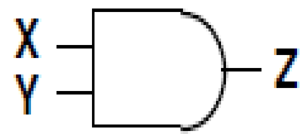
Logic gates

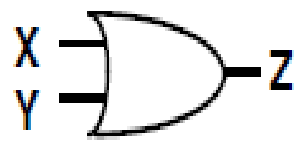
Logic gates and truth tables

- AND $X \bullet Y$ XY



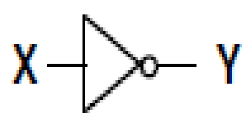
X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	1

- OR $X+Y$



X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	1

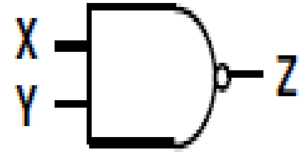
- NOT $\overline{X}$ X'



X	Y
0	1
1	0

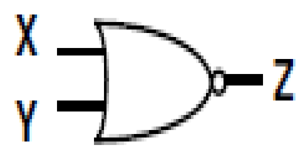
Logic gates and truth tables (con't)

- NAND $\overline{X \bullet Y}$ $\overline{XY}$



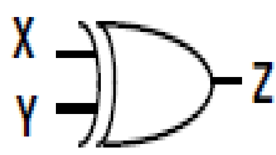
X	Y	Z
0	0	1
0	1	1
1	0	1
1	1	0

- NOR $\overline{X + Y}$



X	Y	Z
0	0	1
0	1	0
1	0	0
1	1	0

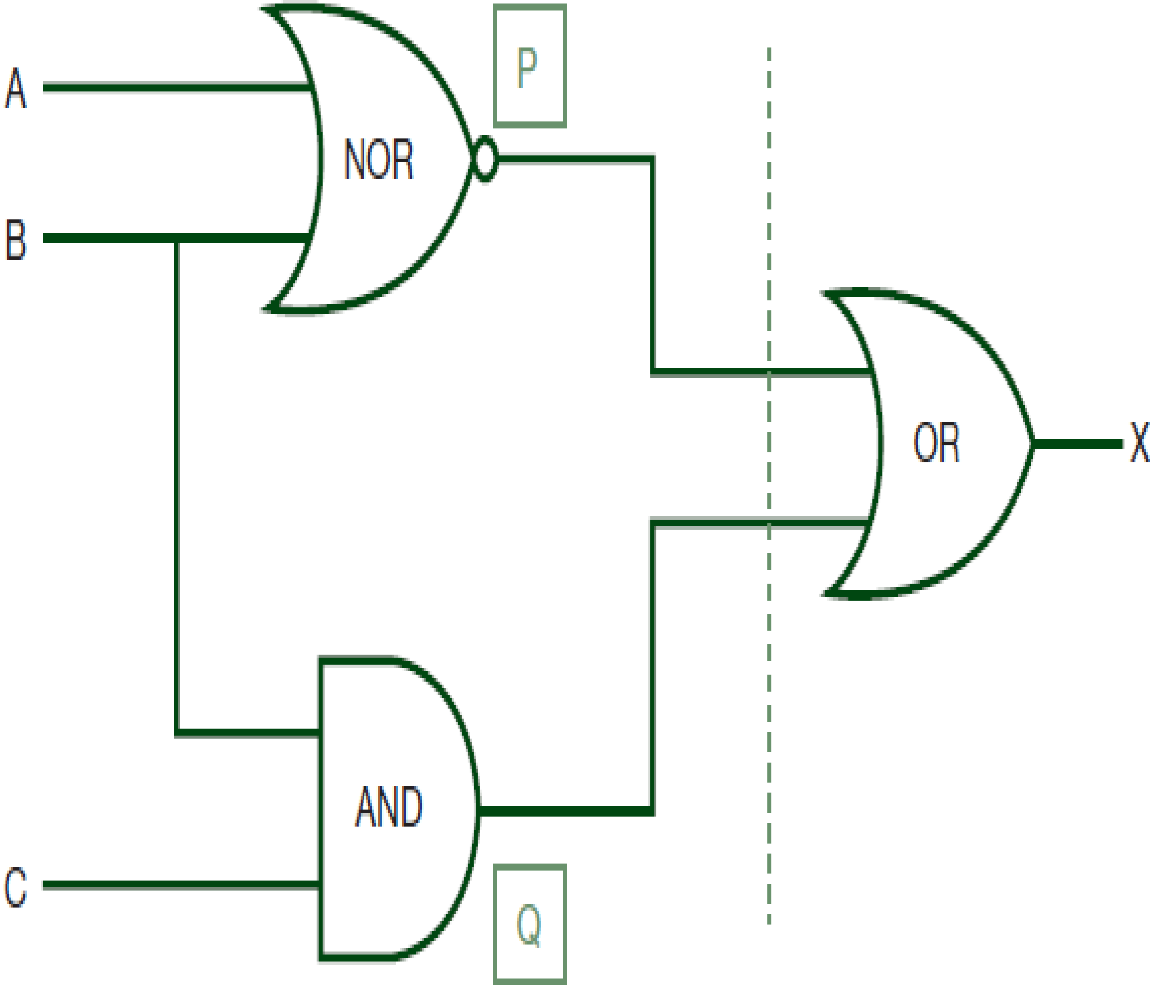
- XOR $X \oplus Y$



X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

Example 1

Produce a truth table from the following logic circuit (network).



To show how this works, we will split the logic circuit into two parts (shown by the dotted line).

We thus get:

INPUT A	INPUT B	INPUT C	OUTPUT P	OUTPUT Q
0	0	0	1	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	0	1

INPUT P	INPUT Q	OUTPUT X
1	0	1
1	0	1
0	0	0
0	1	1
0	0	0
0	0	0
0	0	0
0	1	1

Examples:

Draw construct logic circuit and construct truth table

1- $\overline{(A+B)}$ +AB

2- A+BC+$\overline{D}$

3- (A+B)C

4- AB+$\overline{AC}$

5- $\overline{(\bar{A}+B)}$(C+D) $\bar{C}$