

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

PAPER ID : 2714

Roll No.

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B. Tech.

(SEM.VII) THEORY EXAMINATION 2011-12

DATA COMPRESSION

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

1. Attempt any **four** parts of the following : **(5×4=20)**
 - (a) What do you mean by Data Compression ? Write some of the application where it is used.
 - (b) What do you mean by Lossless Compression ? Compare lossless compression with lossy compression.
 - (c) Differentiate between static length and variable length coding scheme. Explain with the help of an example.
 - (d) What is average information ? What are the properties used in measure of average information ?
 - (e) Explain Markov Model and Composite Source Models.
 - (f) What do you understand by Uniquely Decodable Codes ?

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

- (a) What is the limitation of Huffman Coding ? Explain by an example.
- (b) Explain the update procedure of adaptive Huffman Coding algorithm with the help of a flow chart.
- (c) Write down the application of Huffman Coding in Text compression and audio compression.
- (d) Explain Golomb Codes and Tunstall Codes.
- (e) Prove that the average codeword length \bar{l} of an optimal code for a source S is greater than or equal to entropy H (S).
- (f) Explain Lossless Image Compression with an example.

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

- (a) (i) What do you mean by Binary Code ? Compare Binary Code with Huffman Code.
(ii) Explain the Run-Length Coding with the help of suitable example.
- (b) (i) Compare Huffman Coding and Arithmetic Coding.
How a tag is generated in Arithmetic Coding ?

- (ii) A sequence is encoded using LZW algorithm and the initial dictionary shown in table :

<i>Index</i>	<i>Entry</i>
1	a
2	b
3	r
4	t

The output of LZW encoder is the following sequence
3, 1, 4, 6, 8, 4, 2, 1, 2, 5, 10, 6, 11, 13, 6. Decode this sequence.

- (c) (i) Give differences between static and adaptive dictionary coding scheme.
(ii) Write short notes on the following :
(1) Dynamic Markov Compression
(2) Graphic Interchange Format.

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

- (a) What is Rate Distortion Theory ? Drive the rate distortion function for the :
(i) Binary Source
(ii) Gaussian Source.
- (b) Describe the steps involved in Basic Algorithm for Prediction with Partial Match (PPM).
- (c) What is lossy data encoding ? Write down the distortion measure criterias to check the fidelity of a reconstructed source sequence to the original one in such type of encoding techniques.

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

- (a) What is Quantization ? Describe the Quantization problem with the help of example in detail.
- (b) What do you mean by Codebook of Quantizer ? Explain the steps of the Linde-Buzo-Gray Algorithm.
- (c) What is Tree Structured Vector Quantization ? Explain the following Quantization Technique : (i) Structured Vector Quantization (ii) Pyramid Vector Quantization.