COMPUTER STUDIES

Paper 7010/11

Paper 11

Key message

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.

General comments

The new topics (such as logic gates and use of trace tables) were particularly well answered.

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

This question was generally well answered with the majority of candidates knowing at least 2 stages of the systems life cycle.

Question 2

(a) Good candidates responded with: "file size is smaller than on CD" or "uses a compressed file format". Candidates need to understand that "can store many files" does not really explain the benefit of MP3 format (storing many files is true of any format if the storage device has a large enough memory) and that MP3 files don't give a better quality of music".

(b) Few candidates knew that the type of memory in MP3 players is non-volatile (solid state, EEPROM or mini hard disk drives).

Question 3

This was generally well answered. Candidates need to do more than just concentrate on the security aspect and give 3 security measures such as: passwords, encryption and anti-spyware.

Question 4

This question was well answered by many candidates. Candidates need to understand that checking if an order had been placed must be done after the stock level has been checked.

Some candidates also tried to squeeze in the full written statements rather than just the numbers 1 to 9 as indicated in the question. This made it much more difficult for the Examiners to check the candidates' answer.

Question 5

(a) Most candidates could state that CAD is software that can be used to design new products and makes use of features such as 2D, 3D, wire frames library of parts and may link to CAM.

(b) Candidates need to understand the difference between design and manufacture. CAD is used in the design of products.

(c) Candidates need to understand that *printer* or *monitor* were not enough on their own either since the question required *specialist devices* such as large hi resolution monitors or 3D printers.

Question 6

(a) Most candidates could name webcam, speakers, microphone and broadband modem.

(b) Few candidates knew of CODEC or other software. Candidates need to be aware that "SKYPE" is a brand name (which is not accepted as stated on the front page of the exam paper) and is not video conferencing software.

(c) Good candidates gave answers which included: "it takes much longer to type in the messages when using instant messaging rather than just talk" or "video conferencing hardware and software is expensive".

(d) Good answers included: "faster communications (e.g. broadband speed) now available", "increase in terrorism in recent years (safety issue)" or "increase in the number of multi-national companies" – all of these take the last part of the question into account. Candidates need to be aware that general responses such as "saves time" or "can call meetings at short notice" do not answer the question.

Question 7

There were some good attempts at this question. Candidates need to work carefully through each part of the flowchart and take particular note of the following:

- initialisation of **total** and **neg** columns
- count goes up to 8 in part **(i)** and to 7 in part **(ii)**

Question 8

This was a different way of getting candidates to consider how *expert systems* were developed. Good candidates correctly described the gathering of information, design of the knowledge base, entering data, creating the inference engine and rules base etc.

Question 9

(a) Most candidates gave the correct answer for part **(i)**. For part **(ii)**, candidates need to be aware that the correct formula is: AVERAGE(D2:D7). For part **(iii)**, the correct formula is MAX(D2:D7).

(b) The better candidates correctly stated all three cells: D7, D8, D9.

(c) Very few candidates made a good attempt at this part of the question. Candidates need to understand

Question 10

(a) This was generally satisfactorily answered. Candidates need to be aware that call centre are not necessarily open 24/7.

(b) Few candidates could give advantages for the customer, such as no need to wait in a queue, open 24/7.

(c) Many candidates gave a correct answer here, such as job losses, need to re-train.

Question 11

(a) This was reasonably well answered with the majority giving 8 bits as the answer to part **(i)**. For part **(ii)** the majority of correct answers were: 1024 megabytes. Candidates need to understand the difference between bytes, Kilobytes, Megabytes and Gigabytes.

(b) Flash memory is solid state memory that plugs directly into the USB port and supports direct transfer of data. CD-RW is an optical medium which requires a separate drive and data need to be finalised before being used on another device. Candidates need to be aware that data on a CD-RW can be changed.

Question 12

(a) The better candidates correctly identified the sensors as temperature and oxygen sensors.

(b) Few candidates could provide a good description. Candidates need to understand how sensors and microprocessor (real time) systems work. Sensors send data (often via an ADC) to a microprocessor, which makes decisions based on stored/set values and sends signals to actuators, for example, to control valves.

(c) All that was needed here was some form of alarm or a fail-safe system which switches off the heater in case of mal-operation.

Question 13

(a) Candidates need to understand that the navigation system (in the transport) does not send signals to the satellites. Satellites transmit signals to onboard computers. The system depends on very accurate timings from atomic clocks. Each satellite transmits data indicating location and time and the computer in the aeroplane calculates the location based on at least three satellites (known as triangulation). The computer can also calculate the altitude of the aeroplane.

(b) This question was a good example of many candidates forgetting the scenario and referring to car drivers (rather than pilots). Good answers included reduction of possible pilot error and accurate estimation of arrival time.

Question 14

(a) Good candidates realised that the given statement had to first of all be converted into a logic statement:

e.g. X = 1 IF (P is NOT 1 AND R is NOT 1) OR (R is 1 AND T is NOT 1)

Once this statement was produced, it was a relatively straight forward matter to draw the logic circuit to solve the problem described.

(b) Many candidates correctly realised that it was possible to complete the truth table even if they could not draw the logic circuit in part **(a)**.

Question 15

(a) Most candidates correctly identified the first ID as not valid and the second one as valid.

(b) Fewer candidates were able to calculate the correct check digit as 3.

(c) Many candidates gave *transposition* and *transcription* errors without giving examples to explain what is meant by these terms.

Question 16

(a) Candidates need to understand that backing up data is not a way to stop information being stolen. Physically locking the room or computer or logging off when the computer is not attended and using passwords so that unauthorised users can't get into the system prevents data theft. If encrypted data is stolen, then it is of no use to the thief, so it is still protected.

(b) Encryption makes the data unreadable if it has been accessed illegally. It does not stop the act of hacking. Other relevant risks were viruses, phishing and pharming.

(c) Most candidates were able to draw a star network and compare this with a ring network.

(d) Better candidates realised the question was asking about specific features of processors looked for in a laptop, such as: "run cool", "no need for fans" or "consume little power".

Question 17

(a) There were some good attempts at this algorithm. The most common were:

```
input a, b, c
if a > b and a > c
  then print a
  else
    if b > c
       then print b
       else print c
```

or

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largest = 0
for x = 1 to 3
  input number
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next x
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(b) Very few candidates understood how to use the hint which was given i.e. INT (X) (for example, if INT(X) = X then number is a whole number). A correct example algorithm is:

```
for x = 1 to 1000
   input number
   difference = INT(number) - number
   if difference = 0
     then total = total + 1
next x
print total
```

COMPUTER STUDIES

Paper 7010/12

Paper 12

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COMPUTER STUDIES

Paper 7010/13

Paper 13

General comments

Most candidates followed the guideline on the front of the question paper and gave the generic terms as opposed to trade names when answering the questions. Candidates need to understand that in those questions where a specific number of responses were asked for, a long list of answers is not appropriate. The candidate needs to give the required number of responses and not more.

Comments on specific questions

Question 1

(a) This was answered well. The most popular answers were related to the sharing of resources and the capability of being able to work at any workstation across the network. A common error was to assume that 'data or information' could be shared easily – this was too vague to be given credit. It is 'very easy' to share data using a memory stick.

(b) An advantage of using wireless networks is that no trailing wires would be necessary. A number of candidates simply stated that 'no cables would be needed' which is insufficient for a mark as cables would be needed for example where peripherals were attached to workstations. The most common disadvantage given usually related to the 'limited range' of a wireless network. The idea that a wireless network is generally less secure was not sufficient – if no attempt is made to secure any network then it would be open to unauthorised access.

Question 2

This was well answered by many candidates. Braille printers and speakers were identified as suitable output devices for a visually impaired person. Some candidates included input devices such as 'Braille keyboards' or types of sensor, which were not asked for. Plotters for accurate printing of large drawings were suggested when using CAD and a buzzer or light for a house monitoring system.

Question 3

(a) A number of candidates described CLIs and GUIs without describing how, and with what, they might select an application. Candidates need to understand that with a CLI a user types in a command to open application software, whereas when using a GUI the user would point at an icon representing the application software using either a mouse or a touch screen.

(b) (i) Candidates need to understand that automatic data capture is the collection of data with no actual need for human interaction.

(ii) Most candidates chose a barcode reader, some type of sensor, or MICR. Usually the application given was also correct, though some candidates just described the device without mentioning an application.

Question 4

This was very well answered with candidates correctly matching the description of verification, validation, simulation, search engine and batch processing with the given technical terms.

Question 5

(a) Many candidates knew that the purpose of user documentation is to explain how to use or operate the software. Far fewer could explain that the purpose of technical documentation is to help programmers make improvements and maintain the system.

(b) Most candidates correctly identified which items would be found in user documentation, technical documentation or both.

Question 6

(a) Candidates need to understand that the purpose of a web browser is to display web pages or web sites. Many mistakenly stated that web browsers could search for information or allowed access to the Internet when search engines perform the former and ISPs the latter.

(b) Most candidates could name the hyperlink but fewer the webpage, and very few the radio buttons.

(c) Candidates need to understand that websites use cookies to store a user's buying preferences.

(d) The majority of candidates mentioned viruses but few could list one of the other security issues such as phishing, pharming, key logging or spyware.

Question 7

The trace table was correctly completed by many candidates. The most common error seen was the omission of the initial zeros in the first 3 columns. Surprisingly candidates who omitted these zeros then went on and gave the correct answers in the last three columns.

Question 8

(a) Most candidates knew that unemployment, the need to re-train or possible de-skilling were possible effects on workers.

(b) Good answers included greater productivity and therefore lower unit cost as well as work can go on in un-lit, unheated factories.

(c) Candidates need to understand that robots are not more accurate than humans, they are just more consistent and they can work non-stop without a break or holiday.

Question 9

Most candidates knew the formula in part **(a)** should be =D2/C2 and for part **(b)** should be =AVERAGE(E2:E6). The formula for column F was for cell F1: =B2*C2/10, replicated down the column. The condition evaluated to Loss.

Question 10

(a) (i) Candidates need to understand that when monitoring the process, the computer decides if the temperature/pressure is out of range and then give a warning. It would not change the process parameters.

(ii) When controlling the process the computer would also send signals to open/close the valve and/or switch on/off the heater. Importantly, the output affects the input.

(b) Most candidates could list the steps accurately: the data from the temperature/pressure sensor is changed into digital by ADC. Data is then sent to the computer where the input is compared to values in memory. If the temperature is too low, signal is sent to heater, if pressure is too low signal is sent to valve and heater turned on / valve is opened etc. Control systems loop indefinitely.

(c) Candidates seemed well versed in a variety of applications for particular sensors.

Question 11

(a), (b) Most candidates could convert the clock displays correctly.

(c) Many candidates knew that the microprocessor compares present time with stored time and if the values are the same, it sends a signal to activate the alarm.

Question 12

(a) Candidates seem to understand the difference between fields, records and data items.

(b) Most candidates were able to evaluate the search condition.

(c) Most candidates were able to write the correct search condition. Candidates need to remember that character strings should be enclosed in " ".

(d) Most candidates were able to sort the record into the correct order.

Question 13

Most candidates were able to insert correctly the missing statements in the flowchart.

Question 14

(a), (b) The vast majority of candidates seemed to clearly understand logic circuits and truth tables.

Question 15

Some candidates correctly identified the terms being described by **(i)** to be an interrupt, **(ii)** handshaking and **(iii)** a buffer).

Question 16

Many candidates realised that when initialising variables they had to initialise the 'lowest temperature' to a high number, and the 'highest temperature' to zero or a negative number. This ensures that the initial temperature input would cause the value to reflect the initial input.

COMPUTER STUDIES

Paper 7010/02

Project

General comments

There was a great variety of well-chosen project titles which gave candidates the opportunity to score highly and achieve their potential. 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 Centres assessment of the projects. It is very disappointing to note that in many Centres where changes have been recommended by the Moderators these are for exactly the same reasons as in previous years. Sadly there continues to be a number of instances of suspected malpractice, some of which were clearly in breach of the syllabus which states that the project must be the candidate's own, original work. Coding, for example, presented by candidates should demonstrably be the work of the candidate and be appropriately annotated. Such coding should also be accurately dated to reflect when the candidate created it.

By and large the administrative tasks required for the coursework – MS1, Individual candidate Record Card (ICRC), Coursework Assessment Summary Sheet (CASS) and the correct number in the sample for moderation – was followed precisely. There were, however, a number of Centres that failed to provide some of these documents. For the candidates projects to be moderated accurately it is essential that the required documentation is provided. The MS1 form provides the definitive record of candidates name, number and total marks awarded; the ICRC provides details not only of the marks that candidates have been awarded for each section in the assessment criteria but also the actual page numbers in the candidates work where evidence is to be found justifying these marks; the CSS sheet (preferably with the candidates whose work is included in the sample highlighted) allows Moderators to check quickly that a representative sample of work has been provided. Without these documents it is possible that delays in issuing results may occur. A number of Centres failed to submit the required sample projects – some sent all the candidates work which means increased and unnecessary expense; some did not send the minimum number of projects required, and some did not provide a sample which reflected the range of marks awarded. The details of the sample to be submitted are clearly laid out in the syllabus. It was pleasing to note that very few Centres now submit soft copies of the candidates' work. It is very good practice to retain a soft copy of the work submitted as occasionally exemplar pieces of work may be retained by Cambridge.

CIE offer training to Centres in a variety of forms. There are distance-learning packs where teachers are given examples of good practice, and then required to complete a coursework marking exercise that is submitted for assessment. There are online training courses, where teachers take part in online exercises and have the opportunity to discuss issues with the trainer directly online. Finally there are in-country, face-to-face training courses offered. Please contact Cambridge International Examinations for details on all training offered.

It is absolutely not necessary to submit coursework of excessive quantity (teachers should question the value of time spent producing coursework that contains more than around 100 pages) or that has been expensively bound (these are extremely costly to submit), or that contains reams of coding that in most cases has not been written by the candidate. Such material slows down the moderation process and can lead to delays.

There are many Centres that understand and interpret the criteria laid out in the different sections of the coursework specification, and consequently award marks accurately. There are, however, many Centres where there appears to be some confusion over what is expected for marks to be awarded. Each of the sections laid out for the coursework are progressive – that is, unless a candidate provides evidence for achieving the criterion for 1 mark they cannot be awarded higher marks for that section. For example it is not possible to award a candidate 3 marks in ***section 6*** (action plan) for only producing a Gantt or PERT chart. There must also be the detailed formal plan, including time schedule, required for 2 marks to have been awarded. In ***section 14*** it is only possible to award more than 1 mark if there is a complete test strategy submitted. This strategy, to be complete, should not only detail the types of data requested in ***section 15***

but also include ways in which other aspects of the solution are to be tested – such as whether a planned back-up occurs as expected, whether any documents to be printed are actually output as planned. The strategy also needs to include the data to be tested and the expected results, and for maximum marks need to be linked to the computer objectives set in ***section 2***.

There were some errors in interpretation of certain sections that the following comments may help to overcome in future submissions:

Section 2: This is an extremely important part of the coursework as the objectives set the direction of the work as a whole.

It is advisable to separate the business-related and computer-related objectives into separate, numbered sections. It is easier later in the project to refer to the numbered objectives as being achieved without having to rewrite them all again in detail.

The computer-related objectives set here are those objectives which are to be tested in ***section 14*** and ***15*** so whilst it is acceptable to detail the objectives as the examples given in the criteria for 2 marks, it is much easier if the objectives are more detailed. For example, in ***section 15*** to provide evidence of three types of data being tested it is necessary to define the validation rule being applied. So clearly stating in the objectives that a database is to be created which will store, amongst other data, the price of an item being sold (or the wages of an employee; or the size (length, width, thickness) of planks of wood etc.) will allow three types of data to be tested.

Later in the project, in ***section 8*** where the method of solution is described, the actual rule to be applied can be detailed exactly (say, price >= $5 or <= $200). It is a simple matter then, in ***sections 11*** and ***12***, to be very specific about describing and implementing how this has been achieved. It is not difficult to set out in the test strategy the data to be tested (normal data - $12; abnormal data - $215; extreme data $5 and $200) and provide evidence of the results of such tests.

Section 3: For maximum marks candidates need to provide evidence of exactly how the present solution works. This should include actual examples of input, output documents or forms, processing which occurs, how the data is captured etc.

Section 6: The action plan should be in specific terms, not just the time to be spent on each of the areas characterised in the specification – analysis, design, implementation, testing, documentation, evaluation and further development. These areas should be broken down into, at least, the sections within each area – so how long will be set aside to complete the description of the problem, to formulate the objectives, to collect information about and to describe the existing solution, and so on.

Section 7: System flowcharts are different to program and process flowcharts, and are not dataflow diagrams or structure charts. They give an overview of the whole system, and use recognised symbols to do this. A decision box, for example, has no place in a systems flowchart.

Section 8: It is in this section that candidates describe in detail what they are going to do. They might produce rough drawings of what a spreadsheet will look like – column headings, formulas needed; what data will be needed in a database – the field names, data types, any relationships; if they are going to use, or create, macros then what will these need to do etc.

Section 11: This is where candidates put into practice what they have said they are going to do in ***section 8***. They must describe what they are doing and how they are doing it. Once they have done this they should have a working solution (which yet needs to be tested and documented – but a working solution nevertheless) to the problem, and which hopefully meets the objectives set in ***section 2***.

Section 13: Candidates cannot be awarded more than 1 mark for producing evidence of code they have not written themselves. Unless they annotate any coding they have written themselves – by explaining what tasks the sections or modules within the coding perform (not simply giving a section a label such as 'this module allows me to print out a form' for example) - then candidates may not be awarded more than 1 mark.

Section 14: This is best achieved in the form of a table with columns which include the field name, the validation rule (if any) the test data to be input; the expected results; the computer-related objective the test is linked to; a page number where the results of the test may be found.

Section 15: For maximum marks results of testing of all aspects of the solution need to be included. This could include printouts, evidence that formulas work as expected, back-up has performed as expected, selecting a button gives the expected result etc. Although this is at a stage in the candidates' work where much work has already been done it is nevertheless a very important task that cannot be rushed.

Section 16: The technical documentation must contain descriptions of how the solution to the problem has been achieved. It is not a guide to producing the solution – there is no need to describe, for example, how to set up the fields in a database. It should contain details of the hardware and software that has been used; a data dictionary (a table with details of variables/field names used): details of the cells where, and what formulas have been used; relationships between tables; which macros have been used where; what programming language has been used; etc. In short it is documentation that would assist a competent technician to maintain and/or modify the solution. Copies of work produced earlier *without any explanation* are worthless.

Section 18: An evaluation should sum up the whole of the work that has gone into the project. It is not enough to say 'I have met all of the objectives I set'. There needs to be not only a look at these objectives in detail, and the testing done, and explain how successful the work has been in achieving the objectives and testing – with links to where the evidence may be found to back this up – but also any problems which may have occurred during the work, and how these were overcome. For example, whether the action plan went as anticipated and how any changes to this plan were accommodated. For 2 marks the evaluation must be relevant, exact and detailed. A simple statement with no expansion should not qualify for more than 1 mark.

Section 19: Any developments, to gain 2 marks, must be realistic and must contain detailed descriptions highlighting the reasons, and possible advantages, for their implementation.

COMPUTING

Paper 7010/31
Written Paper

Key message

Candidates are 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 the candidates carefully study the information provided at the start of the paper, since answers to all parts of the single compulsory question on this paper require reference to the specific system described.

General comments

This paper provided an alternative to submitting coursework

Candidates who did not use the information about the Furniture Showroom system described at the start of the paper could not obtain full marks for their answers.

Comments on Specific Questions

Question 1

(a) Many candidates correctly identified a Gantt chart and a PERT chart as tools that could help the analyst draw up an action plan.

(b) Most candidates named two methods that the analyst could have used to gather information and the best candidates went on to explain why the method chosen would be useful when investigating the existing Furniture Showroom system.

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

Method 1: Interview

Explanation: An interview could be used for both the salesman and the filing clerk as there are not a large number of members of staff. It would be a suitable method because this would allow me to tailor questions for each individual and to ask supplementary questions if there was anything in an answer that required clarification.

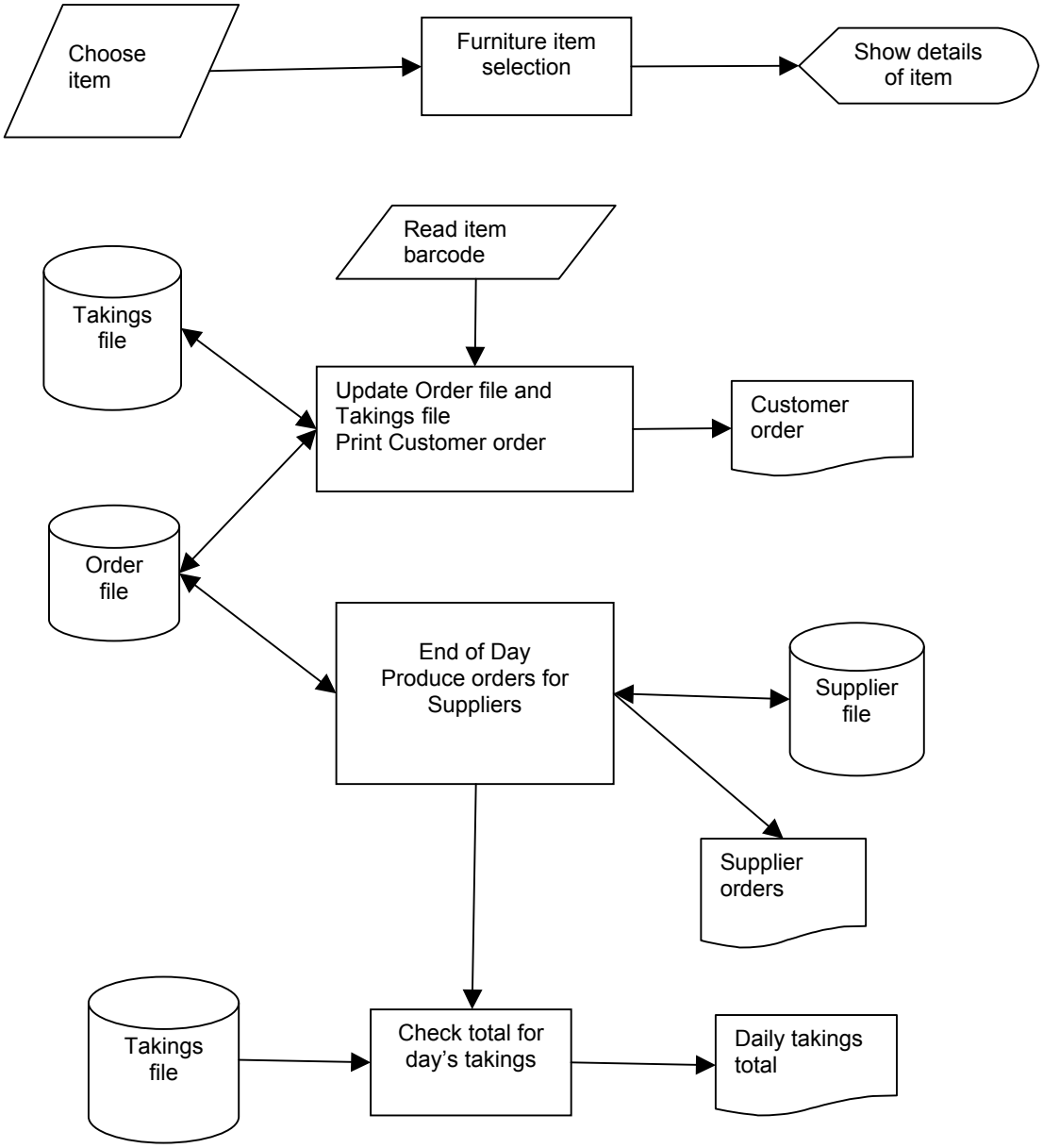
Method 2: Questionnaire

Explanation: I would use a questionnaire to find out any strengths or weaknesses in the current system from the point of view of many customers. This method would enable me to gather information from many customers without spending a lot of time at the furniture showroom. Also the customers could remain anonymous if they wanted to.

(c) Most candidates correctly 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 Furniture Showroom system, for example 'a laser printer to print order forms for the customers and suppliers' would be a creditworthy answer as order forms were mentioned in the information on the examination paper.

(d) There were some excellent responses for this part of the question that showed a clear understanding of how the proposed system could work. Candidates need to take care not to include processes, data stores, inputs and outputs that relate to previous examination papers.

There were many ways of drawing a systems flowchart for the furniture showroom system; a model answer is shown below.



(e) Few candidates provided a good explanation of why the systems analyst would choose to employ a programmer to write bespoke software for the new computer-based furniture showroom system.

(f) Few candidates fully described a test strategy that would have been suitable for the proposed furniture showroom 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.

(g) Some excellent responses contained specific examples of test data that could have been used, for example 1234 as normal data for the item code that would be accepted by the system or 12345 as erroneous/abnormal data for the item code that would be rejected by the system. Other candidates

needed to be more specific in their answers as the question asked for examples of data that could be used to test the item code, so other examples of normal data or abnormal data or extreme data were not creditworthy.

(h) Some excellent responses to this question showed a clear understanding of what should be included in a User Guide and why it should be included. Other candidates could identify items to be included and describe them but omitted to give a clear reason that explained why the item was included.

(i) Nearly all candidates could identify and describe a method of implementation that could have been used. Very few candidates provided well-reasoned responses explaining why the method identified would have been suitable for the computer-based Furniture ordering system.

(j) Most candidates described at least one advantage of introducing a new computer-based system when compared to a paper-based system. Better candidates' answers clearly showed advantages that were for the computer-based Furniture ordering system.

(k) Only the best candidates described one or more limitations of adopting the new computer-based Furniture ordering system. A few candidates erroneously described advantages again.

(l) Candidates, who read the question carefully and provided a web page design for customers to order online, generally scored good marks for this part of the question.

COMPUTING

Paper 7010/32
Written Paper

Key message

Candidates are 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 the candidates carefully study the information provided at the start of the paper, since answers to all parts of the single compulsory question on this paper require reference to the specific system described.

General comments

This paper provided an alternative to submitting coursework

Candidates who did not use the information about the Furniture Showroom system described at the start of the paper could not obtain full marks for their answers.

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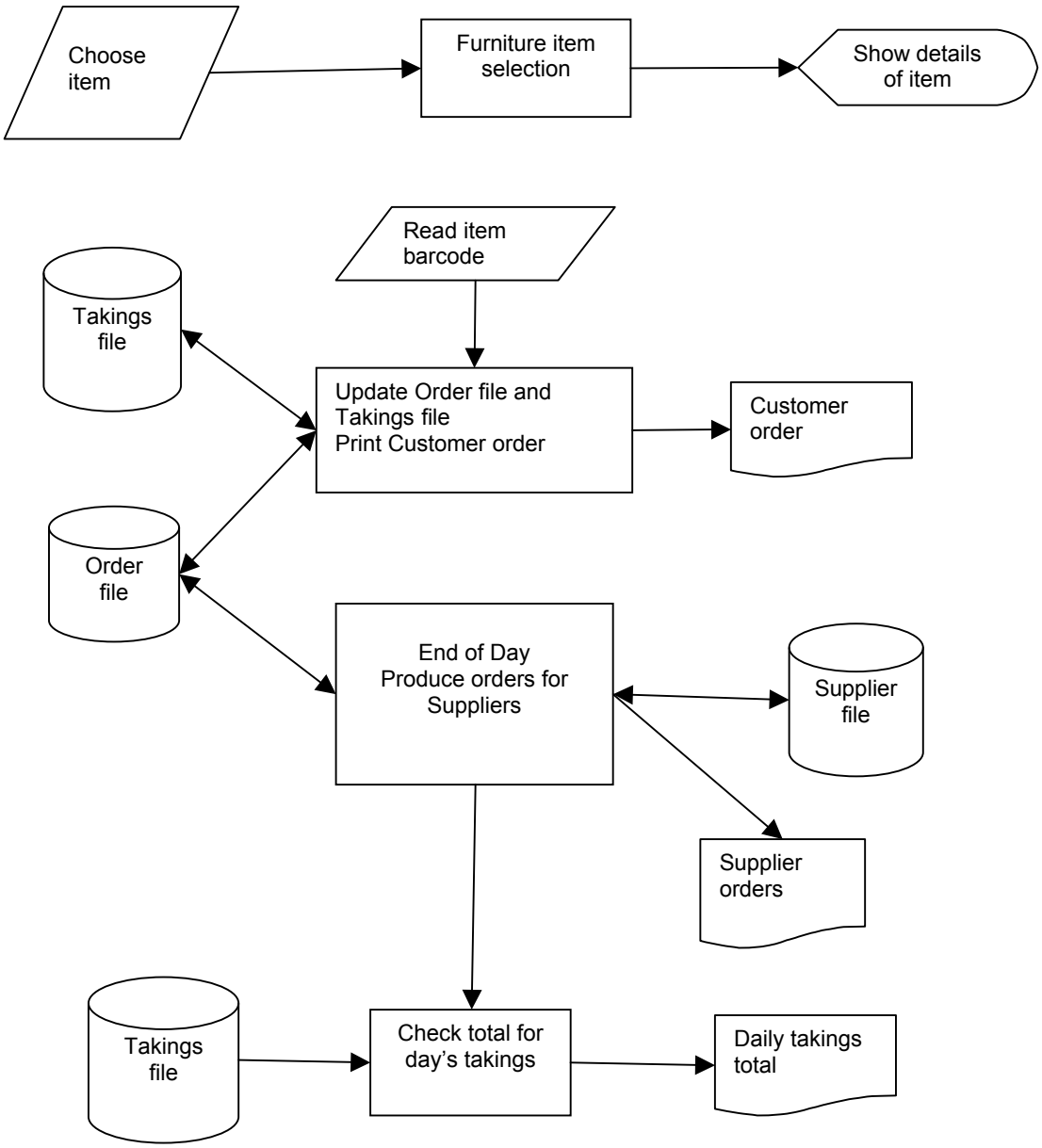

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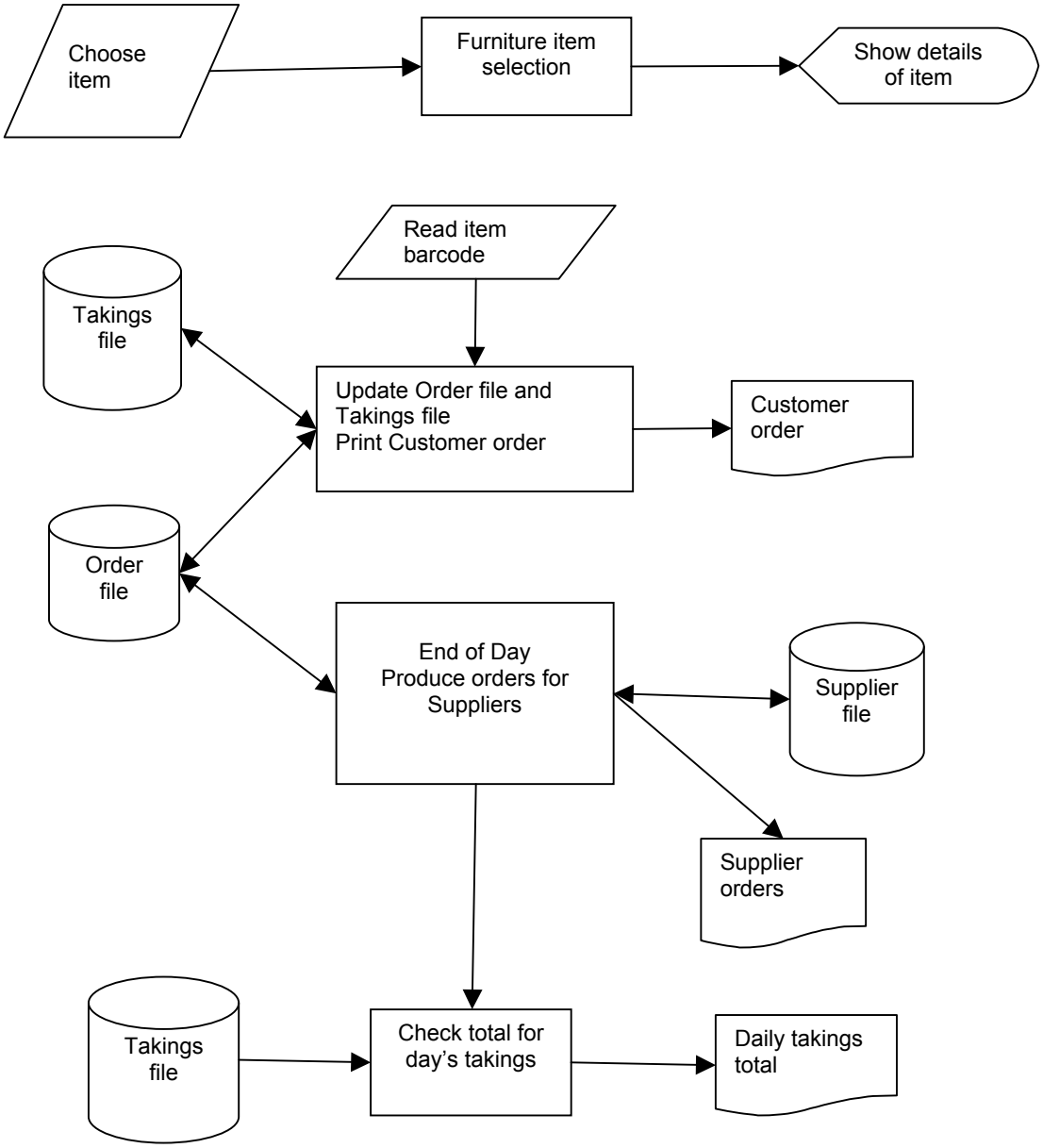

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