



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS General Certificate of Education Advanced Level

CANDIDATE NAME	Ξ
CENTRE NUMBER	



9691/33

October/November 2011

2 hours

COMPUTING

Paper 3

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.

International Examinations



1

ac di
[2]
[4]

For iner's

	The state of the s
	3
(a)	Describe the use of the Memory Data Register (MDR). Explain how the contents change during the fetch-execute cycle.
	[3]
(b)	Name three types of bus that are used in a computer. For each one explain what it is used for.
	[6]

3

(α)	001	onvert the following denary numbers into 8-bit, sign and magnitude, binary num				
	(i)	+39				
	(ii)	- 47				
		[3]				
(b)	Cor	overt the following denary numbers into 8-bit, two's complement, binary numbers:				
	(i)	- 3				
	(i)	- 3				
	(i)	- 3				
	(i)	- 3				
	(i)	- 3				
		[2]				
		[2]				
		[2]				

(c) A particular computer uses a single 10-bit word to store a floating-point represe of a number.

	www.
	5
of a	particular computer uses a single 10-bit word to store a floating-point represe a number.
	particular computer uses a single 10-bit word to store a floating-point representation and the remaining 4 bits are used to store the mantissa and the remaining 4 bits are used to the exponent. Explain why 000101 0100 = $2\frac{1}{2}$ using this notation.
(i)	Explain why 000101 0100 = $2\frac{1}{2}$ using this notation.
	[2]
(ii)	Rewrite the binary value of this floating-point representation so that it is in normalised form.
	[2]
(iii)	011001 0011 is a normalised floating-point number.
	By converting each of the mantissa and the exponent into a denary number first, write this number in denary.
	[3]

The health system in a country consists of a number of local surgeries. Individual give medical assistance to people in the immediate area. In addition to this there a number of main hospitals. Each hospital provides services which the doctors are unable provide in their surgeries. The main hospitals and the surgeries which they serve are linked by using an intranet. (a) Describe what is meant by an intranet. [3] (b) Explain the advantages and disadvantages of using an intranet rather than the Internet.		44
(b) Explain the advantages and disadvantages of using an intranet rather than the Internet.		6
(b) Explain the advantages and disadvantages of using an intranet rather than the Internet.	giv nur pro	e health system in a country consists of a number of local surgeries. Individual a medical assistance to people in the immediate area. In addition to this there an other of main hospitals. Each hospital provides services which the doctors are unable vide in their surgeries. In addition to this there are unable vide in their surgeries. In addition to this there are unable vide in their surgeries. In addition to this there are unable vide in their surgeries.
(b) Explain the advantages and disadvantages of using an intranet rather than the Internet.	(a)	Describe what is meant by an intranet.
(b) Explain the advantages and disadvantages of using an intranet rather than the Internet.		
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		[3]
	(b)	Explain the advantages and disadvantages of using an intranet rather than the Internet.

[5]

www.PapaCambridge.com A new car is being designed. It is decided that different designs for the braking 5 should be tested using a computer simulation of each design rather than built prototypes. (a) Describe three advantages of using computer simulation when testing each design. [6] **(b)** Simulation allows for the braking system to be tested in different conditions. Describe the variables in the simulation that would need to be changed in order to replicate different driving conditions.

6	(a)	Des file.	cribe the advantages of using a relational database to store data rather that
			[3]
	(b)	data Whe	a about guests in a hotel are stored in a relational database. One part of the abase consists of a table of GUEST details. This is linked to a table ACCOUNT. enever a guest orders something in the hotel, the charge for that service is stored in ACCOUNT table.
		(i)	State the primary key of the GUEST table, justifying your choice.
			[2]
		(ii)	State a secondary key in the ACCOUNT table, justifying your choice.
			[2]
		(iii)	State what is meant by a foreign key.
			[1]
		(iv)	State a foreign key in the ACCOUNT table, justifying your choice.

For iner's

[2]

7	(a)	Exp high	plain how variables are managed during the different stages of compilation-level language program.
			[7]
	(b)	(i)	Give two advantages of using a compiler rather than an interpreter to translate a high-level language program.
			[2]
		(ii)	Describe an advantage of using an interpreter rather than a compiler to translate a high-level language program.
			[2]

For iner's

		The state of the s
		how the following memory management techniques may be used: Paging
Ехр	lain	how the following memory management techniques may be used:
	(i)	Paging
	(ii)	Segmentation
	\'' <i>)</i>	- Cognonation
		[6]
(a)	Stat	te the meaning of the following types of programming paradigm:
. ,	(i)	Declarative
	(ii)	Procedural
		[2]
		(ii) (a) Stat (i)

(b)	The c	class diagram e.	n shows son	ne of the inform	ation about	plants on sa	ale in a	Cambr
				Plant				
			So Co 	ilType st				
				tSoilType() tCost()				
		ı		1		1		
]			1	
		Tre	ee			ulb	_	
		WoodType CountryOfC	Origin		Colour			
		getWoodTy getCountry(getColour())		
	Use t	he diagram to	help vou ex	cplain the meanir	na of the terr	ms:	-	
		Class						
								[2]
	(ii) li	nheritance						
	1.							
								[2]
	(iii) E	Encapsulation						
	181							

		12	30
10	computer system.	ry each have an identity code which identifies their reco	
	<group></group>	::= <group> <group><number> ::= <letter> <letter><group> ::= A B C D ::= <digit> <digit><digit> ::= 0 1 2</digit></digit></digit></group></letter></letter></number></group></group>	
	(a) Explain why eac	h of the following identity codes is invalid:	
	(i) 2BA		

	[3

(b) The definition is changed to allow only a number which begins with a 1 or a 2. The first digit in the number is now defined as

<non-zero-digit> ::= 1 | 2

Draw a syntax diagram to show the definition of an identity code using only the terms:

- non-zero-digit
- digit

(ii) XAA

(iii) ACB021

- letter
- identity-code

[4]