GCE

Computing

Report on the Units

January 2009

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Advanced GCE Computing (H447)

Advanced Subsidiary GCE Computing (H047)

REPORT ON THE UNITS

F451 Computer Fundamentals

General comments

Candidates had been well prepared for the examination with few scripts demonstrating a noticeable lack of understanding on the part of the candidate. Indeed, there were a number of excellent scripts that demonstrated a thorough understanding of the subject matter from the candidates concerned. Generally, there was a good spread of marks on a paper which discriminated well across the whole mark range.

Considering that this is the first paper of a new specification it is good to see that the transition has not been too difficult. There are questions that are different from the types of questions that were asked in the previous specification and there are questions which did not work as was hoped, but generally the questions proved to be fair, discriminating and clear to candidates as to what was expected of them to successfully respond.

The scripts were marked on-screen. Candidates had been well instructed in the methods to be used to make their responses clear and to ensure that where parts of a response were not where the examiner would normally expect to find them then clear indicators were given to ensure that the examiner could find the response easily.

One area that gave rise for concern should be mentioned. Candidates should be aware that the scanning process is very sensitive so that everything is picked up and shown to examiners on the screen. This includes any pencil work or work in another colour of ink. The software shows it to the examiner in a single monochrome black, and distinctions between different 'colours' that are used on the page may look very clear when read on paper but lose their variation when the examiner sees the response on the screen. Work from candidates who do this can look very confusing. There were no obvious cases in this paper where there may have been a problem because the candidate had used different colours for subtle reasons (perhaps to indicate different types of data flow) but it is important that candidates are made aware of this and that in the future they should be encouraged to only use one pen when writing their responses.

The paper was well laid out with very few candidates needing extra space for any of the questions.

Individual Questions:

1.a   The definition of the storage device was not intended to be a difficult question but candidates failed to indicate that it was peripheral to the processor. Responses of the type 'A device to store data' is not specific enough to attract the mark. Definitions like these should be clear and unequivocal.
   The second part of this question was well answered with the exception of candidates stating 'CD'. This is rather like saying 'a disk', it is not precise enough. Both CDROM and CDRW were acceptable answers, but they have very different uses and as such are very different devices. This was perhaps the most problematic thing with the responses, a reluctance to commit! There were too many instances of the use of words like 'could be, 'nearly' 'one of…', these demonstrate an indecision, and are a demonstration of a reluctance to commit to an answer. This use of 'CD' is sometimes an example of that and sometimes a simple laziness of expression, in either case it is not worthy of credit.
   b   It is no longer possible to say that the quality of responses is centre based because examiners rarely see consecutive scripts from the same centre any more, but the impression is that this was true in this question. Responses fell into three groups. One was the group that simply defined the terms buffer and interrupt, this did not answer the question. Others either gave a thorough explanation gaining most or all of the marks, or

they demonstrated a total lack of understanding. This distinction seemed to be largely independent of the abilities demonstrated by the candidate in the rest of the paper.

2.   The question tried to split the process into three specific stages: storing data; input of the data stored and finally the use of the data input. Undoubtedly, this helped many candidates to formulate their responses, but it did the opposite to some who saw the word 'barcode' and had an immediate Pavlovian reaction to write down everything that they could remember about the use of barcodes in a(i). The result of this was that they had run out of things to say for the other two parts of the question. While having a degree of sympathy for a young person at the start of an important examination, the problem of this Pavlovian reaction is a real one which should be addressed. Candidates must answer the question, not one word of a question.

3.   While there were many good responses to this question showing that the candidate understood the concepts thoroughly, there were too many who interpreted ROM as CDROM, or they got the two types the wrong way around or they offered inappropriate types of software. For ROM, teachers should note that the only safe response is the boot (or bootstrap or startup) program. Sometimes the OS may be on ROM and if a candidate qualifies their response by saying 'The OS in an embedded microprocessor' then that is an excellent response, however, the OS is more normally found on the backing storage device until it is needed. The rule should be not to suggest other software here unless it is qualified properly. Happily the number offering BIOS continues to fall and is now negligible.

4.   Very well answered by most candidates. Candidates should be aware of the mark allocation when answering this sort of question. Here it only allows 2 marks for part a, and while accepting that the question was somewhat loose the mark allocation should give a clear indication to candidates of the number of points that need to be made.

5.a   The importance of an understanding of the tasks of the people involved in this system is not well understood and yet is crucial to the development of any system. The types of maintenance were well understood with most candidates picking up the marks here. The accurate naming of the three types was not necessary as long as the meaning was evident, though this did not worry many candidates who obviously knew this work well.

   b   Surprisingly, many candidates confused validation checks with verification. This should not happen at this level. Many candidates failed to answer the question by relating their validation to one of the other pieces of data rather than the two specified. This was accepted, but when candidates started talking about data input to the pupil file in a school then it was too far removed from the question asked.

   c   A new style of question. An important part of this assessment is the style of the response. Part of the assessment is for the candidate demonstrating a sensible and clear presentation of the points which they want to make. This does not have to be in the form of an essay, although that is the obvious form for this question, other forms of question may be well suited to a numbered point solution or perhaps a diagrammatic solution, these two types of response would be well suited for a question which requires the candidate to give their response in some form of order, for instance a question which asked about the transfer of data to and from peripheral devices. The method of marking these questions is that the mark scheme (to which the attention of the reader is drawn for the expected responses to this and all other questions) has a number of criteria listed under each of three bands of marks. The examiner first of all makes a judgement as to which of the three bands the candidate should be in according to those criteria and then considers the amount of detail that the candidate has produced in order to determine which mark is appropriate within that band. Most candidates were able to produce sensible responses with those responses being an excellent discriminator right across the range of marks and ability.

6.a Well answered. This has become a standard question with a standard response.

  b As a reference to the mark scheme will indicate, the mention of hardware links and software links were both credited here although the expected response was the handshake signal between the two devices.

  c This was intended to be a high end question and so it proved. The logical parts were better answered than the hardware though some excellent answers were received for both parts, particularly from candidates who structured their answers around wireless technology.

7.a The question quite clearly specifies that these computers are all in the same office. There might be a very weak argument for suggesting the use of a bridge but linking the computers with a modem or a gateway, I suspect, indicates a lack of reading of the question rather than a lack of ability or knowledge in this topic.

  b This was well answered by most candidates who had a good understanding of this topic. A small proportion of candidates believed that the drop down menu feature of a GUI made it a menu based interface. This not only restricted any marks they could earn in (ii) but made life very difficult in (iii) where they had to compare the uses of menu based and GUI and they had already decided they were the same thing.

8 This was very poorly answered. It may have been because of its position in the paper, but the definitions of a character set were often wide of the mark showing a basic misunderstanding of the whole question. The examples given were often extremely nebulous but the examiners tried to be as generous as possible. Some good answers were spoiled by the candidate clinging to the belief that a byte is 8 bits. While they were still able to pick up the marks on other mark points, it was disappointing to read this from even very able candidates, because this is, after all, the whole point to this question, the relationship between the character set and the byte and the need for specific applications to use different sizes of byte. This is an area where centres would be advised to ensure that candidates understand the relationship and have discussed different requirements for different common applications as this is a standard way of testing this area of the specification.

F452 Programming Techniques and Logical Methods

Given that this was the first session of a new specification and that there were relatively few candidates, it may be hasty to make too many generalisations from the performances in this session. However, this is a new style of examination within this specification and certain trends and common mistakes/misinterpretations have begun to appear, even within such a small sample, which centres are advised to consider. These are discussed individually under each question below.

On a positive note, centres appear to have adequately prepared the candidates for this examination and taken differences between this and the previous specification into account. There was a spread of performance from the centres who submitted more than just a handful of candidates, as would have been expected. This suggests that the level of difficulty was just about right. There was no evidence that candidates were unable to finish the question in the time allocated.

Question 1

Part (a) was generally poorly answered. The question asked specifically how a good design can contribute to making a program easy to use. Too many candidates simply defined and gave examples of what would be a good design without relating this to ease of use.

In part(b) most candidates obtained at least 6 marks out of 8 for designing an interface that included all the elements included in the question. Doing just this would be considered E-grade performance. Candidates performing at a higher level would be expected to also consider general aspects of good input screen design covered in the specification but not specifically mentioned in the question such as titles and instructions, facilities for using the interface such as buttons and scroll bars, and validation.

In part (c) a majority of candidates showed an awareness of what a serial file is. However, many candidates were vague in their response by suggesting that the data in a serial file is in "no particular order". The data is in the order in which it was input – a crucial fact in the implementation of some serial files. In part (c)(ii) candidates needed to refer specifically to the file in the question and give reasons related to that file. Some candidates made general points about serial and sequential files. Other candidates misunderstood the content of the file and answered the question referring to a file containing all the recipes in the program. Such an error could have been prevented by reading the question carefully.

Part (d) was correctly answered by many candidates. Many candidates included quotation marks in their output. They were not penalised for this as the purpose of the question was to see if the candidate could apply the algorithm to the data given. However, it was disappointing as one would expect a candidate having studied the specification to understand that when a literal string is output, the quotation marks are not included in the output. Some candidates misunderstood the question and simply rewrote the algorithm in prose.

Part (e) was a good discriminator between the stronger and weaker candidates. (This will often be the case, for the last part of a question). Only the best candidates produced an algorithm which created a new file with the adjustments made although this is made clear in the question. Some candidates attempted to make an in-place update of the original file and the weakest candidates focused only on the process for calculating the new quantities without adequately handling the way the data is stored in the recipe file.

Question 2

In part (a) it was pleasing to see that this topic, which is newly added to this specification, was familiar to most candidates. However, many candidates needed to be clearer about the iterative nature of RAD. It is more than a cycle of tests and bug fixes. In future sessions, there may be a greater insistence on the candidates demonstrating an understanding that in each cycle the program is refined, its functionality increasing ultimately to meet the end user's requirements.

Part (b) required some standard definitions which candidates ought to learn. In most cases, correct answers were given for black box and alpha testing, but unfortunately not for acceptance testing.

When producing test cases for a black box test such as in part (c) candidates should be very specific when giving the purpose of each test case. "Valid data", "Invalid data" etc... are not specific enough. The purpose should clearly identify a group of potential input data which are likely to be treated by the program in a similar manner (such as, in the question, the start and finish times being both between 5 and 8 am). They should ensure that the purposes are defined clearly enough so that they are mutually exclusive. In this session, a generous mark scheme allowed candidates to be awarded marks for the test data and expected outcome even where the purpose was unclear. (This is generous because unless the purpose is clear, the examiner cannot be certain that the test data is correct without making assumptions about the intentions of the candidate). Centres are therefore advised to train candidates to be more specific in future sessions.

Part (d) was a quality of written communication question. This does not necessarily mean an essay. Candidates who gave a higher level response demonstrated a detailed knowledge of the purpose and actual process of installation, using technical terms correctly. Weaker candidates typically focused on peripheral aspects of the installation program (such as inserting the CD and signing the licence agreement).

Question 3

While part (a) was generally well answered, some candidates did not realise that part (b) and (c) were supposed to be answered in a similar manner, by using the algorithm provided and instead attempted to answer these using "common sense". This led to wrong answers in part (c) which gives an incorrect output for the state of the printer described. Allowances were given for candidates accustomed to C-style languages using the values 0 and 1 for FALSE and TRUE respectively. However, it would be preferable to see candidates demonstrating that they understand the difference between a relational expression and an arithmetic one by using FALSE and TRUE as their Boolean values.

It was pleasing to see a majority of correct answers for part (d).

Question 4

Few students obtained full marks for part (a) and (b). In part (a) it was not sufficient to paraphrase the statement T = 0 by saying that it sets the value of T to 0. The purpose of the question was to test the candidates' understanding of the need to initialise the value of T. Candidates showed some understanding of the syntax error in part (b) and even how to resolve this. Those who did not get two marks were not able to demonstrate their understanding clearly, sometimes due to insufficient communication skills.

Part (c) was generally well answered although those who didn't do so suffered in part from not having read the question carefully. The question requires the candidate to apply their knowledge to the algorithm given (rather than algorithms in general). A few candidates even offered the answer which was already given in the question.

Part (d) was another quality of written communication question, albeit a very different one from question 2(d). Question 2(d) required candidates to explain a technically complex process in a cogent manner, this question demanded a reasoned argument for using good programming techniques. At higher level, a candidate would give some reasons for using good techniques and relate these to specific techniques explaining how these techniques enable the advantages (for example by discussing how using standard conventions in code can assist teams of programmers). In such cases, it is better to limit oneself to two or three good reasons and justify these fully than to list more reasons but with little justification, as the quality of the argument is part of the assessment. The phrase "good programming techniques" appeared to be vague to some candidates. Centres are advised that this term will be used to mean good programming habits, especially the internal documentation of code as described in section 2.6 of the specification.

Question 5

Part (a) was quite well answered by most candidates. Candidates who did not achieve full marks tended not to give enough detail in their definitions.

In part (b) questions (i) and (iii) should have been answered correctly by the majority of candidates, and indeed, many did. In question b(i) however, some candidates answered "10p" even though the question states the value output is an integer. Similarly many candidates failed to get the correct output in (iii). Candidates appeared not to have read the specification of the function given in the stem of the question carefully. Question b(ii) was intended to be more of a discriminator and as expected only the most able candidates spotted that the = sign here would be a relational operator rather than an assignment operator.

Recursion is a topic which often causes difficulties for candidates and it was pleasing to see that most were at least able to define it in question c(i) although many were then not able to identify it in question c(ii). Question (d) was quite well answered. However, question (e) which required candidates to demonstrate a thorough understanding of recursion produced more mixed results - as expected. Centres are advised that the ideal way to set out the answer for questions such as these is to start each new function call in a box and use arrows to show how and when the functions call each other. Examples of this are shown in the sample assessment materials for this unit, as well as in mark schemes for paper 2507 of the legacy specification.

Grade Thresholds

Advanced GCE Computing (H047/H447)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
F451	Raw	100	64	57	50	43	37	0
	UMS	100	80	70	60	50	40	0
F452	Raw	100	83	74	65	56	48	0
	UMS	100	80	70	60	50	40	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
H047	200	160	140	120	100	80	0
H447	400	320	280	240	200	160	0

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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