**Boolean Expressions Evaluator**

Test Case

Version <1.0>

Revision History

| **Date** | **Version** | **Description** | **Author** |
| --- | --- | --- | --- |
| <02/05/24> | <1.0> | Creation | Trent Weston |
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**Test Case**

# Purpose

This Test Case Specification document for the Boolean Logic Simulator defines test cases for evaluating the functionality and robustness of a Boolean logic simulator, which is designed to handle logical operations such as AND, OR, NOT, NAND, and XOR. The purpose of these test cases is to ensure that the program correctly interprets and computes Boolean expressions based on various inputs and operator combinations, handles errors, and adheres to the requirements specified in the project documentation. This document organizes the test cases in the tabular view below.

# Test case identifier

(See Table Below)

# Test item

(See Table Below)

# Input specifications

(See Table Below)

# Output specifications

(See Table Below)

| ***Test Case Identifier*** | ***Test Item*** | ***Input Specifications*** | ***Output Specifications*** |
| --- | --- | --- | --- |
| *TC001* | *XOR Operator with OR* | *Input:* ***(T | F) $ F*** | *Output:* ***True*** |
| *TC002* | *NOT Operator with AND* | *Input:* ***! (T & T)*** | *Input:* ***False*** |
| *TC003* | *OR Operator with multiple NANDs* | *Input:* ***(F @ T) | (T @ F)*** | *Output:* ***True*** |
| *TC004* | *AND Operator with XOR* | *Input:* ***(T $ T) & F*** | *Output:* ***False*** |
| *TC005* | *OR Operator with multiple NOTs* | *Input:* ***! F | ! T*** | *Output:* ***True*** |
| *TC006* | *Combination of OR, AND, NAND, and XOR* | *Input:* ***(((((T | F) & F) | (T & (T | F))) @ (T @ T)) $ (! (T | F)))*** | *Output:* ***True*** |
| *TC007* | *Combination of XOR, AND, NAND, and OR* | *Input:* ***((F $ ((T | F) & (F @ (T | F)))) | (T $ (T & F)))*** | *Output:* ***True*** |
| *TC008* | *Combination of NOT, XOR, AND, NAND, and OR* | *Input:* ***(((! (T $ F)) & (T @ T)) | ((F | T) & (T $ T)))*** | *Output:* ***False*** |
| *TC009* | *Combination of NAND, XOR, NOT, AND, and OR* | *Input:* ***(((T @ T) $ (F @ T)) | ((!T) & (T | (!T))))*** | *Output:* ***True*** |
| *TC010* | *Combination of NAND, XOR, OR, AND* | *Input:* ***((F @ T) $ (T | (F & F))) & (T & (T @ (!T)))*** | *Output:* ***False*** |
| *TC011* | *Error Handling: Double Operator* | *Input:* ***T && & F*** | *Output:* ***Invalid Expression: Consecutive Operators*** |
| *TC012* | *Error Handling: Unknown Operator* | *Input:* ***T ? T*** | *Output:* ***Invalid Expression: Unknown Character: ?*** |
| *TC013* | *Error Handling: Missing Parentheses* | *Input:* ***(T & F*** | *Output:*  ***Invalid Expression: Missing closing parenthesis*** |
| *TC014* | *Error Handling: Invalid Characters* | *Input:* ***a & b*** | *Output:* ***Invalid Expression: Unknown Character: a*** |
| *TC015* | *Combination of OR, NOT, AND, and NAND* | *Input:* ***(T | (! F)) & (F @ T)*** | *Output:* ***True*** |
| *TC016* | *Combination of NOT, XOR, AND, and OR* | *Input:* ***! ((T $ F) | (T & F))*** | *Output:* ***False*** |
| *TC017* | *Combination of NAND, XOR, NOT, AND, and OR* | *Input:* ***((F @ F) $ T) | (T & (! T))*** | *Output:* ***False*** |
| *TC018* | *Combination of XOR and AND* | *Input:* ***(T $ (T $ T)) & T*** | *Output:* ***False*** |
| *TC019* | *Combination of NOT, AND, and OR* | *Input:* ***! T & ! (F | T)*** | *Output:* ***False*** |
| *TC020* | *Error Handling: Unknown Operator* | *Input:* ***T ? ! T*** | *Output:* ***Error - Unknown Character: ?*** |
| *TC021* | *Missing operand* | *Input:* ***! & T*** | *Output:* ***Invalid Expression: Consecutive Operators*** |
| *TC022* | *Circular logic* | *Input:* ***T = !(T & T)*** | *Output:* ***Invalid Expression: Unknown Character: =*** |
| *TC023* | *Empty expression* |  | *Output:* ***Invalid Expression: Empty Expression*** |
| *TC024* | *Missing truth values* | *Input:* ***X | Y*** | *Output:* ***Invalid Expression: Empty Expression*** |
| *TC025* | *Operator after operand* | *Input:* ***T!*** | *Output:* ***Cannot end expression with operation*** |

# Environmental needs

### Hardware (nothing particular for the arithmetic expression project)

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

### 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.*

### Other

No other requirements necessary to specify.

# 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.*

# Intercase dependencies

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