UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

7983207402

COMPUTER STUDIES **0420/01**

Paper 1 **October/November 2009**

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.

For Examiner's Use

1 Explain, using examples where appropriate, the meaning of these computer terms.

(a) interrupt

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.....

..... [2]

(b) icon

.....

.....

..... [2]

(c) ROM

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.....

..... [2]

(d) buffer

.....

.....

..... [2]

(e) validation

.....

.....

..... [2]

For Examiner's Use

2 Give **two** advantages of using high level languages when writing new computer software rather than using low level languages.

1 .....

.....

2 .....

..... [2]

3 A school decides to allow internet access on all its networked computers.

(a) Describe **two** problems this could create and how the system could be protected against these problems.

Problem 1 .....

.....

Protection 1 .....

.....

Problem 2 .....

.....

Protection 2 .....

..... [4]

(b) Student records are stored on a computer. This is linked to the network to allow teachers to access information from anywhere on the school site.

(i) How is it possible to prevent unauthorised access to student records?

.....

.....

.....

(ii) Each student record is approximately 5 megabytes. Suggest a possible back up device to store the student records.

.....

..... [2]

For Examiner's Use

4 A fashion company wants to produce a catalogue advertising their latest clothes. Describe **two** ways they could obtain images of clothes and use them in their catalogue.

1 .....

.....

.....

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2 .....

.....

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..... [4]

5 Name **two** methods of implementing a new computer system. Give **one** advantage and **one** disadvantage of each method chosen.

Method 1 .....

Advantage .....

.....

.....

Disadvantage .....

.....

.....

Method 2 .....

Advantage .....

.....

.....

Disadvantage .....

.....

..... [4]

For Examiner's Use

6 As well as being a valuable source of information, the internet has also enabled users to save money through a number of online services.

Give **two** different examples of services that have allowed users to save money and describe how the internet has made these savings possible.

Example 1 .....

.....

Reason .....

.....

.....

Example 2 .....

.....

Reason .....

.....

..... [4]

For Examiner's Use

7 Video-conferencing has increased in popularity over the last five years.

(a) Give **three** reasons for this increase in popularity.

1 .....

.....

.....

2 .....

.....

.....

3 .....

.....

..... [3]

(b) Describe **one** type of software and **two** hardware devices needed for video-conferencing.

Software .....

.....

.....

Hardware 1 .....

.....

.....

Hardware 2 .....

.....

..... [3]

(c) Apart from video-conferencing, what **two** other forms of communication exist which make use of computer networks?

1 .....

.....

2 .....

..... [2]

For Examiner's Use

8 **(a)** How could a computer simulation be used by a supermarket to reduce queuing at checkouts?

.....

.....

.....

..... [2]

(b) The supermarket has decided to fit sensors at the shop entrance to count people coming in and leaving.

(i) What type of sensor would be suitable to detect people?

.....

..... [1]

(ii) How could the supermarket use the information obtained from these sensors?

.....

.....

.....

..... [2]

(c) The supermarket has decided to fit information screens at various locations for customer use. These information screens do not use keyboards.

(i) Give **one** example of a suitable input device.

.....

..... [1]

(ii) What information could be made available to supermarket customers?

.....

.....

..... [1]

(iii) Give **one** advantage of using this system rather than displaying signs and notices around the supermarket.

.....

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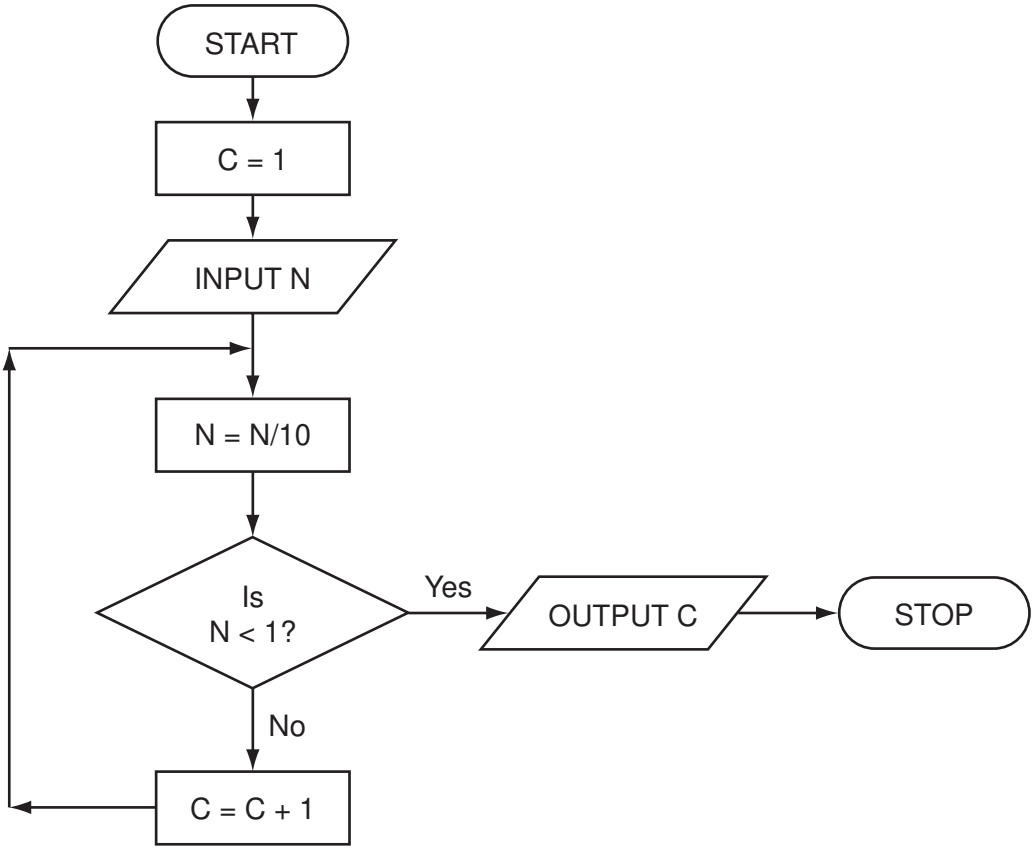
..... [1]

9 Study the flowchart.

For Examiner's Use



Complete the table to show what outputs you would expect for the **three** inputs.

INPUT N	OUTPUT C
55	
2100	
1	

[3]

10 Houses for sale can be viewed using a *Virtual Reality Tour*. This takes you round the house in three dimensions (3D) on a computer screen "*as if you were there in person*".

For Examiner's Use

(a) Give **two** advantages of *Virtual Reality Tours*.

1 .....

.....

2 .....

..... [2]

(b) How are the house images created for the *Virtual Reality Tour*?

.....

.....

.....

..... [2]

(c) What **two** changes in technology have allowed *Virtual Reality Tours* to become possible?

1 .....

.....

.....

2 .....

.....

..... [2]

(d) Describe a typical tool on a *Virtual Reality Tour* web page.

.....

.....

..... [1]

(e) Give another application of *Virtual Reality Tours*.

.....

..... [1]

11 A spreadsheet has been set up to store results of football matches for 12 teams. Halfway through the year the results were:

For Examiner's Use

	A	B	C	D	E	F	G	H	I
1	Team Name	Won (3 points)	Drawn (1 point)	Lost (0 points)	Number of Points	Goals For	Goals Against	Goal Difference	Matches Played
2									
3									
4	United	7	2	2	23	16	4	12	11
5	City	7	2	2	23	21	10	11	11
6	Town	6	1	4	19	16	10	6	11
7	Academics	4	6	1	18	12	9	3	11
8	Rovers	4	4	3	16	16	14	2	11
9	Runaways	3	5	3	14	10	12	-2	11
10	Yorkers	3	5	3	14	10	14	-4	11
11	Albion	3	3	5	12	14	15	-1	11
12	Knights	4	0	7	12	10	18	-8	11
13	Sporting	2	5	4	11	10	12	-2	11
14	Nohopers	2	3	6	9	8	16	-8	11
15	Jokers	2	2	7	8	6	14	-8	11

(a) What formula is in cell **E4** to calculate the Number of Points for United?

.....

..... [1]

(b) Goal Difference = (Goals For – Goals Against). What formula is in cell **H4** to find Goal Difference for United?

.....

..... [1]

(c) State **two** ways of checking the correctness of data in columns F and G.

For Examiner's Use

1 .....

.....

2 .....

..... [2]

(d) Rovers played Yorkers and won 2 – 0. Columns B, D, F, G and I were updated. Which other cells would be automatically updated?

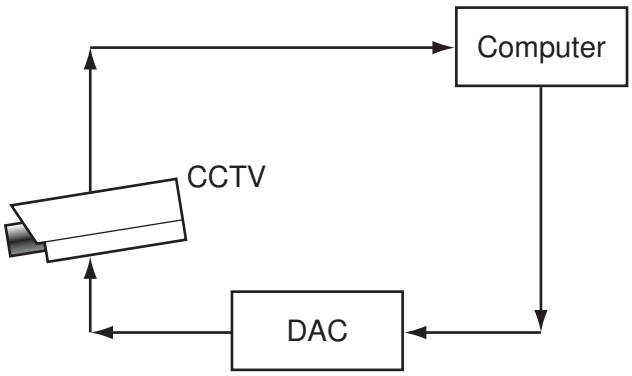
.....

.....

..... [2]

12 A digital security camera was set up as shown in the diagram.

For Examiner's Use



The digital CCTV camera is connected to a computer. The computer can make the camera move in any direction by sending out digital signals. The computer system has a 400 gigabyte hard disk.

(a) What hardware is needed to inform the computer that the camera needs to move to capture an image?

.....

..... [1]

(b) Why is the DAC needed?

.....

..... [1]

(c) How could the computer use the camera to detect an intruder?

.....

..... [1]

(d) Give **two** advantages of using digital cameras.

1 .....

.....

2 .....

..... [2]

For Examiner's Use

(e) Each image size is 400 kilobytes (0.4 gigabytes).

(i) How many images can be stored before the hard disk is full?

.....

.....

..... [1]

(ii) Once the hard disk is full, how can the system ensure that the stored images are not lost and new images can be stored?

.....

.....

..... [1]

For Examiner's Use

13 A radio station keeps a database of all its music CDs. Here is part of this database:

Reference Number	CD title	number of tracks	special edition	CD length (mins)	number of hit tracks
1111	Afternoon Glory	12	N	55	1
1112	Stone Tulips	10	N	42	3
1113	Aftermath	8	N	33	0
1114	Major Peppers	15	Y	72	5
1115	Seaside	9	N	40	2
1116	Lookout	12	N	62	2
1117	Future Dreams	11	N	60	3
1118	Moonlight	14	Y	70	2

(a) How many records are there in the database section?

.....

[1]

(b) If the following query was input:

(**CD length (mins)** < 60) AND (**number of hit tracks** > 1)

using **Reference Number** only, write down which data items would be output.

.....

.....

[1]

(c) Write down a query to select which CDs are **special edition** or have more than 10 tracks.

.....

.....

[2]

(d) The database is sorted in descending order on **CD length (mins)**. Using **Reference Number** only, write down the order of the records following this sort.

.....

.....

[1]

For Examiner's Use

(e) The radio station has a phone-in service where a listener texts the title of the CD on their mobile phone. The popularity of each CD is then known and which CDs the radio station should play.

(i) How would this information be stored?

.....

..... [1]

(ii) How could this information be linked to the database?

.....

..... [1]

14 Describe how an expert system could be created to help in diagnosing faults in electronic car management systems.

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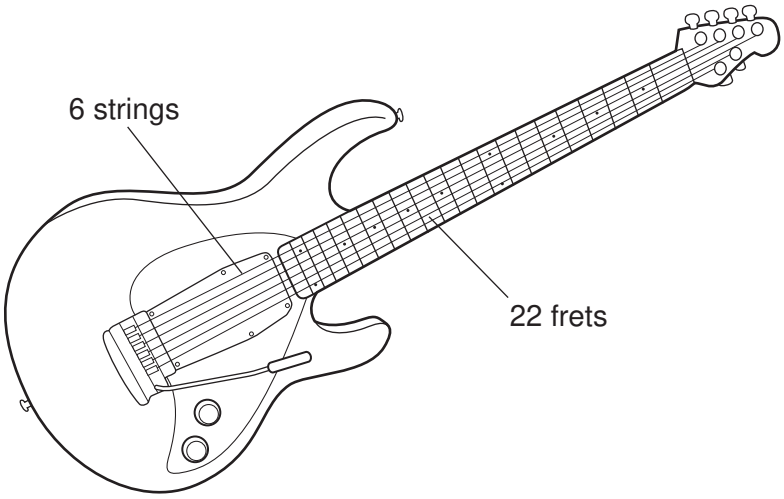
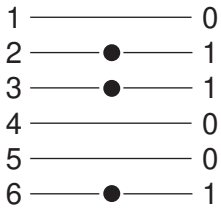
..... [4]

15 Electric guitars consist of strings and frets.

For Examiner's Use



Musical notes on the guitar can be represented using the TAB notation:



Each line represents a string; the dots indicate which strings must be held down with the fingers. These are shown with a binary value of 1; otherwise the binary value is 0.

Thus, the above note would be shown as:

6	5	4	3	2	1
1	0	0	1	1	0

TAB notation

It is also important to indicate **where** the strings should be held down. This is shown on the FRET. If the fingers are to be held down at the 20th FRET, this is shown in binary as:

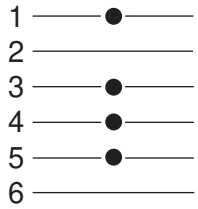
32	16	8	4	2	1
0	1	0	1	0	0

FRET position

(NOTE: add up the numbers in the headings where binary 1s appear, i.e. 16 + 4 = 20)

For Examiner's Use

(a) A note is being played according to the TAB notation:



The strings are being held down on the 18th FRET.

Write down the binary notation for the TAB and for the FRET position:

TAB notation:

6	5	4	3	2	1

FRET position:

32	16	8	4	2	1

[2]

(b) (i) Show on the diagram below which note corresponds to TAB notation: 000010.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(ii) What FRET position corresponds to 010011?

.....

..... [2]

(c) Describe **two** advantages of storing musical notes in this format.

1 .....

.....

.....

2 .....

.....

..... [2]

16 Many airlines now offer electronic tickets (e-tickets) to passengers when booking flights online. A reference number is emailed to the passenger rather than mailing printed paper tickets.

For Examiner's Use

(a) Give **two** advantages of e-tickets compared to paper tickets.

1 .....

.....

.....

2 .....

.....

..... [2]

(b) Give **two** advantages of the paper ticket system compared to e-tickets.

1 .....

.....

.....

2 .....

.....

..... [2]

(c) Give **two** examples of information you would expect to see on the booking website.

1 .....

.....

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2 .....

.....

..... [2]

17 (a) A car's speed is measured between points A and B, which are 200 km apart.

For Examiner's Use

The final speed of the car is calculated using the formula:

$$\text{Final Speed} = \frac{200}{\text{Time (hours)}}$$

What is the final speed of a car if it takes 2 hours to get from A to B?

.....

..... [1]

Part (b) is on the next page.

(b) Write an algorithm, using pseudocode or otherwise, which inputs the times for 500 cars, calculates the final speed of each car using the formula in part **(a)**, and then outputs:

- the final speed for ALL 500 cars
- the slowest (lowest) final speed
- the fastest (highest) final speed
- the average final speed for all the cars.

For Examiner's Use

[6]