Software Testing

What is Software Testing?

Agenda

- What is Testing?
- What is Quality?
- Basic terminology
- Why do we test?
- The 7 principles of testing
- The role of the test engineer

What is testing?

Software Testing:

The process of executing a system with the intent of finding defects.

“Designing an experiment to gather empirical evidence to answer a question about a risk”

Elisabeth Hendrickson

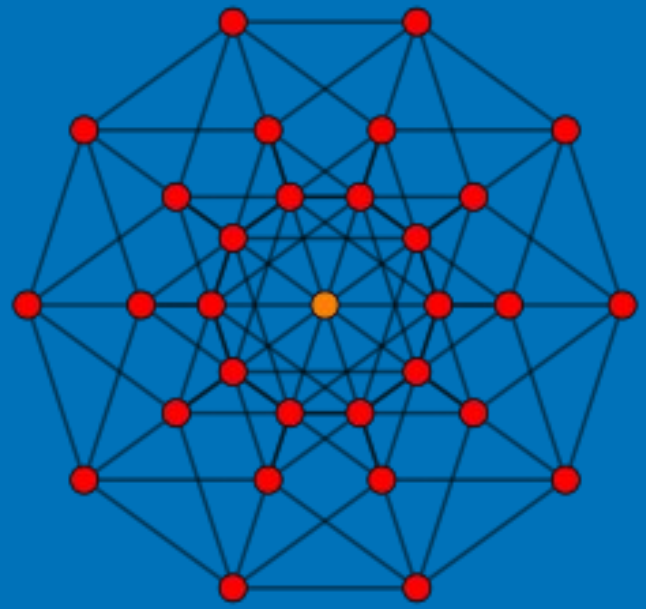
What is quality?

“The degree to which a component, system or process meets specified requirements and/or user/customer needs and expectations.”

Definition by iSTQB

Dimensions of quality

- Functionality
- Reliability
- Usability
- Efficiency
- Maintainability
- Portability



Quality dimensions - heuristics mind-map

Basic terminology

Software Development Life Cycle (SDLC) - *a process followed for a software project, within a software organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software.*

Basic terminology

Software Testing Life Cycle (STLC) *is the testing process which is executed in systematic and planned manner. In STLC process, different activities are carried out to improve the quality of the product.*

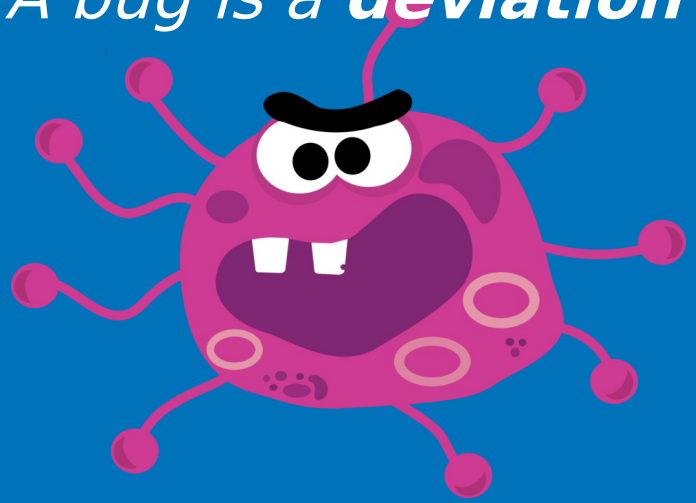
Basic terminology

Testing	Quality Control	Quality Assurance
Focuses on actual testing.	Focuses on actual testing by executing Software with intend to identify bug/defect through implementation of procedures and process.	Focuses on processes and procedures rather then conducting actual testing on the system.
Product oriented activities.	Product oriented activities.	Process oriented activities.
Detection	Detection	Prevention

Basic Terminology

Bug/Defect

- *A flaw in a component or system that can cause the component or system to fail to perform its required function, e.g. an incorrect statement or data definition. A defect, if encountered during execution, may cause a failure of the component or system.*
- *A bug is a **deviation** of an **actual result** from the **expected result***



Why we call it “Bug”?

Basic terminology

Testing	Problem investigation	Debugging
Finding and locating of a defects in a Testing phase	Finding the source of the problem	Isolating defects
Done by testers	Done by testers	Done by developers
To find as many defects as possible	To find the actual nature of the problem and facilitate it’s resolution	To remove the defects

Basic terminology

Testing incident: *deviation between expected result and actual result*

Testing incidents can be caused by:

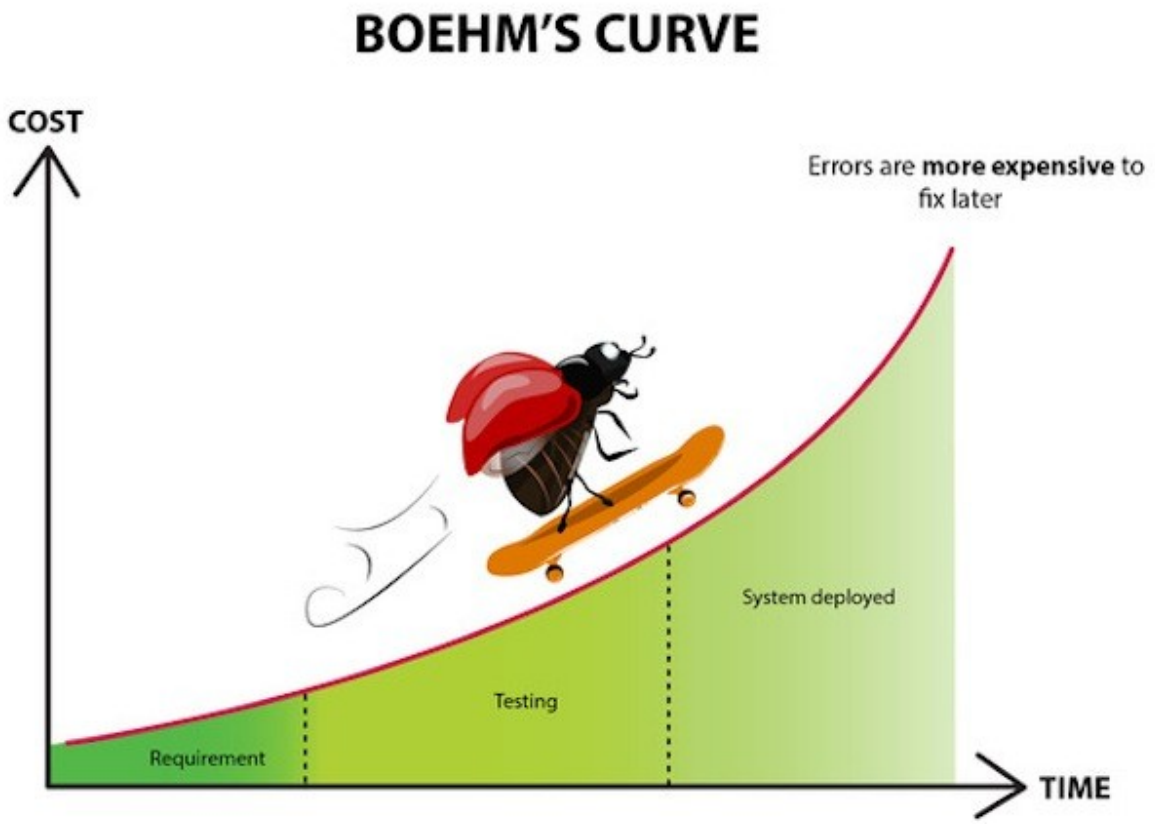
- Non-communicated change in requirements
- Inaccuracy of the test case
- Configuration problem
- Test environment problem
- *Bug/defect*

How to determine the cause of the incident: **investigate!**

7 principles of testing

- **Testing shows presence of defects** – testing can reduce probability of undiscovered defects, but cannot prove that there are no defects
- **Exhaustive testing is impossible** - testing all combinations of inputs and preconditions is not feasible except for trivial cases
- **Defect clustering** - A small number of modules usually contains most of the defects discovered during pre-release testing, or is responsible for most of the operational failures
- **Pesticide paradox** - if the same kinds of tests are repeated all over again, eventually the same set of test cases will no longer be able to find any new bugs
- **Testing is context depending** - testing is done differently in different contexts; for example – mission-critical software requires different approach to testing than website
- **Absence of errors fallacy** - if the system does not meet user's needs and expectations (i.e. we have not developed the right product in the first place), then finding and fixing defects does not help
- **Early testing**

- The later we test, the later we find the defects
- Errors are more expensive to fix later
- A small error can lead to huge failure in production
- Testing is a key activity in every software development process



Common misconceptions about testing

- **MYTH:** Software quality depends on how well we test the software
  FACT: *Software quality depends on how well we create the software*

- **MYTH:** The main objective of testing is to improve quality
  FACT: *The objective of testing is to prevent risk for the customers, by identifying potential problems as early as possible, while evaluating how well software meets requirements.*

- **MYTH:** The best tester is the one who's found most defects
  FACT: *The best tester is the one who finds ways to prevent defects in the first place.*

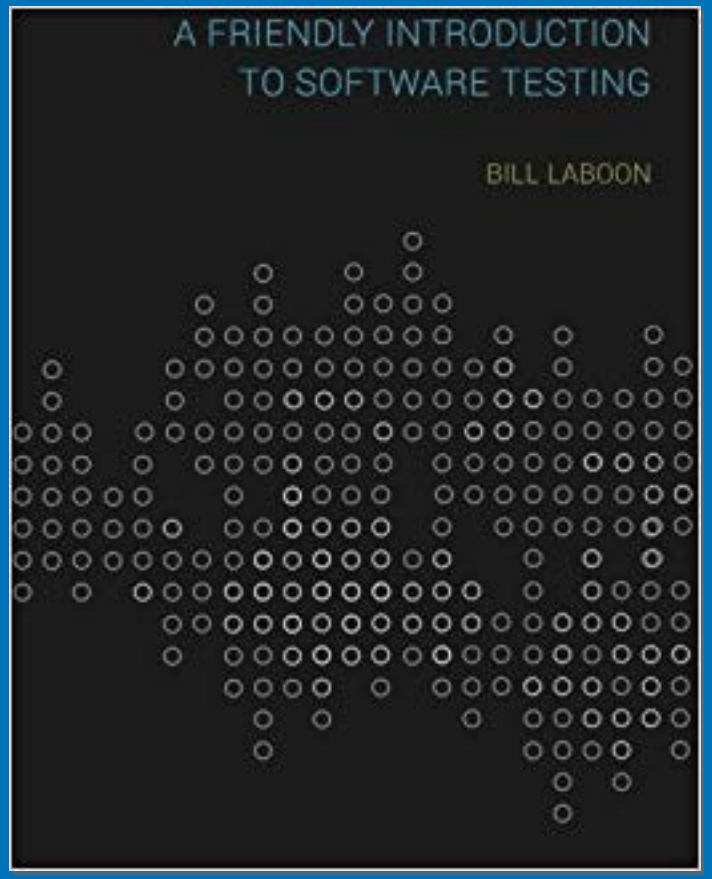
The role of the test engineer

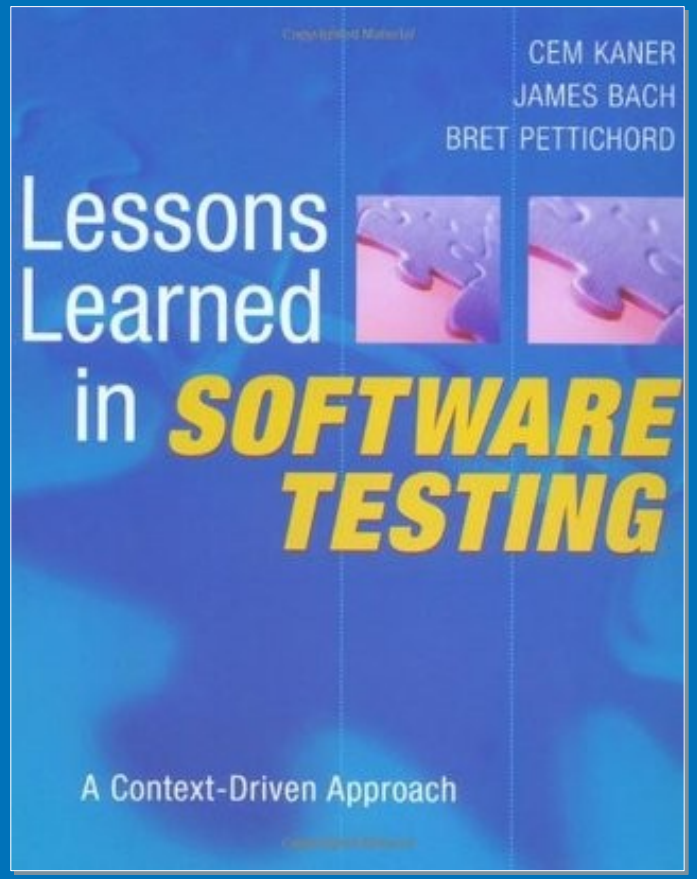
- Measure software quality
- Reduce risk through **designing and following** efficient **test processes**

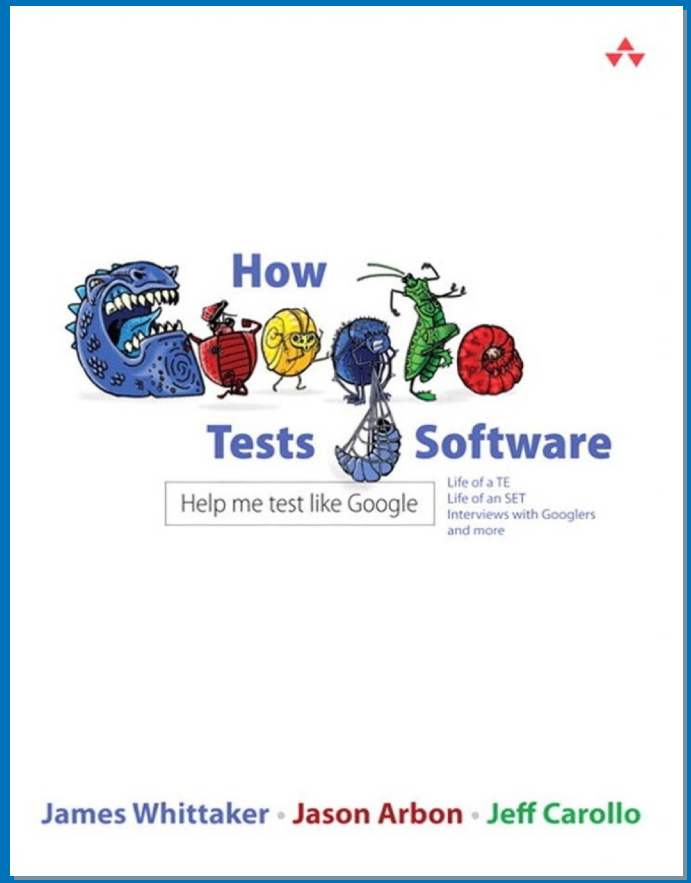
What's special about testers?

- Broad competence (hard skills & soft skills)
- Special attitude (problem prevention & problem detection)

Further reading





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