0478

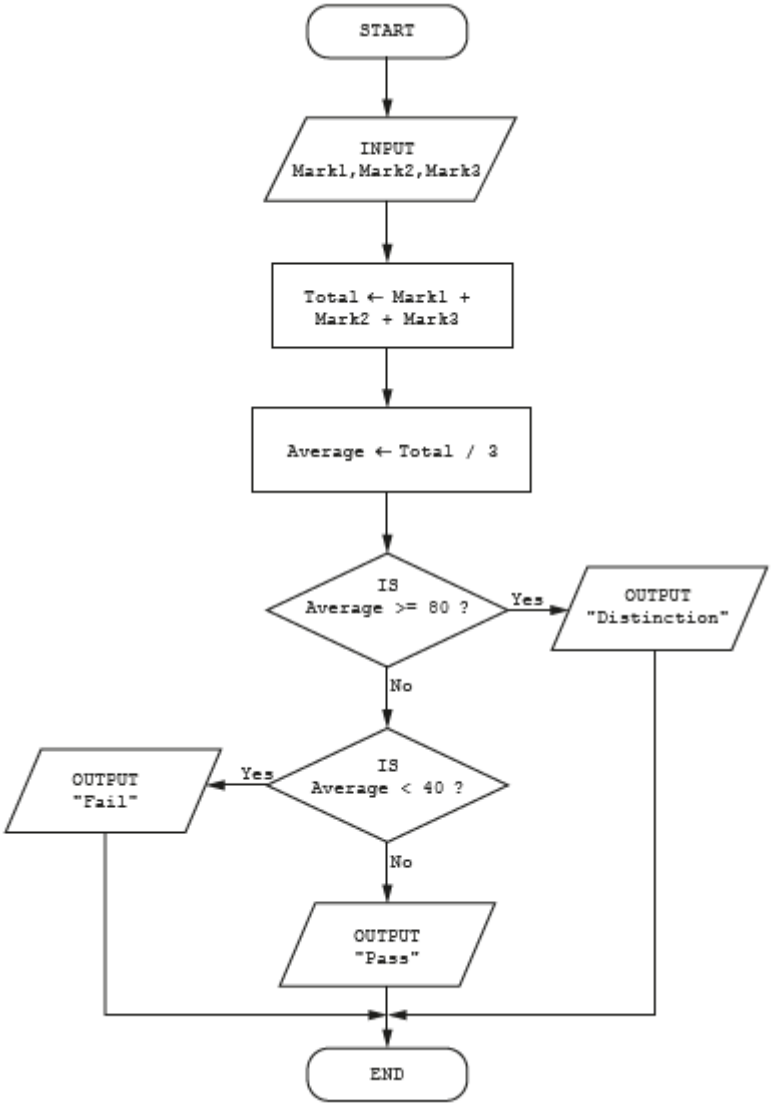
COMPUTER SCIENCE

TOPIC QUESTION PAPER-2 SET- 5

SMART EXAM RESOURCES

Unit 7 Algorithm Design and Problem Solving

1. This flowchart inputs student percentage marks for three examinations. If the average of these marks is 80% or over then a distinction grade is awarded. If the average of these marks is less than 40% then a fail grade is awarded. Otherwise a pass grade is awarded.



(a) Complete a trace table for each set of input data:

Set 1: 88, 74, 60

Mark1	Mark2	Mark3	Total	Average	OUTPUT

Set 2: 20, 33, 67

Mark1	Mark2	Mark3	Total	Average	OUTPUT

Set 3: 79, 91, 70

Mark1	Mark2	Mark3	Total	Average	OUTPUT

[5]

(b) It has been decided to include an extra grade of Merit when the average of the marks is 60% or more, and less than 80%. Describe the changes that will need to be made to the flowchart.

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2. Explain why validation and verification checks are needed when data is input. Include an example of each type of check in your answer.

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3. Tick (√) **one** box in each row to identify if the statement about structure diagrams is true or false

Statement	True (✓)	False (✓)
A structure diagram is a piece of code that is available throughout the structure of a program.		
A structure diagram shows the hierarchy of a system.		
A structure diagram is another name for an array.		
A structure diagram shows the relationship between different components of a system.		

[2]

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4. Programs can perform validation and verification checks when data is entered.

(a) Give the names of **two** different validation checks and state the purpose of each one.

Check 1 .....

Purpose .....

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Check 2 .....

Purpose .....

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[4]

(b) Give the name of **one** verification check.

..... [1]

(c) Describe the difference between validation and verification.

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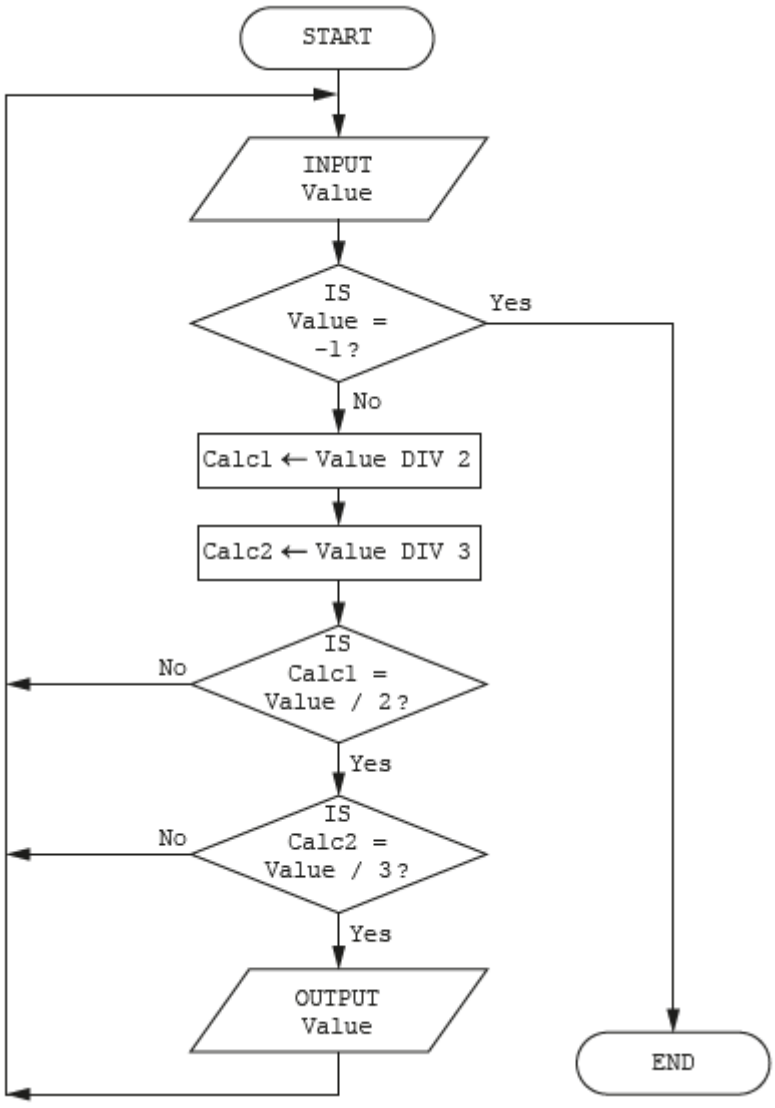
5. The flowchart represents an algorithm.

The predefined function `DIV` gives the value of the result of integer division, for example, `y ← 9 DIV 4` gives `y` a value of `2`

An input value of –1 ends the algorithm.



(a) Complete the trace table for the input data:
50, 33, 18, 15, 30, –1, 45, 12, 90, 6

Value	Calc1	Calc2	OUTPUT

[4]

(b) Describe the purpose of the algorithm.

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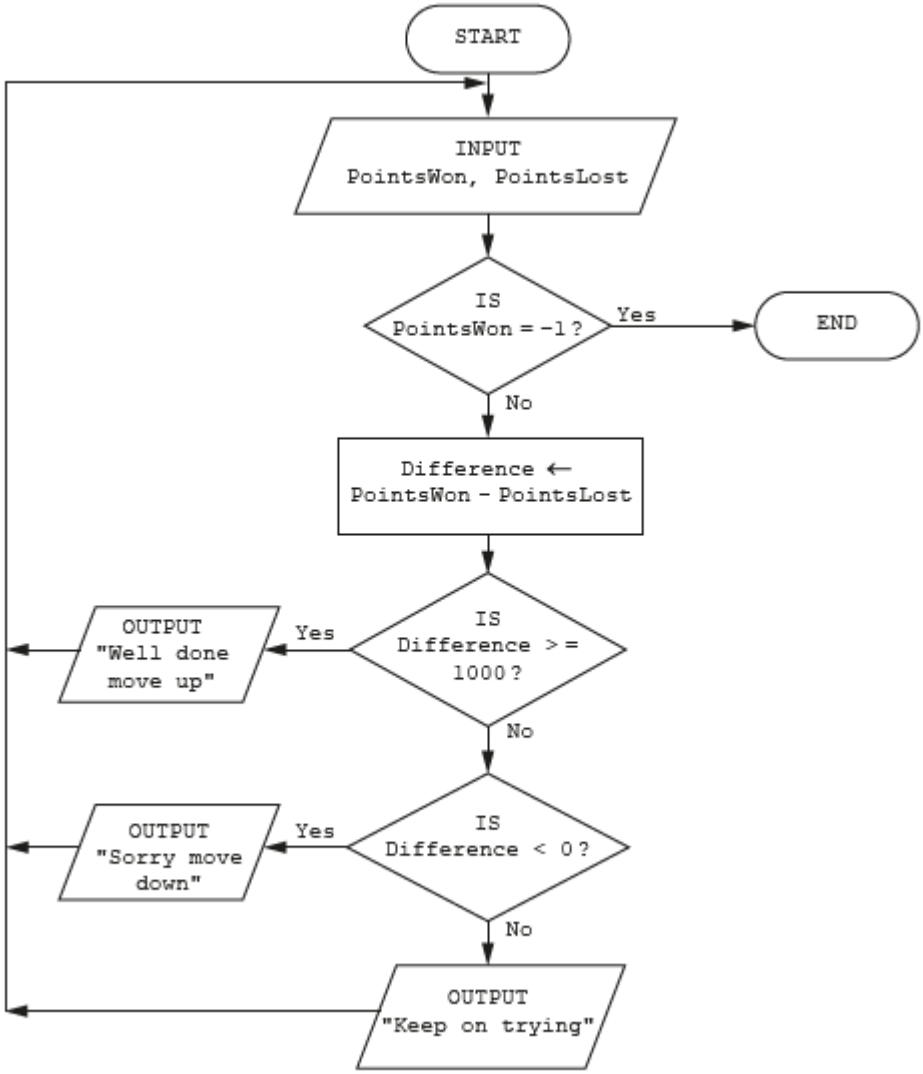
6. This flowchart inputs the points won and the points lost when playing a game. The difference between the points won and lost is calculated and depending on the result the player can: move up to the next level, stay at the same level, or move down to the previous level. The flowchart finishes when the input for points won is –1.



(a) Complete a trace table for this set of input data:
5000, 4474, 6055, 2000, 7900, 9800, 3000, 2150, –1, 6700, 7615

PointsWon	PointsLost	Difference	OUTPUT

[3]

(b) The flowchart needs to be changed. When the difference is more than 5000 the output message is 'Fantastic leap up two levels'.

Describe the changes that will need to be made to the flowchart.

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