COMPUTER SCIENCE

Paper 0478/11
Paper 1

Key Messages

This is a new syllabus and the standard of candidates work was mostly very good. 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 a good 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 answers 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), (b) and (c)

In part **(a)** many candidates provided a good standard of answer and gained both marks. Some candidates provided answers that were not precise enough, making references to pieces of data rather than bits. Some candidates also referred to bytes of data rather than bits. Candidates also gained marks for reference to single and multiple wires, but not single and multiple cables, as only one cable would be used in each case.

In part **(b)** some candidates provided an answer for parallel transmission that gained marks, mostly by making reference to it being a faster method than serial. Candidates mainly gave an answer that needed more reference for serial. Many stated it was more reliable, but did not refer to what it was more reliable than, or in what situation it was more reliable, e.g. over longer distances.

In part **(c)** candidates gave hardware devices as a demonstration of serial and parallel data transmission, rather than an application. A reference to 'printers' or 'the internet' was not adequate as an application of data transmission, an application such as 'sending a file from a computer to a printer' would improve their answer.

Question 2 (a) and (b)

Most candidates gained a mark for their answer to part **(a)**. This was mainly through stating Universal Serial Bus as the full name for USB. Those candidates that did not provide the name, but instead gave a description also gained a mark. Some candidates in their description mistook USB as a device rather than a method of connection.

In part **(b)** candidates mainly gained marks by stating that many computers have the ability to connect using USB as it has become a universal and industry standard connection. Most candidates referred to the benefits of a USB device rather than the connection and were unable to gain marks as a result.

Question 3 (a), (b) and (c)

Many candidates gained most of the marks for this question, demonstrating a good standard of knowledge and application with logic gates.

In part **(b)**, for some candidates' work, it was difficult to identify the difference between the AND gate and the OR gate. Candidates need to make sure that they draw the gates very clearly. For this question, candidates either understood the logic and provided an accurate circuit, or had little understanding of the logic and were unable to provide a circuit that gained any marks.

For part **(c)** many candidates gained at least two marks. Some candidates provided a description of the logic circuit rather than a logic statement and did not gain marks as a result.

Question 4

The full range of marks were awarded to candidates for this question. It was clear some candidates knew the process and gained full marks, but most candidates achieved two or three marks.

Question 5

The full range of marks were awarded for this question, with very few candidates gaining full marks. Candidates could identify the correct category of storage for most of the descriptions, but many candidates were unable to identify the correct name for the storage device. Many candidates could correctly name ROM and Blu-ray, but not the remaining three.

Question 6 (a) and (b)

In part **(a)** many candidates answered the section about viruses very well. Many candidates were not precise in their response for phishing and pharming and some candidates confused the two, mistaking one for the other.

In part **(b)(i)** most candidates gained just one of the two marks. This was normally for an answer that included reference to the prevention of key loggers picking up key presses. Candidates were not precise enough in their answer to gain two marks. Many candidates referred to stopping a person looking over their shoulder and seeing the password. This answer was often imprecise.

Candidates provided some good security measures and descriptions in part **(b)(ii)**. A wide range of knowledge was demonstrated by candidates in this area with most giving a good description for the security measure. Chip and Pin, security protocols such as SSL and encryption were the more common responses.

Question 7 (a) and (b)

Part **(a)** was answered very well with most candidates able to gain two marks.

In part **(b)** very few candidates gained full marks despite the range of responses they could have given. Most candidates demonstrated a need to improve their knowledge of the fetch-execute cycle. Many candidates gained just one mark for the incrementation of the program counter. Some candidates gained three marks for identifying some correct stages.

Question 8 (a), (b), (c), (d) and (e)

Many candidates answered both part **(a)** and part **(b)** very well. Candidates demonstrated a good knowledge of converting between binary and denary.

Most candidates only gained one or two marks for part **(c)**. Many candidates did not refer to the time being stored in the registers in their answer, which often made their answer imprecise.

Many candidates provided a good response to part **(d)** that gained two or three marks. The most common error in this questions was candidates that incorrectly referring to the microprocessor sending 'information' rather than 'data' or a 'signal'.

In part **(e)** many candidates gave a good response. The most common answers gained marks for providing a higher resolution, being thinner/lighter and being more energy efficient. Some candidates referred to health and safety issues as a benefit that did not gain marks. Some candidates were imprecise in their answer such as 'better picture' or 'smaller size', these could not be awarded marks.

Question 9

The full range of marks was awarded for this question. Many candidates gained full marks. The most common errors were miscalculations for 30, 19 and 12.

Question 10

Candidates normally gained full marks or no marks for this question. They could often identify the correct statements but sometimes confused the role of an interpreter and a compiler.

COMPUTER SCIENCE

| Paper 0478/12 |
| Paper 1 |

Key Messages

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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 answers must be written very clearly so that Examiners can easily read the text and award candidates the appropriate mark.

Comments on Specific Questions

Questions 1(a) and 1(b)

In part **(a)** the full range of marks were awarded with most candidates gaining three or four marks. The most common error was candidates mistaking cookies for being spyware.

In part **(b)** the full range of marks were awarded and candidates displayed a good level of knowledge of security issues. The most common error was candidates confusing the definition of phishing and pharming.

Questions 2(i) and (ii)

Very few candidates displayed knowledge of touch screen technology. Very few candidates gained marks for this question and generally repeated phrases from the question, rather that describing how touch screen technology works. Candidate's answers were mostly too vague, with a simplistic level of knowledge displayed. The most common answer given was infrared technology. In terms of infrared touch screen technology candidates gave a vague description of a heat based method, but most infrared touch screen technology works with a grid of infrared beams that are interrupted to register a 'touch' on the screen.

Question 3

Many candidates displayed an excellent level of knowledge input devices and their uses, gaining five or six marks for the answer. The most common error was candidates confusing stock control and reading passports.

Questions 4(a) and 4(b)

Most candidates gained a mark for their answer to part **(a)**. This was mainly through stating Secure Sockets Layer as the full name for SSL. Those candidates that did not provide the name, but instead gave a description of SSL involving encryption and web servers also gained a mark.

In part **(b)** the full range of marks were awarded with many candidates demonstrating a good level of knowledge of secure websites. The most common error was the confusion of steps 2 and 3.

Questions 5(a), 5(b), 5(c) and 5(d)

In part **(a)** many candidates gained full marks. The most common error was candidates inverting the responses and getting all three incorrect.

In part **(b)(i)** the full range of marks were awarded. Most candidates chose the correct byte number but a range of answers were given for the column number with only some candidates giving the correct column.

In part **(b)(ii)** some candidates were able to give a clear description how they had arrived at their answer through counting the number of 1's in a byte/column and checking if this was odd/even. However some candidates struggled to explain how they had arrived at their answer giving a vague description or referring to counting zeroes rather than ones.

Many candidates were able to give a correct answer for part **(c)** and demonstrated a good understanding of binary conversion. Some candidates seemed to correctly map out the calculation needed but noted an incorrect response as their answer so a mark could not be awarded.

In part **(d)** most candidates demonstrated some understanding that if bits were transposed an error may not be detected, but candidates needed to describe that it would need to be an even number of bits that were transposed, and some were too vague in their response due to this.

Questions 6(a), 6(b) and 6(c)

Many candidates demonstrated a good level of knowledge of producing logic gates in part **(a)**. Candidates just need to make sure that they draw the gates very clearly. They need to make sure that the small circle at the front of a NOT logic gate is included and is visible in order for it to be a valid NOT gate. The most common error was the emission of the NOT logic gates from the circuit.

In part **(b)** the full range of marks were awarded. Those candidates gaining higher marks normally correlated to a correct answer given in part **(a)**.

In part **(c)** around 50% of candidates could correctly give the output of an XOR gate.

Questions 7(a) and 7(b)

The full range of marks were awarded in part **(a)**, but not many responses gained full marks. Most candidates gave a good description of a sensor sending data/signal to a microprocessor and the value being compared to a stored value. Some candidates included the use of an analogue to digital converter. Very few candidates acknowledged the issue of preventing the lights frequently turning on and off. A most common error in this questions was candidates that incorrectly referring to the microprocessor sending 'information' rather than 'data' or a 'signal'.

Most candidates gained some marks in part **(b)** with the full range being awarded. Some candidates were too vague in their naming of the sensor, for example a heat sensor, and some candidates repeated the application they gave for different parts of the question.

Question 8

Some candidates demonstrated a good level of knowledge of computing terms and gained full marks but a number of vague and confused responses were also give. Some candidates confused freeware and free software, and some candidates referred to trial software, which was too vague.

Question 9(a), 9(b), 9(c), 9(d) and 9(e)

In part **(a)** many candidates demonstrated a good knowledge of compilers and interpreters, gaining full marks. The most common errors for incorrect answers occurred in the first and fourth rows.

In parts **(b)**, **(c)** and **(d)** candidates either gave a clear description demonstrating a good level of knowledge or a very vague response. Common errors were a reference to machine language rather than machine code in part **(b)** and not stating who machine code was easier to understand for in part **(c)**. In part **(d)** a number of candidates referred to the amount of memory used and it running faster, but with modern processors this is often not the case, or is very minimal, so not a true advantage.

In part **(e)** most candidates gave a correct response.

Questions 10(a) and 10(b)

Many candidates showed some knowledge of binary conversion in part **(a)** and could correctly convert the values. Some candidates showed little knowledge and gave a random and incorrect response as a result.

In part **(b)** many candidates were able to correctly carry out the bit shift then covert the value to hex. Some candidates gained marks for a correct bit shift but were unable to demonstrate the knowledge to convert the values to hex so gained two marks. Candidates were awarded follow through marks if they had calculated the values incorrectly in part **(a)** for both their bit shift and the hex conversion.

COMPUTER SCIENCE

| Paper 0478/13 |
| Paper 1 |

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Many candidates provided a good response to part **(d)** that gained two or three marks. The most common error in this questions was candidates that incorrectly referring to the microprocessor sending 'information' rather than 'data' or a 'signal'.

In part **(e)** many candidates gave a good response. The most common answers gained marks for providing a higher resolution, being thinner/lighter and being more energy efficient. Some candidates referred to health and safety issues as a benefit that did not gain marks. Some candidates were imprecise in their answer such as 'better picture' or 'smaller size', these could not be awarded marks.

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Question 10

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COMPUTER SCIENCE

Key Messages

Candidates who had completed the tasks for the pre-release (temperature recordings) 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, set on the paper, performed better than those who wrote out the code from their solution to the task mentioned 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. Once declared the same identifier name should be used throughout the answer. The use of spaces and punctuation marks and minor alterations in name was condoned this session, as it was the first examination in the series.

General Comments

This was the first session of 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 arrays of an appropriate size with meaningful variable names.

   (ii) Most candidates correctly modified the size of the two arrays previously declared, so that the program could be used for a week rather than one month.

   (iii) Nearly all candidates declared two variables; most candidates could state what their variables had been used for.

(b) Algorithms were seen written in pseudocode, program code or as a flowchart. Better candidates provided for the correct number of iterations, seven, and used the loop counter to index the array of stored temperatures from task 1 for the calculation of the running totals. Candidates who wrote in program code provided a variety of viable solutions. When indentation was required by the choice of programming language to indicate which lines of code should be included in the loop, candidates needed to take care with their indentation to ensure that their algorithm could be clearly understood.

(c) Better candidates correctly included a data set for a week, seven items and explained why the items were chosen. Several candidates stated the type of test data and did not provide further explanation; this type of answer was not creditworthy.

(d) Better candidates provided a clear explanation of how the day with the highest midday temperature was selected. Many candidates did not answer the question set on the paper and could not gain all the marks available. A common error was to only providing pseudocode or programming code and no explanation.

Section B

Question 2

Most candidates located at least one error and suggested a suitable piece of corrected code. The error on line 8 was often identified, with better candidates providing a working correction.

Question 3

Many candidates showed the skill of using a trace table for data entry; most candidates correctly initialised the variables, Total and Reject; some candidates did not always trace the weight checking correctly and had errors in the Total column.

Question 4

Nearly all candidates could link the data type of Boolean with the correct data sample. Some candidates confused Real and Integer data types and/or String and Char data types.

Question 5

Well answered by many candidates.

Question 6

Most candidates could identify at least one loop structure. A common wrong answer was to incorrectly identify IF as part of a loop structure.

Question 7

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

(b)   Most candidates correctly identified the field to choose for the primary key. Better candidates gave a correct reason for their choice.

(c)   Nearly all candidates correctly stated at least one data type.

(d)   Most candidates correctly showed only the Price in $ and the Brochure No, as identified by the query-by-example grid. Better candidates showed attention to detail, by correctly putting the prices in ascending order and the Price in $ field before the Brochure No field as indicated by the query-by-example grid.

(e)   Most candidates correctly identified the fields to include in the query-by-example grid and identified those that were to be shown. A common error was to incorrectly set the criterion for the garage, when the data type had been set as a Boolean field in part (c).

COMPUTER SCIENCE

Key Messages

Candidates who had completed the tasks for the pre-release (school records of pupil weights) 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, set on the paper, performed better than those who wrote out the code from their solution to the task mentioned 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. Once declared the same identifier name should be used throughout the answer. The use of spaces and punctuation marks and minor alterations in name was condoned this session, as it was the first examination in the series.

General Comments

This was the first session of 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 an array of an appropriate size with a meaningful variable name.

 (ii) Many candidates correctly declared an array of an appropriate size with a meaningful variable name.

 (iii) Most candidates correctly modified the size of the two arrays previously declared, so that the program could be used for the whole school instead of a single class.

(b) Algorithms were seen written in pseudocode, program code or as a flowchart. Better candidates provided for the correct number of iterations, 600, and used the loop counter to index the array of stored weights from task 1 for the calculation of each pupil's difference in weight. Candidates who wrote in program code provided a variety of viable solutions. When indentation was required by the choice of programming language to indicate which lines of code should be included in loops and selection statements, candidates needed to take care with their indentation to ensure that their algorithm could be clearly understood.

(c) (i) A few candidates correctly described at least two validation rules that they had used for task 1. Many candidates described one rule, so could not be awarded full marks. Some candidates incorrectly wrote only pseudocode or programming code, thus not providing the description required.

 (ii) Most candidates correctly gave two pupil weights. Better candidates explained why each weight was chosen. Several candidates stated the type of test data and did not provide further explanation; this type of answer was not creditworthy.

(d)   Better candidates provided a clear explanation of how pupils with a fall in weight were selected. Many candidates did not answer the question set on the paper and could not gain all the marks available.   Common errors included only providing pseudocode or programming code and no explanation or checking for both a rise and fall in weight.

Section B

Question 2

Most candidates located at least one error and suggested a suitable piece of corrected code. The error on line seven was the one identified and corrected by nearly all candidates. The error on line 3 was often identified, with better candidates providing a working correction.

Question 3

(a)   Many candidates showed the skill of using a trace table for data entry, better candidates correctly updated the variables, Total, Check and Output.

(b)   Better candidates correctly identified the purpose of the flowchart as performing a check digit calculation.

(c)   Very few candidates correctly identified a problem with the check digit calculation. The flowchart cannot deal with a remainder of 10 from the check digit calculation, there needs to be a special case where x is used as the check digit.

Question 4

Nearly all candidates could link the programming concept of selection with the correct example of programming code. Many candidates correctly linked at least three out of the four programming concepts.

Due to an issue with this question, a discussion took place between the Principal Examiner and Assessment specialists to consider the impact on candidates in the light of answers seen. No candidates were disadvantaged and the full range of marks was seen.

Question 5

(a)   Most candidates attempted the loop structure, better candidates also showed the skill of being able to use the loop counter as the array index. Some candidates misread the question and incorrectly provided program code rather than pseudocode.

(b)   Better candidates correctly used `REPEAT … UNTIL` or `WHILE … DO … ENDWHILE` structures. The most challenging aspect was the correct management of the loop counter.

Question 6

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

(b)   Most candidates correctly identified the field to choose for the primary key. Better candidates gave a correct reason for their choice.

(c)   Better candidates correctly showed only the student names as identified by the query-by-example grid. Some of these candidates correctly ordered the names in ascending order.

(d)   Most candidates correctly identified the fields to include in the query-by-example grid and identified those that were to be shown. A common error was to set the Maths or English criteria to OR rather than AND, where both criteria are on the same row.

COMPUTER SCIENCE

| Paper 0478/23 |
| Paper 2 |

Key Messages

Candidates who had completed the tasks for the pre-release (temperature recordings) 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, set on the paper, performed better than those who wrote out the code from their solution to the task mentioned 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. Once declared the same identifier name should be used throughout the answer. The use of spaces and punctuation marks and minor alterations in name was condoned this session, as it was the first examination in the series.

General Comments

This was the first session of 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 arrays of an appropriate size with meaningful variable names.

   (ii) Most candidates correctly modified the size of the two arrays previously declared, so that the program could be used for a week rather than one month.

   (iii) Nearly all candidates declared two variables; most candidates could state what their variables had been used for.

(b) Algorithms were seen written in pseudocode, program code or as a flowchart. Better candidates provided for the correct number of iterations, seven, and used the loop counter to index the array of stored temperatures from task 1 for the calculation of the running totals. Candidates who wrote in program code provided a variety of viable solutions. When indentation was required by the choice of programming language to indicate which lines of code should be included in the loop, candidates needed to take care with their indentation to ensure that their algorithm could be clearly understood.

(c) Better candidates correctly included a data set for a week, seven items and explained why the items were chosen. Several candidates stated the type of test data and did not provide further explanation; this type of answer was not creditworthy.

(d) Better candidates provided a clear explanation of how the day with the highest midday temperature was selected. Many candidates did not answer the question set on the paper and could not gain all the marks available. A common error was to only providing pseudocode or programming code and no explanation.

Section B

Question 2

Most candidates located at least one error and suggested a suitable piece of corrected code. The error on line 8 was often identified, with better candidates providing a working correction.

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Many candidates showed the skill of using a trace table for data entry; most candidates correctly initialised the variables, Total and Reject; some candidates did not always trace the weight checking correctly and had errors in the Total column.

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Nearly all candidates could link the data type of Boolean with the correct data sample. Some candidates confused Real and Integer data types and/or String and Char data types.

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(e)   Most candidates correctly identified the fields to include in the query-by-example grid and identified those that were to be shown. A common error was to incorrectly set the criterion for the garage, when the data type had been set as a Boolean field in part (c).