MODULE K ALGORITHM DESIGN · K10

Explaining the purpose of an algorithm

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 7.3, 7.4, 7.5, 7.7

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. All algorithms are written in Cambridge pseudocode or as flowcharts. The total for this worksheet is **21 marks**.

1

Total: 4 marks

A shop stores its takings for each day of one week in the array `Sale[1:7]`. Each pseudocode fragment **A** to **D** is part of an algorithm that processes the array. The variable `Day` is the array index.

(a) Tick (✓) **one** box in each row to show the standard method of solution that each fragment is part of. **[4]**

	Fragment	Totalling	Counting	Maximum	Minimum	Average
A	`Amount ← Amount + Sale[Day]`					

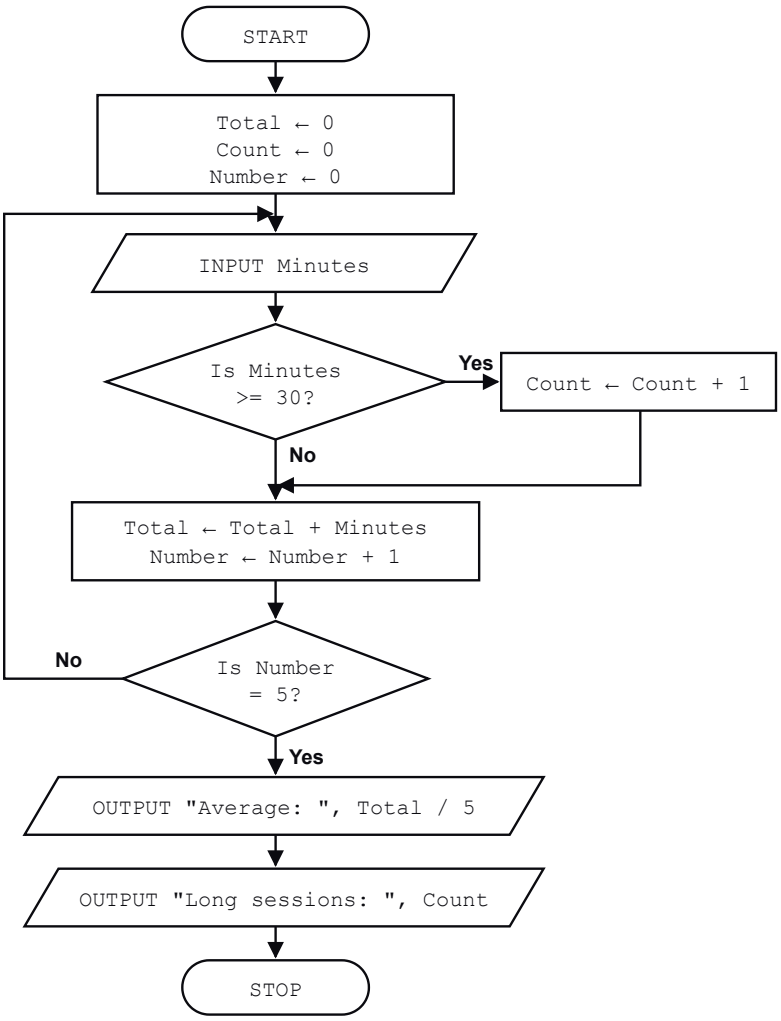
B	`IF Sale[Day] > 100.0`
	`  THEN`
	`  Days ← Days + 1`
	`ENDIF`					

C	`IF Sale[Day] > Top`
	`  THEN`
	`  Top ← Sale[Day]`
	`ENDIF`					

D	`Mean ← Amount / 7`					

2 **Total: 7 marks**

A gym instructor uses this flowchart to process the number of minutes that a member exercised in each of their last five sessions.



(a) Complete the trace table for the input data: **25, 40, 30, 15, 50** **[5]**

Minutes	Count	Total	Number	OUTPUT
	0	0	0	

(b) Explain the purpose of the algorithm shown in the flowchart. **[2]**

3

Total: 6 marks

A hardware warehouse stores the codes of the 500 parts it keeps in the array `PartCode[1:500]`. The array `Bay[1:500]` stores the number of the bay where each part is kept: `Bay[1]` is the bay for `PartCode[1]`, and so on.

```
01 REPEAT
02     OUTPUT "Enter a part code of 6 characters"
03     INPUT Wanted
04 UNTIL LENGTH(Wanted) = 6
05 Found ← FALSE
06 Index ← 1
07 WHILE (Found = FALSE) AND (Index <= 500) DO
08     IF PartCode[Index] = Wanted
09       THEN
10         Found ← TRUE
11       ELSE
12         Index ← Index + 1
13     ENDIF
14 ENDWHILE
15 IF Found = TRUE
16   THEN
17     OUTPUT "Stored in bay ", Bay[Index]
18   ELSE
19     OUTPUT "Part not stocked"
20 ENDIF
```

(a) Describe the processes involved in the algorithm. **[4]**

(b) Identify the standard method of solution used in lines 05 to 14. **[1]**

(c) State the type of validation check carried out in lines 01 to 04. **[1]**

4 **Total: 4 marks**

This algorithm is given a whole number that is 0 or greater.

```
01 INPUT X
02 Y ← 0
03 WHILE X > 0 DO
04     Y ← Y + MOD(X, 10)
05     X ← DIV(X, 10)
06 ENDWHILE
07 OUTPUT Y
```

(a) State the output when the input is **4072**. **[1]**

(b) State the purpose of the algorithm. **[1]**

(c) The input is **0**. State the output and explain why. **[2]**

Total for this worksheet: 21 marks