



GCE MARKING SCHEME

**COMPUTING
AS/Advanced**

SUMMER 2014

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCE COMPUTING. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were 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 conferences was to ensure that the marking schemes were 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' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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GCE COMPUTING - UNIT CG3

Mark Scheme - Summer 2014

- Q.1 VLE: is a software system / intranet application / facility / tool (**Condone website or program**) designed to help (teachers and pupils) in the (management and) use of learning materials 1
- Both ideas needed for the mark.**
- Could be used for instance by pupils to access revision / a classwork assignment / feedback / etc - Accept any specific example. 1
- Internet: is a (world-wide) networked information and communication system freely available via any connected computer/device (**Not** just a large network) 1
- Could be used to research for information not available from the VLE 1
- Drawbacks: any 2 of: 1+1
- could be used to look at unsuitable material (**needs a reason** eg pornography, hate sites, etc)
 - could be used for time-wasting / to communicate with friends, social media etc
 - could be used to look up answers for tests, etc
 - could allow a virus etc to be downloaded / can carry out illegal downloads etc, eg pirated films or games
 - could make pupils susceptible to paedophiles / cyber-bullying etc
 - information derived from www could be incorrect
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- Q.2 Data structures are: **any 1 of:**
- convenient / efficient way of organising/grouping data relating to a real problem 1
 - may be efficient to deal with various elements as one item
- Any 1 of:**
- (binary) tree 1
 - linked list
- Q.3 **Any 2 of:**
- subprogram return address etc 1+1
 - undoing / back for instance on a browser
 - recursion values
 - short-term arithmetical result / reverse Polish calculations (**accepted not exp**)
 - reversing a queue / list
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Q.4	Circuit switching:	1
	Any 2 for one mark total :	
	<ul style="list-style-type: none"> • Path is set up between the sender and receiver • All data follows the same path, in order • Path cannot be used by any other data 	
	Packet switching:	
	Any 2 for one mark total :	1
	<ul style="list-style-type: none"> • Data split into packets • Each packet may be transmitted by different routes • Packets may arrive out of order and are re-assembled 	
	Packet switch preferred:	
	<ul style="list-style-type: none"> • Better security as it is very difficult to intercept 	1
	<ul style="list-style-type: none"> • Makes more efficient use of data lines as there is no waiting during gaps 	1
	NOT (as it's in the question) Less likely to be affected by network failure, etc	
	Content of packet: any 2 of:	
	<ul style="list-style-type: none"> • the source address • the order number of the packet / reassembly data / assembly data / timestamp • error control mechanism / check sum / parity bit / etc 	1+1
	NOT (as it's in the question) actual data and destination addresses	

An example of an extended answer worth six marks is:

Circuit switching is where a path is set up between the sender and receiver before the start of transmission and is kept open until the end of transmission. All data follows the same path, in order. The path cannot be used by any other data during the transmission.

Packet switching is where the data is split into packets before transmission. Each packet may be transmitted by different routes through network. They may arrive out of order and are re-assembled on arrival.

Packet switching is usually preferred because it results in better security as it is very difficult to intercept and reconstruct the packets. Packet switching also promotes the more efficient use of data lines as there is no waiting during gaps.

A packet could also contain the source address and the order number of the packet

Q.5	Data collision occurs when two sets of data are detected on the network <u>simultaneously</u>	1
	Once detected, each computer waits for a short/random time then sends again	1
<hr/>		
Q.6	Mask(ing)	1
	00000010	1
	AND	1
<hr/>		

Q.7	Hex: any 1 of:	
	<ul style="list-style-type: none"> acts as shorthand for binary easier for humans to read and understand / fewer characters required than binary 	1
	NOT takes up less space	
	0100 1110 = 4E	1
Q.8	Advantage of integer form: any 2 of:	
	<ul style="list-style-type: none"> numbers are stored completely accurately / precisely require less complex processing than floating point allows for an exact representation of zero takes up less storage space 	1+1
	Advantage of floating point form: any 1 of:	
	<ul style="list-style-type: none"> non-integers / real numbers / number with decimals can be stored greater range of (pos/neg) numbers can be stored 	1
Q.9	<u>Overflow</u> : occurs when the number is too large to be stored (satisfactorily) by the computer	1
	<u>Underflow</u> : occurs when the number is too close to zero (condone too small) to be stored (satisfactorily) by the computer	1
Q.10	Any 1 of:	
	<ul style="list-style-type: none"> enables computer /software (systems) to communicate with each other easily use of (mainly) just one code avoids confusion/ incompatibility between systems 	1
	"d" or d Not "D" or D	1
Q.11	Records stored in key sequence order	1
	An index allows data to be accessed directly / index contains key field and disc address of record / the key field and index are used to locate the position	1
	Compared with ordinary sequential: Allows for faster access because you can access individual records directly	1
Q.12	Archiving is the process of storing data which is no longer in current use	1
	It is held for security / legal / historical reason	1
	It frees up resources on the main computer system.	1
Q.13	<u>Blocked</u> means that the process is not running because it is waiting for some event (such as an input/output operation)	1
	<u>Ready</u> means that the process is not running because another process is currently being run / waiting for processor time	1

- Q.14 Buffering:
 Using an area of memory to store data while transferring to/from a peripheral 1
- Single buffering: only one buffer is used)
 Double buffering: while one buffer is being emptied, another can be filled) 1
- Double buffering is quicker as it avoids waiting for the data transfer 1
- An example of where double buffering is useful is writing to a screen / in a printer queue 1

An example of an extended answer worth four marks is:

A buffer is an area of computer memory where data is held while transferring it to or from a (slower) peripheral. With double buffering, while one buffer is being emptied, another can be filled. This avoids waiting for the data transfer. An example is a printer queue double buffering system - one buffer can be filled while another one is being emptied to the printer, whereas a single buffer is adequate for a keyboard.

Q.15

Example:

		GCSE Grades		
		English	Maths	
Pupil1		C	A	----
Pupil2		B	E	----
-----		----	----	----
-----		----	----	----

Marking: 1 mark for each dimension 1+1
 Must be more than one column / row to get mark for that dimension
 If no diagram, max of 1 mark

Three-dimensional array: more complex to program / process 1

- Q.16 BNF is used to describe (unambiguously) the syntax / grammar / rules of a programming / computer language 1

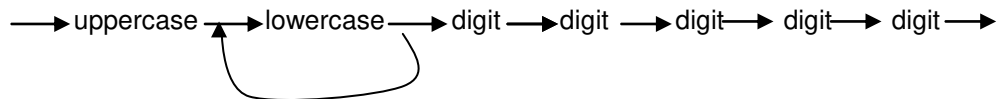
- Q.17 <upperletter> ::= A|B|C||Z
 <lowerletter> ::= a|b|c| |z 1
 <digit> ::= 0|1|2||9 (**Must have** indication of zero) 1
- <name_chars> ::= <lowerletter>|<lowerletter><name_chars> 1
- <compcode> ::= <upperletter><name_chars><digit><digit><digit><digit><digit> 1

Accept

<compcode>::=
 <upperletter><name_chars><digit><digit><digit><digit><digit> |
 <upperletter><digit><digit><digit><digit><digit>

[Marking: one mark for attempted recursion even if incorrect:
 - same item Left and Right + other item(s) on Right are needed
 Can't get 4 unless completely correct
 Notation error max 1 mark lost]

Q.18



Marking: 1 mark for uppercase
 1 mark for lowercase plus repeat
 1 mark for 5 digits

1+1+1

Q.19 Any partial dependencies must be removed

1

Q.20 Any 1 of:

- Any transitive dependencies must be removed 1
- It needs to be ensured that each attribute/field depends only on the primary key

Q.21 A primary key is a field which uniquely identifies a record in a database.

1

Q.22 POET (PoetID, PoetName, PoetDOB)

POEM (PoemTitle, PoetID, DateCompleted)

VENUE (VenueName, Address, AudienceSize)

POETRY-READING (VenueName, Date, PoetID)

Marking: Four suitable name tables

1

Each of four tables with suitable PK shown as such (1 mark if 2 or 3 PKs) 2

Each FK shown as such

3x1

Any number of bad fields / bad FKs – remove only 1 mark
 Ignore additional / irrelevant fields

Q.23 A pass is made through the data, comparing each value with the following one...
 ... and swapping them if necessary

1

1

A number of passes is made until the data is in order / no swaps

1

Accept a diagrammatic answer

Q.24 A recursive algorithm is one which calls itself.

1

It must also have a terminating condition / “base case”
 (**Condone** idea of unwinding)

1

Quicksort

1

Q.25 Why it's important: any 2 of:

1+1

- Many organisations could not survive if the system failed / data lost
- All computer systems are liable to fail
- You can't always avoid fires, floods, terrorist attacks etc.
- Organisation needs to recover quickly after the disaster

Elements of disaster planning: any 3 of:

1+1+1

- Backups should be made
- Files should be archived off-site
- There should be an alternative system
- There should be a back-up power supply
- Staff need to be trained to be able to recover successfully

Q.26

Marking	
1 declare Sales array(1..999) of integer (or real)	
2 set Total = 0	Initialise and first input
3 set Min = 999999 (or any large number, or can be set to first value)	
4 set NumLows = 0	
5 input NumStaff	
6 for Count = 1 to NumStaff	(either) Loop structure
7 input Sales(Count)	
8 set Total = Total + Sales(Count)	Input and two updates
9 if Sales(Count) < Min then set Min = Sales(Count)	
10 endfor	
11 set Mean = Total / NumStaff	Calc and output mean
12 output "Mean = ", Mean	
13 for Count = 1 to NumStaff	
14 if Sales(Count) < Mean then	
15 set NumLows = NumLows+1	Update & output in loop
16 output Sales(Count)	
17 endif	
18 endfor	
19 output "Total number of values below mean = ", NumLows	Two outputs
20 output "Lowest sales figure = ", Min	

[Marking: Other approaches are possible and will be given full credit if correct.
No marks are given for brevity/efficiency/elegance]

Q.27

Data is stored on a number of different computers (probably in different locations)	1
It is often more efficient / it will maximise performance to store data in this way	1
It is difficult to ensure that all the data in all the computers is always up-to-date / maintain integrity	1

Q.28

4GL:

used in (eg) a relational database system as a query / manipulation language 1

Why:

aimed at end-users / relatively close to natural language / requires less prog'g skill 1

Visual Language:

used for production of objects / buttons / icons / GUI / windows / graphics content /
event driven environment 1

Why:

may be easier to learn / more intuitive because visual / tools available 1

Special Purpose Language:

used for simulation, control applications, etc 1

Why:

may have special features relevant to the application e.g. time analysis elements 1

Q.29 Any 1 of:

- A scripting language (is often embedded in other languages and) can add functionality to web pages, etc 1
 - Is the set of commands understood by the application software. Different software usually have different script languages and the scripts cannot always be used with other produces [BCS, 2013]
-

Q.30 Suitable interfaces (No mark just for naming interface)

GUI

- GUI system is usually easy to learn for a novice user
- GUI system is usually more intuitive to use e.g. icons relevant to the application
- may be similar to other packages with which users are familiar
- can show images/videos etc to promote the clothing / make it appeal to customers
- can have an on-screen / soft keyboard

Touch screen

- generally more robust than eg mouse or keyboard
- easy to use with little comp knowledge/customer may be familiar with touch screen
- can be designed to replicate common mobile phones / tablets (swiping etc)
- takes up less space the keyboard and mouse
- will be attractive to customers
- can have an on-screen / soft keyboard [not twice]

Forms dialogue

- customers can choose items from a list
- may have in-built validation

Unsuitable interfaces (No mark just for naming interface)

Text-based

- time consuming
- not attractive to most customers / not likely to have images
- not easy to learn or use in a crowded environment

Speech recognition interface

- not easy to use in a crowded environment - probably too much background noise
- may be ineffective until computer “learns” customer’s speech style: impractical
- may have problems with different accents / different voices, homophones etc

Voice synthesis

- not suitable in noisy environment (particularly if several computers nearby)

Handwriting recognition

- text input may not be appropriate for this application
- not very reliable
- may not be easy to use in a crowded shop

Mouse

- not easy for complete novice users
- easily damaged [not twice]
- could be stolen

Hardware Keyboard [**COULD BE A SUITABLE INTERFACE IF WELL ARGUED**]

- text input not appropriate for this application
- easily damaged [not twice]
- quite large [but not if used as a benefit of eg touchscreen elsewhere in answer] 11

[Marking: The description of any point can be extended with more detail to gain extra marks]

- 8-11 Candidates give a clear, coherent answer fully and accurately describing and explaining both suitable and unsuitable interface types. They use appropriate terminology and accurate spelling, punctuation and grammar.
- 4-7 Candidates describe and explain a reasonable part of the subject area, but responses lack clarity. There are a few errors in spelling, punctuation and grammar.
- 0-3 Candidates simply list a range of points or give a brief explanation the subject area. The response lacks clarity and there are significant errors in spelling, punctuation and grammar.

Maximum of 8 if only suitable interfaces discussed (or if only unsuitable interfaces)]



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