AQA

GCSE

Computer Science

Paper 2 Additional Questions
Mark scheme

V1.0
21/01/16

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from http://www.aqa.org.uk/

COMPONENT NUMBER: **Paper 2 Additional Questions**

COMPONENT NAME:

STATUS:

DATE: **22 January 2016**

To Examiners:

- **When to award '0' (zero) when inputting marks on CMI+**
  A mark of 0 should be awarded where a candidate has attempted a question but failed to write anything credit worthy.

  Insert a hyphen when a candidate has not attempted a question, so that eventually the Principal Examiner will be able to distinguish between the two (not attempted / nothing credit worthy) in any statistics.

- This mark scheme contains the correct responses which we believe that candidates are most likely to give. Other valid responses are possible to some questions and should be credited. Examiners should refer responses that are not covered by the mark scheme, but which they deem creditworthy, to a Team Leader.

The following annotation is used in the mark scheme:

; - means a single mark
// - means alternative response
/ - means an alternative word or sub-phrase
A - means acceptable creditworthy answer
R - means reject answer as not creditworthy
NE - means not enough
I - means ignore
DPT - in some questions a specific error made by a candidate, if repeated, could result in the failure to gain the mark. The **DPT** label indicates that this mistake should only result in a candidate losing one mark on the first occasion that the error is made. Provided that the answer remains understandable, subsequent marks should be awarded as if the error was not being repeated.

Level of response marking instructions.

Level of response mark schemes are broken down into a number of levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are a range of marks in each level. The descriptor for the level represents a typical mid-mark performance in that level.

Before applying the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level. ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

01	1	**All marks for AO1 (understanding)** Image is divided into pixels; Each possible colour is represented by a (unique) bit pattern; The colour of each pixel is stored; The order of the bit patterns for the individual pixels indicates where the pixel will appear in the image; Metadata about the image will also be stored; **Maximum 3 marks**	3

01	2	**Mark is for AO2 (apply)** **1 mark:** 14;	1

02	1	**All marks for AO1 (recall)** **1 mark:** number of samples taken; **1 mark:** per second; A. alternative time periods eg minute	2

02	2	**All marks for AO1 (recall)** **1 mark:** Number of bits; **1 mark:** used to represent a sample;	2

02	3	**All marks for AO1 (understanding)** **1 mark:** Multiply the sampling rate and sampling resolution; **1 mark:** Multiply by the number of seconds the (original/analogue) sound lasts;	2

03	1	**Mark is for AO1 (understanding)** **1 mark: C**: Data and instructions; **If more than one lozenge shaded then mark is not awarded**	1

<table>
<tr>
<td>03</td>
<td>2</td>
<td>All marks for AO1 (understanding)

<table>
<tr><th>Description</th><th>Letter</th></tr>
<tr><td>Sends a continuous series of electronic pulses</td><td>D;</td></tr>
<tr><td>Decodes the current instruction</td><td>C;</td></tr>
<tr><td>Completes calculations</td><td>B;</td></tr>
</table>

Mark as follows:
1 mark: one row correct;
2 marks: two rows correct;
3 marks: all rows correct;</td>
<td>3</td>
</tr>
</table>

<table>
<tr>
<td>04</td>
<td>1</td>
<td>All marks for AO1 (recall)

Group of computers/devices;
connected together // that can communicate with each other;</td>
<td>2</td>
</tr>
</table>

<table>
<tr>
<td>04</td>
<td>2</td>
<td>All marks for AO1 (understanding)

Share hardware;
Share data/files;
Improved communication tools;
Improved monitoring of users;
Centralised back-up;

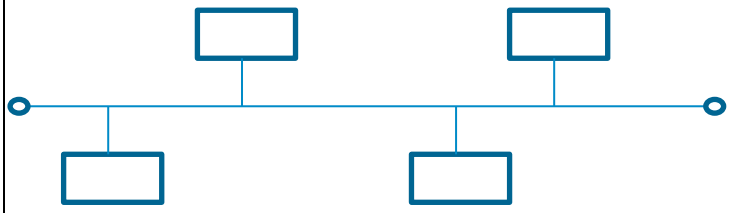
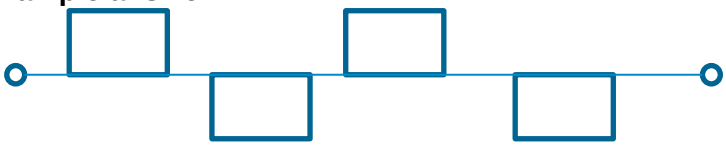
Max 3 marks</td>
<td>3</td>
</tr>
</table>

<table>
<tr>
<td>04</td>
<td>3</td>
<td>All marks for AO1 (understanding)

Reliance on server;
Network can slow down (when traffic is heavy);
Cabling/additional hardware/installation costs;
May have additional costs due to need to employ a network manager;

Max 3 marks</td>
<td>3</td>
</tr>
</table>

04	4	**2 marks for AO1 (understanding) and 2 marks for AO2 (apply)** **1 mark for AO1:** Authentication is ensuring that a user is who they are claiming to be; **1 mark for AO2:**The business could give each employee their own username and password // the business could use a biometric system, eg fingerprints, to check which employee is logging in / to ensure that only employees can log in; **1 mark for AO1:** Encryption is changing data so that it cannot be read (except by authorised users / those with the decryption key); **1 mark for AO2:** The business could use encryption to prevent unauthorised people from reading sensitive data; **A.** example of sensitive data eg personnel records	4

04	5	**All marks for AO1 (understanding)**  **Mark as follows:** Diagram has a main cable; **I.** bidirectional arrow instead of line **R.** unidirectional arrow Each computer is connected to the main cable; **I.** bidirectional arrows instead of lines **R.** unidirectional arrows Network contains exactly four computers and each computer is not connected to any other computers (except via the main cable); **I.** missing terminators at ends of main cable **Maximum 2 marks if any errors in diagram** **Example answer**  This diagram worth 2 marks as there is a main cable and there are four computers not connected to any other computers (except via the main cable). However, it does not get the mark for connecting the computers to the main cable as the computers have not been given connections to the main cable.	3

04	6	**All marks for AO2 (apply)** The installation cost will be high; There is a reliance on the central switch/hub (and if this fails the network is unusable); **A.** As there are only a small number of workstations there is little (**A.** no) difference in network speed between the bus and star networks; **Max 2**	2

05		**Two marks for AO1 (recall) and four marks for AO1 (understanding)** **Level** / **Description** / **Mark Range** 3 – Clear descriptions of the roles of all or almost all of the layers of TCP/IP have been included along with the names of the missing layers. – 5-6 2 – Accurate description of one or two of the roles of layers of TCP/IP has been included along with the name of at least one of the missing layers. – 3-4 1 – Answer includes one of the following: an accurate description of the roles of the application and/or network layers of TCP/IP, a statement of the names of the missing layers of the TCP/IP model, a statement of the name of one of the missing layers of the TCP/IP layer which may include a description of the role of this layer. – 1-2 No creditworthy answer – 0 **Guidance – Response for AO1 (recall)** Transport (layer); Data link (layer); **A.** link **A.** network interface (layer) **Guidance – Indicative Response for AO1 (understanding)** Application layer is where network applications operate; Transport layer sets up the communication between the two hosts; Transport layer splits the data into packets; Network layer adds (IP) addresses to the packets; Network layer routes the packets across the network; Data link layer is where network hardware operates (eg network interface card); Data link layer is where operating device drivers operate; **Note: there is significantly more detail that can be written about the roles of the layers that is beyond the scope of the syllabus. Responses that contain some of this detail would also obtain credit though the additional detail has not been included on this mark scheme.** **Maximum four marks for AO1 (understanding)**	6

06		**Nine marks for AO1 (understanding)** **Level 3** Clear descriptions of the similarities and the differences between all or almost all of the four stated types of malware. At least three appropriate measures that can be taken to minimise the risks posed by malware have been described. **Mark Range: 7-9** **Level 2** Answer includes one of the following: • Clear descriptions of the similarities and the differences between all or almost all of the four stated types of malware. • Descriptions of the similarities and the differences between some of the types of malware and descriptions of more than one appropriate measure that can be taken to minimise the risks posed by malware. **Mark Range: 4-6** **Level 1** Answer includes one of the following: • Descriptions of some of the differences between the different types of malware. • Descriptions of some of the similarities between the different types of malware. • Description of appropriate measures that can be taken to minimise the risks posed by malware. **Mark Range: 1-3** No creditworthy answer **Mark: 0** **Guidance – Indicative Response for differences** Users sometimes choose to allow/install adware (this is not the case with the other types of malware); An alternative to purchasing software can be to use free software that makes use of adware; Spyware tracks what a user is doing – adware doesn't; Adware does not do any harm to a computer system (unlike spyware, viruses and Trojans) though it can be irritating and be used to conceal spyware; Spyware and Trojans are often installed unwittingly by the user; Viruses can replicate themselves / spread without user being involved; Trojans and viruses can be very destructive; Spyware and adware work in the same way; All four types of malware can be intrusive/disruptive;	9

		Guidance – Indicative Response for minimising risks Read software license agreements before installing software as sometimes these state that spyware will be installed; Install anti-spyware/virus software; Update anti-spyware/virus software regularly; Run anti-spyware/virus software regularly; Before downloading/installing new software complete research to check if it is safe / provided by an organisation that can be trusted; Be careful when using peer-to-peer file sharing; Don't open attachments on emails from people you don't know/trust; Adjust browser security settings; **Maximum four marks for minimising the risks from malware.** **Maximum six marks for comparison of types of malware.**	

07	1	**All marks for AO2 (apply)** The program source code is not available/published/made public; (In large programs) it could be difficult to spot a small amount of copied program code; The two programs were designed for the same purpose so it is likely that some of the code will be similar; The two versions of the code could be based on the same idea/algorithm; It is possible for (small sections of) code in two programs to be the same by coincidence; **Max 2**	2

07	2	**Mark is for AO2 (apply)** Publishing their program code would mean that competitors could copy it; Publishing their program code would mean that competitors could see how their program works and would find it easier to write chess-playing programs that could beat Rybka; Publishing their code would help competitors to improve their chess-playing programs making it more likely people will buy alternative (improved) programs (meaning that the company that wrote Rybka would make less money); **Max 1**	1

07	3	**All marks for AO2 (apply)** **Reasons for:** Can lead to higher levels of innovation; It is difficult to be sure that program code has been copied; People could be discouraged from developing similar products to those already on the market, so reducing competition; Makes it easier for other people to release bug fixes; **R.** some people might want people to be allowed to copy their code **Reasons for disagreeing:** Loss of income for developers; Discourages software companies from developing new programs; Copying code could result in multiple products having the same bugs; **Maximum 1 mark for reasons for** **Maximum 1 mark for reasons against**	2

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