MODULE M PROGRAMMING · M11

Condition-controlled loops (WHILE)

Original practice questions · 21 marks · ~25 minutes · OCR J277 spec 2.2.1 (with 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 **21 marks**. Code on this sheet is written in OCR Exam Reference Language.

1

Total: 3 marks

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

Statement	True	False
The condition is checked before the code inside the loop runs.		
The code inside a `while` loop always runs at least once.		
It is suitable when the number of repeats is not known before the loop starts.		

2 **Total: 6 marks**

A goods lift in a warehouse can carry a total of 100 kg. A program counts how many boxes can be loaded before the next box would take the total over 100 kg. Each box weight is entered in whole kilograms.

```
01 total = 0
02 boxes = 0
03 weight = int(input("Enter box weight"))
04 while total + weight <= 100
05     total = total + weight
06     boxes = boxes + 1
07     weight = int(input("Enter box weight"))
08 endwhile
09 print(boxes)
```

(a) Complete the trace table for the program when the box weights entered are **30, 45, 20, 15**. **[4]**
You may not need to use all the rows.

Line	total	boxes	weight	Output

(b) The program is run again. The first box weight entered is **120**. **[1]**
State what the program outputs.

(c) State why line 03 is needed **before** the loop starts. **[1]**

3 **Total: 4 marks**

An adult is saving 60 pounds each week to buy a 500 pound bicycle. This program should output how many weeks it takes to save at least 500 pounds.

```
01 const TARGET = 500
02 saved = 0
03 weeks = 0
04 while saved < TARGET
05     weeks = weeks + 1
06 endwhile
07 print("Weeks needed: " + str(weeks))
```

(a) When the program is run, it never outputs anything. Explain why. **[2]**

(b) Write the line of code that needs to be added inside the loop so that the program works correctly. **[1]**

(c) State the output of the corrected program. **[1]**

4 **Total: 3 marks**

A heating controller asks for a temperature setting in whole degrees. It must keep asking until a temperature from 10 to 30 inclusive is entered. Two lines of the program are missing.

```
01 temp = int(input("Enter temperature setting"))
02 while ..........................................
03     print("The setting must be from 10 to 30")
04     ..........................................
05 endwhile
06 print("Heating set to " + str(temp))
```

Write the missing code for line 02 and line 04. **[3]**

Line 02 `while`

Line 04

5 **Total: 5 marks**

A gym's rowing machine adds up the distance a member rows in one session. The member enters the distance of each row, one at a time, and enters 0 when they have finished.

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

- asks the user to enter the distance of a row in metres
- uses a `while` loop to keep asking for distances until 0 is entered
- adds each distance to a running total
- outputs the total distance with a suitable message after 0 is entered.

You must use either:

- OCR Exam Reference Language, or
- a high-level programming language that you have studied.

Total for this worksheet: 21 marks