

1.) Program included.

2.) Encoding:

$(3,3): 1 \rightarrow 01$

$(3,5): 3 \rightarrow 11$

3.) $(5,3): 2 \rightarrow 10$

3.) Reconstructed Table:

$(3,3) \rightarrow (0,0)$

$(5,3) \rightarrow (5,3)$

$(3,5) \rightarrow (1,7)$

4.) Distortion:

For point $(3,3)$ the distortion

$$\text{is } (3-0)^2 + (3-0)^2 = 18$$

5.) Compression Ratio:

4 bits per pixel

6 objects so $(6 \times 4) = 24$

Each centroid requires $(6 \times 2) = 12$ bits

Thus $24/6 = 4$ for compression ratio.