2008   Software Development GA 3: Written examination

GENERAL COMMENTS

The 2008 Software Development paper comprised of three sections: Section A contained 20 multiple-choice questions, Section B comprised of short answer questions and Section C was a case study. The maximum score was 89, with Section A worth 20 marks, Section B worth 17 marks and Section C worth 52 marks.

Most students handled the multiple-choice questions reasonably well, with an average mark of 14. However, a number of students left questions unanswered. Students should be encouraged to provided responses to **all** multiple-choice questions even if they are unsure of the correct response. Marks are not deducted for incorrect answers. Teachers are encouraged to consider using multiple-choice questions throughout the year for formative assessment.

Section B required students to demonstrate core theoretical knowledge. Students appeared to be familiar with this structure, but it is disappointing that the mean score for this section was approximately 58 per cent. Students were not required to apply their knowledge to a case study, rather they were just required to demonstrate knowledge about key concepts. Teachers should endeavour to use a similar questioning format throughout the year, perhaps using Section A of past examination papers (2003–2005), Section B of past examination papers (2006–2008) and Assessment Reports as tools to help develop internal assessment and practice examination material.

Section C has followed a consistent format for many years (previously as Section B), and student responses were again expected to apply to the case study. Students found many questions in this section challenging, with many gaining no marks on particular questions, either through providing no response or an incorrect response. The mean for this section of the paper was approximately 51 per cent, showing a significant increase on the 2007 mean of 45 per cent. Despite this improvement, students again did very poorly on Question 5, which focussed on an algorithm. This type of question appears every year and students must be prepared for such questions.

During the examination, students should:
- endeavour to use correct IT language throughout the paper
- when asked to justify a choice or compare one option with another, they should discuss all options
- know the difference between verbs such as 'state', 'explain', 'justify' or 'describe'
- re-read the question and their response to ensure the actual 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	Comments
1	13	9	51	26	
2	15	30	10	46	
3	18	15	10	57	
4	74	12	5	8	
5	70	12	15	3	
6	20	29	34	16	It is expected that students will be able to look at an algorithm and desk check it to see what it actually produces. There was little evidence of a formal desk check in student responses.

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7	7	4	84	4	
8	49	16	15	20	
9	18	64	15	3	
10	30	5	59	5	
11	40	41	15	4	This question was poorly done, showing that students were either not aware of the difference between bits and bytes or that they misread the question.
12	5	91	1	3	
13	8	13	7	72	
14	88	5	2	5	
15	1	94	1	4	
16	22	5	63	10	
17	3	2	38	57	Many students confused where a firewall should be placed.
18	10	80	5	5	
19	9	16	4	71	
20	2	89	5	4	

Section B – Short answer questions
Note: Student responses reproduced herein have not been corrected for grammar, spelling or factual information.

Question 1a.

Marks	0	1	2	Average
%	6	42	53	**1.5**

Acceptable purposes included:
- archiving: long-term storage of main system files in case information is needed in the future and to free up space on the main system
- backup: storage of files so that the system can be restored in the case of a crash or similar problem – data security.

This question asked students to state the purpose of archiving and backup and did not ask for an explanation of how to do it. A large number of students did not appear to know the purpose of archiving, even though it is listed in the *VCE Software Development Study Design*. Students needed to explain why the process was used, not how the process was performed. Many students explained how to archive and/or backup and therefore did not answer the question.

Question 1b.

Marks	0	1	2	Average
%	28	31	41	**1.1**

A possible response could have been:

Archiving is the storage of important data that is external to the main system for the purpose of later retrieval if required. Backup is the storage of data that is external to the main system in case the system crashes and data is lost.

This question required students to explain a difference between archiving and backup. Many students struggled to describe a difference and simply gave a definition without contrasting one process with the other. Many students also tended to repeat their answer for part a. Archiving transfers **inactive** files to an auxiliary storage medium before being deleted from the hard disk. Backups involve the copying of **active** files to an auxiliary storage medium to safeguard against loss or corruption – the files are not deleted.

Question 2

Marks	0	1	2	3	4	Average
%	14	12	22	20	32	**2.5**

- user documentation explains the use and features of a program as well as providing a guide to fix any common errors. It is external and usually printed in hard copy through online user documentation
- internal documentation refers to the comments inserted into the code by the original programmers. These comments provide guidance or explanations to maintenance programmers who may have to fix bugs in the software

Students needed to contrast both the purpose and the type of user and internal documentation. Many students did not clearly explain that internal documentation occurs in the code or did not mention the purpose of the documentation.

Question 3

Marks	0	1	2	3	Average
%	35	8	22	35	**1.6**

Students were asked to describe the features of a naming convention and state the advantages of this convention. Students needed to give two different advantages and not simply a rewrite of one advantage. It was disappointing to see the number of students who did not answer this question.

Following is an example of a student response that does not use Hungarian notation.

Main features: clear naming – relating the variable/procedure name to its purpose and using an underscore to separate multiple words, that is, 'procedure name'.

Advantage 1: makes it easier to tell what the purpose of the variable or procedure is if someone else was to read the program.

Advantage 2: the use of underscore makes the variable name easy to read and therefore easier to understand.

Question 4

Marks	0	1	2	Average
%	35	28	37	**1**

C – Write the program so that it first copies the entire file into main memory and then reads the data as needed.

C was the expected answer due to the speed of access and the critical words in the question 'randomly accessed many times'. However, many students chose option B 'Write the program so that it first copies the entire file onto hard disk and then reads the data as needed', arguing that the memory may not be able to handle 600 Mb of data without slowing the computer down which was also accepted. Students were expected to give reasons why the non-selected systems were inferior. Many students did not discuss the options they did not choose.

Question 5

Marks	0	1	2	3	4	Average
%	10	16	28	21	25	**2.4**

Claim	Criteria for evaluation	Comment
Very easy to use	Usability	This should mean that teachers will need very little training but you will need to check this
It takes only three minutes to load per user	Efficiency	This will need to be tested on our hardware. Three minutes is also a long time to wait
Operates without fatal errors on most networked systems	Stability, compatibility or reliability	Fatal errors will often cause a loss of all current work so this needs to be well checked. What is meant by most networked systems and is our network one of these systems?

The terms listed in the 'Criteria for evaluation' column are from the study design and students were expected to know them. Comments needed to be more than a restatement of the claim and should have included information that would help the principal make a decision, demonstrating that the student understood the implications of the claim.

Section C
Question 1

Marks	0	1	2	3	4	Average
%	33	17	38	4	7	**1.4**

Type of Factor	Example	Explanation
economic	errors in quotes	leads to a loss of income for Pattie's Parties
technical	out of date information or double booking	the manual system cannot keep the information up-to-date the system does not record information
social	long working hours	lack of staff means that records are rarely up-to-date, causing staff to work long hours

This question was very poorly answered. Very few students gave the correct example and explanation for the social factor. The question asked students to select from the case study, however many did not. Students were also asked to explain why it was a technical or social factor; many simply expanded on their example and did not answer the question asked.

Question 2

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

Lucy should take the flow chart back to Pattie's Parties to check if she has correctly interpreted what is happening and ensure that no errors have occurred.

Most students did not answer this question well. They had to mention that Lucy needed to show the flow chart to Pattie to link their answer to the case study.

Question 3

Marks	0	1	2	3	4	Average
%	17	19	20	20	24	**2.2**

A – client
B – suppliers
C – itemised costs
D – create quote

Students should have identified the names from the system flow chart in the case study in order to complete the data flow diagram (DFD) in this question. Ideally the same names should have been used for the same items, functions and procedures. It was clear that a number of students had little idea of what the symbols meant and what they could contain in them. Students need to be familiar with data flow diagrams and the meaning of standard symbols.

Question 4a.

Marks	0	1	2	Average
%	21	30	49	**1.3**

Pattie's staff will not have to wait for the database to load over the Internet each time they use it, as loading from memory is quicker than loading off the web, which is what System B does.

In this question students were asked to explain one advantage of System A over System B. Full marks were not awarded for simply stating one factor that was relevant to System A without reference to System B.

Question 4b.

Marks	0	1	2	Average
%	14	29	57	**1.4**

They have an updated database each time they use it as the database could change during the day, whereas in System A the staff are stuck with the one database all day and they have no way of knowing whether it has been updated.

In this question students were asked to explain one advantage of System B over System A. Full marks were not awarded for simply stating one factor that was relevant to System B without reference to System A.

Question 5a.

Marks	0	1	2	Average
%	79	16	5	**0.3**

This question was presented in two parts. The first part required students to read the test data and the description of what was wanted and predict what the algorithm should have produced. The second part of the question required students to desk check the algorithm to find out what was produced. In responses where this was done well, the answers to parts b and c of the question were also done well. Students should be able to create expected results from test data and also desk check algorithms, although most did not do so. This type of question has appeared on past examination papers so teachers and students should be well prepared for such questions.

5ai.
Pattie, Manfred

5aii.
Charles

Question 5b.

Marks	0	1	2	Average
%	72	4	24	**0.5**

The Count_Coordinator was initialised at 1 and then immediately increased to 2 before the first coordinator's details were accessed. Therefore, the first coordinator's details were allocated to the second coordinator, and the second to the third, without the third ever being accessed.

Many students recognised this error even if they could not complete part a.

Question 5c.

Marks	0	1	2	Average
%	74	4	22	**0.5**

To fix the error initialise the Count_Coordinator to 0 instead of 1. An alternative patch would be to move the line 'Count_Coordinator ← Count Coordinator + 1' to just before the line 'UNTIL Count_Coordinator = Num_Coordinators'. If the second method was chosen, students needed to alter the UNTIL line by changing the '=' sign to a '>' sign or changing Num_Coordinators to Num_Coordinators + 1.

Students who answered Question 5b. correctly generally also answered this question correctly. However, students who chose the second method of fixing the error generally did not mention the change to the UNTIL line and only obtained half marks.

Question 6

Marks	0	1	2	3	Average
%	13	6	16	65	**2.3**

Type	Variable Name
Boolean array	Coordinator_Available[]
String (Text) array	Coordinator_Name[]
Numeric	Num_Coordinators or Count_Coordinator

This question was generally well answered with most students achieving full marks.

Question 7a.

Marks	0	1	2	Average
%	23	36	40	**1.2**

Appropriate answers could have included:
- to eliminate the chance of spelling errors
- to restrict the choice to those options that are available.

A number of students did not recognise this as a question on data validation and their reasons for using text boxes were generally either incorrect or irrelevant.

Question 7b.

Marks	0	1	2	Average
%	24	25	51	**1.3**

Appropriate answers could have included:
- an existence test: to see if any data has been added
- a numeric test: to see if a number was entered
- a range test: to check that the number falls within a restricted range.

This question was well answered. Students were asked to explain the validation technique and not simply list a name.

Question 8

Marks	0	1	2	3	4	Average
%	12	17	31	18	22	**2.2**

Generally this question was not answered as well as expected. Students were asked to discuss the ethical considerations from both points of view. It was expected that students would contrast the two views and add further relevant information showing their understanding. However, many failed to do this and either simply restated the question and/or only discussed one point of view. Students need more practice on this type of question. Students need to understand that when an ethical dilemma exists usually there is not a clear-cut right or wrong viewpoint; rather it is a matter of weighing up these viewpoints, and determining which stakeholder has the strongest argument.

The following is an example of a reasonable answer.

Ethically programmers are expected to create programs which do not maliciously seek to cause harm to other companies (i.e. virus) and are expected to maintain the integrity of the data which has been given to them, so as it does not breach the Privacy Act 1988 or the Information Privacy Act 2000. While Sally contends that implementing encryption software is expensive and will increase the overall development costs, and it might be ethically wrong, she is bound by law to abide with the agreement with Pattie. While Schroeder is correct that ethically they should include the encryption software as it is part of their job as programmers to protect the information given to them, legally he cannot do anything about it as he would be breaking the contractual agreement which Pattie agreed to.

Question 9

Marks	0	1	2	3	4	Average
%	9	14	14	18	45	**2.8**

Marcell, Franklin, Linus

This question was generally well answered. Students who answered it poorly did not take into account the reason for the use of the mobile computing device and instead chose the largest and best model.

The following is a sample of a good discussion.

The Marcell and Franklin models have large hard drives for image and video storage, as well as for software, whereas the Linus does not. The Linus' screen is too small to view images or video and although the Franklin's screen is larger, the Marcell's screen is big enough. The battery life and the input does not differ greatly between the three models. The full keyboard will be useful for the detailed description of parties, but the camera and barcode scanner are not needed. The Marcell does the required job the best.

Question 10

Marks	0	1	2	3	4	5	Average
%	17	2	25	4	29	4	**3.2**

Appropriate responses included:
- range of network
- travelling to the client's home is part of the job. The range of the network must allow any access with the areas of Pattie's clients
- high-speed wireless network
- this will allow Pattie and her staff to upload information directly from the mobile device to the website in quick time and resolve delays.

Characteristics that could have been discussed included coverage, speed, cost, etc. Students then needed to explain what it was about the feature that was of interest in this particular case. Many students did not link their answers back to the case study. Students cannot expect to receive marks for generic answers or answers that restate the question without showing how it relates to this particular situation.

Question 11

Marks	0	1	2	3	4	Average
%	14	9	42	7	28	**2.3**

Appropriate responses included:
- how frequently backups are made
- Pattie would want to know that this is the plan because if backups are only made on a fortnightly or weekly basis she would lose a lot of quotes, and therefore a lot of business if there was a disaster and it needed to be implemented
- recovery speed
- if the company cannot get the system back online quickly, Pattie could lose money through loss of business as no information is being provided to her clients.

This question referred to the disaster recovery plan of the ISP and not for Pattie's Parties. Areas that could have been discussed included the backup plan and the recovery plan. Students not only had to explain the plans but also needed to explain why they would be important to Pattie's Parties. Some students did not link their answers to the case study and did not know what was in a disaster recovery plan (for example, discussing data security issues).

Question 12a.

Marks	0	1	2	Average
%	13	29	58	**1.5**

- Advantage of Training program 1: the staff can concentrate on learning Pattie's new system and not be distracted by the day-to-day business.
- Advantage of Training program 2: staff would learn to use the new system on the job and can apply what they are learning to real life situations. It also gives them the opportunity to ensure the system will work correctly from each home.

This question was well answered. For the minority of students who did not score full marks, it was because they cited cost as an advantage (when the question asked them to state an advantage apart from cost) or claimed that they would not get professional trainers for option 2, despite the question stating that the same company was supplying the training. Students also lacked knowledge of what onsite training involves.

Question 12b.

Marks	0	1	Average
%	25	75	**0.8**

Pattie should choose option two despite the cost as this training allows the staff to see how the new system will actually work from Pattie's house. Pattie's staff will learn how their mobile devices and the new software will work from their homes.

This question was well answered. Most students were able to find justifications for the option they chose.

Question 13

Marks	0	1	2	3	4	5	Average
%	38	14	14	15	9	11	**1.8**

This question was poorly answered with very few students getting full marks. Many students did not understand what an evaluation strategy is and what it should include. Many students also did not refer to the criteria that were to be evaluated and their answers were not relevant.

The following is a sample answer.

Time frame: three to six months after the implementation of the new system

Data to be collected and from where: database (to collect initial quotes and final billing details). Get feedback from customers regarding the timeliness of the quote

How the data will be used to evaluate this system goal: if the initial quote and final billing details are usually close, this would indicate that Pattie had achieved her goal of providing accurate quotes. If the customers responded positively about the timeliness of the quote, this would mean that Pattie had achieved her goal of providing timely quotes