VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

# 2010 Software Development GA 3: Written examination

## GENERAL COMMENTS

The 2010 Information Technology: Software Development paper comprised three sections: Section A contained 20 multiple-choice questions (worth a total of 20 marks), Section B comprised four short answer questions (worth a total of 17 marks), and Section C was a case study (worth a total of 53 marks). This was the final examination for the current study design. The 2011 examination will be based on the *VCE Information Technology Study Design 2011–2014*.

Students performed well in Section A of the 2010 paper; however, some students did not answer all multiple-choice questions. It is important for students to provide responses to all multiple-choice questions. Throughout the year it may be appropriate for students to practise answering this type of question.

Section B provided a challenge for many students. This section required students to demonstrate sound theoretical knowledge and to provide detailed and accurate responses.

In Section C, student responses were expected to apply the case study to the questions asked. This year the algorithm question (Section C, Question 9) was challenging for many students.

During the examination, students should:

- endeavour to use correct IT terminology
- discuss all options when asked to justify a choice or compare one option to another
- know how to respond to key instructional terms in questions, such as ‘state’, ‘explain’, ‘justify’ or ‘describe’
- reread each question and their response to ensure the question has been answered
- avoid using pencil in Sections B and C as responses in pencil can often be difficult for assessors to read
- read the case study and questions carefully and underline or highlight key words
- endeavour to demonstrate their knowledge of the subject and apply that knowledge to the case study, as generic responses often result in low or no marks.

## SPECIFIC INFORMATION

For each question, an outline answer (or answers) is provided. In some cases the answer given is not the only answer that could have been awarded marks.

## Section A – Multiple-choice questions

**The table below indicates the percentage of students who chose each option. The correct answer is indicated by shading.**

| Question | % A | % B | % C | % D | % No answer | Comments |
|---|---|---|---|---|---|---|
| **1** | 88 | 9 | 2 | 1 | 0 | |
| **2** | 6 | 72 | 10 | 12 | 0 | |
| **3** | 22 | 6 | 17 | 55 | 1 | |
| **4** | 33 | 56 | 0 | 10 | 0 | |
| **5** | 84 | 9 | 5 | 2 | 0 | |
| **6** | 72 | 22 | 4 | 1 | 1 | |
| **7** | 1 | 15 | 80 | 4 | 0 | |
| **8** | 4 | 17 | 68 | 11 | 0 | |
| **9** | 3 | 3 | 11 | 83 | 0 | |
| **10** | 81 | 2 | 15 | 2 | 1 | |
| **11** | 10 | 25 | 26 | 39 | 0 | Thirty-nine percent of students identified the procedure as acceptance testing (option D). Students should familiarise themselves with a range of techniques for testing acceptance by users. |

| Question | % A | % B | % C | % D | % No answer | Comments |
|---|---|---|---|---|---|---|
| **12** | 5 | 86 | 5 | 4 | 0 | |
| **13** | 5 | 7 | 68 | 19 | 4 | |
| **14** | 1 | 30 | 3 | 66 | 2 | |
| **15** | 2 | 91 | 7 | 0 | 1 | |
| **16** | 12 | 59 | 18 | 11 | 2 | |
| **17** | 92 | 3 | 3 | 1 | 0 | |
| **18** | 1 | 97 | 0 | 1 | 1 | |
| **19** | 7 | 16 | 60 | 17 | 1 | |
| **20** | 13 | 69 | 5 | 14 | 0 | |

## Section B – Short answer questions

**Note: Student responses reproduced herein have not been corrected for grammar, spelling or factual information.**

**Question 1**

This question was poorly done. The majority of students were able to identify one disadvantage, but most were unable to articulate how the file could be organised to make it more efficient.

**Question 1a–cii.**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 32 | 28 | 31 | 4 | 5 | 1.2 |

**1a.**

This question required students to discuss the use of RAM when loading 'the whole file into memory', such as the disadvantage of needing a large amount of RAM for this method.

**1b.**

Students needed to make a comment about how slow it would be obtaining 'the record from the file each time'.

**1ci.**

Students were expected to be able to identify a random access file as the more efficient way the file could be organised.

**1cii.**

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

*A random access file means that you can go directly to a specific record without having to look at all the records starting with the first file each time you need to search for a file.*

**Question 2**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 7 | 20 | 28 | 28 | 17 | 2.3 |

It was evident that some students did not read each question carefully as they gave generic definitions of the words 'viruses', 'spyware' and 'trojans' instead of focusing on the key words in each question: 'get into a computer system' (2a.) and 'the purpose of' (2b.).

**2a.**

While viruses come attached to emails, files and programs, and install themselves into computer systems, a user installs a trojan by installing the program containing the trojan.

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

*Trojans usually appear as something positive like an email from a friend, but when the email is opened the Trojan software is installed on your computer. Viruses may be received through infected USBs, going onto certain bad websites are installed automatically into your machine usually without your knowledge.*

**2b.**
The purpose of a virus is to copy itself to as many other computers as possible and to generally cause disruptions. However, spyware is installed to transmit information about the use of the computer to an outside source.

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

*Spyware – designed to spy on the actions on the computer of the user and send this data back to the creator of the code. Viruses are designed to destroy data and in the process destroy the system (destructive code) through malicious code.*

**Question 3a–cii.**

| Marks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | Average |
|---|---|---|---|---|---|---|---|---|
| % | 2 | 3 | 7 | 17 | 29 | 21 | 22 | 4.2 |

Overall, this question was handled reasonably well by students; however, some students misread parts of the question.

**3a.**
Examples of appropriate responses included:

- trading 24/7
- access to global clientele
- wider audience
- accurate, up-to-date advertising.

**3b.**
Some students did not read this question carefully and wrote a response regarding security; for example, hackers.

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

*It may be difficult for them to communicate with and provide support to, overseas customers. If an issue arises it may be difficult to handle.*

**3ci–ii.**
Most students were able to indicate that advantages of buying an existing program included the ability for the program to be used immediately, the probability of reduced cost (3ci.), and that hiring a programmer allowed for a more tailored approach to the client's needs (3cii.).

**Question 4a. and 4b.**

| Marks | 0 | 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| % | 49 | 25 | 15 | 11 | 0.9 |

Many students were unable to provide adequate responses to these questions.

**4a.**
The main difference is that the logical design describes what the new system has to do, not how to do it. The physical design specifies the technical components that will be used to create the new system.

**4b.**
There are a range of tools that could be used to represent the physical design; for example, system flowchart, structure chart and network diagram.

## Section C – Case study

**Question 1a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 53 | 47 | 0.5 |

The government's main reason for the creation of RuraLink is to try to overcome the issues created by the shortage of specialist doctors in country areas.

Many students were able to provide the appropriate response. However, a number of students incorrectly referred to the solution that was put in place – to put rural hospitals in touch with specialists in the city.

**Question 1b.**

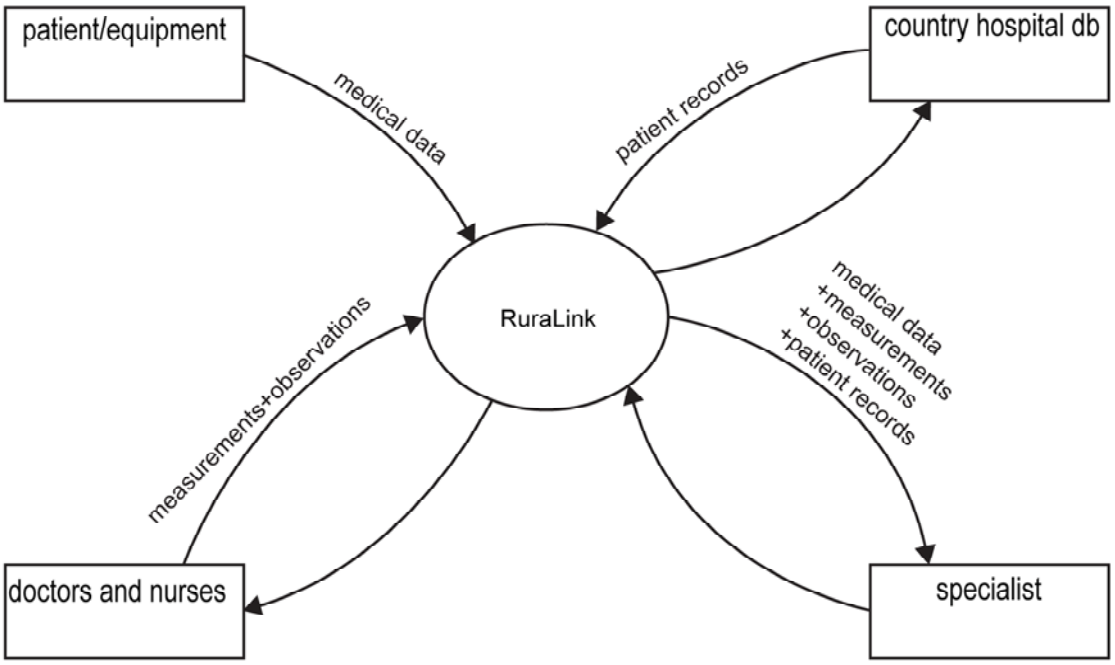
| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 34 | 66 | 0.7 |

This change is prompted by a social factor.

Many students were able to answer this question correctly.

**Question 2**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 14 | 16 | 21 | 16 | 33 | 2.4 |




Students should be familiar with Data Flow Diagrams and be able to complete them accurately. However, only a small number of students were able to correctly complete the diagram and many students repeated entities.

**Question 3a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 34 | 66 | 0.7 |

182500GB of data would need to be stored for five years, ie. 100 x 365 x 5

Most students were able to complete the required calculation for five years of data storage. Many students showed their working; however, this was not required.

**Question 3b.**

| Marks | 0 | 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| % | 21 | 21 | 19 | 38 | 1.8 |

Solution A or C was possible. Solution B was impractical as there was no way of determining which 0.1 per cent of cases to keep.

Many students handled this ‘select and justify’ question well. When responding to this type of question, students should remember to discuss why their selection is the ‘best’ and also discuss why the alternatives are not the ‘best’. A number of students did not indicate why the alternatives were inappropriate.

**Question 4a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 22 | 78 | **0.8** |

Either of:

- Null, Length, Type, Existence
- Null, Type, Length, Existence.

Students were generally able to put the validations tests listed in an appropriate order.

**Question 4b.**

| Marks | 0 | 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| % | 24 | 13 | 14 | 49 | **1.9** |

Some students had difficulty giving reasons why their nominated order was the most effective. Students were expected to have knowledge of validation techniques, including existence checking, range checking and type checking for Unit 4, Outcome 1.

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

*Reason 1 A Null test must come first, as none of the other test can be done if nothing has been entered.*

*Reason 2 The Existence test should come last, as the input will not be in the database if it has failed the previous tests.*

*Reason 3 The Length test should come before the type test, as it requires less processing to check and inputs length.*

**Question 5**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 50 | 15 | 35 | **0.9** |

A range of responses was accepted, including warranty and customer support; however, bandwidth was the most obvious and critical aspect that needed to be checked to ensure the transmission of the video data.

Students must remember to read questions carefully and ensure that they understand the question stem. This question asked for an explanation, so statements such as ‘check the Internet connection’ or ‘check the bandwidth’ were not adequate. Students needed to provide details as to why the system aspects should be checked.

Students should familiarise themselves with the range of question stems and be aware of the expectations of each. Teachers should endeavour to utilise a range of these when setting assessment.

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

*Whether the internet connection will have a high enough bandwidth to efficiently stream such high resolution video from multiple cameras in the hospital at one time.*

**Question 6a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 11 | 89 | **0.9** |

Another way of connecting the portable device to the telemedicine trolley is to use a wireless connection.

Students performed very well on this question.

**Question 6b.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 13 | 25 | 62 | **1.5** |

Students needed to ensure that they read this part of the question carefully as it asked them to suggest advantages and disadvantages of the method (other than cost) selected in 6a. Responses that related to cost were incorrect. Most students gave mobility or safety due to lack of cables as the advantage, and loss of signal, interference or security of transmission as the disadvantage. It was important, that the explanation provided was applicable to the hospital; simply stating ‘easy to move around’ was not sufficient.

**Question 7**

| Marks | 0 | 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| % | 9 | 9 | 33 | 49 | 2.3 |

The most appropriate features were battery life, screen size and weight; however, students could have selected other features as long as they were also able to explain why the feature was essential. Ethernet connection was not appropriate as the question asked for items other than methods of communication.

Many students were able to provide appropriate responses.

**Question 8**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 5 | 10 | 15 | 24 | 46 | 3.0 |

| Criteria | Software quality |
|---|---|
| After 1 hour's training, the software can be operated by doctors and nurses without further help in 98% of all cases. | usability |
| The software can be modified to take on new diagnostic equipment where needed. | maintainability |
| The software uses less than 50% of its allowable bandwidth to transmit data at maximum resolution. | efficiency |
| The software allows all video and images to be transmitted in a clear high-resolution format. | effectiveness |

It was evident that most students knew the meaning of the software qualities listed; however, some students were not able to gain full marks for this question. Key terms such as usability, maintainability, efficiency and effectiveness should be used throughout the year so that students become familiar with their usage.

**Question 9a.**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 17 | 8 | 17 | 13 | 45 | 2.6 |

Students struggled significantly with this algorithm question and the related questions. Most students were able to identify that the first value (12a) was valid and the other three items of data were checking an invalid * at the start, middle and end of the password. Students should practise these types of questions either in classroom activities, using past examination papers or in assessment where appropriate.

**Question 9b.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 53 | 7 | 40 | 0.9 |

A large number of students correctly suggested that an additional aspect which should be tested was 'blank' or 'null'. However, many students were not awarded any marks as they suggested tests that did not test another aspect of the procedure.

**Question 10a.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 40 | 53 | 7 | 0.7 |

| Test Data | Expected Output | Actual Output |
|---|---|---|
| 12a | Password Accepted | Password Rejected |
| *1a | Password Rejected | Password Rejected |
| 1*a | Password Rejected | Password Rejected |
| 1a* | Password Rejected | Password Rejected |

This question required students to desk check the algorithm and fill in the table. Students needed to fill in each column correctly to be awarded full marks. When testing the algorithm, the content of the table needed to reflect the output as writing in the algorithm, so responses such as 'true', 'false' or 'access granted' were not appropriate.

**Question 10b.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 48 | 26 | 26 | **0.8** |

The algorithm had two key errors that students needed to identify:

- the first character in the password is never tested as the first character is always skipped
- the **If** statement – all possible passwords combinations are rejected.

A significant number of students were not able to identify the two key errors. Students need to ensure that they practise these types of questions throughout the year.

**Question 10c.**

| Marks | 0 | 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| % | 64 | 22 | 12 | 3 | **0.6** |

The algorithm could be corrected in the following ways:

PasswordChar ←Next Character of Password
Charcount←Charcount +1
Put these lines after the **If** statement but before the end of the **Repeat Until**

**Or**

Add the **If** statement before the start of the Repeat loop as well as leaving it inside

**And**

**If** (PasswordChar is **Not** Numeric) AND (PasswordChar is **Not** Alphabetic) **Then**
ValidPassword=False
**EndIf**

The If statement should have the **O**r changed to **And**.

**Question 11a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 37 | 63 | **0.7** |

A technical manual provides specifications that the medical staff do not need and is often written in highly technical language that they may not understand.

Students were expected to explain that technical manuals were inappropriate for end users as technical manuals are intended for IT professionals.

**Question 11b.**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 18 | 4 | 23 | 8 | 47 | **2.6** |

Suitable user documentation included:

- Online procedures manual – the medical staff would be better off using online simple quick-start guides, procedure manuals, or user guides that are presented in simpler language, easily searchable and are aimed at the needs of the medical staff.
- Quick-start guides that are printed and laminated – these could be attached easily to the side of the trolley for quick and easy reference for the staff.

It was pleasing to see that most students were able to discuss a range of user documentation and were able to identify the appropriateness for intended audiences.

The following is an example of a high-scoring response for one type of user documentation.

*Type – Online User guide explaining all functions of the software*

*Reason – The doctors and nurses will need to know how to use all of the functions that the software provides, and an online help facility with a search function will make it easier to find help*

**Question 12a.**

| Marks | 0 | 1 | Average |
|---|---|---|---|
| % | 51 | 49 | **0.5** |

Students were able to demonstrate a sound level of knowledge on training strategies, with many indicating that technicians or support staff would also need to be trained.

**Question 12b.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 24 | 28 | 48 | **1.3** |

Students were able to articulate why onsite training was a valuable training strategy, with many indicating that onsite training would allow the users to learn to use the equipment and software in a real environment.

**Question 12c.**

| Marks | 0 | 1 | 2 | Average |
|---|---|---|---|---|
| % | 48 | 25 | 28 | **0.8** |

Staff require ongoing support in order to use the new systems, rather than a one-day session.

Some students appeared to think the 'one-day intensive training' meant that all staff were out on the same day and this would mean that the hospital would not be able to function. Teachers should ensure that students are able to contextualise how each training method may occur.

**Question 13**

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|---|---|---|---|---|---|---|
| % | 40 | 11 | 27 | 6 | 15 | **1.5** |

Appropriate comments could have included:

- the average time taken to gain access to a specialist in that medical area – this could be compared to previous lengths of time it took to access the specialists. If the length of time has decreased, patient outcomes have improved
- the time between the presentation of symptoms, diagnosis and treatment – could be compared to previous lengths of time
- the number of patients with positive outcomes – if fewer patients are dying, then the patient outcomes have improved.

Students struggled with this evaluation question and it was clear that most students had limited knowledge about how to provide an appropriately detailed response. Many students left this question blank; however, students should be encouraged to provide a response to all questions even if they are unsure of the correct response. The key with most evaluations strategies is that data from a previous system is compared with current details, so data collected must be measurable and allow a comparison.