Multimedia IGDS MSc Exam 2000

Setter: ADM
Checker: ACJ

Additional Material:

SMIL Language Sheet

Answer 3 Questions out of 4

Time Allowed 2 Hours

1. (a) Why is data compression, including file compression, highly desirable for Multimedia activities? [2]

(b) Briefly explain how entropy coding and transform coding techniques work for data compression, clearly identifying the differences between them. Illustrate your answer with a simple example of each type of encoding. [7]

(c) (i) Show how you would use *Huffman coding* to encode the following set of tokens:

BABACACADADABBCBABEBEDDABEEEBB

How is this message transmitted when encoded? [7]

(ii) How many bits are needed to transfer this coded message? What is its entropy? [3]

(iii) What amendments are required to this coding technique if data is generated live or is otherwise not wholly available? Show how you could use this modified scheme by appending the tokens ADADA to the end of the above message. [5]

2 (a) Give a definition of a Multimedia Authoring System. What key features should such a system provide? [2]

(b) What Multimedia Authoring paradigms exist? Describe each paradigm briefly. [8]

(c) You have been asked to provide a Multimedia presentation that can support media in both English and French. You have been given a sequence of 10 images and a single 50 second digitised audio soundtrack in both languages.

Each image should be mapped over consecutive 5 second fragments of the audio. All images are of the same 500x500 pixel dimension.

Describe, giving suitable code fragments, how you would assemble such a presentation using SMIL. Your solution should cover all aspects of the SMIL presentation. [14]

3. (a) What is meant by the Quality of Service of a multimedia application? [2]

   (b) What major factors affect the Quality of Service of a multimedia application? [8]

   (c) Perform a CORR analysis on the following Traffic scheduling problem:

   A scheduler has an allocation cycle time of length 5 seconds and is serving 3 connections. The connections have rates of 2.5, 1.5 and 1 cells per cycle respectively. You should assume that all three connections are initially *backlogged*. What is the ideal delivery rate where fractional slots can be allocated? How should the connections be scheduled using CORR? [14]

4. (a) What is MIDI? How is a basic MIDI message structured? [6]
   (b) In what ways can MIDI be used effectively in Multimedia Applications, as opposed to strictly musical applications? [8]
   (c) How can MIDI be used with modern data compression techniques? Briefly describe how such compression techniques may be implemented? [10]