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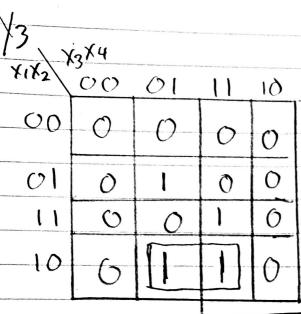
Truth table

#	Input				Output			
	X_1	X_2	X_3	X_4	Y_1	Y_2	Y_3	Y_4
0	1	0	1	0	0	0	0	0
1	1	1	0	1	0	0	0	1
2	1	0	0	1	0	0	1	0
3	0	1	0	1	0	0	1	1
4	0	1	1	0	0	1	0	0
5	0	1	1	1	0	1	0	1
6	1	0	1	1	0	1	1	0
7	1	1	1	1	0	1	1	1
8	1	1	1	0	1	0	0	0

Y_1

X_1X_2 \ X_3X_4	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	0	0	1
10	0	0	0	0

$$Y_1 = X_1 X_2 X_3 X_4'$$

Y_2

X_1X_2 \ X_3X_4	00	01	11	10
00	0	0	0	0
01	0	0	1	1
11	0	0	1	0
10	0	0	1	0

$$Y_2 = X_1' X_2 X_3 + X_1 X_3 X_4$$

y_3

x_1x_2 \ x_3x_4	00	01	11	10
00	0	0	0	0
01	0	1	0	0
11	0	0	1	0
10	0	1	1	0

$$y_3 = X_1 X_2' X_4 + X_1' X_2 X_3' X_4 + X_1 X_2 X_3 X_4$$

y_4

x_1x_2 \ x_3x_4	00	01	11	10
00	0	0	0	0
01	0	1	1	0
11	0	1	1	0
10	0	0	0	0

$$y_4 = X_2 X_4$$