



GCSE MARKING SCHEME

SUMMER 2016

COMPUTER SCIENCE

Unit 1: Understanding Computer Science

4341/01

INTRODUCTION

This marking scheme was used by WJEC for the 2016 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

Unit 1: Understanding Computer Science

Summer 2016 - Mark Scheme

Qu.	Answer	Marks	MAX
1.	<p>Award 1 mark for each of:</p> <ul style="list-style-type: none"> 1 IP 4 TCP 6 HTTP 7 FTP <p>Deduct one mark for each additional tick above 4</p>	<p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p>	4
2. (a)	<p>Award 1 mark for naming each component Award 1 mark for description of function</p> <p>Register: is a storage location found on the CPU where data or control information is temporarily stored. (Registers are usually much faster to access than internal memory) A named register is accepted but only once for the register mark e.g. Accumulator, program counter etc.</p> <p>Controller: Directs the flow of instructions and/or data / Coordinates the other parts of the CPU / Generates clock ticks or controls the clock</p> <p>ALU: The ALU performs all the mathematical calculations and logical operations in the CPU</p> <p>Internal memory / Cache: Where most <u>frequently or recently</u> used data and instructions are held for use by the CPU and where the CPU puts the results it generates</p> <p>Buses – one bus exists physically, but could be described as logical bus e.g. Address Bus – <u>Carries</u> information on where data is held in RAM Control Bus – <u>Carries</u> control signals internally and to peripherals Data Bus – <u>Carries</u> data between points Only accept bus once as an answer</p>	<p>2 marks</p> <p>2 marks</p> <p>2 marks</p> <p>2 marks</p>	8
2. (b)	<p>The purpose of a hardware port is to act as an interface / connection between the computer and other computers or devices.</p> <p>Examples of different hardware ports are:</p> <ul style="list-style-type: none"> • HDMI • USB • Audio and video • Ethernet • DVI • Serial and parallel • PS2 	<p>1 mark</p> <p>1 mark</p>	2

3.(a)	<p>Advantage of cloud storage for the architect, any two of:</p> <ul style="list-style-type: none"> Plans can be accessed on any device with internet access Plans are backed up by cloud storage provider Data is not lost in the event of failure/disaster/hardware stolen Clients can be given access to view plans (via a secure login) Unlimited storage space available Architects could work collaboratively on a plan from anywhere in the world Relative cost if well justified 	2 x1 mark	2
3.(b)	<p>Might not want to use cloud storage because (any one of the following):</p> <ul style="list-style-type: none"> their internet access might be slow or unreliable in some areas they are concerned if cloud servers are down then they will not be able to access their work they are concerned about the security of the data servers may be in a country without adequate legislation Relative cost if well justified <p>Response must NOT be the reverse of a response to part (a).</p>	1 mark	1
4.(a)	Hardware required by each computer to connect to a network is a Network Interface Card / NIC / network adapter	1 mark	1
4.(b)	<p>Computer A adds computer D's address to packet</p> <p>Computer A sends packet to switch</p> <p>Switch looks at address on packet</p> <p>Switch compares to stored list of addresses on network</p> <p>Switch forwards packet to computer D's address</p>	<p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p>	5
5(a)(i)	Run time (execution)	1 mark	1
5(a)(ii)	Logical	1 mark	1
5(b)(i)	Syntax	1 mark	1
5(b)(ii)	Syntax error is detected during translation into executable code / attempted to run but fails	1 mark	1
6(a)	<p>It is good programming practice to use libraries when developing writing computer code because: (Any 4 from below):</p> <ul style="list-style-type: none"> time is saved as the programmer can simply use the private functions and programs stored in a library subroutines contained in a library have already been tested, so they should work reliably and not need further testing programs will contain less code and will therefore be easier to maintain there is a consistency between programs as other programmers will understand what a standard library routine does standard library routines are often written by experts so should be efficient 	4 x1 mark	4
6(b)	Linking	1 mark	1

8(b)

2 marks for correct answer
If incorrect 1 mark for sensible method

Could go via binary
 $1 = 0001$
 $E = 14 \rightarrow 1110$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
0	0	0	1	1	1	1	0

$16 + 8 + 4 + 2 = 30$

$0001\ 1110 = 30$

Alternatively could go Hex direct to denary as shown below

16^1	16^0
16	E
1×16	14

$16 + 14 = 30$

2 marks

2

9

Marking: One mark for each correct row

A	B	A OR B	NOT (A OR B)
1	1	1	0
1	0	1	0
0	1	1	0
0	0	0	1

1 mark
1 mark
1 mark
1 mark

4

<p>10</p>	<p>1 mark for naming each feature 1 mark for suitable example</p> <p>Windows for example a word processing application and a spread sheet</p> <p>Menus for example to allow user to perform operations or run applications such as right click to create a new folder</p> <p>Icons for example a picture of linked computers for networking</p> <p>Pointers(mouse or touchscreen) for example to select items/trigger events</p> <p>Shortcuts for example to frequently used applications for example having a shortcut to your mail client on your desk top</p> <p>File navigation for example when searching the hard disc for a file/folder using a browser</p> <p>copying / deleting / moving / sorting / naming / searching of files or folders for example copying of a file from the hard drive to a USB pen drive (File handling)</p> <p>Desktop customisation for example changing the colours and background image</p> <p>Copy and paste for example between applications e.g. copying a graph from a spread sheet to a word processor</p> <p>Error messages for example provide user with error/warning/help messages for example 'printer out of paper'</p>	<p>4 x (1 + 1)</p>	<p>8</p>
<p>11</p>	<p>Marking - One mark for each correct output</p> <p>3 6 9 12</p>	<p>1 mark 1 mark 1 mark 1 mark</p>	<p>4</p>
<p>12(a)</p>	<p>1 mark for identifying suitable data type, 1 mark for reason</p> <p>Real is most suitable for Mean as when two numbers are divided the answer could be a decimal number</p> <p>Integer (1 mark) is most suitable for Count as it is a control variable that is a whole number / increases by one each time around the loop</p>	<p>1 mark 1 mark 1 mark 1 mark</p>	<p>4</p>
<p>12(b)</p>	<p>A local static variable retains its value every time the function is called.</p> <p>A local variable does not retain its value every time the function is called</p>	<p>1 mark 1 mark</p>	<p>2</p>

<p>13</p>	<p>One mark for identifying user type</p> <p>A programmer / network technician / scientist / expert user is likely to use a command line interface because:</p> <p>Any three reasons of:</p> <p>They can be faster to navigate or use if you are an expert and know all the commands</p> <p>They use far less system resources like RAM and processor than other interfaces (GUI, menu, Voice, etc...)</p> <p>They take up far less backing storage than other interfaces (GUI, menu, Voice, etc...)</p> <p>Batch commands can be made (shell scripting)</p>	<p>1 mark</p> <p>3 marks</p>	<p>4</p>
<p>14(a)</p>	<p>Lossy compression can reduce the size of the file further than lossless compression. Lossy compression loses quality but lossless compression does not.</p>	<p>1 mark</p> <p>1 mark</p>	<p>2</p>
<p>14(b)</p>	<p>Three reasons why image files are compressed are:</p> <ul style="list-style-type: none"> • Take up less storage space on secondary storage • Takes up less storage space on servers • Easier to send as email attachment • Quicker to upload to a web site • Web site faster to download 	<p>3 x 1 mark</p>	<p>3</p>
<p>14(c)</p>	<p>Any two examples of meta data that would be stored with an image examples include:</p> <ul style="list-style-type: none"> • Dimensions of the image, • Colour depth • Make • Model • Orientation • Exposure time • F number, etc.... 	<p>2x1 mark</p>	<p>2</p>

15	<p>The business ensures that only employees can access the network by:</p> <ul style="list-style-type: none"> • Having unique allocated usernames • Having 'strong' passwords <p>Other security measures to limit what data employees can view and amend are:</p> <ul style="list-style-type: none"> • Some employees will have only 'read' access rights (permissions) • Others will have 'read' and 'write' access rights 		10
	<p>Data could be encrypted by:</p> <ul style="list-style-type: none"> • Using a key • And an encryption algorithm <p>And decrypted using:</p> <ul style="list-style-type: none"> • The same key and the same algorithm 		
	<p>The procedures the bank should have in place to recover from a natural disaster are:</p> <ul style="list-style-type: none"> • Data should be backed up to different medium (disc, tape or cloud) • Backups should be made every night (regularly) • Backups should be stored off site (fire proof safe) • Spare hardware or have supplier ready to supply new hardware at very short notice <p>The data would be recovered after a fire destroyed the hard discs by:</p> <ul style="list-style-type: none"> • Installing new hardware (discs) • Copying (restoring) all the data from the backups are 		
	<p>8 – 10 marks All three topics have been described and clearly explained. There will be few, if any, errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly.</p> <p>4 – 7 marks At least two of the three topics have been covered. If included:</p> <ul style="list-style-type: none"> • Logins and access rights have been described. • A method of encryption and possibly decryption has been described. • Back up procedures and how data is recovered has been briefly explained. <p>There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct.</p> <p>1 – 3 marks At least one of the three topics has been described. Information will be poorly expressed and there will be limited, if any, use of technical terms. There are significant errors in grammar, punctuation and spelling.</p> <p>0 marks No appropriate content.</p>		