COMPUTER SCIENCE

**Paper 2210/12
Paper 1**

Key messages

Candidates continue to demonstrate a good level of knowledge about the fundamental aspects of computer science. It would be beneficial for candidates to consider the context that is given in some questions. Candidates should look to reflect the application of this context in the knowledge and understanding they are required to demonstrate. This would allow candidates to demonstrate a greater level of understanding, beyond a general response, about the topic in question.

General comments

Candidates are reminded to make sure that they do not write outside the given writing space in a question. If additional writing space is required, candidates should use the additional pages available. They should make sure they clearly indicate the question for which they are providing a further response.

Comments on specific questions

Question 1

Many candidates were able to correctly identify which statements were True or False. The most common incorrect answer was the final statement given as True.

Question 2

Most candidates were able to provide at least three suitable components. Candidates are reminded to make sure that they are accurate when providing the name of a component. Some candidates provided responses that were not accurately named, for example memory register.

Question 3

(a)   Few candidates were able to show understanding of what is meant by analogue data. It would be beneficial for candidates to understand that it is a continuous stream of data that is processed by humans.

(b)   Many candidates gained a mark by providing an example of digital data, such as binary data. It would be beneficial for candidates to be able to describe what is meant by digital data also, understanding it to be discrete data.

Question 4

(a)   Most candidates were able to provide the correct value.

(b)   Many candidates were able to carry out the correct shift. Some candidates shifted in the wrong direction.

(c)   Many candidates were able to identify the effect the shift had on the value. Some candidates merely stated the value changed; however, this did not provide enough detail about how the value had changed.

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Question 5

(a) It was pleasing to see the level of detail that many candidates provided about the process of lossy compression in this context. Some candidates referred to reducing the resolution of the image and removing colours that humans may not see. Candidates are reminded that they should apply the question to the context that they are provided.

(b)(i) Many candidates were able to provide a suitable benefit. Some candidates lacked detail in their response such as it makes the size smaller, and it uses less space. It would be beneficial for candidates to make sure they are providing enough detail about the benefits they provide.

(ii) Many candidates were able to provide a suitable drawback.

(c)(i) Candidates demonstrated limited understanding of MIDI files. Some provided reference to the MIDI interface, but the question required information about MIDI files. It would be beneficial for candidates to develop a greater understanding of a MIDI file, its contents and how they are created.

(ii) Many candidates were able to provide suitable benefits. Candidates are reminded that if they want to use 'cheaper' as a benefit, they must clarify what it is that they are stating is cheaper, such as cheaper to manufacture.

Question 6

Candidates demonstrated a good level of knowledge about the given touch screen technology. A common incorrect response was that candidates ticked that resistive technology uses the electrical properties of the human body.

Due to an issue with this question, careful consideration was given to its treatment in marking in order to ensure that no candidates were disadvantaged.

Question 7

(a) Candidates demonstrated limited understanding of the operation of a keyboard. Some candidates were able to show understanding that a when a key is pressed a result occurs such as the completion of a circuit, along with some understanding that a character set such as ASCII is used in the process. It would be beneficial for candidates to develop a greater understanding of the operation of a keyboard.

(b) Many candidates were able to provide at least two functions of a browser.

(c) Many candidates demonstrated a good level of understanding of https. A range of knowledge was seen from candidates which was pleasing to see.

Question 8

(a) Many candidates were able to provide a correct statement. The most common incorrect response from candidates was the use of NOR in place of XOR in the statement, some candidates had confused the two gates.

(b) Many candidates were able to provide a correct truth table.

Question 9

(a) Candidates demonstrated a good level of knowledge about duplex data transmission. A common incorrect response was that duplex data transmission would automatically detect any errors in data.

(b) Most candidates correct identified parallel.

(c) Many candidates were able to provide at least one benefit and description of a USB connection. It was pleasing to see a range of benefits referred to by candidates. Some candidates referred to benefits of a USB storage device rather than a USB connection. It would be beneficial for candidates to understand the distinction between the two.

Question 10

(a) Candidates demonstrated limited understanding of the process of check digit. Many candidates described the process of a check sum, rather than a check digit. It would be beneficial for candidates to understand the difference between the two, most importantly that a check digit is used to check data entry and not as a check for errors in data after transmission.

(b) Many candidates were able to identify and describe three different security methods that could be used. It would be beneficial for candidates to understand that anti-virus is not a suitable choice, as a virus is not commonly used to obtain personal data. It may cause the loss of any personal data stored on a computer, but it is not commonly used to collect that data.

Question 11

(a) Candidates are reminded to answer the question in terms of the context given. Many candidates gave a definition of each of the components, rather than providing understanding of how they would be used in the given context.

(b) Most candidates were able to provide two suitable reasons.

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| Paper 2210/22 |
| Paper 2 |

Key messages

Candidates who had previously worked through the pre-release material (Concrete Slabs) and who completed the tasks by producing their own programming code were able to demonstrate appropriate techniques for solving this problem. These candidates were able to provide answers for the questions in *Section A* that demonstrated the programs they had written, descriptions of how they had solved tasks, why they had used their chosen methods and how their program was altered between the tasks to achieve additional functionality.

Candidates who took care to ensure they answered the question that was asked generally scored higher marks. Examples included: candidates who described how their program achieved certain tasks, or who supplied detailed annotations to their code, rather than simply writing the code; and candidates who took care to name or describe variables, constants and arrays appropriately to match their purpose, within the context or task required by the question.

Candidates should take care to read questions thoroughly before answering them and make sure they respond in the manner required. For example, candidates should limit the length of any program code they write in the examination to match the question that is asked rather than writing out excessive code covering the whole pre-release material.

Candidates are advised to ensure that any flowcharts they construct make use of standard programming flowchart symbols and conventions, and that they are fully connected.

General comments

This was the tenth session of the examination for IGCSE Computer Science paper 2, Problem-solving and Programming. Very few questions were left unanswered and the overall performance on this paper was of a very good standard, with a generally good performance being maintained from previous series.

Comments on specific questions

Section A

Question 1

(a) (i) Most candidates scored some marks on this question. In general, candidates were able to name a whole range of variables and constants used in their programs, including relevant uses and data types. Their marks, however, would have been even higher, had candidates also stated that they had used arrays, variables or constants. An example of a correct answer for five marks is:

> A variable named 'Colour' of data type string is used to store the colour of the slab.
> A constant named 'Pi' of data type real is used to store the value of Pi, to calculate the area of the slab.

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(ii) Candidates scored very highly on this question. They were able to name a variable that could be used in **Task 3** of the pre-release materials, along with their appropriate data types and purposes. An example of a correct answer for three marks is:

Variable name   `ConcretePrice`
Data type   real
Purpose   to store the price of the grade of concrete

(b) This question required an explanation to show that candidates understood how their programs calculated the volume of the concrete slabs. Many fully and almost fully correct answers were seen. However, it is important to note that the focus of the question was on the volume of the actual slabs rather than the volume of concrete needed for a batch of slabs. An example of a correct answer for three marks is:

The size and depth of each shape were used to calculate the volume. First the area of the shape was found, for example, using length x breadth for the rectangular slabs. Then the area was multiplied by the depth of the slab.

(c) This question permitted a degree of flexibility in candidates' responses as answers could be written using program code, pseudocode or flowcharts. Most candidates made a good attempt at a response, with a very high proportion of candidates achieving high marks.

Responses were seen in a variety of programming languages, as well as pseudocode and flowcharts. Many creative responses were seen with a range of approaches seen to tackling some of the problems to be solved, for example, rounding up the number of slabs needed to the next 20, to create batches of 20.

In general, responses written in program code or pseudocode covered the task more successfully than responses written as flowcharts, as they tended to be more detailed and included more of the steps required to solve the problem.

(d) This question required candidates to explain how their program was changed to give it more flexibility, as required in **Task 3**. As a change to previous similar questions, although explanations were required, candidates were also asked to include code to illustrate their answers. Many high scoring responses were seen, however, candidates who described what the program did or simply wrote code were unlikely to score many marks, because the question required an answer to say how the program achieved the task. For example, the task involves changing the program from a fixed basic price for the concrete to a variable price for the concrete. An appropriate answer for one of the marks, to cover this part of the task, would be, 'a user prompt is provided to allow the price of the concrete to be entered'.

Section B

Question 2

This question required candidates to identify a number of errors and suggest corrections in a piece of code. The vast majority of candidates managed to find and correct at least one of the errors, with many candidates scoring full or nearly full marks. The answers for four marks are:

`IF TotalTry > Number`	should be	`IF Guess > Number`
`IF Guess > Number`	should be	`IF Guess < Number`
`TotalTry ← Guess + 1`	should be	`TotalTry ← TotalTry + 1`
`UNTIL Guess <> Number`	should be	`UNTIL Guess = Number`

Question 3

(a) Candidates generally scored well on this question with many achieving full or nearly full marks. Candidates should take care to ensure that the content of the OUTPUT column matches the syntax of the output as would be expected from the given flowchart. An example of a correct answer for four marks is:

Reject	Count	Length	OUTPUT
0	0		
	1	24.88	
1	2	25.01	
	3	24.98	
	4	25.00	
	5	25.05	
	6	24.99	
	7	24.97	
	8	25.04	
	9	25.19	
2	10	25.07	Batch rejected

(b)(i) This question required candidates to give a correction to the flowchart that would change the limits of the lengths of rope tested to only reject those that were too short. Some candidates correctly gave the correct test that would be required. An example of a correct response is:

Change the test in the decision box (after the `Length` has been input) to

```
Is Length > 24.9?
```

(ii) This question proved a little more difficult and required candidates to explain how the algorithm could be made more efficient and effective when rejecting batches. Correct answers were based around the algorithm immediately terminating, with the batch rejected, once the rejection limit of two ropes was reached; rather than continuing to test the remaining ropes in the batch. A small number of candidates achieved some marks here.

Question 4

This question required candidates to match validation checks with their correct descriptions. The vast majority of candidates scored some marks here, with many achieving full marks.

Question 5

Candidates were required to explain how totalling and counting could be used in a given context, in which some variables: `Total` and `BasketCount` had been given. It was therefore important that the explanations given were in the context of the scenario rather than generic, and that the given variables appeared in any program statements. A large number of candidates achieved some marks with a small number achieving full or nearly full marks. An example answer for four marks is:

In totalling, the weight of each basket is added to the total weight as each weight is entered.

```
Total = Total + Weight
```

In counting, the number of baskets is incremented by 1 as each weight is entered.

```
BasketCount = BasketCount + 1
```

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Question 6

Candidates were required to explain why constants, variables and arrays are used in programming. Most candidates were able to do this, in part, and so achieved some of the marks; with some candidates scoring highly. An example answer for six marks is:

A constant cannot be changed during the execution of a program.

A variable can be changed during the execution of a program.

An array is a list of items of the same data type stored under a single name.

Question 7

(a) Most candidates were able to explain that the data in the 'Item number' field was not unique, so it could not be a key field.

(b) This question required candidates to identify some errors in a given query-by-example and then provide a corrected version. Most candidates scored some marks, with many candidates gaining full or nearly full marks. Candidates generally recognised that the fields that would be shown in the given grid were incorrect: 'Order number' and 'Amount' would be shown instead of 'Item number' and 'Order number'. Some candidates went on to explain why the criteria in the Status field was incorrect, as it would also display items that were 'cancelled', rather than those that were 'in progress' or 'not started'.

An example of the correct grid is shown, which, when added to the marks for the explanation, would give a total of five marks:

Field:	Item number	Order number	Status	
Table:	SALES	SALES	SALES	
Sort:				
Show:	☑	☑	☐	☐
Criteria:			Like 'Not started'	
or:			Like 'In progress'	