



Cambridge International Examinations

Cambridge International General Certificate of Secondary Education

CANDIDATE NAME				
CENTRE NUMBER		CANDIDATE NUMBER		

COMPUTER STUDIES

0420/12

Paper 1

May/June 2014

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 an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, 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.

The maximum number of marks is 100.



1 Four health and safety risks are shown in the table below.

Put a tick (\checkmark) in either column 2 or 3 to indicate whether the risk is a health risk or a safety risk.

In column 4, describe a method of removing or reducing the risk. Give a different method for each risk.

1	2	3	4
risk	health risk	safety risk	method of removing or reducing the risk
eye strain			
trip hazard			
fire			
Repetitive Strain Injury (RSI) in the wrists			

Г	6	1

A customer books a flight to Brazil using an online travel age	ncy.
--	------

(a)	Describe the steps taken by the customer and by the agency when booking the flight online.
	[3

(b)	Describe the main differences between batch processing and real processing .	time trai	nsaction
			[2]
3 (a)	Name two items of software needed to run video conferencing. In each purpose of the software.	ı case, ex	plain the
	software item 1		
	purpose		
	software item 2		
	purpose		
			[4]
(b)	The table below has three statements. Each of them is about video confer	encing.	
	One or more of these is a benefit of using video conferencing.		
	Tick (✓) each statement that is a benefit.		
	statement	benefit	
	It is possible to hold meetings at any time.		
	There is no problem with time zones.		

Reduces the "hidden cost" of employees being away from the office.

(c)	A student made the following two statements. Each of them is about video conference hardware.	ing
	Explain why both statements are incorrect.	
	"microphones are used so that delegates can hear what is being said"	
	"webcams record the images and then transmit them to the other meeting room"	
		[2]
(d)	Describe two drawbacks of using video conferencing.	
	1	
	2	
		[2]

4	A student used the search engine:	ne Internet	to help	with his	Chemistry	project.	He	typed	the	following	into	а
	transition	+ elements										

(a) The first two search results listed were:

	Chemistry of the transition elements
	The elements of transition during computer animation
	Considering these two examples, describe one problem when using search engines.
	[1]
(b)	This search gave the student over 480 000 results ("hits").
	Many of these results were not relevant.
	How could the student obtain more relevant results?
	[1]
(c)	Other than security issues, describe one undesirable feature of using the Internet when looking for information.
	[1]
(d)	Describe one benefit of using the Internet to find information.

_	TI	£ - 11		algorithm	- 1 1 -1 -
5	Ind	$t \cap U \cap V$	ม/เทก	aldorithm	enallia:
J	1110	IUIIU	wiiiu	aluuliilii	onoulu.

•	input	ten	numbers
---	-------	-----	---------

- output the largest number input
- output the average value of the input data

```
10
         largest = 0
         sum = 0
20
        for x = 1 \text{ to } 10
30
40
             input x
50
             if x > largest then x = largest
60
             output largest
70
             sum = sum + x
80
         next x
```

There are **four** errors in this algorithm.

output average

average = sum * 10

90

100

Locate these errors and suggest a correction.

error 1	
correction	
correction	
error 3	
correction	
error 4	
correction	
	[4]

6 The following diagram shows six descriptions of automatic data capture methods and six terms.

Draw lines to connect each description to the correct term.

reading data directly from hard copy and converting into electronic/ computer-readable form

biometrics

use of fingerprint scans, retina scans, face identification, etc. as a way of identifying a person uniquely

data logging

recognises spoken word patterns and compares them to patterns stored in memory

optical character recognition (OCR)

use of minute electronic devices (containing microchip and antenna) that can be read from distances up to 5 metres

optical mark recognition (OMR)

automatic data collection using sensors

radio frequency identification (RFID)

system that reads pencil or pen marks on a piece of paper in pre-determined positions

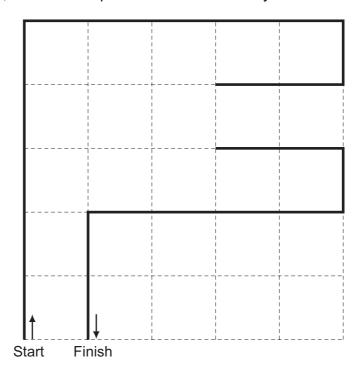
voice recognition

[5]

7 A floor turtle uses the following commands:

command	description					
FORWARD <i>n</i>	Move <i>n</i> cm in a forward direction					
BACKWARD n	Move <i>n</i> cm in a backward (reverse) direction					
RIGHT t	Turn right through <i>t</i> degrees					
LEFT t	Turn left through <i>t</i> degrees					
PENUP	Lift the drawing pen up					
PENDOWN	Lower the drawing pen					
REPEAT x	Repeat the next set of instructions x times					
ENDREPEAT	Finish the REPEAT loop					

In the following grid, each of the squares measures 10 cm by 10 cm:



Complete the set of instructions to draw the shape shown above (in bold lines).

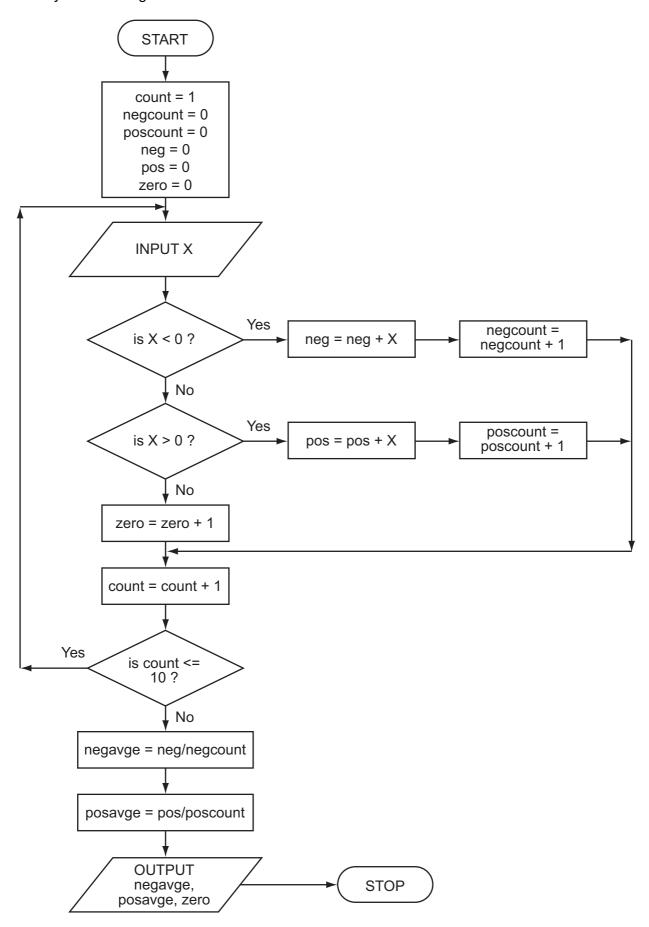
1	PENDOWN
2	REPEAT 2
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	

In e	each case below, state which Internet term is being described.
(a)	Malicious software installed on a user's hard drive or a web server; the software re-directs the user to a fake website without their consent or knowledge.
	[1]
(b)	Personal Internet journals where a writer enters text about a certain topic; anyone car comment on the topic.
	[1]
(c)	Websites designed to promote the building of online communities who share the same interests; usually free of charge; users can add friends, post messages to each other and update personal profiles.
	[1]
(d)	Legitimate-looking email sent to a user in the hope of gathering personal information; as soon as the recipient clicks on the link in the email (or email attachment) they are sent to a fake website.
	[1]
(e)	Software that secretly gathers information by monitoring key presses on a user's keyboard this information is relayed back to the person who sent the software originally.
	[1

9

The	five	e statements below are incomplete. Each statement is about computer animation .										
(i)		nen producing 3D animation effects,are used to define the start int and the end point to allow a smooth transition in the animation.										
(ii)		he use of intermediate frames between two images to give the appearance of movement called										
(iii)		one image merges into another different type of image (e.g. a mouse turning into an en) this is called										
(iv)		is used to generate the final 3D image from the 2D model.										
(v)		metimes are used; these are variables controlling the position of rt of an animated character.										
Cor	nple	te the five statements above using terms from the following list:										
•	ava cart key moi rene stic	toons rframes rphing dering k figures eening										
	(i)											
	(ii)											
((iii)											
((iv)											
	(v)		[5									

10 Study the following flowchart.



Complete the trace table for the flowchart using the following data:

0, 3, 5, 6, -4, -1, 0, 0, -4, 10

negcount	poscount	neg	pos	zero	count	X	negavge	posavge

11	A computer system can be changed over to a new one by direct changeover.
	Name two other methods of changeover. Give one benefit and one drawback of each method.
	method 1
	benefit
	drawback
	method 2
	benefit
	drawback
	[6]

12 Camilo works as a hotel inspector. He travels to hotels in his own country and overseas. He visits

the hotels and then sends back a report to his head office after each hotel visit.

Name three modern electronic devices that Camilo could use to help him with his work. Give a different reason for your choice of each device.
device 1
reason
device 2
reason
device 3
reason
[6]
Most of the hotels offer wireless Internet (Wi-Fi) in the rooms.
Give two disadvantages of using wireless (Wi-Fi) rather than wired Internet access.
1
2
[2]

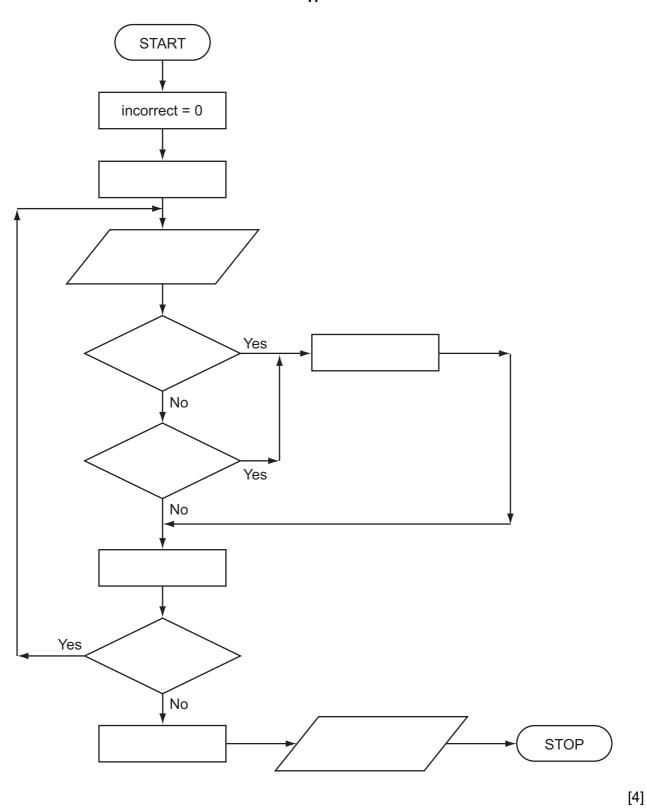
13 An algorithm has been written to check that code numbers are valid on input. They must be in the range 1000 to 9999.

Five hundred codes are being entered and the percentage of entered codes which are incorrect is output.

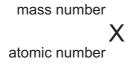
There is a flowchart on the opposite page. It has some statements missing.

Complete the flowchart. Use statement numbers only, chosen from the list below.

statement number	statement
1	Incorrect = Incorrect + 1
2	INPUT Code
3	is Number <= 500 ?
4	is Code < 1000 ?
5	is Code > 9999 ?
6	Number = 1
7	Number = Number + 1
8	OUTPUT Percent
9	Percent = Incorrect / 5



14 A spreadsheet has been written to help students with their Chemistry. Chemical elements are written as:



For example, iron is represented as:

An atom of a chemical element is made up of protons, neutrons and electrons.

atomic number = number of protons = number of electrons

mass number = atomic number + number of neutrons

The spreadsheet is shown below. Column B contains input values and column C contains calculation results. Input values for the element iron are shown as an example.

Show what formulas must be in cells C3, C4 and C5:

	Α	В	С
1	input mass number	56	
2	input atomic number	26	
3	number of electrons		=
4	number of protons		=
5	number of neutrons		=

[3]

15	(a)	State four components of an expert system.	
		1	
		2	
		3	•••••
		4	
			[4]
	(b)	Give an example of the use of an expert system.	
			[1]

16 An encryption system gives each letter of the alphabet a value:

$$A = 1, B = 2, C = 3, \dots, Y = 25, Z = 26.$$

Each letter is stored in a 12-bit binary register. The letter "S" (19th letter) is stored as:

2048	1024	512	256	128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	1	0	0	1	1

A 4-bit register is used to store the encryption key. This register shows how many places the bits are shifted to the left in the 12-bit register when it is encrypted. So,

means each bit in the 12-bit register is shifted 5 places to the left and the register now becomes:

2048	1024	512	256	128	64	32	16	8	4	2	1
0	0	1	0	0	1	1	0	0	0	0	0

Therefore, the letter "S" would be transmitted with the 4-bit register and the 12-bit register as follows:



- (a) "W" is the 23rd letter of the alphabet.
 - (i) Show how this letter would be stored in the 12-bit register before encryption:

(ii) The 4-bit register contains the following value:

Show how the letter "W" is now stored in the 12-bit register in encrypted form:

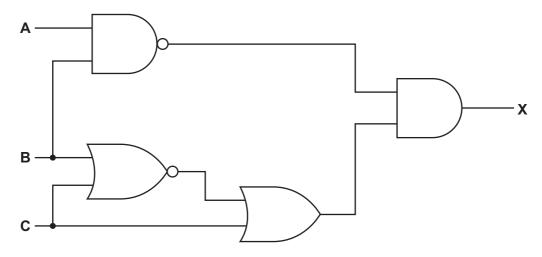
1			l	1			
1			l				
1			l	1			
1			l	1			
1			l	1			
1			1	1			
1			1	1			
1			1	1			
1	1	ı	ı	ı	1		

[2]

(b)	Find	d which	n lett	er of	the	alpha •	abet I	has t	oeen	enci	rypte	d he	re. (\$	Show	/ all y	our '	work	ing.)
		0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	
						•												
			•••••		•••••					•••••		•••••						
			•••••															
									••••••									[2]
		•••••																
(c)	(i)	What	is th	e lar	gest	encr	-	n ke	-				d in	the 4	-bit r	egis	ter?	
						[8		4	2		1	7					
	(ii)	Conve	ert th	is int	to de	nary	(bas	e 10)).									
((iii)	If this	encr	yptic	n ke	y we	re us	sed, '	what	prob	olem	wou	ld it o	caus	e?			

[3]

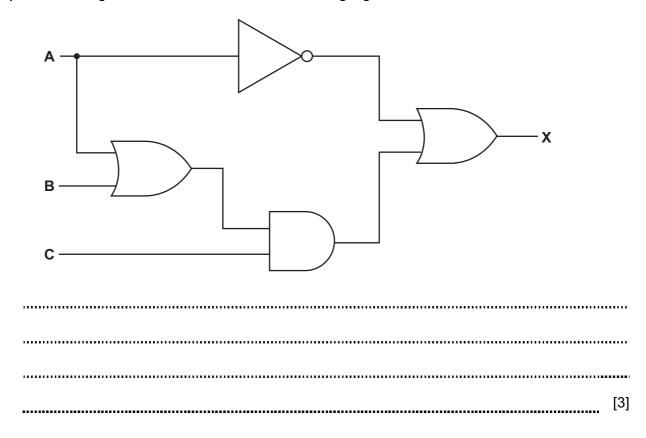
17 (a) Complete the truth table for the following logic circuit:



			Working	
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]

(b) Write the logic statement to describe the following logic circuit:



- **18** A school has 1500 students. It is conducting a survey on their music preferences. Each student uses a computer and inputs their name and then chooses one of 5 options:
 - rock (input value 1)
 - soul (input value 2)
 - pop (input value 3)
 - jazz (input value 4)
 - classical (input value 5)

Write an algorithm, using pseudocode **or** a flowchart, which:

- inputs the choice of all 1500 students (values 1 to 5)
- outputs all the names of the students who chose classical music
- outputs the percentage who chose each option.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.