بسم الله الرحمن الرحيم

جامعة الموصل – كلية علوم الحاسوب والرياضيات
قسم الامن السيبراني

CIRCUTE DESIGN

المحاضرة الثانية
Logic Gates

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OR Gate

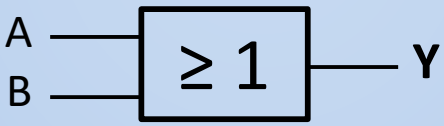
- An Or gate can have two or more inputs and one output.
- It performs what is known as LOGICAL ADDITION.
- It produces a HIGH on the output when any of the inputs is HIGH .
- The output is LOW only when all of th inputs are LOW .

Two inputs OR Gate

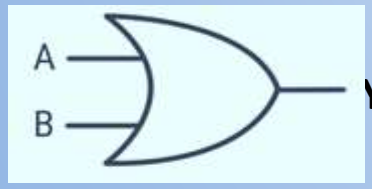
If two inputs **A** and **B** are combined using the OR operation, the result can be represented as Y=A+B.

The output equation or output expression:

Y=A+B



The Logic symbol of Two inputs OR Gate



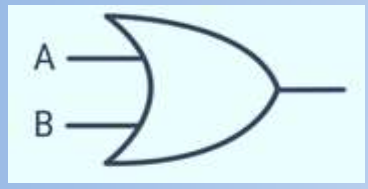
The truth table of two inputs OR gate:

A	B	Y=A.B
0	0	0
0	1	1
1	0	1
1	1	1

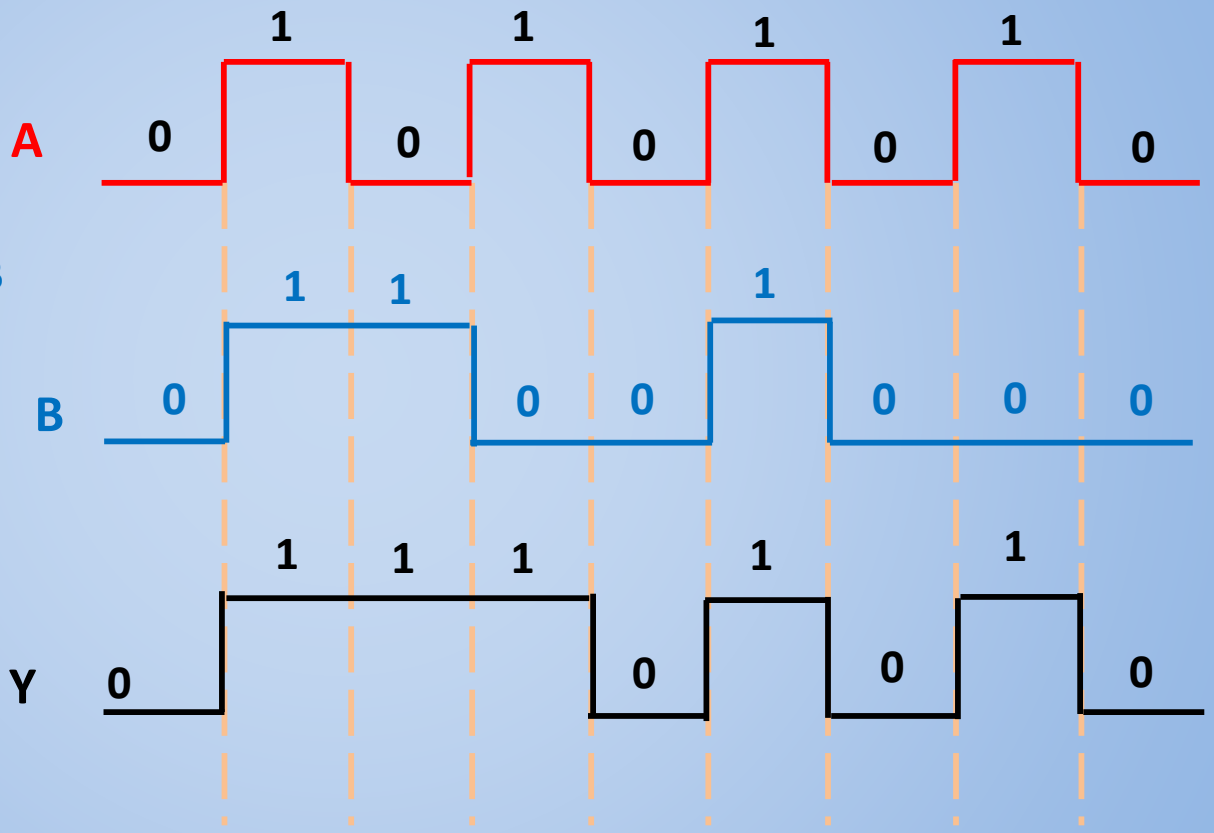
OR Gate

Example:

Determine the output y from the OR gate for the given input waveforms shown below.



Y=A+B

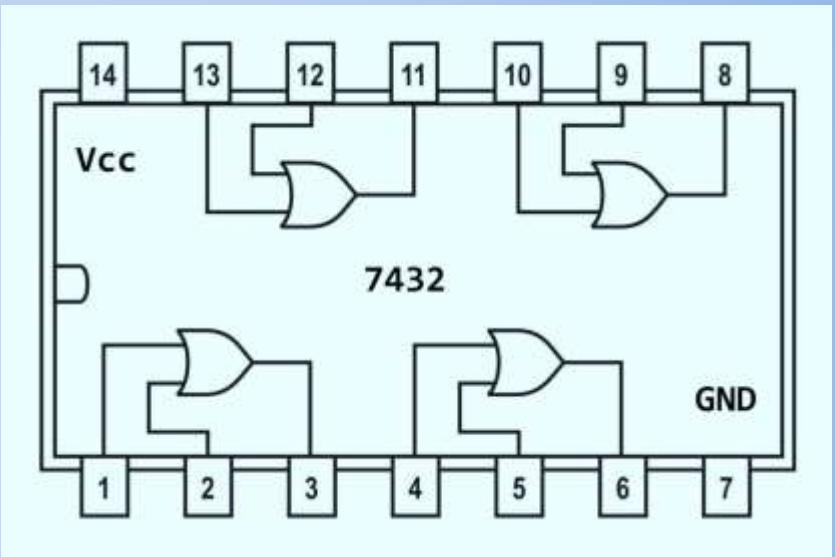


OR Gate

Standard Package:

The pin diagram of the chip (IC 7432), a TTL quad-2 input OR gate is shown below, this IC contains (Four 2-input OR gate) and it is (14-pin dual-line package).

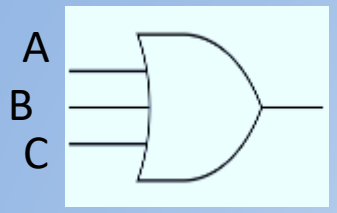
The TTL quad-2 input OR gate (7432)



The pin diagram of the chip (IC 7432)

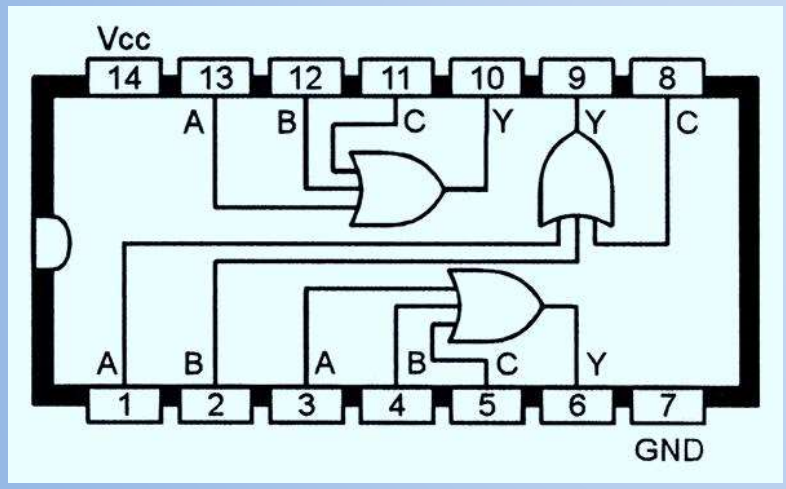
OR Gate

Three inputs OR gate:



Y=A+B+C

The output equation: Y=A+B+C



The pin diagram of the 3-inputs OR gate

The truth table of three inputs OR gate:

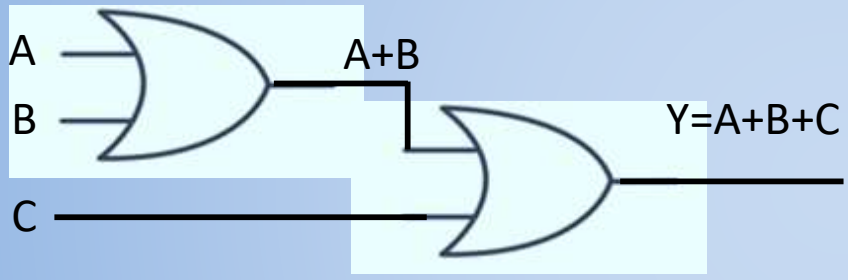
INPUTS			OUTPUT
A	B	C	Y=A+B+C
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

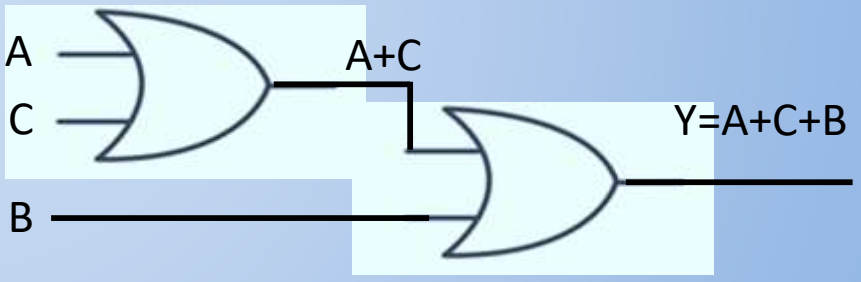
OR Gate

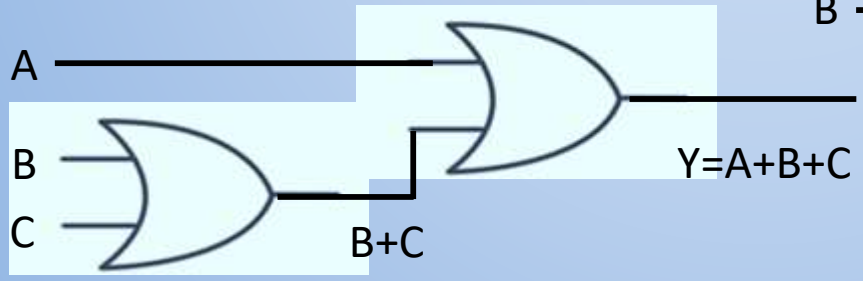
Build a 3-inputs OR gates using TWO 2-inputs OR gates only?

We can use two (2-inputs or gates) to perform three inputs OR operation.

Since A+B=B+A then The output equation can be written as : Y=A+B+C.
Y=(A+B)+C or Y=A+(B+C) or Y=(A+C)+B

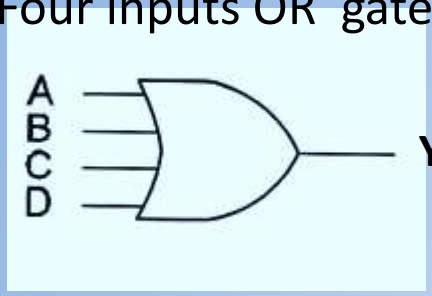




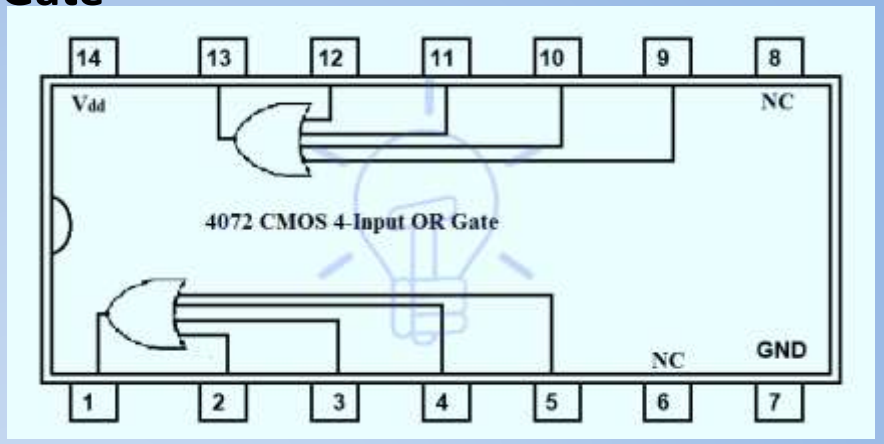


OR Gate

Four inputs OR gate:



Y=A+B+C+D

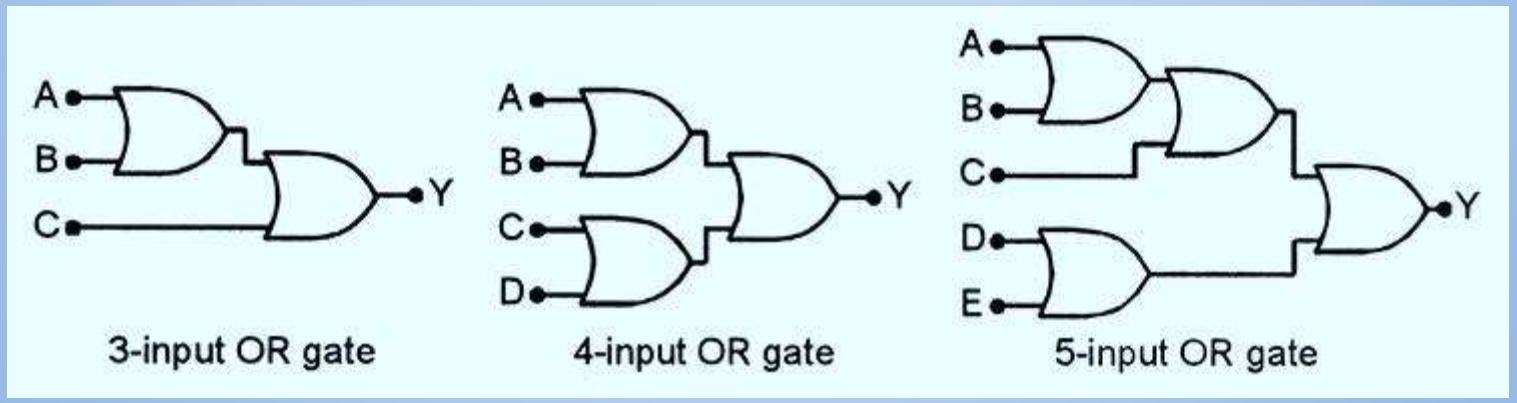


Dual 4-Input OR Gates

H.W:

Write the truth table and the output equation of the 4-inputsn OR gate?

N inputs OR gate:



OR Gate

Conclusion:

1- The OR operation produces a result of “1” when any of the input variable is “1”.

2- The OR operation produces a result of “0” only when all the input variables are “0”.

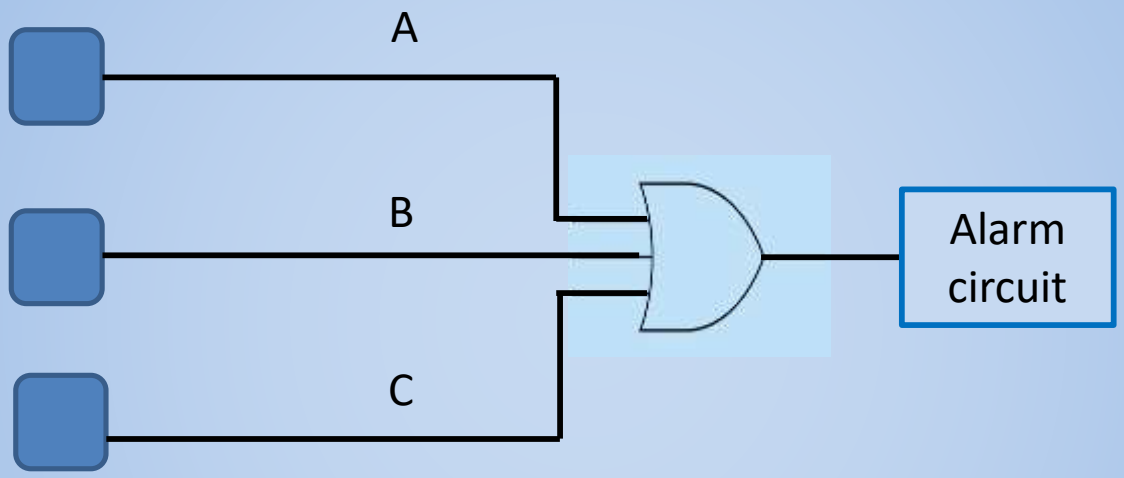
3- With OR operation 1+1=1, 1+1+1+1 ….=1.

Application Example:

A simple portion of an intrusion detection and alarm system is shown below, this system could be used for one room in a home, a room with two windows and one door. The sensor are magnetic switches that produce a HIGH output when open and a LOW output when closed. As long as the windows and the door are secured, the switches are closed and all three of the OR gate inputs are **LOW**. When one of the windows or the door is opened, a **HIGH** is produced on that input to OR gate, and the gate output goes to **HIGH**, it then activates an alarm circuit to warn of the intrusion.

OR Gate

HIGH = open
LOW = closed



Open door / window sensors

Thank you