

Logic Gate Simulator

Test Cases

Version 1.0

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Test Case	Date: 5/2/24
TC-v1	

Revision History

Date	Version	Description	Author
02/May/24	1.0	Test Cases used in testing the functionality of the Logic Gate Simulator project.	Lily Gray, David Sutherland, Daniel Bobadilla, Fatima Avila

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Test Case

1. Purpose

This Test Case Specification document for the Logic Gate Simulator project defines a series of test cases designed to test specific functionalities of our project. The purpose of this document is to find flaws in our code by picking input arguments that could potentially have a different actual vs. expected result. These inputs will test the various logic operators (&, |, \$, @, !) as well as the order in which the simulator conducts each operation and handles parentheses.

2. Test case identifier

Each of 50 test cases is given an identifier “TC#”. See Table 1 in section 5 for all the test cases.

3. Test item

The items to be tested are listed in the “Test Case Description” column of Table 1 in section 5.

4. Input specifications

The exact input conditions for each test case are shown below in Table 1.

5. Output specifications

Expected and actual outputs for each test case are shown below in Table 1.

Test Case ID	Test Case Description	Test Data	Expected Results	Actual Results	Pass/Fail Status
TC01	Verify that the simulator correctly evaluates the NAND operator with 2 Falses	F @ F	T	T	Pass
TC01	Verify that the simulator correctly evaluates the NAND operator with 2 Trues	T @ T	F	F	Pass
TC03	Verify that the simulator correctly evaluates the NAND operator with one T and one F input	T @ F	T	T	Pass
TC04	Verify that the simulator correctly	F @ T	T	T	Pass

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	evaluates the NAND operator with one F and one T input				
TC05	Verify that the simulator correctly evaluates the "\$" operator with two expressions- one that is T and one F	(T F) \$ F	T	T	Pass
TC06	Verify that the simulator correctly evaluates the "!" operator on a T expression	!(T&T)	F	F	Pass
TC07	Verify that the simulator correctly evaluates the NAND operator with two expressions that both evaluate to F	(F@T) (T@F)	T	T	Pass
TC08	Verify that the simulator correctly evaluates the "\$" operator with two true expressions	(T\$T) & F	F	F	Pass
TC09	Verify that the parsing evaluates the correct order of operations for two expressions	!F !T	T	T	Pass
TC10	Verify that the parsing evaluates the correct order of operations for several compound expressions	(((((T F) & F) (T & (T F))) @ (T @ T)) \$ (! (T F)))	T	T	Pass
TC11	Verify that the simulator can parse parentheses in correct order	((F \$ ((T F) & (F @ (T F)))) (T \$ (T & F)))	F	T	Fail
TC12	Verify it can handle multiple parenthesis instances	(((! (T \$ F)) & (T @ T)) ((F T) & (T \$ T)))	F	F	Pass
TC13	Verify it can calculate nots inside parenthesis	((T @ T) \$ (F @ T)) ((!T) & (T (!T)))	T	T	Pass

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TC14	Verify that the simulator correctly evaluates NAND	((F @ T) \$ (T (F & F))) & (T & (T @ (!T)))	F	F	Pass
TC15	Verify that the simulator correctly evaluates “!” with correct order of operations	!(T & (F T)) (!T & T)	F	F	Pass
TC16	Verify that the simulator correctly evaluates “!” in a simple case	!(T & (F T))	F	F	Pass
TC17	Verify that the simulator follows left to right order of operations to group operands	T@F\$T T@F	F	F	Pass
TC18	Verify that the simulator correctly handles the reversed order of TC17	F@T T\$F@T	T	T	Pass
TC19	Verify it can handle a ton of ands, like a ton of them	(T & T) & (T & T) & (T & T) & (T & T)	T	T	Pass
TC20	Verify that the simulator correctly evaluates expressions with extraneous parentheses	((T F))@(((T&T)))	F	F	Pass
TC21	Verify that the simulator does the correct order of operations with parentheses	(T (F&(T\$(F@(F T))))	T	T	Pass
TC22	Verify that the simulator correctly prioritizes the “!” operator	F\$!F\$F	T	T	Pass
TC23	Verify that the simulator correctly evaluates the XOR operator	F \$ F	F	F	Pass
TC24	Verify that the simulator correctly evaluates the XOR operator with one F	F \$ T	T	T	Pass

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	and one T				
TC25	Verify that the simulator correctly evaluates the XOR operator with 2 Trues	T \$ T	F	F	Pass
TC26	Verify that the simulator correctly evaluates the XOR operator with one T and one F (switched order)	T \$ F	T	T	Pass
TC27	Verify that the simulator can handle a bunch of useless spaces	T & F	F	F	Pass
TC28	Verify that the simulator can handle empty parenthesis	()T&T	T	T	Pass
TC29	Verify that the simulator correctly handles flipped parenthesis)T&T(Error	Error	Pass
TC30	Verify that the simulator throws an error when the input is invalid characters	fish	Error	Error	Pass
TC31	Verify that the simulator can handle a single Boolean	T	T	T	Pass
TC32	Verify that the simulator correctly handles an empty parenthesis	()	Error	Terminates	Fail
TC33	Verify that the simulator correctly handles two empty parentheses	() & ()	Error	Error	Pass
TC34	Verify that the simulator correctly handles extraneous operators	T && T	Error	Error	Pass
TC35	Verify that the simulator correctly handles incorrect use of not operator	T ! T	Error	T	Fail

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TC36	Verify that the simulator correctly handles mismatched operands	T &	Error	Error	Pass
TC37	Verify that the built-in quit function works	q	Goodbye	Goodbye	Pass
TC38	Verify that the simulator will not accept brackets instead of parentheses	[T & T]	Error	Error	Pass
TC39	Verify that the simulator will not evaluate mismatched parenthesis	(T&T	Error	Error	Pass
TC40	Verify that the simulator will not evaluate extraneous Booleans	T T & T	Error	T	Fail
TC41	Verify that the simulator correctly handles precedence of NOT operator	! T@F	T	T	Pass
TC42	Verify that the simulator will not evaluate mismatched operators	& T ! T	Error	F	Fail
TC43	Verify that the simulation correctly handles NOT operator	! F & ! T	F	F	Pass
TC44	Verify that the simulator correctly parses a chain of expressions	T&T&T&T&T&F	F	F	Pass
TC45	Verify parenthesis precedence before not operator	!(T&T)	F	F	Pass
TC46	Verify NOT operator precedence inside parenthesis	(!T&!T)	F	F	Pass
TC47	Verify that the simulation can handle multiple NOTS inside parentheses	(!T&T) (!F&F)	F	F	Pass

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TC48	Verify that the simulation correctly handles multiple extraneous parenthesis	(((((T&T))))))	T	T	Pass
TC49	Verify that the simulation correctly parses through extraneous parentheses	(T&T())	T	T	Pass
TC50	Verify that the simulator correctly evaluates several NOT operands	(T F) (F T)	T	T	Pass

Table 1: Description of Test Cases for Logic Gate Simulator Project

6. Environmental needs

6.1.1 Other

There are currently no additional environmental needs for the software.