MODULE L STANDARD ALGORITHMS · L7

Totalling, counting, maximum, minimum and average

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 7.4, 7.7, 7.8, 7.9, 8.1.4(d)

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **21 marks**. All algorithms on this sheet are written in pseudocode. Write your own algorithms in pseudocode.

1

Total: 4 marks

A parcel depot uses these pseudocode statements in its programs.

(a) Draw **one** line from each statement to the standard method of solution it is part of. Not all standard methods will be used. **[4]**

Statement

```
TotalWeight ← TotalWeight + Weight
```

```
IF Weight > Heaviest
  THEN
    Heaviest ← Weight
ENDIF
```

```
Parcels ← Parcels + 1
```

```
MeanWeight ← TotalWeight / Parcels
```

Standard method

- counting
- finding the average
- finding the maximum
- finding the minimum
- linear search
- totalling

2 **Total: 7 marks**

A sensor on a solar farm records the midday temperature, in °C, of a solar panel. This algorithm processes the temperatures for five days.

```
01 Total ← 0
02 Count ← 0
03 Lowest ← 100
04 FOR Day ← 1 TO 5
05     INPUT Reading
06     Total ← Total + Reading
07     IF Reading < Lowest
08       THEN
09         Lowest ← Reading
10     ENDIF
11     IF Reading >= 30
12       THEN
13         Count ← Count + 1
14     ENDIF
15 NEXT Day
16 Average ← Total / 5
17 OUTPUT "Lowest: ", Lowest
18 OUTPUT "Hot days: ", Count
19 OUTPUT "Average: ", Average
```

(a) Complete the trace table for the algorithm using this input data: **[5]**

24, 31, 18, 30, 27

Day	Reading	Total	Lowest	Count	Average	OUTPUT

(b) Explain why `Lowest` is given the value 100 on line 03, and not the value 0. **[2]**

3 **Total: 4 marks**

A taxi firm stores the distances, in km, of 20 trips in the 1D array `Distance`, declared as `DECLARE Distance : ARRAY[1:20] OF REAL`. All the distances are greater than 0. This algorithm should find the longest trip and count the trips that are longer than 25 km. It contains **four** errors.

```
01 Longest ← 0
02 Count ← 1
03 FOR Trip ← 0 TO 20
04     IF Distance[Trip] < Longest
05       THEN
06         Longest ← Distance[Trip]
07     ENDIF
08     IF Distance[Trip] > 25
09       THEN
10         Count ← Count + Distance[Trip]
11     ENDIF
12 NEXT Trip
13 OUTPUT "Longest trip: ", Longest, " km"
14 OUTPUT "Trips over 25 km: ", Count
```

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

Error 1: line ..... correction .....

Error 2: line ..... correction .....

Error 3: line ..... correction .....

Error 4: line ..... correction .....

4 **Total: 6 marks**

A craft stall at a weekend market wants an algorithm to summarise the items it sells in a day.

(a) Write an algorithm using pseudocode to: **[6]**

- input the price of each item sold, one at a time
- stop when a price of 0 is input
- total the prices and count the number of items sold (the 0 is not an item)
- output the total of the prices and the average price, rounded to two decimal places, with suitable messages.

You do not need to declare any variables.

Total for this worksheet: 21 marks