Chhetri Academy

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GCSE COMPUTER SCIENCE

2.1

Edexcel 1CP2 | Specification point 2.1.1

That computers use binary to represent data (numbers, text, sound, graphics) and program instructions...

Untiered

Past paper question booklet

3	2020-2024	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

1 A computer game designer is creating a new game.

(a) Colours in the game are represented in hexadecimal.

Convert the binary numbers in this table to hexadecimal.

(3)

	Hexadecimal
1101 1110	
1010 1111	
1100 0100	

(b) Convert the hexadecimal number 12 to binary and the result from binary to denary.

(2)

Binary

.....

.....

Denary

.....

.....

(c) State what is meant by the term 'image resolution'.

(1)

(d) Computers use binary to represent colour.

Compare the use of 8 bits and 24 bits to represent colour.

(3)

(e) The game uses black and white as well as colour images.

Explain the effects of using a run-length encoding (RLE) algorithm on the black and white images used in the game.

(3)

(Total for Question 1 = 12 marks)

5 The principles of computer science are used in computer game design.

(a) State the reason why console games are provided on ROM rather than RAM.

(1)

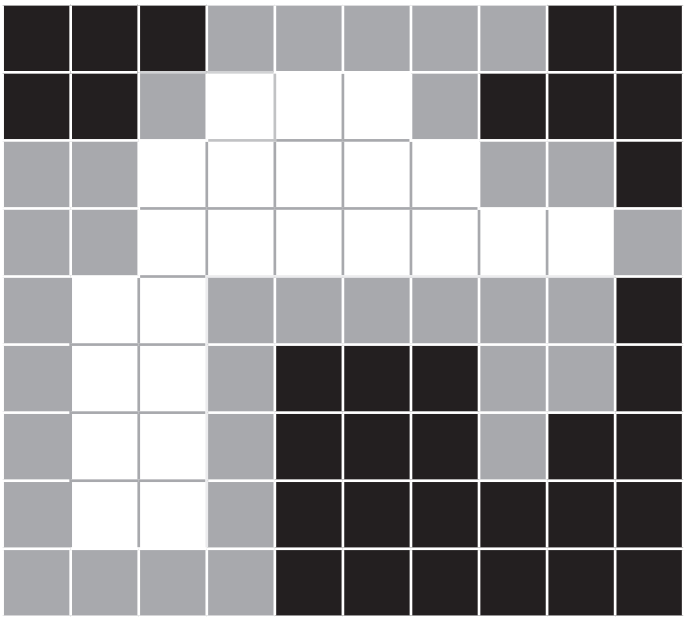
(b) Explain why a game console requires RAM.

(2)

(c) Describe how logic is used in computer games to produce more realistic simulations of the real world.

(2)

(d) Data representing this image must be compressed using run-length encoding (RLE).



Palette:

	000
	010
	111

(i) The first 3 bits are used for the colour and the next 4 bits are used for the run length of pixels.

Encoding starts from the top left pixel and is continuous between rows.

Convert the first two rows of pixels to binary data using RLE.

(3)

(ii) Construct an expression to show the maximum saving in bits that could be made by using an RLE algorithm to compress an image with this resolution.

(4)

(Total for Question 5 = 12 marks)

2 Data

(a) The ASCII system is used to represent letters and symbols.

(i) State the number of bits used to represent each letter or symbol in ASCII.

(1)

(ii) The ASCII code 65 represents the letter A.

Give the letter represented by the ASCII code 68.

(1)

(b) Sound waves are converted to binary using sample intervals.

Define the term 'sample interval'.

(1)

(c) Give an expression to calculate the size of a bitmap image, not the size of the file that stores the image.

(2)

(d) Computers manipulate binary patterns.

(i) Complete the table with the result of applying the shift to the binary pattern.

(2)

Binary pattern	Shift	8-bit binary result
1010 0011	Logical shift left by 3	
1100 1010	Arithmetic shift right by 2	

(ii) Identify the correct statement about overflow.

(1)

☒ **A** Causing the program to crash during an arithmetic operation

☒ **B** Requiring more bits to store a result than are available to store it

☒ **C** Switching between binary and hexadecimal number systems

☒ **D** Using an index less than 0 or greater than the length of an array

(iii) Convert the denary value +112 to 8-bit binary representation.

(2)

(iv) Give the 8-bit binary two's complement representation of denary –73

(2)

(e) The number of bits determines the number of patterns that can be represented.

(i) Identify the number of symbols available in the hexadecimal system.

(1)

- ☒ **A** 2
- ☒ **B** 8
- ☒ **C** 10
- ☒ **D** 16

(ii) The address bus of a computer is 8-bits wide.

State the number of unique addresses that can be accessed.

(1)

.....

(f) Construct an expression to convert 40 681 930 227 712 bytes to tebibytes.

(2)

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.....

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(Total for Question 2 = 16 marks)