Assignment 1

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2018-08-15, 23:59 IST.**

Short answer questions for assignment 1.

1. A source has two symbols – s₁ and s₂. The probability of s₂ is half that of s₁. The duration of the s₁ is 0.2 and the s₂ is 0.4 seconds. What is the information rate of the source (in bits/sec) ?

   No, the answer is incorrect.
   Score: 0
   Accepted Answers: (Type: Range) 3.4, 3.5

2. A discrete memoryless source has an alphabet of 5 symbols. The symbol probabilities are as following.

\[ P(s_0) = 0.55, P(s_1) = P(s_2) = 0.15, P(s_3) = 0.10, P(s_4) = 0.05. \]

What is the average codeword length of a Huffman code for this source ?

No, the answer is incorrect.
Score: 0
Accepted Answers: (Type: Range) 1.85, 1.95

3. \( X \) and \( Y \) are discrete jointly distributed discrete valued random variables. The relation between their joint entropy \( H(X, Y) \) and their individual entropies \( H(X), H(Y) \) is

Multiple choice questions in assignment 1.

1 point

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs - In association with

A project of National Programme on Technology Enhanced Learning

Funded by
\[ H(X,Y) \geq H(X) + H(Y), \text{ equality holds when } X, Y \text{ are uncorrelated} \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[ H(X,Y) \leq H(X) + H(Y), \text{ equality holds when } X, Y \text{ are independent} \]

4) Let \( X, Y \) be discrete random variables related as \( Y = g(X) \), where \( g \) is a deterministic function. The ordering of their entropies satisfies:

\[ H(X) \leq H(Y), \text{ equality holds if } g \text{ is a one to one mapping} \]
\[ H(X) \geq H(Y), \text{ equality holds if } g \text{ is a one to one mapping} \]
\[ H(X) \leq H(Y), \text{ equality holds when } H(X|g(X)) = 0 \]
\[ H(X) \geq H(Y), \text{ equality holds when } H(X|g(X)) = 0 \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[ H(X) \geq H(Y), \text{ equality holds if } g \text{ is a one to one mapping} \]
\[ H(X) \geq H(Y), \text{ equality holds when } H(X|g(X)) = 0 \]

5) The mutual information \( I(X,Y) = H(X) - H(X|Y) \) between two random variables \( X \) and \( Y \) satisfies:

\[ I(X,Y) > 0 \]
\[ I(X,Y) \geq 0 \]
\[ I(X,Y) \geq 0, \text{ equality holds when } X \text{ and } Y \text{ are uncorrelated} \]
\[ I(X,Y) \geq 0, \text{ equality holds when } X \text{ and } Y \text{ are independent} \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[ I(X,Y) \geq 0 \]
\[ I(X,Y) \geq 0, \text{ equality holds when } X \text{ and } Y \text{ are independent} \]