MODULE M PROGRAMMING · M12

Post-condition loops, and choosing the right loop

Original practice questions · 22 marks · ~25 minutes · OCR J277 spec 2.2.1, 2.1.2

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**. All code on this sheet is written in OCR Exam Reference Language.

1

Total: 3 marks

OCR Exam Reference Language has two condition-controlled loops: `while ... endwhile` and `do ... until`.

(a) Tick (✓) **one** box in each row to show which loop each statement describes. **[3]**

Statement	`while`	`do ... until`	Both
The condition is checked before the code inside the loop runs.			
The code inside the loop always runs at least once.			
It is a condition-controlled loop.			

2 **Total: 6 marks**

A coffee roaster tips freshly roasted beans into a cooling tray. This program models the bean temperature, in °C, falling minute by minute.

```
01 temp = 96
02 minutes = 0
03 do
04     temp = temp - 18
05     minutes = minutes + 1
06     print(temp)
07 until temp < 40
08 print("Minutes to cool: " + str(minutes))
```

(a) Complete the trace table for the program. The first row has been done for you. You may not need to use all the rows. **[4]**

temp	minutes	Output
96	0	

(b) Line 01 is changed to `temp = 35`. The rest of the program is unchanged. **[2]**
State everything the program now outputs.

3

Total: 5 marks

(a) Complete the table by writing the most suitable loop for each task: `for`, `while` or `do ... until`. **[3]**

Task	Most suitable loop
A lighthouse lamp flashes exactly 6 times in each cycle.	
A quiz machine shows a question and reads an answer. It must do this at least once, and repeats until the answer is correct.	
A robot vacuum cleaner moves forward as long as its front bumper sensor is not pressed. The robot may already be touching a wall when the program starts.	

(b) Explain why a `do ... until` loop would **not** be suitable for the robot vacuum cleaner. **[2]**

4

Total: 3 marks

A lift display shows each level it passes on its way up.

```
01 for level = 1 to 4
02     print("Level " + str(level))
03 next level
```

(a) Rewrite this program using a `do ... until` loop instead of a `for` loop. Your program must give exactly the same output. **[3]**

5 **Total: 5 marks**

A smart heating controller lets a user set a target room temperature. The target must be a whole number from 10 to 30 inclusive.

(a) Write a program that: **[5]**

- asks the user to enter a target temperature
- uses a condition-controlled loop to keep asking until the target entered is from 10 to 30 inclusive
- then outputs `Target set to` followed by the target.

You may assume the user always enters a whole number.

You must use either: OCR Exam Reference Language, or a high-level programming language that you have studied.

Total for this worksheet: 22 marks