## 1. Logic Operators

| **Boolean Operator** | **Symbol** | **Logic Operation** | **Symbol** | **Set Theory** | **Symbol** | **Inputs =** xy | xy | xy | xy |
|---|---|---|---|---|---|---|---|---|---|
| ZERO | | Null | | | | 0 | 0 | 0 | 0 |
| AND | $\cdot$ | Conjunction | $x \wedge y$ | Intersection | $x \cap y$ | 0 | 0 | 0 | 1 |
| ONLY X | | Inhibit | | | | 0 | 0 | 1 | 0 |
| X | / | | | | | 0 | 0 | 1 | 1 |
| ONLY Y | | Inhibit | | | | 0 | 1 | 0 | 0 |
| Y | / | | | | | 0 | 1 | 0 | 1 |
| XOR | $\bigoplus$ | Mod 2 Addition | | | | 0 | 1 | 1 | 0 |
| OR | $+$ | Disjunction | $x \vee y$ | Union | $x \cup y$ | 0 | 1 | 1 | 1 |
| NOR | $\downarrow$ | | | | | 1 | 0 | 0 | 0 |
| COINCIDENCE | $\odot$ | Equivalence Tautology | $x \Leftrightarrow y$ | | | 1 | 0 | 0 | 1 |
| NOT Y | $-$ | Negation | $\neg y, y', \bar{y}$ | Complement | $y', \bar{y}, y^c$ | 1 | 0 | 1 | 0 |
| NOT ONLY Y | | Imply | $y \Rightarrow x$ | | | 1 | 0 | 1 | 1 |
| NOT X | $-$ | Negation | $\neg x, x', \bar{x}$ | Complement | $x', \bar{x}, x^c$ | 1 | 1 | 0 | 0 |
| NOT ONLY X | | Imply | $x \Rightarrow y$ | | | 1 | 1 | 0 | 1 |
| NAND | $\uparrow$ | | | | | 1 | 1 | 1 | 0 |
| ONE | | Unity | | | | 1 | 1 | 1 | 1 |

Special definitions:

In the imply operation, $x \Rightarrow y$, the variable on the left side is called the *antecedent*, and the variable on the right side is called the *consequent*.

Tautology: Statement whose truth values are always true.