

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:

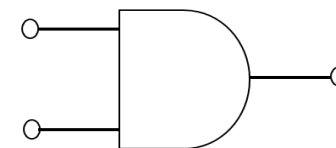
128	64	32	16	8	4	2	1
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To convert binary to decimal **!**, simply take each place value that has a 1, and add them together.

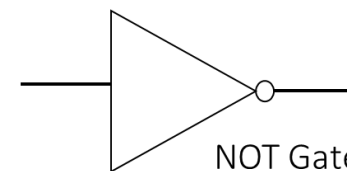
Example - binary number 1111100

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

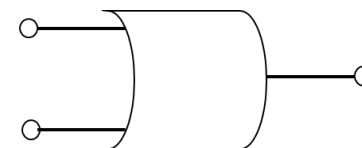
Logic gates



AND Gate



NOT Gate



OR Gate

Binary addition: Remember the four magic rules

- Put the binary numbers in columns
- Start** from the right, **add** the numbers in each column together using the rules below

3)

$$0 + 0 = 0$$

$$1 + 1 = 10$$

$$1 + 0 = 1$$

$$1 + 1 + 1 = 11$$

$$\begin{array}{r}
 01 \\
 + 101 \\
 \hline
 110 \\
 \hline
 1
 \end{array}$$

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