MODULE K ALGORITHM DESIGN · K9

Finding and fixing errors in an algorithm

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 7.8 (with 7.7)

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. Write any corrections using pseudocode. The total for this worksheet is **21 marks**.

1

Total: 4 marks

An algorithm has been written in pseudocode to:
- input 12 monthly electricity readings (in kWh) for an office building
- output the total of the readings
- output the average reading per month
- count and output the number of months with a reading of **400 or more**.

```
01 DECLARE Month : INTEGER
02 DECLARE HighCount : INTEGER
03 DECLARE Reading : REAL
04 DECLARE Total : REAL
05 Total ← 0.0
06 HighCount ← 1
07 FOR Month ← 1 TO 11
08     OUTPUT "Enter the reading for month ", Month
09     INPUT Reading
10     Total ← Total + Reading
11     IF Reading > 400.0
12       THEN
13         HighCount ← HighCount + 1
14     ENDIF
15 NEXT Month
16 OUTPUT "Total used: ", Total
17 OUTPUT "Average per month: ", Total / HighCount
18 OUTPUT "Months of 400 or more: ", HighCount
```

(a) Identify the line numbers of the **four** errors in the pseudocode and suggest a correction for each error. **[4]**

Line number	Correction

2

Total: 7 marks

A running club times five members over a 10 km course, in whole minutes. This algorithm should output the fastest (lowest) time.

```
01 Fastest ← 0
02 FOR Runner ← 1 TO 5
03     INPUT Time
04     IF Time < Fastest
05       THEN
06         Fastest ← Time
07     ENDIF
08 NEXT Runner
09 OUTPUT "Fastest time: ", Fastest
```

(a) Complete the trace table for the algorithm using this input data: **62, 58, 71, 55, 60** **[4]**

Runner	Time	Fastest	OUTPUT

(b) (i) Explain why the algorithm does not output the fastest time. **[1]**

(ii) Write a corrected line 01. **[1]**

(iii) State the output from the corrected algorithm for the same input data. **[1]**

3 **Total: 3 marks**

A restaurant's booking system should only accept a table booking for **1 to 8** seats. This pseudocode should keep asking until a value in this range is input.

```
01 DECLARE Seats : INTEGER
02 REPEAT
03     OUTPUT "Enter number of seats (1 to 8)"
04     INPUT Seats
05 UNTIL Seats < 1 OR Seats > 8
```

(a) Describe what happens when the value **5** is input. **[1]**

(b) Write a corrected line 05. **[2]**

4 **Total: 4 marks**

A judge at a dog show gives 10 scores. This pseudocode should input the 10 scores and output their total.

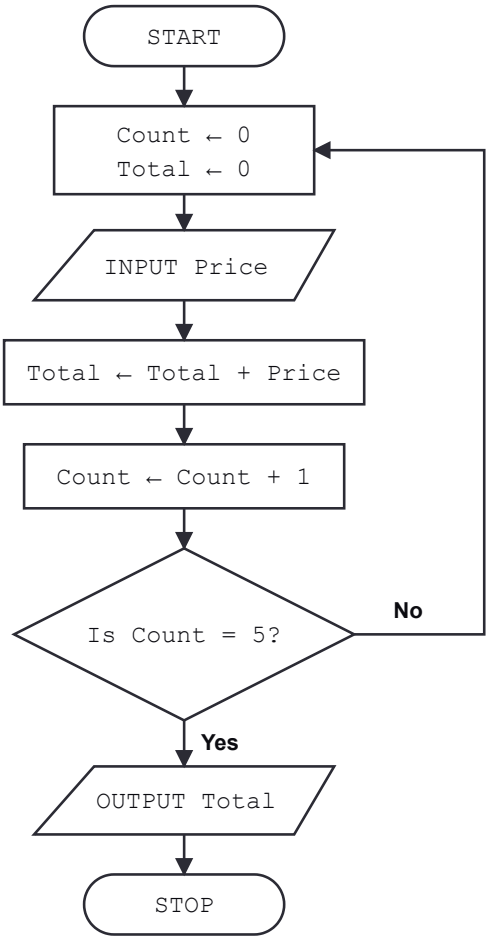
```
01 Count ← 0
02 Total ← 0
03 WHILE Count < 10 DO
04     INPUT Score
05     Total ← Total + Score
06 ENDWHILE
07 OUTPUT "Total score is ", Total
```

(a) Explain why this algorithm never outputs the total. **[2]**

(b) Write the missing pseudocode statement and state where it should be placed. **[2]**

5 **Total: 3 marks**

This flowchart should input the prices of **five** items and output the total price.



(a) Describe the error in the flowchart and its effect. **[2]**

(b) Describe how the flowchart should be corrected. **[1]**

Total for this worksheet: 21 marks