WhiteBox Testing Report

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Introduction

This document details the types of whitebox testing done on the Checkstyle eclipse test project. In this document, I will detail the types of tests performed , their results , and test coverage metrics collected in the process.

Development Environment

This project was developed in a windows operating system environment using the eclipse Ide ecosystem.

Testing Framework Used

The white box test tests written were mocked using mockito and Junit5. Code coverage and test analysis were collected using the PITeclipse tool to gather mutation analysis.

Test Cases Used

Since all Checkstyle checks inherit from the same parent class, all checks tested the *acceptedTokens(), defaultTokens(), requiredTokens()* functionality with slight modifications based on check type.

- **Number Of operands Check**
  - Test for single operand token.
  - Test for unique operands.
  - Test for multiple unique operands in a given set.
  - Test for no operants and init values in constructor
- **Number Of Operators Check**
  - Tested unique operands via mocks.
  - Tested nested Unique operands via operators.
  - Tested nested operands with unique operators.
  - Tested for proper response for No operators and init values

- **Number Of Expressions Check**
  - Test for single expression.
  - Test for multiple expressions.
  - Test for no expressions and init values

- **Number Of Loops Check**
  - Test for loops.
  - Test for loops.
  - Test for while loops.
  - Test for do while loops.
  - Test for a variation of all loops.

- **Number Of Comments Check**
  - Test for single comments.
  - Test for no comments.
  - Test for block comments.

- **Number Of comment Lines Check**
  - Test line count for simple comments.
  - Test line count for block comments.
  - Test line count for both single and block counts.

- **Halstead Effort Check**
  - Test mocked values for volume and difficulty.
  - Test for incorrect token given. (incomplete)
  - Test for No token given. (incomplete)
  - Test for No comments.

- **Halstead Length Check**
  - Test multiple operands and operators
  - Test single operand and multiple operators.
  - Test multiple operands and single operator.
  - Test No operands and operators.
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- **Halstead Vocabulary Check**
  - Test Uniqueness of Operand and operator
  - Test multiple operands and operators to calculate Vocabulary.
  - Test for no Unique operand/operators.
  - Test for wrong token inputted.

- **Halstead Volume Check**
  - Test For know Values
  - Test for wrong tokens
  - Test for no given values.

- **Halstead Difficulty Check**
  - Tests halstead difficulty with known
  - Test for incorrect token given. (incomplete)
  - Test for No token given. (incomplete)

test results and coverage percentage

Here is my whitebox test analysis in pitEclipse.

Checks

Number of Classes	Line Coverage		Mutation Coverage	
11	90%	355/396	57%	85/149

Breakdown by Class

Name	Line Coverage		Mutation Coverage	
HalsteadDifficultyCheck.java	88%	46/52	35%	7/20
HalsteadEffortCheck.java	85%	45/53	26%	5/19
HalsteadLengthCheck.java	100%	48/48	71%	12/17
HalsteadVocabularyCheck.java	100%	51/51	76%	13/17
HalsteadVolumeCheck.java	91%	51/56	35%	7/20
LinesOfCommentCheck.java	84%	16/19	80%	8/10
NumberOfCommetsCheck.java	75%	9/12	71%	5/7
NumberOfExpressionsCheck.java	67%	14/21	67%	8/12
NumberOfLoopsCheck.java	96%	27/28	70%	7/10
NumberOfOperandsCheck.java	83%	19/23	75%	6/8
NumberOfOperatorCheck.java	88%	29/33	78%	7/9