



Subject: DLCA

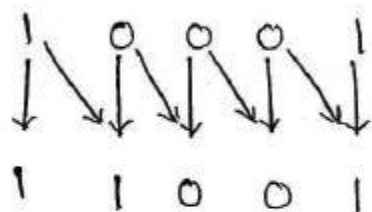
SEM: III

3> Convert $(17)_{10}$ to gray

i) convert $(17)_{10}$ into binary

$$(17)_{10} = (10001)_2$$

ii) Convert $(10001)_2$ into gray.



$$\therefore (17)_{10} = (11001)_{\text{gray}}$$

Code Conversions.

1> Binary to BCD

2> BCD to Binary

3> BCD to Excess-3

4> Excess-3 to BCD.

1] Binary to BCD Conversion.

Step 1 :- convert Binary no. to decimal

2 :- convert decimal no. into BCD.



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Ex 1) $(110101)_2 = (?)_{BCD}$

i) binary to decimal

$$\begin{aligned}(110101)_2 &= 2^5 + 2^4 + 2^2 + 2^0 \\ &= 32 + 16 + 4 + 1 \\ &= (53)_{10}\end{aligned}$$

ii) decimal to BCD

$$\begin{array}{cc} 5 & 3 \\ 0101 & 0011 \end{array}$$

$$\therefore (110101)_2 = (0101\ 0011)_{BCD}$$

2) BCD to Binary

Step 1:- convert BCD to decimal

2:- convert decimal to binary.

① $(0101\ 0011)_{BCD} = (?)_2$

i) BCD to decimal

$$0101\ 0011$$

$$5\quad 3$$

$$= (53)_{10}$$

$$\therefore (0101\ 0011)_{BCD} = (110101)_2$$

ii) decimal to binary

$$\begin{array}{r|l} 2 & 53 \\ \hline 2 & 26 \\ \hline 2 & 13 \\ \hline 2 & 6 \\ \hline 2 & 3 \\ \hline & 1 \end{array}$$

$$= (110101)_2$$





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3) BCD to excess-3.

$$\text{Ex 1) } (0101\ 0011)_{\text{BCD}} = (?)_{\text{Ex-3}}$$

$$\begin{array}{r} \text{BCD} \quad 0101\ 0011 \\ \text{Add } (0011) \quad \underline{0011\ 0011} \\ \hline 1000\ 0110 \end{array}$$

$$\therefore (0101\ 0011)_{\text{BCD}} = (1000\ 0110)_{\text{Ex-3}}$$

4) Excess-3 to BCD.

* Subtract $(0011)_2$ from each 4 bit excess-3 digit to get BCD code.

$$\text{Ex 1) } (1001\ 1010)_{\text{Ex-3}} = (?)_{\text{BCD}}$$

$$\begin{array}{r} \text{Ex-3 code} \quad 1001\ 1010 \\ \text{Sub } (0011)_2 \quad \underline{0011\ 0011} \\ \hline 0110\ 0111 \end{array}$$

9	10
- 3	3
6	7

$$\therefore (1001\ 1010)_{\text{Ex-3}} = (0110\ 0111)_{\text{BCD}}$$



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Example :- Convert the following binary code into excess-3 & gray code. $(10110.101)_2$

→ i) $(10110.101)_2 \rightarrow (?)_{XS}$

Convert binary to decimal

$$= 2^4 + 2^2 + 2^1 + 0 + 2^{-1} + 2^{-3}$$

$$= 22 + \frac{1}{2} + \frac{1}{8}$$

$$= \frac{181}{8}$$

$$= (22.625)_{10}$$

Convert decimal to XS-3

$$\begin{array}{r} 22.625 \\ + 3.375 \\ \hline 25.000 \end{array}$$

in BCD

$$\begin{array}{r} 0010 \ 0010 \cdot 0110 \ 0010 \ 0101 \\ + \ 0011 \ 0011 \ 0011 \ 0011 \ 0011 \\ \hline 0101 \ 0101 \cdot 1001 \ 0101 \ 1000 \end{array}$$

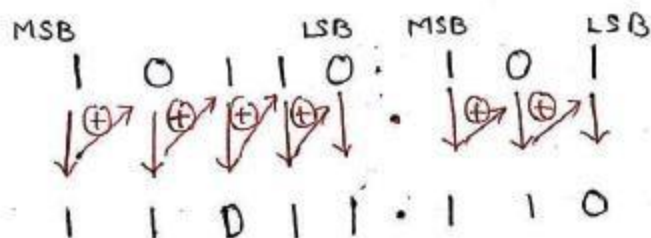
∴ $(10110.101)_2 = (0101 \ 0101 \cdot 1001 \ 0101 \ 1000)_{XS-3}$



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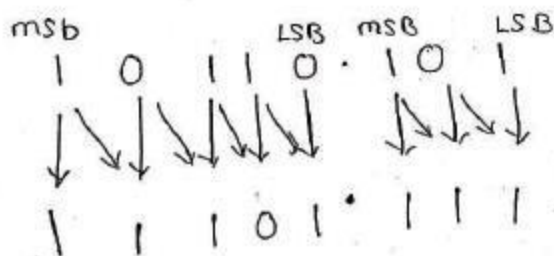
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* Q. $(10110.101)_{\text{gray}} = (?)_{\text{binary}}$



$\therefore (10110.101)_{\text{gray}} = (11011.110)_{\text{binary}}$

) $(10110.101)_2 = (?)_{\text{gray}}$



$= (11101.111)_{\text{gray}}$