MODULE M PROGRAMMING · M28

Writing maintainable code: naming, comments, indentation and sub programs

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.3.1, 2.2.3

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

1

Total: 4 marks

A programmer is told to make a program more **maintainable**.

(a) Tick (✓) **two** boxes to show which actions would make the program more maintainable. **[2]**

Action	Tick (✓)
Adding comments that explain what each section of code does	
Checking that every number input is within a sensible range	
Asking the user to enter a username and password	
Indenting the statements inside each loop and `if` statement	
Running the program with boundary test data	

(b) Give **two** reasons why comments are useful in a program. **[2]**

2 **Total: 7 marks**

A water company records the rainfall at a reservoir each day for a week. A day with more than 25 mm of rain is a heavy-rain day. A programmer has written this program, which works correctly.

```
01 t = 0
02 h = 0
03 for d = 1 to 7
04 r = float(input("Enter rainfall in mm"))
05 t = t + r
06 if r > 25 then
07 h = h + 1
08 endif
09 next d
10 print("Total rainfall: " + str(t))
11 print("Heavy-rain days: " + str(h))
```

(a) Explain how indenting lines 04 to 08 would make this program easier to maintain. **[2]**

(b) Rewrite the program so that it is easier to maintain. Your program must: **[5]**

- do exactly the same job as the program above
- use meaningful identifiers that follow a naming convention
- use indentation
- include at least one suitable comment.

3 **Total: 7 marks**

A museum sells adult tickets at £12.50 and senior tickets at £9.00. If the cost of one type of ticket comes to more than £100, 10% is taken off that cost. This is part of the program used at the ticket desk.

```
01 adults = int(input("Number of adult tickets"))
02 adultCost = adults * 12.50
03 if adultCost > 100 then
04     adultCost = adultCost * 0.9
05 endif
06 seniors = int(input("Number of senior tickets"))
07 seniorCost = seniors * 9.00
08 if seniorCost > 100 then
09     seniorCost = seniorCost * 0.9
10 endif
11 print("Total to pay: " + str(adultCost + seniorCost))
```

Lines 03 to 05 and lines 08 to 10 do the same job. The programmer decides to replace them with a function called `applyDiscount()`.

(a) Complete the function `applyDiscount()`. The function: **[3]**

- takes a cost as a parameter
- takes 10% off the cost if the cost is more than £100
- returns the cost.

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

```
function applyDiscount(cost)

    ..........................................................................

    ..........................................................................

    ..........................................................................

    ..........................................................................

endfunction
```

(b) Write the statement that should replace lines 03 to 05 so that the program uses the function. **[1]**

(c) Explain how using the function `applyDiscount()` makes this program easier to maintain. **[3]**

4 **Total: 2 marks**

A software company has a team of programmers. Every programmer must follow the same naming convention for identifiers, for example `camelCase` for all variables, such as `ticketsSold`.

(a) Explain why using the same naming convention helps the team to maintain its programs. **[2]**

Total for this worksheet: 20 marks