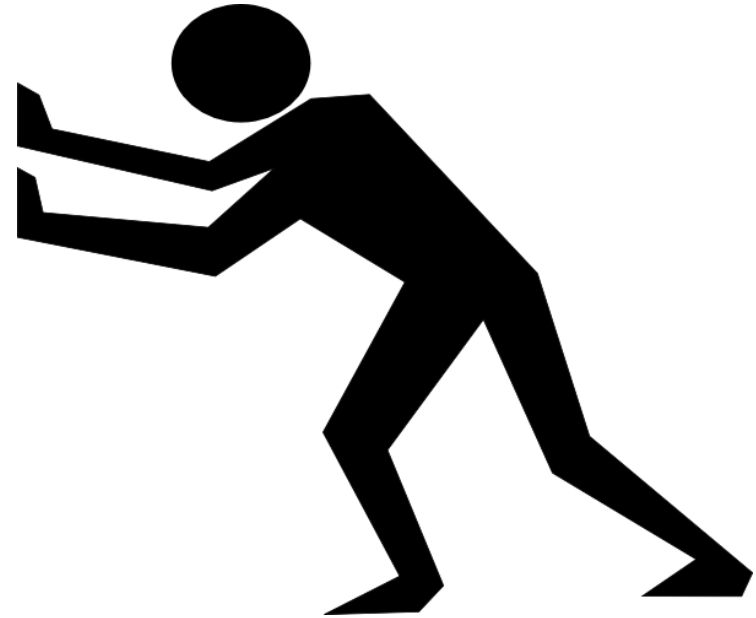


Shifting Left – A More Intelligent Direction

Jim Thomas
Director of Software Testing



Larry Smith – Dr Dobbs Journal 2001

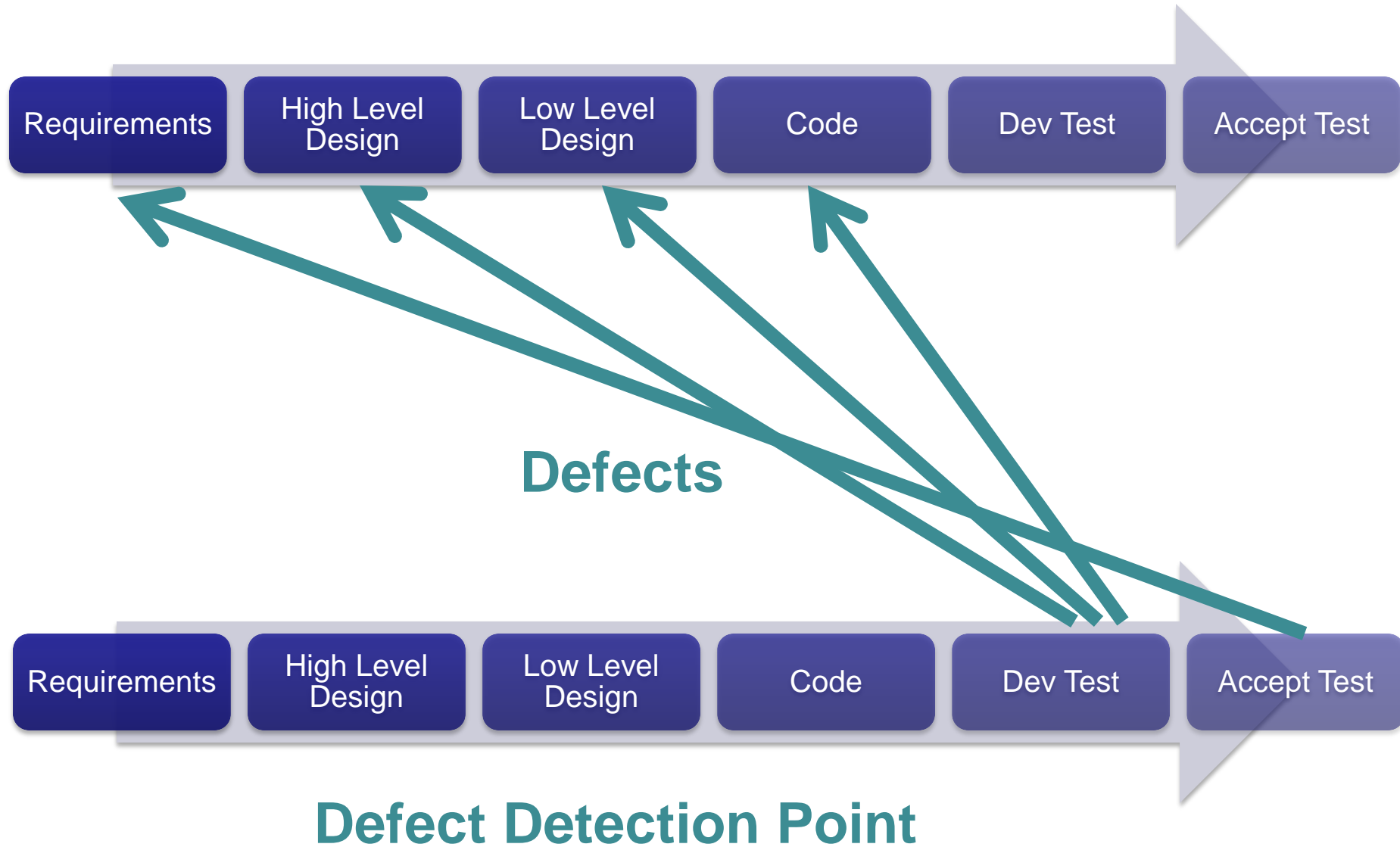
**Combining development and
quality assurance**



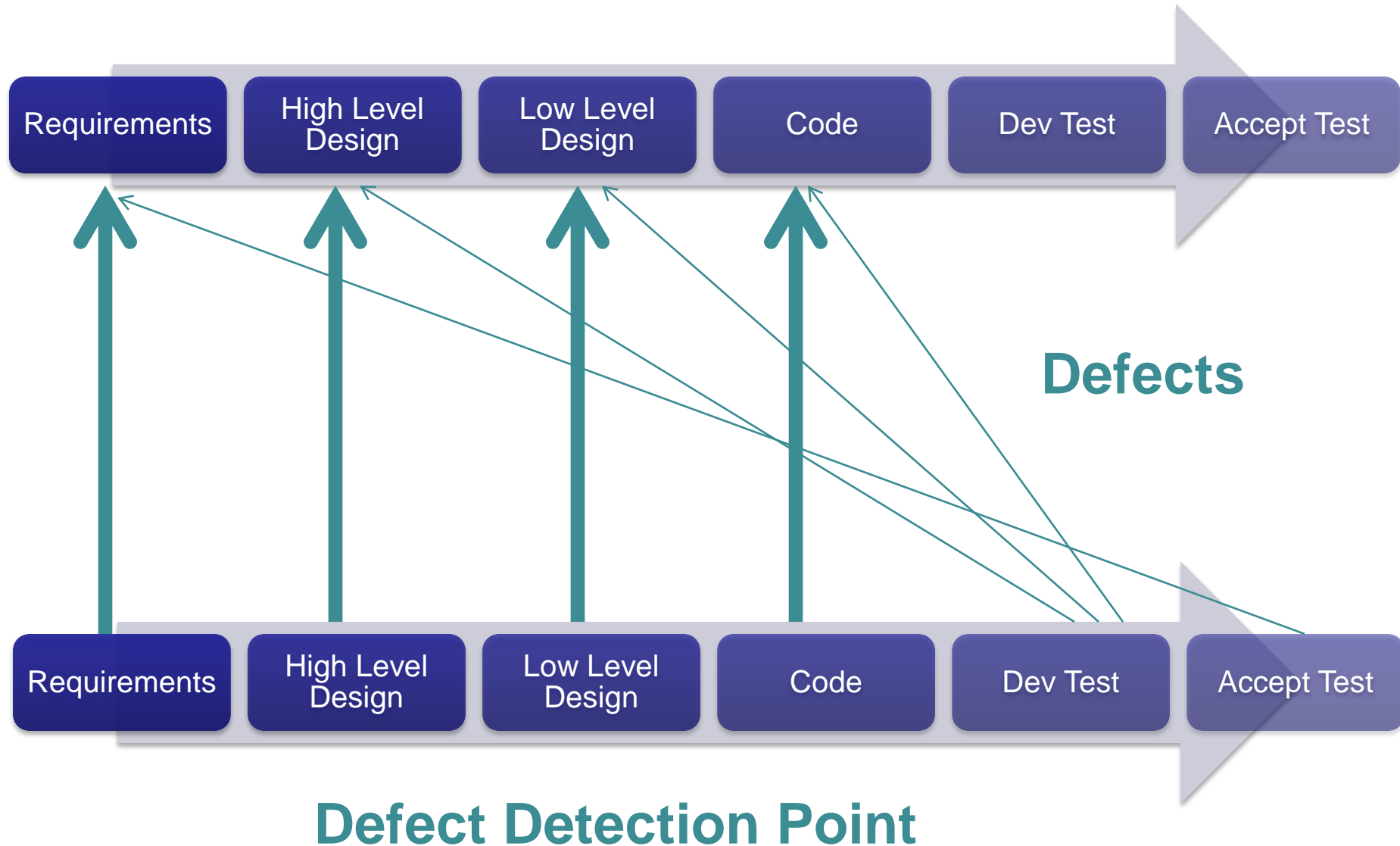
earlier and more deeply

- ✓ **Caught bugs earlier**
- ✓ **Saved time by working in parallel**
- ✓ **Saved resources**
- ✓ **More testable code**
- ✓ **Speeded up bug fixing**
- ✓ **Did more testing overall**
- ✓ **Motivated QA – part of the team, not seen as an overhead**

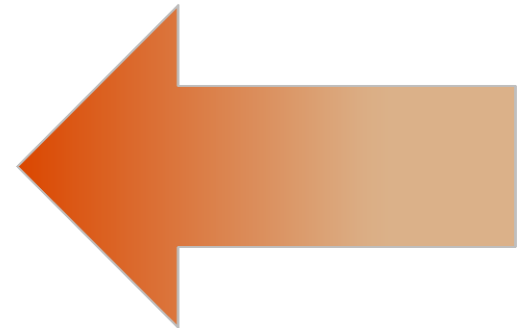
We Do This



... But We Could Shift 'Testing' Left



- **Inspections/reviews**
- **Benchmarking/prototyping**
- **Static analysis**
- **Early Test/QA involvement**

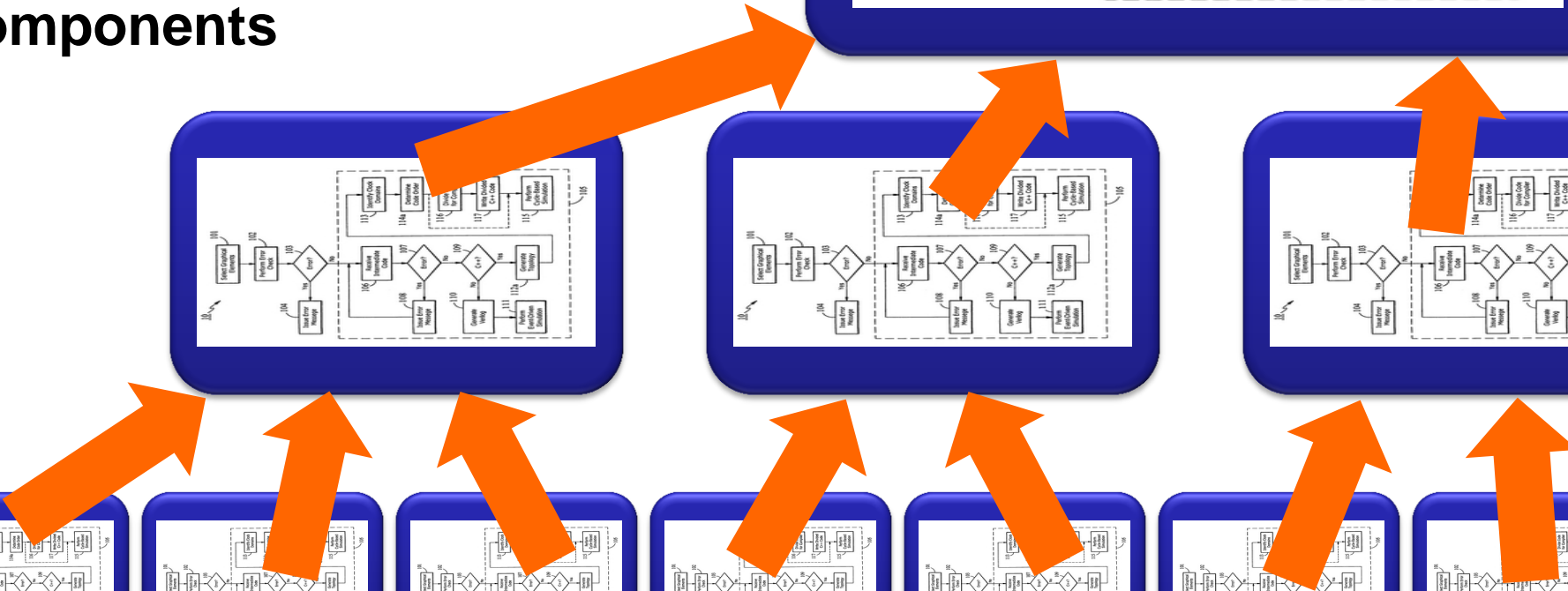
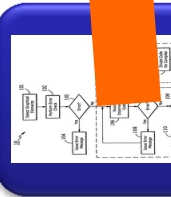
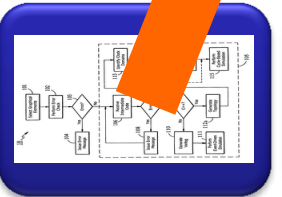
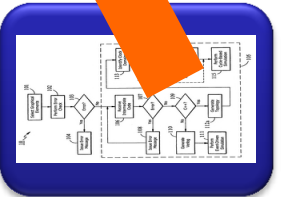
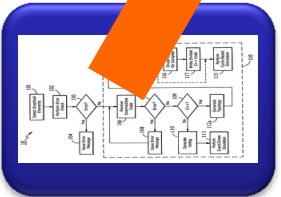
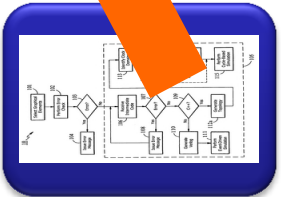
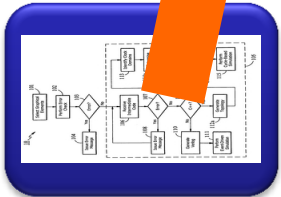
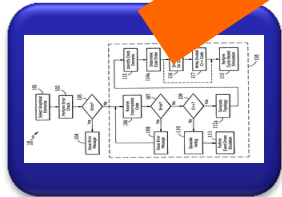
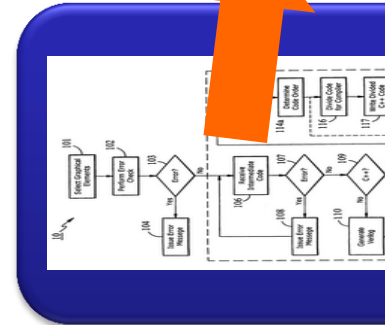
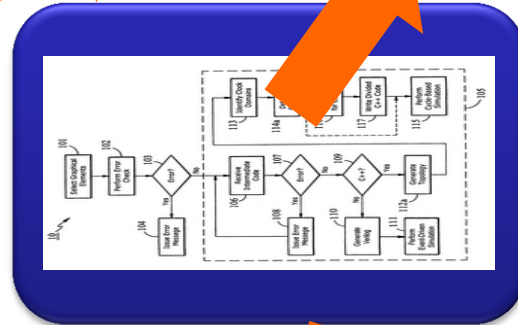
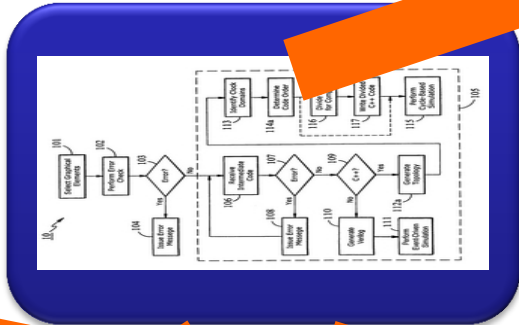
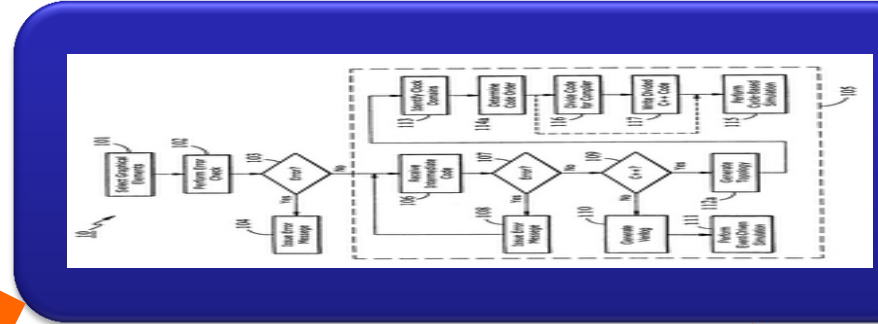


but

- ✓ **Improved requirements and design**
 - ✓ **Earlier test specifications**
 - ✓ **More collaboration**
 - ✓ **Better motivation**

The Pyramid of Proof

Integration of Pre-tested Components



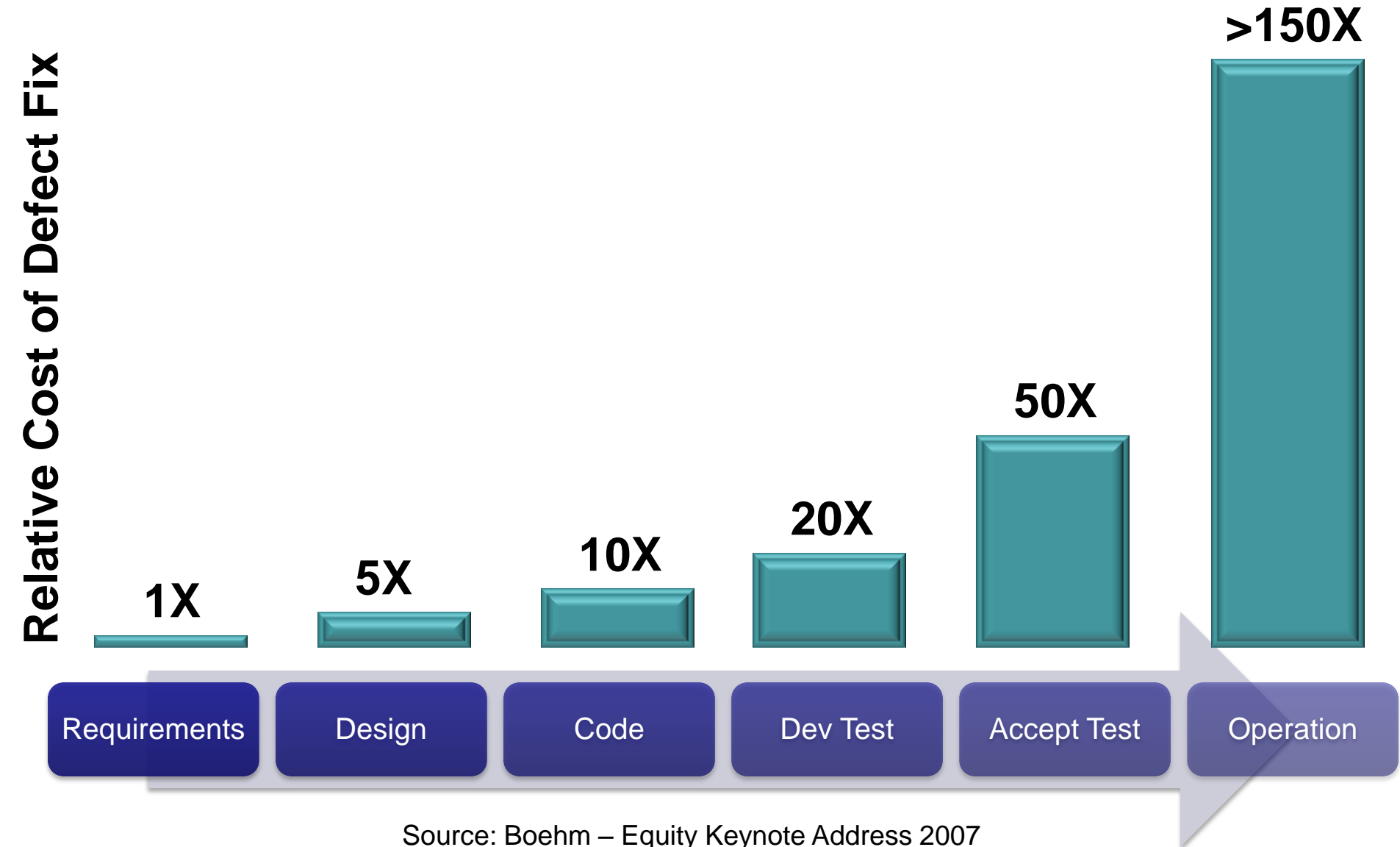
Quality



Built in

Tested in

We All Know This



Source: Boehm – Equity Keynote Address 2007

40-50% effort on avoidable rework

Peer reviews catch 30-90% defects

Personal practice reduces defects up to 75%

Best v Average SW Quality 6 times fewer defects

Programmers <50% efficient finding own defects

Inspections, Static analysis, Testing:

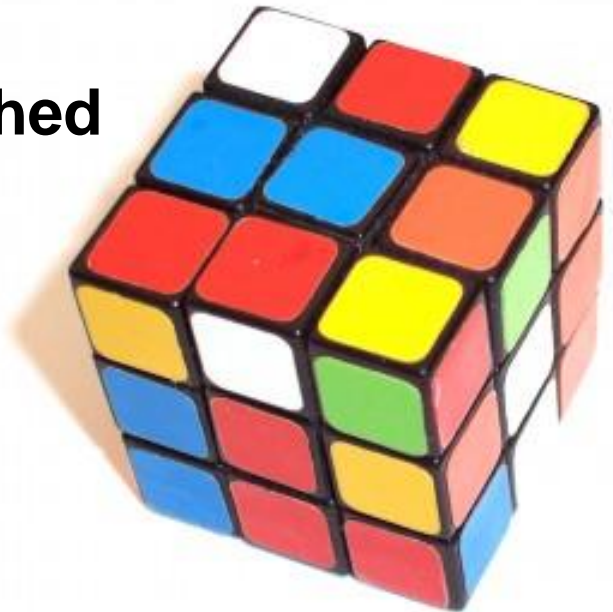
>97% efficient

Lower costs & schedules by >20%

Lower TCO by >45%

The Challenges

- **Shift Left can look expensive**
- **Pressure to deliver software**
- **Requirements and design often rushed**
- **Inspections/reviews not popular**
- **Dev test too ad-hoc**
- **Test/QA has become developers' crutch**





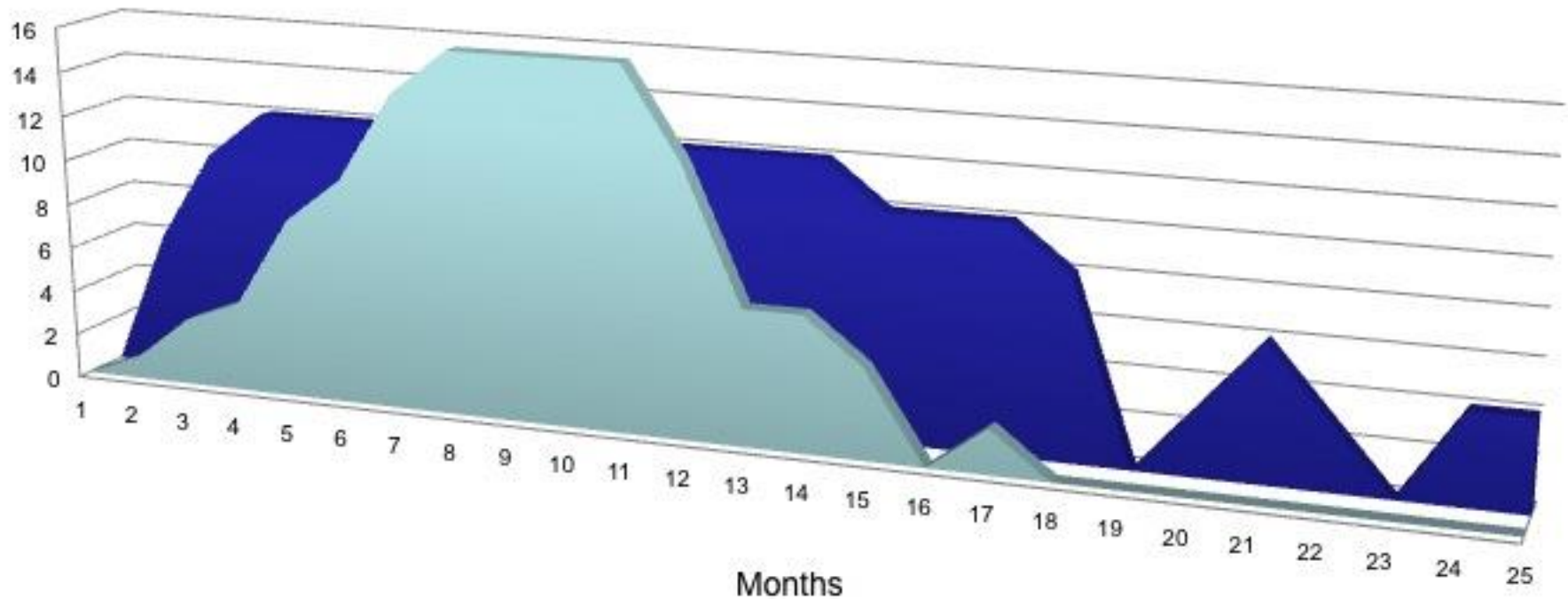
Mindset Change

Shift Left in Practice

Project Comparison

■ Project A ■ Project B

Resource



- **Shift Left isn't new**
- **Focus on building quality in**
- **Bring testing into development phase**
- **Inspection/review, static analysis and more intelligent testing can be highly effective**

***Better quality, Faster and Cheaper development
(and happier users)***