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THE HONG KONG ASSOCIATION FOR COMPUTER EDUCATION
INFORMATION AND COMMUNICATION TECHNOLOGY
MOCK EXAMINATION 2022

PAPER 2C

Multimedia Production and Web Site Development

Time Allowed: 11:15 am – 12:45 am
(1 hour 30 minutes)
This paper must be answered in English.

	Marker's Use Only	
Question No.	Marks	
1		4
2		—
3		3
4		0
Total		7

INSTRUCTIONS

(1) After the announcement of the start of the examination, you should stick the label in the space provided on Page 1.

(2) Choose 3 out of 4 questions to answer.

(3) Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins.

(4) Supplementary answer sheets will be provided on request. Write your candidate number and question number on each sheet.

(5) No extra time will be given to candidates for filling candidate number and question number after the 'Time is up' announcement.

Choose 3 out of 4 questions to answer.

1. John is an IT technician in a school. He is responsible for developing and managing the school website.

   (a) Miss Lee recorded the school choir singing the school song. When a user browses the website, the song will be used as background music. John considers using **one** format among WAV or MP3 or MIDI to save the song.

   (i) When Miss Lee records the school choir singing the school song, she can use a sampling rate of 44.1kHz or 88.2kHz. Miss Lee plans to use a sampling rate of 88.2kHz, but John disagreed with her decision. Give **one** reason to support John.

   It is because 88.2kHz has uses more time to transfer the recording than 44.1kHz.

   (1 mark)

   (ii) Select the most suitable file format and give **one** reason for **not using** the other two file formats.

   WAV / MP3 / MIDI (circle the most suitable file format)

   A reason for **not using** the other two file formats:

   It has smaller size and others can make for video.

   (2 marks)

   (iii) Other than volume, give **one** attribute that can be adjusted to embed this background music.

   The length of the background music.

   (1 mark)

(b) The school website provides video files of teaching records. John considers the following five settings.

	Setting 1	Setting 2	Setting 3	Setting 4	Setting 5
Resolution	1920 x 1080	1920 x 1080	3840 x 2160	3840 x 2160	2560 x 1600
Colour depth (bit)	30	30	30	12	12
Frame rate (fps)	30	12	12	60	30

Select the most appropriate setting for each following situations. (2 marks)

Situation	Setting
The display quality of static images is the best	3
The video contains fast moving objects	4

2

(c) John use streaming technology to live broadcast principal sharing, the format as shown below.

Video
Resolution: 1920 x 1080
Colour depth: 24 bits
Frame rate: 30 fps

Audio
Sampling rate: 44.1 kHz
Sample size: 16-bit
Channel: Stereo

(i) John decided not to use the AVI file format. Other than file size and compression ratio, give **one** reason to support John's decision and suggest **one** suitable file format.

It cannot change easily, MP4 1

(2 marks)

Show your calculations in the following scenarios:

(ii) Estimate the file size of one-minute sharing without file compression (in GB).

$\frac{1920 \times 1080}{(24 \div 8) \times 30} \div 1024 \div 1024$

$\simeq 0.0220$ GB

(2 marks)

3

(iii) The compression ratio of the live stream is 300:1, estimate the bit rate after compression (in Mbps).

$\frac{1920 \times 1080}{24 \times 30} \times \frac{1}{300}$

$= 9.6$ Mbps

(3 marks)

(d) Miss Lee finds the live broadcast does not play smoothly. She suspects insufficient network bandwidth is the cause, so she conducts a network speed test. The result is as follows.

Upload speed: 510 Mbps
Download speed: 485 Mbps

Why cannot Miss Lee watch the live broadcast smoothly? Give **two** reasons.

The Download speed is lower than the upload speed.

She has low network bandwidth.

(2 marks)

0

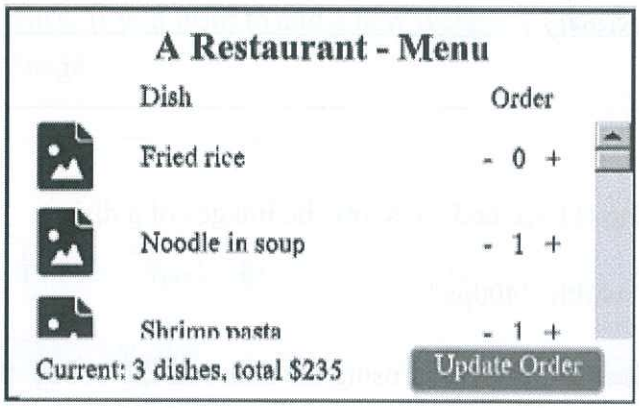
3. Chris is responsible for designing a food ordering system for a chain restaurant. In the system, a QR code will be printed for each table. Customers use their smartphones to scan the QR code, which brings them to the online system.

(a) The food ordering system uses a website instead of a mobile app. Suggest **one** advantage of using a website over a mobile app.

Customers do not need to take any storage of their mobile phone to download the app. ✓

(1 mark)

The following shows the user interface of the webpage.



When customers want to place an order, they should click the "+" button to adjust the number of dishes and then click the "Update Order" button to confirm their orders.

(b) When customers update their order, the summary at the bottom update immediately.

(i) The update can be done using either server-side scripting or client-side scripting. State **one** advantage of each approach.

Server-side: Chef and waiters can clearly see what customers' orders. Avoid giving them wrong dishes. ✓

(1)

Client-side: Customers can clearly see what they have ordered and the total price of the bill.

(2 marks)

To promote some of the dishes, Chris wants to include a video over images showcasing the production of a dish for some dishes.

(ii) Chris's manager disagrees with his idea. Suggest **one** reason to support Chris's manager. Explain briefly.

The file size of video is bigger than images. Customer may not load it while they are ordering the food. It is user-unfriendly.

(2 marks)

Chris uses the following HTML code to show the images of a dish.

```
<IMG src="dish1.jpg" width="400px">
```

(iii) Briefly describe the problem of using the above HTML code. Suggest **one** workaround for Chris.

There is no 'px' in width.
width = "400".

(2 marks)

(iv) Chris wants to make sure that if a user uses the same device to enter the system, the user's orders can be retrieved automatically. Suggest how Chris may store user's orders on the user's device.

Save the record before finish paying the bill.

(1 mark)

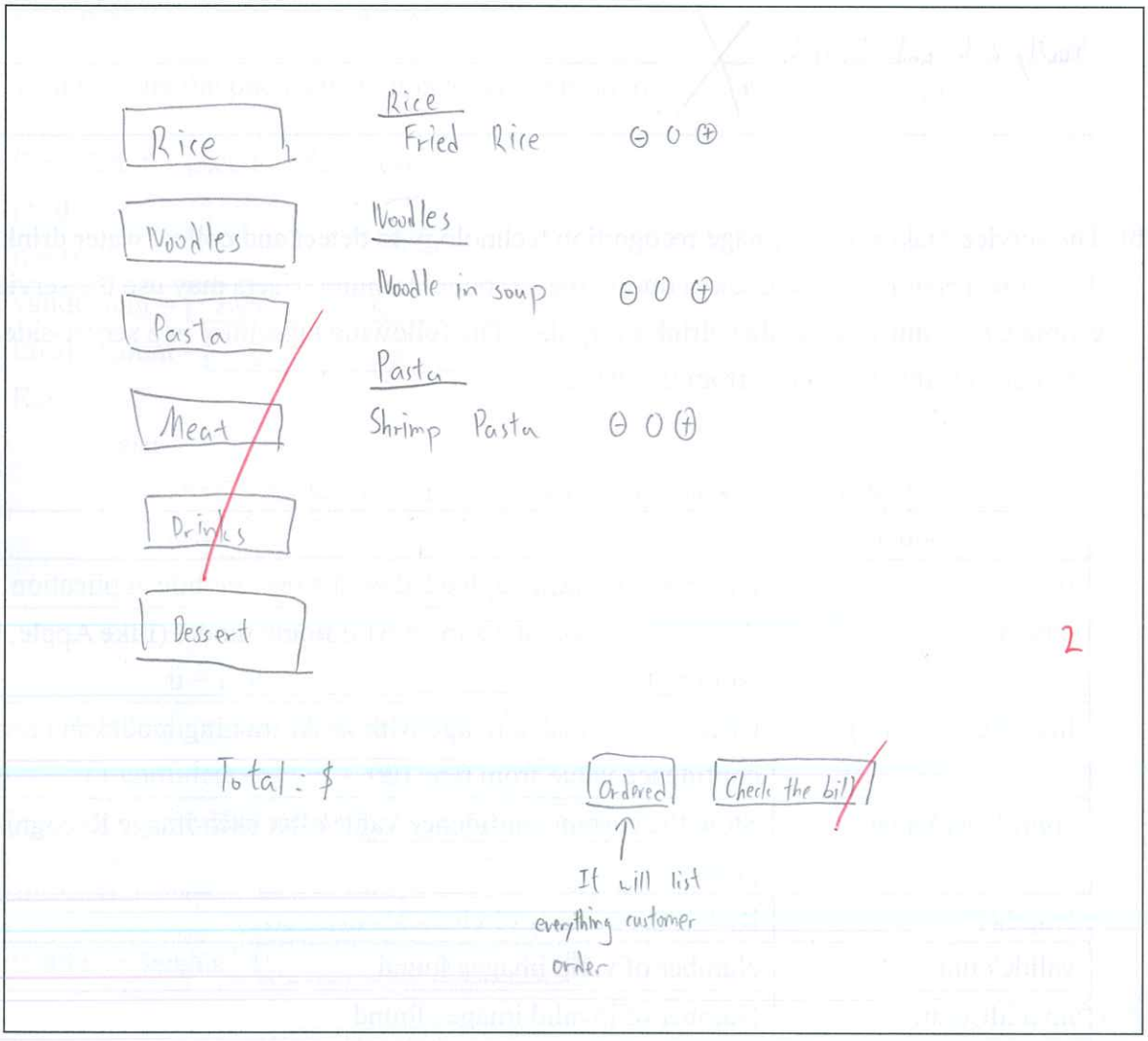
(c) Chris thinks that a secure connection is not necessary for this system. Do you think a secure connection is necessary for the system? Explain your answer briefly.

Yes, because other people can order lots of food in the order without a secure connection but the customers do not order it. It is unfair to the customers who are ordering

(2 marks)

(d) Customers find that there are so many dishes available. It is hard to find the dish they want to order. It is also difficult to check which dishes they have ordered.

Redesign the user interface and draw it in the space provided below. Describe how your design improves users' experience. If you want to add a new webpage, briefly describe your design without drawing a new page.

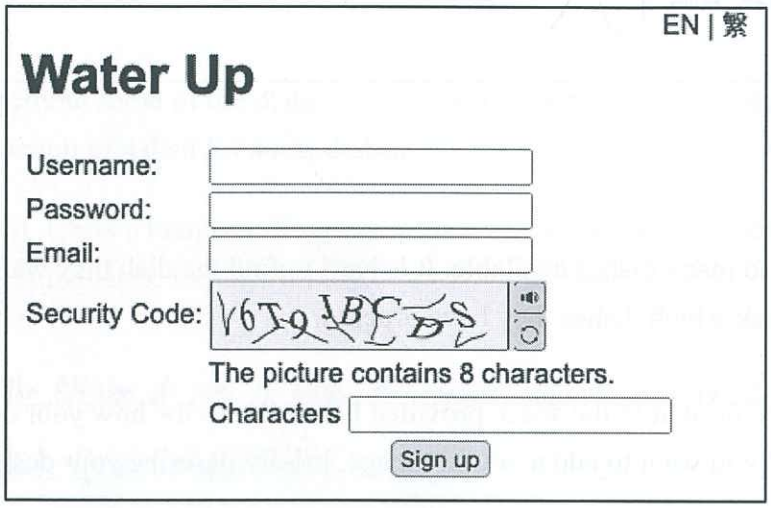


(5 marks)

2

4. Water Up is a service designed by Tom. It uses Artificial Intelligent which detects users about how much water users drink every day. Users may install a mobile application to their smart phone and stay connected to the service.

(a) A web-based interface is made available to sign up the Water Up service as follows.



Name **two** web accessibility designs which Tom has put in sign up page.

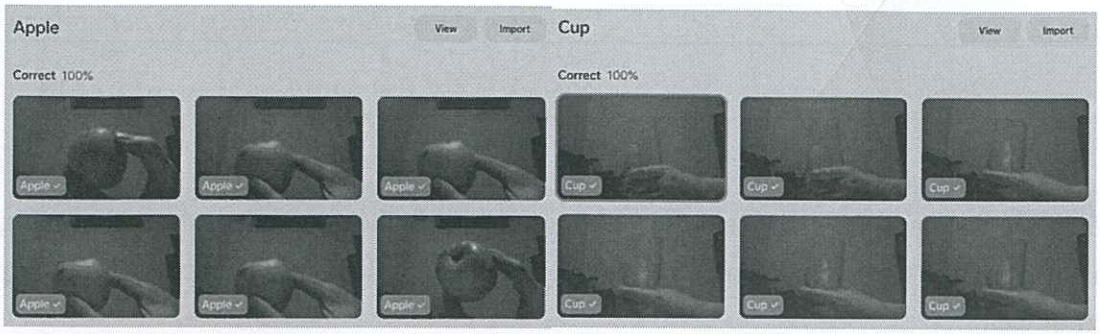
Security Code and Password.

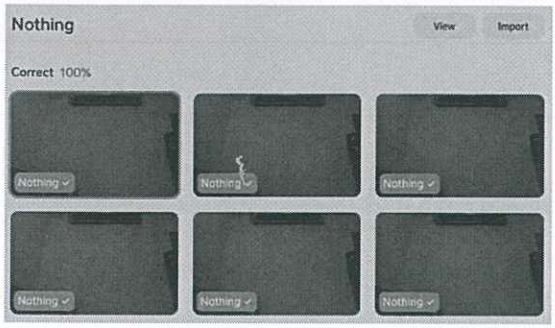
(2 marks)

(b) The service makes use of image recognition technology to detect and collect water drinking data. A series of photos was taken during the Ai model training. Users may use the service to estimate how much water they drink every day. The following algorithm in a server-side script detects invalid photos from the data set.

Variable / Subprogram	Description
ImageSet	An array of Images uploaded by the user mobile application
labelSet	A string array of labels in an AI training model (Like Apple, Cup, Nothing)
imageRecognise()	Check the uploaded image with an AI training model and return a confidence value from 0 to 100
confidenceValue	Store the current confidence value after each Image Recognition process
length()	Return the number of elements in an array
validCount	Number of valid images found
invalidCount	Number of invalid images found
i	Counting variable for iterating through the array of ImageSet
ii	Counting variable for iterating through the array of labelSet

A confidence value means the percentage of correctness to a particular image recognition task.





The above are the photos in an image recognition model to recognize an apple or a cup.

Complete the pseudocode below.

```
i = 0
ii = 0
validCount = [ Apple + Cup ]
invalidCount = [ Nothing ]
Repeat
    Repeat
        confidenceValue = imageRecognise( ImageSet[i] , labelSet[ii] )
        if ( [ Apple + Cup ] >= 80 ) then
            validCount = validCount + 1
            break
        ii = ii + 1
    Until  ii >= length( labelSet )
    If ( confidenceValue < 80 ) then
        invalidCount = [ Nothing ]
    end if
    [ End ]
Until i >= length( [ Apple + Cup + Nothing ] )
```

(6 marks)

(c) Suggest **two** possible access rights which a user need to grant to the Water Up mobile application before it works properly.

(2 marks)

(d) If Water Up does not use server-side script to interact with the AI service, suggest **one impact** in both software and hardware perspective with its mobile application which make Water Up function well.

List a report.

(2 marks)

(e) A user visits the official web site of Water UP and see the following screen. What is the user experiencing and how may Water UP fix the issue?

Not secure	http://www.waterup.ai

Your connection is not private

Attackers might be trying to steal your information from **waterup.ai** (for example, passwords, messages, or credit cards).
NET:ERR_CERT_AUTHORITY_INVALID

They cannot open the browser as the connection is not private. Water UP can turn to public to let customers to see the result.

(2 marks)

(f) When smart phone is used to run Water Up, how may the location information of the mobile application help improve the user experience?

Allow GPS to use in the app

(1 mark)

END OF PAPER

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