GCE

Computing

Advanced GCE **A2 H447**

Advanced Subsidiary GCE **AS H047**

OCR Report to Centres

January 2012

1111124265 **HX47/R/12J**

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

CONTENTS

Advanced GCE Computing (H447)

Advanced Subsidiary GCE Computing (H047)

OCR REPORT TO CENTRES

Content	**Page**
Overview	1
F451 Computer Fundamentals	2
F452 Programming Techniques and Logical Methods	5
F453 Advanced Computing Theory	10
F454 Computing Project	13

Overview

General Comments

The majority of candidates demonstrated an appropriate level of understanding and some scripts and projects were a pleasure to mark or moderate.

Centres appear to understand that, unlike the previous incarnation of this specification where the first unit could realistically be attempted after only one term, F451 now consists of too much content to be attempted by most candidates after such a short time. Despite the content being relatively straight forward and there being a sizeable overlap with the GCSE course that candidates may have followed, it is unreasonable to expect students to accept such a dry body of knowledge without teaching the more practical work in F452 side by side with it.

F451 Computer Fundamentals

General Comments

The paper seemed to be of the correct standard, giving a good range of marks. There were marks available to all candidates while still maintaining some challenging material for more able candidates. Each question elicited the full range of marks from at least some in the cohort, although the distribution of the marks from 0 to maximum was different according to the difficulty of the subject matter.

As in previous sessions, some of the presentation was disappointing with some handwriting being almost unintelligible. However, it is good to relate that there has been an improvement in this aspect of presentation as there has in the level of English used. The examining team believe they have been able to interpret all answers and have been able to give credit as appropriate to the knowledge demonstrated rather than to the presentation. Some candidates seemed to measure their response according to the amount of space that had been taken up, the habit of trying to make sure that the answer ended at the end of the last dotted line assigned to it has once again become noticeable.

There was no evidence of any candidate having suffered from any time trouble.

Comments on Individual Questions

Question 1

(a) Most candidates scored well although some candidates failed to imply that the devices had anything to do with a computer, a fountain pen fitting the definitions given.

(b) Many candidates used a 'scanner' as the input device. This was not accepted.

(c) This was a good discriminator question. The less able candidates simply wrote about barcodes and checkout tills. However, more able candidates related this to the concept of stock control mentioned in the question and the best responses were able to describe the storage requirements to carry out the tasks involved. Many responses talked about removing the item that has been bought from the database of stock, implying that all single items appear individually on the stock file.

Question 2

(a) While understandable, it would be good to get away from the stock answers of OMR, OCR, and MICR as examples of automatic data collection and input. Better responses included references to sensors and voice recognition among others. Again, the better responses were able to talk about advantages in relation to specific examples of use and not just regurgitate the stock, generic, responses as far as advantages were concerned. The quality of the responses was generally very good giving evidence that this type of question no longer creates a problem in candidates' perceptions.

(b) The first part of the question was quite difficult because it involved an analysis of a situation whereas the second part was a description of a process which most candidates were used to.

Question 3

(a) **(i)** In order to describe the whole process candidates should not ignore the obvious. It is important to give an example of an input device for example and what sort of a storage device will be used to store the inputs. There is no 'correct' answer to this but candidates should make valid suggestions if they expect their response to be considered complete.

(ii) This proved easier than the first part of the question because the responses are generic and most candidates had obviously learned them.

(b) This proved to be a relatively easy question. The types of data stored were grouped and most candidates scored full credit here. The second part of the question proved to be very popular with most candidates scoring well.

Question 4

(a) The concept appears well understood because it is something concrete of which the candidates have knowledge. Most were even happy with the rather more abstract notion of a handshake and were happy to give examples of the rules that would be agreed as part of the process.

(b) This is rather more difficult because it is very much more abstract. Candidates who were successful here were able to distinguish between rules relating to the data being communicated and the rules relating to the method of communication. Because of the wording of the question the mark scheme was enlarged to allow responses based on describing a particular protocol like TCP(IP) or FTP.

Question 5

(a) Most candidates were able to score full marks here.

(b) There were some very good responses here though some candidates tried to describe the transmission of data around the CPU registers rather than sending it to a storage device.

Question 6

(a) Some very good answers. Unfortunately, some confused 'output format' with the device that might be used to produce it. An image might be produced on a monitor but the output format is an image, not a monitor. The examining team were generous in their interpretations here but candidates needed to, at least imply, that they were talking about the format of the output data.

(b) The majority of candidates were unable to picture themselves in the place of the operator, hence the responses given were too often the standard generalities, rather than valid points related to the scenario given.

Question 7

(a) Most candidates earned full marks here.

(b) Many candidates confused two's complement and sign/magnitude notations. This was possibly because they were asked in a different order than candidates may be expecting.

(c) This was very poorly done. The question stated that the binary numbers should be added up. Consequently, it was not acceptable to change them into denary equivalents, add the resultant denary numbers and turn the answer back into binary. Most candidates were capable of doing the first three columns but when the 'carry' became greater than one most were unable to get any further.

Question 8

This was well answered with most candidates being able to score well on the last question on the paper. This was probably because candidates had experience of this having produced their own user guide for a piece of practical work that they have produced in the past.

F452 Programming Techniques and Logical Methods

General Comments

The overall quality of the candidates' responses was good and indicated that a good number of candidates had been adequately prepared by centres for the examination – more so than in previous January sessions. Most candidates finished the examination within the time given, and were able to respond to the majority of the questions, with significantly fewer questions omitted than in previous sessions.

In general, candidates could have improved the quality of their responses by reading the question carefully, taking note of the command word such as "describe" or "explain" so as to make sure that they were answering the specific question asked – which may be different from questions asked about the same topic in previous sessions. Also, some candidates used technical terms incorrectly, resulting in answers which were too vague or simply incorrect although they indicated that the candidate may have started with the correct idea. Finally, accuracy is an important skill in computer programming and candidates should check their work carefully, especially when referring to code and terms that are in the question. While examiners take into account the fact that candidates are under the pressure of a written test in examination conditions and as a result they may overlook some finer details which they would probably correct if they were actually writing a program, in some cases candidates were being simply sloppy – for example by quoting the wrong lines from code and misspelling or incorrectly copying keywords and identifiers.

These areas for improvement are illustrated further in the detailed comments on questions below.

Comments on Individual Questions

Question 1

(a) The first part on beta testing was generally well answered with most candidates obtaining 2 or 3 marks. The answers for acceptance testing were good too, but slightly less so. There were still some candidates (though proportionally fewer than in previous sessions) who confused acceptance testing with black box testing, stating for example that acceptance testing is testing whether data would be accepted. A careful reading of the question should point out to candidates that there are two elements to each part: a general description of the type of testing and a description of how it would be applied to the program in question. Where candidates obtained 2 marks rather than 3, they tended to omit the second element.

(b) This question was asked slightly differently from previous sessions and this seemed to throw a few candidates. Candidates were not required to describe each test case as this had largely been given to them in the question. They only needed to provide the test data and expected outcome. Candidates should be aware that in a test plan, they need to provide the actual test data which should be input by the person testing. In this case a date relative to the reference date given was sufficient; candidates did not need to explain or justify their choice of the date. However, they need to be precise. Dates without the year, for example, would require a black box tester to know more about the scenario in order to effectively carry out the tests. There were a small number of candidates who clearly do not understand the concept of invalid data and suggested, for example, that in this case a date which results in a fine would be invalid data.

(c) This question was generally well answered. As usual, examiners allowed for language specific names of data types that are equivalent to the general data types stated in the specification (including date and currency). The main difficulty that candidates had was in recognising that dates are intrinsically numeric (for example arithmetic operations can be performed on them, and when they are compared, we consider their values) and credit card numbers are intrinsically text (the numeric value is meaningless, when their characters are compared). Although the program MAY be implemented with dates as strings and credit card numbers as integers (and many programs regrettably do this), if the question specifically asks for the MOST appropriate data type, these answers are wrong.

(d) Candidates generally obtained a maximum of 2 out of the 4 marks here, usually by describing the use of sound to confirm actions by the user such as scanning a book correctly. Many candidates gave advantages of using sound as part of the design which was not the question being asked. In doing so, they were perhaps influenced by their study of F451 which considers different types of user interface and their benefits. F452 is more about the design and development of programs, and in this question they were asked specifically how they would incorporate sound into the user interface of the library system, if they were designing it. There are a number of similar areas where the specifications for F451 and F452 appear to overlap, and centres are advised to note the difference in the assessment aims of the two modules and point this out to candidates.

Question 2

(a) Most candidates knew what a serial file was and described it correctly for a full 2 marks. However, answers on random files were significantly worse. Many candidates suggested that in a random file, records are placed in a random location which is factually incorrect as the location is determined by the hash algorithm. There was also some indication that candidates may be confusing random files with file management in a hard disk. This was made worse by very approximate use of technical terms. Words like “random”, “record” and “file” have very specific meanings in Computing, and candidates need to be clear about these meanings especially where, like “random”, they may differ from some everyday usage.

(b) This was generally well answered. Typically candidates who did not obtain all 3 marks used > rather than <. There is still some evidence that some candidates do not know which sign is “less than” and which is “greater than”, and in this question this was compounded by the fact that they also needed to work out which inequality was needed in the first place.

(c) A range of answers was given here but it was pleasing to see that candidates realised that initialising a variable is not necessarily giving it the value 0 or 1. Some candidates simply stated what the statement in the line does eg “it sets the value of FastesTime to the time read”. Such candidates need to pay closer attention to the command words in question, in this case “Explain why [the statement] is needed.” The best answers were able to identify the where FastestTime was used in an expression later in the code and hence why it needed a value. Weaker candidates simply suggested that initialising variables is good practice.

(d) Both parts of section d were well answered by most candidates.

(e) It was pleasing to see that most candidates know how to tackle this in a variety of programming languages, but some candidates would have scored better here by reading the question carefully. The question specifically asked for the output to be given in a sentence, but many candidates did not do this. Also, candidates need to be careful in particular when writing code. Some candidates lost marks because of incorrect or unclear

positions for their quotation marks, making it unclear in their string expressions which parts were literal strings.

(f) There was a range of responses, with most candidates picking up the 3 lower ability marks in the question. Many candidates simply suggested once the file was opened, the most recent time can be retrieved without adding sufficient detail to their algorithm to indicate how the most recent entry would be identified or how the time would be extracted from this entry. Although definitions for a serial file were mostly correct in part (a), some candidates did not appreciate that the most recent entry would be the last record in the file and did a serial search for the record with the most recent date.

Question 3

(a) Answers to this question were disappointing, owing partly to some candidates' inability to express their answers clearly. Also some candidates appeared unclear about the term "parentheses" which is clearly stated in this specification. This term is used in preference to "brackets" as it is more specific and distinguishes from other types of bracket.

(b) Most candidates started well, substituting the value of the variables as indicated. So far, this is a skill they could have obtained from studying mathematics. But when it came to the assessment objectives of this module, some candidates did not notice that the comparison operations would evaluate to a Boolean (or at least, they did not state this as part of the working out they were required by the question to show). Also many candidates did not recognise AND as a Boolean operator, and so stated that the output would be "true AND false".

(c) Parts c(i) and c(ii) were generally well answered although in c(ii), many candidates did not recognise the name of the function "HasDoneIt" as an identifier. Also, in order to demonstrate that candidates knew precisely what an identifier is, they needed to state the identifier only, as used in the code and in the correct case, and their answers were not considered correct if they had additional information such as data types, function declarations or the word "input". In part c(iii) the question already told them that the identifiers need to be improved. Therefore answers such as "they need to be more appropriate" are too vague; candidates needed to state how to make them more appropriate.

(d) Part d was generally well answered with most candidates able to identify and describe two internal documentation techniques, usually commenting and indenting. Note that candidates were not asked to give advantages of these techniques as the question already tells them this. Instead, they were specifically asked to describe how the technique would be used in the code provided. Some candidates demonstrated that they do not know how to use indentation correctly, suggesting for example that line 06 should be indented further than the rest of the code "because it is important". Also, some candidates came back to the use of meaningful identifiers which had been the subject of part (c) even though the question specifically asked for two OTHER ways to make code easier to understand.

Question 4

(a) This was a relatively easy question to ensure that candidates understood the problem at hand before answering the rest of the question and it was well answered. Where candidates did not get full marks, they usually gave the total value taken obtained rather than the values of the three coins taken.

(b) It was pleasing to see that all parts of (b) were generally well answered. The purpose of decomposing the expression to be built up into stages was to target the question at lower ability candidates, and this seems to have worked. In previous sessions, these easier marks have focused on the designs of interfaces and outputs. Centres should continue to emphasise to candidates that questions aimed at the full ability range can be asked on any aspect of the specification and across the examination paper. The only difficulties that a minority of candidates had with this question were recognising that you needed to multiply the number of £2 coins by 2 to get their value, and getting the order of an assignment correct (ie variable = expression and not the other way around).

(c) This was generally well answered. However, candidates needed to recognise that this was a 3 mark question and give enough detail in their description to get all 3 marks. A few candidates stated that a procedure returns a single value. Procedures can return values only via parameters that are passed by reference. Although this is beyond the specification, candidates who described it correctly were, of course, credited for doing so. There is some variability in exactly how passing parameters by reference is done and expressed in different programming languages and this is recognised by examiners.

(d) There were two errors in line 02 of the code given. Candidates were fully credited for identifying either of these, and generally candidates scored well on 4(d)i. In 4(d)(ii) it was rather disappointing to see many candidates fail to recognise a missing END IF in the code given. 4(d)(iii) was well answered.

(e) There were a range of answers. Once more, candidates should use the number of marks available as an indication of the level of detail needed. Candidates who did not get full marks often did not include enough detail to accrue 4 marks or did not attempt to relate their answers to the errors in d. There were also some difficulties in using technical terms precisely (such as candidates referring to a “debugger” as a person testing the program or a “breakpoint” as the point at which a program crashes).

(f) Candidates responded well to this question. There was a range of answers which reflected the ability of the candidates. Among the best answers, the most common error was omitting to ensure that there were enough £2 coins in the machine to give the maximum amount of £2 coins possible. Also, although commenting every step of the algorithm is unnecessary and actually reduces the quality of communication, some annotation was needed in most cases to outline the general strategy the algorithm uses to ensure that the change is given in as few coins as possible. These omissions unfortunately meant that although there were many excellent solutions, there were very few that scored the full 8 marks. Middle ability candidates generally gave a more incomplete or incorrect algorithm that was clearly along the right lines and could be corrected relatively easily.

Question 5

(a) This produced a range of answers. While most candidates did attempt to make three separate points for the 3 marks available, they were sometimes too vague in their responses (for example by stating that the program would be easier to write/test/debug etc without making it clear that this was because you would be writing/testing/debugging a module at a time rather than the program as a whole).

(b) Answers here were disappointing owing largely to some candidates’ inability to express their answer accurately (eg by saying that an IF statement has two conditions). Also, candidates should be trained in a comparison question to make a positive statement about both items being compared, rather than imply or assume that if something is true for the first item, then it is not true for the second. A minority of candidates appeared to be unfamiliar with the SELECT CASE construct. While we recognise that its actual implementation varies in different languages, candidates are expected, at least for the purposes of pseudocode, to recognise the format given in the specification.

(c) Part (i) was well answered, most candidates being able to recognise recursion and parts (ii) and (iii) worked well as discriminators for middle and higher ability candidates. In part (iii) some candidates who were potentially thinking along the right lines may have scored better if they had picked up the emphasis on describing the MAIN advantage in using iteration (particularly in the algorithm for a command line menu which potentially might be repeated very numerous times).

F453 Advanced Computing Theory

General Comments

An ongoing problem is the quality of the candidates' presentation. If a candidate wants to gain marks, it is vital that the examiner can read what is written. Many scripts did not help the reader to understand the points being made, although the examining team feel that no candidate was disadvantaged as all responses were understood.

A few candidates did not read the questions carefully and some answered their own questions rather than the one on the question paper.

Centres are asked to access the support materials on the OCR website specifically for explanations of the versions of the UML diagrams. Many candidates were unable to identify or explain the diagrams in the paper.

Comments on Individual Questions

Question 1

(a) **(i)** Generally well answered with most candidates able to define an interrupt and offer an acceptable example.

(ii) A few misidentified this as a queue and as a result described the wrong structure. Not many candidates mentioned contents of registers instead using vague terms like job or task.

(iii) Generally well answered with most candidates gaining marks.

(b) Most candidates were able to offer a valid example.

(c) Some candidates either did not know it was a file allocation table or were unable to identify the contents of the FAT. However, those candidates who were able to identify the FAT were normally confident of the contents.

Question 2

(a) **(i)** Most candidates were able to identify an assembly language.

(ii) Candidates were able to score marks for identifying features of the language although there were many who failed to give three responses to match the three marks available for the question.

(iii) This was a question about translating a low level language, not a high level language. Many candidates quoted lexical analysis and removing quotes showing a lack of understanding of the question.

(b) The concepts of being immediately available and ready tested were well explained but few other responses were given.

Question 3

(a) **(i)** Responses tended to be good although a common answer was to say a single processor rather than a single control unit.

(ii) Most candidates picked up at least one mark for this question.

(b) Opportunities for awarding marks were missed here because candidates failed to identify that the MAR holds the address of the next instruction/data, with some going on to describe the function of the PC which was not asked for in this question, although this is symptomatic of a poor understanding of this topic and many candidates would benefit by a more thorough knowledge of the fetch execute cycle generally.

(c) Where marks were missed in this question it was normally for stating that the accumulator actively does something with the data held.

Question 4

(a) **(i)** Generally well explained. Candidates should be aware that most of the marks are for the explanations rather than for the final answer.

(ii) Again, the marks are for the explanation and in some scripts the working was not obvious. Students and centres should be aware that some questions insist on working being shown and that full marks will not be awarded if the annotation is not clear.

(b) Although harder, the negative exponent did not stop most candidates scoring the marks here.

(c) The average mark for this part of the question and for the previous part were greater than the more straight forward ones in part a. This may well have been because the questions were more difficult and consequently the candidates needed to write down their working in order to follow their responses.

Question 5

(a) An easy question which was answered well by the majority of candidates. Those who describe a serial search have either not read the question properly or are not ready for the examination yet.

(b) Very few achieved full marks on this question, most candidates gave a disadvantage and then went on to describe an advantage of a serial sort rather than expanding on why a file needed to be sorted.

(c) Perhaps one of the most poorly answered questions, most students kept the duplicated entry in the merged file.

(d) Most students got one mark on this with a few describing the need for two pointers.

Question 6

(a) Because of the multiple notations used in UML the board has published a comprehensive set of notations and the attention of all centres is directed to this for future sessions.

(b) Some of the additions to the diagram did not conform to the standard but most candidates scored well here. The common error was to interpret the diagram as an ER diagram resulting in an attempt to put webbed feet on one end of the line connecting the objects.

Question 7

(a) A standard question with a standard set of answers which most candidates were able to answer well. The candidates were able to describe breaking up the problem into a number of smaller steps but failed to realistically give the stopping point of the steps being small enough to be individual steps in the algorithm or individual procedures.

(b) Well answered, but invariably the final mark was missed in both parts. This may have been because the candidate had said all that they could, however many were probably in a position of thinking that they had fully answered the question when they had only said two things for a three mark question.

Question 8

(a) Most candidates failed to score full marks in this question, very few stated that they were used for a specific purpose.

(b) The same comments relate here as they did in question 3b. Many candidates need to improve their understanding of the fetch execute cycle. Candidates sitting an A2 paper in Computing should not be stating that the PC 'counts the number of programs that have been run'. This form of answer was too common to be comfortable.

Question 9

(a) Candidates showed a good understanding of these concepts. The weak areas were the use of a link entity to overcome the problem of the many to many relationship and the explanation of the foreign key.

(b) **(i)** Most students had difficulty with this question, a lot could name parts of a DBMS but did not describe what they did.

(ii) Most candidates were able to give two actions and hence gained the marks.

Question 10

(a) Candidates who did not know what type of language this was gained few or no points here, those who did know the language answered well.

(b) Generally well answered with most candidates saying enough to gain the marks at each step.

F454 Computing Project

As usual there were very few entries for the January session and those entries raised very few issues.

It is impressive to see so many original ideas and obvious enthusiasm for developing coded solutions. It was also clear that the key to success lies in careful, thorough and detailed investigation of the problem and potential solutions. Where candidates had gone beyond a simple interview and looked at the problem in greater depth the development became more focussed and effective.

There were a number of impressive coded games and activities including retro games like asteroids and teaching aids such as a binary tutor. It is clear that when a student finds the topic area interesting they focus more on the task in hand and produce good quality solutions.

The best reports provided a commentary on the whole process in chronological order using segments of code, test results and further investigation to illustrate their progress towards a working solution.

It is worth noting that a number of centres have submitted electronic evidence alongside the printed report to good effect. OCR will now accept the work for this unit in electronic form and no longer require a printed report. We are also quite happy to accept electronic forms of evidence for testing to supplement these reports, for example, avi files showing testing in progress. For the next session these will have to be submitted by post but we expect to have the option for repository entry for the 2013 sessions allowing centres to upload work directly to OCR via Interchange.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2012