MODULE M PROGRAMMING · M11

Pre-condition loops (WHILE)

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 8.1.4(c) (with 7.7, 7.8, 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 **21 marks**. Pseudocode on this sheet follows the Cambridge 0478 pseudocode rules. Write any pseudocode answers in the same style.

1

Total: 3 marks

Tick (✓) **one** box in each row to show whether each statement about a pre-condition (`WHILE`) loop is true or false. **[3]**

Statement	True	False
The condition is tested before the statements inside the loop are executed.		
The statements inside the loop are always executed at least once.		
The loop terminates when the condition evaluates to FALSE.		

2

Total: 3 marks

A garden centre grows hedge plants. A new plant is 12 cm tall and grows 5 cm each week. It is ready to sell when it is at least 40 cm tall. This algorithm uses a pre-condition loop to work out how many weeks it takes before the plant is ready to sell.

```
01 Height ← 12
02 Weeks ← 0
03 WHILE ............................... DO
04     Height ← ...............................
05     Weeks ← Weeks + 1
06 ...............................
07 OUTPUT "Ready to sell after ", Weeks, " weeks"
```

Complete the pseudocode by writing the missing parts of lines 03, 04 and 06. **[3]**

Line 03 _____

Line 04 _____

Line 06 _____

3 **Total: 7 marks**

A factory has a noise sensor. A worker enters each noise reading, in decibels, into this algorithm. A reading above 50 is loud. The value −1 is entered to stop.

```
01 LoudCount ← 0
02 ReadingCount ← 0
03 INPUT Reading
04 WHILE Reading <> -1 DO
05     IF Reading > 50
06       THEN
07         LoudCount ← LoudCount + 1
08     ENDIF
09     ReadingCount ← ReadingCount + 1
10     INPUT Reading
11 ENDWHILE
12 OUTPUT LoudCount, " out of ", ReadingCount, " readings were loud"
```

(a) Complete the trace table for the algorithm using this input data: **[4]**
42, 65, 51, 50, −1

Reading	LoudCount	ReadingCount	OUTPUT

(b) The algorithm is run again. The first value input is −1. **[1]**
State the output.

(c) Explain why the algorithm needs the `INPUT` statement on line 03 as well as the one on line 10. **[2]**

4 **Total: 3 marks**

A farm shop packs eggs into boxes that each hold 12 eggs. This algorithm should input the number of eggs collected, then output how many boxes can be completely filled and how many eggs are left over. It uses a pre-condition loop.

```
01 DECLARE Eggs : INTEGER
02 DECLARE Boxes : INTEGER
03 Boxes ← 1
04 OUTPUT "Enter the number of eggs"
05 INPUT Eggs
06 WHILE Eggs > 12 DO
07     Eggs ← Eggs + 12
08     Boxes ← Boxes + 1
09 ENDWHILE
10 OUTPUT Boxes, " full boxes and ", Eggs, " eggs left over"
```

There are **three** errors in this algorithm. **[3]**
Identify the line number of each error and write the corrected pseudocode for that line.

Error 1: line number ..... Correction .....

Error 2: line number ..... Correction .....

Error 3: line number ..... Correction .....

5 **Total: 5 marks**

A ferry company takes bookings for small groups. Each booking must be for 1 to 9 passengers inclusive. The fare is $12.50 for each passenger.

Write an algorithm using pseudocode to: **[5]**

- input the number of passengers in a booking
- use a pre-condition loop to output an error message and input the number again, until a number from 1 to 9 is entered
- calculate the total fare for the booking
- output the total fare with a suitable message.

You do not need to declare any variables.

Total for this worksheet: 21 marks