

# 2023 VCE Applied Computing: Software Development external assessment report

## General comments

The 2023 VCE Applied Computing: Software Development examination comprised three sections: Section A contained 20 multiple-choice questions (worth a total of 20 marks); Section B had six short-answer questions (worth a total of 20 marks); and Section C was a case study with 17 questions (worth a total of 60 marks).

Section A was answered quite well by most students. In Section B and Section C some students found it difficult to demonstrate their theoretical knowledge or use subject-specific terminology correctly. The key weakness in many responses in these sections was a lack of detail and depth of understanding.

Students are encouraged to consider the question command term (for example, 'describe', 'explain' or 'outline'), the number of marks and the number of lines provided as a guide to the detail and depth of the required response.

In Section C, some students found it difficult to apply their knowledge to the case study.

During the examination, students should have:

- endeavoured to use correct technical terminology
- discussed all options when asked to justify a choice or compare one option with another
- responded to key command terms, such as 'state', 'explain' and 'describe'
- re-read each question and their response to ensure that the question had been answered
- removed the case study insert from the question-and-answer book, and referred to it when completing Section C
- read the case study and questions carefully, and underlined or highlighted key words
- demonstrated their knowledge of the subject and applied that knowledge to the case study.

General responses often resulted in low or no marks, but knowledgeable, clear and appropriate responses received high marks.

## Specific information

Note: Student responses reproduced in this report have not been corrected for grammar, spelling or factual information.

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

The statistics in this report may be subject to rounding resulting in a total more or less than 100 per cent.

## Section A – Multiple-choice questions

The table below indicates the percentage of students who chose each option. Grey shading indicates the correct response.

Question	Correct Answer	% Correct	%A	%B	%C	%D	Comments
1	A	73	<b>73</b>	4	12	11	
2	D	43	10	28	18	<b>43</b>	When working through the trace table it is shown that the item at position 4 of the list has a value of 17 and the item at position 7 has a value of 23. Therefore, the only correct response is D. Many incorrectly selected B (which contains numbers 0–9 in order); however, this was incorrect as neither 17 nor 23 are in this list. A is incorrect as it is too short. C is incorrect as it is an unordered list and would be unsuitable for a binary search.
3	B	56	19	<b>56</b>	10	15	'Selection' refers to a conditional statement which is represented as If/Then/Else.
4	C	96	2	1	<b>96</b>	1	
5	D	62	24	13	1	<b>62</b>	
6	B	78	15	<b>78</b>	3	4	
7	A	47	<b>47</b>	2	24	27	The question refers to customer satisfaction logs of the existing system.
8	B	91	2	<b>91</b>	5	2	
9	C	91	7	1	<b>91</b>	2	
10	B	66	21	<b>66</b>	2	11	
11	C	70	4	22	<b>70</b>	4	
12	D	47	35	17	1	<b>47</b>	A new system that will improve order tracking through notifications will result in a reduction of customer complaints regarding lost or delayed orders. Many selected A (Improve service to customers); however, this is a goal, not a measurable objective.
13	C	65	22	9	<b>65</b>	4	

Question	Correct Answer	% Correct	%A	%B	%C	%D	Comments
14	C	76	9	5	<b>76</b>	9	
15	A	70	<b>70</b>	9	2	18	
16	B	66	15	<b>66</b>	7	12	
17	D	61	6	25	8	<b>61</b>	
18	C	79	18	2	<b>79</b>	1	
19	B	76	7	<b>76</b>	15	2	
20	A	<b>53</b>	53	1	1	45	The Health Records Act is Victorian legislation. Many incorrectly selected D (All states of Australia).

## Section B – Short-answer questions

### Question 1

Mark	0	1	2	Average
%	40	21	39	1.0

Students were awarded a mark for identifying one of the following relevant characteristics and for providing a relevant description of the characteristic:

- clarity / use of clear and concise language
- completeness
- consistency of requirements
- consistency between specifications
- clear prioritisation of requirements
- detail
- relevance

Students were also awarded marks for identifying one of the following components of an SRS with a relevant description:

- functional/non-functional requirements
- scope
- constraints
- system and technical requirements
- assumptions

Students missed out on marks if they did not provide a relevant description of their chosen characteristic or repeated the characteristics instead of providing a description.

The following is an example of a high-scoring response.

*Characteristic: Functional and non-functional requirements*

*Description: In an SRS, the requirements of the solution should be clearly set out – where functional requirements relate to what the solution must actually do, and non-functional requirements relate to the characteristics of the solution.*

## Question 2

Mark	0	1	2	Average
%	40	16	44	1.0

Students were awarded marks for explaining that numbers that are not needed for calculations (for example a post code) should be stored as strings. Students were also awarded marks for explaining that numerical data types don't store leading zeros (for example phone numbers).

Many students missed out on higher marks because they did not include an example. Some students incorrectly stated that numbers should be stored as a string if they needed to be added and displayed as part of a message within an application.

The following is an example of a high-scoring response.

*In the case of trailing zeroes in an input, if the number were to be stored as an integer, the program would automatically remove the trailing zeroes (e.g. '0123' would become '123'). An example is postcodes, where it may begin with a zero, such as 0230, and will most likely not have arithmetic performed on it, so it should be stored as a string.*

## Question 3a.

Mark	0	1	Average
%	33	67	0.7

Students were awarded a mark for correctly identifying that the design tool used was a mock-up.

## Question 3b.

Mark	0	1	2	3	Average
%	38	24	28	10	1.1

Students were awarded marks for explaining that:

- Object descriptions outline and describe properties and methods of a class/object.
- Pseudocode is used to represent the logic of an algorithm.
- Mock-ups are used to design user interfaces and do not consider the logical design or structure of an application.

Some students provided descriptions of an object description and pseudocode but didn't provide a comparison with a mock-up, and as a result missed out on marks. Many students were unable to explain with relevant and subject-specific terminology what either an object description or pseudocode was.

The following is an example of a high-scoring response.

*Although mockups represent the user interface and its appearance, object descriptions describe the methods and events relating to the objects within the solution, usually in the form of a table with name, type and descriptions. Moreover, pseudocode is English-like statements that are used to represent algorithms to be used within the solution, as we all any parameters and outputs.*

## Question 4a.

Mark	0	1	2	Average
%	26	18	57	1.3

Students were awarded marks for identifying that it would be most suitable for the client's employees to participate in the software's usability testing because they will be using the software for their work once it is complete, and would be able to provide unbiased or objective feedback.

The following is an example of a high-scoring response.

*Employees from the client's company. Because they are the group the solution most caters to and testing with them will indicate where people of this skill set have difficulties with the solution.*

## Question 4b.

Mark	0	1	2	3	Average
%	72	5	14	9	0.6

Students were awarded marks for correctly identifying Method 1 (Recording a video of the tests) and for:

- justifying why Method 1 was appropriate (for example being able to watch the video many times and having a record of the steps the user had taken as part of the testing)
- justifying why Method 2 was inappropriate (for example, asking clarifying questions would introduce bias).

The following is an example of a high-scoring response.

*Method 1. This provides an objective record of the tests that can be viewed after the fact, by different people to determine improvements that need to be made without bias. Method 2 does not allow this as the results are collected only by Ananta and could be influenced by her view of the solution rather than objectively documenting the user's experience.*

## Question 5a.

Mark	0	1	Average
%	91	9	0.1

Students were awarded marks for describing that a risk-management strategy should be applied as it ensures the minimisation of vulnerabilities within software development practices. The question was not answered well, as most students stated that a risk-management strategy manages risk.

The following is an example of a high-scoring response.

*A risk management strategy is the application of security practices based on analysis of vulnerabilities, and should be applied to prevent threats to the system or data in advance.*

## Question 5b.

Mark	0	1	2	3	Average
%	90	4	3	2	0.2

Students were awarded marks for providing a risk-management strategy. As per the question, students were expected to break the strategy down to a technique, responsibility and timing. Techniques from the following list were awarded a mark:

- a software audit
- security, vulnerability or penetration testing
- security and compliance checks
- security coding practice training for developers.

Many students incorrectly listed security controls such as backing up and version control, and were not awarded marks.

When addressing the responsibility component of the strategy many students incorrectly described the technique instead of outlining the professional whose responsibility it was to implement the technique.

A mark was awarded for proposing a sensible time at which the technique would be implemented. In most cases this related to a time in the development of the software.

## Question 5c.

Mark	0	1	Average
%	93	7	0.1

In order to be awarded marks for this question students needed to suggest one benefit of using the technique proposed in part b. Marks were awarded for suggestions such as:

- Software audits ensure software meets legal and technical security requirements.
- Security/Penetration testing ensures that vulnerabilities are identified and not present when the software is released.
- Compliance checks ensure third-party software won't introduce vulnerabilities.
- Training in secure coding practices minimises risk as it places security at the forefront of the minds of developers.

## Question 6

Mark	0	1	2	Average
%	22	38	40	1.2

Students were awarded marks for stating that version control keeps track of changes made to a file so that it can be rolled back to a previous version, if necessary, as compared to backing up a file, which keeps a copy of a file so that it can be restored if lost or corrupted.

Many students were unable to provide a clear definition of each and therefore were unable to make a comparison.

The following is an example of a high-scoring response.

*Version control involves the monitoring of builds and when they were last stored into separate folders from one another, and even separate locations through archival. Backing up files meanwhile involves the*

*storing of up-to-date data in multiple locations (physical on-site, physical off-site, cloud, for example) to reduce the risk of files being lost or corrupted and unrecoverable.*

## Section C – Case study

### Question 1a.

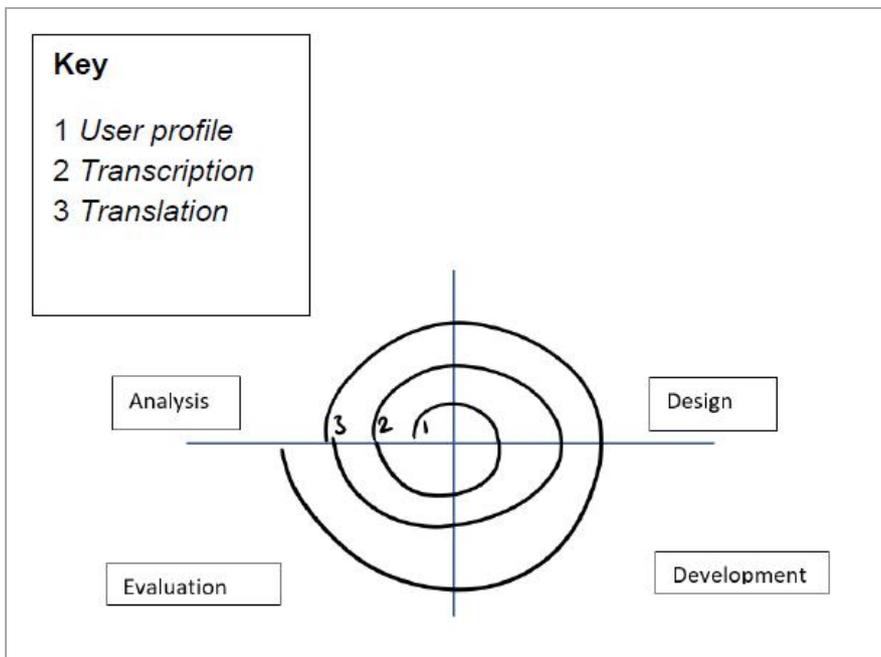
Mark	0	1	Average
%	54	46	0.5

Students were awarded a mark for identifying the spiral model.

### Question 1b.

Mark	0	1	2	3	Average
%	28	55	11	6	1.0

Although most students were able to complete the key by writing the three phases of the project, few were able to adequately draw a spiral correctly, starting with analysis and progressing to design, development and evaluation. Even fewer labelled the diagram with numbers referencing the key.



## Question 2

Mark	0	1	2	3	Average
%	57	15	14	15	0.9

In order to obtain marks for this question, the suggested criteria needed to be measurable (or be posed as a question) and relate to one of the secure development practices outlined on page 2 of the case study (under the heading 'Establishing expectations for secure development').

Many students who were awarded marks for this question wrote about the following:

- How successful was two-factor authentication in preventing unauthorised access to the office space / devices working on the project?
- High rate of success in ensuring that users were only permitted to access the areas they were authorised to.
- Success rate in identifying security vulnerabilities from code auditing.

The following are examples of high-scoring responses.

### *Example 1*

*Criterion 1: How well are staff able to respond to threats after professional learning?*

*Criterion 2: How accurate are the access logs in detecting failed access attempts?*

*Criterion 3: How reliable is the two-factor authentication in preventing intruders?*

### *Example 2*

*Criterion 1: Staff are able to demonstrate sufficient knowledge regarding secure development practices.*

*Criterion 2: Code is able to meet industry standards and legal requirements around security.*

*Criterion 3: User access logs are accurate and reliable.*

## Question 3

Mark	0	1	2	Average
%	25	19	56	1.3

Students were awarded marks for describing a range of characteristics that a naming convention should incorporate. These included:

- meaningful names
- descriptive
- data type or data structure in element name
- short
- lowercase letters with underscores between words
- lowercase prefixes indicating data or object type, with subsequent words capitalised.

Most students were able to provide a relevant example.

The following is an example of a high-scoring response.

*A characteristic of their naming convention could be the use of a 3 letter prefix before the name of variables to indicate the type of variable. For example, "strName" would indicate that the variable is of the string data type due to its prefix, making it immediately clear to all developers how it should be handled.*

## Question 4a.

Mark	0	1	2	Average
%	53	14	33	0.8

Students were awarded marks for describing the following techniques:

- annotating the project plan
- keeping a project log
- adjustments to tasks and timeframes.

The following is an example of a high-scoring response.

*Ness could keep a log book of all changes made to the project and project plan, as well as why they occurred and the time and date they were made.*

## Question 4b.

Mark	0	1	2	Average
%	50	15	35	0.9

Students were awarded marks for describing the 1-day delay to the milestone, and that Tasks 3 and 4 would run simultaneously. Many students incorrectly stated that there would be a delay of 6 days (not realising that Tasks 3 and 4 could run simultaneously).

## Question 5

Mark	0	1	2	3	Average
%	18	33	10	39	1.7

- A user
- B login\_details
- C login\_status

While most students were able to identify that the external entity represented by A was the user, many struggled to identify the data flow represented by B and C. As these details were clearly outlined in Figure 2 of the case study, this is a reminder of the importance of removing the case study from the exam and referring to it when completing each question from Section C.

## Question 6

Mark	0	1	Average
%	46	54	0.5

Students were awarded a mark for identifying a drop-down list, combo box and radio buttons (or equivalent). Students were not awarded a mark for textbox, as it would lead to inconsistent data entry (i.e. Victoria, Vic, VIC etc).

## Question 7a.

Mark	0	1	2	Average
%	28	43	28	1.0

Students were awarded one mark per distinct consequence arising from the issue (one from reducing the size of the team, the other from purchasing lower-quality test data).

- Reduce the size of the team:
  - some staff will no longer have a job at the company
  - low morale
  - increased workload
  - loss of quality in end product
  - loss of expertise
  - project will run over time
- Purchase lower-quality test data:
  - compromising functionality or quality of the module due to incomplete testing

Most students were able to identify a consequence resulting from reducing the size of the team. However, few were able to identify that purchasing lower-quality test data would lead to a product with compromised functionality.

The following are examples of high-scoring responses.

### *Example 1*

*- Lower-quality test data would result in less comprehensive testing and possibly compromise the accuracy of the module.*

*- Eliminating two members' roles could result in the project taking longer to complete with a lesser quality product.*

### *Example 2*

*Lower-quality test data could cause some code errors to go unnoticed, and as a consequence Ness may be giving users an incomplete or vulnerable product. Eliminating jobs will make fired staff feel betrayed as they did nothing wrong themselves.*

### *Example 3*

*By eliminating two members, Ness could drastically increase the time spent creating the software solution. By purchasing low quality test data, vulnerabilities may be undetected in the authentication, allowing malicious access once the solution is deployed.*

## Question 7b.

Mark	0	1	2	3	Average
%	91	1	2	6	0.2

Students were awarded marks for suggesting a method of resolution, as well as an advantage and a disadvantage for this approach, such as:

- speaking with management regarding issues for advice and guidance
- speaking with the finance department to understand where other savings could be made (despite the ultimatum)
- discussing with the team in order to find other approaches to completing the project without compromising personnel
- negotiating changes to features to reduce workload
- negotiating increased budget/time.

Many students incorrectly suggested one of the outcomes from the original dilemma (reduce the size of the team or purchase low quality testing data) and were not awarded marks. Many students also incorrectly suggested that the team write their own testing data, which was not awarded marks as such a suggestion is unrealistic given the scenario.

The following is an example of a high-scoring response.

*Method: Cut the budget of another part of the organisation and purchase the high-quality data*

*Advantage: High-quality data can now be purchased and inauthentic results are no longer a concern*

*Disadvantage: Budget cuts may cause development to be delayed/prolonged and deadlines may be harder to reach.*

## Question 8a.

Mark	0	1	Average
%	55	45	0.5

Students were awarded marks for identifying that the risk posed to the platform was an SQL injection. Some students incorrectly identified the risk as an issue relating to authentication and others incorrectly identified it as cross-site scripting.

## Question 8b.

Mark	0	1	2	Average
%	60	17	23	0.6

Students were awarded marks for providing two reasons from the following list:

- to gain access to personal data stored by the database
- to manipulate or delete data stored by the database
- to gain elevated access rights to the platform/database
- to cause the platform/database to crash.

The following are examples of high-scoring responses.

*Example 1*

- To gain access to the solution despite not having the correct credentials.
- To damage the data stored in the database and cause the organisation to lose money.

*Example 2*

1. To gain access to the SQL data base and print out sensitive/personal information such as a list of billing addresses.
2. To delete data in the SQL database and cause the system to stop working.

## Question 8c.

Mark	0	1	Average
%	76	24	0.2

Students were awarded a mark for a relevant proposal as to how the SQL injection could be mitigated:

- validation of input fields
- use of parameterised queries and procedures, rather than dynamic queries
- sanitising/escaping characters
- ensuring access privileges from the form to the database are set as low as possible
- keep all code and DBMS software up to date with latest security patches.

The following is an example of a high-scoring response.

*Use validation techniques to prevent SQL commands from being entered via the input fields.*

## Question 9

Mark	0	1	2	3	Average
%	18	27	33	22	1.6

In order to obtain marks for this question students had to:

- Select Design B as their preferred design and justify their choice by outlining that Design B has met more of the design criteria than Design A.
- State that Design B has met two of the design criteria:
  - Design B uses buttons to select the source and output, so less typing is required and thus better suiting Criterion 3.
  - Design B also uses standard icons to show the menu functions, satisfying Criterion 2.
- State that Design A has only met one of the design criteria:
  - Design A better meets Criterion 1 with clear headings for navigation at the top of the screen.

Although students were awarded marks for outlining which criteria were met by Design B, many did not refer to Design A and therefore were unable to be awarded marks for justification. Some students also gave general reasoning for their preferred design without referencing the design criteria and were not awarded marks.

The following is an example of a high-scoring response.

*Preferred design: Design B*

*Justification: Design B meets more of the evaluation criteria as it uses standard symbols to communicate functions such as a house symbol for home and a gear for settings. It also minimises typing as it uses buttons to select inputs rather than input boxes. Design A though follows more common layout conventions such as a navigation bar and inputs on left and find button in the bottom right but overall Design B fits more evaluation criteria.*

## Question 10

Mark	0	1	2	Average
%	30	6	64	1.3

Proposed test	Example file name	Expected result
Compatible/valid extensions	Message.mp4	File uploaded. Process continues.
Incompatible/invalid extensions	Message.docx	Error message appears. Request for new file.

Students were awarded marks for providing:

Compatible/valid extensions:

- example file name: a file with an extension from the list of compatible fields in the question
- expected result: a statement that the file has been uploaded and that the process continues (or equivalent)

Incompatible/invalid extensions:

- example file name: a file with an extension that was not from the list of compatible fields in the question
- expected result: a statement that an error message would appear and that a new file would be requested (or equivalent)

Students were not awarded marks if their example file names only included an extension (i.e. .mp4 instead of Message.mp4).

## Question 10b.

Mark	0	1	2	Average
%	16	42	42	1.3

Students were awarded a mark for explaining that an error message outlines to the user that a file is incompatible with the platform and enhances usability because it communicates to the user why the file is not being accepted, giving them the opportunity to rectify the issue. Students were also awarded a mark for reasoning that if there were no error message, users might continue trying to upload the same file and not realise that the file was incompatible.

The following is an example of a high-scoring response.

*The use of an error message helps users in understanding what they did wrong and how they can fix it, rather than the solution simply rejecting, thus increasing the usability and forgiveness of the solution.*

## Question 11a.

Mark	0	1	2	3	Average
%	59	17	15	10	0.8

In order to obtain full marks for this question students had to provide:

- a description of a function – a segment of code that returns a value
- a description of a method – either of the following two:
  - a segment of code belonging to a class/object
  - a segment of code that does not return a value
- justification of a function being in the context of the case study (audio data being passed in, a transcription file being returned).

Some students provided a definition of a function but provided no information about a method and therefore were unable to be awarded marks for justification.

The following is an example of a high-scoring response.

*A function is a contained section of code which can be called from anywhere within the program and return an output, whereas methods are used to alter the behaviour of an object or engage in its functionality, and can only be called through its associated object. As the process involves passing an input and returning an output without correlation to an object, a function should be used.*

## Question 11b.

Mark	0	1	2	Average
%	80	15	6	0.3

Students were awarded one mark for describing a class as a blueprint or a template for an entity within a system that is used to store the behaviours, properties and attributes of that entity. Another mark was awarded for stating that an uploaded file class could be used within the transcription module to contain the file and related metadata such as audio duration, file type, whether the audio has been transcribed, and the transcription.

Few students were able to describe a class and provide an adequate example.

## Question 12

Mark	0	1	2	3	4	5	6	Average
%	17	16	19	18	15	7	9	2.5

Name	Data type/structure	Description
error	Integer	Used to determine the position of an error within the transcription.
transc_text[]	array (string)	Collection of words that have been transcribed from uploaded audio.
rec[]	array (audio)	A collection of audio from the uploaded audio.
i	Integer	An index or counter used to iterate through transc_text and rec.
matched	Boolean	Used to determine whether an issue with the transcription has been detected.
wordLibrary[]	array (string)	Collection of words from previously transcribed audio.

Although most students correctly completed the name 'matched' and data type 'integer', many incorrectly wrote 'array' instead of 'array (string)' and were not awarded marks. Some correctly completed the descriptions.

## Question 13

Mark	0	1	2	3	Average
%	53	33	12	2	0.6

Risk 1: Students were awarded marks for making one of the following relevant suggestions as to how best to mitigate the loss of access to the third-party AI translation service:

- Notify their users of known server maintenance periods, given Ness and her team cannot control when this will occur.
- Ensure that appropriate error messaging is implemented as part of the new platform, where a connection to the third-party service cannot be established.
- Request that the third-party service notify Ness's team about any significant platform changes that may impact access.

Many students unrealistically suggested that a backup of the third-party AI be made by Ness and her team and were not awarded marks.

Risk 2: Students were awarded marks for making one of the following relevant suggestions as to how best to mitigate security vulnerabilities being introduced into the platform:

- Engage a penetration tester / ethical hacker to identify vulnerabilities.
- Undertake software security audits using a test environment.
- Liaise with the third-party provider to understand where vulnerabilities may be present.
- Request and review security logs from the third-party company related to their software.

Many students incorrectly listed security controls such as backup/encryption and authentication; however, they were not awarded marks as more information would need to be identified about the specific vulnerabilities before making such a recommendation.

Risk 3: Students were awarded marks for making one of the following relevant suggestions as to how best to mitigate user data being transferred internationally without their knowledge.

- Ensure that the privacy policy (for Ness's company) has been updated to highlight that they are using the third-party service and this could occur.
- Notify the customer about this arrangement through the customer agreement.

Many students suggested 'deidentification' or 'use a pseudonym'; however, these suggestions were not awarded marks as they did not involve alerting the customer to their data being sent off-shore. Students were also not awarded marks for suggesting that the data not be transferred internationally, as this suggestion was unrealistic. Some students incorrectly suggested encrypting the data so it could be transferred securely.

The following are examples of high-scoring responses.

*Risk 1: Ness could integrate a notification system to notify users when the servers are down.*

*Risk 2: Conduct a full security audit of the service before incorporating it with the platform.*

*Risk 3: Outline in the terms & conditions of creating account that user info may be transferred internationally via the translation module if used.*

## Question 14a.

Mark	0	1	2	3	Average
%	56	26	14	5	0.7

To achieve full marks for this question students needed to explain why they chose XML and not CSV by making a comparison, as for example:

- XML is more suitable for interfacing with an API because it is easier to make changes to the structure of XML than CSV.
- If the order of fields changes, the order of fields in the CSV needs to change, but no change is needed to the XML file.

Many students were awarded a mark for describing how XML files are structured. For example:

- XML files use tags that not only separate each field but describe what the field contains.

Few students were awarded a mark for describing how CSV files are structured. For example:

- CSV files separate different fields by using a delimiter such as a comma.

The following are examples of high-scoring responses.

### Example 1

*EXtensible Markup Language files use custom tags to describe the data and show layers of relations, whereas Comma Separated Values files use delimiters to store data in a set number of fields. In this case, as paragraphs are bound to have varying numbers of words each time, the inflexibility of CSV files in the number of fields makes XML files the better choice.*

### Example 2

*XML has better interoperability than CSV. The user defined tags allow it to store information about the data contained making it easier for different systems to interpret (such as the API). CSV does not achieve this as it is limited to strings separated by commas, with no additional information.*

## Question 14b.

Mark	0	1	Average
%	34	66	0.7

Interoperability

## Question 15

Mark	0	1	2	3	Average
%	22	31	29	18	1.4

Students were awarded marks for outlining what type of backup, when the backup would take place and where it would be stored. Few students included details about all three in their answer.

Sample student response:

*Ness could use a combination of three different backup media – two hard disk drives and one cloud-based backup. She should conduct a full backup once every week, and incremental backups for every other day of the week on each medium. She should ensure that all backups are appropriately named and stored properly, and regularly test both the backup and recovery procedures.*

## Question 16

Mark	0	1	2	Average
%	44	34	21	0.8

Students were awarded marks for suggesting two of the following areas of investigation:

<ul style="list-style-type: none"> <li>• Maintainability               <ul style="list-style-type: none"> <li>– use of internal documentation</li> <li>– use of clear naming convention</li> </ul> </li> <li>• Legal compliance               <ul style="list-style-type: none"> <li>– check of the platform against known legal requirements</li> <li>– options to de-identify data</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Security               <ul style="list-style-type: none"> <li>– secure transmission of data</li> <li>– secure storage of customer data</li> <li>– backup and recovery</li> <li>– review of how well secure development practices have been adopted</li> <li>– code audit</li> <li>– access controls (encryption, authentication etc.)</li> <li>– penetration testing</li> <li>– software audit</li> <li>– use of TLS</li> </ul> </li> </ul>
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Most students were awarded marks for suggestions such as security audit, code audit, penetration testing, and for checking the platform against known legal requirements.

The following are examples of high-scoring responses.

### Example 1

*Suggestion 1: She could have a third-party software audit conducted in order to find vulnerabilities in the solution's security*

*Suggestion 2: She could review if the code and other functionality incorporated into the solution meets all its licensing requirements*

*Example 2*

*Suggestion 2: Readability of code modules and internal documentation (maintainability)*

*Example 3*

*Suggestion 1: Review code internal documentation to ensure it exists and is helpful for developers in fixing bugs / improving the platform*

## Question 17a.

Mark	0	1	2	Average
%	67	23	10	0.4

Students were awarded one mark for suggesting an appropriate technique, such as the use of annotations or logs, for assessing the project plan. Students were awarded another mark for a description of that technique, for example that annotations or logs could be used to check

- whether all tasks were identified at the start of the project
- whether tasks were scheduled appropriately
- whether milestones were achieved on time
- whether the project plan was constructed appropriately.

Students were expected to write their responses in relation to either the annotations or the project plan and not awarded marks for making generalised comments such as 'check if the project was complete' or 'check if the requirements from the project were met'.

The following are examples of high-scoring responses.

*Example 1*

*The updated project plan could be compared to the initial project plan, as well as if all milestones were achieved on time – and if the project plan assisted or was not beneficial in doing so. The progress of the project plan throughout time could also be assessed through log books and project plans.*

*Example 2*

*Use project log and annotations to determine how accurate and complete the plan was based on whether tasks were able to be completed on time and whether all tasks were included in the plan.*

## Question 17b.

Mark	0	1	2	Average
%	40	40	20	0.8

Students were awarded marks for describing the importance of assessing project plans and for describing the benefits to organisations who assess project plans. Most students were awarded marks for outlining that an organisation should assess a project plan to determine whether it should be reused. Some students made general statements about efficiency and effectiveness without contextualising to a project plan or the case study and were not awarded marks.

The following is a possible response:

*Ness should assess how the project plan assisted in the monitoring of the project, as this can allow her to understand whether her expectations were realistic around task scheduling, where issues arose and areas where the team exceeded expectations. The benefit to doing this is that she can be better informed when planning future projects and that hopefully similar issues can be avoided.*

*Following is a high-scoring response. It is important for Ness to assess the usefulness of the project plan as it can help her make better decisions for future projects. This is because she can review what she can do better in managing tasks, time and accounting for changes to assist her in making more educated decisions.*