

## On the Subject of Logic

*Logic is easy, but logic AND bomb defusal might not.*

- Each row displays 3 letters. Each letter represents a statement which can be found in table 1.
- On each row, the GREEN statements should be considered as if they were enclosed in parentheses. These must be solved before the rest.
- Statements are joined with logical connective symbols. Find how each symbol works in table 2.
- Apply negation (NOT gate: false becomes true and true becomes false) to each statement first if the red LED above that statement is lit.
- Find the end result of each row, and then use the T/F button to the right to select True/False. Press “Submit” when done.

The interface shows a logic puzzle grid. At the top right is a small circle. Below it are two rows of logic expressions. Each row consists of three square boxes, each with a red LED indicator above it. The first row contains a box with 'V' (OR) between the first and second boxes, and a box with '^' (AND) between the second and third boxes. The second row contains a box with '^' (AND) between the first and second boxes, and a box with 'V' (OR) between the second and third boxes. To the right of each row is a box labeled 'F' (False). Below the grid is a 'SUBMIT' button.

*See Appendix A for indicator identification reference.*

*See Appendix B for battery identification reference.*

*See Appendix C for port identification reference.*

**Table 1: Statement list**

Letter	Statement	Letter	Statement
A	Number of batteries = number of indicators	N	More than 2 battery holders
B	Serial number has more letters than digits	O	Has both lit and unlit indicators
C	Has IND indicator	P	Has parallel port
D	Has FRK indicator	Q	Exactly 2 ports
E	Exactly 1 unlit indicator	R	Has PS/2 port
F	More than 1 port type	S	Sum of digits in serial number > 10
G	2 batteries or more	T	Has MSA indicator
H	Less than 2 batteries	U	Exactly 1 battery holder
I	Last digit of serial number is odd	V	Serial number contains vowels
J	More than 4 batteries	W	No indicators
K	Exactly 1 lit indicator	X	Exactly 1 indicator
L	More than 2 indicators	Y	More than 5 ports
M	All ports are unique	Z	Less than 2 ports

**Table 2: Logical connective symbol list**

Logical Connective	Symbol	Logic Gate Equivalent	Meaning
Conjunction	$\wedge$	AND	Returns true if all inputs are true. Else returns false.
Disjunction	$\vee$	OR	Returns true if any input is true. Else returns false.
Exclusive Disjunction	$\underline{\vee}$	XOR	Returns true if exactly one input is true. Else returns false.
Alternative Denial	$ $	NAND	Returns false if all inputs are true. Else returns true.
Joint Denial	$\downarrow$	NOR	Returns false if any input is true. Else returns true.
Biconditional	$\leftrightarrow$	XNOR	Returns false if exactly one input is true. Else returns true.
Implication (Left)	$\rightarrow$	–	Returns false when left input is true and right input is false. Else returns true.
Implication (Right)	$\leftarrow$	–	Returns false when left input is false and right input is true. Else returns true.