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## FOREWORD

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This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned.**

# COMPUTING

## GCE Advanced Level and GCE Advanced Subsidiary Level

Paper 9691/01

Written

### General comments

Generally, the candidates were well prepared and the Examining Team were impressed by the standard of understanding demonstrated. There is a big difference between the performance shown in the standard bookwork questions which predominate in the first section of the Paper and the scenario based questions in the second part of the Paper. Many candidates were able to demonstrate considerable ability with the knowledge while finding difficulty applying it in given situations. More about this in the questions section of this report, but it is something that Centres could concentrate some of their efforts on, particularly using application based questions when covering sections of the work with the candidates.

The Paper worked well, providing a full range of marks on every question and across the Paper as a whole. Some scripts were quite outstanding and were a joy for the Examiner to mark. There was a little evidence of candidates getting in to time trouble toward the end of the Paper. It was sometimes difficult to decide whether or not it was genuine time trouble or just that the candidate was finding the work harder, however, there were certainly a significant number of candidates who had spent so much time on earlier questions that they were bound to fall foul of the clock. Candidates do not automatically possess abilities in exam technique and many could benefit from being taught how to pace themselves, perhaps starting with the simple 1 mark should take one minute. The Examiners were once again impressed by the presentation of the work, it showing evidence that most candidates are justifiably proud of their work. The Examining Team also marvelled at the high standards of communication skills shown by the candidates, many of whom will have been working in a foreign language. The vast majority of your candidates are to be applauded for the work produced and Teachers also deserve credit for producing candidates capable of impressing the Examiners so much.

Much has been made of the space left between **Questions 7** and **8**. Some Centres suggested that many candidates failed to see the last 6 questions. While finding it difficult to understand how a candidate could have missed the questions on the back, it must be accepted that in the pressure of the examination room candidates are capable of much that they would not normally do. Every effort has been made to be fair to these candidates while taking every care not to penalise those who followed the instructions correctly. It should be noted that the numbers involved were very small.

A problem which is beginning to show itself again is that of brand names. Examiners have never accepted brand names in answers, either of software or of hardware, and are not starting with the new syllabus. A number of candidates are giving brand names in answers, it should be said that this is mainly Centre based, so please ensure that your candidates are aware of this before they are entered for examinations.

### Comments on specific questions

#### Question 1

Generally this question worked well as a starter question that let all candidates score something and yet proved to be a good discriminator, particularly for the lower abilities.

- (a) The previous comment about brand names is particularly pertinent to this question. A number of candidates lost marks because they simply used the terms Windows and Word.
- (b) Very well answered by most except that a significant minority gave three application programs.

**Question 2**

- (a) Very well answered by most candidates, however, there are still a large number who believe that on-line and off-line are to do with the internet. Again, this tended to be Centre based.
- (b) It escapes the combined intellect of the Examining Team to understand how a racing game can be played in batch mode, but a number of candidates who got full marks in part (a) believe this to be true. Otherwise, with the exception of the internet again, this was well answered.
- (c) Well answered with many candidates writing far too much for only three marks and suffering in the later stages of the Paper.

**Question 3**

- (a) This is not considered to be a simple type of question. The subject matter is difficult for candidates to accept as it deals with errors and young people find the concept of getting something wrong difficult to understand. Secondly, the concept is split into different sections which gives another tier to the understanding necessary. Lastly, the logic and arithmetic errors are very difficult concepts to put into words. The Team were very gratified to see that this question was far better answered this time than it has been in the past.
- (b) Again, well answered, with almost all candidates able to describe at least one method.

**Question 4**

Well answered, although some of the diagrams were very difficult to decipher and many omitted a stack pointer/stack size field or some other way of showing whereabouts the top of the stack was.

**Question 5**

This was the one question in the first part of the Paper that was poorly answered. The reason is doubtless because the question was based around an application. The last part of the question which was not application based was far better answered with most candidates scoring well, although the suspicion is that many had been put off by the first two parts and failed to attempt part (c).

**Question 6**

- (a) Disappointing, particularly at this level. Too many lost marks because of lack of understanding of simple terms. The control unit controls the processor, not the computer. The memory is internal, many thought that it referred to the hard drive. This may have been because of the use of the term 'unit', but this is straight out of the syllabus and should be known.
- (b) Candidates might argue that 'main' and 'secondary' put them off. However, the important words that should have been latched onto were 'memory' and 'storage', and all candidates should know the distinction between them. As can be seen from the published mark scheme, the Examiners were not expecting complex answers for the marks. The attention of Centres is drawn to the mark scheme for this and all other questions.

**Question 7**

- (a) Some of the simpler concepts on the syllabus which made it all the more disconcerting that so many were not able to define serial and parallel, many confusing the terms with serial and sequential files while others gave the answers for simplex and duplex twice.
- (b) Parity is relatively well understood, though many still describe the checksum while others become so confused by the language necessary to describe odd and even that they tie themselves in knots. The Examiners realise that this is a very difficult thing to describe and will help as much as they can with their interpretation of what the candidate has said, but ultimately Examiners have to be sure that what they are ascribing to them is what they meant and that they do not read in to an answer something that was not there.

The remaining parts were based around a scenario and, while the questions generally were no more difficult than those that came before, the responses were far worse because the additional skill of thinking to an application was introduced.

**Question 8**

This was the first time that this question had been asked, and it showed. Most answers were based on a feasibility study while others were long lists of all the people that the analyst should speak to. It is surprising that this was so badly answered because it is at the very heart of systems analysis, that there are different groups of people with different knowledge that must be harnessed.

**Question 9**

- (a) Too many simply produced a list of information which the college would expect to be put on the site. The significant part of the question was ...designing the site. The actual information is not required yet, we have not even decided what it is going to look like yet.
- (b) Some candidates lost marks because they used brand names of software packages, others because they mentioned inappropriate types of software. One can stretch a point and accept a database because it could possibly be used to store a file of names and addresses to whom a posting could be sent advertising the college, but a spreadsheet for marketing?

**Question 10**

All candidates could pick up something here by mentioning passwords, but the full five marks was a little more difficult to find. Some candidates limit themselves to describing measures in data protection legislation, which does not answer the question.

**Question 11**

A very good example of candidates finding difficulty with a scenario based question. The difference between verification and validation is well understood but that was not enough, this is all about how they would be used here. Most candidates scored one or two marks but failed to get any more because their answers were too general.

**Question 12**

This question was intended to be the most difficult question on the Paper and so it proved to be. There were many long answers about filling in of forms and the relative importance of the information, however, few understood the implication of the phrase ‘...processing implications..’ in the question. There were a few very good answers here from a few of the strongest candidates.

**Question 13**

Intended as a lighter question at the end of the Paper, almost all candidates were able to gain a few marks here and it became a very good differentiator right across the mark range.

**Paper 9691/02**

**Practical Tasks**

**General comments**

The candidates appeared to think that this was a straightforward Paper. However, many candidates treated each Task as a minor project. This is not necessary; candidates should simply do what they are asked and provide hard copy evidence that they have done this. The Paper was intended to discriminate across all Grade boundaries but Centres appeared to have the impression that all candidates should be able to do all the Tasks and get full marks. If this were the case, there would be no way that Grade Boundaries could be drawn up.

It is essential that Centres understand, also, that all the work must be the candidate's work. Teaching staff must not directly help candidates, in any way, to solve the Tasks. Candidates should be taught the tools needed to solve the Tasks but they should not be told which tools to use to solve a particular Task. If the Moderators feel that too much help has been given, they can complete a Dishonesty Report which, if upheld, can result in candidates' Grades being withdrawn.

It is a good idea to include a photocopy of the mark scheme with each candidate's work and to refer to the mark scheme so that Moderators can see which marks have been awarded. Some Supervisors have annotated the scripts to show where marks had been awarded. Both these habits are very much appreciated by the Moderators and they usually find the work has been accurately marked.

Candidates should present their work in the order of the Tasks on the Examination Paper. They should also clearly identify their answers to each part of a Task. It was sometimes very difficult to find the evidence that a part of a Task had been done because the solutions to each part were not kept separate. If Moderators cannot identify the evidence, candidates' marks may well be reduced.

### **Comments on specific questions**

#### **Question 1**

There was confusion between a data capture form and an input screen. Good data capture forms provide the person who has to complete it with clear instructions. The forms should also give an idea of the number of characters that are required and the format expected for the data. For example, if a date is to be entered, there should be clear instructions what format is expected such as DD/MM/YYYY.

In part **(b)**, candidates should have included a table showing all the fields, their data types and a note explaining the purpose of the field. The key field should also be identified. A screen shot of the design view of a table is perfectly acceptable. There should also be screen shots of the tables with some data in them.

In order to prove that a validation check has been created, candidates should show what data has been input and what has happened after it is input. Generally, it should be possible to see both the input data and the result at the same time; this can usually be done by means of a screen shot. Also, in the case of a database, the candidate should include screen shots of the table designs showing the masks or other validation rules.

In order to show that the candidate has used a correct query, a screen shot of the query design should be included as well as the result of the query. Moderators cannot give marks unless there is evidence that a valid query has been used. Just providing output is not sufficient.

#### **Question 2**

A large number of very similar answers were received. Some were from the same Centre and some were from different Centres. It cannot be emphasised enough that all the work must be the candidate's. If there is any suspicion that candidates have helped one another or that a solution has been found in a book or on the Internet, Moderators will reduce the marks.

Many candidates failed to note that the values need not be sorted. Also, there were a number of cases where full marks were given for algorithms that did not work.

#### **Question 3**

Very poor designs were often produced for the input screens. Candidates should have shown the contents of the tables before entering data and again after the data had been entered in order to show that their input screens did update the database. The content of the tables does not need to be extensive but it does need to cover all possibilities, including extreme data.

Generally, it was almost impossible for the Moderators to find evidence that the candidate's solution did what they said it did. Just showing a table with data in it is not sufficient. Moderators expect to see screen shots of tables before and after entering data, screen shots of data being entered, examples of data being rejected, screen shots of query designs, table designs and so on. Candidates should also annotate their screen shots so that the Supervisor and Moderator are aware of what is being done.

Annotation is very important when designing a computer solution. This is particularly important if a Task expects the candidates to use a high-level language. If that is the case, candidates should use meaningful names for variables and objects, such as text boxes and command buttons, code should be indented appropriately and thoroughly annotated.

**Paper 9691/03****Written****General comments**

The Paper was deemed to be at an appropriate level by the team of Examiners, but they did have some reservations. The rigour of the Paper seemed to come as a surprise to some of the candidates. Perhaps they were lulled into a false sense of security by their experience with Paper 1 and expected the same standard, not realising that Paper 1 is an AS Paper while Paper 3 is an A Level Paper and the difference is great. Some candidates suffered from time trouble toward the end of the Paper. Examiners have not had to write this in a report for some time, Centres having done sterling work in training their candidates in examination techniques, but there are a few, and it seems to be confined to a small number of Centres, who are writing a disproportionate amount on the first few questions and then rushing the rest of the Paper. Please ensure that yours is not one of those Centres and continue with the good work of training candidates in how to take an examination.

The presentation of the work was, once again, excellent. The number of candidates who make life difficult for the Examiner because of the poor way that they present their work is very small. There seems to be a fashion for pastel shades of ink developing in some Centres. Please ask your candidates to not use such inks as, pleasant though they are, at 11 o' clock at night in artificial light, they are virtually unreadable. Similarly, but from the other end of the spectrum, some are using black gel-ink pens which put so much ink on the paper that it goes through to the other side, making that very difficult to read. Please tell the candidates that a bit of thought will help the Examiner help them.

**Comments on specific questions****Question 1**

- (a) Most candidates scored well here, although many turned the question into one that was far more complex than originally envisaged. The idea of a loop was ignored by most, who opted for a general description of interpreter and compiler. Candidates are still saying that a compiler "...does everything at once." or similar.
- (b) This part, intended to be harder, was well answered by the majority of candidates, many scoring here who failed to get a mark in part (a). The difference is that this is book work whereas part (a) was set in a context. So many of this Paper's questions are set in context and Centres are advised to prepare their candidates accordingly.

**Question 2**

Very much Centre based. Candidates either scored no marks or did very well, there did not seem to be a middle path. Data structures is a major part of the Syllabus and tree diagrams, though limited in what can be asked, are a structure new to Paper 3 which will not appear in Paper 1, so candidates need to be prepared to see it.

**Question 3**

A prime example of the need for examination technique. This was worth 9 marks. When a candidate has finished their answer they should read through it and imagine they are the Examiner. They should try and find nine things that can be given marks, and if they cannot, how do they expect the Examiner to?

Long essays were written, taking a lot of time up and looking very impressive but only covering two or three mark points. Encryption, in particular, had obviously been covered in far more depth in many Centres than is considered necessary in the Syllabus and, however good the answer may be, there are a limited number of marks that can be given for a single technique.

**Question 4**

A number of candidates gave excellent answers here, displaying a full understanding of the fetch cycle. Others had less clarity in their answers but could still pick up marks for a part of the process. Some had little idea of the process, most of those who lost marks did so because they were not able to adapt their book version of the cycle to the question which did not contain an address in the instruction but an immediate operand.

**Question 5**

Only a small proportion of the candidature displayed an understanding of OOP. The combination of attributes and methods to form a class was poorly understood and few were able to explain polymorphism, encapsulation and inheritance, although they did earn marks for the mention in part (a). Answers in part (b) often reflected an understanding of the subscripts 'sub' and 'super' rather than any knowledge of OOP.

**Question 6**

While the two marks for the definition of protocol were eagerly accepted by most candidates, the concept of standardisation of communication between systems was almost always restricted to a listing of the 7 layer OSI model. While marks are obviously available for this, a detailed regurgitation of the 7 layers is not expected, or wanted, the problem being that a candidate might well have learned the 7 layers, but few, if any, have an understanding of what they mean. It is reasonable to assume that a knowledge of the use of the layers and why they are important is a part of the syllabus, but that the detail is not necessary. Part (c) was an interesting question with a number of good answers, however, many candidates once again showed a cavalier disregard for the marks shown in brackets at the end of the question and simply did not give enough things to award marks for, despite writing long answers. Centres are directed to the model answers for this, and all other questions which are available in the published mark scheme.

**Question 7**

Generally, a well answered question, with almost all candidates being able to score something while only the best candidates scored maximum marks.

**Question 8**

Many candidates were able to explain the difference between the three types of implementation, though few were able to supply convincing examples of the last two, or indeed reasons for adopting them. A significant number of candidates confused pilot and phased introduction which meant that by the time they reached part (iii) they had used up the right answer and then described pilot running as direct implantation, or the big bang. A successful question which allowed almost all candidates some credit, but reserved the top marks for the more able candidates.

**Question 9**

Many candidates seemed to understand how interrupts affect processor activity and hence gained some marks. However, it was rare for a candidate to give an answer which demonstrated an in-depth understanding of the process, and the thought that an interrupt may not be immediately acted upon was obviously alien to them.

**Question 10**

Many candidates gained good marks here. Most were able to identify the entities, though the number who could produce the correct relationships was considerably lower. Few provided statements describing the relationship of one entity to the next. Most realised the need for a link entity, but seem unaware of the need to make it obvious what two entities are being linked. While most candidates picked up the mark for sensible id's few scored for the key of the link.

**Paper 9691/04**

**Coursework**

### **General comments**

This Report provides general feedback on the overall quality of project work for 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 many candidates showing evidence of researching a problem beyond their school or college life. Most projects were developed using Access with Visual Basic. Centres are reminded that the Computing project may involve programming or the tailoring of generic software packages and may also involve the choosing and installing of hardware. The Syllabus also states that it is not intended that any method of solution is better than another, merely that the solution must be one that suits the problem that is being solved. Guidance on the selection of projects is on page 22 of the syllabus.

The selection of an appropriate problem by the candidate is extremely important, as the analysis, design and implementation of a computerised system should always involve consultation with a user, ideally a 'third party' user throughout the development of the system.

This was the first year of the new GCE Advanced Level Computing Syllabus (9691) and there were changes in the project requirements from the previous Syllabus (9348). Not all Centres reflected these changes in the presentation of project work and/or the Centre marking of the coursework. Centres are reminded that the new marking scheme is out of 60 not 100 as before and the sections, requirements for each section and the weighting of the marks for each section of the report have changed. The requirements are clearly set out on pages 23 to 26 of the syllabus, which can also act as a useful check list setting out the expected contents of each section.

### **Project reports and presentation**

The presentation of most of the reports was to a very high standard, with all reports word-processed and properly bound. However, the use of proofreading and a spell checker is to be recommended. In addition, 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 the submission of magnetic or optical media is not required and the Moderators do not consider it.

It is recommended that the structure of the report follows that of the mark scheme, this gives a clear outline as to contents for the candidates to consider and also aids the assessment by Teachers and Moderation of the work.

### **Project assessment and marking**

In many cases, that standard of Teacher assessment was close to the agreed CIE standard. However, some assessment was generous particularly where evidence of user involvement was required and was not evident in the candidate's report. Centres should use the mark scheme set out in the syllabus and include a detailed breakdown of the marks awarded section by section together with a commentary as to why marks fit the criteria. This greatly aids the Moderation of the projects allowing Moderators to identify why marks have been awarded. Centres are also reminded that the use of half marks is not allowed.



**Comments on specific sections**

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

**(a) Definition investigation and analysis****(i) *Definition - nature of the problem***

Most candidates could describe the organisation and methods used but not all candidates identified the origins and form of the data.

**(ii) *Investigation and analysis***

Candidates should clearly document user involvement and agreed outcomes. Also alternative approaches need to be considered as applied to the candidate's proposed system not in general terms

**(b) Design****(i) *Nature of the solution***

The requirements specification set out in the analysis needs to be discussed with the user and a set of achievable objectives agreed. Only examples of screen layout design and output formats should be included. Many candidates only considered the screen layouts and neglected the reporting aspect of their system.

**(ii) *Intended benefits***

Candidates need to clearly identify the merits of the intended system.

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

Candidates need to discuss the limitations of the intended system and estimate the size of the files required.

**(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 cases, and expected results.

**(ii) *Implementation***

An implementation plan needs to be included, this should contain details of user testing, user training and system changeover that have been discussed and agreed with the user.

**(iii) *Appropriateness of structure and exploitation of available facilities***

Candidates should discuss the suitability of both hardware and software. A log of any problems encountered should be kept together with details of how these problems were overcome.

**(d) Documentation****(i) *Technical documentation***

Very few candidates produced a stand-alone technical guide including 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 formulae used. Candidates need to annotate all parts of this guide since this is important for subsequent development of the system. The specifications of the hardware and software on which the system can be implemented should also have been included. Large tracts of unannotated printouts produced by Access documenter are not required here.

(ii) *User documentation*

For full marks the candidate needs to include an index and a glossary, 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**

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

Candidates need to consider each objective in turn and indicate how the project met the objective or explain why the objective was not met. The use of user defined, typical test data to show up unforeseen problems is required for full marks.

(ii) *Evaluate the users' response to the system*

Candidates need to obtain the users' response to how the system developed meets the agreed specification and evaluate this response as to the satisfaction with the system developed.

(iii) *Desirable extensions*

To obtain full marks, as well as identifying the good and bad points, limitations and possible extensions the candidate needs to indicate how the extensions would be carried out.