Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali

https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9



Data Communication CS601 Lecture No 13

Lecture Prepared By

Muhammad Abid Ali

We are also Provide Online Classes for CS601

Contact Us on WhatsApp for join our online Classes

WhatsApp No 03449767315

CS601 Lecture No 13 Topic 61 to 66

Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali







https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

Today's Topic

1. Block Coding
    a) Division
    b) Substitution
    c) Combination
2. Scrambling
    a) Types of Scrambling
        i) B8ZS
        ii) High Density HDB3

Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali



https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

Block Coding (Error Detection)

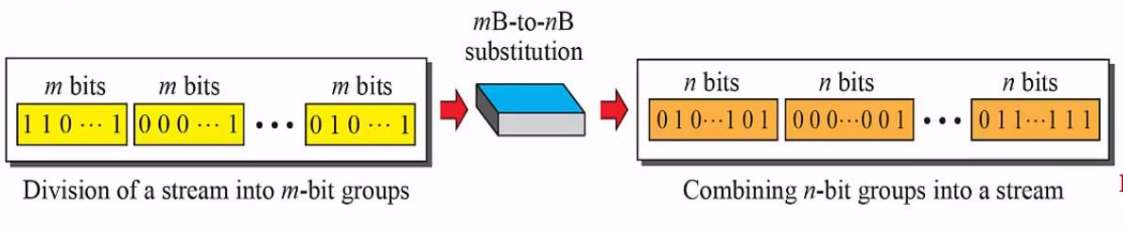
Block coding refers to the technique of adding extra bits to a digital word in order to improve the reliability of transmission.

When we are using Line Coding we not know where to start long ZEROs "0s" and where from start long Ones "1s". This problem is known as synchronization. To over the said problem we use second technique is known as Block Coding.

In this method we convert the "m" bits into "n" bits. These n bits is less than the m n < m. Its tell about where is long series of ZEROs "0s" and where from start long series of Ones "1s". We add some extra bit with original bits known as redundancy bits.

Three Steps of Block Coding:

- Division
- Substitution
- Combination



Division of a stream into *m*-bit groups

Combining *n*-bit groups into a stream

Redundancy
n > m

Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali

https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

Block Coding with Line Coding

We have select 4B / 5B scheme.

Example:

We need to send data at a 1 Mbps rate. What is the minimum required bandwidth, using a combination of 4B/5B and NRZ-I or Manchester coding?

Block Code Resolve:

Synchronization → ✓

Bandwidth (NRZ-I) < Bandwidth (Manchester) ✓

DC Components → X

SOLUTION

M = 4

N = 5

n > m

Data Rate

4 Bit = 1Mbps

5 Bit = 1.25 Mbps

↑ Signal Rate Grow Up

NRZ-I (Minimum Bandwidth is half of the Data Rate)

Formula = N / 2

= 1.25 / 2 Mbps

= 62.5 Mbps

= 625 KHZ

8B / 10B Scheme

Manchester (1 MHZ)

Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali



https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

DC components

- When voltage level in a digital signal is constant for a while, spectrum creates very low frequencies (around zero), called DC *components*
- *Creates problems for a* system that cannot pass low frequencies
- a telephone line cannot pass frequencies below 200 Hz.

Visit Our Channel for CS601 Short Lectures

Learning With Abid Ali 

https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

Scrambling

- ✓ In **Scrambling** we increase the **No. of Pulses** instead of **No. of Bits**. Because in Block Coding when we increase the No. of Bits it will increase the data rate as well as it increase bandwidth. But in Scrambling when we increase Pulses it will increase data rate but not increase the bandwidth.
  - ✓ Biphase schemes suitable for Dedicated Link (LAN) but not for Long Distance
  - ✓ Block Coding + NRZ-I solves Synchronization issue but has DC Component
  - ✓ Bipolar AMI has a narrow bandwidth (no DC Component) but synch issue (long series of 0s)

Visit Our Channel for CS601 Short Lectures

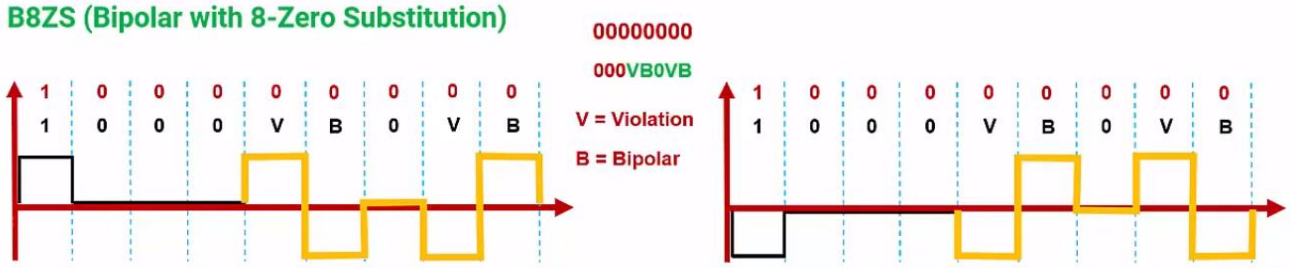
Learning With Abid Ali



https://www.youtube.com/watch?v=-0kr2sG8JUQ&list=PLAUocDaOe9K6nDHAxKa-7fHsIFAKBPE8q&index=9

Types of Scrambling Techniques

1. B8ZS (Bipolar with 8-Zero Substitution)



a. Previous Level is Positive

b. Previous Level is Negative

2. High Density HDB3 (Bipolar with 3-Zero Substitution)

