

2.6 DATA REPRESENTATION CONTINUED

IMAGES

Images are made up of pixels
The colour of each pixel is represented by a binary number
If an image uses 1 bit to represent each colour then it will only have 2 colours:

0	0	1	0	0
0	0	0	1	0
1	1	1	1	1
0	0	0	1	0
0	0	1	0	0

0	0	1	0	0
0	0	0	1	0
1	1	1	1	1
0	0	0	1	0
0	0	1	0	0

This is a 1-bit image
so it uses 2 colours.

0=white and 1=black

Using more bits allows for more colour options:

10	11	00	11	10
11	11	00	11	11
00	00	01	00	00
11	11	00	11	11
10	11	00	11	10

10	11	00	11	10
11	11	00	11	11
00	00	01	00	00
11	11	00	11	11
10	11	00	11	10

This is a 2-bit
images so it uses
4 colours.

00=white,
01=blue, 10=red,
11=black

Colour depth = the number of bits used for each pixel

Resolution = how many pixels are in a certain space – this is measured in “dots per inch”. If there are more dots per inch then there are more pixels in the image so it will have a higher resolution and a better picture quality.

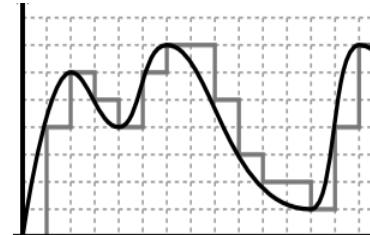
The higher the resolution or the colour depth, the more bits used, so the bigger the file size.

Metadata = the information about the image file that is stored within it. This makes sure the file is displayed correctly. It can include: the height, width, colour depth, resolution and file format as well as the time and date that the image was created.

SOUND

When sound is recorded it is an analogue signal (waves). It has to be converted to a digital signal so that it can be stored by a computer. This is done by sampling

Sampling: The amplitude of the wave is measured at regular intervals which creates a digital representation of the wave. If samples are taken more frequently then you will end up with a more accurate sound file but it will be a larger file size.



The analogue wave is smoother and shows continuous data. The digital sampling shows the amplitude of the wave at different points.

COMPRESSION

Compression is used to make file sizes smaller. Smaller file sizes means that data will be faster to send, quicker to download (so webpages will load faster) and it will take up less storage space.

Lossy Compression: permanently removes some of the data from a file to make the file size smaller. The file – eg: an image or sound track – will be a lower quality than the original.

Lossless Compression: data is temporarily removed from the file and then put back together when it is opened. This is good for program files or documents where you do not want to lose any content but the files can only be made a little bit smaller.