

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2935

Roll No.

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- (f) What are the advantages of Adaptive Huffman Coding compared to the original Huffman Coding algorithm? Explain what is the purpose of this? Why is it feasible?
4. Write short notes on any **four** of the following :—(5×4=20)
- Video compression
 - Recent Developments in multimedia.
 - Video file formats.
 - MHEG standard
 - OCR
 - Card and page based authoring tools.
5. Attempt any **four** parts of the following :— (5×4=20)
- Briefly explain why we need to be able to have less than 24-bit color and why this makes for a problem. Generally, what do we need to do to adaptively transform 24-bit color values to 8-bit ones.
 - What are some of the different animation file formats? What are some of the advantages or key features of each of these file formats?
 - What factors determine the quality of the sound file? What steps are involved in producing digital audio? Explain briefly.
 - What is the difference between analog and digital video? How do you digitize analog video? What factors determine the quality of the video file?
 - Describe what MIDI is, what its benefits are, and how it is best used in a multimedia project?
 - What is the advantage of interlaced video? What are some of its problems? Discuss.

B.Tech.

(SEM. VIII) THEORY EXAMINATION 2011-12
MULTIMEDIA SYSTEMS

Time : 3 Hours

Total Marks : 100

Note :—Attempt **all** questions.

1. Attempt any **two** parts of the following :— (10×2=20)
- Most high resolution computer monitors are not based on television picture tubes. What is the amount of memory that is required to store an image with each of the following display sizes :
 - 1024 × 768,
 - 1280 × 1024 ?
 Derive the time to transmit an image with each type of display assuming a bit rate of :
 - 56 kbps,
 - 1.5 Mbps.
 - Messages comprising seven different characters, A through G, are to be transmitted over a data link. Analysis has shown that the relative frequency of occurrence of each character is :
 A 0.10, B 0.25, C 0.05, D 0.32, E 0.01, F 0.07, G 0.2
 (i) Derive the entropy of the messages.

- (ii) Use static Huffman coding to derive a suitable set of codewords.
 - (iii) Derive the average number of bits per codeword for your codeword set to transmit a message and compare this with both the fixed-length binary and ASCII codewords.
- (c) You have been assigned to design and produce the audio portions of a multimedia project. The program will be delivered on a CD-ROM, and video clips will take up most of the CD. You have only 50 MB of storage space to store 20 one-minute clips of speech, 10 songs averaging three minutes long, and a background sound loop. What sampling rates and depths should you use for the speech, for the music, and for the background sound? Why? Roughly calculate the file size totals for these specifications and be sure that you end up with less than the 50 MB of storage space allotted. Discuss your reasoning.

2. Attempt any two parts of the following :— (10×2=20)

- (a) Consider the following symbols and their probability of occurrence :

A	B	C	D	E	F
.80	.10	.04	.03	.03	.20

Compute the following :—

- (i) Find Huffman codes
- (ii) Find Shannon Fano Codes
- (iii) Calculate Entropy
- (iv) Calculate the Redundancy in Shannon Fano and Huffman Codes.

- (b) How many principal modes does JPEG have? What are their names? Explain briefly. Suppose we view a decompressed 512 * 512 JPEG image but use only the *color* part of the stored image information, not the luminance part, to decompress. What does the 512 * 512 color image look like? Assume JPEG is compressed using a 4 : 2 : 0 scheme.
- (c) What are dictionary-based compression techniques? How are they different from other conventional coding schemes? Discuss the relative merits and demerits of dictionary-based compression schemes. Discuss the genesis of dictionary-based compression schemes.

3. Attempt any four parts of the following :— (5×4=20)

- (a) An audio clip has a duration of 8 minutes. The maximum frequency of the sound wave is 15 kHz. This is to be sampled using 8 bits per sample and in stereo mode. Estimate the minimum data rate in KB/sec required to play back the digital file and the audio file size in MB.
- (b) Explain why you don't see a flicker effect on your workstation screen when displaying this video at NTSC frame rate?
- (c) Explain the terms "anti-aliasing" and "dithering" as used in image processing mentioning clearly how they help in enhancing the quality of images.
- (d) What is a pixel? Explain briefly the role of pixels in creating an image on a CRT screen.
- (e) What are the merits of vector graphics format compared to the bitmap format?