MODULE M PROGRAMMING · M18

One-dimensional arrays

Original practice questions · 22 marks · ~25 minutes · Cambridge 0478 syllabus 8.2.1, 8.2.2, 8.2.3 (with 7.7, 7.9)

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 **22 marks**. Write all algorithms and statements in pseudocode. All data on this sheet is made up.

1

Total: 4 marks

(a) Tick (✓) the **two** statements that are true for a one-dimensional (1D) array. **[2]**

Statement	Tick (✓)
All the elements of the array have the same data type.	
The elements of the array can be a mix of STRING and INTEGER values.	
The number of elements can be increased while the program is running.	
The lower bound of an array must always be 1.	
Each element is accessed using its index.	

An air-quality monitor stores one reading for each hour of the day. The array is declared as:

```
DECLARE Hourly : ARRAY[0:23] OF REAL
```

(b) (i) State the number of elements in the array `Hourly`. **[1]**

(ii) State the data type of `Hourly[5]`. **[1]**

2 **Total: 2 marks**

A parcel depot stores the weights, in kg, of five parcels in the array `Weight`:

```
DECLARE Weight : ARRAY[1:5] OF REAL
```

Index	1	2	3	4	5
Weight	2.5	7.0	1.2	4.8	3.3

(a) State the value of `Weight[4]`. **[1]**

(b) The parcel that weighs 1.2 kg is re-weighed and now weighs 1.5 kg. Write **one** pseudocode statement to store this new weight in the array. **[1]**

3 **Total: 2 marks**

(a) The depot will soon weigh 400 parcels a day. Explain why the weights should be stored in an array rather than in a separate variable for each parcel. **[2]**

4

Total: 5 marks

A bakery has four shelves. The array `Loaves[1:4]` stores the number of loaves left on each shelf. At the end of the day, this algorithm refills any shelf with fewer than 5 loaves so that it holds 12.

```
01 Count ← 0
02 FOR Shelf ← 1 TO 4
03     IF Loaves[Shelf] < 5
04       THEN
05         Loaves[Shelf] ← 12
06         Count ← Count + 1
07     ENDIF
08 NEXT Shelf
09 OUTPUT Count, " shelves refilled"
```

(a) Complete the trace table for the algorithm. The starting contents of the array are shown. **[4]**

Count	Shelf	Loaves[1]	Loaves[2]	Loaves[3]	Loaves[4]	OUTPUT
		8	3	0	5	

(b) Explain why the value in `Loaves[4]` is **not** changed by the algorithm. **[1]**

5

Total: 3 marks

A walking club has 20 members. Their names are to be stored in an array called `Members`.

(a) Write pseudocode to: **[3]**

- declare the array `Members`, with a lower bound of 1
- use a loop to input the name of each member and store it in the next element of the array.

You do not need to declare any other variables.

6 **Total: 6 marks**

A tool-hire shop has eight types of tool, numbered 1 to 8. The array `Stock[1:8]` stores how many of each tool are in the shop. The array has already been declared and filled with values.

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

- input a tool number from 1 to 8 and the number of that tool being returned to the shop
- add the number being returned to the element of `Stock` for that tool
- then use a loop to output the tool number of every tool that has a stock of 0.

You do not need to declare any variables or validate the inputs.

Total for this worksheet: 22 marks