

Tuesday 21 May 2019 – Morning

AS Level Computer Science

H046/01 Computing Principles

Time allowed: 1 hour 15 minutes



Do not use:

- a calculator



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

Last name

INSTRUCTIONS

- Use black ink.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).

INFORMATION

- The total mark for this paper is **70**.
- The marks for each question are shown in brackets [].
- Quality of extended responses will be assessed in questions marked with an asterisk (*).
- This document consists of **16** pages.



No calculator can be used for this paper

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

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

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.....
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.....
.....
.....
..... [4]

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

.....
.....
.....
..... [2]

(c) State the name of a type of translator software other than a compiler or interpreter.

.....
..... [1]

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]

2 Variables in programs contain specific types of data.

(a) Complete the table below to suggest a suitable data type for each piece of data.

Data	Data Type
'H'	Character
"Hello"	
35	
-2.625	Real
True	

[3]

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

.....
 [1]

(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]

(d) Show the denary number $-2\frac{5}{8}$ as a floating-point binary number with a 6-bit mantissa and 4-bit exponent, both stored using two's complement representation.

.....

 [3]

4 Stacks and queues are both data structures.

(a) State which of a stack or queue would be considered as a 'First In First Out' data structure.

..... [1]

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")
```

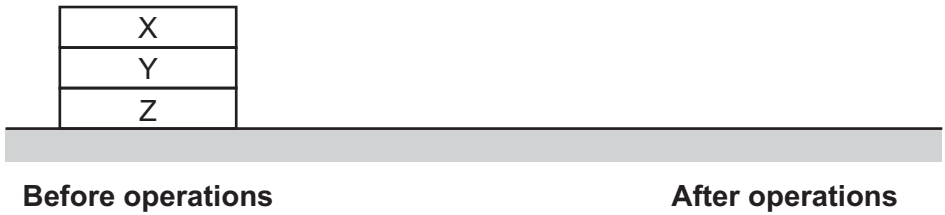


Fig. 4.1

[2]

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



Fig. 4.2

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

.....
.....
..... [3]

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")`



Fig. 4.3

[2]

- 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]

7 A number of laws govern the use of computers.

(a) For each of the following scenarios tick **one** law that is being broken.

Scenario	Computer Misuse Act	Copyright Design and Patents Act	Data Protection Act
A bank accidentally publishes customers' account details on its website.			
Someone downloads a pirated version of a piece of software that users would ordinarily have to pay for.			
Someone writes and distributes a virus.			

[3]

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

.....

.....

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.....

.....

[3]

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]

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]

- 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]

END OF QUESTION PAPER

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