Data Transmission, Modulation & Multiplexing

EE450: Introduction to Computer Networks

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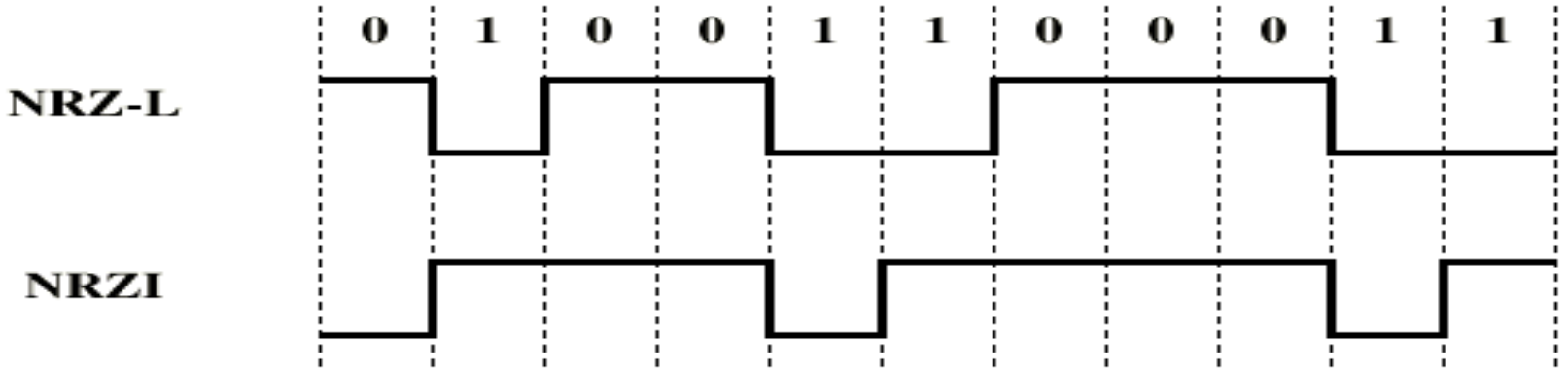
Digital Data/Digital Signals (Line Coding)

- Line coding is the process of encoding the binary string of bits by a digital/discrete-level signal suitable for transmission over the line
- Examples include:
  - NRZ-L : Non-Return-to-Zero Level
  - NRZ-I : Non-Return-to-Zero Inverted
  - Manchester/ Differential Manchester Coding
  - Many others…

NRZ & NRZI

- NRZ: Two different voltages for 0 and 1 bits
- Voltage constant during bit interval
- e.g. Absence of voltage for zero, constant positive voltage for one. More often, negative voltage for one value and positive for the other
- NRZI: Non-return to zero inverted on ones

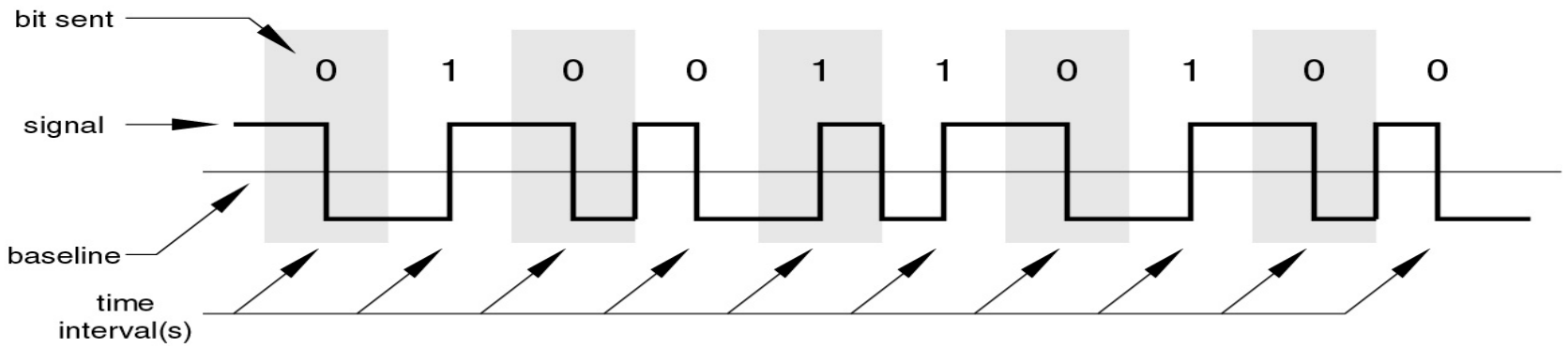


Manchester/Differential Manchester

- Manchester
  - Transition in middle of each bit period
  - Transition serves as clock and data
  - Low to high represents one
  - High to low represents zero
  - Used by IEEE 802.3
- Differential Manchester
  - Mid-bit transition is clocking only
  - Transition at start of a bit period represents zero
  - No transition at start of a bit period represents one
  - Note: this is a differential encoding scheme
  - Used by IEEE 802.5

Manchester/Differential Manchester

Manchester Encoding



Differential Manchester Encoding