EE3009 Tutorial 10

(Stop-and-Wait, Selective-Repeat, Error Detection & Correction)

Problems

1. Consider the stop-and-wait protocol. Draw a diagram showing that if the network connection between the sender and receiver can reorder messages (that is, that two messages propagating in the medium between the sender and receiver can be reordered), then the protocol will not work correctly.

2. Consider the Selective-Repeat protocol. Suppose the sequence number space is of size k. What is the largest allowable sender window that will avoid the occurrence of problems in the lecture notes?

3. Suppose the information content of a packet is the bit pattern 1010101010101011 and an even parity scheme is being used. What would the value of the error checking field be for the case of a two-dimensional parity scheme? (Put the information bits into a 4×4 array.)

4. Suppose a transmission channel operates at 3 Mbps and has a bit error rate of 10^{-3}. Bit errors occur at random and independent of each other. Suppose that the following code is used. To transmit a 1, the codeword `111` is sent; to transmit a 0, the codeword `000` is sent. The receiver takes the three received bits and decides which bit was sent by taking the majority vote of the three bits. Find the probability that the receiver makes a decoding error.

5. Consider the use of (7, 4) Hamming code. If the received codeword is `1001010`, what are the decoded data bits?