CSE320 Assignment 2 [SFQ | Summer 2024]
1 message

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A composite periodic signal passing through a channel consists of 7 frequency components of 150, 250, 300, 400, 700, 900 and 1200 MHz. The signal-to-noise ratio in decibel for this channel is 28. **Predict** the maximum theoretical bit rate and signal level for the channel. Consider the actual bit rate to be 25% of the maximum bit rate.
*

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Estimate the total delay (latency) in ms for a frame of size 4400 bytes that is being sent on a link with 4 routers, each having a queuing time of 5 μs, 2 ps, 3 ns and 3 ns, respectively. And the processing times of the routers are 2 ps, 4 ps, 6 μs and 5 μs, respectively. The length of the link is 4800 km. The speed of light inside the link is 2.6 × 10^8 m/s. The link has a bandwidth of 18 Mbps.
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Convert the following bit stream to digital signal using an appropriate encoding scheme that matches the requirements given. Write which signal encoding scheme you are using.
<u>**Data**</u>: 1 1 0 1 1 1 0 0 0 0 0 0 0 1

Requirement 1: The encoding scheme does not support self-synchronization for long 0's. Additionally, this scheme maintains a bipolar nature

Requirement 2: Now apply a technique to prevent long sequences of 0's in the above bipolar scheme without increasing the number of bits and signals.
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As we know, many line coding techniques face the common issue of consecutive 0's that may cause the receiver to lose self synchronization or have DC components. To mitigate the issue, we have introduced a 3B/4B block coding scheme shown in the table below. Based on this block coding scheme, draw a digital signal using NRZ-I line coding technique for the following data stream.

Data: 1 0 0 0 0 0 0 0 1 0 1 1

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Data Sequence	Encoded Sequence
000	1110
001	1101
010	0101
011	1001
100	0111
101	1111
110	1010
111	0101

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