Assignment 1

Ngo Van Canh

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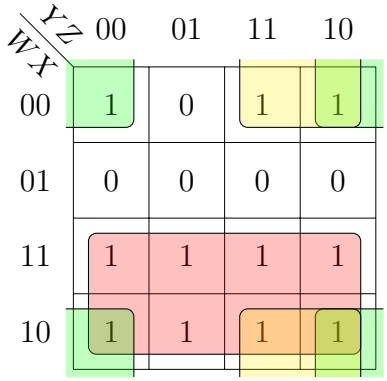
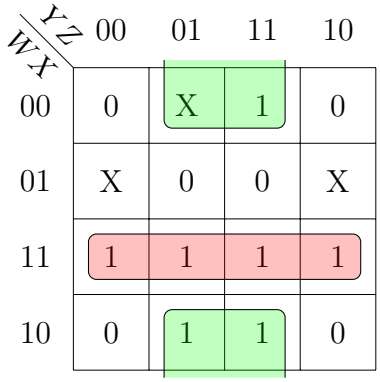
Problem 1 : Design Combinational Circuit

1. $F(W,X,Y,Z) = \sum m(0,2,3,8,9,10,11,12,13,14,15)$



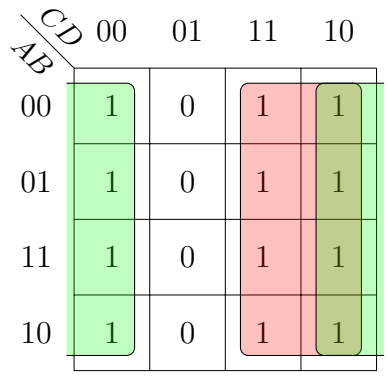
$\Rightarrow F = W + X'Z' + X'Y$

2. $F(W,X,Y,Z) = \sum m(3,9,11,12,13,14,15) + \sum d(1,4,6)$



$\Rightarrow F = WX + X'Z$

3. $F(A,B,C,D) = AC'D' + A'C + ABC + AB'C + A'C'D'$

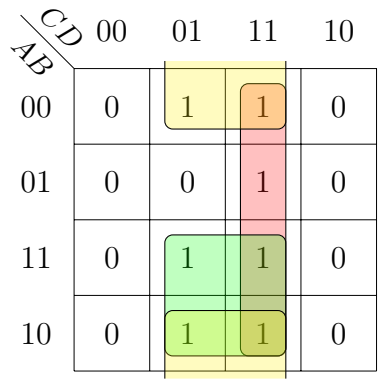


$\Rightarrow F = C + D'$

Truth table

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

4. $F(A,B,C,D) = A'B'C'D + CD + AC'D$



$\Rightarrow F = AD + B'D + CD$

Truth table

A	B	C	D	F
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	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

Problem 2 : Design Sequential Circuit

Current State (S)	Next State (S')		Output (Z)
	X=0	X=1	
A	F	B	0
B	A	F	1
C	A	D	1
D	F	E	0
E	D	B	1
F	D	E	0