COMPUTER STUDIES

Paper 0420/01

Paper 1

General comments

The general standard of work from candidates was very similar this year to previous years. It was pleasing to note that there was less evidence of rote learning in the questions which required definitions and descriptions of standard processes.

There were one or two new topics in the syllabus for 2007; although these appeared not to cause the candidates any major problems.

Questions which involve interpreting or writing algorithms continue to cause many candidates problems. The last question on the paper, which requires candidates to write their own algorithm, can be answered either in the form of pseudocde or flowchart. Weaker candidates should consider using flowcharts if their algorithmic skills are rather limited.

Comments on specific questions

Question 1

(a) Most candidates were aware of what a virus was and what effect it had on a computer system. However, there is still some confusion with “worms”, “trojan horses”, etc.

(b) There is still much confusion between verification and validation. Unfortunately, there were still too many examples where candidates gave validation checks (such as range, type and character) as examples of verification.

(c) Many candidates gained one mark for recognising that an interrupt was a signal generated by a device or program and a second mark for an example (most common: printer out of paper). A large number of candidates claimed that an interrupt was generated by the CPU – this has been a common error for a number of years.

(d) Many candidates gained full marks here for reference to a model and that such a system was used to study the behaviour of a system. An increasing number of candidates made reference to virtual reality systems here.

(e) Candidates had either learnt this definition exactly or indicated that they had never heard of the term and simply guessed the answer.

Question 2

The majority of candidates gained at least 2 marks here by mentioning one of the three types of test data: *normal, abnormal and extreme*. Good examples or a good definition gained the second mark (e.g. in *abnormal data* – if a date was being input then -1 or 50, for example, should cause an error in the month field). Several candidates just described validation checks (e.g. range, type and character) and completely missed the point of the question.

Question 3

This question was testing whether candidates knew the difference between speech recognition and speech synthesis. Those who recognised that the former was an example of input and the latter an example of output gained both marks. Many just gave examples of their use which did not answer the question.

Question 4

This was a very straight forward text book question. Answers such as: *file management, management, security aspects, handling interrupts and input/output control* were typical responses question was looking for. As expected, many candidates did extremely well here but there were still so very vague answers referring to "resource management", "looks after the computer system", etc. none o which were specific enough to gain any marks.

Question 5

This was very well answered; although some candidates did confuse the advantages to the workers and company (e.g. advantage to company was they do not have to pay commuting costs) and also disadvantages were confused as well (e.g. disadvantage to the worker is they would need to be trained).

Question 6

Most candidates correctly chose data flow diagrams and flowcharts as examples of diagrams used by a systems analysts. The most common error was to choose top down approach as an example; this is not a type of diagram, but if the candidate chose modules or structure diagrams this would have gained them the mark.

Question 7

(a) The three most common answers were *deskilling, retraining and loss of jobs*. Very vague answers, such as "makes the job easier" or "there would be fewer mistakes" were awarded no marks.

(b) Passwords and use of firewalls or physical measures (e.g. lock the computer room) were the most common answers here. A very common error was to choose encryption – this does not stop access to data; it simply makes the data impossible to understand once accessed unless the user has the encryption key.

(c) Most candidates correctly chose the use of back up files or generations of files.

(d) This was reasonably well answered. The statement: "leaving the hospital" was not regarded as an acceptable response to *delete data* since this would only be done if the patient died or moved completely out of the area so they would never return to the hospital. Under *amend data* it was not acceptable to use "when a patient's age changes" since the file would store date of birth and not age.

Question 8

(a) This was reasonably well answered with many candidates realising digital cameras allowed direct transfer of photos to the computer. Several candidates clearly did not read the question carefully since they gave "there is no need to develop the film and produce prints" as their answer.

(b) A large number correctly identified that the number of pixels or memory size was the primary way of ensuring picture quality. Whilst it was generally accepted that lens quality and the amount of light available also affected picture quality, these were not regarded as the primary factors peculiar to a digital camera.

Question 9

(a) (b) Very well answered with the majority of candidates gaining full marks.

(c) This question caused the majority of candidates a problem. Basically, all that was required was: *for the system to note the direction of the lift, to note that the required floor was below the existing floor and that some form of sorting was carried out to ensure that the lift stopped at all floors in order*. Those candidates that did gain marks realised the sorting aspect but the rest of the answer was usually very vague, e.g. "the system makes sure that the lift stops at all floors", "it is a more efficient way of controlling the lift", etc. – none of these responses were worth a mark.

Question 10

(a) The only problem here was for some candidates to choose a cell from column E. It sho been clear from the spreadsheet that this column must contain formulae.

(b) It is still common to see the "x" symbol used in formulae instead of the correct "*" symbol. Many candidates lost marks because of this error.

(c) The majority of candidates gained high marks here. The main reason for loss of marks was because of sloppy answers, e.g. "highlight the cell and drag the cursor down"; this sort of answer is really vague and misses essential detail such as which cell, the mechanism for copying the cell and where the cursor is dragged to".

(d) (e) These two parts were well answered with no problem identified.

Question 11

(a) Generally, fairly well answered. The most common error was to give ALL the values of S in the output column. As the flowchart was written, the value of S should only be output once the value of X becomes negative. Several candidates did not spot that the third input value was already negative and the algorithm would stop after only one cycle giving a value of S = 1

(b) Whilst most candidates gained the mark here for an example of a validation check, very few were able to give a reasonable definition. There is still much confusion with candidates as to the difference between validation and verification.

Question 12

This question was, looking for responses such as *use of braille keyboards, touch screens using head wands, speech synthesis, foot activated controls, etc.* Since it was assumed in the question that a standard computer system was being used, answers such as "use loudspeakers" and "use microphones" gained no marks; candidates had to mention speech synthesis or speech recognition to gain the mark. Another fairly common way of losing marks was to mis-match the interface with the disability e.g. "use of speech synthesis to help the deaf".

Question 13

(a) Although many candidates gained one mark here, a large number clearly mis-understood the question. Answers such as "to save time", "to make check-out queues shorter", etc. were reasons for using bar code readers and NOT the advantages to customers of being issued with itemised bills.

(b) Generally this was answered satisfactorily. Marks were lost for vague or lazy answers such as "lasers", "light pens", etc.

(c) This was not particularly well answered – very few gained full marks. The stages required were: *identify item on file, reduce number in stock by 1 each time item sold, when minimum stock level/reorder level reached, automatic reordering done, etc.*

Question 14

(a) Essentially this was answered correctly by the majority of candidates. The most common errors were: to give 7 as the answer (this was the number of columns) and to multiply 9 and 7 together to give the answer 63.

(b) Again this caused few problems, but for some reason a significant number of candidates only gave the output from the first half of the search condition.

(c) This question was very well answered. Most marks that were lost through careless mistakes such as using OR instead of AND, putting $ signs in the wrong place, using the incorrect item (e.g. top speed) from the database, etc.

(d) This question was basically asking what advantages would be gained by allowing [illegible] search the car dealer's database. Many answers referred to not needing a large show[illegible] fewer staff, etc. Whilst these are true, such responses did not really answer the questi[illegible] main reasons would be: *potentially larger customer base, less expensive advertising and [illegible] 24/7.*

Question 15

(a) No problems identified.

(b) Very badly answered. Very few candidates realised that the question was looking for the type of interface (e.g. YES-NO answers, touch screen with options, etc.) and gave answers like "they would use a keyboard", "a monitor would be needed", etc.

(c) Many just gave very vague answers such as "it would tell you the fault". Expert Systems would give the percent probability of a certain fault existing or it would give a list of possible fault conditions and how to carry out remedial action. Unfortunately, a significant number of candidates did not read the question and referred to medical diagnostics.

(d) No problems.

Question 16

(a) Some good answers here. The most common errors were mention of heat sensors and thermometers.

(b) This was badly answered by many candidates. It was really a simple example of use of sensors, the need to convert the data to digital, how the computer analyses the data and takes action if necessary. Many candidates decided that the system warned the driver when the car was out of fuel etc. – completely missing the main point.

(c) No problems with this question.

(d) Again, the majority of candidates realised that an immediate response was needed and hence batch processing would be totally inappropriate.

Question 17

Probably the worst answered question on the whole paper. Very few candidates seemed to understand what was being asked for and described search engines and general Internet techniques. The question was simply asking for web browser features such as: *hyperlinks, history (i.e. previous searches), hot spots, filters, ability to refresh, mark favourites and forward/back buttons.*

Question 18

(a) No problems identified with this question.

(b) Unfortunately, most candidates described the advantages and disadvantages of laptops. It was aspects of the wireless connection that needed to be discussed to gain the marks here; it was the fact that laptops can take advantage of wireless features that is important here.

Question 19

As usual, the attempts made by the candidates were very varied. There are still very few candidates who try to adopt a flowchart approach to such algorithms; this is often the easiest method unless a good working knowledge of pseudocode is known.

The answer required a simple loop and a number of if … then … else statements to complete the task. There were a number of ways of identifying if the code began with a 1, 2, 3 or 4; the simplest way was to do a range check on the data. The most elegant method was to "invent" a function called INT(X) which gives the whole number part of a calculation; if the code was divided by 10000 then the whole number part would give the first digit which then allows use of if … then … else or case … of constructs.

COMPUTER STUDIES

Paper 0420/02

Project

General comments

The quality of work was of a similar standard to previous years; the range of topics chosen was wide and varied and it was pleasing to note that web design projects were much better documented and scoring higher marks.

Many Centres assessed the projects accurately according to the assessment headings. However, some Centres appeared to be awarding marks for which there was no documented evidence. **Marks can only be awarded where there is printed hardcopy proof in the documentation.** Centres should note that assessment of the project can only be by reference to the criteria in the syllabus and that Centres must not devise their own mark schemes. There were still a small number of Centres that awarded half marks which are not allowed by the syllabus. Similarly there were a number of Centres where the marks entered on the MS1 form were out of a maximum 100 marks; the maximum marks for this component is 50. Whilst internal moderation must be carried out if there are two or more teachers assessing the projects, there is no need for any internal moderation by the Centre when only one teacher has assessed the projects and, in this case, there is also no need to copy the marks into the other column on the summary mark sheet. A small number of Centres failed to submit either hardcopy MS1 or an electronic version as stipulated by CIE. It is a requirement that MS1 forms are completed for each Centre.

It is important to realise that the project should enable the candidate to use a computer to solve a significant problem, be fully documented and contain substantial sample output from their proposed system. Testing should include full test plans with expected results which can then be compared with the actual results and examiners would also expect to see labelled printouts which clearly match the test plans. Some projects did not demonstrate that they had actually been run on a computer. It is recommended that candidates make use of appropriate screen dumps and include these in their documentation to show the use of a computer; it is vital to use screen shots to show any abnormal data being entered, as well as the error message produced by the software.

However, the standard of presentation and the structure of the documentation continued to improve. Many candidates structured their documentation around the broad headings of the assessment scheme and this is to be commended. It appeared that many schools provided their candidates with a framework for documentation. This can be considered part of the normal teaching process but the candidates need to complete each of the sections in their own words. Each project must be the original, unaided work of the candidate; joint projects are not allowed.

Centres should note that the project work should contain an individual mark sheet for every candidate and one or more summary mark sheets, depending on the size of entry. The moderators would like to congratulate all Centres for the quality of their candidates' work which was the result of much hard work by candidates and teachers. The standard of presentation was almost always of a very high standard but Centres should note that the presentation of work does not qualify for the awarding of any marks. It would be helpful to the moderators if Centres would indicate on the summary mark sheet those candidates whose work has been included in the sample. It is recommended that the Centre retain a copy of the summary mark sheet(s) in case this is required by the moderator. In addition, the MS1 mark sheet should be sent to CIE by separate means. It was pleasing to note that the vast majority of the coursework was received by the due date; it causes some considerable problems in the moderation process where Centres fail to meet this deadline. Centres should note that on occasions coursework may be retained for archival purposes.

The standard of marking was generally of a consistent nature and of an acceptable standa there were a few Centres where there was a significant variation from the prescribed standard, where marks had been awarded for work which did not appear in the actual documentation; the teac well have seen this work but it needs to be fully documented as part of the candidate's solution. recommended that when marking the project, teachers indicate in the appropriate place where credit is be awarded, e.g. by writing in the margin 2, 7 when awarding two marks for section seven. A small number o Centres are beginning to adopt this convention and it is hoped that more Centres will use this method of demonstrating where credit has been awarded.

Areas of relative weakness in candidate's documentation continue to include setting objectives, hardware, algorithms and testing.

The mark a candidate can achieve is often linked to the problem definition. The candidate needs to describe in detail the problem and, where this is done correctly, it enables the candidate to score highly on many other sections. This is an area for improvement as many candidates did not specify their objectives in computer-related terms. If the objectives are clearly stated in computer-related terms, then a testing strategy and the subsequent evaluation should follow on naturally, e.g. print a membership list, perform certain calculations, design a website with 5 pages, etc. Many candidates produced a Gantt chart based on the systems life cycle but this is not what the specification requires. What is required in this action plan is a Gantt chart based on a time scale for the objectives defined in *Section 2*.

The hardware section often lacked sufficient detail where full marks are scored by a full technical specification of the required minimum hardware, together with reasons why such hardware is needed by the candidate's solution to his/her problem.

Candidates should ensure that any algorithm is independent of any programming language and that another user could solve the problem by any appropriate method, either programming or using a software application. It is possible for some applications to generate the algorithms; these should be clearly annotated by the candidates to score any marks. To print almost one hundred pages of SQL code serves no purpose whatsoever; candidates should only be awarded marks for any generated coding which is coded and the candidate demonstrates, by annotation, that they understand the coding and its purpose. Algorithms must clearly relate to the candidate's solution. If a candidate uses a spreadsheet to solve their problem then full details of the formulae, links and any macros should be included.

Many candidates did not produce test plans by which the success of their project could be evaluated. Marks can only be awarded in the test strategy section if the candidate produces some expected results. The results of a test strategy should include: the predicted results, output both before and after any test data. Such printouts should be clearly labelled and linked to the test plans; this will make it easy to evaluate the success or failure of the project in achieving its objectives.

An increasing number of candidates are designing websites as their project. Candidates must include site layout and page links in their documentation. The better candidates should include external links and, possibly, a facility for the user to leave an email for the webmaster or submit details to an online database; in this case, the work would qualify for the marks in the modules section. Candidates might also consider designing an online form or questionnaire for submission which can then be tested. Testing for abnormal data can be interpreted as being a link to a non-existent page or to the home page. Candidates can also score marks by annotating any HTML coding.