Outline
Software development life cycle Model
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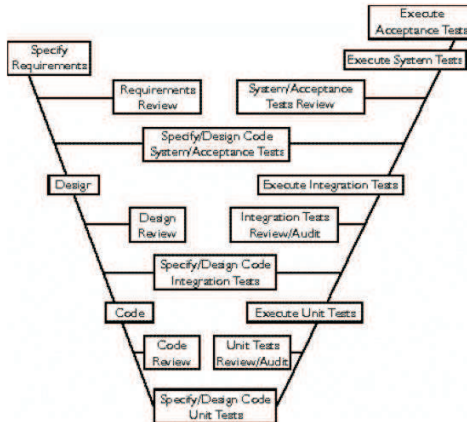# Software Systems Verification and Validation
Lecture 01 - Inspection

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2015-2016

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Extended V-Model [CB03]

V-Model

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Human testing

- Prevent errors - Introduction of a verification step at the end of each process.

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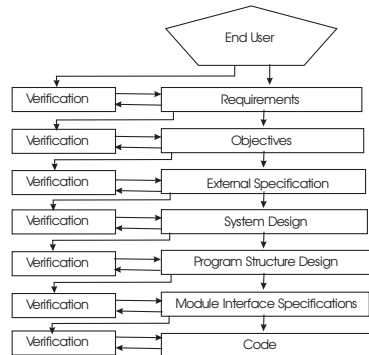
Human testing methods [Mye04] (chapter 3), [PY08] (chapter 18), [Fre10] (chapter 4)

- Is it useful? they contribute to productivity and reliability:
    - The earlier errors are found, the lower the cost of correcting the errors.
    - Psychological change of programmers when computer-based testing commences.   more errors
- Human testing methods are:
    - Inspections
    - Walkthroughs
    - Pair-programing
- **Objective** - to find errors but not to find solutions to the errors.
- **Advantage** - when an error is found it is usually located.
- Find from 30% to 70% of the logic-design/coding errors in programs.
- Inspection and computer-based testing are complementary.

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Inspection

- Inspection - process of trying to find defects in development documents during various phases of the software development process.
- Fagan Inspection team ([4 members])
    - Moderator - duties
        - Distributing materials for, and scheduling the inspection session.
        - Leading the session
        - Ensuring that the errors are subsequently corrected.
    - Author of the product (analyst, designer, programmer)
    - Secretary
    - Reader
- Checklists
- Time - 90-120 minutes

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Inspection activities

- Planning
  - the moderator selects the team members;
  - distribution of the materials to the members; task assignment
- Presentation/Overview - not compulsory
  - used to present details to the members of the inspection team.
- Individual preparation
  - reading and understanding the received documentation;
- Inspection meeting
  - critical observations of each individual inspectors - discussed;
  - conclusions of the inspection - documented;
- Rework
  - the author makes the required changes and correct the errors;
- Reinspection/Follow-up
  - to verify if the modification did eliminate the errors;
  - may be only between the author and the moderator;

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Inspection checklists

- Inspection scope - to find errors
- Depending on the analyzed document - special kind of errors
- Specification Document
  - Does the specification conforms to the user's needs?
  - Are there ambiguities in the specification?
  - Do the input/output date are clearly stated? What about input/output conditions?
  - Are there requirements that are not present in the specification?
  - Are there performance conditions? What precise computation conditions?
- Analysis Document
  - Does the design conforms to the specification?
  - Are all the functionalities from the specification specified?
  - Is there an analysis documentation about the made decisions?

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Inspection checklists

- Code
  - Does the code conforms to the design?
  - Are all the methods are called?
  - Are all the variables initialized?
  - Problems with: infinite cycles, out of bound indexes, improper allocation of memory.
- Test Document
  - The test cases are well documented?
  - The test cases are well chosen?
  - Are the test data sufficient to coverage criterion?
  - For the integration testing, the order of integration is clear?
  - At regression testing is the testing continued?

Inspection advantages

- Early error discovery;
- Reduce product development time and cost;
- Group method;
- Mean to education;
- The source of error is known;
- Eliminates the debugging stress if few day remains until product release.

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Walkthroughs

- Walkthroughs - process of trying to find defects in development documents during various phases of the software development process.
- Similar to Inspection
- Team members ([3-5] members)
    - Moderator
    - Secretary
    - Tester
- Procedures are slightly different
    - Planning
    - Meeting - the participants "play computer".
    - Rework
    - Follow-up
- Different error-detection technique
- Time - 90-120 minutes

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Pair-Programming

- Variation of program inspection.
- Merges coding and inspection activities.
    - The inspection activities
        - are not driven by checklists;
        - are based on shared programming practice and style;
    - Programmers frequently alternate roles;
    - Is carried out in normal work days, without excessive overtime and without severe schedule pressure.
    - No mediator, so responsibility for open and nondefensive discussion of decisions/alternatives falls to the programmers.

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- Testing. Test planning.
- Testing Management Tool - TestLink.
- Test case design - Black-box testing.

Questions

- Thank You For Your Attention!

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References

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