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**MacroHard**

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**Boolean Expressions Evaluator**

**Test Case**

**Version <1.0>**

Boolean Expression Evaluator	Version: <1.0>
Test Case	Date: <02/05/24>
<document identifier>	

## Revision History

Date	Version	Description	Author
<02/05/24>	<1.0>	Creation	Trent Weston

Boolean Expression Evaluator	Version: <1.0>
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# Table of Contents

1.	Purpose	4
2.	Test case identifier	4
3.	Test item	4
4.	Input specifications	4
5.	Output specifications	4
6.	Environmental needs	4
	6.1.1 Hardware	4
	6.1.2 Software	4
	6.1.3 Other	4
7.	Special procedural requirements	5
8.	Intercase dependencies	5

Boolean Expression Evaluator	Version: <1.0>
Test Case	Date: <02/05/24>
<document identifier>	

## Test Case

### 1. 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.

### 2. Test case identifier

(See Table Below)

### 3. Test item

(See Table Below)

### 4. Input specifications

(See Table Below)

### 5. Output specifications

(See Table Below)

<i>Test Case Identifier</i>	<i>Test Item</i>	<i>Input Specifications</i>	<i>Output Specifications</i>
<i>TC001</i>	<i>XOR Operator with OR</i>	<i>Input: (T   F) \$ F</i>	<i>Output: True</i>
<i>TC002</i>	<i>NOT Operator with AND</i>	<i>Input: ! (T &amp; T)</i>	<i>Input: False</i>
<i>TC003</i>	<i>OR Operator with multiple NANDs</i>	<i>Input: (F @ T)   (T @ F)</i>	<i>Output: True</i>
<i>TC004</i>	<i>AND Operator with XOR</i>	<i>Input: (T \$ T) &amp; F</i>	<i>Output: False</i>
<i>TC005</i>	<i>OR Operator with multiple NOTs</i>	<i>Input: ! F   ! T</i>	<i>Output: True</i>

Boolean Expression Evaluator	Version: <1.0>
Test Case	Date: <02/05/24>
<document identifier>	

TC006	Combination of OR, AND, NAND, and XOR	Input: (((((T   F) & F)   (T & (T   F))) @ (T @ T)) \$ (! (T   F)))	Output: <b>True</b>
TC007	Combination of XOR, AND, NAND, and OR	Input: ((F \$ ((T   F) & (F @ (T   F))))   (T \$ (T & F)))	Output: <b>True</b>
TC008	Combination of NOT, XOR, AND, NAND, and OR	Input: (((! (T \$ F)) & (T @ T))   ((F   T) & (T \$ T)))	Output: <b>False</b>
TC009	Combination of NAND, XOR, NOT, AND, and OR	Input: (((T @ T) \$ (F @ T))   ((!T) & (T   (!T))))	Output: <b>True</b>
TC010	Combination of NAND, XOR, OR, AND	Input: ((F @ T) \$ (T   (F & F))) & (T & (T @ (!T)))	Output: <b>False</b>
TC011	Error Handling: Double Operator	Input: T && & F	Output: <b>Invalid Expression: Consecutive Operators</b>
TC012	Error Handling: Unknown Operator	Input: T ? T	Output: <b>Invalid Expression: Unknown Character: ?</b>
TC013	Error Handling: Missing Parentheses	Input: (T & F	Output: <b>Invalid Expression: Missing closing parenthesis</b>
TC014	Error Handling: Invalid Characters	Input: a & b	Output: <b>Invalid Expression: Unknown Character: a</b>

Boolean Expression Evaluator	Version: <1.0>
Test Case	Date: <02/05/24>
<document identifier>	

TC015	Combination of OR, NOT, AND, and NAND	Input: $(T \mid (! F)) \& (F @ T)$	Output: <b>True</b>
TC016	Combination of NOT, XOR, AND, and OR	Input: $! ((T \$ F) \mid (T \& F))$	Output: <b>False</b>
TC017	Combination of NAND, XOR, NOT, AND, and OR	Input: $((F @ F) \$ T) \mid (T \& (! T))$	Output: <b>False</b>
TC018	Combination of XOR and AND	Input: $(T \$ (T \$ T)) \& T$	Output: <b>False</b>
TC019	Combination of NOT, AND, and OR	Input: $! T \& ! (F \mid T)$	Output: <b>False</b>
TC020	Error Handling: Unknown Operator	Input: $T ? ! T$	Output: <b>Error - Unknown Character: ?</b>
TC021	Missing operand	Input: $! \& T$	Output: <b>Invalid Expression: Consecutive Operators</b>
TC022	Circular logic	Input: $T = !(T \& T)$	Output: <b>Invalid Expression: Unknown Character: =</b>
TC023	Empty expression		Output: <b>Invalid Expression: Empty Expression</b>
TC024	Missing truth values	Input: $X \mid Y$	Output: <b>Invalid Expression: Empty Expression</b>

Boolean Expression Evaluator	Version: <1.0>
Test Case	Date: <02/05/24>
<document identifier>	

TC025	Operator after operand	Input: T!	Output: <b>Cannot end expression with operation</b>
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## 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

No other requirements necessary to specify.

## 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.

## 8. Intercase dependencies

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