

8: Yr9 Computer Science: Data Rep Char_Image_Sound

Characters

Characters Set description:

ASCII: Bits= 7 Characters= 128

Extended ASCII: Bits= 8 Characters= 256

Unicode: Bits= 16 Characters= 65536

Character sets are tables of character and symbols stored inside the computer. Each character or symbol has a unique denary number and an associated binary value. The computer uses these binary values to process information entered via the keyboard. For example capital A id denary 65, which is binary 01000001.

Images

BPP (Colour Depth): The number of bits used per pixel to store colour information.

Resolution: The number of pixels (width * height) that make up the image.

How many Colours if using:

1 Bit = 2 colours

2 Bits = 4 colours

4 Bits = 16 colours

Metadata includes: additional information about the image stored, includes: date/time, GPS location, author (device used), and format (type of image structure)

Sound

How sound is stored:

Analogue sound waves are recorded by microphone, passed through an Analogue to Digital Converter (ADC), and stored as binary. Samples are used each time we record a part of the sound wave.

Resolution (Bit Rate): This is the number of bits used to record the sound wave amplitude every time a sample of the sound wave is taken. This is known as Bits Per Sample (BPS).

Sample Rate: This is the number of sound samples taken per second.

Image File Size Calculation: Resolution (Width * Height) * BPP / 8

e.g: 20 pixels by 30 pixels * 4 bpp = 2400 bits / 8 = 300 bytes

Sound File Size Calculation: Sample Rate * Duration * BPS / 8

e.g: 3 samples per second * 4 seconds * 6 bps = 72 bits / 8 = 9 bytes

Compression

Lossy vs Lossless:

Lossy Compression permanently removes data from a file, which is how compression takes place, the file size is smaller, and easier to transmit or store. When it is uncompressed the data is still missing, so the original quality is reduced. Lossless Compression, uses codes for repeating patterns in a file, meaning no data is permanently lost and the original quality is maintained.

Competencies I can...

State 3 character sets saying how many bits and characters each has

State what image BPP or Colour Depth means, with examples

Explain image Resolution and how it impacts image quality

State 4 items included in Metadata

Explain sound Resolution or Bit Rate

Explain how sound is recorded and stored

Explain the impact of sound quality when changing Bit Rate or Sample Rate

Calculate Image and Sound File sizes, using bytes

Differentiate between Lossy and Lossless Compression

