*D.  Given the following data sample, calculate the entropy (n) of the circumscribed-x symbol.  If a fixed-length 8-bit-per-symbol encoding scheme is used for the uncompressed data, what is the efficiency of the original 8-bit code for the*circumscribed-x *symbol?  (Here, we'll define the "efficiency" to be the ratio of the bit length of the most efficient representation (the entropy) to the bit length of the symbol in its uncompressed form.  This is the inverse of the compression ratio.) (5 points)*

x = 2/10 = 0.2

-log(0.2)/log2/8

29%

Icon

Description automatically generated

*E.  Consider a photo image to be transmitted over a 56Kbps link. (Assume 1K = 1000). JPEG can compress a typical photo image at a ratio of approximately 30:1.  JPEG compression is typically done well before transmission, but for this question we’ll assume that we are trying to determine whether it is worth compressing the image immediately before transmission, as part of the overall transmission process.*

*Using the formula presented on page 599 of the text (Bc > ( r/(r - 1) ) x Bn) and a 30:1 compression ratio, determine the "break even" point for the “bandwidth” of the compression process Bc (in bps), at which compression becomes worthwhile.  (5 points)*

(30/29)x56000 = 57,931 bps