OCR
RECOGNISING ACHIEVEMENT

GCE

Computing

Advanced GCE **A2 H447**

Advanced Subsidiary GCE **AS H047**

Report on the Units

June 2009

HX47/MS/R/09

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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CONTENTS

Advanced GCE Computing (H447)

Advanced Subsidiary GCE Computing (H047)

REPORT ON THE UNITS

Chief Examiner Report

It was encouraging to see the standard of the work that was produced by the majority of candidates for both of the papers in this qualification. There were very few papers that were submitted by candidates who demonstrated that they were poorly prepared for the assessments. Both examining teams report that candidates seemed unaware that all questions contain a graded set of assessment, so that even if a candidate is unable to do parts of the question there should be other parts which they are able to attempt. This was particularly true in F452 where the fact that a question might involve producing an algorithm should not deter any candidate from attempting it as there are always easy marks available in such a question as well as harder ones.

Most candidates were able to attempt all questions, even if this was to different degrees of success. The one exception was the surprising inability of many candidates to explain actuators and sensors despite the fact that they are stated in the specification.

There were no reports of candidates being penalised because they ran out of time.

F451 Computer Fundamentals

General comments

There were some very good scripts seen by the examiners and the young people who produced these are to be congratulated. However, there is a cohort of candidates for whom the examination is not appropriate. This may be because they simply do not have the ability to understand the concepts or may be because they simply have no interest in whether or not they succeed. Whichever it is, the fact that they have been made to sit in the examination room for that length of time looking at a paper that they know they cannot answer must be a very dispiriting experience and one wonders how much educational value they get from it.

Standards of presentation continue to improve. This includes the quality of the English used to answer the paper and the format and handwriting used in the presentation of the responses. There are bound to be different levels of presentation, but it is nice to report that a perceptible effort is being made by nearly all candidates. The use of text-English has all but disappeared and candidates are using simple diagrams or bulleted answers to make their points, anything that makes it easier for them to put their points across and also makes it easier for the examiner to understand the points that they are trying to make. It should be mentioned that there was a small group of candidates who did not follow their colleagues and managed to produce scripts that were messy, disorganised and almost illegible. While the examiner will always do their best to ensure that credit is given where it is deserved, if the answer can't be read or understood the examiner cannot award marks.

There was no indication of time trouble being exhibited by candidates, the same level of effort being applied to the last question as to others.

Individual questions

1a Most scored both marks. The problem, if any, was caused by candidates being unable to express themselves. Many simply turned the wording of the question around, saying that an input device was a device to input data.

1b As would be expected, candidates scored well here. The only problems were caused by an occasional laziness of expression. If a candidate states that a barcode reader is used to read a product then they will get a mark for the barcode reader but not for the second part. The examiner may know what the candidate meant to say but it is positively wrong, so no mark can be given.

1c This was poorly answered. The examining team found this difficult to understand as it was directly taken from the specification and involved only knowledge and understanding, no skills work.

2a Almost all candidates could name two busses, however, too many then went on to attribute rather more to them than the conduits that they actually are. Typically, candidates confused a control bus with the control unit, attributing rather more to the bus than is warranted.

2b&c These were well answered although a significant proportion of candidates confused packet and circuit switching.

2d The new style of question of which this is one, continues to have supporters and detractors. The truth is that it produced a very good spread of marks. The form of the response is not dictated as having to be an essay style although that was probably the most sensible form for this particular question.

3 It was disappointing to see the number of candidates who not only failed to score full marks here but demonstrated that they simply did not understand the terms. Candidates should have the basic examination technique necessary to realise that two things had to be said in the description to accompany the mark available for the use. Candidates who state that MICR is the use of magnetic ink to sign cheques so that the signature cannot be forged, or that it is used to create the black stripe on a credit card, are simply not ready for this examination. This is basic work which does not involve any degree of complexity, like analysing why a particular input method might be appropriate in a given circumstance. Again, candidates must understand that the examiner does try to give credit whenever possible but they cannot do that if there is any confusion as to meaning. A popular use for OMR was 'for exams'. Examiners knew what the candidate probably meant when they saw this, but they were unable to give a benefit of the doubt because for an exam that is of the form which is used here, OMR would not be appropriate. A greater precision in the response is necessary.

4a Most candidates were able to score three marks here although some wrote down any three thoughts, the stages of the fetch execute cycle were relatively popular. It is very sad to see, when marking work, that some candidates are so desperate they will simply latch onto any topic which will give them three or more things to choose from. Few of the candidates were able to go on from the basic concept of writing down the factors to describe them in order to earn a second mark. Once again, this is basic exam technique: if there are two marks for a question, the candidate needs to say two things in order to be able to earn the two marks.

4b Understandably this proved problematic. Most candidates had the basic idea, that the model sent the analyst back to revisit the process. The difficulty is that candidates understand it in the same way that the waterfall model allows the process to return to different stages as and when they are necessary. The spiral model does not work on the individual stages but on the basis of the whole solution, so that after evaluation the analyst is returned to the analysis stage to refine the solution. Some candidates went a stage further than was necessary to discuss RAD and prototyping of solutions.

5 The examining team simply could not understand why this question was so badly answered. It seemed at times that candidates simply had never heard of an actuator or of a sensor. Both terms are stated in the specification along with a requirement that candidates should understand their uses, indeed there were some excellent responses to this question, but it is a shame that discrimination between candidates could be because of whether this topic has been taught or not.

6a A good discriminator question with most candidates being able to answer in binary, fewer able to give the hexadecimal and fewer again able to produce BCD. Logic dictates that this is the wrong order in that BCD only requires binary up to 1001.

6b The last time this was asked the question was to explain the connection between binary and octal. Unfortunately many candidates had simply learned this and reproduced it here. For those who understood the connection this was an easy three marks.

7 Comments from examiners ranged from 'superficial treatment' to 'vague sentences and rambling, unstructured answers'.

7a Scoring 1 mark for each of 3 factors was not beyond most of the candidates. It should not be after all, because this is a standard part of the specification. However, once again, the proportion of candidates who could expand on the basic factor in order to earn the second mark in each case was disappointing. Perhaps the examiners were not so much disappointed about that, which is a higher level skill after all, but we were disappointed by the number of candidates who simply did not try. A candidate who writes down 'colour' and does not at least try to say anything further, once again is demonstrating a lack of understanding of the requirements of the examination paper.

7b It might be a new specification but some things don't change, one of them is the confusion brought on by archive and back-up. Too many candidates simply get them the wrong way round. The last time this question was asked they were asked in the opposite order and this may be responsible for the confusion this time. Only the most able candidates were able to give a reason that was clearly related to the application given.

7c There were some very confused answers here but those candidates who had demonstrated an understanding in part b answered well. The proportion of candidates answering by describing an ancestral filing system was smaller than for this question in the past, but they were still given full credit for their answer.

8a Well answered.

8b This was intended to be a difficult question and so it proved. The impression was that most candidates knew how a checksum is used, but actually being able to explain it proved very difficult for many. Many talked about adding up the bits in a byte, others described perfectly the use of check digits while failing to understand the difference between data input and data transmission. However, it wasn't all doom and gloom. Many candidates understood the concept of a checksum and explained it perfectly. The idea of parity being used to check blocks of data was less well understood. Many candidates picked up a mark for the basic idea of parity, but there were far fewer who were able to explain self checking on a block. A number of candidates were able to do this and there were very few part marks in this question, in that those candidates who understood the concept scored full marks.

F452 Programming Techniques and Logical Methods

General Points

This examination is designed to test the candidates' knowledge and understanding of fundamental programming principles as well as their ability to apply these when writing programs. It is expected that a considerable amount of practical programming experience will be used to prepare candidates for the examination and this was evident in the candidates' responses. Almost all candidates demonstrated a working knowledge of at least one high level programming language and were able to understand and follow the pseudocode in the questions.

The overall performance of the candidates was lower than expected. As this is the first full session for this specification we envisage that a period of adjustment might be necessary for centres to be fully conversant with the new requirements and style of examination. Detailed notes are provided for each question explaining the candidates' performance, but it is useful to highlight some of the general factors which readily apply to all future sessions. Significantly, these factors affected weak and strong candidates alike.

The candidates' ability to articulate definitions of key terms was weak. When the question paper is designed, it is expected that the weakest candidates would be able to recall these definitions without much understanding, while only the stronger candidates would be able to define and demonstrate an understanding. In the responses, most definitions were vague or incorrect, but the candidates then went on to demonstrate a good working understanding of the concept, gained through experience. Centres should help candidates prepare for this examination by reinforcing key terms encountered in their practical work. The key terms required are clearly highlighted in the specification.

Questions requiring algorithms to be written from scratch tend to include "something for everyone". It was disappointing to see one in ten candidates not attempt these questions at all, presumably because part of it was very difficult. The notes below for questions 3(d) and 4(c) explain what marks were available for even the weakest candidates, and centres should train the candidates to recognise these when they encounter similar questions. The mark penalty for not attempting these questions is very significant. (This also applies to questions where candidates are asked for an input design, a flow chart or a report design).

Question 2 was based on an area of the curriculum which is new to this specification. Candidates seemed not to be sufficiently prepared for this. Centres should ensure that they are fully aware of all the changes in the specification.

Question 1

Part (a) was surprisingly poorly answered. The question paper includes some definitions out of context in order to provide some answers that are accessible to the majority of candidates. In this case over half the candidates failed to get 3 of the six marks available. Part (b) tested the candidate's understanding of the concepts in part (a) beyond just being able to define the terms. It also tested the understanding of the assignment operation. The majority of the candidates were able to demonstrate this understanding. It was still disappointing to note that one in four candidates appeared not to understand which variable takes the value of the other in an assignment statement such as A = B; this is the least that could be expected of the candidates.

Part (c)(i) was generally well answered, most candidates being able to follow the algorithm and provide the correct outputs with few or no errors. Weaker candidates were still able to access some of the marks. Part (c)(ii) was less well answered which may well have been expected as it requires the higher skill of analysing the inputs and outputs and considering the logic of the algorithm to determine its purpose. Candidates who are adequately prepared should recognise this. Many candidates simply described or rewrote the algorithm in prose; it was difficult to tell whether they were genuinely unable to "see the bigger picture" or whether they had simply misunderstood the question.

Parts (c)(iii) and (d) were quite well answered although strong candidates were expected to get near full marks on these questions, and many of them did not. This may, in part, be due to the printing error which was notified to candidates, although there was no clear evidence of this in the candidates' answers. The specification requires candidates to be able to classify errors as syntax, logic or run-time errors. Question d(i), in particular, should have stretched the most able candidates by including both a syntax and a logic error, but very few candidates commented on the syntax error.

Part (e) was a quality of written communication response. Candidates are especially required to use technical terms correctly in such questions. All candidates who have prepared for this examination should have had considerable experience debugging programs within an IDE and this showed in the majority of cases. Consistently using correct terms for different tools would have enabled most candidates to score better. Some candidates (perhaps as a result of preparing using the January 09 paper) described testing rather than debugging. Note that the quality of written communication does not mean that the answer has to be structured like an essay with an introduction, a number of points and a conclusion. Introductions such as "There are many debugging tools which can be used to ... " do not provide any additional information about the candidates' understanding of the subject matter. Candidates should just answer the question directly.

Question 2

Part (a) was well answered, most candidates getting full or nearly full marks. The specification requires candidates to be able to apply the content to actual problems to be solved, and this will inevitably require that the candidates have some knowledge of a number of common everyday situations. In this case, parcel delivery was considered one of these situations and a small number of candidates were perhaps disadvantaged by not having an adequate understanding of this (for example by suggesting that the customer will supply the ID number of the parcel, or the cost of delivery). As a general rule, centres should encourage candidates to provide answers which are clearly different from each other when multiple answers are asked for. This is especially relevant where additional expansion (in this case, the purpose of the data) is required, as similar answers often have the same expansion and examiners will be unable to award additional marks for making the same point.

Part (b) was very poorly answered. This is a new topic to the specification and the candidates' responses suggested that as a topic it had not been studied (or not been studied adequately) by the candidates. About half of the candidates obtained 0 out of the 6 marks available. The specification requires that the candidate understand that when comparison operations are carried out on strings, the character codes (or ASCII codes) are compared in turn numerically. (This links well with the section of unit F451 which requires the candidate to understand how strings are represented in a computer). They were expected to realise that this is the issue here. Most candidates did not realise this and guessed answers based on the information given (in some cases correctly enough to obtain a few marks).

Part (c)(i) was another question which required candidates to recall a definition. Many answers were vague and surprisingly few candidates got full marks here. This section of the specification relates to the section in F451 on handling data. It should be noted, however, that only validation and not verification, is covered in F452. In preparing for this paper, candidates are expected to have an understanding of different validation rules AND to be able to apply them to specific input data. This was tested in part (c)(ii) where most candidates gave reasonable answers.

Part (d) was misunderstood by many candidates. The question required the candidates to outline a process for reformatting the post codes entered into the valid format. Many candidates discussed how to validate the postcodes instead. Because these answers would be similar to answers for part (c), candidates who made this error were not given the benefit of the doubt, even when their answers contained a good use of subject manipulation functions, and hence scored few marks. It is worth noting once again that a quality of written communication response does not have to be an essay. In this question, a series of bulleted or numbered steps augmented with snippets of code would have been an adequate (and arguably a better) way of communicating in writing how to use string manipulation functions in a high level language to reformat the post code. Significantly up to one in eight candidates just left this question out.

Question 3

Part (a) was yet another question which required the candidates to define a programming term in this case “array”, and the number of candidates gaining full marks was disappointing. In part (b), however, where candidates were required to demonstrate their understanding of the structure of an array most candidates answered correctly and got full marks. Part (c)(i) then required the candidates to use the array in an algorithm and there was a mixture of responses, as would be expected, with most of the stronger candidates scoring full marks. In part (c)(ii) most of the candidates were able to identify the parameters of a procedure.

In part (d) the question stem made it clear that there would be marks for defining a subroutine called “SupervisorCall” which has a parameter called “Floor”. These are mark points which should be accessible to almost all candidates (and most did in fact get it correct). Centres should train candidates to read the stems of questions requiring algorithms and spot such requirements. The stem also required that code be written in a named language using good program writing techniques. This should have alerted the candidates that they were required to use comments, indentation and sensible identifiers, as they would if they were programming on a computer. However, correct syntax for the language given was not required. Ignoring the 10% of candidates who left out this question, although they possibly could have accessed the marks above, if not the correct logic for the subroutine, the range of marks was as expected.

Question 4

Part (a) required some definitions and here again, the low number of candidates obtaining full marks was disappointing. It is reasonable to expect that all candidates have used variables and constants in their course and should be able to define these. While candidates were not expected to quote a particular definition, their answers should be semantically accurate. A variable is not a value, it stores or represents a value. And stating that a variable can change while a constant cannot is vague and demonstrates little subject knowledge beyond the everyday meaning of the words. The value of a variable can only change at run-time and the value of a constant can actually change at design-time, a fact which is the basis for the answer to part (a)(iii). Consequently the most popular answers for (a)(i) “A variable is a value which can change” and (a)(ii) “A constant cannot change” received no marks. In part (a)(iii) many candidates considered constants as a better alternative to variables; this cannot be as they have completely different purposes. Instead, candidates were supposed to see constants as a better alternative to literals (particularly ones that are used repeatedly within the code).

Part(b) was generally well answered, with the majority of candidates obtaining full marks in each of the parts.

Part(c) was designed to provide stretch and challenge to the most able candidates but, once again, there were some marks in the question for the weakest candidates and centres should train candidates to read the question and spot these marks rather than just leave the question out, as 10% did. The question stem tells us what should be input and output. There were marks available for including this in the algorithm which even the weakest candidates should have been able to access. In addition, candidates could gain some marks for validating the input, or for ensuring that the search starts from row A and stops at row J – obvious requirements which were, however, not stated explicitly in the question. Most candidates who attempted the question obtained some of the marks. Only the strongest candidates were expected to produce a creditable algorithm for searching for contiguous seats, and there were a number of excellent, imaginative answers which demonstrated considerable programming ability. It is worth noting that as this is a written examination and not a practical programming task (as in unit 2507 of the previous specification) candidates were given some latitude and it was not necessary to produce a complete, correct algorithm to obtain full marks.

Grade Thresholds

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

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
F451	Raw	100	66	59	52	45	38	0
	UMS	100	80	70	60	50	40	0
F452	Raw	100	70	61	53	45	37	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

The cumulative percentage of candidates awarded each grade was as follows:

	A	B	C	D	E	U	Total Number of Candidates
H047	9.5	24.1	42.7	61.7	77.9	100	1373

1373 candidates aggregated this series

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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