Year 9 Computer Science Audio Visual Representation Knowledge Organiser

Key Word	Definition
Digital image	An image composed of pixels and each pixel is assigned a tonal value (black, white, shades of grey, or colour).
Picture Element	The smallest item of information in an image.
Resolution	The number of pixels in a digital image.
Colour Depth	The (fixed) number of binary digits used to represent each pixel's colour.
Bitmap or Raster Images	Digital images that are formed using a binary representation of each pixel's colour.
Binary Image Representation	The way that the information about the image is coded and how the image is stored in binary.
Pixels	The elements of a digital image.
Representation Size	The number of bits required to represent the image/sound.
RGB Colour	Stands for "Red Green Blue." RGB refers to three hues of light that can be mixed together to create different colours.
Compression	A reduction in the number of bits needed to represent data.
Image Editing Functions	The tools that are used in photo manipulation software to make changes to pictures.
Sound	Vibrations that travel through the air.
Waves	A disturbance in a medium that carries energy without a net movement of particles.
Microphone	An input device used to digitise sound.
Speaker	An output device used to convert digital signals into sound waves.
Analogue	Using a continuously changing range of physical quantities to measure or store data.

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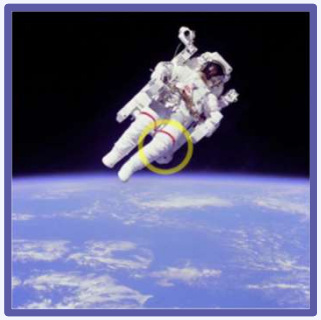
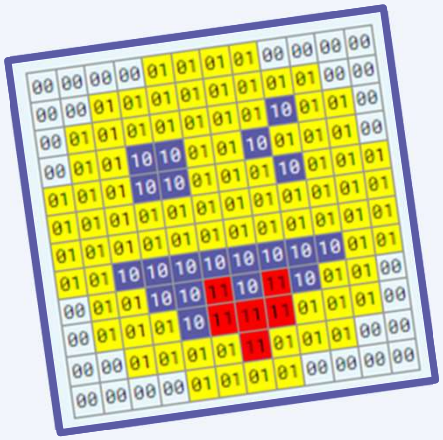
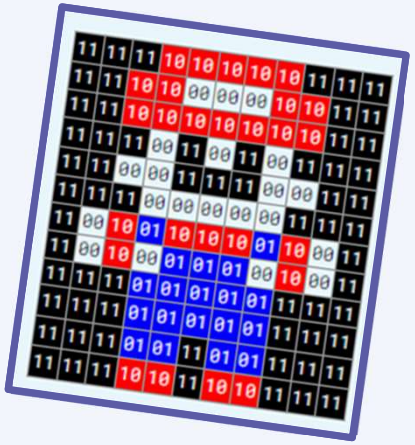
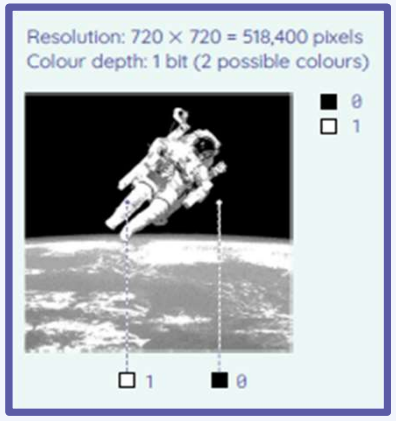
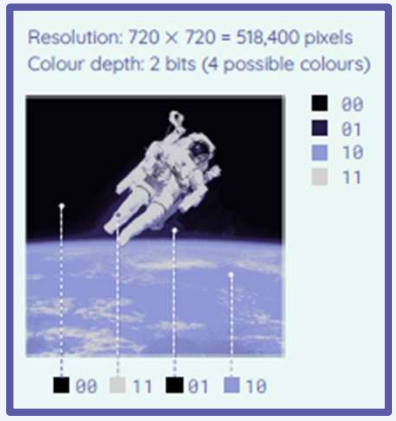
Digital	Data made up of the binary values 0 and 1.
Digitisation	The conversion of text, pictures, or sound into a digital form that can be processed by a computer.
Digital Sound Representation	A series of discrete numbers that represents the fluctuating voltage of the analogue signal.
Sampling Rate	The number of samples per second (or per other unit) taken from a continuous signal to make a discrete or digital signal.
Sample Size	The number of bits used to describe each sample.
Channels	The representation of sound coming from or going to a single point, such as the left and right headphones.
Trade-offs	A giving up of one thing in return for another.
Sound Editing	The process of manipulating sound recordings.
Symbolic Representation	An object that represents, stands for, or suggests an idea, belief, action, or material entity.
Vector Graphic	Computer images created using a sequence of commands or mathematical statements that place lines and shapes.
Compression	A technique that reduces file size.

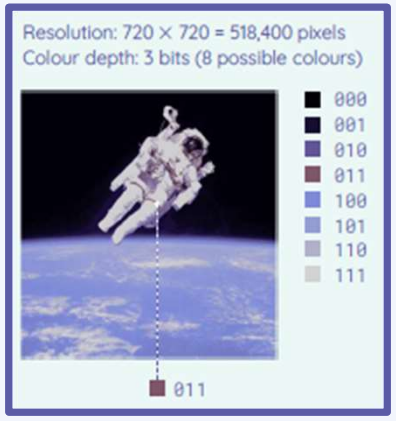


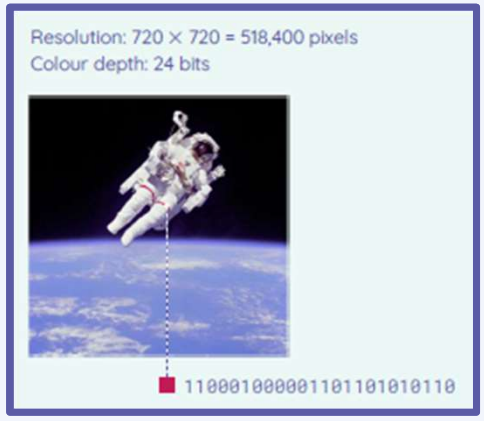


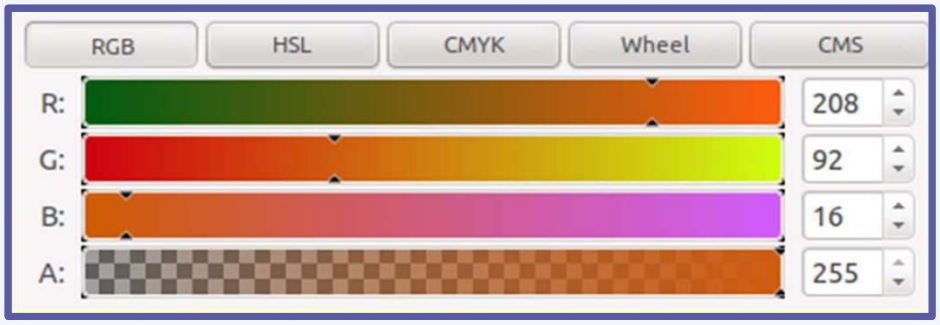










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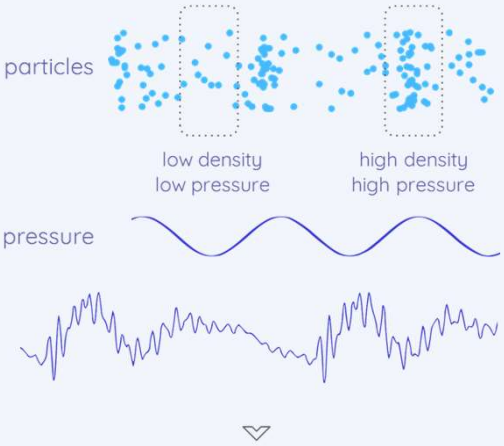
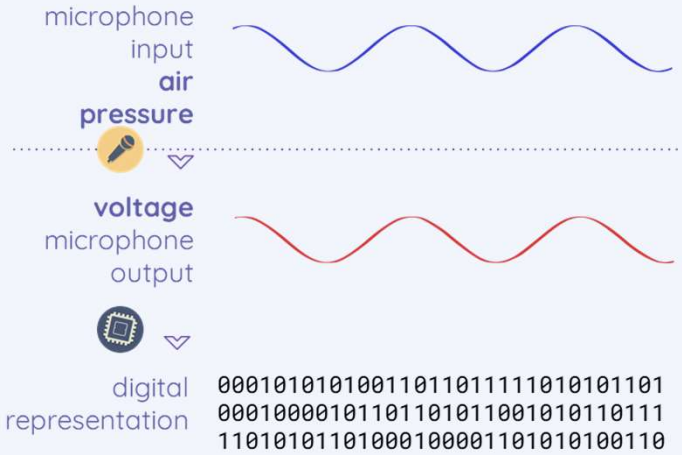
What is the representation size, in bits and bytes, of a bitmap image with a resolution of 800×600 and a colour depth of 24 bits.

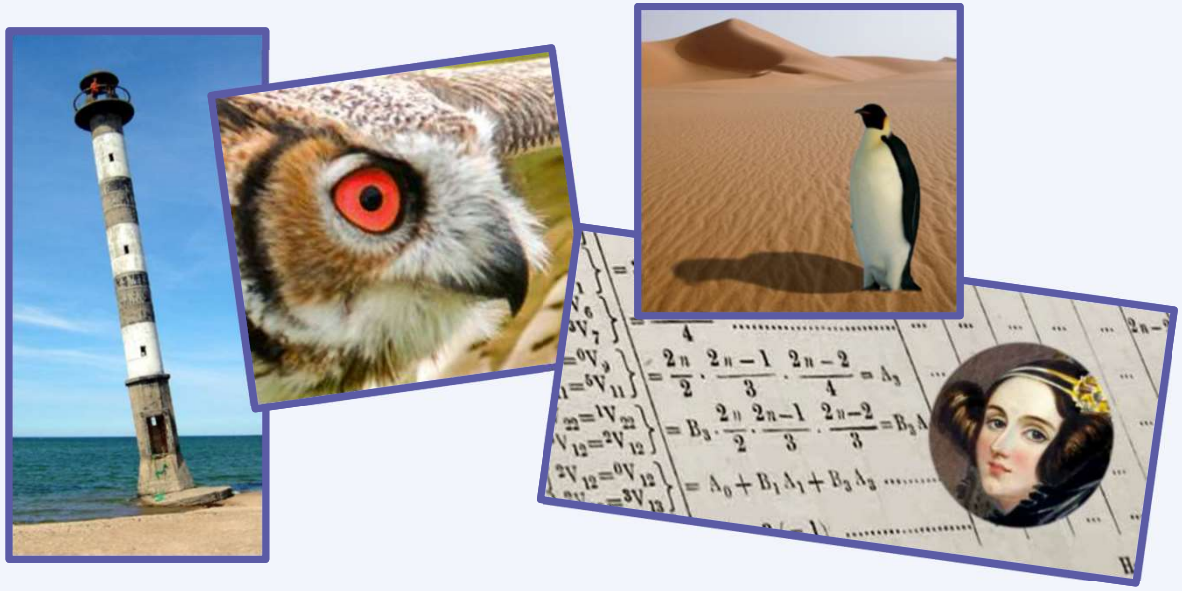
representation size	=	resolution	×	colour depth
	=	800 × 600 pixels	×	24 bits per pixel
	=	480,000 pixels	×	24 bits per pixel
	=	**11,520,000 bits** (or 11.5 megabits)		

You could convert bits to bytes by dividing by 8. You could also calculate the size in bytes directly, since 24 bits is 3 bytes:

representation size	=	resolution	×	colour depth
	=	480,000 pixels	×	3 bytes per pixel
	=	**1,440,000 bytes** (or 1.44 megabytes)		





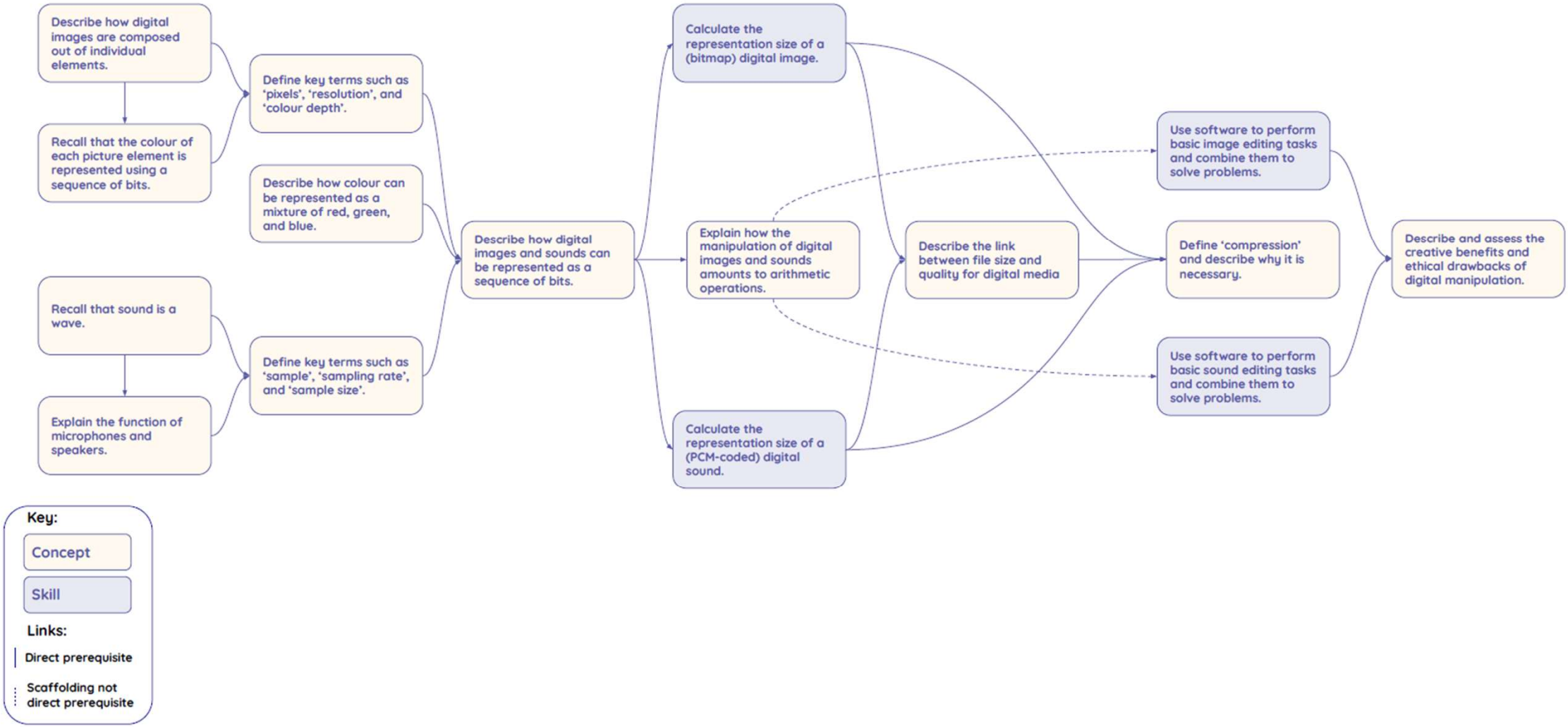


What is the representation size, in megabytes, of 1 minute of stereo sound (2 sound channels) with a sampling rate of 48,000 Hz (48,000 samples per second) and a sample size of 24 bits?

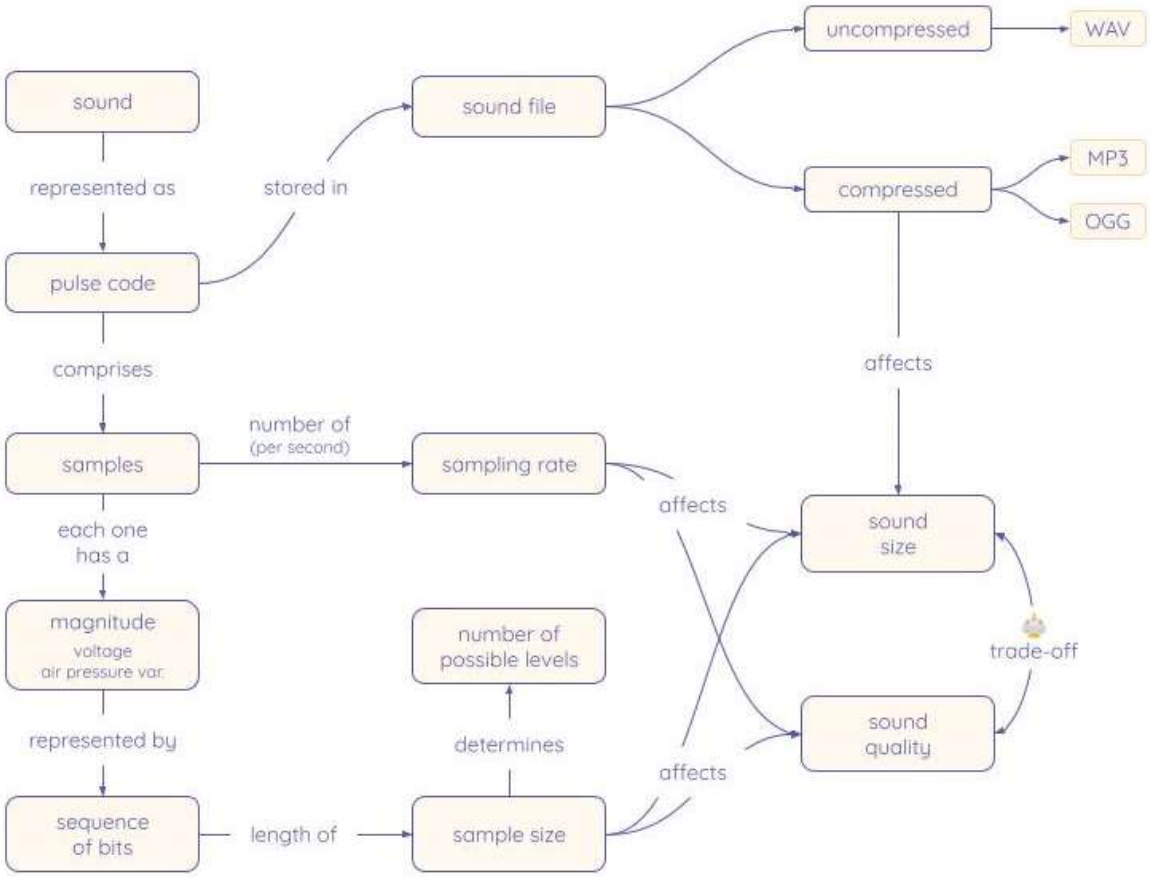
representation size	=	sampling rate	×	sample size	×	duration
	=	48,000 samples per second	×	24 bits per sample	×	60 seconds
	=	1,152,000 bits for each second			×	60 seconds
	=	144,000 bytes for each second			×	60 seconds
	=	8,640,000 bytes in total				
	=	8.6 megabytes (MB) in total				

There are 2 channels, so this result should be doubled, and the final answer is **17.2MB**.

Learning Graph



Concept Map


sound
represented as
pulse code
comprises
samples
each one has a
magnitude
voltage
air pressure var.
represented by
sequence of bits
length of
sample size
determines
number of possible levels
number of (per second)
sampling rate
stored in
sound file
uncompressed
WAV
compressed
MP3
OGG
affects
affects
affects
sound size
sound quality
trade-off