

18-642:

SQA Isn't Testing

10/4/2018



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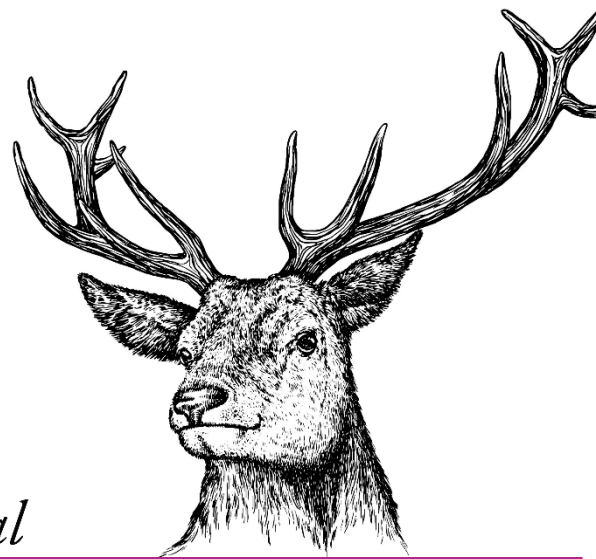
“If builders built buildings the way programmers write programs, then the first woodpecker that came along would destroy civilization.”

– *Gerald M. Weinberg/Weinberg's Second Law*

Carnegie
Mellon
University

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Essential

Quality Assurance

O RLY?

@ThePracticalDev

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Software Quality Assurance (SQA/PPQA)

■ Anti-Patterns:

- Process steps are being skipped
- Nobody tasked with ensuring SW process is actually being followed
- Less than 5%-6% of effort on SQA

■ SQA / PPQA* responsibilities:

- Define & maintain software process definition
- Train on process and related skills
- Audit to ensure process is being followed
- Keep metrics & diagnose process-related failures
- Coach/intervene to fix process failures

**DEFINE
TRAIN
AUDIT
DIAGNOSE
FIX**

(*) PPQA = Product and Process Quality Assurance

Audit: Is The Process Being Followed?

■ Every process step produces artifacts

- If it's not written down, it didn't happen
 - Audit says “yes, it happened”
- Artifacts must be lightweight but useful
 - Artifacts are the arrows on V diagram

■ Process quality audits are more subtle

- Some information from quality of written artifacts
 - Completeness – were all required fields filled out?
 - Internal consistency checks, e.g., traceability
- Some information indirectly via process-related metrics
 - Are defects escaping to later process stages?
- Sometimes direct observation (e.g., randomly attend peer reviews)



<https://www.flickr.com/photos/81894496@N06/15896297412>

SQA Personnel As Coaches

■ SQA defines the process

- With inputs from all stakeholders!
- Keeper of the process diagram
- Create/maintain templates and work aids



<https://pixabay.com/en/softball-team-coach-sports-1485997/>

■ SQA conducts training

- Initial training for new team members
- Remedial coaching, guidance, etc. for process failures

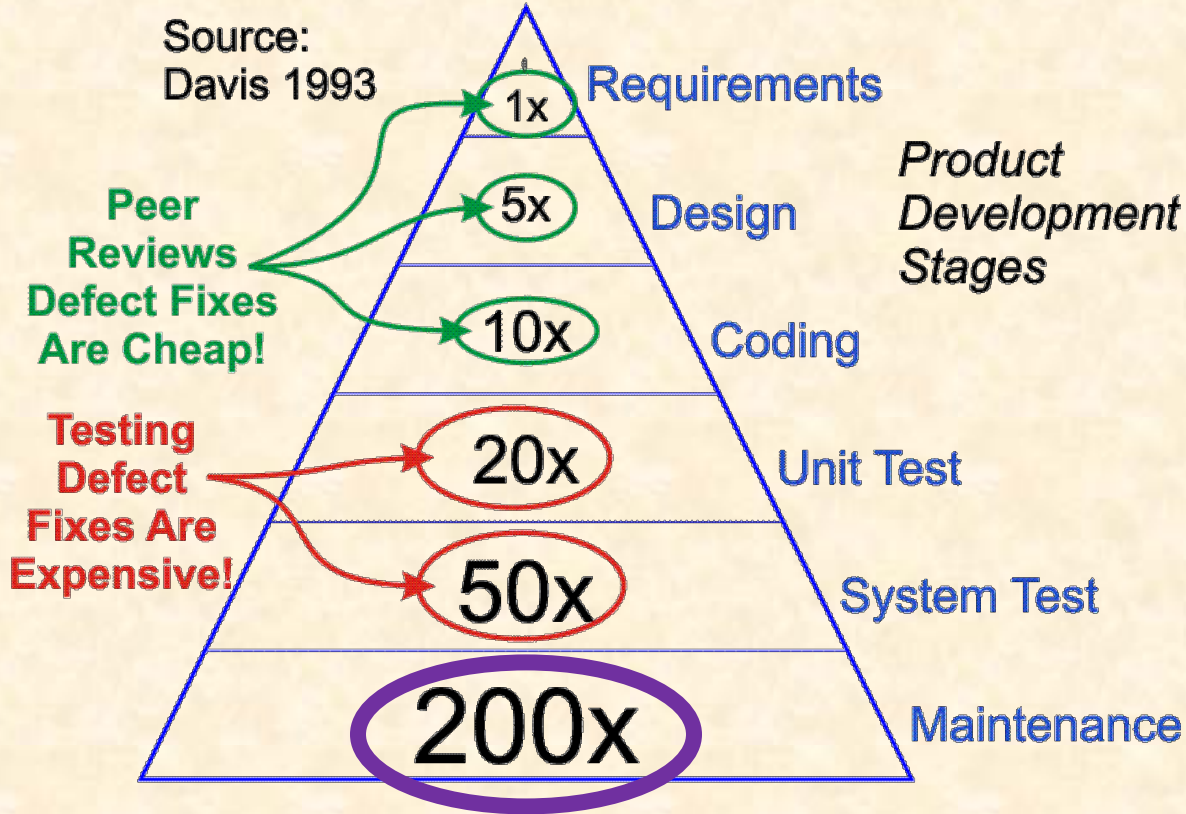
■ SQA keeps records & metrics to ensure process is on track

- Metrics should encourage high quality work products
- Better to coach problems than punish them

One Reason Process Matters

Relative Cost to Fix Defects

Source:
Davis 1993



■ Poor process:

- Bugs escape to field

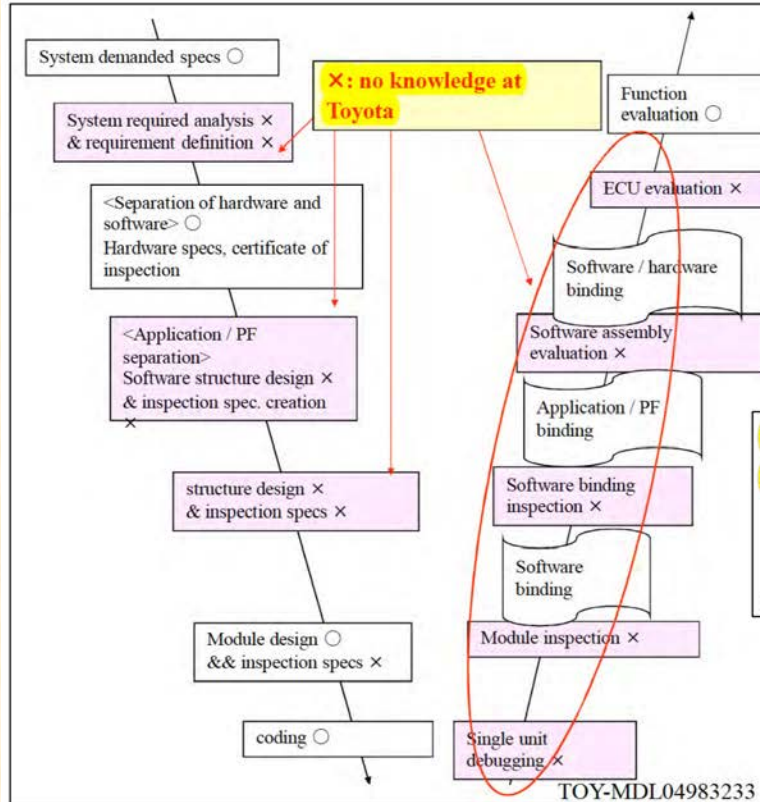
■ Testing:

- Can't even look for bugs until it's **expensive** to find and fix them

■ Peer Reviews:

- Find bugs while it is still **cheap** to do so

TOYOTA'S INADEQUATE SOFTWARE PROCESS



- Toyota failed to exercise a safe standard of care for software
 - Relied too much on vendors
 - Lacked internal expertise
- Inadequate supervision and training of software

There is a process in place for hardware, but not software.

- Process IN/OUT, timeframe not decided.
 - There are processes at Toyota yielding no knowledge.
- ⇒ Large deviation in product quality among vendors.

Barr Chapter Regarding
Toyota's Code Complexity



SQA Best Practices

■ SQA must have broad view of quality

- Define & maintain processes
- Audit & measure process effectiveness
- Train & intervene to keep process conformance on track
- About 5%-6% of staffing for SQA



■ SQA pitfalls

- SQA is not testing (product defects); it's about process defects
- Avoid form over substance; technical quality matters!
- Beware adversarial role of SQA (the "Process Police")