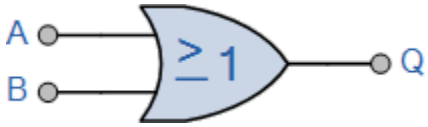


Logic OR Gate Tutorial

The Logic OR Gate is a type of digital logic circuit whose output goes HIGH to a logic level 1 only when one or more of its inputs are HIGH

The output, Q of a "Logic OR Gate" only returns "LOW" again when **ALL** of its inputs are at a logic level "0". In other words for a logic OR gate, any "HIGH" input will give a "HIGH", logic level "1" output.

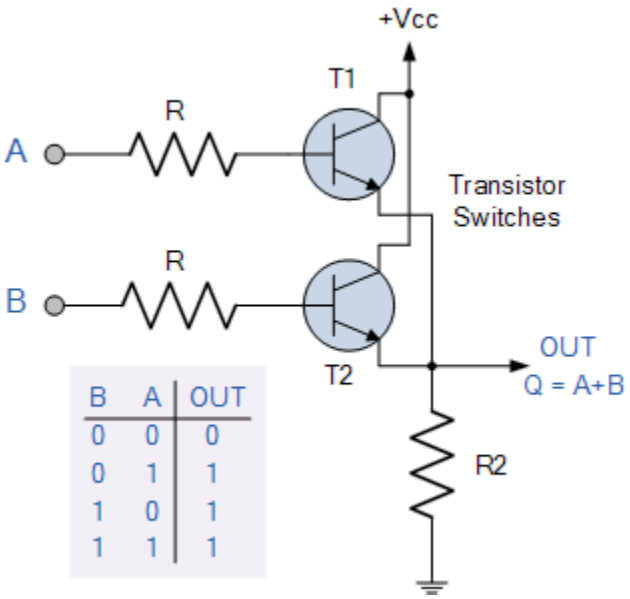
The logic or Boolean expression given for a digital logic OR gate is that for *Logical Addition* which is denoted by a plus sign, (+) giving us the Boolean expression of: A+B = Q.

Thus a logic OR gate can be correctly described as an "Inclusive OR gate" because the output is true when both of its inputs are true (HIGH). Then we can define the operation of a 2-input logic OR gate as being:

"If either A or B is true, then Q is true"

2-input Transistor OR Gate

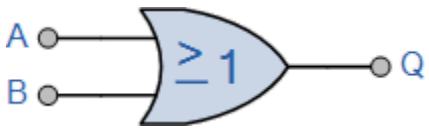
A simple 2-input inclusive OR gate can be constructed using RTL Resistor-transistor switches connected together as shown below with the inputs connected directly to the transistor bases. Either transistor must be saturated "ON" for an output at Q.



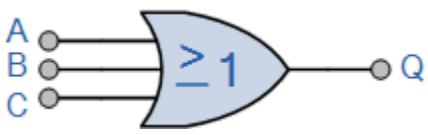
Logic OR Gates are available using digital circuits to produce the desired logical function and is given a symbol whose shape represents the logical operation of the OR gate.

Digital Logic "OR" Gate Types

The 2-input Logic OR Gate

Symbol	Truth Table		
 2-input OR Gate	B	A	Q
	0	0	0
	0	1	1
	1	0	1
	1	1	1
Boolean Expression **Q = A+B**	Read as A **OR** B gives Q		

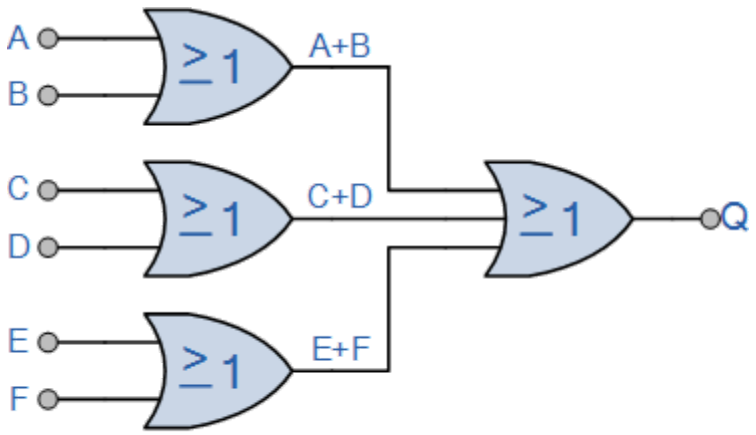
The 3-input Logic OR Gate

Symbol	Truth Table			
	C	B	A	Q
	0	0	0	0

3-input OR Gate	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
Boolean Expression **Q = A+B+C**	Read as A **OR** B **OR** C gives Q			

Like the AND gate, the OR function can have any number of individual inputs. However, commercial available OR gates are available in 2, 3, or 4 inputs types. Additional inputs will require gates to be cascaded together for example.

Multi-input OR Gate



6-input "OR" Function

The Boolean Expression for this 6-input OR gate will therefore be:

Q = (A+B)+(C+D)+(E+F)

In other words:

A OR B OR C OR D OR E OR F gives Q

If the number of inputs required is an odd number of inputs any "unused" inputs can be held LOW by connecting them directly to ground using suitable "Pull-down" resistors.

Commonly available digital logic OR gate IC's include:

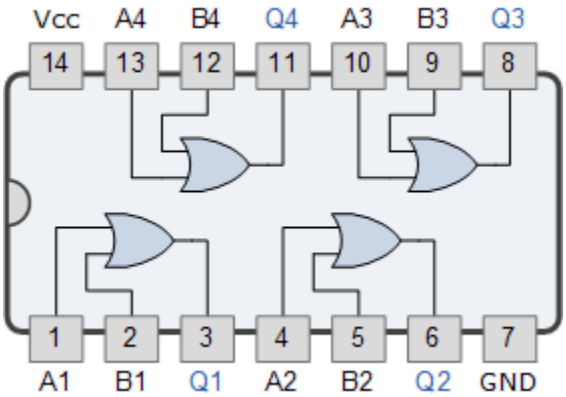
TTL Logic OR Gates

74LS32 Quad 2-input

CMOS Logic OR Gates

CD4071 Quad 2-input
CD4075 Triple 3-input
CD4072 Dual 4-input

7432 Quad 2-input Logic OR Gate



In the next tutorial about **Digital Logic Gates**, we will look at the digital logic NOT Gate function as used in both TTL and CMOS logic circuits as well as its Boolean Algebra definition and truth table.

31 Comments

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Email Address

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A Asrar

Give Procedures of
1) OR-gate using IC-7432
2) AND-gate using IC-7408
3) NOT-gate using IC-7404
Note : please give me procedures of these experiments

Posted on October 04th 2018 | 4:08 pm

Reply

V Vineet barfa

Give Components detail of or gate

Posted on September 29th 2018 | 4:37 am

Reply

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a abhishek

I need 4 input truth table or and not not nand ,nor exor exnor

Posted on September 28th 2018 | 10:07 am

Reply

---

a

abdirahmn abdulahi

i need formula OR send me e-mail thanks

Posted on August 23rd 2018 | 5:00 am

Reply

W

Wayne Storr

Read the tutorial

Posted on August 23rd 2018 | 6:18 am

Reply

R

Ravi

Hello sir i m in doubt of 1+1=10 in binary operation of OR gate so carry is 1 and sum is 0 then 1+1=1 how it is possible.

Posted on August 12th 2018 | 12:40 pm

Reply

B

Bryan StMartin

Ravi, binary is 1,s and zeros. 0 represents zero voltage or “NOT”. 1 represents circuit voltage level, or “TRUE”. The far right digit is the least significant bit. The far left would be most significant bit. So, take an eight bit “Byte” 00000000 = Zero. Toggle one clock pulse and you have 00000001, one more and you have 00000010, or two. Toggle once again and you have 00000011, or three, once more and you have 00000100, or 4. It’s binary or Base 2 that was taught in grade school. But since the machine can only understand high/low, true /false, this is the way we communicate with it.

Posted on September 01st 2018 | 9:14 pm

Reply

g

gamal mandour

asking for OR logic gate with high output power.

Posted on March 08th 2018 | 12:59 pm

Reply

---

a

abdullahiabubakar

(a+b)=×(b+c)=what

Posted on March 03rd 2018 | 1:03 pm

Reply

Mr lynx

Nice work

Posted on December 17th 2017 | 2:42 am

Reply

Abasido

What are the four input of an OR gate,thanks to you for your response.

Posted on December 14th 2017 | 12:34 pm

Reply

M

Martin Wator

Send me some information about dhgates

Posted on December 04th 2017 | 3:06 pm

Reply

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