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Principal Examiner Feedback

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Computer Science (4CP0)
Paper 2 – Application Of Computational Thinking

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This report is split into two sections: General Comments and Specific Comments. In the Specific Comments, there will be comments about the candidates' responses to the written and coding questions.

GENERAL COMMENTS

This was the second series of the Specification of Pearson's International GCSE Computer Science.

There were very few candidates for the specification in this series. Most candidates attempted all questions and the three hours allowed for the examination did not seem to be an issue for most candidates.

The format of the question paper is a combination of written theoretical questions about computational thinking and practical coding tasks. It is intended that the structure of the paper is such that demand increases through each question and through the paper. The approximate split, in terms of marks, is approximately 40% written responses and 60% coding responses. There will normally be 5, 6 or 7 questions, with the last question in each series an extended coding exercise intended to allow candidates to demonstrate their knowledge, skills and understanding of computational thinking applied to a problem. The questions requiring written responses and coding responses were interspersed to allow candidates time to be looking away from computer screens.

Candidates are required to complete the coding exercises using one of three programming languages: C sharp (C#), Java or Python. For this series, most candidates submitted work using Python as their programming language. Two centres had candidates who submitted their work using Java and there was no work submitted using C#.

Most centres submitted the candidates' work in the appropriate manner with the scripts and the coding responses in the same envelope. For the most part, candidates' work was correctly identified. However, some centres identified the candidates' work by the name of the candidate and not according to the instructions in the ICE document (**I**nformation for the **C**onduct of **E**xaminations). This document (updated each year) is usually available on the Pearson website early in the year of the examination. A few centres had to be contacted because the script envelope did not contain one of either the written responses or electronic coding files (on a CD/DVD or a USB drive).

Due to the format of the question paper, the mark scheme is arranged so that the questions with written responses are grouped at the start of the scheme, followed by the questions with coding responses including a completed example.

SPECIFIC COMMENTS

Written response questions

- The multiple-choice question included in the question paper was generally well answered with most candidates scoring the mark.
- Single mark questions were also generally well answered.
    - 1(b) was very well answered with very, very few candidates answering incorrectly.
    - 1(d) this was also very well answered with most candidates being able to define the term **variable**. Those who did not achieve defined a data type as opposed to a variable.
    - 1(e)(i)(ii)(iii)(iv) these questions required the candidates to examine code and identify a logic operator (i), the start of a subprogram definition (ii), the name of a numeric variable (iii) and the name of a string variable (iv). Most candidates achieved all the marks available. However, where some of the marks were not achieved, the most common incorrect responses were for (i) and (ii).
    - 3(a) and 3(b) Considering the current COVID-19 climate the responses for (a) and (b) were considered together as it was clear that some candidates confused what is meant by the term encryption (a) and why data needs to be encrypted (b). For (a) we expected to see that candidates understood encryption is the conversion of plain text into cipher text, whilst for (b) we expected to see that candidates understood that data is encrypted to ensure it cannot be read by an unauthorised person. Many candidates gave the answer to (b) as their response to (a) and then slightly rephrased that answer as their answer to (b) or gave a completely different, incorrect, response. The approach taken was to ensure that where candidates had given the answer to (b) as their response to (a) and they then had an incorrect answer for (b) that they were given the mark in (a).

- Multiple mark questions were generally less well answered with answers often not gaining full marks due to a lack of expansion of the response.
    - 1(c) was very well answered with most candidates gaining the full three marks for identifying and amending the errors within the code. The lowest mark achieved was two.
    - 3(c)(i) In most responses, if the candidate understood Rail Fence cipher encryption then they achieved all four marks. However, it was clear to see that some candidates did not know how to perform Rail Fence cipher encryption and performed Caesar cipher encryption in its place. Considering the current COVID-19 climate, where this had occurred candidates achieved one mark for using the key of 4 consistently. Approximately a third of candidates achieved full marks whilst approximately a third did not achieve any marks.
    - 3(c)(ii) It was obvious that some of those who did not understand Rail Fence cipher encryption struggled to answer this question resulting in several candidates missing out on marks. However, it was nice to see that some of the candidates who did not achieve marks in (c)(i) did manage to achieve at least one mark in this question. The most common responses were variations of it is easy to crack using brute force. However, many of the responses were not linked explanations with candidates missing why they are easy to crack using brute force i.e., the limited number of usable keys.
    - 5(a) This question was similar to a question in the 2019 paper. The responses were much better compared to the responses in that paper. It was pleasing to see how

many candidates achieved the full four marks. Very few candidates did not achieve any marks. Where marks were lost was generally because the test itself was not specific enough e.g., “there must be three uppercase letters” without saying where or the test data given failing more than one test e.g., not ensuring the e or o at the end of the test data matched the sum of digits. Where a candidate had specified an incorrect test as in the example given, if the candidate had gone on to give test data that matched their test and did not fail any further tests then they achieved the mark for the test data.

Coding response questions

Generally, examiners found that candidates responded very well to the coding challenges presented in the question paper. There were many candidates who scored close to full marks on these tasks.

1(c) Most candidates scored all three marks for the correction of errors in the short section of code presented. Where candidates did lose marks, it was often in not initialising the constantValue variable with the value of 7

2(a) It was pleasing to see how many candidates achieved the full 10 marks for this question. Some of the common reasons for not achieving marks were copying the algorithm word for word as opposed to using a programming language or failing to validate the height correctly.

2(b) Candidates also responded to this question well with many achieving the full seven marks. Where candidates had included a response for this question, the most common reasons for not achieving marks were to do with the calculation for the number of panels needed. For example, length * width – 4.

4(a) Many candidates achieved the full six marks for this question and all candidates achieved at least two marks. Common reasons for not achieving marks were transposing logical and/or relational operators, and not using the messageIndex in the ELSE statement.

4(b) Over a third of candidates achieved full marks for this question. It was nice to see that where candidates could not remember how to use subprograms, they wrote code to achieve find and display the details of the low attendees etc. in the main program. This meant they could still access most marks. It was nice to see the number of candidates who tailored the display of the low attendees so that each name appeared on a separate line.

It was clear to see that some candidates did not read the question properly and displayed the name of the high attendees as opposed to the number of high attendees. This was the most common area where marks were not achieved.

6 Over half of the candidates achieved at least 17 marks for this question. Most candidates did achieve marks for the individual sales, many went on to achieve the mark for the total sales, fewer went on to give markworthy responses for the highest and second highest sales.

It was noted that at times candidates did not use coding to do the calculations and identification of sales etc. Instead, they had carried out a manual search and then printed out the results of the search.

Many candidates did not comment their code, which is good practice and a part of award of the levels-based marks e.g. band 3 expects code to be clear and readable – this includes comments.

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