AQA Computer Science GCSE

3.3.8 Data Compression

Flashcards

What is data compression?

What is data compression?

Data compression is the process of reducing the file size of digital data without losing the original information (or with minimal acceptable loss).

Why is data compression used?

Why is data compression used?

To save storage space, speed up file transfer, reduce bandwidth usage, and enable faster downloads and streaming

What are the two main types of compression?

What are the two main types of compression?

Lossy and lossless

What is lossy compression?

What is lossy compression?

Compression that removes some data permanently, reducing file size more but lowering quality.

Give three examples of lossy compression formats.

Give three examples of lossy compression formats.

JPEG for Images, MP3 for audio, and MP4 for video

Is lossy compression reversible?

Is lossy compression reversible?

No - original data cannot be fully recovered.

What is lossless compression?

What is lossless compression?

Compression that preserves all data, allowing the original file to be perfectly reconstructed.

Give four examples of lossless compression formats.

Give examples of lossless compression formats.

Text files, code, PNG images, ZIP archives

What is a benefit of lossy compression?

What is a benefit of lossy compression?

Significantly file sizes for fast transmission.

What is a drawback of lossy compression?

What is a drawback of lossy compression?

Some quality is lost, and the file cannot be restored exactly.

What is a benefit of lossless compression?

What is a benefit of lossless compression?

No data is lost - original quality and content are fully preserved.

What is a drawback of lossless compression?

What is a drawback of lossless compression?

File sizes are larger than with lossy compression.

Which compression type is best for compressing text or code?

Which compression type is best for compressing text or code?

Lossless

Which compression type is better for streaming music or video?

Which compression type is better for streaming music or video?

Lossy

State two types of lossless compression

State two types of lossless compression

- Huffman coding
- Run Length Encoding (RLE)

Why do more frequent characters have shorter bit patterns in Huffman coding?

Why do more frequent characters have shorter bit patterns in Huffman coding?

More frequent characters are placed higher in the tree (closer to the root), requiring fewer steps to reach them, which makes the representation as compact as possible.

How do you calculate the number of bits required to represent data in ASCII?

How do you calculate the number of bits required to represent data in ASCII?

Multiply the number of characters by 7.

How do you calculate the number of bits required for Huffman coding?

How do you calculate the number of bits required for Huffman coding?

Multiply the length of each character's Huffman code by its frequency, then sum these products for all unique characters.

How do you calculate the number of bits saved by using Huffman coding instead of ASCII?

How do you calculate the number of bits saved by using Huffman coding instead of ASCII?

Subtract the number of bits in Huffman coding from the number of bits in ASCII.

What is run length encoding (RLE) and how does it work?

What is run length encoding (RLE) and how does it work?

RLE reduces file size by removing repeated information and replacing it with one occurrence of the repeated information followed by the number of times it is to be repeated.

How would Run Length Encoding (RLE) encode the sequence 0000011100000011?

How would Run Length Encoding (RLE) encode the sequence 0000011100000011?

5 0 3 1 6 0 2 1