MODULE M PROGRAMMING · M26

Random numbers

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.2.3 (random number generation)

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 **20 marks**. Code is written in OCR Exam Reference Language, where `random(a, b)` gives a random number from a to b inclusive. No calculator.

1

Total: 4 marks

A cinema booking program and a weather simulation each use one of the statements below.

(a) Complete the table. For each statement, give the data type of the value stored, and the smallest and largest value that could be stored. **[4]**

Statement	Data type	Smallest value	Largest value
`seat = random(1, 40)`			
`wind = random(-3.0, 3.0)`			

2

Total: 2 marks

A building's door-entry system creates a temporary code for each delivery driver. Its lights then flash after a short random pause.

(a) Write one statement that stores a random whole number from 100 to 999 in the variable `code`. **[1]**

(b) Write one statement that stores a random real number from 0.5 to 2.5 in the variable `pause`. **[1]**

3

Total: 3 marks

A museum's welcome screen shows visitors one fact chosen at random. The array `facts` holds 6 facts, stored at indexes 0 to 5. The programmer has written this code.

```
01 pick = random(1, 6)
02 print("Did you know? " + facts[pick])
```

(a) Line 01 contains a logic error. Describe **two** problems this error causes when the program is run. **[2]**

(b) Rewrite line 01 so that any of the 6 facts can be shown. **[1]**

4

Total: 5 marks

A gardening simulation models how a seedling grows. Each day it grows by a random whole number of centimetres. The program stops when the seedling is at least 15 cm tall.

```
01 height = 5
02 days = 0
03 do
04     growth = random(1, 4)
05     height = height + growth
06     days = days + 1
07 until height >= 15
08 print("Ready after " + str(days) + " days")
```

(a) When the program is run, `random(1, 4)` returns **3**, then **4**, then **1**, then **2**. **[4]**
Complete the trace table. The first row has been done for you. You may not need to use all the rows.

growth	height	days	Output
	5	0	

(b) State the **smallest** number of times the loop could run on any run of the program. **[1]**

5 **Total: 6 marks**

A coffee shop runs a reward game at the till. Each customer is given a random whole number from 1 to 20. A customer who is given 20 wins a free drink.

(a) Write a program that: **[6]**

- asks the user to enter the number of customers
- for each customer, generates a random whole number from 1 to 20
- outputs "Free drink" if the number is 20, otherwise outputs the number
- after all the customers, outputs how many free drinks were won.

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

Total for this worksheet: 20 marks