

Lecture 9: Inspections & Reviews

Types of Inspection

Benefits of Inspection

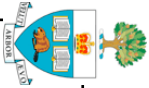
Inspection is more cost effective than testing

How to conduct an inspection

who to invite

how to structure it

Some tips



Reviews, Inspections, Walkthroughs...

Note: these terms are not widely agreed

formality

informal: *from meetings over coffee, to regular team meetings*

formal: *scheduled meetings, prepared participants, defined agenda, specific format, documented output*

"Management reviews"

E.g. preliminary design review (PDR), critical design review (CDR), ...

Used to provide confidence that the design is sound

Attended by management and sponsors (customers)

Usually a "dog-and-pony show"

"Walkthroughs"

developer technique (usually informal)

used by development teams to improve quality of product

focus is on finding defects

"(Fagan) Inspections"

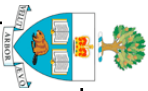
a process management tool (always formal)

used to improve quality of the development process

collect defect data to analyze the quality of the process

written output is important

major role in training junior staff and transferring expertise



Source: Adapted from Blum, 1992, Freedman and Weinberg, 1990, & notes from Philip Johnson.

For applications programming:

most reviewed programs run correctly first time
compare: 10-50 attempts for test/debug approach

**Benefits
of formal
inspection**

Data from large projects

Data from Bell-Northern Research:

Inspection cost: 1 hour per defect.

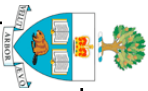
Testing cost: 2-4 hours per defect.

Post-release cost: 33 hours per defect.

error reduction by a factor of 5; (10 in some reported cases)
improvement in productivity: 14% to 25%
percentage of errors found by inspection: 58% to 82%
cost reduction of 50%-80% for V&V (even including cost of inspection)

Effects on staff competence:

increased morale, reduced turnover
better estimation and scheduling (more knowledge about defect profiles)
better management recognition of staff ability



Constraints

Source: Adapted from Blum, 1992, pp369-373 & Freedman and Weinberg, 1990.

Size

“enough people so that all the relevant expertise is available”

min: 3 (4 if author is present)

max: 7 (less if leader is inexperienced)

Scope

focus on small part of a design, not the whole thing

Fagan recommends rates:

130-150 SLOC per hour

Duration

never more than 2 hours

concentration will flag if longer

Timing

Examines a product once its author has finished it

not too soon

product not ready - find problems

the author is already aware of

Outputs

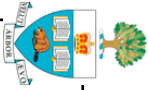
all reviewers must agree on the result

accept **or** re-work **or** re-inspect

all findings should be documented

summary report (for management)

detailed list of issues



Choosing Reviewers

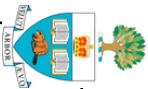
Source: Adapted from Freedman and Weinberg, 1990.

Possibilities

- specialists in reviewing (e.g. QA people)
- people from the same team as the author
- people invited for specialist expertise
- people with an interest in the product
- visitors who have something to contribute
- people from other parts of the organization

Exclude

- anyone responsible for reviewing the author
 - i.e. line manager, appraiser, etc.
- anyone with known personality clashes with other reviewers
- anyone who is not qualified to contribute
- all management
- anyone whose presence creates a conflict of interest



Roles

Formal Walkthrough

Fagan Inspection

Review Leader

- chairs the meeting
- ensures preparation is done
- keeps review focussed
- reports the results

Moderator

- must be a competent programmer
- should be specially trained
- could be from another project

Recorder

- keeps track of issues raised

Designer

- programmer who produced the design being inspected

Reader

- summarizes the product piece by piece during the review

Coder/Implementor

- programmer responsible for translating the design to code

Author

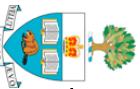
- should actively participate (may be the reader)

Tester

- person responsible for writing/executing test cases

Other Reviewers

- task is to find and report issues



Guidelines

Prior to the review

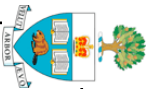
- schedule Formal Reviews into the project planning
- train all reviewers
- ensure all attendees prepare in advance

During the review

- review the product, not its author
 - keep comments constructive, professional and task-focussed
- stick to the agenda
 - leader must prevent drift
- limit debate and rebuttal
 - record issues for later discussion/resolution
- identify problems but don't try to solve them
- take written notes

After the review

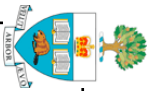
- review the review process



Opening Moments

- 1) Don't start until everyone is present
- 2) Leader announces:
"We are here to review product X for purpose Y"
- 3) Leader introduces the reviewers, and explains the recording technique
- 4) Leader briefly reviews the materials
check that everyone received them
check that everyone prepared
- 5) Leader explains the type of review

Note: The review should not go ahead if:
some reviewers are missing
some reviewers didn't receive the materials
some reviewers didn't prepare



Structuring the inspection

Checklist

uses a checklist of questions/issues
review structured by issue on the list

Walkthrough

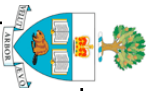
one person presents the product step-by-step
review is structured by the product

Round Robin

each reviewer in turn gets to raise an issue
review is structured by the review team

Speed Review

each reviewer gets 3 minutes to review a chunk, then passes to the next person
good for assessing comprehensibility!



Fagan Inspection Process

1 Overview

communicate and educate about product

circulate materials

Rate: 500 SLOC per hour

2 Preparation

All participants perform individually
review materials to detect defects

Rate: 100-125 SLOC per hour

4 Rework

All errors/problems addressed by author

Rate: 16-20 hours per 1000 SLOC

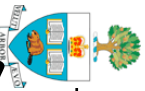
3 Inspection

a reader paraphrases the design
identify and note problems (don't solve them)

Rate: 130-150 SLOC per hour

5 Follow-up

Moderator ensures all errors have been corrected
if more than 5% reworked, product is re-inspected by original inspection team



Devil's advocate

deliberate attempt to adopt a contrary position

Bebugging

put some deliberate errors in before the review
with prizes for finding them!

Tactics for problematic review meetings

Money bowl

if a reviewer speaks out of turn, he/she puts 25c into the drinks kitty

Alarm

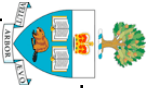
use a timer to limit 'speechifying'

Issues blackboard

appoint someone to keep an issues list, to be written up after the review

Stand-up review

no tables or chairs!



References

van Vliet, H. "Software Engineering: Principles and Practice (2nd Edition)" Wiley, 1999.

Section 13.4 gives a very brief overview of inspections and walkthroughs.

Freedman, D. P. and Weinberg, G. M. "Handbook of Walkthroughs, Inspections and Technical Reviews". Dorset House, 1990.

Good practical guidebook, full of sensible advice about conducting reviews. Not so strong on the data collection and process improvement aspects of Fagan inspections, though.

Ackerman, A. F. "Software Inspections and the Cost Effective Production of Reliable Software". From "Software Engineering", Dorfman & Thayer, eds., IEEE Computer Society Press, 1997.

This paper summarizes some of the practical aspects of introducing inspections, including how inspectors are trained.

Karl E. Wieggers, "Peer Reviews in Software: A Practical Guide", Addison-Wesley, 2001

Not actually published yet, but some chapters are on the web. We'll be using the forms from this book for our practical inspection exercise in the tutorials.

Blum, B. "Software Engineering: A Holistic View". Oxford University Press, 1992

Section 5.2 provides one of the best overview of walkthroughs and inspections anywhere. Blum manages to cut through a lot of the confusion about 'walkthroughs', 'inspections' and 'reviews' managing to get to the key issues.