# COMPUTER STUDIES

**Paper 0420/01**

**Paper 1**

## General comments

The standard of work from the candidates this year was very similar to previous years.

Questions involving algorithms continue to give a large number of candidates real problems which could be resolved in many cases by practising examples from previous years (mark schemes are published so Centres are aware of the standard required in these type of questions).

There were two or three new types of question this year which were approached with mixed success.

The standard of English continues to be excellent in many cases which makes life much easier for the Examiners!

Finally, it is necessary to apologise for an error which crept into **Question 12 (e) (i)**. A full description of the effects of this error can be found in the next section. We are grateful to the Centres who pointed out this error before the marking process started so it was possible to adapt the mark scheme well in advance.

## Comments on specific questions

### Question 1

**(a)** More than half the candidates made a reasonable attempt at this question. The majority referred to printers out of paper or out of ink. It was still common to see *signal sent by CPU/computer* rather than by a peripheral.

**(b)** The majority of candidates knew that an icon was a picture or image on the desk top; but very few really knew that it was a short cut to an application which could be launched by clicking on the image/picture.

**(c)** This was very well answered by more than three quarters of the candidates. But it was surprising to see a number who thought that ROM meant *random access memory* or *that ROM contents were lost when the computer was switched off.*

**(d)** Most candidates knew the answer to this question. There were some interesting answers this year with candidates referring (correctly) to buffering when streaming videos on the Internet.

**(e)** This was generally satisfactory; although there was still some evidence of continued confusion between verification and validation.

### Question 2

Reasonably well answered with many candidates referring to English-like statements and that it is easier to debug. It was still very common to see statements like "*it is easy to debug"* – which may NOT be true. It is the comparison with low-level languages that gains the mark. A subtle use of English perhaps, but essential where comparisons are to be made.

**Question 3**

**(a)** This part was generally well answered with reference to viruses (and anti-virus softwa hacking (and use of firewalls, passwords). Many candidates hinted at social networking site gave brand names (such as facebook) rather than give a description. It is clearly indicated on front page of the examination paper that brand names are not permitted – this point should be reinforced by Centres, since many candidates lost marks by ignoring this warning.

**(b)** Part **(i)** was basically satisfactory with passwords chosen by the majority of candidates. It was still common to see encryption; however, this does not prevent access to data.

Part **(ii)** was not very well answered. The question asked for a device and many candidates gave the medium (e.g. CD, DVD, etc.). It was also surprisingly common to see DVD-ROM and CD-ROM as backing stores.

**Question 4**

This was generally well answered. The most common answers referred to digital cameras and locating (and downloading) images from the Internet. Several candidates misunderstood the question and described how the company could advertise their clothing/catalogue e.g. *upload pictures to a web site so people can see their designs.*

**Question 5**

This was surprisingly badly answered with many candidates scoring 0 marks. **Either** the answers were so vague to be worthless (e.g. direct access advantages: the system is implemented directly) **or** there was little or no attempt made **or** the answers referred to interviews, questionnaires, etc.

**Question 6**

This question was generally well answered with online banking and online shopping being the most common choices. It was common to see video conferencing (this is not really valid in this scenario since that is a system used by companies and not individuals at home); however, reference to Internet telephone/webcam communications (i.e. VoIP) would have been acceptable. Again, it was far too common to see brand names, such as *skype*, being used which gained no marks.

**Question 7**

**(a)** This question has been asked, in one form or another, for several years but continues to give candidates a number of problems (many gained zero marks). There were many vague answers such as "*it is easier", "it is faster", "you can see each other", "can be called at any time", etc*. none of which answered the question. Acceptable answers included: *large cost savings due to reduced travelling, many companies are now multi-national, travel disruption due to terrorism/increased airport security, etc.* – all of which are valid reasons for the increased popularity of video conferencing.

**(b)** The majority of candidates got the hardware items – webcams, microphones, speakers and monitors - but very few got the mark for software e.g. codec, communications software and synchronisation software. It was common to see answers like *msn* (a brand name again) and other service providers/instant messaging vehicles.

**(c)** Most candidates gained 1 mark for emails; many did not earn the mark for just giving *chatting* (this could be talking on the telephone) – the candidate needed to mention chat rooms or instant messaging to gain the mark. Again, skype, facebook, myspace, etc. were all too common which failed to give candidates marks.

**Question 8**

**(a)** The majority of candidates gained zero marks here; the point of the question was lost unfortunately i.e. how the computer simulation would be used (e.g. allow optimum number of checkouts to be opened, run computer model with a number of scenarios, etc.). Many candidates simply wrote: *count people in and out of the supermarket* which is inadequate.

**(b)** Part **(i)** was generally acceptable with the most common choices being *pressure, mo* *red sensors*. It was still common to see heat sensors, noise/sound sensors and proxim which are either incorrect or too vague.

Part **(ii)** was misunderstood by many candidates with vague answers like *"count people in* *count people out"* being very common. Good answers would refer to safety (know how many people were in the supermarket in case of a fire), check number of people at certain times of the day, counting people coming in so the manager can decide in advance how many checkouts to keep open, etc.

**(c)** Part **(i)** caused few problems with touch screen/pad being chosen by many. It was, however, common to see mouse, trackerball and barcode reader as the input devices – none of which would be applicable in this case. Some candidates suggested using microphones – an interesting option in a supermarket.

Part **(ii)** was well answered with many referring to prices, specials offers and supermarket map.

Part **(iii)** was badly answered with many referring to notices/signs being too easy to deface or rip. The question was looking for answers such as faster/easier to update, allows interaction with customers, etc.

**Question 9**

This question caused quite a few problems, although a full range of marks was achieved. Several candidates went to stage 1 only in the flowchart for **each** input i.e. 5.5, 210, 0.1 and gave these as outputs. Many got as far as 0.55, 0.210 and 0.1 but then output the value of C rather than N as required. In 2011, questions of this type will require full trace tables to be produced which will hopefully help candidates to work their way through flowcharts in a logical fashion.

**Question 10**

**(a)** This question was not well answered; those who gained a mark referred to the fact that there was no need to visit the house. Very few other options were offered, such as *view as often as you like, can print out room layouts, view when you want, etc.* Many candidates thought this allowed a customer to see a house **before** it was built and was therefore much safer.

**(b)** This was very badly answered; it was a new type of question which clearly caused many problems. In reality, it was fairly easy to gain both marks by referring to: *take photos using a digital camera, rotate the camera around the room, use a single point to take the photos, etc.* Reference to the software required was really aimed at grade A candidates but it was very rare to see any mention of this. It was very common to see CAD mentioned which would not give a virtual tour of an existing house ... but it does tie up with the common error in part **(a)** – using virtual reality to see houses before they were built. Unfortunately, such answers missed the point of the question.

**(c)** Again, this was badly answered. Most candidates homed in on virtual reality equipment such as goggles, gloves and helmets rather than on more general computer technology such as faster broadband connections, digital cameras, faster processors, and so on.

**(d)** Unfortunately, this part was not any better. It was rather surprising since it was expected that many candidates would have experienced (or knew about) virtual reality sites and were aware of their features.

**(e)** This was rather better with a number of applications being known.

**Question 11**

**(a)** Considering the fact that spreadsheet questions appear every year on this paper, it was surprising to see how badly answered it was. The errors made are still far too common – for example, (B4 x 3 + C4) with an "x" being used instead of "*" and SUM(B4:C4) which is completely incorrect.

**(b)** This was slightly better, but it was fairly common to see SUBTRACT(F4 – G4) as the formula.

**(c)** Not that well answered. Two validation checks, such as range check and type/ch k would have gained both the marks.

**(d)** Very few candidates gained any marks here. It was common just to see E or H mentioned w reference as to whether these were cells or columns.

**Question 12**

**(a)** This was not very well answered. Many candidates just gave *sensor* as the answer or *DAC* (which was already in the question)

**(b)** Many candidates just described digital-to-analogue conversion without mentioning **why** it was needed – the camera motors need an analogue signal and computer output is digital.

**(c)** Answers here were very variable. All that was required was for the candidate to recognise that once movement was detected the camera could take an image and the computer would check to see if an intruder had been detected.

**(d)** Many candidates missed the simple point that the main reason for digital cameras is they do not use film.

**(e)** There was an unfortunate error in part **(i)** of this question. Candidates were told to assume that *4 kilobytes = 0.4 gigabytes* which is clearly incorrect. It was feared that this error may cause problems for some of the candidates. Consequently, the mark scheme was modified to include answers using the incorrect data given and answers where candidates had realised the error and did the calculation based on the correct conversion. Examiners were instructed to monitor the question closely and report any evidence of a candidate being disadvantaged by the error. It is pleasing to report that there was no evidence of any candidates being disadvantaged and, in fact, this question was well answered by the majority who sat the paper.

**Question 13**

**(a)** This was generally well answered; although some candidates confused records with fields and gave 6 as the answer.

**(b)** Many candidates gave the correct response: 1112 and 1115.

**(c)** This was basically satisfactory, but marks were lost for using AND instead of OR and missing out the equals sign in the (special edition = Y) part of the query. It was also quite common to see N instead of Y in the query.

**(d)** There were two basic errors here: confusion between ascending and descending AND some candidates just gave the 8 reference numbers in descending order i.e. 1111 1112 ..... 1117 1118

**(e)** This was badly answered; very few realised the data would be stored in the database using reference number or the CD title as the link in the database.

**Question 14**

This was not well answered. The majority of candidates did not read the question carefully enough and described **how the Expert System would be used** and not **how it would be created**. Similar issues have occurred in the past and Centres are encouraged to reinforce the need for candidates to read questions very carefully before putting pen to paper.

**Question 15**

**(a)** This was satisfactory with many candidates coping very well with a new style of question.

**(b)** There was a 50:50 chance of getting the note in position 2 or 5. Position 2 was the correct response. Some candidates showed the binary calculation in part **(ii)** and did not give the denary value of the fret position as required.

**(c)** This was not well answered with few candidates understanding the advantages of st notes in a computer file format.

**Question 16**

**(a)** Many candidates gave one of the advantages of using e-tickets; very few knew a second answe and just made a guess (usually wrong)

**(b)** This was badly answered with all responses referring to losing electric power, risk of viruses, need to have a computer, etc. and missed the key reasons such as human confidence in having a piece of paper in their hand, computer crashing causing lost reservation or lack of portability of e-tickets between air lines.

**(c)** This part was generally well answered.

**Question 17**

**(a)** More than 90% of the candidates got this part right.

**(b)** This question was not well answered. Three quarters of the candidates scored 0 marks – usually because they simply re-wrote the question in essay form or made no attempt at all. But some 10% of the candidates scored full marks which is what you might expect from a grade A question.

# COMPUTER STUDIES

**Paper 0420/02**

**Project**

The quality of work was of a similar standard to previous years. A small number of Centres failed to realise that there had been changes to the assessment, including revised forms. This necessitated some additional changes to the scaling as a result of this error. It is vital the correct assessment criteria and documentation have been used. Centres are urged to look carefully at the specification and re-cycle any old paperwork and forms which are now out of date. All candidates' work was moderated according to the new criteria, some candidates marks were reduced to take this into account. A number of Centres put each candidate's project into a separate envelope; this is not necessary and is a waste of natural resources.

A large number Centres assessed the projects accurately according to the assessment headings. **Marks can only be awarded where there is written proof in the documentation.** In some instances, marks are awarded by the Centre where there is no written evidence 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 are still a small number of Centres that award half marks which is not allowed by the syllabus.

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 we would also expect to see labelled printouts which clearly match the test plans. Without the expected results, no marks can be awarded for either the test strategy section or the evaluation section, although marks can still be awarded for the actual test results. Some projects do not clearly demonstrate that they have actually been run on a computer. Software advances and the use of 'cut & paste' can give the impression that the results have simply been word-processed. It is recommended that candidates make use of appropriate screen dumps and include these in their documentation to show that they have actually used their solution to produce the results. Such screen dumps are particularly useful when proving that abnormal data has been tested.

However the standard of presentation and the structure of the documentation continue to improve. Many candidates structure their documentation around the broad headings of the assessment scheme, and this is to be commended. It would appear that many Schools provide their candidates with a framework for documentation. This can be considered part of the normal teaching process but the candidates do need to complete each of the sections in their own words. Each project must be the original work of the candidate. Where it is found that candidates use large sections of identical wording then all credit will be disallowed for these sections for all candidates in the Centres and this will be reflected in the scaling recommended by the Moderator.

Centres should note that the project work submitted for external moderation should contain a copy of the MS1 form, an individual mark sheet for every candidate and one or more summary mark sheets, depending on the size of entry. 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. Although the syllabus states that disks should not be sent with the projects, it is advisable for Centres to make back up copies of the documentation and retain such copies until after the results query deadlines. Although disks or CDs should not be submitted with the coursework, the Moderators reserve the right to send for the electronic version. Centres should note that on occasions coursework may be retained for archive purposes.

The standard of marking is generally of a consistent nature and of an acceptable standard. However there are a few Centres where there was a significant variation from the prescribed standard, mainly for the reasons previously outlined. It is recommended that when marking the project, teachers indicate in the appropriate place where credit is being awarded, e.g. by writing in the margin 2, 7 when awarding two marks

for ***section seven***. A small number of Centres are beginning to adopt this convention and it more Centres will use this method of demonstrating where credit has been awarded.

Areas of relative weakness in candidates' documentation continue to include setting objectives, hard algorithms and testing.

The mark a candidate can achieve is often linked to the problem definition. The candidates need 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 by many candidates whereby they do not specify their objectives in computer-related terms, but use such general objectives as for example, to make a certain process faster, this is to be considered as a business objective. If the objectives are clearly stated in computer terms, and numbered, then a testing strategy and the subsequent evaluation should follow on naturally, e.g. print a membership list, perform certain calculations etc.

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. Some candidates produce pages and pages of code, usually auto-generated, which does not serve a useful purpose and could easily be omitted. Any such code will not score credit unless it is annotated. Algorithms must clearly relate to the candidate's solution. If a candidate uses a spreadsheet to solve their problem then full details of the formulas, links and any macros should be included. Similarly, when using spreadsheets, data could be exported from one worksheet and imported into another spreadsheet, i.e. the spreadsheets are linked together. Centres might wish to encourage the candidates to use validation checks, lookup tables and what-if analysis. Such techniques would enable candidates to score higher marks in the technical skill section.

Many candidates did not produce test plans by which the success of their project could be evaluated. The contents of a test plan 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.

One of the changes in the assessment criteria for this year included the inclusion of contents pages. A large number of candidates did not include any contents page and therefore should not have been awarded any marks in the technical documentation section. A contents page should ideally be the first page of the report listing the main headings and subheadings, together with the page number for each section. At the very least the technical documentation section should be a separate section and this must have its own contents page. Without either of these two acceptable contents pages, the candidate must not be awarded any marks for technical documentation unless there is a contents page of some description.