

0478**COMPUTER SCIENCE****TOPIC QUESTION PAPER-2 SET-2****SMART EXAM RESOURCES****Unit 7 Algorithm Design and Problem Solving**

1. Tick (✓) **one** or more boxes in each row to match the type(s) of test data to each description

Description	Types of test data			
	Boundary	Erroneous / Abnormal	Extreme	Normal
test data that is always on the limit of acceptability				
test data that is either on the limit of acceptability or test data that is just outside the limit of acceptability				
test data that will always be rejected				
test data that is within the limits of acceptability				

[4]

2. The pseudocode represents an algorithm.

The pre-defined function DIV gives the value of the result of integer division.

For example, $Y = 11 \text{ DIV } 4$ gives the value $Y = 2$

```

Count ← 0
INPUT Limit
FOR In ← 1 TO Limit
    Logic ← TRUE
    Test ← 2
    INPUT Number
    REPEAT
        IF Number / Test = Number DIV Test
            THEN
                Logic ← FALSE
            ELSE
                Test ← Test + 1
            ENDIF
    UNTIL NOT Logic OR Test >= Number DIV 2
    IF Logic
        THEN
            Store[Count] ← Number
            Count ← Count + 1
        ENDIF
    NEXT In
FOR Out ← 0 TO Count - 1
    OUTPUT Store[Out]
NEXT Out

```

(a) Complete the trace table for the algorithm using this input data: 5, 9, 5, 8, 10, 7

In	Logic	Test	Number	Store [Count]	Count	Limit	Out	OUTPUT

(b) State the purpose of this algorithm.

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..... [2]

(c) This algorithm only works for numbers that are 3 or greater.

Describe how you could change this algorithm to make sure that only numbers that are 3 or greater are entered. Any pseudocode statements used in your answer must be fully described.

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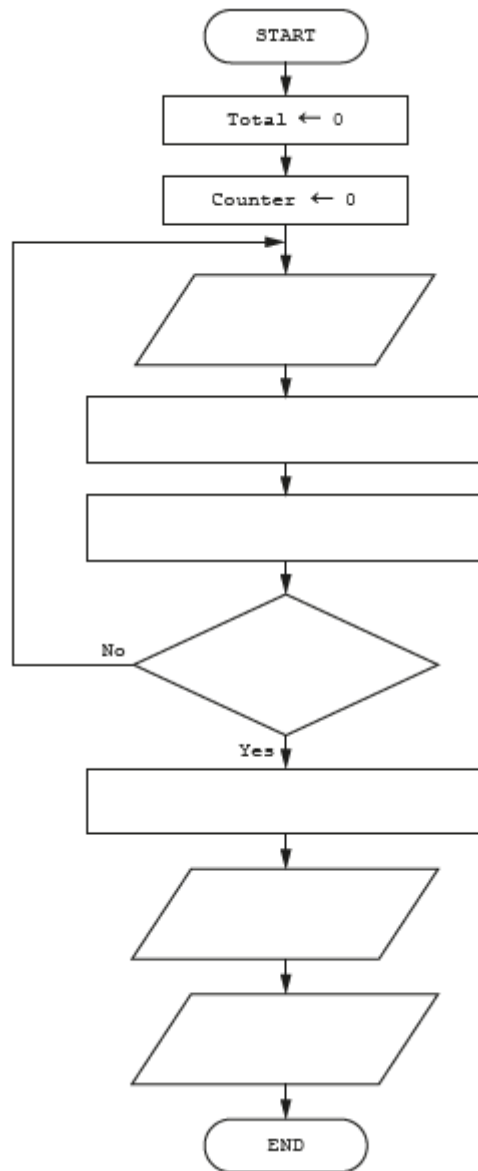
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..... [3]

3. The flowchart shows an algorithm that should:

- allow 100 numbers to be entered into the variable `Number`
- total the numbers as they are entered
- output the total and average of the numbers after they have all been entered.

Complete this flowchart:



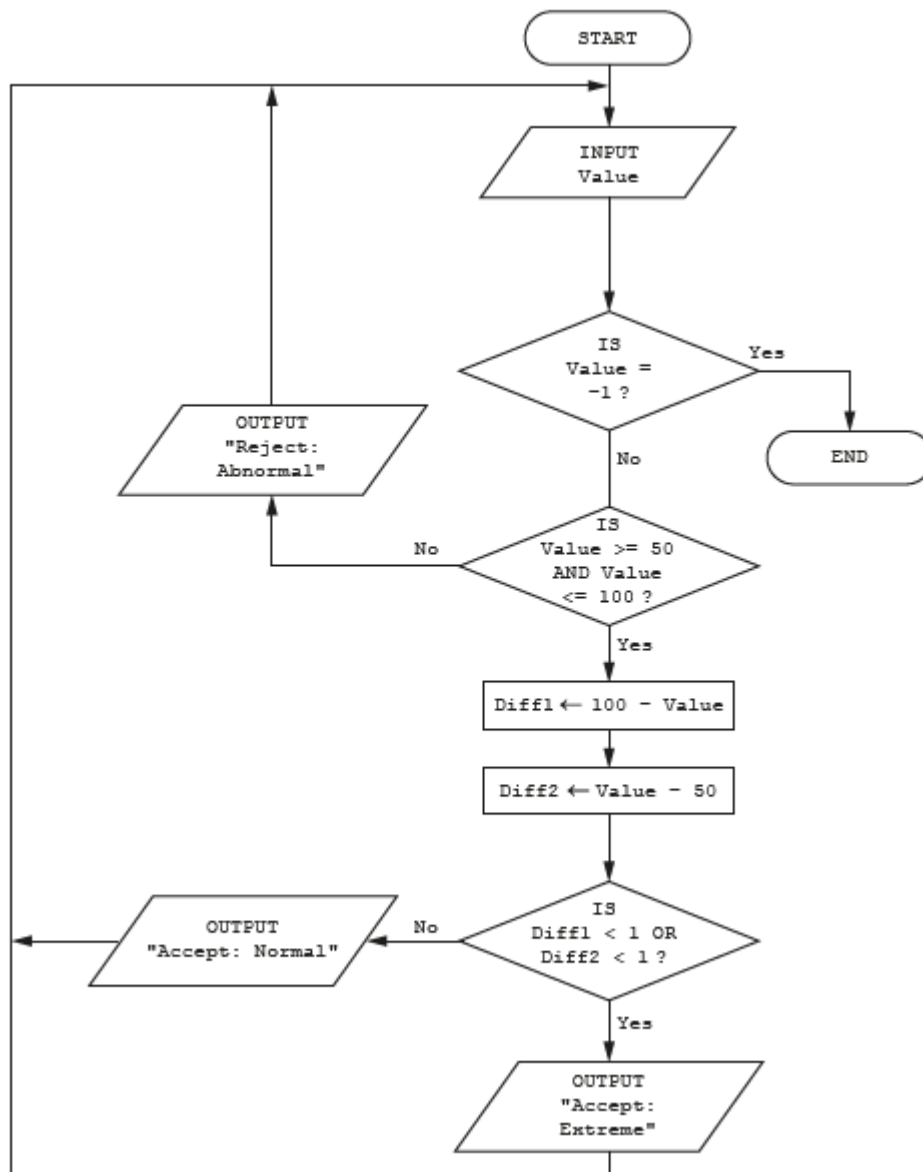
[6]

4. Tick (✓) **one** box in each row to identify if the statement is about **validation**, **verification** or **both**.

Statement	Validation (✓)	Verification (✓)	Both (✓)
Entering the data twice to check if both entries are the same.			
Automatically checking that only numeric data has been entered.			
Checking data entered into a computer system before it is stored or processed.			
Visually checking that no errors have been introduced during data entry.			

[3]

5. The flowchart represents an algorithm.
The algorithm will terminate if -1 is entered.



(a) Complete the trace table for the input data: 50, 75, 99, 28, 82, 150, -1, 672, 80

Value	Diff1	Diff2	OUTPUT

[4]

(b) Describe the purpose of the algorithm.

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.....[2]

6 (a) Write an algorithm in pseudocode to input 500 positive whole numbers. Each number input must be less than 1000. Find and output the largest number input, the smallest number input and the range (difference between the largest number and smallest number).

[6]

(b) Describe how the algorithm could be changed to make testing less time-consuming.

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..... [2]