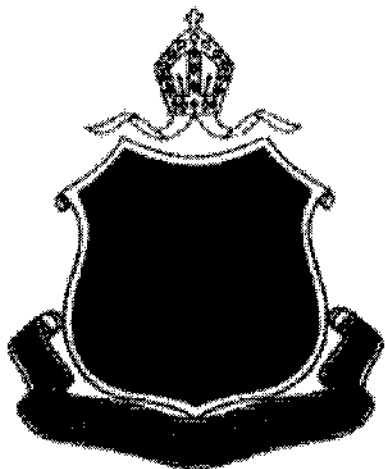




Barker College

2001 Year 12 Trial HSC EXAMINATION

Information Processes and Technology

LFK*
AJI
SLS

General Instructions

- Reading time - 5 minutes
- Working time - 3 hours
- Write using blue or black pen

Section I

Pages 1 – 4

Total marks (20)

- Attempt Questions 1 - 20
- Allow about 35 minutes for this section

Section II

Pages 5 - 10

Total marks (50)

- Attempt Questions 21 - 24
- Allow about 90 minutes for this section

Section III

Page 11

Total marks (30)

- Attempt Questions 25 - 26
- Allow about 55 minutes for this section

CALCULATORS ARE NOT PERMITTED

Section I

Total marks (20)

Attempt Questions 1 – 20

Allow about 35 minutes for this section

Use the multiple-choice answer sheet.

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9

A ○ B ● C ○ D ○

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:

A  B  C  D 

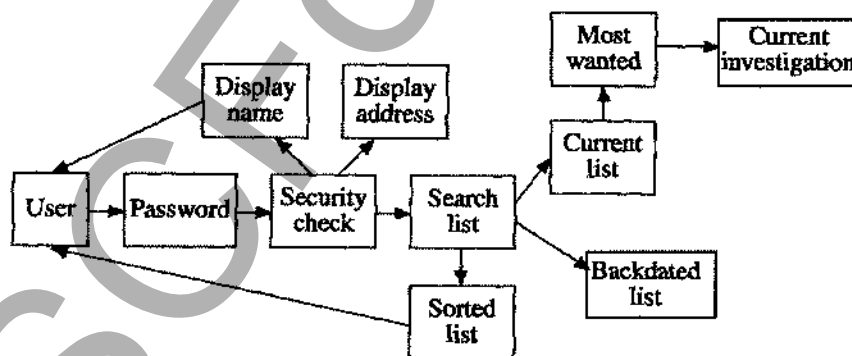
← correct

correct

- 1 In a high school library, books can be borrowed by using a borrower's card that has a magnetic strip uniquely identifying the borrower. Which information process is involved when the borrower card is "swiped" to read its magnetic strip?
 - (A) Organising.
 - (B) Processing.
 - (C) Storing and retrieving.
 - (D) Collecting.
- 2 Technical feasibility
 - (A) compares the costs of developing the new system with the expected benefits.
 - (B) determines the information technology requirements of the new system and the demands that will be placed on the new system.
 - (C) determines whether time is available to implement the new system.
 - (D) determines whether the new system will fit into the organisation and meet the current goals and objectives.
- 3 What is the best way for a university to organise data about students and the courses in which they are enrolled?
 - (A) On a course web-site.
 - (B) In a relational database.
 - (C) In a flat-file database.
 - (D) As hypermedia.
- 4 Which of the following is the best way to validate information retrieved from the Internet?
 - (A) Access the information using a variety of search engines.
 - (B) Determine the number of visitors the Internet site has had.
 - (C) Verify information with a variety of other sources.
 - (D) Identify the author of the information.
- 5 An organisation has decided to systematically replace each employee's desk-top computer with a laptop computer over a three-year period. When each desk-top reaches a certain age, it is replaced with a new laptop. What name is given to this type of conversion method?
 - (A) Pilot.
 - (B) Direct.
 - (C) Parallel.
 - (D) Phased.
- 6 A Gantt chart is useful
 - (A) During the feasibility study.
 - (B) During the design phase.
 - (C) As a part of a prototype design.
 - (D) At all stages of the project.
- 7 To safeguard data on a networked computer against viruses, computer failure and a malicious user -- what would be the best precaution to take?
 - (A) Encrypt the data.
 - (B) Password protect the data.
 - (C) Backup the data.
 - (D) Put the computer in a locked room.

- 8 Which of the following system design tools has the advantage that it is easily understood by non technical users?
- (A) Decision tree.
 - (B) Data flow diagram.
 - (C) Systems flow chart.
 - (D) Context diagram.
- 9 Batch processing is a method of processing data where
- (A) Transaction are processed as they arrive.
 - (B) Data is processed in real time.
 - (C) Previously collected data is preprocessed before it is entered.
 - (D) Data, which may have been collected over a period of time, is entered all at once.
- 10 The Webmaster of a school won't allow students to be identified on the school web site. This is a case of
- (A) Access.
 - (B) Freedom of information.
 - (C) Changing nature of work.
 - (D) Ethics.
- 11 Ergonomics is the relationship between people and
- (A) Their work environment.
 - (B) The equipment they use.
 - (C) The climate.
 - (D) Their colleagues.
- 12 A major role of the network administrator is to
- (A) Install network hardware and software.
 - (B) Manage user passwords.
 - (C) Check that the internet is operating at optimum speed.
 - (D) Maintain network efficiency.
- 13 The most common and efficient method of error correction in data transmissions between computers
- (A) Cyclic redundancy check.
 - (B) Parity check.
 - (C) Retransmission.
 - (D) Checksum.
- 14 Undesirable duplication of data within a database is
- (A) Data redundancy.
 - (B) Data bias.
 - (C) Data integrity.
 - (D) Data independence.

- 15 In a word processed document, the font size can be changed, headings can be emphasised with bold face and paragraphs can be indented. These are examples of
- Editing.
 - Documentation.
 - Saving.
 - Formatting.
- 16 The information process that is carried out by a scanner is
- Analysing.
 - Collecting.
 - Storing and retrieving.
 - Displaying.
- 17 In a data flow diagram, a person who receives data would be represented as a
- External entity.
 - Data flow arrow.
 - Process.
 - Data store.
- 18 Consider the traffic control system of Sydney's Central Business District (CBD) as an information system. The environment for this system would be best described by
- Traffic lights throughout the CBD
 - The traffic lights, drivers, vehicles and the road network
 - The city of Sydney
 - The cars and drivers in the CBD
- 19 The diagram represents a system development tool.



It is called a

- Storyboard.
 - Systems flowchart
 - Hierarchy chart.
 - Data flow diagram.
- 20 An advantage of using interviews as a method of collecting data is that
- They are inexpensive to implement.
 - Large amounts of data can be gathered quickly.
 - Personal contact often results in more accurate data.
 - The interviewer has a more interesting job.

Section II**Total marks (50)****Attempt Questions 21 – 24****Allow about 90 minutes for this section**

Answer each question on SEPARATE sheets of paper. Extra sheets of paper are available.
If you include diagrams in your answer, ensure that they are clearly labelled.

Marks**Question 21 (10 marks)** Use a SEPARATE sheet of paper.**Project**

As part of your HSC Studies you have completed several projects. In relation to ONE of these projects

- | | | |
|-----|---|---|
| (a) | Name the information system on which your project is based and describe the problem you attempted to solve. | 1 |
| (b) | Identify the participants in this information system and identify their needs. | 1 |
| (c) | Describe TWO factors you considered in the feasibility study of your project. Discuss BOTH of these factors in relation to you project. | 2 |
| (d) | (i) What is prototyping? | 1 |
| | (ii) Explain how prototyping could be used in your project. | 1 |
| (e) | Identify one software application used in your project and justify why it was used in the context of your project. | 1 |
| (f) | Describe the criteria you used for evaluating the success of your information system. | 1 |
| (g) | Briefly discuss one Social or Ethical issue that arose in your project. | 2 |

End of Question 21

Question 22 (15 marks) Use a SEPARATE sheet of paper.

Databases

The diagram below shows ten records of a database set up by the Information Technology Manager of a university. This database consists of records containing information about the computers in use within the university. Each record refers to just one computer.

Marks

User	Room	Type	PC ID	IP Address	OS
Dr Horsfield	205 G	Mac LC II	Maths20	127.94.80.203	Mac OS
Data Entry	Editing	Pentium III	IBM2	127.94.62.156	Win 95
Prof Reilly	210 C	G4 Cube	English05	127.94.80.247	Mac OS
Jeng-Won	21 G	G3 Laptop	Bigmumma	127.94.62.80	Mac OS
Ms Ashford	204 B	ThinkPad	IBM2	127.94.80.212	Win 98
File Server	304 B	Dell 4400	Snoopy	127.94.80.255	Linux
Data Entry	Reception	Pentium III	Office221	127.94.62.190	Win 95
Students	210 D	Mac G3	LAB2220	127.94.80.156	Mac OS

- (a) Create a data dictionary for this data base. 2
- (b) A field value can be verified as '**Not Empty**' and '**Unique**' if there is always an entry and the value is always unique to the record. When this is set for a field, the program will not allow a blank entry. What is one field that must be **Not Empty** and must be **unique**?
Use the records above as your guide. 1
- (c) (i) A dialog box enables the manager to use a **pre-defined list** with a field. In which field of this database would it make most sense to have a **pre-defined value list**? 1
- (ii) List the values you would use for this predefined value list. 1
- (iii) Give two advantages of creating such a predefined value list. 2
- (d) (i) This database is a flatfile database. If a relational database were to be created with a link to a table from an **existing STAFF** database which included the fields NAME, SURNAME, TITLE, DEPARTMENT, PHONE EXTENSION and PAYROLL NO, which field would need to be added to the **above computer database** as a primary key? 1
- (ii) Draw the schema for this relational database. 2
- (e) A technician needs to locate all computers with IP addresses from 127.94.80.0 inclusive to 127.94.80.50 inclusive. To do this the Match Records feature of the Database (shown over) will be used.

Question continues over...

Marks

Enter Match Records Condition

Fields	Operators	Function
User	+	ABS(number)
Room	-	ACOS(number)
PC Type	*	AND(logical1,logical2,...)
PC ID	/	ASIN(number)
IP address	=	ATAN(number)
OS	>	ATAN2(x number,y number)
	<	AVERAGE(number1,number2,...)

Formula

Cancel % OK

Records can be matched using both Operators and Functions

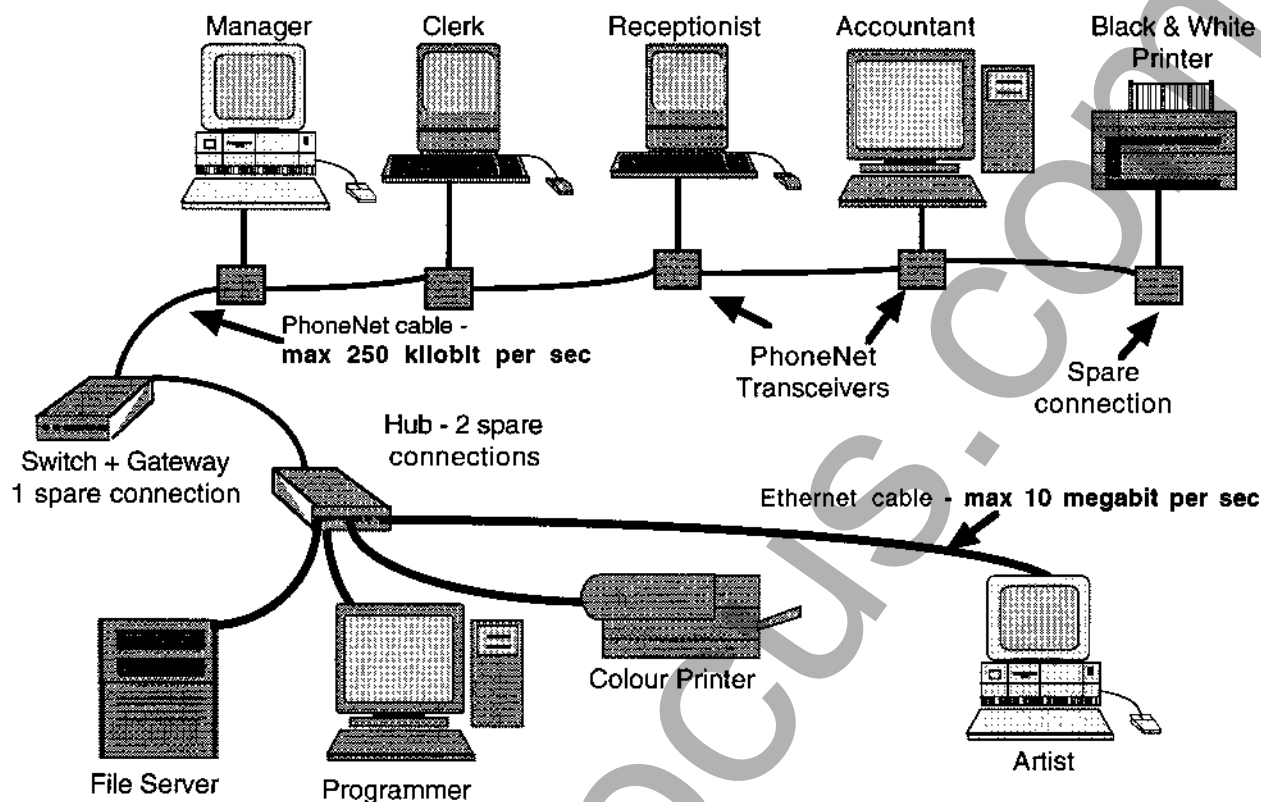
Operators		
> greater than	< less than	<> not equal to
>= greater than or equal to	<= less than or equal to	
Functions		
AND (condition1, condition2)		
OR (condition1, condition2)		

- (i) Write the correct formula to match the records needed. 2
- (ii) This database is available for the Technicians to use on the university network. Discuss, using appropriate examples, one social and ethic issue associated with networked databases. 3

End of Question 22

Question 23 (15 marks) Use a SEPARATE sheet of paper.**Marks****Communications**

(a) The following diagram shows the computer networks used by a small software company.



There are two networks:

- The First Floor network links four computers and a printer in a bus network using slow (250 kilobit per sec) PhoneNet cable.
- The Ground Floor network links two computers, a file server and a printer using faster (10 megabit per sec) Ethernet cable. Both networks are linked by a combination switch and gateway.

(i) After working on a file, the Clerk uploads the file to the File Server. Uploading takes 5 minutes and 20 seconds. No-one else was using the network during this operation. If no-one else is using the network, how long (in seconds) will it take the Artist to download the same file from the File Server? (Allow for maximum data transfer rates on all parts of the network. Show all working)

2

(ii) A technician has been called in because the Manager complains that he cannot print on the black and white printer, he can only print on the colour printer. The technician asks the other users if they also have printing problems. The Clerk and Receptionist both say they only ever use the black and white printer and they are not having any problems. The Artist says she only ever uses the colour printer and that she is not having any problems. The Accountant says he is not having any black and white printing problems but he cannot access the File Server. The technician suspects a broken cable. Which cable is faulty?

1

- (iii) Describe two alternatives to copper cable as a transmission media in Wide Area Networks. Give the advantages and disadvantages of each. 4
- (b) Hubs are 'dumb'. When they receive a packet they retransmit it in all directions. Switches are 'smart'. They read the destination and sender addresses of a packet and they allow the packets to pass from one zone of a network to another only if the destination address is in the other zone. Below is a table of destination addresses and sender addresses from four different packets. Which packet would the switch pass through? 1
- | | Destination Address | Sender Addresss |
|---|---------------------|-------------------------|
| A | Clerk | Receptionist |
| B | Artist | Colour Printer |
| C | Manager | Black and White Printer |
| D | Programmer | Black and White Printer |
- (c) (i) The Manager hires a casual programmer for a period of two months. This programmer will need to upload and download very large files, very quickly, to the file server. The programmer is given a new computer with the address "Casual". Mark on the diagram where you think this compuer (Casual) should be connected to the network to allow fast uploading and downloading and least interference with other users. 1
- (ii) The manager has decided to go into **e-commerce**. He wants the company to have a presence on the web. He has had a web page created. Describe the hardware and software required to allow internet access for everybody on the company network and at the same time to host the company web page. 3
- (iii) This decision by the manager has changed the network from a closed network only accessible by staff connected to the network, to an open network which can be accessed by anyone. Discuss one social and ethical issue associated with open networks. 3

End of Question 23

Question 24 (10 marks) Use a SEPARATE sheet of paper.

General - Case Study

Marks

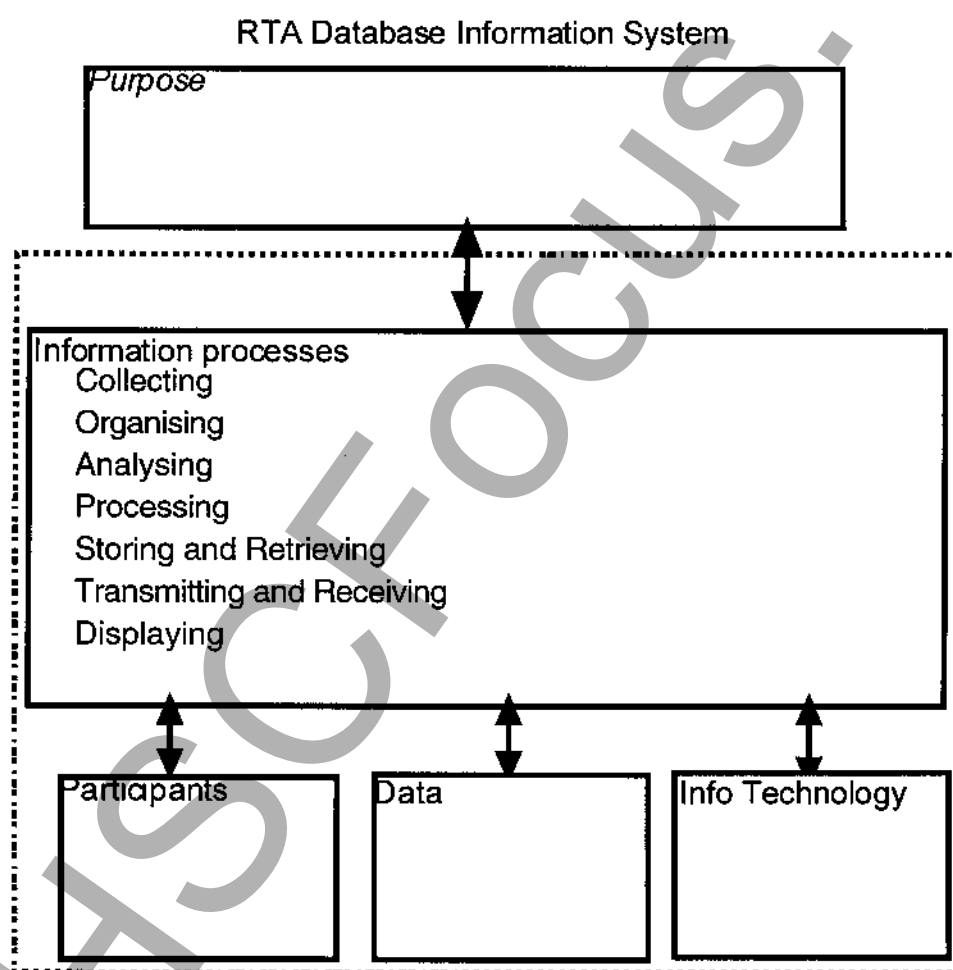
The Roads and Traffic Authority (RTA) is an organization that uses a database information system. Its purposes are to ensure vehicles are safe and to provide individuals with a driver's licence. When the owner of a vehicle needs to renew the registration, he or she requires a pink slip and a green slip. These forms are presented to the RTA staff along with the old Certificate of Registration. Computer terminals are used to update the data, and a central database is automatically updated with the details of the vehicle, such as plate number, model and engine number. The owner pays the registration fee. Updated details are then printed on a new Certificate of Registration, which is issued to the owner.

(a) REDRAW THE FOLLOWING DIAGRAM ONTO A SHEET OF ANSWER PAPER

6

THEN...

Complete the diagram representing the RTA information system in context.



(b) Draw a data flow diagram representing the process of renewing a vehicle's registration.

4

End of Question 24

Section III

Total marks (30)

Attempt Questions 25 – 26

Allow about 55 minutes for this section

Answer each question on SEPARATE sheets of paper. Extra sheets of paper are available.
If you include diagrams in your answer, ensure that they are clearly labelled.

Question 25 (20 marks) Use a SEPARATE sheet of paper.

Multimedia

Multimedia consists of a number of media, one of which is sound.

- | | Marks |
|--|--------------|
| (a) Name the other media used in multimedia. | 2 |
| (b) Describe in detail how the sound component of a multimedia project is recorded and stored. Include a labelled diagram. | 4 |
| (c) Sound files can take up a large amount of space. Explain in detail how sound files can be compressed. | 4 |
| (d) Other than compression, what other factors can be manipulated to reduce the size of a sound file? | 4 |
| (e) Discuss the issue of copyright in relation to multimedia presentations? | 2 |
| (f) When designing a multimedia presentation for children less than 8 years of age what features would you incorporate. | 4 |

Question 26 (10 marks) Use a SEPARATE sheet of paper.

Social and Ethical issues

The issue of the **Nature of Work** investigates the changes in an individual's day to day work-related activities as a result of the introduction of computer technology, and the implications of these for the individual and the possible consequences for work, health and lifestyle. **10**

Using **one or more** of the following individuals, describe the impact that computer technology has had on the nature of work for this individual. Contrast what or how tasks were done previously to what or how tasks are done today. Describe the advantages and disadvantages to this individual of the changed nature of their work. In your answer you should address the issues of deskilling and retraining.

- petrol station attendant
- secondary school teacher
- checkout operator in a supermarket
- manager/owner of a small business
- pilot
- bank teller

End of Paper