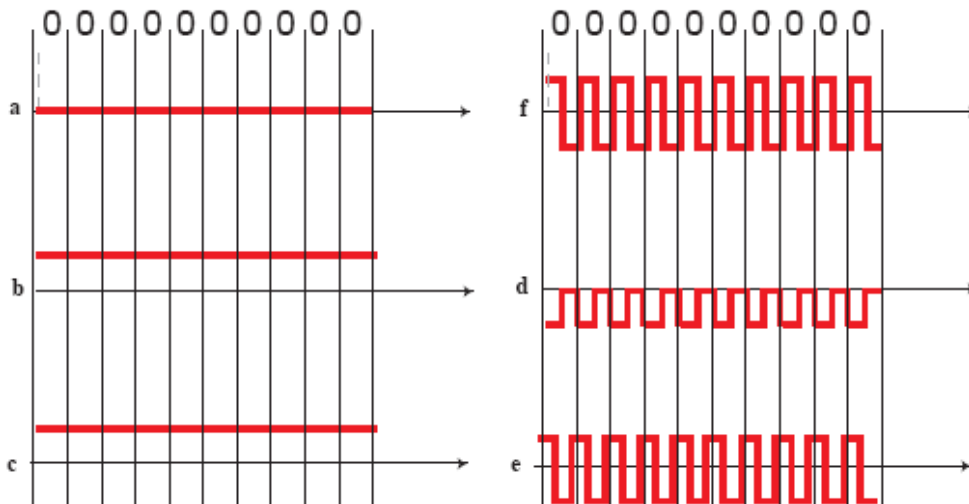


Review Question 2
due to 6/3

1. Assume a data stream is made of ten 0s. Encode this stream using the following encoding schemes. How many changes (vertical line) can you find for each scheme?
 - a. unipolar
 - b. polar NRZ-L
 - c. polar NRZ-I
 - d. RZ
 - e. Manchester
 - f. differential Manchester

Ans:



2. We measure the performance of a telephone line (4 kHz of bandwidth). When the signal is 10 V, the noise is 5 mV. What is the maximum data rate supported by this telephone line?

Ans:

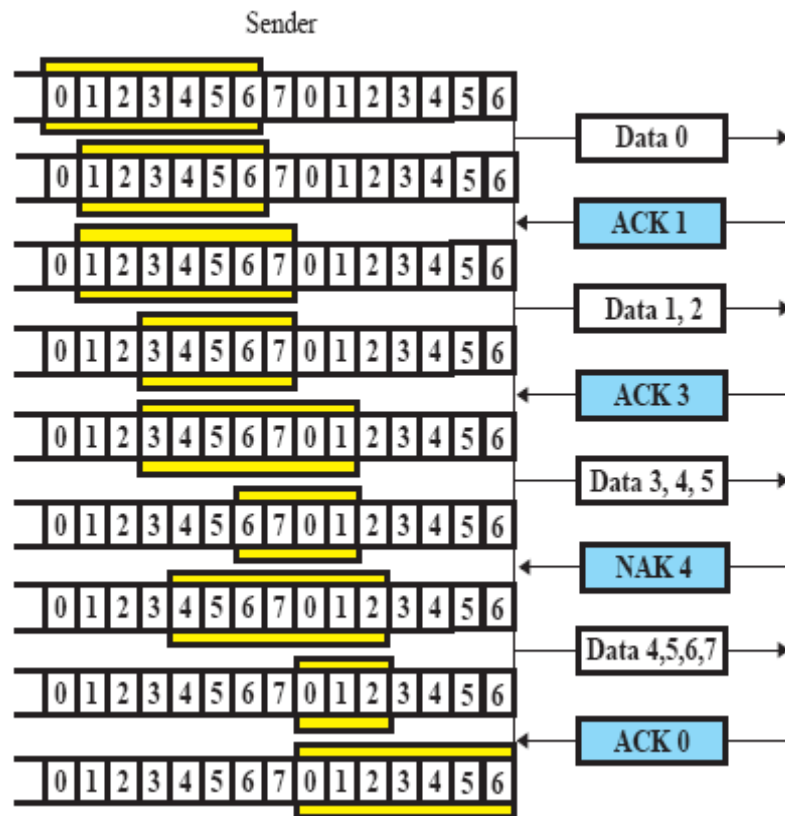
$$4,000 \log_2 (1 + 10 / 0.005) = 43,866 \text{ bps}$$

3. Given a 10-bit sequence 1010011110 and a divisor of 1011, find the CRC. Check your answer.

Ans: 001

4. Draw the sender and receiver windows for a system using go-back-n ARQ given the following:
- a. Frame 0 is sent; frame 0 is acknowledged.
 - b. Frames 1 and 2 are sent; frame 1 and 2 are acknowledged.
 - c. Frames 3, 4, and 5 are sent; NAK 4 is received.
 - d. Frame 4, 5, 6, and 7 are sent; frames 4 through 7 are acknowledged.

Ans:



5. Repeat Question 4 using selective-reject ARQ.

Ans:

