UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	

9106074384

COMPUTER STUDIES **0420/11**

Paper 1 **October/November 2011**

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 **19** printed pages and **1** blank page.

IB11 11_0420_11/2RP
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International Examinations

1 Name **three** of the stages in the system life cycle.

1 ....

....

2 ....

....

3 ....

.... [3]

2 **(a)** Give **one** benefit of storing music files in MP3 format.

....

.... [1]

(b) Describe the type of memory used in MP3 players.

....

....

....

.... [2]

3 Give **three** features expected in a data protection act.

1 ....

....

2 ....

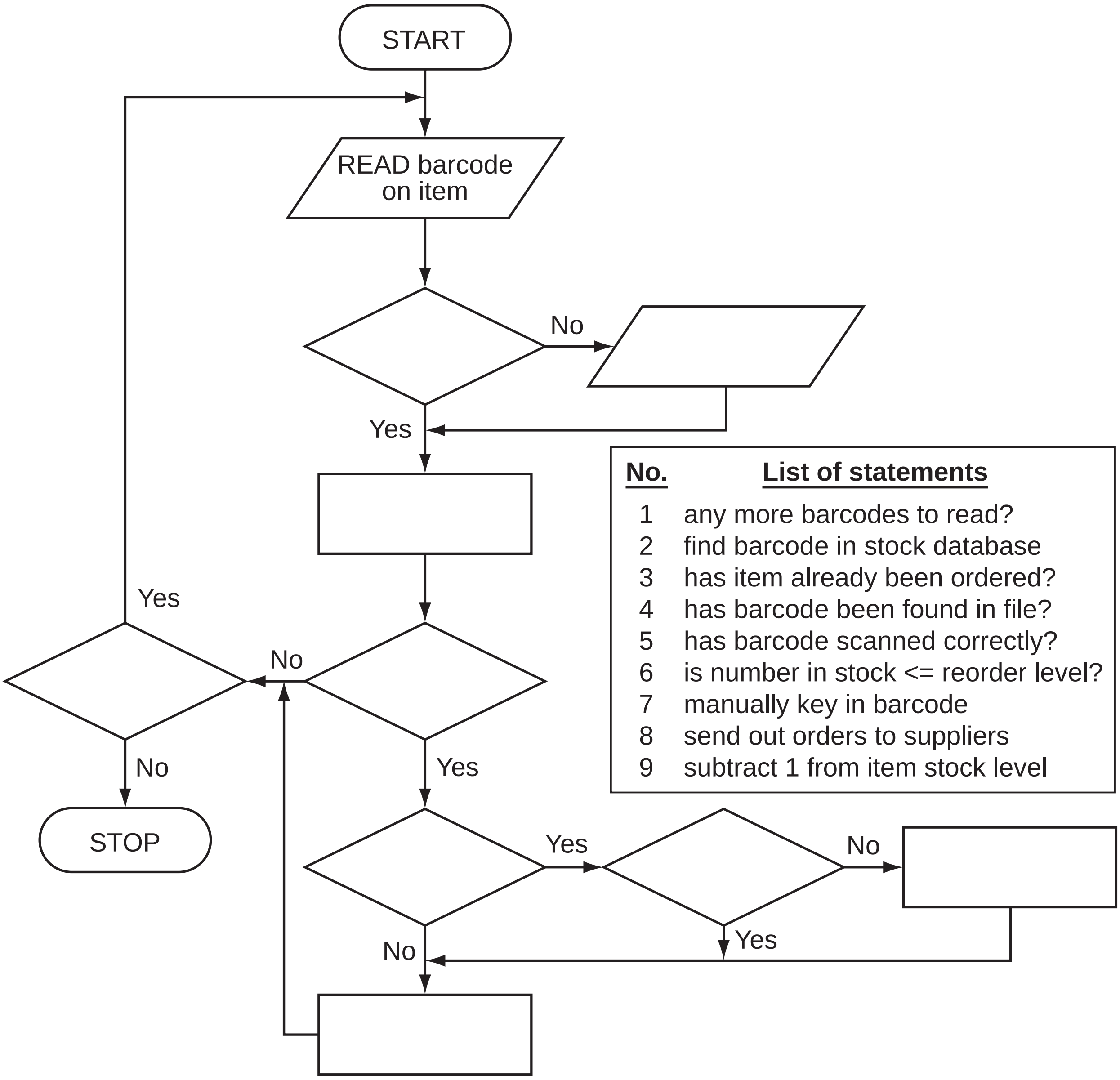
....

3 ....

.... [3]

4 The following flowchart shows how barcodes are used at the point of sale in an au
stock control system.

Select statements from the list below, **using numbers only**, to complete the flowchart.


START
READ barcode on item
No
Yes
Yes
No
No
Yes
Yes
No
Yes
No
Yes
STOP

No.	**List of statements**
1	any more barcodes to read?
2	find barcode in stock database
3	has item already been ordered?
4	has barcode been found in file?
5	has barcode scanned correctly?
6	is number in stock <= reorder level?
7	manually key in barcode
8	send out orders to suppliers
9	subtract 1 from item stock level

[5]

5 **(a)** State what is meant by *Computer Aided Design (CAD)*.

[1]

(b) Give **three** different applications that make use of CAD.

1

2

3

[3]

(c) Name **three** specialist input/output devices used in CAD.

1

2

3

[3]

6 **(a)** Name **two** pieces of hardware needed to enable video-conferencing to take using a standard computer system.

1 ....

....

2 ....

.... [2]

(b) State **one** piece of specialist software needed to carry out video-conferencing.

....

.... [1]

(c) A company has decided to use video-conferencing rather than instant messaging.

(i) Give **one** advantage of doing this.

....

....

(ii) Give **one** disadvantage of doing this.

....

.... [2]

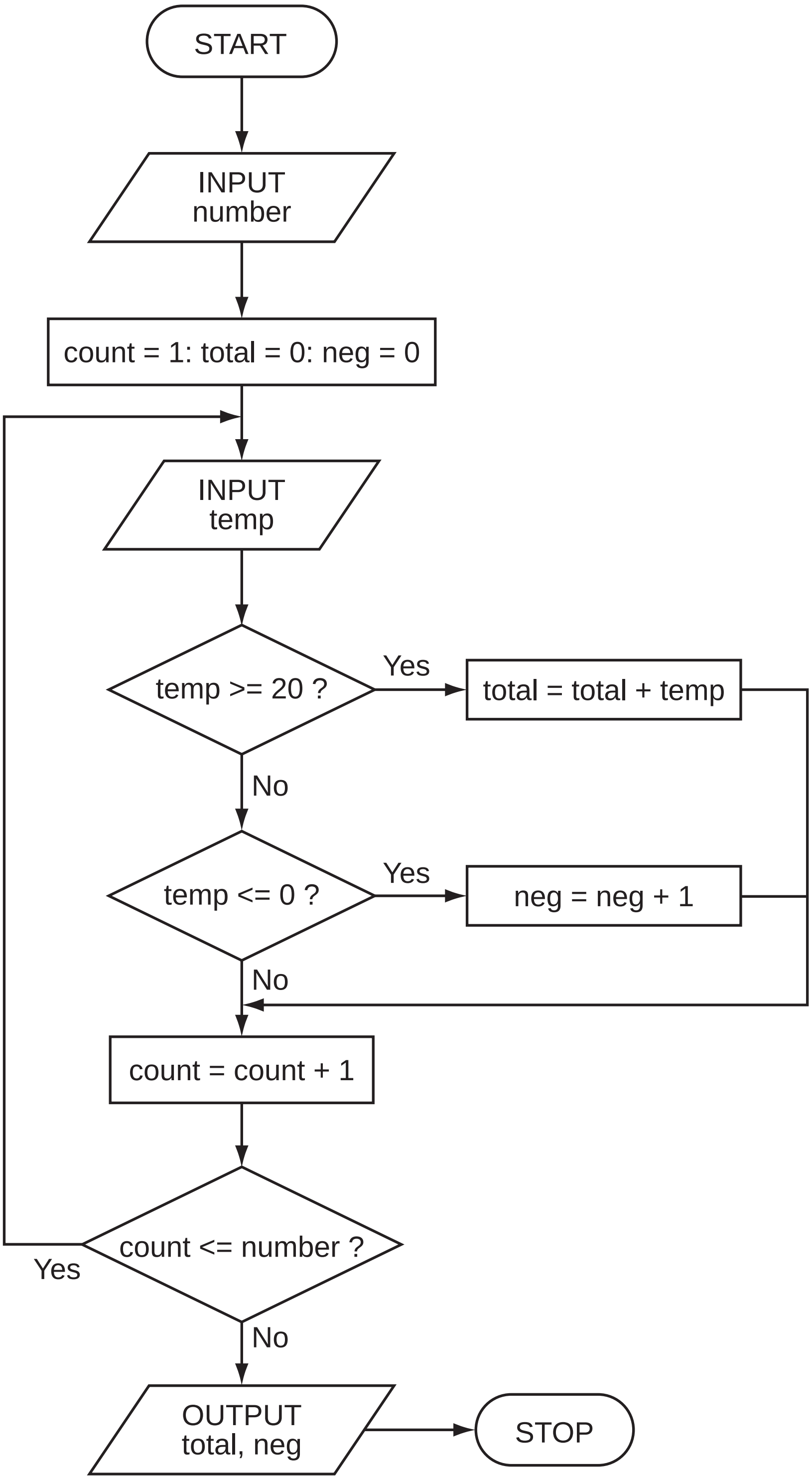
(d) Give **one** reason why use of video-conferencing has increased over the last ten years.

....

....

.... [1]

7 Carefully study the following flowchart:


START
INPUT number
count = 1: total = 0: neg = 0
INPUT temp
temp >= 20 ?
Yes
total = total + temp
No
temp <= 0 ?
Yes
neg = neg + 1
No
count = count + 1
count <= number ?
Yes
No
OUTPUT total, neg
STOP

Complete the trace tables for the following two sets of test data:

(i) number = 7, temp = -5, 0, 5, -4, 0, 10, -2

(ii) number = 6, temp = 21, 20, 30, 19, 21, 15

(i) trace table:

number	count	temp	total	neg	OUTPUT

(ii) trace table:

number	count	temp	total	neg	OUTPUT

[6]

For
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8 You have been asked to write an article on how an expert system is developed. What would you include in your article?

....

....

....

....

....

....

.... [3]

9 A spreadsheet has been designed to calculate the fuel economy for 6 cars:

	A	B	C	D
1	**car**	**distance (km)**	**fuel used (litres)**	**economy (km/litre)**
2	car 1	48	4.0	12.0
3	car 2	160	9.0	17.8
4	car 3	70	4.5	15.6
5	car 4	200	20.0	10.0
6	car 5	150	33.0	4.5
7	car 6	300	15.0	20.0
8			average economy:	13.3
9			best economy:	20.0

(a) **(i)** What formula is in cell D2 to calculate the economy for car 1?

....

(ii) What formula is in cell D8 to calculate the average economy for all 6 cars?

....

(iii) What formula is in cell D9 to calculate the best (highest) economy?

.... [3]

(b) If cell B7 was changed to 200, which cells would be automatically updated?

....

.... [2]

(c) Fuel economy is often given in the form **litres per 100 km**. A column E is to be to the spreadsheet to contain these new economy values.

What formula needs to be in E7 to find the economy of car 6 in **litres per 100 km**?

....

.... [2]

10 A company's technical services are now available on the Internet as well as using call centres.

(a) Give **two** advantages to the customer of using call centres.

1 ....

....

2 ....

.... [2]

(b) Give **two** advantages to the customer of using technical services on the Internet.

1 ....

....

2 ....

.... [2]

(c) Describe **two** effects on company staff of replacing the call centres with Internet services.

1 ....

....

2 ....

.... [2]

11 Computer memories are measured in terms of the number of *bytes*.

(a) **(i)** What is meant by the term *byte*?

....

....

(ii) What is meant by a *Gigabyte*?

....

.... [2]

(b) Flash memories and CD-RWs are used as backing media for computers.

Give **two** differences between these two media.

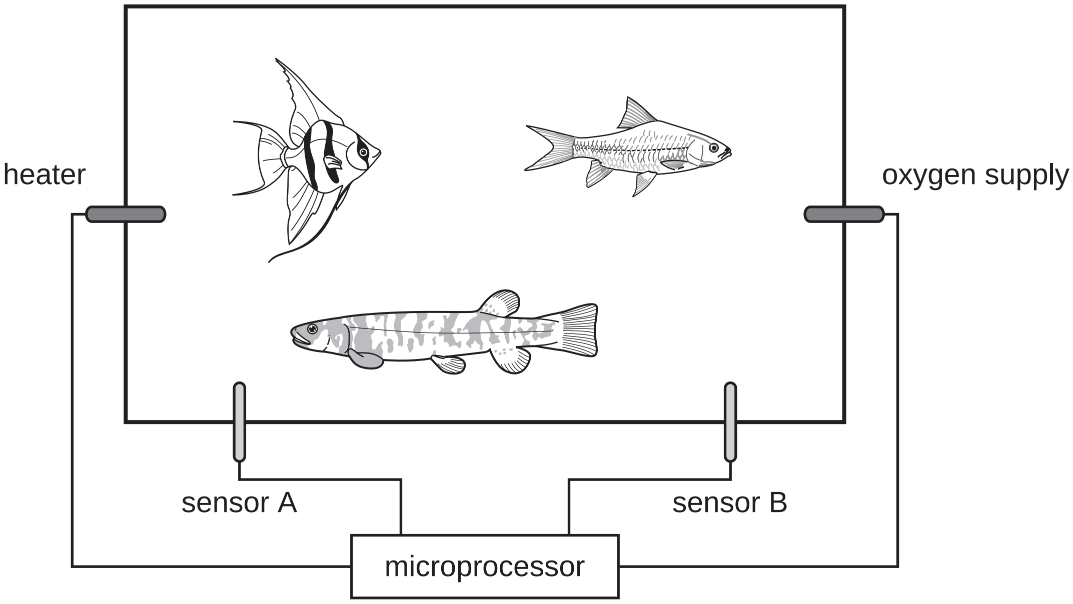
1 ....

....

2 ....

.... [2]

12 The conditions in a fish tank are being controlled using sensors and a microprocessor. To keep the fish healthy, the temperature must be at 25°C and the oxygen content needs to be 20 ppm (parts per million). The tank contains a heater and an oxygen inlet controlled by a valve.



(a) Name the **two** sensors used in this application.

Sensor A ....

Sensor B .... [2]

(b) Describe how the sensors and the microprocessor are used to maintain the correct conditions in the fish tank.

....

....

....

....

....

....

....

....

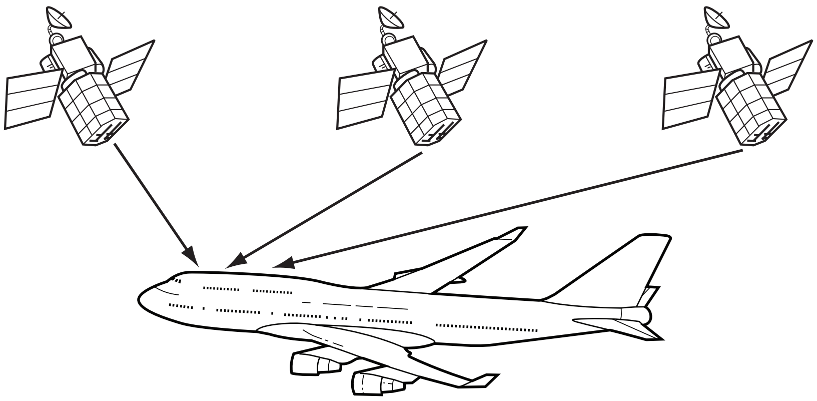
.... [4]

(c) What safeguards would be needed to stop the fish tank temperature rising too high?

....

.... [1]

13 Aeroplanes now use Global Positioning Systems (GPS) to determine their location.



(a) Describe how the computer on board the aeroplane uses GPS to find its exact location.

[4]

(b) Give **two** benefits of using GPS in this application.

1

2

[2]

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14 An alarm, X, gives a signal (i.e. X = 1) when a car fuel injection system gives certa conditions. The inputs are:

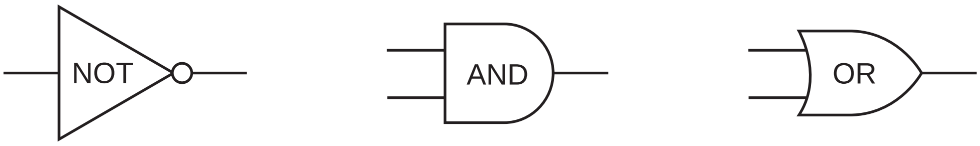
input	**binary value**	**condition**
P	0	pressure < 5 bar
	1	pressure >= 5 bar
R	0	revs > 8000 rpm
	1	revs <= 8000 rpm
T	0	temp > 120 °C
	1	temp <= 120 °C

The alarm returns a value of 1 if:

either **(i)** pressure < 5 bar AND revs > 8000 rpm

or **(ii)** revs <= 8000 rpm AND temp > 120 °C

(a) Draw the logic circuit for the above system using these logic gates.



[6]

(b) Complete the truth table for this alarm system.

P	R	T	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]

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15 A company selling CDs uses a unique 6-digit identification number for each CD titl
right-most digit (position 1) is a *check digit*.

For example,

6 5 4 3 2 1 ← digit position
3 0 6 1 4 9 ← identification number
↑
check digit

The validity of the number and check digit is calculated as follows:

- multiply **each** digit by its digit position
- add up the results of the multiplications
- divide the answer by 11
- if the remainder is 0, the identification number and check digit are valid

(a) Show whether the following identification numbers are valid or not. You **must** show how you arrived at your answer.

(i) 4 2 1 9 2 3

working: ....

....

....

....

valid or not valid? ....

(ii) 8 2 0 1 5 6

working: ....

....

....

....

valid or not valid? .... [3]

(b) Find the *check digit* for the following identification number:
5 0 2 4 1 __

working: ....

....

....

....

check digit: .... [2]

(c) Describe, with examples, **two** different types of data entry errors that a check digit would detect.

1 ....

....

2 ....

.... [2]

16 A company has bought some computers which can be used as stand-alone or netwo

(a) When used as stand-alone, there is a risk of information being stolen.

Give **two** ways this risk could be removed or minimised.

1 ....

....

2 ....

.... [2]

(b) There are additional, different security risks when using the computers on a network.

Describe **two** of these risks and how the system can be protected against them.

Risk 1 ....

Protection ....

....

Risk 2 ....

Protection ....

.... [4]

(c) The company use a *star* network which is linked externally to the Internet.

(i) Draw a labelled diagram of a *star* network.

(ii) Another type of network is a *ring*. Give **one** advantage of a *star* network compared to a *ring* network.

....

.... [2]

(d) The company also decides to buy some laptop computers for use on the network.

Give **two** desirable properties you would look for in the laptop processors.

1 ....

....

2 ....

.... [2]

17 **(a)** Write an algorithm, using pseudocode or flowchart only, which:

- inputs three numbers
- outputs the **largest** of the three numbers

[3]

(b) Write an algorithm, using pseudocode or flowchart only, which:

- inputs 1000 numbers
- outputs how many of these numbers were whole numbers (integers)
  (You may use INT(X) in your answer e.g. Y = INT(3.8) gives the value Y = 3)

[4]

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