Candidates' Performance

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 'Basic Programming Concepts.' Post-examination item analysis revealed the following:

1. Less than half of the candidates demonstrated comprehensive knowledge of the binary number system and its application.   (Question 2 and Question 5)

    Q.2   Arrange the following 4-bit numbers using two's complement representation in ascending order.

    (1) 1000
    (2) 0100
    (3) 0111
    (4) 1111

A.	(4) < (1) < (3) < (2)	(33%)
* B.	(1) < (4) < (2) < (3)	(23%)
C.	(2) < (3) < (1) < (4)	(40%)
D.	(3) < (2) < (4) < (1)	(4%)

    Q.5   10,000 runners participate in a marathon competition. Each runner has a unique identity code stored in a RFID (radio-frequency identification) tag on one of his or her shoes. What is the minimum storage size required in each tag?

A.	1 byte	(13%)
* B.	2 bytes	(46%)
C.	3 bytes	(9%)
D.	4 bytes	(32%)

2. In Question 13, candidates were not familiar with the fetch-decode-execute cycle and CPU components.

    Q.13   Which of the following components in a Central Processing Unit (CPU) fetches an instruction from the main memory?

A.	Arithmetic and Logic Unit (ALU)	(18%)
B.	Memory Address Register (MAR)	(29%)
C.	Program Counter (PC)	(11%)
* D.	Control Unit (CU)	(42%)

3. In Question 30, candidates overlooked that there are only two assignment statements to be executed in the algorithm and they both involved 'Carol'. 41% of the candidates were able to apply basic analytical skills to trace the algorithm.

Q.30 An array DAT stores English names as shown below.

Amy	Bob	Carol	Dave
DAT[1]	DAT[2]	DAT[3]	DAT[4]

After executing the following algorithm, which element in DAT stores 'Carol'?

```
P ← 4
While P > 2
    DAT[P] ← DAT[P-1]
    P ← P - 1
```

A.	DAT[1]	(9%)
B.	DAT[2]	(31%)
C.	DAT[3]	(19%)
* D.	DAT[4]	(41%)

4. In Question 36, candidates understood that taking breaks during the use of a tablet computer is necessary. However, about one third of the candidates were not able to identify the concern when using a tablet computer.

Q.36 Mr Chan wants to buy a tablet computer for his 8-year-old daughter, Susan. Which of the following actions is/are appropriate?

(1) Mr Chan should buy a tablet computer with a longer battery life.
(2) Susan should use the tablet computer with a mouse.
(3) Susan should take a 5-minute break after using the tablet computer for 30 minutes.

A.	(1) only	(4%)
B.	(2) only	(1%)
* C.	(1) and (3) only	(61%)
D.	(2) and (3) only	(34%)

Paper 1B

1. 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.

2. Candidates' performance was generally satisfactory.

Question Number			Performance in General
1	(a)	(i)	Poor: Some candidates answered 'any time' and 'any place'. They were not aware of the need to compare and analyse the operations through the wireless router and the mobile phone network.
		(ii)	Fair: Almost all candidates did not answer the advantage correctly. Some of them wrongly gave 'connection to the Internet' as the advantage, which was already stated in the question.
	(b)		Very good.
	(c)		Very good: Candidates were able to identify the network bandwidth and security as the key points. However, a small number of candidates focused on the discussion of the issues related to processing power or file size of the video, which were irrelevant to the design issues.
	(d)	(i)	Good.
		(ii)	Good.
2	(a)	(i)	Satisfactory: Candidates were expected to identify the role and use of a primary key in a database. Some of them stated that TELNO involved privacy or could be changed, which itself is true, but the argument is irrelevant to the question.
		(ii)	Poor: The majority of the candidates stated 'check the accuracy' without further elaboration. They did not specifically explain the purpose of a check digit.
	(b)		Very good.
	(c)	(i)	Fair: About a third of the candidates did not know how to apply 'bcc' to sending email. Another third of the candidates just stated that the two recipients would not know who would receive the email. They showed a limited experience in using 'bcc'.
		(ii)	Satisfactory: Some candidates wrongly stated that Mr. Li could compress the file or change the file format. Candidates showed a limited understanding of the use of file compression.
		(iii)	Satisfactory: Some candidates stated that members could browse the presentation any time and any place, which itself is true. However, this answer is not a benefit to the members.
	(d)	(i)	Excellent.
		(ii)	Very good.

Question Number			Performance in General
3	(a)		Good: Some candidates stated 'microphone' or 'touch screen' and did not elaborate how John could input data.
	(b)		Good.
	(c)		Fair: About a third of the candidates were able to clearly explain the benefits and the risks. Some of the other candidates just stated 'free' as the benefit and 'virus and malware' as the risk without a proper comparison of the two software types.
	(d)		Fair: More than half of the candidates understood that the information stored in John's email address book would be collected by the software company, leading to an improper use possible. Quite a number of candidates wrongly stated that John's email account would be hacked.
	(e)		Very good.
4	(a)	(i)	Good.
		(ii)	Poor: Only a small number of the candidates were able to integrate the features of an operating system and ROM and to come up with an argument. Candidates showed a limited understanding of a simple computer system.
		(iii)	Satisfactory.
	(b)	(i)	Satisfactory.
		(ii)	Poor: Only a small number of the candidates were able to interpret the value of N and its relationship with the values in P.
		(iii)	Very poor: Almost all candidates were not able to state clearly the benefit of using Boolean as the data type of FLAG. Some of them even answered that less storage space was required.
	(c)	(i)	Very good.
		(ii)	Very poor: Many candidates wrongly stated that ALG1 or ALG2 had bugs.
5	(a)	(i)	Fair: Some candidates simply wrote 'online payment' or 'registration' as the answer, instead of examples about the scenario.
		(ii)	Good. A very high proportion of candidates knew the protocol used in web browsing but the majority showed a limited understanding of email protocols.
	(b)	(i)	Satisfactory.
		(ii)	Satisfactory.
	(c)		Poor: Candidates gave vague answers, such as 'used in different computers,' without any elaboration of the idea of 'different computers'.
	(d)	(i)	Satisfactory.
		(ii)	Fair: Some candidates misinterpreted the question and answered searching techniques, which are out of the scope of the requirement.

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)	Very good.
	(b)	Satisfactory: About half of the candidates answered the correct AGE conditions.
	(c)	Satisfactory: Candidates well understood the question but many of them wrongly chose the MAX function.
	(d)	Fair: About a third of the candidates correctly used the GROUP BY command.
	(e)	Satisfactory: Candidates seemed to know the purpose of the SQL command but they did not answer clearly.
2	(a)	Very Good.
	(b)	Good: Candidates were able to draw the ER diagram with appropriate entities and relationships. Yet, some did not correctly specify the minimal and maximal cardinalities.
	(c)	Fair: About a third of the candidates were able to point out the advantages of using the view FIND_VIP and establish the condition part of the SQL command in (i).
	(d)	Satisfactory: Many candidates failed to provide two different issues in (i) and to describe the new field names in (ii).
3	(a)	Excellent.
	(b)	Very good.
	(c)	Poor: Candidates were not able to provide appropriate comparisons to justify their choice.
	(d)	Fair: A small number of the candidates correctly described the drawback of indexing and explained why the query performance has not been improved. Many candidates left the answer in (iii) blank.
4	(a)	Very poor: Candidates seemed not to know what CASE tools are.
	(b)	Very good: Candidates demonstrated a thorough knowledge of different stages in a development life cycle.
	(c)	Satisfactory.
	(d)	Satisfactory: About half of the candidates were familiar with the meaning of ethical practices.

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)	Excellent: Almost all candidates correctly identified the suitable connection ports.
	(b)	Very poor: Only a small number of the candidates were aware that the setting is used for a wired network and WPA2 is used to secure wireless computer networks. They were also able to explain that VPN applies IPsec to authenticate and encrypt data packets.
	(c)	Poor.
	(d)	Fair: About half of the candidates illustrated the contents of a data packet. Only a small number of the candidates were able to give clear description on the concept of buffering for data transfer.
	(e)	Fair: A small number of the candidates were aware that the random period of waiting time can only minimise the chance of data collisions.
2	(a)	Fair.
	(b)	Very good: Candidates were able to do the quantitative analysis on network bandwidth precisely.
	(c)	Fair: About half of the candidates understood the influence of a Denial of Service (DoS) attack but were not able to explain the process of a DoS attack clearly.
	(d)	Fair.
3	(a)	Good.
	(b)	Fair.
	(c)	Good: About two thirds of the candidates demonstrated a good knowledge of the security functions of a firewall.
	(d)	Poor: Only a very small number of the candidates understood the use of the subnet mask.
	(e)	Fair. Candidates seemed to be unfamiliar with the concept of roaming. On the other hand, generally they gave two examples of terms for visitors to accept and only one of them was a suitable term.
4	(a)	Satisfactory: About half of the candidates were able to differentiate the functions of a switch and a router.
	(b)	Satisfactory: Candidates understood the advantage of using Cloud storage but they did not give a sound argument about the potential disadvantage.
	(c)	Fair.
	(d)	Fair: About a third of the candidates were able to master the permission setting.

Paper 2C

1. This paper assessed candidates' understanding of 'Multimedia Production' and 'Web Site Development', and the application of ICT knowledge in real life.

2. Candidates' performance was generally fair.

Question Number		Performance in General
1	(a)	Fair: In general candidates were able to write the formula to estimate the file size of the audio file. However, only a small number of them were aware of the data compression ratio and did the calculation correctly.
	(b)	Fair: Less than half of the candidates were able to explain clearly that more data collected would lead to a better sound quality. They showed the concept that human beings are not easily aware of the increase of audio data with a sampling rate greater than 44.1 kHz.
	(c)	Fair: Candidates well understood the transition effects that can be added but a high proportion of them were not able to properly name the effect that they described. About a third of the candidates were able to name two attributes of an audio file. Some of the other candidates were not able to correctly spell the essential term 'amplitude'.
	(d)	Satisfactory: About a third of the candidates were able to estimate the waiting time with the given bit rate and the data size. About half of the candidates were able to answer (ii) correctly.
	(e)	Satisfactory: The majority of the candidates were able to identify clearly the difference between the properties of GIF, JPG and PNG. They correctly named the term 'cookies' but had difficulty in describing the techniques employed behind.
2	(a)	Fair: About half of the candidates were able to state the use of server-side scripting or the database for checking the username. However, most of them wrongly explained how the strength of the password is identified and they just recited the rules stated in the given table. About one third of the candidates were able to explain why the 'copy and paste' functions are disabled.
	(b)	Fair: Candidates were very familiar with the use of hyperlink. However, only a small number of the candidates were able to point out the part of the HTML code with style sheet and provide the justification.
	(c)	Poor: Only a small number of the candidates demonstrated a sound knowledge of using scripts and SWF files to implement the mouse hover effect.
	(d)	Fair: Candidates generally were able to suggest that the image can be displayed as a single image by enlarging it. However, only a very small number of them were able to describe clearly that the image can be duplicated and displayed as tiles.

Question Number		Performance in General
3	(a)	Fair: About half of the candidates were able to explain the benefit of using thumbnails but only some of them were able to describe clearly how a thumbnail is created.
	(b)	Satisfactory: The majority of the candidates were able to give at least one way to enhance the photo searching.
	(c)	Poor: Candidates seemed to be unfamiliar with using an image map in the web page design. Only a small number of them were aware that alternative text can also be added into an image map for the text-to-speech service.
	(d)	Satisfactory: The majority of the candidates correctly drafted the layout of Design 1. However, some of them were not aware of the requirement of Design 2 that all the thumbnails should be displayed on the same page.
	(e)	Fair: Some candidates were found having a wrong concept in (i) that web hosting service is always virus free. About one third of the candidates were able to point out that the FTP service allows uploading multiple files at a time.
4	(a)	Satisfactory: About half of the candidates were able to name different measures to minimise the risk of being hacked.
	(b)	Good: About two third of the candidates were able to suggest columns that could help customers shop in the web site. However, less than one fifth of the candidates were able to describe clearly how the array is updated with the operation of the '-1' button.
	(c)	Poor: Candidates seemed to be unfamiliar with the use of a dialogue window in the web page design. Some of them confused it with a pop-up window.
	(d)	Satisfactory: About half of the candidates showed that they had experience in using a shopping cart.
	(e)	Satisfactory: About half of the candidates were able to consider the requirements incurred by the small display size and the limited transmission rate of a mobile device.

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	(a)	Very good: Almost all candidates answered (i) correctly.
	(b)	Satisfactory: About a third of the candidates were able to answer (iii) and (iv) correctly. The other candidates had difficulty in tracing the algorithm with a number of iterations.
	(c)	Satisfactory: Only a small number of candidates understood that a compiled language produces more efficient programs.
2	(a)	Very good.
	(b)	Satisfactory.
	(c)	Satisfactory: Only a small number of the candidates were able to clearly describe all the three criteria and their benefits for system development.
	(d)	Fair: About a third of the candidates were able to state that the linker links external programs or libraries during compilation.
3	(a)	Excellent: Almost all candidates showed a comprehensive understanding of the data structure used in the question.
	(b)	Satisfactory: A high proportion of the candidates were able to trace the pseudocode correctly. However, they demonstrated a limited understanding of using the three arrays to store information.
	(c)	Excellent.
	(d)	Poor: Only a very small number of candidates were able to demonstrate a sound knowledge of binary search.
4	(a)	Satisfactory: Only a small number of candidates identified all items correctly.
	(b)	Good.
	(c)	Very good: almost all candidates correctly encoded 'Peter is a man'. In (ii), the decoded string should start with 'a' instead of 'A'.
	(d)	Poor: Only a small number of candidates were able to design an unfamiliar, complex algorithm.

School-based Assessment (SBA)

1. The SBA component consisted of one project assignment, which comprises 20% of the subject mark. Teachers marked the project assignments (0–50 marks) using the new assessment criteria stated in section 2.3 of the 2015 SBA Teachers' Handbook. The project assignment was evaluated in accordance with only the following four categories:

   (1) Design & Implementation
   (2) Testing & Evaluation
   (3) Conclusion & Discussion
   (4) Project Management

   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. The project work was recorded in written format such as project reports and presentation documents, or in other formats when appropriate.

2. 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 reveal that 58.9% of schools fell into the 'within the expected range' category, while 20.5% of schools were higher than expected, and 20.6% were lower than expected. However, among the schools with marks higher or lower than expected, the majority only deviate slightly from the expected range. This is encouraging as the data showed that the majority of the teachers do have a good understanding about the SBA implementation, and hence the marking standards are generally appropriate.

3. 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.

4. 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.

   Re-use of the backdated project titles is not prohibited but special attention should be placed on how to avoid plagiarism. In general, new project titles tailored for the new cohort of the students would best cater for their diversity as well as their interest.

5. There was a serious plagiarism case. It involved a student who directly copied a report from another student. A zero mark was given to the SBA and a downgrade by one level in ICT was imposed on the student.

   It is reminded that students have to sign a declaration form to confirm that the work they produce is their own. Teachers are required to confirm that, to the best of their knowledge, the work presented for assessment is the student's own work. It is advised that a presentation of the project assignment with a question and answer session could be done to assure the originality.

6. The scoring rubrics of some schools were not able to exhibit completely the assessment criteria stipulated in the SBA Teachers' Handbook. Teachers are expected to state the assessment criteria clearly in the guidelines to their students that can demonstrate how the concepts and skills learnt will be assessed.

7. Students are expected to complete their SBA assessment tasks and activities in the same language as the medium of instruction according to their schools' medium of instruction policy.

8. Teachers are reminded to mark students' work in a fair manner. Schools are reminded that if there is more than one subject teacher teaching the subject to the same cohort of their students, the teachers involved should agree on the criteria for awarding marks so that a unified standard of assessment will be applied to all students in the cohort.

General comments and recommendations

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

Option	Popularity (%)
A. Databases	13
B. Data Communications and Networking	4
C. Multimedia Production and Web Site Development	66
D. Software Development	17

2.   Candidates demonstrated a limited understanding of the applications of information and communication technology in our daily life. They should have a wider exposure to different aspects of the applications in the society.

3.   Occasionally candidates made spelling mistakes when writing keywords.

4.   Occasionally candidates gave flimsy 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.