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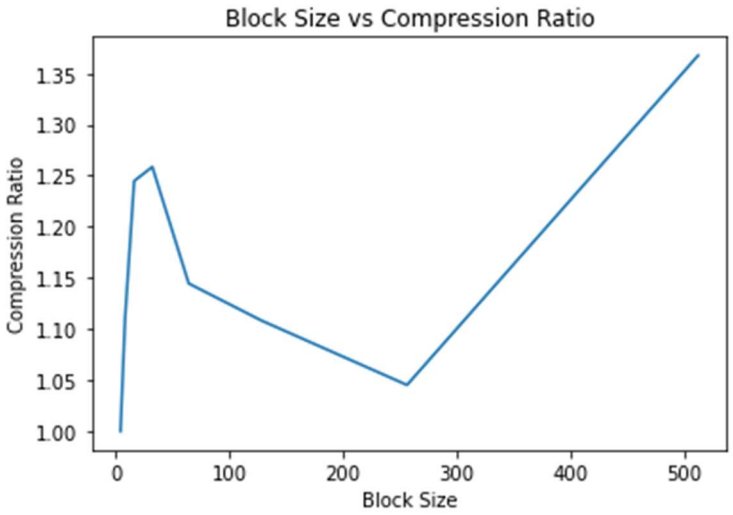
Enrolment No.: - 2022CSM1006

Subject: - CS-517 Digital Image Processing Lab Assignment 3

Observations: -

1. Analysis of Block Size and Compression Ratio:-

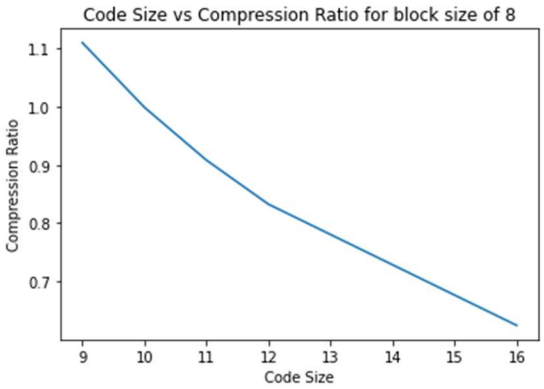
   The input image taken for observations is *kodak23.png.* For different block sizes and code sizes of 9 bits, the compression ratio is calculated and the graph is shown below.

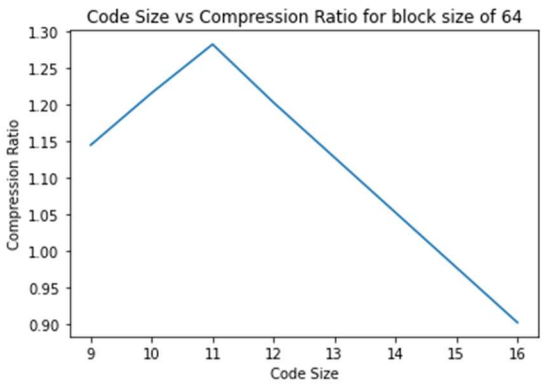


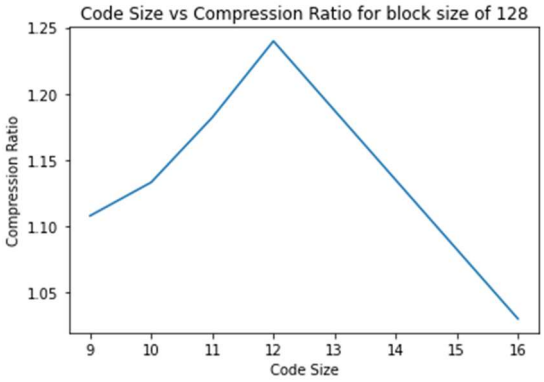
   As the block size increases, the compression ratio decreases, but after some particular value when the block size takes over the code size, the compression ratio starts increasing.

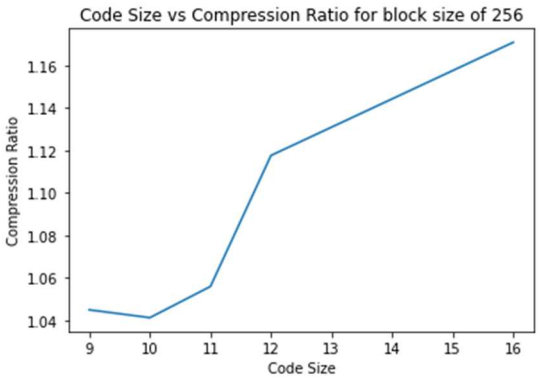
2. Analysis of Code Size and Compression Ratio:-

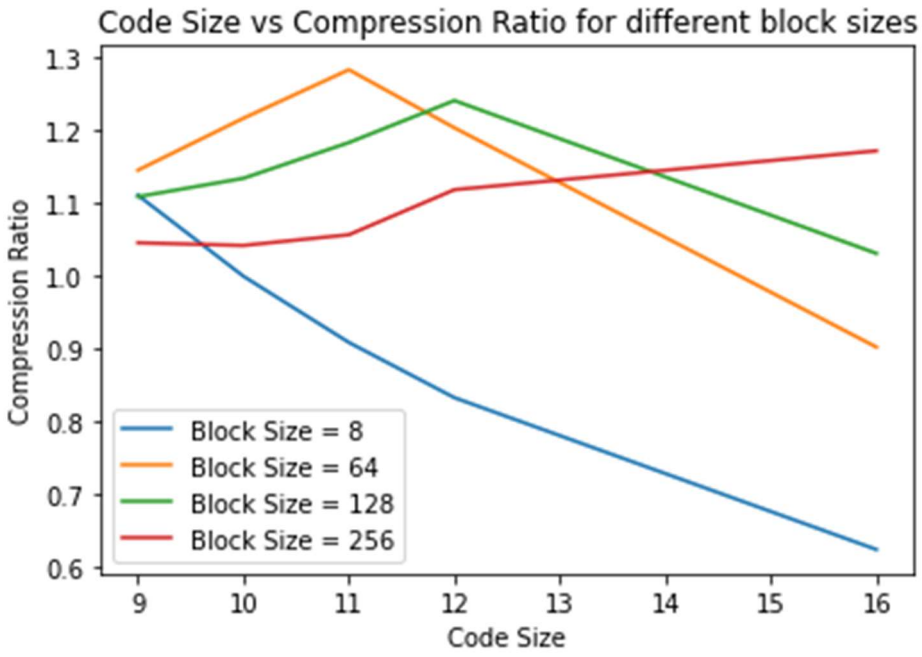
   For different block sizes and different code sizes, the compression ratio is plotted. The individual graphs are shown below.







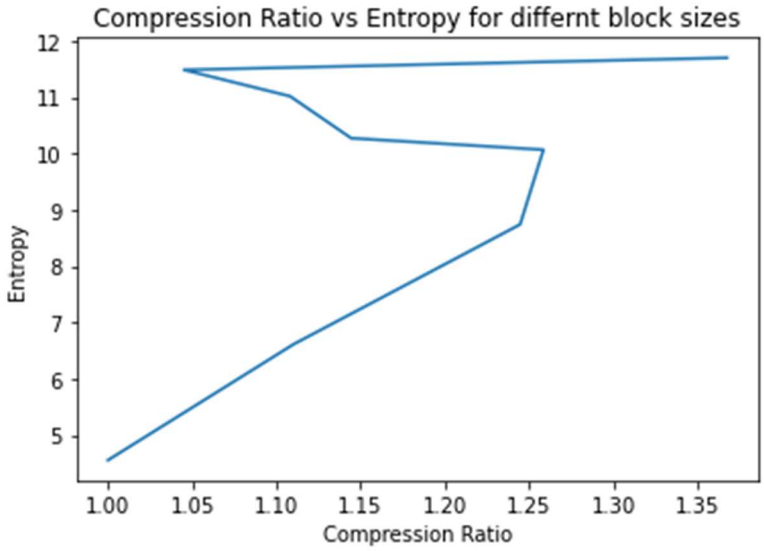


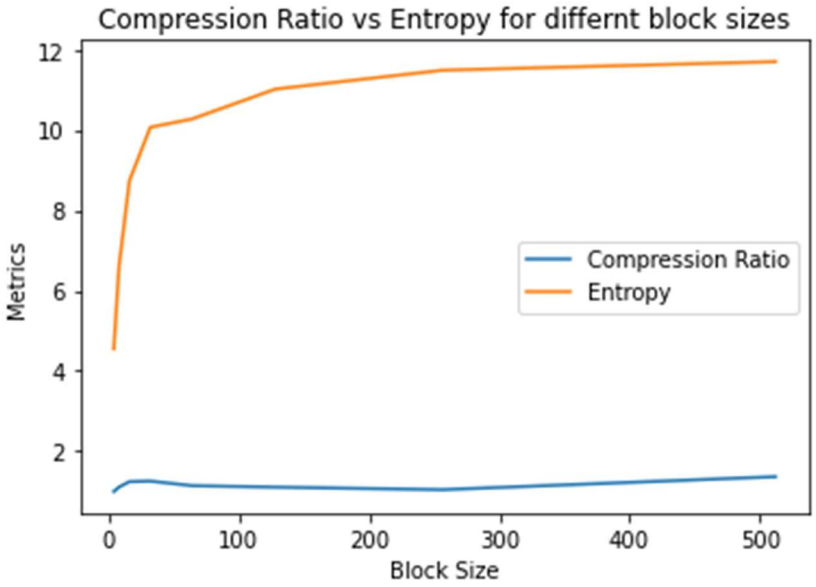


When the block size is 8 and as the code size increases, the compression ratio decreases.
When the block size is 64 and as the code size increases, then after some value compression ratio starts decreasing.
It is observed that for different block sizes and code size combinations, the compression ratio varies.

3. Analysis of Compression Ratio vs Entropy:-

The compression Ratio vs Entropy graph is plotted for different block sizes and the corresponding graph is shown below. No specific pattern is observed in this case.

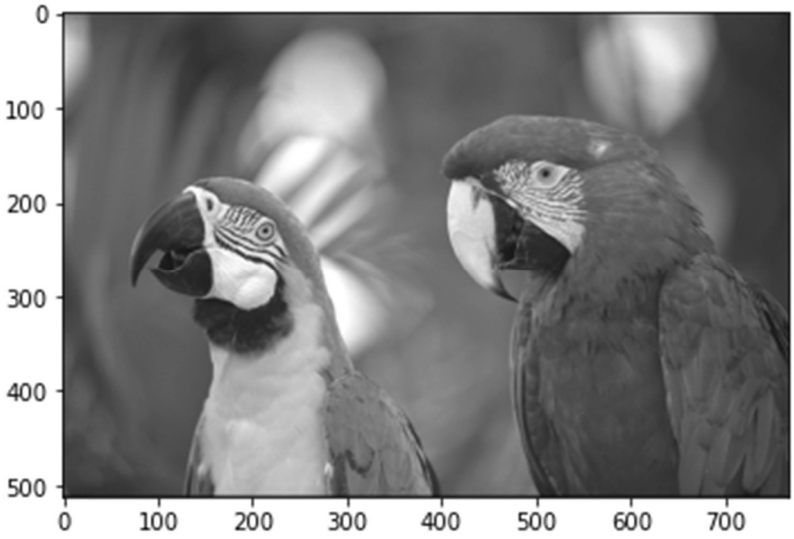




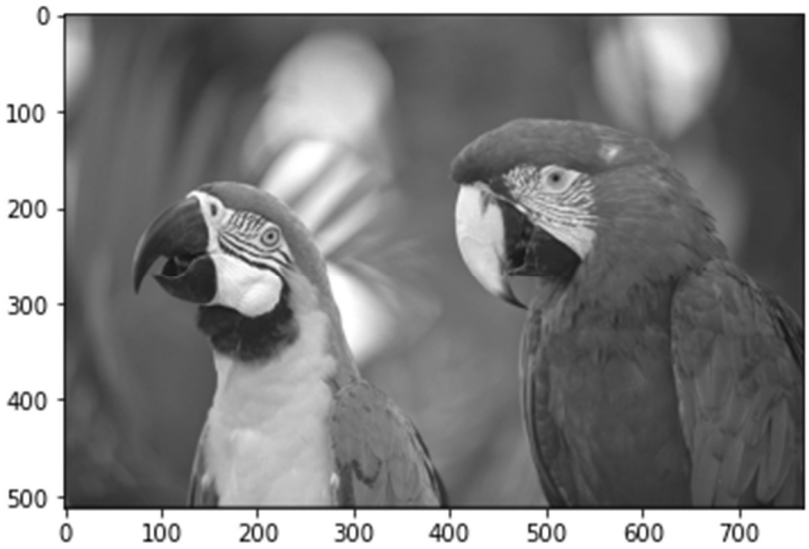
From the second graph, it is observed that as the block size increases, the compression ratio also increases, and entropy also increases.

4. Analysis of Lossless compression:-

From the below images, we can conclude that the LZW encoding technique is lossless. Further to verify this, the RMSE is calculated which comes out to be 0. The original input image and the final output or reconstructed images are shown below.



Original Image



Reconstructed Image

Conclusion: -

Thus we got an understanding of LZW encoding and conclude that the LZW encoding technique is a lossless compression technique.