MODULE O ROBUST PROGRAMS · O5

Why we test: testing in the coding and testing stages

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 7.1 (with 7.6 and 7.8)

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 Cambridge pseudocode.

A bike-hire company asks a programmer to develop a program that works out what customers pay to hire a bike. The program is written as separate modules: one checks the number of hours entered, one works out the cost and one outputs a receipt. All the questions on this worksheet are about this program.

1

Total: 4 marks

(a) The table describes four tasks. Tick (✓) **one** box in each row to show the stage of the program development life cycle in which each task is carried out. **[4]**

Task	Coding	Testing
The cost module is tested on its own as soon as it has been written.		
The complete program is run using a set of normal, abnormal, extreme and boundary test data.		
An error is corrected in the receipt module and that module is tested again before the next module is written.		
The complete program is checked to see that it meets all the requirements identified in the analysis stage.		

2

Total: 1 mark

(a) State the name given to the testing that is carried out on each module as the program code is written during the coding stage. **[1]**

3

Total: 6 marks

The company's charges are:

- hires of 5 hours or more cost $3 for each hour
- shorter hires cost $4 for each hour.

During the coding stage the programmer writes this function for the cost module. The parameter `Hours` is always a whole number from 1 to 8.

```
01 FUNCTION HireCost(Hours : INTEGER) RETURNS INTEGER
02     DECLARE Cost : INTEGER
03     IF Hours > 5
04       THEN
05         Cost ← Hours * 3
06       ELSE
07         Cost ← Hours * 4
08     ENDIF
09     RETURN Cost
10 ENDFUNCTION
```

The programmer tests the function as soon as it is written. The table shows the tests.

Test	Value of `Hours`	Expected result ($)	Actual result ($)
1	2	8	8
2	5		20
3	7		21

(a) Complete the table by writing the expected result for Test 2 and Test 3. **[2]**

(b) Identify the test that shows there is an error in the function. **[1]**

(c) Identify the line number of the error and suggest a correction. **[2]**

Line number .....

Correction

(d) State what the programmer does after correcting the error. **[1]**

4 **Total: 5 marks**

All the modules have been written and the program is complete. In the testing stage, the programmer tests the complete program with test data. The program must only accept a whole number of hours from 1 to 8.

(a) Complete the table. For each type of test data, give a suitable value for the number of hours and state whether the program should accept or reject it. **[3]**

Type of test data	Number of hours	Accept or reject
Normal		
Extreme		
Abnormal		

(b) Describe how the programmer uses the results of these tests. **[2]**

5 **Total: 4 marks**

(a) Explain the difference between the testing carried out in the coding stage and the testing carried out in the testing stage of the program development life cycle. Refer to the bike-hire program in your answer. **[4]**

Total for this worksheet: 20 marks