

## Fault Models for CheckStyle Checks

A fault model is used to identify common defects in the system's design, or in this case, the CheckStyle checks. Below are lists of the CheckStyle Checks, separated by classes:

- Number of Casts
- External Method References
- Local Method References
- Number of Lines of Comments
- Number of Expressions
- Number of Comments
- Number of Looping Statement
- Number of Variable Declarations

Checks in the same class:

- Halstead Length
- Halstead Volume
- Halstead Effort
- Number of Operands
- Halstead Vocabulary
- Halstead Difficulty
- Number of Operators
- Maintainability Index

Fault models are divided by classes, so there will be 9 total Fault models. Each model identifies faults in the check that are likely to happen. The faults are numbered in tables to be referenced in other black box testing documentation.

### Number of Casts

FM1	
Fault No.	Fault
1	Registering casts in a comment
2	Not registering implicit casts
3	Not registering casts using reflection

## Number of Expressions

FM2	
Fault No.	Fault
1	Registering expressions in a comment
2	Not registering relational expressions
3	Improperly registering chained expressions

## External Method References

FM3	
Fault No.	Fault
1	Registering external method reference in a comment
2	Locally overwritten method references are registered

## Number of Comments

FM4	
Fault No.	Fault
1	Missing multiline comments
2	Missing single line comments
3	Counting comments within comments
4	Counting opening and closing tokens of multiline comment
5	Missing comments nested in line of code

## Local Method References

FM5	
Fault No.	Fault
1	Registering local method references in a comment
2	Locally overwritten method references are not registered

## Number of Looping Statements

FM6	
Fault No.	Fault
1	Not registering while loops
2	Not registering for loops
3	Not registering do while loops
4	Not registering nested loops
5	Registering loops in comments
6	Not registering infinite loops

## Number of Lines of Comments

FM7	
Fault No.	Fault
1	Not registering each line in a multiline comment
2	Not registering opening and closing multiline comment tokens
3	Improperly registering comments within comments

4	Not registering single line comments
5	Counting comments within lines of comments

## Number of Variable Declarations

FM8	
Fault No.	Fault
1	Registering variable declaration in a comment
2	Not registering member variables
3	Not registering multiple variable declarations in a single line (int x,y = 0; int z = 5; double temp = 4.6;
4	Not registering class instances
5	Registering variable redefinitions

## Halstead Length, Halstead Vocabulary, Halstead Volume, Halstead Difficulty, Halstead Effort, Number of Operators, Number of Operands, Maintainability Index

FM9	
Fault No.	Fault
1	Registering operands in a comment
2	Improperly registering operands in chained expressions
3	Registering operators in a comment
4	Improperly registering operators in chained expressions
5	Does not register all arithmetic operators (+, -, *, /, ++, ---)
6	Does not register all assignment operators

7	Does not register registers all comparison operators (==, !=, <, >, <=, >=)
8	Does not register all logical operators (&&,   , !)
9	Formula for Halstead Length is incorrect
10	Operators used for Halstead Vocabulary are not unique
11	Operands used for Halstead Vocabulary are not unique
12	Formula for Halstead Volume is incorrect
13	Number of lines in code (N) is calculated incorrectly
14	Formula for Halstead Effort is incorrect
15	Formula for Maintainability Index is incorrect
16	Cyclomatic Complexity is calculated incorrectly
17	Percent lines of comments is calculated incorrectly