Data Knowledge Organiser

Binary	Decimal	Hex
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F

Binary Place Table

Denary number	128	64	32	16	8	4	2	1
10	0	0	0	0	1	0	1	0

Binary Addition Rules

Rules

0 + 0 = 0

0	+
0	
=0	

0 + 1 = 1

0	+
1	
=1	

1 + 1 = 10

1	+
1	
=10	

1 + 1 + 1 = 11

1	+
1	
=11	

LEFT SHIFT

SHIFTS Each number left a certain amount of spaces

	128	64	32	16	8	4	2	1	
Original number = 1					0	0	0	1	
L shift 1 place = 2				0	0	0	1	0	x 2
L shift 2 place = 4			0	0	0	1	0	0	x 4

Binary	Numbers expressed in base 2.
Decimal (denary)	Numbers expressed in base 10.
Hexadecimal	Numbers expressed in base 16.
Overflow	An error caused by attempting to store a number that is too large for the number of bits available.

Sound

Sound is converted into a digital signal by a process called **sampling**.

Sampling is where hardware, such as a microphone, **measures the level of sound many times per second** and records this as binary digits.
The number of times that the sound level is sampled per second is called the ***sampling frequency***.
A typical sampling frequency is 44,000 times per second, also known as 44 kHz.

Bit depth: the number of bits available for each clip
The higher the bit depth the better the quality of sound

Characters

When characters are stored on a computer system, they are stored as a binary number..

ASCII is one example of a character set.
UNICODE - Is a character set that has more characters and can be used for many different languages

A = 0100 0001

Letter — Binary number

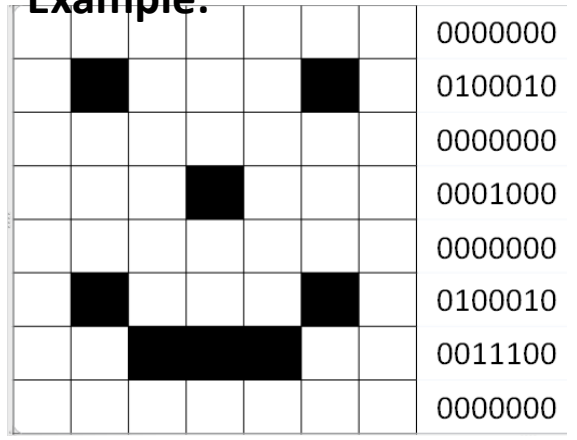
Images

In a **bitmap**, the image is divided into a grid of tiny parts, these are called **pixels**

Pixels are the smallest element in an image

The number of bits used to represent the colour or greyscale value of a pixel is called the **colour depth**.

Example:



Measurement Unit

4 Bits	1 Nibble
8 Bits	2 Nibble
1024 Byte	1 KB (Kilobyte)
1024 KB	1 MB (Megabyte)
1024 MB	1 GB (Gigabyte)
1024 GB	1 TB (Terabyte)
1024 TB	1 PB (Petabyte)

Must Know

You must:

- Be able to covert:
  - Denary to Binary e.g. 45 to binary
  - Binary to Denary e.g. 00100110 to Denary.
- Be able to add two binary numbers
  - E.g. 10010011 + 00110011
- Describe how a character is stored on a computer.
- Give a definition of a character set
- Explain one advantage of ASCII
- Explain one advantage of UNICODE

Should know

You Should:

- Be able to convert denary to Hexadecimal and vice versa.
- Calculate left and right shift of binary digits.
  - E.g. 00011100 left shift 2 places
  - E.g. 00011100 right shift 1 place
  - Explain what it does the number
- Explain why computers use binary to store data.
- Describe a bitmap image.
- Describe a pixel.
- Calculate the size of a 2 colour bitmap image.
- Give me 2 examples of metadata for an image or sound file

Top of the class

You Could:

- Be able to explain how sound is converted into a digital format.
- Explain how sample frequency and bit depth affect the sound quality.
- Calculate the size of an image that has many colours.
- Explain how resolution and colour depth affect the quality of an image.
- Explain the concept overflow of a binary number.
- Describe meta data and give examples