

Roll No.	7E7038	Total No. of Pages : 3
B.Tech. VII Semester (Main/Back) Examination, Dec. - 2015 Computer Engg. 7CS6.3A Data Compressing Techniques		
7E 7038		

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) What is data compression & Why we need it? Explain compression & reconstruction with the help of block diagram. (5)
- b) How modeling & coding are related? Explain with the help of examples. (5)
- c) Write huffman coding algorithm? What do you understand by length of huffman code and How it is defined. (6)

OR

1. a) Describe the steps for a test for unique decodability. Determine whether the following codes are uniquely decodable.
 - i) {0,01,11,1111}
 - ii) {0,01,110,111}
 - iii) {0,10,110,111}
 - iv) {1,10,110,111}(6)

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(1)

[Contd....

- b) A source emits letters from an alphabets $A = \{a_1, a_2, a_3, a_4, a_5\}$ with probabilities $p(a_1) = 0.15, p(a_2) = 0.04, p(a_3) = 0.26, p(a_4) = 0.05, p(a_5) = 0.5$.
- Calculate the entropy of this source.
 - Find a Huffman code for this source.
 - Find the average length of code in (ii) & its redundancy. (10)

Unit - II

- How a tag is generated in arithmetic coding? Encode & decode the following stream of characters: BACA with probabilities $P(A) = 0.5, P(B) = P(C) = 0.25$ using arithmetic coding. (8)
 - Where we use the dictionary techniques of encoding? Explain various types of dictionary techniques. (8)

OR

- A sequence is encoded using LZW algorithm & the initial dictionary shown in table:

Index	Entry
1	a
2	bc
3	cr
4	tr

The output of LZW encoder is following sequence:

- 3,1,4,6,8,4,2,1,2,5,10,6,11,13,6 decode the sequence (8)
 - Encode & Decode the following sequence: this X is $\{t, h, e\}$ using Burrows-wheeler transform. (8)

Unit - III

- What do you understand by vector quantization? Explain the procedure of vector quantization (8)

- Explain the linear system models with a suitable example. (8)

OR

- What do you mean by codebook of a quantizer? What problems can be there when designing a codebook for a higher dimensional quantizer? How Linde-Buzo-Grey algorithm is helpful here. (10)
 - Explain the concept of quantization in lossy compression with the help of an example. (6)

Unit - IV

- Explain Adaptive DPCM encoder & decoder for audio compression? (8)
 - What is Z-transform? Explain its types & properties. (8)

OR

- Explain various types of delta modulation. Compare delta modulation with DPCM. (8)
 - What is the significance of discrete cosine transform in JPEG baseline algorithm. (8)

Unit - V

- Explain basic sub-band algorithm with suitable example (8)
 - Explain multi-resolution analysis ? How scaling function are used in multi-resolution analysis. (8)

OR

- Write short notes on the following: (16)
 - MPEG Audio coding
 - Applications of wavelets for image compression.