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Reg. No.

B.E / B.Tech.(Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012

INFORMATION TECHNOLOGY

FIFTH SEMESTER (REGULATION – 2008)

IT 9302 – MULTIMEDIA SYSTEMS

Time: 3 hrs

Max. Marks: 100

Answer ALL Questions

Part – A (10 × 2 = 20 Marks)

- 1 What is meant by the terms Multimedia and Hypermedia? Distinguish between these two concepts
- 2 Define the terms static and dynamic media? Give two examples of each type of media.
- 3 Why data compression is highly desirable for Multimedia activities?
- 4 What are the two broad classes of data compression techniques applied to video compression? How does each class type typically get applied in video compression methods?
- 5 Give the definition of a Multimedia Authoring System.
- 6 What key features should Multimedia Authoring System provide?
- 7 What is RAID technology and list the advantages it offers as a medium for the storage and delivery of large data?
- 8 State the major factors to be taken into account while considering storage requirements for Multimedia Systems?
- 9 What are the key distinctions between multimedia data and more conventional types of media?
- 10 What key issues or problems does a multimedia system have to deal with when handling multimedia data?

Part – B (5 × 16 = 80 Marks)

- 11 The main types of multimedia data are: graphics, images, audio, and video. What technical issues are associated when these data types are integrated in a Multimedia System? For each media type briefly relate to the issues involved in generating, capturing, storing and transmitting the respective media components. (16)
- 12 (a) (i) Briefly explain how the Discrete Cosine Transform Operates, and why is it so important in data compression in Multimedia applications. (10)

(ii) A Simple Transform Encoding procedure maybe described by the following steps for a 2x2 block of monochrome pixels: (6)
(a) Take top left pixel as the base value for the block, pixel A.
(b) Calculate three other transformed values by taking the difference between these (respective) pixels and pixel A, i.e. B-A, C-A, D-A.
(c) Store the base pixel and the differences as the values of the transform.
Given the above transform:
(1) What is the inverse transform?
(2) How may such a transform scheme be used to compress data?

(OR)

(b) (i) What is meant by a group of pictures in H.261 and MPEG video encoding? Briefly explain how each type of frame, in the group of pictures, achieves some form of video compression. (8)

(ii) Briefly explain why a bidirectional B-frame improves video compression rates. What drawbacks are there with using B-frames? (8)

13 (a) (i) What Multimedia Authoring paradigms exist? Briefly describe **five** ways in which content can be formatted and delivered in a Multimedia Authoring System. (8)

(ii) List three distinct models of colour used in Multimedia. Explain why there are a number of different colour models exploited in multimedia data formats (8)

(OR)

(b) You have been asked to provide a Multimedia presentation that can support media in both English and French. You may assume that you have been given a sequence of 10 images and a single 50 second digitized 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. (16)

Describe with suitable code fragments, how you would assemble above presentation using SMIL. Your solution should cover all aspects of the SMIL presentation.

14 (a) (i) Briefly explain the eight levels of RAID functionality. (8)

(ii) What specialized input and output devices have been developed for Virtual Reality? Describe each device briefly. (8)

(OR)

(b) (i) 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 stored using the disk striping concept. A block size of 8 Kb is used for each I/O operation. (16)

(1) What is the performance improvement in sequentially reading the complete file when compared to a single drive subsystem in terms of the number of operations performed?

(2) What is the percentage performance improvement expressed as the number of physical I/O operations to be executed in on the RAID and single drive systems?

15 (a) (i) Discuss the following in detail: (16)
(1) QOS issues in multimedia networks
(2) Multimedia over ATM networks.

(OR)

(b) An analog signal has bandwidth that ranges from 15Hz to 10 KHz. What is the rate of sampler and the bandwidth of band limiting filter required if: (16)

(1) The signal is to be stored within computer memory.

(2) The signal is to be transmitted over a network which has a bandwidth from 200Hz to 3.4 KHz. [4]

(2) Assuming that each signal is sampled at 8 bits per sample what is the *quantization noise* and the *signal to noise ratio* expected for the transmission of the signals in (1) and (2).