

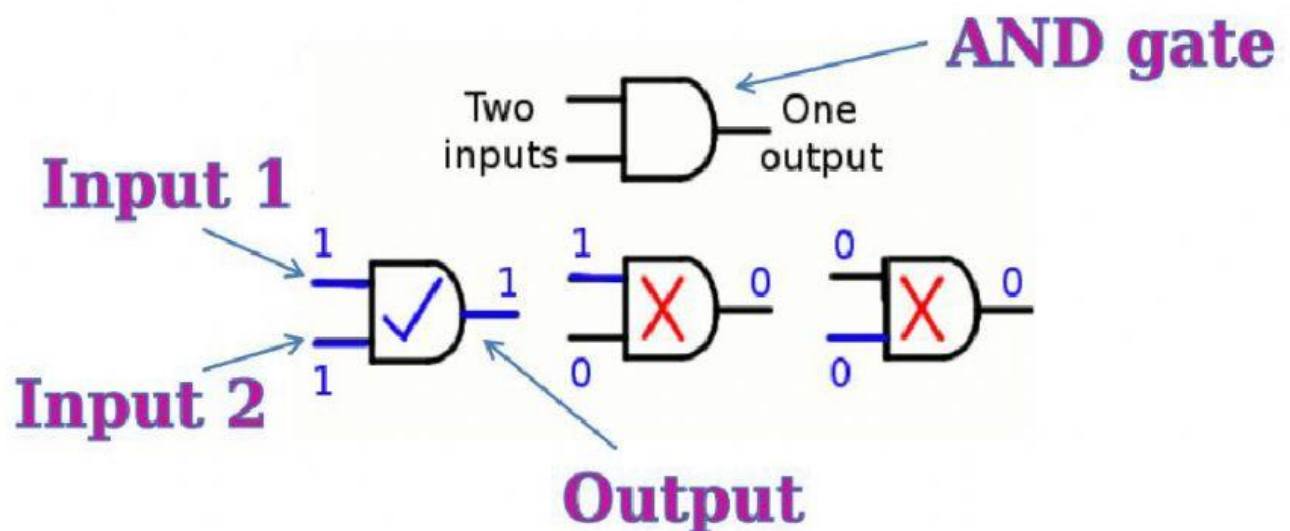
Physical computing

Basic logic gates

There are three basic logic gates as AND, OR and NOT.

AND gate

- AND needs two inputs.
- It only turns on when both inputs are ON.
- If only one input is on, it spits out OFF.
- If both inputs are off, it spits out OFF.



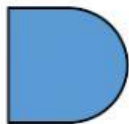
AND gate Truth Table

- A convenient way to visualize the outputs for the logic gates is through a truth table.
- The truth table depicts the gate's response to each possible set of inputs.

		Input 1	
		0	1
Input 2	0	0	0
	1	0	1

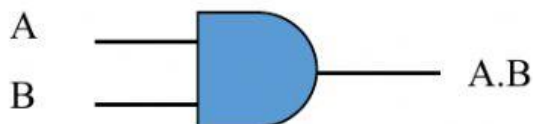
Output

The standard symbol for AND Gate



When A and B are inputs

Inputs of a Gate is shown in capital letters. The output of AND gate is denoted by A.B when inputs are A and B.



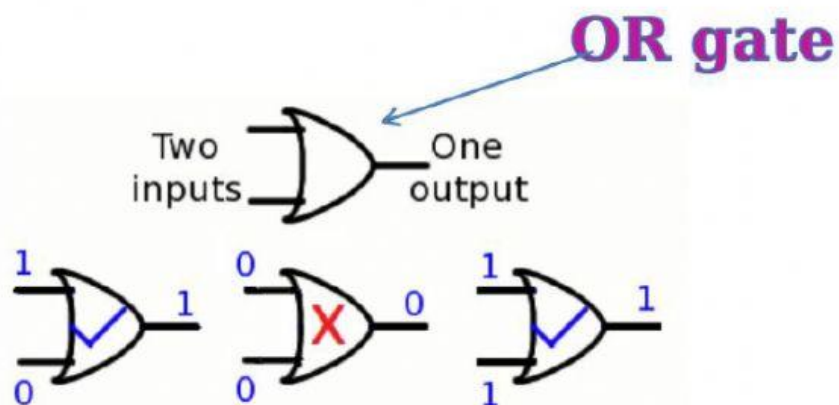
The following truth table shows the function of the AND gate.

A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

In order to obtain the output 1, both inputs should be 1 in an AND gate.

OR gate

- OR also needs two inputs.
- OR needs one input to be ON for it to spit out ON.
- It is also ON when both inputs are ON.
- It is OFF when both inputs are OFF.



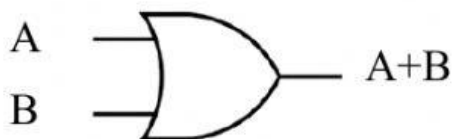
OR gate Truth Table

		Input 1	
		0	1
Input 2	0	0	1
	1	1	1
		Output	

The standard symbol of the OR Gate.



When A and B are inputs.



The illustration above shows OR Gate as it appears on circuits. When A and B are inputs, output of OR gate is $A+B$. Truth table related to OR Gate is as follows;

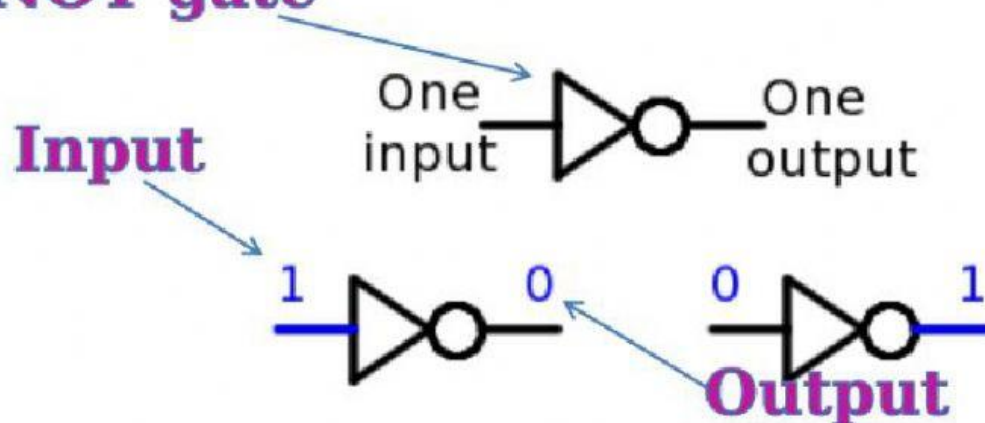
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

Output of OR Gate is state '1' when at least one input is in '1' state.

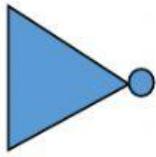
NOT gate

- NOT is the simplest logic gate.
- All it does is take in an input that is either ON or OFF and spits out the opposite.
- So for a 1 it will give a 0, and for a 0 it will give a 1.
- Another name for a NOT gate is inverter, because it inverts (makes opposite) the input.

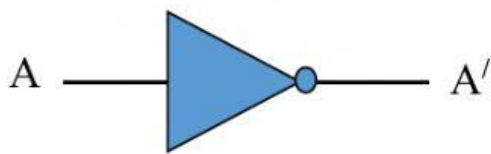
NOT gate



The symbol of NOT gate is as follows;



When A is its input.



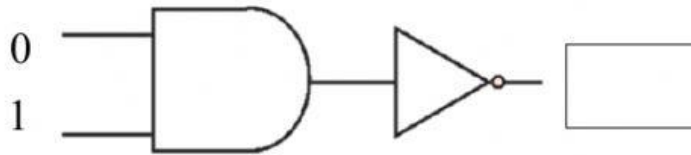
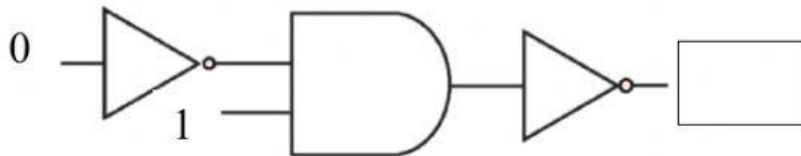
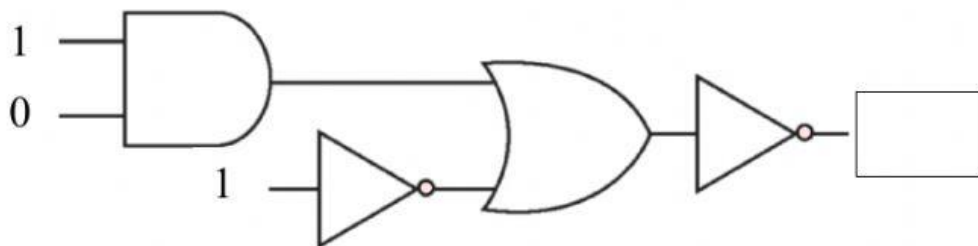
The above illustration shows a NOT gate in an electric circuit with A' as input and A as output. The equivalent truth table is as follows;

A	A'
0	1
1	0

A particular voltage is shown by state 1 and another voltage is shown by state '0'.

Activity

In the circuits given below, write the output for the given input.



1

1

0