

	UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS General Certificate of Education Advanced Subsidiary Level and Advanced Level	In
CANDIDATE NAME		
CENTRE NUMBER	CANDIDATE NUMBER	
COMPUTING	9691/13	
Paper 1	May/June 2013	
	1 hour 30 minutes	
Candidates ans	swer 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.



(a)	What is an operating system?
	[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]

2

For Examiner's Use

1

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

- **3** A computer system is being developed to monitor seismic (earthquake) activity in the Antarctic. Sensors are being used to detect ground tremors.
 - (a) Describe how the sensors and a computer would be used to gather data which is processed to warn scientists of any abnormal seismic readings.

[4]

- (b) The information received is processed and then displayed on large output screens in a control 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]		 [3]

For

Examiner's Use

	(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	er Aided Design (CAD) uses many specialist input and output devices.	
	Name t CAD pa	hree specialist input or output devices and describe what they are used for in the ckage.	
	Device	1	
	Descrip	tion	
	Device	2	
	Descrip	tion	
	Device	3	
	Descrip	tion	
		[6]	

5	A ta	able contains the values below:	For
		$ \begin{vmatrix} 3 & 4 & 1 & 4 & 5 & 3 \\ 2 & 1 & 6 & -4 & 0 & 0 \\ 0 & 0 & 2 & 2 & 1 & 8 \end{vmatrix} $	Examiner's Use
	(a)	Describe an array MyTable which would be suitable to store the above table.	
		[3]	
	(b)	Using your answer for (a) show how the value 6 is referenced.	
		[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]	



[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 **four** 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]

For

Examiner's Use (b) The new system needs to be tested.

Describe how test results are recorded and explain how they affect further development.

[3]

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

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	bytes received								
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 C 0 1 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	
(ii)	 (ii) Indicate which bit has been transmitted incorrectly. column number row number 									
(iii)	(iii) Explain how you arrived at your conclusion.									
u I										
										[3]

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

11

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

[3]

9 A supermarket uses barcodes as part of its item price retrieval and automatic stock control system.

A customer 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 two 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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