Subject: DLCA **SEM: III**

Decimal	Binary	BCD	Excess - 3	Gray
0	0000	0000	0011	0000
1	0001	0001	0100	0001
2	0010	0010	0101	0011
3	0011	0011	0110	0010
4	0100	0100	0111	0110
5	0101	0101	1000	0111
6	0110	0110	1001	0101
7	0111	0111	1010	0100
8	1000	1000	1011	1100
9	1001	1001	1100	1101
10	1010	0001 0000	1101	1111
11	1011	0001 0001	1110	1110
12	1100	0001 0010	1111	1010
13	1101	0001 0011	0000	1011
14	1110	0001 0100	0001	1001
15	1111	0001 0101	0010	1000

· Excess-3 Code (Non-Weighted Code)

This is a four bit code which can be derive from the BCD code by adding $(3)_{10}$ i.e $(0011)_2$ to each coded no.

Ex :- $(246)_{10} = (?)_{Ex-3}$

2	4	6
0010	0100	0110
+ 0011	0011	0011
0101	0111	1001

OR

2	4	6
+ 3	3	3
5	7	9

$= 0101\ 0111\ 1001$

$\therefore (246)_{10} = (0101\ 0111\ 1001)_{Ex-3}$

Gray Code :- (Non-Weighted Code)

→ It is not an arithmatic code.

→ Only one bit changes at a time, the decimal no is incremented by 1. So also called as unit distance code.

A ⊕ B	Gray
0 0	0
0 1	1
1 0	1
1 1	0

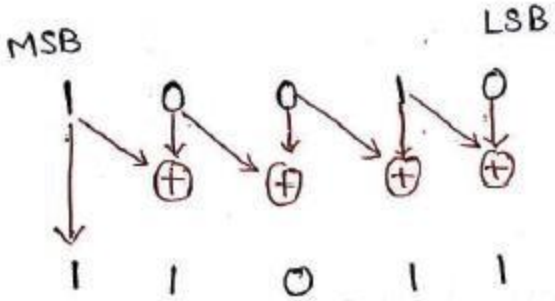
i) To Convert Binary to Gray

ii) → Gray to Binary.

① Binary to Giray

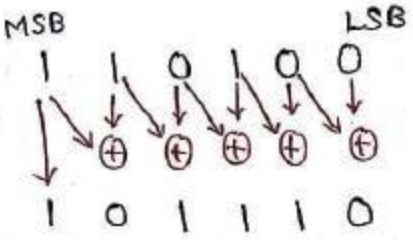
1) Record MSB as it is
2) Add this bit to next position using 'x' or MOD 2 addition. neglecting Carry.
3) Record sum until completed

Ex 1:- $(10010)_2$ into gray.



$= (11011)_{gray}$.

2] $(110100)_2 \rightarrow$ gray.



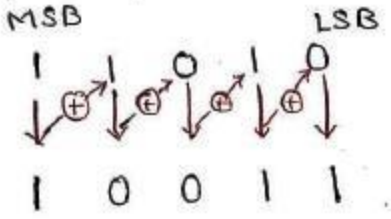
$= (101110)_{gray}$.

③ (1011) to gray.

(2) Gray to Binary

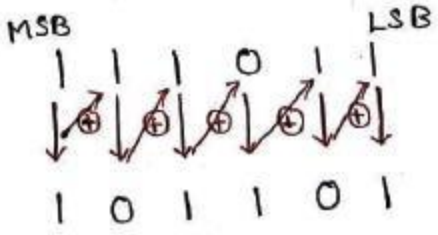
1) MSB of gray & Binary are same so write directly.
2) Add each binary digit generated to gray digit. Record result & ignore carry.
3) Continue the process till LSB.

Ex 1) $(11010)_{gray} = (?)_2$



$= (10011)_2$

2] $(111011)_{gray} = (?)_2$



$= (101101)_2$