MODULE O ROBUST PROGRAMS · O3

Validation vs verification: mark scheme

20 marks · Cambridge 0478 syllabus 7.5(b) (the need for verification checks; visual check and double entry check, their purpose and algorithms), 7.5(a) (validation checks), 7.7 (trace tables), 7.8 (identify and correct errors), 7.9 (write algorithms)

How to use. One mark per creditworthy point up to the maximum shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark. Algorithm answers must be in pseudocode; marks are for the features listed, not for one exact algorithm. Ignore minor slips in case and spacing. Accept <- or = for assignment. Do not accept English ("is not equal to") or maths symbols (≠) in place of operators. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 7.5(a), 7.5(b)	One mark for each correct row: • compared by eye with the paper form: verification • date only accepted in the form DD/MM/YYYY: validation • data entered is the same as the data meant to be entered: verification • quantity rejected if not a whole number: validation	**4**	A row with both boxes ticked = 0 for that row. Accept a cross or other clear mark in place of a tick.
2(a) 0478 7.5(a), 7.5(b)	Any two from: • 150 is within the range 1 to 500 // 150 is a valid / reasonable value // 150 meets the rule, so it is accepted • a range check / validation only checks that the data is sensible / within the limits / follows the rules • it does not check that the value is correct // that it matches the paper order // that it is the value that was intended (105)	**2**	Max 2. "The range check is wrong / too big" alone = 0. Do not accept "150 is outside the range" (wrong). Credit any other valid answer.
2(b) 0478 7.5(b)	Any two from: • the quantity that was entered (150) is shown / displayed on the screen • the clerk compares / reads it against the original paper order (by eye) • the clerk sees that 150 does not match 105 // sees the two values are different, so does not confirm it and re-enters / corrects it	**2**	Max 2. The comparison must be with the original (paper order / source document) for that mark. "The clerk checks it" alone = 0. Do not credit a description of a double entry check (entering the data twice) or of a validation check.

QUESTION	ANSWER	MARKS	GUIDANCE
3(a) 0478 7.7, 7.5(b)	One mark for each correct column: • `Entry1`: 58204, 58204, 58204 • `Entry2`: 58240, 52804, 58204 • `Attempts`: 0, 1, 2, 3 • OUTPUT: `Entries do not match, start again` (twice, after attempts 1 and 2 only), then `Account number 58204 accepted after 3 attempts` (once, at the end)	**4**	Accept 58204 written once in the `Entry1` column (it is input again but does not change). Any value in a column after the loop has ended loses the mark for that column. A mismatch message on the third pass loses the OUTPUT mark. The final output may be on the same row as the last values or on the next row. Ignore quotation marks round outputs. Accept small spacing differences in the final output.

4(a)
0478 7.9, 7.5(b)
	One mark per bullet point, max 5:
	• condition-controlled loop (e.g. `REPEAT` ... `UNTIL`) around the input, display and reply steps
	• prompt (OUTPUT) and `INPUT` of the registration, inside the loop
	• OUTPUT of the registration that was entered (the variable, not its name in quotes), after it is input
	• prompt asking whether it matches the booking form (Y or N) and `INPUT` of the reply, after the registration is output
	• loop ends only when the reply is Y: `UNTIL Reply = 'Y'`
	• message that the registration has been saved, output once, after the loop
	Example:
	`REPEAT`
	`  OUTPUT "Enter the car registration"`
	`  INPUT Registration`
	`  OUTPUT "You entered ", Registration`
	`  OUTPUT "Does this match the booking form? (Y or N)"`
	`  INPUT Reply`
	`UNTIL Reply = 'Y'`
	`OUTPUT "Registration saved"`
		5	Accept `"Y"` for `'Y'`; accept `UNTIL Reply = 'Y' OR Reply = 'y'` // `UNTIL UCASE(Reply) = 'Y'`. A WHILE loop that inputs the registration and reply before the loop and again inside it can get full marks. `UNTIL Reply = 'N'` or `UNTIL Reply <> 'Y'` (reversed) loses the condition mark. A single IF with no loop (only one re-entry): max 3. Do not penalise extra validation, but it earns no marks. Program code instead of pseudocode: 0.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) 0478 7.8, 7.5(b)	One mark for each line identified **and** correctly corrected: • line 05: `INPUT ConfirmPin` • line 06: `IF NewPin <> ConfirmPin` // `IF NOT (NewPin = ConfirmPin)` • line 10: `UNTIL NewPin = ConfirmPin` // `UNTIL NOT (NewPin <> ConfirmPin)`	**3**	A line number with no correction, or a correction with no line number = 0. Line 05: `ConfirmPin ← INPUT` is not pseudocode (0); do not accept deleting the line without the INPUT. Line 06: do not accept changing the message on line 08 instead (the mismatch message would then never be output). Line 10: `UNTIL ConfirmPin = NewPin` is fine. Ignore extra lines given if the three errors are found, but a correct line "corrected" into an error loses one mark.

Total: 20 marks