2011 Assessment Report

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2011 Information Technology: IT Applications GA 3: Examination

GENERAL COMMENTS

The questions on the IT Applications 2011 examination examined the key knowledge and skills in the *VCE Information Technology Study Design 2011–2014*. A key element of the study design is the problem-solving methodology (pages 16 and 17). The 2011 examination included an assessment of students' ability to apply this methodology when solving problems in given scenarios.

In Unit 3, students study the types, purposes and functionality of websites that meet the needs of specified online communities and Relational Database Management Systems (RDBMS) as they are used to acquire and manipulate data. In Unit 4, students study either RDBMS or spreadsheet software as it is used to meet the ongoing information needs of an organisation, and the management of data and information with a view to recommending improvements to current practices associated with their communication, storage and disposal. The four outcomes in these units provide the contexts in which the key knowledge and key skills are expected to be understood. They also provide the contexts for examination questions.

Generally, students understood that good data produces relevant and accurate information, and they identified the appropriate data types, validation techniques and software functions to achieve this. They also described and named a comprehensive range of security equipment and procedures to protect data and information to meet various legal obligations. Less well understood was the need to provide a comprehensive testing strategy during the development stage of the problem-solving methodology.

For the first time in this study students were asked to provide a comprehensive solution to an information problem in the form of an extended response. Many students provided lengthy and accurate descriptions of either a database or spreadsheet layout for appropriately selected data but failed to complete the task by naming functions that would ultimately provide the required information. Very few responses then identified data to test the functions named or processes described or even outlined a testing strategy. Teachers are reminded that lists of the functions to be studied are published on the VCAA website.

It was very pleasing to see that the majority of students used a range of tools to represent both the appearance of solutions and the relationships between elements in solutions. Many students, for example, successfully used an annotated sketch to enhance their answer to the extended response question.

In many instances where full marks were gained students provided well-thought-out examples to clarify their descriptions, explanations and recommendations. Words such as 'list', 'describe', 'explain', 'discuss' and 'recommend' require appropriate responses.

SPECIFIC INFORMATION

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	Comments
1	3	72	23	2	
2	57	26	11	6	
3	6	10	14	70	
4	1	0	1	98	
5	50	18	28	4	The problem-solving methodology described on pages 16 and 17 of the study design clearly states the activities associated with each stage.
6	65	10	15	11	
7	34	60	4	2	
8	26	26	5	42	Validation occurs at data entry before processing occurs; calculations are made or reports are created.
9	15	36	32	17	A tactical decision is short to medium term.

Question	% A	% B	% C	% D	Comments
10	47	7	1	45	The *SPAM Act 2003* refers to electronic mail. This question dealt with paper mail outs.
11	5	19	39	37	Hierarchy charts and site maps represent relationships in a website, and mock-ups and layout diagrams represent appearance.
12	2	15	81	2	
13	56	13	4	26	Characters entered as text data do not have a place value, so the first digit in '17' is worth one and not ten. The items listed are sorted according to the first character of each 1, 2, 3, 6.
14	3	91	3	3	
15	6	6	15	73	
16	2	25	60	12	
17	22	52	14	11	
18	9	86	3	2	
19	3	7	46	43	In online communication, uppercase text is recognised as shouting.
20	11	8	68	13	

Section B

Question 1

Marks	0	1	Average
%	72	28	**0.3**

Most students indicated that the data should be permanently deleted, but only a minority of responses indicated how this could be achieved. Typically, responses which received a mark suggested 'overwrite the files', 'format the disk' or 'physically destroy the disk'. Other answers which described specialised software to electronically clean or shred the files were also accepted.

Question 2a.

Marks	0	1	Average
%	64	36	**0.4**

The solution is tested at the development stage of the problem-solving methodology. Many students confused testing with evaluation.

Question 2b.

Marks	0	1	2	Average
%	31	40	29	**1**

The most commonly accepted answers were 'deciding what tests will be conducted', 'what test data will be used', 'conducting tests', 'recording actual results', identifying errors', 'correcting errors' and 'checking that validation methods worked'.

Question 3

Marks	0	1	2	Average
%	46	31	23	**0.8**

Many students stated that normalising data reduces errors and saves time but did not go on to explain how normalisation achieves these. Typically, responses which received marks included statements such as 'because it reduces data redundancy there are fewer errors when data is updated', 'because it reduces data repetition, processing time can be saved', 'because related data are grouped it is clear to read' and 'key fields define accurate relationships between tables' or 'key fields help create accurate queries'. Responses to this question indicated that students had learnt the theory associated with relational databases very well.

Question 4a.

Marks	0	1	2	Average
%	22	24	54	**1.3**

Students scored one mark if they correctly identified a format applied in the image of the webpage. An additional mark was allocated if the students could explain how this feature contributed to the effectiveness of the webpage. Relevance, as a measure of effectiveness, was explained in terms of the use of 'bold and reserve font to show the main information groups on the website'. Completeness, as a measure of effectiveness, was explained in terms of 'tables used to give a complete list of important information headings'. Accepted responses included 'links displayed in bolded, white font on black' and 'links underlined'. Many other responses were also accepted. These referred to left, centre or right 'alignment of particular elements', the 'orientation of groups of links', the proportion or hierarchy evident in the 'arrangement of titles-subtitles-links', 'the consistency in font style' or colour and contrast used to emphasise 'hierarchy of titles-subtitles-links'.

Question 4b.

Marks	0	1	2	Average
%	28	39	33	**1.1**

Most students recommended an appropriate test to ensure the website worked as it should for members. For example, 'click on the forum link to check that it goes to the login'. Other successful responses included 'ask a group of members to use the links from the forum button to check that all features and links work as expected'. Justifications included the login restricts access to members only and testing each link checks that all features of the forum operate as intended.

A number of students suggested conducting a member survey three to six months after the website had been running. Again, these students were confusing the problem-solving stage of evaluation with the testing that takes place during the development stage.

Question 5a.

Marks	0	1	2	Average
%	15	30	55	**1.4**

Many students were able to suggest a type of website to meet the stated needs of the youth group. Successful responses included 'a social network such as a forum with a login for members because it has an online space for discussions', 'a membership login that restricts access to members of the youth group' or 'a forum because it provides advertising space for group events'. Responses that suggested a wiki or a blog, along with a reasonable explanation, were also awarded marks.

Question 5b.

Marks	0	1	2	Average
%	30	35	35	**1.1**

Again, most students stated the features needed on a website to help build the youth group's collective identity. Successful responses included 'consistent use of colours and a logo or image relevant to the group', 'images and reports of youth group events regularly posted on the site' and 'an Introduce Yourself section and About Us page'.

Question 5c.

Marks	0	1	2	3	4	Average
%	26	9	27	10	28	**2.1**

Many students identified and explained social online protocols. Typical responses were in two general categories. First was 'discussions on the forum should show respect for others' explaining that 'everyone needs to feel safe when using the site' or that 'no one should be bullied and everyone has the right to contribute.' The second category was that discussion on a topic should be under one heading 'to stop the same issues being repeated under different headings.'

Question 6a.

Marks	0	1	2	Average
%	9	24	67	**1.6**

Most responses identified data associated with a delivery address such as 'Customer Address' and with a payment method such as 'Credit Card Details'. Responses which included contact data for the purpose of order tracking were also awarded a mark. Students answered this question well.

Question 6b.

Marks	0	1	2	Average
%	13	20	67	**1.6**

The majority of students explained that a text box allowed customers to type in 'an infinite variety of individual details they wanted in their customised puppet' and that a drop down list 'would not be practical' because it would need millions of items to meet 'all possible variations in colours and clothes'. Again, this question was well answered.

Question 6c.

Marks	0	1	2	Average
%	43	25	32	**0.9**

Most students could name a correct validation technique, which scored one mark, but only some could then justify its use in the database described. The most common student response was range check where 'if a zero or negative number is entered an error message pops up' or 'the quantity must be between 1 and 10'. Other accepted answers included 'a drop list where Paul can decide what quantity of any toy is sold', a 'type check, where quantity must be a number or an error message is shown' and an 'existence check, where if nothing is entered in a field then "a required field" error message is displayed'.

Question 6d.

Marks	0	1	2	Average
%	19	41	40	**1.2**

- Customer Gender: Boolean/Yes-No/Char (1)
- ToyCost: Currency/Decimal/Floating point/Numeric.

This question was well answered.

Question 6e.

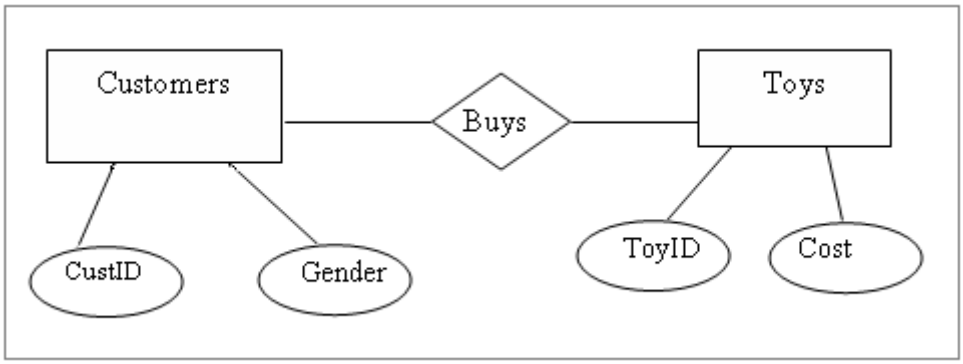
Marks	0	1	2	Average
%	28	44	28	**1**

Students clearly understood that ToyID and CustomerID provided unique identities for customers and toys, and that this not only reduced errors when queries were made on individual tables but also when queries were made across tables. For example, 'the ToyID can be included as a foreign key in the Customer table and a relationship set so that Paul can then create Queries to accurately show which toys a customer has purchased' or 'customers with same name can be identified uniquely and their orders processed accurately.'

Question 6f.

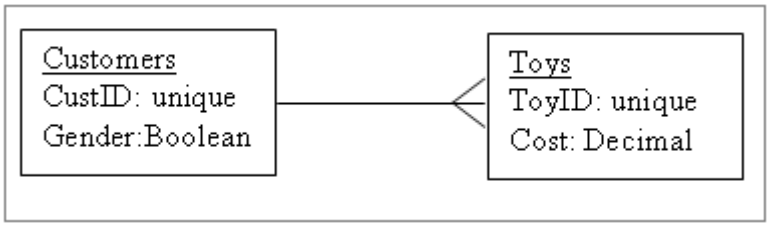
Marks	0	1	2	3	Average
%	31	22	28	19	**1.4**

Most students drew an Entity Relationship (ER) Diagram and received marks. While the study design does not name any specific diagram styles, the most frequent style presented was the Chen style shown below. Many students also correctly included a one-to-many representation in this style of diagram.



Chen-style Entity Relationship diagram

Another common response was the Bachman style.



Bachman-style Entity Relationship diagram

Responses which represented the one-to-many relationship using text or symbols such as '1 to ∞' and 'one-to-many' were also awarded marks. Other recognised styles of Entity Relationship diagram were also acceptable.

Question 7

Marks	0	1	2	3	4	5	6	7	8	Average
%	28	16	20	15	15	3	2	1	0	2

Most students began their response to this question with an introduction. Successful responses were frequently organised under the three headings 'Best-Selling Item', 'Staff Bonus' and 'Test Data'. Generally, marks were awarded to students who comprehensively described and named the data and formulae or functions or queries under these headings. Students who took note of the statement 'Your answer should include . . .' and used the requirements listed to plan their answers generally gained high marks.

Spreadsheet

Students who chose a spreadsheet solution generally described or sketched a Sales worksheet that included columns for Staff and Products. Other students described or sketched linked worksheets for Products, Sales and Staff. Syntax was not taken into account.

Best-Selling Item

Examples included 'QuantitySold', a 'Product Sales column' and a combination of Sum and Max functions to return a best-selling item. Marks were also awarded to students who explained how a CountIF function or Sort could be used.

Staff Bonus
For example, 'Create a Sales ($) column for each staff member in a Staff worksheet and in another column called MonthlyBonus use a formula (if Sales>5000, "yes", "no").'

Test data
Successful responses provided complete sets of test data and named the expected outcome. Two items of test data for the best-selling item were 'all different quantities with a clear maximum expected' and 'two quantities the same with both, expect both to be highlighted'. Three items of test data for the monthly bonus calculations were 'one <5000, expecting no', 'one=5000, expecting no' and 'one>5000, expecting yes'.

Database
Students who chose a database solution generally described or sketched normalised or related tables for Products, Sales and Staff or a Sales Table with fields for StaffID, ProductID and QuantitySold or Sales. Syntax was not taken into account.

Best-Selling Item

Many successful responses described a 'QuantitySold' or a 'Sales' calculated field and using a Sort or Order function 'to bring the best selling item to the top'.

Staff Bonus
'Have a Sales ($) calculated field in the Staff table and use a query (if Sales>5000) to list the staff who should receive the bonus.'

Test data
Again, successful responses provided complete sets of test data and named the expected outcome. Two items of test data for the best-selling item were 'all different quantities grouped with a clear best expected at the top' and 'two quantities the same with both expected at the top'. Three items of test data for the monthly bonus query or calculations were 'one <5000, not expected', 'one=5000, not expected' and 'one>5000, expected to be listed'.

Students who answered 'use real data and manual desk check and compare the expected to actual outcomes' also received a mark. It is worth noting that very few responses included test data, indicating that many students did not read the question carefully.

Question 8a.

Marks	0	1	2	Average
%	30	26	44	**1.2**

It was pleasing to note that most students could explain the legal responsibilities of the hospital. The *Health Records Act 2001* is the relevant Act. Accepted answers related to either the access rights of patients or the data collection responsibilities of the hospital. Access means patients having the right to their health information kept by the hospital. Accepted legal obligations regarding collection included only using health information for primary purposes, not secondary purposes, or the hospital taking reasonable steps to protect the patient data from misuse, loss, unauthorised access, modification and disclosure, or the hospital ensuring that its data is accurate, complete, up-to-date and relevant to its activities.

Question 8b.

Marks	0	1	2	Average
%	37	31	33	**1**

Many students recognised that implementing such procedures against staff wishes would affect staff morale. Examples included 'honest employees will think the hospital doesn't trust them and not work as hard' and 'hackers will find other ways of getting the data out anyway'. Other students suggested 'the hospital's reputation would suffer' first because of the data theft and secondly because 'the staff were unhappy and going on strike'.

Question 8c.

Marks	0	1	2	Average
%	57	29	14	**0.6**

Many students did not consider an ethical dilemma when answering this question. Successful responses included 'if the manager takes advantage of other information he has read he is behaving unethically'. Responses that did not directly mention ethics but that did indicate risk or moral difficulty such as 'to solve the problem of data theft the manager risks losing the trust of his employees' and 'the manager is allowed to read staff emails to protect the patient data not pry into their private lives' were awarded marks.

Question 8d.

Marks	0	1	2	3	Average
%	18	44	30	7	**1.3**

Responses generally included two or three steps in a procedure the hospital could follow. Typically, these covered communicating with staff, checking physical security and upgrading protective software. For example, 'the hospital should explain the legal obligation to secure patient data' or 'discuss possible solutions with all the employees'. They could check all security procedures 'with staff assistance, and make any changes that might help'. And very frequently 'use electronic tagging and see if there is some way of tracking data' and 'tighten up the passwords so that only certain people can access patient data'.

Question 9

Students were given identical data displayed in formats suitable for either spreadsheet or database manipulation. Students selected to answer questions on one of these software types.

Question 9a.

Marks	0	1	2	Average
%	55	20	25	**0.7**

Spreadsheet responses mostly stated 'Sort or Order the LecturerID column in the Lecturer data sheet from A to Z'.

Database responses mostly stated 'Sort or Order the LecturerID field in the Lecturer data table from A to Z'.

Question 9b.

Marks	0	1	2	Average
%	49	25	26	**0.8**

Spreadsheet responses generally suggested an automated procedure or conditional formula such as 'if LecturerID=BALR' to identify the required rows and show them in either a separate worksheet, grouping, column or colour.

Database responses generally suggested 'design a select query or filter such as LecturerID=BALR' to show LecturerID and the College fields.

Question 9c.

Marks	0	1	2	Average
%	45	30	26	**0.6**

Many students suggested the spreadsheet SUM formula at the bottom of the NumberStudents column or wrote 'a formula sum(E2:E5) and label it TotalAttendance'.

For database, many students wrote 'calculate TOTAL in new field using the NumberStudents field' and others wrote 'create a query called TotalAttendance using Total on the NumberStudents field'.

Other reasonable answers, including annotated sketches, were also awarded marks.

Question 10a.

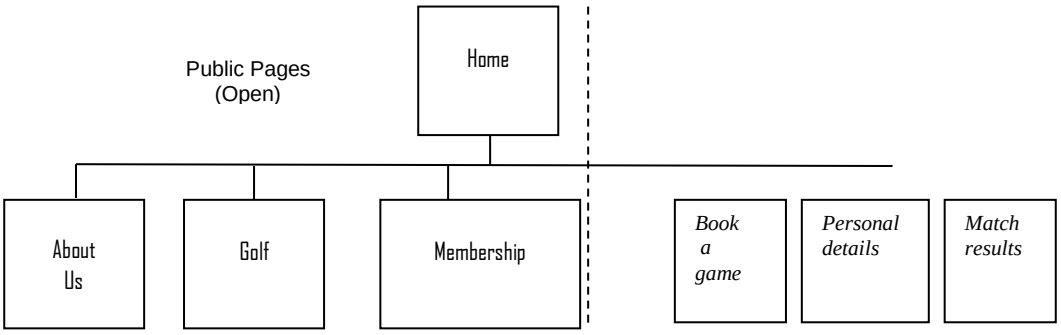
Marks	0	1	Average
%	73	27	**0.3**

Appropriate navigation links were listed in the scenario presented in the question. These were game bookings, personal details and match results. Any one of these was accepted. Some students used other similar phrases such as 'game scores' or 'member profile', which were also accepted.

Question 10b.

Marks	0	1	2	3	Average
%	27	20	29	24	**1.5**

The most frequently accepted answer is shown below.



Many students correctly placed the new pages one level further down and added a Member or Login page in the private space immediately below the horizontal line. Generally, responses which indicated that three new pages were in a private space and below the level of the Home page received full marks.

Question 10c.

Marks	0	1	2	Average
%	19	29	51	**1.3**

Most students described a security procedure the golf club could use and gave an example of the protection it provided. Successful responses included 'a member ID given by the club and then a strong password chosen by the member' or 'a firewall or antivirus software to stop hackers stealing members' private details' or 'use secure banking like PayPal' when members' fees are paid online by credit card. This question was well answered.

Question 10d.

Marks	0	1	2	Average
%	13	27	60	**1.5**

Students who chose a forum over a wiki were able to provide two very direct reasons for their selection. For example, 'a forum will let members have their say in a conversation-like manner' and 'a wiki is more formal and might frighten some members out of stating their opinion'. Others explained that the editing/referencing protocols of a wiki might make discussion 'more difficult for ordinary members and a forum would be easier for discussion'. Those who argued for a wiki over a forum typically suggested that a wiki would be best because 'rules need a regulated environment for discussion'. Other responses which argued a case in the context of the golf club also received a mark.

Question 10e.

Marks	0	1	2	3	Average
%	10	3	14	73	**2.5**

Successful representations of the new home page for the website indicated a header or logo, navigation links and membership login section. This question was very well answered.

Question 11a.

Marks	0	1	2	Average
%	34	33	33	**1**

Most students could explain that data saved directly to the cloud is backed up as it is recorded and therefore available to other team members or head office almost immediately. Typically accepted responses included 'data will be available to teams more quickly and will be more up-to-date'.

Question 11b.

Marks	0	1	Average
%	53	47	**0.5**

Most accepted responses presented a criterion in the form of a question comparing the quality of new and old images. Examples included, 'Are the images using the cloud the same resolution?' and 'Are the new images as clear as the old images?'

Responses which compared the download speed, ease of retrieval or security of images were also accepted.

Question 11c.

Marks	0	1	2	Average
%	47	21	32	**0.9**

Many students received a mark for stating that encrypting the data would protect it from hackers during communication. Complete answers included an explanation such as 'encryption scrambles the data and makes it unreadable to hackers' or 'data is encrypted with a key before it is sent and only users with the key will be able to decrypt and read the data'.