Answer all questions.

John produces video files with the following specifications:

Video part	
Resolution	1920 × 1080
Colour depth	24-bit true colour
Frame rate	24 fps
Bit rate	8 Mbps
Duration	2 hours

Audio part	
Sampling rate	44.1kHz
Sample size	16 bits
Channel	Stereo
Bit rate	192 kbps
Duration	2 hours

(a) (i) Estimate the uncompressed file size of the video part in GB. Show your calculation.

(2 marks)

(ii) Estimate the uncompressed file size of the audio part in GB. Show your calculation.

(2 marks)

(b) John can use the following modes to record a video:

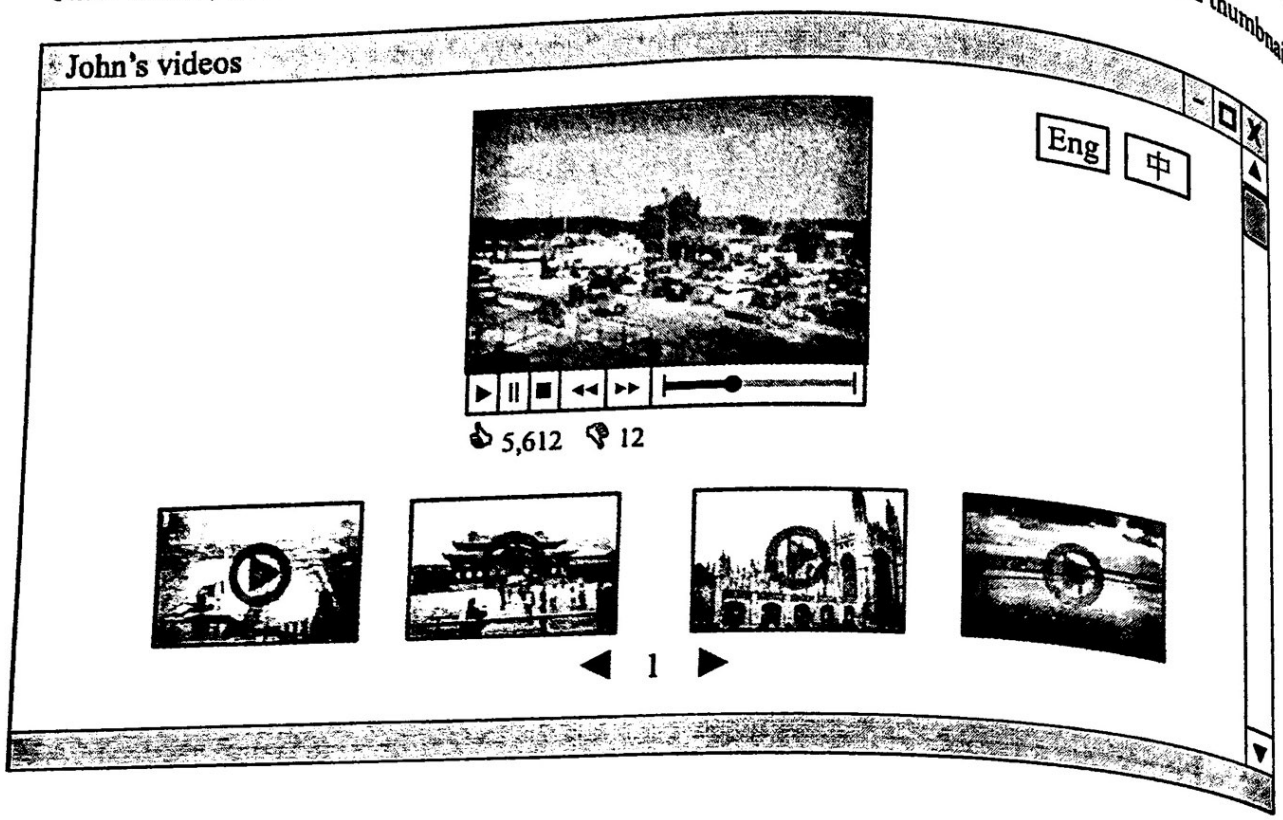
	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5
Resolution	1920 × 1080	1920 × 1080	1920 × 1080	3840 × 2160	3840 × 2160
Colour depth (bit)	30	12	30	48	30
Frame rate (fps)	24	30	30	30	60

Suggest the best mode for each of the following situations.

Situation	Mode
Record a video involving fast moving objects	
Best display quality of still images captured from the video	
Smallest video file size	

(3 marks)

(c) John has hundreds of videos. He drafts a web page consisting of a video to be played and thumbnails of other videos, as shown below:



(i) Suggest **two** different uses of the mouse over effect that may enhance the viewer experience. Explain your answer briefly.

(4 m

(ii) Viewers can vote on the video by clicking on thumb images (👍 👎). Explain briefly how John can use the voting data to provide better service to viewers. Give an example to illustrate your answer.

(2 marks)

(iii) Explain briefly how cookies in a browser can enhance the viewer experience. Give an example to illustrate your answer.

(2 marks)

2. Amy has three vector images:

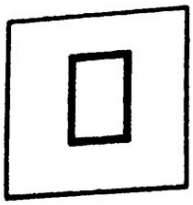


Image 1

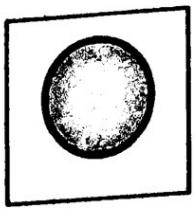


Image 2

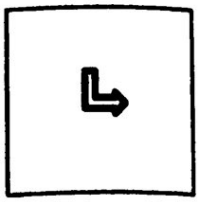


Image 3

(a) (i) Which file format AI, BMP, JPG or PNG supports vector images? _____ (1 mark)

(ii) Give two advantages of using vector images.

_____

_____

_____ (2 marks)

(iii) Amy imports the three images and then obtains Image 4. How does she create the logo below from Image 4? Describe the editing steps involved.

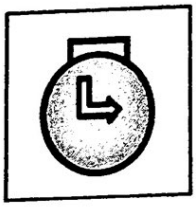
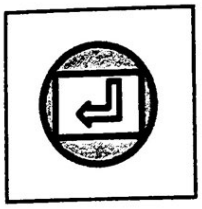


Image 4



Logo

_____

_____

_____

_____

_____

_____ (3 marks

Amy has two photos:

Photo 1

Photo 2

b) (i) Name **two** editing effects, other than image brightening, that Amy can use to refine the photos.

(2 marks)

(ii) How can she create the following composite photo from Photo 1 and Photo 2? Describe the editing steps involved.

(3 marks)

Answers written in the margins will not be marked.

(c) Amy uses the composite photo to create a 16 inch × 10 inch poster. She plans to print this poster at a printing resolution of 300 dpi.

(i) What is the aspect ratio of this poster?

(1 mark)

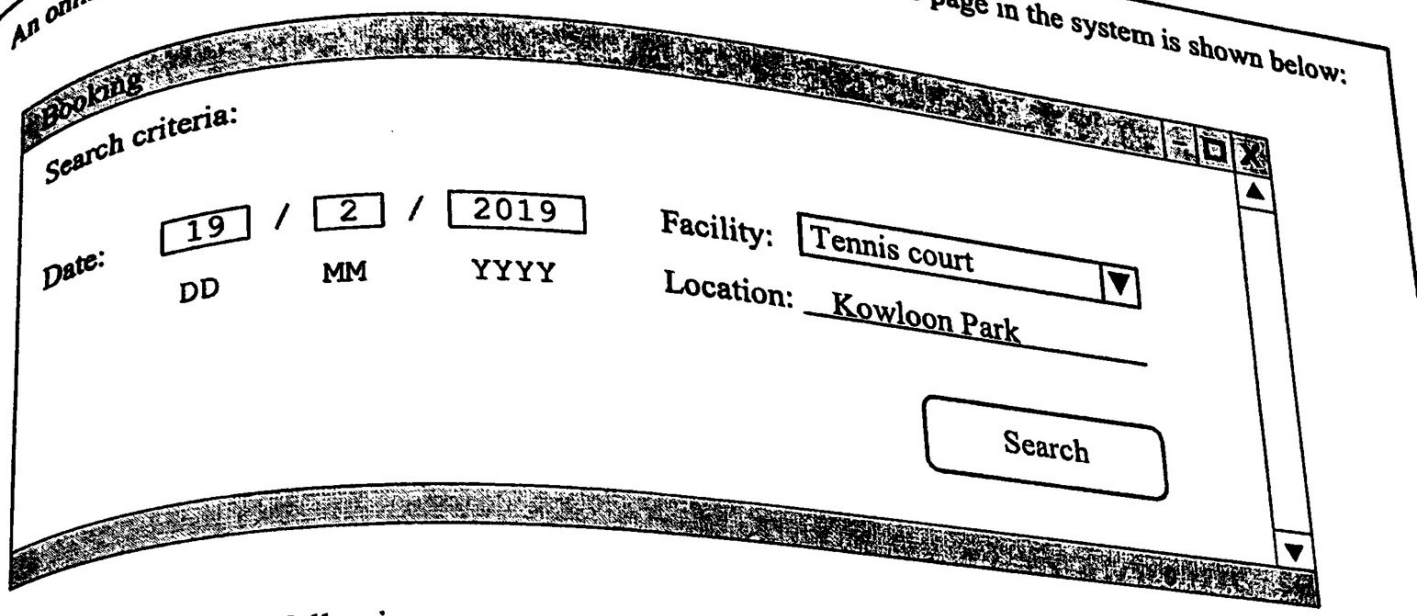
(ii) To ensure that the printout is not fuzzy, what should the minimum resolution of the composite photo be?

(1 mark)

(d) Amy considers using RGB or CMYK to produce the poster. Briefly explain the difference between RGB and CMYK.

(2 marks)

An online booking system is used for booking sports facilities. A web page in the system is shown below:



Users have given the following comments after booking sports facilities:

C1. Sometimes the system shows nothing in the search result because I make a typo error in location.
C2. Only one kind of facility for each search is not enough for me.
C3. Sometimes the search result contains so many entries for me to choose from. It is difficult fo to select a suitable one.
C4. I do not care about the location. I just want to book facilities over a specific date range.
C5. The online booking system is not user-friendly.

(a) Suggest **two** different web design features that can be implemented to address the issue in C1.

(b) Re-design the web page to address the issues in C2, C3, C4 and C5. Describe your design briefly.

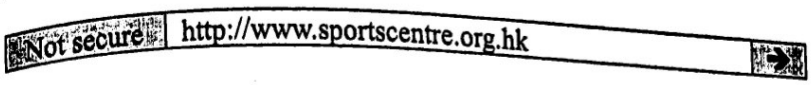
(6 marks)

Answers written in the margins will not be marked.

(c) Cascading Style Sheet (CSS) will be used in several web pages in the online booking system. Give two reasons to support the use of CSS.

(2 marks)

(d) A user browses the web site of the online booking system:



(i) Referring to the alert message 'Not secure', what issue will occur when browsing this web site? Explain your answer briefly.

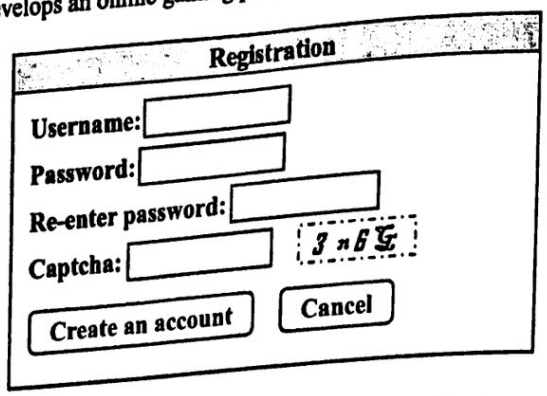
(2 marks)

(ii) What feature should be implemented in the web site to address this issue? Explain your answer briefly.

(2 marks)

Answers written in the margins will not be marked.

4. Susan develops an online gaming platform. The design of the registration page is as follows:



(a) Error messages might be shown after clicking the 'Create an account' button. For each of the following error messages, state whether server-side or client-side validation should be carried out. Justify your answer.

(i) 'The username has been used.'

(1 mark)

(ii) 'The password must contain more than 6 characters.'

(1 mark)

(iii) 'The two passwords entered are not identical.'

(1 mark)

(b) (i) What is the purpose of using Captcha on the registration page?

(1 mark)

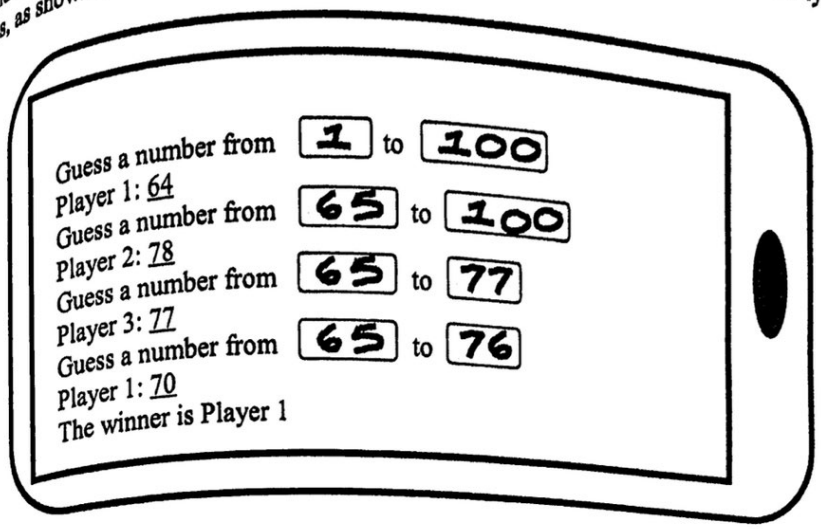
(ii) Suggest an accessibility measure which would allow visually impaired users to access Captcha.

(1 mark)

(iii) Give another method to replace the use of distorted characters in the Captcha.

(1 mark)

Three players in the platform play a number guessing game. The answer in the game is a number between 1 and 100 inclusive. The players take turns to enter a number. A player who correctly guesses the answer wins, as shown in the following example:



(c) (i) The numbers shown on the screen are images instead of text. Suggest and describe a web design feature to assist visually impaired players play this game.

(2 marks)

(ii) Susan writes a server-side script for the number guessing game, with the following:

Variable/Subprogram	Description
MyRAND	Generate a random integer between 1 and 100 inclusive
A	Store the answer
N	Store the player identity number (1, 2 or 3)
G	Store the immediate input
LN	Store the lowest number in the range
HN	Store the highest number in the range

Complete the pseudocode for the script below.

```
A ← [          ]
N ← 0
G ← 0
LN ← 1
HN ← 100
Repeat
        N ← N + 1
        If [          ] then
                N ← 1
        Output: Guess a number from LN to HN
        G ← input from player N
        If A > G then
                [          ]
        else
                [          ]
Until   [          ]
Output: The winner is Player [     ]
```

(6 mark

(d) Susan plans to operate the gaming platform in her server at home. Give a drawback of using this serv and suggest an alternative solution.

(2 mark

END OF PAPER