

<Project Name>

Test Case

Version <1.0>

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Arithmetic Expression Evaluator	Version: <1.0>
Test Case	Date: <11/12/24>
Test Case 1	

Revision History

Date	Version	Description	Author
<11/12/24>	<1.0>	<Imported into test cases doc>	<everyone>

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Test Case

1. Purpose

This document defines the test cases used in the testing of our arithmetic expression evaluator. This makes sure that the evaluator works as intended with a multiple of different test cases that can be either valid or invalid.

NOTE: for sections 2, 3, 4, and 5: It is OK to use a table like the one proposed in class, also suggested on the project part 5 description.

Expression Evaluator Test Cases

Test #	Description	Test Data	Expected	Actual	Pass/Fail
TC 01	Addition	3+4	7	7	Pass
TC 02	Subtraction With Parenthesis	8-(5-2)	5	5	Pass
TC 03	Multiply and Divide	10*2/5	4	4	Pass
TC 04	Exponentiation	2**3	8	8	Pass
TC 05	Mixed Operators	4*(3+2)%7-1	5	5	Pass
TC 06	Complex Addition with Extraneous Parentheses	((2 + 3)) + ((1 + 2))	8	8	Pass
TC 07	Mixed Operators with Extraneous Parentheses	((5 * 2) - ((3 / 1) + (4 % 3)))	6	6	Pass
TC 08	Nested Parentheses with Exponents	((2 ** (1 + 1)) + ((3 - 1) ** 2)) / ((4 / 2) % 3)	4	4	Pass
TC 09	Combination of Extraneous and Necessary Parentheses	(((((5 - 3))) * (((2 + 1))) + ((2 * 3))))	12	12	Pass
TC 10	Extraneous Parentheses with Division	((9 + 6)) / ((3 * 1) / (((2 + 2))) - 1)	-60	-60	Pass

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TC 11	Combining Unary Operators with Arithmetic Operations	$+(-2) * (-3) - ((-4) / (+5))$	6.8	6.8	Pass
TC 12	Unary Negation and Addition in Parentheses	$-(+1) + (+2)$	1	1	Pass
TC 13	Negation and Addition with Negated Parentheses	$-(-(-3)) + (-4) + (+5)$	-2	-2	Pass
TC 14	Unary Negation and Exponentiation	$+2 ** (-3)$	0.125	0.125	Pass
TC 15	Combining Unary Operators with Parentheses	$-(+2) * (+3) - (-4) / (-5)$	-6.8	-6.8	Pass
TC 16	Unmatched Parentheses	$2 * (4 + 3 - 1$	Invalid	Invalid	Pass
TC 17	Operators Without Operands	$* 5 + 2$	Invalid	Invalid	Pass
TC 18	Incorrect Operator Usage	$4/0$	Invalid	Invalid	Pass
TC 19	Missing Operator	$5(2+3)$	Invalid	Invalid	Pass
TC 20	Invalid Characters	$7\&3$	Invalid	Invalid	Pass
TC 21	Mismatched Parentheses	$(((3+4)-2)+(1)$	Invalid	Invalid	Pass
TC 22	Invalid Operator Usage	$((5+2/(3*0))$	Invalid	Invalid	Pass
TC 23	Invalid Operator Sequence	$((2-)1+3)$	Invalid	Invalid	Pass
TC 24	Missing Operand	$((4*2)+(-))$	Invalid	Invalid	Pass
TC 25	Invalid Characters	$((7*3)^2)$	Invalid	Invalid	Pass
TC 26	Complex Nested Parentheses with Mixed Operators	$(((10 + 5) * 2) - ((4 / 2) ** 3))$	22	22	Pass

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TC 27	Floating-Point Multiplication	$2.5 * 4.2$	10.5	10.5	Pass
TC 28	Large Numbers with Addition and Subtraction	$1000000 + 500000 - 200000$	1300000	1300000	Pass
TC 29	Decimal Division	$22.5 / 4.5$	5	5	Pass
TC 30	Negative Numbers in Multiplication	$-5 * -10$	50	50	Pass
TC 31	Simple Addition with Three Operands	$1 + 2 + 3$	6	6	Pass
TC 32	Nested Exponentiation	$(2^{**}3)^{**}2$	64	64	Pass
TC 33	Modulus Operator with Large Numbers	$100000 \% 300$	100	100	Pass
TC 34	Division Resulting in Zero	$0 / 5$	0	0	Pass
TC 35	Complex Parentheses Arrangement	$((6 + 3) * 2) / (4 - 2)$	9	9	Pass
TC 36	Large Negative Subtraction	$-1000 - 500$	-1500	-1500	Pass
TC 37	Combining Parentheses and Modulus	$(8 + 2) \% (3 * 2)$	4	4	Pass
TC 38	Simple Exponentiation with Large Base	$10^{**}3$	1000	1000	Pass
TC 39	Multiple Mixed Operators with Division	$(4 * 2) + (6 / 3)$	10	10	Pass
TC 40	Adding Zero	$5 + 0$	5	5	Pass
TC 41	Invalid Floating-Point Format	$5..6 + 4$	Invalid	Invalid	Pass

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TC 42	Missing Operand in Mixed Operators	$5 + - / 3$	Invalid	Invalid	Pass
TC 43	Invalid Modulus Usage	$5 \% 0$	Invalid	Invalid	Pass
TC 44	Multiple Operators Without Operand	$5 ** ** 2$	Invalid	Invalid	Pass
TC 45	Invalid Characters Mixed with Valid Operators	$5 + 3 @ 4$	Invalid	Invalid	Pass
TC 46	Empty Parentheses	$5 + () - 3$	Invalid	Invalid	Pass
TC 47	Extra Closing Parentheses	$5 + 3 * 2))$	Invalid	Invalid	Pass
TC 48	Invalid Use of Parentheses with Modulus	$5 + (3 \%)$	Invalid	Invalid	Pass
TC 49	Parentheses with Nested Invalid Characters	$((3+4)-x)$	Invalid	Invalid	Pass
TC 50	Modulus with Large Negative Numbers	$-100000 \% 300$	200	200	Pass
TC 51	Modulus with Decimals	$10.5 \% 3.2$	0.9	.9	Pass
TC 52	Subtraction and Multiplication Without Parentheses	$5 - 3 * 2$	-1	-1	Pass
TC 53	Mixing Decimals, Exponents, and Modulus	$3.5 ** 2 \% 2$	0.25	.25	Pass
TC 54	Alternating Unary Operators with Exponentiation	$(-2) ** 3$	-8	-8	Pass
TC 55	Exponentiation with Large Negative Exponent	$2**-10$	0.0009765	0.0009765	Pass
TC 56	Division with Negative	$10 / -2$	-5	-5	Pass

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	Divisor				
TC 57	Exponentiation Resulting in One	$10^{**}0$	1	1	Pass
TC 58	Decimal Multiplication Resulting in Zero	$0.0 * 1.0$	0	0	Pass
TC 59	Unbalanced Parentheses with Unary Negation	$-(-3 + 2$	Invalid	Invalid	Pass
TC 60	Modulus with Negative Dividend and Positive Divisor	$-17 \% 4$	3	3	Pass

2. Test case identifier

See Table

3. Test item

See Table

4. Input specifications

See Table

5. Output specifications

See Table

6. Environmental needs

6.1.1 Hardware (nothing particular for the arithmetic expression project)

Specify the characteristics and configurations of the hardware required to execute this test

6.1.2 Software (nothing particular for the arithmetic expression project)

Specify the system and application software required to execute this test case. This may include system software such as operating systems, compilers, simulators, and test tools. In addition, the test item may interact with application software.

6.1.3 Other

7. Special procedural requirements

Describe any special constraints on the test procedures that execute this test case. These constraints may involve special set up, operator intervention, output determination procedures, and special wrap up.

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8. Intercase dependencies

List the identifiers of test cases that must be executed prior to this test case. Summarize the nature of the dependencies.