Information Technology Studies

2004 ASSESSMENT REPORT

Technology Learning Area

SSABSA
SENIOR SECONDARY ASSESSMENT BOARD OF SOUTH AUSTRALIA

SACE
SOUTH AUSTRALIAN CERTIFICATE OF EDUCATION

INFORMATION TECHNOLOGY STUDIES

2004 ASSESSMENT REPORT

GENERAL COMMENTS

The examination was designed to provide the students with the opportunity to demonstrate their knowledge and understanding of the key ideas and concepts as stated in the curriculum statement.

Part A consisted of questions that mainly assessed recall and application of knowledge, whereas Part B – Section 1 provided students with scope to demonstrate their problem solving skills and ability to write extended answers to apply their understanding of concepts to a given context. Part B – Section 2 gave students the opportunity to write a structured response to an article that was based upon a current information technology issue.

The most common areas to students' responses needing improvement were:

- Lack of sufficient detail in their explanations. Students are reminded that the marks provide a guide as to the number of key points required. Students must use specific, accurate, and relevant information technology terms when answering questions.
- Not being familiar with the curriculum statement's key ideas and concepts.
- Not reading the question carefully enough. Students must be familiar with verbs such as 'outline', 'describe' and 'explain' and know the differences between them. They must read the question as a whole before answering each part.

ASSESSMENT COMPONENT 1: EXAMINATION

PART A: SHORT ANSWER QUESTIONS

Question 1

The mean mark for this question was 4.7, and was the best answered question in Part A. Over one-third of the students scored full marks, with 93% scoring at least half marks. Terms A and F were answered incorrectly more often than any of the other terms.

Question 2

This question had a mean mark of 3.5 with nearly 53% of students scoring less than half marks.

(a) Many students wrote a definition of ROM and RAM rather than explain why they are needed by a computer system.

(b) The better responses focussed on describing the start up processes – in particular, the comparison of the data stored in the CMOS chip with the results of the POST.

(c) This was well done. The notion of 'free memory' was sometimes overlooked.

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Question 3

This question had a mean mark of 3.

(a) There was some confusion about the role of a Systems Analyst, with students either referring to the work performed by a System Administrator instead, or writing a vague

answer such as ‘they analyse systems’. On the other hand, students had a good understanding of the work performed by Technicians and Programmers.

(b) The responses to this part were well done.

Question 4

This question had a mean mark of 2.3.

a) Many students were able to recall that machine code is made up of binary digits and supported their answer with the fact that it was made up of 1’s and 0’s. A small number of students said it was machine dependent.

b) This part was poorly answered with many answers being a restatement of the question or a discussion on what compiling meant. Good answers stated that the code was checked for syntax errors and that the entire source code was converted to object code when there were no errors.

c) Most responses stated that compiled code runs faster, but did not say why this is the case. Poor responses compared the compiling process against the interpreter process.

d) The better answers demonstrated an understanding of the difference between programmers and software users, that is, the programmer works with the code and a user uses the completed software. Most students could recount that a programmer could not copy lines of code as their own without permission. Some students made mention of the licensing agreements that are agreed upon at the time of installation.

Question 5

The mean mark for this question was 3.2.

a) This part was well answered with students discussing the conversion of the digital signal to analogue and vice versa. Poor answers simply stated a modem was needed to connect to the Internet.

b) Many answers to this part correctly identified communication media but were unable to correctly outline the method of transmission of data by the media. Quite a few students did not seem to understand what was meant by the term ‘communications media’, as they gave answers like ‘the Internet’ and ‘the ISP’.

c) The good answers to part (i) indicated that the email was stored on an email server at the ISP. Many answers did not give a reason as to why this could be the case. Likewise, many answers to part (ii) demonstrated a poor understanding of POP email accounts provided by the ISP and the need to run email software such as Eudora or Outlook. These answers tended to discuss web email accounts. The better answers discussed logging on to the ISP and running email software.

d) Good answers to this part mentioned that a virus is an executable program and therefore has to be attached to the email as a file. Plain text cannot contain the code in an executable form. Poor answers stated that any email could contain a virus and discussed virus prevention methods such as using anti-virus software.

Question 6

This question had a mean mark of 2.7.

a) The better responses were able to explain that an intranet is more than a local area network, as it uses Internet (tcp-ip) and web technologies (html) to foster internal communication within an organisation.

b) Most students were able to recall that the IP address identified a computer on a network, but not all were able to say it was a unique identification that consists of a 4 byte number.

c) Most students were able to write about read-only permissions. The better responses stated that this would prevent a student from saving changes to the file.

d) This part was well done, as the responses stated that Thea could access the file without bothering the teacher and at any time that she wished. Few students said that this would have to be done from a computer on the school's network.

e) A significant number of students said that Thea could use the Internet for research because the Internet has much useful information. Such responses missed the point of having access to the assignment sheet from any other computer that is connected to the Internet.

Question 7

This question relates directly to the Information Systems and Relational Databases topic. Its mean mark was 1.6.

(a) Most responses concentrated too heavily on the hotel in general, rather than its information system. They also focused on the benefits of a database, rather than a relational database. The better answers referred to a relational database being able to reduce data redundancy and improve the integrity of the data it stores.

(b) This part was answered well.

(c) The language used by most students in this part was vague, as they tended to write simplistic answers.

(d) This part was not well done.

Question 8

This question had a mean mark of 3.5. Given that all students are required to design and create a relational database for their Individual Project, it was surprising that this question created difficulties for students.

(a) Most students had difficulties in explaining why the RaceDates table was required for the database.

(b) Some students were not able to demonstrate an understanding of the many-to-many relationship that exists between the RaceDates and Horses tables.

(c) Only a small number of students were able to add the two fields to the correct table. Common errors were to place the jockey field in the Horse table (this means that each horse could only be ridden by one jockey), and the prize money field in the Races table (this means that the prize money for a race would always be the same).

(d) A majority of students were able to answer the question correctly. Some errors occurred in accurately identifying data types and field sizes.

(e) In general, students had difficulties in communicating the exact impact of the keys on the database. For example, in part (ii), an incorrect response was 'each horse could only ever be one colour' when the correct response is 'each horse would have to be a different colour'.

Question 9

The responses to this question were normally distributed about a mean of 3.5. Almost 9% of the students scored full marks.

(a) Many students found it difficult to explain the difference between the two types of loops. Frequently, they reversed the answers for the two loops. For example, they stated that a pre-test loop tests the stopping condition after the loop happens.

(b) This part was answered quite well, but some students forgot the first part to the statement 'totalCount=' writing just 'totalCount =1'.

(c) Quite a few students responded with 10793 and did not factor in that the pre-test loop will happen one more time when totalCount has this value.

(d) This part was answered well, although a common mistake was to circle their answer to part (b).

(e) Many students thought that no one would be admitted to the stadium, rather than the gate would be open regardless of whether a ticket was valid or not.

PART B – SECTION 1: EXTENDED RESPONSE QUESTIONS

Question 10

Although the mean and modal marks for this question were 6, the responses were negatively skewed. Students must be familiar with answering questions that relate to embedded computer systems, with more emphasis upon applying their knowledge rather than just memorising the parts and their general function.

(a) Many students did not apply their knowledge of storage systems to the required depth, writing answers such as 'large capacity' or 'easily damaged'. Others did not fully understand the types of storage.

(b) Students should use a calculator to work out their answer to this type of question. In particular, they should use multiples of 1024 when converting between bytes, kilobytes, megabytes, and gigabytes. The better responses included all the required working out and had a critical look at their answer.

(c) This part was poorly answered. Most students explained what each term meant or gave a definition of each term, but did not relate it the question. Students struggled relating the terms to the scrolling through a list of songs.

(d) Most students had a strong awareness of the rights of artists and breach of copyright, with many able to name music sharing programs. Unfortunately, some students offered vague descriptions such as 'downloading it from the Internet'. The better answers highlighted their knowledge that the Internet is extensive, and only some parts of it, such as web and ftp sites are involved in this scenario.

Question 11

The mean mark for this question was 8.2.

(a) Most students only gained half a mark as they did not 'explain' the advantage, but rather only made a brief statement of a few words.

(b) General knowledge of what a firewall was and what it did was poor, as students often only stated that it 'blocked hackers'. Poor responses stated that a firewall blocks unauthorised users or stops anybody from entering the computer. A firewall is simply a program or hardware device that filters the information coming through the Internet connection into a private network or computer system. A firewall could also be used to block certain ports, hence restricting access.

(c) This part was answered satisfactorily, although quite a few students wrote that packets are sent along the fastest route. The better responses wrote that the packets were individually routed along their own path then reassembled into the correct order.

(d) Generally very well answered, with students clearly understanding the role of http and html. For some students, 'the Internet service' was not recognised as being the world wide web, and this affected their answer.

(e) This was answered well, with most students aware of the data that flows during a logon process. The better answers referred to a database of accounts and password that would be accessed by the web site during the validation process.

(f) Most students correctly identified two different methods, but did not include enough depth in their description of how the methods work.

(g) The responses to this part tended to be general and often included a rephrasing of the question. The better responses addressed the nature of interactivity and wrote about the use of 'radio' and 'submit' buttons to collect and send a response respectively; and the use of a programming environment such as Javascript to process the responses against a database of answers to determine whether a pass is awarded.

(h) Many answers lacked detail. There was generally no explanation and very few students elaborated as to how the technologies would be used. Most students answered that a WebCam would be used, but did not mention that someone who knew the student or had a photograph of the student would be needed to look at this photograph. Alternatively the image captured on the WebCam can be compared with biometric data already stored in the computer.

Question 12

This question was answered the best in Section B. Its mean mark was 8.

(a) Many students created a transaction table which included recipe ID and ingredient ID. However, not many students thought carefully about what they are actually resolving, the fact that each recipe may have many ingredients and that the cook needs to know just how much of each ingredient is needed in the recipe.

(b) This was poorly answered. Students who considered the meaning of the database found the correct answer – the amount of each ingredient.

(c) The students could have answered 'yes' or 'no' to this question. If they answered 'no' it was expected that they explain that sometimes an ingredient may be used twice in the same recipe perhaps with different amounts for different components, and as such, no restriction was necessary. If they answered 'yes' it was expected that they explain that each ingredient is needed once in any recipe and hence a key that consists of two fields would be acceptable.

It was not expected that students understood how a recipe works, only how keys in a database and transaction table work. Many students found it difficult to explain how and why keys are necessary in tables. The concept that a key not only uniquely identifies a record and cannot be repeated but also blocks illegal transactions, was not well explained.

(d) The better responses showed an understanding that SELECT means fields, FROM means tables, and WHERE is the criteria. They included more than just 'ingredient' and 'time to prepare' in the SELECT part, however this was not required for full marks, as they had not yet looked at what was required in part (e). The link between a SQL type query and a Data Flow Diagram was missed in some responses.

(e) The ability of students to complete a Data Flow Diagram has been improving each year, and there was no exception this year, with many being able to complete it. There

was a small loss of marks if students were unable to complete parts (a) and (b) of the question correctly. Students needed to look carefully at the final outcome to see that 'name' and 'instructions' were also required from the recipe table. Common errors included writing examples of field contents (prawns) rather than the field name (ingredient); and omitting a second value either entering a table (time to prepare) or leaving it (amount, instructions).

Question 13

The responses for this question were evenly distributed about a mean mark of 8.

(a) Many students answered this part correctly. The poor responses did not label the constructs clearly, and often circled the whole module that contained the construct.

(b) Most students answered this part correctly.

(c) Responses to this part varied, with the majority of students attempting the desk check. Many students had different problems at various stages of the desk check. A common error was to leave out the calculation of the cars variable. A considerable number of students did not recognise the end of the REPEAT …UNTIL loop. These students traced the Results module for each iteration of the loop, causing the results to be displayed during each iteration.

(d) Many students were able to place the modules, loop, and condition control structures correctly. Those who did not do well put variable names instead of module names in their structure chart. They also included some of the pseudo code as well. A few students correctly identified the flow of data for the variables.

(e) Most students determined that it was a logic error, but did not explain why, and instead, they gave the definition of a logic error. A few students were able to make the change to the algorithm.

PART B – SECTION 2: STRUCTURED RESPONSE

Students are getting much better at structuring their responses, covering most of the points, and ensuring that they include a healthy mix of fact and opinion. Some introductory paragraphs are too long, one or two sentences should be sufficient. Too many responses were 'conversational', with general comments (e.g. 'firewalls could be used to block hackers'), and discussion of the issues. Students who applied technical knowledge to the issue and gave more specific details were appropriately rewarded. Students must be careful to have a balance of fact and opinion. The average result for the Structured Response was 58%.

Question 14

Nearly 44% of the students answered this question, which had a mean mark of 18.7.

The students were clear about was required by Jack to use the Internet. There was, however, confusion between the Internet and the world wide web, with the terms often used interchangeably. Many students did not realise that it was the features of the web, such as hyperlinks and URLs, that were needed to clarify how Jack would benefit from using this service; not the features of the Internet.

Nearly all students knew how to use a search engine and could give an example of a search engine. They knew what sorts of search strings could be used and how the results were relayed back to Jack. Few students understood how the search engines worked, many referring to the search engine as a program that took the search string and searched the Internet for matches.

A few students noted that information is available 24 hours a day and 7 days a week and the wealth of information due to the number of web sites available. Students needed to give precise examples of the accuracy of information.

The advantages and disadvantages were well covered. Students were aware of the lack of credibility and difficulty of verifying information found in web pages. They were aware of the volume of data available and the need to cross-reference the information for validity.

Question 15

Just over a quarter of the students answered this question, which had a mean mark of 14.9.

Many students were not able to identify different people who can steal money from a bank account. In most cases only a hacker was mentioned. Few students made an attempt to identify people from inside and outside a bank.

Most students gave a good answer to the hardware needed, but very few explicitly addressed the options of having dial-up connection, a dedicated line, broadband and an ADSL modem. Most students only mentioned 'hacking software'. Some students mentioned virus programs, but without specifying details (Trojan) and without explanation how it could be used.

It was surprising how many students claimed that it is relatively easy to hack into a bank account. The whole concept of security, firewalls, and passwords, appears to be generally misunderstood. There was a general belief that a hacker simply had to hack and they had entry into the computer system. There was also a general belief that banks did not have any security or firewalls, and that should people use passwords then hackers would not be able to hack the computers.

There is a need for students to give specific details. 'Access' in particular was poorly answered. Knowing a person's credit card number and PIN did not give people access to the ATM as was generally thought. There was little reference to the fact that should a person know a bankcard number and password they could use a computer from home to access the account. There was little understanding that all transactions were recorded, and should a hacker illegally use somebody else's account, then this can be traced.

In general, the students were very aware of the measures to be taken to protect data from hacking. While most students discussed possible impacts of hacking on individuals, banks, and communities, only the better students were able to explicitly and logically discuss implications and effects of bank hacking.

Question 16

The number of students who answered this question was the same as question 15. The mean mark was the same as question 14.

There were a number of competent answers to this question, and a few excellent ones. The more successful answers concentrated on the original (and main) definition of SPAM (ie unsolicited junk email), and treated similar items such as pop-ups only fleetingly. The bulk nature of the mail-out was often ignored.

Many students were able to identify the main senders of spam but were less successful in identifying where they got the addresses from or the problems spam causes. The most common of these were loss of genuine emails, and clogging bandwidth / mailboxes.

Successful answers always identified changing people's practice in various ways as the most effective anti-spam measures. Difficulties in combating spam was the least successfully answered section of the response. Students generally offered only two reasons from the following list — anonymity, ubiquity, profitability, and lack of sanctions.

ASSESSMENT COMPONENT 2: THE INDIVIDUAL PROJECT

The moderation panel stresses the importance of teachers checking and approving the student individual projects, especially their outcomes, before students start developing their database. Teachers and students must take note of the project notes that are stored on the SSABSA web site. In particular, the attention of teachers and students is drawn to the fact that all outcomes must relate to the transaction table.

Students are not to lock down their databases or use passwords. Although this demonstrates particular skills, it makes it more difficult for the moderators to assess the other skills demonstrated by the student.

Teachers must supply a 'Skills Checklist'. The checklist is a qualitative measure of the skills demonstrated by the student. It shows the level of skills taught and expected by the teacher. A-level students are expected to show high level skills – for example, 'user selection' should refer to a form-based selection using combo or list boxes; not parameter value entries.

Students who achieved excellent results in the Individual Project were able to demonstrate an efficient use of the necessary tables. They were also able to trace the data through the source tables for one record in the transaction table when validating their outcomes.

Some students tended to add an ID field as the key to a table. They should be able to have a critical look at the data and determine a realistic key, rather than fall back to using an autonumber for a source table.

Chief Assessor
Information Technology Studies