



CANDIDATE NAME

CENTRE NUMBER

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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COMPUTER STUDIES

0420/11

Paper 1

October/November 2013

2 hours 30 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

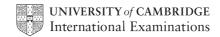
No marks will be awarded for using brand names of software packages or hardware.

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.

For Examiner's Use

This document consists of 20 printed pages.



[Turn over

- Internet security is a major issue for many people. The following is a list of five security issues:

 hacking 1

 - viruses

Choose three of these security issues. For each one, describe the security issue and suggest a way of protecting against it.
Security issue 1
Description of issue
Method of protection
Security issue 2
Description of issue
Method of protection
Method of protection
Security issue 3
Description of issue
Method of protection
[6]

WWW. Papa Cambridge Com (a) Mobile phones are communication devices. They allow communication via spe 2 text messaging. (i) Most mobile phones offer *predictive texting*. State what is meant by this term. (ii) What two additional functions would you expect to find on a mobile phone? 2 (b) Connecting a USB telephone to a computer allows communication using VoIP technology. (i) Give **one** advantage of using VoIP rather than other telephone systems. (ii) Give one disadvantage of using VoIP rather than other telephone systems. (iii) To use VoIP, there is no need to use a USB telephone. What other hardware could be used to allow verbal communications?

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- A motor car manufacturer offers various combinations of 3
 - seat colours
 - seat materials
 - car paint colours

A database was set up to help customers choose which seat and paint combinations were possible.

> seat material car paint colours

code	cloth	leather	seat	white	red	black	blue	green	silver	grey
			colour							
СВ	Υ	N	black	Υ	Υ	Υ	Υ	Υ	Υ	Υ
LB	N	Υ	black	Ζ	Υ	N	Ν	N	Υ	Υ
CC	Υ	Ν	cream	Ζ	Υ	Υ	Υ	N	N	Ν
LC	N	Υ	cream	Ζ	Υ	Υ	Υ	N	N	Υ
CG	Υ	Ν	grey	Ζ	Υ	Υ	Υ	Υ	Υ	Ζ
LG	N	Υ	grey	Ν	Υ	N	Υ	N	Υ	Υ
CR	Υ	Ν	red	Υ	Ν	Υ	Ν	N	Υ	Υ
LR	Ν	Υ	red	Υ	Ν	Υ	Ν	N	Υ	Υ
CL	Υ	Ν	lime	Ζ	Ζ	N	Υ	N	N	Ζ
LL	N	Y	lime	N	N	Υ	Υ	Υ	N	N

(NOTE: N = no, not a possible combination, Y = yes, combination is possible)

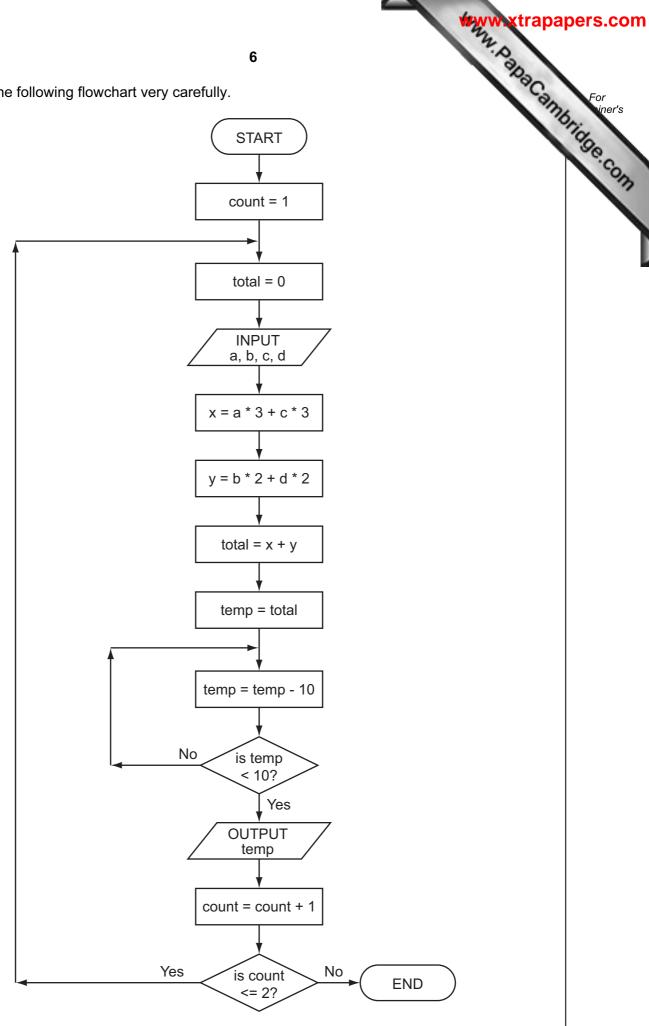
How many records are shown in the database?	
	[1]
The following search condition was entered:	
(cloth = "Y") AND (blue = "Y")	
Using code only, which records will be found?	
	[2]
A customer wanted to know the possible combinations for a car with leather seats a either silver or grey paint colour.	ınd
What search condition would need to be input?	
	The following search condition was entered: (cloth = "Y") AND (blue = "Y") Using code only, which records will be found? A customer wanted to know the possible combinations for a car with leather seats a either silver or grey paint colour.

[2]

(u)	seat materials were not a possible combination with green paint.	ch seat colou
	What search condition would he need to enter?	
		[1]
(e)	Give one advantage of using the codes Y and N in the database ra and No.	ather than using Yes
		[1]
(a)	Seven hardware items are shown on the right hand side in the diag applications are shown on the left in the diagram.	ram below. Three
	By drawing arrows, link each application to the appropriate hardware hardware item must be used once only):	re items (each
		speakers
CO	mputer aided design (CAD)	light pen
		microphone
vid	eo conferencing	spaceball
		data goggles
vir	ual reality	webcam
		data gloves
		[3]
(b)	Name one additional item of hardware used in each of the three ap the above diagram.	oplications named in
	CAD	
	video conferencing	
	virtual reality	[3]

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5 Study the following flowchart very carefully.



Complete the trace table for the following two sets of data:

(i)
$$a = 5, b = 4, c = 1, d = 9$$

(ii)
$$a = 5, b = 9, c = 4, d = 1$$

count	total	а	b	С	d	х	у	temp	ОИТРИТ

[6]

[Turn over

6 A spreadsheet was set up to calculate values of ${\bf v}$ based on the formula:

·	adsheet was set up : u + a * t	to calculate values	8 of v based on the	formula:	wxtrapapers.com
	Α	В	С	D	o.G.
1	value of u	value of a	value of t	result v	ON
2	20	9.81	10		
3	10	9.81	20		
4	30	9.81	40] '
5	40	9.81	30		
6	50	9.81	20]
7	20	9.81	50		
8]

(a)	A student typed in = (D2 + B2 * C2) into cell D2.	
	Why would this formula produce an error message?	
		[1]
(b)	What is the correct formula that should be in cell D2?	
	=	[1]
(c)	If this formula was replicated down to cell D7, what formula would be in D7?	
	=	[1]
(d)	What formula is required in cell D8 to find the highest value of <i>v</i> ?	
	=	[1]
(e)	Column B has the same value throughout.	
	If column B was removed, what would be the new formula in D2?	

•	viner's	
-		

(a)	The health and safety of the staff when using computers is very important.
	(i) It was discovered that two staff were suffering from PSI in the hands as

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		9 any employs staff who frequently use computer systems. health and safety of the staff when using computers is very important. It was discovered that two staff were suffering from RSI in the hands and wrists.
A c	omp	any employs staff who frequently use computer systems.
(a)	The	health and safety of the staff when using computers is very important.
	(i)	It was discovered that two staff were suffering from RSI in the hands and wrists.
		What could cause such problems?
		How could this health risk be removed or reduced?
	(ii)	Three accidents had been caused by staff tripping over wires in the office.
		How could this safety risk be removed?
	(iii)	Name another health and safety risk and describe what problem it might cause.
		Name of risk
		Description of problem
(b)		ore the introduction of computers, the staff used to do all the office tasks (such ag) manually.
	Des	scribe two ways the introduction of computers might have affected the staff.
	1	
	2	

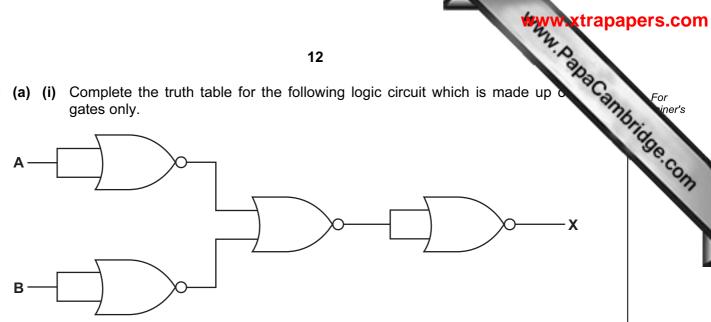
A piece of pseudocode was written to input 1000 positive numbers and then out highest and lowest numbers.
10 highest = 0 20 lowest = 0 30 for count = 1 to 100 40 input number 50 if number > highest then number = highest 60 if number < lowest then number = lowest 70 count = count + 1 80 next count 90 print highest, lowest
There are errors in the code.
Locate these errors and suggest a correction.
Error 1
Correction
Error 2
Correction
Error 3
Correction

8

	11	**************************************
Error 4		For ine
		Tide
Correction		
		[8]
Describe three possible	a number of attachments to his friend, Nicconproblems Nicola might have when sh	
Describe three possible attachments.	problems Nicola might have when she	
Describe three possible attachments.	problems Nicola might have when she	e tries to open these
Describe three possible attachments.	problems Nicola might have when she	e tries to open these
Describe three possible attachments.	problems Nicola might have when she	e tries to open these
Describe three possible attachments. 1	problems Nicola might have when she	e tries to open these
Describe three possible attachments. 1	problems Nicola might have when she	e tries to open these

[Turn over

10 (a) (i) Complete the truth table for the following logic circuit which is made up gates only.

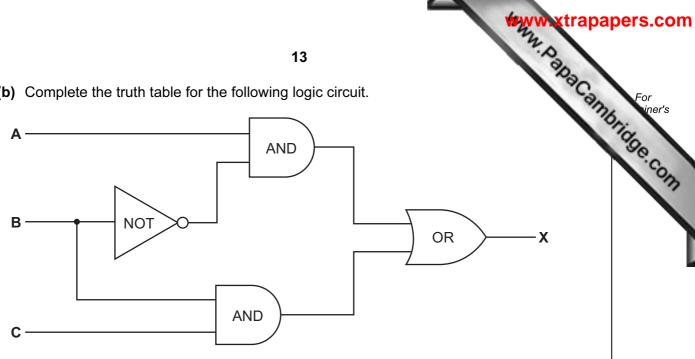


		Working space	
Α	В		X
0	0		
0	1		
1	0		
1	1		

[2]

(ii)	What single logic gate has the same function as the above circuit?	
(/		

(b) Complete the truth table for the following logic circuit.



			Working space	
Α	В	С		Х
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]

11 A denary number can be represented as an 8-bit binary number. For example:

27 would be represented as:

	128	64	32	16	8	4	2	1
	0	0	0	1	1	0	1	1
,	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
	128	64	32	16	8	4	2	1
	0	0	1	1	0	1	1	0

All the bits in the binary number have now been shifted (moved) one place to the left.

(a)	What denary	number	does this	now repr	resent?
-----	-------------	--------	-----------	----------	---------

· ·	۲4	1
	11	
		-

1	h)	What effect	did the sh	ift have	on the	original	denary	number?
١	ω_I	vviiat ciicct	. uiu tiic si	IIIL Have	OII LIIC	Original	uchai y	HUHHDCH:

F41	,
l'i	ı

(c) If the above binary number was shifted another one place to the left, what denary number would it be equivalent to?

[1]

(d) (i) Represent the denary number 46 as an 8-bit binary number.

128	64	32	16	8	4	2	1

[1]

(ii) Shift this 8-bit binary number 2 places to the left. What is the denary equivalent?

Γ1	1
 r.	4

(iii) What problem would arise if you tried to shift this 8-bit binary number 3 places to the left?

 [1]

	(e)	If any 8-bit binary number was shifted one place to the right , what would equivalent to?
		[1]
12		hop uses an information screen linked to a computer to allow customers to order goods ectly.
	The	e first screen shows three options:
		electrical goods
		furniture
		stationery
	(a)	What is the best input device to allow customers to choose one of the three options?
		[1]
	(b)	The customer is then sent to another screen where they have to input:
		 the goods reference number which is 8 digits long today's date which must be in the form dd/mm/yyyy the customer's telephone number
		For each input give one validation check that should be performed. A different type of check must be given in each case.
		goods reference number
		today's date
		telephone number [3]

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13 A company advertises its Internet broadband speeds as follows:

•	download	speed of	128	megabits	per	second

•	upload	speed	of 16	megabits	per	second

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16	
company advertises its Internet broadband speeds as follows:	For
download speed of 128 megabits per second upload speed of 16 megabits per second (8 bits = 1 byte)	Bridge iner's
Explain what is meant by the two terms download speed and upload speed.	COL
download speed	
upload speed	
-p	
[2]	
Give two advantages of using broadband rather than dial-up.	
1	
2	
[2]	
Give two different scenarios when a fast broadband connection is essential.	
1	
2	
[2]	
How many 4-megabyte files could be <i>downloaded</i> per second using this company's broadband?	
[1]	
	download speed of 128 megabits per second upload speed of 16 megabits per second upload speed of 16 megabits per second Explain what is meant by the two terms download speed and upload speed. download speed upload speed [2] Give two advantages of using broadband rather than dial-up. 2 [2] Give two different scenarios when a fast broadband connection is essential. 1 2 [2] How many 4-megabyte files could be downloaded per second using this company's broadband?

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	17 A. P.
	17 expert system has been developed to help diagnose faults in car engines. The set in the set in the set of
(a	Describe two desirable features to look for in a laptop rather than a desktop computer.
	1
	2
	[2
(b	Part of the expert system is supplied on a memory stick. This needs to be plugged into a USB port for the expert system to work.
	Give one reason why this is done.
	[1
(c	Describe two features you would expect to see in the expert system's interactive use interface.
	1
	0
	2
(d	Apart from the user interface, name three other components that make up a typica expert system.
	1
	2
	3
	[3

[Turn over

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15 A library uses barcodes to identify borrowers and books. A borrower has a card con a barcode with an equivalent numerical code. Each book also has a barcode with equivalent numerical code.

The flowchart on the facing page shows what happens when book(s) are taken out by a borrower. However, several stages are missing.

Using **item numbers only**, complete the flowchart by selecting stages from the item list below.

Item List

Item Number	Item Description				
1	any more books to scan?				
2	has book's barcode been recognised?				
3	has book's numeric code been recognised?				
4 has borrower's barcode been recognised?					
5 has borrower's numeric code been recognised?					
6	input book's numeric code manually				
7	input borrower's numeric code manually				
8	scan in barcode shown in book				
9	update borrower and book files				

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16 (a) A greenhouse is being monitored by a computer using 2 sensors. SENSOR1 method the temperature and SENSOR2 measures oxygen levels.

If the temperature exceeds 45°C or oxygen levels fall below 0.19, then an error message is output by the computer.

Write an algorithm, using pseudocode or flowchart only, which

- inputs both sensor readings
- checks the sensor input values and outputs a warning message if either are out of range
- continues monitoring until the <ESCAPE> key is pressed

	(You may assume that READ SENSOR <i>n</i> will take a reading from SENSOR <i>n</i> and that READ KEY inputs a key press from the keyboard).
	[5]
(b)	Describe why a DAC (digital to analogue converter) would be needed if the computer is used to control the greenhouse environment.
	[2]

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