

LAB3_AADR_2306152374_AhmadDzulfikarAsShavy

Thursday, 28 September 2023 07:50

1. Specification

- BCD to Excess-5 code converter
- Transforms BCD code for the decimal digits to Excess-5 code for the decimal digits
- BCD code words for digits 0 through 9: 4-bit patterns 0000 to 1001, respectively
- Excess-5 code words for digits 0 through 9: 4-bit patterns consisting of 5 (binary 0101) added to each Binary code word
- Implementation:
 - multiple-level circuit
 - NOR gates

2. Formulation

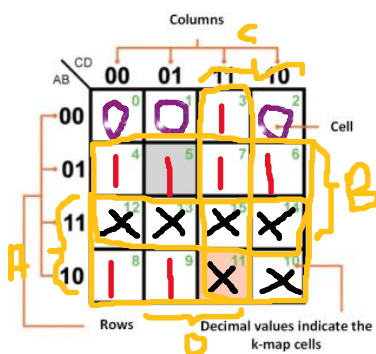
Variables BCD: A,B,C,D

Variables Excess-5: W,X,Y,Z

Don't Cares: BCD 1010 to 1111

Input BCD				Output Excess-5			
A	B	C	D	W	X	Y	Z
0	0	0	0	0	1	0	1
0	0	0	1	0	1	1	0
0	0	1	0	0	1	1	1
0	0	1	1	1	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	1	0	1	0
0	1	1	0	1	0	1	1
0	1	1	1	1	1	0	0
1	0	0	0	1	1	0	1
1	0	0	1	1	1	1	0
1	0	1	0	X	X	X	X
1	0	1	1	X	X	X	X
1	1	0	0	X	X	X	X
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X

$$3. W = A + B + CD$$

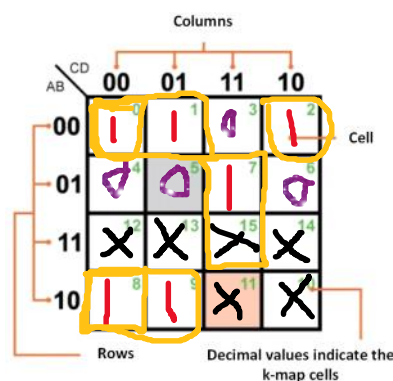


PROCEDURE MAPPING:

$$\begin{aligned} &= A + B + CD \\ &= ((A + B + CD)')' \\ &= ((A + B)'(C + D'))' \\ &= (((A + B)')' + (C + D'))' \end{aligned}$$

TECHNOLOGY MAPPING

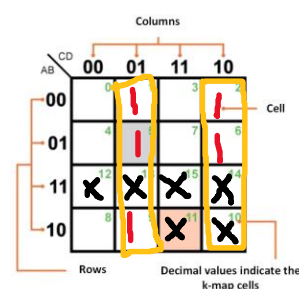
$$3. X = BCD + B'C' + B'D'$$



PROCEDURE MAPPING:

$$\begin{aligned} &X = BCD + B'C' + B'D' \\ &= ((BCD + B'C' + B'D')')' \\ &= ((B + C)(B + D)(B' + C'D'))' \\ &= (((B + C)' + (B + D)' + (B' + C'D'))')' \end{aligned}$$

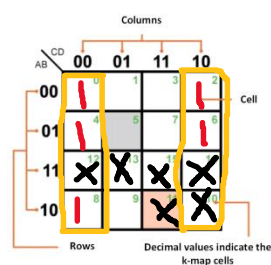
$$3. Y = CD' + C'D$$



PROCEDURE MAPPING:

$$\begin{aligned} &Y = CD' + C'D \\ &= ((CD' + C'D)')' \\ &= ((C + D)(C' + D'))' \\ &= (((C + D)' + (C' + D'))')' \end{aligned}$$

$$3. Z = D'$$



PROCEDURE MAPPING:

$$\begin{aligned} &Z = D' \\ &= ((D'))' \end{aligned}$$

