MODULE O ROBUST PROGRAMS · O8

Writing a test plan: mark scheme

21 marks · OCR J277 spec 2.3.2: ability to create/complete a test plan; selecting and using suitable test data (normal, boundary, invalid/erroneous); identify syntax and logic errors; refining algorithms

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative answers for the same mark. Words in (brackets) are not needed for the mark. **Test data** must be an actual value, not a description ("a number between 1 and 14" = 0). **Types of test data** must use the OCR names: normal, boundary, invalid, erroneous ("extreme" and "abnormal" are not OCR terms; do not credit them). For "give two" items, mark the first two answers only. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 2.3.2	Test number Purpose of the test / what is being tested / description of the test Type of test (data) // normal / boundary / invalid / erroneous Expected result / expected output Actual result Pass / fail // whether the actual result matches the expected result Action needed / comments / what was changed	**2**	1 mark per bullet, max 2. Credit any other valid item of a test plan. Do not accept "the test data" (excluded by the question) or "the code" / "the program". Do not award the same item twice in different words.
1(b) J277 2.3.2	So it can be compared with the actual result (to see if the test passes / fails) To check whether the program works as intended // to show whether there is an error (e.g. a logic error)	**1**	Any 1 bullet. Do not accept "so the program works" / "to test the program" alone (NE).
2 J277 2.3.2	Test 2, type: Boundary Test 2, expected result: Accepted, (outputs) cost £168 Test 3, test data: 1 Test 4, type: Invalid Test 5, test data: any value of the wrong data type, e.g. `ten` / `abc` / `7.5` **Test** / **Test data** / **Type of test** / **Expected result** 2 / 14 / Boundary / Accepted, cost £168 3 / 1 / Boundary / Accepted, cost £12 4 / 0 / Invalid / Rejected, Enter 1 to 14 days 5 / ten / Erroneous / Rejected, Enter 1 to 14 days	**5**	1 mark per bullet. Test 2 type: do not accept normal / extreme. Test 2 result: accept "accepted" / "valid" / "outputs £168"; if a cost is given it must be £168. Do not accept "it works" (NE). Test 4 type: accept "invalid/erroneous" written together; do not accept "erroneous" alone (0 is the correct data type). Test 5: accept a real number (e.g. 2.5) or text; accept an empty input. Do not accept a whole number (e.g. 20 or −3: correct data type, so invalid not erroneous).

<table>
<tr><th>QUESTION</th><th>ANSWER</th><th>MARKS</th><th>GUIDANCE</th></tr>
<tr><td>3
J277 2.3.2</td><td>A weight above 0 and up to 2 (e.g. 1.5) … returns <code>Small</code>
A weight above 2 and up to 10 (e.g. 6) … returns <code>Medium</code>
A weight above 10 and up to 30 (e.g. 12) … returns <code>Large</code></td><td>3</td><td>1 mark per row: the weight must be in the correct range and the returned value must match it. Rows may be in any order, but each route must be tested once for its mark (two Small rows score only once). Accept the edge values 2 (Small) and 10 (Medium). Do not accept weights of 0 or less, or above 30 (the function never receives them). Accept returned values with or without quotation marks.</td></tr>
<tr><td>4(a)
J277 2.3.2</td><td>Test 2: Fan off … Fail
Test 3: Reading rejected … Pass
Test 4: Fan off … Pass
<table><tr><th>Test</th><th>Actual result</th><th>Pass/Fail</th></tr><tr><td>2</td><td>Fan off</td><td>Fail</td></tr><tr><td>3</td><td>Reading rejected</td><td>Pass</td></tr><tr><td>4</td><td>Fan off</td><td>Pass</td></tr></table></td><td>3</td><td>1 mark per row: both the actual result and Pass/Fail must be correct. The trace must follow the code as written: 28 is not greater than 28, so the else branch runs. FT Pass/Fail from the candidate's actual result only if the Pass/Fail correctly compares it with the expected result (max 2 if the actual result for test 2 is wrong).</td></tr>
<tr><td>4(b)
J277 2.3.2</td><td>Line 04
<code>elseif temp >= 28 then</code></td><td>2</td><td>1 mark for the line number, 1 for the refined line. Accept <code>temp > 27</code> (temp is a whole number) and <code>28 <= temp</code>. Accept the refined line without <code>elseif</code>/<code>then</code>, or in a high-level language, if the comparison is correct. Do not accept => or ≥. Do not accept an English description alone ("change > to greater than or equal") for the second mark.</td></tr>
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QUESTION	ANSWER	MARKS	GUIDANCE
4(c) J277 2.3.2	Run the tests again // re-test (using the same test plan / test data) Repeat the tests to check test 2 now passes (and the other tests still pass)	**1**	Any 1 bullet. Accept "update the actual results and Pass/Fail columns after re-running". Do not accept "change the expected result" (the expected result was correct) or "delete test 2".
5 J277 2.3.2	Weakness: no boundary data is tested … Improvement: add tests for 2 and 10, both expected to be accepted Weakness: no erroneous data is tested … Improvement: add a test of the wrong data type, e.g. `six` / `4.5`, expected to be rejected Weakness: only one invalid value / nothing below the range is tested … Improvement: add an invalid test below the range, e.g. 1 or 0, expected to be rejected Weakness: expected results are vague / not specific ("It works", "Error") … Improvement: state exactly what should happen, e.g. "accepted, booking continues" / "rejected, error message shown and group size asked for again" Weakness: tests 1 and 2 test the same thing (both normal) … Improvement: replace one of them with a boundary / erroneous / other test Weakness: no actual result / pass-fail columns … Improvement: add columns to record the actual result and whether the test passed	**4**	Mark in pairs: 1 mark for each weakness, 1 for a matching improvement, max 2 pairs. The improvement must match its weakness. An improvement that names test data must give an actual value in the right category (e.g. boundary 2 or 10, not 11). Award a weakness on its own if the improvement is missing or wrong. Do not accept "there are not enough tests" alone (NE) unless the missing type is named. Do not award the same weakness twice.

Total: 21 marks