

## Lab Experiment # 06

### Simplification of Boolean expressions - II

#### Objectives

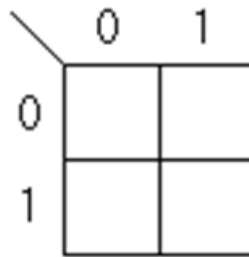
- 1- Study K-maps with 2, 3 and 4 inputs.
- 2- Simplify Boolean logic equations by using K-maps.

#### Lab Tasks

##### Task 1: Simplifying two-input Boolean functions

Simplify the following Boolean expression using a k-map of size 2x2.

$$F(A, B) = (A \cdot B) + A' (A+B)$$



A



F



B



Draw the simplified and the original Boolean expression using EWB and make sure that they are both equivalent by filling-in the following truth table.

A	B	F (A, B) (original)	Y (Simplified)
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0	0		
0	1		
1	0		
1	1		

**Task 2: Simplifying three-input Boolean functions**

Simplify the following Boolean expression F

$$F(A, B, C) = (A + C') + C(C.A' + (B.A) + C)$$

	0	1
00		
01		
11		
10		

A



B



C



F



Draw the simplified Boolean expression using EWB. Find out the truth table of the circuit.

	A	B	C	F
1	0	0	0	
2	0	0	1	
3	0	1	0	
4	0	1	1	
5	1	0	0	
6	1	0	1	
7	1	1	0	
8	1	1	1	

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### Task 3: Simplifying four-input Boolean functions

Simplify the following logic function using k-maps

$$F(A, B, C, D) = \Sigma(6, 8, 9, 10, 11, 12, 13, 14)$$

Then draw the logic circuit that represents this function.

A



B



C



D



F



Fill the truth table of the circuit above.

	A	B	C	D	F
0	0	0	0	0	
1	0	0	0	1	
2	0	0	1	0	
3	0	0	1	1	
4	0	1	0	0	
5	0	1	0	1	
6	0	1	1	0	
7	0	1	1	1	
8	1	0	0	0	
9	1	0	0	1	
10	1	0	1	0	
11	1	0	1	1	
12	1	1	0	0	
13	1	1	0	1	
14	1	1	1	0	
15	1	1	1	1	

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