

## Candidates' Performance

### Paper 1A

This section consisted of 40 multiple-choice questions. Candidates' performance was generally satisfactory with an average of 27 questions answered correctly. Comparatively, they performed better in 'Social Implications' but worse in 'Information Processing' and 'Basic Programming Concepts.' Post-examination item analysis revealed the following:

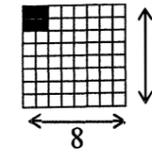
1. In Question 10, less than half of the candidates demonstrated basic knowledge of using a form for data entry. Many candidates thought that a form was used to filter data, indicating a lack of practical experience in using a database management system.

Q.10 What is the major benefit of using a form in a database management system?

- \* A. Simplifies data entry. (44%)
- B. Simplifies report printing. (11%)
- C. Saves storage space. (4%)
- D. Filters data in a single database table. (41%)

2. Candidates demonstrated a basic understanding of data representation in computers. In Question 9, about half of them were able to correctly apply the binary system on a display board. In Question 12, 39% of the candidates were able to integrate the knowledge of two's complement representation and overflow errors.

Q.9 A black-and-white display board uses  $8 \times 8$  pixels to illustrate a pattern. The upper left 4 pixels must be black at any time. How many different patterns can the display board illustrate?



- A. 60 (15%)
- B. 120 (12%)
- C.  $2^{36}$  (16%)
- \* D.  $2^{60}$  (57%)

Q.12 The following calculations involve 8-bit numbers using two's complement representation. Which one will generate an overflow error?

- A.  $0001\ 0101 + 1000\ 1000$  (11%)
- B.  $0111\ 0011 + 1000\ 1000$  (12%)
- \* C.  $1100\ 0110 + 1000\ 1000$  (39%)
- D.  $1111\ 1100 + 1000\ 1000$  (38%)

3. In Question 18, the majority of the candidates demonstrated sound knowledge of the characteristic of registers in CPU. About a third of the candidates did not realise that secondary storage commonly refers to nonvolatile storage devices such as hard disks.

Q.18 Which of the following statements about the registers in CPU is correct?

- \* A. Their read/write data transfer rates are high. (58%)
- B. Their functions are the same. (4%)
- C. They are used as secondary storage. (31%)
- D. Their total storage size is usually larger than 1 GB. (7%)

4. In Question 26, 36% of the candidates understood how a domain name was defined. Weaker candidates thought that 'goodcompany' was the only domain name used in the links.

Q.26 Peter is going to set up a web site for his new company so that customers can access his web site through any one of the following links:

web.goodcompany.hk  
 www.goodcompany.hk  
 www.goodcompany.com.hk  
 www.goodcompany.com  
 web.goodcompany.com

How many domain names does he need to register?

- A. 1 (23%)
- B. 2 (32%)
- \* C. 3 (36%)
- D. 4 (9%)

5. In Questions 32 and 33, about a third of the candidates were able to apply basic analytical skills to trace the algorithms. From the response figures, it was speculated that many candidates did not understand some fundamental knowledge of algorithm design.

Q.32 Study the following statement:

```
If NOT ( X > 30 OR ( Y AND Z ) )
    Then output '****'
```

For which of the following combinations of the values X, Y and Z will '\*\*\*\*' be displayed?

- |      | X  | Y     | Z     |       |
|------|----|-------|-------|-------|
| A.   | 20 | TRUE  | TRUE  | (31%) |
| * B. | 30 | FALSE | FALSE | (41%) |
| C.   | 40 | FALSE | FALSE | (15%) |
| D.   | 50 | FALSE | TRUE  | (13%) |

Q.33 A is an array with A[1], A[2], ..., A[N] storing N non-zero values. What is the purpose of the following algorithm?

```
Input P
K ← P
While K ≤ N-1 do
    A[K] ← A[K+1]
    K ← K+1
N ← N-1
```

- \* A. Removes the P-th value in A. (33%)
- B. Increases the value of P by 1. (12%)
- C. Swaps the values of A[K] and A[K+1] for K ≤ N-1. (41%)
- D. Calculates the sum of the values in A. (14%)

**Paper 1B**

- This paper assessed candidates' understanding of 'Information Processing', 'Computer System Fundamentals', 'Internet and its Applications', 'Basic Programming Concepts' and 'Social Implications', and the application of ICT knowledge in real life.
- Candidates' performance was generally satisfactory.

| Question Number | Performance in General   |
|-----------------|--|
| 1 (a)           | Satisfactory. A very high proportion of the candidates were able to give the benefit of the encryption function. However, only about a third of them answered the drawback of the function correctly and many of the other candidates stated that the network connection would not be tapped by hackers, which was not true. In fact, the content of the messages was protected and hackers needed to find ways to decrypt the messages. |
| (b)             | Satisfactory. Weaker candidates gave answers like the smiling face symbol instead of text and thought that it was a good presentation. However, these answers were irrelevant to the issue of code handling in the question.   |
| (c)             | Fair. Weaker candidates wrongly stated that reducing the file size of the video could increase the transmission speed of the network connection. In fact, the transmission speed over the Internet itself will not be affected by the size of transmitted files. It will be affected by the use of transmission media such as optical fibre and coaxial cable.   |
| (d)             | Very good. Weaker candidates tried to describe ergonomic-designed furniture for the tablet computer to alleviate the health issue on neck without further elaboration. In general, the tablet computer is not designed for prolonged usage. Arranging a short break is the common practice to minimise the problem. Another possible way is to use additional peripherals such as a wireless keyboard.                                   |
| (e)             | Satisfactory.  |
| 2 (a)           | Fair. Stronger candidates demonstrated an understanding of the differences between system software and application software. Weaker candidates wrongly stated that system software cannot play videos in MP4/AVI format.   |
| (b)             | Very good. A very high proportion of the candidates correctly used 1,024 instead of 1,000 for 1K in their calculation.   |
| (c)             | Satisfactory. Candidates demonstrated a good understanding of the concept of video streaming. However, weaker candidates were not able to clearly explain the need to provide options in the video settings. They thought that the display unit could not support a high video resolution which was not true nowadays in general.  |
| (d)             | Good.  |

| Question Number | Performance in General  |
|-----------------|---|
| 3 (a)           | Satisfactory. The majority of the candidates clearly illustrated how passengers could input the destination information on the touch screen display panel to look for the arrival times and platform numbers of trains.   |
| (b)             | Fair. Less than half of the candidates were able to demonstrate an understanding of the different types of memory. Weaker candidates wrongly stated the issues of size, speed, or even cost as the differences among various types of memory.   |
| (c)             | Excellent.  |
| (d)             | Fair. Weaker candidates were not able to properly use an array in the algorithm design and wrongly gave the direct addition of $W[1], W[2], \dots, W[9]$ as the input of X or Y.  |
| (e)             | Poor. Only about a quarter of the candidates were able to correctly use variables in the loop.  |
| 4 (a)           | Fair. Weaker candidates stated that parent's phone numbers could be changed. However, such arrangement did not affect the uniqueness of a primary key in the question.  |
| (b)             | Satisfactory.   |
| (c)             | Satisfactory. Stronger candidates were able to state clearly the fact that Unicode involves characters from different languages, leading to more storage capacity being required, whereas Big-5 code does not.  |
| (d)             | Good.   |
| (e)             | Fair. About a third of the candidates were able to complete the steps for creating the pivot table. Some other candidates did not give relevant answers and they were very weak in creating a pivot table.  |
| 5 (a)           | Satisfactory.   |
| (b)             | Fair. Less than a quarter of the candidates were able to state clearly the major difference between 'To' and 'cc'. Many candidates wrongly stated that 'To' referred to the original email whereas 'cc' referred to a copy of the original email without naming the different recipients. Moreover, they did not realise the usage of 'bcc' in the group email and its effect on the recipient. Weaker candidates gave ambiguous answers such as 'faster' in (b)(iii) as a benefit of using an IP address in the hyperlink without further elaboration. |
| (c)             | Fair. Weaker candidates did not discuss the arrangement of the password itself but stated the changes of the login process. They also gave some simple answers such as 'using a token was a means to increase the security', but were not able to elaborate them. Their understanding of network security was weak.   |

**Paper 2A**

1. This paper assessed candidates' understanding of 'Basic Concepts of Databases', 'Relational databases', 'Basic Concepts of Database Design Methodology' and 'Database Applications, Development and Society', and the application of ICT knowledge in real life.
2. Candidates' performance was generally satisfactory.

| Question Number | Performance in General   |
|-----------------|--|
| 1 (a)           | Good.  |
| 1 (b)           | Poor. Candidates in general were weak in describing derive attributes in the explanation.  |
| 1 (c)           | Satisfactory. Stronger candidates were able to provide examples of redundant data in different ways.   |
| 1 (d)           | Fair. Candidates should have more practical experience in creating forms and reports. Only a small number of them were able to explain the difference between forms and reports clearly and provide a suitable interface design to support the creation of new routes. |
| 2 (a)           | Poor. Candidates were not familiar with the use of UPDATE command when dealing with more than one database table.  |
| 2 (b)           | Satisfactory.  |
| 2 (c)           | Good. A high proportion of the candidates were able to describe the integrity problem and indicate the effect of the deletion correctly.   |
| 2 (d)           | Good. A high proportion of the candidates demonstrated a sound understanding of the difference between DELETE and DROP commands.   |
| 2 (e)           | Fair. Data mining is widely used in diverse areas in the society. Average candidates had some relevant ideas but there were a gap between the candidates' answer and the expected answer. They were not able to precisely describe how data mining can be useful.      |
| 3 (a)           | Satisfactory. Many candidates answered well while weaker candidates provided a wrong join condition.   |
| 3 (b)           | Good.  |
| 3 (c)           | Satisfactory. Candidates were able to provide the basic SQL command structure, while the weaker ones were not familiar with the use of multi-level ordering.   |
| 3 (d)           | Poor. Candidates were not familiar with the use of SQL subqueries and GROUP BY and HAVING commands.  |
| 3 (e)           | Satisfactory. Weaker candidates were able to give the query result, but did not write the purpose of the SQL command correctly.  |
| 4 (a)           | Good.  |
| 4 (b)           | Satisfactory. Weaker candidates demonstrated some difficulty in describing the purposes of the two types of the manuals.   |
| 4 (c)           | Good. Candidates demonstrated good knowledge of ER diagram.  |
| 4 (d)           | Poor. The majority of the candidates provided answers that were not related to the technical aspect.   |

**Paper 2B**

1. This paper assessed candidates' understanding of 'Data Communications and Networking Basic', 'Network Design and Implementation' and 'Network Management and Security', and the application of ICT knowledge in real life.
2. Candidates' performance was generally satisfactory.

| Question Number | Performance in General   |
|-----------------|--|
| 1 (a)           | Satisfactory. About half of the candidates were able to give the transmission medium of the underwater cables and describe its characteristics.  |
| 1 (b)           | Good.  |
| 1 (c)           | Fair. About half of the candidates demonstrated a basic understanding of the use of MAC address filtering and account authentication for network control.  |
| 1 (d)           | Poor. Only a small number of the candidates were aware of the concept of roaming.  |
| 1 (e)           | Satisfactory. A high proportion of the candidates correctly answered that the UPS can provide temporary power supply. However, only a small number of them gave an additional function of the UPS.   |
| 2 (a)           | Poor. Many candidates overlooked the conversion of MB and Mbps in the calculation. Weaker candidates were not aware of the 100Mbps limitation of the wired connection.   |
| 2 (b)           | Satisfactory.  |
| 2 (c)           | Fair. Weaker candidates did not indicate the use of the staff computer that connects to the IP camera through the fixed IP address of the broadband connection.  |
| 2 (d)           | Poor. Candidates demonstrated an adequate understanding of the functions of proxy server, but they were not able to give the differences in placing the proxy server in different locations of the network.  |
| 3 (a)           | Poor. The concepts of synchronous transmission and circuit switching are essential in the curriculum. Candidates are recommended to spend more time on studying these concepts and their applications in computer networks.  |
| 3 (b)           | Fair.  |
| 3 (c)           | Very poor. Only a very small number of the candidates applied 1 KB = 1,024 bytes and calculated the number of packets to be sent precisely.  |
| 4 (a)           | Fair.  |
| 4 (b)           | Poor. Only a very small number of the candidates wrote two network services correctly.   |
| 4 (c)           | Very poor. Only a very small number of the candidates demonstrated a basic understanding of the use of subnets.  |
| 4 (d)           | Satisfactory. Candidates demonstrated an adequate understanding of network design and correctly identified the locations of the various network devices. Weaker candidates were not aware of the limitation of 16-port switches and connected more than 16 cables to a switch. |

**Paper 2D**

1. This paper assessed candidates' understanding of 'Programming', 'Programming languages' and 'Systems Development', and the application of ICT knowledge in real life.
2. Candidates' performance was generally satisfactory.

| Question Number | Performance in General  |
|-----------------|---|
| 1               | <p>(a) Satisfactory. About half of the candidates did not include the dependencies of the tasks in the Gantt Chart. Only a small number of the candidates answered the correct critical path.</p> <p>(b) Very good. Weaker candidates provided an answer that only printed out the values of all elements in the array without noting the requirement for the pseudocode.</p> <p>(c) Excellent.</p> <p>(d) Satisfactory. About half of the candidates were able to identify the advantage of a graphical user interface over a command line interface. Only a small number of the candidates were able to give the two basic components of a graphical user interface.</p>  |
| 2               | <p>(a) Excellent. Almost all candidates were able to complete the flowchart.</p> <p>(b) Good. A very high proportion of the candidates were able to trace the subprogram and identify its purpose.</p> <p>(c) Fair.</p> <p>(d) Good. About two thirds of the candidates were able to give the best-case and worst-case situations in the execution of the subprogram.</p> <p>(e) Poor. Language translators and compilers are fundamental concepts of programming languages in the curriculum. Only about a quarter of the candidates were able to correctly justify the use of compiled language. Candidates are recommended to spend more time on studying the concepts and the relevant programming paradigms.</p> |
| 3               | <p>(a) Fair. Only a minority of the candidates were able to correctly use stack operations to implement UNDO and REDO buttons.</p> <p>(b) Poor. Only about a quarter of the candidates were able to give a proper way to handle a full stack.</p> <p>(c) Good. About two thirds of the candidates were able to logically explain different tests that would be carried out in software development.</p> <p>(d) Fair.</p>  |
| 4               | <p>(a) Good.</p> <p>(b) Good.</p> <p>(c) Good. Almost all candidates demonstrated a good understanding of how to calculate the value of <math>K</math>. About two thirds of the candidates wrote the pseudocode completely correct.</p> <p>(d) Good.</p> <p>(e) Satisfactory. Less than half of the candidates were able to state that the binary search is inappropriate for counting the number of occurrences of <math>P</math> in the given image.</p>  |

**School-based Assessment (SBA)**

1. The SBA marks submitted by schools were moderated in accordance with the principles and methods described in the booklet 'Moderation of School-based Assessment Scores in the HKDSE'. The quantitative results in the SBA moderation revealed that 54.0% of schools fell into the 'within the expected range' category, while 24.3% of schools were higher than expected, and 21.7% were lower than expected. Majority of the teachers demonstrated a good understanding about the SBA implementation, and hence the marking standards were generally appropriate.
2. An SBA Supervisor and 25 District Coordinators were appointed to oversee and support the implementation of SBA. They worked with teachers through the SBA conferences, territory-wide sharing sessions, district group meetings and a teachers' online e-platform. The e-platform made it possible for teachers to download the 'Resource Package on Professional Development for Teachers in Preparation for the School-based Assessment Component of HKDSE Information and Communication Technology, which contains project samples and other teaching materials. They were also able to communicate with each other through online discussion forums, thus creating their own SBA support community.
3. Teachers are reminded to inform students clearly various requirements and regulations regarding the SBA component at the beginning of the course, which include task requirements and assessment criteria, schedule of assessment and critical deadlines, the school's regulations and administrative procedures for conducting SBA, the importance of academic honesty and proper conduct in SBA, record keeping requirements and guidance on how to acknowledge sources properly in their SBA work.
4. Teachers were requested to provide school-based project titles for their students to suit their needs. Students were asked to select a project title and recorded the project work with the product. When setting project titles for students, teachers are encouraged to consider whether their students can make use of the project to effectively demonstrate their knowledge and understanding, generic skills and practical skills learnt from the ICT curriculum. The project work was asked to be recorded in written documents such as project reports and presentation documents, or in other formats when appropriate.
5. It is encouraging that some students set appropriate titles and scopes of the projects for their individual needs and their teachers gave them advice on how to develop the good project management skills. In other words, students not only completed their project assignments effectively and scored well in the SBA, but also acquired good project management skills, which will help conduct and manage projects in ICT and projects in other disciplines in their future lives.
6. Teachers are encouraged to offer general advice on SBA at the initial stage. However, they are reminded not to give specific and detailed guidance or advice in such a way as to put into question the student's authorship of his/her work.
7. It is found that many students copied a lot of information from the web or make reference to the information provided by their teachers onto their projects, without giving their personal views on the ICT topics involved. Some students did not digest the meaning of the information well. Teachers should guide students to integrate what they have learnt and the information they have, in order to complete a more coherent and logical project assignment.
8. Teachers are reminded to provide feedback to students, including their marks or grades on individual assessment tasks after the completion of the review or marking of those milestones planned for the project assignment.

### General comments and recommendations

1. The popularity of the Elective Part is shown below.

| Option  | Popularity (%) |
|---|----------------|
| A. Databases                                      | 14             |
| B. Data Communications and Networking             | 4              |
| C. Multimedia Production and Web Site Development | 62             |
| D. Software Development                           | 20             |

2. Candidates demonstrated a basic understanding of the applications of information and communication technology in the daily life. They should participate in more learning activities so as to have a wider exposure to different aspects of the ICT and its applications in the society.
3. Occasionally candidates gave ambiguous answers, such as 'larger', 'faster' and 'better', without any reference to the functions or characteristics of computer systems and services. They were not able to apply relevant technical terms to various ICT concepts.