AS LEVEL

Examiners' report

COMPUTER SCIENCE

H046
For first teaching in 2015

H046/01 Summer 2019 series

Version 1

Contents

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Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates. The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report. A full copy of the question paper can be downloaded from OCR.

Paper 1 series overview

H046/01 (Computing Principles) is one of two examined components for the GCE AS Level Computer Science. This component focuses on:

- The characteristics of contemporary processors, input, output and storage devices
- Software and software development
- Programming
- Exchanging data
- Data types, data structures and algorithms
- Legal, moral, ethical and cultural issues

To do well on this paper, candidates need to be able to demonstrate and apply knowledge across all of the topics listed above in different contexts.

Centres must be aware of the need to cover the whole of the specification content for this component; for example, Section 1.3.3 Web Technologies HTML, CSS and JavaScript. To support this section of the specification, centres should be aware and make use of the appendices to the specification, specifically section 5d. Centres should take note of the HTML tags that candidates are expected to have an awareness of. They should also be mindful of the JavaScript specification requirement 'Candidates are expected to be able to follow and write basic JavaScript code. It is hoped they will get practical experience of JavaScript in their study of the course'.

Candidates who did well on this paper generally did the following:	*Candidates who did less well on this paper generally did the following:*
- successfully wrote programming code 6b. - understood and used appropriate HTML tags in Question 8a. - successfully wrote JavaScript in Question 8c.	- did not use key terminology in Question 1a, 1d and 7b. - demonstrated limited discussion in Question 3 And 5. - showed poor understanding of stack and queue operations in Question 4c and 4d. - demonstrated a lack of understanding of the difference between an array and a list in Question 6a.

Question 1 (a)

1   Open source software has grown in popularity over the last few decades.

     (a)   Explain the difference between open source and closed source software.

....

....

....

....

....

.... **[4]**

Candidates who did not refer to the ability to access and modify or distribute the 'source code' in relation to open source and closed source software did not generally score well on this question. Centres need to make sure candidates use the correct technical terminology at this level of study.

Question 1 (b)

     (b)   Explain why all closed source software is most likely to be compiled rather than run on an interpreter.

....

....

....

.... **[2]**

Many candidate responses explained the difference between compilation and interpretation rather than explaining why compilation would be more appropriate in this situation. Candidates should be reminded that their response must relate to the context of the question.

Question 1 (d)

Linux is a popular open source operating system and Windows is a popular closed source operating system.

(d) Give **three** functions of an operating system.

1 ....

....

2 ....

....

3 ....

....

[3]

> Candidates need to be reminded that they need to be specific when giving the functions of an operating system. Ideally referring to those outlined in the specification. Responses like 'manage resources' is not specific enough at this level of study, the resources referred to must be specified.

Question 2 (b)

(b) Show the denary number 35 as an 8-bit (unsigned) binary number.

....

.... **[1]**

> In general, most candidates achieved this mark. Some candidates calculated the correct binary value but then did not show their result as an 8-bit binary number. Candidates should be reminded to read the question thoroughly.

Question 2 (c)

(c) The character 'A' in the ASCII character set is represented by the denary value 65. Write the binary representation for the ASCII character 'H'. Show your working.

....

....

....

.... **[2]**

> Some responses lacked attention to detail in that candidates initially calculated the denary ASCII value of H to be something other than 72. This error was then followed through to the binary representation. Candidates should be well advised to check their workings to combat such errors.

Question 2 (d)

(d) Show the denary number −2⅝ as a floating-point binary number with a 6-bit mantissa and 4-bit exponent, both stored using two's complement representation.

....

....

....

....

....

.... **[3]**

The presentation of the responses to 'denary to floating point' conversion questions is improving. Although, some candidates are not reading the question thoroughly and presenting their final answer in a different format to that specified in the question i.e. a 6-bit mantissa and a 4-bit exponent.

Question 3

3* "The Megahertz Myth" is the name given to the argument that clock speed alone is an insufficient method to compare the performance of processors.

Discuss the extent to which you agree with this argument. You should include any other factors that might affect a processor's performance.

....

....

....

....

....

.... **[9]**

Candidates were assessed on the quality of their extended response in this question. Most candidates correctly cited number of cores and cache as additional factors which could affect processor performance. The level of discussion varied with most candidate responses being given level 2.

Question 4 (b)

A stack is shown in Fig. 4.1 before a set of operations are carried out on it.

(b) Draw what the stack shown in Fig. 4.1 would look like after the following operations:

```
push("A"), push("B"), pop(), push("C"), pop(), push("D")
```
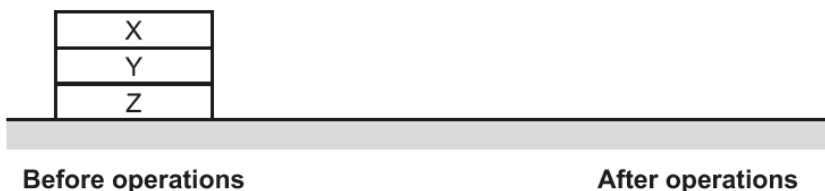
X
Y
Z

Before operations   **After operations**

Fig. 4.1

[2]

This part question was generally well answered.

Question 4 (c)

Fig. 4.2 shows a stack in two states: State One and State Two.

X
Y
Z

State One

A
Z

State Two

Fig. 4.2

(c) List the operations needed to get the stack from State One to State Two.

....

....

.... [3]

In most cases candidates used the operations given in the stem of the question correctly. Some candidates did not achieve full marks for incorrect use of the pop () operation. They incorrectly passed a parameter to specify the item to pop. Candidates should be reminded that a stack data structure can only pop items from the top therefore no parameter is required.

Question 4 (d)

A queue is shown in Fig. 4.3.

(d) Draw what the queue shown in Fig 4.3 would look like after the following operations:

```
enqueue("A"), enqueue("B"), dequeue(), enqueue("C"), dequeue(),
enqueue("D")
```

X	Y	Z

Front   Rear

Before operations   **After operations**

Fig. 4.3

[2]

Too many candidates did not show the position of the front and rear pointers in their response and therefore did not gain credit on this question.

Question 5

5*   **Item removed due to third party copyright restrictions**

The quote above suggests that the Internet is a lawless place.

Discuss the extent to which you agree with this statement and how important you feel that the regulation of the internet is.

....

....

....

....

....

.... **[9]**

Candidates were assessed on the quality of their extended response in this question. Most candidates offered a reasonably well supported discussion citing appropriate legislation which can be applied to the internet. Many continued the discussion offering valid reasons why the application of such legislation may not be successful. Many candidates were given L2 or L3.

Question 6 (a)

6   A programmer has written the following code designed to take in ten names then print them in a numbered list.

```
name1 = input("Enter a name: ")
name2 = input("Enter a name: ")
name3 = input("Enter a name: ")
name4 = input("Enter a name: ")
name5 = input("Enter a name: ")
name6 = input("Enter a name: ")
name7 = input("Enter a name: ")
name8 = input("Enter a name: ")
name9 = input("Enter a name: ")
name10 = input("Enter a name: ")

print("1. " + name1)
print("2. " + name2)
print("3. " + name3)
print("4. " + name4)
print("5. " + name5)
print("6. " + name6)
print("7. " + name7)
print("8. " + name8)
print("9. " + name9)
print("10. " + name10)
```

It has been suggested that this code could be made more efficient and easier to maintain using an array or a list.

(a) Define the term 'array'.

....

....

....

.... **[2]**

It was clear that some candidates were unsure about the difference between an array and a list. Centres must make sure that all aspects of the specification are fully addressed regardless of the programming language used as the vehicle for delivery of algorithms.

Question 6 (b)

(b) Write a more efficient version of the programmer's code using an array or a list.

....

....

....

....

....

.... **[5]**

Many candidates scored well on this question. Although, some candidate responses demonstrated confusion when using language specific iterative statements, resulting in the loop iterating more or less than 10 times. Other candidates placed the input and output statements within the same loop which does not meet the requirements of the question.

Question 7 (b)

(b) Describe the purpose of the Regulation of Investigatory Powers Act.

....

....

....

....

....

.... **[3]**

Many candidate responses lacked the technical terminology appropriate for this level of study. The terms 'surveillance' and 'communication' were used too generically. Candidates need to make it clear that the surveillance is technological and the communication electronic.

Question 8 (a)

8   A theatre has a website showing its productions and allowing people to make bookings.

Part of the site is shown below. The words 'Book tickets' link to the page 'bookings.html'.

Upcoming productions:
1. Macbeth
2. Blood Brothers
3. An Inspector Calls

Book tickets

(a)   Write the HTML code for the extract above.

....

....

....

....

....

.... **[3]**

It was evident that some candidates did not have the required awareness of the HTML tags outlined in the specification appendix. Those candidates who did, generally scored well on this question. See Exemplar 1 which was given full marks.

Exemplar 1

```
<p> Upcoming productions: </p>
<ol>
   <li> Macbeth </li>
   <li> Blood Brothers </li>
   <li> An Inspector Calls </li>
</ol>
<br>
<a href=" bookings.html"> Book Tickets </a>
```

Question 8 (b)

The theatre website also uses CSS.

(b) Give an example of why the theatre website might use CSS.

....

.... **[1]**

Many candidate's response to this question lacked evidence of technical understanding. '…to make the website more appealing' is too vague for this level a study.

Question 8 (c).

The theatre offers price reductions on Tuesdays and Wednesdays.

The theatre manager wants some text on the website to display "Midweek Special – tickets £15 tonight" on Tuesdays and Wednesdays, and "Tickets £20 tonight" on all other nights.

The website coders will use a div tag with the id 'prices' to do this. The Javascript code to change the contents of the div tag has been started below. The variable dayCode holds a number representing the current day of the week (0 for Sunday, 1 for Monday, 2 for Tuesday and so on).

(c) Complete the Javascript code below so the correct message is displayed in a div tag with the id 'prices'.

```
var date = new Date();
var dayCode = date.getDay();
//0 is Sunday, 1 Monday, 2 Tuesday etc
var priceText="";
```

                                                                    = priceText;

[4]

There was a very clear distinction in candidate responses between those who had practical JavaScript experience and those who did not. Candidates with that experience generally scored well on this question. See Exemplar 2 which was given full marks. Centres are reminded that candidates should have experience of writing basic JavaScript code like that required in this question.

Exemplar 2

```
if dayCode == 2 or dayCode == 3 {
    priceText='Midweek special- tickets £15 tonight'
} else {
    priceText='Tickets £20 tonight'
}
document.getElementById('prices').innerHTML = priceText;
```

Question 8 (d)

When a booking is made on the website it is stored in a database.

(d) Describe **one** of the tables you might expect to see in this database.

....

....

....

.... **[2]**

Most candidates gave an appropriate table but did not describe relevant attributes of their specified table.

Question 9

9 Complete the truth table to represent the following Boolean expression.

$Q \equiv \neg (A \wedge B) \vee C$

A	B	C	Q
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

[2]

Most candidates achieved both marks on this question. The presentation of some responses made it difficult to determine if the candidate was offering a zero or a one. Centres should encourage candidates to rewrite their response if they have overwritten a zero with a one and vice versa.

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