

Chapter 3 Assignments

1. A bit stream 10011101 is transmitted using the standard CRC method described in the text. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. Give an example of bit errors in the bit string transmitted that will not be detected by the receiver.
2. A channel has a bit rate of 4 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop-and-wait give an efficiency of at least 50 percent?
3. Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to the stationary satellite evolving around the Earth at 3×10^4 km altitude. Assuming that each frame carries 1 kB of data, what is the minimum number of bits you need for the sequence number in the following cases? Assume the speed of light is 3×10^8 meters per second.
 - (a) Receive Window Size = 1.
 - (b) Receive Window Size = Send Window Size.
4. Suppose that we run the sliding window algorithm with $SWS = 5$ and $RWS = 3$, and no out-of-order arrivals.
 - (a) Find the smallest value for $MaxSeqNum$. You may assume that it suffices to find the smallest $MaxSeqNum$ such that if $DATA[MaxSeqNum]$ is in the receive window, then $DATA[0]$ can no longer arrive.
 - (b) Give an example showing that $MaxSeqNum - 1$ is not sufficient.
 - (c) State a general rule for the minimum $MaxSeqNum$ in terms of SWS and RWS .