CSE3213 Communication Networks, Winter 2010
Section: M
Instructor: Foroohar Foroozan

Time Allowed: **15 minutes**

Quiz 3

Student Name: _____

Student Number: _____

1. Error Detection [1 point]

To provide more reliability than the Single Parity Bit technique, a new error-detecting scheme has been proposed. The scheme uses one parity bit for checking all the odd numbered bits and a second parity bit for all the even numbered bits. What is the (minimum) Hamming distance of this code? Is this code able to correct errors? Explain!

By making changes to either one even or one odd bit a new dataword will be generated. This change will cause (only) one of the parity bits to be changed. Hence, the minimum Hamming distance of this code is 2. The code still cannot correct any errors. (For correction of 1-bit errors, minimum Hamming distance of 3 is required.

2. Flow Control [2 points]

The Trivial File Transfer Protocol (RFC 1350) is an application layer protocol that uses the Stop-and-Wait protocol. To transfer a file from a server to a client, the server breaks the file into blocks of 512 bytes and sends these blocks to the client using Stop-and-Wait ARQ. Find the efficiency in transmitting a 1 MB file over a 10 Mbps Ethernet LAN that has a diameter of 300 meters. Assume the transmissions are error free and that each packet has 60 bytes of header attached.

The propagation delay in an Ethernet LAN is negligible compared to the total transmission time of a packet from start to finish. Ignoring processing time and using the terminology in the chapter, we have:

$$t_o = t_f + t_{ack} = \frac{8(512+60)}{10\times10^6} + \frac{64}{10\times10^6} = 4.64\times10^{-4}$$

$$\eta_o = \frac{R_{eff}^0}{R} = \frac{\frac{n_f - n_o}{t_o}}{R} = \frac{\frac{8\times512}{4.64\times10^{-4}}}{10\times10^6} = 0.8828 = 88.3\%$$

One more source of overhead occurs because the last packet is not full. However, this additional overhead accounts for a very small fraction of the total overhead and does not affect the above result.