Tutoial Lecture 11

Q1) A transmitter has the following symbols (S1, S2, S3, S4, S5, S6) with equiprobable probabilities. If the fixed length binary coding is used for the transmitter, calculate code efficiency.

Solution:

$$L_c = int[log_2 n] + 1 = int[log_2 6] + 1 = 3\ bit$$

$$H(x) = log_2 n = log_2 6 = 2.584\ bit/symbol$$

$$\eta = \frac{H(X)}{L_C} \times 100 = \frac{2.584}{3} \times 100 = 86.133\%$$

Q2/ Find code efficiency for 14 equiprobable messages coded using fixed length code.

Solution:

$$L_c = int[log_2 n] + 1 = int[log_2 14] + 1 = 4\ bit$$

$$H(x) = log_2 n = log_2 14 = 3.807\ bit/symbol$$

$$\eta = \frac{H(X)}{L_C} \times 100 = \frac{3.807}{4} \times 100 = 95.175\%$$

Q3/ Find code efficiency for 32 equiprobable messages coded using fixed length code.

Solution:

$$L_c = log_2 n = log_2 32 = 5bit$$

$$H(x) = log_2 n = log_2 32 = 5\ bit/symbol$$

$$\eta = \frac{H(X)}{L_C} \times 100 = 100\%$$

Q4/ Explain if the following codes is prefix free or not and why?

1- [A= 00, B= 01, C= 10, D= 110, E= 1110]

2- [A=1, B= 01, C=001, D=111]

Solution:

1- Prefix free (unique decodable)

2- Not prefix (not unique)