

- 1 Insert **five** of the following words about computer architecture in the correct place in the text below.

memory data bus computer program input device
address bus output device computer processor

A carries out the instructions in a The is where data and instructions are stored ready to be processed. The identifies the location of data. The transports the data from one location to another. [5]

- 2 Give an example for each type of data storage.

Volatile data storage

Non-volatile data storage [2]

- 3 A school wants to use a computer program to find out which student has achieved the lowest score in a Physics class. There are 24 students in the class and all the students' scores are different.

State the inputs, the outputs and the processes required to find the name and the score of the student with the lowest score.

Inputs

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Outputs

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.....

Processes required

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..... [6]

- 4 The problem of calculating the remainder when a number is divided by 4 can be defined as follows:

Input	Output
<ul style="list-style-type: none"> <i>Number</i>: a positive whole number 	<ul style="list-style-type: none"> Remainder when <i>Number</i> is divided by 4

A possible solution to this problem is as follows:

Step 1: If *Number* is less than 4, proceed to Step 3. Otherwise, proceed to Step 2.

Step 2: Subtract 4 from *Number* and then proceed to Step 1.

Step 3: Output *Number* as the final answer.

A similar problem is as follows:

Input	Output
<ul style="list-style-type: none"> <i>Number</i>: a positive whole number <i>Divisor</i>: a positive whole number 	<ul style="list-style-type: none"> Remainder when <i>Number</i> is divided by <i>Divisor</i>.

Write down the solution to the second problem by generalising the first solution.

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[3]

5 Fig. 5 shows a flowchart of an algorithm

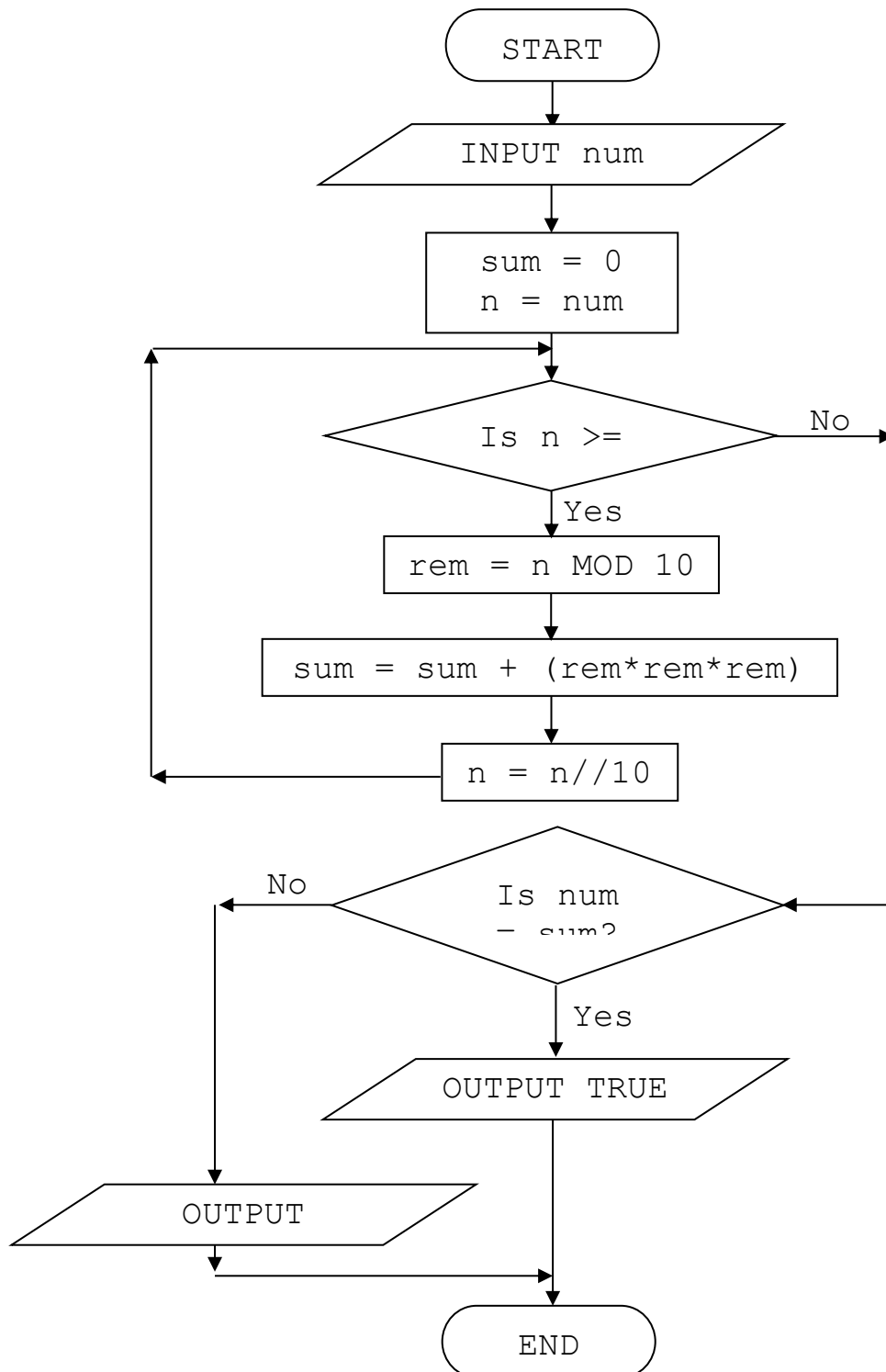


Fig. 5

Complete the trace table for the following set of data.

371

Trace table

num	sum	n	rem	OUTPUT

[5]

6 **Constants, variables and arrays** are used in programming.

Describe what is meant by:

a constant

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a variable

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an array

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[3]

- [illegible]

[9]

- Describe what is meant by:

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.....

[2]

- 9 An algorithm is required to find the average of 10 numbers stored in an array. The input is provided in an array called "Number" and the output is provided through a variable named "Average". Study the following pseudo-code.

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Total = 500
Counter = 1
WHILE Counter > 11 DO
    Total = Total - Number[Counter]
    Counter = Counter + 1
ENDWHILE
Average = Total / Counter
```

There are **four** errors in this pseudo-code. Locate the errors and state the correct pseudo-code.

Error 1

Correction

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Error 2

Correction

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Error 3

Correction

.....

Error 4

Correction

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[8]

- 10 Five descriptions and five security issues are shown below.

Draw a line to connect each description to the correct security issue.

Description	Security issue
malicious code installed on the hard drive of a user's computer or on the web server; this code will re-direct user to a fake web site without their consent	hacking
software that gathers information by monitoring key presses on a user's computer and relays the information back to the person who sent the software	pharming
program or code that replicates itself and is designed to amend, delete or copy data and files on a user's computer without their consent	phishing
the act of gaining illegal access to a computer system without the owner's consent	spyware
creator of code sends out a legitimate-looking email in the hope of gathering personal and financial data; it requires the recipient to follow a link in the email or open an attachment	virus

[5]

- 11 (a) Convert the hexadecimal number **BC** into a binary number. Show your working.

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[2]

- (b) Convert the denary number **401** into a binary number. Show your working.

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[2]

- (c) Convert the denary number **11001** into a hexadecimal number. Show your working.

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[2]

- 12 An alarm sounds when a car fuel injection system gives certain fault 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 output, X, of a logic circuit that drives the alarm must have a value of 1 only if:

either pressure < 5 bar and revs > 8000 rpm

or revs ≤ 8000 and temp > 120 °C

Draw a logic circuit for the system.

[6]

- 13** 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) What formula is in cell D5 to calculate the cost of Caju juice per litre?

..... [1]

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

..... [1]

- (c) Three extra columns are added to this spreadsheet:

Column E will show a percent discount on the normal price of a bottle of fruit juice (number datatype);

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 below by showing the formulas that are needed 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]

14 A computer network is a system of two or more computers that are connected together by a transmission medium for the exchange of data.

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

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[2]

(b) Explain the use of parity bits during data transmission.

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[4]

- [illegible]

End of paper