INFORMATION AND COMMUNICATION TECHNOLOGY PAPER 1

(Sample Paper)

Time allowed: 2 hours

This paper must be answered in English.

GENERAL INSTRUCTIONS

1. There are **TWO** sections, A and B, in this Paper. Section A carries 40 marks and Section B carries 60 marks. You are advised to finish Section A in about 48 minutes.

2. Section A consists of multiple-choice questions in this question book. Section B contains conventional questions printed separately in Question-Answer Book B.

3. Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book B. **The Answer Sheet for Section A and the Question-Answer Book for Section B must be handed in separately at the end of the examination.**

SECTION A (MULTIPLE-CHOICE QUESTIONS)

INSTRUCTIONS FOR SECTION A

1. Read the instructions on the Answer Sheet carefully. Stick a barcode label and insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words **'END OF SECTION A'** after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

> Not to be taken away before the end of the examination session

There will be 40 questions in 2012 examination paper. For this sample paper, there are only 20 sample questions for illustration purpose.

(2005 CECIT 1A Q.1)

1. To create a web page with Traditional Chinese and Simplified Chinese characters, which of the following methods is/are possible?

    (1) Use Unicode on the web page.
    (2) Use both BIG5 and GB on the web page.
    (3) Use BIG5 to represent traditional Chinese characters and image files to display simplified Chinese characters.

    A. (1) only
    B. (2) only
    C. (1) and (2) only
    D. (1) and (3) only

(2005 CECIT 1A Q.4)

2. The hardware address of a network device consists of 48 bits. Which of the following is a valid address in hexadecimal numbers?

    A. 00E0071944A0
    B. 0A23B5
    C. 1E07FG124372
    D. 398A7E9412110408

(2005 CECIT 1A Q.5)

3.

PROGRAMME		
Talk 1	*The Examination System in Hong Kong* Dr. Chan Tai Man（陳大文博士）	15 minutes
Talk 2	*The Examination System in China* Dr. Kwai Wing（季榮博士）	20 minutes
Talk 3	*The Examination System in Singapore* Dr. Sen Kit（孫潔博士）	25 minutes
Talk 4	*The Examination System in South Korea* Dr. Lee Kim King（李金京博士）	30 minutes
	Total :	90 minutes

When using a presentation software package, which of the following may be used to prepare the above slide efficiently?

    (1) sorting
    (2) borders
    (3) copy and paste
    (4) find and replace

    A. (1) and (2) only
    B. (2) and (3) only
    C. (3) and (4) only
    D. (1) and (4) only

(2005 CECIT 1A Q.9)
4. Which of the following is **not** a specification of a CPU?

A. 2.8GHz Clock speed
B. 2MB Cache memory
C. 4.2ms Rotation latency
D. 32-bit word size

(2005 CECIT 1A Q.12)
5. Which of the following is **not** open source software?

A. Internet Explorer
B. Apache HTTP Server
C. Fedora Linux
D. Open Office

(2005 CECIT 1A Q.13)
6. When compared with normal PCs, which of the following statements about Personal Digital Assistants (PDA) is correct?

A. Only small files can be stored.
B. The operating system requires less system memory to operate.
C. The operating system should be re-installed when the system crashes.
D. Data must be stored in an external flash memory card.

(2005 CECIT 1A Q.23)
7. Which of the following actions should **not** be carried out when constructing a web page?

A. Insert more than one hyperlink.
B. Compile the HTML file.
C. Insert multimedia elements but not photos.
D. Use .htm as the filename extension.

(2005 CECIT 1A Q.31)
8. The following algorithm shows how a vending machine works:

Step 1: Wait to receive a coin.
Step 2: If the coin is not $1, $2, $5 or $10, eject it.
Step 3: If $6 or more is deposited, do steps 4 and 5.
Step 4:   Release a can of lemon tea.
Step 5:   Reduce the deposit by $6.
Step 6: Eject the deposit.
Step 7: Do step 1.

Which of the following statements about the algorithm is true?

A. A can of lemon tea will cost less than $6.
B. The vending machine will release lemon tea.
C. A can of lemon tea will cost more than $6.
D. The vending machine will release lemon tea only if a $10 coin is received.

(2005 CECIT 1A Q.33)

9. Which of the following statements about copyright is correct?

A. It is effective only if the author has a statement about copyright on his/her work.
B. It applies to computer software only.
C. The author must register his/her work to obtain copyright.
D. It applies automatically to the owner of the original work.

(2006 CECIT 1A Q.3)

10. What is the minimum number of bits needed to represent a set of 94 characters of 'Hangul' in the Korean language?

A. 7
B. 8
C. 9
D. 10

(2006 CECIT 1A Q.6)

11. Jimmy wants to include some multimedia elements in a presentation file. Instead of copying the multimedia elements into the file, he uses hyperlinks. Which of the following descriptions is correct?

A. The presentation can include more multimedia elements.
B. The presentation can be more interactive.
C. The presentation can play video files immediately.
D. The presentation file is smaller.

(2006 CECIT 1A Q.7)

12. A 3×3 table is created in spreadsheet software and the preview of the printout is shown below:

Which of the following actions is the most appropriate way to improve the presentation of the table?

A. Change the horizontal alignment of the cells in the table.
B. Change the page orientation.
C. Change the border setting.
D. Change the print area.

(2006 CECIT 1A Q.17)

13. Which of the following I/O devices are commonly used by a cashier in a restaurant?

    (1) Magnetic strip card reader
    (2) Optical character reader
    (3) Inkjet printer
    (4) Thermal printer

    A. (1) and (3) only
    B. (1) and (4) only
    C. (2) and (3) only
    D. (2) and (4) only

(2006 CECIT 1A Q.19)

14. Which of the following is **not** an online public service provided by ESD*life*（生活易）?

    A. Booking a football field
    B. Making a dentist's appointment
    C. Booking an appointment to give a marriage notice
    D. Ordering past HKCE examination papers

(2006 CECIT 1A Q.20)

15. Mr. Chan wants to register a domain name using his name, 'Chan Tai Man'. Which of the following domain names is **not** valid?

    A. chantaiman.co.uk
    B. chantaiman.com.org
    C. chantaiman.com.hk
    D. ChanTaiMan.Net

(2006 CECIT 1A Q.24)

16. Lily tells her friends, Ka Kee (KaKee@hkeaa.edu.hk), Po Yan (PoYan@hkeaa.edu.hk) and Mo Yi (MoYi@hkeaa.edu.hk), the date of her birthday party through an email as shown below. Which of the following statements **cannot** be derived from this email?

    To: KaKee@hkeaa.edu.hk
    CC: PoYan@hkeaa.edu.hk
    BCC: MoYi@hkeaa.edu.hk
    SUBJECT: **My birthday party on 25/4**

    Hi,
        Call me if you could come!   :p
    Lily

    A. Ka Kee knows that the birthday party is held on 25/4.
    B. Ka Kee knows that Po Yan receives the email.
    C. Po Yan knows that Mo Yi receives the email.
    D. Mo Yi knows that Ka Kee and Po Yan receive the email.

(2006 CECIT 1A Q.26)

17.

incorrect display

correct display

The above screen shot of a browser, shows that some Chinese characters are correctly displayed while some are not. Which of the following is the possible reason?

A. The server uses two different coding schemes to store the Chinese characters of the web page.
B. The server uses two different protocols to send the web page to the browser.
C. The browser uses two different coding schemes to decode the Chinese characters on the web page.
D. The correct display is an image.

(2006 CECIT 1A Q.28)

18. Which of the following characteristics of high level language reflects the concept of program modules?

A. Subprogram
B. Comment
C. Condition
D. Looping

(2007 CECIT 1A Q.23)

19. Amy owns a domain name, 'amycomp.com'. Which of the following URLs is **not** owned by Amy?

A. http://www.amycomp.com.hk/main.htm
B. http://mail.amycomp.com/register.htm
C. http://www.AmyComp.com/index.html
D. http://www.amycomp.com/next_level/index.html

(2007 CECIT 1A Q.18)

20. The specification of a CPU, 3.0 GHz, indicates _____.

A. the computational power
B. the data transfer rate
C. the storage capacity
D. the maximum I/O speed

END OF SECTION A

Go on to Question-Answer Book B for questions in Section B

B

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 1 (Sample Paper)
SECTION B: Question-Answer Book B

This paper must be answered in English.

INSTRUCTIONS

(1) Write your Candidate Number in the space provided on Page 1.

(2) Stick barcode labels in the spaces provided on Pages 1, 3 and 5.

(3) Refer to the general instructions on the cover of the Question Book for Section A.

(4) The questions in this Question-Answer Book carry 60 marks. Answer **ALL** questions.

(5) Write your answers to Section B in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

(6) Supplementary answer sheets will be provided on request. Write your candidate number, fill in the question number and stick a barcode label on each sheet. Tie them loosely but securely with a string INSIDE this Question-Answer Book.

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1		
2		
3		
4		
5		
Total		

Answer all questions.   Write your answers in this question-answer book.

(Modified from 2007 ASCA1/ALCS1 Q.8)

1.   Mary uses her desktop computer at home to analyse a survey.

   (a) Mary suspects that her computer is infected by spyware.   Give **two** unusual events that may alert her to this possible infection.

   _____

   _____
                                                                    (2 marks)

   (b) After completing the analysis, Mary prepares her findings in PDF file format and posts the file onto her web site for the public to download.   Give **two** reasons to support her use of this file format.

   _____

   _____
                                                                    (2 marks)

   (c) Mary also shows her findings using presentation software.   Suggest **three** precautions which should be taken when including text in a presentation.

   _____

   _____

   _____
                                                                    (3 marks)

   (d) After the presentation, Mary decides to collect more views from respondents and sends them each a questionnaire by postal mail, for which a name label is required.   The name and sex of each respondent are stored in a worksheet and part of the worksheet is shown below.

	A	B	C	D
1	SEX	FIRSTNAME	LASTNAME	
2	F	May	Chan	
3	M	John	Wong	
4	F	Amy	Ho	

   F and M in column A represent female and male respectively.   Each name label should include the title of each respondent before his or her name, for example, Ms May Chan, Mr John Wong and Ms Amy Ho.

   (i) Mary used the following steps in a word processor to create the labels.

   (1) Use 'mail merge' with columns, SEX, FIRSTNAME and LASTNAME, as fields.
   (2) Produce a merged document containing all the name labels.
   (3) Use 'find and replace' in order to add the titles of respondents.

   Instead of "Ms May Chan", the label shows "Mrs Mray Chan".   Explain why.

   _____

   _____

(ii) By making use of formula(e) in the spreadsheet, describe how to add the titles of respondents, 'Mr' and 'Ms', in column D of the worksheet.

_____

_____

(4 marks)

Mary uses spreadsheet software to store the responses from 40 copies of the questionnaire. Each copy consists of 6 questions. The responses to the questions are coded as values: 1, 2, 3 or 4. The following worksheet is used to record the responses.

	A	B	C	D	E	F	G	H	I
1	Questionnaire / Question	Q1	Q2	Q3	Q4	Q5	Q6		
2	Copy 1	1	1	2	2	1	4		
3	Copy 2	1	2	4	4	3	3		
4	Copy 3	1	3		1	2	3		
5	Copy 4		4	2	3	2	4		
6	Copy 5	2	4	4	1	2	3		
:	:	:	:	:	:	:	:		
41	Copy 40	2	4	4	2	3	3		
42									
43	Mean response score	1.8	3.0	3.1	2.3	2.8	2.7	Total number of copies	
44									
45	Total number of '1' and '2'	25	10	5	23	17	18		
46	Total number of '3' and '4'	14	30	34	14	23	12		
47									
48	Overall response	BAD	GOOD	GOOD	BAD	GOOD	BAD		

When some responses are missing, the corresponding cells in the worksheet are left blank (e.g. D4). To calculate the total number of copies without any missing responses, firstly a formula is entered into I2 and then copied into I3 to I41. Secondly, another formula, '=SUM(I2:I41)', is entered into I43.

(e) Write the formula in I2.

_____

_____

(2 marks)

The mean response score of a question is defined as:

$$\text{Mean response score} = \frac{\text{Sum of all values of the responses on that question}}{\text{No. of responses on that question}}$$

where the mean response score is correct to 1 decimal place.

(f) A formula is entered into B43, and then copied into C43 to G43, to find the mean response score for each question. Write the formula in B43.

_____

(2 marks)

A formula, '=FREQUENCY(B2:B41,2)', is used so that the total number of responses '1' and '2' and the total number of responses '3' and '4' for each question can be found in row 45 and row 46 respectively.

(g) How can the FREQUENCY function be entered correctly and efficiently?   Describe the steps required.

_____

_____

_____

_____

(3 marks)

The overall response of a question is regarded as 'GOOD' if it fulfills the following two conditions:

① the mean response score > 2.5
② the total number of responses '3' and '4' > the total number of responses '1' and '2'

Otherwise the overall response of the question is regarded as 'BAD'. A formula is entered into B48, and then copied into C48 to G48 to find the overall responses of the questions.

(h) Write the formula in B48.

_____

_____

(2 marks)

(Modified from 2006 CECIT 1B Q.3)

2. David installs a desktop computer, X, and a notebook computer, Y, forming a LAN and connecting to the Internet through a 10M broadband connection in his bedroom. The configurations of the computers are as follows:

	X	Y
CPU	P4 3 GHz	M 1.73 GHz
Cache	2 MB	2 MB
RAM	512 MB	256 MB
Network	10/100 LAN card	10/100 LAN card and 54M wireless LAN card

(a) David wants to connect an external DVD writer to X.

(i) The DVD writer is not designed to connect to a parallel port. Why not?

(ii) Give the port that the DVD writer should be connected to: _____

(2 marks)

(b) Y can be connected to the Internet through a network cable or wireless communication. Compare the performance using these two methods in the following activities in terms of data transmission speed.

(i) File sharing between X and Y

(ii) Browsing the Internet

(4 marks)

(c) Cache is "high-speed" memory. In X, the size of the cache is much smaller than that of RAM. In order to enhance X's performance, should X install 512 MB cache? Explain briefly.

(2 marks)

(d) In order to preserve the connectivity of X and Y in the LAN, should both be installed the same version of the operating system? Explain briefly.

(2 marks)

(Modified from 2006 ASCA1 Q.5, 2006 ALCS2 Q.9, 2004 ALCS2 Q.8)
3.	David creates a web page with frames and animation.
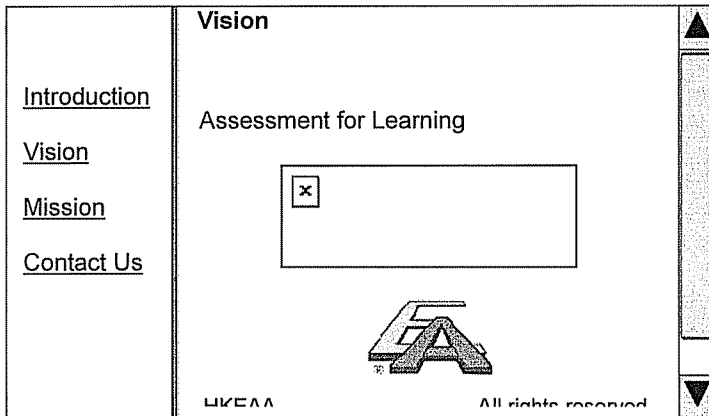
(a)	(i)	David can successfully browse the animation in the web page on one computer but cannot browse it on another one.	The web page is only displayed as shown above.	Give a possible reason for this.

_____

_____

(ii)	Give one unsatisfactory aspect of the design of the above web page presentation, other than the animation.

_____

_____

(3 marks)

David wants to share a file with other people. The file can be downloaded by clicking a hyperlink on the web page or by Peer-to-Peer (P2P) freeware.

(b)	Give one advantage and one disadvantage of using a hyperlink to download the file.

Advantage: _____

_____

Disadvantage: _____

_____

(2 marks)

(c)	List **two** social impacts of the inappropriate use of this P2P freeware.

1. _____

_____

2. _____

_____

(2 marks)

David studies in ACC College. In the college, an SMTP server is used to transfer e-mail with other SMTP servers over the Internet. The SMTP server stores the e-mail in a POP3 server, which allows client computers to retrieve the e-mail. Outgoing e-mail is sent directly through the SMTP server.

David gets the following information from ACC College.

POP3 E-mail Account Settings on Mail Client Software:

SMTP Server Name / IP Address: smtp.acc.edu.hk / 210.0.168.23
POP3 Server Name / IP Address: pop3.acc.edu.hk / 210.0.168.112
User Name: davidchan
Password: beasmartboy

(d) Based on the information provided, fill in the following dialog box from the mail client software so that Peter can send and retrieve e-mail at home with the mail client software.

Server Information

Incoming mail server:

Outgoing mail server:

(1 mark)

(e) Normally, users configure the mail client software with the server names instead of the IP addresses.

(i) Give an advantage of using the server name over the IP address.

_____

_____

(ii) Give an advantage of using the IP address over the server name.

_____

_____

(2 marks)

(f) Suppose the SMTP server is stopped but the POP3 server is still running. What functions with respect to sending and receiving e-mail can still be used? What functions cannot be used?

_____

_____

_____

_____

(2 marks)

(Modified from 2006 CECIT 1B Q.4)

4. Mr. Lam designs a simple greenhouse cooling and heating system. The ideal greenhouse temperature is between 20 °C and 32 °C. Initially, the cooler and heater are off. The system will operate as follows:

Temperature (X)	Cooler (**C**)	Heater (**H**)
X < 20	OFF	ON
X > 32	ON	OFF

The flowchart below describes the operations of the system and Module E is a part for energy conservative.
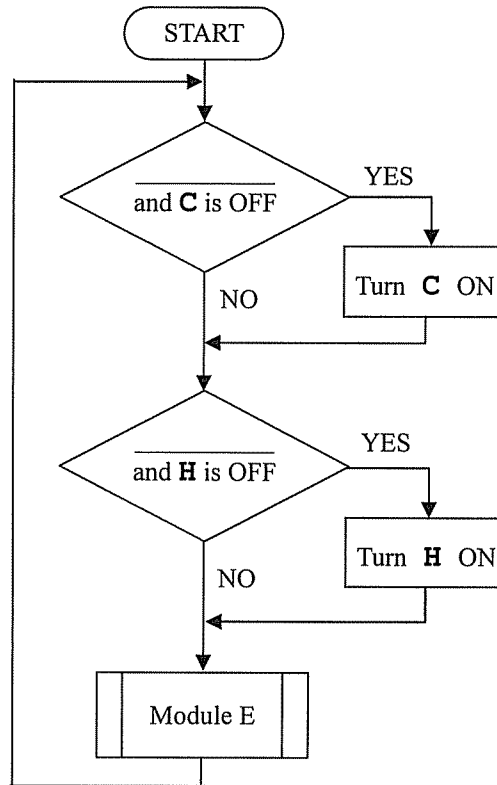
(a) Fill the appropriate conditions of X in the two decision boxes of the flowchart.

(2 marks)
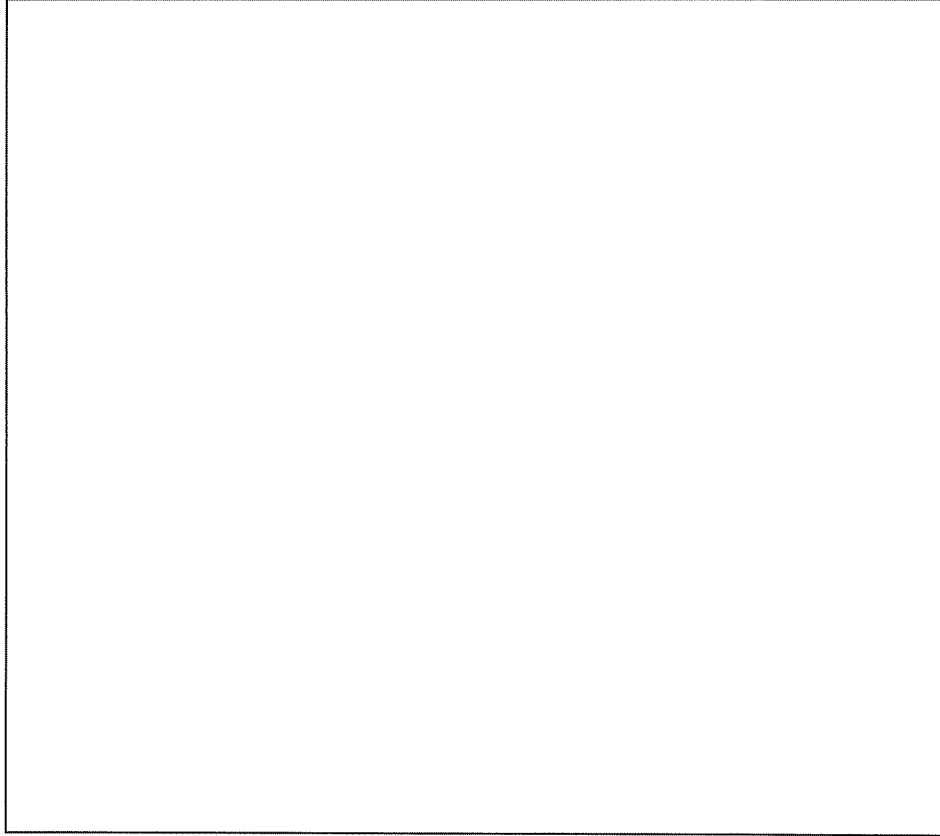
Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

HKDSE-ICT 1B–8 (Sample Paper)   84

(b) In order to save more energy, Mr. Lam decides that the cooler will be turned off when $X \leq 28$, and the heater will be turned off when $24 \leq X$. Draft a flowchart for Module E to implement his idea in the space provided. The design of Module E should be precise and without redundancy.

Module E

(5 marks)

(Modified from 2004 ALCS2 Q.2, 2006 ASCA1 Q.4, 2007 ASCA1 Q.7)

5.   Peter is an IT manager in a company. He gives some suggestions for the ergonomics of a new computer room below:

(1) Use adjustable chairs
(2) Install blinds on the windows to shade the monitors nearby
(3) Create shortcut keys for the software installed in computers

(a) For each of the above suggestions, explain briefly how the working conditions can be ergonomically improved and state the health hazards that can be reduced.

(1) _____

_____

(2) _____

_____

(3) _____

_____

(3 marks)

Peter is responsible for maintaining the e-mail system in the company.

(b) To log in to the e-mail system, users are required to enter a user number and a login password.

LOGIN

User number: [_____]

Password: [_____]

[Submit]

(i) Many users enter wrong user numbers. Suggest **two** methods of improving the design of the system for Peter to help users enter the user numbers correctly.

_____

_____

_____

(ii) The requirement for the system's login password changes from 6 numeric digits to 8 alphanumeric characters.   Give **two** reasons why this change results in better security.

_____

_____

(4 marks)

(c) Peter and his colleague, Mary, send e-mail using public and private key encryption. Peter can send e-mail to Mary using the following two methods:

① Peter encrypts an e-mail with Mary's public key and Mary decrypts it with her own private key.

② Peter encrypts an e-mail with his own private key and Mary decrypts it with Peter's public key.

(i) Give an advantage of using method ①.

_____

_____

(ii) In fact, anyone can have Peter's public key and hence can read the e-mail sent out by Peter through method ②. Why might Peter still want to use method ② ?

_____

_____

(iii) Suggest and describe a method of using public and private key encryption which would be better than methods ① and ② for allowing Mary to read e-mail sent by Peter.

_____

_____

_____

(4 marks)

END OF PAPER

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY

PAPER 2A

Databases

(Sample Paper)

Question-Answer Book

Time allowed: 1 hour 30 minutes
This paper must be answered in English.

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1		
2		
3		
4		
Total		

INSTRUCTIONS

(1) Write your Candidate Number in the space provided on Page 1.

(2) Stick barcode labels in the spaces provided on Pages 1, 3 and 5.

(3) Answer **ALL** questions.

(4) Write your answers to Section B in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

(5) Supplementary answer sheets will be provided on request. Write your candidate number, fill in the question number and stick a barcode label on each sheet. Tie them loosely but securely with a string INSIDE this Question-Answer Book.

Answer all questions. Write your answers in this question-answer book.

(Modified from 2004 ASCA1 Q.1)

1.   A database is created with the following SQL commands to store the subject scores of a class of students in an examination. REG_NO and SUBJ_CODE represent the registration number of a student and the code of a subject respectively.

```
CREATE TABLE EXAM (
  REG_NO CHAR(6),
  SUBJ_CODE CHAR(3),
  SCORE NUMERIC(5,1))

CREATE TABLE STUDENT (
  REG_NO CHAR(6),
  STUD_NAME CHAR(20))

CREATE TABLE SUBJECT (
  SUBJ_CODE CHAR(3),
  SUBJ_NAME CHAR(15))
```

(a) Modify the first SQL command to ensure that no records in EXAM contain empty values in REG_NO and SUBJ_CODE.

(1 mark)

(b) Identify the primary key(s) and foreign key(s) in the database.

(4 marks)

(c) Write an SQL command to insert the following record into SUBJECT.

SUBJ_CODE :	ENG
SUBJ_NAME :	ENGLISH

(2 marks)

(d) Because of a modification in the examination paper of the subject code ENG, all students will be awarded two additional scores. Write an SQL command to increase the value of SCORE by 2 in each relevant record.

_____

_____

(2 marks)

(e) Describe the purpose of the following SQL command.

```
DELETE FROM STUDENT WHERE LEN(TRIM(STUD_NAME)) = 0
```

_____

_____

(2 marks)

(f) A student withdrew from the school after the examination. In order to maintain the referential integrity constraint of the database, it has been suggested that his record in STUDENT should not be removed. Do you agree? Explain briefly.

_____

_____

_____

(2 marks)

(New Question)

2.　　In a secondary school library, a database `LIBRARY` stores the transactions in which students borrow and return books. Each student can borrow at most 5 books at a time. Each copy of book can be borrowed by one student only at a time. The field names of `LIBRARY` are described below:

Field name	Description
StudID	Unique student ID code
Stud_Name	Name of student
Class	Class attended
BookID	Unique book ID code
Book_Title	Title of book
Author	Author of book
Publisher	Publisher of book
Borrow_Date	Date on which the book is borrowed
Return_Date	Date on which the book is returned

(a)　Explain briefly how this design leads to data redundancy.

_____

_____

(2 marks)

(b)　To fix the problem of data redundancy, a librarian re-designs the database and draws an E-R diagram as follows. However, the key attributes of entity, maximum cardinality, mandatory cardinality, optional cardinality are missing in the diagram. Complete the E-R diagram for the librarian.
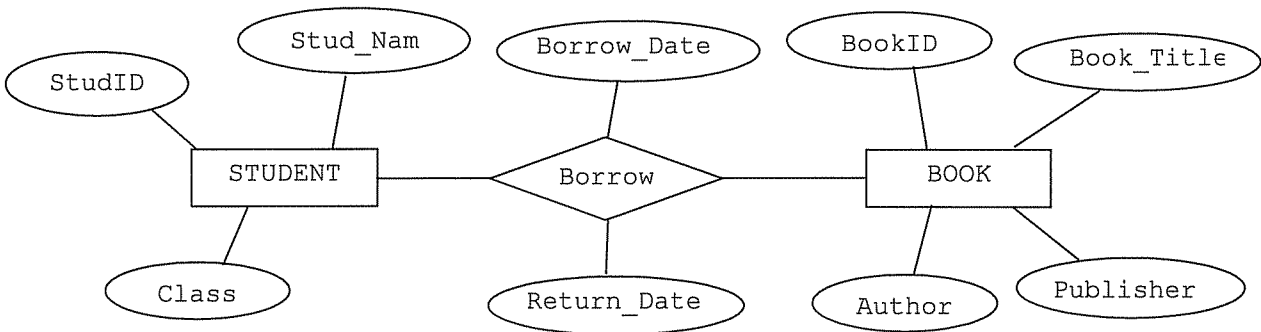
(2 marks)

(c) Transform the E-R diagram in (b) into database using the following schema.

STUDENT (_____)

BOOK (_____)

BORROW (_____)

(6 marks)

(d) The librarian wants to include the company name, address and phone number of publishers in the diagram. It is assumed that a publisher publishes many books and a book is published by one publisher only.   Add an entity in the E-R diagram in (b).

(3 marks)

(e) Suggest a modification to the design of LIBRARY to ensure that each student can borrow 5 books at any time. The total number of books borrowed by a student is not greater than 5 at a time.

_____

_____

_____

_____

(3 marks)

3.   A recreation centre provides several leisure facilities such as tennis courts and barbecue sites for its members. The centre is open daily from 9 a.m. to 11 p.m. The following database files are used to store the information of members, facilities and reservations by members.

MEM

	Field name	Type	Width	Description	Example of data
1	MEMID	Character	6	Member identity number	123456
2	MNAME	Character	20	Name of the member	Chan Po Po

FAC

	Field name	Type	Width	Description	Example of data
1	FCODE	Character	3	Facility code	T02
2	FTYPE	Character	30	Type of facility	Tennis Court
3	RATE	Numeric	3	Charge per hour	40

RES

	Field name	Type	Width	Description	Example of data *A member with member identity number '123456' reserves the facility with Code 'T02' from 11 a.m. to 2 p.m. on 31st December 2003.*
1	MEMID	Character	6	Member identity number	123456
2	FCODE	Character	3	Facility code	T02
3	UDATE	Date	8	Date of use	31/12/03
4	START	Numeric	2	The start time	11
5	END	Numeric	2	The end time	14

RES stores the information of the reservations by members in 2003.

Write SQL commands to complete the following tasks:

(a) List the names of members, without duplicates, who have reserved one or more of the facilities on 21/09/03.

_____

_____

_____

_____

(3 marks)

(b) Output the names of members who have **not** reserved any of the facilities of the centre.

_____

_____

_____

(3 marks)

(c) The members will be billed monthly for reserving the facilities in the centre. The charge for each facility is calculated using the following formula:

Charge = (END − START) × RATE

Where   START   represents the start time
        END   represents the end time
        RATE   represents the charge per hour

List the names of members, and the total amount of the charges in September for those members who are billed for more than $1000 in this month. The records in the list should be arranged in descending order of the total amount.

_____

_____

_____

(5 marks)

(d) There are two soccer pitches with facility codes, 'S01' and 'S02', in the centre. Output the dates on which the two soccer pitches are both reserved.

_____

_____

_____

(4 marks)

(e) There are many barbecue sites in the centre. The first character of the facility code of all barbecue sites is 'Q'. Output the facility codes of the barbecue sites which are **not** reserved during the time period from 6 p.m. to 9 p.m. on 21/09/03.

_____

_____

_____

_____

(5 marks)

4.   Kenneth is the administrator of the database system in a school. TEACHER is one of tables in the database with the following structure:

Field	Description of the teacher
ID	HKID number
Name	Name
Salary	Salary
Address	Address

(a) Kenneth wants Mary, a clerk in the school, to verify the personal information of the teachers. However, the Principal wants to keep the salary information confidential from the clerk.

Suggest a database measure which can be used to implement the above security requirement. Explain briefly how the measure can allow the clerk to verify information without any violation of confidentiality.

_____

_____

_____

(2 marks)

(b) The principal asks Kenneth to create accounts for all 60 teachers in the school so that the teachers can access the school database to check students' information. To protect the data privacy, teachers can be only allowed to view data in the tables containing student information, but not the teacher information in TEACHER.

There are two common approaches to assigning account privileges: account-level and table-level. Which one is more suitable?   Justify your answer.

_____

_____

_____

(3 marks)

In the extracurricular activities, each club is led by at least one chairperson. Each student is allowed to lead at most one club. The information on chairpersons of all clubs is stored in the following table CLUB:

CLUB(ClubID, ClubName, Chairperson, SID, Class)

In the above schema, ClubID, ClubName, Chairperson, SID and Class represent the code of the club, the name of the club, the name of the chairperson, the student ID code of the chairperson and the class of the chairperson respectively.

(c) (i) Is CLUB in first normal form (1NF)? Explain briefly.

_____

_____

_____

(ii) Is CLUB in second normal form (2NF)? Explain briefly.

_____

_____

_____

(iii) CLUB is not in third normal form (3NF). Why not?

_____

_____

_____

(iv) Normalize CLUB to become third normal form.

_____

_____

_____

(6 marks)

END OF PAPER

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 2B
Data Communications and Networking
(Sample Paper)

Question-Answer Book

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1		
2		
3		
4		
Total		

Time allowed: 1 hour 30 minutes
This paper must be answered in English.

INSTRUCTIONS

(1) Write your Candidate Number in the space provided on Page 1.

(2) Stick barcode labels in the spaces provided on Pages 1, 3 and 5.

(3) Answer **ALL** questions.

(4) Write your answers to Section B in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

(5) Supplementary answer sheets will be provided on request. Write your candidate number, fill in the question number and stick a barcode label on each sheet. Tie them loosely but securely with a string INSIDE this Question-Answer Book.

Answer all questions.   Write your answers in this question-answer book.

(Modified from 2001 ASCA1 Q.11)

1.   Tin-tin Book Company is a book wholesaler, and has been in business for over 20 years.   It has been running its daily operations manually, including ordering and delivering books. Each department uses big filing cabinets to store information about books, invoices, customer details, etc.   Last year, the company purchased several stand-alone microcomputers and printers for its various departments to handle daily transactions. In order to cope with business expansion, the company's management team has hired a system consultant to provide professional recommendations for improving the existing system and to study the feasibility of entering the overseas market.

(a) The consultant suggests connecting the stand-alone computers to make a local area network (LAN).

   (i)   Describe **two** advantages of using a LAN.

   _____

   _____

   (ii) What peripheral device(s) should be installed in the computers for network connection?

   _____

   _____
                                                                    (3 marks)

   (iii) Beside the computers, state **two** other types of equipment that are needed to form the network, and describe their functions briefly.

   _____

   _____

   _____

   _____
                                                                    (4 marks)

(b) After the company sets up the LAN, the consultant further suggests developing a web-based retailing application system to promote and sell books through the Internet.

   (i)   Give **two** possible advantages of doing business through the Internet.

   _____

   _____

(ii) Give **three** network considerations that the company should have in designing this application system. For each consideration, briefly describe how it affects the design.

_____

_____

_____

_____

_____

_____

(8 marks)

(Modified from 2004 IT 1 Q.13)

2. A small business enterprise installs a number of personal computers (PCs). The enterprise applies for a business Internet service from an Internet Service Provider. The PCs installed with TCP/IP protocols are linked up in the form of a peer-to-peer network (p2p), which is then connected to a network device so that all the PCs can have access to the Internet.

(a) What is the main characteristic of a peer-to-peer network?

(2 marks)

(b) Why are the PCs installed with TCP/IP protocols?

(2 marks)

(c) In order to have its own web site and to enhance e-business, the enterprise subscribes to an Application Service Provider (ASP). An ASP is a third-party entity that manages and distributes software-based services and solutions to customers from a central data centre. The ASP provides two main products to the enterprise: (1) domain name hosting and web site hosting; and (2) communication applications.

(i) State **two** advantages and **two** disadvantages to the enterprise of subscribing to an ASP.

(ii) What types of services would you expect from the product "communication applications" provided by the ASP?

(6 marks)

(d) To cope with future development, the company has decided to install a file server and a domain controller. The file server is used to store data and company files and the domain controller is responsible for user login.

    (i) After the changes, the network is no longer a peer-to-peer network. What kind of network is it? What is its advantage over the peer-to-peer network?

    (ii) The domain controller can directly refuse users permission to log on to the server. Give **two** other restrictions that can be imposed on the logon service.

    (iii) Should all PCs be installed with the same network operating system? Why?

(5 marks)

3.   A company provides web page design and web hosting services and its office is located on two different floors of a commercial building. Its network infrastructure is shown below:
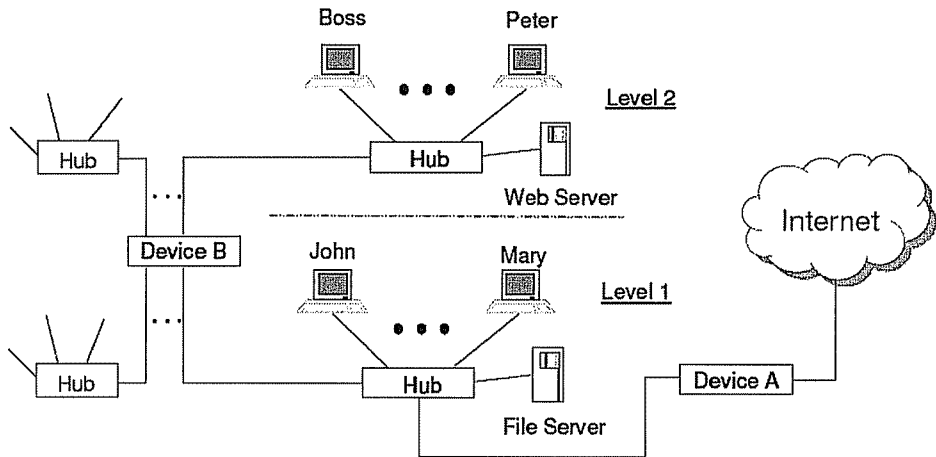
The web server stores the web pages produced by the company for their customers. The file server supports daily business needs.

(a) (i)   What is Device A? Justify your answer.

_____

_____

(ii)   Suggest **two** types of network devices that can be used for Device B. Explain briefly their difference, in terms of the performance in this network.

_____

_____

_____

(5 marks)

(b) How should the network be open to staff so that they can access the file server outside their office? Give **two** possible solutions and state their major difference.

_____

_____

_____

_____

(3 marks)

(c) The company decides to improve the network by the following actions. State the names of the devices to be added and the locations in the network.

    (i) Add a device for better security.

_____

_____

    (ii) Replace certain devices for better network traffic management.

_____

_____

(4 marks)

(d) Suggest **two** feasible types of Internet connection for the network and state the major difference between them other than the bandwidth.

_____

_____

_____

_____

(3 marks)

4.   A small company has set up a local area network in its office. The network consists of five personal computers (PCs) and a web server connected with bus topology. All PCs can access the Internet. The staff frequently surf the Hong Kong Government's web site for information. The Hong Kong Government's web site has the domain name 'info.gov.hk' and IP address '202.128.227.99'.

(a)   The company decides to employ a network administrator. Describe **three** essential duties of a network administrator.

_____

_____

_____

(3 marks)

(b)   State one disadvantage of bus topology.

_____

_____

(1 mark)

(c)   How can a network administrator look for the IP address of a domain name?

_____

_____

(1 mark)

(d)   A user can view the government's web page using the IP address '202.128.227.99' but not the domain name 'info.gov.hk'. Suggest one possible reason for this situation.

_____

_____

(2 marks)

(e)   What kinds of network information can be extracted from the IP address '202.128.227.99' ?

_____

_____

(2 marks)

Answers written in the margins will not be marked.

(f) The network administrator is going to ask users to choose their own passwords. Suggest **three** important guidelines that should be followed by all users when choosing a password.

_____

_____

_____

(3 marks)

(g) A network suffers from various kinds of attack.

   (i) One of the categories is called Spyware. What does Spyware do?

_____

_____

   (ii) Another category is called Adware. Describe how it affects the browsing of a web site.

_____

_____

(3 marks)

END OF PAPER

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY

PAPER 2C

Multimedia Production and Web Site Development

(Sample Paper)

Question-Answer Book

Time allowed: 1 hour 30 minutes
This paper must be answered in English.

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1		
2		
3		
4		
Total		

INSTRUCTIONS

(1) Write your Candidate Number in the space provided on Page 1.

(2) Stick barcode labels in the spaces provided on Pages 1, 3 and 5.

(3) Answer **ALL** questions.

(4) Write your answers to Section B in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

(5) Supplementary answer sheets will be provided on request. Write your candidate number, fill in the question number and stick a barcode label on each sheet. Tie them loosely but securely with a string INSIDE this Question-Answer Book.

Answer all questions.   Write your answers in this question-answer book.

(2006 CECIT 2D Q.3)
1.   An Artist designed his own web page using three frames (A), (B) and (C). He would like to share his pictures as well as other information related to Art. Two of the display screens are shown below:

Screen 1:   with <My Pictures> button pressed

(A)

My Art Gallery
25-04-2006

(B)	(C)
<Home> <About Me> <My Pictures> <Exhibitions> <Forum> <Useful Links> <Feedback>	**My Pictures** Page 1 of 3 < 1 2 3 > Thumbnail 1 Thumbnail 2 Thumbnail 3 Thumbnail 4 Thumbnail 5 Thumbnail 6 Thumbnail 7 Thumbnail 8 Thumbnail 9

Screen 2:   with <Exhibitions> button pressed

(A)

My Art Gallery
25-04-2006

(B)
<Home>

<About Me>

<My Pictures>

<Exhibitions>

<Forum>

<Useful Links>

<Feedback>

(C)
Exhibitions Information

	Type	Artist	Venue	Date
1.	Water Colours	Big Bug	Town Hall	01-03-2006
2.	Sculpture	Ah Ching	Cultural Centre	03-06-2006
3.	Chinese Painting	Big Bug	Cultural Centre	07-09-2006
4.	Water Colours	Ah Ching	Town Hall	30-04-2006
5.	Chinese Painting	Peterson	Town Hall	27-12-2006
6.	Water Colours	Little Bell	Cultural Centre	16-09-2006
7.	Water Colours	Peterson	Community Hall	11-05-2006
8.	Chinese Painting	Little Bell	Cultural Centre	12-08-2006

(a) Describe the functions of the three frames (A), (B) and (C).

_____

_____

_____

(3 marks)

(b) Give one advantage and one disadvantage of using frames in a web page.

_____

_____

_____

(2 marks)

(c) All pictures in Screen 1 have the original resolution of 2272×1704 pixels.

(i) When a thumbnail is clicked, it shows a picture corresponding to the thumbnail with a resolution of 640×480 pixels within frame (C) even though frame (C) has a resolution of 1024×768 pixels. Explain briefly why the artist designs like this.

_____

_____

_____

(ii) What is the aspect ratio of the pictures? Each thumbnail in Screen 1 is designed to have a resolution of 125×75 pixels. Do you think that this is a good design? Justify your answer.

_____

_____

_____

(4 marks)

(d) In Screen 2, the list should contain information on 20 exhibition events. How can we view the rest of the events? In order to make it easier for users to find information, the artist built in four sub-heading buttons in Screen 2. Describe briefly how these buttons function.

_____

_____

_____

(3 marks)

(e) When the cursor is placed on the <Feedback> button, the bottom status line on the browser shows mailto:admin@artgallery.com.hk. What happens when the user clicks on the mouse at this moment? Recommend another method for collecting feedback.

_____

_____

_____

(2 marks)

(f) The artist has now decided to host his web site by building his own web server. Give a reason to support his decision.

_____

_____

_____

(1 mark)

(New Question)

2.　　A teacher would like to write a web page for students to practise arithmetic, as follows:

Basic Arithmetic

1.　3 + 4　=　☐
2.　7 + 6　=　☐
3.　8 + 5　=　☐
4.　9 − 2　=　☐
5.　8 − 6　=　☐

[Submit]

The students can enter the answer of each question in the corresponding text box. When the "Submit" button is clicked, the web page will check whether the answers are correct, and the results will be displayed in a pop-up message box, as shown below:

Results

1.　3 + 4　=　7　　　(Correct)
2.　7 + 6　=　15　　(Incorrect)
3.　8 + 5　=　13　　(Correct)
4.　9 − 2　=　6　　　(Incorrect)
5.　8 − 6　=　2　　　(Correct)

[OK]

(a)　Identify whether HTML or JavaScript should be used to perform the following tasks:

(i)　Show the highlighted title: _____

(ii)　Set the text boxes for accepting answers: _____

(iii)　Check the correctness of answers: _____

(iv)　Set background music: _____

(4 marks)

(b) The teacher would like to display an image with 1024×768 pixels at the centre. However, the display of the image through a browser is not what he expected. Comment on the problems he has encountered.

_____

_____

(2 marks)

(c) If the teacher wants to generate the numbers in the arithmetic questions randomly, does he need other resources other than HTML and JavaScript? Explain briefly.

_____

_____

(2 marks)

(d) The checking of the answers is now processed on the client side. Suggest a script in the web page for doing the checking, and give **two** advantages of checking answers on the client side.

_____

_____

_____

(3 marks)

(e) Is it possible for the teacher to know the performance of the students from the web page? If yes, describe how the teacher would get the data from the system; otherwise, suggest a way to collect the data.

_____

_____

_____

_____

(3 marks)

(f) The teacher would like to produce web pages using animation software with action scripts instead. Give one advantage and one disadvantage of this method.

_____

_____

_____

(2 marks)

3.   Mr. Wong wants to design a demonstration tool for showing how an ancient Chinese character changes to its modern shape by morphing. For example,

見 ⇨ 見

ancient character   modern character
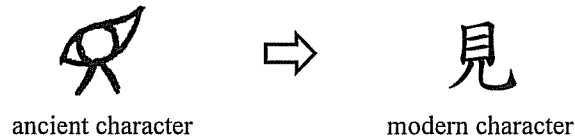
(a) Give one advantage and one disadvantage of using presentation software to design the demonstration.

Advantage : _____

_____

Disadvantage : _____

_____

(2 marks)

(b) Animation software *A* can generate the interim scenes automatically according to the tweening style selected. The product can also be exported as an animated GIF file.

(i)   Give one advantage and one disadvantage of using software A to design the demonstration.

Advantage : _____

_____

Disadvantage : _____

_____

(ii) The number of interim scenes generated in the demonstration can be affected by many attributes. Give **two** of them.

_____

_____

(iii) Besides the number of scenes, give **two** attributes that affect the file size of the exported animated GIF.

_____

_____

(6 marks)

(c) Mr. Wong has to design the demonstration as a 10-second animation which will play continuously at the entry of an exhibition. He is now considering two options for timeline control:

Option 1: Morph from second 0 to second 10.

Option 2: Show the ancient character from second 0 to second 2, morph from second 2 to second 8, and then show the modern character from second 8 to second 10.

Which option will you commend to Mr. Wong? Explain briefly.

_____

_____

_____

(2 marks)

(d) Some professionals suggest that the frame rate should be greater than 20 frames per second.

(i) Do you agree this suggestion? Explain briefly.

_____

_____

_____

(ii) Should the frame rate be very large, for example, 100 frames per second? Explain briefly.

_____

_____

_____

(4 marks)

4.   Audio sounds are captured and converted into digital data using a sound card before they can be processed in a personal computer. This conversion process is called digitisation and the digitised data are commonly stored in WAVE file format. The quality of the sound reproduced depends on the sampling rate and the sample size of the digitisation process. Different sound qualities using different sampling rates and sample sizes are shown in the following table:

Sound Quality	Sampling Rate (kHz)	Sample Size (bits)
A	8	8
B	11.025	8
C	22.05	16
D	44.1	16

(a)   What is the meaning of sampling rate? How does it affect the sound quality?

_____

_____

(2 marks)

(b)   What is the meaning of sample size? How does it affect the sound quality?

_____

_____

(2 marks)

(c)   Calculate the file size (uncompressed) of a one-second mono sound file of Sound Quality D.

_____

_____

(1 mark)

(d)   Sound Quality A is usually used for telephone conversations. Explain briefly why.

_____

_____

(2 marks)

(e)   Describe one advantage and one disadvantage of storing audio sounds in WAVE file format.

_____

_____

(2 marks)

(f) An audio clip in WAVE file format is converted into MP3 file format using a software package. Describe the main characteristics of this MP3 file and its **two** advantages.

_____

_____

_____

_____

_____

(3 marks)

(g) In the conversion (f), an encoder of encoding bit rate 64 kbps is used. If a greater encoding bit rate of 128 kbps is used to do the conversion, what will be its effect on the file size of the sound file? Explain briefly.

_____

_____

(1 mark)

(h) Suggest one audio file format which is suitable for music composing and editing. Describe its main characteristics.

_____

_____

_____

(2 marks)

END OF PAPER

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 2 D
Software Development
(Sample Paper)
Question-Answer Book

Time allowed: 1 hour 30 minutes
This paper must be answered in English.

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1		
2		
3		
4		
Total		

INSTRUCTIONS

(1) Write your Candidate Number in the space provided on Page 1.

(2) Stick barcode labels in the spaces provided on Pages 1, 3 and 5.

(3) Answer **ALL** questions.

(4) Write your answers to Section B in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

(5) Supplementary answer sheets will be provided on request. Write your candidate number, fill in the question number and stick a barcode label on each sheet. Tie them loosely but securely with a string INSIDE this Question-Answer Book.

(Modified from 2005 CECIT 2A Q.1)

1.   Consider the following procedure `func1`:

Line	Statement
1	`for counter i from 1 to 5`
2	`{`
3	`  if (A[i] > A[0]) then`
4	`  {`
5	`    Fvalue ← A[0]`
6	`    A[0] ← A[i]`
7	`    A[i] ← Fvalue`
8	`  }`
9	`}`

After a program initialises the contents of array A below, it then executes `func1`.

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]
4	2	12	7	19	2

(a) (i) Fill in the contents of the array A after completing the `if` statement on lines 3 to 8 when i=1.

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]

(ii) Fill in the contents of the array A after completing the `if` statement on lines 3 to 8 when i=2.

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]

(iii) Fill in the contents of the array A when `func1` completes.

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]

(6 marks)

(b) What is the purpose of the three assignment statements on lines 5, 6 and 7?

_____

_____

(2 marks)

(c) How many times has line 5 been executed?

_____

_____

(2 marks)

(d) (i) What is the purpose of `func1`?

_____

_____

(ii) Give an application of `func1`.

_____

_____

(3 marks)

(e) If line 1 is replaced by "`for counter i from 5 down to 1`", can `func1` achieve its purpose in (d)(i)? Explain briefly.

_____

_____

_____

(2 marks)

2. The library card number of a school consists of a leading capital letter, followed by 5 digits and a check character. In validation, the capital letters, A, B, ..., Z, represent the values, 1, 2, ..., 26, respectively. The value for the letter and each digit are multiplied by their corresponding position numbers as follows:

Card number (example):	Y	9	1	7	1	8	1
Position number:	6	5	4	3	2	1	
Multiplication values:	25×6	9×5	1×4	7×3	1×2	8×1	

check character

WS is defined as the sum of the multiplication values while RE is defined as the remainder of (WS ÷ 11). The check character is defined as:

$$\begin{cases} 0 & \text{if } RE = 0 \\ A & \text{if } RE = 1 \\ \text{the digit of } (11-RE) & \text{if } RE \geqq 2 \end{cases}$$

In the example above,
    WS = 25×6 + 9×5 + 1×4 + 7×3 + 1×2 + 8×1 = 230
    RE = the remainder of (WS ÷ 11) = 10
Hence, the check character is 1.

(a) Find WS, RE, and the check character for the library card number, B88145.

    WS = _____   RE = _____   check character = _____

(3 marks)

The computation of the check character of the library card number is done by a computer program.

(b) Given that the capital letter is stored in a character variable, ch, write a program statement to calculate the multiplication value for ch and store it in an integer variable, N.
    (For example, if ch is 'Y', N should be 25×6 = 150.)

(2 marks)

(c) Suppose that WS has been calculated and stored in an integer variable, sum. Write a program segment to find the check character and store it in a character variable, mycheck. You are not allowed to use variables other than the following.

Variables	Description
sum	an integer variable that has stored WS
r	an integer variable
mycheck	a character variable to store the check character

(4 marks)

The library card numbers are stored in a linked list in ascending order. The following example shows four card numbers in the linked list.

head —▶ A78228 —▶ B99145 —▶ G84176 —▶ W91718 —▶ (a null pointer)
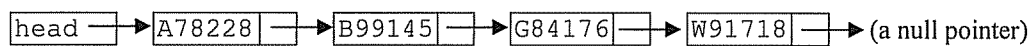
(d) (i) What kind of search method should be used to search for a library card number in the linked list?

(ii) Other than the search method in (d)(i), are there other common search methods applicable to this linked list? Explain briefly.

(iii) When elements are deleted, how should the memory locations of the deleted elements be handled properly?

(4 marks)

Suppose that each element of the linked list is physically stored in a pair of memory locations. The content of head pointer is the address of the first element stored in memory location 01. The content of the pointer of the last element is -1, indicating a null pointer. When the element with B99145 is deleted, the relevant pointers are updated as shown below.

Memory location	Content
01	12
:	:
:	:
12	A78228
13	16
14	W91718
15	-1
16	B99145
17	18
18	G84176
19	14
20	
21	

Before deletion

Memory location	Content
01	12
:	:
:	:
12	A78228
13	18
14	W91718
15	-1
16	
17	
18	G84176
19	14
20	
21	

After deletion

(e)   After the deletion, two library card numbers, X12011 and C34567, are inserted in the linked list and stored in memory locations 20, 21 and 22, 23 respectively.   After each insertion, the elements of the list should be in ascending order.   Write down the contents of the memory locations after each insertion.

Memory location	Content
01	12
:	:
:	:
12	A78228
13	
14	W91718
15	
16	
17	
18	G84176
19	
20	X12011
21	
22	
23	

After inserting X12011

Memory location	Content
01	12
:	:
:	:
12	A78228
13	
14	W91718
15	
16	
17	
18	G84176
19	
20	X12011
21	
22	C34567
23	

After inserting X12011 and C34567

(5 marks)

(Modified from 2007 ALCS2 Q.3)

3.　mySwap(x, y) is used to swap two elements of an accessible array, A , with indices x and y.

(a)　Complete mySwap below.

[Pascal version]
```
procedure mySwap( x, y : integer);
var
  temp : integer;
begin
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  A[x]:= temp
end;
```

[C version]
```
void mySwap(int x, int y) {
  int temp;
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  A[x] = temp;
}
```

[Visual Basic version]
```
Sub mySwap(ByVal x, ByVal y as Integer)
  Dim temp as Integer
  ┌─────────────────────────┐
  │                         │
  └─────────────────────────┘
  ┌─────────────────────────┐
  │                         │
  └─────────────────────────┘
  A(x) = temp
End Sub
```

[Java version]
```
static void mySwap(int x, int y) {
  int temp;
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  ┌─────────────────────────┐
  │                         │ ;
  └─────────────────────────┘
  A[x] = temp;
}
```

(2 marks)

myRev(x, y) is used to reverse the order of the elements of A with indices from x to y without using additional arrays. The following example shows the effect of myRev (3,6) on A.

Before

Indices:	2	3	4	5	6	7
Content of A:	6	7	9	5	11	65

After

Indices:	2	3	4	5	6	7
Content of A:	6	11	5	9	7	65

(b)　Given x <= y, complete myRev below.

[Pascal version]
```
procedure myRev (x, y : integer);
begin
  while ( [            ] ) do
  begin
    mySwap( x, y);
    [            ] ;
    [            ]
  end
end;
```

[C version]
```
void myRev(int x, int y) {

  while ( [            ] ) {

    mySwap(x, y);
    [            ] ;
    [            ] ;
  }
}
```

[Visual Basic version]
```
Sub myRev(ByVal x, ByVal y As Integer)

  Do While ( [            ] )

    Call mySwap(x, y)
    [            ]
    [            ]
  Loop
End Sub
```

[Java version]
```
static void myRev(int x, int y) {

  while ( [            ] ) {

    mySwap(x, y);
    [            ] ;
    [            ] ;
  }
}
```

(3 marks)

SegSwap(x, y, z) is used to 'swap' two segments of A. It moves the elements with indices from x to y after the elements with indices from (y+1) to z. The following example shows the effect of SegSwap(3,7,9) on A.

Before

Indices:	2	3	4	5	6	7	8	9	10
Content of A:	6	7	9	5	11	65	15	19	27

After

Indices:	2	3	4	5	6	7	8	9	10
Content of A:	6	15	19	7	9	5	11	65	27

(c)   Given x <= y <= z, complete SegSwap below.

[Pascal version]
```
procedure SegSwap(x, y, z : integer);
begin
  myRev(x, y);
  [                    ] ;
  [                    ]
end;
```

[C version]
```
void SegSwap(int x, int y, int z) {
  myRev(x, y);
  [                    ] ;
  [                    ] ;
}
```

[Visual Basic version]
```
Sub SegSwap(ByVal x, ByVal y, ByVal z As Integer)
  Call myRev(x, y)
  [                    ]
  [                    ]
End Sub
```

[Java version]
```
static void SegSwap(int x, int y, int z) {
  myRev(x, y);
  [                    ] ;
  [                    ] ;
}
```

(2 marks)

(d) An experimental language supports only assignment statement (=), subprogram, output statement (print), and simple arithmetic expression. Consider the following subprograms, foo and main, with integer variables m, n, x and y:

```
m, n : integer;

subprogram foo(x : integer, y : integer)
{
    x = x + 1;
    y = m + 2 + y;
}

subprogram main
{
    m = 3;
    n = 4;
    foo(m, n);
    print(m);
    print(n);
}
```

(i) What is the output of main if the *call by value* parameters passing method is used in foo?

_____

_____

(ii) What is the output of main if the *call by reference* parameters passing method is used in foo?

_____

_____

(4 marks)

(Modified from 2007 ALCS2 Q.1, 2006 ALCS2 Q.3, 2006 ALCS2 Q.10, 2007 ALCS2 Q.8)
4. A company applies a traditional software development model with five processes:
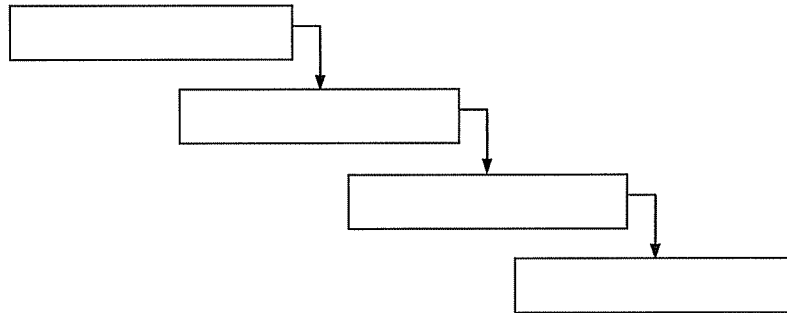
- Implementation
- Documentation
- Design
- Maintenance
- Analysis

One of them is an on-going process which is integrated into various phases of this model.

(a) (i) Which one is the on-going process? _____

(ii) Fill in the other four processes in the appropriate boxes of the following diagram to show the progress of the software development.

(3 marks)

(b) Give a drawback of the model and suggest a modification to it. (Candidates may modify the diagram for illustration.)
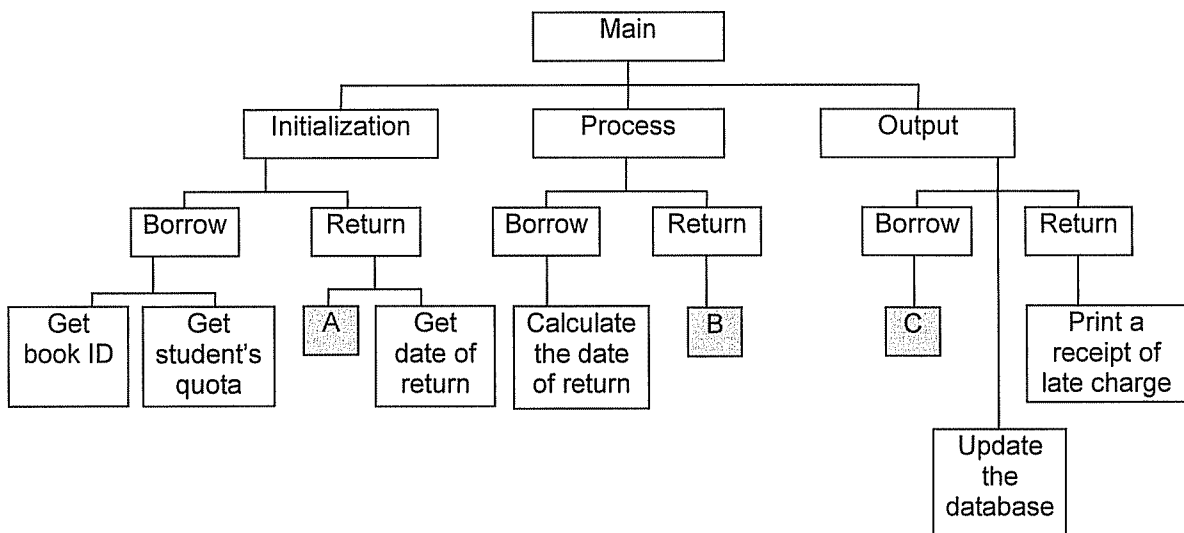
_____

_____

_____

(2 marks)

The company is going to develop a system for borrowing and returning books in a library. The draft of the structure chart of the system is given below.

(c) What should be the contents of Boxes A, B and C?

A: _____

B: _____

C: _____

(3 marks)

(d) The salaries of IT professionals in India are much lower than in Hong Kong. The company decides to move the development work to India and downsize its organization in Hong Kong. Give **two** kinds of jobs relating to systems development which should remain in Hong Kong. Justify your answer.
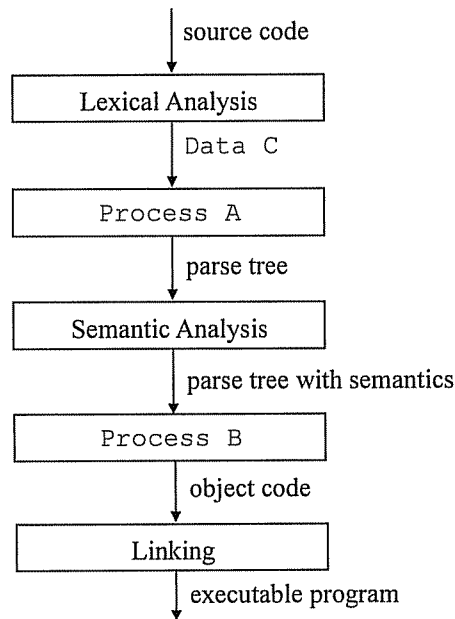
_____

_____

_____

(3 marks)

In system development, after selecting a programming language, coding starts. During the implementation phase, some programs are compiled and the following diagram shows the compilation processes.

```
                    │ source code
                    ▼
        ┌───────────────────────┐
        │   Lexical Analysis     │
        └───────────────────────┘
                    │ Data C
                    ▼
        ┌───────────────────────┐
        │      Process A         │
        └───────────────────────┘
                    │ parse tree
                    ▼
        ┌───────────────────────┐
        │   Semantic Analysis    │
        └───────────────────────┘
                    │ parse tree with semantics
                    ▼
        ┌───────────────────────┐
        │      Process B         │
        └───────────────────────┘
                    │ object code
                    ▼
        ┌───────────────────────┐
        │       Linking          │
        └───────────────────────┘
                    │ executable program
                    ▼
```

(e) What are `Process A, Process B` and `Data C`?

A: _____

B: _____

C: _____

(3 marks)

(f) The development is completed.

(i) State a service that the company should provide for librarians.

_____

(ii) State a service that the company or the library should provide in order to maintain the system afterwards.

_____

(2 marks)

END OF PAPER