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COMMON ASSESSMENT TASK

Level 1 Digital Technologies, 2019

91887 Demonstrate understanding of compression coding for a chosen media type

Credits: Three

Achievement Criteria		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Demonstrate understanding of compression coding for a chosen media type.	Demonstrate in-depth understanding of compression coding for a chosen media type.	Demonstrate comprehensive understanding of compression coding for a chosen media type.

Type your School Code and 9-digit National Student Number (NSN) into the header at the top of this page. (If your NSN has 10 digits, omit the leading zero.)

Make sure that you have the scenario page.

Answer all parts of the assessment task in this document.

Your answer should be presented in 12pt Arial font, within the expanding text boxes, and may only include information you produce during this examination session.

You should aim to write between **800–1500 words** in total.

Save your finished work as a PDF file with the file name used in the header at the top of this page ("SchoolCode-YourNSN-91887.pdf").

By saving your work at the end of the examination, you are declaring that this work is your own. NZQA may sample your work to ensure that this is the case.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Achievement
04

INSTRUCTIONS

The assessment task in this document relates to compression methods for ONE media type (audio, image or video).

The separate scenario page includes two options for you to choose from.

Read the scenario page and the assessment task before you begin. **All your answers must be based on the same media type** from your chosen option.

Type the scenario (A, B or C) in the space below:

> **B**

Type your chosen option from the scenario (audio compression, image compression or video compression) in the space below:

> Option Two:Image
> compression

Begin your answers on page 3.

ASSESSMENT TASK

(a) Explain in detail and justify the format(s) you use for your chosen scenario. Common recording formats include:
- for audio: WAV, MP3, AIFF, WMA
- for image: RAW and JPEG
- for video: 1080p, MP4, AVI, WMV.

I would capture images using the Raw format. I would use this because raw format is a lossless compression which means the quality of the images would be high as there is no compression on the images when the photo is taken. This means the image files would be large but this would not be a problem as I have a team of students to help me take the photos which will mean that we would have a lot of storage, and we also have the school network if the storage on our camera's is full. This means capturing images in a raw file will not be a problem.Also the images can be converted to a lossy compression to save space when the images are stored in the school network.

The JPEG format on the other hand uses lossy compression which means that it takes away some of the original files data in order to save space, this means that there will be less data therefore the file size for the image files would be smaller. Though using JPEG introduces us to possible artifacts and blocky colours especially on sharp edges of an image which would mean a lower quality image and there would be less flexibility when editing the image later on. This means that using the RAW format would be the best option when taking photos during the "Big sing" Competition as storage is not really the problem.

(b) Explain how files of your chosen media type can be represented using bits in an uncompressed form.

Bits: A basic unit of information usually in binary (0 or 1)

Byte:A group of binary digits or bits that work together as a unit usually in 8 bits.

Pixel: The smallest unit in a digital image that can be displayed from a display system.

Colour depth: The amount of information in a single pixel, the higher the bit count the more colour depth an image usually has and usually ranges from 8-32bits.

There is usually 3 colours that are needed in an image red, green and blue or RGB and each colour usually has 8 bits which would mean that the image would have 24 bits or 3 bytes per pixel. This would mean that each colour would display up to 0-255 colours as 2^8= 256. This means that there could be up to 16.7million possible colours on an image.

For example 1 bit colour would have 2 colours, black and white as 2^1 = 2. This would mean that each pixel would only be a 0 or 1, 0 being black and 1 being white.

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(c)   Explain the reasons why files of your chosen media type might be compressed.

> The files of images might be compressed in order to save storage. When the images are compressed useless information on an image gets cut keeping only the important information on an image therefore reducing the size of the image files.Lowering the file size means that less storage would need to be used which means more images could be stored on the hardware. This also saves electricity as less hardware is used which reduces the cost of saving the image files as less hardware needs to be brought which means less electricity is used. With less hardware, this means less maintenance is needed and less resources and physical space is used as hardware will need resources to be produced and stored somewhere cool to prevent overheating. This further decreases the cost when images are compressed. This could also mean when less resources are used the environment would be better. This means when image files are compressed, it will save storage which saves cost of saving the images.

(d)   Explain how lossy file compression can affect media quality from an end-user's perspective.

Lossy file compression can affect image quality from an end user's perspective from the quality of the image. Lossy image compression cuts off the images original data in order to save space. This means that if lossy compression is too high this means the end user would be able to see artifacts and blocky colours which would mean a low quality image as more calculations is used. But if low to medium compression is used, the end user would usually not notice the difference between the raw and lossy compressed version. This would mean that less storage is used while a high image quality as less calculations is used to compress the image.

Another way is lossless compression. Lossless image compression reduces the file size of an image file while retaining the original image information. This will mean that there will be no difference from the raw image to the lossless image which means a high quality image for the end user as there would be no artifacts or blocky colours but would have a larger file size than the lossy compression formats.

(e)   Referring to your chosen option for the scenario, select ONE of the required outputs and type it in the space below:

> Photographs for the school website and facebook page, including a gallery page with thumbnail to full-size image.

For this output, identify an appropriate type of compression method (either lossy or lossless), and then:

- explain why you would use lossless or lossy compression, outlining the advantages and disadvantages of compression for the output using this method
- justify your decision, explaining why your chosen compression method would be the most appropriate
- give examples of appropriate file types for the compression method.

I would use lossy compression in the form of JPEG for photographs for the school website and facebook page. This is because lossy compression reduces the file size by cutting some of the information from the original data which reduces file size for the image, this will mean the load times for websites will be faster as there is less bandwidth needed.But this would also mean that there will be a chance that artifacts and blocky colours will be introduced, affecting the image quality. Though this will not be a problem if low - medium compression is used as very small artifacts will not be noticed as the brain will skip over small inconsistencies of an image. The thumbnail would use JPEG as thumbnails are usually small in size which means lossless compression will not be needed as the user will be unable to notice the difference.

Lossless image on the other hand compresses the image by reducing the file size of an image while keeping the original data intact which will mean that there would be no drop in quality from the original which would mean a high quality image.An example of this is PNG, a lossless compression format which uses the DEFLATE algorithm to reduce file size. But this would have a larger file size than the lossy counterpart which would mean slower loading times as more bandwidth is needed.

This means I would use lossy compression in the form of JPEG for the images on the school website and Facebook page including the gallery page and thumbnail links to full sized images as the websites will load faster which would be good for the end user's who have slow internet and the small artifacts on the images would not be seen or noticed as the brain skips over small inconsistencies or the device the end user is using has a low PPI and thumbnail links are usually small therefore people will not notice the artifacts if there were any.

Achievement Exemplar 2019

Subject	Digital Technologies		Standard	91887	Overall grade	04
Q	**Grade**	**Annotation**				
		The candidate chose an appropriate compression format for their selected scenario. They justified their decisions. They showed an understanding of how uncompressed data could be represented using bits, and provided detailed examples. Their explanation of why files were captured in their chosen media type was limited in scope and lacked a technical explanation. Some examples of file types and sizes would have been useful here. The candidate has chosen and appropriate file type for their selected output scenario and justified their decisions.				