
Why Tests Don't Pass

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Definitions

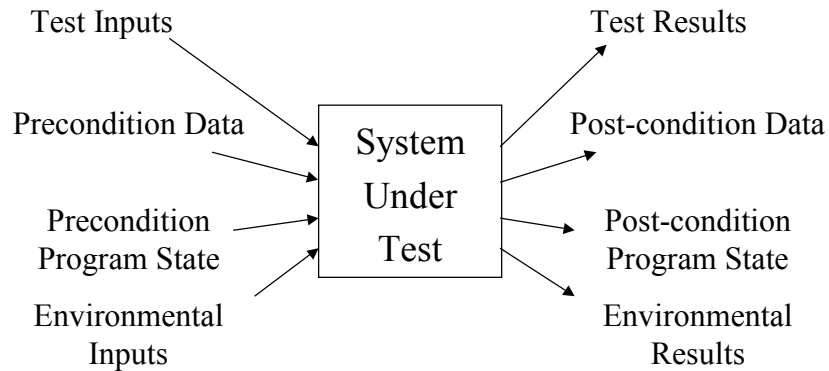
- Test
 - An exercise designed to surface bugs
 - Includes a validation mechanism
- Pass
 - A test that behaves as expected per validation
- Fail
 - A test where validation fails
 - A test with unexpected behavior
- Oracle
 - Principle or mechanism by which we recognize a problem
 - Answers “why” when unexpected things happen

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Expanded Software Testing Model



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Pass?

- What results are we checking?
- How do we know the expected outcome?
- Are we checking all of the results?
- What outcomes are we not checking?
- How would we know misbehaviors for the outcomes we are not checking?

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A Simple Challenge

Given a program and a set of tests for it, modify the code [to do anything] in a way that the tests don't detect.

This change is an undetected bug.

Deterministic Test Result Possibilities

Situation Test Result	No Error in SUT	Error in SUT
As Expected (Pass)	Correct Pass	Silent Miss (Test Error!)
Unexpected (Fail)	False Alarm (Test Error!)	Caught it!

Fail?

- The test finds the bug it's designed for!
- Something unexpected happens while the test is running.
- Possible false alarms.
- Possible unnoticed failures.

Questions to Ask Ourselves

- Are we checking the best outcomes?
- How do we know the expected outcomes?
- What outcomes are we not checking?
- How do we know the test isn't missing bugs?

So What

- Be open minded about (skeptical of) “Pass”
- Understand that a “Fail” could mask errors
- We aren’t checking all of the results
- We don’t know the outcomes from arbitrary errors
- Pass/Fail metrics don’t really give us interesting information

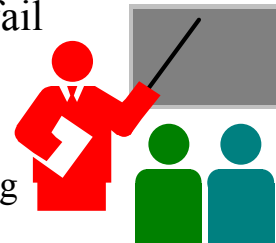
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Summary

- The SUT doesn’t really pass or fail
 - “Pass” means we noticed only expected behaviors
 - “Fail” means we noticed something not according to plan
- There are lots of other possible reasons for “passing” or “failing” other than a bug in the SUT



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