Software Engineering Reviews

Lecture 10b

Software Engineering
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Knowledge Areas

Week 36 – Requirements
Week 37 – Planning and Processes
Week 38 – Design and Architecture
Week 39 – Testing and SCM
Week 40 – Software Quality
A Software Life-cycle Model
Which part will we talk about today?

Part I
Inspections

Part II
Other Software Reviews

- Validate Requirements, Verify Specification
- Verify System Design
- Verify Module Design
- Verify Implementation
- 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
Agenda - What will you learn today?

Part I
Inspections

Part II
Other Software Reviews
Part I
Inspections
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
- System Design (Architecture, High-level Design)
- Module Design (Program Design, Detailed Design)
- Implementation of Units (classes, procedures, functions)
- Development Process Descriptions

Inspections

Part I

- Requirements Specifications
- System Design (Architecture, High-level Design)
- Module Design (Program Design, Detailed Design)
- Implementation of Units (classes, procedures, functions)
- Development Process Descriptions

Part II

- Other Software Reviews
- Release Notes
- Test Documents
- Module Testing (Integration testing of units)
- System Testing (Integration testing of modules)
- Acceptance Test (Release testing)
- Release Notes
- Maintenance manuals
- Installation Procedures
- Maintenance

(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**
  - 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

- **Recorder**
  - Document e.g., defects, decisions, and recommendations.
  - The inspection leader can be the recorder

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

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

Roles

- **Reader**
  - Informs the software product to be inspected
  - Highlight important aspects

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

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

Roles

- **Author**
  - Perform rework to meet inspection exit criteria
  - Responsible for meeting entry criteria
  - Shall not be inspection leader, recorder, or reader

- **Inspector**

- **Recorder**

- **Author**

- **Inspection leader (Moderator)**

- **Reader**
Who participates in an inspection?

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

Roles

- **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 leader** (Moderator)

- **Recorder**

- **Reader**

- **Author**
Inspection Process

Plan and Overview

Individual Checking

Inspection Meeting

Edit and Follow-up

Entry

Exit

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

Source and product - examples

Part II
Other Software Reviews

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Part I
Inspections

(IEEE Std 1028-2008)
**Inspection Process**

**Plan and Overview**
- Identify inspection team
- Assign responsibilities
- Schedule meetings
- Distribute material
- Specify scope and priorities

**Individual Checking**

**Inspection Meeting**

**Edit and Follow-up**

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**Planning the inspection**

**Overview**
- Introduce the product

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**Inspection leader**

**Author**
Inspection Process

Entry

Plan and Overview

Individual Checking

Inspection Meeting

Edit and Follow-up

Exit

Inspectors

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

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

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**Part I**
- Inspections

**Part II**
- Other Software Reviews
Inspection Process

Entry

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

Exit

**Edit**
- Author resolves items

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

Author

Inspection leader
Collected inspection data

**Defect/Anomaly Data Item**

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

**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
Part II
Other Software Reviews
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.
Summary - What have we learned today?

- Inspections rule!
- Inspections are expensive…
- Inspections (and other reviews) complement testing and can be performed early in the process.

Thanks for listening!