

A small icon depicting a document with the letters 'PDF' in red at the top left corner.

### 1.1.3 Data storage

## Computer Science

MIDI files store the actual music notes in a compressed format	F	Text Burst messages
JPEG files are examples of lossless file compression	F	
MP3 files are, on average, 90% smaller than the music files stored on a CD	T	
MP4 files are examples of lossy file compression	T	

[4]

Oct/Nov 2016. P13

10

(b) The current status of the engine is sent to a computer in the aeroplane.

Each piece of data collected is 8 bytes in size. Data collection occurs every 30 seconds.

Calculate the number of kilobytes that would be needed to store the data collected during a 10-hour flight. Show your working.

??

[3]

May/June 2017. P11

3 Steffi has a number of files of different sizes that contain her work.

Tick to show whether each statement is **true** or **false**.

Statement	true (✓)	false (✗)
47KB is larger than 10MB.		✓
250bytes is smaller than 0.5MB.	✓	
50GB is larger than 100MB.	✓	
1TB is smaller than 4GB.		✓

[4]

## Computer Science 2210

### Topical Past Papers

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#### Topic: 1.1.3 Data storage

5 (a) Parity checks are often used to detect errors that may occur during data transmission. The received bytes in the table below were transmitted using **odd parity**.

Tick to show whether each byte has been **corrupted during transmission** or **not corrupted during transmission**.

Received byte	corrupted during transmission (✓)	not corrupted during transmission (✗)
10110100		
01101101		
10000001		

[4]

13 (a) Gurdeep wants to send a large file to Jennifer over the Internet.

State **two** benefits of compressing the file to send it.

[2]

(b) Two types of compression are lossy and lossless.

Choose the most suitable type of compression for the following and explain your choice.

(i) Downloading the code for a computer program: **lossless**

[3]

(ii) Streaming a video file: **lossy**.

[3]

May/June 2017. P12

4 There are various methods used to detect errors that can occur during data transmission and storage. Describe each of the following error detection methods.

Parity check ✓

Check digit ✓

Checksum ✓

Automatic Repeat request (ARQ) ✓

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2 Data files are stored in different file formats.

Complete the table by providing a suitable file format for each file type. The first one has been done for you.

File type	File format
Pictures	.JPEG
Text	.TXT
Sound	.MP3
Video	.MP4 .MPEG

[3]

9 (b) Kamil wants to store a 16-bit colour image file. The image size is 1000 pixels.

Calculate the size of the file.

Give your answer in **bytes**. Show your working.

(c) Describe the differences between primary and secondary storage.

[2]

[4]

May/June 2018. P11

4 Michele wants to email a file to Elsa. The file is too large so it must be compressed.

(a) Name **two** types of compression that Michele could use.

[2]

(b) The file Michele is sending contains the source code for a large computer program.

Identify which type of compression would be most suitable for Michele to use.

Explain your choice.

[4]

May/June 2018. P12

2 (a) Nancy has captured images of her holiday with her camera. The captured images are stored as digital photo files on her camera.

Explain how the captured images are converted to digital photo files.

[4]

(b) Nancy wants to email the photos to Nadia.

Many of the photos are very large files, so Nancy needs to reduce their file size as much as possible.

Identify which **type** of compression would be most suitable for Nancy to use. Explain your choice.

JPGs - lossy and better for images

[4]

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#### Topic: 1.1.3 Data storage

5 The three binary numbers in the registers X, Y and Z have been transmitted from one computer to another.

	Parity bit							
Register X	1	0	0	1	0	0	1	0
Register Y	1	1	1	0	0	1	1	1
Register Z	1	1	1	0	1	0	0	1

Only **one** binary number has been transmitted correctly. This is identified through the use of a parity bit.

Identify which register contains the binary number that has been transmitted **correctly**. Explain the reason for your choice.

The binary number that has been transmitted correctly is in **Register** .....  
Explanation .....

Oct/Nov 2018. P12

1 Computers use a character set to convert text into binary.

One character set that can be used is ASCII.

Each letter in ASCII can also be represented as a denary value.

(a) The word BUS has the denary values:

B	U	S
66	85	83

Convert the denary values into 8-bit binary.

66

--	--	--	--	--	--	--	--

85

--	--	--	--	--	--	--	--

83

--	--	--	--	--	--	--	--

[3]

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#### Topic: 1.1.3 Data storage

(b) Each letter in ASCII can also be represented as a hexadecimal value.  
The word KEY has the 8-bit binary values:

K	E	Y
01001011	01000101	01011001

(i) Convert the three 8-bit binary values into hexadecimal.

01001011 ..... .

01000101 ..... .

01011001 ..... .

[3]

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#### Topic: 1.1.3 Data storage

Oct/Nov 2018 P13 (2210)

2 Parity checks and Automatic Repeat reQuests (ARQ) can be used to check for errors during data transmission and storage.

(a) A system uses **even parity**. Write the appropriate parity bit for each byte.

Parity Bit	1	0	1	0	0	1	1
	1	0	1	1	1	1	1
	1	0	1	0	0	0	1

[2]

[2]

(c) State **one** other method that could be used to check for transmission errors.

[1]

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Topic: 1.1.3 Data storage

Oct/Nov 2018 P13 (2210)

7 (c)

David needs to send a large section of the programming code as an email attachment.  
He uses lossless compression to reduce the file size.  
Explain how the file size is reduced.

[3]

Oct/Nov 2018 P13 (2210)

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Explain the difference between a Musical Instrument Digital Interface (MIDI) file and a MP3 file.

[4]