Video Compression
Homework #1 2024/03/19
Due Date: 2024/03/26, Submit your HW to E3

1. (70%)Suppose that we have a discrete memoryless source with first six samples $a_2a_0a_0a_3a_5a_2$.

   The symbol probabilities $p(a_i)$ for $a_i \in A$ are specified below:

Symbol	a_0	a_1	a_2	a_3	a_4	a_5
Probability	0.4	0.2	0.3	0.05	0.02	0.03

   a) (10%) Find the entropy of the source.
   b) (20%) Design a Huffman codebook for this source.
   c) (10%) Find the average length of codewords.
   d) (10%) How good is this Huffman code?
   e) (20%) Perform arithmetic coding algorithm to encode the first 3 samples. For this case, you shall ignore the termination issue, and output the shortest bit string, while the probability distribution is based on the table above.

2. (30%) <u>Reading Assignment</u>

   Read this article: Wang et al, "Image quality assessment: from error visibility to structural similarity," IEEE Transactions on Image Processing, 2004, (http://ieeexplore.ieee.org/document/1284395/)

   And write a paper report/essay about it (250-500 words).