MODULE K ALGORITHM DESIGN · K5

Reading and writing pseudocode

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 7.2(c), 7.3, 7.8, 7.9, 8.1

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. Write all code answers in pseudocode. The total for this worksheet is **20 marks**.

1

Total: 1 mark

(a) Tick (✓) **one** box to show which statement describes pseudocode. **[1]**

Statement	✓
A diagram that breaks a system down into smaller and smaller sub-systems	
A method of designing a solution that uses keywords and structured, code-like statements without the rules of one programming language	
A set of standard symbols joined by flow lines that show the steps of a solution	
A table that records the values of variables at each step of a dry-run	

2

Total: 3 marks

Precision is needed when writing algorithms. Rewrite each condition as a pseudocode condition, using the identifier given.

(a) Complete the table. **[3]**

Condition written in English	Pseudocode condition
`Distance` is greater than 100	
`Answer` is not equal to the character N	
`Hours` is from 1 to 12 inclusive	

3

Total: 2 marks

A coach company's booking program uses the constant `MaxSeats`, which has the value 52, and the variable `SeatsLeft`, which stores a whole number.

(a) Write pseudocode statements to declare the constant `MaxSeats` and the variable `SeatsLeft`. **[2]**

Constant

Variable

4 **Total: 6 marks**

A bakery uses a machine to check its loaves. This algorithm is used by the machine.

```
01 DECLARE Count : INTEGER
02 DECLARE Weight : INTEGER
03 DECLARE Total : INTEGER
04 DECLARE Accepted : INTEGER
05 Total ← 0
06 Accepted ← 0
07 FOR Count ← 1 TO 5
08     OUTPUT "Enter weight of loaf in grams"
09     INPUT Weight
10     Total ← Total + Weight
11     IF Weight >= 400
12       THEN
13         Accepted ← Accepted + 1
14     ENDIF
15 NEXT Count
16 OUTPUT "Total weight: ", Total
17 OUTPUT "Loaves accepted: ", Accepted
```

(a) Describe the purpose of this algorithm. **[2]**

(b) Give the line number of:

(i) the start of a count-controlled loop ..... **[1]**

(ii) a statement where counting takes place ..... **[1]**

(c) State the outputs from the algorithm for this input data: 410, 395, 400, 388, 420 **[2]**

5 **Total: 4 marks**

A museum is open 7 days a week. This algorithm should input the number of visitors on each of the 7 days, find the highest number of visitors on any one day, and output it. There are **four** errors in the algorithm.

```
01 DECLARE Day : INTEGER
02 DECLARE Visitors : INTEGER
03 DECLARE Highest : INTEGER
04 Highest ← 0
05 FOR Day ← 1 TO 6
06     OUTPUT "Enter visitors for day ", Day
07     INPUT Visitors
08     IF Visitors < Highest
09       THEN
10         Highest ← Day
11     ENDIF
12 NEXT Day
13 OUTPUT "Highest number of visitors: ", Visitors
```

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

Line number	Correction

6 **Total: 4 marks**

A cycle-hire scheme records how long each journey takes, as a whole number of minutes.

(a) Write an algorithm using pseudocode to: **[4]**

- input journey times, one at a time, until the value −1 is input
- count the number of journeys that took longer than 30 minutes
- output this count with a suitable message.

You do not need to validate the input.

Total for this worksheet: 20 marks