

**Roles**

- **Inspection leader (Moderator)**
  - Planning and organizing tasks
  - Must be trained in the inspection process
  - Ensure that inspection data is collected
  - Issue inspection output

- **Recorder**
- **Reader**
- **Author**
- **Inspector**
Who participates in an inspection?

*Inspection: 2-6 participants*  *(IEEE Std 1028-2008)*

### Roles

- **Inspection leader (Moderator)**
- **Recorder**
- **Reader**
- **Author**
- **Inspector**

**Recorder**

- Document e.g., defects, decisions, and recommendations.
- The inspection leader can be the recorder
Who participates in an inspection?

*Inspection: 2-6 participants (IEEE Std 1028-2008)*

**Roles**

- **Inspection leader (Moderator)**
- **Recorder**
- **Reader**
  - Informs the software product to be inspected
  - Highlight important aspects
- **Author**
- **Inspector**
Who participates in an inspection?

**Inspection:** 2-6 participants  *(IEEE Std 1028-2008)*

### Roles

- **Inspection leader (Moderator)**
- **Recorder**
- **Reader**
- **Author**
- **Inspector**

**Author**

- Perform rework to meet inspection exit criteria
- Responsible for meeting entry criteria
- Shall not be inspection leader, recorder, or reader
Who participates in an inspection?

**Inspection:** 2-6 participants (IEEE Std 1028-2008)

**Roles**

- **Recorder**
- **Reader**
- **Author**
- **Inspection leader (Moderator)**
- **Inspector**
  - Identifies and describes defects
  - Chosen due to expertise and different viewpoints (e.g., design, requirements, testing)
  - Can be assigned specific topics (e.g., compliance to standards)
  - All participants are inspectors
Inspection Process

Plan and Overview → Individual Checking → Inspection Meeting → Edit and Follow-up

Input (for entry)
- Objective statement
- Software products / artifacts (to be inspected)
- Inspection procedures
- Reporting forms
- Known defects
- Source documents

Author

Responsible for meeting entry criteria
Source documents

- Requirements Specifications
- Architecture Descriptions
- Design documents

Software products / artifacts

- Architecture Descriptions
- Release Notes
- Test Documents
- Source code

(IEEE Std 1028-2008)
Inspection Process

Planning the inspection
- Identify inspection team
- Assign responsibilities
- Schedule meetings
- Distribute material
- Specify scope and priorities

Overview
- Introduce the product

Entry

Plan and Overview

Individual Checking

Inspection Meeting

Edit and Follow-up

Exit
Inspection Process

Plan and Overview  Individual Checking  Inspection Meeting  Edit and Follow-up

Inspection rate (IEEE Std 1028-2008)
- Requirements or Architecture (2-3 pages per hour)
- Source code (100-200 lines per hour)

Individual checking
- Exam the product individually
- Report all defects to the inspection leader
- Prepare for the inspection meeting

Inspectors
**Inspection Process**

**Meeting agenda**
- Introduction of roles and purpose
- Reader presents the product (details)
- Inspect product, produce defect list (whole team)
- Review defect/anomaly list (completeness and accuracy)
- Make exit decision

**Exit decisions (1, 2 or 3)**
1. Accept with no further verification
2. Accept with rework verification (verify by one member)
3. Reinspect – redo the process

*Should detect, not resolve defects*
Inspection Process

- **Plan and Overview**
- **Individual Checking**
- **Inspection Meeting**
- **Edit and Follow-up**

**Edit**
- Author resolves items

**Follow-up**
- Inspection leader verifies that all items are closed
Collected inspection data

General inspection data
- Software product identification
- Date and time of inspection
- Inspection team
- Inspection time (meeting and individual)
- Volume of inspected material

Defect/Anomaly Data Item

Classification
E.g., logic problem, data sensor problem (see IEEE Std 1044-1993)

Categories
E.g., missing, extra, ambiguous, incorrect, not conforming to standards etc.

Ranking
E.g., catastrophic, critical, marginal, negligible
Process Improvements

Analyze Inspection Data

- Improve Inspection Process
- Improve process for creating the product
Other Software Reviews

**Management Reviews**
- Check deviations from plans
- Products are plans and reports
- Performed by management staff

**Technical Reviews**
- Evaluate conformance to specifications and standards.
- Performed by technical leadership and peers
- Higher volume of material than inspections

**Walk-through**
- The author presents, leads, and controls the discussion.
- Informal atmosphere

**Audit**
- External 3rd party (independent) evaluation of conformance to specification and standards.