

DATA COMPRESSION

◆ SECTION A: Short Answer Questions

1. What is data compression and why is it needed?
 2. What are the different measures of performance of data compression algorithms?
 3. Write short note on Rice codes.
 4. What are non-binary Huffman codes?
 5. Differentiate between Huffman & arithmetic coding.
 6. What is graphic interchange format (GIF)?
 7. Explain Gaussian distribution probability model.
 8. What is entropy coded quantization?
 9. Differentiate between vector quantization and scalar quantization.
 10. Define pyramid vector quantization.
 11. What are the applications of Huffman Coding?
 12. Calculate Golomb Code for $n=9$ and $n=13$ with parameter $m=5$.
 13. List out the applications of dictionary based data compression techniques.
 14. Compare Binary code with Huffman code.
 15. What are the various distortion criteria?
 16. Explain mismatch effect.
 17. Define Code Vectors.
 18. What is the concept of pruning?
 19. Explain dynamic Markov compression with example.
 20. Explain predictive coding techniques.
 21. Write advantages of vector quantization over scalar.
 22. How does the Linde-Buzo-Gray algorithm work?
 23. Compare and contrast JPEG and MPEG.
 24. What benefits are offered by compression schemes in system design?
 25. What are the advantages of using specialized multimedia servers?
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◆ **SECTION B: Descriptive Questions**

1. Explain modeling & coding with suitable examples.
 2. Explain Huffman coding algorithm and compare conventional & adaptive Huffman coding.
 3. What is adaptive dictionary technique? Explain LZ77 & LZ78.
 4. Describe scalar quantization algorithm and its problem with example.
 5. Explain Linde-Buzo Gray (LBG) algorithm and empty cell problem.
 6. Differentiate static length and variable length coding schemes.
 7. Explain classification of data compression techniques based on reconstruction needs.
 8. What is average information? What are its properties?
 9. Explain a generic compression scheme with a block diagram. What are distortion criteria for lossy coding?
 10. Explain uniform and non-uniform quantization and their classification.
 11. Describe the adaptive Huffman coding algorithm and flowchart.
 12. How do uniquely decodable codes differ from prefix codes? Give examples.
 13. Explain Minimum variance Huffman code vs Huffman code.
 14. Discuss prediction with partial match (PPM) and Facsimile encoding.
 15. Explain adaptive quantization and approaches to quantizer parameter adaptation.
 16. Describe vector quantization and its advantages over scalar.
 17. What is the Markov model and its role in compression?
 18. Discuss importance of modeling and coding. How is information theory related to lossless compression?
 19. Write short note on Golomb and Tunstall codes. Explain redundancy codes.
 20. Describe arithmetic coding and how to code a sequence.
 21. Explain Burrows-Wheeler Transform (BWT) with move-to-front coding.
 22. Describe uniform quantization for uniform and non-uniform sources.
 23. Explain rate-distortion theory and rate-distortion function for binary sources.
 24. Describe tree structured and lattice vector quantizers.
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◆ **Coding/Computation Based**

1. Decode using LZW given an initial dictionary and encoded sequence. Compare LZ77, LZ78, and LZW.
2. Decode a binary string using Adaptive Huffman procedure and show updated trees.
3. Encode given text using BWT and move-to-front coding.
4. Compute entropy and Huffman code for a given probability set.
5. Rate and distortion computation for block compression on a binary sequence using thresholding.