CS314 Software Engineering Peer Reviews

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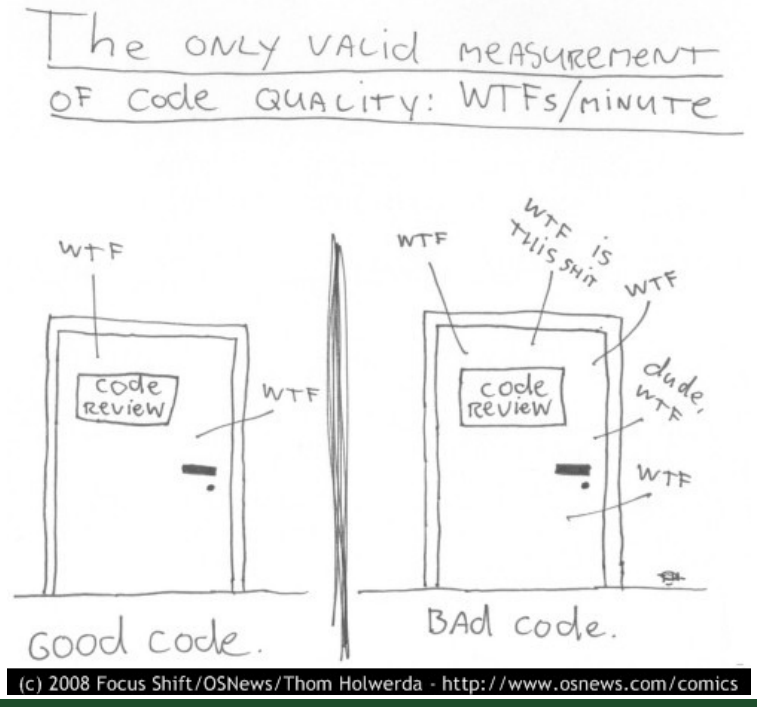

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Peer Reviews

- Informal
  - Over the shoulder
  - Tool assisted (like GitHub pull request reviews)
  - Email pass around
  - Pair Programming
- Formal
  - Inspections

Inspections

- Process to systematically examine project artifacts (documents or code) to identify as many problems as possible.
  - Careful line by line review.
  - May use a checklist of common programming errors, local standards, and practices.
  - Multiple people with different points of view.
  - Review independently to find problems, meet to review and report findings.

Inspections – Why?

- Inspections can find multiple defects at a time.
- Inspections can be done on incomplete systems.
- Inspections can consider broader quality aspects, such as non-functional requirements.
- Inspections can find defects difficult to detect by testing.
- Inspecting can save you a lot of rework / technical debt.

Inspections – What?

- Requirements
- Architecture
- Design
- Code
- Documentation
- Tests

Inspections – When?

- The earlier problems are found, the less expensive they are to fix.
- Inspecting before extensive testing allows you to quickly get rid of many defects, rather than removing them one at a time.
- Inspecting can save you a lot of rework / technical debt.

Inspections – Roles

- End user
  - User experience, useful messages, input validation, responsiveness, …
- Maintainer
  - Descriptive names, consistent exception handling, small classes/methods, good comments, …
- Tester
  - Documentation, well defined interfaces, ...
- Moderator
  - Makes the process efficient and effective at finding problems, ensures only logging occurs – no fixing.

Inspections – Principles

- Advance preparation – identify problems before meeting
- Only inspect things that are ready
- Re-inspect when changes are made
- No blame – work together, next time it will be yours
- Keep the discussions open – don't involve managers
- Avoid discussing how to fix the problems
- Avoid discussing style issues
- Do not rush (200 lines code / hour, 10 pages of text)
- Avoid extended sessions (<2 hours at a time)
- Keep inspection logs to track quality of processes

Inspections – sample checklist

problem class	inspection check
Data faults	Are all program variables initialized before their values are used? Have all constants been named? Should the upper bound of arrays be equal to the size of the array or size-1? If character strings are used, is a delimiter explicitly assigned? Is there any possibility of a buffer overflow?
Control faults	For each conditional statement, is the condition correct? Is each loop certain to terminate? Are compound statements correctly bracketed? In case statements, are all possible cases accounted for? If a break is required after each case in case statements, has it been included?
Input/output faults	Are all input variables used? Are all output variables assigned a value before they are output? Can unexpected inputs cause corruption?
Interface faults	Do all functions and methods have the correct number of parameters? Do formal and actual parameter types match? Are the parameters in the right order? Do all components use a consistent model for shared memory structure?
Storage faults	If a linked structure is modified, have all links been correctly diagnosed? If dynamic storage is used, has space been allocated correctly? Is space explicitly deallocated after it is no longer required?
Exception faults	Have all possible error conditions been taken into account?

Inspection - Team *T##*

Inspection	Details
Subject	*file and methods/line range to review for meeting*
Meeting	*date, time, location*
Checklist	*reference, URL, etc.*

Roles

Name	Role	Preparation Time

Log

file:line	defect	h/m/l	who found	github#

Formal Inspection Activity

- Pick a some code in your project
  - The piece of code in your project that scares you the most
  - Find a problem area with low test coverage
  - Around 200-400 lines
- Plan an inspection and create team/inspection.md
  - Assign roles to team members
  - Pick at time to meet
- Do your preparation ahead of time
  - Add what you find to team/inspection.md
- Meet and discuss the items in inspection.md
  - Create github issues for that you need to address
  - Add the github issue numbers to team/inspection.md