Software Testing

David Letscher

Saint Louis University

CSCI 1300/5001: Introduction to Object-Oriented Programming

Testing Methodologies

Black box testing

Tests the functionality of a program for correctness, efficiency, ...

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White box testing

Tests the internal components of a program.

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Tests that a program responds correctly when used.

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- Randomly generated (thousands even millions of tests)
- Should include edge cases (these are cases where a minor change in the input has the program execute a different flow of execution)

Unit Testing

Tests an internal component (class, function, ...) of a program

Validates behavior, error handling, ... of that component

Integration Testing

Tests whether the components of a program function properly when combined.

Property-based Testing

Tests the output of a program, component, ... for necessary properties. For example, if a function is supposed to sort a list of numbers it checks that they are actually sorted after the function executes.

Can be used in behavior, unit or integration testing.

Regression Testing

Ensure that tests of previous version of a program still pass and prior bugs are not reintroduced.

Tests should include:

- All previous test
- Test cases and/or property tests that catch **ALL** bugs found in previous version

Test Driven Development

Repeated development cycle adding a feature at a time

- Express requirements for the features as tests that must be passed
- Write code that passes the new tests
- Test code against all previous tests