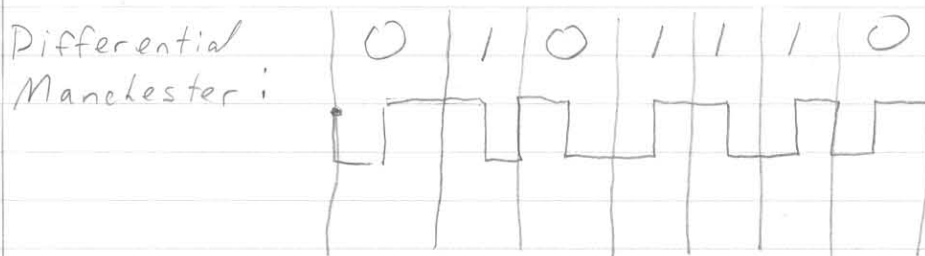
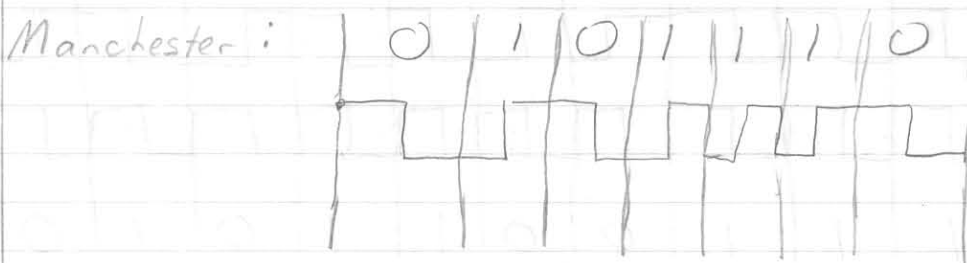
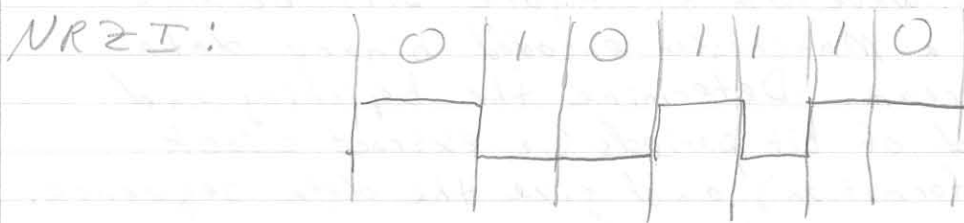
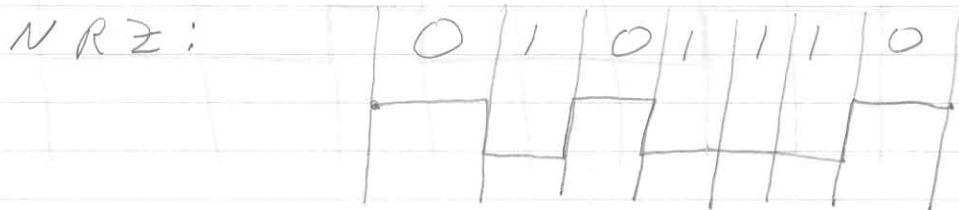


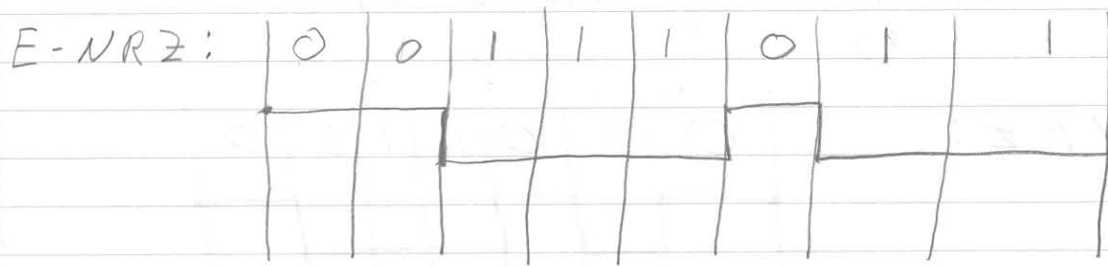
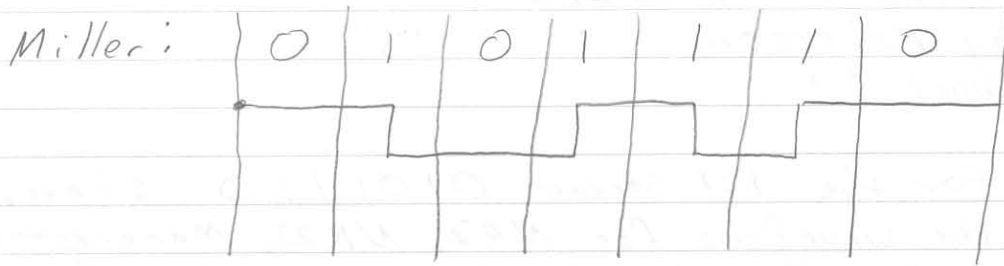
CET 4483- Intro to LAN

Lesley Peterson

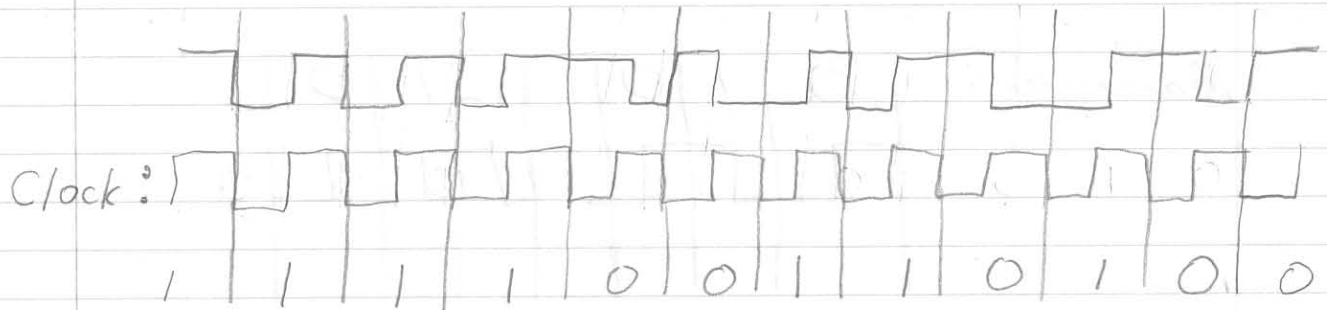
Homework #1

2.3 For the bit stream 0101110, sketch the waveforms for NRZ, NRZI, Manchester and differential Manchester, as well as for Miller coding and E-NRZ.





2.4 The waveform of figure 2.14 belongs to a Manchester encoded binary data stream. Determine the beginning and end of bit periods (ie, extract clock information) and give the data sequence.



- 2.9
- $N$  = Num of hops
  - $L$  = message length in bits
  - $B$  = Data rate (bps)
  - $P$  = Fixed packet size, in bits
  - $H$  = overhead (header) bits per packet
  - $S$  = call setup time (circuit or virtual) in seconds
  - $D$  = Propagation delay per hop in seconds

a) For  $N=4$ ,  $L=3200$ ,  $B=9600$ ,  $P=1024$ ,  $H=16$ ,  $S=0.2$ ,  $D=0.001$ , compute the end-to-end delay for circuit switching, virtual circuit packet switching, and datagram packet switching.

circuit switching:

Delay = Call setup time + Message delivery time

$$\therefore T = C_1 + C_2$$

$$C_1 = S = 0.2 \text{ sec}$$

$$C_2 = \text{Propagation Time} + \text{Transmission Time}$$

$$= (N * D) + \left(\frac{L}{B}\right) = (4 * 0.001) + \left(\frac{3200}{9600}\right)$$

$$= 0.337 \text{ sec}$$

$$\text{Total Delay} = 0.537 \text{ sec.}$$

### Virtual Circuit Packet Switching:

$$V_1 = \text{Call setup time} = 0.2 \text{ sec}$$

$$V_2 = \text{Datagram Packet Switching Time}$$

$$= (L/P) * (H+P) / B + N * D$$

$$= (3200/1024) / 9600 + 4 * 0.001 = 0.343 \text{ sec}$$

$$V_1 + V_2 = 0.2 \text{ sec} + 0.343 \text{ sec}$$

$$= 0.543$$

$$T = 0.543 \text{ sec.}$$

### Datagram Packet Switching:

$$L = 3200, P = 1024, \text{ need 4 packets}$$

$$T = \text{Transmission Time} + \text{Propagation Time}$$

$$= (3200/1024) * (16 + 1024) / 9600 + (4 * 0.001)$$

$$T = 0.343 \text{ sec}$$

b) Derive general expressions for the three techniques of part A

$$\text{Circuit Switching: } T = \text{Setup Time} + \text{Transmit Time} + \text{Propagation Time}$$
$$= S + (N * D) + (L/B)$$

$$\text{VC Packet Switching: } T = \text{Setup Time} + \text{Transmit Time} + \text{Propagation Time}$$
$$= S + (L/P) * (H+P) / B + (N * D)$$

$$\text{Datagram Packet Switching: } T = \text{Transmit Time} + \text{Propagation Time}$$
$$= (L/P) * (H+P) / B + (N * D)$$