

Assignment Project Exam Help

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Brief answers are provided below. If you have questions to work out the answers, please see us at the consultations.

## Question 1

Given the text string below:

**jejunojejunostomy**

- a. What is its entropy?

Ans: 2.98

- b. Draw a Huffman tree based on the letters and their corresponding distributions for the above text string (Do not need to draw trees for the intermediate steps).

- c. Provide the resulting Huffman code for each letter.

Ans: j - 2bits; o,e,u,n - 3bits; s,t,m,y - 4bits.

- d. What is the average number of bits needed for each letter, using your Huffman code? How does it compare to the entropy ? (i.e., equal/larger/small and why)

Ans: 2.98

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## Question 2

- a. The length of a  $\frac{1}{2}$  probability ranges as below:

a [0.0, 0.125), f [0.125, 0.625), i [0.625, 0.75),

Decode the arithmetic code 0.91805 to its corresponding string.

Ans: riffraff

- b. Given the string:

**jejunojeju**

Derive an arithmetic code. (Your answer should be in decimal number with minimum precision).

Ans: 0.1849075 when dividing j,e,u,n,o into the ranges between 0.0, 0.4, 0.6, 0.8, 0.9, 1.0 respectively.

## Question 3

Consider the dictionary-based LZW compression algorithm. Suppose the alphabet is the set of ASCII characters, and the first 256 (i.e., <0> to <255>) table entries are initialized to these characters.

Show the dictionary (symbol sets plus associated codes) and output for LZW compression of the input string:

**jejunojejuno**

Ans: jejuno <256> <258> <260>