

Computers talk using only 0s and 1s

Computers **only** use 0's and 1's. They do math with only 0's and 1's. They communicate to other computers using only 0's and 1's. Everything on a computer is done only using 0's and 1's.

This is called binary. Binary is hard for humans to read, so humans convert **BINARY** to something called **HEX**.

$$\begin{array}{ccc} 001010101111010111010001000011100010 & = & 3af5d10e2 \\ \text{Binary} & & \text{Hex} \end{array}$$

HEX is just a system that converts 0's and 1's that computer use into a (slightly) more human readable form.

Binary

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f

Hex

to convert binary to hex, you group together 4 binary digits, then use the conversion table above to find what Hex representation it is.

$$\begin{array}{cccccc} \underbrace{0110} & \underbrace{0101} & \underbrace{1110} & \underbrace{1111} & \underbrace{0101} & \underbrace{1110} \\ \mathbf{6} & \mathbf{5} & \mathbf{e} & \mathbf{f} & \mathbf{5} & \mathbf{e} \end{array}$$

Your turn! Convert the following Binary to Hex:

1. 0000 0010 1101 0101 = **02d5**
2. 0110 1110 0001 1111 = **6e1f**
3. 0101 1100 1111 0000 = _____
4. 1101 0011 1101 1000 = _____
5. 0111 1101 1001 1010 = _____
6. 0111 0000 0111 0110 = _____
7. 0100 1000 1110 1001 = _____
8. 0001 1101 1110 0010 = _____

Solutions

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0010101011110101110100001000011100010 = 3af5d10e2
Binary

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Binary

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f

Hex

to convert binary to hex, you group together 4 binary digits, then use the conversion table above to find what Hex representation it is.

$\overbrace{0110} \quad \overbrace{0101} \quad \overbrace{1110} \quad \overbrace{1111} \quad \overbrace{0101} \quad \overbrace{1110}$
6 5 e f 5 e

Your turn! Convert the following Binary to Hex:

1. 0000 0010 1101 0101 = **02d5**

2. 0110 1110 0001 1111 = **6elf**

3. 0101 1100 1111 0000 = **5cf0**

4. 1101 0011 1101 1000 = **d3d8**

5. 0111 1101 1001 1010 = **7d9a**

6. 0111 0000 0111 0110 = **7076**

7. 0100 1000 1110 1001 = **48e9**

8. 0001 1101 1110 0010 = **1de2**