Chapter 7

Physical Layer and Transmission Media
DIGITAL TRANSMISSION

- A computer network is designed to send information from one point to another.

- This information needs to be converted to either a digital signal or an analog signal for transmission.
Digital-to-Digital Conversion

- represent digital data by using digital signals.
- The conversion involves three techniques: line coding, block coding, and scrambling. Line coding is always needed; block coding and scrambling may or may not be needed.
Line coding and decoding
Polar schemes (Part I: NRZ)

NRZ-L

NRZ-I

No inversion: Next bit is 0

Inversion: Next bit is 1
Polar schemes (Part II: RZ)
Polar schemes (Part III: Manchesters)

Manchester

Differential Manchester

○ No inversion: Next bit is 1  ● Inversion: Next bit is 0
Bipolar schemes: AMI and pseudoternary

![Diagram](image.png)
Analog-to-Digital Conversion

- change an analog signal to digital data because the digital signal is less susceptible to noise.
Components of PCM encoder
Digital-to-Analog Conversion

is the process of changing one of the characteristics of an analog signal based on the information in digital data.
Binary amplitude shift keying

Amplitude

Bit rate: 5

1 signal element 1 signal element 1 signal element 1 signal element 1 signal element

Time

1 s

Baud: 5
Binary frequency shift keying

Amplitude

Bit rate: 5

1 0 1 1 0

1 signal element 1 signal element 1 signal element 1 signal element 1 signal element

1 s

Baud rate: 5
Binary phase shift keying

Amplitude

Bit rate: 5

1 signal element 1 signal element 1 signal element 1 signal element 1 signal element

1 s

Baud: 5