



Binary

What are binary digits?

Binary digits are known as bits. There are a base-2 number system and are represented by 0 and 1. They are the smallest unit of measurement for data representation.

What is a byte?

A byte consists of 8 bits. In computing, it is very common to group binary digits into chunks of eight. For example:

16 bits / 8 = 2 bytes

16b = 2B

Binary sequences

All information is represented in sequences of binary digits. This includes: Numbers, Text, Sound, Images, Video, Animation

Units

Prefix	Symbol	Meaning
Kilo	K	Thousands
Mega	M	Millions
Giga	G	Billions
Tera	T	Trillions

Converting between units:

8 bits = 1 B (byte)

1000 B = 1 KB (kilobyte)

1000 KB = 1 MB (megabyte)

1000 MB = 1 GB (gigabyte)

1000 GB = 1 TB (terabyte)

Representation:

Just as letters in the alphabet can be used to represent words, sequences of binary digits are also used to represent information in digital systems

Binary numbers

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

In denary (decimal), we use a base-10 number system, so we have ones, tens, hundreds, thousands, etc. Binary is base-2, so the weighting is x2 instead of x10.

The binary number above would be worked out as a denary number by seeing which weightings have been "switched on" (have a 1).

So we only add up the numbers that have a 1.

In this case:

$64 + 4 + 2 = 70$

Therefore, 0100 0110 in binary is 70 in denary.

Converting from Binary to Denary

Converting from binary to denary:

Denary number: 19

Binary number: 010011

To work out the denary number from the binary, begin by looking at the binary weightings. What is the largest binary weighting that goes into 19? 32 is larger than 19, so we can't use 32. So we have to move on to 16. 16 fits, so we can use it. $19 - 16 = 3$, which means we now need to make 3 from the remaining binary digits. 8 and 4 do not fit into 3, so we use 2. This leaves 1, so we then use 1, and have the binary number 010011

32	16	8	4	2	1
0	1	0	0	1	1

Important Vocabulary

Binary

Digits

Denary

Bits

Bytes

Sequences

Kilo

Mega

Giga

Tera