Paper 1 (Section A)

Question No.	Key	Question No.	Key
1.	C (55)	21.	A (79)
2.	B (23)	22.	A (89)
3.	C (78)	23.	B (52)
4.	B (87)	24.	D (88)
5.	B (46)	25.	B (74)
6.	D (85)	26.	B (86)
7.	A (76)	27.	A (58)
8.	A (86)	28.	D (51)
9.	B (67)	29.	A (55)
10.	C (84)	30.	D (41)
11.	D (68)	31.	D (67)
12.	D (88)	32.	C (87)
13.	D (42)	33.	A (70)
14.	C (59)	34.	B (86)
15.	C (65)	35.	C (86)
16.	A (83)	36.	C (61)
17.	A (61)	37.	B (91)
18.	C (70)	38.	B (87)
19.	C (47)	39.	D (71)
20.	B (78)	40.	D (68)

Note: Figures in brackets indicate the percentages of candidates choosing the correct answers.

Paper 1 (Section B)

				Marks
1.	(a)	(i)	The coverage is wider.	1

(ii) Advantage: The mobile device and the wireless router are not necessary to be put nearby. (distance between devices)   1
✘ Simple connection to the Internet

Disadvantage: There is a higher security risk. (security)   1

(b) Multitasking system   1+1
The system instantaneously controls the fly and processes the transmission of video data.

OR

Real-time processing system
The system receives flying instructions and acts accordingly (or video-related actions)

Note: The explanation must involve the scenario of the question but not just state the definition of the computer system.

(c) network bandwidth / network security / wireless standards (protocol 802.11 a/b/g/n/ac) /   1×2
network stability (issues related to computer network)

✘ processing power, video size, video attribute, 'wireless'

(d) (i) 2 improvements are clearly shown (no matter how many improvements have been drafted)   1×2
Examples:
- Direction buttons & location (The location must be user-friendly. The centre position is not appropriate.)
- Merge of two screens
- Buttons within the screen

(ii) 2 improvements are clearly and appropriately described (corresponding to (d)(i))   1×2

2. (a) (i) TELNO may not be unique. /
There may be two members using the same telephone number. /
TELNO may be null. /
Some members may choose EM instead of TELNO as the contact method. /
Some members may not have a telephone number.

✘ TELNO contains private information.
✘ TELNO may be changed in the future.

(ii) Validate the digits of the membership number. (a legitimate membership number)

✘ Verify the membership number.
✘ Check whether there is an error.

(b) 98768 (① locate the record)

(c) (i) Recipients do not know who will also receive the email. /
Hide the email addresses of the other recipients in the email.

(ii) Break the file into several small files and send them into separate emails. /
Upload the file in the Cloud storage (or a web site) and send the corresponding hyperlink to the members. /
Make use of a FTP server and set up an account for members to download the file./
Others: Instant messaging, P2P

✘ Compression, change of file format

(iii) Only a browser is required. /
Format can be kept. (cross-platform) /
Updated information can be provided on the web. /
There is no need to store the presentation. (no need to download)

✘ It can be viewed anytime and anywhere.
✘ The web browsing speed is fast.
✘ HTML supports interactive multimedia elements.

(d) (i) (B4+C4)*B$1
SUM(B4:C4)*B$1
B4*B$1 + C4*B$1

Correctly translate to a spreadsheet formula ①
Correct absolute / relative addresses: $B4, $C4, B1 ①

(ii) B1, B4:C7

Check the first 9 cells only and search for 1 correct answer. ①
All correct ①
The range B4:C7 can also be written as
B4 - C7
B4 to C7
B4,B5,B6,B7,C4,C5,C6,C7

3. (a) voice / speech recognition, sound recognition, handwriting, voice input,   1
        barcode / QR code scanning (input certain kind of text with a built-in camera and OMR)

     ✗ siri / voice control / voice-to-text function
     ✗ microphone / touch-screen

   (b) 1 mark for an answer in each category, maximum 2 categories: 1×2
       (1) more portable (lower weight / smaller physical size)   (portability)
       (2) higher data transfer rate / higher disk access speed / lower latency time / lower seek time
       (3) more resistant to shock
       (4) quiet in operation
       (5) lower power consumption / less heat

     ✗ higher running speed
     ✗ non-volatile
     ✗ more robust (need to be specific)
     ✗ higher storage capacity
     ✗ lower cost
     ✗ The capacity can be increased easily.
     ✗ It can be plugged into another computer easily.

(c)

Shareware	- The software owner usually fixes program bugs and adds features quickly. - Try the software before purchasing it. - Frequent update/support is available. ✗ Free during the trial period ✗ More programs available	- After the trial period, it is not free to use the software or it is illegal to use the software. - Some advanced functions are reserved for paid version only. - Need to pay after the trial period. - Pop-up ad will be shown (until you buy the software). ✗ More prone to hacking ✗ No product support if the company collapses	1,1
Open source software	- It is free to use the program. - Source code is available for viewing/modification. ✗ Users can own the source code.	- Usually there is no technical support. ✗ More prone to hacking ✗ File format may not be compatible.	1,1

Key: Candidates must **compare** the two types of software.

The following is not acceptable for any one of the answers:
- more/less bugs; higher/lower quality
- contains virus/malware/adware/spyware
- privacy/security problems
- a breach of law for commercial use
- functions are not well-developed / software may not be perfect
- free for download

(d) The company can send email (SPAM) to 1
any email accounts stored in the address book without John's consensus. 1

1st mark – what information will be disclosed/misused (email and/or information stored)
2nd mark – example of the disclosure/misuse

✓ Personal information of John's friends will be sold to others by that company
✗ John's email address / account will be hacked
✗ John's privacy will be infringed
✗ The email addresses book will be stored by the company
✗ The email addresses will be used illegally   (need to be specific)

(e) John may encounter a pain in his neck/ fatigue of his muscle fibres. 1
He should take a 5-minute break after using the table computer for every 30 minutes. +1

1st mark – The health problem
✓ Computer Vision Syndrome (vision-related injuries)
✓ Neck pain / back pain / muscle fibre fatigue / Carpal Tunnel Syndrome (Repetitive Strain Injury)
✗ Eyesight problem due to radiation

2nd mark – A <u>corresponding</u> way to minimise the problem
✓ Breaks / doing exercise for prolonged use (after a certain time of usage)
✓ Ergonomic devices – chair with arm rest and/or back rest, tablet holder

✗ Do not use the tablet for a long time (against the question: '*must use the tablet computer for a long-period of time every day*')
✗ Use voice / speech / sound recognition to replace a virtual keyboard or handwriting recognition
✗ Connect to an external keyboard / mouse / monitor

4. (a) (i) It stores the program that monitors the sales of the products. / Drivers 1

(ii) It is not easy to update the operating system. 1

(iii) Advantage: 1
Individual customers' behaviour on using the vending machine can be recorded. /
Reduce the risk of cash handling / fast transaction / no change is required.
Disadvantage: 1
One single payment method may limit the sale.

(b) (i) TRUE 1

(ii) the total number of items remained 2

(iii) It has only two possible values so that the program will be more readable / 1
the control of data is more strict.

(c) (i) 1×3

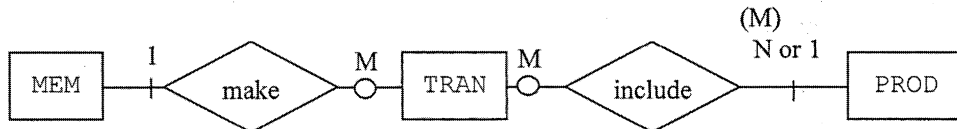| I	FLAG	(I <= 30) AND (NOT FLAG)
1	FALSE	TRUE
15	TRUE	**FALSE**
30	FALSE	**TRUE**
31	TRUE	**FALSE**

(ii) ALG2 – It generates a fewer number of iterations / average execution time is shorter. 1
ALG1 – It may have fewer conditional statements.

5.   (a) (i)   Online shopping web sites for selling cooking recipes/cooking ingredients (online payment)   1×2
                (✓ example of Group purchasing)
                Online cooking classes (video) for registered customers (online registration)
                Sending cooking courses information to prospective and established customers by e-mail (online advertising)
                Providing online assistants (through instant messaging/video chat/social networking/forum/ email) to reply the enquiries from costumers (online assistant)

         (ii) (1) HTTP   1
                (2) HTTP, SMTP   1, 1

      (b) (i)   Streaming technology is used to deliver media in a sequence of data elements. /   1
                A client computer can begin playing the media before the entire file has been transmitted. /
                As the computer plays the media file, it continues to download and buffer additional content from the streaming server.   Playing and downloading happen at the same time. /
                The media data will be discarded after playing. /
                The streamed files are played over the Internet without being downloaded to viewers' computers.

         (ii) Video conferencing usually involves a small number of parties (e.g. two) while webcasting may   1
                involve many simultaneous listeners/viewers. /
                Video conferencing involves two-way communication (interaction) while webcasting is one-way content delivery. /
                Video conferencing involves real time communication while webcasting can be real time or recorded content.

      (c)   It needs to support different kinds of browsers. /   1×2
                Some operating systems do not allow users to install third party plug-ins. /
                It needs to support various versions of browsers.

      (d) (i)   (1) AVI: It can have a better video quality.   1
                (2) MP4: It has a smaller file size.   1

         (ii) well-structured folders, appropriate filenames/folder names, dates & time, indexes, meta data   1×2

1. (a) SELECT DIS FROM EVE, RES   ①   3
        WHERE EVE.EID=RES.EID   ①
        AND PID ='F0023'   ①

   (b) SELECT DIS FROM EVE   ①   3
        WHERE MAXA>=20 AND 20>=MINA   ①
        AND GENDER = 'F'   ①

   (c) SELECT SUM(QUOTA) FROM EVE   3
                      ①   ①
        WHERE GENDER = 'F'   ①

   (d) SELECT DIS, COUNT(*) FROM EVE   ①   3
        WHERE DIS NOT IN (SELECT DIS FROM EVE WHERE GENDER ='F')   ①
        AND GENDER = 'M'
        GROUP BY DIS   ①

   (e) List the champions of all events.   2
                  ①   ①

2. (a) (i) The corresponding attribute cannot be null (empty) in a record.   1

       (ii) Primary key / foreign key / unique / default   1

   (b)   4

        All entities ①
        Relationship ①, ①
        Cardinality ①, ①   (4 out of 5)

   (c) (i) SELECT MID   3
            FROM TRAN, PROD   ⎤
            WHERE TRAN.PID = PROD.PID ⎦ ①
            GROUP BY MID   ①
            HAVING SUM(UPRICE*QUAN)>10000   ①

       (ii) The database cannot be changed or edited accidentally. (better access control)   1×2
            It can be convenient for ordinary users to apply to their information searching. (faster in searching)

(d) (i) There are redundant data in the locations and names of the warehouses.   1×2
It wastes storage on empty fields.
When warehouse information is changed, it may lead to data inconsistency.

   (ii) PRODUCT(<u>PID</u>, *PNAME, UPRICE*)   4
       Primary key: <u>PID</u>   ①
       WAREHOUSE(<u>WID</u>, *ADDR, WNAME*)
       Primary key: <u>WID</u>   ①
       STOCK(<u>WID, PID</u>, STOCK)
       Primary key: <u>WID, PID</u>   ①

       WID – identity code of warehouse
       ADDR – address of warehouse
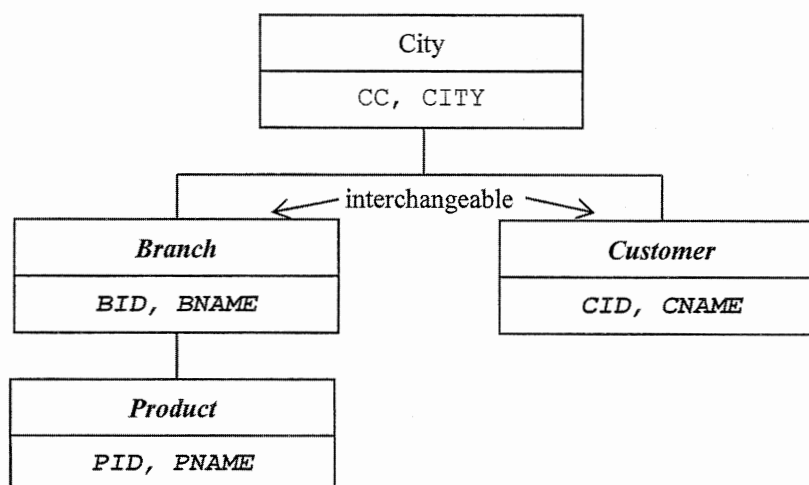   WNAME – name of warehouse
       STOCK – number of product in warehouse   ① (any 1)

3. (a)

City
CC, CITY

← interchangeable →

Branch		**Customer**
BID, BNAME		*CID, CNAME*

1, 1

Product
PID, PNAME

1

(b)   3

	Primary key	Foreign key
PROD	*PID*	*null*
TRAN	*TID, PID*	*CID, PID*

1 for each cell, maximum = 3

(c) Workforce for the related knowledge is more available. (personnel)   1×4
The support from the DBMS is more available. (support)
The performance on heavy duty use of DBMS is better. (performance)
The migration of DBMS costs a lot. (migration/cost of change)
Relational DBMS performs better in indexing. (indexing)
Complicated queries can be made.

(d) (i) Overhead on storage is created. /Overhead on updating is needed.   1

   (ii) (1) It involves accessing all records in CUST and the ordering is not important. So the advantage   2*
of using index in locating a particular record is of no use.

       (2) SELECT * FROM CUST WHERE CID = 'C1234'   1
                                 (or CID under ORDER BY/GROUP BY)

4. (a) (i)

CASE tool	Deliverable
Query editor	Data report/Query command
Graphical modeling tool	ER diagram
Project management tool	Project schedule

1×3

    (ii) Data dictionary, version numbers   (meta data)   1×2

(b)   (i)   7   1×5
          (ii) 3
          (iii) 8
          (iv) 4
          (iv) 1

(c) (i) Daily average AQHI in Central   (summary information)   1

    (ii) The air quality in certain districts in March is improving.   1×2
          Some districts share the similar patterns of AQHI readings.

(d)   Ensure the source of data is reliable.   1×2
          Ensure the information it produces is accurate.
          Collect the only necessary information from users.

* Marking criteria

② Illustrate a logical and concrete answer

① Illustrate a relevant answer

Marks

1. (a)   LAN   1
    WAN   1
    LAN   1

    (b) (i) No, it is because there is no wireless network.   1
           / Yes, it provides wireless connections for other mobile devices.

        (ii) The VPN applies IPsec to authenticate and encrypt data packets.   2*

    (c) (i) Printing jobs can be carried out directly and hence the printing time required is shorter.   1

        (ii) The printing queue can be effectively managed by the desktop computer. (Better control)   1

    (d) (i) a segment of the printing data / a header / a CRC data 1×2

        (ii) Store the data packets in a buffer and print them according to the order of the packets.   2*
            ① Buffering

    (e) (i) It should be duplex mode. During the printing, the printer may send a status message back.   2*

        (ii) Minimise the effort (the amount of coordination required) to avoid retransmission (collisions). /   2*
            Minimise the chance of collisions when other devices need to retransmit data packets.

2. (a) (i) A high performance computer acts a server to centralise the control. 1×2
            The server provides most of its resources to the clients.
            Usually a client does not share any of its resources.

        (ii) memory size in the server / processing power of the server / number of users 1×2
             / types of application

    (b) (i) A = \$17,500   1
            B = \$16,000   1

        (ii) $A = 20 \times 50 + 15 \times 200 + 10 \times 600 = 10,000$ kbps   1
            $B = 20 \times 50 + 20 \times 200 + 5 \times 600 = 8000$ kbps   1
            It can support both scenarios.

    (c) (i) Antivirus software, firewall, public and private key encryption (certificates)   1
            + description   1

        (ii) The system will receive numerous external communications requests (from botnets) such that it   2*
            cannot respond to normal requests. In the end, the server will become overloaded.

    (d) (i) server   1

        (ii) Synchronise the data (Create backup). 1×2
            Send a warning signal to the network administrator.
            Shut down some services in the server.

3. (a) (i) Higher stability 1×2
Higher security
Dedicated locations/computers to access the Internet (less disturbance to the library visitors)

    (ii) mobility (visitors) / sharing of bandwidth (more users) / flexibility (installation) / 1×2
better control of the connections to different kinds of devices

(b) It can minimise the impact of hacker attack on the network as the electronic materials are   2
isolated by the proxy server. /
Since the electronic materials are static in nature, the proxy server can store them in cache so as
to speed up the data access for other visitors.

(c) (i) Install the firewall between the router and the switch in the staff zone / visitor zone.   1

    (ii) A firewall filters suspected data packets so as to avoid denial of service attack. 1×2
A firewall maintains an access control list to control inbound and outbound communication so
as to avoid unauthorised access.
A firewall sends alert signals/messages to network administrators when there is abnormal
network traffic.

(d) (i) The network still works properly because the zones are still in different subnets.   1

    (ii) 192.168.2.254   1

(e) (i) Visitors cannot identify the network of the library without confusion. /   1
Some other networks might use the same SSID.

    (ii) Visitors' mobile devices can detect and connect to the access point   1
with the strongest available signal under the same SSID.   1

    (iii) Examples: (Restrictions on use / restriction of liability / personal data) 1×2
Producing excessive network traffic such as sending massive emails is prohibited.
The library will not be liable for any damages or injury caused by the use of the network.
Personal data sent through the network may be stored by the ISP.

4. (a)   Switches: Separately control the network traffic.   1
         Router: Manage the Internet connection for workstations.   1

   (b)   Advantage: It is easier to access the files outside the office.   1
         Disadvantage: The security control is lower.   1

   (c) (i)   Do IP addresses are set properly?   1
             Can all network devices be found in the network? (ping)   1

       (ii) Network diagram   1×2
             IP configuration

   (d) (i)   Folder owners and guests have the *read* permission.   1

       (ii) Folder owners have the *read* and *write* permissions and guests have the *read* permission. 1

       (iii) No, folder owners and guests have the *read* permission only.   1

       (iv) CR o=r, g=r \usr   2
             CR o=rw, g=r \usr\policy
             CR o=rw, g=r \usr\reports

* Marking criteria

② Illustrate a logical and concrete answer

① Illustrate a relevant answer

Paper 2C

1. (a) $(16 \times 2 \times 22.05 \times 1000 \times 60) / (10 \times 8 \times 1024 \times 1024)$ 1
         = 0.5 MB   1

   (b) (i)   More audio data in each sample is collected so that Mr Ho can recognise the improvement.   1

       (ii) Human beings are not easily aware of the increase of audio data with sampling rate greater than 44.1 kHz.   1

   (c) (i)   He can use the fade in, fade out effect   1
             such that the volume of the speech will gradually decrease while the volume of the school song will gradually increase.   1

       (ii) amplitude, loop / number of channels 1×2

   (d) (i) $(2 \times 1024 \times 1024 \times 8) / (450 \times 1000)$ 1
             = 37.3 seconds   1

       (ii) Reduce the frame rate/resolution/compression ratio so as to create a video with a smaller file size and hence reduce the waiting time.   1

   (e) (i)   GIF is lossless compression.   1

       (ii) The greatest colour depth of PNG format is larger than that of GIF format.   1

       (iii) Cookies are used. The background colour of the web page is saved as a text file in the client computer. It will be retrieved when the user revisits the web page. / (or server-side scripts)   1, 1

2. (a) (i)   Server-side scripting is used to check whether the username has been used and stored in the database.   2*

       (ii) Client-side scripting is used to compute the strength of the password.   2*

       (iii) Do not allow the user to copy and paste the password in the field 'Re-type password'.   1

   (b)   Hyperlink: C   1
         Style sheet: A – Define the layout and apply it to the entire web page. / Apply an external   2*
                           style sheet to the document.
                       C – Define the layout and apply it to the specific segment. (inline style sheet)
         Metadata: Include information about the web page such as keywords so as to increase the   1
                       chance of being searched by search engines
                       A – It can only be used in this part.   1

   (c) (i)   No specific software package is required for creating the button.   1

       (ii) It is easy to create lively, complex animation effects.   1

   (d)   It can be displayed as one image by enlarging it to be 800×600.   1
         It can be displayed as tiles by repeating it both vertically and horizontally.   1

3. (a) It can show more photos on one web page. / It decreases the loading time of the web page.   1
         Use photo editing software to reduce the resolution of the photos but keep their aspect ratios.   1
         /Set the width and height of a photo in the tag <img> (apply to the first reason only).

    (b) Create a text box to allow users to enter keywords to search.   1
         Create a drop-down list of the categories of photos.   1

    (c) (i) Image map – Hyperlinks are added to different parts of the image.   1×2
            A table – The table is set without border and cell padding.
            CSS – Use `id/style/hover` effects to create hyperlinks on the image.

        (ii) No, alternative text can be added for text-to-speech service.   2*

    (d) Design 1:   6
         Include thumbnails ①
         Include previews ①
         User-friendly navigation ①

         Design 2:
         Include all thumbnails ①
         Effective illustration (with categories / tags) ①
         User-friendly navigation ①

    (e) (i) It provides better web management service such as auto-backup and recovery service. /   1
            It provides 7x24 / hardware maintenance service. / The startup cost is lower.

        (ii) Multiple files can be uploaded at a time. / Folder structure can be maintained.   1

4. (a) Use two-level verification. (double passwords) 1×2
Answer personal questions.
Use a randomised numerical keypad to enter.
Use captcha.
Users have to wait for a few seconds to re-enter the information when the input is incorrect.

(b) (i) - Total quantity of a single toy item 1×2
- Subtotal of a single toy item
- Stock of a single toy item
with brief description

(✗column of selected items, button, pull down menu, check box)

(ii) When '−1' button is clicked,
    if P[i] > 0, 1
        P[i] ← P[i] − 1 1+1

Condition ①
Decrement of the content of the variable ①
Mention P[i] or any example of P[i] ①

(c) (i) It keeps the original web page and saves time to re-load the page when the 'Cancel' button is clicked. 1

(ii) colour, size, location, title, opacity 1×3

(d) Do all the payment at a time. 1×2
Compare different items.
Keep the items for purchase next time.

(e) The display size is different. (layout) 1×2
The file size should be smaller because the effective data transfer rate of mobile devices is limited.
The file format should be changed for different operating systems. (compatibility)

* Marking criteria

② Illustrate a logical and concrete answer

① Illustrate a relevant answer

1. (a) (i) 4   1

    (ii) a-c   2

(b) (i)

B[1]	B[2]	B[3]	B[4]	B[5]	B[6]	B[7]	B[8]	B[9]	B[10]
F	T	T	T	T	T	T	T	T	T

1

B[1]	B[2]	B[3]	B[4]	B[5]	B[6]	B[7]	B[8]	B[9]	B[10]
F	T	T	F	T	F	T	F	T	F

1

    (ii)

B[1]	B[2]	B[3]	B[4]	B[5]	B[6]	B[7]	B[8]	B[9]	B[10]
F	T	T	F	T	F	T	F	F	F

2

    (iii) 7   1

    (iv) Find the prime numbers between 1 and n.   1

(c) (i) The final content remains unchanged because the value of B[1] is always false when executing Step 5.   2*
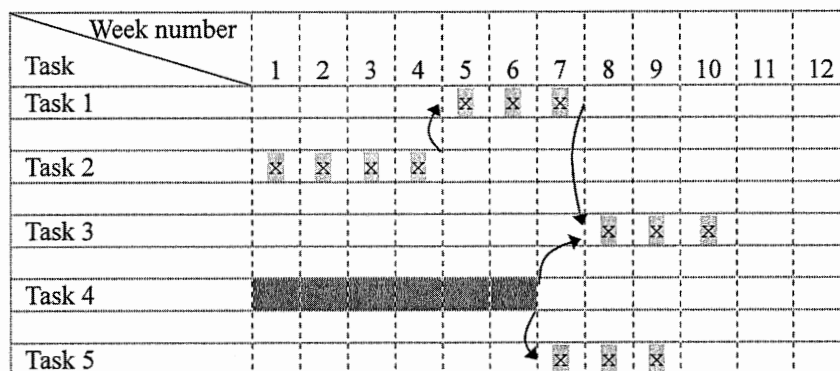
    (ii) Yes, Func(n,i) = 1 when i > Func(n,2), so Steps 6 to 7 will not be executed when i > Func(n,2).   2*

    (iii) A compiled language should be used because the execution code can be optimized better such that the running time of the program is short.   2*

2. (a) (i)

Week number \ Task	1	2	3	4	5	6	7	8	9	10	11	12
Task 1					☒	☒	☒					
Task 2	☒	☒	☒	☒								
Task 3								☒	☒	☒		
Task 4	▓	▓	▓	▓	▓							
Task 5							☒	☒	☒			

                               1 (Task 1)

                               1 (Task 2)

                               1 (Task 3)

                               1 (Task 5)

     (ii) 9   1

(b) (i) interviews, questionnaire, collecting documents, observation, system walkthrough   1×2

     (ii) A user manual will be prepared. It describes how to use the system.   1×2

(c) (i) The system development is a large-scale project. The system can be separately developed in modules (program units), so that the project can be decomposed for different programmers to handle.   2*

     (ii) The source code can be compiled on different platforms without major changes. It saves the development cost on writing source codes for different platforms.   2*

     (iii) With a wide range of utility libraries and efficient development tools, the application development time can be shortened.   2*

(d) The linker is used to incorporate external libraries (programs, object codes, etc.) into the program.   2*

3. (a) E4   1

        0   1

    (b) (i) 0   1

          name[i]   1

     (ii) 4   1

     (iii) Advantage: It requires less storage space when the number of events is much fewer than 7×52.   1

           Disadvantage: The access time to retrieve an event is longer. / The complexity of the use of the data structure is higher.   1

(c) FALSE   1

     FALSE   1

(d)   ① initialisation   5
      ① loop
      ① mid
      ① compare 2 dates
      ① use of shift

[Pascal version]

```
procedure InsertEvent(Newx, Newy : integer);
var
  first, last, mid : integer;
begin
  first := 1;
  last := n;
  while (first < last) do begin
    mid := (first + last) DIV 2;
    if order(x[mid], y[mid], Newx, Newy) then
        first := mid+1
    else   last := mid;
  end;
  shift(first, n);
  name[first] := NewName;
  x[first] := Newx;
  y[first] := Newy;
printQ; readln;
end;
```

[C version]

```
void InsertEvent(int Newx, int Newy) {
int first, last, mid;
first = 1;
last = n;
while (first<last) {
      mid = (int) (first+last)/2;
    if (order(x[mid], y[mid], Newx, Newy))
        first = mid+1;
    else
        last = mid;
}
shift(first,n);
strcpy(name[first], NewName);
x[first] = Newx;
y[first] = Newy;
}
```

[JAVA version]

```java
public static void InsertEvent(int Newx, int Newy) {
int first, last, mid;
first = 1;
last = n;
while (first<last) {
    mid = (int) (first+last)/2;
    if (order(x[mid], y[mid], Newx, Newy))
       first = mid+1;
    else
       last = mid;
}
shift(first,n);
name[first] = NewName;
x[first] = Newx;
y[first] = Newy;
}
```

[Visual Basic version]

```vb
    Sub InsertEvent(ByVal Newx As Integer, ByVal Newy As Integer)
        Dim first, last, mid As Integer
        'MsgBox(Newx & "  " & Newy)
        first = 1
        last = n
        Do While (first < last)
            mid = Int((first + last) / 2)
            If order(x(mid), y(mid), Newx, Newy) Then
                first = mid + 1
            Else
                last = mid
            End If
        Loop
        Call shift(first, n)
        name(first) = newname
        x(first) = Newx
        y(first) = Newy
        ' Call printQ()
    End Sub
```

4. (a) (1) F   5
       (2) A
       (3) D
       (4) C
       (5) B

   (b) (i) It is easy to manage the sequences in the storage / access the words.   1

      (ii) It can save storage space when some words are used frequently.   1

   (c) (i) 00001 000001 01 001   1

      (ii) a man and a pen   1

   (d)   ① initialise a temporary string   5
         ① loop
         ① concatenation takes place with the temporary string until '1' is found
         ① call DEC(temporary string) and print the results
         ① print a space

```
st ← null string
for i from 1 to n
    st ← concatenate st with B[i]
    if B[i] = 1 then
        display DEC(st)
        if i <> n then
            display a space
        st ← null string
```

OR

```
i ← 1
j ← 0
while i <=n do
  if B[i] = 0 then
      j ← j + 1
  else
      print DEC(string from B[i-j] to B[i])
    j ← 0
  i ← i + 1
```

* Marking criteria

② Illustrate a logical and concrete answer

① Illustrate a relevant answer