



Compression

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The Need For Compression

What is compression?

- Compression is **reducing the size of a file** so that it **can be transmitted** or **stored in secondary storage**
- There are scenarios where compression may be needed, such as:
 - **Maximise the amount of data** you can store on a digital device such as a mobile phone or tablet
 - **Minimise the transfer time** of data being uploaded, downloaded or streamed across a network such as the Internet
- Reducing the file size of an image can be achieved by **reducing the colour depth** or **resolution** of the image
- Compression can be achieved using two methods, **lossy** and **lossless**

Lossy Compression

What is lossy compression?

- Lossy compression is when **data is lost** in order to **reduce the size** on secondary storage
- Lossy compression is **irreversible**
- Lossy can **greatly reduce the size** of a file but at the **expense of losing quality**
- Lossy is only suitable for data **where reducing quality is acceptable**, for example images, video and sound
- In photographs, lossy compression will try to group similar colours together, reducing the amount of colours in the image without compromising the overall quality of the image
- Example file types that use lossy compression are:
 - **JPEG** Images
 - **MP3** Audio
 - **MPEG-4** Video



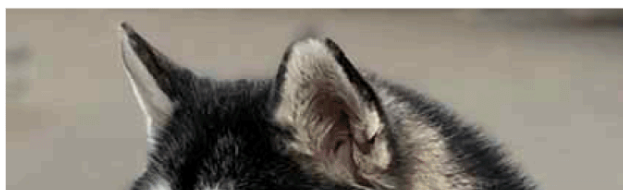
Your notes



ORIGINAL JPG
824KB



50% LOSSY COMPRESSION
76KB





80% LOSSY COMPRESSION
38KB

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Your notes

- In the images above, lossy compression is applied to a photograph and **dramatically reduces the file size**
- Data has been **removed** and the overall quality has been **reduced**, however it is acceptable as it is difficult to visually see a difference
- Lossy compressed photographs take up less storage space which means you can store more and they are quicker to share across a network

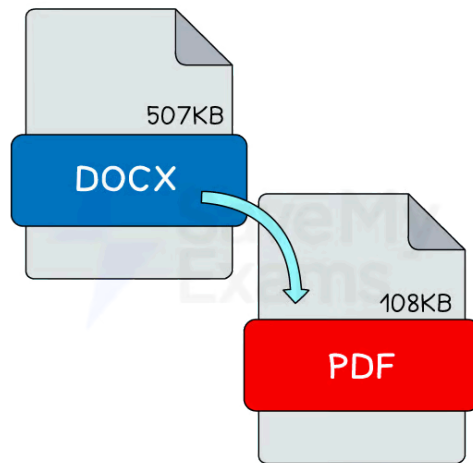
Lossless Compression

What is lossless compression?

- Lossless compression is when data is **encoded** in order to **reduce the size on secondary storage**
- Lossless compression is **reversible**, the file **can be returned to its original state**
- Lossless can reduce the size of a file but not as dramatically as lossy
- Lossless can be used on all data but is more suitable for data where **a loss in quality is unacceptable**, for example documents
- In a document, lossless compression uses algorithms to analyse the contents looking for **patterns** and **repetition**. For example, repeating characters are replaced with a single character and the number of occurrences in the document ("EEEEEE" becomes "E5")



Your notes



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- In the image above, lossless compression is **automatically** applied to document formats such as DOCX and PDF with a different rate of success
- When you open a lossless compressed document the **decompression process reverses the algorithms** and returns the data **back to its original state**
- Lossless compressed documents **take up less storage space** which means you can **store more** and they are **quicker to share** across a network
- Example file types that use lossless compression are:
 - .PNG Images
 - .Zip files
 - .Rar files



Worked Example

Sarah uses her computer to record an audio file of herself narrating a video for work.

She emails her recording to friend for proofing. She uses lossy compression to produce the sound file.

Explain two reasons why using **lossy** compression is beneficial. [4]

How to answer this question

- What are the differences between lossy and lossless?
- Can you state two differences? [2 marks]
- Can you say why each point is a benefit? [2 marks]

Answer

- Lossy will decrease the file size [1]

- ...so it can sent via email quicker [1]
- Lossy means data is lost [1]
- ...the difference is unlikely to be noticed by humans [1]



Your notes