GCE AS EXAMINERS' REPORTS

COMPUTER SCIENCE
AS

SUMMER 2017

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GCE AS COMPUTER SCIENCE

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COMPONENT 1 FUNDAMENTALS OF COMPUTER SCIENCE

Many of the candidates demonstrated that they understood and could answer questions on most of the specification. The mean mark would suggest that candidates found the paper slightly more accessible than last year and it was particularly pleasing to see most candidates answer the mathematical content confidently, which was an improvement on the previous series.

Improvement was also evident in the question requiring candidates to write an algorithm to a given problem.

Candidates were obviously well prepared for this exam and many good answers were evident and candidates giving extended answers where appropriate. However, it was slightly disappointing to see many candidates not giving enough technical detail on the mark-up language programming paradigm, along with insertion sort algorithms and file organisation.

Individual Questions

1. The majority of candidates answered this question effectively.

   Around half of candidates were able to define the term Internet confidently and many candidates were able to correctly identify HTTP as the most appropriate networking protocol for transferring multimedia web pages over the Internet. This was also true for IMAP as the most appropriate protocol for downloading email from a mail server.

   Fewer candidates were able to correctly identify UDP as the most appropriate protocol for broadcasting data where there is no need to guarantee delivery, ordering, or duplicate protection and DHCP for adding devices to a network without the need for manually assigning them a unique IP address.

2. The majority of candidates answered this question effectively and clearly had a good understanding of how data is read from RAM into registers during the fetch-execute cycle. The rest of the candidates only had a superficial technical knowledge, failing to refer to key processes, e.g. address of the next instruction is copied from RAM into the register, the program counter is incremented, etc. Answer by these candidates were limited to the instruction is fetched and then decoded and then executed, which is not a response worthy of credit at this level.

3. The majority of candidates answered this question poorly, with answers only extending as far multiple processors being used to process a single task with many calculations being carried out simultaneously. Very few candidates mentioned that the speedup of a program using multiple processors in parallel computing is limited by the time needed for the sequential fraction of the program.

4. Many candidates answered this question well and there was a clear improvement in standards nationally in relation to this type of mathematical question.

   Most candidates were able to convert between different counting systems confidently and accurately.

   When describing how numbers can be represented using sign and magnitude representation, most candidates were able to describe how the leftmost bit is used to indicate the sign, however only a very few candidates then went on to say that the remaining bits are used to determine the magnitude of the number. This limited many responses to two out of three marks.

   Many candidates were confident is describing how negative numbers are stored using two's complement representation.

   The majority of candidates were able to convert the given real number into the stated floating-point form.

   The majority of candidates were able to calculate the denary value of the given floating-point number, but a few did not state the denary value of the original mantissa.

   Many candidates were able to give one advantage of representing numbers in floating-point form and integer form, but only a very few were able to give two of each.

5. Many candidates were able to answer this question well and this was the best answered question on the paper.

   Most candidates either gained full marks or zero marks for stating what the term algorithm meant and giving two common methods of defining an algorithm.

   A significantly higher proportion of candidates wrote a fully functioning algorithm to the given problem, which was an improvement on the previous series.

   The use of self-documenting identifiers was of great assistance to the marking process.

6. Many of the candidates were able to simplify the given Boolean expression. Some candidates were penalised where they hadn't clearly shown each step.

7. Only a few candidates answered this question well and most candidates particularly struggled with testing the insertion sort algorithm.

   Very few candidates were able to correctly identify that this was an insertion sort algorithm, incorrectly thinking that it was a bubble sort algorithm.

   Most candidates were able to identify the logical operator used in the algorithm.

   Many candidates were able to correctly identify an example of selection from the algorithm, but failed to accurately represent its purpose. Even fewer candidates were able to correctly identify an example of repetition from the algorithm. The main issue with responses seen was that candidates did not give the full example of the repetition, e.g. for i = 1 to n-1 / next I or Do / While (j>=0 AND inserted = FALSE). Only part of the loop was given.

8. A very few candidates answered this question on the mark-up language programming paradigm well. This was the worst answered question of the paper with a significantly number of candidates not attempting the question at all.

   The main issue seen with this question was a lack of technical depth or candidates focussing solely on websites with no technical justification or understanding the paradigm.

9. Around half of candidates answered this question effectively, understating that data compression reduces the file size and that when compressed files are decompressed they do not give back the original data. There were also some good, practical examples of data compression methods useful for digitally sampled analogue data, such as sound, video, graphics and images.

10. A minority of candidates answered this question well.

    Very few candidates were able to describe the terms file and record.

    Most candidates showed only a superficial understanding of fixed and variable length fields and as such limited their marks to three out of six for the second part of the question. There was a good understanding that fixed length fields have same number of bytes in each field and that variable length fields have different number of bytes in each field and this response was also backed up with a suitable example for each, such as postcode and forename respectively. There were very few examples beyond this to show a full understanding of these file designs.

11. This question was answered poorly by many candidates.

    A few candidates wrote that records were stored in key sequence order and that an index allows data to be accessed directly. However, very few candidates gave both aspects of this file organisation.

    The description of how direct random access file organisation is used answered comprehensively by only a very few candidates. In this question, a lack of technical terminology, such as hashing algorithms, collisions, etc. was clearly evident and preventing candidates from answering this question well.

    The diagram required to show how a transaction file and master file are used to produce a monthly mobile phone bill for each customer was answered well in comparison with the rest of the question. However, many candidates lost marks as they did not clearly label a **sorted** transaction file, only a transaction file. The update process showed a lack of understanding for this level where we would expect candidates to demonstrate an understanding that a comparison record by record is made with corresponding master record.

12. Most candidates wrote a response that showed an adequate line of reasoning with elements of coherence, relevance and logical structure. These candidates showed an adequate understanding of the requirements of the question and a satisfactory knowledge as specified in the indicative content on operating systems. These candidates used appropriate technical terminology referring to the indicative content.

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COMPONENT 2 PRACTICAL PROGRAMMING TO SOLVE PROBLEMS

Introduction

Component 2 is a practical examination with candidates required to demonstrate the application of knowledge and understanding at all times.

General Remarks

Most of the candidates demonstrated a good understanding of the specification, question attempted percentages were not available this series. Many candidates were well prepared and many excellent answers were evident. There was evidence also that some candidates had been well prepared for some of the practical programming elements found in question 5.

Comments on Individual Questions

1. This was generally well answered by candidates. Candidates used technical terminology such as class, object, method, inheritance, public, private or parameter well.

2. This was generally well answered with the exception of appropriate validation techniques.

3. Candidates did not use sufficient technical terminology here and could not always describe drawbacks of the methodology they had chosen.

4. (a) Many good answers were seen here, with candidates able to trace through an algorithm and provide the outputs/contents of variables.

4. (b) As is usually the case with algorithm questions, some candidates scored full marks but a large number seemed to have no clear idea about algorithm design.

5. (i) This was generally not well answered with candidates either scoring very highly or not gaining any marks. It was disappointing to see that some centers had not thoroughly prepared candidates for the prospect of fixing “broken” code where the line involved file handling. Python was the most popular language opted for by candidates, with Visual Basic being the second most popular and the least used was Java.

NB.
With Java most centres used the recommended Netbeans IDE with some centres using Eclipse and a small number of centres using BlueJ. Unfortunately, from the evidence seen, BlueJ was not well suited to the demand of an AS-level paper

5. (ii) Generally not well answered. Many candidates were unable to implement validation checks nor deal with file handling.

5. (iii) This question was generally well answered. Many candidates showed detailed annotation of the code they had used.

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