MODULE M PROGRAMMING · M18

One-dimensional arrays: mark scheme

22 marks · OCR J277 spec 2.2.3 (the use of 1D arrays when solving problems; arrays as fixed length or static structures) and 2.1.2 (trace tables)

How to use. 1 mark per bullet up to the Max shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. Code answers are marked for logic, not exact syntax: accept OCR Exam Reference Language or any high-level language, and allow any logically valid method. Minor syntax slips are not penalised; a repeated slip is penalised once then follow through. Capitals in keywords are ignored. Python lists are accepted in place of arrays (e.g. `tickets = [0] * 7`). Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 2.2.3	Every element in an array must be the same data type Once an array has been declared, it cannot change size while the program runs	**2**	1 mark per correct tick. More than two ticks: deduct 1 mark for each extra tick (minimum 0).
1(b) J277 2.2.3	Max 1: One identifier/name holds all 50 values / no need to declare (and name) 50 separate variables A loop can use a variable as the index to process each value in turn / the same code can be repeated for every value The code is shorter / easier to write, read or maintain because the values are grouped under one name	**1**	"Easier", "quicker" or "more efficient" alone, with no reason = 0. "Uses less memory" = 0 (not true in general). Credit any other valid reason.
2(a) J277 2.2.3	`16`	**1**	Do not accept 7 (1-indexed counting) or `parcels[3]`.
2(b) J277 2.2.3	`parcels[1] = 15`	**1**	Index must be 1. Accept `parcels[1] = parcels[1] + 15`. Do not accept `parcels[2] = 15`, `parcels[0] = 15`, or `15 = parcels[1]` (wrong way round). Do not accept a whole new array declaration.
3(a) J277 2.2.3	Max 2: `array guests[5]` creates indexes 0 to 4 / arrays are 0-indexed so the last index is 4 (so) index 5 does not exist / is outside the array / is out of range The array is fixed length / static, so a sixth element cannot be added	**2**	"There is no room 5" alone = 0. Do not credit answers about the string, quotes or the name. Accept "the array only has 5 elements, numbered 0 to 4" for 2.

<table>
<tr><th>QUESTION</th><th>ANSWER</th><th>MARKS</th><th>GUIDANCE</th></tr>
<tr>
<td>4(a)
J277 2.2.3, 2.1.2</td>
<td>1 mark for each correct column:
<code>i</code>: 0, 1, 2, 3
<code>low</code>: 0, 1, 2
Output: 2 (once, at the end)
<table>
<tr><th>I</th><th>LOW</th><th>OUTPUT</th></tr>
<tr><td></td><td>0</td><td></td></tr>
<tr><td>0</td><td>1</td><td></td></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td>2</td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td></tr>
</table>
</td>
<td>3</td>
<td>Values must be in the correct order. Ignore repeated values on later rows (e.g. 1 written again beside i = 1). Accept low = 0 on the same row as i = 0 followed by 1. Output written as <code>print(2)</code> or with quotes: do not award. Any value of i above 3, or low above 2: lose that column's mark.</td>
</tr>
<tr>
<td>4(b)
J277 2.2.3</td>
<td>Index 0: <code>60</code> and index 2: <code>35</code>
Index 1: <code>85</code> and index 3: <code>60</code> (unchanged)</td>
<td>2</td>
<td>Final array: 60, 85, 35, 60. 1 mark per bullet; both values in a bullet are needed for its mark.</td>
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<tr>
<td>5(a)
J277 2.2.3</td>
<td>1 mark each to max 4:
Declares an array/list called <code>tickets</code> with 7 elements
Count-controlled loop that runs 7 times (e.g. <code>for day = 0 to 6</code>)
Inputs the number of tickets inside the loop
Stores each input in <code>tickets[day]</code>, using the loop variable as the index
Example:
<pre>array tickets[7]
for day = 0 to 6
    tickets[day] = int(input("Enter tickets sold"))
next day</pre>
</td>
<td>4</td>
<td>Accept <code>for day = 0 to tickets.length - 1</code>, Python <code>for day in range(7)</code>. Accept any loop variable name. A loop of 1 to 7 used with the index: loop mark only if it runs 7 times; the store mark is lost if index 7 is used (outside the array). Accept an empty list with append inside a 7-times loop: max 3 (no declaration mark). Accept a condition-controlled loop with a correct counter. Do not penalise a missing <code>int()</code>.</td>
</tr>
</table>

QUESTION	ANSWER	MARKS	GUIDANCE

6(a)
J277 2.2.3
	1 mark each to max 6:
	Inputs the gallery number and stores it in a variable
	Uses the input variable as the index: `visitors[gallery]` ...
	... adds 1 to that element and stores the result back in the same element
	Attempt at a loop to visit the elements of the array
	Loop covers every index 0 to 5 exactly once (no index 6)
	Outputs `visitors[g]` inside the loop, using the loop variable as the index
	Example:
	`gallery = int(input("Enter gallery number (0 to 5)"))`
	`visitors[gallery] = visitors[gallery] + 1`
	`for g = 0 to 5`
	`  print(visitors[g])`
	`next g`
		6	Accept `visitors[gallery] += 1`. Accept `for g = 0 to visitors.length - 1`, Python `range(6)` / `range(len(visitors))`. A Python `for v in visitors: print(v)` loop gains the loop, every-index and output marks. Six separate print lines with no loop: max 3 (first three marks). Adding 1 to a variable but not storing it back in the array loses the third mark. The update placed inside the output loop, so it is repeated: lose the third mark. Do not penalise a missing `int()`. Do not accept `input` as a variable name. Do not accept flowcharts, structured English or bullet points.

Total: 22 marks