COMPUTER SCIENCE

Paper 2210/12
Paper 1

Key messages

This standard of candidate's work continues to improve for this syllabus. There is a continued move to provide questions where candidates have to 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 an improved understanding of many of the topics.

General comments

Candidates and centres are reminded that written papers are now scanned in and marked on computer screens by Examiners. Consequently, if a candidate writes the answer to a question on an additional page, they must indicate very clearly to the Examiner where their revised answer is to be found. Also, if answers have 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.

Comments on specific questions

Question 1

(a) Most candidates were able to provide the correct binary values. Some candidates did not include leading zeros. It would be beneficial for candidates to understand that when they are required to provide 8-bit binary values, they make sure that each binary value has 8 bits. This includes any leading zeros required to make the value 8 bits.

(b) (i) Most candidates were able to convert to the correct hexadecimal values. Some candidates did no demonstrate the understanding that values above 9 are represented with other characters in hexadecimal. It would be helpful for candidates to understand that values 10 to 15 are represented with a character value of A to F.

(ii) Many candidates were able to provide three correct uses. Some candidates were vague in their suggestions. It would be beneficial if candidates could be specific in their response. For example, some candidates provided HTML as a response, but this is not specific about which part of HTML or how it is used in HTML.

(iii) Many candidates were able to identify that hexadecimal makes the value easier to read or understand. A common misconception from candidates is that using hexadecimal saves storage space or uses less memory.

Some candidates were not specific enough in their reference to space being saved. Candidates need to make sure that they clarify what they mean by space being saved, whether this is space on a screen/display, or within storage.

It would be beneficial for candidates to understand that the use of hexadecimal is for ease of understanding for the user, and that it does not make things any easier to understand for the computer.

Question 2

(a) Many candidates were able to demonstrate an understanding of the role of the different primary storage in a computer.

(b) A surprising number of candidates had a misconception that the storage type was off-line storage. It would be beneficial for candidates to understand what the different categories of storage are.

(c) Many candidates were able to provide the understanding that the storage is non-volatile, along with a suitable example.

Question 3

Many candidates were able to provide a correct logic circuit. The most common error was candidates not including the necessary NOT gates. Candidates are reminded that the symbol for each gate is given in the syllabus and must be used in the logic circuit. Circles or text-based logic circuits are not enough to demonstrate understanding and the correct symbols must be used.

Question 4

(a) Most candidates were able to provide three correct issues.

(b) Some candidates provided a detailed response for this question, but many candidates lacked the detail required, or did not provide a response that answered the given question. Some candidates described what a firewall is, but not how it can be used to protect a system. It would be beneficial for candidates to make sure that the response they provide address the question in the exam paper.

Question 5

(a) (i) Some candidates were able to provide the correct device, but many candidates were not able to, many were too vague in their device name. Many candidates gave an incorrect response such as laser printer.

(ii) Many candidates were able to provide a correct response. Some candidates were too vague in their device name, providing responses such as monitor.

(iii) Some candidates were able to provide the correct device, but many candidates did not demonstrate an understanding of the device described.

(b) Most candidates correctly identified interactive whiteboard, inkjet and laser. High level candidates were able to provide the remaining two descriptive terms.

Question 6

(a) Many candidates were able to provide the two correct translators. Some candidates showed a misconception that an assembler could be used.

(b) Some candidates were able to provide detailed explanations for each reason they gave. Some candidates stated a reason, it would be helpful in an explanation question if candidates went on to explain their reason, in this case, linking their reason to why this would be better for a programmer.

The most common answers given were those relating to it being easier for a programmer to understand and debug. It would be beneficial for candidates to have a broader understanding of some of the other reasons a programmer may use a high-level language.

(c) Many candidates were able to identify the correct type of language. The most common error was the mix up of assembly language and machine code.

Question 7

Many candidates matched the correct terms with the correct descriptions. The most common error was the mix up of MAC address and IP address.

Question 8

A pleasing level of knowledge was shown by candidates about the role of interrupts in a computer system. A common misconception was demonstrated on many occasions that an interrupt is purely used to highlight a problem for the computer or user to fix. It would be beneficial for candidates to understand the role of an interrupt is for more than just highlighting a problem.

Question 9

(a) (i) Many candidates were able to provide an accurate description of the transmission method. Some candidates were not specific in some of the detail in their response, for example, stating that single bit are sent, but not including the detail that this is done one at a time.

(ii) Many candidates were able to provide an accurate description of the transmission method. Some candidates were not specific in some of the detail in their response, for example, stating that multiple bits are sent, but not including the detail that this is done at the same time.

(iii) Many candidates were able to provide an accurate description of the transmission method.

(b) Many candidates provided a detailed description of three different error detection methods.

Question 10

Many candidates were able to gain half of the marks in this question. Higher level candidates were able to gain full marks through using the context given in the question. It would be beneficial for candidates to apply the context given in the question to the system they are asked to describe.

COMPUTER SCIENCE

Paper 2210/13
Paper 1

Key messages

This standard of candidate's work continues to improve for this syllabus. There is a continued move to provide questions where candidates have to 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 an improved understanding of many of the topics.

General comments

Candidates and centres are reminded that written papers are now scanned in and marked on computer screens by Examiners. Consequently, if a candidate writes the answer to a question on an additional page, they must indicate very clearly to the Examiner where their revised answer is to be found. Also, if answers have 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.

Comments on specific questions

Question 1

Many candidates matched the correct device with the correct description. The most common errors made were linking laser printer to the description for 2D cutter, and mixing up the descriptions for DLP and LCD projector.

Question 2

(a) Most candidates were able to add the correct parity bit.

(b) Many candidates were able to demonstrate an understanding of how an ARQ system is used.

(c) Most candidates were able to suggest another suitable error checking method.

Question 3

Many candidates were able to gain half of the marks in this question. Higher level candidates were able to gain full marks through using the context given in the question. It would be beneficial for candidates to apply the context given in the question to the system they are asked to describe.

Question 4

(a) Most candidates were able to provide the correct binary values. Some candidates did not include leading zeros. It would be beneficial for candidates to understand that when they are required to provide 8-bit binary values, they make sure that each binary value has 8 bits. This includes any leading zeros required to make the value 8 bits.

(b) Many candidates referred to the need for only two states. It would be helpful if candidates showed understanding that this is because a computer uses logic gates. Some candidates were vague in their response, stating that computers only understand binary, but not providing a reason why this is the case.

Question 5

(a) Many candidates were able to provide an accurate description of the transmission method. Some candidates were not specific in some of the detail in their response, for example, stating that single bits are sent, but not including the detail that this is done one at a time.

(b) Many candidates were able to provide a suitable application of serial data transmission.

(c) Many candidates were able to provide an accurate description of the transmission method. Some candidates were not specific in some of the detail in their response, for example, stating that data is sent in two directions, but not including that this is at the same time.

Question 6

Many candidates were able to identify and describe three suitable methods.

Question 7

(a) Some candidates demonstrated a detailed level of knowledge about an interpreter. The most common answers were translating to machine code and execute one line at a time. It would be beneficial to candidates if they had a broader understanding of the role of an interpreter and other areas it deals with, such as errors in the code.

(b) Some candidates demonstrated an understanding of the benefits of compiling the program. Many candidates described how a program would be compiled, rather than the benefits of compiling the program. It would be helpful if candidates thoroughly read the question and addressed all parts of it.

(c) Very few candidates were able to demonstrate how lossless compression would compress a file. Many candidates listed the benefits of lossless compression, rather than explaining how it is carried out. It would be helpful if candidates thoroughly read the question and addressed all parts of it.

Question 8

(a) A surprising number of candidates were not familiar with the full terms for a URL. It would be beneficial to candidates to know the full terms.

(b) Few candidates were able to describe the process of using a URL to retrieve a web page. It would be beneficial to candidates to have a greater understanding of this process. A common misconception candidates had is that the URL is the IP address. It would be helpful if candidates understood the difference between the two.

Question 9

Many candidates were able to describe two differences between RAM and ROM.

Question 10

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

(b) Many candidates were able to provide a correct logic circuit. Candidates are reminded that the symbol for each gate is given in the syllabus and must be used in the logic circuit. Circles or text-based logic circuits are not enough to demonstrate understanding and the correct symbols must be used.

Question 11

(a) Very few candidates were able to describe the role of the program counter. A common misconception that candidates had is that it holds the next instruction to be processed. It would be beneficial for candidates to understand it does not hold the actual instruction, it holds the address.

(b) Very few candidates were able to describe the role of the memory data register. Many candidates were vague in their description, just stating that it stores data, but no indication what the data is for or where it is from. It would be beneficial for candidates to have a greater understanding of the memory data register.

Question 12

Few candidates were able to demonstrate an understanding of a file MIDI file. Some candidates described a MIDI interface, rather than a MIDI file. It would be beneficial for candidates to have a greater understanding of a MIDI file, and to understand that there is a difference between a MIDI interface and a MIDI file.

Question 13

(a) Many candidates were able to provide a suitable storage device and justification.

(b) Many candidates were able to provide a suitable storage device and justification.

(c) Many candidates were able to provide a suitable storage device and justification.

COMPUTER SCIENCE

Paper 2210/22
Paper 2

Key messages

Candidates who had previously completed the tasks and produced their own programming code for the pre-release (junior park run) were able to demonstrate appropriate techniques for solving this problem using a number of valid interpretations of the tasks. These candidates were able to provide answers for ***Section A*** that demonstrated the programs they had written, descriptions of how they had solved tasks and why they had used their chosen methods.

Candidates who were able to explain their code when requested performed better than those who simply wrote out their code.

Candidates should be careful when answering questions pertaining to a specific task in the pre-release materials that their response is related to the relevant task stated in the question and not provide a generic response. It is also important to ensure that any variables, constants and arrays that are named or declared must follow the rules of the programming language to which they belong. Candidates are further advised to ensure that identifiers are descriptive, rather than vague single characters, to demonstrate good programming practice.

Candidates should take care to note the difference between pseudocode and program code when answering questions to ensure their responses are as requested throughout the paper. Candidates with a good knowledge of pseudocode as described in the course specification perform better than those who do not.

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

General comments

Very few questions were left unanswered and the overall performance on this paper was of a good standard, in line with performances in other recent series.

Comments on specific questions

Section A

Question 1

(a) (i) Many candidates scored highly on this question, being able to correctly state an appropriate variable name, data type and use, from Task 3 of the pre-release materials.

(ii) Candidates scored quite highly on this question, with the majority achieving three marks or above. The main reason for not achieving marks was not including all of the arrays required from Task 1 of the pre-release material. Many candidates only described some of the arrays.

(b) Most candidates gained some marks here, but full marks were rare. Some candidates spent too much time describing how they would calculate a check digit at the expense of the remaining marks.

(c) This question permitted a degree of flexibility in candidates' responses and most candidates made a good attempt at a response, with many candidates achieving full marks. Most candidates were able to obtain the marks available for suitable inputs, and calculation and storage of the duration of the run. Other marking points were also seen, such as the use of suitable loops within the programs.

Candidates who provided answers using pseudocode or program code were generally more successful than those whose answers made use of flowcharts.

Some candidates, while scoring highly because they provided the program code required, also included code that was unnecessary to answer the question. Therefore, future candidates would be better advised to limit their responses to the section of the pre-release material actually stated in the question.

(d) Candidates who only wrote code for this question did not receive any marks, as they were asked to explain how their code solved the specific problem of identifying the name and time of the fastest runner for each age range, which is part of Task 3 in the pre-release material.

The full range of marks was seen, with candidates mostly explaining how their programs performed checks for each age range or produced the correct output. Further marks were achieved from storing the new fastest time and the new fastest runner, or by using an ID number or array index to identify a particular runner who was the fastest.

Section B

Question 2

(a) This question generated a wide range of responses, with many candidates scoring highly. Most candidates were able to demonstrate the input of three numbers, with some evidence of finding the largest two of these, multiplying them and outputting the result. Very few candidates, however, showed evidence of checking the three input numbers were different, as required in the question.

(b) Candidates were required to provide two sets of test data to be used with their algorithm in part **(a)** and to give a reason why each set would be used. Many different answers were possible and some good responses were noted, but many candidates did not provide sufficient test data. The algorithm in part **(a)** required the input of three numbers, therefore, each set of test data must include three inputs, such as three numbers.

Question 3

A wide range of responses was seen; many candidates correctly connected the programming concept with the correct description.

Question 4

A wide range of responses was seen, with many candidates achieving some credit for either supplying the programming statements or the explanation. Some candidates achieved higher marks by providing both suitable programming statements and appropriate explanation for selection and repetition.

Question 5

(a) The full range of marks was seen for this question with the vast majority of candidates achieving at least one mark, but few candidates achieved full marks. Candidates were usually able to correctly populate the first four columns of at least one of the trace tables, or state the correct OUTPUT for at least one of the trace tables. However, many candidates did not achieve marks due to errors in the OK column, such as not giving both lines of data where required, or by giving incorrect OUTPUT statements. Future candidates are advised to practice completing trace tables and ensuring their OUTPUT columns are written to exactly match any output text that is given in the flowchart or algorithm.

(b) This question had a range of possible answers as the given flowchart contained a number of possible problems. A range of correct answers was therefore seen from candidates.

Question 6

(a) Many candidates achieved three or more marks for this question. The most common error seen was for the Size field, where candidates gave a numeric data type such as integer, but the example data for this field in the question was 20 × 15, which contains an 'x', which is not a number.

(b) Candidates generally scored at least two marks for this question by correctly identifying at least two of the errors in the given query-by-example grid. The error that was most frequently missed was in the field name 'Reference No', which should have been 'Reference Number'.

COMPUTER SCIENCE

Paper 2210/23
Paper 2

Key messages

Successful candidates showed evidence of practical experience in designing, programming and testing solutions to the three tasks from the pre-release (holiday park cabin rental) to provide answers for ***Section A*** that demonstrated problem-solving and programming skills. Candidates need to read each question carefully and answer the question as set on the paper as a question may only require a response that is a partial solution or an extension to a task set out in the pre-release material.

Successful candidates declaring and using variables and arrays as part of a response ensured that the identifier declared could be used consistently in a program. Identifiers must not contain spaces or other punctuation. Once an identifier is declared or used it must remain the same throughout the response to the question. Candidates are advised to read through each written response to ensure that no changes or errors have been made.

Successful candidates showed practical experience of designing, setting up and querying a database table to provide accurate answers to the database question. Once a field has been assigned a data type, the data type must remain the same throughout the response to the question. Candidates are advised to read through each written response to ensure that no changes or errors have been made.

Successful candidates showed evidence of good examination technique by answering the question as set on the examination paper in the space provided for the answer or clearly signposting where the answer was to be found on the examination paper.

General comments

Nearly all candidates attempted all the questions on the paper.

Comments on specific questions

Section A

Question 1

(a) (i) Many candidates correctly identified three arrays with meaningful names, suitable data types and a description of the use in Task 1. Common errors included incorrectly putting spaces or brackets in array names, or stating an incorrect data type.

(ii) Many candidates correctly identified one variable with a meaningful name, suitable data type and a description of the use in **Task 2**. Common errors included incorrectly putting spaces in variable names, or stating an incorrect data type

(b) Responses providing pseudocode or programming statements for **Task 2** usually scored higher marks than responses providing a flowchart. Many candidates incorrectly included programming statements for booking a log cabin; these programming statements were not required as the question stated that only the displaying cabins available part of **Task 2** was required.

(c) Better responses correctly included valid test data items that identified a log cabin. Any other items chosen would be incorrect as they were not requested by the question.

(d) Good responses provided an explanation of programming statements that were used for **Task 3**. Unlike **Question 1** part **(b)**, this response required an explanation of how the programming statements used by the candidate would provide a solution. Some candidates explained how their programming statements applied a 10% discount. Responses of programming statements seen without an explanation were not creditworthy.

Section B

Question 2

The full range of marks was seen. Some excellent descriptions and examples were seen. Some candidates need to understand more about data types used in programming.

Question 3

Some candidates achieved good marks on this question. A common error seen was to only identify the type of statement and not include an actual pseudocode statement or statements. For example the word IF on its own as an answer would be insufficient to gain the mark for the conditional statement.

Question 4

(a) Many candidates correctly identified all three errors. The error in line 1 was identified by more candidates than the other two errors.

(b) Most candidates gave the correct answer.

Question 5

(a) Most candidates correctly completed the columns for the variables and the OUTPUT in the trace table.

(b) Most candidates correctly completed the columns for the variables in the trace table. Candidates who traced the algorithm correctly would have left the OUTPUT column blank.

(c) Some candidates correctly identified the purpose of the algorithm. A common error seen was to incorrectly identify the purpose of a flowchart rather than this algorithm.

Question 6

(a) Most candidates correctly identified that no field was suitable as a primary key and included a correct explanation.

(b) Most candidates correctly identified the data types. A common incorrect data type seen for **Size3** was integer.

(c) Generally well answered by most candidates.

(d) Completion of the query-by-example grid required good attention to detail and using the information provided to answer part **(b)** of the question. The criteria needed to be suitable for the data type chosen by the candidate. Common errors seen included incorrect sort terminology or using a criteria that would not work with the data type selected in part **(b)**.