CISC 327
Software Quality Assurance
Lecture 21
Inspection
Inspection Process

• Today we look at the inspection process
  – Steps in a formal inspection process
  – Example inspection documents
Inspection At Any Stage

• Inspections may be used at any stage of software development
  – Requirements, design, coding, testing, acceptance
• Ideally, inspections can be applied at every stage, to catch problems as early as they appear
• No matter what stage inspection is applied to, the inspection process is roughly the same
A Generic Inspection Process

• The basic process of formal inspection is always the same, no matter the artifact being inspected.

Planning
  - Choose team, materials, schedule for inspection

Orientation
  - Introduce artifact, process, goals to learn

Preparation
  - Individually check artifact, note issues

Review Meeting
  - Meet to discuss and consolidate issues

Rework
  - Correct defects noted

Verify
  - Verify artifact and process quality
(Recall) Inspection Roles

• **Moderator**
  – Chairs the meeting, *records* faults found
  – Helps others stick to the job, at the right *pace*
  – Keeps proceedings *objective*, professional, friendly

• **Inspectors (2 or 3)**
  – Knowledgeable *peers* who examine the artifact, in detail

• **Author**
  – Silent *observer* who assists or clarifies only when asked
Planning

• Objectives
  – Gather **review package**: artifact being inspected, references for it, checklists of inspection criteria, data sheets to record
  – Form inspection **team**
  – Set **schedule**
Planning

• Procedure
  – Moderator assembles team and review package
  – Moderator customizes checklist to artifact
  – Moderator plans schedule
  – Moderator checks artifact is ready for review
  – Moderator helps Author prepare overview of artifact
## Example Planning Document

<table>
<thead>
<tr>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inspection ID</td>
</tr>
<tr>
<td>2. Team</td>
</tr>
<tr>
<td>3. Documents</td>
</tr>
<tr>
<td>4. Meetings</td>
</tr>
<tr>
<td>5. Planning Objectives</td>
</tr>
<tr>
<td>6. Plan. Effort</td>
</tr>
</tbody>
</table>

(Johnson, U. Hawaii 2000)
Orientation Meeting

• Objectives
  – Author provides overview of artifact
  – Inspectors obtain review package
  – Preparation goals set
  – Inspectors commit to participating
Orientation Meeting

• Procedure
  – Moderator distributes review package
  – Author presents overview
  – Moderator outlines preparation procedure
Example Orientation Document

7. Prep. Goals
   ___ min/pg x ___ pg. = _____ prep time/revewer

8. Orient.
   □ Reviewers understand scope and purpose of work product.
   □ Reviewers understand checking process, checklists, and references.
   □ Work product, references, checklists, and checking forms provided

9. Orient. Effort
   ___ min/meet x ___ particip. = _____ min

(Johnson, U. Hawaii 2000)
Preparation

• Objectives
  – Find the maximum number of non-minor defects in the artifact
Preparation

• Procedure (for Inspectors only)
  – Allocate scheduled time
  – Do detailed individual inspection of the artifact
  – Use checklists as a guide to focus on potential issues
  – Use references for calibration of what is expected or needed
  – Note critical, severe, and moderate level defects on reviewer report form
  – Note minor defects and questions for author clarification on artifact document
Example Defect Classification

• Critical
  – Defects that will cause the system to hang, crash, or produce incorrect results or behaviour, with no known workarounds

• Severe
  – Defects that will cause incorrect results or behaviour, but have known workarounds

• Moderate
  – Defects that affect limited areas of functionality that can either be worked around or ignored

• Minor
  – Defects that can be overlooked without loss of functionality
Example Checklists and References

• Checklists
  – Checklists often include questions concerning completeness, style, adherence to company standards, etc.
  – Code inspection checklists often include detailed questions about use of language features (e.g., no gotos), naming of variables, methods and classes, depth of nesting, etc.
Example Checklists and References

• References
  – May include:
    – Company standards documents
    – High quality examples of artifacts similar to the one being inspected
    – Chapters of reference textbooks on quality practice for artifacts
    – Online resources on quality practice for artifacts
Example Preparation Document

- Reviewer Report Form

1. Inspection ID
2. Document:
3. Name:

4. Critical, Severe, and Moderate Issues
   Num | Location | Severity | Chk/Ref | Description
   --- | --- | --- | --- | ---
   --- | --- | --- | --- | ---
   --- | --- | --- | --- | ---
   --- | --- | --- | --- | ---
   --- | --- | --- | --- | ---
   --- | --- | --- | --- | ---

5. Effort: min
6. Issue Totals: critical severe moderate minor author Qs

7. Preparation Objectives
   □ Work product has been completely checked.
   □ All critical, severe, and moderate issues are noted on this form.
   □ All minor issues and author questions are noted on the work product.

(Johnson, U. Hawaii 2000)
Why Not Write On Artifact Directly?

• Advantages of Reviewer Report Form
  – Minor issues pre-filtered, saving review meeting time, focusing review meeting on important issues
  – Forces inspectors to write down issues clearly, saving meeting time
  – Defects can be considered in order of importance
  – Easy to gather inspection stats
Why Not Write On Artifact Directly?

• Disadvantages (?) of Reviewer Report Form
  – Requires more preparation time (15 minutes?)
  – Discourages last minute preparation
  – Makes quality of inspector preparation more visible
Review Meeting

• Objectives
  – Make consolidated, comprehensive list of non-minor defects to be addressed
  – Help provide group synergy
  – Help provide shared knowledge of artifacts
Review Meeting

• Procedure
  – Moderator requests defects sequentially, in order of importance
  – Inspectors point out defects found, compare notes
  – Moderator (or note taker) writes down consolidated list of defects found and summarizes results of meeting in review summary defect report
Example Review Summary Defect Report

<table>
<thead>
<tr>
<th>Review Meeting</th>
<th>Aggregate Checking Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Prep. Effort</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = Total min</td>
</tr>
<tr>
<td>11. Critical Iss.</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = ___ iss.</td>
</tr>
<tr>
<td>12. Severe Iss.</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = ___ iss.</td>
</tr>
<tr>
<td>13. Moderate Iss</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = ___ iss.</td>
</tr>
<tr>
<td>14. Minor Iss.</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = ___ iss.</td>
</tr>
<tr>
<td>15. Author Q's.</td>
<td>R1 + R2 + R3 + R4 + R5 + R6 = ___ Q's</td>
</tr>
</tbody>
</table>

Review Meeting (cont.)

<table>
<thead>
<tr>
<th>Rev. Meet.</th>
<th>All reviewers present. List absent: ____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>All reviewers prepared sufficiently for meeting.</td>
</tr>
<tr>
<td></td>
<td>All issues noted by Scribe and understood by Author for rework.</td>
</tr>
<tr>
<td></td>
<td>Any problems with inspection process have been noted.</td>
</tr>
</tbody>
</table>

| R.M. Effort | R.M. Effort = ___ min meet x ___ particip. = ___ min |

(Johnson, U. Hawaii 2000)

(plus a detailed description of each defect)
Rework

• Objectives
  – Assess each defect listed in the review defect report, determine if really a defect, and repair as necessary
  – Written report on handling of each non-minor defect
  – Resolve minor issues as necessary and appropriate
Rework

• Procedure (for Author)
  – Author gets review defect summary report as well as marked-up copies of inspected artifact with details
  – Author assesses each defect, categorizes root cause and notes actions taken in an author action report
  – When finished, Author provides author action report and reworked artifact to Moderator for verification
Example Author Action Report

<table>
<thead>
<tr>
<th>1. Inspection ID</th>
<th>2. Document</th>
<th>3. Author</th>
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<tbody>
<tr>
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<tr>
<td><strong>4. Issue Disposition</strong></td>
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<tr>
<td>Num</td>
<td>Fixed</td>
<td>Type</td>
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<table>
<thead>
<tr>
<th>5. Effort</th>
<th>min</th>
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<thead>
<tr>
<th>6. Rework Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Outcome of all Review Meeting Data Sheet issues are noted on this form.</td>
</tr>
<tr>
<td>□ All minor issues have been addressed.</td>
</tr>
<tr>
<td>□ No known defects remain in the work product.</td>
</tr>
</tbody>
</table>

(Johnson, U. Hawaii 2000)
Verify

• Objectives
  – Assess reworked artifact quality
  – Assess inspection process
  – Pass or fail the artifact
Verify

- **Procedure (for Moderator)**
  - Obtain reworked artifact and author action report
  - Review reworked artifact and action report for remaining problems
  - Provide *recommendation* for artifact (pass / fail)
  - With inspectors, *sign off* on artifact
  - Compute summary *statistics* for inspection and archive review documents in quality database
  - Generate process improvement proposals (if any)
Summary

• Inspection Process
  – No matter what artifact of development is being inspected, inspection process is much the same
  – Six steps: planning, orientation meeting, preparation, review meeting, rework, verify

• Reference
  – O’Regan, Ch. 2.1-2.5
    “Overview of Fagan Inspections”

• Next Time
  – Inspections in practice: Code inspections