Computer Network Assignment6

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P2: We have an initial two-dimensional parity matrix like this:

0 0 0 0

1 1 1 1

0 1 0 1

1 0 1 0

If we have a bit error in row 2, column 3, the parity of row 2 and column3 is both wrong in the following matrix for they have an odd number of 1s. We can detect the error's existence and know the position is row 2, column 3 and correct it.

0 0 0 0

1 1 0 1

0 1 0 1

1 0 1 0

However, if two bits have errors, for example, a bit error in row 2, column 2 and column 3, like the following:

0 0 0 0

1 0 0 1

0 1 0 1

1 0 1 0

We can detect the error because the parity of column 2 and column 3 is wrong. But we can find the accurate error position and correct it for every row is right in parity.

P6:

a) We get 1000110000, with a remainder of R=0000.

b) We get 0101010101, with a remainder of R=1111.

c) We get 1011010111, with a remainder of R=1001.

P10:

a) A's average throughput is given by $p_A(1-p_B)$, Total efficiency is $p_A(1-p_B)+p_B(1-p_A)$.

b) A's throughput is $p_A(1-p_B)=2p_B-2p_B^2$,

B's throughput is $p_B(1-p_A)=p_B-2p_B^2$,

We can see that A's throughput is not twice as large as B's.

To make A's throughput is twice as large as B's, we need $p_A=2-(p_A/p_B)$.

c) A's throughput is $2p(1-p)^{N-1}$,and other nodes have throughput $p(1-p)^{N-2}(1-2p)$.

P13:

The length of a polling round is $N(Q/R+d_{poll})$.

The maximum throughput therefore is $NQ/(N(Q/R+d_{poll}))=RQ/(Q+d_{poll}R)$

P17:

For 10 Mbps, the wait is $51.2*10^3$bits/$10^7$bps=5.12msec

For 100 Mbps broadcast channel, the wait is 512 usec.