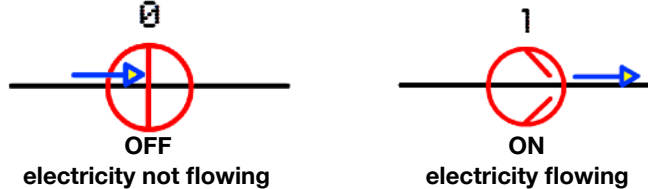


Encoding Data

For computers to process, store and send data, information or instructions, they must be converted to binary so that the computer can understand it.

The Processor

The processor of a computer is made up of logic gates that either allow electricity to flow through them or they don't. There are only these two possibilities.



When there are only two possibilities then we call this **binary**.

All data must be encoded as binary to be processed by a computer.

The more complicated the data, such as text, pictures and sound, the more Binary Digits (**bits**) are needed to store the data, and the larger the file size.

Units of Measurement		Text	Music on iTunes	HD Movies on Netflix
1 bit	A Binary Digit	-	-	-
1 byte	8 bits	1 single letter	-	-
1 kilobyte	1024 bytes	1 paragraph	-	-
1 megabyte	1024 kilobytes	500 pages	30 seconds	1.2 seconds
1 gigabyte	1024 megabytes	1,700 books	115 songs	20 minutes
1 terabyte	1024 gigabytes	1,745,256 books	116,508 songs	129 films

Converting Decimal numbers to Binary

To encode Decimal (Base 10) numbers to Binary we convert them to Base 2.

128	64	32	16	8	4	2	1		Calculation		Decimal Value
0	0	0	0	0	1	0	1	=	4 + 1	=	5
0	1	0	1	0	1	0	1	=	64 + 16 + 4 + 1	=	85

American Standard Code for Information Interchange

A method of encoding text as binary.

Each character (including spaces and punctuation) is given a number between 0 and 255, this is converted to binary. Each character takes up 8 bits (1 byte).

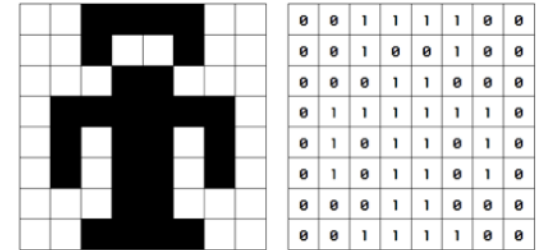
Character	ASCII Value		128	64	32	16	8	4	2	1
D	68	=	0	1	0	0	0	1	0	0
d	100	=	0	1	1	0	0	1	0	0

Raster Graphics

Often called a **bitmap** image.

By creating a grid of pixels we can create a black and white picture using pixels.

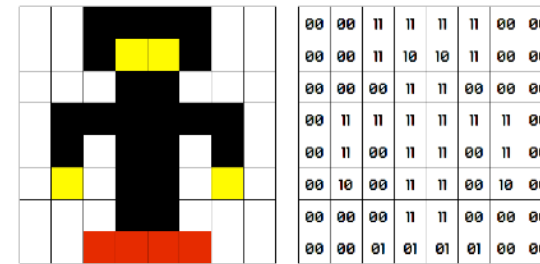
By recording all the black pixels as 1s and all the white pixels as 0s we can store an image as binary.



Colour Depth

The number of bits used to store the colour of each pixel.

The more bits per pixel increase the number of **possible** colours, but also increases the file size.

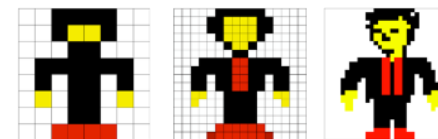


- 1 bit = 2 colours
- 2 bits = 4 colours
- 3 bits = 8 colours
- 4 bits = 16 colours
- 5 bits = 32 colours
- 6 bits = 64 colours
- 7 bits = 128 colours
- 1 **byte** = 256 colours

Resolution

The resolution of an image is measured in Pixels Per Inch (PPI)

The higher the PPI, the better quality the image but the image will take up more memory.



Key Word	Definition
Binary	A term meaning that there are 2 possible states (e.g. OFF or ON). Also refers to the Base 2 counting system. Counts using two numerals (0 to 1).
Decimal	The Base 10 counting system. Counts using 10 numerals (0 to 9).
File Size	The amount of memory a file takes up when saved.
Pixel	Picture Element. An individual block of colour that makes up a raster image. The colour of each pixel is saved as a binary value.