UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

COMPUTING **9691/12**

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.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

For
iner's

1   **(a)** Describe the terms *buffer* and *interrupt*.

buffer ....

....

....

interrupt ....

....

.... [2]

(b) (i) Explain the role of the buffer and interrupts when a large document of over 200 pages is sent to a laser printer.

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.... [3]

(ii) The use of two buffers would speed up the printing process.

Explain why.

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.... [2]

2 (a) State **three** different types of secondary storage media.
Explain how digital data is stored on each.

Type 1 ....

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Type 2 ....

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Type 3 ....

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.... [6]

(b) A remote-controlled toy car contains both RAM and ROM. The car can be programmed to carry out a number of manoeuvres.

(i) Describe the main differences between RAM and ROM.

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.... [2]

(ii) How are the two types of memory used in the car?

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.... [2]

[Turn over

3   (a) Describe what is meant by:

   (i)   serial, simplex transmission

   ....

   ....

   ....

   (ii) parallel, full duplex transmission

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   ....

   .... [2]

(b) The word **C O M P U T I N G** is to be transmitted as nine bytes of data. Each character in the word has an ASCII value.

The system uses even parity and the left most bit is added to make each byte even parity.

   (i)   Complete the codes so that they all have even parity.

C		1	0	0	0	0	1	1
O		1	0	0	1	1	1	1
M		1	0	0	1	1	0	1
P		1	0	1	0	0	0	0
U		1	0	1	0	1	0	1
T		1	0	1	1	0	0	0
I		1	0	0	1	0	0	1
N		1	0	0	1	1	1	0
G		1	0	0	0	1	1	1

[2]

   (ii) Fill in the parity byte in the final row in the table above.   [1]

For
...iner's

(iii) The character 'P' is received incorrectly as   0 1 0 1 1 0 0 0

Describe how horizontal and vertical parity checking would be used to detect t...
erroneous bit.

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.... [3]

4 (a) An airport uses electronic devices as part of its security systems.
One system matches the face of a passenger with the photograph in their passport.

What **two** input devices would be needed to do this? Give reasons for your choice of
device.

Device 1 ....

Reason ....

....

....

Device 2 ....

Reason ....

....

.... [4]

[Turn over

(b) When the passenger goes to the check-in desk, their luggage is weighed.

(i) How does the computer system capture the luggage weight? How does it the check that it does not exceed the airline's weight limit?

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.... [3]

(ii) The computer also prints out a label identifying passenger ID, flight number and destination. This label, which is tied onto the luggage, is computer readable.

Describe a suitable data capture system which could be used to read these labels so that the luggage can be tracked.

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.... [2]

For
iner's

5 (a) A systems analyst has been asked to improve a company's order processing sys

One stage in the process is design. Different types of diagram can be used at th
stage by the systems analyst.

Name **one** of these diagrams and describe its features.

Name ....

Features ....

....

....

.... [3]

(b) Technical documentation is produced as part of the implementation stage.

Name **two** typical items of technical documentation and explain their use.

Item 1 ....

Use ....

....

....

Item 2 ....

Use ....

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.... [4]

[Turn over

6   A large company has four separate departments. The following table describes [each] department and shows tasks that involve a computer system.

	DEPARTMENT	TASKS
(i)	Production - The factory where products are manufactured	Produce quality control stickers to place them on finished items
(ii)	Design Office - Where new products are designed	Produce and present prototypes of new models
(iii)	Marketing	Answer customer queries and produce sales brochures
(iv)	Finance - Wages and salaries department	Produce wage/salary slips each month

(a)   Describe, with a reason, a suitable output device which could be used in **each** of the four departments. Your devices should be different.

   (i)   Production

       Device ....

       Reason ....

       ....

       ....

   (ii)   Design Office

       Device ....

       Reason ....

       ....

       ....

   (iii)   Marketing

       Device ....

       Reason ....

       ....

       ....

(iv) Finance

Device ....

Reason ....

....

.... [8]

(b) The factory also has a control room where an operator monitors and controls the manufacturing process.

Describe a suitable interface for the operator. Include use of colour and type of layout in your description.

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.... [3]

7   A game of "noughts and crosses" is shown below. Players take alternate turns to place X or O in one of the empty boxes until one player gets three identical symbols in a (across, down or diagonal) or the grid becomes full. The grid shows the game after the fir five turns. Player X has the next turn.

	X	O
	X	
O	O	

(a) (i) Describe how the Xs and Os would be stored in a two-dimensional array called `Grid`.

....

....

....

....

.... [2]

(ii) State the data type for this array.

.... [1]

(iii) What value would you use to initialise this array?

.... [1]

(b) How would the computer use this array to determine if anyone has won the game?

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.... [4]

(c) In the game shown, the computer was player 'O' and player 'X' was a human.

Name a suitable input device to allow a human player to select a square to place the 'X'.

Give a reason for your choice of device.

Input device ....

Reason ....

....

....

[2]

8 (a) Describe how a hashing algorithm would be used when a random access file is being accessed.

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[3]

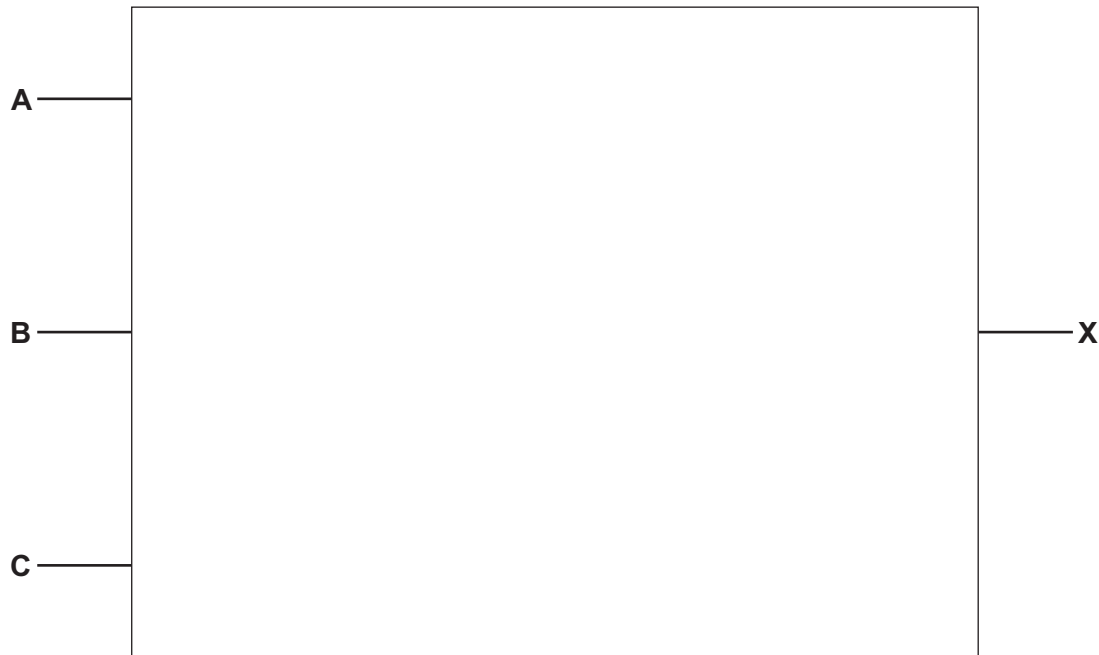**(b)** Describe **one** method used to handle collisions when creating a random access file.

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....

[2]

[Turn over

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

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

A

B ———————————— X

C

[4]

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

A	B	C	Working space	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]