

1.2 SOFTWARE & SOFTWARE DEVELOPMENT · 1.2.3

Writing & following algorithms — Mark scheme

33 marks · spec 1.2.3(c)

AO key: AO2 = apply (trace/analyse) · AO3 = design and program a solution. For "write" questions, accept any logically correct solution; award the indicative points by function, not exact wording.

Q	ANSWER	AO	MARKS										
1(a)	3 (1)	AO2	1										
1(b)	5 (1)	AO2	1										
1(c)	Trace for input 7 (1 mark per correct row, max 4): <table><tr><th>NUM</th><th>COUNT</th></tr><tr><td>7</td><td>0</td></tr><tr><td>3</td><td>1</td></tr><tr><td>1</td><td>2</td></tr><tr><td>0</td><td>3</td></tr></table> Accept omission of the initial row if the three updated rows are correct.	NUM	COUNT	7	0	3	1	1	2	0	3	AO2	4
NUM	COUNT												
7	0												
3	1												
1	2												
0	3												

Q	ANSWER (INDICATIVE)	AO	MARKS
2	<pre>largest = input("Enter a number") for i = 1 to 4 num = input("Enter a number") if num > largest then largest = num endif next i print(largest)</pre> 1 mark each, max 4: input all 5 numbers (1); loop structure (1); correct comparison & update of largest (1); output the largest (1).	AO3	4

Q	ANSWER (INDICATIVE)	AO	MARKS
3	<pre>function countVowels(text) count = 0 for i = 0 to text.length - 1 ch = text.substring(i, 1) if ch == "a" OR ch == "e" OR ch == "i" OR ch == "o" OR ch == "u" then count = count + 1 endif next i return count endfunction</pre> 1 mark each, max 5: counter initialised (1); loop over each character (1); extract current character (1); correct vowel test (1); return the count (1). Allow checking lower and upper case, or using a set/string of vowels.	AO3	5

Q	ANSWER	AO	MARKS
4(a)	4 (1)	AO2	1
4(b)	10 (1)	AO2	1
4(c)	It calculates the greatest common divisor (1) / highest common factor of a and b (1). (2)	AO2	2

Q	ANSWER (INDICATIVE)	AO	MARKS
5	<pre>total = 0 player = 1 while total < 20 choice = input("Player " + str(player) + ": add 1 or 2") total = total + choice if total >= 20 then print("Player " + str(player) + " wins") elseif player == 1 then player = 2 else player = 1 endif endwhile</pre> 1 mark each, max 6: total initialised to 0 (1); loop until total reaches 20 (1); input each choice (1); add choice to total (1); alternate players correctly (1); detect the win and output the correct player (1).	AO3	6

Q	ANSWER (INDICATIVE)	AO	MARKS
6(a)	<pre> function isValid(password) hasDigit = false for i = 0 to password.length - 1 ch = password.substring(i, 1) if ASC(ch) >= 48 AND ASC(ch) <= 57 then hasDigit = true endif next i if password.length >= 8 AND hasDigit == true then return true else return false endif endfunction </pre> 1 mark each, max 5: loop over characters (1); correct digit test (ASCII 48–57 or "0"–"9") (1); set a flag when a digit is found (1); length ≥ 8 check (1); return the correct boolean (1).	AO3	5
6(b)	<pre> password = input("Enter a password") while isValid(password) == false password = input("Enter a password") endwhile </pre> 1 mark each, max 3: input a password (1); loop that calls isValid (1); re-input until valid (correct condition) (1).	AO3	3

Total for paper: 33 marks