Topic 1: Digital Data	Do I understand how to ...
Representing data	• describe the difference between information and data; • describe how data is stored in the following units: – bit; – nibble; – byte; – kilobyte; – megabyte; – gigabyte; – terabyte; • identify the following data types: numeric (integer and real), date/time, character and string;
Representing images	• demonstrate understanding of how pixels are used in image representation; • demonstrate understanding of how image resolution affects file size; • describe how vector-based graphics and bitmap graphics are stored; • describe the difference between vector-based and bitmap graphics; and • demonstrate understanding of how buffering and streaming are used to support the transfer of moving image files.
Representing sound	• describe factors that affect sound quality when recording sound, including sample rate, bit depth and bit rate; • explain the need for analogue-to-digital conversion in sound recording;
Data portability	• demonstrate understanding of data portability and the following file formats that support it: • jpeg, tiff, png, pict, gif, txt, csv, rtf, mp3, mp4, midi, mpeg, avi, pdf, wav, wma; • demonstrate understanding of the need for data compression;

4 CPC is a small multimedia design business that supplies digital products. These include soundtracks, images and printed material.

(a) A client requests a high resolution bitmap image.

(i) Describe how a pixel is used in a bitmap image.

- Smallest unit of an image(1) that can be edited(1)
- Pixel is stored as a series of binary digits. [2]

(ii) Explain the term resolution and its impact on an image.

- Resolution is the quality of the image/ pixels per (1) inch.
- The higher/lower the resolution the better/worse quality the image will be(1) high/low [2]
resolution images need more/less storage space(1)

(b) The image has been saved in a number of file formats.

(i) Answer the questions in the table below.

File Format	
 logo PNG image 52.1 KB	What do the letters PNG stand for? Portable Network Graphics. [1]
 logo JPEG image 14.4 KB	What do the letters JPEG stand for? Joint Photographic Experts Group [1]

7

(ii) The image has also been saved as a bitmap image as shown below.

Explain why the file size of the JPEG file is smaller than that of the BMP file.

- Jpeg is a compressed file format, it contains less pixels (1)
- Bitmap graphic is not compressed (1)
- Compressed file formats contain less detail. [2]

(iii) The client has requested a vector-based graphic of the logo. Identify **one** way in which a vector-based graphic differs from a bitmap graphic.

- Stores information about the shapes that make up the image. [1]

OR - The image is made up from mathematical equations.

OR - The file size of the image is comparatively smaller than a similar sized bitmap image.

8

2 The table below records the details of sales in a local computer hardware store.

COMPUTER STORE		
CODE	DESCRIPTION	COST
AZY1	Keyboard	10.00
BCT2	Mouse	4.00
	TOTAL	14.00
	DiSCOUNT	2.00
	Sales Total	12.00

(a) (i) Using an example from the table above, explain the term data.

Data is raw facts and figures (1)
eg from a table (1) [2]

(ii) Using an example from the table above, explain the term information.

Data with context or meaning which has been processed (1)
eg from a table (1) [2]

A byte contains 8 bits.

(b) (i) How many bits are in a nibble?

4 [1]

(ii) How many kilobytes can be stored in a megabyte?

1024 [1]

26

4 **(a)** Vic is editing her holiday images. Below is the data related to one of her digital photos.

Item type: JPG File
Date taken 20/04/2019 22:34
Rating: Unrated
Dimensions 1397 x 1397
Horizontal resolution 300dpi
Size: 323KB

(i) In the table below tick(✓) the statements which are true about Vic's image.

Statement	Tick(✓)
The image is a compressed file format.	✓
The image is not a compressed file format.	
The image is a vector-based graphic.	
The image is a bitmap graphic.	✓
The image uses lossy compression.	✓
The image uses lossless compression.	

[3]

(ii) Explain the term resolution when referring to a graphic.

- Measures the quality of an image (1)
- More pixels means better quality (1) [2]

OR - Pixels per inch (1)

(iii) The horizontal resolution is 300 dpi. What do the letters dpi stand for?

Dots per inch [1]

31

Computers can process moving images.

(b) Complete the table below by placing one of the following terms beside the correct definition.

BUFFER **STREAMING**

Definition	Term
Allows the user to watch the video as it downloads.	Streaming [1]
A part of memory used to store a downloaded video before it is watched.	Buffer [1]

Computers also support the processing of sound files.

(c) Using **two** of the words supplied complete the following sentences.

DIGITAL MICROPHONE ANALOGUE

A microphone [1] enables a computer to record sound waves. Sounds are recorded in analogue [1] format.

[Turn over

4 A computer stores data in binary format.

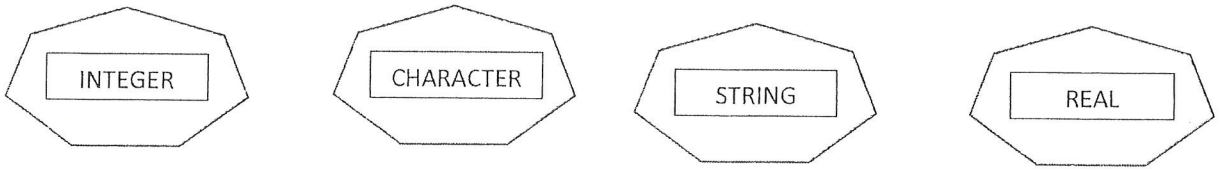
(a) How many bits are there in a byte?

8 bits [1]

(b) What is the name given to a group of four bits?

Nibble [1]

(c) Using the words provided, complete the table stating which data type matches the data.



The first one has been completed as an example.

Data	Data type
22/05/19	DATE/TIME
24, 125, -23	Integer [1]
A, £, @	Character [1]
Main Street	String [1]
1.34, 6.2	Real [1]

57

1 Complete the table below.

(a) Place **one** of the following terms beside the correct definition. (Not all terms will be used.)

BYTE **BIT** **KILOBYTE**

Definition	Term
The smallest unit of digital data represented by either 0 or 1	BIT [1]
Describes eight binary digits	BYTE [1]

(b) A student scores 51 in a Computing Module. State the most appropriate data type for storing the student score.

Integer / Numeric (NOT Number) [1]

86

(c) Below is an example of the results a student has received in their term exams.

Code	Module	Mark	Remarks
CM101	COMMUNICATIONS	57	
CM11	COMPUTING	51	
MT101	MATHS 1	72	MATHS 1 & 2 AVERAGE = 76%
MT102	MATHS 2	79	MATHS 2 GCSE EQUIVALENCE = "B"
CM12	BUSINESS	75	
	AVERAGE MARK for 5 MODULES	67	

From the table above:

(i) Identify **one** item of Data	51	[1]
(ii) Identify **one** piece of Information	AVERAGE = 76	[1]

[Turn over

87

7 Clarendon College produces video tutorials which are made available for students on a website.

(a) (i) Explain the process that Clarendon College can use to ensure that the students can download the video quickly.

Compression will reduce the file size and remove unnecessary detail. [2]

(ii) State a suitable video file format for these tutorials.

mp4 [1]

(b) Podcasts are also used. What is meant by bit depth when referring to a sound recording?

The number of bits used for each sound sample [2]

121

2 Jack's school uses a form to collect data from new students. The data is used to create information that can be used by the school. Place a tick (✓) beside **two** statements that are true about information.

STATEMENT	TICK (✓)
Information is raw facts and figures that have not been given a meaning.	
Information can be produced by processing raw data.	✓
Information is automatically encrypted when it is produced.	
Information is raw facts and figures that have been given a context.	✓

[2]

Examiner Only	
Marks	Re-mark

Examiner Only	
Marks	Re-mark

3 Sarah's dad is a professional photographer. He sometimes has to edit the images he has taken.

(a) Give **two** reasons why he should save his photographs in bitmap format.

1 Can be edited at pixel level [1]

2 Can adjust the resolution of picture being taken [1]

(b) List **two** differences between bitmap and vector-based graphics.

1 Vector - does not depend on resolution for quality. [1]

2 Vector - stores graphics in terms of objects [1]

3 Objects can be easily moved around using vector graphics

4 Vector graphics can be easily resized without impacting on quality.

4 Many mobile phones can now record digital video and sound.

Use some of the words given below to complete the paragraph which explains the process of recording and storing digital sound files.

analogue	memory	digital	microphone	speaker

Mobile phones have a built-in microphone to record sound.

Sound is input in analogue format and is then converted into digital format so it can be stored in the phone's memory. [3]

Examiner Only	
Marks	Re-mark