

Digital Solutions marking guide

External assessment

Combination response (72 marks)

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

1. recognise and describe programming elements, components of exchange systems, privacy principles and data exchange processes
2. symbolise and explain programming ideas, data specifications, data exchange processes, and data flow within and between systems
3. analyse problems and information related to a digital problem
5. synthesise information and ideas to determine possible low-fidelity components of secure data exchange solutions
7. evaluate impacts, components and solutions against criteria to make refinements and justified recommendations.

Note: Objectives 4, 6 and 8 are not assessed in this instrument.

Purpose

This document is an External assessment marking guide (EAMG).

The EAMG:

- Provides a tool for calibrating external assessment markers to ensure reliability of results
- Indicates the correlation, for each question, between mark allocation and qualities at each level of the mark range
- Informs schools and students about how marks are matched to qualities in student responses.

Mark allocation

Where a response does not meet any of the descriptors for a question or a criterion, a mark of '0' will be recorded. Where no response to a question has been made, a mark of 'N' will be recorded.

Allow FT mark(s) – refers to 'follow through', where an error in the prior section of working is used later in the response, a mark (or marks) for the rest of the response can still be awarded so long as it still demonstrates the correct conceptual understanding or skill in the rest of the response.

External assessment marking guide

Multiple choice

Question	Response
1	D
2	B
3	B
4	A
5	B
6	A
7	C
8	D
9	D
10	C

Short response (41 marks)

Q	Sample response	The response:	M	The response:	M
11a)	<p>The elements of visual communication used in this UI are:</p> <ul style="list-style-type: none"> spacing is even and there is lots of clear space between elements to avoid clutter shapes are consistent with readings from other sources and are familiar to many users size of readings makes them easy to read. <p>The principles of visual communication used in this UI are:</p> <ul style="list-style-type: none"> contrast in dial needles and distance values with background — makes information clear and accessible readings are aligned on both sides and are mirrored repetition of shapes, spacing and alignment throughout allows ease of use and pleasing arrangement of information. 	for elements of visual communication:		for principles of visual communication:	
		<ul style="list-style-type: none"> states 3 elements of visual communication and describes how these 3 elements have been used in the UI 	6	<ul style="list-style-type: none"> states 3 principles of visual communication and describes how these 3 principles have been used in the UI 	6
		<ul style="list-style-type: none"> states 3 elements of visual communication and describes how 2 of these elements have been used in the UI 	5	<ul style="list-style-type: none"> states 3 principles of visual communication and describes how 2 of these principles have been used in the UI 	5
		<ul style="list-style-type: none"> states 2 elements of visual communication and describes how these 2 elements have been used in the UI 	4	<ul style="list-style-type: none"> states 2 principles of visual communication and describes how these 2 principles have been used in the UI 	4
		<ul style="list-style-type: none"> states 2 elements of visual communication and describes how 1 of these elements has been used in the UI 	3	<ul style="list-style-type: none"> states 2 principles of visual communication and describes how 1 of these principles has been used in the UI 	3
		<ul style="list-style-type: none"> states 2 elements of visual communication <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> states 1 element of visual communication and describes how this element has been used in the UI 	2	<ul style="list-style-type: none"> states 2 principles of visual communication <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> states 1 principle of visual communication and describes how this principle has been used in the UI 	2
		<ul style="list-style-type: none"> states 1 element of visual communication <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> describes how 1 element of visual communication has been used in the UI 	1	<ul style="list-style-type: none"> states 1 principle of visual communication <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> describes how 1 principle of visual communication has been used in the UI 	1
		<ul style="list-style-type: none"> does not satisfy any of the descriptors above. 	0	<ul style="list-style-type: none"> does not satisfy any of the descriptors above. 	0

Q	Sample response	The response:
11b)		<p>for further development of the UI:</p> <ul style="list-style-type: none"> • symbolises a feature that accurately aligns with the existing interface [1 mark] • symbolises a second feature that accurately aligns with the existing interface [1 mark] • symbolises a third feature that accurately aligns with the existing interface [1 mark] • symbolises a fourth feature that accurately aligns with the existing interface [1 mark] • symbolises a fifth feature that accurately aligns with the existing interface [1 mark]

Q	Sample response	The response:
11c)	<p>Note: Responses are annotations on the diagram from Question 11b).</p> <ul style="list-style-type: none"> • shape (consistent with readings from the existing interface and familiar to many users) • repetition (repetition of shapes, spacing) • alignment (readings are aligned on both sides and are mirrored) • proximity (camera views are located close to the actual locations of cameras on the drone) 	<p>for the justification of features:</p> <ul style="list-style-type: none"> • justifies the symbolised features using an element OR principle of visual communication [1 mark] • justifies the symbolised features using a second element OR principle of visual communication [1 mark] • justifies the symbolised features using a third element OR principle of visual communication [1 mark] • justifies the symbolised features using a fourth element OR principle of visual communication [1 mark]

Q	Sample response	The response:
12a)	<p>Reliability: The data is unreliable as a log of fault events over time because the proposed data structure in the central store does not allow for date and time, so historical data is not stored and therefore provides no ongoing summary.</p> <p>Accuracy: The only logical threat to accuracy is the absence of date and time data in the solution. This is an issue as it would not meet the criteria of the quarterly report request.</p>	<ul style="list-style-type: none"> • correctly evaluates the solution against a criterion [1 mark] • correctly evaluates the solution against a second criterion [1 mark]
12b)	<p>Maintainability (self-determined criterion): The current data store is not maintainable as it requires human intervention to update the fault status once a marker is repaired.</p> <p>Security (self-determined criterion): Security would be an issue as there is no mention of encryption of the data broadcast, how it will be securely stored and user authentication.</p>	<p>for self-determined criteria:</p> <ul style="list-style-type: none"> • states a relevant self-determined criterion [1 mark] • states a second relevant self-determined criterion [1 mark] <p>for evaluation:</p> <ul style="list-style-type: none"> • correctly evaluates against a stated self-determined criterion [1 mark] • correctly evaluates against a second stated self-determined criterion [1 mark]
12c)	<p>JSON is an effective method of exchange between the marine markers and the central database system because it is efficient and retains all of its human readability, so it's easy to interpret even from a non-coding perspective.</p>	<ul style="list-style-type: none"> • justifies the use of JSON with a valid reason [1 mark] • justifies the use of JSON with a second valid reason [1 mark]

Q	Sample response	The response:	M
13a)	<p>Response based on C#:</p> <pre>BEGIN DECLARE string memberNames = {last_name, given_name} ORDER BY last_name OUTPUT memberNames END</pre> <p>Response based on SQL:</p> <pre>SELECT given_name, last_name FROM members ORDER BY last_name ASC</pre>	for the solution:	
		• solves the problem without errors	4
		• could have solved the problem except for 1 logic error OR • could have solved the problem except for syntax errors	3
		• could have solved the problem except for 2 logic errors OR • could have solved the problem except for 1 logic error and syntax errors	2
		• could have solved the problem except for 3 logic errors OR • could have solved the problem except for 2 logic errors and syntax errors	1
		• does not satisfy any of the descriptors above.	0

Q	Sample response	The response:	M
13b)	Response based on C#: <pre> BEGIN DECLARE DateTime currentDate DECLARE DateTime joinDate DECLARE int memberId DECLARE int membershipYears = currentDate - joinDate FOR EACH int in memberId IF membershipYears >= 10 years ORDER BY joinDate OUTPUT joinDate, memberId ENDIF ENDFOR END </pre>	for the solution:	
		<ul style="list-style-type: none"> • solves the problem without errors 	4
		<ul style="list-style-type: none"> • could have solved the problem except for 1 logic error OR • could have solved the problem except for syntax errors 	3
		<ul style="list-style-type: none"> • could have solved the problem except for 2 logic errors OR • could have solved the problem except for 1 logic error and syntax errors 	2
		<ul style="list-style-type: none"> • could have solved the problem except for 3 logic errors OR • could have solved the problem except for 2 logic errors and syntax errors 	1
		<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Q	Sample response	The response:	M
13c)	<p>Response based on C#:</p> <pre>BEGIN DECLARE string memberDetails = {given_name, last_name, email} DECLARE string memberPhone DECLARE int pointsBalance FOR EACH int in pointsBalance IF pointsBalance > 3000 OUPUT memberDetails, memberPhone ENDIF ENDFOR END</pre> <p>Response based on SQL:</p> <pre>SELECT given_name, last_name, email, points_balance FROM members JOIN members_activity ON members.id = members_activity.id WHERE points_balance > 3000;</pre>	for the solution:	
		<ul style="list-style-type: none"> • solves the problem without errors 	4
		<ul style="list-style-type: none"> • could have solved the problem except for 1 logic error OR • could have solved the problem except for syntax errors 	3
		<ul style="list-style-type: none"> • could have solved the problem except for 2 logic errors OR • could have solved the problem except for 1 logic error and syntax errors 	2
		<ul style="list-style-type: none"> • could have solved the problem except for 3 logic errors OR • could have solved the problem except for 2 logic errors and syntax errors 	1
		<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Extended response — Question 14 (21 marks)

Q	Sample response	The response:	M
14a)	<pre> BEGIN INPUT key; IF key contains letter characters AND Length of key = 8 THEN MyKeySet = Blowfish_Initiate(key) INPUT user_text SET cipher_text = "" IF Length of user_text ≥ 8 THEN IF Length of user_text MOD 8 > 0 THEN FOR index = 1 TO Length of user_text MOD 8 user_text = user_text + " " NEXT index ENDIF FOR EACH set of 8 character BlockSet in user_text cipher_text = Blowfish(BlockSet, MyKeySet, 1) ENDFOR OUTPUT cipher_text ENDIF ENDIF END </pre>	for the solution:	
		<ul style="list-style-type: none"> • solves the problem without errors 	6
		<ul style="list-style-type: none"> • could have solved the problem except for 1 logic error <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • could have solved the problem except for syntax errors 	5
		<ul style="list-style-type: none"> • could have solved the problem except for 2 logic errors <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • could have solved the problem except for 1 logic error and syntax errors 	4
		<ul style="list-style-type: none"> • could have solved the problem except for 3 logic errors <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • could have solved the problem except for 2 logic errors and syntax errors 	3
		<ul style="list-style-type: none"> • could have solved the problem except for 4 logic errors <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • could have solved the problem except for 3 logic errors and syntax errors 	2
		<ul style="list-style-type: none"> • could have solved the problem except for 5 logic errors <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • could have solved the problem except for 4 logic errors and syntax errors 	1
		<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Q	Sample response	The response:
14b)	<p>An important usability principle is utility. The web app user interface should be responsive as it needs to adjust to all viewport sizes (display device). As users will use various devices, such as mobile phones and laptops, to access the app, the solution needs to adjust appropriately to ensure it is practical and accessible. Responsiveness can be implemented by using breakpoints and a grid for the layout of interface elements.</p> <p>The solution also needs to be accessible. It should use suitable colours and font (typeface, size and style) to ensure it is accessible to all users, regardless of visual or physical disability. Accessibility can be implemented by checking the colours and fonts with an accessibility checker, available online, to ensure they meet accessibility standards.</p>	<p>for a useability principle:</p> <ul style="list-style-type: none"> • states a relevant useability principle [1 mark] • describes the useability principle in relation to the solution [1 mark] • justifies how to implement the useability principle [1 mark] <p>for a second useability principle:</p> <ul style="list-style-type: none"> • states a relevant useability principle [1 mark] • describes the useability principle in relation to the solution [1 mark] • justifies how to implement the useability principle [1 mark]

Q	Sample response	The response:
14c)	<p>The method used is relatively secure as Blowfish is a well-known and trusted method of encryption. The method could be made more secure with some recommendations to improve security.</p> <p>The strength of meeting in the same location is that they reduce the risk of a security breach by not using technology that could be digitally intercepted. The weakness is that someone could overhear their conversation — this depends on the security of the location.</p> <p>The strength of using different languages is that if one program is breached, it is contained, because the same method of breaching may not work for a program written in another language. A weakness may be the language used, as different languages have different levels of vulnerability.</p> <p>To improve security, it would be recommended to test the program that is written before using it to identify any issues prior to implementation.</p> <p>Another recommendation would be to consider the vulnerabilities of the range of programming languages and use the least vulnerable languages to optimise security.</p>	<ul style="list-style-type: none"> • provides a valid conclusion about Blowfish [1 mark] <p>for evaluating the steps used:</p> <ul style="list-style-type: none"> • states a valid weakness [1 mark] • states a second valid weakness [1 mark] • states a valid strength [1 mark] • states a second valid strength [1 mark] <p>for improving security:</p> <ul style="list-style-type: none"> • provides a relevant recommendation [1 mark] • justifies the provided recommendation [1 mark] • provides a second relevant recommendation [1 mark] • justifies the second provided recommendation [1 mark]