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Question-11

Let us Consider the 7-bit hamming code has bits to 7 as shown in the below

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
d7	d6	d5	P_4	d3	P2	P1

Here Bit 1, Bit 2, and Bit 4 are the parity bits and remaing all the data bits.

Here Parity bit P_1 Covers bit 1, bit 3, bit 5, bit 7

Parity bit P_1 Covers bit 2, bit 3, bit 6, bit 7

parity bit P_4 Covers bit 4, bit 5, bit 6, bit 7

Number 0 is 0000 in binary

d3 = 0, d5 = 0, d6 = 0, d7 = 0

Since d3 = 0, d5 = 0, d7 = 0, so Parity bit $P_1 = 0$

Since d3 = 0, d6 = 0, d7 = 0, so Parity bit $P_2 = 0$

Since d5 = 0, d6 = 0, d7 = 0, so Parity bit $P_4 = 0$

Hamming Code is 0000111

Number 2 is 0010 in binary

d3 = 0, d5 = 1, d6 = 0, d7 = 0

Since d3 = 0, d5 = 1, d7 = 0, so Parity $P_1 = 1$

Since d3 = 0, d6 = 0, d7 = 0, so Parity $P_2 = 0$

Since d5 = 1, d6 = 0, d7 = 0, so parity $P_4 = 1$

Hamming Code is 0011001

Number 3 is 0011 in binary

$d3=1, d5=1, d6=0, d7=0$

Since $d3=1, d5=1, d7=0$, so parity $P_1=0$

Since $d3=1, d6=0, d7=0$, so Parity $P_2=1$

Since $d5=1, d6=0, d7=0$, so Parity $P_4=1$

Hamming Code is 0011110

Number 4 is 0100 in binary

$d3=0, d5=0, d6=1, d7=0$

Since $d3=0, d5=0, d7=0$, so parity $P_1=0$

Since $d3=0, d6=1, d7=0$, so parity $P_2=1$

Since $d5=0, d6=1, d7=0$, so parity $P_4=1$

Hamming Code is 0101010

Result:

Number	Binary	Hamming Code
0	0000	0000000
1	0001	0000111
2	0010	0011001
3	0011	0011110
4	0100	0101010