COMPUTER STUDIES

Paper 7010/11

Paper 11

General comments

Although several new topics and type of question appeared on the paper this year, the standard of candidates' work was broadly similar to previous years. The new topics (such as logic gates and use of trace tables) were particularly well answered.

There is a gradual move to more questions where candidates have to apply their knowledge rather than show their ability to simply remember facts. This appears to produce candidates who are now exhibiting a better understanding of this subject than in the past.

Candidates and Centres are reminded that written papers are now scanned in and marked on computer screens by Examiners. Consequently, if a candidate writes the answer to a question on an additional page they must indicate VERY CLEARLY to the Examiner where their revised answer is to be found. If answers are "scrubbed out", the new answers must be very clear so that Examiners can easily read the text and award candidates the appropriate mark.

Comments on specific questions

Question 1

Since this question was based on pure factual knowledge, most candidates were able to give correct responses such as device control, interrupt handling, memory management. Some candidates gave very generalised, vague answers such as "process management" and "resource management" neither of which gained any marks.

Question 2

(a) Many candidates were able to describe a search engine as a program that searches documents for key words and returns a list. A number of candidates gave examples of search engines such as *google* – it states quite clearly on the front of the exam paper that brand names will not be given any credit. There were also some very vague answers such as "used to search the Internet".

(b) Most candidates knew that search engines might find irrelevant information and pick up words with same spelling but different meaning.

(c) The majority of candidates made a good attempt at answering this question. Many answers were close but not quite close enough to gain marks e.g. "find dates when room available" (how is this done - need to mention use of interactive calendars or something similar) and "find out room rates" (again this is not enough – room rates would be shown in drop down boxes or another web page, etc.)

Question 3

(a) Many candidates knew that use of usernames and passwords prevents unauthorised access to files/the computer system.

(b) Many candidates were able to identify this action as a verification check. Some candidates wrongly suggested that *validation* was being described.

(c) Many candidates were able to describe fire walls, backing up and anti-virus software as a protection against loss or corruption of files. A common mistake was thinking that *encryption* will guard against data loss/data corruption. This is not the case; encryption simply leaves the data unreadable but does not stop a hacker, for example, from deleting the data or altering/corrupting it.

(d) Many excellent responses to part **(i)** included repetitive strain injury (RSI) and headaches/eyestrain/back ache/neck ache. Weaker answers included very vague responses such as "eye problems", "wrist problems", etc. which gained no marks. In part **(ii)**, to suggest use of passwords was insufficient in the context of the question – the candidate needed to mention that the user had to log off, for example, and then use a password to get back into system (or something similar).

Question 4

(a) The full range of marks was seen here. Choices W and Z were frequently shown reversed.

(b) Candidates need to understand that a knowledge base is made up of facts and a rule base. Many candidates quoted the components from part **(a)** or gave a description of how a knowledge base was set up by getting information from experts.

(c) Many candidates were able to give advantages of expert systems. Fewer candidates were able to give a valid disadvantage, such as: it is expensive to set up, it must be kept up-to-date. "there may be errors in the expert system" is not appropriate – thorough testing using data with known outcomes would remove such a risk.

(d) Most candidates were able to give valid examples.

Question 5

(a) A full range of marks was seen here and the question showed very clearly which candidates understood how flowcharts work. There were three common errors:

- missing out initial values in ***count, total*** and ***x*** columns; the initial values were shown very clearly in the flowchart
- working out the ***average*** value in every line when it was only needed once at the end of the algorithm
- putting in extra zeros where values had not changed in the next line (a blank entry should be made in cases such as this)

(b) The flowchart finds the average of all the ***positive numbers*** input. A common error was "finds average of all the numbers input".

Question 6

A greater number of candidates this year mentioned *tweening, morphing, avitars* and *rendering*. A few candidates gained full marks.

Question 7

(a) Many candidates answered this part correctly. Common errors are still being made, such as: = sign missing from formulas, incorrect use of formula e.g. = AVERAGE (D2:D6)/5 and incorrect use of brackets e.g. = (D2 + D3 + D4 + D5 + D6/5).

(b) Most candidates gave a correct validation check.

(c) Many candidates answered this part correctly. Common errors were formulas such as:

= B2 * 0.1
= B3 * 0.2
= B4 * 0.15 etc.

Question 8

(a) Many candidates were able to give examples of sensors such as humidity, moisture, oxygen, light, infrared or pressure sensors. Some non-existent sensors were offered in an attempt to gain marks e.g. *smoke sensors* (these are detectors not sensors; but will contain sensors depending on how they work – the type of sensor would need to be mentioned to gain the mark), *heat sensors* (it has been mentioned in recent Examiner reports that this type of sensor does not exist (in spite of some literature claiming they do) and are actually temperature sensors), speed detectors (again there are no such sensors called *speed* sensors and speed detection devices will use radar, infrared etc.). It should also be pointed out that *temperature sensors* also gained no marks since this sensor was mentioned in the first paragraph of the question.

(b) Candidates need to understand that the sensor relays reading back to computer; computer compares reading with stored value; sends signal to actuators; actuator alters factors such as heating, coolers, etc. Many still believe that it is the sensors that control the central heating system (rather than the microprocessor) and that the sensors make the decisions.

Question 9

(a) This was generally answered satisfactorily for 2 marks (use of the Internet and speaking into the microphone). Higher marks would be gained for mentioning the need to log into system, use of software such as codec and echo cancelling software, images/sound are seen/heard in real time, etc. Some candidates still seem to believe that the microphone in location 1 is connected to speakers in location 2 which is how the voices can be heard.

(b) Most candidates were able to answer this question.

Question 10

(a)(b) This was the first year candidates have seen this type of question. Some very good answers were seen. Weaker candidates simply added up the 1s in the rows and gave 0, 1, 1, 2 in column X for both gates. There was also some confusion between AND gates and OR gates. In general, if the answer in part **(a)** was correct then a good attempt was made in part **(b)** as well.

Question 11

(a)(b) The full range of marks was seen here. Many candidates gained 4 or more marks across both parts showing a clear understanding of how CAD systems work.

Question 12

(a) This year a distinct improvement in understanding how GPS works was noted. A common misunderstanding is that the GPS system sends signal **to** the satellite so it can work out where the vehicle is; the satellites have maps stored in their memory so they can give the vehicle directions. These types of answers indicate that candidates do not fully understand how GPS systems work. Satellites transmit signals to the GPS computer in the taxi; computer interprets these signals; the system depends on very accurate timing/use of atomic clocks; computer in taxi calculates its position based on at least 3 satellites; at least 24 satellites are in operation at a given time; position of vehicle is given with an accuracy of within 1 metre.

(b)(c)(d) The last three parts were reasonably well answered with many candidates understanding how the GPS systems operate in the car.

Question 13

(a) Many candidates gained 1 or 2 marks here. The majority seemed to have learnt from similar questions in the past and seemed to understand how data can be collected for simulations.

(b) This part of the question was well answered by the majority of candidates.

Question 14

(a) Most candidates answered this part well. A common error was to give LAN and WAN as examples of network topologies.

(b) The second part of the question was reasonably well answered.

Question 15

(a)(b) Most candidates seemed to understand the structure of databases.

(c) This year two Boolean operators needed to be used. It was common to see the errors: *(City = "Asia")* or *(city population > 17 million)*

(d) This part was well answered by most candidates.

Question 16

The full range of marks was seen in this question part. Many candidates ignored the *hint* in line 3 and did not use the REPEAT/ENDREPEAT construct. Consequently, marks were lost. However, the second part of the drawing allowed many candidates to redeem themselves since there were 2 or 3 possible ways of drawing the shape on the right.

Question 17

(a) The better candidates gained full marks here with many good attempts shown. Very few made use of flowcharts and the majority attempted to use pseudocode.

(b) Many candidates supplied examples with the type of test data (i.e. normal or abnormal). A large number did not supply examples and therefore lost both of the marks available.

COMPUTER STUDIES

Paper 7010/12

Paper 12

General comments

Although several new topics and type of question appeared on the paper this year, the standard of candidates' work was broadly similar to previous years. The new topics (such as logic gates and use of trace tables) were particularly well answered.

There is a gradual move to more questions where candidates have to apply their knowledge rather than show their ability to simply remember facts. This appears to produce candidates who are now exhibiting a better understanding of this subject than in the past.

Candidates and Centres are reminded that written papers are now scanned in and marked on computer screens by Examiners. Consequently, if a candidate writes the answer to a question on an additional page they must indicate VERY CLEARLY to the Examiner where their revised answer is to be found. If answers are "scrubbed out", the new answers must be very clear so that Examiners can easily read the text and award candidates the appropriate mark.

Comments on specific questions

Question 1

(a) This was generally well answered. The weaker candidates simply described security systems such as passwords and encryption rather than give actual data protection act features.

(b) The better candidates were able to give reasons such as that risk of hacking still exists and that a data protection act doesn't protect the data itself. Weaker candidates were characterised by a tendency to generalised comments.

Question 2

(a) A correct answer would have been that user documentation includes instructions on how to operate the system. A common error was to simply re-write the question e.g. "it is a user guide" or some comment that user documentation was part of systems analysis process.

(b) This was very well answered.

(c)(i) Correct answers included statements such as: no need to print out large user manuals (saves money); much easier to update if changes made to software. Weaker answers were characterised by reasons such as: available *24/7* – paper documentation would also give this. Much evidence of the vague type of answers such as "cheaper", "faster" which, as in previous years, gained no credit at all unless fully qualified.

Many candidates said "the user may not have a computer" – there would not be much point in buying some software unless you already had access to a computer. The need to have Internet access was accepted as a genuine disadvantage.

Question 3

(a) There was a mixed response from candidates here. Most marks were gained from claiming a CLI required commands to be learnt and that a GUI was more user friendly.

(b) Most candidates were able to give correct responses such as device control, interrupt handling, memory management. Some candidates gave very generalised, vague answers such as "process management" and "resource management" neither of which gained any marks.

Question 4

(a) In answering this question candidates should avoid giving general answers. The key here was the fact that access to the Internet leads to **increased** risk of hacking and viruses. Just to mention hacking or viruses was not enough to gain the marks.

(b) Many candidates just repeated their answer to part **(a)** and missed the point that intranets allow information specific to the company and it is possible to limit where and how access to the intranet can be made.

Question 5

The full range of marks were seen here with many candidates gaining 3 or 4 marks for correct choice of input devices. A number of common errors included:

- 3D glasses in virtual reality (clearly confusing this with 3D animation effects)
- voice recognition as a method for disabled people to communicate with a computer (this is not a device … acceptable device would be a microphone in this case)
- many gave barcode as a device which is clearly incorrect
- keyboards and mouse were quite common as GUI interface devices in the airport – these would not be suitable in an airport environment for a number of reasons

Many of the reasons given were very weak and very few candidates gained the 4 marks available for this part of the answer.

Question 6

A full range of marks were seen here. Some candidates confused hacking, encryption and viruses and consequently made errors here. This was a new type of question this year but there was no evidence that the format caused problems to any of the candidates

Question 7

(a) There continues to be an improvement in the understanding of pseudocode and algorithms in general. A large number picked up on the incorrect position of ***print*** *h* and many realised that the loop test condition was incorrect. A common error was the suggestion of using C <= 20 which still would not work. Better candidates correctly suggested changing the loop test condition to C = 20, C > 19 or C > = 20.

(b) This was generally well answered with many gaining high marks. A few candidates suggested "easy to understand" or "easy to write" with no indication at all why this was the case; consequently, no marks could be gained.

(c) Many candidates understood the difference between compilers and interpreters. Few were able to explain the difference accurately enough for a mark.

Question 8

(a) This question attracted a good range of marks.

(b) Many candidates identified a correct validation check such as length check, format check and presence check. A common error was to suggest a *range check*. There was no mention anywhere in the question that the customer id was numerical only. Consequently, a range check would not be a suitable choice.

Question 9

(a) Many candidates knew that MP3 format takes up much less memory space and therefore is faster to download. A common misunderstanding seemed to be that MP3 format gives a better sound quality (which is not the case) or that the MP3 format was already understood by the computer (again this is not true).

(b)(c) If the candidate understood the connection between download/upload speed and the time to transfer files, then they made a very good attempt at the answer. Essentially, a high percentage made a good attempt at answering both parts **(b)** and **(c)**. A few candidates got the units wrong (e.g. 20 minutes or 20 hours in part **(b)**) and so did not gain full marks.

Question 10

(a) This question gave the full range of marks and showed very clearly which candidates understood the concept of dry running algorithms. The question was well answered by many candidates with a pleasing number of maximum marks gained. Common errors included:

- missing initial values in **sum**, **x** and **count** columns (the initial values were clearly shown in the flowchart)
- working out the average value for **average** column at every line (when in fact this value was only calculated once at the end of the flowchart)
- putting in zeros where no values had changed in the columns

(b) Many candidates who did well in part **(a)** also did well in part **(b)**. It was very common just to see one value – 6. Clearly a number of candidates did not check the flowchart where the output box indicates that both **average** AND **N** were to be output (i.e. 6 and 3).

Question 11

(a)(b) This was the first year candidates had seen this topic on the paper. There were some very good answers. Some candidates showed much confusion. The only common error was to add up the 1s in the truth table; thus, in part **(a)** weaker candidates gave the values in column C as: 0, 1, 1, and 2. There was also some confusion between OR/NOR and AND/NAND.

Question 12

(a) Many candidates thought pressure sensors were used to detect movement of the chess pieces (the question mentioned that magnets were used in the base of each piece). Quite a few answered the question well. Very few understood the role of the computer which was to compare sensor readings with the stored positions prior to a move being made.

(b) This part was answered well, with a large number of candidates gaining at least one mark.

(c) The correct answer was that chess is an example of the use of an expert system. A surprising number of candidates gave games, simulations, virtual reality or applications as the answer.

Question 13

This question was generally well answered. Some candidates just said “less expensive” or “saves time” without giving any reasons why. This is not sufficient. Under disadvantages, many said “risk of fraud” or “getting access to credit card information” – none of these are specific to the Internet but risks are perhaps **increased** which could have earned marks.

Question 14

(a) This question was mostly answered well, but a missing = sign or use of incorrect symbols did not gain marks.

(b) Well answered.

(c) Candidates need to understand the use of *filters*. Alternative answers referred to the use of coloured bars on a graph or use of = IF (C2 = 18, “Y”, “N”).

Question 15

Very few candidates understood this question and gave answers like *fixed, portable, permanent, read only etc.* and consequently few gained any marks at all. The types of memory were: magnetic (e.g. hard disk), optical (e.g. CD-R) and solid state (e.g. pen drive).

Question 16

(a) This part was answered well.

(b) Very few candidates knew how barcodes were used as validation checks. Candidates need to be aware that check digits are recalculated at the receiving end of the data.

(c) This was generally well answered. A few candidates apparently did not read the question carefully enough and therefore did not realise that three DIFFERENT validation checks were required.

Question 17

(a) The full range of marks were seen here. The answers ranged from some very good algorithms through to simple essay-like answers that just rewrote the question. Very few tried using flowcharts with the majority attempting to use pseudocode.

(b) Good answers from better candidates. Many gave good examples as well as correctly choosing normal and abnormal test data.

COMPUTER STUDIES

Paper 7010/02

Project

Key message

Reports should not consist of more than 250 pages. Teachers should encourage candidates to choose evidence carefully. When producing databases, candidates should build these from scratch and not use templates provided by the software. Technical documentation should show tables, forms, queries and reports in design view and only program code **written by the candidate** should be listed. Technical documentation should not contain any pages automatically produced from software such as Microsoft Access Database Documenter.

General comments

The quality of work was of a broadly similar standard to previous years and there was a very wide range of suitable topics presented. Centres will need to obtain the moderation report for specific details of candidates' performance and the Centre's assessment of the projects.

There were many examples where the standard of assessment by Centres was reasonably accurate and those Centres achieving this accuracy are to be commended for the rigour and understanding of the standards required. However there were some occasions where credit appears to have been awarded when there was no relevant evidence in the documentation. There were also occasions where a higher mark had been awarded than that warranted by the work. It should be noted that the marks for each section are progressive – i.e. candidates can only gain a higher mark once the lower mark is obtained. If the evidence is not present for the lower marks then higher marks cannot be awarded. The areas of discrepancy in these instances are spread across the range of Assessment Criteria and a number of Centres seemed to demonstrate little awareness of the actual standards required. It is very disappointing to note that in many Centres where changes have been recommended by the Moderators these are often for exactly the same reasons as in previous years.

It is important to realise that the project should enable the candidate to use a computer to solve a significant problem commensurate with the age and ability of the candidate, be fully documented and contain substantial sample output from their proposed solution. Some projects did not demonstrate that they had actually been run on a computer by the candidate. It is recommended that candidates make use of appropriate screenshots as evidence and include these in their documentation to show the use of a computer.

The standard of presentation and the structure of the documentation continued to improve though in some instances the quantity of work was excessive and gained no more marks than work of a more appropriate size which met the criteria. 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 their 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. Marks were deducted where there was an overuse of such templates. Sadly there was an increase in the number of suspected malpractice, some of which were clearly in breach of the syllabus which states that the project must be the candidate's own work. Coding, for example, presented by candidates should demonstrably be the work of the candidate and be appropriately annotated.

In order to gain maximum marks candidates should aim to match the Assessment Criteria clearly stated in the Specification. Work which does nothing towards achieving these criteria should be discouraged – for example no marks are awarded for producing a feasibility study prior to beginning the Analysis phase. The evidence presented by the student should aim to illustrate how the criteria have been achieved.

Centres should note that the project work should contain an individual mark sheet for **every** candidate, not only showing the mark awarded for each section but also the page numbers where evidence for such marks

may be found, 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.

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, or do not provide the correct and complete mark sheets and forms. 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. Centres should note that on occasions coursework may be retained for archival purposes.

Areas of relative weakness in candidates' documentation continue to include setting objectives, a clear and detailed description of the methods **to be** used in their solution, hardware, technical documentation, test strategy and subsequent testing.

The mark a candidate can achieve is often linked to the problem definition and the objectives set. The candidates need to describe in detail the problem to be solved and to set attainable objectives. Where this is done correctly it enables the candidate to score highly on many other sections. The method of solution must be **explained** in order to gain credit in section 11. In order to gain credit for the test strategy section candidates **must** include the expected result. Without these expected results the candidates will score zero marks. Candidates should be taught that to gain maximum marks their test strategy and results should include testing for all aspects of their solution stated in the objectives and not only for the three types of data stated in section 15. It is important to note that candidates write their own documentation to reflect the individuality of their problem and that group projects are not allowed. Centres are reminded of the fact that they should supervise the candidates' work and that the candidate verifies that the project is their own work. This means that it has been created by the candidate. A number of candidates did not meet the requirement for technical documentation that states a contents table had to be provided. If a contents table is not provided then no marks can be scored for technical documentation.

Centres should remember that the minor adjustments to the assessment criteria made for the June 2011 examinations continue to apply. Full details can be found on the CIE website but these include:

Section 6: Action plan - must be referenced to the system life cycle, contain a time schedule and either a Gantt or PERT chart is needed to score full marks.

Section 7: Systems flowchart - marks will be awarded for a **systems** flowchart – this is different and separate from any process and/or program flowcharts – and zero marks must be awarded for section 7 unless correct systems flowchart symbols are used (as defined by the British Computer Society (BCS).

Section 13: Programming Code - marks will be awarded specifically for **candidates'** own program coding and use of macros. Application embedded coding is not the candidates own work and will not be awarded credit. Any coding presented **MUST** be annotated in order to attract any marks.

COMPUTER STUDIES

Paper 7010/31
Alternative to Coursework

General comments

This paper provided an alternative to submitting coursework. The candidates were advised to spend at least 20 minutes reading the information about the existing system and the proposed computer-based system. It is really important that candidates carefully studied the information provided at the start of the paper, since answers to all parts of the single compulsory question on this paper required reference to the Bathroom Fittings system described.

Candidates who did not use the information provided at the start about the Bathroom Fittings system could not obtain full marks for this paper.

Comments on Specific Questions

Question 1

(a) Most candidates correctly identified a Gantt chart as one tool that could help the analyst draw up an action plan and many could provide a good description. This part of the question asked for more than one tool, only the best candidates could describe another tool such as a PERT chart or how software could be used as a tool to aid the production of Gantt and/or PERT charts to track the progress of a project.

(b) Many candidates named two methods that the analyst could have used to gather information and the best candidates explained why the method chosen would be useful when investigating the existing Bathroom Fittings system.

For example a sample response (there are many others) that would gain full credit for both methods could read:

Method 1: Interview
Explanation: I would interview both the salesman and the filing clerk because this would allow me to ask supplementary questions if there was anything in their answers that required clarification.

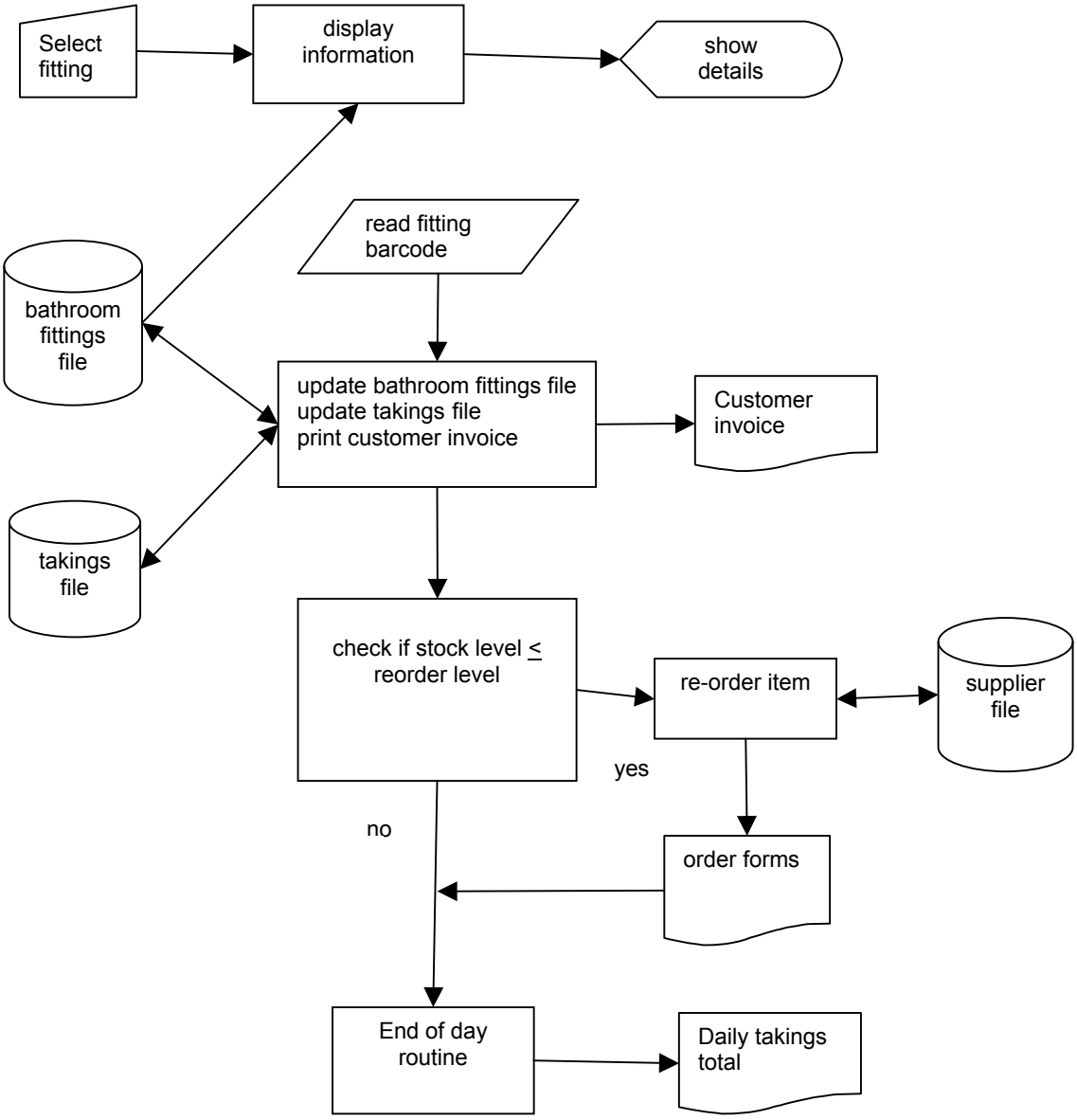
Method 2: Questionnaire
Explanation: I would use a questionnaire to find out any strengths or weaknesses in the system from the point of view of the customers. This enabled me to gather information from many customers without spending a lot of time at the retailers.

(c) Most candidates identified two items of hardware, popular correct answers included barcode readers, laser printers, high resolution screens. The reason given to justify the choice of hardware needed to clearly relate to the proposed Bathroom Fittings system, for example 'a laser printer to print invoices for the customers and order forms for the suppliers' would be a creditworthy answer.

(d) Candidates who had learnt their system flowchart symbols gained excellent marks for this part of the question.

(e) Excellent responses for this question showed a clear understanding of how the proposed system would work.

(f) This part was well answered by most candidates.
There were many ways of drawing a systems flowchart; the example below would have gained full marks.



(g) Few candidates described a test strategy that would have been suitable for the proposed bathroom fittings system. Many candidates just concentrated on the types of test data that would have been used, rather than outlining a strategy for the whole test procedure that could have included items such as white box testing as the routines were built, user testing on site with the salesman and filing clerk etc.

(h) Some excellent responses contained specific examples of test data that could have been used, for example 19.99 as some normal data for the price of the new fitting or -19.99 as erroneous/abnormal data for the price of a new fitting that would be rejected. Others needed to be more specific as only normal data or abnormal data or extreme data had been identified not the example asked for in the question.

(i) Some excellent responses to this question showed a clear understanding of Technical Documentation. Other responses seen needed to provide a clear reason to explain why the item was included rather than a description of the item.

(j) This part was well answered by most candidates with nearly all candidates identifying three methods of implementation that could have been used. Better candidates provided well-reasoned

responses explaining why each method identified would have been suitable for the Bathroom Fittings retailer.

(k) Better candidates described how the proposed Bathroom Fittings system could be evaluated, clearly relating the method chosen to how it could be used in this case. For example checking that the invoices and order forms produced from the new system provided all the information required. Other responses seen needed to relate more clearly to the Bathroom Fittings system in order to be creditworthy.

COMPUTER STUDIES

Paper 7010/32

Alternative to Coursework

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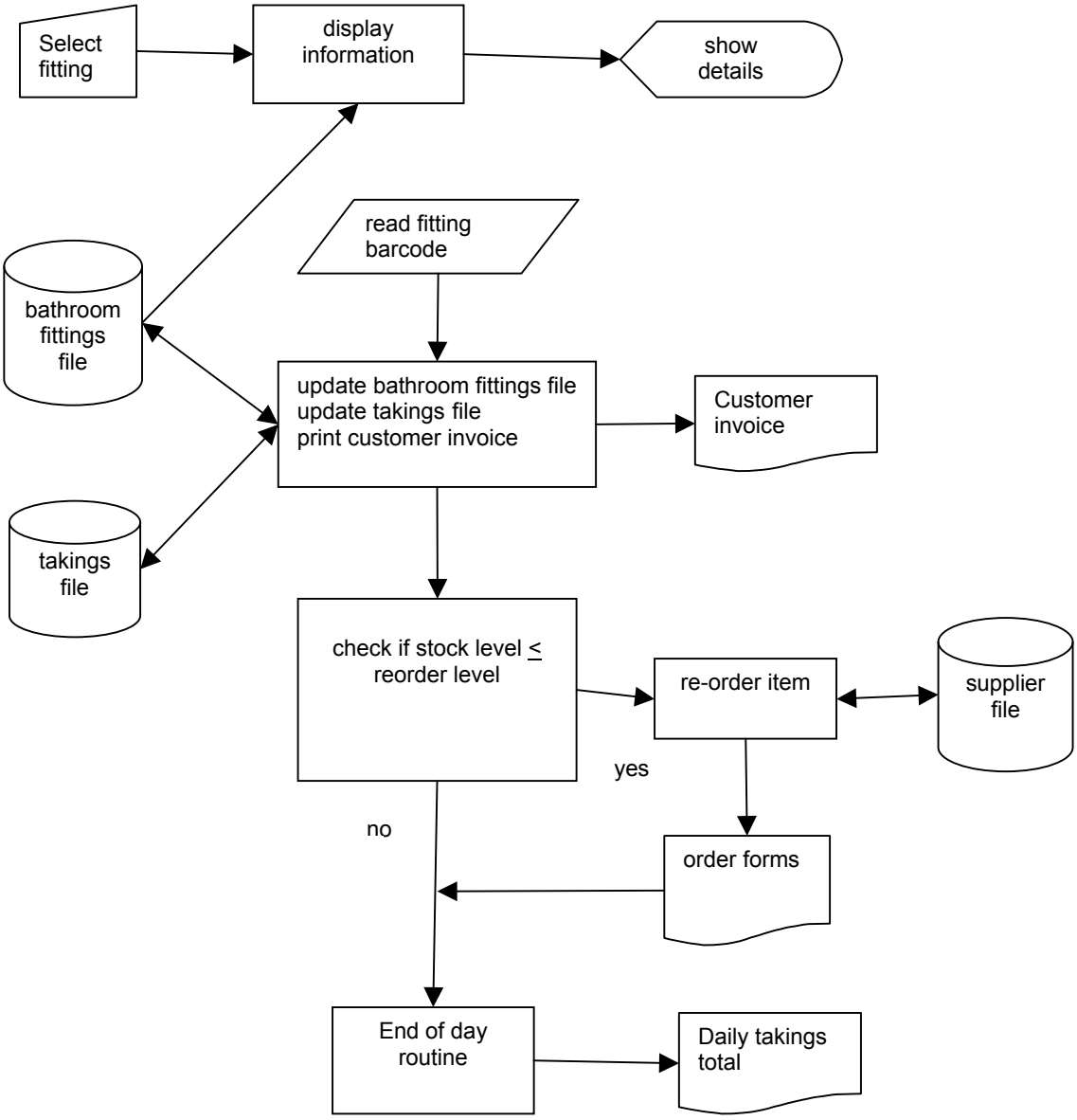

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