>>> Assignment #4 for Computer Networks (EEL 4781) <<<
Due on 11/03/09 at the beginning of class

This assignment covers material from chapters 4 and 5 of the textbook and as covered in class lecture.

Problem #1

Your professor was "out of town" the week of October 11th participating in the NSF FIND Summit in Arlington, Virginia. What is FIND (in your own words!)? What do you think your professor's contributions/ideas for FIND might be?

Problem #2

Your professor was "out of town" the week of October 18th to give a presentation at the IEEE Conference on Local Computer Networks (LCN). What is the LCN conference? Who goes to conferences such as LCN? Name one major networking technology (hint: it is a standard and you probably use it every day) that has its original root in a conference or journal paper. Find the paper and include a print-out of it with your homework submission.

Problem #3

Fairness and throughput are a trade-off in bandwidth allocation. In class we studied max-min allocation of bandwidth. Assume a 100 Mb/s link and 5 nodes (named A, B, C, D, and E) requesting the following bandwidth, A requests 25 Mb/s, B requests 18 Mb/s, C requests 10 Mb/s, D requests 52 Mb/s, and E requests 30 Mb/s. What is the max-min fair bandwidth allocation for each of the 5 nodes? What other "fair" methods of allocating bandwidth can you think of? Suggest at least one other fair allocation schemes. Explicitly define "fair" for your allocation scheme.

Problem #4

Do problem P4 (a) and (b) (page 425) from the text book.

Problem #5

Do problem P6 (page 426) from the text book (and note that we have been sloppy in class with these terms – now is the time to be precise).

Problem #6

Do problem P8 (page 426) from the text book.

Problem #7

Do problem P24 (page 430) from the text book. You need not show the table (as asked for in the book), it is sufficient to just show the order in which nodes are added.

Problem #8

Assume asynchronous transmission with 1 start bit and 2 stop bits per word. Assume that the link has a bit error rate (where bit errors are independent) of $p = 0.0015$. Odd parity (single parity bit) is used as the error detection mechanism. To simplify matters, assume that start and stop bits are never in error. Answer the following questions:

a) If we want a success rate of 99% (that is, 99% of transmitted words arrive without error for a large number of words transmitted), what is the maximum number of data bits a single data word can contain?

b) If a word contains 5 data bits, what is the probability of receiving a word with an undetectable error?

c) If a word contains 5 data bits, what is the probability of receiving a word that "checks out as good" (that is, has odd parity)?

Note:

The TA and I are here to help you! Make use of help if you need it.