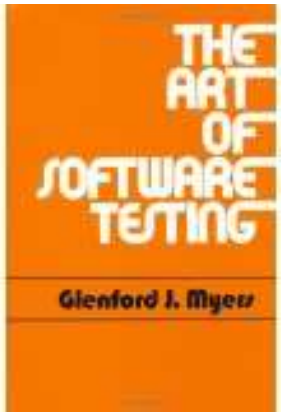
Improve
IT SERVICES B.V.

The Essentials of Structured Testing

Erik van Veenendaal



Erik van Veenendaal

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- Founder and shareholder ImproveQS
- In testing since 1989 working for many different clients and in many different roles
- Author “TMap”, “ISTQB Foundation” and “TMMi” and many other books and papers
- Former Vice-President International Software Testing Qualifications Board (ISTQB)
- Supporting member IREB board
- Keynote speaker, e.g., EuroSTAR, STAR
- Winner of the European Testing Excellence Award

Why is testing necessary?

- Increasing importance and size of software in society as a whole
  - Amount of software in consumer product doubles every 24 months (Hans Aerts)
- # defects hardly decreases
  - Defect density (defects/KLOC) is almost constant in the last 15 years (Les Hatton)
- High Competition & Outsourcing
  - –Time-To-Market, Product Quality, Price Levels are essential for business success
- Testing often takes 30 - 40% of project costs

Software get Eindhoven's newspaper into trouble

Software-fout bij verkeerstoren Guam

Software oorzaak chaos in betaling thuiszorg

Programming Fault: Claim for 100 Milion D-Mark

Duitse PTT bledt dag goedkoop bellen na blunder

Dubbele afschrijving door computerfout

'Fout in software oorzaak crash Ariane'

Beveiligingsfout in browser Microsoft

Computerfout legt Schiphol plat

AMSTERDAM ■ Het luchtverkeer
Schiphol is afgelopen weekend en
stie vertraagd door een storing in
de luchtve

Denver's International Airport

Role of testing

- Helps to reduce risk of failures occurring
- Contributes and measures product quality
- Provides information for decision making
- Provides confidence in the product
- Sometimes required by law or contract
- However, you cannot test quality into a system

IT-Auditing & SW Testing

- To ensure reliability of IT systems
  - You cannot test the entire yourself
- Audit Testing Process
  - Review documented test process
  - Review deliverables
  - Interview project (test) team members

IT-Auditing & SW Testing (2)

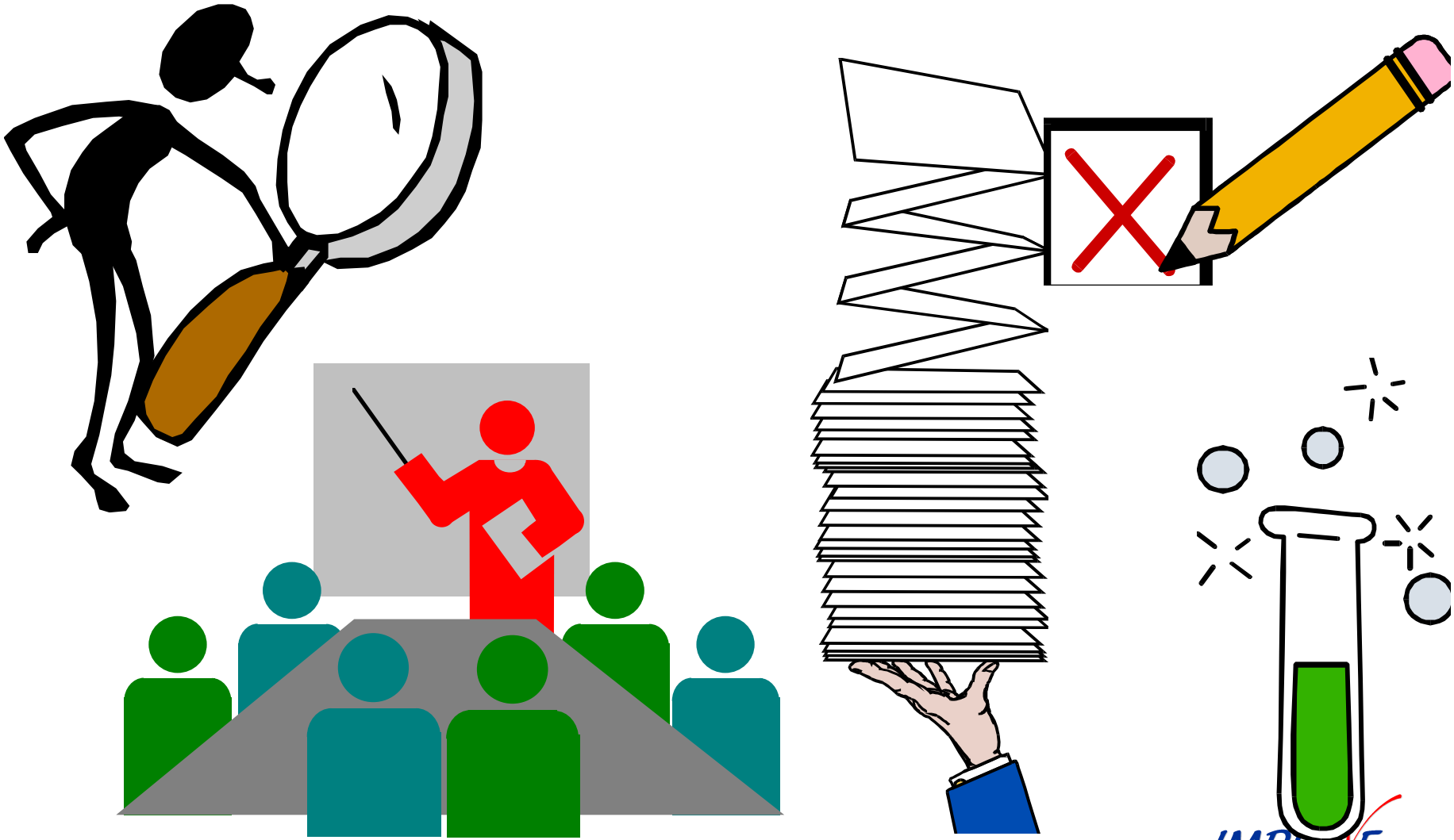
- Deliverables
  - Test strategy, plans, cases, logs, defects, test coverage, reports, etc.
- Focus
  - Compliance, Coverage, Defect status, Effectiveness, Efficiency

IT-Auditing and SW Testing

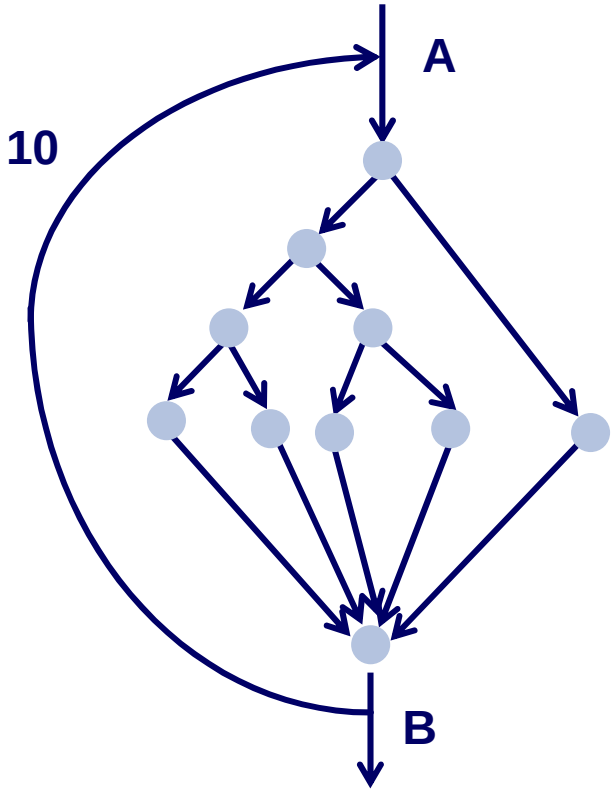
- To ensure the reliability of IT-systems
  - You cannot test the entire system
- Audit test process
  - Review test process manual
  - Review deliverables
  - Interview project (test) team

- Focus
  - compliance, coverage, defect status, effectiveness, (efficiency)
- Audit report, incl. recommendations

What is Software Testing?



1. Complete testing is not possible



DO loop that runs 10 times
perhaps 10 - 20 statements
independent decisions

5 paths throughout the program

total of 5^{10} test cases

9.765.625 test cases!

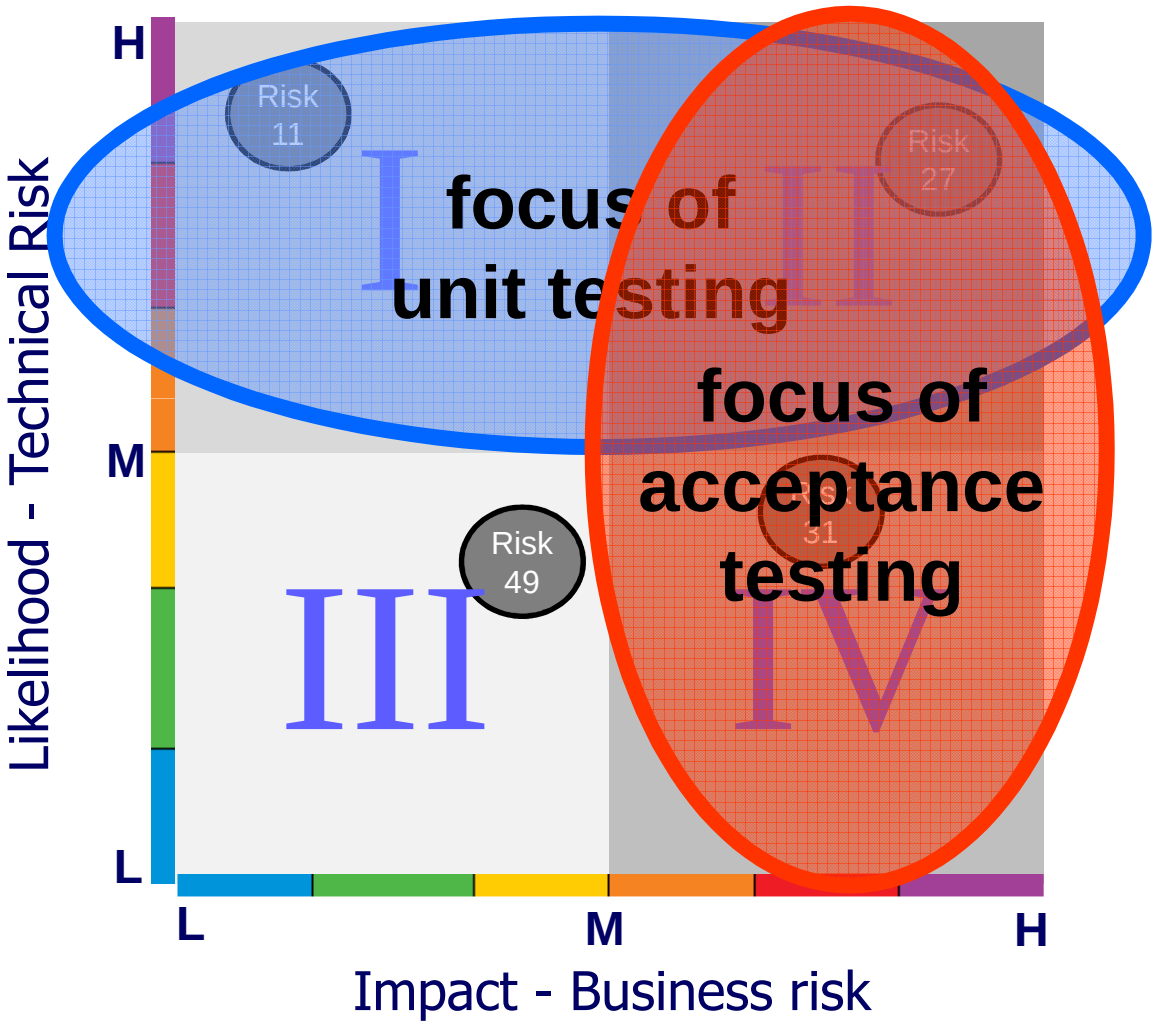
Testing is setting priorities

2. Testing is Risk-Based

- Objective: most *feasible* coverage
  - effective usage of limited resources
  - optimize test effort
- Limited resources
  - staffing
  - infrastructure
  - time !
  - ..

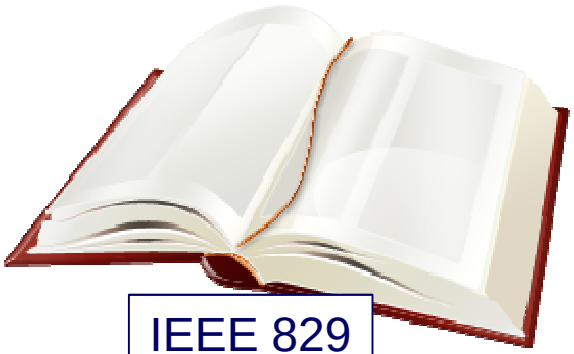
- The *right* level and type of coverage on the *right* parts at the *right* time
- Testing is context dependent

Product Risk Matrix

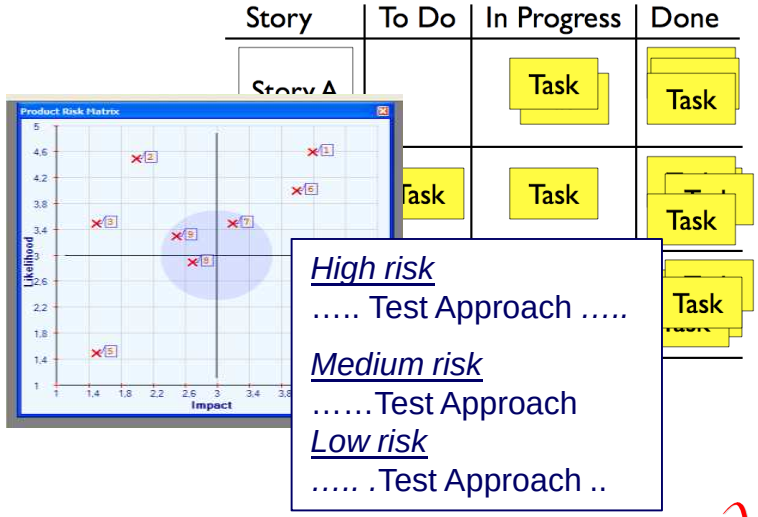


3. Testing must be Planned

- Upfront thinking
- Separately or part overall estimations sessions
- Also estimate and plan *re*-testing!



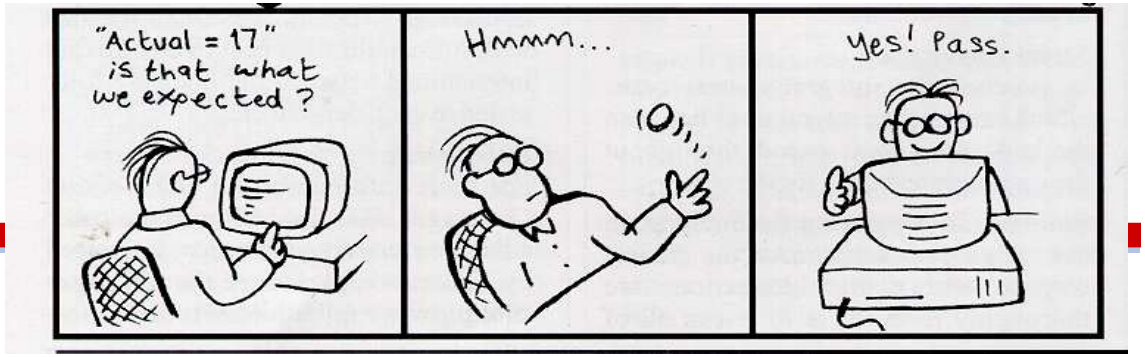
IEEE 829



4. Defect Clustering

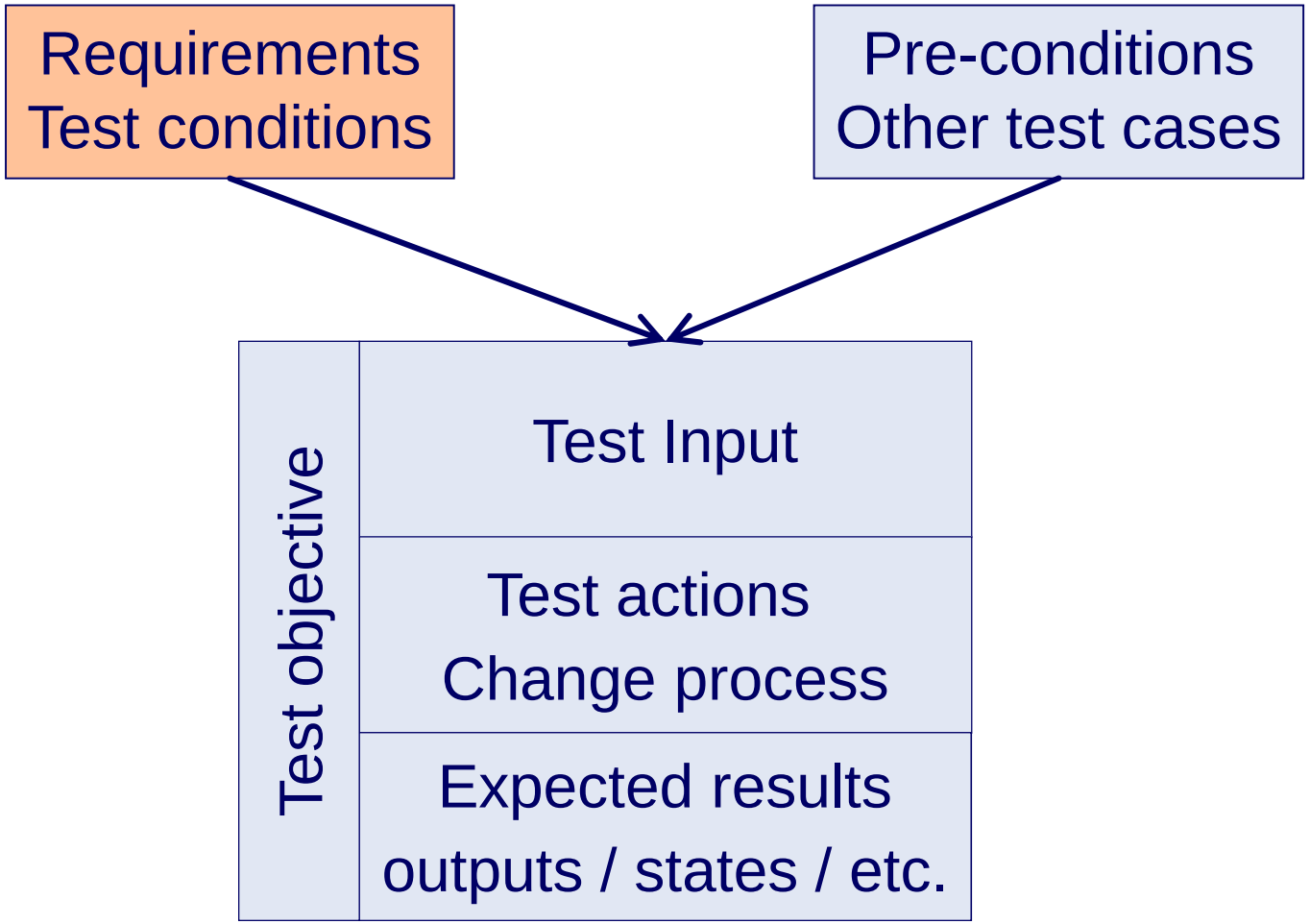
- Number of defects found is an indication for more defects in that section!
- Adapt the test approach on the basis of results
- Learn from defects found in previous projects (iteration)
- Works great for Agile and Exploratory Testing
  - Learning through retrospective and debriefing meetings

5. Test Cases

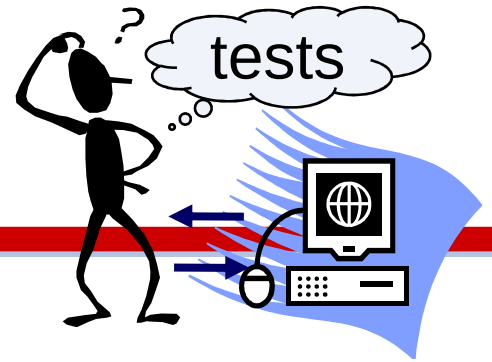


- An important part of test cases are the expected result
  - “the eye seeing what it wants to see”
- Test both valid and invalid / unexpected situations and input conditions
  - unexpected behavior results in unexpected defects
- Avoid through-away test cases; make sure test cases are re-usable
  - important for re-testing and regression testing

Test Case (Design) Spec



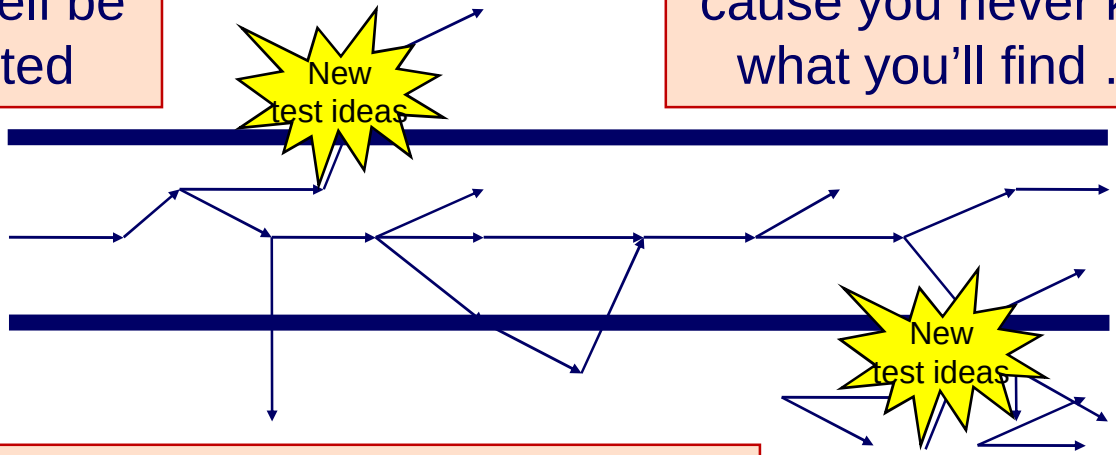
6. Testing is Finding Defects



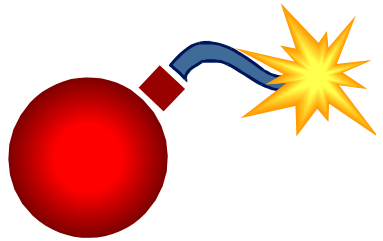
- Exploratory Testing; simultaneous exploration, test design and execution
- Finding most important defects in time available

Let yourself be distracted

'cause you never know what you'll find ….'

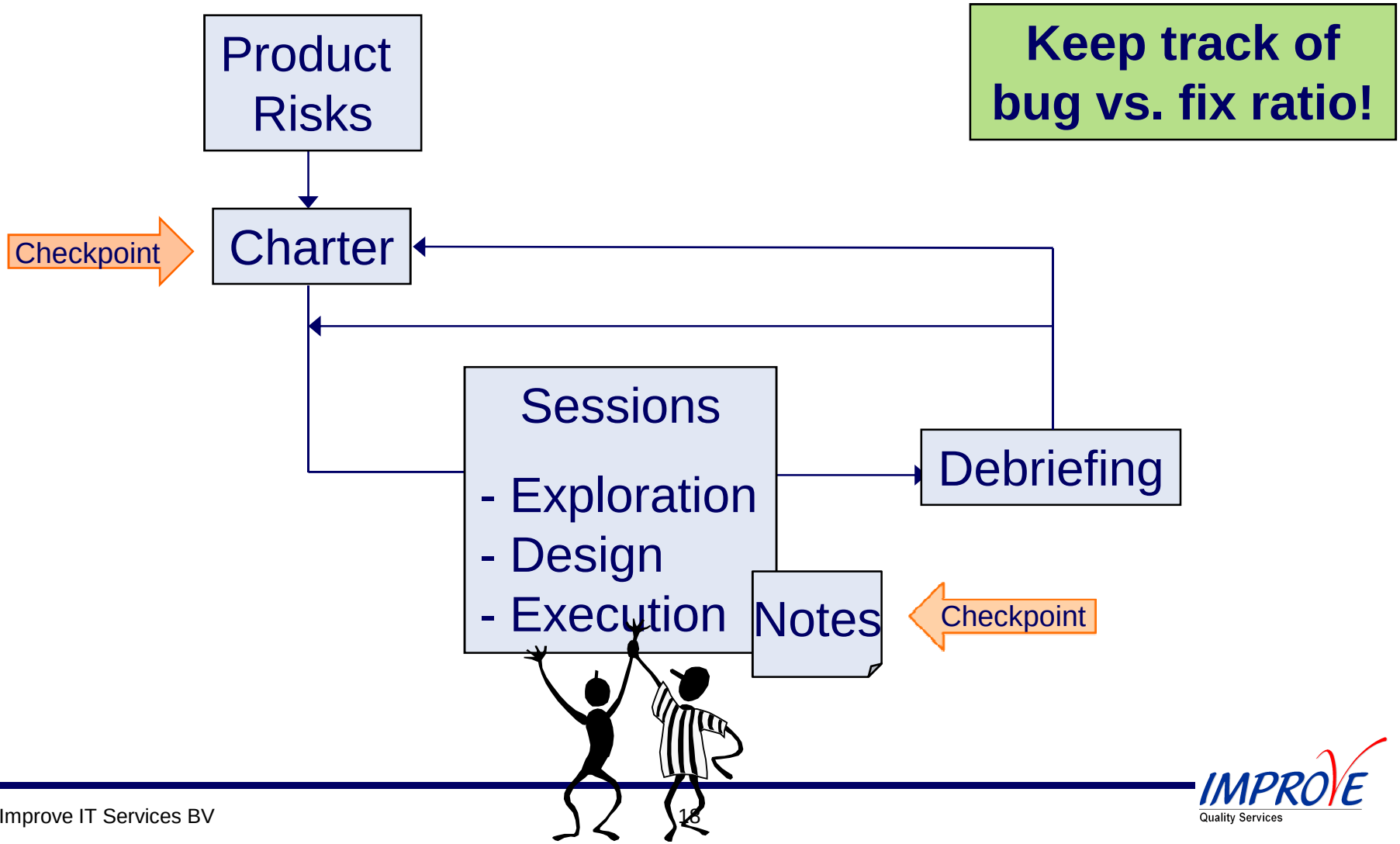


But periodically take stock of your status against your mission

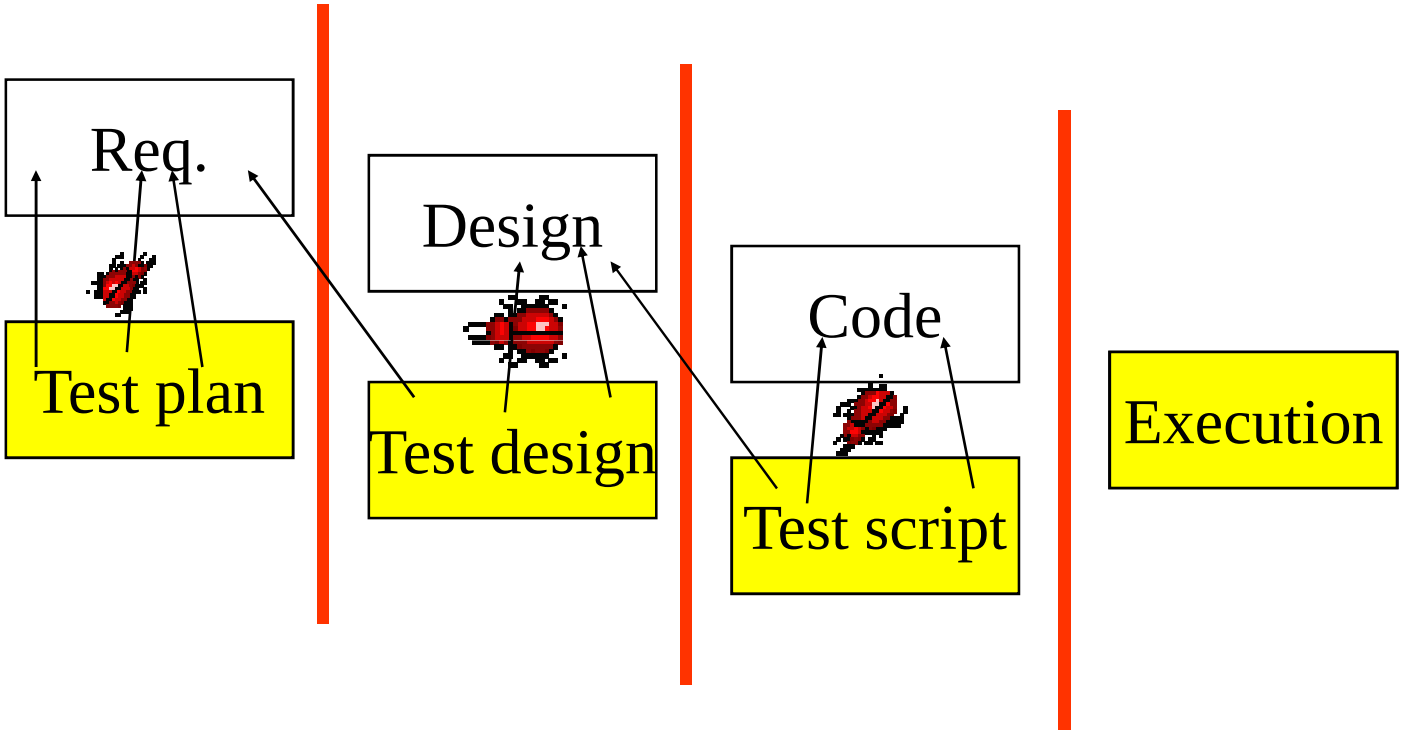


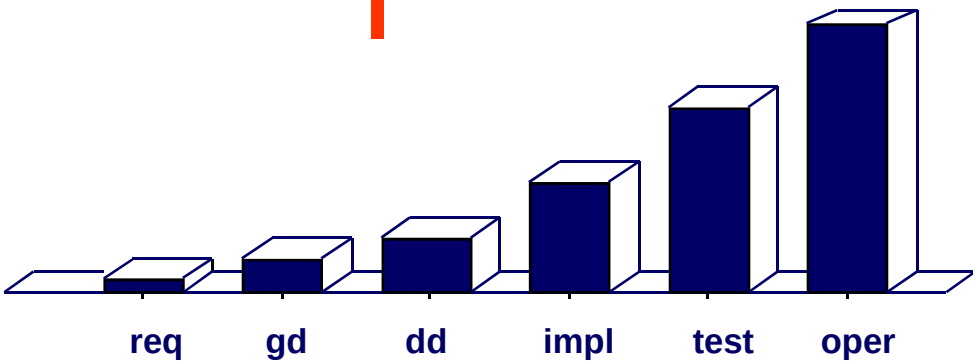
Exploratory Testing Process

Session-Based Testing

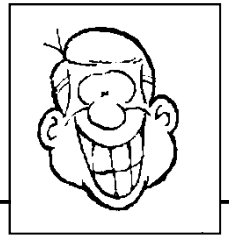


7. Testing is to Prevent Defects





8. Testing Work is Creative and Difficult



via (exchanging) Practical Experiences, Coaching and (formal) Training

Test knowledge

- Test principles
- Techniques
- Tools, etc.

ISTQB

TMap®

IT knowledge

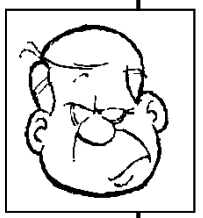
- Scripting
- Requirements **(IREB)**
- Configuration mgt.

Domain knowledge

- Business process
- User characteristics

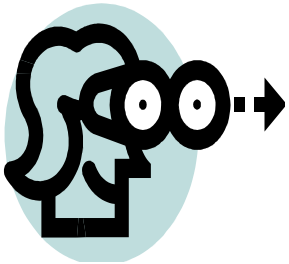
Soft skills

- Communication
- Critical mindset
- Presentation & reporting



IMPROVE Quality Services

9. Testing Requires Independence



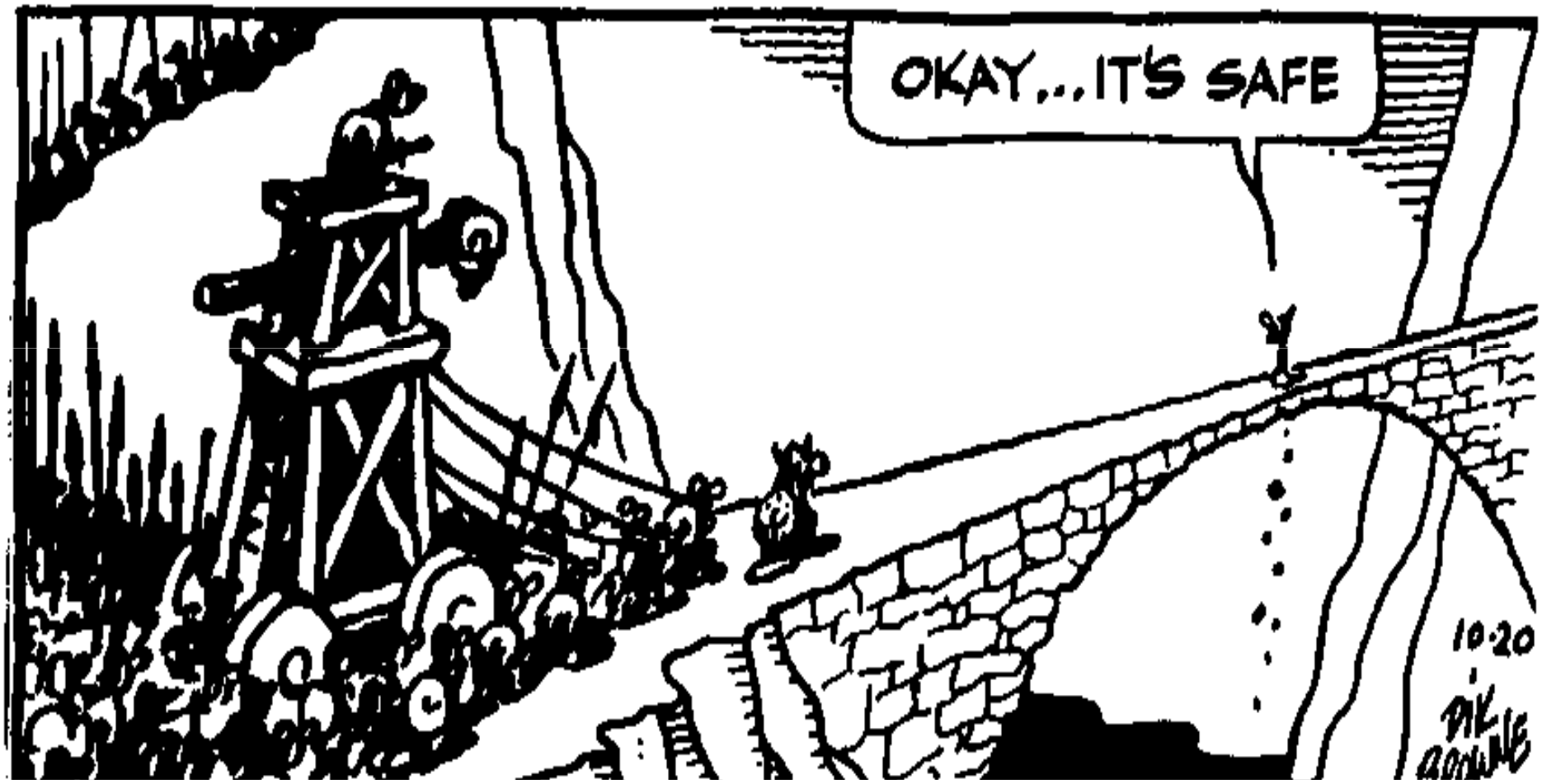
- If we can, we also get someone else to check our work…
  - different view and mindset!
  - egoless engineering (Weinberg)

➢ Testing by another person

➢ Testing by a different group

➢ Testing by a different company

10. Test Environment



Testing should be done under conditions as close as possible to those under which it will be used

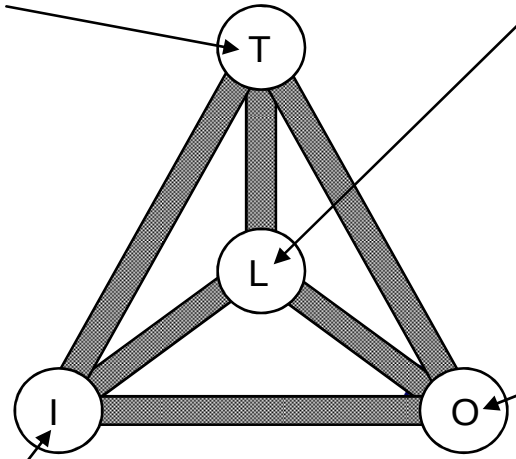
TMap

Techniques

- Test Design
- Expected Result
- Invalid Test Cases
- Re-usable Test Cases
- Exploratory Testing

Life-Cycle

- Risk-Based
- Context dependent
- (re-)Planned
- Early Testing

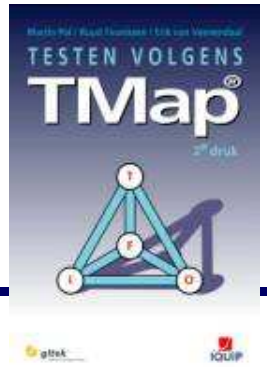


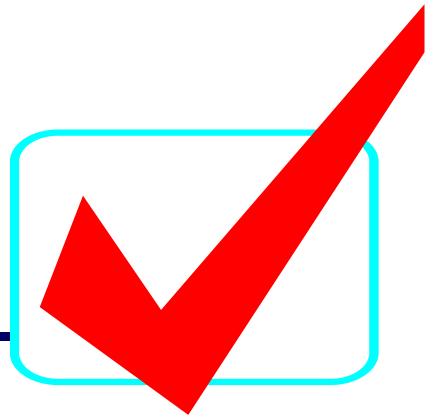
Organization

- Skills of Testers
- Independence

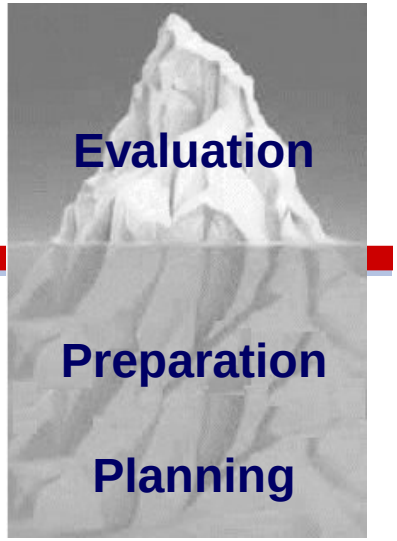
Infrastructure

- “Real-life” (as much as possible)





Testing Definition



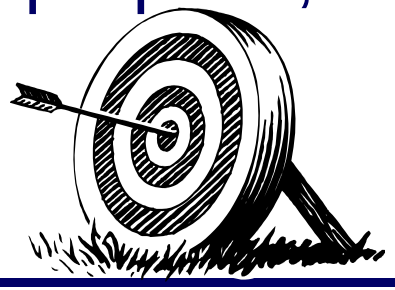
The process consisting:

- of all life cycle activities, both static and dynamic, concerned with
- planning, preparation and evaluation of software products and related work products

➢to determine they satisfy specified requirements,

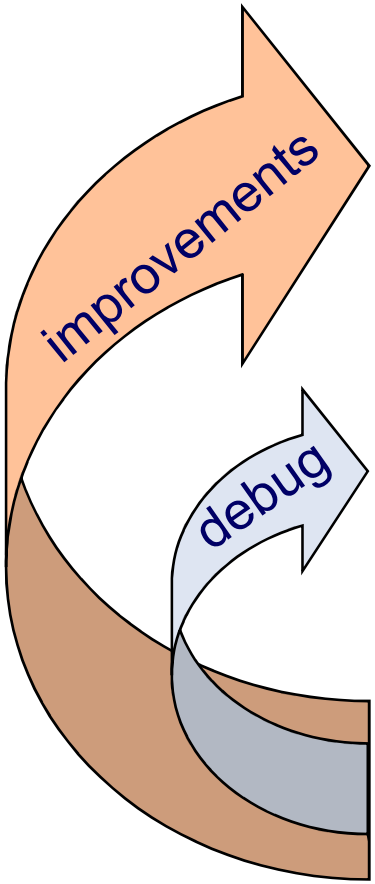
➢to demonstrate they are fit for purpose, and

➢to detect defects



Test Improvement

ISTQB Glossary for terminology



- Errors – we all make mistakes

- Defects – not all will result in a failure

also referred to as Faults or Bugs

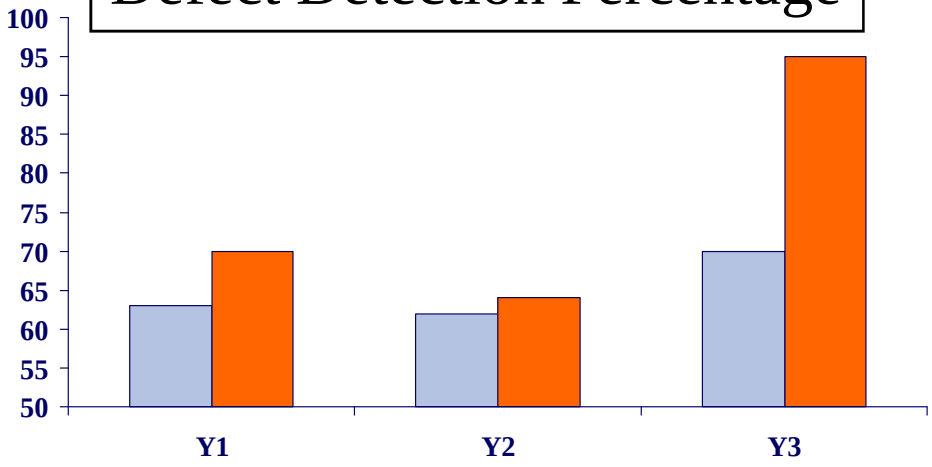
- Failures

Test Frameworks

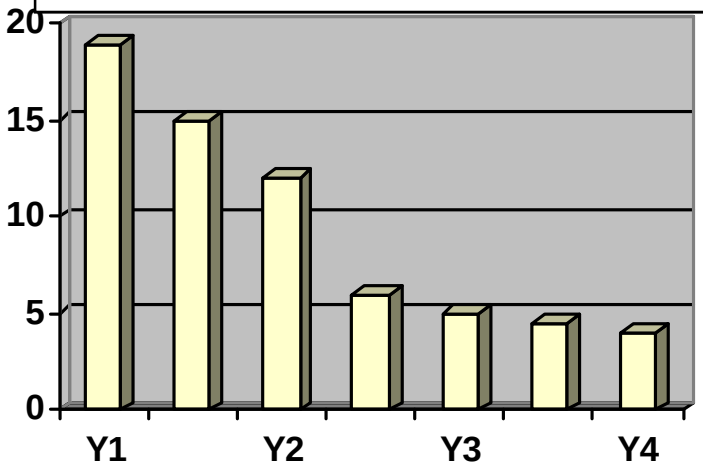
- For Compliance, but look beyound the obvious for:
  - Effectiveness
  - Efficiency
  - Recommendations

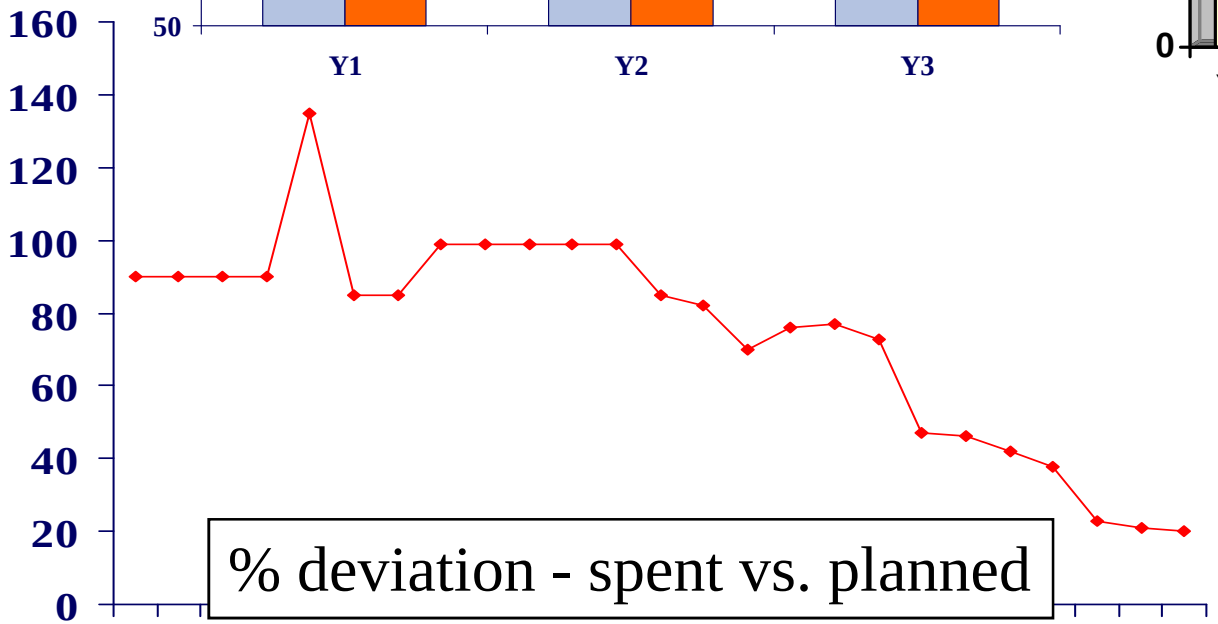
Results

Defect Detection Percentage



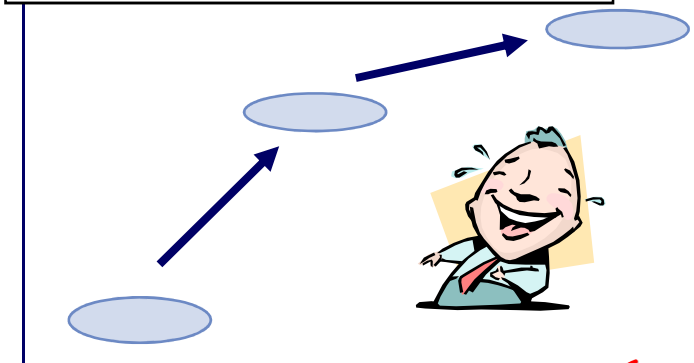
alpha / beta test lead time





% deviation - spent vs. planned

Employee satisfaction



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