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0420/13

October/November 2012

2 hours 30 minutes

No Additional Materials are required.

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.

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.

- 1 For advertising at a trade fair, a company has a choice of computer facilities. One option is a stand-alone computer with multimedia facilities. The other option is a computer with Internet access to the company's website.

Discuss the benefits and drawbacks of each method.

Stand-alone computer with multimedia

Benefit

.....

Drawback

.....

Internet website

Benefit

.....

Drawback

..... [4]

- 2 New software is often developed using top-down (modular) design.

Give **three** benefits of using this method of development.

1

.....

2

.....

3

..... [3]

- 3 Five descriptions are given on the left of the diagram below. Five computer applications are shown on the right of the diagram.

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Using arrows, link each description to the correct application.

use of synthesisers to
combine simple
waveforms to produce
more complex sounds

animation

audio-visual
communication using
compression and echo
cancellation software

MP3

use of avatars in the
sequence of images one
after the other to produce
special effects

music generation

audio compression
technology to compress
large files into smaller files
often used in media

simulation

imitation of a real event
using a mathematical
model of a set of formulas

video-conferencing

[5]

4 (a) Describe **four** different communication methods that use the Internet.

- 1
-
- 2
-
- 3
-
- 4
- [4]

(b) Give **two** drawbacks of using the Internet for communications.

- 1
-
- 2
- [2]

(c) Mobile phones are a common method of communication.

Describe **four** types of application, other than the Internet, that may be available on a mobile phone.

- 1
-
- 2
-
- 3
-
- 4
- [4]

- 5 A program requires the user to type in a user ID which must be in the form:

XX999999

where X stands for any letter, and 9 stands for any digit.

- (a) Name **two** possible validation checks that could be applied to this user ID.

1
2 [2]

- (b) Name a validation check that could **not** be used on this occasion.
Give a reason for your choice.

Name
Reason
.....
..... [2]

- 6 The following is a list of stages when an email is sent and received.

Write the numbers from 1 to 8 in the right-hand column to put each stage of the process in the correct order. The first one has been done for you.

Description of stage	Order of stage
The message travels over the Internet and arrives at recipient's ISP mail server	
Message sent to sender's ISP mail server	
Recipient logs on to read his messages	
The sender composes his message and activates the send command	1
Message held in recipient's electronic mail box	
ISP mail server examines address associated with message	
Message retrieved and sent to recipient's computer to be opened and read	
Sender's ISP mail server decides how to route the message	

[7]

7 Credit card fraud in many countries is now reducing.

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(a) What changes to credit card technology have helped this reduction?

.....

.....

..... [1]

However, there has been a large increase in online fraud. This has resulted in fraudulent use of bank accounts.

(b) Name and describe **three** ways bank account information (such as passwords) can be accessed illegally.

1

.....

Description

.....

.....

2

.....

Description

.....

.....

3

.....

Description

.....

..... [6]

- 8 Word processors often use language translators and spell checkers to help users when composing documents.

- (a) A user selects the spell checker to check a document, but two errors in the document are not identified.

Give **two** possible reasons for this.

1

.....

2

..... [2]

- (b) The user also types in the following statement:

This is an example of a translation using a word processor

and selects the language translator English-Russian and the following text is produced:

Это пример перевода на текстовом редакторе

Such translations are often not very good. Give **one** reason for this.

.....

..... [1]

- (c) Describe **two** other features you might expect to find in a typical word processor.

1

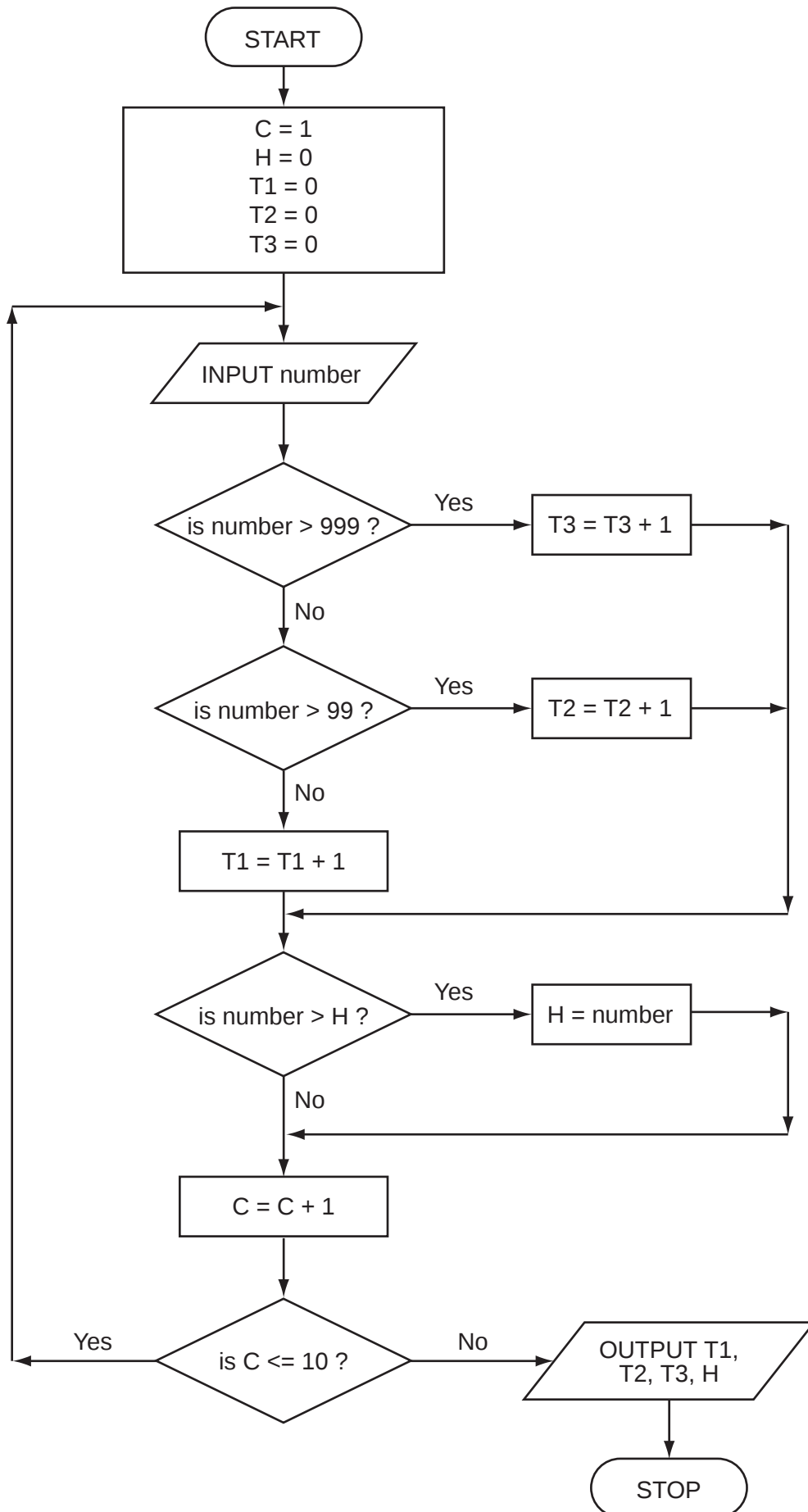
.....

2

..... [2]

9 Study this flowchart very carefully.

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Complete the trace table for the following data:

1500, 1000, 100, 10, 999, 99, 2000, 5, -3, 0

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C	H	T1	T2	T3	number	OUTPUT

[6]

- 10 You have just been appointed as the IT representative of a small engineering company. The company need to buy:

- external backing storage
- printers
- input devices

Choose a suitable example for each and give a reason for your choice.

External storage device

Reason for choice

.....

.....

Printer type

Reason for choice

.....

.....

Input device

Reason for choice

.....

..... [6]

- 11 A database was set up showing the largest ocean-going liners. Part of the database is shown below.

Liner ID	Year built	Gross Tonnage	Country of Registration	Country of Construction
OA	2009	225 282	Norway	Finland
IN	2008	154 407	Norway	Finland
QM	2004	148 528	UK	France
EX	2000	137 308	Norway	Finland
VO	1999	137 276	Norway	Finland
GP	1997	108 865	UK	Italy
DE	1996	101 509	USA	Italy
SP	1995	77 499	UK	Italy
SO	1988	73 192	Norway	France
FR	1972	66 343	France	France
QE	1940	86 673	UK	UK
NO	1935	79 280	France	France
MJ	1922	56 561	UK	Germany
TI	1912	46 329	UK	UK
MA	1907	31 938	UK	UK

- (a) How many records are shown in the above part?

..... [1]

- (b) Using **Liner ID** only, what would be output if the following search condition was typed in:

(Year built < 2000) AND (Country of Registration = Country of Construction)?

..... [2]

- (c) Write the search condition to find out which liners have a gross tonnage larger than 80 000 or are registered in the UK.

..... [2]

- 12 (a) A spreadsheet was set up to determine if a triangle is right-angled. Part of the spreadsheet is shown below.

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Use

	A	B	C	D	E
1	a	b	c	$a^2 + b^2 - c^2$	is triangle right-angled?
2	2	5	6	-7	No
3	3	4	5	0	Yes
4	3	6	8	-19	No
5	5	12	13	0	Yes
6	7	24	25	0	Yes
7	8	15	17	0	Yes

- (i) What formula must be in D3?

.....
..... [1]

- (ii) Complete the formula that must be in column E to generate the output Yes or No. Use cell E3 as your example.

= IF (D3 = 0,,) [1]

- (iii) How could the spreadsheet be used if **a** and **b** values were known and it was required to predict the value of **c** to get a right-angled triangle?

.....
.....
.....
.....
..... [2]

- (b) Apart from the use of formulas and functions, give **three** features of spreadsheet software.

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1

.....

2

.....

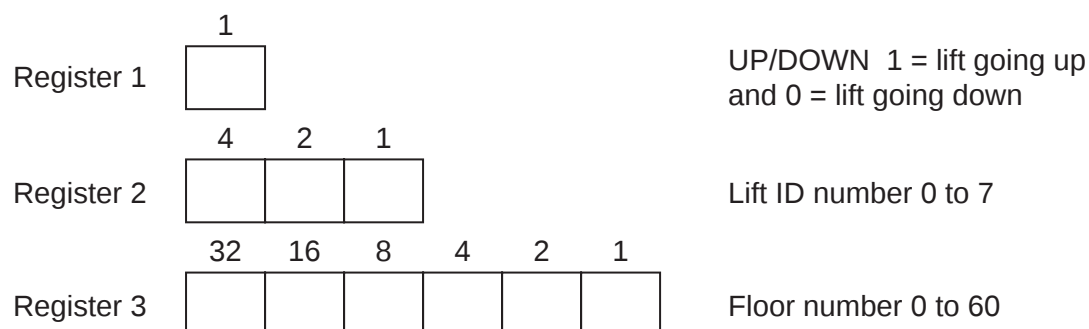
3

..... [3]

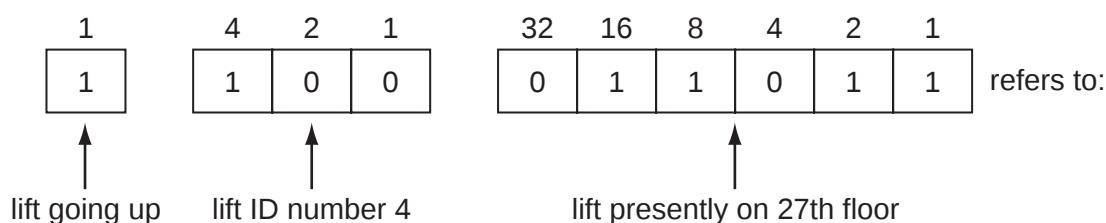
- 13** A large hotel uses eight lifts (elevators) to carry passengers between its sixty floors.

A computer is used to control and monitor the lifts. Each lift has three registers to represent its state.

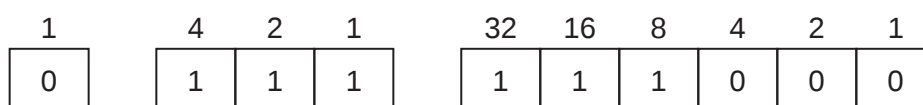
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Use



Thus



- (a)** If the three registers contain the following data:



what information about the lift is shown?

.....

.....

..... [2]

- (b)** How would the following information be shown in the three registers:

lift 6 presently on the 45th floor and going down



[2]

- (c) (i) A customer is on the 14th floor and wants to go to the 50th floor. She presses the button to call the lift.

What **two** pieces of information would the computer check to identify which of the eight lifts should be made available?

1

.....

2

..... [2]

- (ii) Using your answers to part (i), which of the following lifts would be made available to the customer?

1	0	0	0	1	0	0	1	0	0	A
0	0	0	1	0	0	1	1	1	1	B
1	0	1	0	1	1	0	0	1	0	C
1	0	1	1	0	0	1	0	1	0	D

..... [1]

- (d) An engineer wishes to test that this computer system detects incorrect data.

Describe what input the engineer might use to check that the computer can correctly identify a fault condition.

.....

.....

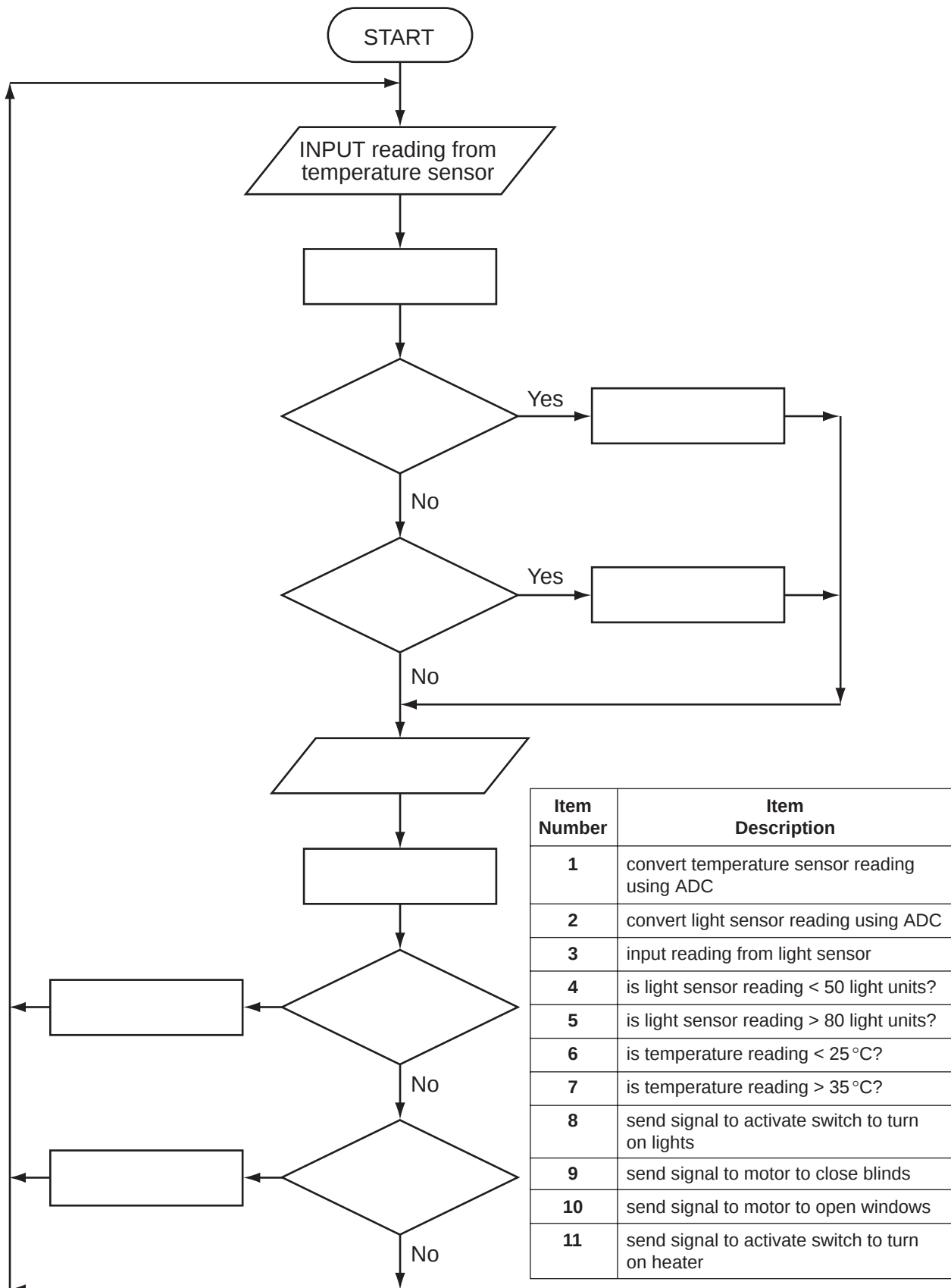
.....

.....

..... [2]

- 14 The following flowchart shows how a computer and sensors are used to control the environment in a greenhouse. Temperatures must be between 25°C and 35°C. Light must be between 50 and 80 light units.

(a) Complete the flowchart, using item number only, from the list of items given below.

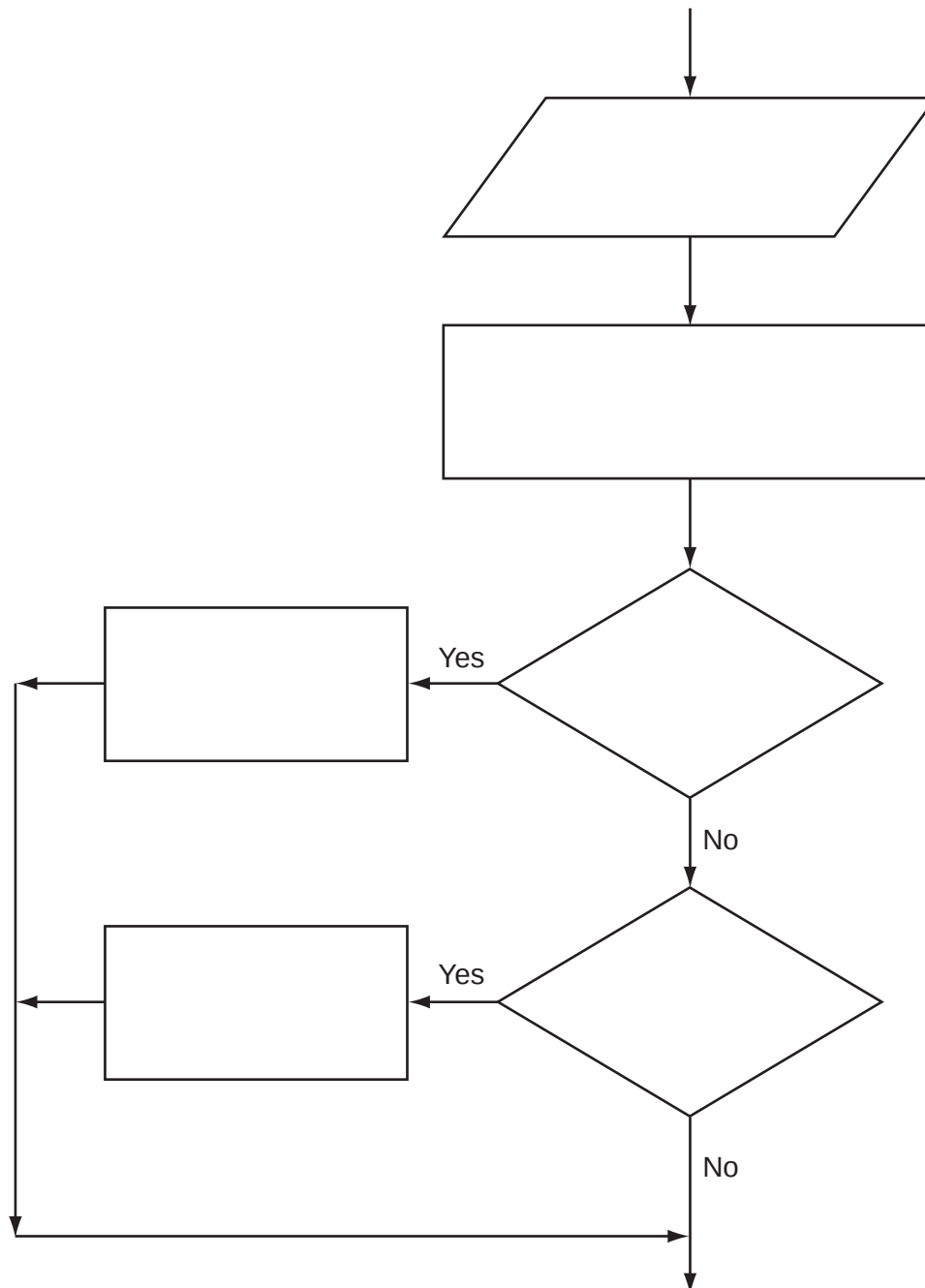


[5]

- (b) The computer also checks on humidity levels (using humidity sensors) which must be between the values of 40 and 90.

If humidity is too low, water is sprayed into the air.
If humidity is too high, fresh air is allowed to enter.

Write the necessary commands in the following flowchart section to show how the humidity levels are controlled:

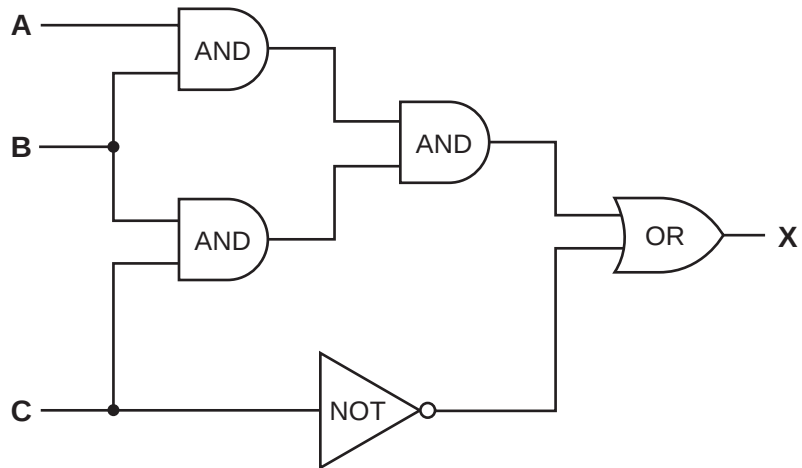


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[4]

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

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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]

- (b) The above logic circuit uses AND, OR and NOT gates.
Name another logic gate and complete its truth table.

Name of gate

A	B	X
0	0	
0	1	
1	0	
1	1	

[3]

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- Write an algorithm, using pseudocode or a program flowchart only, which

- [6]

[6]