VIMAL JYOTHI ENGINEERING COLLEGE
JYOTHI NAGAR, CHEMPERI – 670632, KANNUR D.T., KERALA
An ISO 9001 : 2015 Certified Institution

Assignment No	1	4th year Semester - 8
Subject	CST 446 Data Compression Techniques	Branch – S8 CSE B
Issue Date	06-01-2025	Maximum mark -15

Instruction to students

Sl.No	Batch	Q.No
1	Roll No: 1-5	1
2	Roll No: 6-10	2
3	Roll No: 11-15	3
4	Roll No: 16-20	4
5	Roll No: 21-25	5
6	Roll No: 26-30	6
7	Roll No: 31-35	7
8	Roll No: 36-40	8
9	Roll No: 41-45	9
10	Roll No: 46-50	10
11	Roll No: 51-55	11
12	Roll No: 56-60	12

Answer 1 out of 12 questions

Q.No	Questions	Marks	CO	Level
1	Explain the differences between lossy and lossless compression techniques, providing real-world examples for each.	15	1	2
2	Describe the Run Length Encoding (RLE) technique with a suitable example. Calculate the compression	15	2	2

	ratio for the sequence `AAAAABBBCCDAA`.			
3	Define and describe the measures of performance for compression techniques. How are they used to evaluate efficiency?	15	1	1
4	Compare and contrast binary Huffman coding and non-binary Huffman algorithms. When would you use each?	15	2	2
5	Illustrate the physical and probability-based models used in lossless compression, highlighting their applications.	15	1	2
6	Explain the concept of arithmetic coding and illustrate its process with an example of compressing the string `ABABABBB`.	15	2	2
7	Describe the mathematical models used in lossless compression. Explain how probability models and physical models contribute to efficient data representation with examples.	15	1	2
8	Define and calculate the compression ratio for the following example: Original data size = 100 KB, Compressed data size = 40 KB.	15	1	1
9	Define prefix codes and explain their importance in data compression. Provide an example of a prefix code.	15	2	1
10	Why are statistical methods important in data compression? List and briefly explain two statistical methods covered in this module.	15	2	1

11	Given a dataset with repetitive patterns, design a simple physical model for lossless compression. Justify how the model reduces data size and provide an example to demonstrate your approach.	15	1	1
12	For the following set of symbols and probabilities, construct a binary Huffman tree: Symbols:A,B,C,D,E Probabilities: A=0.1, B=0.2, C=0.3, D=0.25, E=0.15 Use the Huffman tree to encode the message ABCADE. Calculate the compression ratio if each symbol in the original dataset was stored using a fixed-length code of 3 bits.	15	2	3

CO 1: Describe the fundamentals principles of compression.
CO 2: Make use of statistical and dictionary based compression techniques for various applications.