WHAT IS SOFTWARE TESTING?

University of Information Technology

Lecture: MSc. Nguyen Thi Thanh Truc

Email: trucntt@uit.edu.vn

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

DEFINITION

Software Testing is a **process** of executing a program or application with the intent of finding the **Software Bugs**

Software Testing can be stated as the **process** of **validating** and **verifying** that a software program or application or product:

- Meets the business and technical requirements that guided its' design and development
- Works as expected

Software Testing is a **Process** implemented in a **controlled environment** and which includes a set of **activities** which often require the use of **tools** and **techniques** to achieve multiple objectives such as **risk measurement** and **risk reduction** which are achievable by **detecting faults** and ensuring that faults are removed **when possible**.

DEFINITION

TECHNIQUES
Example: Use case Modeling
Boundary Value Analysis
Equivalence Partitioning, etc.

TOOLS
Example: Test Director, Excel, LoadRunner, etc

THE TEST PROCESS

ACTIVITIES
* Develop a Test Plan
* Perform Component Testing
* Design a Test Template
* Produce a Test Estimate

CONTROLLED ENVIRONMENT
Example: Staging, Development, UAT, Live

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

OBJECTIVES AND PURPOSES

Fault Detection
Major objectives for testing but also very important is fault removal**.**

Risk Reduction
Fault Removal → Prevent defects → To make sure that
* The end result meets the business and user requirements
* Software satisfies Business Requirement Specification and System Requirement Specification.

Risk Measurement
* Measure and analyze defects.

Confidence Building
* To gain confidences in and providing information about the level of quality
* To gain the confidence of the customers by providing them a quality products.

OBJECTIVES AND PURPOSES

We work out what the risks are

We select tests to address those risks..

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

WHY TEST SOFTWARES?

- Existence of faults in software is unavoidable
- Software can never be made perfect.
- We must test software to find as many faults as we can to ensure that a high quality product with minimum of faults is delivered
- Testers need to know how faults occur because it is our business.
- Only by understanding how faults occur, can we prepare effective strategies to detect them.

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

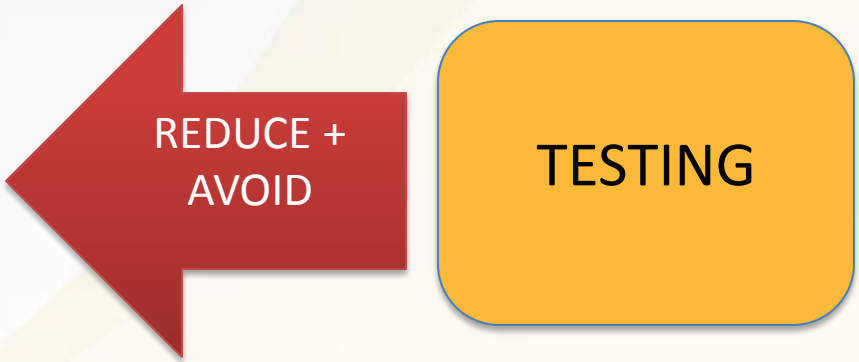
CONTRIBUTORS TO SOFTWARE FAILURES

PRESSURES
Deadline may lead to mistakes to be made in:

- Planning - project manager
- Specifications - Business Analyst
- Coding - Programmer
- Testing - Test Analyst.

Complexity of the application

Environmental Conditions



CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Real - life testing example
- Careers in Software Testing

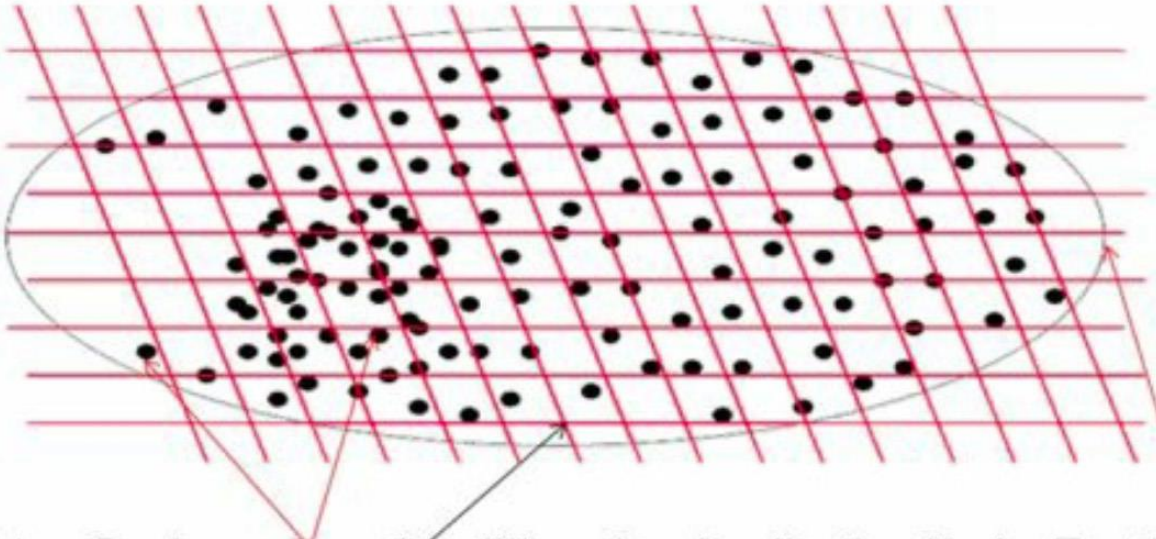
PRINCIPLES OF TESTING

- Testing shows presence of bugs
  - The purpose of testing does not show that software is bug free.

- Exhausted testing is impossible
  - On large project it is not practically possible to test all combinations of input (data) and preconditions.

PRINCIPLES OF TESTING

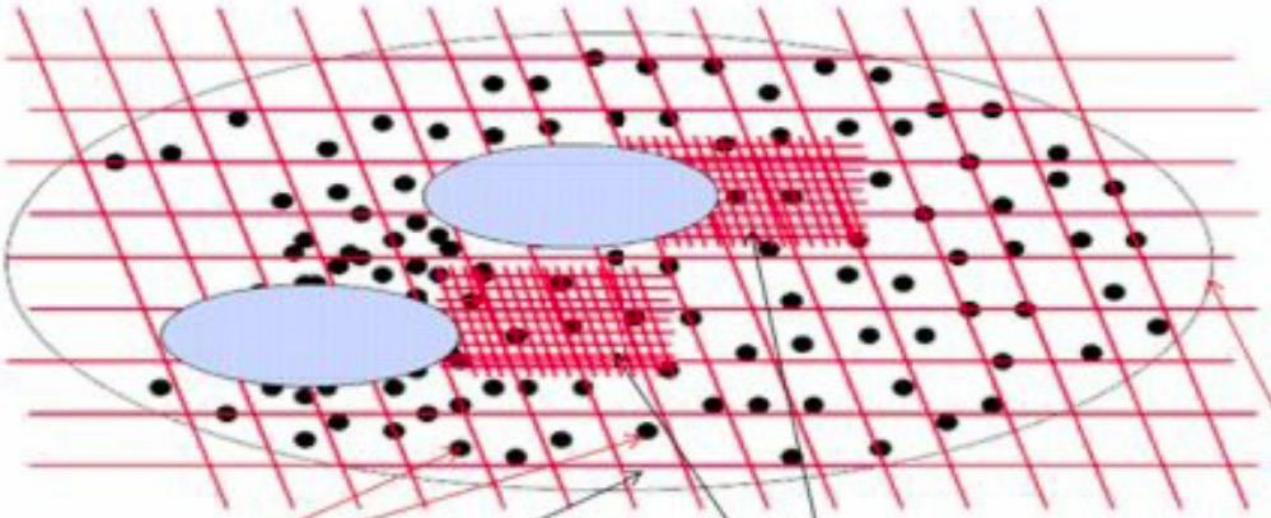
Business tests for 100% coverage



- Black dots – Business Functionalities of an Application Under Test (AUT)
- Red wire mesh – Business Tests
- Can 100% Coverage of the business functionalities be achieved?
- Yes ! Testers must always design tests to ensure 100% coverage of business functionalities that are in scope of testing for an AUT.

PRINCIPLES OF TESTING

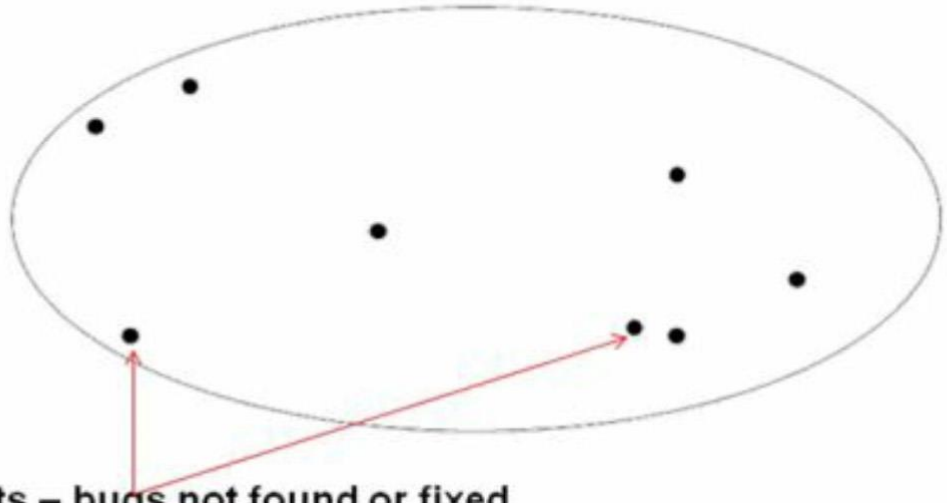
Business Critical Tests for 100% coverage



- Black dots – Business Functionalities of a Large Complex System (LCS)
- Red wire mesh – Business Tests
- Repeated Red wire mesh – Multiple passes of Business Critical Tests
- Is exhaustive testing possible in a large and complex system?
- No! but Testers can run multiple passes of Business Critical Tests on high risk areas of a Large Complex System.

PRINCIPLES OF TESTING

Bugs not found or not fixed



- Black dots – bugs not found or fixed
- Can the software be deemed reliable?
- Yes ! it is possible if the software fits the purpose for which it was built for the users. This means the bugs not found or fixed do not impede the functions that the users require in the application.

PRINCIPLES OF TESTING

- Early Testing is important
  - Testers do not need to wait until software is available before commencing testing activities.
- Defect Clustering
  - A small number of modules contains most of defects discovered during pre - release testing.
- Pesticide Paradox
  - Running the same test continually will not find new defects. Regression tests should change to reflect change in business needs.

PRINCIPLES OF TESTING

- Testing is context dependent.
  - The Test Approach, tools, and techniques that are used on a particular test project will not be the same as those used on a different test project. For example, how you test a website application will be different from that of a database application.
- Absence of errors fallacy
  - The fact that no errors were outstanding does not imply fitness for go live. Users' expectations should be met.

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

PSYCHOLOGY OF TESTING

- Tester must understand:
  - Skills and techniques of testing
  - Test independence
  - The mindset of a developer differs from that of a tester
  - tact and diplomacy are the keys to effective communication between tester and developer.

PSYCHOLOGY OF TESTING

- Developers
  - Are perceived as very creative.
  - Are often highly valued within an organization
  - Are sent on relevant industry training courses to gain recognised qualifications.
  - Can often specialized in one or two skills (VB, C#, Java, SQL)

PSYCHOLOGY OF TESTING

- Tester
  - Are perceived as destructive.
  - Previously did not need any industry recognized qualification, until 1998 when Information System Examinations Board - ISEB certificated the first Software Testers.
  - Usually require good communication skills, tact and diploma to deal with other stakeholders.
  - Normally need to be multi - talented (technical, testing, team skills)

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

THE INTERNATIONAL SOFTWARE TESTING STANDARDS

- To ensure clarity and consistency across all training organizations, there are 5 standards:
  - ISO/IEC 29119-1: Concepts and Definitions
  - ISO/IEC 29119-2: Test Process
  - ISO/IEC 29119-3: Test Documentation
  - ISO/IEC 29119-4: Test Techniques
  - ISO/IEC 29119-5: Keyword Driven Testing

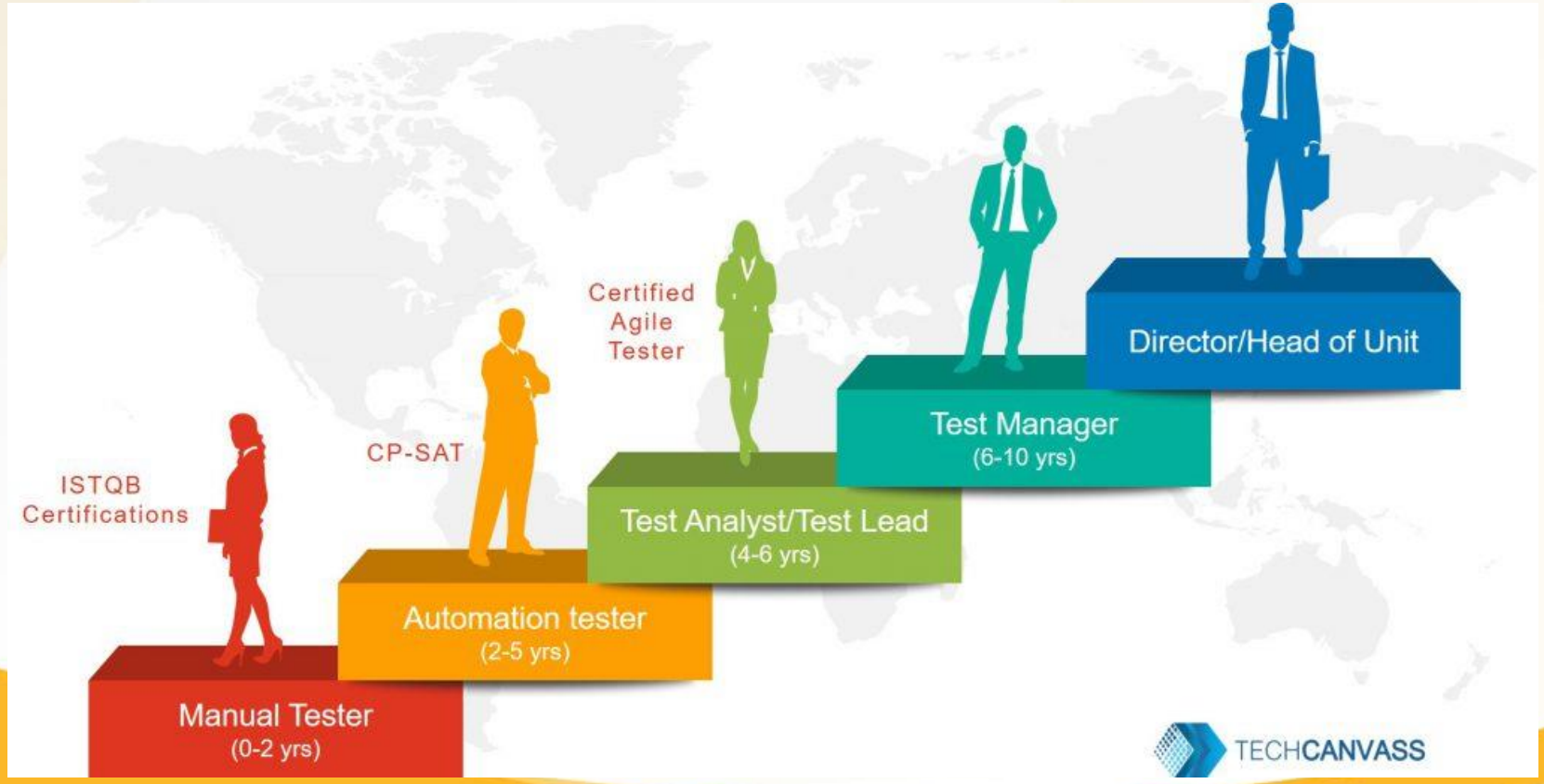
- The ISO/IEC/IEEE 29119 standards replace a number of existing software testing standards:
  - IEEE 829 Test Document
  - IEEE 1008 Unit Testing
  - BS 7925-1 Vocabulary of Terms in Software Testing
  - BS 7925-2 Software Component Testing Standard.

CONTENTS

- Definition
- Objectives and Purposes
- Why test software?
- Contributors to Software Failures.
- Principles of testing
- Psychology of testing
- The International Software Testing Standards
- Careers in Software Testing

CAREERS IN SOFTWARE TESTING

- Software Testing Career provides multiple options for a testing professional.



CAREERS IN SOFTWARE TESTING

- Manual Tester (0 - 2 years)
  - be involved in conducting functionality testing manually.
  - Write test cases
  - should be able to master the skills within 6 months.
  - Should get ISTQB Foundation Level Certification.

CAREERS IN SOFTWARE TESTING

- Automation Tester (2 - 5 years)
  - Learn automation testing tools such as: Selenium, TestComplete, HP UFT, SilkTest
  - Selenium requires you to learn Java
  - Write automated test suites, frameworks.
  - Should take Selenium Certification Course (CP – SAT)
  - If you are not comfortable with programming, you can go for alternative career move to become a business analyst.

CAREERS IN SOFTWARE TESTING

- Test Analyst (4 - 6 years)
  - Key requirements to become a test analyst are as follows:
    - 2 - 5 years experience as automation tester
    - Mastering Framework development
    - Maintain and manage automation scripts
    - Creating and managing test environments.
  - Certifications:
    - Certified Agile Tester (CAT)

CAREERS IN SOFTWARE TESTING

- Test Lead/Manager (5 - 10 years)
  - Key requirements
    - Ability to plan, schedule and track test activities
    - Capability to design and plan for testing strategy
    - Ability to manage and track testing activities.
  - Skills
    - Estimating team effort (Estimation techniques like FPA)
    - Manual and automation test processes and cycles.
    - Agile testing techniques
    - Quality process awareness like CMMI
    - People management skills.
  - Certificates
    - Advance level test manager from ISTQB
    - Certified Manager of Software Testing (CMST)
    - PMP (Project Management Professional)

CAREERS IN SOFTWARE TESTING

- Business Analyst (2 - 5 years)
  - Certificates:
    - Business Analyst Certification for beginner - ECBA

Tester Attitudes and Skills

- **Attitudes:**
  1. Careful
  2. Patient
  3. In details
  4. Ethic

- **Skills:**
  1. Communication
  2. Reading Comprehension
  3. Problem Solving
  4. Documentation
  5. Self-organization

Recommendation for Testers

1. Improve your foreign language skills
2. Self study software testing techniques
3. Improve the five skills
4. Attend software testing class
5. Take testing certificates

Thank you!