VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2003

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

									Letter
Figures									
Words									

INFORMATION SYSTEMS

Written examination

Wednesday 12 November 2003

Reading time: 11.45 am to 12.00 noon (15 minutes)
Writing time: 12.00 noon to 2.00 pm (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	14	14	25
B	11	11	75
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, an approved graphics calculator (memory cleared) and/or one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 14 pages with a detachable insert containing a case study for Section B in the centrefold.

Instructions

- Remove the insert containing the case study during reading time.
- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other electronic communication devices into the examination room.

SECTION A – Short-answer questions

Instructions for Section A

Answer **all** questions in the spaces provided.

Question 1

In a data flow diagram, actions performed on data are called _____.

1 mark

Question 2

Name the most appropriate phase of the Systems Development Life Cycle for each of the following activities.

Activity	Phase
Using strategies to check that the new system continues to function correctly	
Interviewing current users	
Installing the new system	

3 marks

Question 3

State the difference between a local area network and a wide area network.

1 mark

Question 4

Why would a computer be given an 'IP address'?

1 mark

Question 5

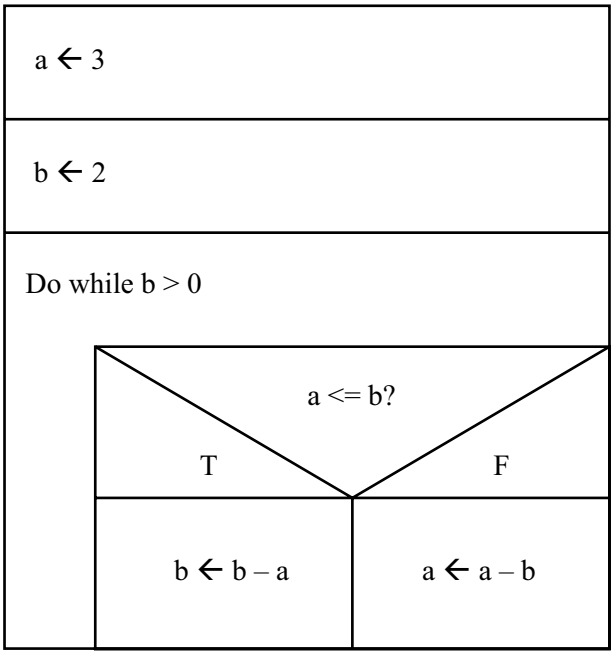
Files can be accessed sequentially.

What is meant by 'sequential access'?

1 mark

Question 6

Study the Nassi-Schneidermann (N-S) diagram below.



a. How many times does it loop?

_____

b. What are the final values of a and b?

_____

1 + 1 = 2 marks

Question 7

Examine the following algorithm.

```
For student_number ← 1 to 25
        Read student_name(student_number)
End for
```

What type of data structure is student_name?

_____

1 mark

Question 8

You see an advertisement for a computer with the following specifications.

256 MB RAM, 1.7 GHz CPU, 20 GB HDD and 10/100 Ethernet card.

State the function of a 10/100 Ethernet card.

_____

_____

1 mark

Question 9

Susan wants to purchase a new digital camera. She is given the choice of a serial cable or a USB cable. Which should she choose? Explain why.

2 marks

Question 10

Compare **U**nshielded **T**wisted **P**air (CAT5) and fibre-optic cabling in terms of

i. speed of transmission

ii. distance between nodes

iii. cost

3 marks

Question 11

a. Name **one** tool used in project management.

b. Explain what this tool is used for.

1 + 1 = 2 marks

Question 12

The system programmer for the new small company, Kids Clothes, has discovered that his organisation's database will run faster and be more reliable if an extra software component, called OABC, from the American software company Macrobig, was installed on the 20 users' workstations.

Macrobig normally sells OABC for an **annual** licence fee of $200 for each computer. The programmer is confident that if his organisation paid for only two licences, he could install OABC on all the computers because Macrobig had no way of finding out how many computers were using it.

Discuss why this situation will cause conflict between the two companies. Consider the viewpoint of each company in your response.

3 marks

Question 13

In a network, explain in technical terms one advantage of using a switch (switching hub) compared with a non-switching hub.

2 marks

Question 14

Describe a parallel changeover method for implementing an information system.

2 marks

Total 25 marks

END OF SECTION A

TURN OVER

SECTION B – Case study

Instructions for Section B

Answer **all** questions in the spaces provided.
Remove the case study insert and read **all** the information provided before you answer these questions.

Question 1

Draw and label a diagram of the **existing network** at the WHF headquarters.

4 marks

Question 2

WHF has employed Maree Simons, a system analyst, to analyse the existing system capabilities and make recommendations to enable the new web site to function effectively.

Maree has discovered the existing system will not meet the demands of the new web site.

Identify **four** technical hardware specifications of the existing system and explain why each specification is unsatisfactory for the new web site.

Specification	Reason unsatisfactory

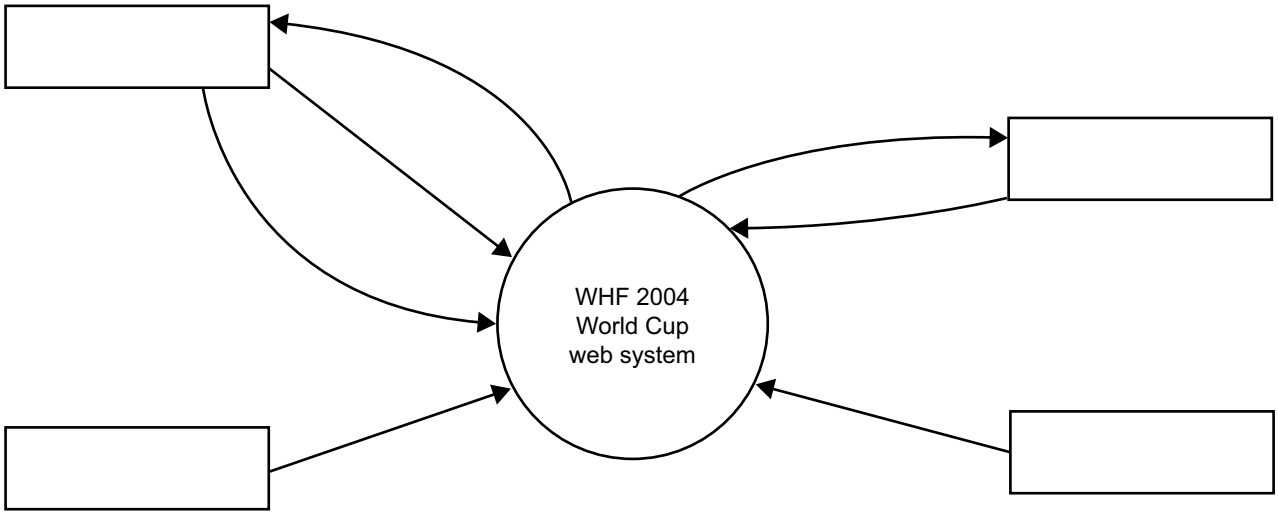
8 marks

Question 3

During her analysis Maree also discovered that the following input and output is required.

- Before the World Cup each **country's officials** provide details of all players in their squad and these are entered into the database.
- During the World Cup the **WHF officials** provide the statistics during and after each match.
- During the World Cup **photographers** provide action photographs from each match.
- The **public** can access the web site and search for information about any player or match or watch video.
- **WHF officials** can obtain personal information on players not available to the public.

In the following context diagram, label the entities and their data flows.



7 marks

CONTINUED OVER PAGE

Question 4

The personal data about players will be stored in fields as part of a database file. Data can be stored in a number of different ways; some of which are listed below.

Data type	**Other details**
Text	Fixed length field. Default length 50 characters. Maximum 250 characters. Can store all characters.
Memo	No fixed length. Can store all characters.
Number	Default type **Long Integer**. Other types include **Integer, Single, Double**.
Date	Can hold a variety of date formats.
Currency	Can be formatted to a large variety of currency types.
Auto number	In Long Integer format and automatically increments the number as each record is stored.
Yes/No	A Boolean field.

From the list above choose the **most** appropriate data type for each of the following fields and include any other restrictions (such as size) where appropriate. Justify your selections.

Last Drug Test (When participant was last drug tested)

Data type _____

Justification _____

Mobile Phone Number (Stored in format 0499-999-999)

Data type _____

Justification _____

History (1–3 paragraphs depending on player, listing the players' past highlights and achievements)

Data type _____

Justification _____

6 marks

Question 5

Use the table of data and the suggested algorithm found on the detachable sheet to answer the following.

a. Using only user codes made up of two digits and three alphabetic letters

- state **four** items of test data which will show that the algorithm correctly validates the user code
- indicate the expected and actual results produced by each test.

Test no	Test data	Expected results	Actual results
1			
2			
3			
4			

12 marks

b. Identify **two lines** that produce logic errors. Explain how to correct these errors.

i. Line with error 1

_____

Correction 1

_____

ii. Line with error 2

_____

Correction 2

_____

4 marks

Question 6

At the Hockey World Cup, officials and photographers will have wireless-enabled notebook computers. These will be used to update results, statistics and photographs for the web site. The digital video cameras are connected to computers and may transmit their video images to the temporary server by a wireless or cable network.

Explain **two** advantages and disadvantages of using a **wireless network** at the World Cup.

Advantage 1

Advantage 2

Disadvantage 1

Disadvantage 2

4 marks

Question 7

Before she decides on which notebook would be best for the system, Maree feels it is important to thoroughly test a range of notebook brands. She intends to invite 20 officials and photographers to the main stadium, and give each a different brand of wireless-enabled notebook.

She plans the following test.

Officials and photographers will log onto a temporary stadium network. During a 30-minute period, they will send as much data as possible to the stadium temporary server.

a. What aspect of the notebook is Maree testing?

_____

1 mark

b. Describe how the test results will help Maree to determine the best notebook.

_____

_____

2 marks

c. Describe **two** other tests that Maree could conduct to assist her to identify the best notebook for this purpose. For each test

- briefly outline what will occur in **each** test.
- what aspect of the equipment will it test?
- describe the desirable outcome of each test that will assist Maree to identify the best notebook.

Proposed test	Equipment tested	Desirable outcome

6 marks

Question 8

The notebook computers used by all the officials will have the following hardware and software components.

- 1.6 GHz processor
- 256 MB RAM
- 20 GB hard drive
- 13.3" TFT screen
- 24x CD drive
- 56K Fax/Modem
- an operating system

Apart from the above specifications, name **three** hardware or software components that will be required for the **network** and/or the **notebooks** if they are to operate in a wireless environment. Describe the function of each.

Component 1

Function

Component 2

Function

Component 3

Function

6 marks

Question 9

The WHF will need to make sure that all information is protected during data transfer from the host country to the web site in Melbourne. Maree is investigating the installation of encryption software in the new information system.

Describe how the encryption process will work in this transfer of data from the host country to Melbourne.

3 marks

Question 10

Part of Maree's task is to provide recommendations for a suitable back-up system for the new web server. Maree has estimated that allowance should be made to back up at least 2 GB of data.

She is investigating the following options.

Option 1. On-line back up through an external company

This system schedules a daily back up of all relevant data to a data storage facility. A back up of the back up is then sent electronically to another site at least five kilometres away. The cost for data storage is $10 per month for every 100 MB stored. The back-up software is installed free.

Option 2. Tape back up

An external tape unit with USB connection with 2 Mbps transfer rate. Back ups can be scheduled daily. Tapes can hold 20 GB of data and cost $100 each and the tape drive costs $450.

Discuss **three** factors that Maree needs to consider before making her final recommendation.

1.

2.

3.

6 marks

Question 11

World Cup officials, technicians and photographers will require different types of system support documentation.

List **two** types of documentation required by each of the following.

Web master and technicians in Melbourne

Stadium technicians

World Cup officials and photographers

6 marks

Total 75 marks

END OF QUESTION AND ANSWER BOOK

CASE STUDY INSERT

Please remove from the centre of this book during reading time.

The existing system

Hockey is a popular world sport and is managed by the World Hockey Federation (WHF). The WHF runs its Hockey World Cup competition every six years. As Australia is one of the leading hockey nations, the WHF have their headquarters in Melbourne.

The WHF hosts its own web site. This has not been updated since the last World Cup.

The web site is hosted on a server running at 400 MHz with a 2 GB hard drive and 32 MB RAM. It operates through a router and 64K ISDN line. This was sufficient for the 1998 World Cup web site as web pages were small and contained text and photos that only required a total storage space of 10 MB. It was not dynamic or interactive.

The host server is also used as the network fileserver at the WHF headquarters. The fileserver is part of the existing client-server network in Melbourne. This network is connected using an eight port non-switching hub with six workstations, one colour printer, one black and white printer and a scanner.

Proposed system

For the 2004 Hockey World Cup, the WHF will set up a temporary site in the host country's main stadium. A temporary server will collect data from all World Cup officials at each match and transmit it to the on-line web server in Melbourne.

For this event, the WHF will need to improve its web site since it is expected that this web site will receive about one million hits per day. It is planned that the new site will enable fans to search for information on teams, players and matches. This information will be kept in an interactive database. The web site will also provide up-to-date statistics and photos. A real-time view of matches in progress will be provided by digital video cameras (web cams) set up at the main pitch.

Extra material for Question 5

It is planned that only authorised users can gain access to some of the details maintained on the new database. For security it is decided that authorised users from each country will be identified by a user code that contains a two-digit country code followed by a three-letter name code.

The country code is taken from the following table.

Code	Country	Code	Country
11	Australia	19	Brazil
12	United States of America	20	Russia
13	Great Britain	21	China
14	South Africa	22	Pakistan
15	Japan	23	India
16	New Zealand	24	Indonesia
17	France	25	Mexico
18	Germany	26	Canada

The following algorithm has been suggested to check the user codes before the password is checked.

```
Start
    ValidUserCode ← False
    While ValidUserCode = False
        Get UserCode
        If Length(UserCode) = 5 Then
            Country ← First 2 Characters of UserCode
            Letters ← Last 3 Characters of UserCode
            If Letters are Alphabetic Then
                ValidUserCode ← True
                If Country is Numeric Then
                    If Country > 11 AND Country < 26 Then
                        ValidUserCode ← True
                    EndIf
                EndIf
            EndIf
        EndIf
        If ValidUserCode < > True Then
            Display InvalidUser Message
        EndIf
    EndWhile
End
```

END OF CASE STUDY INSERT