



National
Qualifications
2019

2019 Computing Science
Higher
Finalised Marking Instructions

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These marking instructions have been prepared by examination teams for use by SQA appointed markers when marking external course assessments.

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General marking principles for Higher Computing Science

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

- (a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b) If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.
- (c) Award marks regardless of spelling, as long as the meaning is unambiguous.
- (d) Candidates may answer programming questions in any appropriate programming language or pseudocode. Award marks regardless of minor syntax errors, as long as the intention of the coding is clear.
- (e) For a **describe** question, candidates must provide a statement or structure of characteristics and/or features. This will be more than an outline or a list. It may refer to, for example, a concept, process, experiment, situation, or facts, in the context of and appropriate to the question. Candidates must make the same number of factual/appropriate points as there are marks available in the question.
- (f) For an **explain** question, candidates must relate cause and effect and/or make relationships between things clear, in the context of the question or a specific area within the question.

Marking instructions for each question

SECTION 1

Question		Expected response	Max mark	Additional guidance						
1.		-102	1							
2.		<ul style="list-style-type: none"> Both substrings Assignment and concatenation 	2	<p>1 mark for each bullet</p> <p>Examples:</p> <p>shortDate = left(month,3) & right(year,2)</p> <p>shortDate = mid(month, 1, 3) & mid(year,3,2)</p> <p>shortDate = month[0:3] + year[2:4] shortDate = month[:3]+ year[2:] OR year[-2:]</p> <p>shortDate = month[1]+ month[2]+ month[3] + year[3]+year[4]</p>						
3.		<ul style="list-style-type: none"> The processor activates the read line on the control bus/the control unit activates the read line. An instruction is fetched from the memory location using the data bus (and stored in the instruction register). 	2	<p>1 mark for each bullet</p> <p>Read line and control bus/unit required</p> <p>From memory/to processor and data bus required</p>						
4.		<ul style="list-style-type: none"> Sign bit: 0 Remaining 15 bits of mantissa: 110 0010 0000 0000 Exponent: 0000 0011 	3	<p>1 mark for each bullet</p> <p>(9 x 0s) (6 x 0s)</p>						
5.		<p>The client:</p> <ul style="list-style-type: none"> Details requirements Outlines scope and boundaries Evaluates prototype/suggest changes Provides feedback/liasing with development team throughout process 	2	<p>1 mark for each bullet</p> <p>Maximum 2 marks</p>						
6.		<table border="1"> <thead> <tr> <th>course</th> <th>least expensive item</th> </tr> </thead> <tbody> <tr> <td>Starter</td> <td>2.99</td> </tr> <tr> <td>Dessert</td> <td>8.99</td> </tr> </tbody> </table>	course	least expensive item	Starter	2.99	Dessert	8.99	2	<p>1 mark for each correct row</p> <p>Maximum 2 marks</p> <p>1 mark if two correct, one wrong</p>
course	least expensive item									
Starter	2.99									
Dessert	8.99									
7.		A key comprising two or more attributes which are foreign/primary keys from other tables	1							

Question		Expected response	Max mark	Additional guidance	
8.	(a)	<ul style="list-style-type: none"> Two drop down boxes have no indication of the inputs No context for media elements Inconsistent image alignment or size under Book Now/bottom right File formats of the media used are not specified No URLs specified for navigation links 	2	1 mark for each bullet Maximum 2 marks	
	(b)	<ul style="list-style-type: none"> Provide scenario/give prospective users a task to perform Observe users Receive feedback Identify problems with navigation eg missing/orphan pages/ hyperlink destinations Record difficulties or improvements needed 	2	1 mark for each bullet Maximum 2 marks No mark for testing hyperlinks without reference to destination	
9.		A - Nav B - Footer	2	1 mark for each line Accept with < >	
10.	(a)	2	1		
	(b)	<ul style="list-style-type: none"> Use a conditional loop With termination 	2	1 mark for each bullet Termination examples include target is found, target=list[index], found =true	
	(c)	(i)	0	1	
		(ii)	<ul style="list-style-type: none"> Logic Returns a position for an item that is not in the list OR Returns the position of the first item in the list/C232 	2	1 mark for each bullet

SECTION 2

Question		Expected response	Max mark	Additional guidance
11.	(a)	<ul style="list-style-type: none"> • 200 readings/values • Accelerator OR brake maximum 100 (%) OR minimum 0 • Speed minimum is 0 OR maximum dependent on car • Data is accurate as it is captured from sensors. • No input validation required 	2	<p>1 mark for each bullet Maximum 2 marks</p>
	(b) (i)	<ul style="list-style-type: none"> • Record structure with name • Four fields specified 	2	<p>1 mark for each bullet</p> <p>Record structure could be Type, Structure, Class, Named Tuple, Record name Is</p> <p>Livecode Global CarData Put empty into CarData[1][speed] Put empty into CarData[1][accel] Put empty into CarData[1][brake] Put empty into CarData[1][seatb]</p> <p>Defining a RECORD structure does not start with DECLARE - do not award first bullet</p>
	(ii)	<ul style="list-style-type: none"> • Array structure • Using data type created in (i) 	2	<p>1 mark for each bullet</p> <p>Example Python: readings=[datatype_a() for x in range (200)]</p> <p>Example VB: DIM readings(199) AS datatype_a</p> <p>Example Livecode: Set the data of eventdata to CarData</p>
	(c)	<ul style="list-style-type: none"> • Initial set of max • Loop traversing array with termination • If condition • Assignment of max 	4	<p>1 mark for each bullet</p> <p>Set max to first speed Loop to end of array If current speed > max then Set max to current speed (End If End Loop)</p> <p>Do not penalise incorrect shapes in graphical notations.</p>

Question		Expected response	Max mark	Additional guidance
12.	(a)	<ul style="list-style-type: none"> grouping selector for header, main elements with properties additional header selector with height property 	2	<p>1 mark for each bullet</p> <pre>header, main { background-color:White; margin-top:20px; margin-bottom:20px}</pre> <p>Allow <code>margin:20 0 20 0;</code></p> <pre>header { height:90px}</pre> <p>header, main selector must be separated with comma</p>
	(b)	<ul style="list-style-type: none"> Suitable control for session (radio/list) Name, Mobile, Date, Additional Information inputs Validation of any one input from bullet 2 Submit button 	4	<p>1 mark for each bullet</p> <p>Date picker/calendar/formatted date validates date input</p>
	(c)	Presence check	1	
	(d)	(i)	1	Accept min and max without “ ”
		(ii)	1	
	(e)	<ul style="list-style-type: none"> Reduced screen area (required for large number of options) Multiple selections can be made 	2	1 mark for each bullet
	(f)	<ul style="list-style-type: none"> Browser/device problems 	1	

Question		Expected response	Max mark	Additional guidance
13.	(a)	<ul style="list-style-type: none"> • (A query to) display the total donations made to each fundraiser • (A query to) allow the charity to display total donations made • (A query to) display the total donations from a sponsor(s) • (A query to) display the total donations from a fundraiser(s) • (A query to) insert new fundraisers/sponsors or make a new donation 	2	1 mark for each bullet Maximum 2 marks
	(b)	<pre> graph LR Fundraiser <--> Donation Sponsor <--> Donation </pre>	2	
	(c)	<ul style="list-style-type: none"> • Select clause with fundraiserID field and average aggregate function with amount field • Alias (allow missing £ sign) and From • Group by fundraiserID 	3	1 mark for each bullet Example: <pre>SELECT fundraiserID, AVG (amount) As 'Average Donation (£)' FROM Donation GROUP BY fundraiserID</pre> Do not penalise use of extra table
	(d)	<ul style="list-style-type: none"> • Aggregate function should be MAX(amount) • No alias implemented (Largest donation (£)) • Should have a Group By (Fundraiser.)name 	3	1 mark for each bullet
	(e)	<ul style="list-style-type: none"> • Public key encrypts the data • Private key decrypts the data 	2	1 mark for each bullet 1 mark for the concept of encrypt and decrypt without assigning to appropriate keys

Question		Expected response	Max mark	Additional guidance
14.	(a)	<ul style="list-style-type: none"> In: stars[], price[] Out: position 	2	<p>1 mark for each bullet</p> <p>Any additional entries in a row, award 0 marks for that row.</p>
	(b)	<ul style="list-style-type: none"> Initialisation of position and lowest that does not cause an error ie position < 0 and lowest as a suitable high value Condition stars = 5 Condition price < lowest value Assign lowest OR use of price (position) in the condition Assign position 	5	<p>1 mark for each bullet</p> <p>Set position to -1 Set lowest to 1000 Loop for each hotel If current stars = 5 and current price < lowest Set lowest to current price Set position to index End if End loop</p> <p>Award 4 marks if position of price is used eg</p> <p>Set position to -1/0 (no mark) Loop for each hotel If current stars=5 and current price<price [position] Set position to current index End if End loop</p> <p>Do not penalise incorrect shapes in graphical notations.</p>
15.	(a)	<ul style="list-style-type: none"> Three arrays of 200 elements Data types of each array: string, string, integer 	2	1 mark for each bullet
	(b)	<ul style="list-style-type: none"> initialise and increment count loop with termination condition matching category condition matching score >= qualScore output statement concatenating count, message and qualScore 	5	<p>1 mark for each bullet</p> <pre> DECLARE count INITIALLY 0 RECEIVE qualScore FROM KEYBOARD FOR index FROM 0 to 199 DO If category[index] =“Junior” AND score[index]>= qualScore THEN SET count to count +1 END IF NEXT FOR SEND count & “Juniors achieved the qualifying score of ”& qualScore </pre> <p>Concatenation can be &, +, comma</p>

Question		Expected response	Max mark	Additional guidance	
16.	(a)	<ul style="list-style-type: none"> 4 main pages in top level 3 sub-pages from Grooming 	2	<p>1 mark for each bullet</p> <pre> graph TD HP[Home Page] --- K[Kennels] HP --- G[Grooming] HP --- Gal[Gallery] HP --- CU[Contact Us] G --- C[Costs] G --- T[Treatment] G --- P[Photos] </pre>	
	(b)	<ul style="list-style-type: none"> background-color in header selector OR border-color margin in imageBanner class float:right in h1 selector 	3	<p>1 mark per bullet</p> <pre> header{ background-color/border-color:lightgrey; padding:0px; } .imageBanner{ margin:20px; float:left; padding:0px; height:90px; width:130px } h1{ float:right; margin-right:30px; margin-top:30px; color:white; display:inline; } </pre>	
	(c)	(i)	<ul style="list-style-type: none"> style will only apply within the (parent) nav element style will apply to unordered list/list and/or anchor elements 	2	<p>1 mark for each bullet</p> <p>Exemplification of bullet two is acceptable</p>
		(ii)	The background colour changes to black and the text colour changes to white	1	
		(iii)	display:block	1	

Question			Expected response	Max mark	Additional guidance
16.	(d)	(i)	<ul style="list-style-type: none"> • Appropriate function name with parameter in brackets • Change source attribute of the parameter to Bailey1 image 	2	<p>1 mark for each bullet</p> <pre>function mouseaway(my_image) {my_image.src = "../images/Bailey1.png";}</pre> <p>Accepts solution using document.getElementById()</p> <p>Do not penalise {}, " ", ; Ensure new function is not named rollover</p>
		(ii)	<ul style="list-style-type: none"> • Add onmouseout event to element • Match function name to name created in part (i) 	2	<p>1 mark for each bullet</p> <pre></pre>
	(e)		<p>Pro-active decision making by software/apps to reduce usage eg</p> <ul style="list-style-type: none"> • automatically switch heating off/on when within range • monitoring/responding to external weather conditions • adjust heating based on historical patterns of data • zoned heating 	1	1 mark for any one bullet

Question		Expected response(s)	Max mark	Additional guidance
17.	(a)	<ul style="list-style-type: none"> forename, surname, SUM(lessonDuration) selection of date in search grouping by forename and surname 	3	<p>1 mark for each bullet</p> <p>Date selection may be between, range and use wildcards (* ?? %)</p>
	(b)	<ul style="list-style-type: none"> SUM aggregate function Calculation of lessonDuration * 35 Alias and Booking table 	3	<p>1 mark for each bullet</p> <p>Example: SELECT SUM(lessonDuration*35) AS 'Total Payments' FROM Booking;</p> <p>Note can be (lessonDuration) * 35</p>
	(c)	<ul style="list-style-type: none"> UPDATE Customer table SET new address and postcode values WHERE criteria based on forename and surname OR customer ID 	3	<p>1 mark for each bullet</p> <p>Example: UPDATE Customer SET Address = '27 Drummer Street', Postcode = 'AB33 7QR' WHERE forename = 'Simon' AND surname = 'Wenger' OR customerID = 2</p>
	(d)	<ul style="list-style-type: none"> forename, surname and COUNT function on any field Tables(s): Instructor and Booking Grouping: forename and surname Sort Order: Count of field descending 	4	<p>1 mark for each bullet</p> <p>COUNT function can be applied to any field or *</p> <p>Accept ALIAS in the Sort Order</p>

Question			Expected response(s)	Max mark	Additional guidance							
18.	(a)	(i)	List or newList	1								
		(ii)	Emails or uniques	1								
	(b)	(i)	Section of code in which a variable is accessible/usable	1								
		(ii)	Global or a description of global	1	Lines 1 to 79							
(c)	(i)	<table border="1"> <thead> <tr> <th>Variable</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>position</td> <td>1</td> </tr> <tr> <td>newList[position]</td> <td>bert@yeeha.com</td> </tr> <tr> <td>list[index]</td> <td>bert@yeeha.com</td> </tr> </tbody> </table>	Variable	Value	position	1	newList[position]	bert@yeeha.com	list[index]	bert@yeeha.com	3	<p>1 mark for each row</p> <p>Award 2 marks for: position 2 newList[position]: colin@icloud.com list[index]: colin@icloud.com</p> <p>Award 1 mark for: position 0 newList[position]: allan@giggle.com</p>
		Variable	Value									
position	1											
newList[position]	bert@yeeha.com											
list[index]	bert@yeeha.com											
(ii)	<ul style="list-style-type: none"> bert@yeeha.com or list(1) does not equal allan@giggle.com or newList(0) therefore condition is true newList(1) is assigned the value bert@yeeha.com (list(1)) 	2	<p>1 mark for each bullet</p> <p>Accept answers that compare values from trace table in (c)(i)</p> <p>Award 1 mark for meaningful description that does not reference given values in the array</p>									
(d)		<ul style="list-style-type: none"> Slow performance Inability to access 	1	<p>1 mark for each bullet</p> <p>Maximum 1 mark</p>								

[END OF MARKING INSTRUCTIONS]