**Boolean Algebra**

Boolean algebra is a division of mathematics that deals with operations on logical values and incorporates binary values.

**Addition:**

0 + 0 =0

0 +1 = 1

1+ 0 = 1

1 + 1 = 1

e.g.

A + 0 = A

A + 1 = 1

**Multiplication:**

0 X 0 = 0

0 X 1 = 0

1 X 0 = 0

1 X 1 = 1

e.g.

A x 0 = 0

A x 1 = A

**Negation:**

If A =1

Then = 0

If A = 0

Then = 1

**Logic Gates**

* Logic gates are digital circuits.
* They are the building blocks of any digital system.
* They are an electronic circuit having one or more inputs and only one output.

**“AND” Gate:**

An AND Gate has two or more inputs and only one output which is equal to the Product of all the inputs.

Y (Output) = A x B (Inputs)

Truth Table:

|  |  |  |
| --- | --- | --- |
| INPUTS | | OUTPUT |
| A | B | Y = A x B |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

**“OR” Gate:**

An “OR” Gate has two or more inputs and only one output. The output is equal to the SUM of all the inputs.

Y (Output) = A + B (Inputs)

Truth Table:

|  |  |  |
| --- | --- | --- |
| INPUTS | | OUTPUT |
| A | B | Y = A x B |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

**“NOT” Gate:**

“NOT” Gate is a single input and single output gate. The output is the complement of the input logic. It corresponds to Negation explained above.

Y (Output) = (Input)

Truth Table:

|  |  |
| --- | --- |
| INPUT (A) | OUTPUT () |
| 0 | 1 |
| 1 | 0 |