MODULE M PROGRAMMING · M7

Boolean operators AND, OR and NOT in code

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

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**. Code is written in OCR Exam Reference Language. All data on this sheet is made up.

1

Total: 3 marks

(a) Tick (✓) **one** box in each row to show which Boolean operator matches each description. **[3]**

Description	AND	OR	NOT
Gives True only when both conditions are True.			
Reverses a Boolean value, so True becomes False.			
Gives True when at least one of the conditions is True.			

2

Total: 3 marks

A security unit in a storeroom uses three variables. At one moment they hold these values:

```
temperature = 23
doorOpen = False
alarmSet = True
```

(a) Complete the table to show whether each expression evaluates to True or False for these values. **[3]**

Expression	True or False
`temperature > 20 AND doorOpen`	
`temperature > 30 OR NOT doorOpen`	
`NOT(temperature < 25 AND alarmSet)`	

3 **Total: 4 marks**

A weather station stores each wind speed reading as a whole number in the variable `windSpeed`. A reading is accepted only if it is between 0 and 250 inclusive.

(a) Write a condition that is True when the reading is accepted. **[2]**

(b) Write a condition, using the **OR** operator, that is True when the reading is **not** accepted. **[2]**

4 **Total: 6 marks**

The door of a shared workshop should unlock only when **both** of these are true:

- the hour is from 7 to 19 inclusive
- the person has a keycard, entered as `"Y"` or `"y"`.

The program below has **two** errors.

```
01 hour = int(input("Enter the hour (0 to 23)"))
02 keycard = input("Do you have a keycard? (Y/N)")
03 if hour >= 7 OR hour <= 19 then
04     if keycard == "Y" OR "y" then
05         print("Door unlocked")
06     else
07         print("Keycard needed")
08     endif
09 else
10     print("Workshop closed")
11 endif
```

(a) Identify the line number of each error and write the corrected line of code. **[4]**

Error 1 Line number ..... Corrected line

Error 2 Line number ..... Corrected line

(b) The program is run **before** it is corrected. A person enters an hour of `2`. Explain why the program does **not** output `Workshop closed`. **[2]**

5 **Total: 6 marks**

A city e-bike hire dock decides whether a bike can be hired.

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

- asks the user to enter the battery level of the bike, as a whole number from 0 to 100, and stores it
- asks the user whether the bike is already booked, entered as `"Y"` or `"N"`, and stores it
- outputs `Available` if the battery level is 20 or more **and** the bike is **not** booked
- otherwise outputs `Not available`.

You must use either:

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

Total for this worksheet: 22 marks