

# 18-642: SQA Isn't Testing

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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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# Software Quality Assurance (SQA/PPQA)

## ■ Anti-Patterns:

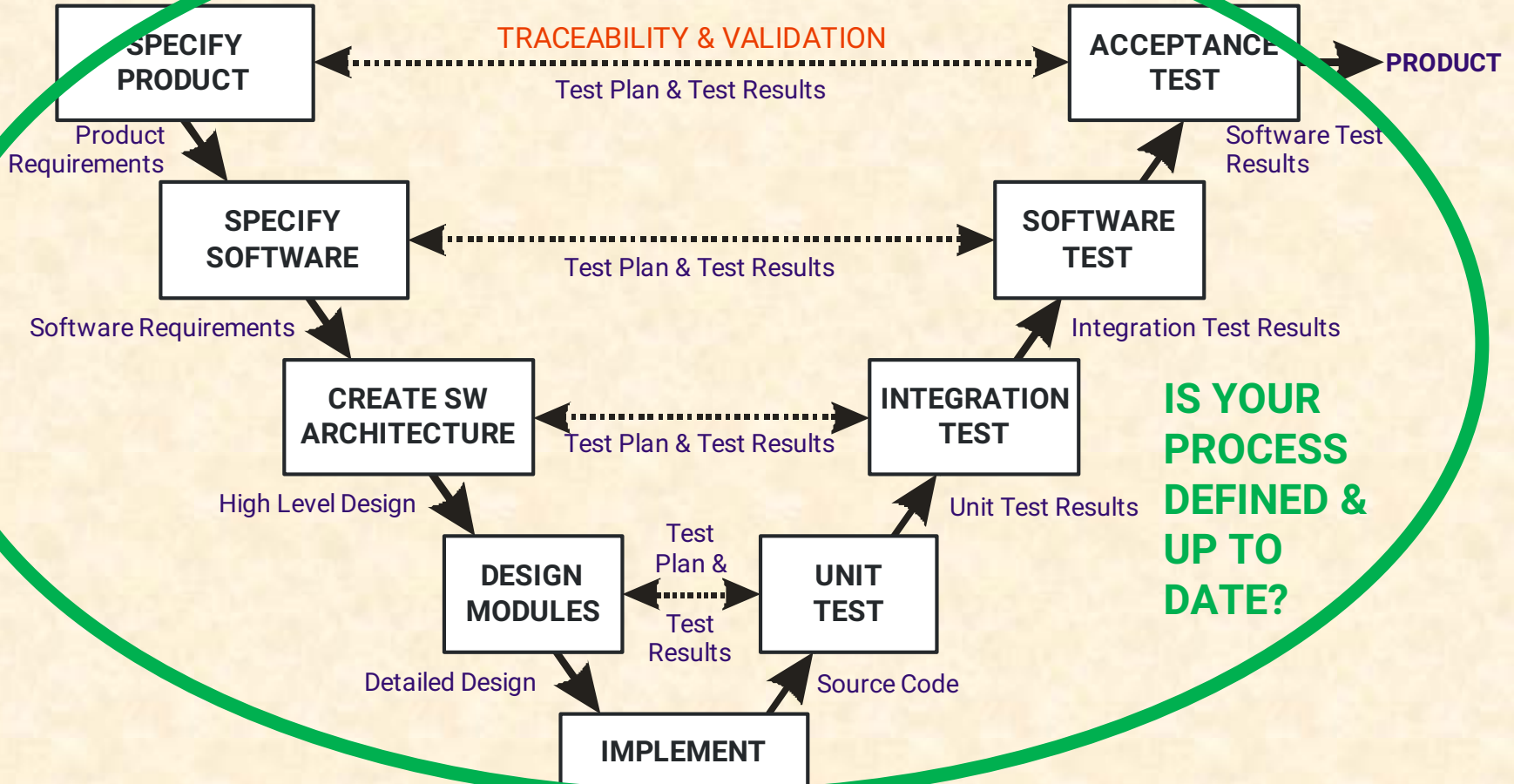
- **Process steps are being skipped**
- **Nobody tasked with ensuring SW process is actually being followed**
- **Less than 5%-6% of effort on SQA**

## ■ 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**

# YOU ARE HERE



# 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

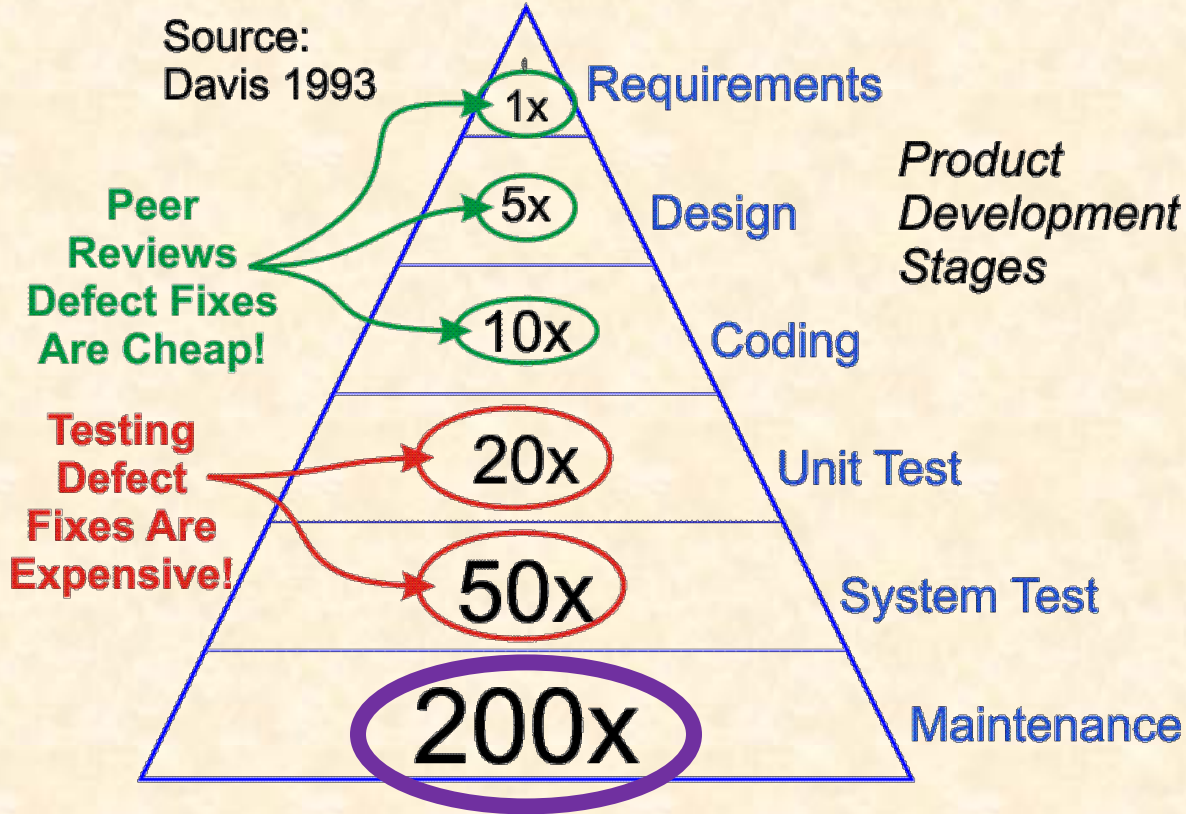
## ■ SQA keeps records & metrics to ensure process is on track

- 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



# 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")