COMPUTING

Paper 9691/11
Written Paper 11

General comments

The work was well presented in most respects. It was becoming noticeable in the scripts that there were a significant number of candidates who answered the questions in any order and even split up individual questions, answering the first part in one part of the paper and the other parts somewhere else. The candidates concerned were invariably weaker candidates who should benefit from the flow through the paper (particularly the second part where the questions are linked by the scenario) and particularly from one part of a question to the next.

There appeared to be a few cases where candidates exhibited a problem with time management and that the final responses were either rushed or in a few cases were not presented. These cases were normally accompanied by other responses in the earlier parts of the paper which were far too long and covered much material which was not to the point. Candidates must be aware of the need to manage their time sensibly in the examination.

Comments on specific questions

Question 1

(a) (i) This was well answered, although a small minority confused ROM and RAM and lost marks both here and in **(ii)**. Some candidates appeared not to have understood that volatility and being able to change the data held are two different things.

(ii) The majority stated the boot program but many failed to score the second mark, being content with comments like 'it is always present'.

(b) Most candidates mentioned a Network Interface Card but were unable to say why it was necessary, most answers instilling it with a value far exceeding reality. The second response was either cable or modem. A modem was perfectly acceptable but the reason given: 'to let two computers communicate was inappropriate as the computers were on a LAN.

Question 2

(a) This was generally well answered although some candidates did not consider the storage requirements of the system and hence limited themselves to 6 of the 8 marks.

(b) This question was surprisingly poorly answered. It is a standard system which candidates normally have little difficulty with but most responses lacked any detail. The basic idea of decrementing numbers of products in stock was not a problem but few were able to go further than the bland 'an order is sent to the supplier', few candidates mentioning the supplier file and fewer still guarding against repeat orders by having a Boolean field to state whether an order is presently outstanding or not.

Question 3

The basic procedure was well answered but many candidates lost out because they did not give enough detail. 'The picture is printed on to the shirt by a printer' was common. What sort of printer? Few candidates mentioned the format by which the picture was stored or were able to go into any detail at all about the way the image was captured.

Question 4

(a) Well answered.

(b)(i),(ii) Most candidates managed to score one or two marks here. A few candidates understand that irrespective of packet or circuit switched messages, the message is split into packets and consequently scored well, but too many considered that a message sent by circuit switching was 'sent all at once' or 'in one block' or similar. It is only when this basic point is understood that the importance of stating that a packet switched message must be reordered at the destination becomes apparent, as both messages need to be reassembled.

Question 5

(a) Many candidates scored all four marks in a question which was intended to be straight forward. However, many were unable to explain an example of communication software, many of the responses being just as relevant to using a telephone or even talking to each other: 'the doctors could communicate in the surgery'.

(b) This was intended to be a difficult question and so it proved. The common response was to suggest a database of patients or medicines but there were some excellent attempts often centred around monitoring patients, which attracted the marks. Candidates were not expected to be able to describe a complex piece of software but simply to identify an area where off-the-shelf software was not expected to be available.

(c) This was surprisingly poorly answered. Most candidates seemed not to understand the concept of a mail-merge. There were a few good responses but most were typified by the idea of writing an email and then finding all the email addresses and putting them in the CC line.

Question 6

(a) This question was extremely poorly done. Indexed sequential access to data is on the syllabus and is particularly appropriate to this scenario because of the two types of access required. The first being an immediate access when a telephone operator wants to access a particular customer record and the second a sequential access when all the records in a group of records need to be accessed for warehouse staff to be able to check the status of customer orders so that none are missed. This question has been asked in a number of different guises in the past and has always been well answered, it is difficult to understand why candidates found this particular version difficult.

(b) Bizarrely, the second part of this question should have been the difficult part but proved to be a good discriminator with most candidates having the right concept and many being able to gain full marks. The marks were almost always awarded for the diagram presented, the written explanations which some candidates insisted upon were rarely of any value as the marks were already given in the diagram.

Question 7

Well answered with the points relating to the scenario of the company.

Question 8

(a) (i) Most scored all three marks, though there are a number of candidates who still want everybody to use a command line interface.

(ii) Well answered. The definition of what constituted a sensitive piece of data probably differs from one culture to the next and consequently the Examiner was happy to accept most suggestions. A minority concentrated on the customer being able to protect their own data and not letting anyone else see it, rather defeating the purpose of storing the data in the first place.

(b) (i) Well answered with the majority of candidates scoring full marks.

(ii) The significance of the fact that this is a company website was lost on most candidates. Most were able to score the marks for naming the types of maintenance but seemed unable to then go on and relate the reasons for their importance to the application given, giving instead a simple generic reason.

Question 9

(a) Candidates found this question difficult. Some were able to name the procedure and even to use a loop in order to read all the outstanding order payments, but it was rare to see a suitable means of summing these values.

(b) Similar comments can be made about part **(b)**, though in this case there was less reason for doing so. Many candidates answered this very well. In both cases there were far more mark points available than actual marks that could be awarded, so in questions like these it is always worth providing a partial answer if that is all that the candidate can think of. Many candidates gave partial answers but were able to pick up marks for the condition statements.

COMPUTING

Paper 9691/12
Written Paper 12

General comments

The work was well presented in most respects. It was becoming noticeable in the scripts that there were a significant number of candidates who answered the questions in any order and even split up individual questions, answering the first part in one part of the paper and the other parts somewhere else. The candidates concerned were invariably weaker candidates who should benefit from the flow through the paper (particularly the second part where the questions are linked by the scenario) and particularly from one part of a question to the next.

There appeared to be a few cases where candidates exhibited a problem with time management and that the final responses were either rushed or in a few cases were not presented. These cases were normally accompanied by other responses in the earlier parts of the paper which were far too long and covered much material which was not to the point. Candidates must be aware of the need to manage their time sensibly in the examination.

Comments on specific questions

Question 1

(a) (i)   This was well answered, although a small minority confused ROM and RAM and lost marks both here and in (ii). Some candidates appeared not to have understood that volatility and being able to change the data held are two different things.

(ii)   The majority stated the boot program but many failed to score the second mark, being content with comments like 'it is always present'.

(b)   Most candidates mentioned a Network Interface Card but were unable to say why it was necessary, most answers instilling it with a value far exceeding reality. The second response was either cable or modem. A modem was perfectly acceptable but the reason given: 'to let two computers communicate was inappropriate as the computers were on a LAN.

Question 2

(a)   This was generally well answered although some candidates did not consider the storage requirements of the system and hence limited themselves to 6 of the 8 marks.

(b)   This question was surprisingly poorly answered. It is a standard system which candidates normally have little difficulty with but most responses lacked any detail. The basic idea of decrementing numbers of products in stock was not a problem but few were able to go further than the bland 'an order is sent to the supplier', few candidates mentioning the supplier file and fewer still guarding against repeat orders by having a Boolean field to state whether an order is presently outstanding or not.

Question 3

The basic procedure was well answered but many candidates lost out because they did not give enough detail. 'The picture is printed on to the shirt by a printer' was common. What sort of printer? Few candidates mentioned the format by which the picture was stored or were able to go into any detail at all about the way the image was captured.

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Question 4

(a)   Well answered.

(b)(i),(ii) Most candidates managed to score one or two marks here. A few candidates understand that irrespective of packet or circuit switched messages, the message is split into packets and consequently scored well, but too many considered that a message sent by circuit switching was 'sent all at once' or 'in one block' or similar. It is only when this basic point is understood that the importance of stating that a packet switched message must be reordered at the destination becomes apparent, as both messages need to be reassembled.

Question 5

(a)   Many candidates scored all four marks in a question which was intended to be straight forward. However, many were unable to explain an example of communication software, many of the responses being just as relevant to using a telephone or even talking to each other: 'the doctors could communicate in the surgery'.

(b)   This was intended to be a difficult question and so it proved. The common response was to suggest a database of patients or medicines but there were some excellent attempts often centred around monitoring patients, which attracted the marks. Candidates were not expected to be able to describe a complex piece of software but simply to identify an area where off-the-shelf software was not expected to be available.

(c)   This was surprisingly poorly answered. Most candidates seemed not to understand the concept of a mail-merge. There were a few good responses but most were typified by the idea of writing an email and then finding all the email addresses and putting them in the CC line.

Question 6

(a)   This question was extremely poorly done. Indexed sequential access to data is on the syllabus and is particularly appropriate to this scenario because of the two types of access required. The first being an immediate access when a telephone operator wants to access a particular customer record and the second a sequential access when all the records in a group of records need to be accessed for warehouse staff to be able to check the status of customer orders so that none are missed. This question has been asked in a number of different guises in the past and has always been well answered, it is difficult to understand why candidates found this particular version difficult.

(b)   Bizarrely, the second part of this question should have been the difficult part but proved to be a good discriminator with most candidates having the right concept and many being able to gain full marks. The marks were almost always awarded for the diagram presented, the written explanations which some candidates insisted upon were rarely of any value as the marks were already given in the diagram.

Question 7

Well answered with the points relating to the scenario of the company.

Question 8

(a) (i)   Most scored all three marks, though there are a number of candidates who still want everybody to use a command line interface.

(ii)   Well answered. The definition of what constituted a sensitive piece of data probably differs from one culture to the next and consequently the Examiner was happy to accept most suggestions. A minority concentrated on the customer being able to protect their own data and not letting anyone else see it, rather defeating the purpose of storing the data in the first place.

(b) (i)   Well answered with the majority of candidates scoring full marks.

(ii)   The significance of the fact that this is a company website was lost on most candidates. Most were able to score the marks for naming the types of maintenance but seemed unable to then go on and relate the reasons for their importance to the application given, giving instead a simple generic reason.

Question 9

(a)   Candidates found this question difficult. Some were able to name the procedure and even to use a loop in order to read all the outstanding order payments, but it was rare to see a suitable means of summing these values.

(b)   Similar comments can be made about part **(b)**, though in this case there was less reason for doing so. Many candidates answered this very well. In both cases there were far more mark points available than actual marks that could be awarded, so in questions like these it is always worth providing a partial answer if that is all that the candidate can think of. Many candidates gave partial answers but were able to pick up marks for the condition statements.

COMPUTING

| Paper 9691/13 |
| Written Paper 13 |

General comments

The work was well presented in most respects.

There appeared to be a few cases where candidates exhibited a problem with time management and that the final responses were either rushed or in a few cases were not presented. These cases were normally accompanied by other responses in the earlier parts of the paper which were far too long and covered much material which was not to the point. Candidates must be aware of the need to manage their time sensibly in the examination.

Comments on specific questions

Question 1

(a) (i) This was well answered, although a small minority confused ROM and RAM and lost marks both here and in (ii).

  (ii) There were a number of candidates who gave answers like 'video player' or 'word processor', but most scored well although 'software' was not allowed because it implies that all software is stored there.

(b) (i) Most candidates understand what a NIC is and even why it is necessary but were unable to say, most answers instilling it with a value far exceeding reality. Typical was: 'It connects the computer to the Internet'.

  (ii) Most gave a good response here.

Question 2

(a) This was generally well answered although some candidates did not think about the scenario and tried to suggest inappropriate peripherals.

(b) This proved to be one of the most difficult questions on the paper. Most candidates could not get past the basic concept of the OMR reading what the answer was and then seeing if it was right. The idea of the marks being identified by their coordinates or by their positions on the paper was not mentioned by many. This is a prime example of a question where many candidates are unable to realise that the way that a computer system works is very different from the way that a human being operates.

Question 3

The basic procedure was well answered but many candidates lost out because they did not give enough detail. 'The picture is printed on to the card by a printer' was common. What sort of printer? How was the picture and the text arranged?

Question 4

(a)   Well answered.

(b)(i)   Many candidates answered very well while others struggled to understand the features that were expected. The best answers included details of why it was important to agree the features.

(ii)   Generally well answered although many candidates stated that the message did not have to be reassembled rather than reordered.

Question 5

(a)   Most candidates scored all four marks in a question which was intended to be straight forward. Presentation software was the most commonly missed mark because some candidates persisted in talking about producing a video.

(b)   Some very good examples were given. These normally centred around the idea of a robot which was used to repair dents in body panels. Too many candidates gave an example which, while being an example of a need for non-generic software, was invariably to control a production line in a factory which was not an answer to the question.

(c)   This was surprisingly poorly answered. Most candidates earned marks for the concept of searching the database for certain records and then reading the name and address, but then simply sent the same letter or email to everyone on the list. This topic is firmly on the syllabus and is intended to be within the experience of candidates because most should have actually produced a mail-merge themselves.

Question 6

(a)   This question was extremely poorly done. Indexed sequential access to data is on the syllabus and is particularly appropriate to this scenario because of the two types of access required. The first being an immediate access when a teacher wants to access the record of a particular student and the second when all the records in a group need to be accessed for something like updating the exam marks. The first requires an index while the second requires the members of a group to be held together, probably sequentially. In previous sessions when this has been asked the question has been very well answered, but this time it proved to be the hardest question on the paper.

(b)   The same comment applies to part **(b)**. The diagram is a standard one which has not caused any problem in the past but for some reason candidates did not like it this time. Some gave excellent answers, but the majority must learn that the types of response expected are reliant on the facts in the question and not governed by trying to spot a familiar scenario.

Question 7

Well answered with the points relating to the scenario of the school.

Question 8

(a) (i) Most scored all three marks, though there are a number of candidates who still want teachers to be using a command-line interface.

   (ii) Well answered. The definition of what constituted a sensitive piece of data probably differs from one culture to the next and consequently the Examiner was happy to accept most suggestions.

(b) (i) Well answered with the majority of candidates scoring full marks.

(ii) The significance of the fact that this is a website was lost on most candidates. The point is that someone has to look after the site and update the information on it. They will need to have details of how to change pictures for instance. The assumption is that this person is in the school and consequently can have a hard copy of their documentation. The other user is the person who might be on the other side of the world. They cannot have a hard copy version, where would they get it from? This user needs the documentation on the screen, so if they want to pay the fees for the coming year they can click a help button which will access a screen which will tell them how to do it. Too many candidates when they see 'documentation' immediately decide to talk about user and technical for the user and the technician or programmer.

Question 9

(a) Candidates found this question difficult. Successful candidates approached the question in one of two ways. One was to loop until all the values had been dealt with, using cumulative totals for the scores and the number of exams, or alternatively they copied all the scores into an array and then summed the values in the array. Either was perfectly reasonable. Unfortunately there were too many responses which simply stated that the marks should be added up and then divided by the number of exams, this approach did not attract credit.

(b) Similar comments can be made about part **(b)**, though in this case there was less reason for doing so. Many candidates answered this very well. In both cases there were far more mark points available than actual marks that could be awarded, so in questions like these it is always worth providing a partial answer if that is all that the candidate can think of.

COMPUTING

The quality of the work that was seen by the Moderators was the highest yet. Most of the projects were very well presented, not overlong and containing good quality code that solved a worthwhile problem. The general documentation of the code has steadily improved. The designs leading up to the code stand out as being thorough and meaningful.

It was good to see languages other than Visual Basic used. In particular there were some very good projects written in Java.

Many Centres used their own expanded mark sheets with added comments. These must have been of considerable help to the teachers in their marking and clearly showed the Moderators where the marks had been gained. Overall, only a relatively few Centres had their marks changed, so the Centres must be thanked for such good work. Some had their marks raised. There were still Centres where the work submitted appeared to be more appropriate for Paper 4, and these were the Centres whose marks were adjusted the most.

Again it has been a pleasure to see so many problem ideas and the range of solutions that the candidates produced.

COMPUTING

Paper 9691/32

Written Paper 32

General comments

The work was well presented and generally the way that arguments were made was very clear and precise.

Many candidates used bulleted answers, a very sensible way of allowing the candidate to concentrate on their knowledge of Computing rather than having to spend valuable intellectual energy on trying to write perfect English prose. Bullets are extremely valuable because they allow the candidate to concentrate their efforts on the question and to write down pertinent facts relating to the question. They also allow the candidate to keep a check on how many points have been made because candidates must be aware that the full mark allocation for a question can only be awarded if enough points have been made for that response. However, candidates must be careful to guard against the desire felt by many that they only needed to write down everything that they could possibly remember about the broad area of the question and they must get all the marks somewhere. This sort of approach is not to be encouraged as it shows clearly a lack of discrimination in the responses.

There was evidence that a few candidates who had written large volumes of text in response to some of the earlier questions were hurrying their answers to the later questions. The candidates need to be able to plan their time well, a particularly important part of examination technique.

Comments on specific questions

Question 1

(a)   Lots of misunderstandings here, often based around a confusion about which of the translators was which. It is perhaps a good exercise to ask candidates to practice such questions without using words like 'faster' and 'more efficient'. The candidates answered the two parts here as though there was no distinction between translation and execution and the Examiners considered that points made for either part were valid wherever they were made.

(b)   Well answered by the majority of candidates. The only common failure was to be unable to indicate why optimisation of the code was necessary.

Question 2

(a)   The question simply asked for descriptions of the methods so no formal work was expected, however, many able candidates decided that this was the best way to present their responses.

   (i)   Many candidates decided that, despite the question stating that a file was being searched, they were going to search a list of numbers, though it was still possible that they could score all the marks.

   (ii)   Most understood that the search could end upon the finding of a single occurrence but very few were able to suggest how this could be done.

   (iii)   Many candidates knew the basic principle of continued halving of the file but many were then very careless in their description of the method, discarding the wrong half of the file being the most common error.

(b) This sort technique is poorly understood. Candidates should realise that it does not involve swapping of data within the present list. Two essential elements are expected for an insertion sort: One is that the items are copied onto a new list, though this can be circumvented if necessary; and the second is that successive values are inserted, not swapped.

Question 3

(a) The choices of sensors were rarely both sensible or even possible: a heat sensor was common while a metal sensor was seen more than once. The candidate did not need to remember specific names to get the marks though and the justification marks were independent of stating the named sensor.

(b) Candidates were quite happy to describe the use of robots in the factory and strictly speaking the mark points had to reflect sensible responses. Candidates who related their responses to things that a robot could sensibly be expected to do in a car factory rather than suggesting abstract ideas, tended to score better marks.

Question 4

(a) Well answered by most candidates.

(b) Again, most candidates were able to score well here, the better marks being scored by candidates who planned their response properly either by using bullets or by writing short paragraphs for each advantage.

Question 5

This question was very definitely based in the scenario of the computer systems in a new School and the answers should have born that in mind. Many candidates simply gave generic answers about a bus topology and the rest without suggesting reasons why they may or may not be suitable in a School. Clues are given in this sort of question which allow the candidates to provide sensible responses. For example the School is described as 'new' so cabling can be part of the design of the buildings and optic fibre can be laid down to connect different parts of the site. There were many candidates who simply listed the three common topologies and then went on to try to describe them. Many candidates did not mention media for carrying data at all and consequently severely limited the marks that they could earn.

Question 6

(a) This question was well answered.

(b) Some very good responses with sensible answers about the handling of pages by the O.S. and thorough explanations of virtual memory. However, these were not common, most candidates being content to answer in fairly generic fashion, vaguely mentioning the possible use of an index and saying something about virtual memory. Many confused storage and memory in their explanations while others were keen to mention disk thrashing while not being sure of what it was.

Question 7

(a) A question which was well answered by most candidates, though it was designed to be a fairly simple question aimed at being answerable by all. The main problem was that many candidates failed to see the phrase 'factory production line' in the question which made the working-from-home types of answer inappropriate.

(b) Again the improvement in quality was to be expected but it was good to see so many able to talk about the consistency of the finished product improving.

Question 8

Candidates need to be aware that there are three marks for each of the registers in the question and to score full marks three things need to be said about each one. The main problems here, although the question was well answered by many, were the failure to get the direction correct, for instance saying that the contents of the MAR went to the PC rather than saying the contents of the PC are sent to the MAR; and the problem of suggesting that, for example, the MAR stores all the addresses of the instructions. The understanding of the stages of the fetch-execute cycle though are well understood by most.

Question 9

(a) Well answered with clear and precise mark points.

(b) Those candidates who decided to use the wording of the question and answer by talking about each system separately and then within that division further dividing the response into hardware, software and the data structures, did very well because only one point was needed about each to score 6 of the 8 marks. Those who tried to write an essay invariably became confused and the points being made were mixed between the two systems.

Question 10

(a) Well answered.

(b) Some difficulty with the final definition because candidates tried to make it too complex and in doing so ended up with definitions which included combinations which were not allowed. However, many scored 2 marks for the definition of either 0 or . and for the correct use of notation.

(c) Occasionally there was a perfect answer but they were few and far between. Having drawn their diagrams it is important to follow them through to ensure that they actually allow what is defined in the question. The Examiners suggest that this is an area of the syllabus which could benefit from further practice from most candidates.

COMPUTING

Paper 9691/33

Written Paper 33

General comments

The work was well presented and generally the way that arguments were made was very clear and precise.

The diagrams that were necessary in the paper, particularly **Questions 4** and **10** were clearly presented and most candidates had sensibly not wasted time by making their work look good, but instead had concentrated on the Computing facts that needed to be elicited in the response.

Many candidates used bulleted answers, a very sensible way of allowing the candidate to concentrate on their knowledge of Computing rather than having to spend valuable intellectual energy on trying to write perfect English prose. Bullets are extremely valuable because they allow the candidate to concentrate their efforts on the question and to write down pertinent facts relating to the question. They also allow the candidate to keep a check on how many points have been made because candidates must be aware that the full mark allocation for a question can only be awarded if enough points have been made for that response.

Comments on specific questions

Question 1

(a) Some candidates have difficulty in understanding the differences between the two stages. The majority of responses to this question were very good.

(b) This was very well answered with all the mark points being covered in responses.

(c) Most candidates scored both marks here, those that did not invariably managed to say that the program was loaded into memory although were a number of answers of the form 'loaded into an address'.

Question 2

(a) Neither part of this question was answered with any confidence by candidates. It proved to be one of the hardest questions on the paper. The problem was caused by not answering the question as set. The question asked why it was necessary to have the transaction file in serial form, not for a description of a file in serial form.

(b) The two parts of this question were well answered by most candidates. The merging of two files is well understood, the only real problem being the final stage where it is necessary to state that the remainder of the unused file is copied to the end of the new merged file, many candidates failing to do this. The description (notice, only a description, no algorithm was required) was not so confidently attempted by most, but marks were accrued for the idea of the binary cut.

Question 3

(a) Heat sensors are not acceptable in any question, but temperature sensors, despite being common, are not sensible in this application.

(b) Candidates were quite happy to describe the use of robots in the factory. The candidates who failed to score here talked about robots writing reports in the office or keeping the company accounts or carrying out simulations on imaginary washing machines.

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Question 4

Some excellent responses were seen, though others were struggling to provide a sensible answer and some answered in terms of an ER diagram probably because that was the database question that was expected.

Question 5

This question was very definitely based in the scenario of the computer systems in a hospital and the answers should have born that in mind. Many candidates simply gave generic answers about a bus topology and the rest without suggesting reasons why they may or may not be suitable in a hospital. Clues are given in this sort of question which allow the candidates to provide sensible responses. For example the hospital is described as 'new' so cabling can be part of the design of the buildings and optic fibre can be laid down to connect different parts of the hospital. They were also told that there were different parts to this network, so why were bridges not mentioned in many of the responses?

Question 6

This question was extremely well answered with many instructive diagrams which contained enough detail to earn all the marks without recourse to description. The two types of scheduling algorithms in part **(b)** were almost universally well answered.

Question 7

Another question which was well answered by most candidates. It was encouraging to see that almost all candidates managed to cover both the advantages and the disadvantages.

Question 8

Candidates need to be aware that there are three marks for each of the registers in the question and to score full marks three things need to be said about each one. The main problems here, although the question was well answered by many, were the failure to get the direction correct, for instance saying that the contents of the CIR went to the MDR rather than saying the contents of the MDR are sent to the CIR; the second problem was the IR which many thought held a number of different addresses (of data that the processor was working on at the time) (sic).

Question 9

(a)   Well answered with clear and precise mark points.

(b)   Those candidates who decided to use the wording of the question and answer by talking about each system separately and then within that division further dividing the response into hardware, software and the data organisation, did very well because only one point was needed about each to score 6 of the 8 marks. Those who tried to write an essay invariably became confused and the points being made were mixed between the two systems.

Question 10

(a)   Well answered.

(b)   Some difficulty with the final definition because candidates tried to make it too complex and in doing so ended up with definitions which included combinations which were not allowed. However, many scored 2 marks for the definitions of the end values and non-zero digit.

(c)   Occasionally there was a perfect answer but they were few and far between. Having drawn their diagrams it is important that candidates follow them through to ensure that they actually allow what is defined in the question.

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. Most of the projects seen 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 systems life cycle, not just the use of software to solve a problem. The requirements are clearly set out in the syllabus in 'The Guidance on Marking the Computing Project' section. These requirements can also act as a useful checklist, for both teachers and candidates, setting out the expected contents of each section. Centres are reminded that this guidance and the mark scheme will change in 2011.

Centres are also reminded that candidates should 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 may miss out vital sections of their reports; or complete unnecessary work e.g. feasibility studies and costings.

Project Reports and Presentation

As usual, 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 so that there is only one volume of work submitted per candidate. 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 typed out by the candidate.

It is strongly recommended that the structure of the candidate's report follows that of the mark scheme set out in the syllabus. Essential evidence should not be relegated to appendices. This allows both teachers at the Centres and Moderators to check easily that work for all sections has been included. It is essential that the pages of the report are clearly numbered by the candidate.

Project assessment and marking

Unfortunately 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.

Centres that provide a commentary are far more likely to have accurately assessed the project work of their candidates.

Section 3 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**

   Most candidates described the organisation and the methods used but only the better candidates identified the origins and form of the data.

   (ii)   **Investigation and Analysis**

   In order to gain good marks candidates must clearly document user involvement and clearly state agreed outcomes. Candidates need to consider carefully the evidence obtained from interviews, observation of the existing system and 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 and applied to the candidate's proposed system. A detailed requirements specification should be produced based on the information collected, this must include the specific requirements of the system to be produced and not just concentrated on hardware and software.

   Centres are again reminded that candidates do not need to research the history or structure of the organisation of the business or organisation chosen.

(b)   **Design**

   (i)   **Nature of the solution**

   Centres are again reminded that the requirements specification set out in the analysis needs to be discussed with the end-user and a set of measurable objectives agreed. These objectives will then form the basis for the project evaluation. Many candidates proposed data structures and designs for input screens but then forgot to provide a detailed description of the processes to be implemented and designs for the required outputs.

   (ii)   **Intended benefits**

   Candidates should describe the benefits of their intended system, not just a list of general statements that could apply to any system.

   (iii)   **Limits of the scope of solution**

   Candidates should describe the limitations of their intended system, not just a list of general statements that could apply to any system.

   Full marks for this section cannot be awarded without candidates supplying evidence for **(i)** and **(ii)**.

(c)   **Software Development, Testing and Implementation**

   (i)   **Development and Testing**

   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 (boundary) cases, together with expected results for all tests. The test plan should show that all parts of the system have been tested. Yet 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 pleasing to see more candidates providing a detailed implementation plan that contained details of user testing, user training and system changeover. However for good marks to be awarded there should be evidence to show that this has been agreed with the user.

(iii)   Appropriateness of structure and exploitation of available facilities

For good marks here candidates need to discuss the suitability of both hardware and software, not just provide a list. As well as the log of any problems encountered together there should be details of how these problems were overcome.

(d)   Documentation

(i)   Technical Documentation

The standard of work provided for this section is usually high. However Centres are reminded that this should read as a stand-alone document and not just contain references to items elsewhere in the report.

(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 how to install the new system, backup routines and a guide to common errors. Also good on-screen help should exist where this is a sensible option.

(e)   Evaluation

Centres are again 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. Many candidates provide scant evidence for this section, if this is the case then there are few marks that can be awarded.

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

Candidates need to consider each objective set and explain how their project work met the objective or explain why the objective was not met. This exam session it was pleasing to see more candidates including results from the use of user-defined, typical test data as part of this discussion.

(ii)   Evaluate the users' response to the system

Again Centres are reminded that this response needs to be clearly provided from the end-user showing that they have used the system, not just reported by the candidate. The candidate should then evaluate their end-user's response. Evidence for this section must include original letters, preferably on headed notepaper, signed by the end-user and not typed out by the candidate.

(iii)   Desirable extensions

Most candidates identified possible extensions but did not always identify the good and bad points of their final system.