

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Tuesday 21 May 2019 – Morning**

**AS Level Computer Science**

**H046/01 Computing Principles**

**Time allowed: 1 hour 15 minutes  
plus your additional time allowance**

**DO NOT USE:  
a calculator**

**Please write clearly in black ink.**

**Centre number**

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**Candidate number**

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**First name(s)** \_\_\_\_\_

**Last name** \_\_\_\_\_

**READ INSTRUCTIONS OVERLEAF**



## **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 (\*).**

<b>NO CALCULATOR CAN BE USED FOR THIS PAPER</b>
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**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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**[4]**

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

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**[2]**

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

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\_\_\_\_\_ **[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. [3]

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

- (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.

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[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]**

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#### 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")` [2]

FIG. 4.1

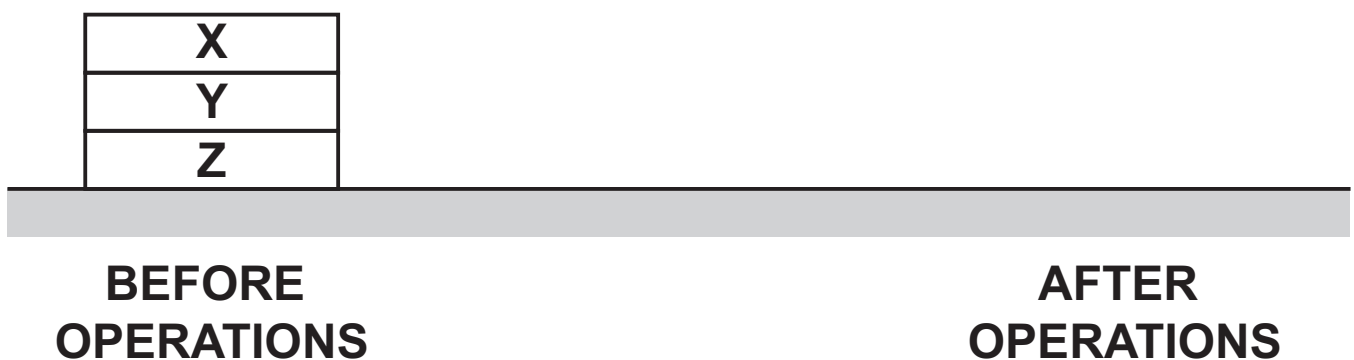


Fig. 4.2 shows a stack in two states: State One and State Two.

FIG. 4.2



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

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[3]

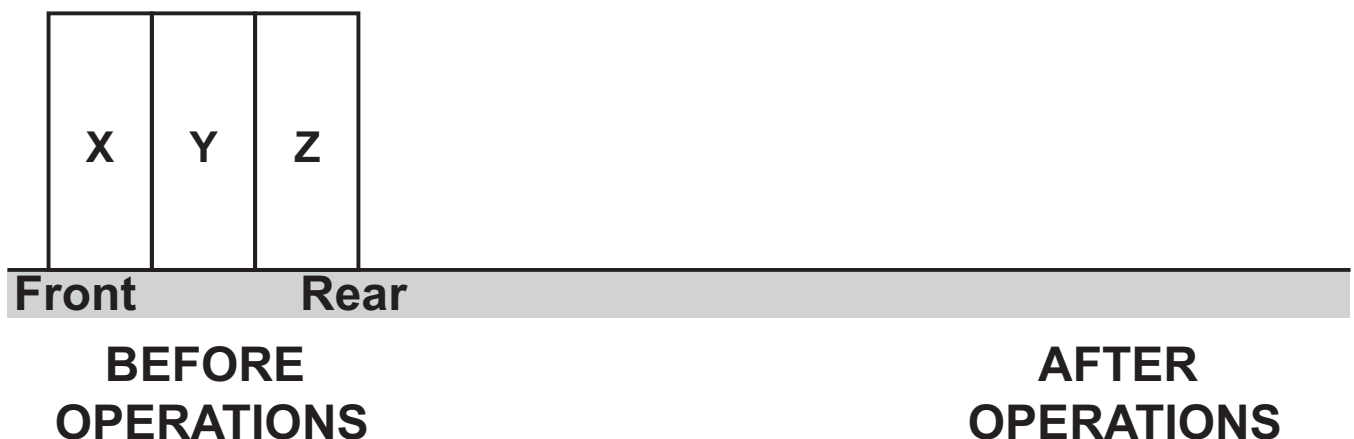
A queue is shown in Fig. 4.3.

- (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")`

[2]

**FIG. 4.3**



**5\* “It’s like the Wild West, the Internet. There are no rules.” – Steven Wright.**

**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]**

[illegible]

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

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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’.**

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**[2]**

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[5]

**7 A number of laws govern the use of computers.**

**(a) For each of the following scenarios tick ONE law that is being broken. [3]**

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



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

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**[3]**

- 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.

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[3]

**The theatre website also uses CSS.**

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

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**[1]**

**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.**

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**[2]**

- 9 Complete the truth table to represent the following Boolean expression. [2]

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

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	

END OF QUESTION PAPER



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