

COMPUTING

Paper 9691/11
Written Paper 1

General Comments:

The standard of the work presented by the candidates was, generally, acceptable.

The candidates' ability to understand the requirements of the paper and then to provide responses to the questions in a language which is probably not their native tongue continues to impress and congratulations to all the candidates who demonstrated such a command of both the subject and language of the paper.

There was no indication of any cultural or social problem arising from any of the questions and the assessments in that respect seem to be fair.

There was no indication of candidates suffering from time problems, the last questions on the paper were answered as fully as the first on almost all papers, those who did not manage this seemed to suffer because of an inability to answer rather than because time was a factor.

Many candidates answered the questions in a different order to that presented on the paper. There is no problem caused by this but the candidates who answer in a different order should have a positive reason for doing so as the paper is designed to be answered in a particular way. Having said that it is always sensible to start with a question that you feel confident about answering in order to raise your confidence levels and the candidates who began at **Question 7** and answered the scenario based questions first before returning to the simpler questions in the first half of the paper, possibly have a sensible strategy for producing their best work by attempting the harder part of the paper while they are still fresh at the start of the examination. Candidates who decide to answer questions in a different order must ensure to identify carefully the questions which they are answering or the Examiners will find difficulty in assigning the correct part answers to the part questions.

Many candidates are still trying to write English prose type answers to the longer questions. This is not necessary and candidates who respond by using bulleted or numbered points generally give better responses because they are concentrating on the Computing rather than on the presentation of the answers.

Individual Questions

Question 1

- (a) Most candidates could clearly state other types of generic applications software and provide an example of its use within the context of the garage. There were a number of instances of candidates providing brand names. There seemed to be some confusion between the use of a spreadsheet and a database, although the distinction is somewhat difficult to define and a suitable use for either was sufficient to earn the marks. CAD was not considered to be relevant in this situation.
- (b) This part of the question was, surprisingly, badly answered. Few candidates were able to provide full details of the mail merge process. Many candidates focused their answer on the features, such as different size and styles of font, which word processing software provides. Descriptions of the recall of customer data from a database or other source were rare, as were answers which encompassed the concept of a regular query of some kind to identify customers whose car service was due.

Question 2

Many candidates were able to describe the use of the different utility software provided in the exam. However, the application of these to a given situation was weak. The description of disk formatter was well answered and a common misconception was that formatting freed up space on the disk by deleting unwanted files.

Question 3

- (a) Many of the candidates were able to correctly state the meaning of the terms provided, although the storage device did not always include the keeping the data when the computer is switched off so that it can be used at a later time. Candidates should consider such seemingly simple questions carefully. There are standard definitions for these terms. It is always sensible to consider an answer to see whether other items fit the definition given. In this case many definitions would also apply to RAM memory and others would define a filing cabinet well.
- (b)(i) Many candidates were able to state that a bar code reader would be used. However, many were unable to provide further details of the process. Many answered with the use of a bar code to look up stock details which was not what was being asked here where the question asked how the information was read and captured by the computer system. A full list of acceptable responses is available in the published mark scheme and the attention of the reader is directed to this document for information.
- (b)(ii) Candidates answered this question quite well, providing answers relating to hard copy printed receipts for the customer and the display of product data or a sound to indicate correct/incorrect scanning of the item for the operator.

Question 4

Most of the candidates were able to provide a limited description of the two types of interface but were then unable to provide a suitable application for which the command line would be used. They were, however, able to provide an application for the form-based interface. It was pleasing to see that there was only limited confusion between form-based and menu-based interfaces, a distinction which has caused a problem in the past.

Question 5

This should have been a straightforward question with the order of the parts of the question leading the candidates through the application of the theory.

- (a) Few candidates were able to give two points as to why sequential access was suitable for this application.
- (b) Only the more able candidates were able to express the key point that sequential access, on average, will result in a large number of records having to be accessed in order to locate a particular record.
- (c) Most candidates were able to score here, providing a well-argued response.
- (d) Some candidates did not read the rubric of the question and quoted 'bookwork' type applications such as 'online airline reservation systems' and so gained no credit. Some candidates wrongly suggested that the data capture of the daily start and finish times would require rapid response processing.

Question 6

- (i) Poorly answered. Many candidates answered in terms of the control unit controlling the whole system including any peripheral devices.
- (ii) Generally well answered but some were confused and answered in terms of memory management.
- (iii) The best answered part of the question.

Question 7

- (a) Answers here were poor and lacked the key idea that there would need to be negotiation between the analyst and the client.
- (b) The majority of candidates were able to suggest two fact-finding methods but the advantage which followed often lacked substance especially for interviews where the emphasis was on meeting face-to-face with managers. This provides no advantage, it is what the analyst uses the meeting for which provides the advantage.
- (c) Answers were usually vague with little clear conviction other than 'it was important to do this!' Several candidates missed the point and wrote about maintenance. Unsurprisingly the quality of the answer in part (a) was reflected here because if the candidate fails to understand the point that any problem solution is a collaboration then it is very difficult to justify any form of evaluation.

Question 8

This was a wide ranging question and candidates scored well on parts (a) and (b) but less so on part (c). Differences between a LAN and a WAN were well understood. Candidates described differences between geographical span and quoted the medium of communication as the second difference. Some candidates wrongly suggested wireless could be used as a medium of communication on a WAN.

Most candidates followed the suggestion in the rubric that they should draw a diagram for (b) (i) and a maximum mark of three was common.

When asked to describe the use of buffers many candidates were only able to produce definitions of an interrupt and of a buffer. Answers often wrongly described the interrupt signal as being received by the primary memory or even the user!

Question 9

- (a) This was well answered with many being able to provide sensible measures that could be taken and how these would improve conditions. Some candidates failed to understand the focus of the question providing answers such as air-conditioning and using ergonomically designed chairs, some even focused on allowing workers to work from home!
- (b) Poorly answered by the majority of candidates which was surprising because it is the standard question of privacy and security of data, though it looked a bit different because it was to do with taxation files.

Question 10

- (a) Many candidates were able to provide an algorithm which met most of the requirements defined in the question.
- (b) Many candidates were able to state that I & T were unsuitable as they may cause confusion but were then unable to provide an improvement!
- (c) This part of the question was very poorly answered by the majority of candidates. Some managed to state the need for a loop, but were unable to provide further details.

COMPUTING

Paper 9691/12

Written Paper 1

General Comments

The paper was broadly in line with the equivalent paper from last year.

The candidates' ability to understand the requirements of the paper and then to provide responses to the questions in a language which is probably not their native tongue continues to impress and congratulations to all the candidates who demonstrated such a command of both the subject and language of the paper.

There was no indication of any cultural or social problem arising from any of the questions and the assessments in that respect seem to be fair.

There was no indication of candidates suffering from time problems, the last questions on the paper were answered as fully as the first on almost all papers, those who did not manage this seemed to suffer because of an inability to answer rather than because time was a factor.

Many candidates started half way through the paper with **Question 5** and then went back to the first half of the paper after reaching the end of **Question 8**. The second half of **Paper 1** is a scenario-based set of questions and as such the questions are that much more difficult than simple knowledge based questions.

Many candidates are still trying to write English prose type answers to the longer questions. This is not necessary and candidates who respond by using bulleted or numbered points generally give better responses because they are concentrating on the Computing rather than on the presentation of the answers.

Individual Questions

Question 1

- (a) These were well answered although the use of ROM media was less well explained than the other two. The justifications were often not given.
- (b) The important point here was that the student should 'need' the suggested device. There was no main storage device mentioned in the rest of the question so the expected response was a hard drive. This was duly given by most candidates but some decided to offer floppy disk or magnetic tape drive. Any response other than a hard drive needed to be justified in such a way that the student would 'need' it rather than just have it as another device.

Question 2

- (a) The problem here is not the knowledge but the means of describing it clearly enough. Many candidates become confused in the English because they are trying to answer in perfect sentences and end up contradicting themselves. These are basic definitions and should be quoted as such.
- (b) The question did not ask for a description of the interface, although a small part of the answer would need to be a description. The question asked why it is important that the interface is designed well. Too many candidates saw the question was about an interface and immediately thought of the operator of the city's water system which was on the previous paper and which would have been fresh in the mind as it may have been used as a past paper question. That question did ask for a description of the interface and hence was a very different question with a very different answer. This highlights the danger of the candidates relying too heavily on past paper answers.

Question 3

- (a) This question was well answered. Many candidates confused the two parts of this question and the Examiners credited the responses wherever in the answer they came.
- (b) Too many candidates are still confusing validation and verification. This was intended to be a simple question which the candidates should be able to earn marks on. However, the majority of candidates either answered a question about verification or understood that it was about validation and then proceeded to just give two validation checks which were not appropriate. For example the question states that the name is input to the system, so a presence check is not appropriate as the question states that the name is input.
- (c) Well answered.
- (d) Well answered, although a significant number failed to convert the value into Megabytes.
- (e) Most scored one mark for each, failing to understand that a simple statement in a two-mark question cannot say anything more than one thing and hence score only one mark.

Question 4

- (a) Most candidates had difficulty explaining the importance of the bit rate. Candidates at this level should be able to explain that the important thing is not the size of the file, but how it is going to be used. The largest video file can be transferred using a small bit rate if it is simply being saved and will not be used for a week!
- (b) Most candidates were unable to get past a modem which scores only one mark. Some said that it was used to connect to the telephone line, gaining another mark, but few were able to offer anything more. The full set of acceptable responses is available in the published mark scheme for the paper.

Question 5

Well answered with few candidates getting the two types the wrong way around.

Question 6

- (a) This is not understood. The basic premise is that the stages must be taken one at a time in a strict order unless returning to a previous stage. The attention of Centres is directed to the published mark scheme.
- (b) The majority of candidates did not answer the question but instead they either picked three of the stages of the systems life cycle to explain or they explained three methods of data collection.

Question 7

- (a) Well answered.
- (b) Some candidates answered this question very well while others struggled. The difference seemed to be based on Centre rather than ability and it is suggested that Centres who do not teach this fully at the moment might spend some more time on it. There were a large number of candidates who convinced the Examiners that they knew what the answers were and yet only scored 4 or 5 marks because they wrote the answer in prose style. If a number of points are given it is easy for the candidates to see when they have given enough information for their six marks.
- (c) Well answered.
- (d) Most candidates understood this part of the question and answered well. However a substantial minority did not understand the term and simply gave an answer relating to the normal running of the system, like the amount that the student has spent this lunch time.

Question 8

Some very good attempts at this question. It was an excellent discriminator providing the full range of marks from 0 to 9. Almost all candidates understood the system although their attempts at finding the price and then arranging for payment were instructive. If teachers use this question as an exercise with candidates the published mark scheme is useful but there are two particularly telling pointers which show whether or not the candidate has understood the concepts. The first is the loop for payments: Is a loop used and then what is the end condition for the loop? The second is when they are describing a payment being made. If the candidate states 'Input coins' or something similar then they have not understood the necessity for inputting a single coin and dealing with that before going on to the next coin. The able candidate who takes a little time to think will provide a good answer.

COMPUTING

Paper 9691/02

Practical Programming Project

It was good to see so many short, high quality pieces of work, the vast majority of which was accurately marked.

Many candidates had chosen fairly straightforward ideas. So long as there is a need to define a file with a variety of fields, and manipulate that file to some end, candidates can use the programming skills that this paper asks for. Many centres had got their candidates to list examples and reference where these skills had been used. This made marking the project simpler for the teacher and the Moderators. It also acted as a check list for the candidates.

The good projects were usually about 30 -35 pages long. They had detailed design of their program, along with detailed annotation within the code listing that, taken together, enabled anyone else to clearly see what the program did, how it was constructed and how it could be maintained. The testing produced a table of expected results to show that the program worked, along with the hard copy evidence, and then sufficient detail to enable a user to implement the program.

The main features of projects that were not highly marked were:

- Producing projects that had elements of a system problem. There is no expectation or need in this paper to have an end user, an investigation, evaluation, and user letters. Producing projects where some of the code was written using wizards or autocode facilities. Such code will not have been written by the candidate.
- Writing code without annotation. The Moderators often see pages of well written code, but have no idea what it might do. It needs annotating so that the code can be related to the design, and so that any other person who wants to understand the code can do so without being an expert in the language used. Some candidates wrote a comment at the top of some blocks of code, but good annotation needs to be a comment after most lines of code.
- Limited testing. It was common to just test a few different items of data being entered to see if the validation methods work. This does not show that the whole program works.

These aspects were also the ones that teachers had the main difficulties with for allocation of marks.

Overall the quality of the work had gone up from November 2008, and the Moderators enjoyed seeing so many well programmed, well documented projects.

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Paper 9691/31
Written Paper 3

General Comments:

The paper was considered, by the Examiners, to be a fair test of ability at this level. There was no evidence of candidates suffering time problems and the examining team feel confident that the candidates had every opportunity to produce evidence of their abilities.

Every year Examiners espouse the virtues of answering some of the longer questions in a series of bullets or numbered points. This allows the candidate to concentrate on the computing knowledge that they are trying to convey and it also allows them to keep a check on how many points that they have made so that the number of points can be compared with the mark allocation for the question. Such simple examination technique, that a candidate cannot score three marks if only two points have been made, is somewhat lacking from some candidates.

Question 1

Many candidates gave files or processes (stock control, payroll) rather than organisations (which were generally banks or supermarkets). Examples of data were often generalised to files (often stock details or payroll details) rather than fields or types of data and candidates often did not understand what *commercial value* meant, commonly linking it to simple monetary items.

Question 2

This was generally reasonably well attempted, with most candidates understanding the distinction between intranet and Internet and commenting on the private nature of an intranet and its resultant better security. The full list of accepted mark points is available in the published mark scheme to which the attention of the reader is directed.

Question 3

This is a very difficult concept to explain in words, which is why the question suggested the use of a diagram. If the candidate showed the idea of the address in the instruction (1) pointing to an address which contained another address (1) which in turn pointed to a location with data in it (1), all the marks were awarded. The second part of this question is concerned with the fact that addresses are, themselves, lengthy items and if they are too long they do not fit in the space allowed in the instruction.

Question 4

- (a) Candidates believed that because the person in the question was the headteacher it meant that the server and administration hardware would have to be included. The truth is that the question specifically listed a system administrator as one of the people needing access to the system. The headteacher will require the same types of hardware that any other user will have except that some of the files are particularly sensitive and therefore will need to be stored separately from others.
- (b) Media for data transmission refers to the method used to communicate around the system. The choices will, sensibly, be between cables of different types and wireless. Reasons for choices will range from speed of communication to volume of data that can be conveyed to keeping the data being transmitted safe. Many candidates scored well here while too many considered only backing storage devices.

- (c) Poor examination technique was once again displayed by many candidates. The candidates did not read the question carefully and they are not all to do with expertise. Examiners do not recall any candidate noticing that there are five office staff and only one administrator and consequently the training and the resources needing to be included by the School would be different. The question about consideration of the CD training for the office staff was better answered, but there again, the responses seemed to concentrate on the fact that it meant individual learning, not the consequences.
- (d) The question about the addition of a value to a linked list normally gives no trouble to candidates. This is probably because the contents of the list are given and the question asks candidates to show how a particular extra item can be added. In this case the candidates needed to think in the abstract, but if they had drawn a diagram to explain the concepts, all the marks were available. Indeed, some candidates did draw such a diagram and they scored well, but others found the question extremely difficult to gain credit on.

Question 5

Many candidates scored well here. Candidates should be careful however, there is a tendency to be careless when the correct answer is probably known: e.g. *transfer the contents of the MAR to the MDR* without going into memory to fetch the instruction in this case. Such carelessness quite often lost candidates 1-2 marks. The *execute* phase was the least well understood.

Question 6

Many candidates scored 1 or 2 marks by writing about lexical and syntax analysis and often code generation as well. Mention of the removal of spaces and comments were therefore common, but that does not answer the question. A dictionary of keywords and rules for variable names were rarely mentioned.

Question 7

- (a) Most scored well enough, with sensible examples being given. Some, however, erred by mixing up inputs and outputs. A considerable number who used ATM as their example gave poor reasons. The question stated that the example 'must be real-time' and consequently if an example like the use of an ATM is given then it is important that the candidate give the full explanation which isolates the part of an ATM application which is indeed real-time.
- (b) Sensor names were more common than adequate reasons (noise sensors "detecting noise", for example); some sensor names seem to have been grabbed from other work the candidates had done, e.g. temperature and humidity sensors, while others were unacceptable names for sensors, for example heat sensor and one candidate even suggested a 'burglar sensor'.

Question 8

Few candidates seemed able to say very much about the parts of a DBMS, especially a data dictionary or DDL. More gained marks for DML but there was little evidence that candidates equated this to SQL or had clear knowledge of what such a language allowed the user to do. Equally, few were able to tackle the advantages of using a relational database. Most marks were given for the idea that items usually only need to be stored once. *User views of data* seemed to be largely an unknown concept. This is a standard piece of the syllabus which has been asked many times before but not in this particular form. Perhaps it was the fact that the question asked about the 'more difficult' ideas first, before going on to ask about the advantages of a database rather than flat files may have been off-putting to candidates. This is a very good example of the dangers of candidates being prepared by a too-rigid adherence to past paper questions. Candidates tend to develop an expectation of what they will be expected to do in the exam and when it looks a little different many candidates believe that the concepts being asked about are totally different.

Question 9

- (a) Most candidates scored well here, though there was a significant proportion who stated that a single-user operating system was one which is only ever used by one person.
- (b) Most candidates were able to describe the concept of transparency which is a very abstract idea. It was somewhat mystifying then to see otherwise good candidates unable to talk about directory services despite the fact that it is something that they probably use every day in the School computer rooms.

Question 10

Many candidates failed to appreciate the significance of the word 'relationships' in the question and gave generalised answers describing the activities and how long they would take, some even copied out the statements in the question which could never attract credit. Few candidates could identify the critical path. Most thought 'least time' meant the shortest route in days, hence the commonest wrong answer, 27 days. Others just added up everything and decided that the process would take approximately 9 weeks.

COMPUTING

Paper 9691/32
Written Paper 3

General Comments:

The candidates produced a full range of responses to all questions. Obviously some questions were easier than others but all attracted the full range of marks from 0 to maximum. The quality of the answers relies heavily on the abilities of the candidates but all were able to express themselves and their ideas. The quality also depends on the method used by the candidates to present their responses and in that respect it is heartening to report that fewer candidates are trying to answer in long English prose sentences, but instead are getting used to the idea of using short bulleted points to give their ideas.

There was no indication of any of the candidates suffering from time shortage in the paper.

Individual Questions;

Question 1

Most candidates had a clear idea of the concepts inherent in managing the implementation of new systems, however, many failed to read the question which was about the need to explain the implications of the different methods to the manager of the store. Too often candidates gave the AS answer to this question which is simply to describe them or to talk about advantages and disadvantages of different implementations. If a candidate is going to earn credit at this level the answer really does need to be above the simple knowledge level of understanding.

Question 2

It was encouraging to note that a significant proportion of candidates scored well here and that many were able to gain full marks.

Question 3

- (a) An insertion sort should be the easiest of all the sorts to describe. The question did not require the candidates to produce an algorithm, simply to use the file provided and show what it looked like after each stage of the sort. The attention of the reader is directed to the published mark scheme for this and all other questions.
- (b) The two files were now sorted into alphabetic order and consequently the merge should have been quite straight forward and so it proved for the majority of candidates.
- (c) The majority of candidates scored full marks here.

Question 4

- (a) This was not an easy question, but most candidates made a creditable attempt. Candidates who answered in bullets or numbered points tended to score better than those that gave prose answers because the candidate is able to keep a record of how many responses they have offered, knowing that five are expected to score full marks.
- (b) Very well answered by the majority of the candidates.
- (c) Again, these concepts held no terrors for the candidates.

- (d) Most candidates failed to understand the significance of the procedure and the data. The main point is that the marks have to come from outside of the procedure otherwise it has no data to work with while the calculation which is done within the procedure uses these values to produce an intermediate value of the total before then dividing it by three. As the intermediate value is produced within the procedure and is not part of the final result to be exported then it needs to be a local variable.

Question 5

Candidates should know what these questions are expecting by now but there are still too many who talk about robots or who give the answer to the simulation question from a past paper which was based around a different scenario. Many candidates gave good answers but, once again, did not say enough to earn full marks. It appears that many candidates simply lose count of the number of points they have made, or do not relate them to the number of marks available.

Question 6

Html was well understood and most candidates were able to answer the question satisfactorily. The most difficult thing for many candidates was the acceptance of the keyword 'describe' and its importance to the volume of information needed in the answer. Too many were happy to leave the three features as single comment answers.

Question 7

This question was very well answered, presumably many candidates had first hand experience after producing their project work. However, too many candidates wrongly described a secondary key as 'another unique field which is the secondary key because the member ID is the primary key'.

Question 8

The same comment applies to this question as to so many of the others. Most candidates had a clear understanding of the concepts involved, but if bullets or numbered points were not used they simply had little idea of what constituted a full response to the question.

Question 9

This was very well answered by most candidates. The only part that caused some problem was the final explanation where too many candidates suggested that the problem was caused because the numbers were two's complement numbers and you cannot add them up.

Question 10

This was a very good discriminator question with able candidates scoring full marks and all candidates being able to make an attempt.

COMPUTING

Paper 9691/04

Project 2

General Comments

This report provides general feedback on the overall quality of project work for GCE Advanced Level Computing candidates. In addition, all Centres receive specific feedback from their Moderator in the form of a short report that is returned after moderation. This reporting provides an ongoing dialogue with Centres giving valuable pointers to the perceived strengths and weaknesses of the projects moderated.

The projects submitted covered a wide variety of topics with better candidates again showing evidence of researching a problem beyond their school or college life. The majority of projects were developed using Access.

In order to have the full range of marks available to the candidate, the computing project must involve a third party end-user whose requirements are considered and clearly documented at all stages of the system development. Centres are reminded that the project work is designed to test the candidates' understanding of the whole systems life cycle, not just the use of software to solve a problem. The requirements are clearly set out on pages 30 to 34 of the syllabus in 'The Guidance on Marking the Computing Project' section. These requirements act as a useful checklist, for both teachers and Students, setting out the expected contents of each section of the report.

Centres are strongly reminded that candidates must use this guidance for the expected contents of their reports rather than some of the popular 'A' level textbooks available for project work, which do not cover the full requirements of the CIE syllabus. Candidates who prepare their work only using text books and not the syllabus for guidance often miss out vital sections of their reports; reducing the marks available to them. Also candidates should not include items that are not required by the syllabus in their report as this just increases the size of the document produced and does not attract any extra marks.

Project Reports and Presentation

The presentation of most of the reports was to a very high standard, with reports word-processed and properly bound. However, candidates should ensure that only material essential to the report is included bound in a single volume. Candidates are reminded that authentic letters from end users are essential to provide evidence for the Evaluation and Investigation and Analysis sections, these letters must not be word-processed by the candidate as part of their report.

It is strongly recommended that the structure of the candidate's report follows that of the mark scheme set out in the syllabus. This allows both teachers at the Centres and Moderators to easily check that work for all sections has been included. Also it is essential that the pages of the report are clearly numbered by the candidate.

Project assessment and marking

Only a few Centres provided a breakdown of marks showing the marks given for each sub-section of the syllabus. Centres are reminded that they must use the mark scheme as set out in the syllabus and also include a detailed breakdown of the marks awarded for each sub-section together with a teacher commentary as to why the marks awarded fitted the criteria for that sub-section. This commentary should include references to the appropriate pages in the candidates' reports. Moderators find Centres providing a commentary are far more likely to have accurately assessed the project work of their candidates.

Comments on Individual Sections

The comments set out below identify areas where candidates' work is to be praised or areas of concern and are not a guide to the required contents of each section.

(a) Definition Investigation and Analysis

(i) Definition- nature of the problem

It was pleasing to see that more candidates included a description of the organisation, the methods used and identified the origins and form of the data. Other items such as a history of the organisation or a map of the location are not required.

(ii) Investigation and Analysis

In order to gain good marks candidates must clearly document end-user involvement and clearly state agreed outcomes. Candidates need to consider carefully the evidence obtained from interviews, observation of the existing system and analysis of user documents, and then ask follow-up questions to fill in any gaps in the knowledge obtained about the current system or requirements for the new system. Also, alternative approaches need to be discussed in depth as applied to the candidate's proposed system rather than in general terms. A detailed requirements specification should be produced based on the information collected. Centres are again reminded that the system proposed does not have to cover more than one area of the business or organisation chosen. Also detailed descriptions and prices of hardware and software available are not required here.

(b) Design

(i) Nature of the solution

Many candidates are including a set of measurable objectives agreed with their end-user. However, not all candidates provided a detailed description of the processes to be implemented and designs for the required outputs. Also some candidates wrongly included evidence from implementation here.

(ii) Intended benefits

Most candidates described the benefits of the intended system. However, some Centres' candidates did not provide evidence for this sub-section so those candidates should not have been awarded any marks.

(iii) Limits of the scope of solution

Again, some Centres' candidates did not provide evidence for this sub-section so those candidates should not have been awarded any marks.

(c) Software Development, Testing and Implementation

(i) Development and Testing

Centres are again reminded that evidence of testing needs to be supported by a well-designed test plan that includes the identification of appropriate test data, including valid, invalid and extreme (borderline) cases, together with expected results for all tests. This plan should be cross-referenced to the test results. For marks to be awarded in the top band for this sub-section the test plan and results should show that all parts of the system have been tested. Again, many candidates only tested the validation and navigation aspects of their system, and omitted to test that the system did what it is supposed to do, thus not being able to gain marks in the highest band for this section.

(ii) Implementation

It was again pleasing to see an improvement in the work presented for this section with more candidates providing written evidence from their end-user that they have used the system and agree with the strategy for implementation. Better candidates' reports contained details of user testing, user training and system changeover that were discussed and agreed with their end-user.

(iii) Appropriateness of structure and exploitation of available facilities

It was pleasing to see more candidates discussing the suitability of both hardware and software and providing a log of any problems encountered together with details of how these problems were overcome.

(d) Documentation

(i) Technical Documentation

The standard of work provided for this section is high, with most candidates producing a stand-alone technical guide that includes most of the following: record, file and data structures used; database modelling and organisation including relationships, screens, reports and menus; data dictionary; data flow (or navigation paths); annotated program listings; detailed flowcharts; details of the algorithms and formulas used. Better candidates also included specifications for the hardware and software on which the system could be implemented.

(ii) User Documentation

This section was completed to a good standard by most candidates. Centres are again reminded that for full marks the candidate must include an index and a glossary, and the guide needs to be complete, including details of backup routines and common errors. Also good on-screen help should exist where this is a sensible option.

(e) Evaluation

This section is still consistently marked very generously by Centres with high marks incorrectly given to candidates who have provided little evidence for each of the sub-sections. Centres are reminded that there are 8 marks for this section and in order to gain high marks candidates need to provide a detailed evaluation that includes the content set out in the guidance for marking projects section of the syllabus.

(i) Discussion of the degree of success in meeting the original objectives

Most candidates considered each objective in turn but few indicated exactly how their project work met each objective or explained why that objective was not met. Centres are reminded that for high marks to be obtained for this sub-section candidates need to include results from the use of user defined, typical test data as part of this discussion.

(ii) Evaluate the users' response to the system

Evidence for this section must be in the form of original letters, preferably on headed notepaper, signed by the end user and not word-processed by the candidate as part of their report. For top marks the candidate must also evaluate that response.

(iii) Desirable extensions

For the 2 marks available in this sub-section candidates need to identify possible extensions and identify the good and bad points of their final system.