Knowledge Organiser: Data representation—Binary and logic gates

Binary vs Decimal

0	=	0
1	=	1
2	=	10
3	=	11
4	=	100
5	=	101
6	=	110
7	=	111
8	=	1000
9	=	1001
10	=	1010
11	=	1011
12	=	1100
13	=	1101
14	=	1110
15	=	1111

Converting between number bases using binary

Binary to decimal

The binary system is base two and has just two symbols, 0 and 1. The first eight binary place values are:

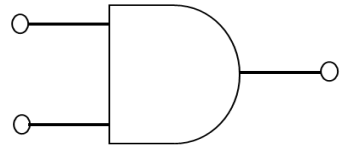
128	64	32	16	8	4	2	1

To convert binary to decimal, simply take each place value that has a 1, and add them together.

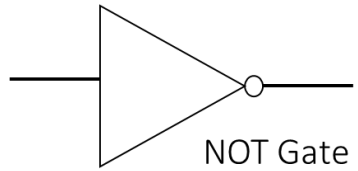
Example - binary number 1111100

128	64	32	16	8	4	2	1
0	1	1	1	1	1	0	0

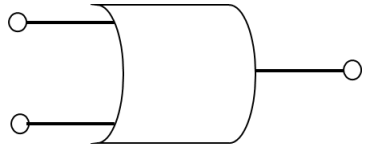
Logic gates



AND Gate



NOT Gate



OR Gate

Binary addition: Remember the four magic rules

1) Put the binary numbers in columns

2) **Start** from the right, **add** the numbers in each column together using the rules below

3)

0 + 0 = 0	1 + 1 = 1 0
1 + 0 = 1	1 + 1 + 1 = 11

4) You can check that you have the **correct answer** by converting everything into decimal together.

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  0 1
+ 1 0 1
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  1 1 0
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  1
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