MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Aeronautics and Astronautics

16.36: Comm. Sys. Engineering — Date Issued: April 17
Problem Set No. 8 — Date Due: April 29

Problem 1

Suppose a cyclic code with generator string 11001, is used to generate a CRC.

A) Suppose the data sequence is 110101, what should the CRC be?

B) Suppose you receive the sequence 1001111, did any errors occur?

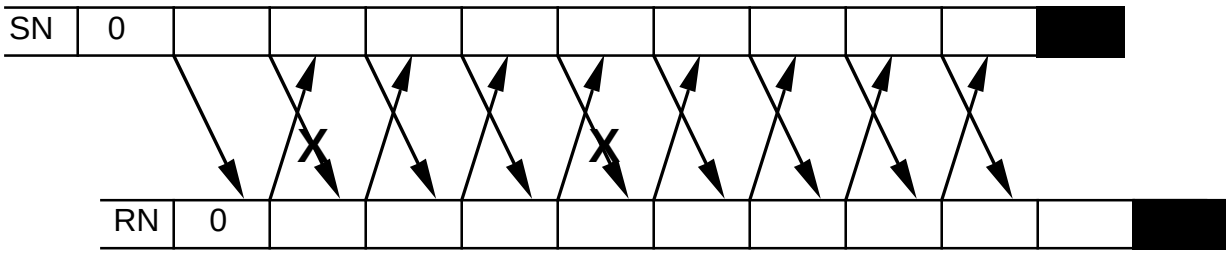
C) Find the generator matrix for the (7,3) block code based on the above generator. (note that a (7,3) code has 3 information bits and 4 check bits).

D) Using the generator matrix from above, generate all 8 codewords for this code. What is the minimum distance of the code?

Problem 2

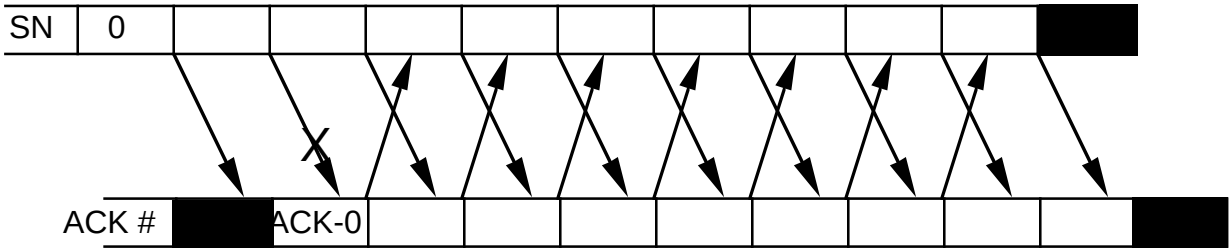
A) For the diagram below, suppose you are using the Go Back N protocol (with N=3) and indicate, in the space provided, the sender's sequence numbers (SN) and the receivers request numbers (RN). The first RN and SN are 0 and 0 as indicated in the diagram. (X => lost packet)

What modulo will you use to number the packets?



B) Suppose, now, that you are using the SRP with window size 4. In the diagram below indicate the sender's sequence numbers (SN) and the receiver ACK numbers. The first packet has sequence number 0, and it is acknowledged by ACK-0.

What modulo will you use to number the packets?



Problem 3:

You have to design a satellite transmission link where two nodes communicate through a satellite. The distance between the two nodes through the satellite is 60,000 miles. The packets and acknowledgments are 1000 bits long. The transmission rate is 100Kbs. The link is full duplex and you propose to use Go Back N retransmission. What window size would you recommend using?

Problem 4:

In class I said that for go back N, packets must be numbered modulo N+1. Can you give an example in which go back n fails if the packets are numbered modulo N (use N=3).