OCR
Oxford Cambridge and RSA

GCSE

Computing

General Certificate of Secondary Education **J275**

OCR Report to Centres June 2016

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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

A451 Computer Systems and Programming

General Comments

The number of candidates, again, increased significantly this year. There was evidence that many candidates had been prepared appropriately and could demonstrate their knowledge and skills. A significant number, however, had a limited understanding of some elements of the specification and were unable to answer some of the questions, particularly in programming.

At times, candidates could have improved by reading the question carefully, for example where a question asks explicitly for reference to an example or situation, then the candidate will be unable to get full marks without meeting this requirement. At times, candidates answered a different question to what was asked, or wrote what they knew about a topic instead of answering the question.

Comments on Individual Questions

Question 1

This question required an understanding of character sets.

Q.1(a) Most candidates made a good attempt at defining a character set, but they needed to be explicit that it referred to the characters in a computer. A common error was that it was the characters that people use, or those that are on a keyboard, the latter of which is not accurate enough because a character set often has many more characters than those a keyboard displays.

Q.1(b) This question was answered well, candidates were able to correctly convert the numbers into hexadecimal. Those candidates who could not convert to hexadecimal were still often able to get the conversion of 4 correct.

Q.1(b)(ii) Many candidates had a good understanding of the differences between the two languages, the most common response being that Unicode could have more characters. Fewer candidates went into further detail to explain why this was the case. Some candidates got these the wrong way, and stated that Unicode was used because it would take up less space.

Question 2

This was a quality of written communication question about legal and ethical issues.

The majority of candidates wrote a reasonable, structured response to this question. The most common legal issues identified were the Data Protection Act and copyright. Some candidates found the ethical issues more difficult to identify, and confused these with legal issues. The responses given were often well contextualised to the situation.

Question 3

This question was about databases.

Q.3(a) Candidates had a good attempt at this question, with a significant number correctly identifying that it was to identify which film the rating was for. The better candidates were then able to explain how this was set up in the databases, correctly referencing the primary and foreign keys. A common error was that the candidates did not identify which table the PK and FK was in, or which tables were linked.

Q.3(b) This question was not well answered, with many candidates not having an understanding of what it meant to separate the data from the applications. A common incorrect answer was that it stopped the data getting mixed up. It was clear where candidates had come across this terminology before, or where they had looked at the past paper where a similar question was included, and they were able to give a reasonable response, usually that different types of the application could still access the data, or that the application can be changed without the data being changed.

Q.3(c) This question was not well answered. Candidates confused record with field, and gave an example of a field from the table.

Q.3(d)(i) This question was answered well. Some candidates did not read the question fully, and gave more fields that was being asked for.

Q.3(d)(ii) The majority of candidates made a good attempt at this question. There were often some minor errors, such as not including the speech marks around the string Comedy.

Question 4

This question was appropriate programming theory and techniques.

Q.4(a) This question was answered well, with many candidates correctly getting sequence. Some candidates did not read the question, and gave a response other than the three options the question gave.

Q.4(b) This question was not answered well by many candidates. Some candidates did not appear to have any understanding of what a constant was, and made a guess based on the English definition of the word. Some candidates did not differentiate between a constant and a variable in their response, saying that the value doesn't change in the program, which could also be the case for a variable. The better candidates were able to correctly identify that it can't be changed.

Q.4(c) There was a mix of responses to this question, many candidates were able to get this correct, whilst others were unable to follow the code.

Q.4(d) This question was answered well by many candidates, who were able to identify the appropriate data type. Many candidates did not know what a data type was, and gave other responses.

Q.4(e) As with Q.4(d), where candidates knew what a data type as, they were able to give good responses to this question. There was a significant number of candidates who did not know what a data type was. Some candidates did not fully read the question, and gave one data type and then a reason for it.

Q.4(f) This question was not answered well. Many candidates did not know what an IDE was, often giving utility programs as responses. A significant number of candidates gave compiler and interpreter as answers, showing that they did not understand that these are examples of the translator that was given in the question. The better candidates were able to name the tools, as given in the specification, and describe them. Marks were often given for descriptions of the tools, where they could not be named.

Q.4(g) Many candidates did not answer the question, instead giving definitions of compilers and interpreters, instead of describing how they were used when producing a program. The most common answers involved checking for errors.

Question 5

This question was about data representation, focusing on image and sound.

Q.5(a) Very few candidates used the example in the figure as part of their response, there was the opportunity to annotate the diagram here, or to use it throughout their explanation, but this was very rarely done. The better candidates were able to use the correct terminology, whilst many wrote everything they knew about bitmap images, including how they are displayed on screen as opposed to how it is stored.

Q.5(b) This question was not answered well. Most candidates repeated the question by saying there was less data. Candidates needed to explain how the reduction in colours reduces the file size. Another common error was that there were less pixels because there were less colours. The better candidates were able to clearly explain that there were less bits needed per colour, and therefore less bits needed to represent each pixel.

Q.5(c) This question was answered well by many candidates, who were able to give a reasonable example of metadata. Fewer candidates could define metadata, but, again, a significant number of candidates could do this.

Q.5(d)(i) Where candidates knew how sound was stored, they were able to give a clear description, and those better candidates did well with this question. Some candidates did not understand the terminology of sampling, and often guessed at the meaning of the word.

Q.5(d)(ii) Many candidates were able to correctly identify that the file size increased. Fewer candidates could express that the quality was improved because it was closer to the original that was being recorded.

Question 6

This question was about hardware and computer specifications.

Q.6(a) This question was answered fairly well, candidates were able to express that two processes could be carried out at once, and they then often got a second mark for identifying that this made it faster. Some candidates could not clearly express what was being processed, or simply stated that it was faster which was insufficient as the actual processes are not carried out faster, it is faster because it is completing two processes at the same time.

Q.6(b)(i) This question was answered well, with candidates able to express the differences between RAM and ROM, although many candidates gave a full description of one in the first difference space, and a full description of the second in the second difference space. Candidates should be writing both sides of the difference in the given space. Some candidates only gave one side of the difference, or did not full describe both sides.

Q.6(b)(ii) Many candidates were able to identify that virtual memory would be relied on less. Fewer candidates could identify that more programs could be open at once, a common error was that the computer could store more data or more programs which was referring to secondary storage.

Q.6(b)(iii) This question was answered well by the majority of candidates, who were able to give a structured response. Most candidates could identify a number of different improvements that could be made. A small number of candidates did not answer the question, and gave a description of how RAM improvers the computer, repeating their response to Q.6(b)(ii). Some candidates described hardware that would not affect the performance, such as using a touch screen and adding a printer.

Question 7

This question was about networks.

Q.7(a) Many candidates were able to correctly identify the difference in size between a WAN and a LAN. The better candidates also identified the difference in hardware, or ownership of the hardware used.

Q.7(b) This question was not answered well, with few candidate able to demonstrate an understanding of client-server and peer-to-peer networks. The most common response was the central storage of data, although this was often not expanded to explain why this is a benefit.

Q.7(c) Many candidates did not understand the difference between the Internet and the WWW, a significant number knew the difference but got it the wrong way around, stating that the WWW was the hardware, and the Internet was the websites. Many candidates guessed incorrectly, and assumed that World Wide meant it could be accessed internationally and the Internet was only local.

Question 8

This was a binary conversion and addition question.

Q.8(a) This question was answered well, with the majority of candidates getting this correct.

Q.8(b) Many candidates were able to answer this correctly.

Question 9

This was an algorithm question.

Candidates were required to write an algorithm to access specific array elements and then either keep track of the number of taken elements, or to loop through and count the number not taken.

Most candidates were able to take the number as input. Few candidates had a good understanding of arrays and how to access specific array elements. Some candidates attempted to keep track of the number of spaces taken by adding 1 to a variable each time through, but a common mistake was to also reset this value each time so that it was not actually keeping track correctly.

Many candidates who tackled this question used pseudo code and often made a better attempt at the question. When a flow chart was used, there was rarely any use of arrays and accessing the array elements.

A452 Practical investigation

General Comments

There was another significant increase in the number of entries this year. The standard of work overall was similar to previous years, although slightly weaker at times.

There was good evidence of research, with candidates referencing materials that they had used. Often this was limited to the response to the final question, candidates should be referencing material throughout their reports.

The presentation and structure of the reports is important. Candidates should be submitting no more than one document, preferably in pdf format. Additional files may include videos of testing, but these should not be excessive and should be clearly linked or referenced to completed testing tables.

Candidates need to produce evidence of design in A452, in the tasks there is at least one question with the opportunity for candidates to demonstrate their design skills, and candidates should be producing detailed flow charts and/or pseudocode.

Candidates are only awarded marks for their evidence of completing the tasks. Where candidates have carried out significant research prior to starting the tasks, and then complete few of the actual tasks, the marks are only awarded for those tasks completed. Candidates need to produce evidence of any code produced, and evidence that this code has been tested and it works. Witness statements are not accepted as evidence, and if there is no evidence in the candidates' reports then it will not be assumed that they work.

Where candidates show their final code, with no development, research or explanation of the code produced, it cannot be assumed that they understand the work they have completed. Candidates need to be demonstrating their understanding of the work they are carrying out by explaining the processes they are following, and the code they have produced.

Where there is an option for candidates to identify their own improvement, or element to focus on, this is an opportunity for candidates to show off their knowledge and skills. They are expected to select challenging extensions, especially at the higher end, rather than trivial additions that do not demonstrate any further research or skill.

The final question in each set of tasks is a research question that requires a substantial response. Candidates should be investigating the question and developing their own conclusions, with evidence of their research to support their statements. This response needs to be the candidates' own interpretation of the information. Where candidates have produced a minimal response, or relied heavily on copied information, their marks for the conclusions section, and the technical understanding is limited accordingly.

The better responses came from candidates who worked freely to develop their own solution without restriction. They produced a clear narrative of how they tackled the investigation, and their work was well designed, explained and tested.

The standard of marking was variable, but overall it was more accurate. Some centres still awarded high marks when only a small number of the tasks had been attempted, or where there was little evidence produced by the candidates. Centres need to only mark what is presented and submitted as evidence.

Detailed comments by the centres in the URS forms helped moderators to see where marks were awarded. These should be more than repeating the statements in the boxes, there should be references to the tasks and the location of the evidence, explaining why that mark was given for that candidate.

Centres must ensure they are tackling the new tasks for submission in 2017. Where centres are submitting work from a three-year GCSE and withdrawn tasks have been used, centres must ensure they inform OCR prior to the submission of the work.

Comments on Individual Questions

Low level programming
The best submissions had evidence of the development of the solutions, they showed mistakes that were made and how these were corrected. Where candidates simply showed their final solution, there was little evidence that they understood the work completed and that it was their own work. There was often a lack of testing, of limited testing for example only testing the solution once with one set of data, instead of ensuring it worked with a range of data.

App Inventor
The best submissions had clear evidence of the blocks used for each task, these were explained by the candidates (and not just a repeat of what the code says). The candidates then produced detailed testing tables to thoroughly test their solutions, and there was evidence to support the tests. The better candidates chose complex additions, such as using a database to store who had booked a computer, and only allowing cancellation of this addition, or having good logging in facilities. In the final question, the candidates found out about security issues in databases, and issues such as concurrent access.

Linux
This was a popular submission and the work produced was generally well structured, with a natural narrative following each of the tasks. Some candidates struggled with the explanation, where a question asks the candidate to 'explain in detail', this needs to be more than a sentence describing the code. Candidates did not always thoroughly test their solutions, and planning was often missed by candidates completing this task.

A453 Programming project

General Comments

This was the largest entry for the unit and the first session with three new tasks, the arithmetic quiz, cyphers and vehicle speed checks. Most centres chose the arithmetic quiz. Please note it is important centres select from the tasks designated for the session. In 2017 there are three new sets of tasks, a troubleshooting system, stock control and compression.

The moderators saw some very good work that was analysed carefully, designed in detail, coded effectively and thoroughly tested. In the arithmetic quiz the better work typically created a complete program by completing each stage and building upon that for the next task. The third element often provided the differentiation between candidates, with the better candidates using files created in task two based on the results from task 1 to load data to be processed.

The cypher task produced some excellent work with candidates able to complete all three tasks. In a number of cases candidates struggled with double key encryption, though many of these were able to understand the principle and were able to create a partial solution. The vehicle speed check produced the most disjointed solutions with each part being tackled as a separate item by many candidates.

The work was generally well organised as single narrative documents with plenty of test evidence at each stage of the process and evidence that validation had been used effectively to produce robust programs. Most teachers used the URS effectively providing useful notes to identify how the work was assessed for the moderator. There were significantly fewer centres sending large numbers of separate files that gave a disjointed view of the process.

Once again there were clerical errors with the marks from the URS not being transferred to interchange, these delay the moderation process quite significantly and centres are urged to check that the marks submitted match those on the work. Other issues that delay moderation are non-submission of the URS and not using candidate numbers to identify the work; while moderating we use the candidate number to identify work.

Issues affecting the quality of the work include limited design work that included little beyond a restatement of the problem and an algorithm. A good design will include a detailed analysis of what a program that would meet the end user requirements should include. Discussion of validation to make the program robust, suitable measurable success criteria and a test strategy that includes test data to use during development should also be included.

The development should show the program being developed and tested stage by stage with evidence of test outcomes at each stage. Testing was often a factor limiting the marks for a candidate with some providing limited evidence that the program worked. Good testing will be systematic and aggressive trying to break the program. Evidence of test outcomes must be provided to demonstrate how well the program has been tested and as evidence to cross reference with the success criteria to evaluate the work.

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