Software Quality & Testing – COMP – 10066 – 03 Lab Report 1 – Black Box Testing

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# Introduction

The purpose of this lab exercise is to test a program called evaluateIt using the black box testing method. I will be this software’s primary and only tester for the duration of this exercise. This lab report uses test to pass and test to fail cases to evaluate the expected outputs of the software. A list of bugs will be compiled and arranged by severity from the results of the test cases.

# Software & Testing Specifications

This program contains an expression evaluator that allows you to enter a mathematical expression that will be evaluated using standard BEDMAS rules. The calculated result will be presented to the right of the Result Label. The program is supposed to validate the syntax of the expressions before evaluation. If there is an error in the data entry you should be notified. I will be using a standard Windows built in calculator along with Google’s scientific calculator to confirm the results of the mathematic expressions.

# Test Cases

## Test to Pass

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ID | Functionality | Input | Expected Output | Actual Output | Status | Reason |
| TCP1 | + | 5.5 + 6.6 | 12.1 | 12.1000 | P | Correct output but unexpected formatting |
| TCP2 | +, () | 5 + (-6) | -1.000 | -1.0000 | P | Correct output |
| TCP3 | - | 5 - (6) | -1.0000 | -1.0000 | P | Correct output |
| TCP4 | -, () | -8 - (-12) | 4.0000 | 4.0000 | P | Correct output |
| TCP5 | \* | -25 \* 4 | -100.0000 | -100.0000 | P | Correct output |
| TCP6 | \* | -2.5 \* -4 | 10.0000 | 10.0000 | P | Correct output |
| TCP7 | / | 15 / 2 | 7.5000 | 7.5000 | P | Correct output |
| TCP8 | / | -55 / 11 | -5.0000 | -5.0000 | P | Correct output |
| TCP9 | BEDMAS, () | (5 + 2) \* 5 + 2 | 37.0000 | 37.0000 | P | Correct output |
| TCP10 | BEDMAS, () | 15 \* ((5 + 50) / 5) | 165.0000 | 165.0000 | P | Correct output |
| TCP11 | ^ | 2^2^12 | 16777216.0000 | 16,777,216.0000 | P | Correct output but unexpected formatting |
| TCP12 | Modulus | 21%4 | 1.0000 | 1.0000 | P | Correct output |
| TCP13 | Sine in Degrees | sin(90) | 1.0000 | 1.0000 | P | Correct output |
| TCP14 | Cosine in Degrees | cos(60) | 0.5000 | .5000 | P | Correct output but unexpected formatting |
| TCP15 | Tangent in Degrees | tan(45) | 1.0000 | 1.0000 | P | Correct output |
| TCP16 | Sine in Radians | sin(pi) | .0000 | .0000 | P | Correct output |
| TCP17 | Cosine in Radians | cos(pi) | -1.0000 | -1.0000 | P | Correct output |
| TCP18 | Tangent in Radians | tan(pi) | .0000 | -.0000 | F | Incorrect output |
| TCP19 | Arc Sine in Degrees | asin(1) | 90.0000 | .0175 | F | Incorrect output |
| TCP20 | Arc Cosine in Degrees | acos(0.5) | 60.0000 | 1.5621 | F | Incorrect output |
| TCP21 | Arc Tangent in Degrees | atan(1) | 45.0000 | .7854 | F | Incorrect output |
| TCP22 | Arc Sine in Radians | asin(1) | 1.5708 | 1.5708 | P | Correct output |
| TCP23 | Arc Cosine in Radians | acos(0.5) | 1.0472 | 1.0472 | P | Correct output |
| TCP24 | Arc Tangent in Radians | atan(1) | .7854 | .7854 | P | Correct output |
| TCP25 | Absolute | abs(-5) | 5.0000 | 5.0000 | P | Correct output |
| TCP26 | Average | average(4.5,6.5,8.5) | 6.5000 | 6.5000 | P | Correct output |
| TCP27 | Ceil | ceil(-5.2) | -5.0000 | -5.0000 | P | Correct output |
| TCP28 | Floor | floor(-5.2) | -6.0000 | -6.0000 | P | Correct output |
| TCP29 | Max | max(-5, 5, 5\*2) | 10.0000 | 10.0000 | P | Correct output |
| TCP30 | Min | min(-5,3,2) | -5.0000 | 3.0000 | F | Incorrect output, selecting max value |
| TCP31 | Round | round(pi) | 3.0000 | 3.0000 | P | Correct output |
| TCP32 | Sum | sum(1,2,3) | 6.0000 |  | F | No output |
| TCP33 | Random | random(4) | any integer 0 to 4 | 2.0000 | P | Correct output |
| TCP34 | Random | random(4) | any integer 0 to 4 | 3.0000 | P | Correct output |
| TCP35 | Random | random(4) | any integer 0 to 4 | 1.0000 | P | Correct output |
| TCP36 | Random | random(4) | any integer 0 to 4 | .0000 | P | Correct output |
| TCP37 | Random | random(4) | any integer 0 to 4 | 2.0000 | P | Correct output |
| TCP38 | Random | random(4) | any integer 0 to 4 | 1.0000 | P | Correct output |
| TCP39 | Natural Log | ln(e) | 1.0000 | 1.0000 | P | Correct output |
| TCP40 | Base 10 Log | log(50) | 1.6990 | 1.6990 | P | Correct output |
| TCP41 | Base 2 Log | log2(4) | 2.0000 | 2.0000 | P | Correct output |
| TCP42 | e | e | 2.7183 | 2.7183 | P | Correct output |
| TCP43 | pi | pi | 3.1416 | 3.1416 | P | Correct output |
| TCP44 | To Degree | todeg(pi) | 180.0000 | 180.0000 | P | Correct output |
| TCP45 | To Radian | torad(180) | 3.1416 | 3.1416 | P | Correct output |

## Test to Fail

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ID | Functionality | Input | Expected Output | Actual Output | Status | Reason |
| TCF1 | + | a + 5 | Error Message | a not recognized as a valid expression | P | Correct output |
| TCF2 | + | 5 + -6 | -1.000 | -1.0000 | P | Correct output |
| TCF3 | - | 5 - x | Error Message | x not recognized as a valid expression | P | Correct output |
| TCF4 | -, () | -8 - -12 | Error Message | 4.0000 | F | Incorrect output |
| TCF5 | \*, / | 5\*/7 | Error Message |  | F | No output |
| TCF6 | () | )-4 \* 2 | Error Message | expression can't start with a close bracket | P | Correct output |
| TCF7 | / | 1 / 0 | Infinity | ∞ | P | Correct output |
| TCF8 | / | 0 / 0 | Error Message | � | F | Unexpected output |
| TCF9 | ^ | 2^^2 | Error Message |  | F | No output |
| TCF10 | ^ | 2^121212 | Infinity | ∞ | P | Correct output |
| TCF11 | ^ | 2^24 | 16777216.0000 | 16,777,216.0000 | P | Correct output but unexpected formatting |
| TCF12 | Modulus | 2% | Error Message |  | F | No output |
| TCF13 | Sine | Sin(90) | 1.0000 | Sin not recognized as a valid expression | F | Unexpected output |
| TCF14 | Cosine | Cos(60) | Error Message | Cos not recognized as a valid expression | P | Correct output |
| TCF15 | Tangent | Tan(45) | Error Message | Tan not recognized as a valid expression | P | Correct output |
| TCF16 | Sine | sin(1,2) | Error Message | Invalid argument count for sin | P | Correct output |
| TCF17 | Average | average(1,,2) | Error Message | argument is missing | P | Correct output |
| TCF18 | Ceil | ceil() | Error Message | Invalid argument count for ceil | P | Correct output |
| TCF19 | Absolute | abs(-2\*-3\*-4) | 24.0000 | 24.0000 | P | Correct output |

# Bug Summary

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ID | Functionality | Input | Expected Output | Actual Output | Reason | Severity |
| Programming Error | | | | | | |
| TCP18 | Tangent in Radians | tan(pi) | .0000 | -.0000 | Incorrect output, function has incorrect calculations | High |
| TCP19 | Arc Sine in Degrees | asin(1) | 90.0000 | .0175 | Incorrect output, function has incorrect calculations | High |
| TCP20 | Arc Cosine in Degrees | acos(0.5) | 60.0000 | 1.5621 | Incorrect output, function has incorrect calculations | High |
| TCP21 | Arc Tangent in Degrees | atan(1) | 45.0000 | .7854 | Incorrect output, function has incorrect calculations | High |
| TCP30 | Min | min(-5,3,2) | -5.0000 | 3.0000 | Incorrect output, function has incorrect calculations, selecting max value | High |
| TCP32 | Sum | sum(1,2,3) | 6.0000 |  | Incorrect output, function has incorrect calculations with multiple arguments | High |
| Bad Inputs | | | | | | |
| TCF4 | -, () | -8 - -12 | Error Message | 4.0000 | I thought the software required () for negative values | Low |
| TCF5 | \*, / | 5\*/7 | Error Message |  | No error message, bad input from two operators with no value in between | Low |
| TCF9 | ^ | 2^^2 | Error Message |  | No error message, bad input from two identical operators with no value in between | Low |
| TCF12 | Modulus | 2% | Error Message |  | No error message, bad input, missing argument after operator | Low |
| Others | | | | | | |
| TCF8 | / | 0 / 0 | Error Message | � | Unexpected output | Medium |
| TCF13 | Sine | Sin(90) | 1.0000 | Sin not recognized as a valid expression | Unexpected output, functions are case sensitive | Low |