fit@hcmus

Software Testing

CSC13003

Software Testing Introduction

Content

- What is Software Testing?
- Why must we test?
- What does a Software Tester do?
- Potentials of Software Testing Career?
- Tester is a “low-level” job?
- How is a good tester?

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Software Testing

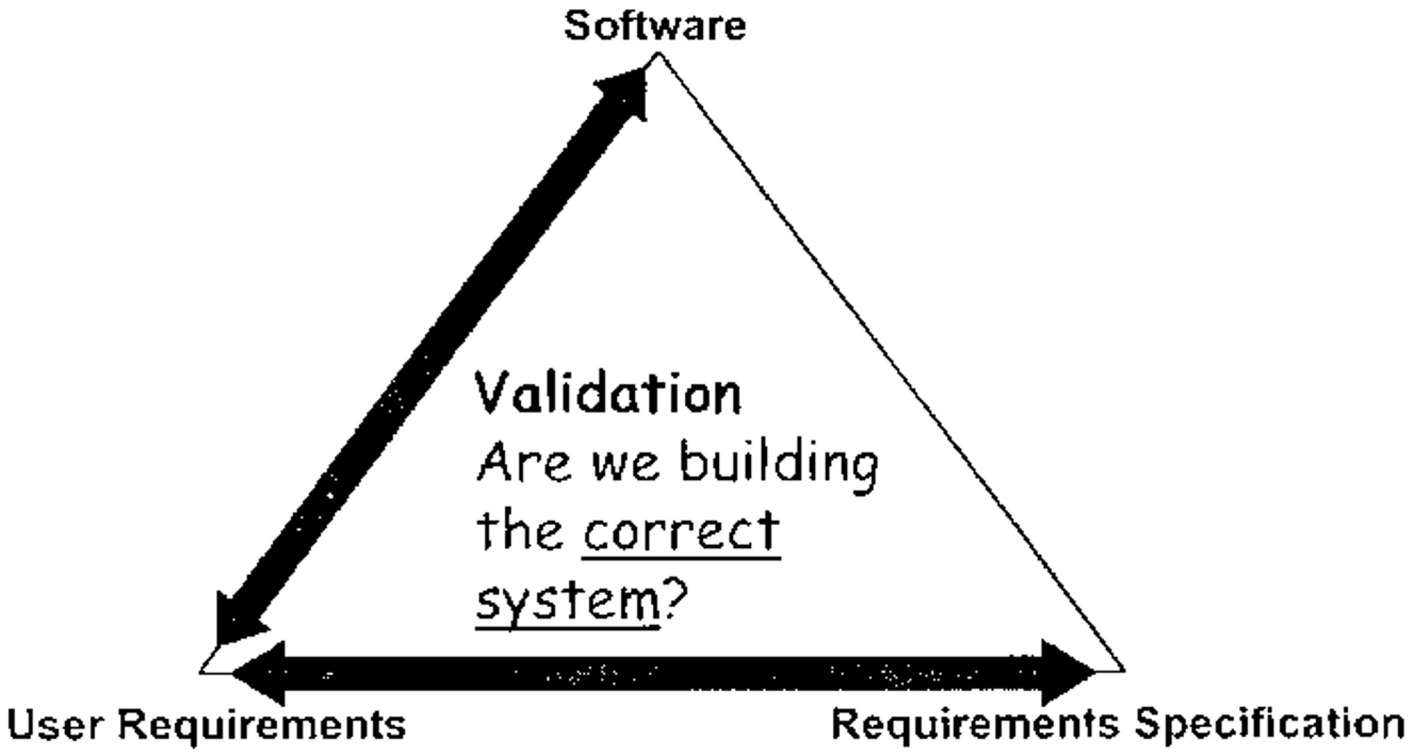
Testing is the process consisting of all lifecycle activities, both static and dynamic, concerned with planning, preparation and evaluation of software products and related work products to determine that they satisfy specified requirements, to demonstrate that they are fit for purpose and to detect defects.

Source: Glossary of Software Testing Terms

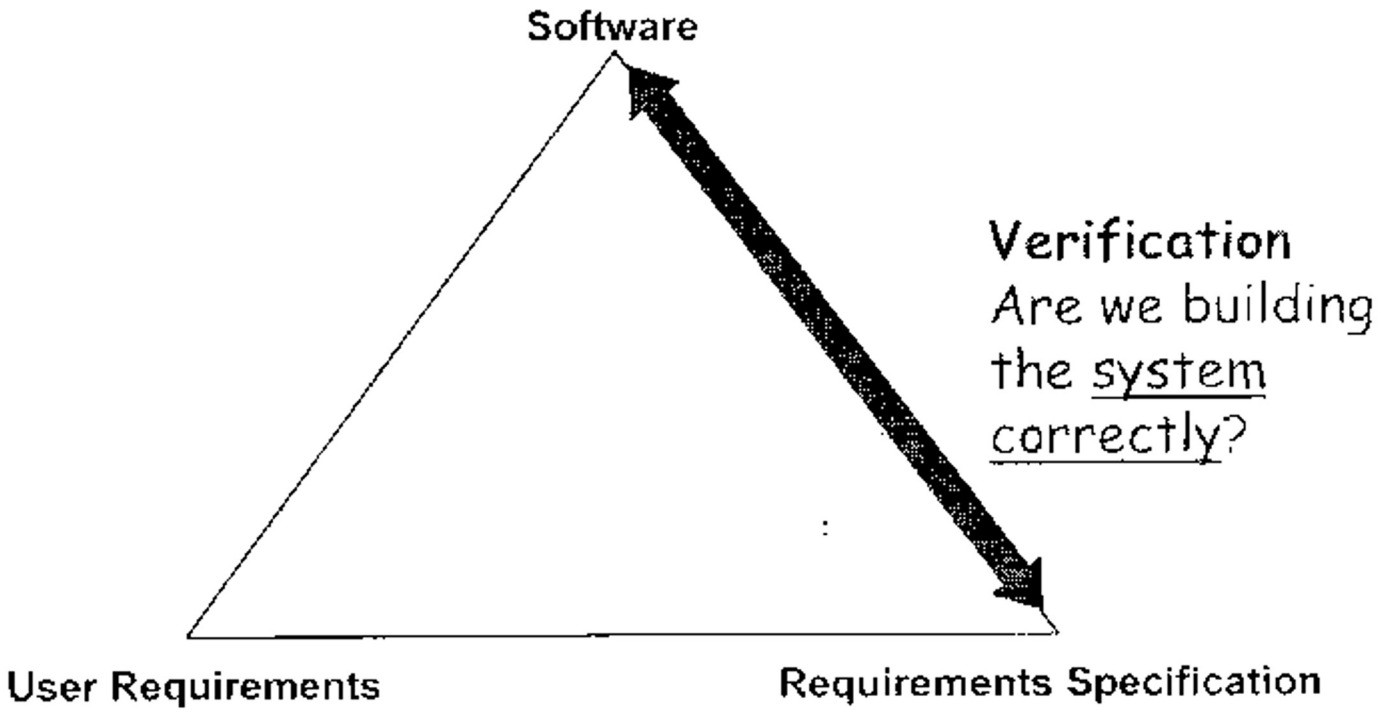
Static Testing vs. Dynamic Testing

- Static Testing
  - Examine the code
  - NOT Execute it
  - Code analysis, Code inspection, Code review…
- Dynamic Testing
  - Execute the code
  - Without, necessarily, examine it

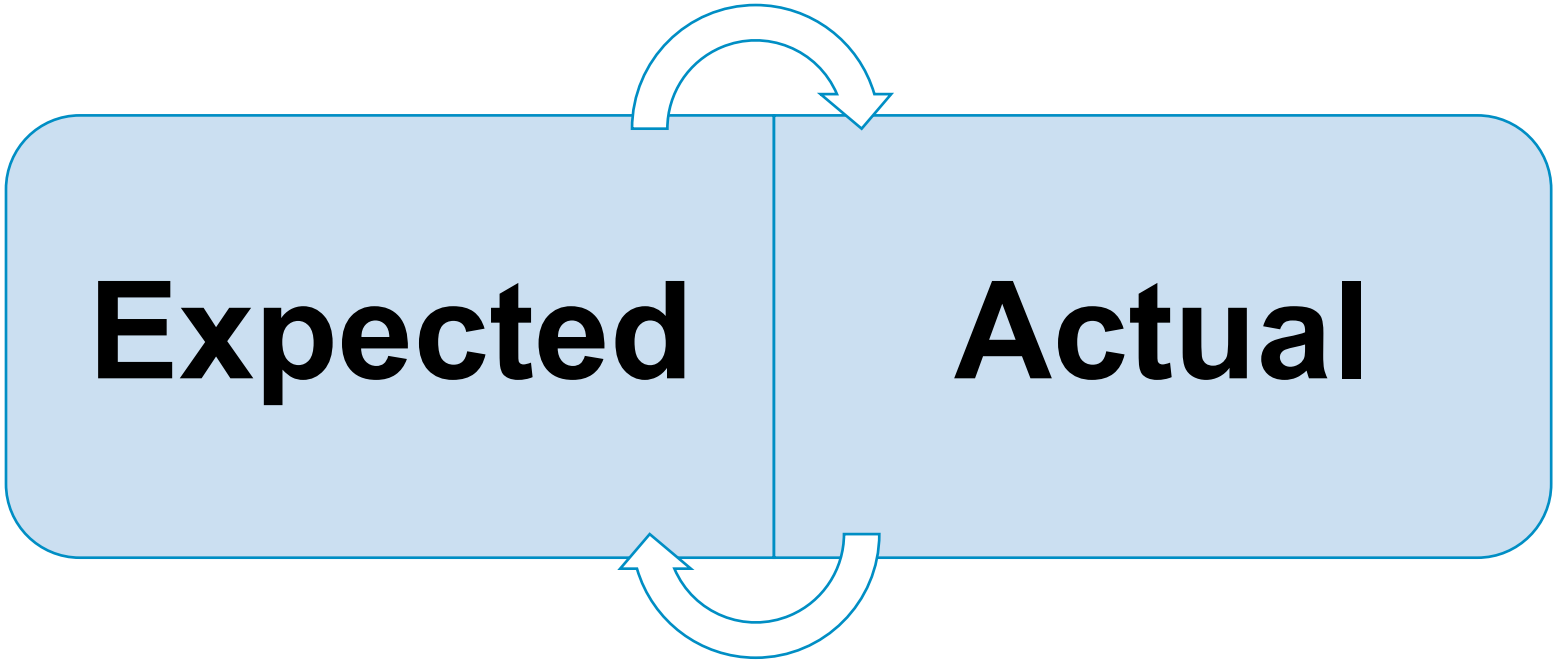
Validation Testing vs. Verification Testing



Validation Testing vs. Verification Testing



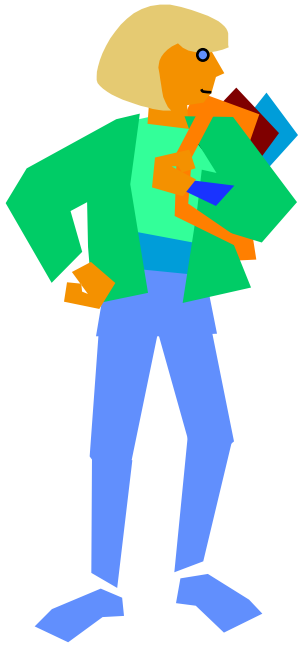
Test Oracle



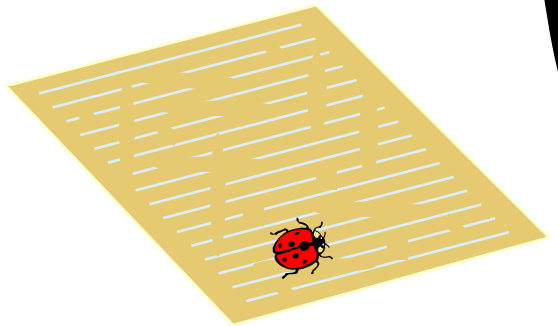
- **Test Oracle**: a source of information about whether the output of a program (or function or method) is correct or not

Error – Fault – Failure

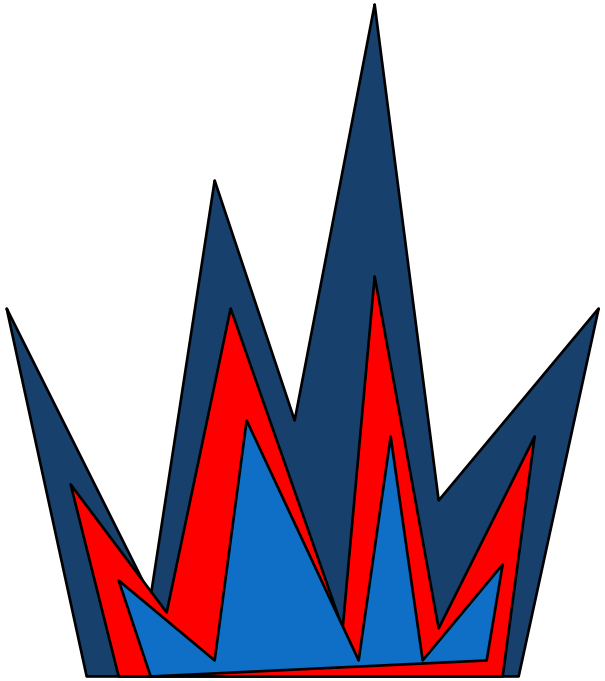
A person makes an **error** ...



… that creates a **fault** in the software ...



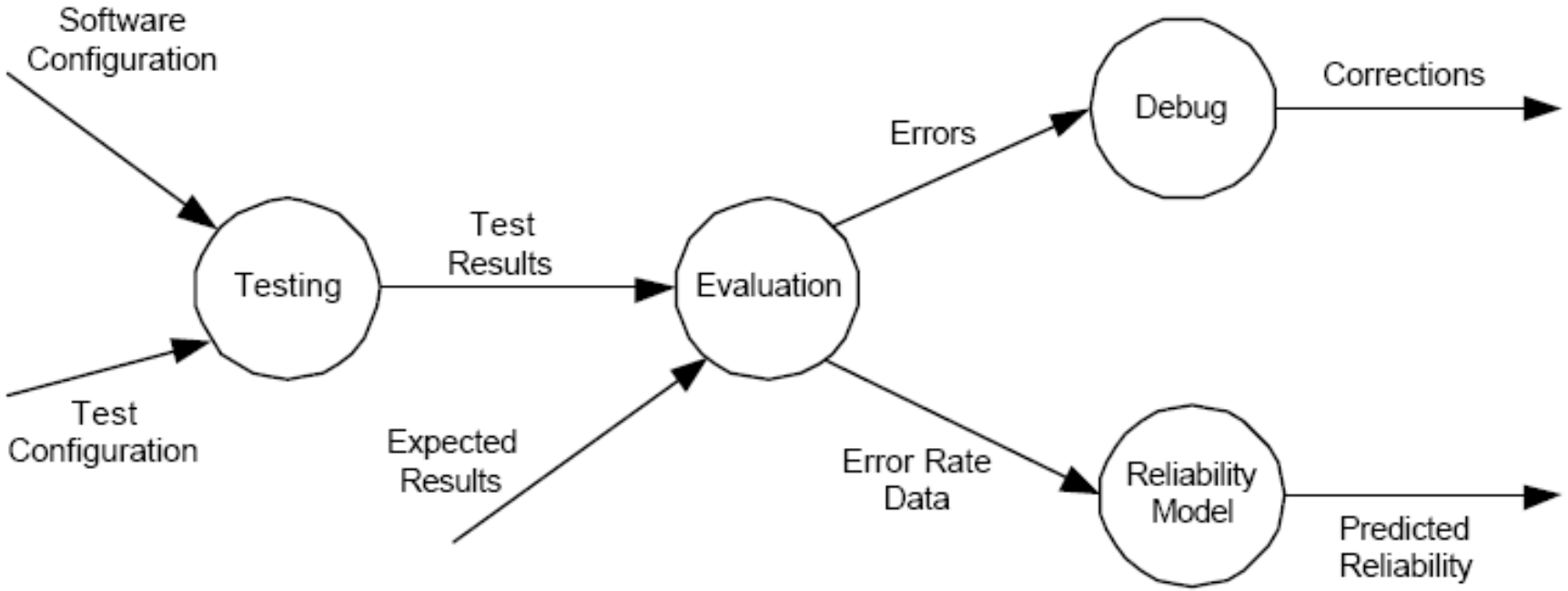
Fault / Defect / Bug



… that can cause a **failure** in operation

Testing vs. Debug

- Testing: finding input that cause the program to fail
- Debug: the process of finding a fault given by a failure



Test Bed

- The test execution environment configured for testing
  - Hardware
  - Software
  - Operating system
  - Network configuration
  - The product/application under test (AUT)
  - Other system/application
  - …

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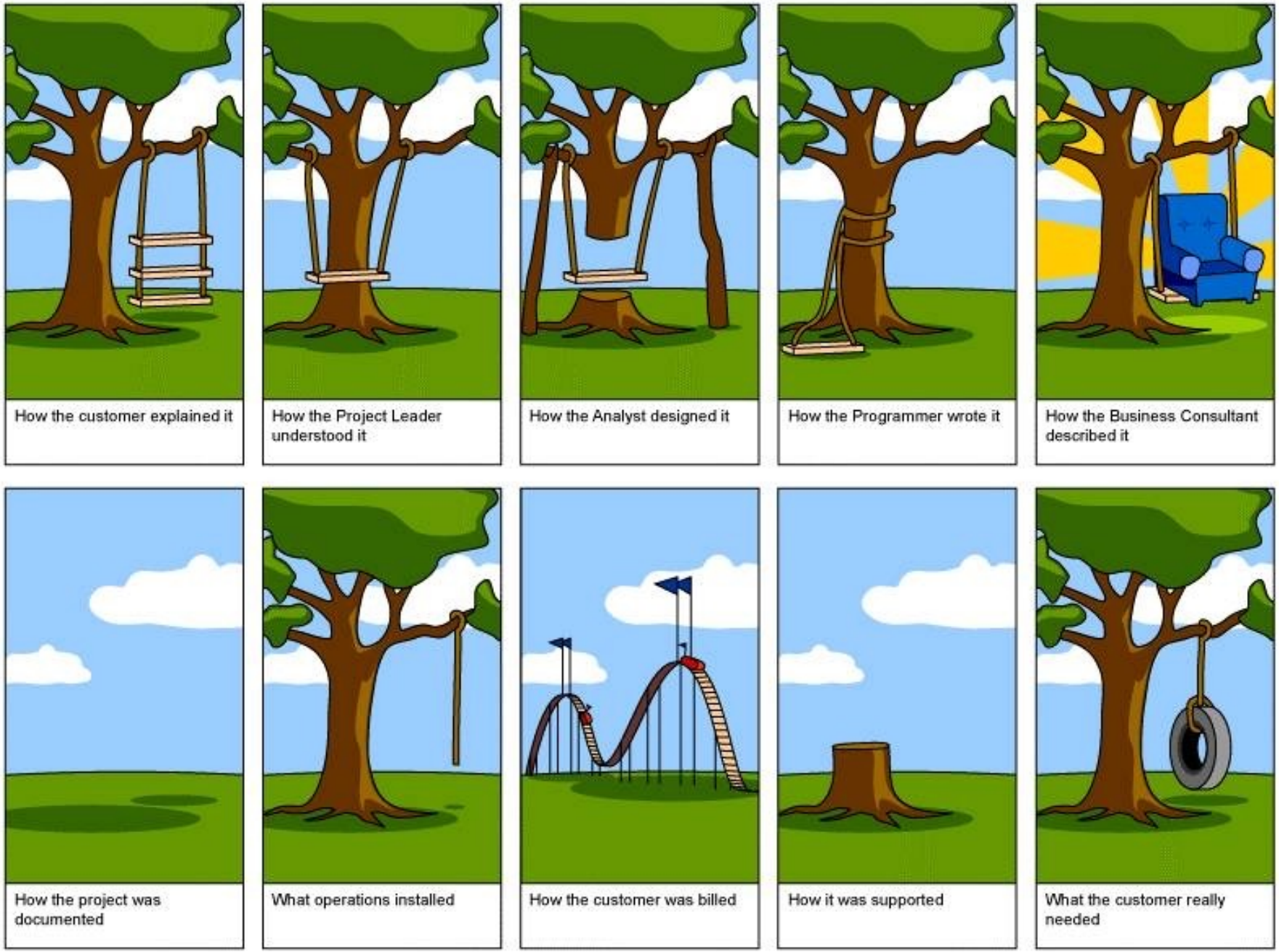

How the customer explained it
How the Project Leader understood it
How the Analyst designed it
How the Programmer wrote it
How the Business Consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed

Why must we test?

"A clever person solves a problem. A wise person avoids it"

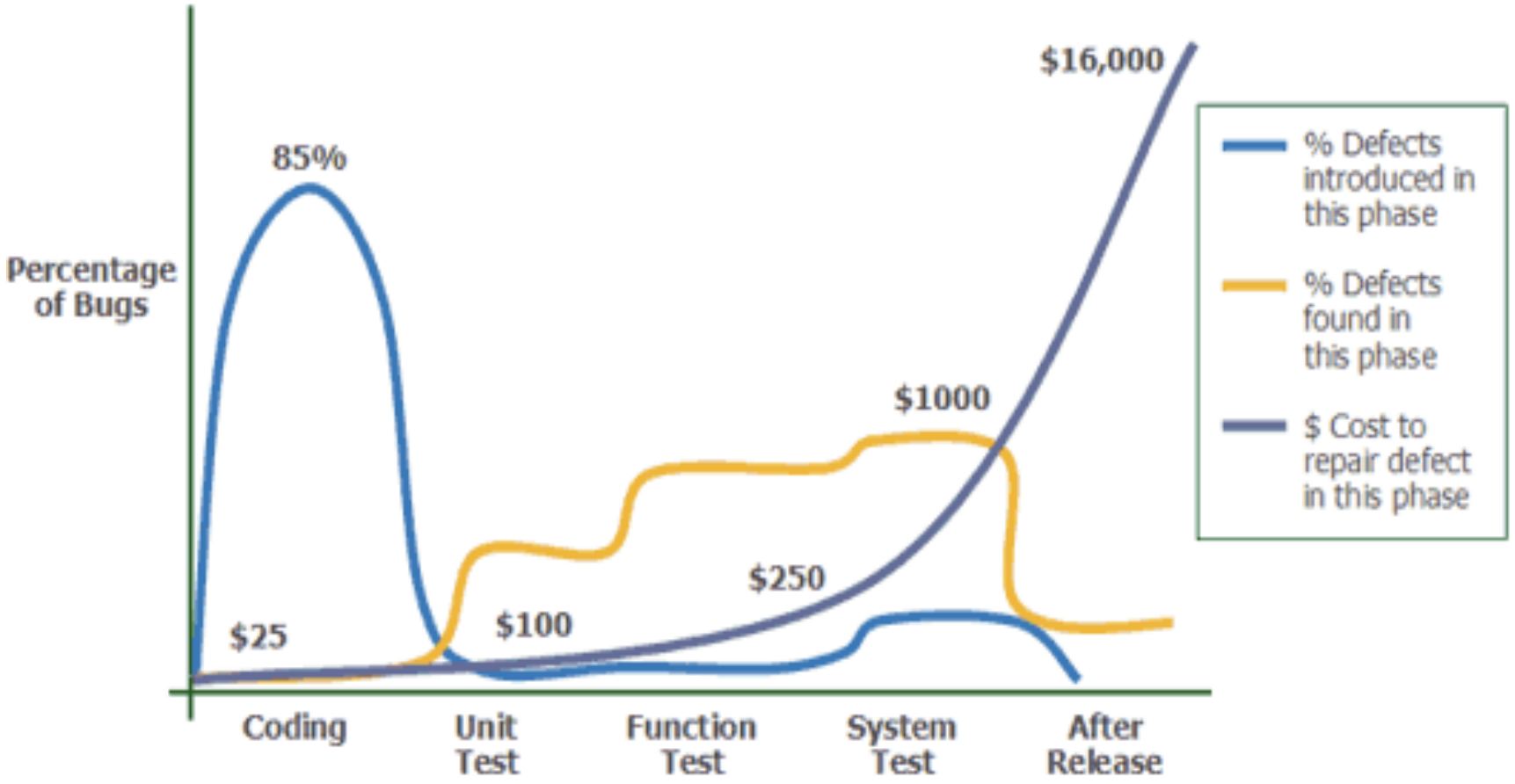
Albert Einstein

Software bugs could be expensive and even dangerous

Korean Air Flight 801 crashed, 1997
254 people dead & injured

Ariane 5 rocket exploded, 1996
$500 million lost

Cost of fixing defects



Objective of Testing

- Detect Faults
- Establish confidence in the software
- Evaluate properties of the software
  - Reliability
  - Performance
  - Memory usage
  - Security
  - Usability
  - …

Objectives of Testing

- Should NOT be to verify that the program works correctly
  - If you can't test the program completely, you can't verify that it works correctly
  - "Testing can show the presence of bugs, but not the absence" - Dijkstra

If you set your mind to show that a program works correctly, you'll be more likely to miss problems than if you want and expect the program to fail.

Objectives of Testing

The Objective of Testing a Program is to Find Problems

Finding problems is the core of your work. You should want to find as many problems as possible. The more serious testers find, the better tester is.

A test that reveals a problem is a success. A test that did not reveal a problem is (often) a waste of time.

Objectives of Testing

The Purpose of Finding Problems is to Get Them Fixed

The point of the exercise is quality improvement!

- The best tester is not the one who finds the most bugs or who embarrasses the most programmers.
- The best tester is the one who gets the most bugs fixed.

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Comparison between QA, QC and Testing

Quality Assurance	Quality Control	Testing
Subset of SDLC	Subset of QA	Subset of QC
Process oriented	Product oriented	Product orinted
Ensure that processes and procedures are in place to achieve quality	Activities to ensure the product quality	Validate the product against specifications
Focus on process to achieve required quality	Focus on product to check for the required quality	Focus on actual testing of the product

QC vs. QA

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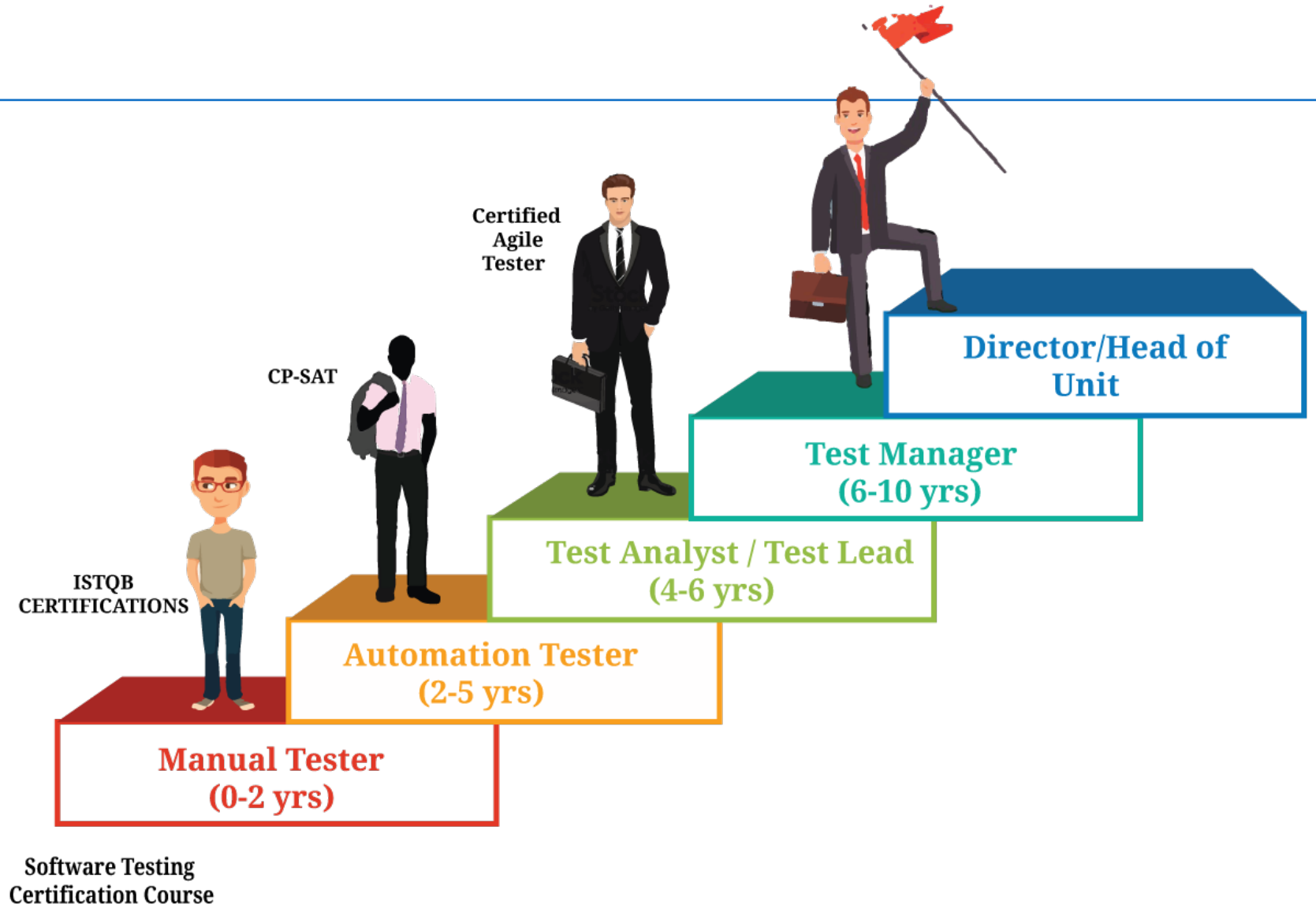
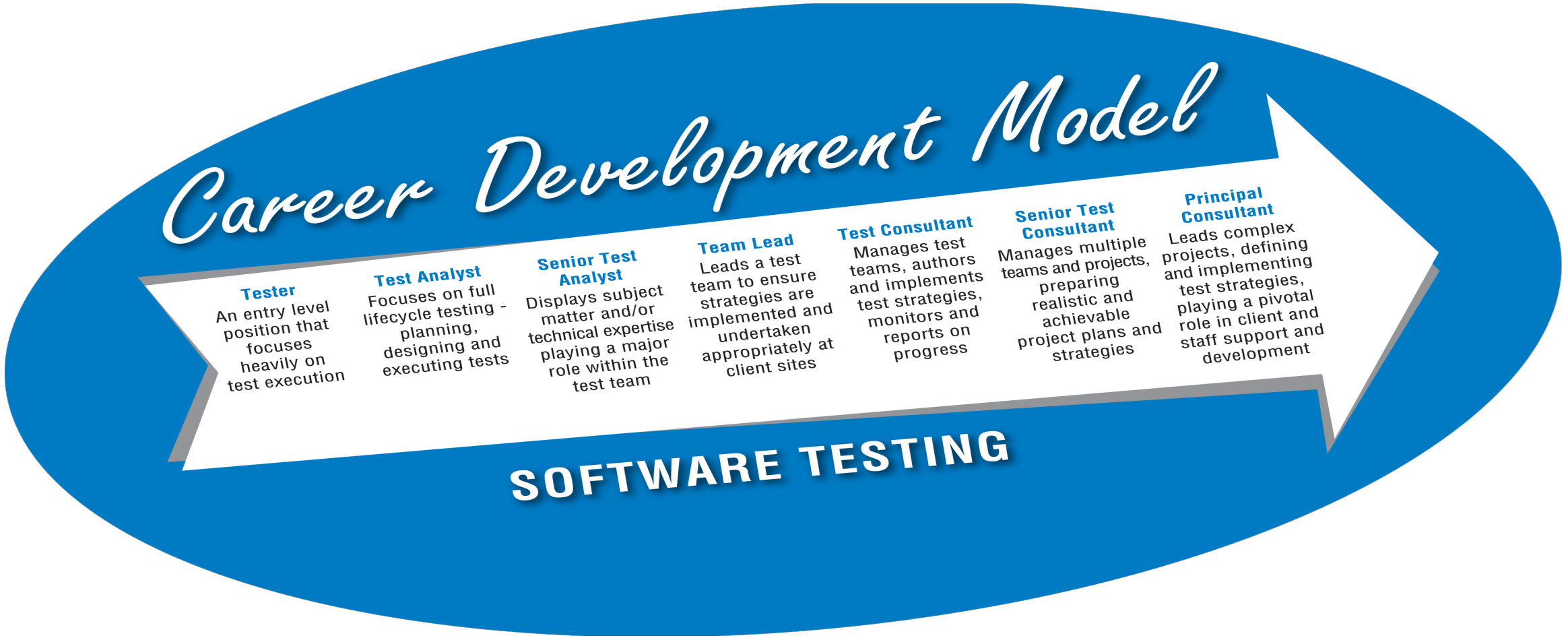

Director/Head of Unit
Test Manager (6-10 yrs)
Test Analyst / Test Lead (4-6 yrs)
Automation Tester (2-5 yrs)
Manual Tester (0-2 yrs)
Certified Agile Tester
CP-SAT
ISTQB CERTIFICATIONS
Software Testing Certification Course

Software Testing Career Path



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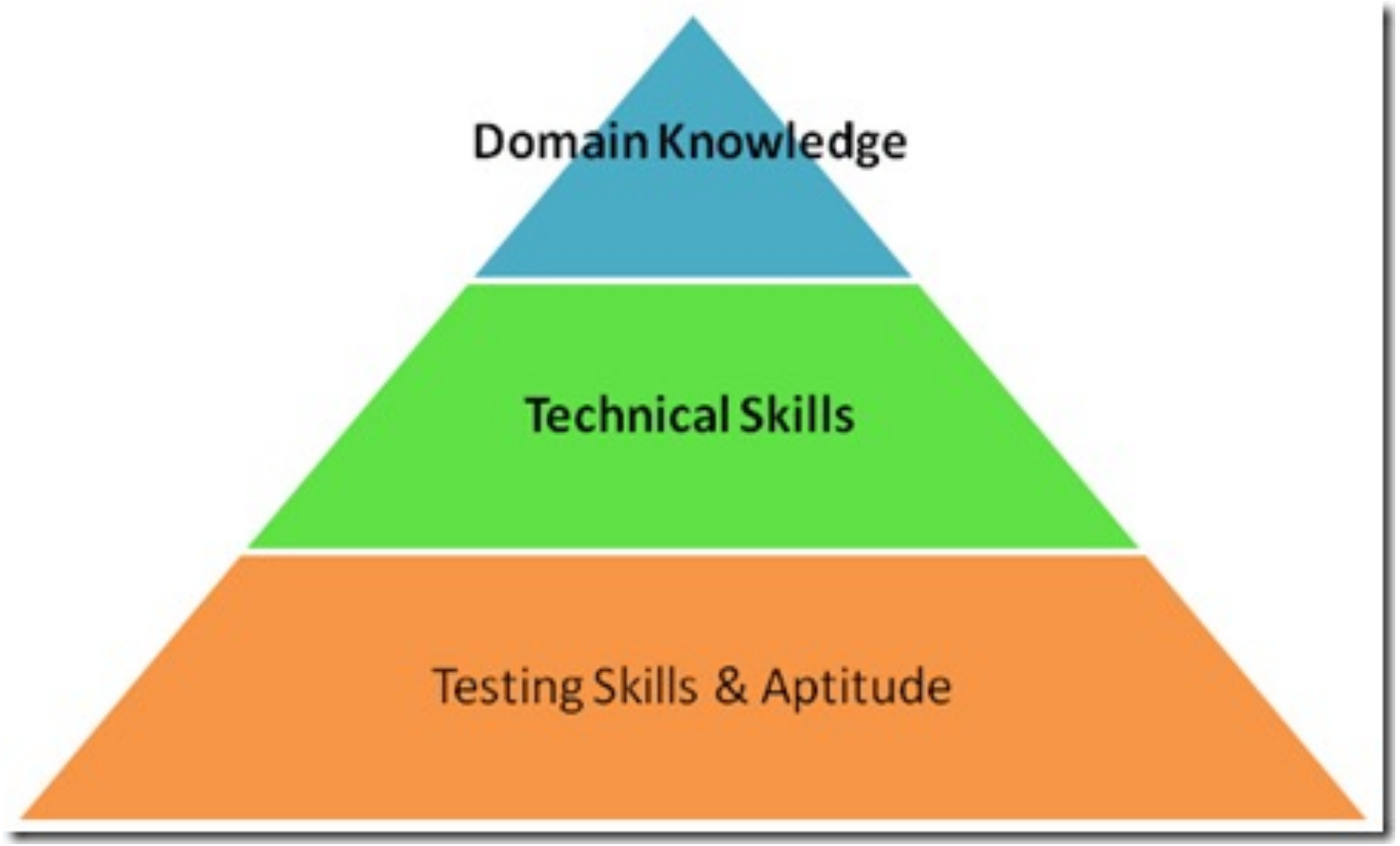
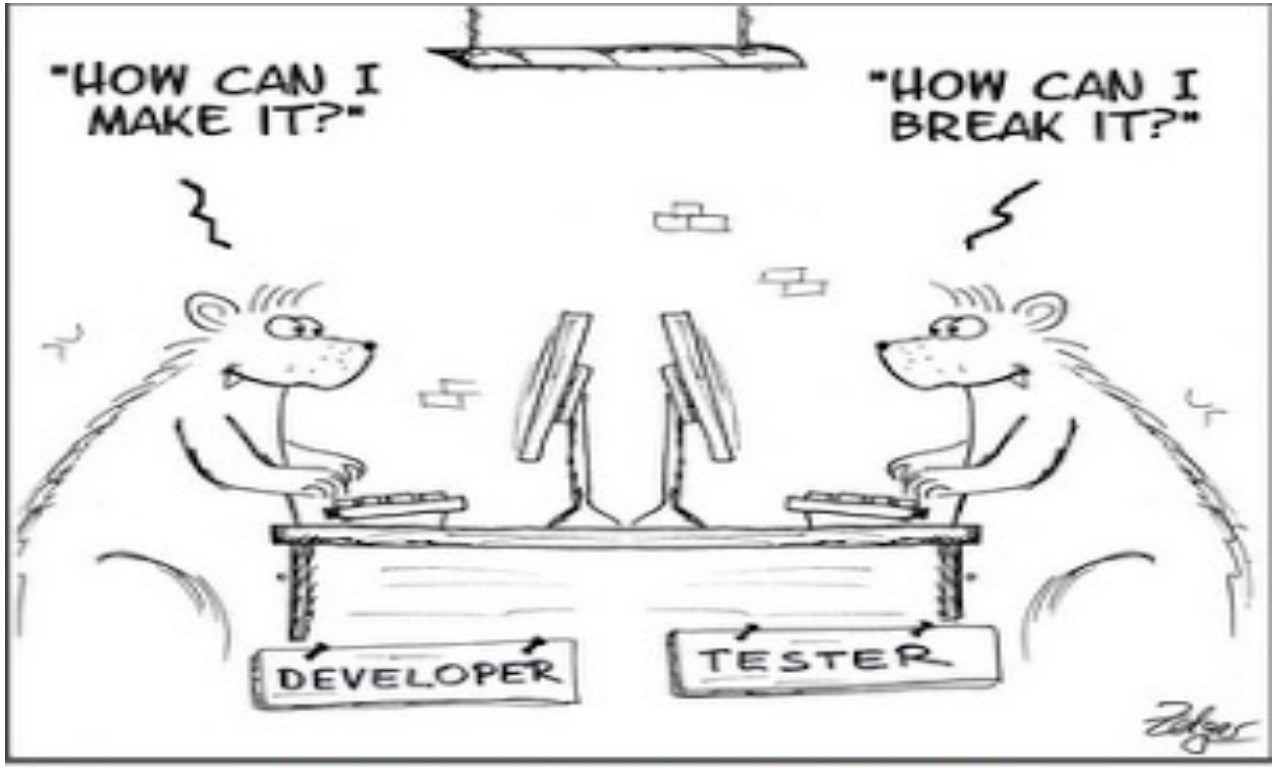

Domain Knowledge
Technical Skills
Testing Skills & Aptitude

Domain Knowledge

Good Software Tester

Tester vs. Developer



They are not so much different,
but they have different path for the same goal,
to improve quality!!


Q
A