

Lec5

Good test

1. independent
2. single assertion for one test
3. assertEquals(expected, actual)

Standard measurement for test quality?

Code coverage!

□ Code coverage is a measure used to describe the degree to which the source code of a program is executed when a particular test suite runs (是一种动态分析手段)

□ Code Coverage is classified as a White box testing

□ White Box testing: Testing where internal structure/ design/ implementation of the item being tested is known

Advantages of Code Coverage

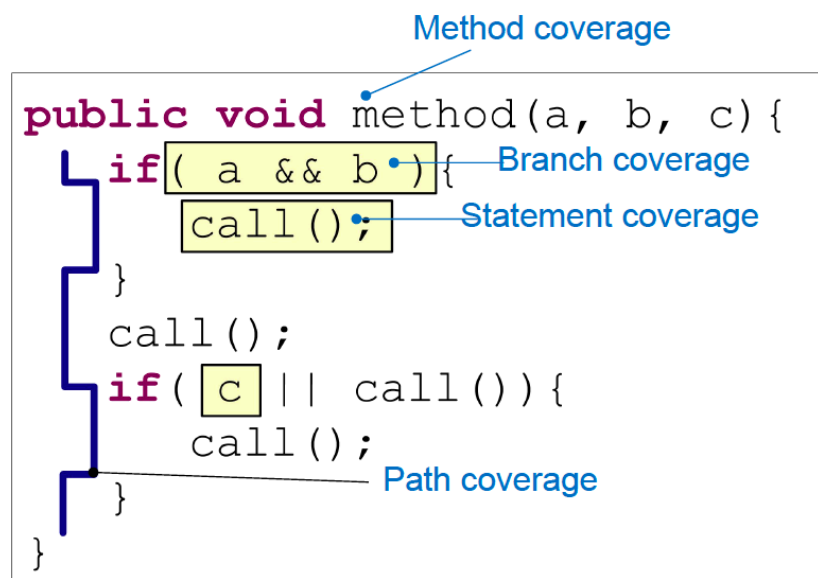
Identify untested part of codebase

Improve the Quality by improved test coverage

Identify testing gaps or missing tests

Identify the redundant/dead Code

Coverage: Instructions(bytecode stream)/Statements/Branch/Method/Class Coverage



Statement Coverage

statement coverage = #of executed statement/# number of statements

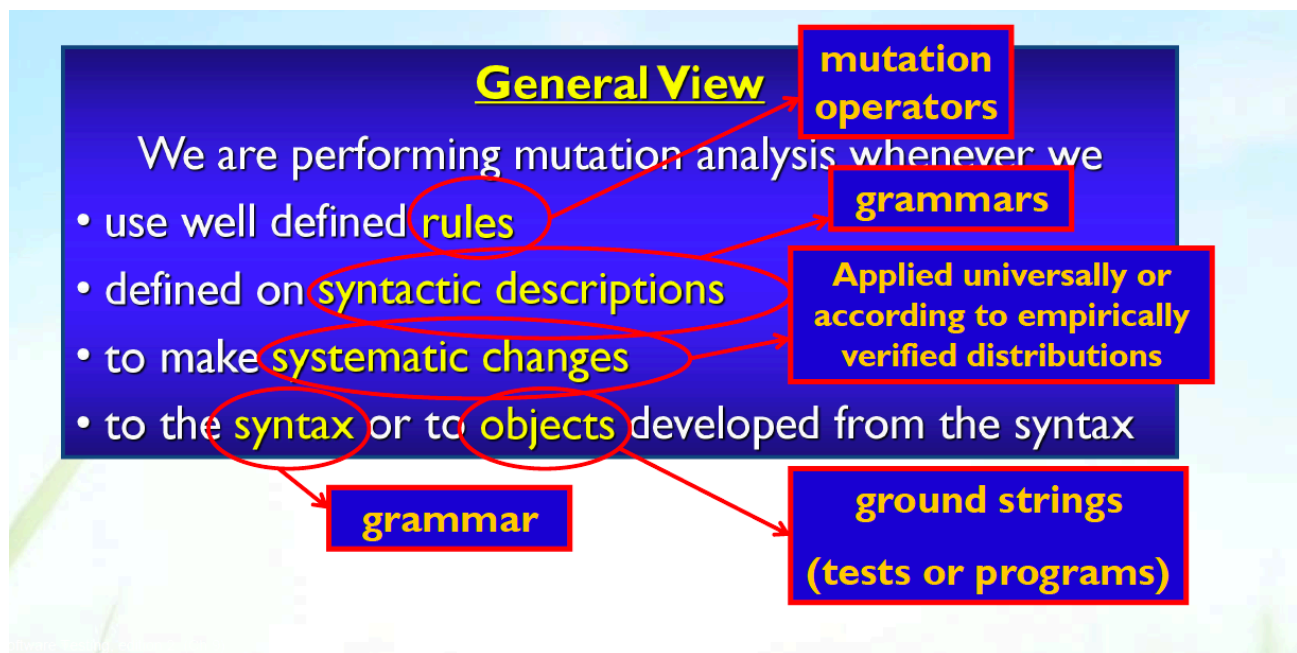
Branch Coverage

Branch coverage = #of executed branch/# number of branch

Code Coverage Analysis Process

1. Writing test cases and execute them
2. Finding areas of code not covered using Code Coverage Tool
3. Creating additional tests for identified gaps to increase test coverage
4. Determining a quantitative measure of code coverage

Evosuite



Mutation Testing is a type of software testing in which certain statements of the source code are changed/mutated to check if the test cases are able to find errors in source code. Each mutated version is called a *mutant*.

突变体可能就会改一改简单的符号。

用来模仿简单的程序员犯的错误。

PIT is a tool for Mutation testing

自动生成testing的工具：Evosuite, Randoop

EvoSuite uses evolutionary algorithm to generate and optimize whole test suites towards satisfying a coverage criterion.

换语言: Would need to reimplement representation, search operators, fitness functions, test execution, ...