

# Digital Solutions marking guide and response

External assessment 2022

## Combination response (69 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 consists of a marking guide and a sample response.

The marking guide:

- 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.

The sample response:

- demonstrates the qualities of a high-level response
- has been annotated using the marking guide.

## 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.

# Marking guide

## Multiple choice

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

## Short response

Q	Sample response	The response:
11	<p>Two network transmission protocols are HTTP and HTTPS.</p> <p>HTTP (hypertext transfer protocol) transfers data as text and offers no encryption and no authentication. This can be intercepted so should not be used for transferring data between websites.</p> <p>In contrast, HTTPS (HTTP secure) uses a range of encryption protocols, e.g. TLS standard and certificates to confirm the identity of the server, making it the more secure option.</p>	<ul style="list-style-type: none"> <li>explains features of               <ul style="list-style-type: none"> <li>one valid network transmission protocol <b>[1 mark]</b></li> <li>another valid network transmission protocol <b>[1 mark]</b></li> </ul> </li> </ul>
12a)	<p>Assignment: A value (stated or calculated) stored in a variable/memory location. Example: Line 13, value = 0.04.</p> <p>Condition: A comparison that retrieves a true or false value (or the value of a Boolean variable). Example: Line 12, IF depositAmount &lt;= 10000.</p> <p>Iteration: A group of algorithmic statements that are repeated while a condition is met. Example: Lines 25–27</p> <pre>FOR i = 0 TO years deposit = depositAmount + depositAmount x interestRate NEXT i</pre>	<ul style="list-style-type: none"> <li>describes               <ul style="list-style-type: none"> <li>assignment <b>[1 mark]</b></li> <li>iteration <b>[1 mark]</b></li> <li>condition <b>[1 mark]</b></li> </ul> </li> <li>identifies an example of               <ul style="list-style-type: none"> <li>assignment <b>[1 mark]</b></li> <li>condition <b>[1 mark]</b></li> <li>iteration <b>[1 mark]</b></li> </ul> </li> </ul>
12b)	<p>Modularisation breaks sections of code into smaller chunks so the algorithm is easier to understand, and allows the same code to be used in different parts of the application. For example, <code>calculateInterestRate</code> is a separate module (lines 11–22) and is called/used at line 5. It returns a value (line 21) which is stored in <code>interestRate</code> (line 5).</p>	<ul style="list-style-type: none"> <li>explains the purpose of modularisation <b>[1 mark]</b></li> <li>identifies an example of how modularisation is used <b>[1 mark]</b></li> </ul>

Q	Sample response	The response:
13a)	See page 9 for sample response.	<ul style="list-style-type: none"> <li>• symbolises, without logic errors, an algorithmic statement for               <ul style="list-style-type: none"> <li>– user input of text <b>[1 mark]</b></li> <li>– user input of key <b>[1 mark]</b></li> <li>– ‘indexOf’ sub-procedure <b>[1 mark]</b></li> <li>– ‘lengthOf’ sub-procedure <b>[1 mark]</b></li> <li>– ‘checkLowerCase’ sub-procedure <b>[1 mark]</b></li> <li>– ‘lowerCaseAlphabet’ <b>[1 mark]</b></li> </ul> </li> <li>• effectively uses pseudocode conventions <b>[1 mark]</b></li> </ul>
13b)	<pre> userText = queens optKey = ryjwah  Letter of userText = q u e e n s userText letter index= 16 20 4 4 13 18  Letter of optKey = r y j w a h optKey letter index = 17 24 9 22 0 7  Encryption index = 7 18 13 0 13 25 cipherOutput = h s n a n z </pre>	<ul style="list-style-type: none"> <li>• demonstrates accurate use of               <ul style="list-style-type: none"> <li>– one programming feature that specifies all inputs and outputs in table form <b>[1 mark]</b></li> <li>– a second programming feature that specifies all inputs and outputs in table form <b>[1 mark]</b></li> <li>– a third programming feature that specifies all inputs and outputs in table form <b>[1 mark]</b></li> <li>– a fourth programming feature that specifies all inputs and outputs in table form <b>[1 mark]</b></li> <li>– a fifth programming feature that specifies all inputs and outputs in table form <b>[1 mark]</b></li> </ul> </li> </ul>

Q	Sample response	The response:
14	<pre> BEGIN   IF checkLogin(studentID,     hashPassword(password)) THEN     Results = getResults(studentID)     FOR i = 0 to (size of Results)-1       Display decryptData(key, results[i])     ENDFOR   ELSE     Display "Access denied"   ENDIF END </pre>	<ul style="list-style-type: none"> <li>• symbolises, without logic errors, an algorithmic statement for       <ul style="list-style-type: none"> <li>- password encryption using 'hashPassword' <b>[1 mark]</b></li> <li>- checking student ID and hashed password using 'checkLogin' <b>[1 mark]</b></li> <li>- handling login errors <b>[1 mark]</b></li> <li>- retrieving data for specific student ID using 'getResults' <b>[1 mark]</b></li> <li>- outputting data for specific student ID using 'decryptData' <b>[1 mark]</b></li> </ul> </li> <li>• effectively uses pseudocode conventions <b>[1 mark]</b></li> </ul>

## Extended response — Question 15

Q	The response
15a)	<ul style="list-style-type: none"><li>• symbolises process for<ul style="list-style-type: none"><li>- login/user authentication <b>[1 mark]</b></li><li>- viewing/displaying items <b>[1 mark]</b></li><li>- selecting items <b>[1 mark]</b></li><li>- collecting payment details <b>[1 mark]</b></li><li>- adding item details <b>[1 mark]</b></li><li>- updating stock <b>[1 mark]</b></li></ul></li><li>• symbolises admin-only access for<ul style="list-style-type: none"><li>- adding item details <b>[1 mark]</b></li><li>- viewing payment details <b>[1 mark]</b></li><li>- viewing order history <b>[1 mark]</b></li></ul></li><li>• symbolises datastore for<ul style="list-style-type: none"><li>- users <b>[1 mark]</b></li><li>- items <b>[1 mark]</b></li><li>- orders <b>[1 mark]</b></li><li>- payment details <b>[1 mark]</b></li><li>- and effectively uses data flow diagram conventions <b>[1 mark]</b></li></ul></li><li>• symbolises incoming and outgoing data flow for<ul style="list-style-type: none"><li>- login/user authentication <b>[1 mark]</b></li><li>- viewing/displaying items <b>[1 mark]</b></li><li>- selecting items <b>[1 mark]</b></li><li>- collecting payment details <b>[1 mark]</b></li><li>- updating stock <b>[1 mark]</b></li></ul></li></ul>

Q	Sample response	The response:
15b)	<p>The wireframe depicts the item view page/screen. For this to occur, the 'view items' process would have occurred. Before reaching this screen, they would have had to log in as indicated by the 'Logged in' element in the top right of the screen.</p>	<ul style="list-style-type: none"> <li>• correctly determines <ul style="list-style-type: none"> <li>– a process that has occurred in the system <b>[1 mark]</b></li> <li>– a second process that has occurred in the system <b>[1 mark]</b></li> </ul> </li> <li>• justifies <ul style="list-style-type: none"> <li>– one determined process <b>[1 mark]</b></li> <li>– a second determined process <b>[1 mark]</b></li> </ul> </li> </ul>
15c)	<p>The item tiles request details from the datastore, while the 'Buy item' button would initiate the selection process and push selected items to the shopping cart datastore. Users can view the shopping cart and initiate checkout to confirm the order. As users are shopping, if another user finalises an order, either the item tiles or the shopping cart of other users should request updated item data to ensure the items are still available for purchase.</p>	<ul style="list-style-type: none"> <li>• determines processes and data flows will occur for <ul style="list-style-type: none"> <li>– adding items to shopping cart <b>[1 mark]</b></li> <li>– viewing shopping cart <b>[1 mark]</b></li> <li>– updating items <b>[1 mark]</b></li> </ul> </li> <li>• another valid process or data flow <b>[1 mark]</b> justifies all processes and data flows using relevant user interface elements <b>[1 mark]</b></li> </ul>



Q	Sample response	The response:
15d)	<p>Personal: Students have the ability to create an account and purchase items for fundraising. The social impact is that of intrinsic motivation and reward for using the application.</p> <p>Social: The application could ignite a healthy level of competition among students to see who can fundraise the most money. Depending on the items available for purchase, the social impact may include the start of a new trend, or an increase/decrease in the popularity of certain items, especially sensory or wearable items.</p> <p>Economic: The application allows users to purchase items to raise money. There is an obvious economic impact with this feature; the purpose of the app is to make an economic impact to raise money for various school activities or events.</p>	<ul style="list-style-type: none"> <li>• evaluates the personal impact of at least one feature <b>[1 mark]</b></li> <li>• evaluates the social impact of at least one feature <b>[1 mark]</b></li> <li>• evaluates the economic impact of at least one feature <b>[1 mark]</b></li> </ul>



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