MODULE M PROGRAMMING · M8

Selection: IF, ELSE IF and ELSE: mark scheme

20 marks · OCR J277 spec 2.2.1 (the three programming constructs: selection; comparison operators; inputs and outputs), 2.1.2 (nesting for selection; identify logic errors and suggest fixes; complete, write and refine algorithms)

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: mark the logic, not the language. Allow OCR Exam Reference Language or any high-level language, and allow any logically valid method. Do not penalise minor syntax slips (missing casting, capitals, a missing colon, `else if` or `elif` for `elseif`). A recurring slip: penalise once, then follow through. Do not accept maths symbols such as ≥ or ≤ in code. Outputs: ignore quotation marks round output text.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 2.2.1	1 mark each to max 2: A condition is tested / checked / evaluated (as true or false) The result decides which block of code / which statements run (next) / which path the program takes Code may be skipped / only some of the code runs	**2**	An example alone, e.g. "an if statement" or "if ... else": max 1. Do not accept answers that describe repeating code (iteration) or running every line in order (sequence). Credit any other valid point.
2(a) J277 2.2.1, 2.1.2	1 mark per correct output: 22: `Fan low` 30: `Fan high` 40: `Fan high` 15: `Fan off`	**4**	Spelling of the output must be clear. Do not accept more than one output in a row. Do not accept `print("Fan low")`.
2(b) J277 2.2.1	The condition on line 02 is tested first / is true first, and once one branch runs the rest of the statement (the `elseif`/`else` parts) is skipped / only the first true branch runs / line 04 is never tested	**1**	Do not accept "because 45 is more than 40" alone (does not explain why line 04 does not also run).
3(a) J277 2.1.2, 2.2.1	`Bronze`	**1**	Do not accept `Silver` (that is the intended badge, not the output).
3(b) J277 2.1.2, 2.2.1	Any number that is 8 or more (or 12 or more) is also 4 or more, so the condition on line 02 is true first / is tested first and the `elseif` lines are skipped / lines 04 and 06 are never reached when they could be true	**1**	Allow "the tests are in the wrong order; `>= 4` is checked first, so a member with 8+ classes gets Bronze". Do not accept "it is a logic error" or "the order is wrong" alone.

QUESTION	ANSWER	MARKS	GUIDANCE

3(c)
J277 2.1.2, 2.2.1
	1 mark each to max 2:
	`classes >= 12` tested first and gives `Gold`
	... then `classes >= 8` gives `Silver` and then `classes >= 4` gives `Bronze` (in that order, using `elseif`)
	`02 if classes >= 12 then`
	`03  badge = "Gold"`
	`04 elseif classes >= 8 then`
	`05  badge = "Silver"`
	`06 elseif classes >= 4 then`
	`07  badge = "Bronze"`
		2	Allow conditions with full ranges in any order, e.g. `elseif classes >= 8 AND classes <= 11 then` (or `< 12`); 1 mark for Gold correct, 1 mark for Silver and Bronze correct. Allow `> 11`, `> 7`, `> 3`. Each side of AND must be a full comparison: do not accept `classes >= 8 AND <= 11`. Allow a rewrite that also keeps lines 08 to 10.

4(a) J277 2.1.2, 2.2.1	1 mark per correct output: 600, "Y": `Lift moving` 720, "N": `Close the door` 650, "Y": `Overloaded`	**3**	Row 2: do not accept `Overloaded` or two outputs (the inner `if` is never reached when the door is open).

5(a)
J277 2.2.1, 2.1.2
	1 mark each to max 6:
	Inputs the length and stores it in a variable
	Attempt at selection with more than two branches (`if` ... `elseif` / nested `if`)
	Outputs `Invalid` for a length of 0 or less (`<= 0`)
	Outputs `Small` for more than 0 and up to 30 (`<= 30`) and `Medium` for more than 30 and up to 50 (`<= 50`)
	Outputs `Large` for more than 50 and up to 80 (`<= 80`)
	Outputs `Too big` for more than 80 (`else` / `> 80`)
	Only one message can be output for any length (conditions in a working order / ranges that do not overlap)
	`length = float(input("Longest side in cm"))`
	`if length <= 0 then`
	`  print("Invalid")`
	`elseif length <= 30 then`
	`  print("Small")`
	`elseif length <= 50 then`
	`  print("Medium")`
	`elseif length <= 80 then`
	`  print("Large")`
	`else`
	`  print("Too big")`
	`endif`
		6	Boundaries must be exact: 30 is Small, 50 is Medium, 80 is Large, 0 is Invalid. Allow `int(...)` or no casting. Allow separate `if` statements with full ranges using AND (e.g. `if length > 30 AND length <= 50 then`). Separate `if` statements with open conditions (e.g. `if length <= 50` after `if length <= 30`) give two outputs: do not award the last bullet. Allow tests in reverse order (e.g. `> 80` first). A message with the output is not needed.

Total: 20 marks