

Answer all questions.

1. Peter is a musician who can play different instruments.

(a) He stores the music he plays as a MIDI file because it has a small file size and is easily edited.

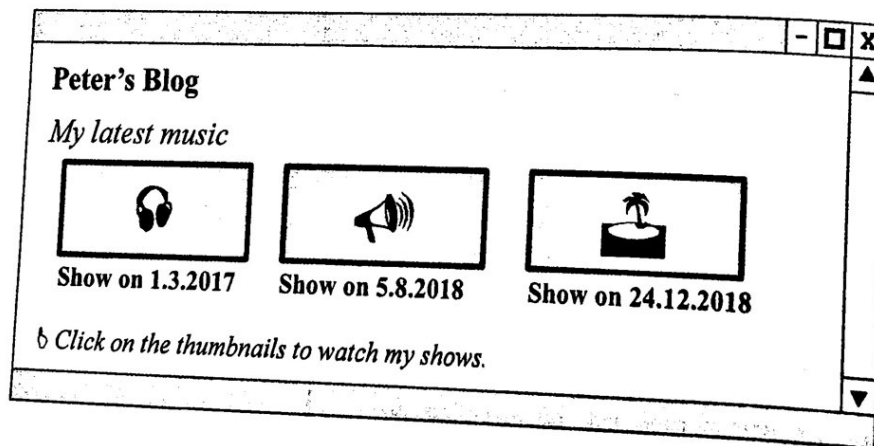
(i) Give another reason to support Peter's choice.

(1 mark)

(ii) Explain briefly why a MIDI file can be easily edited.

(2 marks)

Peter creates a web page and uploads the videos of his music performance for visitors to watch, as follows:



(b) Peter wants blind people to be able to select the shows from the thumbnails easily. What web design feature should he apply to enable this? Describe how the design feature is used.

(2 marks)

(c) Peter creates and converts his latest song abc.wav to abc.mp3. Then he embeds it as the background music of the web page.

(i) Peter uses abc.mp3 instead of abc.wav for the background music. Other than file size, give a reason to support his decision.

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(ii) Give **two** attributes that can be adjusted for embedding the background music, other than audio control buttons. (1 mark)

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(iii) He cannot convert abc.mp3 back to the original file. Why not? (2 marks)

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(1 mark)

(d) Peter broadcasts his live performance using streaming technology. The specifications are:

Audio

Sampling rate: 44.1 kHz  
Sampling size: 16 bits  
Channel: stereo

Video

Frame rate: 24 fps  
Frame size:  $1920 \times 1080$   
Colour depth: 24 bits

Assume that the bit rate is 4 Mbps after encoding and at least 2 MB data have to be downloaded before the streamed video starts to play.

Show your calculation in the following parts.

- (i) Estimate the number of frames to be downloaded before the streamed video starts to play.

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(3 marks)

- (ii) Estimate the file size required for a 1-second performance without compression in MB.

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(2 marks)

- (iii) Estimate the data compression ratio required for the broadcast.

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(1 mark)

A video company provides an online system for subscribers to watch movies.

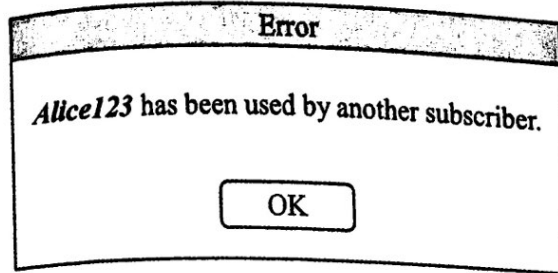
- (a) A mobile version is produced together with the desktop version. How can the system identify subscribers' devices and deliver the correct version to them?

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(1 mark)

- (b) A new subscriber chooses a username for registration but the following error message is displayed.



- (i) Describe what the online system has done before generating this error message.

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(2 marks)

- (ii) The subscriber completes the registration. When logging on to the system, he only needs to enter his partial password, as shown below:

Password:       ...

1st 4th 5th

How can the use of a partial password enhance security?

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(2 marks)

Answers written in the margins will not be marked.

A designer in the company uses image editing software to create a movie still from a full-colour photo, as shown below. He then uploads the movie still to a web page.



- (c) Before using a printer with  $720 \times 720$  dpi to print the full-colour photo, the designer uses dithering to edit the photo. Why does dithering need to be used?

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(2 marks)

- (d) When subscribers click on the image of any actress in the photo, a web page about the actress will be shown. How can the designer create this feature?

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(2 marks)

- (e) The designer does not use JPG format for the movie still. Give a drawback of JPG format and suggest a suitable file format for the movie still that can overcome this.

Drawback: \_\_\_\_\_

Suggested file format: \_\_\_\_\_

(2 marks)

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(f) The company provides a video streaming service subscribers can use to watch 4K movies. Suggest two technical adjustments for the company which can help subscribers view the 4K movies more smoothly.

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(2 marks)

(g) The company provides two video modes: 720p or 1080i. The letters 'p' and 'i' after the numbers refer to 'Progressive' and 'Interlaced' respectively.

(i) What do '720' and '1080' mean?

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(1 mark)

(ii) What do 'Progressive' and 'Interlaced' mean?

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(2 marks)

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3. Mary plans to develop a Hong Kong restaurant guide web site which will provide information on more than 30,000 restaurants such as which district they are in and what dishes they offer. She creates the following web search page for finding restaurants.

**Search**

| District     |                                     |
|--------------|-------------------------------------|
| Wan Chai     | <input checked="" type="checkbox"/> |
| Shatin       | <input checked="" type="checkbox"/> |
| North Point  | <input type="checkbox"/>            |
| Kowloon City | <input type="checkbox"/>            |

| Dish Type |                                     |
|-----------|-------------------------------------|
| Beijing   | <input type="checkbox"/>            |
| Japanese  | <input checked="" type="checkbox"/> |
| Thai      | <input checked="" type="checkbox"/> |
| Western   | <input checked="" type="checkbox"/> |

- (a) Suggest and describe **two** additional web design features that can help a user look into the search results easily.

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(2 marks)

Mary rewrites the web search page so that it has three parts, as shown below:

**Search**

| Region - District - Dish Type - Rating |                                     |
|--|-------------------------------------|
| HK Island - Wan Chai - Japanese - ***  | <input type="checkbox"/>            |
| HK Island - Wan Chai - Western - **    | <input checked="" type="checkbox"/> |
| N.T. - Shatin - Japanese - ***         | <input checked="" type="checkbox"/> |
| N.T. - Shatin - Chinese - *            | <input type="checkbox"/>            |

Part 2 { Price range (\$) from 0 to

Part 3 { Please enter your options:

|                     |   |
|---------------------|---|
| Accept credit card? | Provided <input type="radio"/> Not provided <input type="radio"/> |
| Online booking?     | Provided <input type="radio"/> Not provided <input type="radio"/> |
| Take-away?          | Provided <input type="radio"/> Not provided <input type="radio"/> |

(b) (i) Give two potential issues for users with the design in Part 1.

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(ii) Give one potential issue for users with the design in Part 2.

(2 marks)

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(iii) Give one potential issue for users with the design in Part 3.

(1 mark)

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(1 mark)

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(c) Draft a new design for the web search page to solve the issues in (b) and describe briefly how to use it.

Description:

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(4 marks)

(d) In the mobile version of the web site, information on the locations of the restaurants will be provided by a Global Positioning System (GPS). Give **two** examples to illustrate how this information can help the users.

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(2 marks)

(e) A dialogue box is shown when users first browse the web site, as follows:

Notification

In order to deliver a personalised service and to improve the web site, cookies are used.

Accept

Cancel

(i) How can cookies help deliver a personalised service and improve the web site? Give an example to illustrate each of the following:

Delivering a personalised service: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Improving the web site: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2 marks)

(ii) Describe how cookies might create a potential threat to users. Give an example to illustrate your answer.

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(2 marks)

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4. Mr Wong works in a start-up company and designs a web site to teach children mathematics through games and quizzes.

(a) Give an example to illustrate how to use HTML metadata to help promote the web site.

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(2 marks)

(b) The company asks Mr Wong to get the domain name *math.org.hk* for the web site.

(i) Describe how to get the domain name.

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(1 mark)

(ii) Give **two** possible reasons why Mr Wong fails to apply for the domain name.

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(2 marks)

(iii) Mr Wong creates some web pages with valid hyperlinks in his personal computer and then uploads them to the web site. Later on, some customers complain that there are some invalid hyperlinks in the web pages. Give **two** possible reasons why these hyperlinks are invalid.

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(2 marks)

(iv) Mr Wong plans to acquire web hosting services. Other than the cost, give one advantage and one disadvantage of his plan.

Advantage: \_\_\_\_\_

Disadvantage: \_\_\_\_\_

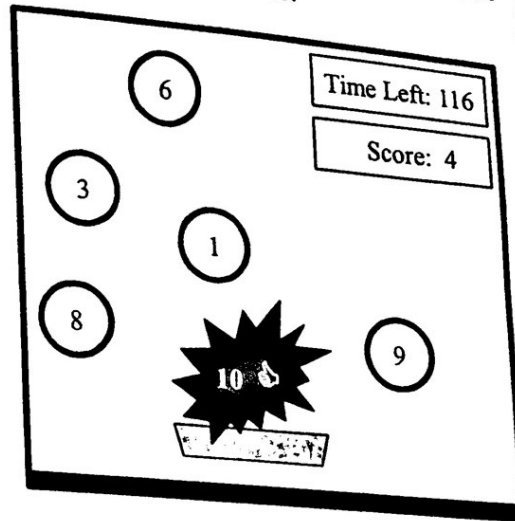
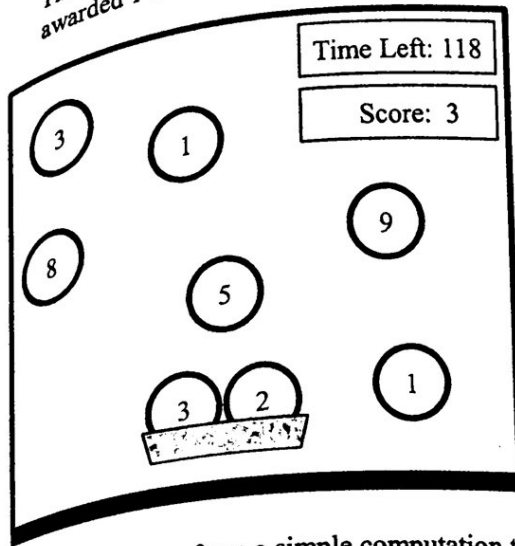
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(2 marks)

Answers written in the margins will not be marked.

(c) Mr Wong designs a simple mathematical game, illustrated below:

In 300 seconds, the player controls the basket at the bottom to hold falling bubbles with numbers. The basket will empty when the sum of the numbers in the basket is 10 or above. The player will be awarded 1 score if the sum of the numbers in the basket is exactly equal to 10.



The game will perform a simple computation to update the score with the following variables:

| Variable | Description  |
|----------|--|
| SUM      | Store the sum of the numbers already in the basket                         |
| N        | Store the number in the bubble which is the latest to fall into the basket |
| SCORE    | Store the score  |

AddBubble (N) is a script that will be executed when the basket holds a new bubble with a number N. Describe the script for updating continuously the score of the player.

AddBubble (N)

(4 marks)

END OF PAPER