OCR
Oxford Cambridge and RSA

GCE

Computing

Advanced GCE **A2 H447**

Advanced Subsidiary GCE **AS H047**

OCR Report to Centres June 2015

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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 specification 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.

OCR will not enter into any discussion or correspondence in connection with this report.

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OCR REPORT TO CENTRES

F451 Computer Fundamentals

General Comments:

In general, candidate responses demonstrated subject knowledge appropriate to the specification. There were a few candidates who were evidently not fully prepared for the rigour of the examination.

The presentation of work was generally good. Candidates' handwriting on some scripts was difficult to read. Candidates should be aware that they may not gain credit for creditworthy responses if their handwriting is illegible. There was no evidence to suggest that candidates experienced any issues with the duration of the exam.

For this unit, in general, examiners require candidates to demonstrate their understanding of fundamental computing concepts. In an increasing number of cases the descriptions of these concepts lack clarity. One common error is that candidates use terms that form part of the question in their response, without describing their understanding of the term. This was particularly evident in Q9c in which many candidates offered 'to backup files' as the purpose of a backup utility. Candidates should be encouraged to describe terms that form part of the question before using them in their response.

Comments on Individual Questions:

Question No.

1ai)
This question was well answered; most candidates could give two differences between RAM and ROM.

1aii)
Most candidates could state a valid item that is stored in RAM but did not go on to say 'currently in use' therefore did not gain full credit.

1aiii)
Common answers were BIOS and Bootstrap, with some candidates incorrectly stating that data files are held in ROM.

1bi)
Most candidates stated a valid creditworthy example use of OCR but descriptions were poor and lacked clarity. Some candidates confused OCR with MICR. The most common loss of credit was due to describing scanning a document, rather than the characters on it.

1bii)
Most candidates stated a valid creditworthy example use of OMR and although descriptions were better than those in 1bi) they still lacked clarity. The most common loss of credit was due to describing scanning the mark, rather than scanning the position of the mark.

2i)
Most candidates were able to name and give the purpose of an appropriate input device. Many lost credit for citing a (digital) thermometer.

2ii)
A good range of output devices and purposes were given here with most candidates gaining full credit.

2iii)
A range of storage devices were given but many candidates suggested the purpose was to store temperature logs.

2iv)
Most candidates achieved credit for describing real time processing, although some did use the term in their response. Many did not extend the need beyond 'fish may die'.

3ai)
Most candidates correctly converted from denary to binary.

3aii)
Most candidates correctly converted from denary to binary coded decimal.

3aiii)
Most candidates correctly converted from denary/binary to octal.

3b)
Candidates who answered this question by demonstration, scored well. Those who tried to describe the process using prose invariably lacked clarity and therefore did not achieve full credit.

3ci) and 3cii)
Most candidates correctly converted from denary to two's complement.

3di)
For the most part, those candidates with correct answers for 3ci) and 3cii), produced correct answers for this but some did not gain credit for an 8 bit answer because they did not evidently discard the 9^{th} carry bit.

3dii)
Most candidates gained some credit for identifying the need for 9 bits or the discarded bit producing a positive answer. Few candidates gained maximum credit with some candidates stating that sign and magnitude should be used for binary subtraction.

4)
This was a QWC question. Most candidates made a good attempt at describing the specific purposes of single user and multi-tasking operating systems but failed to extend their response to incorporate the generic purposes of operating systems that this type of system would include.

5i)
Few candidates gained full marks for this question. Some candidates demonstrating confusion between which registers hold the actual instruction/data and which hold the memory location address of the instruction/data.

5ii)
Again, some candidates demonstrated confusion between registers. A common error was 'address of next instruction'.

5iii)
Although most candidates did state that this register holds data/instructions there was a lack of clarity about where the data/instruction was coming from/going to, hence not clearly explaining the need for the register.

6a)
Most candidates gained only part credit for this question. The common responses considered the changeover method, stating the possible options, and the need for staff training. However, very few candidates correctly identified that the analyst would plan the type of training rather than carry it out themselves. Likewise, many candidates stated that the analyst would go out and buy the hardware rather than plan when and how it would be installed.

6b)
Most candidates gained credit for identifying the three maintenance types. Credit was commonly lost on corrective maintenance, where candidates did not state that it dealt with errors that arose after the system was installed.

7a)
This question was well answered with most candidates gaining full credit.

7b)
Most candidates gained credit for stating example rules with many creditworthy descriptions. Some candidates cited baud rate/bit rate which appeared in the question. Candidates should be reminded to read the stem of the question.

7c)
This question was generally answered quite poorly. Many candidates used the term 'time sensitive' as part of their response with few demonstrating an understanding of the link between time sensitivity and immediacy of use. Part credit was generally given for identifying buffering as a consequence of low bit rate in the video stream.

8ai)
This question was poorly attempted by most candidates with many candidates not contextualising their response.

8aii)
As above, in general, candidates were not clear in their description of how this device would be used.

8bi)
This question was well attempted by most candidates but some candidates did not achieve full credit due to lack of detail in their explanation. Many candidates used terms such as 'easy' without justification.

8bii)
Few candidates were able to describe a command line interface. Some candidates gained credit for mention of a prompt or typed input - rarely both in the same response. Descriptions again lacked detail.

8biii)
Candidates who correctly identified a Graphical User Interface, scored well on this question. Many candidates cited a Menu Driven interface which gained no credit.

9a)
Most candidates correctly described how file handlers would be used but very few correctly stated the purpose, most stating that they 'organise files' rather than 'organise data storage'.

9b)
Some candidates gained credit for stating appropriate uses of hardware drivers but again the purpose was generally too vague. Many stating that they 'allow hardware to run' rather than 'allow communication between the operating system and peripheral device'

9c)
This question was well attempted by most candidates although too many responses included the term 'backup' to describe the purpose of the utility without explaining the term.

10)
This was a QWC question. Most candidates were credited medium level band or above. There were some very good responses that looked at the implications of portable computing on work, life and society in general, citing both positive and negative effects. For the most part, candidates focused on the impact on social interaction, specifically through the use of social networking. Some candidate responses lacked structure. Centres should encourage candidates to structure their response to clearly address all strands in the stem of the question.

F452 Programming Techniques and Logical Methods

General Comments:

The candidates, on the whole, showed a good understanding of the subject matter. Nearly all candidates were able to attempt all questions, and this year there seemed to be less questions with no responses. The use of standard technical terms and there definitions still causes some candidates problems.

The layout and legibility of their answers were better this year, with most candidates clearly showing the links to continuation booklets and/or other space used in the exam paper.

There were several general areas that the candidates seem to have problems with. The first being the difference between a variable and a literal string i.e. the variable A and the string literal ”A” are two different things. Secondly, not reading the question fully (skip reading) and misinterpreting what is required in their answer. Thirdly, they must answer the question and ensure they contextualise their response accordingly. Lastly candidates need to be more familiar with planning, reading and writing algorithms.

Comments on Individual Questions:

Question No.

Q1 (a) - Most candidates made a reasonable attempt at this and gained 3 marks in the design part, although a large minority didn’t fully utilise the space given. A small number of candidates wasted space with titles such as “Goals”.

The assumptions part was not generally well answered – with very few candidates getting all 3 marks. A minority were confused over what was meant by assumptions, and stated things along the line of “one team has scored 2 goals” to match with their own example.

(b) - Few candidates realised that modules should have a specific task and be independent. Most candidates got a mark here for dividing into sub tasks and then dividing again. The advantages were much better known with “Modules can be shared between programmers” being the most common correct answer.

(c) - Generally well answered, the most common error was with the dimensions where candidates gave (3, 15) or 45 as the answer.

(d) – This question was well answered with most candidates gaining full marks

(e) (i) - The most able candidates got the right answer. Most failed to spot the error, with the common answer stating that it would try to show the message vertically not horizontally.

(e) (ii) - Those that got part e(i) correct, usually got this right too.

(e) (iii) - The majority of candidates achieved this mark even when getting the first 2 two parts wrong.

(f) – Most candidates managed to get 2 marks on this question. Very few candidates realised it was the array (out of bounds) that was the problem not the display. Runtime error was correctly stated by most candidates, although a few stated it as a syntax error.

(g) - A minority of candidates tried to write the DisplayString() function itself but as this was given in the question did not score many marks. Many answers showed unfamiliarity with string manipulation. Most candidates did well and gained 5+ marks, only having problems with the player & team name truncations and centring of text.

2 (a) - Almost all candidates achieved this mark

(b) (i) - Often well answered but a number of candidates did not give an example from the code.

(b) (ii) – Almost all candidates achieved this mark.

(c) - Many good answers given, with most candidates gaining at least 1 mark, although some candidates only stated "it sets d to a null value".

(d) - This was poorly understood by many candidates. Most thinking it was a mathematical addition, and unfortunately not realising that the variables were strings.

(e) – Those that did poorly on this question showed a lack of understanding about the difference between the variable A and the string literal "A". It was a shame that some candidates also missed out on marks for not inputting/passing the "message" in and the indentation of their code. Python seems to be the most common language used but the syntax was not always used correctly.

(f) - Translator Diagnostics, Breakpoints and watches were generally well known but not always expressed clearly. With breakpoints, for example, most got the point of stopping execution at a statement but then just said "to find the error" rather than checking variable values to see if they matched expected values. In the case stepping it was not always clear if they were describing dry running or stepping.

3 (a) - Many poorly expressed statements were given here. It was worrying how many described a serial file.

(b) - Mostly well answered, though a large minority of candidates do not know how many bytes each data type uses.

(c) - Most candidates gained all 3 marks here though some lost the "overhead" mark.

(d) - The comparison operator was generally well known as was the assignment operator but often candidates missed out the term "assignment".

(e) – Most candidates gained the 3 marks. The most common error was to put the £ sign before the 3.50 (i.e. £3.50)

(f) - Candidates who believed a sequential file was one where records are added to the end inevitably failed to score more than 2 marks in this question. It was generally not well answered; candidates who did try to find an insertion point often did it poorly. This is one of the standard algorithms that candidates should ensure they are familiar with.

4 (a) – This was answered well by most. The most common mistakes being "9 DIV **4.5** = 2" and "1 MOD 3 = **3**".

(b) - Many good answers but a large minority tried to explain the principle of a while loop not how it was used in this algorithm.

(c) - Many candidates lost the first point by simply copying the Temp = true line from the given algorithm.

(d) - A large number of candidates scored 1 mark almost by accident as they simply wrote the line numbers in ascending order. There were, however, many responses getting 5 or 6 marks here.

(e) - Most candidates understood what recursion is but some failed to give the locations of where it was used in the algorithm and subsequently lost marks. There was a worrying number of candidates who confused it with Iteration and even the IF statement. As with question 4(b) the candidates did not read/understand the question fully, in that it asked "Describe how … used in this function".

(f) - Many poor answers were given here. Many students didn't appear to have a depth of knowledge regarding recursion and its issues beyond "it calls itself".

(g) - Quite a few no responses here. Very few responses clearly showed the steps taken in each call to the recursive function and especially the unravelling of the recursive calls. Although some candidates scored full marks their answers were not always absolutely clear. Only a few candidates used diagrams, and on the whole their answers were easier to follow.

F453 Advanced Computing Theory

General Comments:

The exam was very well received by the candidates and most seem to have accomplished a credible batch of responses to the paper. Some of the questions were designed as stretch and challenge and some were pointed at finding those who could use the correct terminology that is expected at this level of achievement, there was also a focus on UML diagrams and the Principal Examiner was pleased to see that the candidates did very well on these. Overall the standard of answers was very high. For some of the simpler questions it was disappointing to see that candidates gave vague answers and threw away relatively easy marks such as questions 3 a (iii), 3 b (i) and 5 b (iii). The question that raised the most concern was the lack of knowledge shown by a large number of candidates about the different sorting algorithms. Overall a good response to the paper and some very strong responses.

Comments on Individual Questions:

Question No.

1 (a) candidates managed the full range of answers on this question with most in the middle band of marks available, with the higher achievers getting the expected full marks.

1 (b) A few candidates had obviously not been taught (or forgotten) this point and answered using POST or BIOS, but most had the general idea of what was required.

1 c(i) A fair amount of candidates seemed to be of the opinion that just because it was an interrupt that it automatically stopped everything and got immediate processor time.

1 c(ii) Again a fairly standard question for this type of paper but candidates are expected to use some technical language at this level and unfortunately a large proportion were not accurate in their description.

2 (a) This question covered the full range of abilities for candidates and it was a good discriminator of levels of ability. A small but significant amount of candidates answered about high level language compilers or interpreters rather than an assembler.

2 (b) Again the Principal Examiner was looking for more technical knowledge with this question and it was apparent from the range of answers given that this was one question that showed true understanding of the subject.

3 a(i) A significant amount of candidates gave a single processor as a response to this question which was judged to not be sufficient for this level of examination.

3 a(ii) Well answered by most candidates with almost all getting at least one mark and a large proportion getting both marks.

3 a(iii) A large number of candidates were of the opinion that “Slower” or “Not as fast” was sufficient for this. It was not.

3 b (i) Again there were a significant number of answers that were vague, saying “faster”; at this level it really is expected that candidates can back up their assertions.

3 b (ii) A small minority didn't have a clue which register this was meant to be, some were vague and didn't mention it. Most candidates managed to get middle marks which was pleasing to see.

4 a (i) Most candidates got full marks.

4 a (ii) Most, but not all, candidates were foxed by the negative mantissa and exponent and worked out the numbers correctly but didn't realise that it was a negative. This was a challenging question, aimed at the higher grade candidates.

4 b Most candidates answered this correctly.

4 c (i) and (ii) It was pleasing to see that a high proportion of candidates were able to correctly identify where the mantissa and exponent were.

4 c (iii) It was really pleasing to see the high proportion of candidates who got full marks on this question.

5 a This was a standard algorithm that almost everyone should have been able to get, but a fair proportion of candidates did not put the stop on "report error and stop" and/or did not state that for a queue they should have been adding to the rear pointer and incrementing the rear pointer. Slightly disappointing.

5 b(i) There were quite a few very muddled answers to this question, those that were not muddled, were just plain wrong. A large proportion of candidates either were swapping for a bubble sort or using pivots; neither of which were what was required.

5 b (ii) Those who knew what an insertion sort was got this correct, a fair percentage used quick sorts or bubble sorts and as such did not receive any marks.

5 b (iii) Similar to the answer for 3 a (iii) a lot of unnecessarily vague answers who did not get an easy mark.

6 a (i) Most candidates answered this correctly.

6 a (ii) Nearly all candidates achieved at least one mark in this question.

6 (b) Those who knew what object oriented language was did quite well, with the average response able to gain four marks and a fair proportion gaining maximum marks on this.

7 a (i) Well answered by most candidates.

7 a (ii) Nearly all candidates were able to get at least one mark on this.

7 b (i) and (ii) Very few candidates got no marks. The candidate's ability to read this type of diagram has improved significantly.

8 (a) A good discriminator question, with candidates achieving a range of marks.

8 b (i) Nearly all candidates achieved at least one mark in this question.

8 b (ii) Nearly all candidates achieved at least two marks in this question.

9 (a) A very open ended question that was designed to test candidates' ability to hypothesise about what should be in a database, most candidates achieved a creditable answer.

9 b (i) Most students got the “Unique identifier” as was expected, a few were able to go on and say what it was used for. Most candidates were assumed to have not read the question correctly.

9 b (ii) A well answered question.

9 c A few candidates showed a lack of understanding of the E-R Diagram and said that customers would not be able to see the products, but most were able to correctly analyse what was asked for.

9 (d) Another question that was targeted at precise technical language, it was clear from the candidates responses that some only had very superficial knowledge of this topic.

10 a(i) This question was aimed at candidates being able to interpret a diagram correctly and almost all candidates got this correct.

10 a (ii) Well answered by most candidates.

10 b (i) A question aimed at the more able candidates and this showed with the expected amount of candidates able to access this question. Very few candidates got both marks.

10 b (ii) As with the previous question this was aimed at those with a very good knowledge of UML diagrams and was designed to stretch and challenge the most able candidates. Most candidates were able access one or two marks but very few got the maximum.

F454 Computing Project

There was a larger than normal entry this year with a number of new centres entering candidates for the unit.

Problem selection has been an issue this year with a number of candidates selecting simplistic problems that have not been able to access all the mark points. Projects must lead to multi-faceted solutions coded in a suitable high-level language. For the most part it is unlikely programs created in block programming languages will be suitable. Projects created in applications such as Excel, or Access or static websites created in HTML are also unlikely to meet the requirements for this unit.

Investigations were, once again, a weakness with many relying purely on evidence gathered from an end user, often through an interview. Candidates should research the problem thoroughly, looking at similar solutions to similar problems to inform their designs.
Designs that concentrate on aesthetic considerations are also unlikely to score well, data structures; data flow and validation are among the other areas that must be considered.
Algorithms were also a weakness with many providing simple overviews of the problem rather than detailed algorithms that described the intended solution in detail, rarely were these algorithms shown to describe a complete solution to the problem.

Development must show the process from the initial coded elements through to; testing of each of these, remedial actions, and the coded elements being combined into a working solution. Often we were presented with some code and some after-thought testing for functionality. Candidates should demonstrate how testing informed the process and post development testing should demonstrate how the system has been tested for robustness.

Many candidates still rely on a user guide for documentation, programs should be internally documented and evidence of this should be provided as part of the documentation.

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