MODULE M PROGRAMMING · M25

Local and global variables

Original practice questions · 22 marks · ~25 minutes · Cambridge 0478 syllabus 8.1.6(c), 8.1.6(b)

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 in pseudocode. All data on this sheet is made up.

1

Total: 3 marks

(a) Tick (✓) **one** box in each row to show whether each statement describes a local variable or a global variable. **[3]**

Statement	Local variable	Global variable
It is declared inside a procedure or function and can only be used there.		
It is declared in the main program and can be used anywhere in the program.		
The memory it uses is freed when the procedure it belongs to ends.		

2

Total: 9 marks

An electric scooter docking station runs this algorithm at the end of each trip. The procedure is defined at the start of the code; the main program starts at line 08.

```
01 PROCEDURE EndTrip(Minutes : INTEGER)
02     DECLARE Credits : INTEGER
03     Credits ← Minutes * 2
04     TotalMinutes ← TotalMinutes + Minutes
05     OUTPUT "Credits used: ", Credits
06 ENDPROCEDURE
07
08 // main program
09 DECLARE TotalMinutes : INTEGER
10 TotalMinutes ← 0
11 CALL EndTrip(15)
12 CALL EndTrip(8)
13 OUTPUT "Total minutes: ", TotalMinutes
```

(a) Identify the global variable in the algorithm. **[1]**

(b) Give the line number of the statement that declares a local variable. **[1]**

(c) State the **three** outputs from the algorithm. **[3]**

1

2

3

(d) A programmer adds this statement after line 13:

```
14 OUTPUT "Last trip credits: ", Credits
```

Explain why this statement will **not** work. **[2]**

(e) Explain why `TotalMinutes` is declared as a global variable rather than inside the procedure `EndTrip`. **[2]**

3 **Total: 4 marks**

A team of programmers is writing a large stock control program for a warehouse. Each programmer writes their own procedures and functions.

(a) Explain **two** reasons why the team should use local variables, rather than global variables, inside their procedures and functions. **[4]**

1

2

4 **Total: 6 marks**

A museum gives each group of visitors one free guidebook for every 6 people in the group. The main program has already declared a global variable `TotalVisitors` of type INTEGER.

(a) Write pseudocode for a procedure `RecordGroup` that: **[5]**

- has one parameter, `GroupSize`, of type INTEGER
- declares a **local** variable and uses it to store the number of free guidebooks for the group
- adds `GroupSize` to the global variable `TotalVisitors`
- outputs the number of free guidebooks with a suitable message.

(b) `TotalVisitors` starts at 0. These two statements are then run:

```
CALL RecordGroup(20)
CALL RecordGroup(13)
```

State the value of `TotalVisitors` after both statements have run. **[1]**

Total for this worksheet: 22 marks