

LAB 03

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Name of Experiment: Application of K-map method

Objective:

i) To investigate the rules of K-map

ii) To gain experience working with practical circuits

iii) To simplify a complex function using K-map:

Required components:

i) Ground

ii) AND, OR, NOT GATE

iii) LED

iv) LOGIC STATE

Result:

$$1. F(A, B, C, D) = \sum (1, 3, 9, 10, 13, 15)$$

$$2. F(A, B, C, D) = \sum (1, 4, 10, 13) + d(3, 5, 12, 14)$$

Function 1

A	B	C	D	Y
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

	0'D	C'D	CD	CD'
A'B'		1	1	
A'B				
AB		1	1	
AB'	1			1

$$\begin{aligned}
 Y &= A'B'D + B'C'D + ABD + AB'CD' \\
 &= A'B'C'D + A'B'CD + AB'C'D + AB'CD' \\
 &\quad + AB'CD + ABC'D + ABC'D' + ABCD \\
 &= A'B'D + B'C'D + ABD + AB'CD'
 \end{aligned}$$

Function 2:

A	B	C	D	Y
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	X
0	1	0	0	1
0	1	0	1	X
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	X
1	1	1	0	X
1	1	1	1	1

		1	X		
				3	2
1	X				
				7	6
		X	1		
				13	14
					1
				11	10
8	9				

$$Y = A'B'D + A'BC' + ABD' + ABD$$

$$= A'B'C'D + A'BC'D + AB'C'D' + ABCD$$

$$= A'B'D + A'BC' + ABD + ACD'$$

Discussion:

1. The simplification by Kmap way easier.
2. In this case, parallel circuit ain't work.