COMPUTING ADVANCED LEVEL

Paper 8959/5215
Practical Programming Project

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One obvious feature has been that overall the standard of notation within the code has become better, and the amount of notation has increased, making the programming easier to follow.

Our greatest problem, which has stood out more than any other, are the number of Centres, and hence candidates, who submit for Paper 2 a project that looks as though it is really for Paper 4. These projects describe a system rather than a problem, and often have no programming code. As Paper 2 is a chance for candidates to show how well they can write programming code, it is virtually impossible for such Paper 4 type projects to gain a pass mark.

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COMPUTING ADVANCED LEVEL

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Paper 8959/5216

Computer Systems, Communications and Software

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General comments

The paper was of the same standard as this paper has been in previous sessions. There were some questions which were slightly different in nature from what candidates may have been expecting and it is possible that candidates were trying to fit standard answers to questions rather than trying to find the answers which would fit the questions.

A very good example of this was **Question 4(b)** where the question contained the word 'validation' and many candidates simply gave the standard types of validation rule having misunderstood the question completely. The candidates had not been prepared for a variation of the algorithm question, which was a shame because the only thing that was difficult about **Question 4(a)** was that it may have been unexpected; in all other respects it was intended to be more accessible than other algorithm questions.

Scripts were well-presented and candidates are to be congratulated for the impressive way that they set about answering the papers. Thanks also go to the teachers, for generally preparing these young people for what is a difficult task for them.

There were no obvious areas of the paper that caused a problem of understanding and there were very few scripts where the candidate had failed to offer a response to any of the questions. There was no indication of any candidates having any time trouble in answering the script.

Comments on specific questions

Question 1

(a) Most candidates earned marks for the first two parts but failed to give any indication in **(iii)** that the device was outside the processor for long term storage while the computer is switched off for later use.

(b) The application was a control application so the devices should reflect this. While the input and storage devices were treated with some latitude, the idea of an output device being a monitor so that the human could take action when they were told that the temperature was changing was not in the spirit of the application.

(c) (i) More able candidates were able to answer this part of the question, which was as it was intended to be, more difficult than parts **(a)** and **(b)**. Many candidates stated 'type of data' rather than 'data type'. These are two different things, and while Examiners try to interpret candidates' responses, they cannot give credit for responses which are specifically wrong.

(ii) This was intended to be a difficult question and so it proved. Most candidates treated this as a queue of data items despite not being told this at any point in the question. The other common answer was to give a search algorithm for a particular data item. The question is specifically about data entry to an array and in that respect is not difficult. The difficult part was to decide on a sensible index to use to determine the correct position in the array. The reader's attention is directed to the published mark scheme for the answer to this and all other questions on the paper.

Question 2

(a) Most candidates were able to give three methods but rather fewer could explain or describe the methods that they had chosen. Many were resigned to simply rewording the question and saying something like '…to make it more presentable'.

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(b) Few could say anything about white box testing other than that it had something to do with the actual code. Concepts like transparent boxes so that the tester can see inside the program and see the code, may well be useful analogies in the classroom but are not acceptable in exam answers.

Many were able to score well when providing alternative testing methods but too many thought that alpha and beta testing were appropriate. These are references to the type of tester rather than the testing being done. For example different testing methods can be used by both alpha and beta testers.

Question 3

(a) Generally well answered although many candidates interpreted generic software as 'off the shelf'.

(b) Most candidates chose custom written and were able to justify the choice.

(c) Very few were able to answer this question. Most responses were parts of the feasibility study. This takes place before the solution is even designed. It is difficult to understand this error as the question clearly states the implementation (installation) of the new software.

Question 4

(a) This was not intended to be as difficult as it proved. Candidates at this level should be able to dry run an algorithm. The algorithm is not difficult, it is very short, it comprises only a repetition construct and a selection construct and a simple output command after each selection. A difficulty was added in the form of extra data which is not used when the algorithm is run, but if the algorithm is followed carefully there should be no chance that this data is used. Candidates commonly used the marks in the number column, not realising that there was only ever one input to NUMBER. They also insisted on adding another two lines to the table in order to use up the data. Finally, candidates failed to output the count along with the result, despite it being included in all three versions of the output command. This is an area of the syllabus which needs to be addressed by most Centres.

(b) The marks were for a description of the extra commands, however they were explained. However, the question did state that the check needed to be included in the original algorithm and consequently just to name some validation checks and say why they would be appropriate is not answering the question as set.

Question 5

(a) This question was made harder by candidates who looked at the application and immediately thought 'batch processing'. This is not a question about batch processing. The type of processing used may well be batch processing but that is only because of the answers to this question about why the data has to be stored first, not the other way around. The data is first stored on disk because of the speed mismatch between the data entry and the processor. This then leads to collecting data in a batch which ultimately (and not an answer appropriate here) will lead to the data being batch processed. It is not that the processing is going to be by batch and therefore that the data has to be collected in batches.

(b) This question gave a good spread of marks with most candidates scoring at least something. It is probably time to dispense with floppy disks as a sensible medium for the backed up files, although credit was still given for this and the same is true of the traditional version of the ancestral filing system, though it is accepted that this is still very common and has many sensible points. This method too was awarded all the relevant marks from the scheme but the diagrams that so often accompany the responses are evidently referring to large reel to reel tapes which are not appropriate here.

(c) Most candidates were able to score here, with largely generic type answers being acceptable.

A problem arose with the understanding of many of the candidates over the stem of the remaining questions. The stem specifically states that this example takes place within an office (singular) and that the machines in the office are being networked. There is an assumption that any networking

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must automatically mean a link to the Internet. The Internet or any other WAN is simply not mentioned with the exception of there being a link between the accounts department and the bank. This mismatch between the question being about a LAN and the candidates who assumed that this was automatically a WAN meant that many parts of candidates' responses were inappropriate.

Question 6

(a)   A modem is not appropriate in a single office.

(b)   This was a standard question with a standard answer which most candidates now manage to succeed with.

(c)   Viruses are not acceptable by themselves, but the candidate was given credit if they said that the spread of a virus that a machine already had would be speeded up.

Question 7

Both parts of this question gave most candidates the opportunity to earn many marks. The first part was standard book work and the second part was an understandable situation. There was confusion amongst some candidates who thought that each worker would have to learn the payroll system so that they could work out their own pay and pay themselves.

Question 8

Some high marks were earned here. Typical shortcomings were the failure to be able to describe the use of the hard disk and to justify it, while the CD-ROM was, once again, interpreted as a CD-RW which is a very different thing.

Question 9

The important distinction here is that one can be altered while the other cannot. To state that a payroll system cannot be altered is obviously wrong, unless the candidate is being very specific about who is the user and under what circumstances it cannot be altered.

Question 10

This was not an easy question. Given the application there is only one sensible HCI for each user type, unless the candidate fully justified some alternative.

(i)   This was well answered.

(ii)   Candidates scored well with their choice of HCI, although the justification was usually given as 'the technician knows the commands' which is not a reason for using it for that application.

(iii)   This was poorly answered. The question clearly states '…in an unstructured way'. Consequently the only acceptable response is a natural language interface as all others are structured.

COMPUTING ADVANCED LEVEL

Paper 5217

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COMPUTING ADVANCED LEVEL

Paper 5218

Further Systems and Software

General Comments

Papers were well presented and there was little evidence of candidates being penalised because of their inability to express themselves satisfactorily. It is always a remarkable thing to report that candidates from all over the world, the majority having English as a second or even third language can manage to answer an examination paper with complex concepts and a need for the use of technical terminology at such a young age. This is not just a testament to the candidates themselves but also to the preparation that they have been put through.

Some of the questions were evidently more difficult than others but this is what would be expected in an examination paper and, indeed, it is the way that the paper is designed. However, there was no evidence of general misconceptions about any of the questions, either based on computing knowledge or on cultural issues and none were reported by Centres to the examining team. There were occasions where individual candidates had misunderstood the requirements of a question, for example talking about parallel forms of communication in **Question 8** rather than parallel processing, but none of these were Centre based, simply individual candidates succumbing to the pressure of the examination room.

Centres are reminded that candidates are encouraged to answer the majority of the questions in bullet point form and there is a clear correlation between candidates who use bullets properly and the quality of the responses in computing terms. Many candidates have obviously been encouraged to use bullets but cannot shake off the need to write in full English prose so the effect is that they put a bullet point in front of each sentence of their answer, which is not really what Examiners are suggesting. **Question 7(b)** leant itself to the use of a diagram for the answer and the candidates who answered by drawing a diagram invariably gained most or all of the marks whereas those who tried to describe the process found it very much more difficult to score. Centres are asked to encourage candidates to use diagrams where it is appropriate to do so.

There is evidence that some candidates are using rote learning for many of the concepts involved in the syllabus. This becomes apparent when Examiners see some useful points being made and then candidates from the same Centre carrying on their response in the wrong way. There is also evidence of previous answers being used for questions on this year's paper. Examiners were commonly marking answers which were the correct answers to questions from last year's paper and had been used for a similar question this year. This is where such rote learning techniques fall down and where a lack of understanding of the syllabus concepts becomes all too apparent.

There was no evidence of any of the candidates suffering from time trouble, the final questions being attempted just as thoroughly as the first. **Question 10(ii)** was often not completed and this was because it was, purposely, the hardest question on the paper.

Comments on individual questions

Question 1

This proved a more demanding question than was intended. The question was clearly about using simulation for testing a design. However, there were two commonly misreading by candidates. Some simply decided to talk about testing and ignore simulation completely. This question was a very good example of a common problem in examining, that is the habit of candidates to see a word or phrase in the question which they latch on to and give answers which they believe are correct but in fact they are answering the wrong question. The second misread of the question was to simply see the word 'simulation' and to write about that. This would, at least, mean that four of the marks were accessible but the four about testing were often lost. A common response was to talk about using simulation because of an impossibility otherwise and then to give the example of training astronauts, nothing about testing.

It is important to encourage candidates to read the entire question and not just be side tracked when a word is recognised.

Question 2

(a)   Many candidates got the definitions the wrong way around.

(b)   The question specifically said 'With reference to object code…' A candidate who did not mention object code could not expect to earn any marks here. The majority of answers given were simple rote learned responses which did not answer the question.

(c)   Generally well answered although too many candidates gave meaningless responses of the form that 'Compilers are faster than interpreters'. Such responses indicate a lack of understanding by candidates.

Question 3

This question was well answered as would be expected as it was examining some of the knowledge that the candidates had become familiar with from their project work. The main problems were in **part (b)** where many candidates either failed to give examples of a primary key and a foreign key or did not say enough. To say that Teacher ID is an example of a primary key is not true, it can also be a foreign key, it depends which table it is in and this last bit of information was often missing. One candidate drew up and populated a table of car makes with appropriate fields (why this was done when two perfectly good tables were given in the question is a mystery). The candidate then went on to label the country of manufacture field as the foreign field.

Question 4

Many candidates were unable to answer here. Many of those that did could give three features but could not expand on their features, save for giving a very brief mention to the idea of tags.

Question 5

(a)   The quality of answers to this question was very largely Centre based. This should not cause a problem to candidates as the answers were standard definitions which should be known and there were obvious places that they could have been used within the given scenario. The answers that the examining team were expecting are given in the published mark scheme and the attention of Centres is drawn to this document for the expected responses to this and all other questions on the paper.

(b)   This was better answered and proved to be a good discriminator with only the most able candidates being able to score full marks. The responses from candidates who used a series of numbered points rather than producing a prose answer were markedly better because they were able to judge the quality of their response better.

(c)   Very poorly understood. The majority of responses talked about accounting on the system or about some aspect of systems analysis.

Question 6

A very good example of the problems of rote learning. Candidates should have been aware of the need to make three points for each of the three methods of management in order to get the marks. Very few did this, with the majority who gave reasonable responses not being able to score more than two. Most candidates clearly knew some of the facts but there were rather fewer who managed to attribute them to the correct methods.

Question 7

(a)   These are standard definitions but too few candidates were happy with them. Too many defined a procedure as a function. This is worrying as there is a specific difference between the two, though perhaps not as worrying as candidates who described a procedure as a way of doing something.

(b)   The mention of the word stack struck a chord with many candidates who took it as an invitation to write down everything that they knew about stacks, including algorithms for storing and reading to and from stacks. Candidates at this level certainly need to show a higher level of discernment about what is and what is not relevant to a particular response.

Question 8

(a)   Most candidates were able to score marks here, though there was a small proportion of candidates who interpreted the question as an invitation to describe in detail the fetch execute cycle.

(b)   Too many candidates see the word 'parallel' and immediately write about either parallel data transmission or parallel implementation of a solution to a problem. However, most were able to score on both parts of **(b)**. The most significant type of error was from candidates who decided that parallel processing was important because of the volume of data to be handled rather than the volume of calculations that need to be carried out. The volume of data is not important here.

Question 9

(a)   The question clearly stated 'Describe an algorithm…' which meant that as long as the stages of the algorithm were clearly expressed then the presentation was not important. Most however decided to produce a pseudo code algorithm. The quality of the algorithms was extremely variable with some excellent examples, but many others that were not appropriate with variables being scattered throughout and suddenly changing half way through. The loop rarely worked and when it did had the wrong stages within it. The ability to write an algorithm for an unseen problem is examined in Paper 1. This is a standard algorithm to describe a common problem solution, it was disappointing to find so few candidates who could produce a passable response.

(b)   There are a number of different methods of file access which were perfectly acceptable as an answer for **(ii)** though the one that Examiners were expecting was a sequential file to be searched with a binary search. A common response which was not accepted was a direct access file as the index for this file could be stored in either serial or sequential form. This was accepted if the candidate stated that the index was stored sequentially because the response then became that which is on the published mark scheme.

Question 10

(i)   Was generally well answered though there were a number of candidates who demonstrated their lack of knowledge of the concepts by referring to the fact that hello contains two l's.

(ii)   This was intended to be a difficult question and so it turned out. There were very few candidates who scored full marks by providing a workable definition, though some did manage to define the punctuation separately and a smaller number were able to use recursion to define a sentence with different numbers of words in it. A very few managed to understand the significance of the need for spaces between the words and a few of them managed to put everything together in a full definition.