

COMPUTER SCIENCE

Paper 0478/11 Computer Systems

Key messages

Candidates need to show a greater use of technical terminology in their responses. Candidates also need to note the key terms given in a question and structure their response based upon these. Candidates should note that any context given in a question and provide their responses using the given context.

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 give the correct number. Some candidates incorrectly wrote 256.
- (b) Most candidates were able to give the correct binary numbers.
- (c) Most candidates were able to give the correct denary number.
- (d) Most candidates were able to give the correct denary number.
- (e) Most candidates correctly gave the first four bits. Some candidates found the final four bits more challenging. Some candidates were able to give a fully correct answer. Some candidates gave a correct answer but did not show any working such as carries. Candidates were needed to show their working in binary such as showing any carries.
- (f) Many candidates were able to identify a suitable method such as two's complement. Some candidates identified methods not covered in the syllabus such as sign and magnitude.
- (g) Most candidates stated that it was an embedded system, as it had a dedicated function. Few candidates provided detail beyond this such as it has dedicated hardware like a microprocessor. Many gave generic statements such as it is a combination of hardware and software. A vague statement like this does not differentiate it from a general-purpose computer. It would be beneficial for candidates to have a greater understanding of the features of an embedded system.

Question 2

- (a) Most candidates were able to give two accurate aspects of the image that would be reduced. The most common correct answer were resolution and quality.
- (b)(i) Many candidates gave the correct device. Some candidates gave inaccurate and often unclear answers such as the central processing unit.
- (ii) Most candidates were able to correctly identify the correct part of the packet. Some candidates did not use the correct technical terminology and gave imprecise responses such as the top of the packet. Candidates should be encouraged to use technical terminology in their responses.
- (c) Some candidates were able to give three correct characteristics. The most common correct answer was that it can be represented using hexadecimal. Some candidates answered the question by giving benefits of the IPv6 format over the IPv4. This led to inaccurate answers being given. candidates are reminded to make sure that they read the question and not assume the question.
- (d) Many candidates were able to draw a correct diagram.
- (e)(i) Most candidates selected the correct option.
- (ii) Most candidates were able to give an alternative type of encryption.

Question 3

- (a) Few candidates were able to accurately explain how the text is converted to binary. Many candidates focussed on the operation of a keyboard. Candidates are reminded that the operation of input and output devices is no longer listed in the syllabus and not assessed. The most common correct answer that was awarded was a correct example of a character set, for example ASCII.
- (b)(i) Some candidates were able to state the amount of RAM in mebibytes. Some candidates gave the inaccurate answer of 4000.
- (ii) Some candidates were able to state the correct amount of RAM in tebibytes.
- (c) Some candidates were able to give an accurate explanation. Many candidates gave a generic description of the features of RAM rather than explaining why it is needed. Candidates are expected to use the context given within the question.
- (d) Many candidates were able to circle three correct terms.

Question 4

- (a) Many candidates were able to describe the process of phishing. Some candidates gave a confused description that referred to aspects from both phishing and pharming. For example, they referred to malware being downloaded on the user's computer.
- (b) Many candidates were able to give effective ways that an employee could identify phishing.
- (c) Most candidates were able to give three examples of malware. Some candidates gave inaccurate examples that may involve the use of malware, but were not examples of malware, for example hacking.
- (d)(i) Many candidates were able to give a definition of a high-level language. Some candidates gave a benefit of a high-level language rather than a definition. For example, they stated it was a language that was easier for humans to use to program.
- (ii) Most candidates were able to give two benefits of using a high-level language.

- (iii) Few candidates were able to give a drawback of using a high-level language. Candidates seemed confident in giving benefits, but this confidence did not seem repeated when giving drawback. It would be beneficial for candidates to have a greater understanding of the drawback of using a high-level language.
- (iv) Few candidates were able to explain why an interpreter would be more appropriate. Most candidates merely described how an interpreter functions rather than why it is more appropriate in the context given. The most common correct mark point given is that it would be easier to debug. It would be beneficial for candidates to understand why different translators are more suitable for different tasks and not just how each translator operates.

Question 5

- (a) Many candidates were able to describe the characteristics of a robot.
- (b) Many candidates were able to give a suitable benefit, and many used the given context.
- (c) Many candidates were able to give a suitable drawback, and many used the given context.
- (d) Most candidates were able to identify the correct option. The most common incorrect answer given was that the MAC address is assigned by the router.
- (e) Few candidates were able to give any ways that the robot could make use of artificial intelligence. Most candidates just gave three features of artificial intelligence, which was not what the question asked.

Question 6

- (a) Some candidates chose all the correct missing terms. It would be beneficial for candidates to have a greater understanding of the operation of the CPU.
- (b)(i) Many candidates were able to identify the type of interrupt.
 - (ii) Some candidates were able to identify the name of the program used.
 - (iii) Most candidates were able to give another function of an operating system.

Question 7

Some candidates were able to give a full and suitable method of data transmission with a suitable explanation of why it was the most suitable method. Those candidates that chose the correct method mostly tried to apply the context given in the question as to why it would be the most suitable method. Candidates are required to use context given in the question in this way.

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Paper 0478/12 Computer Systems

Key messages

Candidates need to show a greater use of technical terminology in their responses. Candidates also need to note the key terms given in a question and structure their response based upon these. Candidates should note that any context given in a question and provide their responses using the given context.

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) Some candidates gave the correct hexadecimal number. Many candidates just gave F instead of FFF.
- (b) Many candidates gave the correct denary number. Some candidates gave 4096 instead of 4095.
- (c) Many candidates were able to correctly convert the two hexadecimal codes to 12-bit binary numbers. Some candidates did not show the required leading zeros to make sure that they gave a 12-bit binary number as required by the question.
- (d) Most candidates correctly converted the two binary numbers to hexadecimal numbers.
- (e) (i) Many candidates correctly identified that the hardware described was a microprocessor.
 - (ii) Most candidates selected the correct option.
 - (iii) Many candidates identified a suitable type of sensor.
 - (iv) A minority of candidates accurately described how the database is written to the optical storage. Some candidates tried to describe how data is read from optical storage. The question required candidates to describe how the data is written. The most common correct mark was for 'a laser is shone onto the disk'.

Question 2

- (a) Many candidates were able to give the correct binary answer. Some candidates did not show any working, such as any carries. Candidates are reminded to show all their working in binary addition questions.
- (b) Many candidates were able to show the shift performed and the correct denary number as a result

Question 3

- (a) Many candidates were able to accurately describe what is meant by an assembly language.

- (b) Most candidates were able to identify the correct translator.
- (c) Many candidates were able to select the correct option. The most common incorrect response given was that it is machine independent.

Question 4

- (a) Few candidates were able to complete an accurate diagram to show how instructions are decoded and executed. It would be beneficial for candidates to have a greater understanding of the operation of the CPU.
- (b) Some candidates were able to give an accurate description of a core. Many candidates inaccurately referred to a core setting the speed of the CPU.
- (c) Many candidates were able to explain two ways that the performance could be increased. The most common ways described were increasing the clock speed and increasing the number of cores. Some candidates gave this by example. For example, they stated that it could be upgraded to being a quad core processor. Answers given by example in this way were accepted.

Question 5

- (a) Many candidates were able to identify the correct type of interrupt for the scenario.
- (b) A minority of candidates provided an accurate description of what happens to an interrupt after it is placed in the queue. Most candidates gave an imprecise description of an interrupt, and little knowledge was demonstrated of the process of servicing an interrupt. Candidates need to have a greater understanding of the process of servicing an interrupt.
- (c) Many candidates were able to correctly describe how data is sent using serial data transmission.
- (d) Most candidates were able to give two correct suitable benefits.
- (e) Many candidates were able to give one correct suitable drawback.

Question 6

- (a) Many candidates were able to label the three distinct parts of the URL correctly.
- (b) A minority of candidates were able to describe how the proxy server can help stop a DDoS attack. The most common correct mark point was that incoming traffic would be examined. Candidates were able to demonstrate little knowledge beyond this. Candidates need to have a greater understanding of the operation of a proxy server and how it can be used as a security solution.
- (c) Many candidates were able to give the correct missing terms in the table. Few candidates were able to give accurate descriptions for HTML and DNS.
- (d) Many candidates were able to give the correct missing terms.

Question 7

- (a) A minority of candidates accurately described why the smart speaker described was not a robot. Many candidates inaccurately stated that it was not a robot because it could not be programmed.
- (b) Most candidates were able to give the correct input device.
- (c) Some candidates were able to explain how the smart speaker can make use of machine learning. Most candidates either gave a very generic description of machine learning that was not applied to the context, or they referred to the speaker using machine learning to improve the music chosen rather than improve the input. For example, they said that the machine learning would learn which artists the user liked and to play them first. This was not relevant to the context of improving the voice command input but incorrectly referred to the output played by the speaker.

- (d) Most candidates were able to correctly explain why the smart speaker is an embedded system.
- (e) Some candidates were able to give two advantages of storing the music in the cloud. Many candidates stated that it meant the music could be accessed anywhere. This was an imprecise response and not fully relevant as if the music was stored locally within the speaker, it could still be accessed anywhere that the speaker was taken.
- (f) (i) Most candidates were able to correctly explain how errors may occur in the data.
(ii) Most candidates were able to give two correct suitable error detection methods.

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Paper 0478/13 Computer Systems

Key messages

Candidates need to show a greater use of technical terminology in their responses. Candidates also need to note the key terms given in a question and structure their response based upon these. Candidates should note any context given in a question and provide their responses using the given context.

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) Most candidates selected the correct option.
- (b)(i) Most candidates gave the correct binary number.
 - (ii) Most candidates gave the correct binary number.
 - (iii) Most candidates gave the correct denary number.
 - (iv) Most candidates gave the correct denary number.
- (c)(i) Most candidates were able to correctly convert the hexadecimal number. Candidates need to make sure that they give all 4 digits in the nibble when giving the binary conversion for a hexadecimal value.
 - (ii) Most candidates were able to correctly convert the hexadecimal number to binary.
 - (iii) Most candidates were able to correctly convert the binary number to hexadecimal.
- (d) Some candidates were able to give the correct two's complement binary integer. Some candidates gave the value 10000101. These candidates may have inaccurately given the value 5 in binary and then put a 1 at the beginning to try and show the value is negative.
- (e)(i) Most candidates selected the correct option. The most common incorrect answer was process.
 - (ii) Some candidates were able to give an accurate description. Some candidates tried to give a lot more information about how the whole system would operate. This was not necessary and candidates are reminded to focus on the information requested in the question.
- (f) Many candidates were able to explain why the air-conditioning system is an embedded system.

Question 2

- (a) Most candidates were able to give the correct name of the register.

- (b)(i) Some candidates correctly described the role of the control unit. The most common correct mark point was that it sends control signals to the other components. Candidates need to have a greater understanding of the role of the control unit. Few candidates referred to its role of decoding the instruction.
- (ii) Some candidates were able to give the correct name of the register. Many candidates mistakenly gave 'the accumulator'.
- (c)(i) Many candidates were able to select the correct option. The most common incorrect answer given was 'It stores important instructions.'
- (ii) Many candidates were able to give a correct example of primary storage and the type of data it would store.
- (d) Some candidates were able to give the correct types of secondary storage. Some candidates incorrectly gave 'magnetic storage' for 'It has a read/write arm that moves a laser across a disc'.

Question 3

- (a) Some candidates were able to give the three sections of a packet and example of what each would contain. Candidates are reminded that they need to make sure they use accurate terminology for the different sections of the packet. For example, some candidates labelled the payload as the 'main' section of the packet. The accurate terminology required is payload.
- (b)(i) Many candidates were able to give a full and accurate description of the data transmission method.
- (ii) Many candidates were able to give a full and accurate description of the data transmission method.

Question 4

- (a) Many candidates were able to identify two correct solutions. Some candidates were able to go on to give an accurate explanation about the solution would help prevent hacking. Some candidates gave encryption as a solution. Candidates need to understand that encryption will not stop a hack being successful. The data can still be stolen; it will just not be meaningful. This will not stop the hack.
- (b) Many candidates were able to describe social engineering and then give an accurate example. The most common example given was a description of phishing.
- (c)(i) Some candidates were able to give an accurate similarity. Many candidates gave an imprecise statement that they both store data. Candidates need to make sure that their answer is not generic and is applied to the context given.
- (ii) Many candidates were able to accurately describe one difference.

Question 5

- (a) Most candidates were able to give the correct missing terms. Only some candidates gave the correct missing descriptions. The most common correct description was for resolution. Few candidates were able to give an accurate description for character set or pixel.
- (b) Some candidates were able to give the correct number of bits. A wide range of incorrect answers were given involving some use of multiplication or division of 1024.
- (c) Some candidates were able to give the correct file size.

Question 6

- (a)** Many candidates were able to give an accurate description of artificial intelligence.
- (b)** Some candidates were able to correctly explain how artificial intelligence can be used to improve the characters movements. Many candidates just tried to repeat a description of artificial intelligence. Candidates need to have a greater understanding of how to apply the use of artificial intelligence to a real-world context.
- (c)** Many candidates were able to fully describe one difference between high-level and low-level language.
- (d)(i)** Some candidates were able to give the correct translator. Some candidates tried to give generic answer such as 'a translator'. This was given in the question. Some candidates gave imprecise answers such as 'decoder'.
- (ii)** Some candidates were able to give the correct translator. Some candidates tried to give generic answer such as 'a translator'. This was given in the question. Some candidates gave imprecise answers such as 'error reporter'.
- (iii)** Some candidates were able to give the correct translator.
- (iv)** Some candidates were able to give the correct translator.

COMPUTER SCIENCE

Paper 0478/21 Algorithms, Programming and Logic
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Key messages

Candidates were able to demonstrate a good level of understanding of algorithms and programming. It would be beneficial to candidates to fully understand the published pseudocode within the syllabus as this is the basis for the initial set of questions within the paper.

General comments

Candidates using additional pages are reminded to clearly indicate the question for which they are providing a further response. They will need to clearly write their name and candidate number on any additional pages or booklets.

Comments on specific questions

Question 1

Most candidates were able to correctly identify three or four SQL keywords and their correct descriptions.

Question 2

Most candidates were able to correctly identify three different types of test data.

Question 3

Most candidates correctly identified `DIV` as the correct answer.

Question 4

- (a) This question was answered correctly by a few candidates, who used the correct pseudocode and correctly included the 15% discount.
- (b) Only a minority of candidates correctly used the `ROUND` function and assigned it to a variable or used it in an output.
- (c) (i) Most candidates identified half of the Boolean expression. A minority of candidates identified the full expression.
(ii) Candidates who provided the correct expression in **c(i)**, correctly drew the logic circuit.
- (d) Most candidates achieved one of the two marks either by drawing the correct logic gate symbol with two inputs and one output or by completing the correct truth table.

Question 5

A minority of candidates provided a structure diagram of the sub-systems with inputs and outputs clearly identified. Most candidates provided a flowchart instead of a structure diagram.

Question 6

- (a) A minority of candidates identified the correct four corrections. Most candidates identified two.
- (b) A minority of candidates achieved all the marks by identifying that a range check would be required. Most candidates either wrote pseudocode or explained a length check. Any pseudocode for this question had to be fully explained. A length check is unsuitable for a number as it can only be applied to a string.
- (c) Some candidates correctly identified one of the two verification methods and explained them. Most candidates identified a validation method.

Question 7

- (a) Most candidates achieved at least two marks on the trace table.
- (b) Only a minority of candidates were able to identify that the algorithm represented a `DIV` function.
- (c) Most candidates correctly identified the data type for the variable `Count`.
- (d) Some candidates answered this question fully by following the flowchart. Only a minority of candidates included a suitable loop.

Question 8

- (a) Most candidates correctly identified why the field `ParentName` was not appropriate for a primary key.
- (b) Most candidates identified the correct field.
- (c) Most candidates identified the correct data types for the fields given in the table.
- (d) Most candidates provided the correct SQL statement.

Question 9

Most candidates were able to write the correct pseudocode for reading a line of code from a given file.

Question 10

- (a) Some candidates wrote the correct pseudocode for declaring the variables `Seconds` and `Minutes`.
- (b) Most candidates were able to write a procedure and perform a calculation using either `DIV` or `MOD`.

Question 11

Candidates are required to read the question fully before starting and use any given variables or arrays in their solution.

The candidates were asked to meet three requirements.

Requirement 1 was to input each competitor's score for each of the ten rounds and validate the entry to ensure it was within the range of 0 to 30. Requirement 2 was to calculate the total score for each competitor, discarding the highest and lowest score achieved. Requirement 3 was to identify the scores that fell into each category and keep a running total. They then needed to output the name of each competitor, their score, the category they were in, and output the total from each category.

Requirement 1 was attempted by well by most of the candidates using two loops to input the scores into the two-dimensional array. Most candidates demonstrated correct use of a loop to validate the entries were within the set limits. Some candidates used an `IF` statement to validate the entry, but this only allows for one extra data entry.

Requirements 2 was attempted by most candidates who calculated the score for each round. A minority of candidates correctly calculated the minimum and maximum scores to subtract.

Requirement 3 was attempted by most candidates who categorised each competitor and output their name and score. A minority of candidates attempted to count the number of competitors in each category and output this.

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Paper 0478/22 Algorithms, Programming and Logic
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Key messages

Candidates must read questions carefully before answering each question, using the given context.

Candidates are also required to use pseudocode to answer algorithm questions as stated in the question.

Candidates who took care to familiarise themselves with the syntax of the pseudocode defined within the course syllabus were more likely to answer those questions accurately.

Candidates who answered questions in an appropriate manner to the command word used, such as answering questions beginning with explain with more detail than questions beginning with identify, were more likely to achieve higher marks.

General comments

Most candidates demonstrated a good overall understanding of the requirements of this paper.

When answering 'explain' type questions, candidates are required to provide an explanation of how something was done, rather than providing a simple description.

When answering practical questions, candidates are required to provide an answer in the manner required in the question. For example, if a question asks candidates to use pseudocode, they must use the pseudocode statements and commands given in the syllabus.

Comments on specific questions

Question 1

Most candidates were aware that the result of the operation 4^2 is 16.

Question 2

- (a) Most candidates identified some of the errors in the given algorithm, but few identified five errors. Errors included an incorrect data type in one of the declaration statements, an output that should have been an input, an incorrect array index, an incorrect loop termination command and an incorrect flag assignment.
- (b)(i) Candidates who understood how to construct procedures in pseudocode achieved better marks. The marks were awarded for correctly completing the parameter name and data type in the procedure header statement, using the parameter as the loop termination variable, correctly storing the input data into the array, and closing the nested loops with `NEXT` statements.
- (ii) Candidates were required to write an input statement and a procedure call statement to pass a value to the procedure used in **Question 2(b)(i)**. Many candidates were able to construct an appropriate input statement, but few were able to complete the task using the `CALL` command.
- (c)(i) Many candidates achieved at least one mark for recognising that many people share the same first name, so this would not be a good search key. Those who expanded this point, to say that the results output may well be for a different person to the one expected, achieved both marks.

- (ii) Most candidates identified an improvement that could be made to the search key, including use of first and last names, or using some form of identification code. Some candidates gave a more complete answer by giving a reason for this, such as to make the search criteria more specific to the person being sought.

Question 3

A mixed set of results was seen for this question with candidates achieving marks across the whole range of possible marks. Candidates with a clear understanding of normal, boundary and abnormal test data and the purpose of each achieved the highest marks.

Question 4

- (a) Many candidates correctly stated that the purpose of a length check was to make sure the data entered has the required number of characters, or similar. A significant number of candidates stated that the purpose of a length check was to check the length of the data entered, which, although not an incorrect statement, does not demonstrate that candidates understand the meaning of the test, as they used its name in their explanation.
- (b) There was a mixed range of responses. Most candidates wrote a correct algorithm to check that an email address had been input and contained an @ character. This was a substantial algorithm that made use of string handling functions and iteration. Many candidates made a good attempt at this algorithm and achieved marks at the higher end of the range.

Question 5

- (a) Stronger candidates worked systematically through the algorithm using the supplied input data and completed the trace table as they went. Most candidates achieved at least one mark.
- (b) The majority of candidates recognised at least one of the processes that the algorithm performed. This included checking that the input was a code, that it contained four characters, that it had not been used before and if there was enough space left in the array, stored any code that passed these tests. Some candidates identified all of these.
- (c) Candidates were required to write a short algorithm to declare and initialise the array used to store the codes so that each element of the array began with the null string, defined in the question as "". This required a declaration statement for the array itself, a declaration for a loop counter, a simple loop that iterated six times and a statement to assign the null string to each array element.

Question 6

- (a) This was generally answered well, with many candidates achieving high marks. Candidates are however advised to make sure that their logic gate representations match as closely as possible those given in the syllabus.
- (b) Most candidates achieved at least one mark for completing the truth table for the given logic expression, with the full range of marks seen.

Question 7

- (a) Many candidates correctly stated the purpose of a primary key in a database table as uniquely identifying a record. Some candidates simply stated 'unique identifier' or similar is describing a property of a primary key rather than stating its purpose, so does not answer the question.
- (b) The majority of candidates were able to identify fields from the database table that were likely to use each of the given data types, or most of the given data types.
- (c) Candidates, in most cases, correctly stated the output that would be generated by the given select query. Some errors were seen in the presentation of this data, including, commas incorrectly used to separate the columns, data not being in the specified order, or additional columns listed that were not required.

- (d) Most candidates answered this question very well. Some candidates had not listed the correct fields for the query or used the wrong comparison statement such as >10 , when it should have been $>=10$, or sorted on the wrong field.

Question 8

Candidates were required to complete an extended program to meet a set of requirements given in a scenario. The scenario for this question was to write a program to test the fairness of a random number generator.

The program was required to generate 100,000 random numbers, integers between 1 and 10 inclusive, and store them in a one-dimensional (1D) array. The frequency that each of the ten possible random numbers occurred was then to be counted and the results stored in a two-dimensional (2D) array. The ten possible random numbers were also stored in this 2D array. The next stage required the 2D array to be sorted in descending order of frequency. After this, the chance of each of the possible random numbers being generated was to be calculated using the formula $\text{chance} = \text{frequency}/100,000$ and rounded to four decimal places. Finally, output was required to show each of the ten possible random numbers, in descending order of frequency, with the chance that it would be generated.

Declarations and appropriate initialisation of arrays and variables were required for this question.

There were a wide range responses, with the majority of responses using either pseudocode or Python. Many candidates provided solutions worthy of marks in the higher or middle mark bands. Candidates whose responses more closely matched the requirements outlined in the scenario, and used good programming skills, achieved the highest marks. These candidates also followed the remaining additional guidance written at the end of the scenario, which required the comprehensive use of comments to explain what each part or subpart of their solution was doing and to use appropriate messages with all inputs and outputs.

The best responses correctly used the data structures given in the scenario in the way they were expected to be used as stated in their descriptions. These were the 1D array `RandomNumber()` to store the 100,000 random numbers that were generated and the 2D array `CountedNumber()` to store the possible random numbers 1 to 10, and the number of times that each of these numbers was generated.

Some candidates incorrectly expected each of the random numbers to be input by a user instead of using the random number generator.

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Paper 0478/23 Algorithms, Programming and Logic
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Key messages

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General comments

Candidates using additional pages are reminded to clearly indicate the question for which they are providing a further response. They will need to clearly write their name and candidate number on any additional pages or booklets.

Comments on specific questions

Question 1

Most candidates were able to correctly identify a way of creating a maintainable program with a few candidates identifying three correct ways.

Question 2

Most candidates were able to correctly identify four programming techniques.

Question 3

This question was answered correctly by most candidates who identified the correct data type.

Question 4

- (a) This question was answered correctly by most candidates, using correct pseudocode.
- (b) Some candidates correctly answered this question. They correctly identified the need for a condition-controlled loop. Some candidates incorrectly answered the question, using pseudocode, without providing any explanation.
- (c) (i) Most candidates provided a correct logic expression.
(ii) Most candidates provided a correct truth table.

Question 5

- (a) Most candidates achieved at least two marks for completing the first two columns of the trace table. A minority of candidates correctly completed all columns.
- (b) Some candidates correctly identified that the algorithm could not assign a value as both the lowest and highest value. A minority of candidates correctly explained how the algorithm could be corrected.

Question 6

- (a) Most candidates identified one correct output from the flowchart. Only a minority of candidates identified all the correct outputs.
- (b) A few candidates identified the flowchart method used was a linear search.
- (c) Most candidates achieved at least two marks for the initialisation and input statements. Candidates who used a loop achieved higher marks.

Question 7

- (a) Most candidates achieved correctly identified the incorrect data type. A minority of candidates identified the loop needed to run eight times. Only a minority identified that the MOD function should have been 2 instead.
- (b) Most candidates provided the correct programming technique.
- (c)(i) Most candidates indicated that the validation method was a range check.
 - (ii) Some candidates used an IF statement for validation. Candidates should be reminded that validation requires a loop and reinput of the value.

Question 8

- (a) (i) Most candidates correctly identified EquipmentID as the most appropriate primary key.
 - (ii) Most candidates correctly stated that it is a unique field.
- (b) Most candidates provided the correct SQL statement.

Question 9

- (a) Many candidates correctly gave the correct pseudocode statements for declaring variables. Some candidates incorrectly used text as a data type.
- (b) (i) Some candidates wrote a procedure with a parameter, using the correct pseudocode for storing a variable in the file.
 - (ii) A minority of candidates identified that CALL was required to use the procedure. Some candidates correctly added the name as the parameter with quotation marks.

Question 10

Candidates are required to read the whole question before starting and ensure they use the given variables and arrays.

The candidates were asked to meet three requirements:

Requirement 1 was to input the two players name with validation. This required either a presence check or a length check to achieve this.

Requirement 2 was to generate 100 random whole numbers between 1 and 6 and store these in the correct array. Points for each player was to be calculated for each player and stored.

Requirement 3 was output the name and score of each player with their total scores in descending order, ensuring that one player had a higher score than the other. If the scores were tied, the game continued until one player had a higher score.

Requirement 1 was attempted by well by most of the candidates using a loop to input the names. Most candidates produced correct use of a loop to validate the names were entered. Some candidates used a

length check to check the length but set this incorrectly. Some candidates used an `IF` statement to validate the entry, but this only allows for one extra data entry.

Requirements 2 was attempted by most candidates who correctly calculated the score for each of the players.

Requirement 3 was attempted by most candidates who output the names of the players and their total scores. Some candidates did not consider a tied score (when players have the same number total number of points) and did not recalculate. Some candidates recalculated the scores and then output the names and scores after they had already output the names and scores, which although not incorrect, would have unnecessarily added extra time to completing the overall solution.