

## UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education Advanced Subsidiary Level and Advanced Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		



COMPUTING 9691/13

Paper 1 May/June 2013
1 hour 30 minutes

Candidates answer on the Question Paper.

No additional materials are required.

No calculators allowed.

## **READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

No marks will be awarded for using brand names for software packages or hardware.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of 12 printed pages.



1	(a)	What is an operating system?
		[1]
		[1]
	(b)	There are two different types of real-time operating system.
		Give an example application for each type. Explain why each application requires a real-time operating system.
		Application 1
		Explanation
		Application 2
		Explanation
		[4]
	(c)	Many household appliances contain embedded microprocessors.
		Explain why most of these microprocessors don't need operating systems.
		[2]

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2	(a)	At the end of a word processing session the document is saved to the hard disk.
		Describe how a buffer and interrupts are used during this data transfer.
		[4]
	(b)	Describe the functions of each of the following components of a processor.
		control unit
		memory unit
		[4]

		c. Sensors are being used to detect ground tremors.							
(a)		scribe how the sensors and a computer would be used to gather data which is cessed to warn scientists of any abnormal seismic readings.							
		[14]							
	•••••	[4]							
(b)		e information received is processed and then displayed on large output screens in a strol room.							
	(i) Scientists must be able to quickly assess the incoming data.								
		Describe a suitable interface. Include use of colour, content and layout in your description.							
		[3]							

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	(ii)	Describe the input devices you would expect to see in the control room. Justify your choice of devices.	For Examiner's Use
		Input devices	
		Justification	
		[3]	
4	Comput	ter Aided Design (CAD) uses many specialist input and output devices.	
	Name <b>t</b> CAD pa	hree specialist input or output devices and describe what they are used for in the ckage.	
	Device	1	
	Descrip	otion	
	Device	2	
		otion	
	Device	3	
	Descrip	otion	
		[6]	
		101	1

5 A table contains the values below											
	۸,	$\sim$	hΔ	HAC	val	tha	ntaine	٠,	tabla	Δ	5

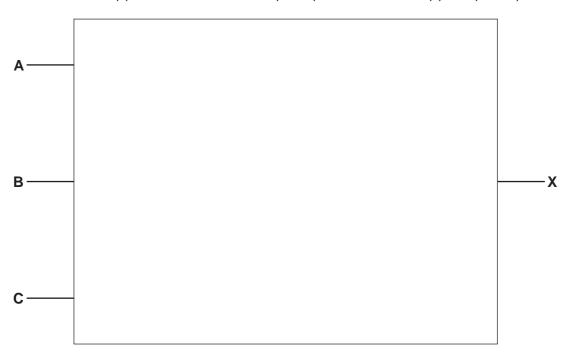
3	4	1	4	5	3
2	1	6	-4	0	0
0	0	2	2	1	8

(a)	Describe an array MyTable which would be suitable to store the above table.
	[3]
/ <b> </b> _\	
(D)	Using your answer for (a) show how the value 6 is referenced.  [1]
	[1]
(c)	The table should only contain values greater than 0. How could any values not meeting this criterion be located in the array, $MyTable$ , and their position in that array identified?
	[3]

**6 (a)** Draw the logic circuit corresponding to the following logic statement:

X = 1 IF ( (A is NOT 1 AND B is 1) OR (B is 1 AND C is 1) ) OR (C is 1)

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[5]

**(b)** Complete the truth table for the above logic statement:

			Working space	
Α	В	С		X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

7 A company has a number of shops that sell DVDs, CDs and books. Its existing computer system is no longer adequate. It has hired a systems analyst to develop improvements to in-shop customer sales, stock control and marketing.

(a)	One part of the design is the file structures. Factors to consider include use of fixed length or variable length records.
	Describe <b>four</b> more parts that the systems analyst will need to design. Include for each part the factors that need to be considered.
	Part 1
	Factors
	Part 2
	Factors
	Part 3
	Factors
	Part 4
	Factors
	[8]

(b)	The new s	system	need	ds to be	teste	d.						
	Describe developm		test	results	are	recorded	and	explain	how	they	affect	further
		•••••										
		•••••										
		•••••										
												[3]

8 The term LOGIC GATES is to be transmitted as 12 bytes of data.

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Each character in the term has an ASCII value. The system is using **odd parity** and the left-most bit is used as the parity bit. An additional parity byte is also sent after the term.

The following bytes arrived at their destination:

_		1	2	3	4	5	6	7	8
	letters				eceived				
1	L	0	1	0	0	1	1	0	0
2	0	0	1	0	0	1	1	1	1
3	G	1	1	0	0	0	1	1	1
4	I	0	1	0	0	1	0	0	1
5	С	0	1	0	0	0	0	1	1
6	<space></space>	0	0	1	1	0	0	1	0
7	G	1	1	0	0	0	1	1	1
8	Α	1	1	0	0	0	1	0	1
9	Т	0	1	0	1	1	0	0	0
10	E	0	1	0	0	0	1	0	1
11	S	0	1	0	1	0	1	1	1
12	parity byte	0	1	0	0	1	1	1	1

(a) One of the bytes has an error after transmission.

(i)	Locate which character contains the error.	
		[1]
(ii)	Indicate which bit has been transmitted incorrectly.	
	column number	
	row number	[1]
(iii)	Explain how you arrived at your conclusion.	
		เรา

**(b)** The following bytes were sent during a data transmission:

0	0	1	1	0	0	0	1
1	0	0	1	1	0	1	1
1	1	1	0	0	0	0	0

Explain how a checksum is used to check during data transmission.	whether the bytes have been corrupted
	[3]

	supermarket uses barcodes as part of its item price retrieval and automatic stock control stem.	For Examiner's Use
A c	sustomer takes items to the point-of-sale (POS) checkout. The barcodes are scanned.	
(a)	Describe what happens next regarding data retrieval and stock control.	
	[5]	
(b)	Name <b>two</b> devices needed at the POS checkout. Give a reason for your choice of device.	
	Device 1	
	Reason	
	Device 2	
	Reason	
	[4]	

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