
<MXCD>

<Arithmetic Evaluator>

Test Case

Version <1.0>

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Revision History

Date	Version	Description	Author
<02/12/2023>	<1.0>	<First 30 cases added to Test Case document>	<Michael Hoopes>

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Test Case

1. Purpose

The test case specification document for the Arithmetic Evaluator project specifies several test cases for the evaluation of the project's functionality. An excel file listing our test cases and their results can also be found in this repository, labeled "Test_Cases.xlsx".

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.

2. Test case identifier

Test case identifiers are of the form TC##, where ## is a number identifying the specific test case. Our test cases range from TC01-TC30

3. Test item

Identifier	Features to be tested
TC01	Basic addition
TC02	Subtraction with parenthesis
TC03	Exponentiation
TC04	Mixed operators
TC05	Complex addition with extraneous parenthesis
TC06	Complex calculation with extraneous parenthesis
TC07	Unary operations
TC08	Floating point calculations with exponents
TC09	Verification of complex mixed operations calculations
TC10	Unary operations with negative exponents
TC11	Exponentiation with exponent operation
TC12	Unary negation with unary plus

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TC13	Zero division error checking
TC14	Missing parenthesis
TC15	Invalid characters
TC16	Modulus with floating point values
TC17	Extra whitespace
TC18	Negative values with odd exponents
TC19	Negative values with even exponents
TC20	Floating point exponents
TC21	Complex exponents with extraneous parentheses
TC22	Mixed operators with extraneous Parentheses
TC23	Combining Unary Operators with Parentheses
TC24	Negation nested in Parentheses
TC25	Extreme Extraneous Parentheses
TC26	Unbalanced Parentheses
TC27	Negative Power of 0
TC28	Mixed operators with exponents
TC29	Different operators for exponents
TC30	Mixed operators with modulus

4. Input specifications

Identifier	Input
TC01	20+2100
TC02	192-(123-2)
TC03	2^3+3-2^3
TC04	10*(3-1)%7-1/2
TC05	((2+((2+2))))+((2-2))
TC06	((10 - 2) - ((3 / 9) + ((42 % 3))))
TC07	10-(-5)+(+2)-(-3)
TC08	10.2+3.5-3.3^3
TC09	5*(3+7)-7/2
TC10	2-3^(-5)
TC11	+2-3^(-4-2)
TC12	((9 + 6)) / ((3 * 1) / (((2 + 2))) - 1)-60
TC13	1+3+3+4*2+2/0
TC14	(3+2-3
TC15	<u>7@2#4</u>
TC16	3.8+3.2%3
TC17	15/ 3*(23*(1/23))
TC18	-2 ^3
TC19	(8-4)^2
TC20	(64)^0.5
TC21	((3))^2-((3*3)^(1/2))
TC22	((5 * 2) - ((3 / 1) + ((4 % 3))))
TC23	- (+2) * (+3) - (-4) / (-5)
TC24	-(-(-3)) + (-4) + (+5)
TC25	(((((3+2)/2))))))
TC26	(((((3+2)/2))))))
TC27	((3+2)/2)-2.5)^(-1)
TC28	((3+2)+(5+10))^2/((8/2)^2)
TC29	(3**2)-(3^2)

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TC30 $(3**2)\%3+(4.2\%2+10.6\%5)$

5. Output specifications

Identifier	Expected Output	Actual Output	Pass or Fail?
TC01		2120	2120Pass
TC02		71	71Pass
TC03		3	3Pass
TC04		5.5	5.5Pass
TC05		6	6Pass
TC06		7.67	7.67Pass
TC07		20	20Pass
TC08		-22.24	-22.24Pass
TC09		46.5	46.5Pass
TC10		2	2Pass
TC11		2	2Pass
TC12		-60	-60Pass
TC13	Division by zero error	CALCULATOR ERROR: Divison by Zero	Pass
TC14	Missing parenthesis error	PARSER ERROR: Mismatched parenthesis	Pass
TC15	Invalid characters error	Tokenization error: Invalid character	Pass
TC16		4	4Pass
TC17		5	5Pass
TC18		-8	-8Pass
TC19		16	16Pass
TC20		8	8Pass
TC21		6	6Pass
TC22		6	6Pass
TC23		-6.8	-6.8Pass
TC24		-2	-2Pass
TC25		2.5	2.5Pass
TC26	Missing parenthesis error	PARSER ERROR: Mismatched parenthesis	Pass
TC27	Division by zero error	CALCULATOR ERROR: Divison by Zero	Pass
TC28		25	25Pass
TC29		0	0Pass
TC30		0.8	0.8Pass

6. Environmental needs

6.1.1 Hardware

There is no additional hardware required for the execution of these test cases.

6.1.2 Software

There is no additional software required for the execution of these test cases.

6.1.3 Other

In order to run these test cases, the user must follow the instructions in the User Manual for providing an arithmetic expression to the calculator.