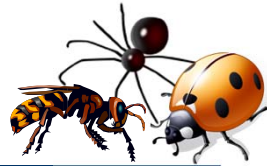**SENG 471**

Software Requirements Engineering

Formal Inspection

Bug Hunt

- "Software inspections and their cousins, reviews and walkthroughs, are proven techniques for reducing the number of defects in a program before it goes out the door."

- "The greatest leverage from the time spent on software inspections comes from examining requirements documents."

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Methods for Bug Hunt

- Reviews
  - high-level to provide confidence

- Walkthroughs
  - low-level to improve quality

- Inspections == Walkthroughs

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Formal Inspections

- Fagan inspections (Michael Fagan)
  - A tool of process management
  - Collecting defects to analyze for improving quality
  - Written output
  - Major role in training junior staff
- Benefits
  - Applications ➔ effective than testing
  - Staff ➔ recognition, morale, estimation, scheduling
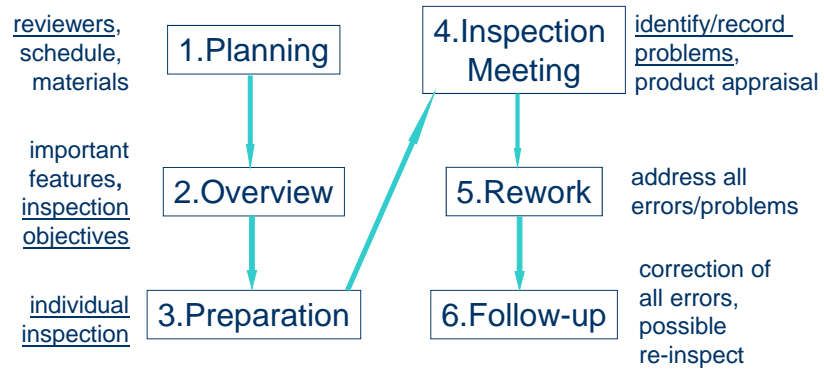- Requirements ➔ these benefits apply to

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Statistics on Benefits

Error reduction	Factor of 5 (10 in some cases)
Improvement in productivity	14% to 25%
Percentage of errors found by inspection	58% to 82%
Cost reduction of verification and validation (incl. inspection cost)	50% to 80%

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Inspection Process

reviewers, schedule, materials → 1.Planning

4.Inspection Meeting → identify/record problems, product appraisal

important features, inspection objectives → 2.Overview

5.Rework → address all errors/problems

individual inspection → 3.Preparation

6.Follow-up → correction of all errors, possible re-inspect

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1. Planning – Choosing reviewers

- Possible REVIEWERS:

- Exclude ANYONE:

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1. Planning – Roles of reviewers

Fagan Inspection	Formal Inspection

• Moderator
  - competent programmer
  - specially trained
  - from another project
• Designer/Author
  - programmer who produced the
    design being inspected
• Coder/Implementer
  - programmer responsible for
    translating the design to code
• Tester
  - person responsible for
    writing/executing test cases
	• **Review leader**
	  - chair the meeting
	  - ensure the preparation
	  - keep review focused
	  - report the results
	• **Recorder**
	  - keep track of issues raised
	• **Reader**
	  - summarize the product
	    piece-by-price in the review
	• Author
	  - participate actively (~ reader)
	• Other reviewers
	  - find and report issues

2. Overview – Inspection objective

- Scope:
  - Partition the entire document → several parts.
- Criteria:
  - Requirements → correct, feasible, necessary, prioritized, unambiguous, verifiable, complete, consistent, modifiable, traceable
  - Example categories (Wieger's defect types)
  - The issues log and/or checklist

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3. Preparation – Individual inspections

- Review
- Focus on **criteria**
- Describe the defect, its severity, its location
- Log typos and style errors

→ Individual inspections are completed before the inspection meeting.

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4. Inspection Meeting – Opening

1) Everyone is present.
2) Leader
   - a) announces:
   - b) introduces:
   - c) explains:
   - d) reviews briefly:
   - e) checks:
   - f) explains:

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

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4. Inspection Meeting – Structure

- Checklist
  - review is structured by questions/issues on the checklist
- Walkthrough
  - one person presents the product step-by-step
- Round Robin
  - each reviewer in turn gets to raise an issue
- Speed Review
  - each reviewer gets 3 minutes to review a chunk, then passes to the next person

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5. Rework + 6. Follow-up

- Author corrects the defects and typos.
- The rework effort is recorded.
- A member of the inspection team verifies that the changes were made.
- The final inspection report is delivered.

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Review: Inspection Process

1. Planning ➔ reviewers, schedule, materials

2. Overview ➔ important features, inspection objectives

3. Preparation ➔ individual inspection

4. Inspection Meeting ➔ identify/record problems,
product appraisal

5. Rework ➔ address all errors/problems

6. Follow-up ➔ correction of all errors,
possible re-inspect

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Inspection - Constraints

- Size ➔ From 3 to 7 (fewer if the leader is inexperienced)
- Duration ➔ Inspection meeting never more than 2 hours
- Outputs ➔ All reviewers must agree on the product appraisal
    - ➔ All findings should be documented
- Scope ➔ Focus on part of the requirements document.
- Timing ➔ Examine a product once its author has finished it
- Purpose ➔ The biggest gains come from fixing the process

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Inspection - Guidelines

- Prior
    - schedule inspections into the project planning
    - train all reviewers
    - ensure all attendees prepared in advance
- During
    - review the product, not its author
    - stick to the agenda
    - limit debate and rebuttal
    - identify problems but don't try to solve them
    - take written notes
- After
    - follow up
    - review the inspection process

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Inspection - Tactics

- Devil's advocate
  - a contrary position
- Debugging
  - deliberate errors/prizes
- Money bowl
  - Counter-incentives
- Alarm
  - timer
- Issue blackboard
  - issue lists for writing up
- Stand-up review
  - no tables or chairs!

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Recap

- Formal inspections
  - Benefits
  - Process
  - Constraints
  - Guidelines and tactics

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