

0478

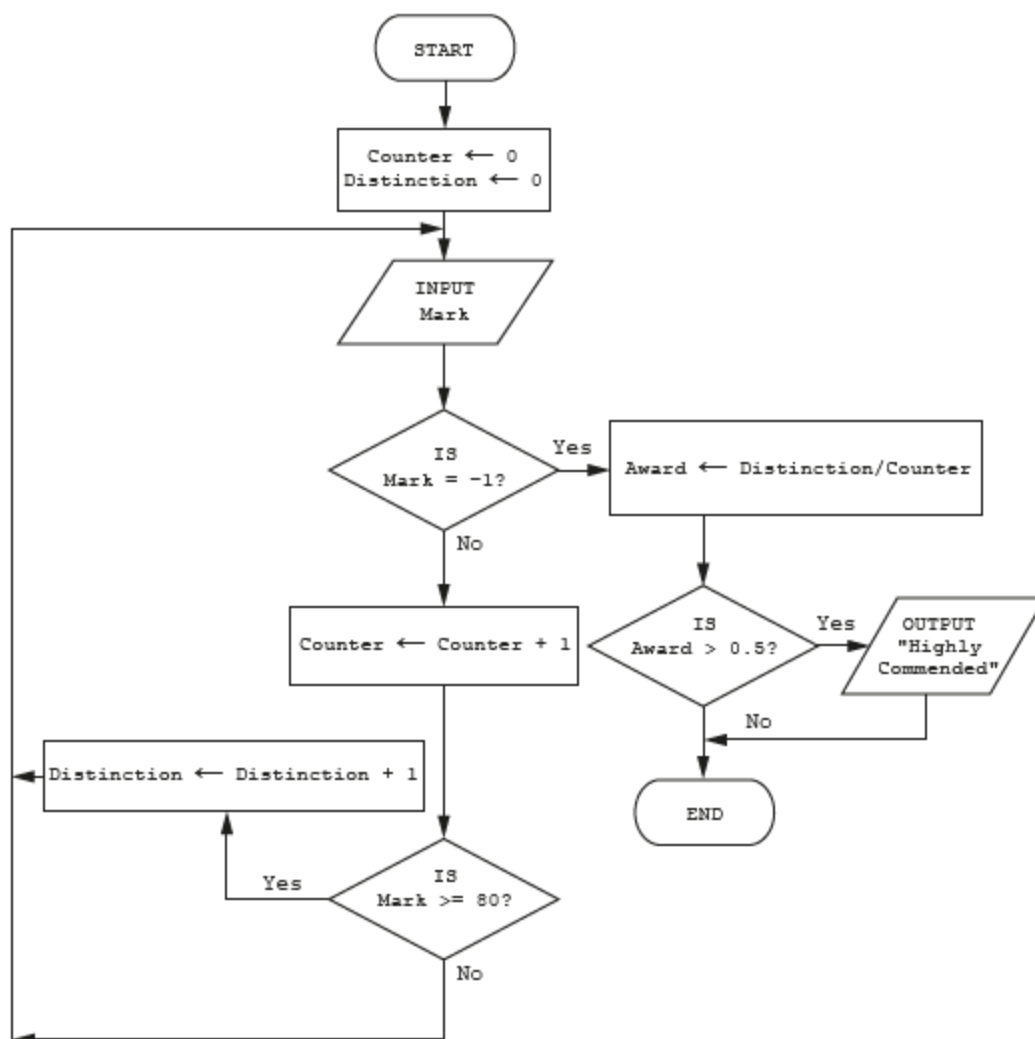
COMPUTER SCIENCE

TOPIC QUESTION PAPER-2 SET-4

SMART EXAM RESOURCES

Unit 7 Algorithm Design and Problem Solving

1. The algorithm shown by this flowchart allows the input of examination marks for a class of students. A mark of -1 ends the process. If a mark is 80 or over then a distinction grade is awarded. The number of distinctions for the whole class is calculated. If this is over 50% of the class, the class is awarded a highly commended certificate



Unit 7 Algorithm Design and Problem Solving

Complete a trace table for the algorithm using this input data:

88, 74, 60, 90, 84, 87, 95, 72, 84, 66, -1

Counter	Distinction	Mark	Award	OUTPUT

[5]

2. Tick (✓) one box in each row to identify if the statement is about validation, verification or neither

Statement	Validation (✓)	Verification (✓)	Neither (✓)
a check where data is re-entered to make sure no errors have been introduced during data entry			
an automatic check to make sure the data entered has the correct number of characters			
a check to make sure the data entered is sensible			
a check to make sure the data entered is correct			

[3]

3. A program checks that the data entered is between 1 and 100 inclusive.

Identify **one** piece of normal, extreme and erroneous test data for this program, and give a reason for each.

Normal test data.....

Reason

.....

.....

Extreme test data.....

Reason.....

.....

.....

Erroneous test data

Reason.....

.....

.....[6]

4. The pseudocode algorithm should work as a calculator and output the result.

```

1  Continue ← 1
2  WHILE Continue = 0
3      OUTPUT "Enter 1 for +, 2 for -, 3 for * or 4 for /"
4      INPUT Operator
5      OUTPUT "Enter the first value"
6      INPUT Value1
7      OUTPUT "Enter the second value"
8      OUTPUT Value2
9      IF Operator
10         1: Answer ← Value1 + Value2
11         2: Answer ← Value1 - Value2
12         3: Answer ← Value1 * Value2
13         4: Answer ← Value1 / Value2
14     ENDCASE
15     OUTPUT "The answer is ", Value1
16     OUTPUT "Do you wish to enter more values (Yes or No)?"
17     INPUT MoreValues
18     IF MoreValues = "No"
19         THEN
20             Continue ← 1
21     ENDIF
22 UNTIL Continue = 0

```

(a) Find the **five** errors in the pseudocode and suggest a correction for each error.

Error 1

Correction

.....

Error 2

Correction

.....

Error 3

Correction

.....

Error 4

Correction

.....

Error 5

Correction

.....[5]

- (b)** The algorithm needs changing to allow only the numbers 1, 2, 3, or 4 to be entered for the input variable `Operator`.

Write the pseudocode to perform this task and state where in the algorithm it would be located.

Pseudocode

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.....

.....

.....

.....

.....

.....

Location in algorithm

.....

.....[5]

5. A program has been written to check the length and content of a password. The password must be eight or more characters long and contain at least one special character, for example, `Secret!*!`

- (a) (i) State suitable examples of normal and erroneous test data that could be used to test this program. For each example give the reason for your choice of test data.

Normal test data example

Reason

.....

Erroneous test data example

Reason

.....[4]

- (ii) Explain why two pieces of boundary test data are required for this program. Give an example of each piece of boundary test data.

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.....

..... [3]

- (b) Describe **two** methods of verification that could be used to verify this data as it is input.

Method 1

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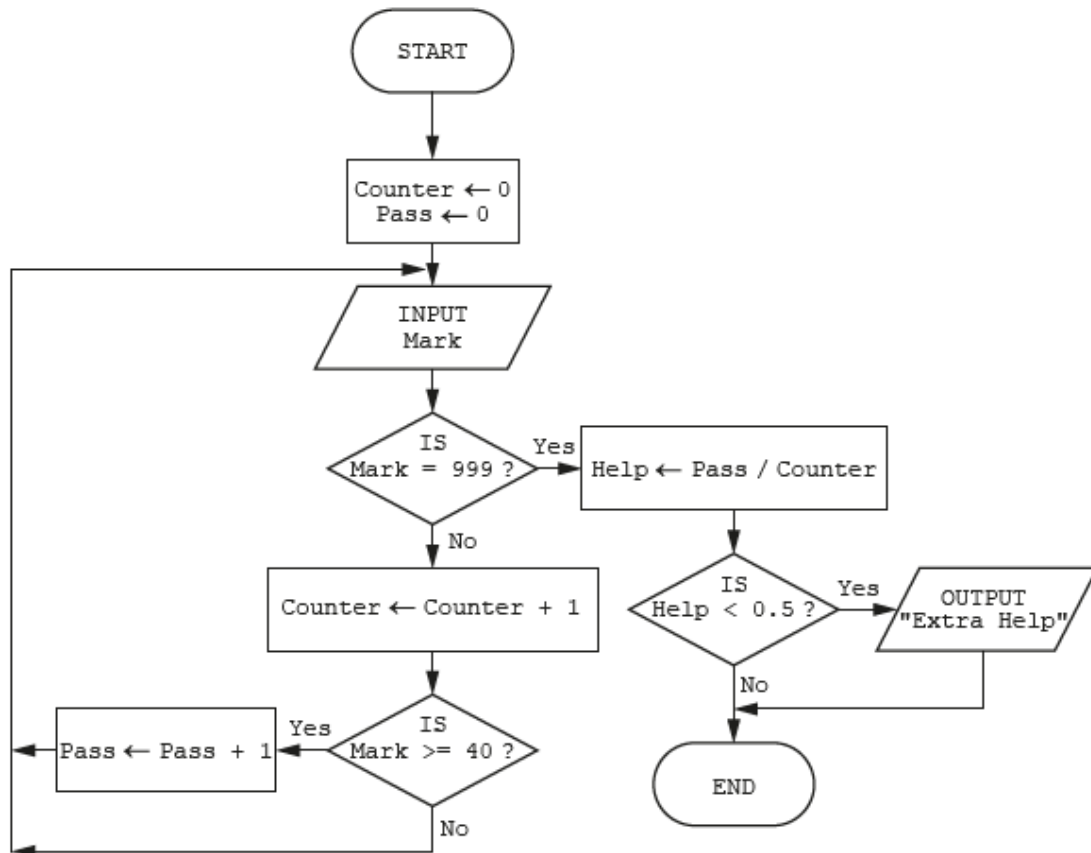
.....

Method 2

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.....[4]

6. The algorithm, shown by this flowchart, allows the input of examination marks for a class of students. A mark of 999 ends the process. If a mark is 40 or over then a pass grade is awarded. The number of pass grades is calculated for the whole class. If this is under 50% of the class, the class is offered extra help



Unit 7 Algorithm Design and Problem Solving

Complete a trace table for the algorithm using this input data:

88, 24, 60, 30, 44, 17, 25, 22, 54, 6, 999, -1

Counter	Pass	Mark	Help	OUTPUT

[5]