

Solution Quiz#4

Question

Find the Error Correction Code (Hamming Code) of 8 bits data.

The 8 bits data is created by using the alphabet sequence number of first letter of student's name. For example, if name is Hammad, then first letter is H which is 8th character of English alphabet. So, the data bits are: 08 = 0000 1000

Solution

Bit Position	12	11	10	9	8	7	6	5	4	3	2	1
Position Number	1100	1101	1100	1001	1000	0111	0110	0101	0100	0011	0010	0001
Data Bit	D8	D7	D6	D5		D4	D3	D2		D1		
Check Bit					C8				C4		C2	C1
Word Stored as	0	0	0	0		1	0	0		0		

Note: I am using "+" sign to depict Exclusive OR.

$$\begin{aligned}C1 &= D1 + D2 + D4 + D5 + D7 \\&= 0 + 0 + 1 + 0 + 0 = 1\end{aligned}$$

$$\begin{aligned}C2 &= D1 + D3 + D4 + D6 + D7 \\&= 0 + 0 + 1 + 0 + 0 = 1\end{aligned}$$

$$\begin{aligned}C4 &= D2 + D3 + D4 + D8 \\&= 0 + 0 + 1 + 0 = 1\end{aligned}$$

$$\begin{aligned}C8 &= D5 + D6 + D7 + D8 \\&= 0 + 0 + 0 + 0 = 0\end{aligned}$$

Therefore, 4 bit code is: 0111