GCSE MARKING SCHEME

SUMMER 2018

GCSE (LEGACY)
COMPUTER SCIENCE - UNIT 1
4341/01

INTRODUCTION

This marking scheme was used by WJEC for the 2018 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCSE COMPUTER SCIENCE (LEGACY)
UNIT 1

SUMMER 2018 MARK SCHEME

Q	Answer		Marks	MAX
1	<table><tr><td></td><td>**Order**</td></tr><tr><td>Gigabyte</td><td>3</td></tr><tr><td>Yottabyte</td><td>5</td></tr><tr><td>Byte</td><td>1</td></tr><tr><td>Exabyte</td><td>4</td></tr><tr><td>Kilobyte</td><td>*2*</td></tr></table>		1 mark for each order 2-5 (1 was given)	4
2(a)	Read Only Memory		1 mark	1
(b)	Award one mark for each one of the following up to a maximum of two. • ROM is non-volatile/permanent • Data that needs to be permanently stored • ROM can be used for storing the programs such as the BIOS. • Bootstrap loader (start-up instructions)		1 mark 1 mark 1 mark 1 mark	2
3(a)	**One mark for each of the following up to a maximum of four. One mark per section.** **ALU** • processes and manipulates data • performs simple calculations • performs all the mathematical calculations and logical operations in the CPU **Registers** • to temporarily store data from the CPU • temporarily store results of calculations • temporarily store instructions **Internal Memory** • Where data and instructions are held by the CPU • where the CPU puts the results it generates **Controller** • Directs the flow of instructions and data within the CPU. • Coordinates the other parts of the CPU		1 mark 1 mark 1 mark 1 mark	4

(b)	Award one mark for each of the following up to a maximum of two • Data Bus • Control Bus (accepted but not expected) • Address Bus	 1 mark 1 mark 1 mark	2
(c)	One mark for each of the following up to a maximum of two. • Should be able to execute more instructions in the same timeframe than a single core • (imply speed/faster processing) • It has two processors carrying out instructions	 1 mark 1 mark	2
4(a)	One mark for each protocol TCP /Transmission Control Protocol IP / Internet Protocol	 1 mark 1 mark	2
4(b)	One mark for each correct answer up to maximum of 5 • The source/IP address • The destination/IP address • Checksum/Error control bit/Check digit • Order or number of packets • The actual data • Control signals/tracking information • Reassembly information	 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark	5
4(c)	Award one mark for each of the following up to a maximum of three. • Data is split into packets • Each packet could take a different path to its destination (routing) • Packets are re-assembled at their destination (packet number) • Missing packets are re-sent (TCP)	 1 mark 1 mark 1 mark 1 mark	3
5	One mark for each correct answer. Suitable data for each of the following data types: String e.g. "Arsenal" Real e.g. 1.1 Boolean TRUE or FALSE OR 1 or 0 NOT YES/NO Character e.g. "A" Integer e.g. 7	 1 mark 1 mark 1 mark 1 mark 1 mark	5
6(a)	7 bits (Condone 8 bits)	1 mark	1
6(b)	ASCII can only represent 128 different characters. Computers need more characters than this and some characters are missing eg in different languages.	1 mark 1 mark	2

7	File A 9000/10 = 900 KB	1 mark	3
	File B 5000/16*2 = 625 KB	1 mark	
	File C 3000/15*2 = 400 KB	1 mark	
8a	**One mark for each of the following up to a maximum of three.** <u>**Must be related to**</u> <u>security</u> Star Network • Each workstation is connected by its own cable directly to the server • Centralised network management • Any workstation will not see other workstation's data • Data should not be intercepted	1 mark 1 mark 1 mark 1 mark	3
8b	**One mark for each of the following up to a maximum of three.** <u>**Must be related to (temporary)**</u> Bus Network • *nodes* of the network are each connected to a single cable. • Easy to implement/quick setup • Easy ~~and~~ to add more computer systems to the network • Quick to set up – well suited for temporary networks • Cost-effective – less cabling	1 mark 1 mark 1 mark 1mark 1 mark	3
8c	**One mark for each of the following up to a maximum of three.** **Must be related avoid collisions** Ring Network The transmission of data is relatively simple as **packets** travel in **one direction only** which **helps prevent collisions.**	1 mark 1mark 1 mark	3
9	**One mark for each of the following up to a maximum of four.** Bonus Awarded No Bonus No Bonus Bonus Awarded **(condone the use of speech marks ie "Bonus Awarded")**	1 mark 1 mark 1 mark 1 mark	4

10(a)	Award one mark for each correct answer to a maximum of two. Binary numbers can be quickly converted into hexadecimal numbers more convenient for humans to use/communicate as it's shorter to write/read. Less likely to make mistakes. For exponential reasons	1 mark 1 mark 1 mark	2
10(b)	Award 2 marks for correct answer or one mark for each part in correct order 11111100 ⟶ FC 1111 F 1100 C	2 marks 1 mark 1 mark	2
10(c)	Award 2 marks for correct answer or one mark for each part in correct order 138 ⟶ 8A 8 A	2 marks 1 mark 1 mark	2
10(d)	Award 2 marks for correct answer or one mark for each part in correct order 5D ⟶ 93 80 + 13	2 marks 1 mark 1 mark	2

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11(a)	Computer Misuse Act (1990)	1 mark	1
11(b)	Award one mark for each of the following up to a maximum of 3. Functions include: • Checking all outgoing and incoming emails and attachments • Checking all files downloaded • Scan hard drive/secondary storage • Warns user of any suspicious files / provide option to delete viruses • Warns user of any suspicious files / provide option to quarantine viruses • Maintain an up to date database of all known viruses • Heuristic scanning methods that identify unclassified viruses based on virus-like behaviour	1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark	3
11(c)	Award one mark • Role of a firewall is to stop unauthorised access to a computer (system) via a network (internet)/hacking • controls the incoming and outgoing network traffic	1 mark 1 mark	1
11(d)	Award one mark for each of the following up to a maximum of 3. Functions of a firewall include: • Filter certain data packets • Block certain ports • Follows a set of pre-set rules • Block access to specified web sites • Block programs on computer accessing the internet • Block certain downloads / ask for confirmation when downloading a file • Enforce additional authentication from outside • Prevent users on network accessing specified data/files • Limit outside access to specified parts of system like the web server	1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark	3

12(a)	Award one mark for each of the following up to a maximum of 3.		3
	• Very intuitive		
	• Easier to use as the user simply touches what is seen on the display	1 mark	
	• No keyboard or mouse is required	1 mark	
	• Touching a visual display of choices requires little thinking and is a form of direct manipulation that is easy to learn	1 mark 1 mark	
	• Easier hand-eye coordination than mice or keyboards	1 mark	
12(b)	Award one mark for each of the following up to a maximum of 2. **Manages printing**		2
	• Data is stored on hard disk/in memory/stored in a queue (spooling)	1 mark	
	• Document is printed when printer is free/in correct order	1 mark	
	• User can carry on working/log off when waiting for job to print	1 mark	
12(c)	Award one mark for each of the following up to a maximum of 2. **Manages processor**		2
	• Ensures different processes can utilise the CPU and do not interfere with each other or crash	1 mark	
	• On a multi-tasking O/S ensure that all tasks appear to run simultaneously	1 mark	
	• Allocates time slices	1 mark	
	• Scheduling of programs	1 mark	
12(d)	Award one mark for each of the following up to a maximum of 2. **Manages memory (RAM)**		2
	• Allocates memory to programs currently executing	1 mark	
	• Ensures programs / data do not corrupt each other	1 mark	
	• Ensures all programs and data including itself is stored in correct memory locations	1 mark	

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13	**One mark for each of the following.** Syntax Error Input Mark Logic Error Total = Total + Mark**/ +**	1 mark 1 mark 1 mark 1 mark	4
14	**Indicative Content** **Editor** Allows a programmer to enter, format and edit source code **Automatic formatting**: Correctly indents code **Automatic colour coding**: Changes key words, literals and annotation to different colours **Compiler** Converts source code into executable machine code. Once compiled, a program can be run at any time **Interpreter** Converts each line of source code into machine code, and executes it as each line of code is run. The conversion process is performed each time the program needs to be run **Linker** A program which allows previously compiled code, from software libraries, to be linked together **Loader** A program which loads previously compiled code into memory **Debugger** A program which helps locate, identify and rectify errors in a program **Trace** A facility which displays the order in which the lines of a program are executed, and possibly the values of variables as the program is being run **Break point** A facility which interrupts a program on a specific line of code, allowing the programmer to compare the values of variables against expected values. The program code can then usually be executed one line at a time. This is called *single-stepping* **Variable watch** A facility which displays the current value of any variable. The value can be 'watched' as the program code is single-stepped to see the effects of the code on the variable.		12

Alternatively a variable watch may be set, which will interrupt the program flow if the watched variable reaches a specified value

Memory inspector
A facility which will display the contents of a section of memory

Error diagnostics
Used when a program fails to compile or to run. Error messages are displayed to help the programmer diagnose what has gone wrong

9-12 marks
Detailed explanation of the tools used in creation of a computer program including the development and testing stages. For this band of marks, all 5 tools will be described with additional qualification/use of the tool. Technical terms will be used appropriately and correctly.

5 - 8 marks
Some discussion of the tools used in the creation of a computer program. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct.

3- 4 marks
Superficial coverage of 5 tools Information will be poorly expressed and there will be limited, if any, use of technical terms. There are significant errors in grammar, punctuation and spellings.

2 marks
If 5 tools of IDE are given **or** discussion of 2 or more tools.

1 mark
If 3 tools of IDE are given **or** discussion of 1 tool.

0 marks
No appropriate content.