



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

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COMMON ASSESSMENT TASK

# Level 1 Digital Technologies 2022

## 91887 Demonstrate understanding of compression coding for a chosen media type

Credits: Three

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 space below. (If your NSN has 10 digits, omit the leading zero.) It should look like “123-123456789-91887”.

SchoolCode-YourNSN-91887

The task in this assessment is in **FOUR** parts.

Answer parts (a), (b), and (c), and then choose **ONE** of parts (d), (e), or (f).

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

Your answers should be presented in 12pt Times New Roman font, within the expanding text boxes, and may include only information you produce during this assessment session. Internet access is not permitted.

**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 assessment, you are declaring that this work is your own. NZQA may sample your work to ensure this is the case.

## INSTRUCTIONS

The assessment task requires you to discuss compression methods for one or more media types (image, video, or audio).

You must answer parts (a), (b), and (c).

Choose only ONE of parts (d), (e), or (f) on lossless compression:

- (d) Huffman coding
- (e) Run-length encoding
- (f) LZW.

You may copy and paste (snip and / or screengrab) relevant information from the following resources to support your answers.

Read all parts of the assessment task before you begin.

## RESOURCE A: Images



*Fig. 1*

## RESOURCE B: Audio

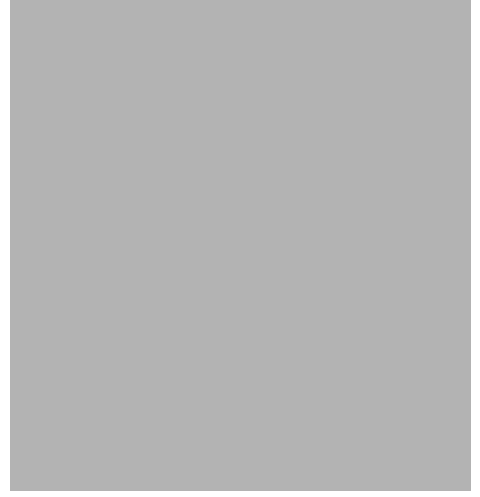


*Fig. 2*

**RESOURCE C: Video**



*Fig. 3*



*Fig. 4*

**Acknowledgements**

Material from the following sources has been adapted for use in this assessment:

<https://helpx.adobe.com/photoshop/key-concepts/compression.html>

<https://boomspeaker.com/320kbps-vs-flac/>

<https://aws.amazon.com/blogs/media/part-1-back-to-basics-gops-explained/>

**ASSESSMENT TASK**

- (a) Referring to ONE media type (image, video, or audio), explain the reasons why files of this media type might be compressed.

Media type:

- (b) Give examples of times when you have used either lossy or lossless compression. Why was it appropriate to use this compression method in these cases?

**SCENARIO: Sharing school photos**

You are the head of your school’s digital media team and have taken photos, video, and audio of the kapa haka group’s latest performance. Because your school is small and in a rural area, internet access can be patchy. The principal would like to share the recordings with whānau and the community.

There are two options available to the principal:

- Emailing the files as attachments and / or
- Storing them on the school’s server and emailing a link to download them.

(c) Consider the scenario above. You may also include snips from Resources A, B, and C on pages 2 and 3.

Select ONE of the media types (photos, video, or audio) and recommend an option to the principal. Refer to the scenario in your recommendation. You may select the same media type as you discussed in part (a).

Media type:

(i) What would be the most appropriate compression method for the scenario?

(ii) Explain why this method would be more suitable than another compression method. Justify your choice by comparing and contrasting it with another compression method.

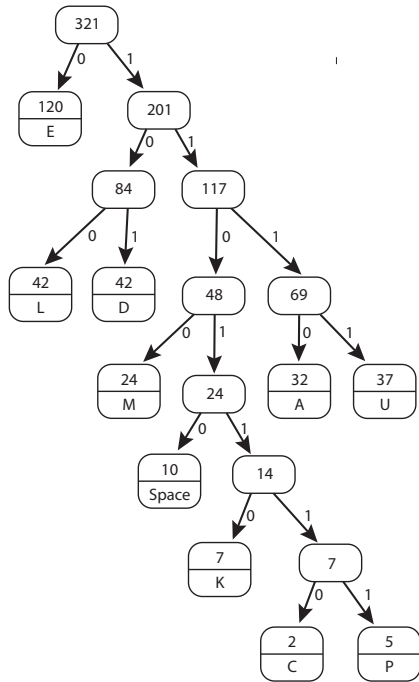
(iii) Explain how this method would affect the output from the end user’s perspective.

**Lossless compression**

Answer EITHER part (d) Huffman coding OR part (e) Run-length encoding OR part (f) LZW

**(d) Huffman coding**

*Note: If you are answering this part, don't answer parts (e) or (f).*



(i) Using the Huffman tree above, decode the code 1100 1111 1101110 1101110

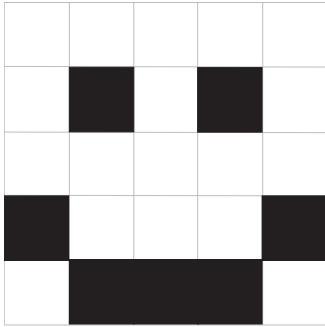
(ii) Using the Huffman tree above, encode the word DAME

(iii) If the phrases A MUDDLED MEAL and PACK UP A CUP are encoded with the Huffman tree above, which phrase will be compressed by more? Justify your answer.

(e) **Run-length encoding**

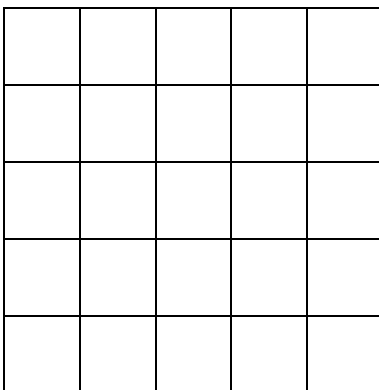
*Note: If you are answering this part, don't answer parts (d) or (f).*

(i) Encode this image using run-length encoding.



(ii) Decode the code below by filling in any 'black' boxes with a cross (X).

0, 5  
1, 3, 1  
2, 1, 2  
2, 1, 2  
5



- (iii) Consider the two 13×13 images below. Which of these will result in a larger file size than the original when compressed using run-length encoding? Justify your answer.

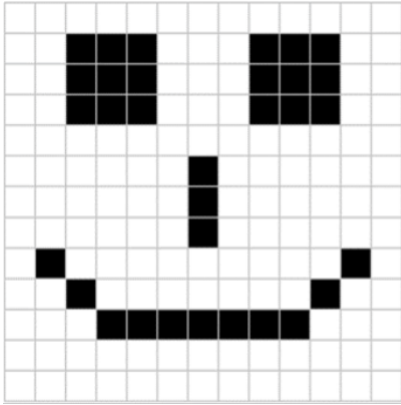


Image A

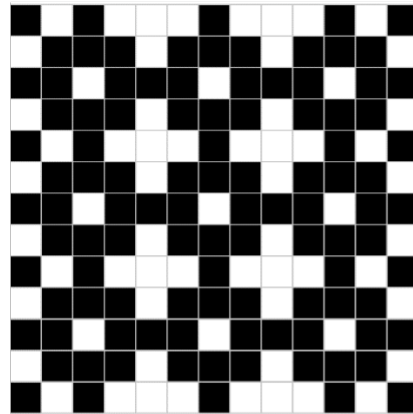


Image B



(f) **LZW**

Note: If you are answering this part, don't answer parts (d) or (e).

Code	Character string	Code	Character string
0	Just drift away	5	day
1	,	6	Day
2	yeah	7	dreaming
3	(	8	so sweet
4	)	9	.

(i) Use the dictionary above to encode the following song lyrics.



(ii) Use the dictionary above to decode the following code.

0 9 6 7 1 8 1 2 9

(iii) How could the dictionary above be changed to improve the compression of the message in (i)? Justify your answer.

**Acknowledgements**

Material from the following sources has been adapted for use in this assessment:

(f) (i) excerpt from Sons of Zion (2018). Drift Away [song]. On *Vantage Point*.