Hamming Gode min value of k' panty bits required are

 $2^k > n + k + 1$ 

n is number of bits in message

k is number of panty bits.

.. Number of bits in Hamming Code are manage, n+k, de la la continue

Let us find Hamming code for message

d4 d3 d2 d1 1000

Find number of Party bits.

2 × > n + k+1

2k > 4 + k+1

: IR K=1 2 > 6 X K=2 4 > 7

k=3 8 7 7 V

So correct value of k=3

party bits required one Pi, Pz, Ps

:. 7 bit hamming code is 7654321 d4 d3 d2 P3 d1 P2 P1 = 100 P3 0 P2 P1

61 = 93 @ 92 @ 92 = 0 @ 0 @ 1 = 5

P2 = d3 1 d8 + d7 = 0 1 0 1 = 1

P4=d5 1 d6 1 d7 = 0 1 0 1 = 1

## Hamming Gde = 1001011

## Boroor Correction

d d c a o c .

If 1001011 is bransmitted

and 1001111 is received

76,54321

1 bit error

Check bit  $C_1 = D_1 \oplus D_3 \oplus D_5 \oplus D_7 = 1 \oplus 1 \oplus 0 \oplus 0 \oplus 1$ Check bit  $C_2 = D_2 \oplus D_3 \oplus D_6 \oplus D_7 = 1 \oplus 1 \oplus 0 \oplus 1 = 1$ Check bit  $C_4 = D_4 \oplus D_5 \oplus D_6 \oplus D_7 = 1 \oplus 0 \oplus 0 \oplus 1 \oplus 1$ 

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Hamming Code is Error Detection & correction code.

Let n be the number of bits in message

k, be the number of panty bits to be added.

Number of bits to be added one given by formulae.

## $2^{k} > n + k + 1$

Let us say you want to transmit 4 bits of data.

... no of party bits required are 3.

os  $2^k > n + k + 1$ Pro k = 3 equation gets satisfied.

We have to And minimum value of k.

So representation for Hamming . Code Data will ...

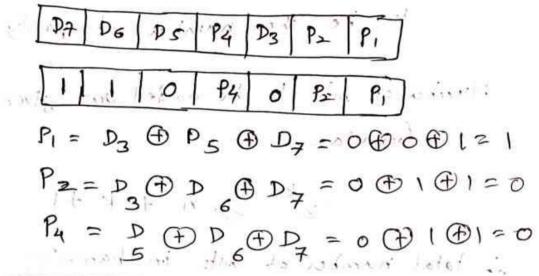
D7 D6 D5 P4 D3 P2 P1

where D7, D6, D5, D4 are data bits. b4 b3 b2 b1
P4, P2, P1 are Parity Bits.

Py = D5 + D6 + D7 = P2 = D3 + D6 + D7 = P1 = D3 + D5 + D7 = Suppose Dala lo be bounsmitted, is

100

Put in bornat.



D7 D6 , D5 P4 D3 P2 P1

Calculate check bits.

$$C_{4} = P_{4} \bigoplus P_{5} \bigoplus P_{6} \bigoplus P_{7}$$

$$= 0 \bigoplus P_{1} \bigoplus P_{5} \bigoplus P_{7} \bigoplus P_{7}$$

$$C_{2} = P_{2} \bigoplus P_{5} \bigoplus P_{5} \bigoplus P_{7} \bigoplus P_{7}$$

$$C_{1} = P_{1} \bigoplus P_{5} \bigoplus P_{5} \bigoplus P_{7} = 0$$

$$C_{1} = P_{1} \bigoplus P_{5} \bigoplus P_{5} \bigoplus P_{7} = 1$$

$$= 1 \bigoplus O \bigoplus P_{5} \bigoplus P_{7} = 1$$

$$= 1 \bigoplus O \bigoplus P_{5} \bigoplus P_{7} = 1$$

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