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SIGNAL ANALYSIS IN ELECTRONIC DEVICES OF LOGICAL ELEMENTS

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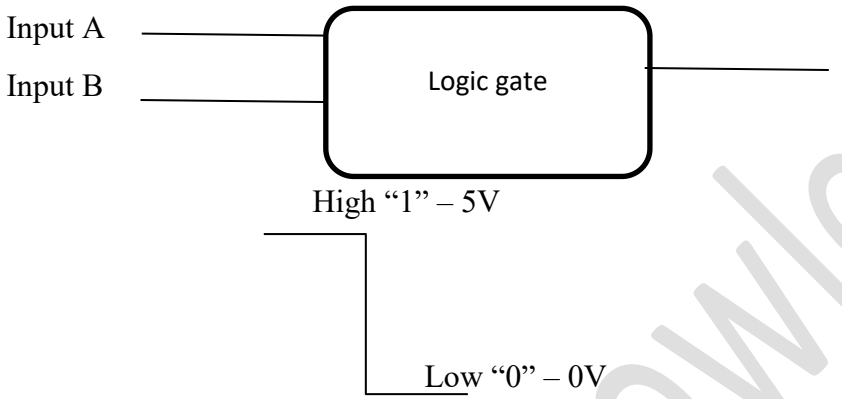
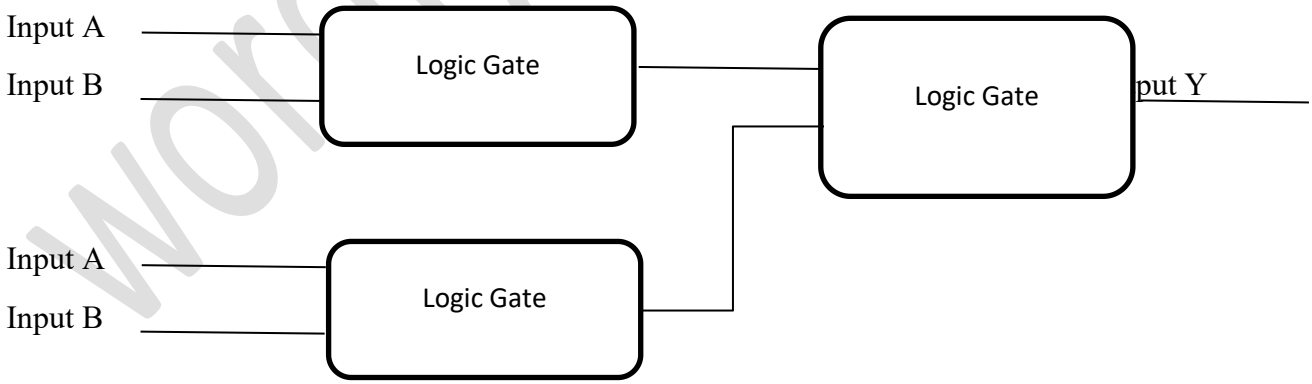
Abstract: The article deals with the study of logic gates parameters for control and regulation of quality indicators with the help of truth table. It was revealed that a change in the voltage of inputs was observed with a change in the high & low parameters.

Keywords: Electronic circuit, digital system, logic gates, truth table, electronic gates.

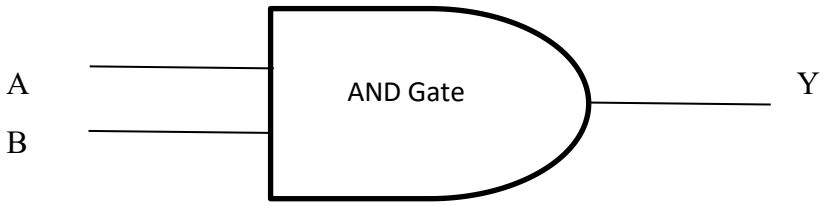
The Logic Gates are a very basic building block of digital systems. So, this Logic gates are the electronic circuit which consists of one or more inputs and one output. Now, the input and outputs of these logic gates can have only two values.



That is logic “1” or the high value and the logic “o” or the low value. Now in reality, this high or low or the logic “1” or the logic “0” are the voltage levels. That means the high could be 5 V, While the low could be zero volt. And relationship between this input and output of the logic gate is based on a certain logic. For example, for some logic gate, the output would be high or the logic “1” when both inputs are high. Or for some other logic gate, the output would be high if any one of the inputs is equal to logic “0”. So, in a way, these logic gates have the ability to make certain logic decisions. And since these electronic gates can make logic decisions, so these gates are known as the logic gates. Now, when we interconnect or cascade these logic gates, then it is possible to perform various logical operations.



And using these logic gates even it is possible to build the processor. So, now let’s understand about these logic gates. So, this AND gate, OR gate, and the NOT gate are the very basic types of logic gates. And using these three gates, it is possible to build any Boolean function. And first, let’s start with the AND gate.

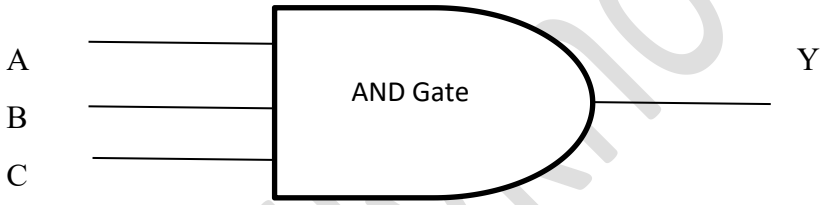


So, this is the symbol of the 2- input AND gate. Where this A and B are the inputs of this AND gate while this Y is the output. So, this output of the AND gate will be high or the logic "1" when the both inputs are high. And if any of the two inputs is low, or the logic "0" in that case, the output of the AND gate will be equal to 0. So, let's understand that with the help of truth table.

Truth Table

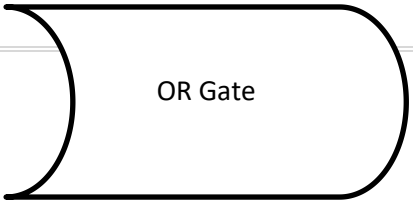
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

So, this truth table shows all the possible combinations of the input signal and the corresponding outputs for those input combinations. So, here is the truth table of the 2-input AND gate. For the two different inputs, there are total 4 different possibilities. The Boolean expression of this AND gate can be given as Y=A*B, Similarly, we can also have AND gate with more than 2 inputs. Y=A*B*C.



A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

And the next gate is the OR gate. Where this A and B are the inputs of this OR gate while this Y is the output. So, this output of the OR gate will be high or the logic "1" when the both inputs are high. And if any of the two inputs is low, or the logic "0" in that case, the output of the OR gate will be equal to 0. So, let's understand that with the help of truth table.



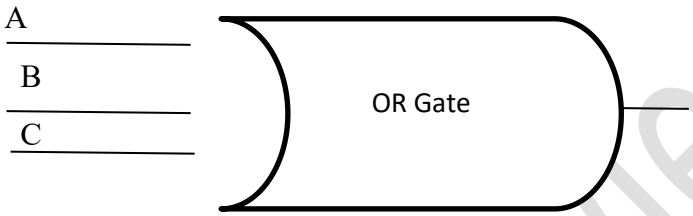
A _____ Y _____

B_____

Truth Table

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

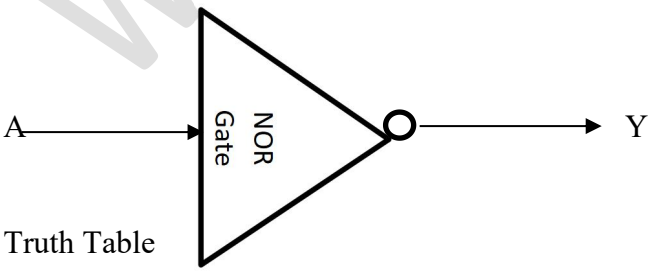
Similarly, we can also have OR gate with more than 2 inputs. Y=A+B+C.



A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

So, this truth table shows all the possible combinations of the input signal and the corresponding outputs for those input combinations. So, here is the truth table of the 2-input OR gate. For the two different inputs, there are total 4 different possibilities. The Boolean expression of this OR gate can be given as Y=A+B. Similarly, we can also have OR gate with more than 2 inputs. Y=A+B+C.

And the next gate is the NOT gate. " Inverter" Where this A is the inputs of this NOT gate while this Y is the output. So, this output of the NOT gate will be high or the logic "1" when the both inputs are high.



Truth Table

A	Y

0	1
1	0

Let's understand that with the help of truth table. So, this truth table shows all the possible combinations of the input signal and the corresponding output for those input combinations. So, here is the truth table of the 1-input NOT gate. For the one input, there are 2 different possibilities. The Boolean expression of this NOT gate can be given as $\overline{Y}=A$. Which indicates that the output is the complement of the inputs signal.

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