

→ Complements :-

→ $(r-1)'s$
→ $r's$

1) Binary $\begin{cases} 1's \\ 2's \end{cases}$

2) Decimal $\begin{cases} 9's \\ 10's \end{cases}$

3) Octal $\begin{cases} 7's \\ 8's \end{cases}$

4) Hexadecimal $\begin{cases} F's \\ 16's \end{cases}$

→ $(r-1)'s$ Complement

↳ Subtract max. No. to the given no

Prob-1 → $1010 \rightarrow (r-1)'s$

$$\begin{array}{r} 1010 \\ - 1111 \\ \hline 0101 \end{array} \rightarrow$$

Prob → $101101 \rightarrow (r-1)'s$ Comp.?

$$\begin{array}{r} 111111 \\ - 101101 \\ \hline 010010 \end{array} \rightarrow (r-1)'s \text{ Comp.}$$

↳ $9's (r-1)'s \rightarrow 2679 \rightarrow (r-1)'s$ Comp.?

$$\begin{array}{r} \text{max. } 9999 \\ - 2679 \\ \hline 7320 \end{array} \rightarrow 9's \text{ complement}$$

* 8's Complement :-

↳ (8-1)'s Complement

↳ Add +1

prob-1 → $10100 \rightarrow 2's \text{ Complement ?}$

I → 1's Complement

11111

-10100

$\hline 01011 \rightarrow 1's \text{ Complement}$

+1

II

$\hline 01100 \rightarrow 8's \text{ or } 2's \text{ Complement}$

prob-2

→ $5690 \rightarrow \text{Calculate its } 10's \text{ Complement ?}$

I → $9999 \leftarrow \text{max}$

-5690

$\hline 4309$

$\rightarrow 9's \text{ Complement}$

+1

II

$\hline 4310$

$\rightarrow 10's \text{ Complement}$

* Codes → BCD

Excess-3 Code

8421 Code

Dec

BCD

Excess-3-Code

0

0000

0011

1

0001

0100

2

0010

0101

3

0011

0110

4

0100

0111

5

0101

1000

6

0110

1001

7

0111

1010

8

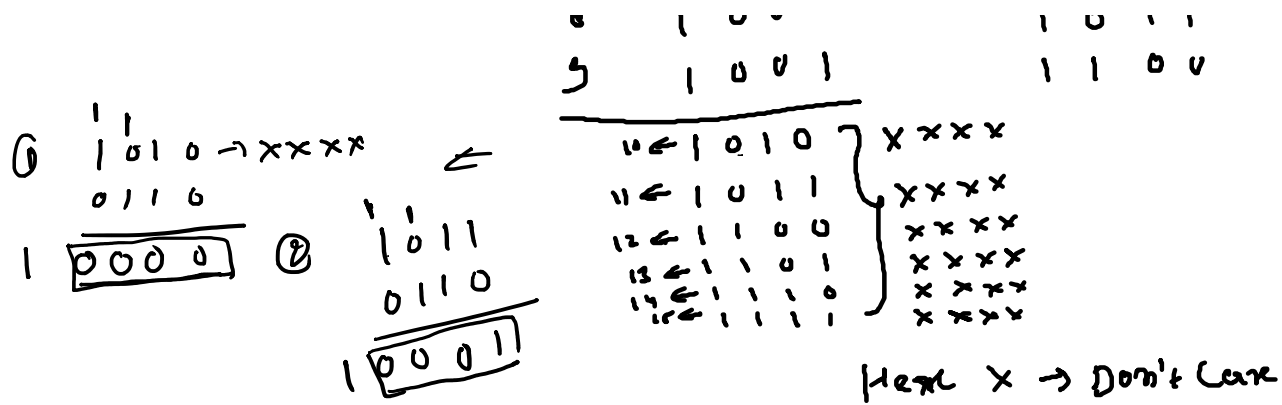
1000

1011

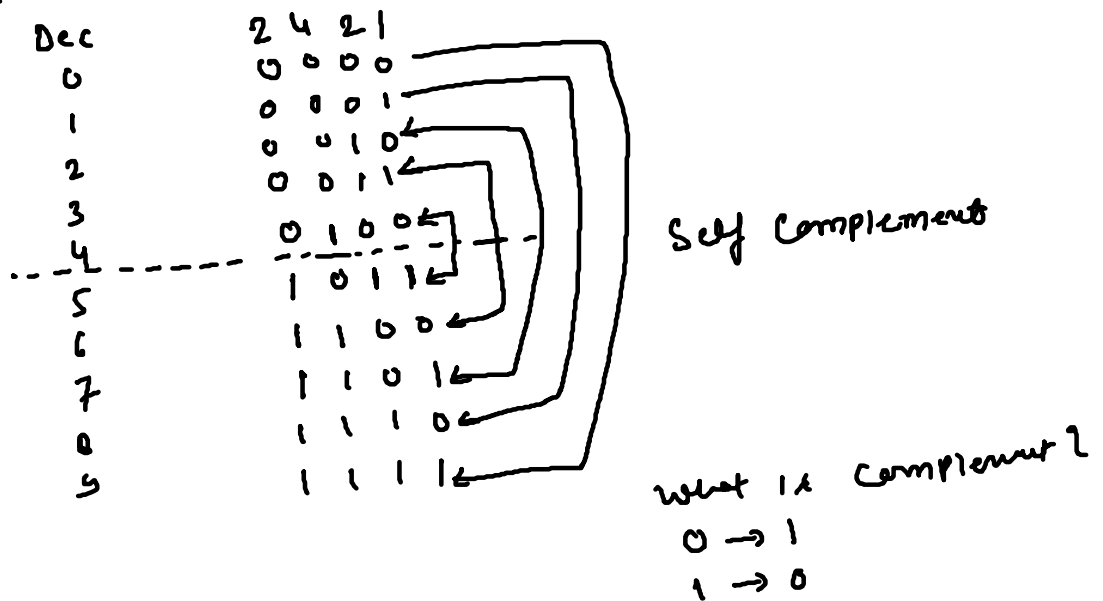
9

1001

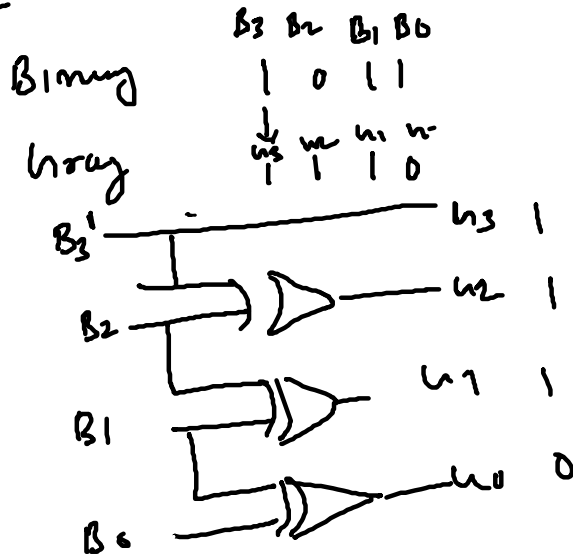
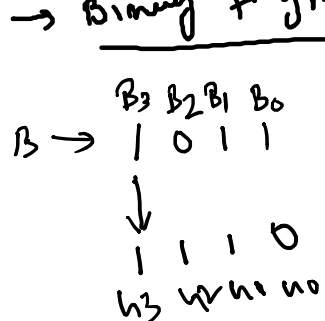
1100



→ 2-4-2-1 Code

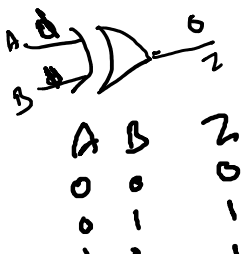


→ Binary to gray Code:-



X - or

Same bit → 0
diff. bit → 1



$(1011)_2 = (1110)_4$

0 0 0
1 1 1
1 1 0



$$(1011)_2 = 110_{10}$$

Gray to Binary

$$\begin{array}{cccc} u_3 & u_2 & u_1 & u_0 \\ 1 & 1 & 1 & 0 \\ \downarrow & & & \\ 1 & 0 & 1 & 1 \\ B_3 & & & \end{array}$$

$$(1110)_u = (1011)_B$$

$$\begin{array}{cccc} \text{Exp-} & u_3 & u_2 & u_1 & u_0 \\ & 1 & 1 & 1 & 0 \\ & \downarrow & & & \\ & B_3 & B_2 & B_1 & \end{array}$$

$$\begin{array}{c} B_1 \\ 1 \oplus 1 \\ 0 \oplus 1 \\ 1 \oplus 1 \\ 0 \oplus 1 \end{array}$$

