COMPUTER SCIENCE

Paper 0984/12
Computer Systems

Key messages

Candidates need to show a greater use of technical terminology in their responses. Candidates will also need to note the key terms given in a question. They must structure their response using these. They must also use the given context in their responses.

General comments

If a candidate writes their response to a question on an additional page, they must indicate very clearly on the script where their response is to be found. If answers are crossed out, any new answer must be written very clearly, so that the text can be easily read.

Comments on specific questions

Question 1

(a) Many candidates were able to state what is meant by software. The most common responses included reference to it being the intangible parts of a computer system.

(b) Many candidates were able to tick the correct option. The most common incorrect answer given was spreadsheet.

(c) Many candidates were able to identify the correct type of software.

Question 2

(a) Most candidates were able to identify the smallest unit of data. The most common incorrect answer given was nibble.

(b) Many candidates were able to give the correct number of nibbles. The most common incorrect answer given was 8.

(c) Many candidates were able to give one or two correct stages of working. Few candidates were able to give the correct answer.

(d) (i) Most candidates were able to state what is meant by file compression. Some candidates focused on a particular kind of compression rather that compression in general. For example, stating that it is when data is permanently removed from the file. This would not be true in all examples of file compression.

(ii) Many candidates were able to give a benefit of compressing the file. Some candidates incorrectly focused on benefits for transmission of the file rather than for the storage of the file.

Question 3

(a) (i) Many candidates were able to give one similarity. Some candidates provided vague responses that did not have the level of accuracy needed. For example, they are both used to represent data.

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(ii) Many candidates were able to give two differences between binary and hexadecimal. Some candidates gave one difference split across the two sections. Candidates are reminded that if they are asked to provided differences between two options that they need to include refence to both options in the difference. For example, just stating 'hexadecimal uses letters' is not enough as it does not include reference to how binary is different to this.

(b) Many candidates were able to provide the correct binary conversions.

(c) Many candidates were able to provide the correct hexadecimal conversions.

(d) (i) Many candidates were able to describe the logical shift that would be performed on the binary integer.

(ii) Many candidates were able to provide the correct effect on the binary integer. Some candidates gave a vague response that did not have the required level of accuracy. For example, stating that the value is increased or changed.

(e) Many candidates were able to give the correct name of the number system.

Question 4

(a) Most candidates identified two correct input devices. The most common correct answer was touchscreen. Some candidates gave generic input devices that were not suitable for the context given in the question, for example a mouse and a keyboard.

(b) Most candidates identified a correct output device. The most common correct answer was a display screen. Some candidates gave a generic output device that was not suitable for the context given in the question, for example a printer.

(c) Many candidates were able to explain the role of the ROM in the smart watch. Some candidates gave a description of what is meant by primary storage rather than explaining the role of the ROM.

(d) (i) Many candidates were able to show understanding of cloud storage. The main understanding shown is that the data is stored on servers that are in a remote location.

(ii) Some candidates were able to explain the benefits of the application using cloud storage. Many candidates focused on repeating understanding shown in **part (d)(i)**. For example, stating that a benefit is that the internet is used to access the data. Candidates need a greater understanding of a wider range of benefits of cloud storage.

(e) Many candidates were able to recognise that the smartwatch is an embedded system and gave the reason for this being that it has limited functionality.

Question 5

(a) Some candidates were able to describe how the system checked for errors. Many candidates focused their answer on describing how a barcode scanner operates rather than showing understanding of how the check digit is used to check for errors.

(b) (i) Many candidates were able to describe how data is sent using the serial simplex data transmission method.

(ii) Many candidates were able to give good reasons why serial simplex data transmission was used. The most common reason given was that the data would have fewer errors after transmission.

(iii) Most candidates were able to give two other error detection methods that could have been used.

Question 6

Some candidates were able to correctly complete the full table. The most common correct answers were MAR and data bus. Candidates appeared to have a common misconception about the purpose of the accumulator. Many candidates described it as carrying out calculations, however the accumulator does not do this.

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Question 7

(a) Some candidates were able to correctly state what is meant by a URL. Many candidates gave a vague description about it being an address for the website. This lacked any technical detail about it being a text-based address.

(b) Many candidates were able to identify parts of a URL.

(c) Many candidates were able to identify the correct software.

(d) Some candidates were able to draw a correct and technical diagram to show the process of retrieving web pages. Some candidates showed a misconception that the request for the web page is sent from the DNS to the web server.

(e) Many candidates were able to complete the paragraph with the correct terms.

Question 8

(a) Most candidates were able to tick the correct option.

(b) Many candidates were able to circle the three correct components.

(c) Few candidates were able to explain how the robot vacuum could make use of machine learning. Many candidates just described what machine learning is rather than referring to how it could be used.

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Paper 0984/22
Algorithms, Programming and Logic

Key messages

Candidates need to carefully read the questions before answering them and their answers must refer to the given context.

Candidates who responded using the correct pseudocode syntax as defined in the syllabus, answered pseudocode questions accurately.

Candidates who answered questions appropriately in terms of the command word used were able to achieve the highest marks, for example: questions beginning with explain require more detail than those beginning with state. In addition, explain type questions usually require an explanation of how something is done, rather than a simple description of what is done.

General comments

Candidates demonstrated a good overall understanding of the requirements of most of the question paper.

Candidates are reminded that when answering the final programming question, they should read the scenario through to the end before they begin to write their solutions. Candidates do not need to declare variables and arrays unless it is stated in the scenario that they need to do this. Candidates should proceed straight to the writing of the program, concentrating their efforts on the given tasks. Candidates must, however, ensure that any variables and arrays defined or stated in the scenario are used and that they include any necessary initialisation.

Comments on specific questions

Question 1

The majority candidates were aware that structure diagrams are an alternative method of representing a solution to a problem.

Question 2

Most candidates understood that an `IF` statement is an example of a selection statement.

Question 3

(a) The majority of candidates were able to match each flowchart symbol with its correct purpose.

(b) Many candidates achieved some marks for their construction of a flowchart to meet the requirements stated in the question. A significant number of these candidates demonstrated a good understanding of flowchart symbols and flowchart structure.

Question 4

(a) Most candidates were able to identify and correct at least one of the errors in the given algorithm with a high proportion of these candidates identifying more than one. Candidates with a good understanding of pseudocode and the bubble sort algorithm were able to correct most of the errors.

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(b) The majority of candidates found this question difficult. Some candidates were able to explain that the algorithm used a flag to stop the execution of the algorithm once it was in order, and/or the inner loop reduced its upper limit so that already sorted data was not checked again.

Question 5

(a) The majority of candidates were able to identify a stage in the program development life cycle other than analysis, for example: design, coding or testing.

(b) This question was answered well, with most candidates identifying abstraction and decomposition as occurring during analysis. Other correct points given included correct expansions on the meaning of abstraction or the inclusion of statements such as identification of the problem and/or identification of the requirements of the solution to the problem.

Question 6

Many candidates correctly identified a verification check such as visual check or double entry check. Some of these candidates expanded correctly to outline how their check would work. A significant number of candidates incorrectly named validation checks such as range check or presence check.

Question 7

(a) Candidates generally found it challenging to correctly complete the trace table. A significant number of candidates did correctly complete the first column with some correctly completing the whole trace table.

(b) A minority of candidates correctly identified the purpose of the algorithm.

(c) A significant number of candidates correctly identified the fact that the given input data could lead to an endless loop because the terminal condition for the loop (1) would never be reached.

Question 8

A significant number of candidates either named types of test data or just gave any values of test data that could be either normal or abnormal data. The question asked for test data that tested the whole number limit of 80, so boundary data was required. In this case, 80 is the highest acceptable value and 81 is the first rejected value. Some candidates did answer this question correctly in whole or in part.

Question 9

(a) Most candidates were able to correctly draw and connect the logic gates.

(b) There was a full range of marks for this question with most candidates achieving at least one mark.

Question 10

There were a mixed set of responses for this question with some very good algorithms provided. Candidates who had a good understanding of string handling, file handling and the pseudocode as presented in the syllabus, achieved the best marks. Some of these candidates achieved full or near full marks.

Question 11

(a) The majority of candidates correctly stated that the database table had 11 fields and 15 records. A small number of candidates reversed these two values incorrectly identifying the fields as records and vice versa.

(b) Most candidates understood that the data in the `Type` field was not unique for all records, so could not be the primary key.

(c) Candidates generally named appropriate fields that would contain each of the given types of data.

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(d) The majority of candidates correctly wrote down the output of the given structured query language (SQL) statement. The most common error on this question was to include extra data in the response that was not required, such as additional punctuation. Candidates who reproduced the data from the database table to match the query, in the same order as it appeared in the table, achieved all three marks.

Question 12

Candidates were required to complete an extended program using pseudocode, Python, Java or VB.NET to meet a set of requirements given in a scenario. This scenario required a program to store the names and dimensions of up to 20 rooms for a house and calculate the area of each room and a range of other statistics that would then be printed.

There was a wide range of good responses, with most using either pseudocode or Python.

Candidates whose responses closely matched the requirements stated in the scenario, ensuring that all points were fully covered, achieved the highest marks.

The best responses included comments to explain what each part or sub part of the solution was doing and used input prompts and appropriate messages to accompany all outputs.

The best responses also correctly used the data structures given in the scenario in the way they were expected to be used, as stated in the scenario; in this case a one-dimensional (1D) array `Rooms()`, a two-dimensional (2D) array `Dimensions()` and a variable `Number` for the number of rooms.

Many candidates demonstrated good computational thinking skills by writing algorithms to cover all or most of the required tasks. Many candidates also spent time declaring arrays and variables, which was not required for this question. Marks are only given for responses that cover all the requirements, with the addition of comments and any messaging, as stated earlier.

It is also important to ensure that correct initialisation of variables is present, when necessary, to ensure that the candidate's solution would achieve the correct output. In this case, a maximum and minimum are required, to find the largest and smallest rooms, so those variables do need to be initialised appropriately. In addition, totalling routines are used to find the total area of the house to enable the average room size to be calculated. It is also important that variables used here are initialised before they are used.

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