

Number Systems (Binary, Decimal and Hexadecimal)

Binary

All computers work with data in binary, a stream of 0's and 1's.
But they may display this data to the user in and number of formats.

Column 1 (right hand) is worth 1
Column 2 is worth 2
Column 3 is worth 4
Column 4 is worth 8

All the way to Column 8 this is worth 255.

For example

13 is converted to binary. So it uses 1,2,4,8 but cannot use 16 as this is to much.

8	4	2	1
1	1	0	1

As you go along take away the figure

Answer is 00001101

	256	128	64	32	16	8	4	2	1
17	0	0	0	0	1	0	0	0	1
26	0	0	0	0	1	1	0	1	0
92	0	0	1	0	1	1	1	0	0
68	0	0	1	0	0	0	1	0	0
125	0	0	1	1	1	1	1	0	1

Answers:

000010001
000011010
001011100
001000100
001111101

Hexadecimal

Hex uses 16 different values: 0-9, just as in decimal and then A-F for the decimal numbers 10 through to 15.

I.E A=10
 B=11
 C=12
 D=13
 E=14
 F=15

- It is used to abbreviate binary values to make them shorter and so easier for us mortals to work with.
- Once upon a time computer programs were written by programmers entering hex code.
- Many program errors messages display the results as hex.

Converting Hex to Binary

- Swap each hex character for four bits.
- You may want to use a decimal as an intermediate stage.

B7 can be treated separately as B and 7.

B is 11.

8	4	2	1
1	0	1	1

And now the 7

8	4	2	1
0	1	1	1

That makes 10110111

This is then worked out:

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

Which =183

TCP/IP

Later in the network parts of the course you will learn about a language that computers on a network talk called TCP/IP.

Every computer has an IP address and this is a 32 bit (binary digit) number.

Understanding how binary and decimal relate to each other will make TCP/IP understanding easier.