

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.Tech
BRANCH: Information Security

SEMESTER : II
SESSION : SP/22

SUBJECT: CS602 DATA COMPRESSION

TIME: 2.00 Hrs

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is Data Compression? Why we need it? Explain Compression and Reconstruction [C1] [5]
with the help of block diagram.
- Q.1(b) Design a minimum variance Huffman code for a source that put out letter from an alphabet [C4] [5]
 $A=\{a_1, a_2, a_3, a_4, a_5\}$ with $P(a_1) = 0.2$, $P(a_2) = 0.4$, $P(a_3) = 0.2$, $P(a_4) = 0.1$, $P(a_5) = 0.1$
Find the entropy of the source, average length of the code and the efficiency.
- Q.2(a) Give LZ77 approach for adaptive dictionary-based encoding with example. [C1] [5]
Q.2(b) Explain the encoding and decoding process of LZW approach for the string. [C4] [5]
"a#bar#array#by#barray#bay"
- Q.3(a) What is Adaptive Quantization? Explain the various approaches to adapting the quantizer [C2] [5]
parameters.
- Q.3(b) Explain step by step algorithm for image compression using RLE algorithm. [C5] [5]
- Q.4(a) Explain the concept of quantization in lossy compression with the help of an example. [C2] [5]
Q.4(b) What do you mean by codebook of a quantizer? How Linde Buzo Gray algorithm is helpful [C5] [5]
for a higher dimensional quantizer explain.
- Q.5(a) Explain the steps involved in video compression. [C3] [5]
Q.5(b) Construct Shannon-Fano code using given set of messages. Also calculate Entropy, Length [C3] [5]
Average, Efficiency and Redundancy
Message X = [x1, x2, x3, x4, x5, x6, x7, x8]
Probability P = [1/4, 1/8, 1/16, 1/16, 1/16, 1/4, 1/16, 1/8]

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