

Software Testing

L01. Introduction
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— “Testing is the process of executing the program with the intent of finding faults”

(Chopra, 2018)

About 70% of development time is spent on testing

92

9/9

0800 Antan started
 1000 " stopped - antan ✓
 1300 (032) MP - MC ~~1.482147000~~
 (033) PRO 2 2.130476415 ~~(2)~~ 4.615925059(-2)
 connect 2.130676415
 Relays 6-2 in 033 failed spiral speed test
 in relay " 10.00 test.
 Relays changed
 1100 Started Cosine Tape (Sine check)
 1525 Started Multi-Adder Test.
 1545  Relay #70 Panel F
 (moth) in relay.
 First actual case of bug being found.
 1630 Antan started.
 1700 closed down.

Relays
 2145
 Relays 3370

Testing is different of debugging

The testing process

Static testing

Dynamic testing

Analisis and designing

Maintenance



1.1. Definition and terminology

Levels of testing:

- Debug
- Demonstrate
- Verify
- Validate
- Prevent

1.1. Definition and terminology

“Testing is the process of exercising or evaluating a system or system component by manual or automated means to **verify that it satisfies specified requirements.**” (IEEE,)

1.1. Definition and terminology

“Software testing is the process of executing a program or system **with the intent of finding errors.**” (Myers,)

1.1. Definition and terminology

“It involves any activity aimed at evaluating an attribute or capability of a program or system and determining that it **meets its required results.**” (Hetzel,)

1.1. Definition and terminology

Testing is NOT

- The process of demonstrating that errors are not present
- The process of showing that a program performs its intended functions correctly
- The process of establishing confidence that a program does what it is supposed to do.

“Testing is basically a task of locating errors.”

- **Positive testing**
- **Negative testing**
- **Positive view of negative testing:** Mentality of the tester has to be destructive—opposite to that of the creator/author, which should be constructive.

Software Testing = Software Verification + Software Validation

Software verification

It is **the process of evaluating** a system or component to determine whether the products of a given *development phase* **satisfy the conditions** imposed at *the start of that phase*

Software Testing = Software Verification + Software Validation

Software validation

It is defined as **the process of evaluating** a system or component *during or at the end of development process* to determine whether it **satisfies the specified requirements**. It involves executing the actual software. It is a computer based testing process.

Why should we test?

- The technical case
- The business case
- The professional case
- The economical case
- To improve quality
- V&V

1.1. Definition and terminology

Terminology

- Error (or mistake or bug)
- Fault (or defect)
- Failure (a failure occurs when a fault executes)
- Incident (when a failure occurs)
- Test (the act of exercising software with test cases)
- Test case (inputs/outputs)

1.1. Definition and terminology

Terminology

- Test suite (collection test scripts)
- Test script (step-by-step instructions that describe how a test case is to be executed)
- Test ware: testing documentation. For example, test specification, test scripts, test cases, test data, the environment specification.
- Test oracle
- Test log
- Test report

1.2. Principles of testing

1. Testing should be based on user requirements
2. Testing time and resources are limited
3. Exhaustive testing is impossible
4. Use effective resources to test
5. Test planning should be early
6. Testing should begin “in small” and progress toward testing “in large”

1.2. Principles of testing

7. Testing should be conducted by an independent third party
8. All tests should be traceable to customer requirements.
9. Assign best people for testing
10. Test should be planned to show software defects and not their absence
11. Prepare test reports including test cases and test results to summarize the results of testing
12. Advance test planning is a must and should be updated in a timely manner.

1.3. Test vs another activities

