2003-ASL
COMP APP

PAPER 1

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

HONG KONG ADVANCED LEVEL EXAMINATION 2003

COMPUTER APPLICATIONS AS-LEVEL PAPER 1

Question-Answer Book

8.30 am – 11.30 am (3 hours)

This paper must be answered in English

Candidate Number						
Centre Number						
Seat Number						

Instructions

1. Write your Candidate Number, Centre Number and Seat Number in the spaces provided.
2. This paper consists of Sections A and B. Section A carries 40 marks and Section B carries 60 marks.
3. Section A: Answer **all** questions. Write your answers in the spaces provided in this question-answer book.
4. Section B: Answer **all** questions in the separate answer book.

	Marker's Use Only	**Examiner's Use Only**
	Marker No.	Examiner No.
Q.1		
Q.2		
Q.3		
Q.4		
Q.5		
Q.6		
Q.7		
Total		

Checker's Use Only		
Checker No.		
Total		

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Section A (40 marks)
Answer *all* questions in this section. Write your answers in the spaces provided in this question-answer book.

1 (a) Figure 1 and Figure 2 show the user interfaces of Operating System A and Operating System B respectively.

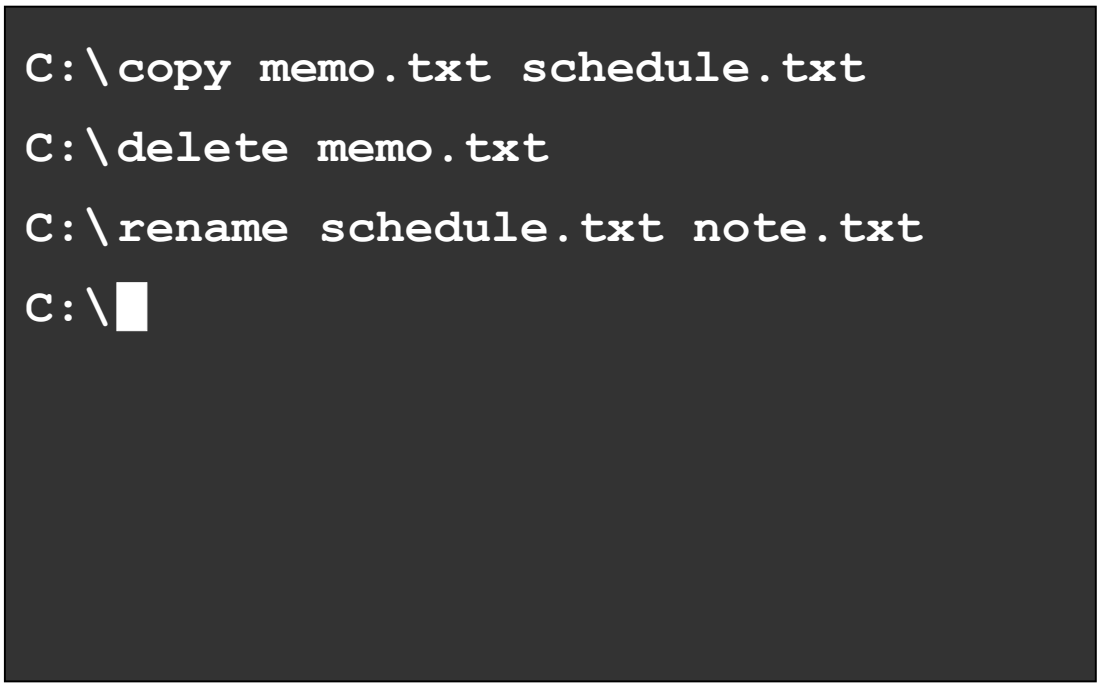


Figure 1 : Operating System A

Figure 2 : Operating System B

(i) State one advantage of using Operating System A over Operating System B.

(ii) State one advantage of using Operating System B over Operating System A.

(2 marks)

(b) When buying an application software package for use in a microcomputer, list **four** system requirements that should be considered.

(4 marks)

2. (a) Users sometimes make mistakes when keying in data into a database. Suggest **two** possible measures that can be considered when designing the database in order to minimise these mistakes.

(2 marks)

(b) (i) Compared with the character data type, state one advantage of defining a field as the memo data type.

(ii) Describe a situation in which it is more appropriate to define a field as the character data type rather than the memo data type.

(2 marks)

3. A school provides school bus service for students. Ms. Chan, the Principal of the school, would like to inform the parents living in Tai Po and Shatin about the changes of the bus route to these areas. Her secretary types the following letter using a word processor:

ABC Primary School
Tin Sam Estate,
Shatin, New Territories.

11 November 2002

Mr. Brian Lee
1 Po Heung St.,
Tai Po.

Dear Mr. Lee,

Please be informed that the school bus service for the areas of Tai Po and Shatin has been changed. The new bus route is as follows:

Bus Stops

- Bus Stop 1 Ting Tai Road, Tai Po
- Bus Stop 2 Ting Kok Road, Tai Po
- Bus Stop 3 Kwong Fuk Road, Tai Po
- Bus Stop 4 Tai Po Road, Tai Po
- Bus Stop 5 Yuen Wo Road, Shatin
- Bus Stop 6 Shatin Centre Street, Shatin
- Bus Stop 7 Che Kung Miu Road, Shatin
- Bus Stop 8 Chui Tin Street, Shatin

The change is effective from 1 December 2002.

Thank you very much for your attention.

Yours sincerely,

Ms. Chan Siu Lai
Principal

signature area

(a) Suggest **two** common features of the word processor that are needed to lay out the eight bus stops as shown in the letter.

_____

_____

(2 marks)

(b) Suggest **two** different features of the word processor that can align the signature area as shown in the letter.

_____

_____

(2 marks)

(c) The secretary wants to generate the letters efficiently by using the word processor for all the parents living in Tai Po and Shatin. The data about the parents are stored in a spreadsheet file ADDRESS as shown below:

	A	B	C	D	E	F	G	
1	Title	Firstname	Surname	Address	District	Contact No	HKID	
2	Mr	Louis	Au	1 Sing Woo Rd.	Sheung Shui	21654484	A023546(1)	
3	Mr	Brian	Lee	1 Po Heung St.	Tai Po	23545498	B498487(2)	
4	Mrs	Anita	Mui	5 Yuen Wo Rd.	Shatin	24797894	C987416(3)	
5	Mr	David	Lee	8 Waterloo Rd.	Kowloon Tong	21694054	D494721(4)	
:	:	:	:	:	:	:	:	
:	:	:	:	:	:	:	:	

Describe the essential steps needed to generate the letters.

(3 marks)

4. The following table shows the structure of a database file STUDENT containing the records of all students in a school.

Field name	Type	Width	Description
CLS_NAME	Character	2	Class name (e.g. 1A, 2E, 4D)
CLASS_NO	**X**	2	Class number
EN_NAME	Character	25	Student name in English
DOA	Date	8	Date of Admission in format mm/dd/yy
LOGIN_ID	Character	**Y**	Login name of School Intranet System

For each of the following cases, write suitable statement(s) (SQL / database commands) to generate a login name for each student and store the login name into the field LOGIN_ID.

(a) **X** represents **Character**.
Y represents **4**.
The first two characters of LOGIN_ID are the class name of the student.
The last two characters of LOGIN_ID are the class number of the student.
Example : For a 5C student with class number 08, his/her LOGIN_ID should be '5C08'.

(1 mark)

(b) **X** represents **Numeric value without decimal places**.
Y represents **4**.
The first two characters of LOGIN_ID are the class name of the student.
The last two characters of LOGIN_ID are the class number of the student.
Example : For a 5C student with class number 8, his/her LOGIN_ID should be '5C08'.

(2 marks)

(c) **X** represents **Character**.
Y represents **6**.
The first two characters of LOGIN_ID are the year of admission.
The next two characters of LOGIN_ID are the class name of the student.
The last two characters of LOGIN_ID are the class number of the student.
Example : For a 5C student with class number 08 who was admitted on 09/01/97, his/her LOGIN_ID should be '975C08'.

(1 mark)

5. John is the chairperson of a chess club in a university. He designs and builds a web site for the club.

(a) A fixed IP address is assigned to him to establish a web server on the campus. However, John has not yet registered a domain name for the club and so he tells the interested parties to use the URL, 'http://200.102.234.48/index.html', to access the web site.

(i) Name the different components of the given URL.

(ii) Is it possible to access the home page without specifying '*index.html*' in the URL? Explain briefly.

(2 marks)

(b) The web site provides the service of recruiting members. John needs to establish identification codes for members to log into the web site.

(i) Can John use members' IP addresses assigned by their Internet Service Providers for identification? Justify your answer.

(ii) John decides to use the email addresses of members for identification. Give one reason to support John's decision. Suggest one method for John to ensure that the email addresses provided by members are not fake.

(3 marks)

(c) The web site also provides a service for registered members to play online chess games through the Internet. Is it necessary for John to keep track of the current IP addresses of the online players? Justify your answer.

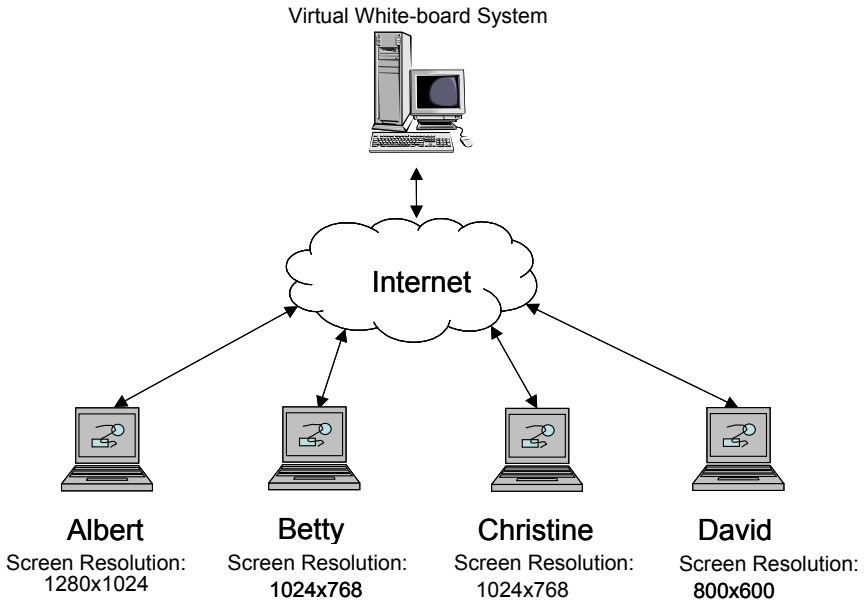
(2 marks)

Go on to the next page

6. Peter is a secondary school teacher. He would like to develop a software package, 'Virtual white-board system', so that his students can interactively share and exchange graphical drawings and texts over the Internet. The software package will meet the following requirements:

- Each user in the system can draw onto the white-board shown on his or her screen and visualise any change in the drawing made by any user on the white-board.
- A scalable font is provided for displaying texts on the white-board.
- Each user can resize the white-board on his or her own screen independently.

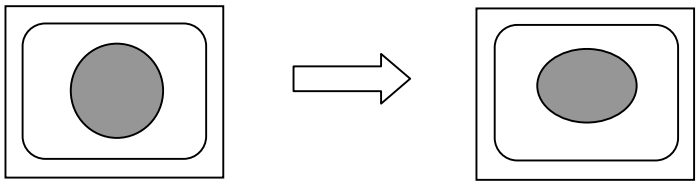
The following diagram illustrates the scenario for some of his students:



(a) Suggest a type of graphical representation of the drawings on the white-board so that the transfer of the drawings will be more efficient. Justify your suggestion.

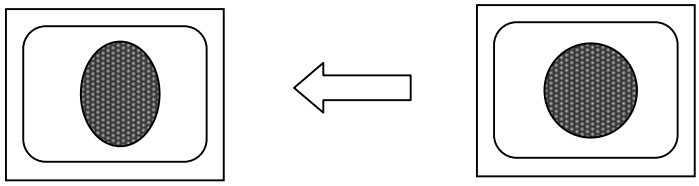
(2 marks)

Currently, Albert and Betty are drawing on the white-board, which is using the maximum display area of each of their screens. Albert draws a circle onto the white-board. Betty observes the circle drawn by Albert as an ellipse on her screen as follows:



Albert Betty

Betty then clears the drawing on the white-board and draws another circle. Albert observes the circle drawn by Betty as an ellipse on his screen as follows:



Albert Betty

(b) Give one possible reason for this phenomenon. Also, suggest one method for Peter to help Albert and Betty correct this type of discrepancy.

(3 marks)

(c) Peter decides to impose a minimum size for the white-board as well as a minimum size for the scalable font. Give one reason to support Peter's decision in terms of the process of displaying characters of a scalable font.

(1 mark)

Go on to the next page

7. Ms. Chung, a teacher, has bought a question bank system to store the questions she has set before. In order to reduce the workload of data entry, she decides to input the questions into the system by scanning the hardcopies of the questions with an image scanner. The system can store the questions in either text or image format.

(a) Initially, Ms. Chung chooses to convert the scanned images of the questions into text format by optical character recognition and store the questions into the system. Give **two** reasons to support Ms. Chung's choice of using text format for storage.

(2 marks)

(b) Later, Ms. Chung decides instead to store the scanned images of the questions into the system directly. Give **two** reasons to support Ms. Chung's choice of using image format for storage.

(2 marks)

(c) Ms. Chung has input a lot of questions into the system and the questions occupy about 103,000,000 bytes of storage space. Suggest **two** storage media for backing up the question bank. For each of the storage media suggested, state its advantage over the other.

(2 marks)

END OF SECTION A

Section B (60 marks)
Answer *all* questions from this section in the separate answer book.

8. A school offers 7 Science subjects and 3 Arts subjects for their students to take and uses three database files to manage the information of students and subjects. The details are as follows:

Database file **STUDENT**

	Field name	Type	Width	Description	Example of data
1	SID	Character	7	Student identity number	s961008
2	NAME	Character	20	Name of student	Sham Hin
3	CLASS	Character	2	Class name	7A
4	ADDRESS	Character	40	Home address	Rm 502 Wai Tat Court, Shatin, NT.

Database file **EXAM**

	Field name	Type	Width	Description	Example of data
1	SID	Character	7	Student identity number	s961008
2	SUBJCODE	Character	2	Subject code	06
3	SCORE	Numeric	2	Score of the subject in final exam	82

Database file **SUBJECT**

	Field name	Type	Width	Description	Example of data
1	SUBJCODE	Character	2	Subject code	06
2	SUBJNAME	Character	30	Subject name	Geography
3	STREAM	Character	1	Science (S) or Arts (A)	A

Write statements (SQL/ database commands) to complete the following tasks.

(a) Refer to the example of data in the database file STUDENT above. List the class names, names and home addresses of students whose home addresses contain a string 'Shatin' or 'SHATIN'.

(2 marks)

(b) Assume that the highest score of each subject is scored by 1 student only. Output the student identity number and score of the student who has the highest score in the subject with subject code '15'.

(3 marks)

(c) List all Arts subjects taken for each student. The list should be arranged in ascending order of name of student and then by subject name. A sample output is given below:

```
NAME                SUBJNAME
Au Ming             Geography
Chan Wan            Geography
Chan Wan            Principles of Accounts
Fong Heung          Geography
Fong Heung          Principles of Accounts
:                   :
```

(4 marks)

(d) Output the total number of Science subjects taken by the student with student identity number 's972009'.

(5 marks)

(e) (i) Output the average of the Geography (SUBJNAME='Geography') scores of the students.

(ii) In order to recognise the students' performance, those with a Geography score which is greater than the average obtained in (e)(i) will be awarded. List the names and Geography scores of the students who will be awarded.

(6 marks)

9. ABC Secondary School is a private school and is required to dismiss some staff in the coming year. The Principal, Mr. Tao, uses a spreadsheet to investigate various possibilities.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2		staff name	subject	dismiss	current salary point	years of service	current salary ($)	expected monthly salary payment ($)	redundancy payment ($)		salary point	salary	years of service <4	years of service >=4
3		Ada	Chinese	TRUE	8	15	$40,785				1	$6,505	2.00	0.72
4		Brian	English	FALSE	4	5	$12,695				2	$7,215	1.96	0.67
5		Chris	Mathematics	TRUE	2	3	$7,215				3	$9,695	1.89	0.63
6		Peter	Technology	FALSE	10	10	$68,550				4	$12,695	1.85	0.61
7		Eva	Mathematics	FALSE	1	6	$6,505				5	$15,270	1.79	0.58
8		Fred	Humanities	TRUE	6	8	$20,150				6	$20,150	1.75	0.56
9		Greg	Art	FALSE	7	9	$32,415				7	$32,415	1.71	0.54
10		Howard	English	FALSE	8	8	$40,785				8	$40,785	1.65	0.51
11		Irene	Chinese	TRUE	4	4	$12,695				9	$55,195	1.61	0.47
12		Jack	Mathematics	TRUE	5	7	$15,270				10	$68,550	1.55	0.45
13		Kerry	Science	TRUE	2	6	$7,215							
:							:							
:							:							
24		Eugene	Mathematics	TRUE	3	7	$9,695							
25		Maggie	Science	FALSE	2	14	$7,215							
26		Tony	Chinese	FALSE	6	5	$20,150							
27		Vincent	English	TRUE	9	6	$55,195							
28		Rita	P.E.	FALSE	8	12	$40,785							
29						total redundancy payment:								

In his first attempt, Mr. Tao decides to manually select the redundant staff as shown in the above spreadsheet PAY. The cells `D3:D28` contain logical values which represent his decision. A logical value, TRUE, means that the staff will be dismissed and the expected monthly salary payment will become $0, while a logical value, FALSE, means that the staff will be retained and the expected monthly salary payment will be the same as the current salary.

(a) A formula is entered into cell `H3` and is copied to other cells in column `H` to calculate the expected monthly salary payment for the staff. Write down the formula in cell `H3`.

(2 marks)

The redundancy payment is calculated according to the years of service and the current salary of the dismissed staff.

If a member of the staff serves the school for less than 4 years, the redundancy payment will be the current salary multiplied by the corresponding factor in the column `M` according to his or her salary point. For example,

Chris's current salary point is 2 and he has served the school for 3 years. Then,

Redundancy Payment = $7,215 × 1.96 = $14,141.4

If a member of the staff serves the school for 4 or more years, the redundancy payment will be the current salary multiplied by the years of service and the corresponding factor in column `N` according to his or her salary point. For example,

Ada's current salary point is 8 and she has served the school for 15 years. Then,

Redundancy Payment = $40,785 × 15 × 0.51 = $312,005.25

(b) A formula is entered into cell `I3` and is copied to other cells in column `I` to calculate the redundancy payment. Write down the formula in cell `I3`.

(5 marks)

In his second attempt, he generates sets of random data to simulate several different scenarios after staff dismissal as shown in the following spreadsheet RAN:

	A	B	C	D	E	F	G	H	I	…
1					number of staff retained					
2		subject	current number of staff	minimum number of staff required	Random Data Set #1	Random Data Set #2	Random Data Set #3	Random Data Set #4	Random Data Set #5	…
3		Chinese		3						
4		English		3						
5		Mathematics		2						
6		Technology		1						
7		Science		2						
8		Humanities		1						
9		Art		1						
10		P.E.		1						
11				Total						
12										

(c) A formula is entered into cell `C3` and then copied into cells `C4` to `C10` to count the current number of the staff. Write down the formula in cell `C3`.
(Hint: use the spreadsheet PAY)

(3 marks)

For each subject, the number of the staff randomly selected is bounded inclusively by the current number of the staff and the minimum number of the staff required. He also understands that the total number of the staff should not be more than 20.

(d) (i) A formula `'=sum(E3:E10)'` is entered into cell `E11` before data are entered into the cells `E3` to `E10`. Will this action cause any error in the cell `E11`? Justify your answer.

(ii) A formula is entered into cell `E3` and then copied into cells `E4` to `E10` to generate the Random Data Set #1. If the total number of the staff generated exceeds 20, Mr. Tao will generate Random Data Set #2 by copying the formula in cells `E3` to `E11` into cells `F3` to `F11`. If necessary, Mr. Tao will repeat the generation for Random Data Sets #3, #4, #5, ... Write down the formula in cell `E3`.

(5 marks)

(e) Mr. Tao observes that the random values stored in cells `E3` to `E10` will change whenever he edits the spreadsheet RAN. Explain why this happens and suggest one method to preserve these values on this spreadsheet.

(2 marks)

(f) Mr. Tao wants to present the composition of the Random Data Set #1 to the retained staff using a Pie Chart. Describe the essential steps needed to produce this Pie Chart.

(3 marks)

10. Steven is an IT coordinator in a school. He considers using the following two methods to filter improper contents on the World Wide Web (WWW).

- Method A: Block access to a list of domains and IP addresses.
- Method B: Allow access only to a list of domains and IP addresses.

Suppose the lists of domains and IP addresses for the two methods are set as follows:

Method A	Method B
yousex.com mypornography.com tooviolence.com	education.com gospel.com news.com 202.40.218.20 202.40.218.23

(a) According to the setting of **Method A**, will the following URLs be blocked? Justify your answers.

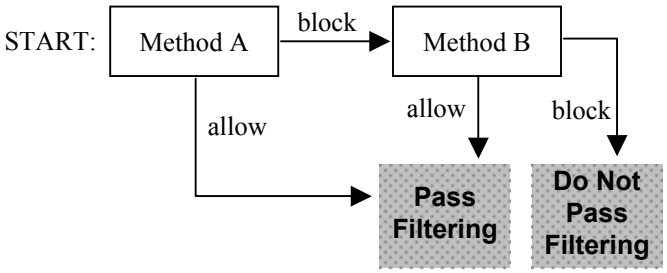
(i) 'http://gallery.mypornography.com/~john/index.html'

(ii) 'http://www2.tooviolence.com'

(iii) 'http://www.yousex.com.jp'

(3 marks)

The following diagram shows the flow of the filtering of Steven's design:



(b) (i) According to Steven's design, will the web site with URL 'http://education.yousex.com' be blocked? Justify your answer.

(ii) Steven discovers that the domain 'tooviolence.com', which contains improper contents, can still pass through the filtering. Give one possible reason.

(3 marks)

In order to protect students from browsing improper contents, Steven considers using a web filtering service in the school. The Internet Service Providers (ISP) of the school provides three proposals for free filtering service:

Proposal 1 : Installing the filtering software on each computer in the school

Proposal 2 : Installing the filtering software on the school proxy server

Proposal 3 : Installing the filtering software on the ISP's proxy server

(c) Give one advantage of each of the proposals over the others.

(6 marks)

(d) (i) Steven discovers that the computers in the school are always infected with computer virus. Suggest two different ways through which computers may be infected.

(ii) Steven considers setting up a firewall to prevent computers in the school from virus infection. Is this method effective? Justify your answer.

(4 marks)

To prevent data loss from the school file servers caused by virus infection, Steven considers the following two types of backup methods:

Backup method	Procedure
Full backup	Duplicate all of the files on the school file server.
Incremental backup	Duplicate only the files that have changed since the latest full or incremental backup.

(e) Compared with full backup, state one advantage and one disadvantage of incremental backup.

(4 marks)

END OF SECTION B

END OF PAPER