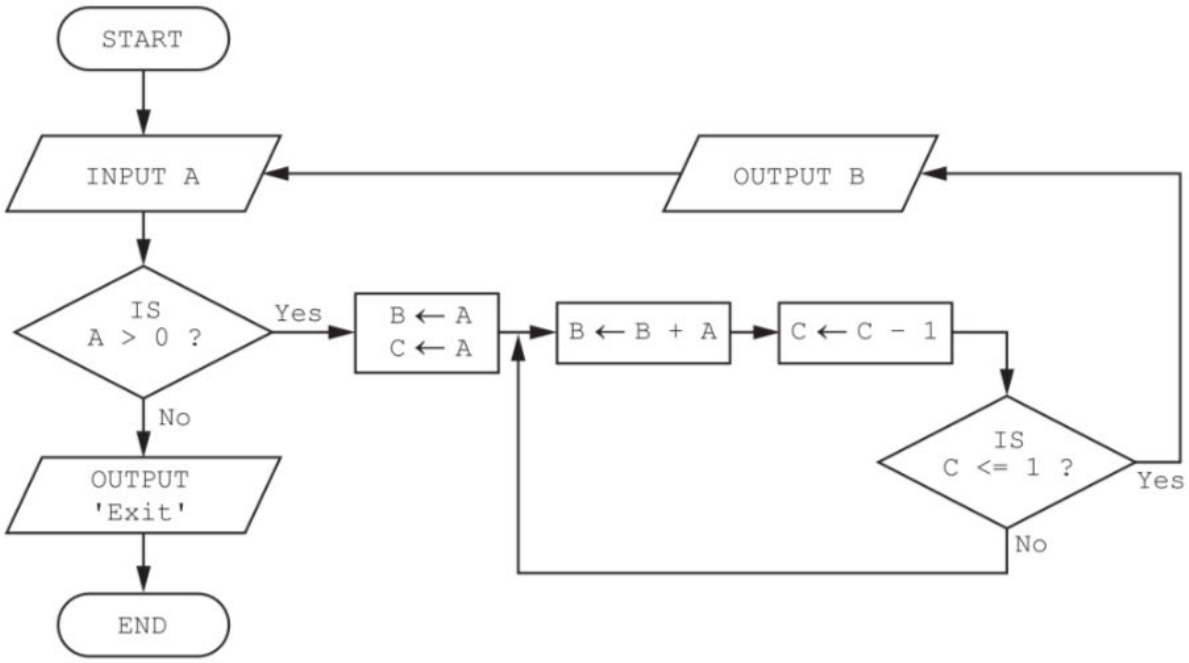
7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

4 Study the flowchart.



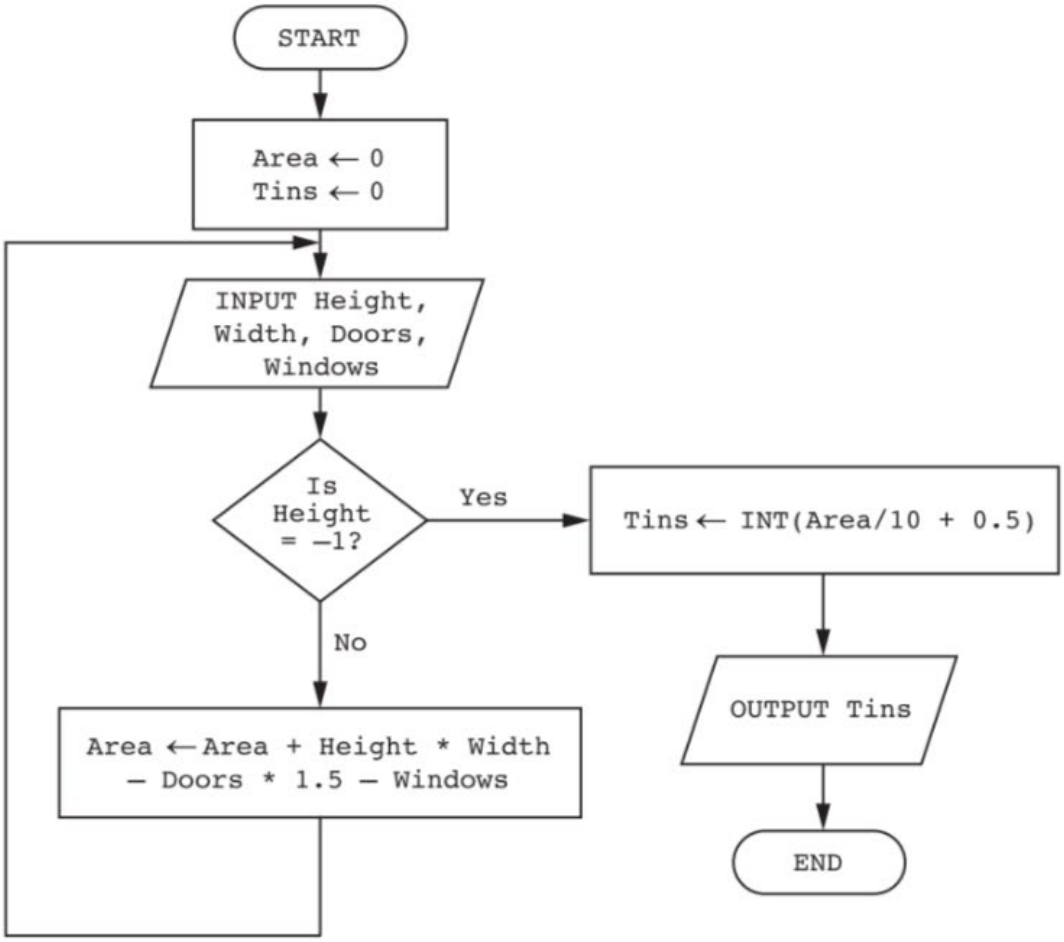
Complete the trace table for the input values 4, 3, –1:

A	B	C	OUTPUT

[4]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

3 The flowchart below calculates the number of tins of paint required to paint walls. The flowchart inputs the height and width of a wall in metres, the number of doors and the number of windows. A value of –1 for the height stops the input.



Complete the trace table for the input data:

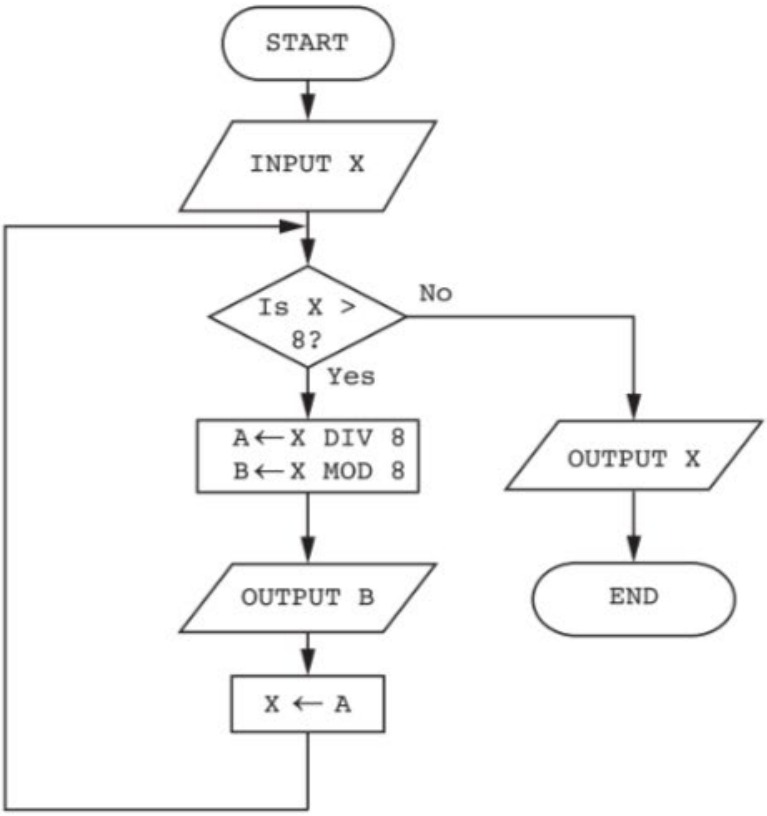
3, 5, 1, 0, 3, 7, 0, 0, 3, 5, 0, 3, 3, 7, 1, 1, –1, 0, 0, 0

Area	Tins	Height	Width	Doors	Windows

[4]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

3 The flowchart below inputs an integer. The predefined function `DIV` gives the value of the division, for example `Z ← 11 DIV 3` gives the value `Z = 3`. The predefined function `MOD` gives the value of the remainder, for example `Z ← 11 MOD 3` gives the value `Z = 2`.



Complete a trace table for each of the two input values **33** and **75**.

Trace table for input value **33**

X	A	B	OUTPUT

Trace table for input value **75**

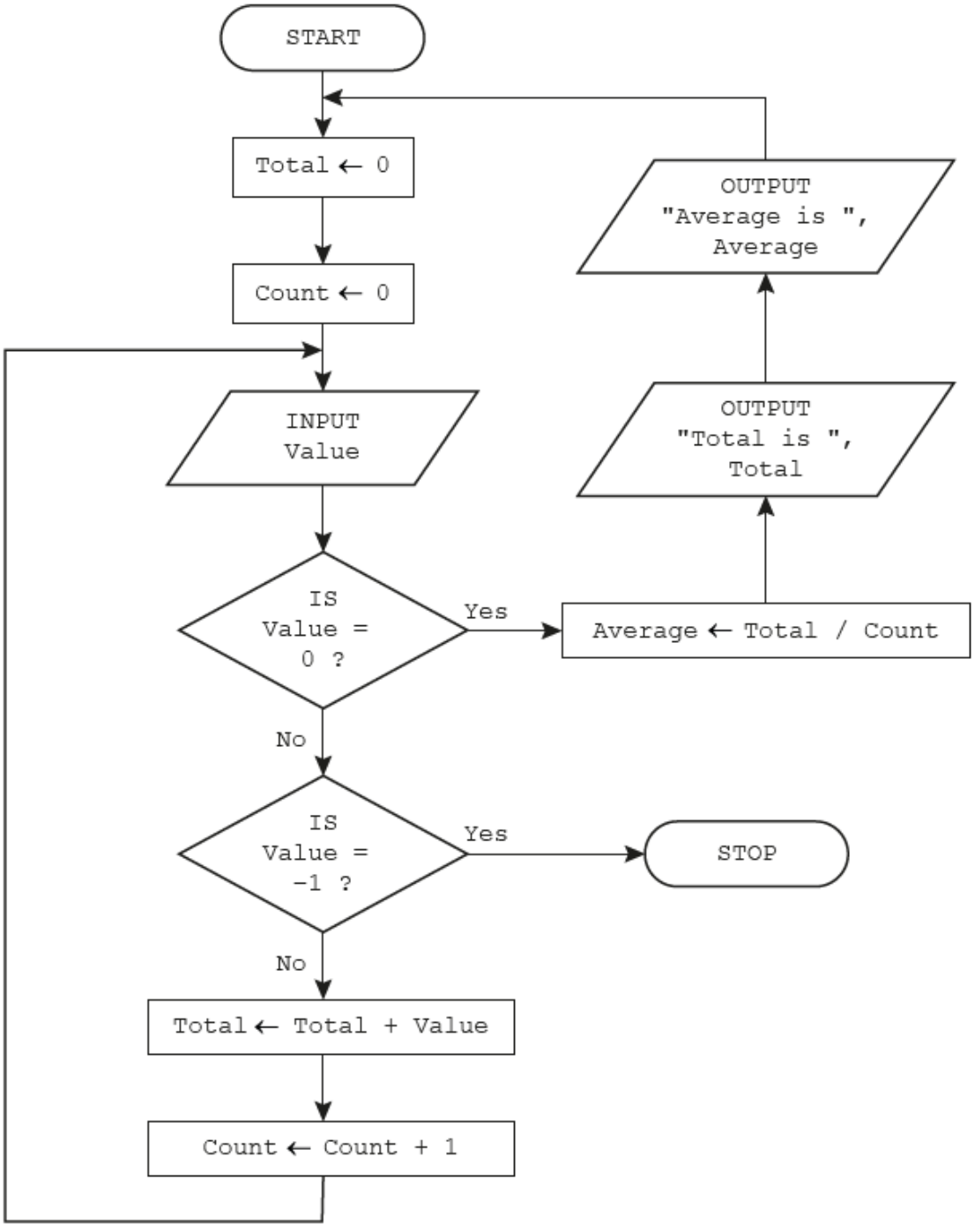
X	A	B	OUTPUT

[4]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

6 The flowchart represents an algorithm that performs a process on groups of values that are input. The algorithm will fail if the first value of any group is 0.

An input of –1 will terminate the algorithm.



7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

(a) Complete the trace table for the input data:

25, 35, 3, 0, 57, 20, 25, 18, 0, –1, 307, 40, 0

Value	Average	Total	Count	OUTPUT

[5]

(b) Describe the purpose of the algorithm.

.....

.....

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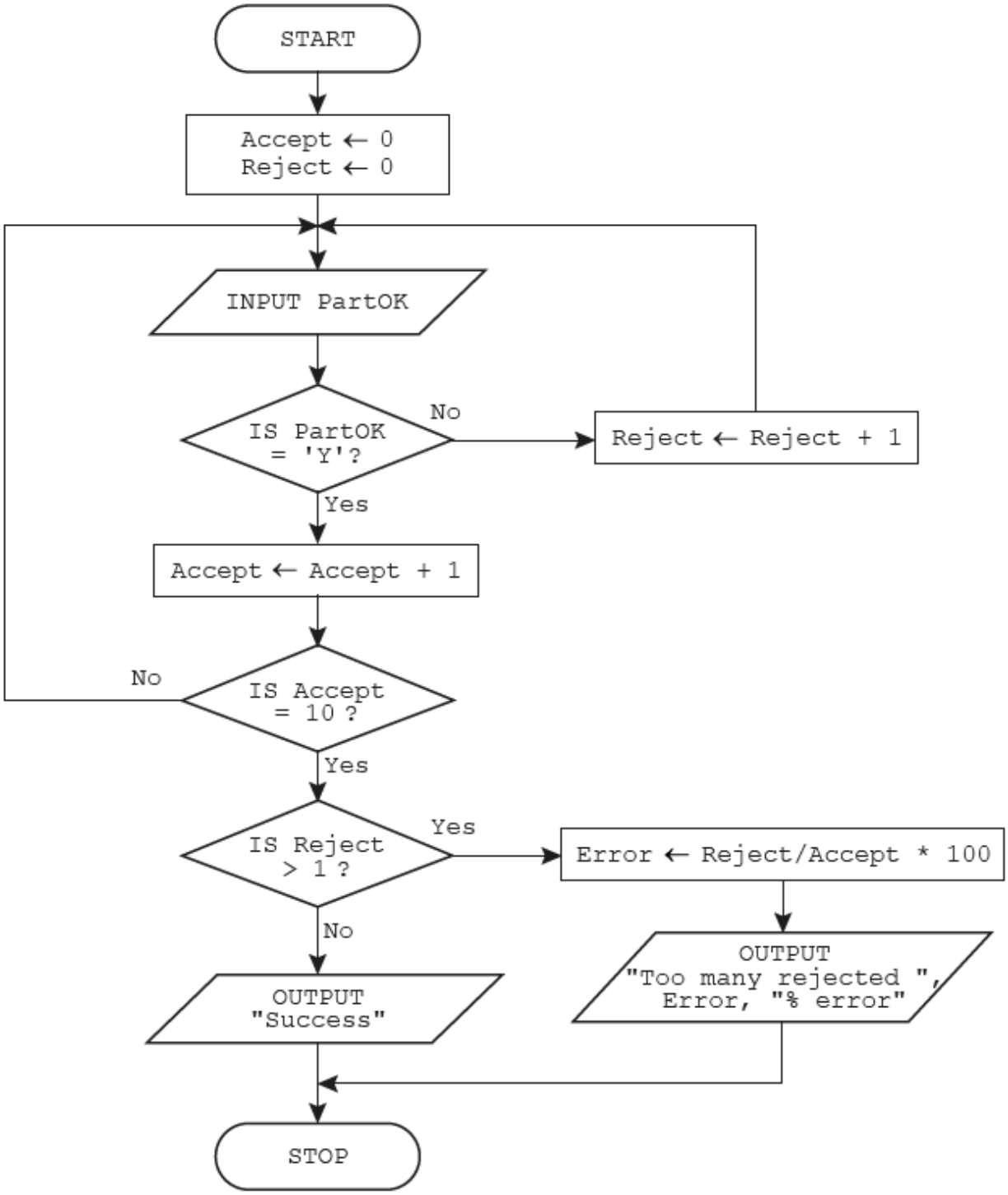
..... [2]

8 This is an algorithm to find if a batch of parts has been manufactured successfully.



7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

(a) Complete the trace table using this data:
Y, Y, Y, N, Y, Y, Y, Y, N, Y, Y, Y, Y

Accept	Reject	PartOK	Error	OUTPUT

[5]

(b) Describe how the algorithm should be changed to accept 'Y' or 'y' for a successfully manufactured part.

.....

.....

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.....

..... [3]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

The table represents the two-dimensional (2D) array `Word[]` which stores the first half of the phonetic alphabet used for radio transmission. For example, `Word[10,1]` is 'J'.

Index	1	2
1	A	Alpha
2	B	Bravo
3	C	Charlie
4	D	Delta
5	E	Echo
6	F	Foxtrot
7	G	Golf
8	H	Hotel
9	I	India
10	J	Juliet
11	K	Kilo
12	L	Lima
13	M	Mike

(a) Complete the trace table for the algorithm by using the input data: F, Y, D, N

Pointer	Letter	Choice	OUTPUT

[4]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

(b) Identify the type of algorithm used.

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..... [1]

(c) Describe **one** problem that could occur with this algorithm if an invalid character was input.

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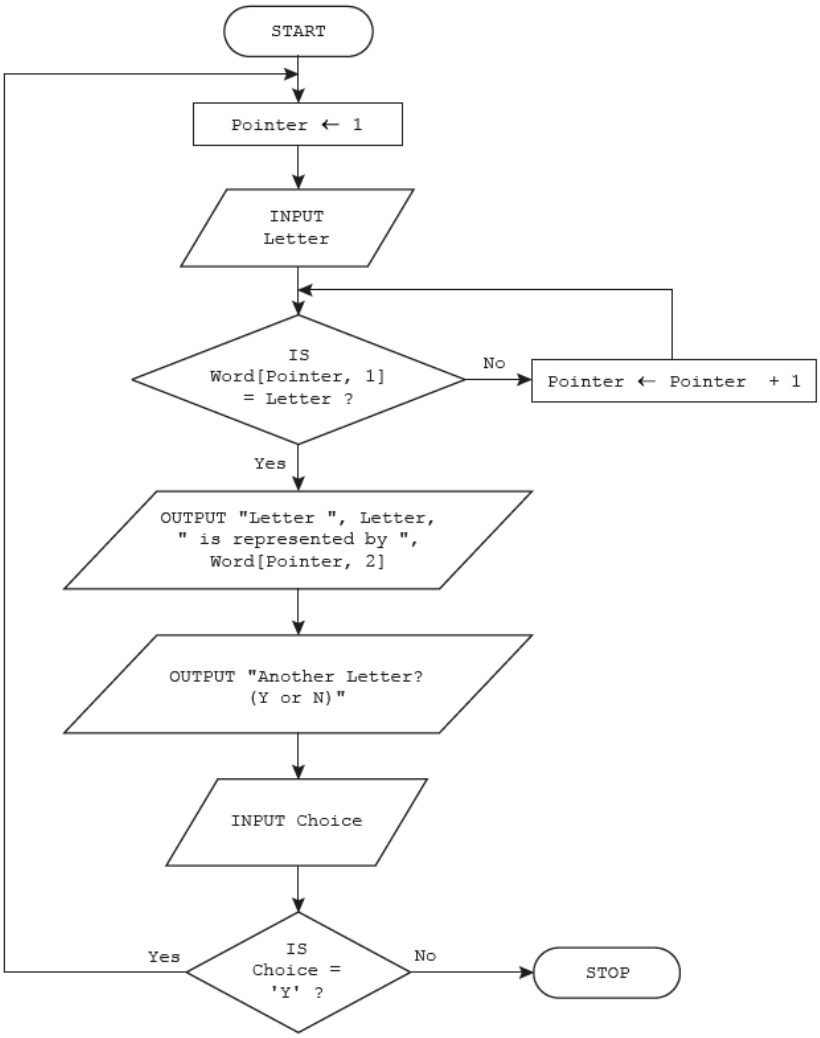
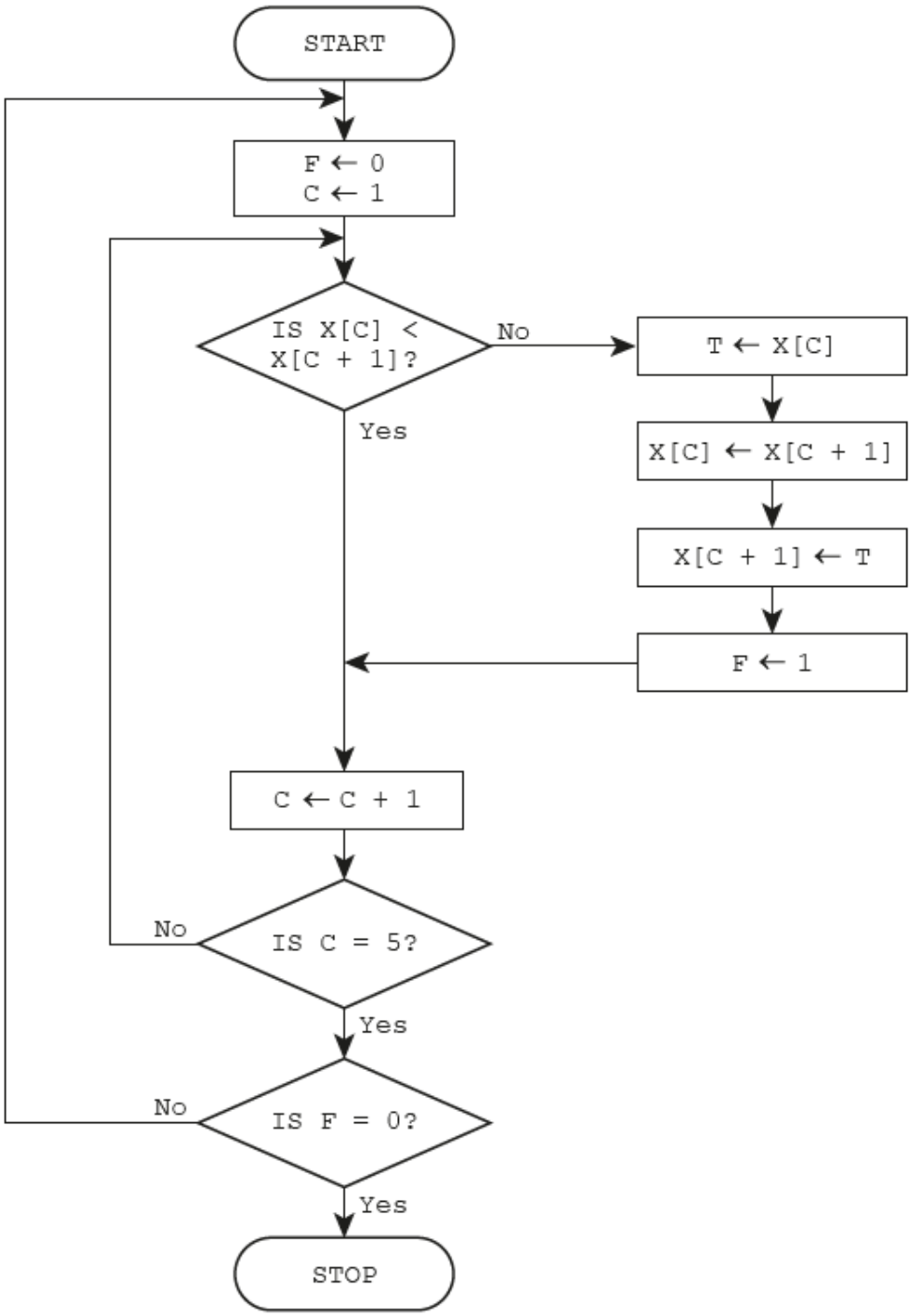
..... [2]



7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

9 This flowchart represents an algorithm.



7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

(a) The array `X[1:5]` used in the flowchart contains this data:

X[1]	X[2]	X[3]	X[4]	X[5]
10	1	5	7	11

Complete the trace table by using the data given in the array.

F	C	X[1]	X[2]	X[3]	X[4]	X[5]	T
		10	1	5	7	11	

[5]

(b) Describe what the algorithm represented by the flowchart is doing.

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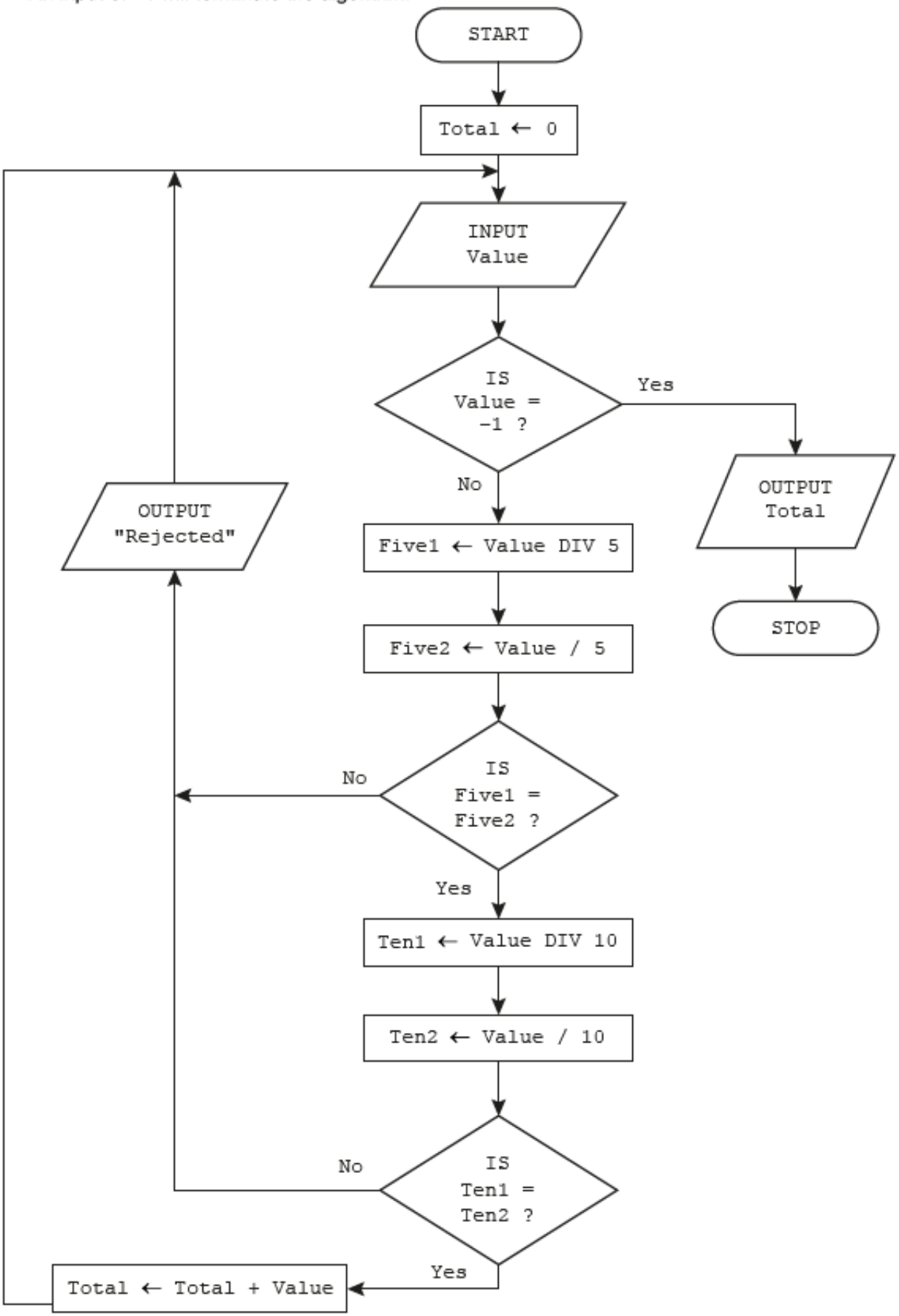
..... [2]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

7 The flowchart represents an algorithm.
An input of –1 will terminate the algorithm.



7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

(a) Complete the trace table for the input data:

5, 50, 52, 555, 57, 500, –1, 5500, 55

Total	Value	Five1	Five2	Ten1	Ten2	OUTPUT

[6]

(b) Describe the purpose of the algorithm.

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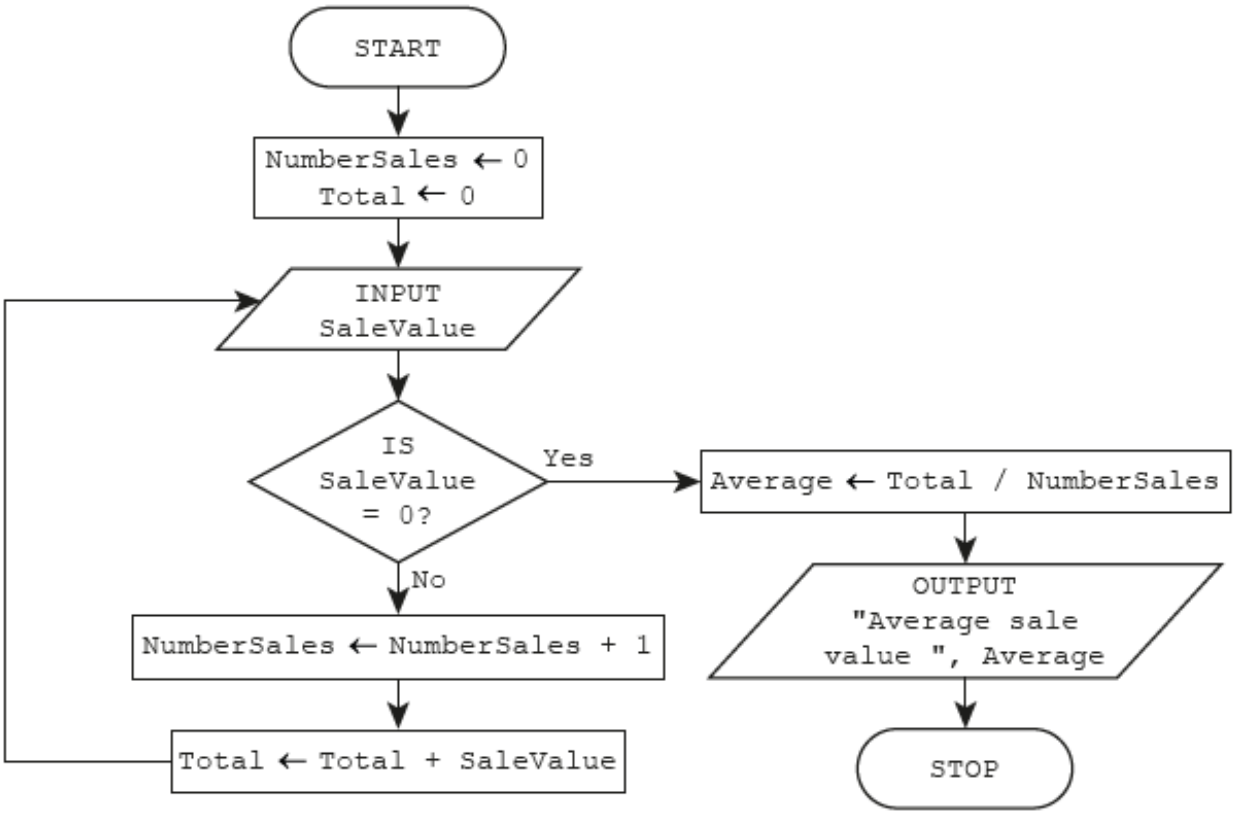
..... [2]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

8 This flowchart represents an algorithm to find the average value of a number of sales.



(a) Complete the trace table using this data:
5.50, 3.40, 6.25, 3.85, –11.00, 0

NumberSales	Total	SaleValue	Average	OUTPUT

[4]

(b) Identify the error in the algorithm and describe how to correct it.

Error .....

.....

Correction .....

.....

.....

.....

[3]

7 Algorithm design and problem-solving – Trace Tables
QUESTIONS

3 **(a)** This pseudocode inputs an integer. The predefined function `DIV` gives the value of the division, e.g. `Y ← 10 DIV 3` gives the value `Y = 3`. The predefined function `MOD` gives the value of the remainder, e.g. `Y ← 10 MOD 3` gives the value `Y = 1`.

```
INPUT X
WHILE X > 15
  DO
  T1 ← X DIV 16
  T2 ← X MOD 16
  CASE T2 OF
    10:OUTPUT A
    11:OUTPUT B
    12:OUTPUT C
    13:OUTPUT D
    14:OUTPUT E
    15:OUTPUT F
    OTHERWISE OUTPUT T2
  ENDCASE
  X ← T1
ENDWHILE
CASE X OF
  10:OUTPUT A
  11:OUTPUT B
  12:OUTPUT C
  13:OUTPUT D
  14:OUTPUT E
  15:OUTPUT F
  OTHERWISE OUTPUT X
ENDCASE
```

Complete a trace table for each of the **two** input values 37 and 191.

Trace table for input value 37

X	T1	T2	OUTPUT

Trace table for input value 191

X	T1	T2	OUTPUT

[4]

(b) State the purpose of the pseudocode in **part (a)**.

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.....[2]