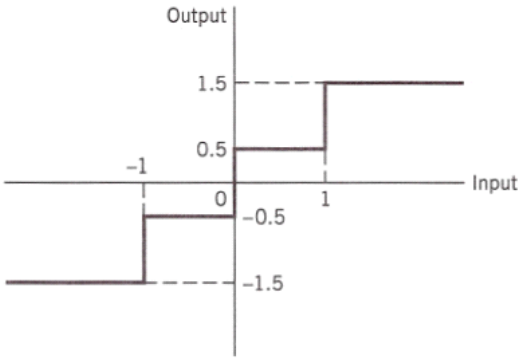
KFUPM-EE DEPT.
EE430: Information Theory and Coding

Problem Set # 1: Dr. Ali Muqaibel Due: 1/Week3

1. A source emits one of four symbols s_0, s_1, s_2, and s_3 with probabilities 1/3, 1/6, 1/4, and 1/4, respectively. The successive symbols emitted by the source are statistically independent. Calculate the entropy of the source.

2. Let X represents the outcome of a single roll of a fair die. What is the entropy of X?

3. The sample function of a Gaussian process of zero mean and unit variance is uniformly sampled and then applied to a uniform quantizer having the input-output amplitude characteristic shown in the Figure below. Calculate the entropy of the quantizer output.



4. Consider a discrete memoryless source with source alphabet : $S=\{s_0, s_1, s_2\}$ and source statistics{0.7,0.15,0.15}.

(a) Calculate the entropy of the source.

(b) Calculate the entropy of the second-order extension of the source. (two symbols)

From our text book "*Applied Information Theory and Coding*"

1.2.5

1.2.6

1.2.7

1.2.8

1.2.11

Note: *not all answers will be posted.*