GCE AS MARKING SCHEME

SUMMER 2024

AS (NEW)
COMPUTER SCIENCE - UNIT 2
2500U20-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCE AS COMPUTER SCIENCE - UNIT 2

SUMMER 2024 MARK SCHEME

Guidance for examiners:

Positive marking

It should be remembered that learners are writing under examination conditions and credit should be given for what the learner writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

For band marked questions mark schemes are in two parts.

Part 1 is advice on the indicative content that suggests the range of computer science concepts, theory, issues and arguments which may be included in the learner's answers. These can be used to assess the quality of the learner's response.

Part 2 is an assessment grid advising bands and associated marks that should be given to responses which demonstrate the qualities needed in AO1, AO2 and AO3. Where a response is not credit worthy or not attempted it is indicated on the grid as mark band zero.

Banded mark schemes

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks.

Examiners should first read and annotate a learner’s answer to pick out the evidence that is being assessed in that question. Once the annotation is complete, the mark scheme can be applied. This is done as a two-stage process.

Stage 1 – Deciding on the band

When deciding on a band, the answer should be viewed holistically. Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance, if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content. Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

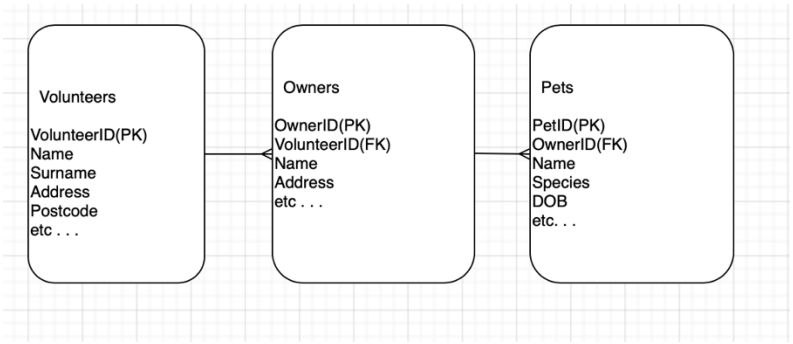
Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is also provided for banded mark schemes. Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Section A

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th></tr>
<tr><td>1 (a)</td><td>Award 1 mark for each:
• Volunteer table has PK and exemplar fields
• Owners table has PK and Volunteer FK
• Pets table has PK and owner FK
• Correct relationship link from Volunteers to Owners (1:M)
• Correct relationship link from Owners to Pets (1:M)
(must indicate many side for each mark above)
 
</td><td>1
1
1
1
1</td><td></td><td>2.1b</td><td></td><td>5</td></tr>
<tr><td>1 (b)</td><td>Any table from part 1 (a) above:
• Fieldnames (2 suitable fields in addition to KF)
• Data types (accept autonumber as type)
• Key Field (any indicator of KF if clear (*/underline))
• Field lengths (reasonable length)
• Requirements for Validation (one mark for each type)
o Range, Format, Presence, Length . . .
Indicative content
Non-exhaustive example of Volunteer table:
<table>
<tr><th>Fieldname</th><th>Keyfield</th><th>Data Type</th><th>Field Length</th><th>Validation</th></tr>
<tr><td>VolunteerID</td><td>Yes-indexed</td><td>Integer</td><td>10</td><td>Presence</td></tr>
<tr><td>Title</td><td>-</td><td>String</td><td>10</td><td>Lookup Mr, Mrs, Miss …</td></tr>
<tr><td>FirstName</td><td>-</td><td>String</td><td>25</td><td></td></tr>
<tr><td>…</td><td>…</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>Postcode</td><td>-</td><td>String</td><td>8</td><td>Format LL00 0LL</td></tr>
<tr><td>Email</td><td>-</td><td>String</td><td>40</td><td>Format</td></tr>
</table>
Etc.</td><td>1+1
1+1
1
1+1
3</td><td></td><td>2.1b</td><td></td><td>10</td></tr>
</table>

Q	Answer	Mark	AO1	AO2	AO3	Total
2	**Indicative content:** • Discussion of interface (CLI/GUI) • Data Structures (arrays/files) • File handling (serial/random) • Validation (range, format, presence, length) • Local or global variables used • Ability to handle data types (string/integer/Boolean) **Note:** this **must** be applied (AO2) to how the scenario can be solved using the language of the candidates' choice. (Limited by spec to VB Python and Java.)	6		2.1b		6

Band	AO2.1b Max 6 marks
3	**5 - 6 marks** The candidate has: • written an extended response that has a sustained line of reasoning which is coherent, relevant, and logically structured • shown clear understanding of the requirements of the question and a clear knowledge of the indicative content. Clear knowledge is defined as a response that provides five to six relevant detailed points on the selection and justification of the proposed method of solution for the main requirements listed in the scenario • addressed the question appropriately with minimal repetition and no irrelevant material • presented a balanced discussion and justified their answer with examples • used appropriate technical terminology referring to the indicative content confidently and accurately.
2	**3 - 4 marks** The candidate has: • written a response that has an adequate line of reasoning with elements of coherence, relevance, and logical structure • shown adequate understanding of the requirements of the question and a satisfactory knowledge of the topic of changeover as specified in the indicative content. Satisfactory knowledge is defined as a response that provides three to four points on the selection and justification of the proposed method of solution for the main requirements listed in the scenario • presented a discussion with limited examples • used appropriate technical terminology referring to the indicative content.
1	**1 – 2 marks** The candidate has: • written a response that that lacks sufficient reasoning and structure • produced a discussion which is not well developed • attempted to address the question but has demonstrated superficial knowledge of the topics specified in the indicative content. Superficial knowledge is defined as a response that provides one to two points on the selection and justification of the proposed method of solution for the main requirements listed in the scenario • used limited technical terminology referring to the indicative content.
0	**0 marks** Response not credit worthy or not attempted.

Q	Answer	Mark	AO1	AO2	AO3	Total
3	1 mark for each of: • Describe 1st method of changeover PVPR could use • Describe 2nd method of changeover PVPR could use • Describe 1 advantage of method 1 to PVPR • Describe 1 advantage of method 2 to PVPR • Describe 1 disadvantage of method 1 to PVPR • Describe 1 disadvantage of method 2 to PVPR • Justify the method advised to PVPR. Note all marks assigned to AO2.1b must be applied to helping PVPR with a clear reason assigned to be awarded the mark **Indicative content:** Direct "big bang" approach can be adopted - sudden change to new system • Could be used where a failure would not be catastrophic • Can be cheaper to implement • New system is available immediately if required • Can be the least disruptive if implemented well • New system may not work as well until staff are fully used to using it • If new system fails they have no system which could be dangerous Parallel running - both systems running together for a time • Safest option as if new system fails they still have existing system • New system is available immediately if required • The outputs from the old and new systems can be compared to check that the new system is running correctly • Time costs as require more staff or overtime for current staff to operate both systems • Could cause confusion for staff having two systems Phased changeover - part-by-part (by functionality) • Allows users to gradually get used to the new system • Staff training can be done in stages • All staff can focus on one area to resolve any problems • Problems can be fixed quicker as more experts to resolve one functionality problem at a time • Difficulties identified in one area can be resolved and managed in next area • Might cause problems in the changeover period when they need to communicate with each other and have different systems			2.1b		7

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th></tr>
<tr><td></td><td>
• Slower to get new system up and running compared to some other methods
• If a part of the new system fails, there is no back-up system, so data can be lost

Pilot changeover - part-by-part (by part of the organisational units within PVPR)
• All features of the new system can be fully trialled
• If something goes wrong with the new system, only a small part of the organisational operations of PVPR is affected
• The staff who were part of the pilot scheme can help train other staff.
• All staff can focus on one area to resolve any problems
• Difficulties identified in one area can be resolved and managed in next area
• For the office / department doing the pilot, there is no back-up system if things go wrong
• Might cause problems in the changeover period when they need to communicate with each other and have different systems
• Slower to get new system up and running compared to some other methods
</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Award 1 mark for each correct number.</td><td></td><td></td><td></td><td></td><td>12</td></tr>
<tr><td>(a)</td><td>
<table>
<tr><td>1.14</td><td>2.28</td><td>3.42</td><td>4.56</td></tr>
<tr><td>1.98</td><td>3.96</td><td>5.94</td><td>7.92</td></tr>
</table>
</td><td>8</td><td></td><td>2.1a</td><td></td><td></td></tr>
<tr><td>(b)(i)</td><td>2.28</td><td>4</td><td></td><td></td><td>3.1c</td><td></td></tr>
<tr><td>(ii)</td><td>4.56</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>(iii)</td><td>1.98</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>(iv)</td><td>5.94</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Section B

Q	Answer	Mark	AO1	AO2	AO3	Total
1	**Award 1 mark for each corrected line of code to allow:** **Indicative content:** • Definition of storage type • Defining a data structure • End if / Indentation / } • Copying data into structure • End subroutine/method • Message for file saved • Outputting a count message • Outputting number counted	8			3.1b	8
2	**Indicative content:** • Input • Length check (Left is sufficient) • Creates a data file called pets.txt • Stores on disk in a text file called pets.txt • Descriptive/useful feedback that file has been saved • Retrieves data from disk • Retrieves specified pets details from disk (Candidates may use Random (direct), serial, or sequential file access) • HCI fit for purpose (Textual or GUI)	8			3.1b	8

Band	AO3.1b Max 8 marks
3	**7-8 marks** The candidate has: • Created a new program including all or the majority of the functionality as required in the question and stated in the indicative content. The majority of the functionality is defined as a response that provides seven to eight items of the functionality signalled in the indicative content • Used and fully exploited the programming facilities of the language • Demonstrated a sound understanding of the appropriate tools and techniques available to them • Written code that is well structured • Provided evidence of a completed user interface which aids user interaction and is intuitive
2	**4-6 marks** The candidate has: • Created a new program including most of the functionality as required in the question and stated in the indicative content. Most of the functionality is defined as a response that provides four to six items of the functionality signalled in the indicative content • Made use of an appropriate range of the programming facilities of the language • Demonstrated an understanding of the tools and techniques available to them • Provided evidence of a completed user interface which aids user interaction
1	**1-3 marks** The candidate has: • Created a new program with a limited range of the functionality as stated in the indicative content or improved the prototype provided by adding a limited range of the new functionality as stated in the indicative content. A limited range of functionality is defined as a response that provides one to three items of the functionality signalled in the indicative content • Used a limited range of the programming facilities of the language • Demonstrated a limited understanding of the tools and techniques available to them • Provided evidence of a user interface
0	**0 marks** Response not credit worthy or not attempted.

Q	Answer	Mark	AO1	AO2	AO3	Total
3	Clear annotation of steps within any of the following routines: • Setting up a data structure • Creating a new blank file • Copying data from screen textboxes to data structure • Writing of data to file • Retrieving data from file • Splitting into array/textboxes/variables • Looking/counting of items required • Validation (left or trim)	4			3.1a	4

Band	AO3.1a Max 4 marks
3	**4 marks** The candidate has: • Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of **all** programming routines listed in the indicative content • Documented all code beyond self-documenting identifiers / explained variables • Used appropriate technical terminology referring to the indicative content confidently and accurately.
2	**2-3 marks** **Three** marks can be awarded if the candidate has: • Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of **most** of the programming routines listed in the indicative content. Most of the routines are defined as four to six of the subroutines and procedure as listed in the indicative content. • Used appropriate technical terminology referring to the indicative content.
1	**1 mark** The candidate has: • Produced listings that are appropriately laid out and include sufficient annotation to demonstrate an understanding of **one** of the programming routines listed in the indicative content • Used limited technical terminology referring to the indicative content. OR • Documented only code that used self-documenting identifiers • Used limited technical terminology referring to the indicative content.
0	**0 marks** Response not credit worthy or not attempted.