

AS

Computer Science

Paper 2 Additional Questions

Mark scheme

V1.0

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: 27 Mar 2015

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 more than one 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		<p>Mark is for AO1 (understanding)</p> <p>a number that can be written as a fraction; where the numerator and denominator are whole numbers;</p>	2
01	2		<p>Mark is for AO1 (understanding)</p> <p>A integer can be written as a fraction over 1//with a denominator of 1;</p>	1
02	1		<p>All marks AO2 (apply)</p> <p>(0)1100110;</p>	1
02	2		<p>All marks AO2 (apply)</p> <p>87 to binary: 01010111 binary to hex: 57</p> <p>1 mark for working: conversion of 87 to binary or use of $5 * 16$ being 80; 1 mark for answer: 57</p>	2
02	3		<p>All marks AO2 (apply)</p> <p>Examples: (MAX 1) Use of hexadecimal to represent colour codes Use of hexadecimal for memory dumps Use of hexadecimal to represent MAC addresses [or any other suitable example]</p> <p>Hexadecimal is used as it provides a shorter representation of a number than binary;</p>	2
02	4		<p>All marks AO2 (apply)</p> <p>00001001 00000011 x</p> <p>00001001 00010010 1 mark (rows in any order);</p> <p>00011011 1 mark for final answer;</p>	2

02	5		All marks AO2 (apply) 011111; 31;	MAX 1
02	6		All marks AO2 (apply) A kibibyte is 2^{10} //1024 bytes whilst a kilobyte is 10^3 //1000 bytes;	1
03	1		Marks are for AO2 (apply) The character has been received correctly; as there are an odd amounts of 1s;	2
03	2		Mark is for AO2 (apply) 0 0 1 1 1 0 0 1;	1

04	1		Mark is for AO2 (apply) COMPUTING VHFINMBGZ ;	1
04	2		Mark is for AO2 (apply) IRMAHG PYTHON;	1
04	3		Marks are for AO2 (apply) 01010011 01001111 01010011 10111001 00110101 00011010 11101010 01111010 01001001 1 mark - correctly writing out binary for S O S; 1 mark - laying out the key under/by the correct letters; 1 mark - correctly applying XOR;	3
05	1		Marks are for AO1 (knowledge) A pixel is a picture element; smallest addressable element of a picture;	MAX 1
05	2		Marks are for AO1 (understanding) run length encoding//RLE;	1

05	3		Mark is for AO1 (understanding) lossy compression results in lost data / quality from the original version;	MAX 1
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05	4		Marks are for AO2 (analyse) Date/time information; camera settings; A. example of camera setting (exposure/aperture) thumbnail; copyright information; A. Any other sensible item of information	MAX 2
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06			<p>2 marks for AO1 (knowledge) and 4 marks for AO1 (understanding)</p> <table border="1"> <thead> <tr> <th>Level</th> <th>Description</th> <th>Mark Range</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>A detailed description where the student identifies the three other types of system data and provides examples that shows a good level of understanding.</td> <td>5-6</td> </tr> <tr> <td>2</td> <td>An adequate description where the student identifies at least two other types of system data and provides examples that shows a reasonable level of understanding.</td> <td>3-4</td> </tr> <tr> <td>1</td> <td>A small number of points recalled but little or no understanding shown.</td> <td>1-2</td> </tr> </tbody> </table> <p>Type of system software translators utility programs library programs</p> <p>Description points operating system: - provides a user interface between the user and the hardware - runs application programs</p>	Level	Description	Mark Range	3	A detailed description where the student identifies the three other types of system data and provides examples that shows a good level of understanding.	5-6	2	An adequate description where the student identifies at least two other types of system data and provides examples that shows a reasonable level of understanding.	3-4	1	A small number of points recalled but little or no understanding shown.	1-2	6
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		<ul style="list-style-type: none">- manages resources / hardware <p>utility programs:</p> <ul style="list-style-type: none">- programs designed to help configure / optimize / maintain the computer- examples include virus scanner / disk defragmenter / system monitor / file managers <p>library programs:</p> <ul style="list-style-type: none">- are collections of resources used to develop software- include pre-written code and subroutines <p>translators:</p> <ul style="list-style-type: none">- convert source code into machine code- assembler converts assembly code into machine code- compiler converts source code written in a high level language into machine code- interpreter treats high level language source code as data and interprets that data as instructions to its own routine	
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07		<p>2 marks for AO1 (knowledge) and 4 marks for AO1 (understanding)</p> <table border="1" data-bbox="445 443 1206 1659"> <thead> <tr> <th data-bbox="445 443 568 479">Level</th> <th data-bbox="568 443 954 479">Description</th> <th data-bbox="954 443 1206 479">Mark Range</th> </tr> </thead> <tbody> <tr> <td data-bbox="445 479 568 1099">3</td> <td data-bbox="568 479 954 1099">A line of reasoning has been followed to produce a coherent, relevant and substantiated and logically structured response. The response covers ethical, legal and cultural issues. In these areas there is sufficient detail to show that the student has a good level of understanding of the issues involved. A good level of understanding would be indicated by two or three substantiated points being made per area.</td> <td data-bbox="954 479 1206 1099">7-9</td> </tr> <tr> <td data-bbox="445 1099 568 1485">2</td> <td data-bbox="568 1099 954 1485">A line of reasoning has been followed to produce a mostly coherent, relevant, substantiated and logically structured response that covers at least two of ethical, legal and cultural issues. In each of these areas, at least two valid points must have been made.</td> <td data-bbox="954 1099 1206 1485">4-6</td> </tr> <tr> <td data-bbox="445 1485 568 1659">1</td> <td data-bbox="568 1485 954 1659">A few relevant points have been made but there is no evidence that a line of reasoning has been followed.</td> <td data-bbox="954 1485 1206 1659">1-3</td> </tr> </tbody> </table> <p data-bbox="430 1693 560 1727">Guidance</p> <p data-bbox="430 1765 659 1798">Underlying issue:</p> <ul data-bbox="430 1798 1262 1901" style="list-style-type: none"> - protecting the safety of students using a social networking site - company has a responsibility to decide how the collected data may be used <p data-bbox="430 1937 528 1971">Ethical:</p> <ul data-bbox="430 1971 1251 2069" style="list-style-type: none"> - what rules should the company develop about the acceptable use of its service? - need to have transparent policies to gain trust of users and 	Level	Description	Mark Range	3	A line of reasoning has been followed to produce a coherent, relevant and substantiated and logically structured response. The response covers ethical, legal and cultural issues. In these areas there is sufficient detail to show that the student has a good level of understanding of the issues involved. A good level of understanding would be indicated by two or three substantiated points being made per area.	7-9	2	A line of reasoning has been followed to produce a mostly coherent, relevant, substantiated and logically structured response that covers at least two of ethical, legal and cultural issues. In each of these areas, at least two valid points must have been made.	4-6	1	A few relevant points have been made but there is no evidence that a line of reasoning has been followed.	1-3	9
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		<p>parents</p> <ul style="list-style-type: none"> - need to consider what harmful purposes users might use the service for - need to consider what security measures the developers should use for the service - need to consider what data should be collected about each student during registration - should the company monitor the messages being posted by students? - should the company develop a system for alerting somebody / blocking users if inappropriate material is posted? - should the company use the data to target adverts // sell the user data on to marketing companies? - what steps should the company take to ensure that the system is not hacked // data lost / damaged? - how to deal with copyrighted material that a student might post as part of a discussion <p>Legal:</p> <ul style="list-style-type: none"> - need to comply with legislation - worldwide service so need to consider different legal systems - where to base the service may be influenced by laws in that country - may be conflicts between how users expect company to deal with data / monitor student messages and legal requirements - data protection legislation will (probably) apply - copyright legislation may be breached if copyright material uploaded / attached to a message <p>Cultural:</p> <ul style="list-style-type: none"> - discussion of science topics that go against a culture's beliefs - risk of pushing developer's values on to other cultures 	
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08		<p>Marks are for AO2 (apply)</p> <p><u>Mark Scheme</u></p> <table border="1" data-bbox="445 472 1206 1064"> <thead> <tr> <th>Level</th> <th>Description</th> <th>Mark Range</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>A detailed description where the student identifies two more hardware decisions and describes all four types with examples that shows a good level of understanding.</td> <td>5-6</td> </tr> <tr> <td>2</td> <td>An adequate description that covers at least three types and demonstrates a reasonable level of understanding.</td> <td>3-4</td> </tr> <tr> <td>1</td> <td>A small number of points recalled but little or no understanding shown.</td> <td>1-2</td> </tr> </tbody> </table> <p>System hardware decisions: clock speed word length address bus width data bus width</p> <p>Effects on performance: multiple cores - two or more independent processing units means that tasks can (potentially) be run in parallel - tasks split up to make use of extra cores so speed of execution is increased</p> <p>cache memory - small amount of very fast memory placed near to the processor - attempts to contain the next instruction(s)/data which speeds up execution of programs</p> <p>clock speed - by increasing the clock speed the processor will execute more instructions per unit time</p> <p>word length - by increasing the word length the processor can handle more data per instruction</p>	Level	Description	Mark Range	3	A detailed description where the student identifies two more hardware decisions and describes all four types with examples that shows a good level of understanding.	5-6	2	An adequate description that covers at least three types and demonstrates a reasonable level of understanding.	3-4	1	A small number of points recalled but little or no understanding shown.	1-2	6
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		<ul style="list-style-type: none"> - by increasing the word length the processor can access a larger amount of memory through direct addressing - by increasing the word length the processor could have a larger instruction set <p>bus width</p> <ul style="list-style-type: none"> - by increasing the address bus size we can address more unique memory locations - increasing the address bus size increases the maximum potential memory size <ul style="list-style-type: none"> - by increasing the data bus size we can move more data around per unit time 	
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