UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

COMPUTER STUDIES **0420/11**

Paper 1 **May/June 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 **24** printed pages.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

For
iner's

1   Give **three** tasks carried out by an operating system.

    1 ....

    ....

    2 ....

    ....

    3 ....

    .... [3]

2   A user decides to use an Internet search engine to help locate a hotel.

    (a) What is a search engine?

        ....

        .... [1]

    (b) Give **two** possible problems the user might encounter when using a search engine.

        1 ....

        ....

        ....

        2 ....

        ....

        .... [2]

For
...iner's

(c) The search engine found the website of a suitable hotel.

Give **three** features you would expect to see on a hotel website.

1 ....

....

....

2 ....

....

....

3 ....

....

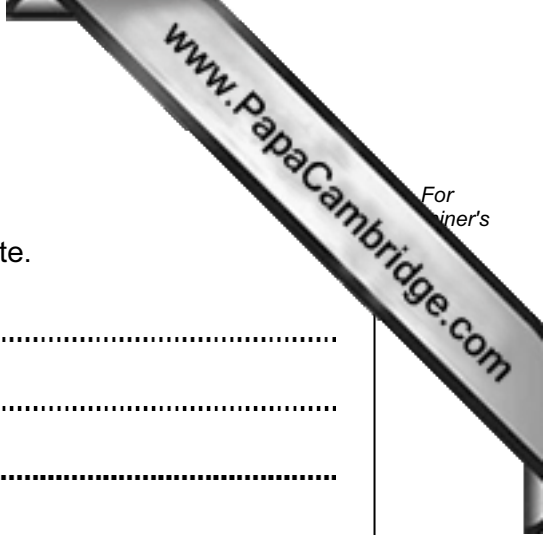.. [3]

3 A worker at a company has to go through a logon procedure to gain access to her computer system.

(a) The first thing she has to do is type in a *user name* and a *password*.

Why is this done?

....

....

.... [1]

(b) The *password* is typed in twice.

Why is this done?

....

....

.... [1]

A menu then appears on her screen. She chooses to connect to the Internet.

(c) Describe **two** ways her computer system is protected against loss or corruption of files once the computer system is connected to the Internet.

1 ....

....

2 ....

.... [2]
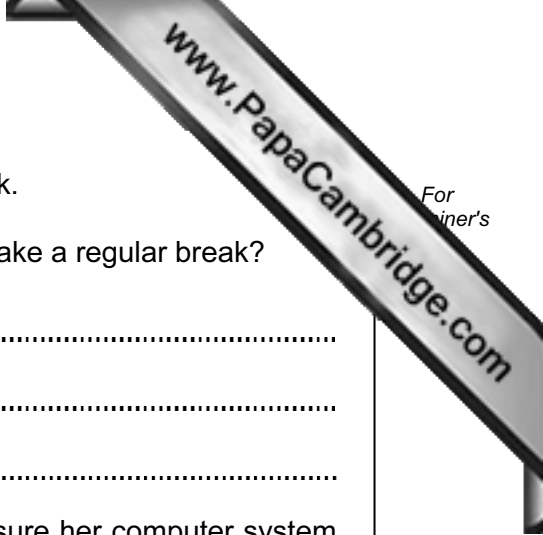
(d) The worker leaves her computer system for a 10-minute break.

    (i) From a health and safety aspect, why does she need to take a regular break?

    ....

    ....

    ....

    (ii) Apart from switching off her machine, how could she ensure her computer system was secure whilst taking her regular break?

    ....

    ....

    .... [2]

4   The following diagram shows a typical expert system.

	Explanation System		Working store
W	**X**		
	Knowledge Base Editor		**Z**

← Y →
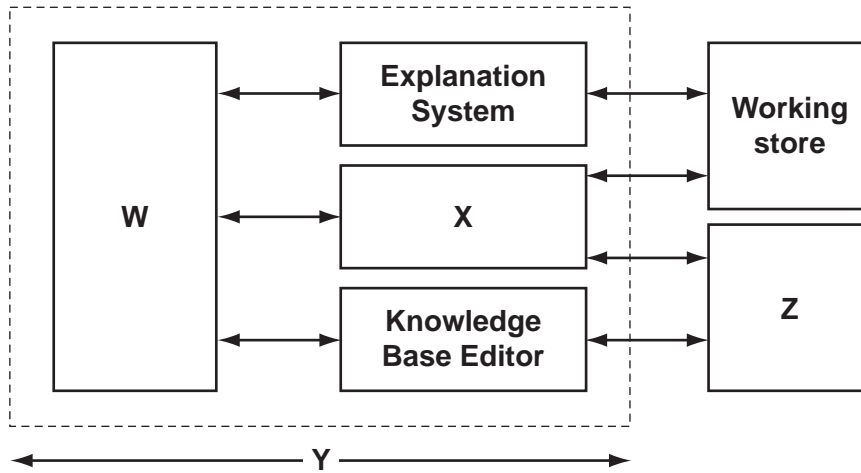
(a) Name the missing labels **W** to **Z** using the following list of possible options.

Inference Engine   Expert System Shell

Knowledge Base   User Interface

W ....

X ....

Y ....

Z .... [4]

(b) Name **one** of the components that makes up the knowledge base.

....

.... [1]

(c) Give **one** advantage and **one** disadvantage of using expert systems.

Advantage: ....

....

....

Disadvantage: ....

....

.... [2]

(d) Name **two** examples of the use of expert systems.

1 ....

....

2 ....

.... [2]

For
......iner's
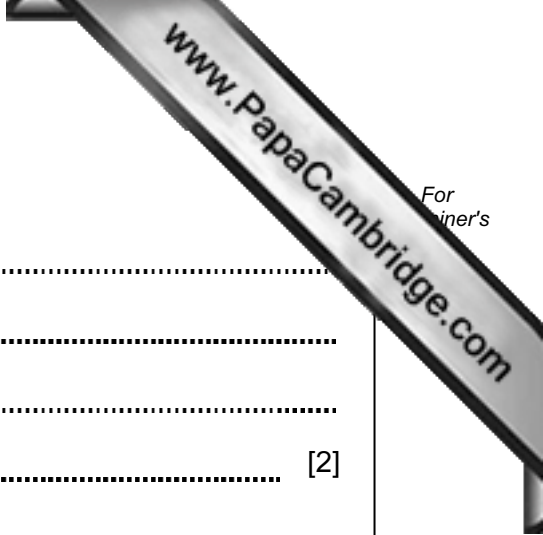
5 Study the following flowchart very carefully:

START

count = 1
total = 0
X = 0

INPUT
number

Is number > 0 ?

Yes → total = total + number

X = X + 1

No

count = count + 1

Is count <= 10 ?

Yes

No

average = total/X

OUTPUT
average

STOP

For
iner's

(a) Complete the trace table for the following data set:

15, -2,   0,   8,   0,   21,   -8,   -12,   1,   25

count	number	total	X	average	OUTPUT

[4]

(b) What is the purpose of this flowchart?

....

.... [1]
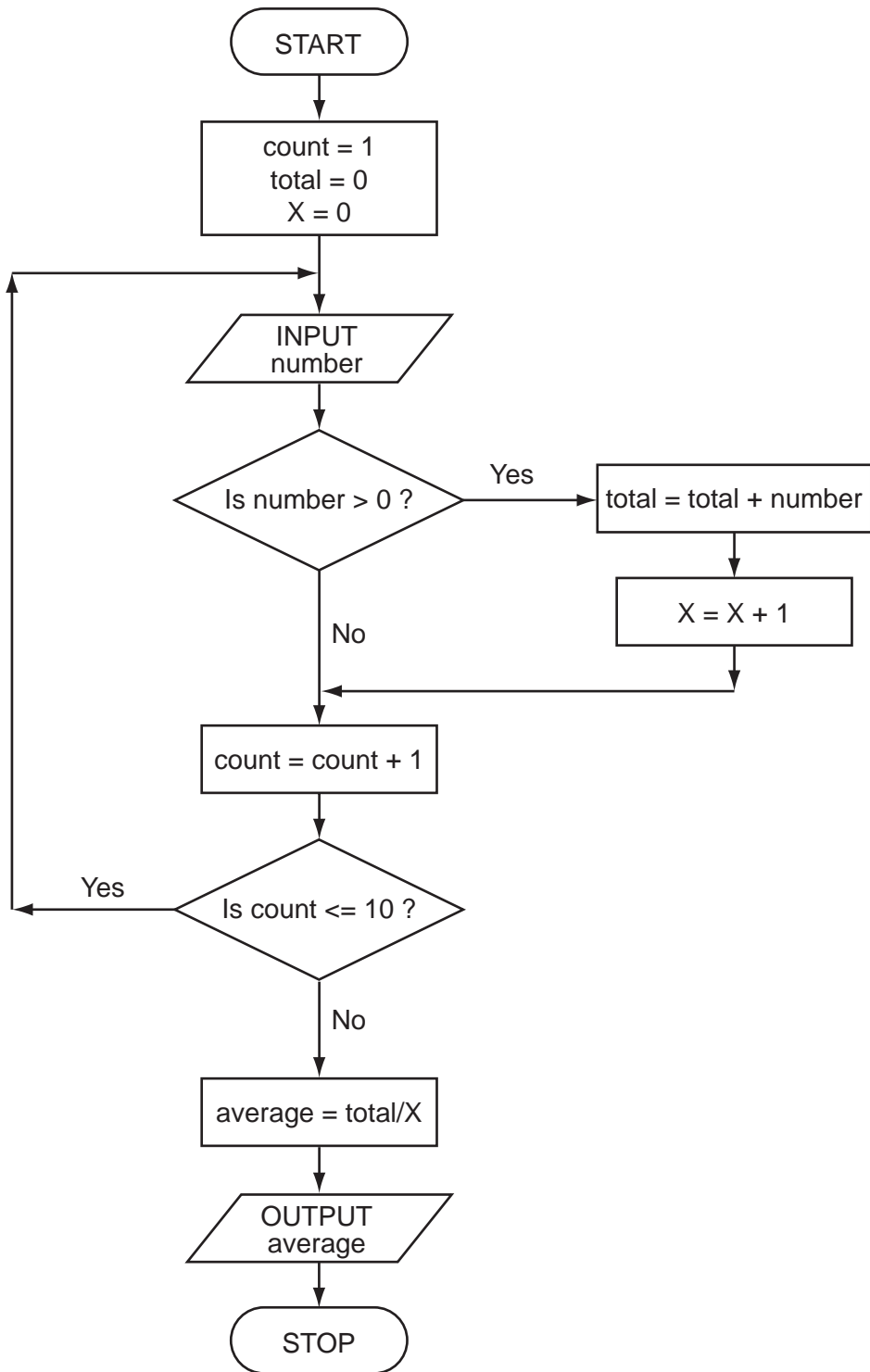
6 Describe the role of computer software and hardware when producing animation e[...]
   the television and film industry.

   ....

   ....

   ....

   ....

   ....

   ....

   ....

   ....

   .... [3]

7 A spreadsheet has been set up to compare the costs of types of fruit juice sold by a shop.

	A	B	C	D
1	NAME OF FRUIT JUICE	NORMAL PRICE PER BOTTLE ($)	VOLUME OF BOTTLE (LITRES)	COST PER LITRE ($)
2	Apple	3.50	1.0	3.50
3	Orange	2.80	1.0	2.80
4	Pomegranate	4.55	0.7	6.50
5	Caju	2.00	2.0	1.00
6	Mango	1.05	0.7	1.50
7			Average cost:	3.06

(a) (i) What formula is in cell D5 to calculate the cost of *Caju juice* per litre?

        ....

    (ii) What formula is in cell D7 to calculate the mean (average) cost of fruit juice per
         litre?

        .... [2]

(b) What validation check could be carried out on the data in cells B2 to B6?

    ....

    .... [1]

(c) Three extra columns are to be added to this spreadsheet:
Column E will show a percent discount on the normal price of a bottle of fruit juice (as shown in column B);
Column F will show this discount in dollars ($);
Column G will show the price of a bottle of fruit juice after discount.

Complete the spreadsheet by showing the **formulas** that need to be placed in cells F2 to F6 and G2 to G6.

	E	F	G
1	Percentage discount (%)	Discount amount ($)	Discounted price per bottle ($)
2	10		
3	20		
4	15		
5	10		
6	5		

[4]

8   Many computer-controlled systems use sensors to gather physical data.   For ex...
    temperature sensors are used in the control of central heating systems.

   (a) Name **three** other sensors and give a different application for each named sensor.

   Sensor 1: ....

   Application: ....

   ....

   ....

   Sensor 2: ....

   Application: ....

   ....

   ....

   Sensor 3: ....

   Application: ....

   ....

   .... [6]
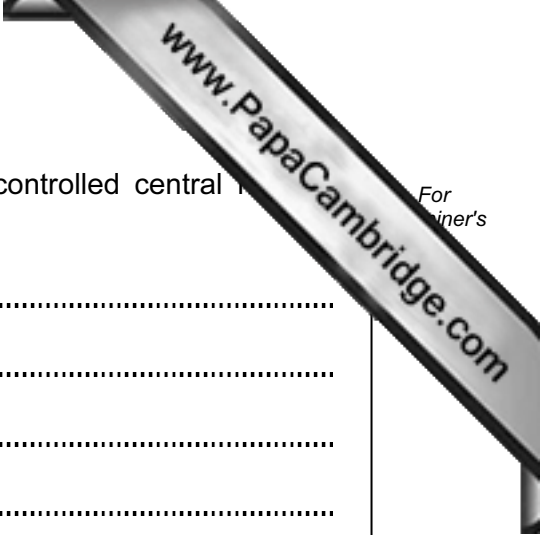
(b) Describe how temperature sensors are used in computer-controlled central systems.

....

....

....

....

....

.... [3]

9 An international company uses video-conferencing. The system is set up as follows:

screen + web cam

micro-phone

micro-phone

speakers

conference room 1   conference room 2
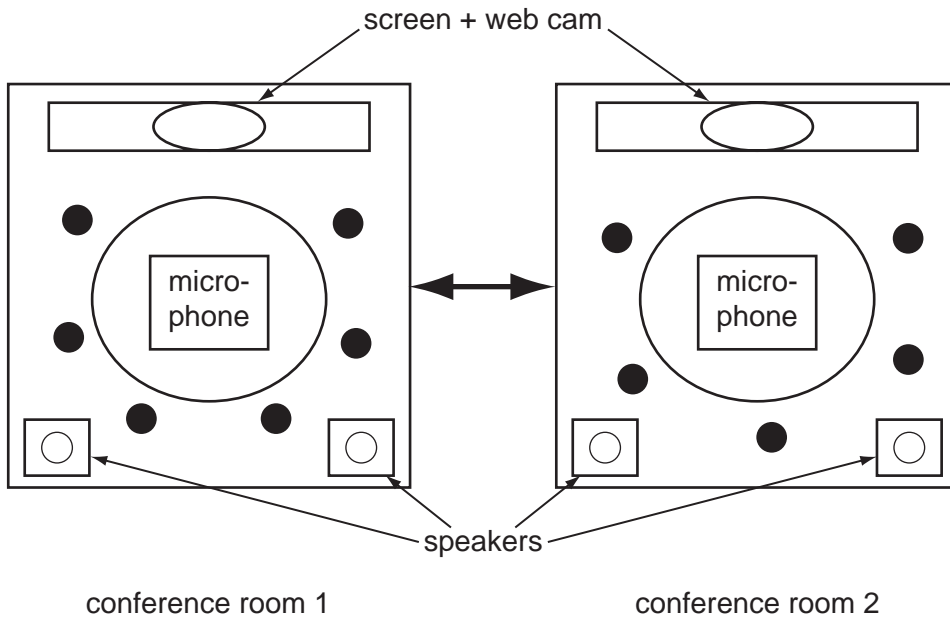
(● represents a person at the meeting)

(a) Describe how the video-conferencing system works.

....

....

....

....

....

....

....

....

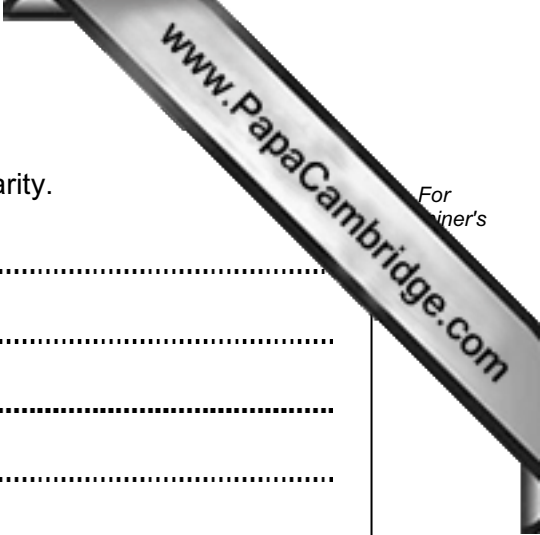.. [4]

For
iner's

(b) Give **two** reasons why video-conferencing is gaining in popularity.

1 ....

....

....

2 ....

....

.... [2]

10 (a) Two logic gates are the AND gate and the OR gate. Complete the truth tables for these two gates:
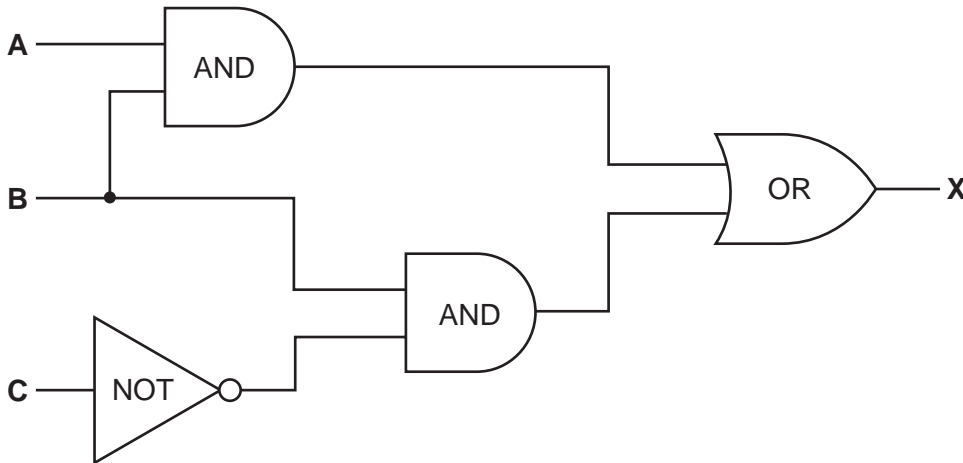
AND gate

A	B	X
0	0	
0	1	
1	0	
1	1	

OR gate

A	B	X
0	0	
0	1	
1	0	
1	1	

[2]

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

A	B	C	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]

11 **(a)** Describe **three** features you would expect to find in a Computer Aided Design package.

1 ....

....

....

2 ....

....

....

3 ....

....

.... [3]

(b) Give **three** different applications where CAD might be used.

1 ....

....

....

2 ....

....

....

3 ....

....

.... [3]

12 Many vehicles use Global Positioning Systems (GPS) to know their exact location times.

(a) How does GPS work?

....

....

....

....

....

....

....

....

.... [3]

A taxi company uses GPS in all its vehicles.

(b) One of its taxis is on Main Street and needs to go to Railway Street.

How is GPS technology used to help the taxi driver get to his new destination?

....

....

....

.... [2]

(c) Name **one** other feature of GPS that could be useful to the driver.

....

.... [1]

For
iner's

(d) Give **two** reasons why the GPS could take the driver to the wrong destination or
error messages.

1 ....

....

....

2 ....

....

.... [2]

13 It has been decided to model the traffic flow at a busy road junction.

(a) Describe how data is gathered for this model.

....

....

....

....

....

....

.... [3]

(b) Give **two** reasons why a model is used.

1 ....

....

2 ....

.... [2]

For
iner's
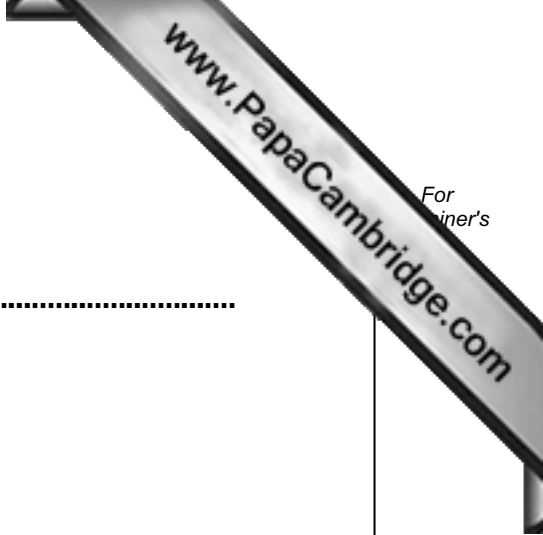
14 (a) Name and draw **two** common types of network topology.

Type 1: ....   Type 2: ....

[2]

(b) Give **two** advantages of networking computers.

1 ....

....

....

2 ....

....

.... [2]

15 A database showing the population of world cities has been produced. A section database is shown below.

Ref No	Name of City	Country	Area	City Population (m)	Urban Population (m)	Capital
1	Tokyo	Japan	Asia	33.2	34.1	Yes
2	New York	USA	America	17.8	21.9	No
3	Sao Paulo	Brazil	America	17.7	20.2	No
4	Seoul	S Korea	Asia	17.5	22.3	Yes
5	Mexico City	Mexico	America	17.4	22.7	Yes
6	Osaka	Japan	Asia	16.4	16.8	No
7	Manila	Philippines	Asia	14.8	14.9	Yes
8	Mumbai	India	Asia	14.4	19.7	No
9	Jakarta	Indonesia	Asia	14.3	17.2	Yes
10	Calcutta	India	Asia	12.7	15.6	No

(a) How many records are shown above?

.... [1]

(b) Using **Ref No** only, which records would be found if the following search condition was typed in

(**Country** = "India" **OR Area** = "America") **AND** (**Capital** = "No")

....

.... [2]

(c) Write a search condition to find the cities in Asia with a city population greater than 17 million OR an urban population greater than 20 million.

....

....

.... [2]

(d) Give **one** advantage of using Y or N rather than Yes or No in the **Capital** column.

....

....

.... [1]

16 A floor turtle can use the following instructions:

Instruction	Meaning
FORWARD *d*	Move *d* cm forward
BACKWARD *d*	Move *d* cm backward
LEFT *t*	Turn left *t* degrees
RIGHT *t*	Turn right *t* degrees
REPEAT *n*	Repeat the next set of instructions *n* times
ENDREPEAT	End of REPEAT loop
PENUP	Raise the pen
PENDOWN	Lower the pen

(Each square in the drawing below is 10 cm by 10 cm.)

Start   Finish

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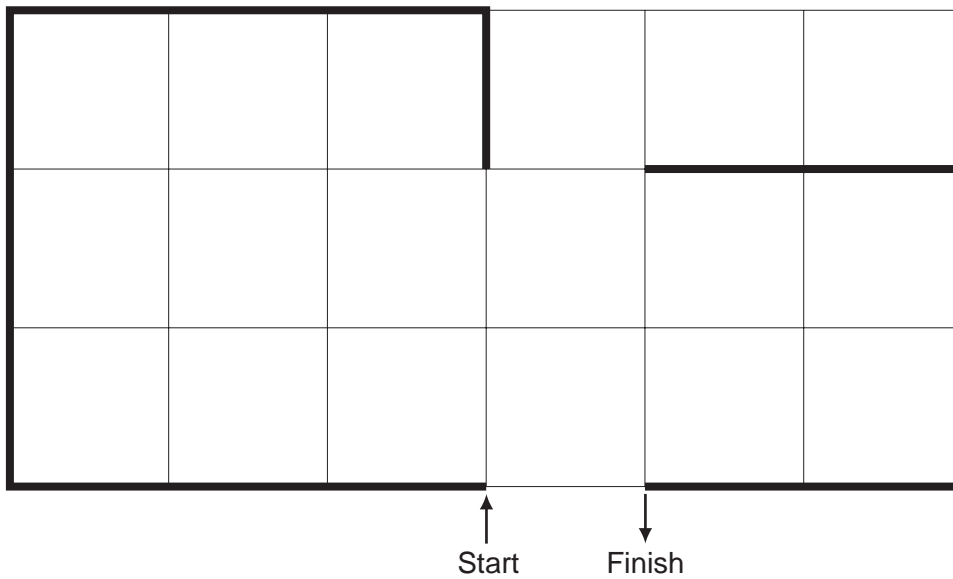
Complete the set of instructions to draw the above shape (shown in bold lines).

PENDOWN

LEFT 90

REPEAT ....

....

....

....

....

....

....

....

....

....

....

....

....

[5]

17 Daniel lives in Italy and travels to Mexico, India and New Zealand. The times diffe~~~~ are:

Country	Hours	Minutes
Mexico	-7	0
India	+4	+30
New Zealand	+11	0

Thus, if it is 10:15 in Italy it will be 14:45 in India.

(a) Write an algorithm, using pseudocode or otherwise, which:

- Inputs the name of the country
- Inputs the time in Italy in hours (H) and minutes (M)
- Calculates the time in the country input using the data from the table
- Outputs the country and the time in hours and minutes

[4]

(b) Describe, with examples, **two** sets of test data you would use to test your algorithm.

1 ....

....

2 ....

[2]