Huffman Coding

A discrete memoryless source X has five symbols

$$\{x_1, x_2, x_3, x_4, x_5\}$$

with probabilities $P(x_1) = 0.42$, $P(x_2) = 0.22$, $P(x_3) = 0.17$, $P(x_4) = 0.10$ and $P(x_5) = 0.09$.

(a) Construct a Huffman code for X.

(b) Calculate the efficiency of the code.

(c) Calculate the redundancy of the code.

- x_1 (0.42)
- x_2 (0.22)
- x_3 (0.17)
- x_4 (0.10)
- x_5 (0.09)

Important Formulae

$$H = -\sum_{j=1}^{m} log_2(p_i)$$

$$E(L) = \sum_{j=1}^{m} (l_i \times p_i)$$

$$\text{Efficiency} = \frac{H}{E(L)}$$