# Digital Solutions marking guide and response

Sample external assessment 2020

## Short response (105 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 solution 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.

# Introduction

The Queensland Curriculum and Assessment Authority (QCAA) has developed mock external assessments for each General senior syllabus subject to support the introduction of external assessment in Queensland.

An external assessment marking guide (EAMG) has been created specifically for each mock external assessment.

The mock external assessments and their marking guides were:

- developed in close consultation with subject matter experts drawn from schools, subject associations and universities

- aligned to the external assessment conditions and specifications in General senior syllabuses

- developed under secure conditions.

# Purpose

This document consists of an EAMG and an annotated response.

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.

# External assessment marking guide (EAMG)

## Multiple choice

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

## Short response

| Question | Sample response | The response for an element | Mark | The response for a different element | Mark |
|---|---|---|---|---|---|
| 11 | Texture refers to the physical and visual qualities of a surface, e.g. the illusion of a real texture on a two-dimensional surface.<br><br>Tone refers to the lightness or darkness of an object. It is used to draw attention or accentuate something. | • identifies an element<br>• provides 2 characteristics | 3 | • identifies an element<br>• provides 2 characteristics | 3 |
| | | • identifies an element<br>• provides 1 characteristic | 2 | • identifies an element<br>• provides 1 characteristic | 2 |
| | | • identifies an element | 1 | • identifies an element | 1 |
| | | • does not satisfy any of the descriptors. | 0 | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | The response for error line 10 | Mark | The response for error line 12 | Mark | The response for error line 18 | Mark |
|---|---|---|---|---|---|---|---|
| 12a | There is an error in line 10 since player 1 is not able to enter the numbers 1 or 10. So to fix this $\geq$ and $\leq$ signs should be used.<br>`UNTIL Answer ≥ 1 AND Answer ≤ 10`<br><br>There is another error on line 12 since player 2 is given four attempts at guessing the answer. To fix this the loop DO WHILE statement must set the condition of loop <3.<br>`DO WHILE NOT correct AND loop < 3`<br><br>Another error is on line 18 since the feedback given to player 2 based on their guess is incorrect. To fix this the > symbol should be used instead of the < symbol.<br>`IF Guess > Answer THEN` | • identifies error | 1 | • identifies error | 1 | • identifies error | 1 |
| | | • explains error | 1 | • explains error | 1 | • explains error | 1 |
| | | • provides correct refinement of error | 1 | • provides correct refinement of error | 1 | • provides correct refinement of error | 1 |
| | | • does not satisfy any of the descriptors. | 0 | • does not satisfy any of the descriptors. | 0 | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | | | | | The response | Mark | The response for Output | Mark |
|---|---|---|---|---|---|---|---|---|---|
| 12b | **Player 1 input** | **Loop** | **Guess** | **Value of 'Correct' at Line 21** | **Output** | • provides 0, 1, 2, 3, in order, in Loop | 1 | • provides the correct value based on guess in row 1 | 1 |
| | 5 | 0<br>1<br>2<br>3 | 7<br>3<br>6 | False<br>False<br>False<br>False | Too High<br>Too Low<br>Too High<br>The number was: 5 | • provides 3 guesses (≠ 5) in Guess | 1 | • provides the correct value based on guess in row 2 | 1 |
| | | | | | | • provides the value FALSE in the first 3 rows in Value of 'correct' at Line 21 | 1 | • provides the correct value based on guess in row 3 | 1 |
| | | | | | | • provides the value TRUE in the last row in Value of 'correct' at Line 21 | 1 | • provides 'The answer was: 5' in row 4 | 1 |
| | | | | | | • does not satisfy any of the descriptors. | 0 | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | The response for symbolisation | Mark | The response for logic and structure | Mark |
|---|---|---|---|---|---|
| 13a |   A larger diagram is provided in the sample response section.  Accept either diagram as correct. | • provides correct symbol for data store | 1 | • for security specification a)<br>  – provides coherent structural logic that fully supports specification<br>OR<br>  – provides structural logic that partially supports specification | 2<br><br><br>OR<br><br>1 |
| | | • provides correct symbol for data flow | 1 | | |
| | | • provides correct arrows with only one-way flow | 1 | • for security specification b)<br>  – provides coherent structural logic that fully supports specification<br>OR<br>• provides structural logic that partially supports specification | 2<br><br><br>OR<br><br>1 |
| | | • provides labels that explain relationships | 1 | | |
| | | • does not satisfy any of the descriptors. | 0 | • for security specification c)<br>  – provides coherent structural logic that fully supports specification<br>OR<br>  – provides structural logic that partially supports specification | 2<br><br><br>OR<br><br>1 |
| | | | | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | The response for one security feature | Mark | The response for a different security feature | Mark |
|---|---|---|---|---|---|
| 13b | Physical security is the protection from physical actions, such as burglary, theft and fire and floods. The medical practice should ensure that places where the computer hardware system is installed should be secured against theft, destruction (fire/water), and power and hardware failure (off-site database backup storage). If this is not implemented then the practice runs the risk of data loss due to any of the events listed.<br><br>Encryption ensures access using a key only so any data files require secure decryption prior to use. It will be important for doctor and patient confidentiality that patients and employees will not be able to access any medical records or doctors' details, so these records should be encrypted to protect data in case of a data breach. Patients and staff will not be able to access/decrypt this information. If not implemented this may result in compromised data security. | • states the security feature | 1 | • states the security feature | 1 |
|  |  | • explains the security feature | 1 | • explains the security feature | 1 |
|  |  | • provides full justification<br>OR<br>• provides simple justification | 2<br>OR<br>1 | • provides full justification<br>OR<br>• provides simple justification | 2<br>OR<br>1 |
|  |  | • does not satisfy any of the descriptors. | 0 | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | The response | Marks |
|---|---|---|---|
| 14 | ```
BEGIN

  Look at first letter

    STORE letter as 'letter'

  Look at next letter

    STORE letter as 'letter1'

  REPEAT

    IF 'letter' = 'letter1'

      THEN DISPLAY 'Word contains
double letters'

      ELSE Look at next letter

      STORE letter as 'letter2'

    ENDIF

    IF 'letter2' = 'letter1'

      THEN DISPLAY 'Word contains
double letters'

      ELSE 'letter2' becomes 'letter1'

    ENDIF

  UNTIL

    IF no more letters

      THEN DISPLAY 'Word does not
contain double letters'

    ENDIF

END
``` | • provides effective code that solves the problem without errors<br><br>OR<br>• provides code that could solve the problem except for 1 minor error<br><br>OR<br>• provides code that could solve the problem except for 2 minor errors | 3<br><br>OR<br>2<br><br>OR<br>1 |
| | | • demonstrates effective use of assignment, condition and iteration<br><br>OR<br>• demonstrates effective use of 2 of assignment, condition or iteration<br><br>OR<br>• demonstrates effective use of 1 of assignment, condition or iteration | 3<br><br>OR<br>2<br><br>OR<br>1 |
| | | • demonstrates efficient programming practices<br>OR<br>• demonstrates efficient programming practices, allowing for at most 2 inefficiencies<br><br>OR<br>• demonstrates programming practices, allowing for very limited efficiency | 3<br>OR<br><br>2<br><br>OR<br>1 |
| | | • demonstrates consistent use of all of the algorithm symbolisation features<br><br>OR<br><br>• demonstrates occasional use of algorithm symbolisation features | 2<br><br>OR<br>1 |

| Question | Sample response | The response | Marks |
|---|---|---|---|
| | | • demonstrates comprehensive debugging/testing<br>OR<br>• demonstrates simple debugging/testing | 2<br>OR<br>1 |
| | | • does not satisfy any of the descriptors. | 0 |

| Question | Sample response | The response |
|---|---|---|
| 15a | There are three errors in the code.<br><br>The first occurs on line 1 where dividing by 100 only determines percentage and not the overall grade (weighted).<br><br>The second error is a missing line. In the code as it is there is no correlation that the item numbers are the same in each calculation.<br><br>The third error occurs on line 3. Here the code groups by Item and not ID. | • identifies<br>  – line 1 error [1 mark]<br>  – missing line error [1 mark]<br>  – line 3 error [1 mark]<br><br>• describes the<br>  – line 1 error [1 mark]<br>  – missing line error [1 mark]<br>  – line 3 error [1 mark] |
| 15b | ```
FROM Results
JOIN Assess
ON Results.Item = Assess.Item
```<br><br>Justification of refinement 1:<br>Multiplying each mark by the relevant weight will determine each weighted mark contribution to the overall percentage. Adding each of these weighted marks then gives a mark out of 100.<br><br>Justification of refinement 2:<br>Inclusion of this WHERE statement ensures that the item ID in the Results table correlates to the item ID in the Assess table<br><br>Justification of refinement 3:<br>The query specifications ask that the query output is grouped by student (ID), this change fulfils this specification | • provides use of SQL syntax (based on ANSI-style SQL, i.e. SQL-92) [1 mark]<br>• provides correct refinement of<br>  – first error (SELECT ID statement) [1 mark]<br>  – second error (WHERE statement) [1 mark]<br>  – third error (GROUP BY statement) [1 mark]<br>• provides correct and logical justification of<br>  – first refinement [1 mark]<br>  – second refinement [1 mark]<br>  – third refinement [1 mark] |

| Question | Sample response | The response |
|---|---|---|
| 15c | ```SELECT ID, SUM(Mark*Weight/100)
FROM Results
JOIN Assess
  ON Results.Item = Assess.Item
GROUP BY ID
HAVING SUM(Mark*Weight/100) =
   (SELECT Rank
    FROM Ranking
    WHERE Rank >= 90);``` | • provides use of SQL syntax (based on ANSI-style SQL, i.e. SQL-92) [1 mark]<br>• provides correction of errors from 15(b) [1 mark]<br>• provides `Select Rank from Ranking` statement [1 mark]<br>• provides `where Description = 'A'` condition [1 mark] |

## Extended response

| Question | The response | Marks |
|---|---|---|
| 16a | • provides effective code that solves the problem without errors<br>OR<br>• provides code that could solve the problem except for 1 minor error<br>OR<br>• provides code that could solve the problem except for 2 minor errors | 3<br>OR<br>2<br>OR<br>1 |
| | • demonstrates consistent use of 4 algorithm symbolisation features<br>OR<br>• demonstrates consistent use of 3 algorithm symbolisation features<br>OR<br>• demonstrates consistent use of 2 algorithm symbolisation features<br>OR<br>• demonstrates consistent use of 1 algorithm symbolisation feature | 4<br>OR<br>3<br>OR<br>2<br>OR<br>1 |
| | • provides comprehensive debugging/testing, recording output at each opportunity<br>OR<br>• provides debugging/testing, recording output at each opportunity, allowing for at most 2 errors<br>OR<br>• provides debugging/testing, allowing for errors | 3<br><br>OR<br>2<br><br>OR<br>1 |
| | • demonstrates efficient programming practices<br>OR<br>• demonstrates efficient programming practices, allowing for at most 2 inefficiencies<br>OR<br>• demonstrates programming practices, allowing for very limited efficiency | 3<br>OR<br><br>2<br>OR<br>1 |

| Question | The response | Marks |
|---|---|---|
| | • provides evidence of 5 prescribed criteria<br>OR<br>• provides evidence of 4 prescribed criteria<br>OR<br>• provides evidence of 3 prescribed criteria<br>OR<br>• provides evidence of 2 prescribed criteria<br>OR<br>• provides evidence of 1 of the prescribed criterion | 5<br>OR<br>4<br>OR<br>3<br>OR<br>2<br>OR<br>1 |
| | • does not satisfy any of the descriptors. | 0 |

| Question | The response | Marks |
|---|---|---|
| 16b | • provides 1 advantage, 1 disadvantage and 1 other (either an advantage or a disadvantage) of encryption method<br>OR<br>• provides 1 advantage and 1 disadvantage of encryption method<br>OR<br>• provides 1 advantage or disadvantage of encryption method | 3<br>OR<br>2<br>OR<br>1 |
| | • selects block key as the better method | 1 |
| | • provides justified explanation of block key as the better method<br>OR<br>• provides explanation of block key as the better method | 2<br>OR<br>1 |
| | • does not satisfy any of the descriptors. | 0 |