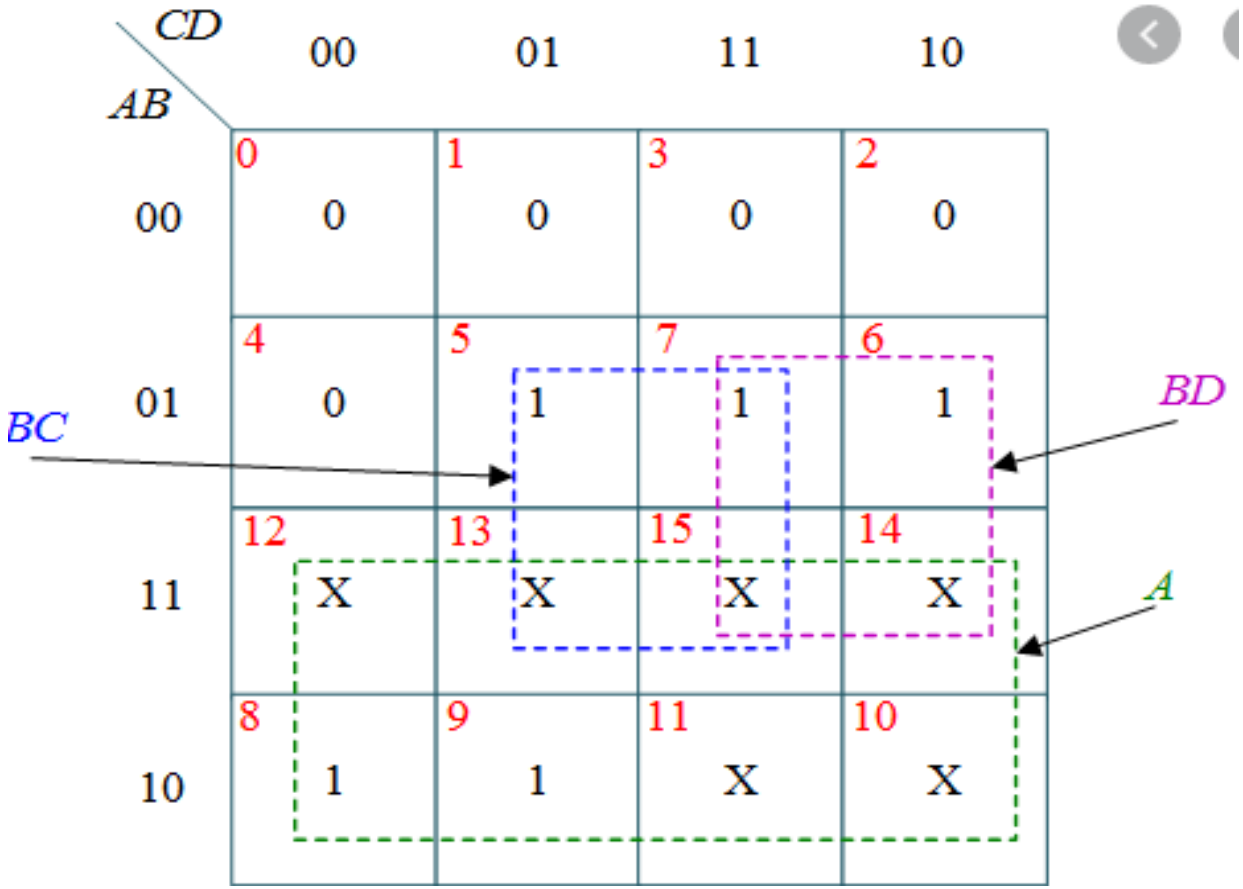
Code Converters

Excess 3

- It is a non weighted code.
- In XS-3, numbers are represented as decimal digits, and each digit is represented by four bits as the digit value plus 3 (the "excess" amount).
- The primary advantage of XS-3 coding over non-biased coding is that a decimal number can be nines' complemented as easily as a binary number can be ones' complemented . In addition, when the sum of two XS-3 digits is greater than 9, the carry bit of a four bit adder will be set high.

	BCD Input				Excess 3 Output			
Decimal	A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	1	1
1	0	0	0	1	0	1	0	0
2	0	0	1	0	0	1	0	1
3	0	0	1	1	0	1	1	0
4	0	1	0	0	0	1	1	1
5	0	1	0	1	1	0	0	0
6	0	1	1	0	1	0	0	1
7	0	1	1	1	1	0	1	0
8	1	0	0	0	1	0	1	1
9	1	0	0	1	1	1	0	0
10-15	All other inputs				X	X	X	X


CD
AB
00
01
11
10
0
0
1
0
3
0
2
0
4
0
5
1
7
1
6
1
12
X
13
X
15
X
14
X
8
1
9
1
11
X
10
X
BC
BD
A

BCD TO EXCESS 3 CODE CONVERTER

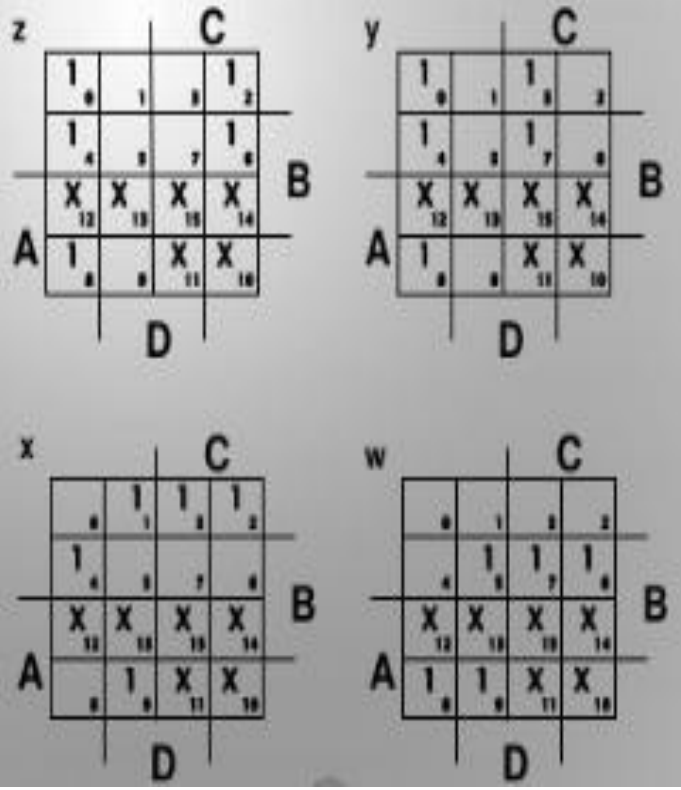
- OPTIMIZATION
  - USING 16 BLOCK K-MAP

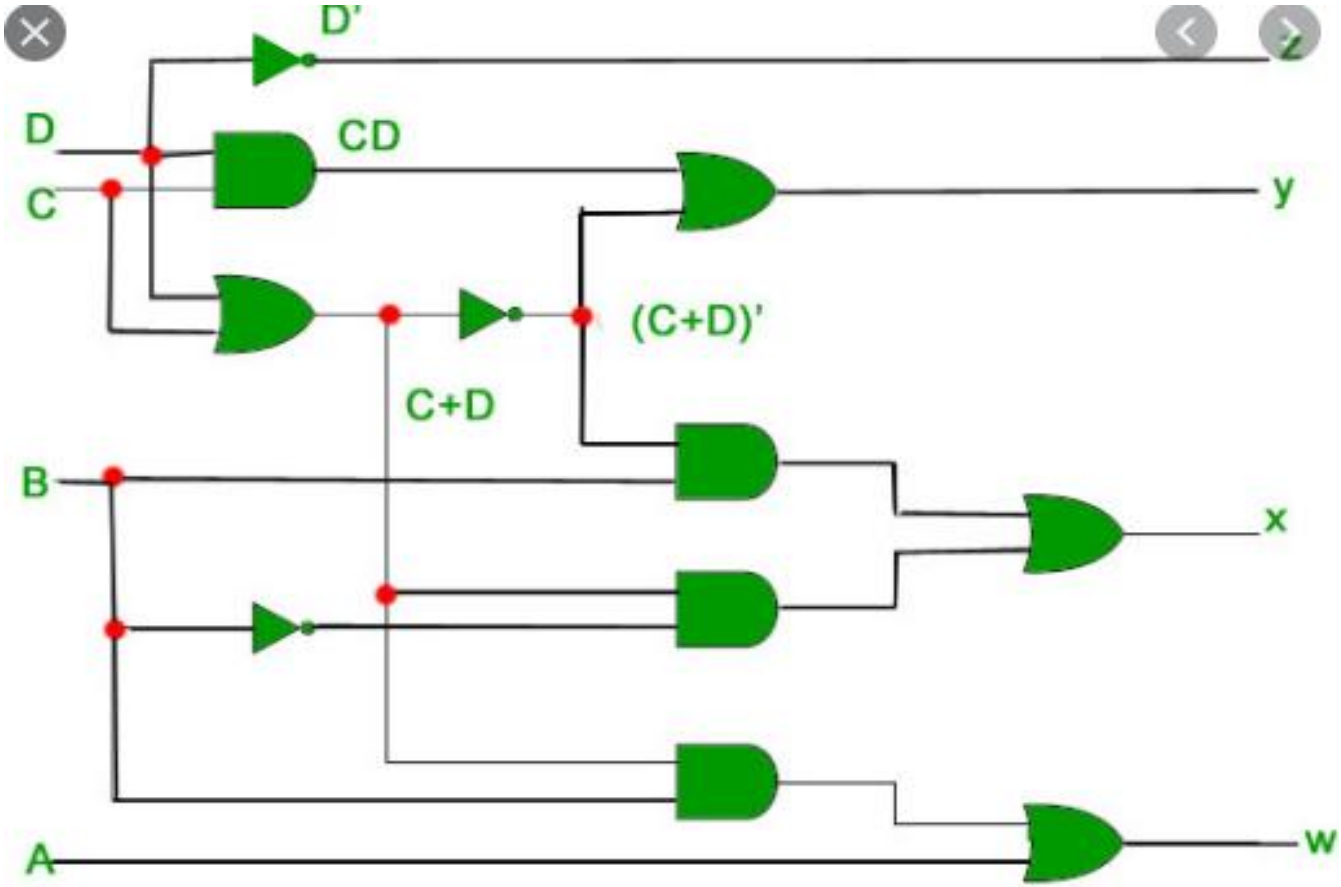
$$W = A + BC + BD$$

$$X = \bar{B}C + \bar{B}D + B\bar{C}\bar{D}$$

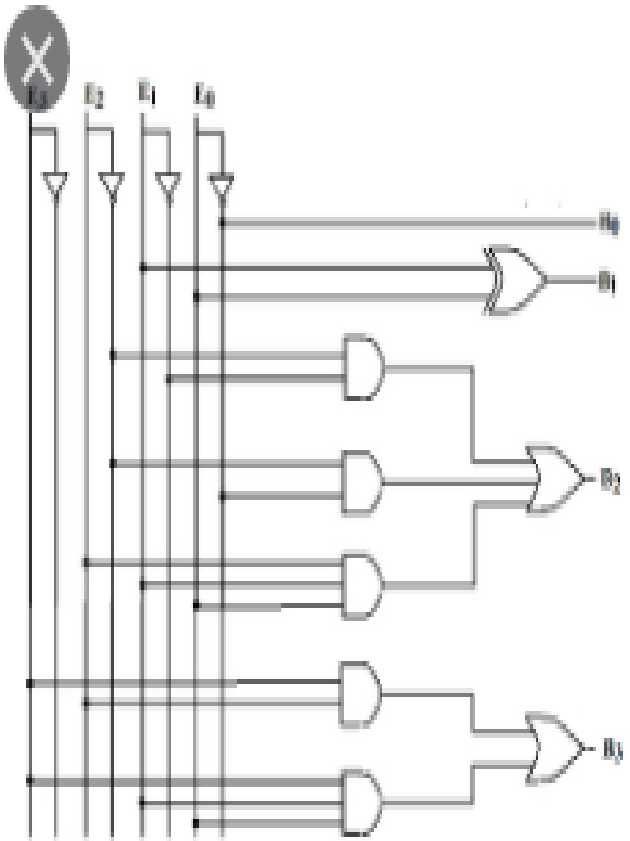
$$Y = C\bar{D} + \bar{C}\bar{D}$$

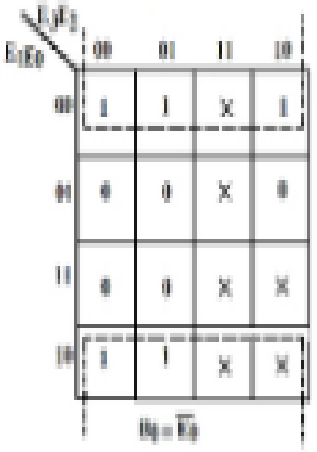
$$Z = \bar{D}$$

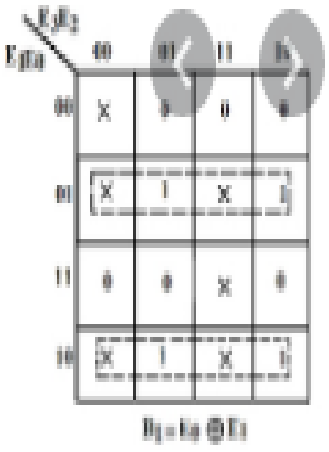


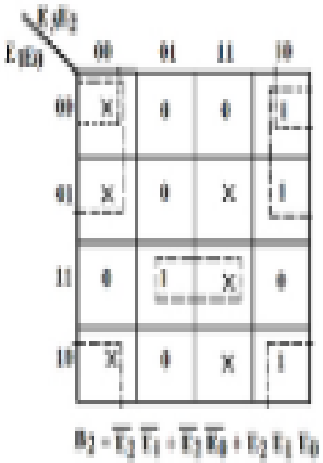

D'
D
CD
C
y
(C+D)'
C+D
B
x
A
w

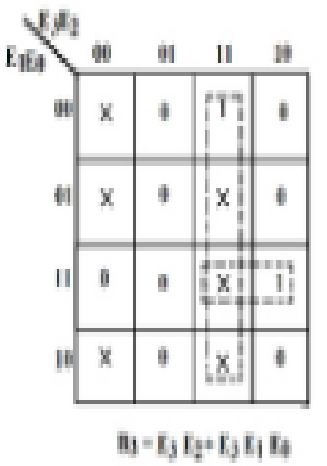
EXCESS-3 INPUT				BCD OUTPUT			
E3	E2	E1	E0	B3	B2	B1	B0
0	0	0	0	X	X	X	X
0	0	0	1	X	X	X	X
0	0	1	0	X	X	X	X
0	0	1	1	0	0	0	0
0	1	0	0	0	0	0	1
0	1	0	1	0	0	1	0
0	1	1	0	0	0	1	1
0	1	1	1	0	1	0	0
1	0	0	0	0	1	0	1
1	0	0	1	0	1	1	0
1	0	1	0	0	1	1	1
1	0	1	1	1	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X

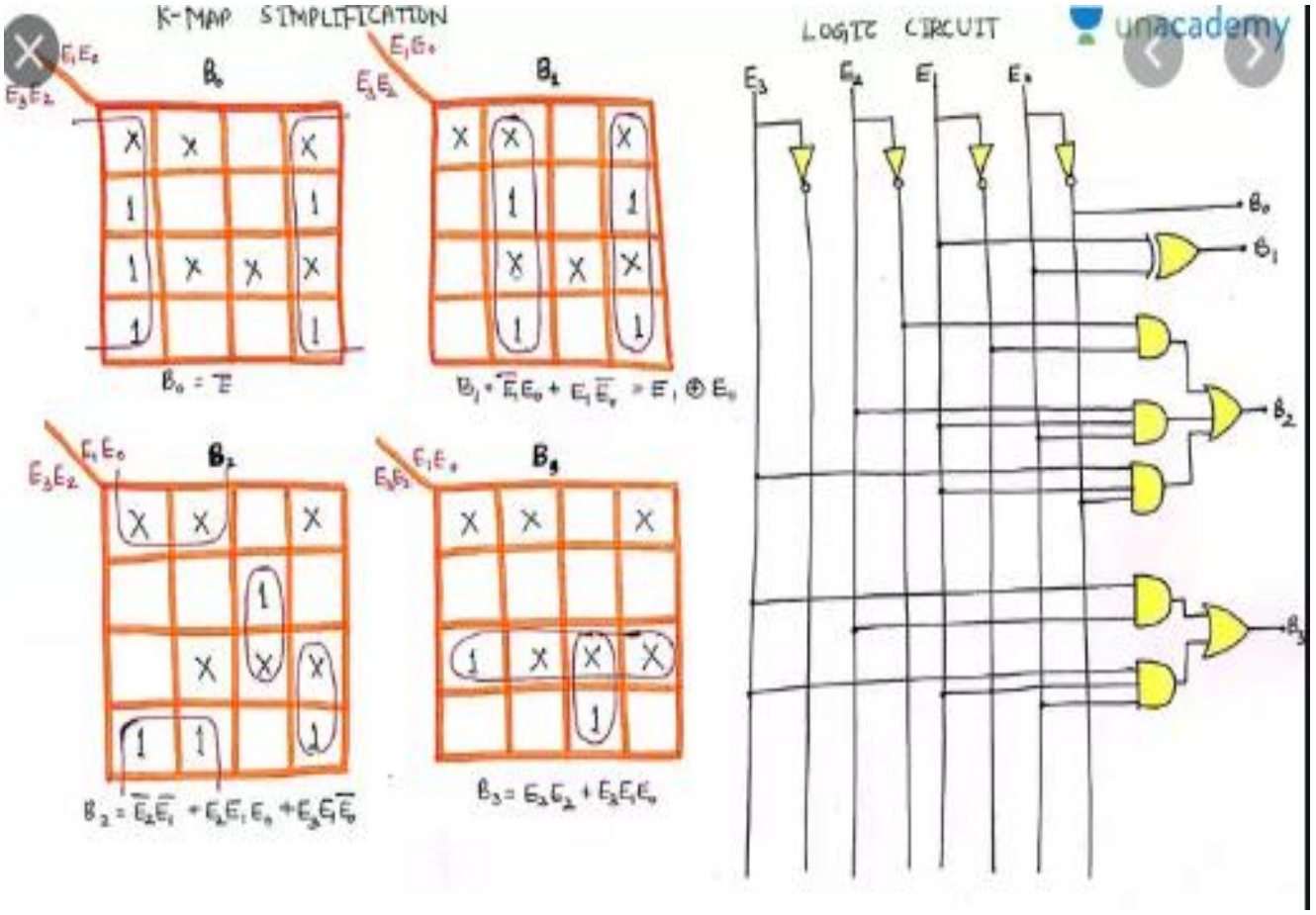








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THANK YOU