Multimedia IGDS MSc Exam 1999

Setter: ADM
Checker: OFR

Time Allowed: 2 Hours
Answer 3 Questions out of 4
Each Question Carries 24 Marks

1. (a) What is meant by the terms *Multimedia* and *Hypermedia*? Distinguish between these two concepts. [2]

(b) What is meant by the terms *static* media and *dynamic* media? Give examples of each type of media. [4]

(c) What types of functionality need to be provided in order to effectively use a wide variety of media in Multimedia applications. Your answer should briefly address how such functionality can be facilitated in general Multimedia applications. [8]

(d) Different types of media will require different types of supporting operations to provide the adequate levels of functionality. For the examples of static and dynamic media given in part 1(b) briefly discuss what operations are needed to support a wide range of multimedia applications. [10]

2. (a) Why is file or data compression necessary for Multimedia activities? [2]

(b) Briefly explain how the Discrete Cosine Transform Operates, and why is it so important in data compression in Multimedia applications [10]

(c) A Simple Transform Encoding procedure maybe described by the following steps for a 2x2 block of monochrome pixels:

1. Take top left pixel as the base value for the block, pixel *A*.
2. Calculate three other transformed values by taking the difference between these (respective) pixels and pixel *A*, *i.e. B-A, C-A, D-A.*
3. Store the base pixel and the differences as the values of the transform.

Given the above transform:

(i) What is the inverse transform? [2]
(ii) How may such a transform scheme be used to compress data?

[3]

(iii) Show how you would encode and compress the following image block:

10	20	20	25
15	25	15	20
20	25	10	20
15	20	15	25

[4]

(iv) Why is this scheme not very suitable for general image compression?

[3]

3 (a) What are the major factors when considering storage requirements for Multimedia Systems?

[4]

(b) What is RAID technology and what advantages does it offer as a medium for the storage and delivery of large data?

[4]

(c) Briefly explain the *eight* levels of RAID functionality .

[8]

(d) A digital video file is 40 Mb in size. The disk subsystem has four drives and the controller is designed to support read and write onto each drive, concurrently. The digital video is stored using the *disk striping* concept. A block size of 8 Kb is used for each I/O operation.

(i) What is the performance improvement in *sequentially* reading the complete file when compared to a single drive subsystem?

(ii) What is the percentage performance improvement for this system compared to a single drive system?

[8]

4 (a) Give a definition of Virtual Reality. [2]

(b) What specialised input and output devices have been developed for Virtual Reality? Describe each device briefly. [8]

(c) Virtual Reality is not only for entertainment. How can Virtual Reality help in professional environments? Write a brief essay discussing this topic. Your answer may include current applications in this field or address future avenues for this application of the technology. [14]