Logic gate

A **logic gate** is an electronic component that can be used to conduct electricity based on a rule. The output of the gate is the result of applying this rule to one or more "inputs". These inputs may be two wires or the output of other logic gates.

Logic gates are digital components. They normally work at only two levels of voltage, a positive level and zero level. Commonly they work based on two states: *On* and *Off*. In the On state, voltage is present. In the Off state, the voltage is at zero. The On state usually uses a voltage in the range of 3.5 to 5 volts. This range can be lower for some uses.

Logic gates compare the state at their inputs to decide what the state at their output should be. A logic gate is *on* or active when its rules are correctly met. At this time, electricity is flowing through the gate and the voltage at its output is at the level of its On state.

Logic gates are electronic versions of Boolean logic. Truth tables will tell you what the output will be, depending on the inputs.

Contents

AND logic gate

AND gates have two inputs. The output of an AND gate is on only if both inputs are on. If at least one of the inputs are off, the output will be off.

Using the image at the right, if *A* and *B* are both in an On state, the output (out) will be an On state. If either *A* or *B* is in an Off state, the output will also be in an Off state. *A* **and** *B* must be On for the output to be On.

A general idea of a symbol for an AND Logic Gate

Truth table

A	B	Output
Off	Off	Off
On	Off	Off
Off	On	Off
On	On	On

OR logic gate

OR gates have two inputs. The output of an OR gate will be on if at least one of the inputs are on. If both inputs are off, the output will be off.

Using the image at the right, if either *A* **or** *B* is On, the output (*out*) will also be On. If both *A* and *B* are Off, the output will be Off.

A general idea of a symbol for an OR Logic Gate

Truth table

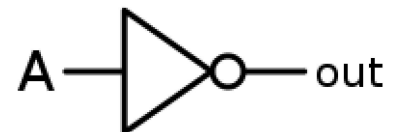| A	B	Output
Off	Off	Off
On	Off	On
Off	On	On
On	On	On

NOT logic gate

The NOT logic gate has only one input. If the input is On then the output will be Off. In other words, the NOT logic gate changes the signal from On to Off or from Off to On. It is sometimes called an inverter.

Truth table

A	Output
Off	On
On	Off

A general idea of a symbol for a NOT Logic Gate
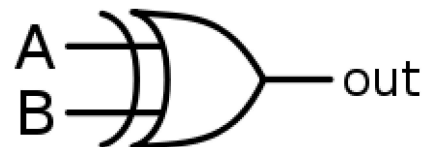
XOR logic gate

XOR gates have two inputs. The output of a XOR gate will be true if only one of the inputs is true. If both inputs are on, the output will be off.

A general idea of a symbol for a XOR Logic Gate

Truth table

A	B	Output
On	On	Off
On	Off	On
Off	On	On
Off	Off	Off