MODULE K ALGORITHM DESIGN · K5

Reading and writing pseudocode

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.1.2, 2.3.1

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. All code in the questions is written in OCR Exam Reference Language. The total for this worksheet is **20 marks**.

1

Total: 1 mark

(a) Tick (✓) **one** box to show which statement describes pseudocode. **[1]**

Statement	✓
A diagram of symbols joined by lines that shows the steps of an algorithm	
A table used to record the values of variables as an algorithm is followed	
A structured, code-like way of writing an algorithm that is not tied to one programming language	
A programming language that must be translated by a compiler before it can run	

2

Total: 3 marks

Conditions in an algorithm must be written precisely. Rewrite each condition in OCR Exam Reference Language, using the variable name given.

(a) Complete the table. **[3]**

Condition written in English	Condition written in OCR Exam Reference Language
The value of `speed` is more than 70	
The value of `colour` is not the text red	
The value of `age` is from 18 to 65 inclusive	

3 **Total: 8 marks**

A café gives each customer a loyalty card. The customer gets one stamp for every cup of coffee they buy. When a card reaches 8 stamps, the customer earns a free drink and 8 stamps are taken off the card. The till uses this algorithm.

```
01 // Loyalty card stamps for the café
02 const TARGET = 8
03 stamps = int(input("Enter stamps already on card"))
04 cups = int(input("Enter cups bought today"))
05 stamps = stamps + cups
06 if stamps >= TARGET then
07     print("Free drink earned")
08     stamps = stamps - TARGET
09 else
10     print(str(TARGET - stamps) + " more needed")
11 endif
12 print("Stamps now: " + str(stamps))
```

(a) Identify the line number where:

(i) a constant is declared ..... **[1]**

(ii) the selection statement begins ..... **[1]**

(b) Complete the table to show the outputs from the algorithm for each set of inputs. **[4]**

stamps input	cups input	Outputs
5	2	
3	5	

(c) Identify **two** features of this code that make it easier to maintain. **[2]**

1

2

4 **Total: 4 marks**

A storeroom door has a keypad. The door should open if the correct access code is entered. The user should be allowed a maximum of **three** attempts. This algorithm has been written for the keypad, but it contains **two** logic errors.

```
01 const CODE = "K7Q2"
02 attempts = 0
03 unlocked = false
04 while unlocked == false AND attempts <= 3
05     entry = input("Enter access code")
06     if entry == CODE then
07         unlocked = true
08     endif
09     attempts = attempts - 1
10 endwhile
11 if unlocked == true then
12     print("Door open")
13 else
14     print("Access denied")
15 endif
```

(a) Identify the line number of each logic error and write the refined line of code to correct it. **[4]**

Line number	Refined line of code

5 **Total: 4 marks**

A garden centre has a sensor in its greenhouse. A worker types in temperature readings from the sensor.

(a) Write an algorithm that: **[4]**

- asks the user to enter **10** temperature readings, one at a time
- counts how many of the readings are more than 30
- outputs this count after all 10 readings have been entered.

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

Total for this worksheet: 20 marks