

For examiners' use only

# EBU5305 A

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Joint Programme Examinations 2017/18

EBU5305 Interactive Media Design and Production

Paper A

Time allowed 2 hours

Answer ALL questions

Complete the information below about yourself very carefully.

QM student number

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Allowed: electronic calculators

## INSTRUCTIONS

1. You must NOT take answer books, used or unused, from the examination room.
2. Write only with a black or blue pen and in English.
3. Do all rough work in the answer book – do not tear out any pages.
4. If you use Supplementary Answer Books, tie them to the end of this book.
5. Write clearly and legibly.
6. Read the instructions on the inside cover.

Examiners

Dr Marie-Luce Bourguet, Dr Yizhe Song

# Instructions

## Before the start of the examination

- 1) Place your BUPT and QM student cards on the corner of your desk so that your picture is visible.
- 2) Put all bags, coats and other belongings at the back/front of the room. All small items in your pockets, including wallets, mobile phones and other electronic devices must be **placed in your bag in advance. Possession of mobile phones, electronic devices and unauthorised materials is an offence.**
- 3) Please ensure your mobile phone is switched off and that no alarm will sound during the exam. **A mobile phone causing a disruption is also an assessment offence.**
- 4) Do not turn over your question paper or begin writing until told to do.

## During the examination

- 1) You must not communicate with or copy from another student.
- 2) If you require any assistance or wish to leave the examination room for any reason, please raise your hand to attract the attention of the invigilator.
- 3) If you finish the examination early you may leave, but not in the first 30 minutes or the last 10 minutes.
- 4) For 2 hour examinations you may **not** leave temporarily.
- 5) For examinations longer than 2 hours you **may** leave temporarily but not in the first 2 hours or the last 30 minutes.

## At the end of the examination

- 1) You must stop writing immediately – **if you continue writing after being told to stop, that is an assessment offence.**
- 2) Remain in your seat until you are told you may leave.

### Question 1

- a) This question is about the design process you studied in class and applied to your coursework. For each statement below, write which task of the design process is best described. You should also specify which phase of the process the task belongs to.

**[6 marks]**

- i) An application that appeals to teenagers will be different from one intended for business executives.

**(2 marks)**

- ii) This task is about deciding if the users will proceed through the application step by step, or if they will be free to surf around the entire application.

**(2 marks)**

- iii) This task creates an overview of the content of the storyboard and a quick reference to the navigation flow.

**(2 marks)**

[illegible]

b) You are commissioned to build an e-commerce website that sells children books.

**[10 marks]**

i) Briefly explain what is user profiling and why you need to draw a user profile.

**(4 marks)**

ii) Who is your most likely audience? Draw a user profile by describing at least three qualities your users have.

**(6 marks)**

[illegible]

- c) The cognitive load imposed by a user interface is the amount of mental resources that is required to operate the system. For each proposition below, explain how the cognitive load is reduced.

**[9 marks]**

- i) Make the interface consistent.

**(3 marks)**

- ii) Information grouping should be designed.

**(3 marks)**

- iii) Use chunking.

**(3 marks)**

[illegible]

**Question marking:**  $\frac{-}{6} + \frac{-}{10} + \frac{-}{9} = \frac{-}{25}$

## Question 2

a) This question is about the use and properties of various media.

**[9 marks]**

i) Explain using examples why you should know the cultural background of your users before choosing colours.

**(3 marks)**

ii) Give three reasons for avoiding the use of video in an interactive media application.

**(3 marks)**

iii) Explain why graphics are said to be passive.

**(3 marks)**

[illegible]

b) This question is about colour coding.

**[10 marks]**

i) Explain the relationships between the R, G, B values of a colour and the hue, brightness and saturation of that colour. You are not asked to make any calculations.

**(6 marks)**

ii) Give possible R, G, B values to encode a colour that has green hue, low saturation and is bright.

**(4 marks)**

[illegible]

- c) Calculate the size in bits of a video which has the following characteristics: frame size is 720 x 480 pixels, true colour, the frame rate is 25 frames/s, the duration is 30 seconds, the audio track is encoded using 44,1 kHz and 16 bits per sample. Show the detail of your calculations.

[6 marks]

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Question marking:  $\frac{9}{9} + \frac{10}{10} + \frac{6}{6} = \frac{25}{25}$



### Question 3

a) This question is about sound encoding.

**[9 marks]**

i) Why is good quality sound usually encoded using a sampling rate of 44.1 kHz?

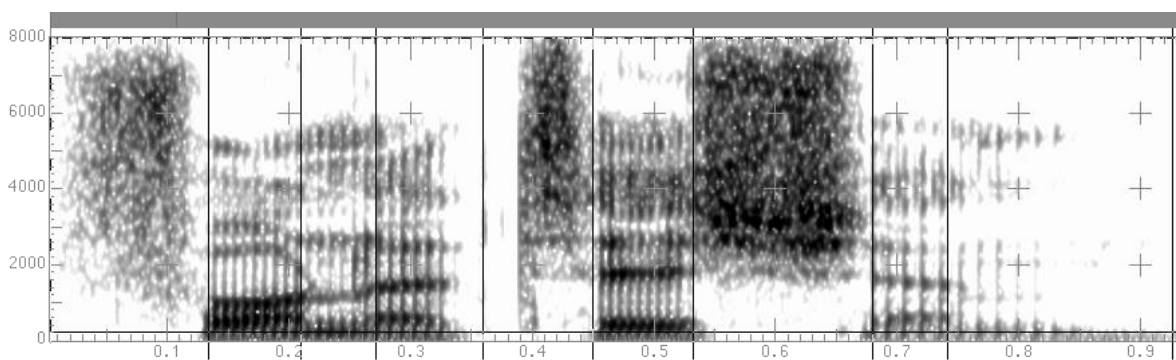
**(4 marks)**

ii) What is the typical sampling rate of a sound file encoded using MIDI?

**(2 marks)**

iii) What are speech formants? Refer to what you see in Figure 1 in your answer.

**(3 marks)**



### Figure 1: Speech spectrogram

[illegible]

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|  | 9<br>marks |

b) This question is about JPEG image compression.

[8 marks]

i) How does chroma subsampling reduce the size of an image?

(4 marks)

ii) Does a quantization table, which contains very high values, achieve high or low compression?  
Justify your answer.

(4 marks)

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- c) This question is about MPEG1 video compression. Consider the three consecutive video frames shown in Figure 2. The middle frame is a B frame. It contains 4 macroblocks.

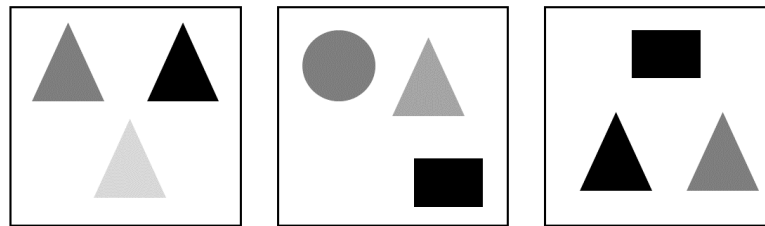
**[8 marks]**

- i) What predictions can be made about the top left macroblock? How will it be encoded?

**(3 marks)**

- ii) What predictions can be made about the bottom right macroblock? How will it be encoded?

**(5 marks)**



**Figure 2: Three consecutive video frames**

[illegible]

**Question marking:**  $\frac{-}{9} + \frac{-}{8} + \frac{-}{8} = \frac{-}{25}$

### Question 4

- a) Consider the following usability problems. For each of them, state which usability heuristic is violated and suggest a solution.

As a reminder, here is the list of usability heuristics: (H1) visibility of system status; (H2) match between system and real world; (H3) user control and freedom; (H4) consistency & standards; (H5) error prevention; (H6) recognition rather than recall; (H7) flexibility and efficiency of use; (H8) aesthetic and minimalist design; (H9) help users recognize and recover from errors; (H10) help and documentation.

**[16 marks]**

- i) The interface is using a word that the users are unlikely to understand.

**(4 marks)**

- ii) The check boxes have round shapes.

**(4 marks)**

- iii) The format of the date is prone to misinterpretation.

**(4 marks)**

- iv) Only one selection can be made at a time.

**(4 marks)**

[illegible]

[illegible]

b) This question is about production.

**[9 marks]**

i) In the Flash timeline, what are the keyframes used for? How about the frames?

**(3 marks)**

ii) To create Flash animations, a frame rate of at least 24 fps (frames per second) is necessary. Is this statement true? Justify your answer.

**(3 marks)**

iii) With H5P, what kinds of user interaction can you add to a video? Give three types.

**(3 marks)**

[illegible]

[illegible]

**Question marking:**  $\frac{\quad}{16} + \frac{\quad}{9} = \frac{\quad}{25}$

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