COMPUTER SCIENCE

Paper 0478/11
Paper 1

Key messages

If a candidate writes the answer to a question on an additional page they must indicate very clearly to the Examiner where the revised answer can be found. Also, if an answer has been crossed out, the new answer must be written very clearly, so that Examiners can easily read the text and award candidates the appropriate mark.

Candidates should be advised to read carefully, especially noting distinctions between being asked to draw either a line or lines between e.g. terms and features.

General comments

There is a continued move to provide questions where candidates must apply their knowledge, rather than just show their ability to simply remember facts. There is strong evidence that this is producing candidates who are now exhibiting a good understanding of many of the topics.

There is a need for candidates to improve their responses to questions that require a detailed explanation, providing clear and thorough answers.

Comments on specific questions

Question 1

Some candidates could correctly identify the three stages of processing an instruction, some managed to identify fetch and execute, but not decode. Some could not identify any correct stages. The most common incorrect answer given by candidates was input, process, output. This was not a specific enough answer for candidates to gain the marks.

Question 2

Some candidates could correctly identify all five potential security issues. Most candidates could identify hacking and virus. Many could identify pharming, but some incorrectly identified this as phishing or spam. Many candidates did not correctly identify cookies or cracking.

Question 3

Some candidates could correctly identify all five computer terms. The most common errors were candidates incorrectly identifying parity check and checksum. Candidates need to make sure that they thoroughly read the question. Some candidates drew more than one line from a computer term to a description. If the question states draw a line, candidates must only have a single connecting line. Questions that require multiple lines to be drawn from a box will indicate to draw lines.

Question 4

In part **(a)** many candidates answered this question well, providing two reasonable disadvantages of using a keyboard.

In part **(b)** some candidates could provide two reasonable benefits. Most candidates tried to turn the disadvantages into a benefit, which provided some good answers. Candidates need to make sure that they provide benefits relating to the context they are given. Some candidates provided a benefit that was not relevant to the context they had been given.

In part **(c)** some candidates could gain marks for identifying a security method. Many candidates did not get a mark for describing how the security method kept the data safe. Most candidates stated that it does keep the data safe by stopping unauthorised access, but did not describe how it did this. The most common error from candidates was reference to anti-virus as a method of security for preventing unauthorised access. This could be a reasonable answer to preventing data from being corrupted, but the question specifically asked for security methods about preventing unauthorised access.

Question 5

In part **(a)** many candidates could draw a correct logic circuit. A small number of candidates used circles to represent a logic gate. Candidates must ensure that they use the correct logic gate symbols, and that they are drawn clearly and accurately.

In part **(b)** many candidates could correctly complete the truth table.

In part **(c)** some candidates could correctly identify register Z, however many candidates identified an incorrect register. This is perhaps because candidates did not fully read the question and mistakenly included the parity bit in their identification of a fault condition.

In part **(d)(i)**, **(ii)**, **(iii)** and **(iv)** many candidates correctly identified the error in the data transmission, providing the correct byte, correct column, the corrected byte and converting this to denary. Some candidates identified the correct column for the error, but identified the byte as the parity byte. Candidates must make sure they identify the byte the error is located in, that causes the error in the parity byte. In part **(d)(v)** most candidates did not identify that if the error was not found then a fault condition would be missed. Many candidates gave a very general answer about the need to have accurate data and any errors should be corrected. Candidates are reminded to refer to the context they are given when answering questions.

Question 6

Many candidates did not provide answers that gained marks for this question on high- and low-level languages. It was clear that candidates did not understand the difference between a high-level language and a low-level language, and the benefits of them. Answers were very vague for high-level language, citing it was easier, but without any reference, for example, easy to debug. Many candidates incorrectly stated that low-level language does not need any translation, that it is already machine code.

Question 7

Some candidates provided good, clear benefits, demonstrating their understanding of LED technology. Some candidates provided very vague answers, for example, it is a better technology.

Question 8

The full range of marks was seen from candidates in this question on compilers and interpreters. Some candidates only connected a single line from each translator. The question stated to draw lines, candidates should note this type of question means that there may be more than one line that can be drawn to connect terms to description. If a question states to draw a line, this is when only a single line should be drawn from each term to a description.

Question 9

Some candidates gained 5 or 6 marks for this question on sensors and a microprocessor controlling a security light, providing very good, detailed answers. Many candidates could give a suitable sensor, but provided a vague response as to how they would be used in the system, in conjunction with the microprocessor. Candidates are reminded to consider the context they are given when answering questions and not provide a generic response.

Question 10

In part **(a)(i)** many candidates incorrectly transcribed the value 431 as though it was a hexadecimal value. Candidates must read the question to correctly establish what the value is, in this case it was a denary value. In part **(a)(ii)** most candidates could correctly provide a hexadecimal conversion, some from follow through from part **(a)(i)**.

In part **(b)** some candidates could provide a full answer gaining 3 marks. Some candidates did not provide any working out, so could not gain full marks. Candidates are reminded to provide full working out when the question asks to show working.

In part **(c)** most candidates could provide the full version of the acronym for MAC and IP. Some candidates gained marks by explaining what a MAC address or an IP address is.

In part **(d)** very few candidates could correctly identify either layer of TLS.

Question 11

Many candidates gave a list of what ethical issues there are. The question required candidates to explain why ethics are important. For this reason, very few candidates were able to gain more than 2 or 3 marks for this question.

COMPUTER SCIENCE

Paper 0478/12
Paper 1

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General comments

There is a continued move to provide questions where candidates must apply their knowledge, rather than just show their ability to simply remember facts. There is strong evidence that this is producing candidates who are now exhibiting a good understanding of many of the topics.

There is a need for candidates to improve their responses to questions that require a detailed explanation, providing clear and thorough answers.

Comments on specific questions

Question 1

In part **(a)** few candidates gained marks for this question, demonstrating a lack of understanding of what the benefits are of a low-level language. Some candidates made a vague reference to the program taking up less space, but this was not detailed enough for a mark; reference to memory needed to be present.

In part **(b)** the full range of marks was seen from candidates. The most common error was candidates confusing the role of a compiler and an interpreter.

Question 2

Some candidates could provide at least one suitable function of an operating system, few candidates could provide more than two. Many candidates gave very vague answers, such as it controls the system. Candidates needed to provide specific functions.

Question 3

In parts **(a)(i)** and **(a)(ii)** candidates gave some good descriptions about the different transmission methods. Candidates need to be careful when referring to the transmission media, some candidates referred to single and multiple cables, which isn't accurate enough.

In part **(b)** some candidates opted for the correct transmission, but many candidates incorrectly opted for parallel. Of those candidates that did opt for serial, few could provide full reasons why. Some gave a vague reference to it being cheaper, but without reference as to why. Some also referred to it being better over longer distances, but without reference as to why.

Question 4

In part **(a)** many candidates could identify the corrupt bit. Some candidates circled either a single row or a single column, but not intersecting them or identifying a single bit, this was not specific enough for that mark.

In part **(b)** some candidates could provide an accurate description of how they found the corrupt bit. Many gave a vague response and did not accurately refer to counting the bits, locating the bit and byte with odd numbers and finding the intersection of them.

Question 5

In parts **(a)** and **(b)** most candidates could provide a correct conversion from binary to denary.

In part **(c)** many candidates could identify the effect that the shift had on the number. Some candidates were too vague in their response stating the number had merely decreased.

In parts **(c)** and **(d)** most candidates could perform the shift and convert it to the correct denary value.

In part **(e)** most candidates could not accurately explain the effect of the shift. They were not able to express that the right most bit would be lost from the register, making the number inaccurate.

Question 6

The full range of marks was seen from candidates in this question on terms and descriptions. Some candidates only connected a single line from each computer term. The question stated to draw lines, candidates should note this type of question means that there may be more than one line that can be drawn to connect terms to description. If a question states to draw a line, this is when only a single line should be drawn from each term to a description.

Question 7

In parts **(a)(i)** and **(ii)** many candidates could complete the truth tables correctly, but were not able to state the correct single logic gate that the table represented.

In part **(b)(i)** many candidates could draw a correct logic circuit. A small number of candidates used circles to represent a logic gate. Candidates must ensure that they use the correct logic gate symbols, and that they are drawn clearly and accurately.

In part **(b)** many candidates could correctly complete the truth table.

Question 8

Very few candidates gained full marks for this question. It was clear that candidates did not have a developed knowledge of file compression. Many candidates were not even aware that MP4 and JPEG are lossy file compression.

Question 9

In part **(a)** very few candidates could provide an accurate description of a denial of service attack. Many just stated that it denies the user of a service, which was not accurate enough for a mark.

In part **(b)** some candidates could identify and describe further security threats. Some candidates mistakenly identified security measures rather than security threats. Candidates must make sure they thoroughly read the question.

Question 10

In part **(a)** many candidates gained a mark for expanding the acronym, some gained a further mark for stating it is used to create webpages.

In part **(b)** many candidates could identify the correct sections. Some candidate could not gain marks for their answer as they were not accurate in their transcription of the parts of the URL. Candidates must accurately write the parts of the URL as shown.

Question 11

In part **(a)** many candidates could convert the hexadecimal to 12-bit binary.

In part **(b)** some candidates could correctly identify at least one sensor and describe how it could be used. The most common error was candidates identifying the same type of sensor, for example giving a motion sensor and an infrared sensor as their answer.

Question 12

Many candidates could not provide an accurate response to the question, most giving a vague description of freeware and free software, but not explaining the difference between the two.

COMPUTER SCIENCE

Paper 0478/13
Paper 1

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Many candidates did not provide answers that gained marks for this question on high- and low-level languages. It was clear that candidates did not understand the difference between a high-level language and a low-level language, and the benefits of them. Answers were very vague for high-level language, citing it was easier, but without any reference, for example, easy to debug. Many candidates incorrectly stated that low-level language does not need any translation, that it is already machine code.

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In part **(d)** very few candidates could correctly identify either layer of TLS.

Question 11

Many candidates gave a list of what ethical issues there are. The question required candidates to explain why ethics are important. For this reason, very few candidates were able to gain more than 2 or 3 marks for this question.

COMPUTER SCIENCE

Paper 0478/21
Paper 2

Key messages

Candidates who read the questions carefully and answered those questions performed better than those who simply wrote out their code for the task in the question.

Candidates should take care when declaring variables, constants and arrays to ensure that the identifier declared could be used in a program and that it is related to the part of the pre-release task mentioned in the question. Identifiers must not contain spaces or other punctuation. Once declared the same identifier name should be used throughout the answer.

General comments

Candidates who had previously completed the tasks for the pre-release (class captain voting system) were able to provide answers for ***Section A*** that showed a clear understanding of what they had created and how they had gone about the tasks.

This was the fourth session of the examination for IGCSE Computer Science paper 2, Problem-solving and Programming. Nearly all candidates attempted all the questions on the paper.

Comments on specific questions

Section A

Question 1

(a) Many candidates correctly named up to four variables with appropriate and meaningful names. Common errors included spaces in the variable names. The question also required a suitable data structure, data type and use to correspond with each correct variable name. This part was less well answered with common errors including data types given as data structures and database data types being given when the correct answer should be a programming data type. An example of a correct answer for two marks is:

Variable Name	`MaxVotes`
Data Structure	Constant
Data Type	Integer
Use	To store the maximum number of votes you can cast

(b) Algorithms were seen in pseudocode, program code in a range of languages or as a flowchart. Most candidates correctly input a choice of candidate number, a check to see if the choice input was suitable. Good candidates also kept a total of the votes cast for each candidate and output the name of the candidate voted for. Common errors included not providing a prompt for the input, not outputting the required text of 'invalid vote' if the input was not suitable or outputting a candidate number rather than name, to show which candidate was voted for.

(c) Many candidates showed how the highest number of votes was found and then output of the name of the winner. Better candidates showed how all of the candidates could be put in order. Some candidates also showed how to check if there was a tie and output 'NO OVERALL WINNER'. A common mistake was to not be clear in the explanation of how the candidates could be selected in descending order of vote totals.

(d) Most candidates offered at least one suitable method of dealing with the case of 'NO OVERALL WINNER'. Better candidates offered two correct solutions or gave a good expansion to the suggestion they had offered. Examples of correct answers are:

Re-run the voting with the least popular candidate(s) removed

Or

Re-run the voting
Allow the teacher the casting vote

Section B

Question 2

(a) The full range of marks was seen for this question on errors within program code, with candidates' correct responses divided amongst all the correct possibilities. Common errors included giving an incorrect initial value to `OutRange`, such as 1, or applying an incorrect variable to `NEXT X`, such as `NEXT Number`.

(b) Most candidates correctly identified that both 10 and 20 were outside the range. Better candidates gave good reasons for this being the case. Common mistakes were for candidates to not fully explain their reason, such as by simply stating erroneous or invalid data, which was not enough for the reason mark.

Question 3

Many candidates demonstrated the skill of using a trace table to trace the progress of an algorithm. A common error was to not include the variable values in the output column.

Question 4

Nearly all candidates were able to link the name of the validation check with its correct description.

Question 5

Many candidates were able to provide a correct structure for a `REPEAT` loop and a `WHILE` loop. Better candidates were also able to give examples of complete loops of both types and some also gave suitable reasons for why they might be used. Common errors included writing the code using programming language types, not pseudocode; giving loops that had errors, such as no `PRINT` or `OUTPUT` command where one was needed; giving loops that could never end; or providing reasons that simply described what the loop actually did in the examples they had provided rather than a reason for using that type of loop.

Question 6

(a) Most candidates were able to identify that the fields supplied in the database had duplicate entries. On the whole, candidates did not recognise that the fields in the database, except for Town, were not suitable as identifiers.

(b) Many candidates did suggest a suitable primary key name of TourID or PerformanceID. Of those who gave a correct field name, the vast majority also correctly stated that it would uniquely identify each performance. A common error was to state existing fields from the database as a suitable primary key, such as Tour date.

(c) Most candidates added the correct fields to their query-by-example grid. Common errors included imprecise use of fieldnames with errors in the words used and errors in the use of capital letters; missing table names; not including the sort either at all or in the correct column; or not showing which fields would be displayed using the show box.

COMPUTER SCIENCE

Paper 0478/22
Paper 2

Key Messages

Candidates should take care when declaring variables, constants and arrays to ensure that the identifier declared could be used in a program. Identifiers must not contain spaces. Once declared the same identifier name should be used throughout the answer.

General Comments

Candidates who had completed the tasks for the pre-release (supermarket charity donations) were able to provide answers for ***Section A*** that showed good understanding of the tasks undertaken. Candidates, who read each question carefully and answered the question, as set on the paper, performed better than those who had memorised code from their solution for the task mentioned in the question and wrote that.

This was the fourth session of the examination for IGCSE Computer Science paper 2, Problem-solving and Programming. Nearly all candidates attempted all the questions on the paper.

Comments on Specific Questions

Section A

Question 1

(a) (i) Many candidates correctly declared three variables with meaningful variable names, data types and a description of use. Common errors included incorrectly putting spaces in variable names, incorrect or missing data types. An example of a correct answer is:

Variable Name	`Bill`
Type	Real
Use	To store cost of the shopping bill.

(ii) Better candidates correctly named a suitable data structure. Common errors included stating a programming concept rather than the data structure required.

(b) Algorithms were seen written in pseudocode, program code or as a flowchart. Most candidates correctly showed inputs of a charity choice and the value of the shopping bill. Some candidates incorrectly included the setting up of the donation system performed by task 1.

(c) Better candidates provided an explanation of how their program calculated, ordered and displayed the charity names and total donations. Weaker candidates incorrectly wrote about what needed to be done rather than explaining how their solution performed the task. Candidates should explain any programming statements used to illustrate their answer.

(d) This question asked for an explanation of how the candidate would change their solution to allow to the number of charities available to be altered from the three (a constant number) in the pre-release material to two, three or four charities (a variable number). Few candidates provided an explanation of how their program would need to be amended. Candidates should explain any programming statements used to illustrate their answer. An example of a correct answer is:

The number of charities would be input and stored in the variable `CharityNumber`. This would be used to set the upper value of the choice of charity; the program code would also need to be changed to allow for a differing number of charities.

Section B

Question 2

Most candidates correctly identified at least one error. Few candidates showed understanding of the program code by suggesting that the `UNTIL Num < 0` should be replaced by `UNTIL Num >= 0` to allow the process to end correctly. Many candidates correctly identified that `Counter` and `Total` were updated incorrectly and could provide the necessary corrections.

Question 3

Many candidates showed the skill of using a trace table. Some candidates provided a 'rough answer' in pencil and a final answer in ink; this is not recommended as extra values can be seen in the trace table.

Question 4

Many candidates provided suitable pseudocode examples for `IF … THEN … ELSE … ENDIF`, fewer candidates showed understanding of a `CASE` statement. Better candidates provided suitable reasons for choosing each type of conditional statement. For example `IF` can be used with complex conditions and `CASE` can be used to test for a large number of discrete values.

Question 5

(a) Most candidates correctly identified the number of fields in each record.

(b) Many candidates correctly identified suitable data types for the database fields given. Some candidates incorrectly provided samples of data rather than the data type asked for in the question.

(c) The full range of marks was seen here. Common errors included writing the fields down in the order seen in the table instead of in the order of the **Play** field and including extra fields and/or text.

(d) Most candidates showed some correct fields in their query-by-example grid. Common errors included incorrect field names, incorrect fields, incorrect criteria, sorting on the wrong field, and not including the table name.

COMPUTER SCIENCE

Paper 0478/23
Paper 2

Key messages

Candidates who read the questions carefully and answered those questions performed better than those who simply wrote out their code for the task in the question.

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General comments

Candidates who had previously completed the tasks for the pre-release (class captain voting system) were able to provide answers for ***Section A*** that showed a clear understanding of what they had created and how they had gone about the tasks.

This was the fourth session of the examination for IGCSE Computer Science paper 2, Problem-solving and Programming. Nearly all candidates attempted all the questions on the paper.

Comments on specific questions

Section A

Question 1

(a) Many candidates correctly named up to four variables with appropriate and meaningful names. Common errors included spaces in the variable names. The question also required a suitable data structure, data type and use to correspond with each correct variable name. This part was less well answered with common errors including data types given as data structures and database data types being given when the correct answer should be a programming data type. An example of a correct answer for two marks is:

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(a) The full range of marks was seen for this question on errors within program code, with candidates' correct responses divided amongst all the correct possibilities. Common errors included giving an incorrect initial value to `OutRange`, such as 1, or applying an incorrect variable to `NEXT X`, such as `NEXT Number`.

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