

Practical 3

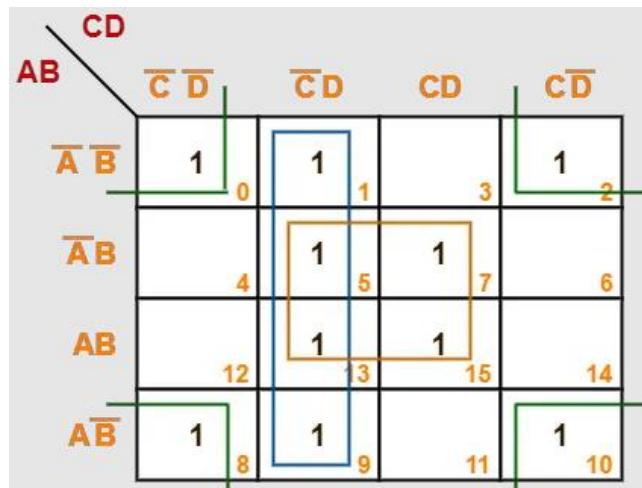
Aim: Implement combinational circuits.

1. Minimize the following Boolean function using k-map-

$$F(A, B, C, D) = \sum m(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$$

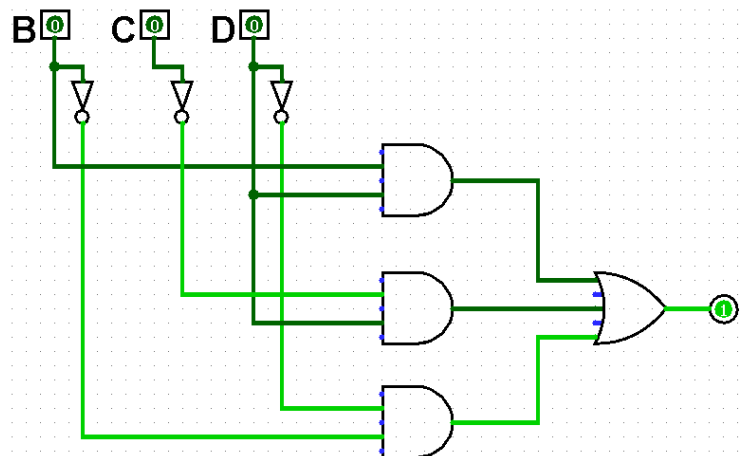
Solution-

- Since the given Boolean expression has 4 variables, so we draw a 4 x 4 K Map.



Thus, minimized Boolean expression is -

$$F(A, B, C, D) = BD + C'D + B'D'$$



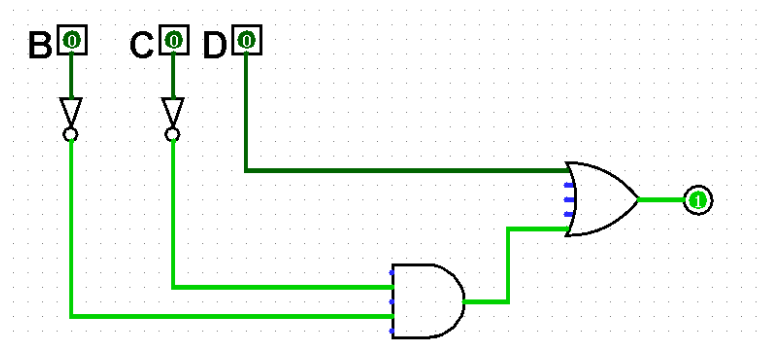
2. Minimize the following Boolean function using k-map-

$$F(A, B, C, D) = \sum m(0, 1, 3, 5, 7, 8, 9, 11, 13, 15)$$

Solution-

CD		AB			
		$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
AB	$\bar{A}\bar{B}$	1	1	1	
	$\bar{A}B$		1	1	
	AB		1	1	
	$A\bar{B}$	1	1	1	

Thus, minimized Boolean expression is-
 $F(A, B, C, D) = B'C' + D$



3. Minimize the following Boolean function using k-map-

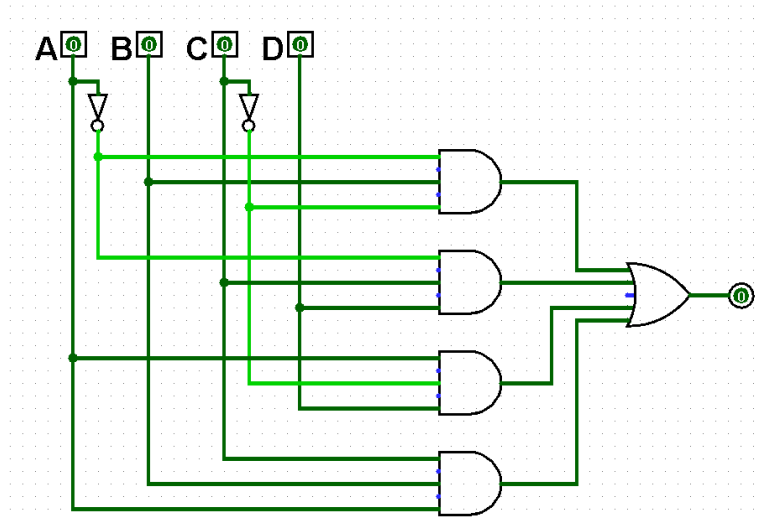
$$F(A, B, C, D) = \sum m(3, 4, 5, 7, 9, 13, 14, 15)$$

Solution-

CD		AB			
		$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
AB	$\bar{A}\bar{B}$			1	
	$\bar{A}B$	1	1	1	
	AB		1	1	1
	$A\bar{B}$		1		

Thus, minimized Boolean expression is-

$$F(A, B, C, D) = A'BC' + A'CD + AC'D + ABC$$



4. Minimize the following Boolean function using k-map-

$$F(W, X, Y, Z) = \sum m(1, 3, 4, 6, 9, 11, 12, 14)$$

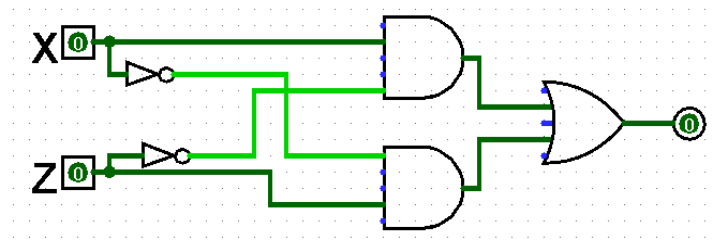
Solution-

YZ					
		$\bar{Y}\bar{Z}$	$\bar{Y}Z$	YZ	$Y\bar{Z}$
WX	$\bar{W}\bar{X}$		1	1	
	$\bar{W}X$	1			1
	WX	1			1
	$W\bar{X}$		1	1	
		0	1	3	2
		4	5	7	6
		12	13	15	14
		8	9	11	10

Thus, minimized Boolean expression is-

$$F(W, X, Y, Z) = XZ' + X'Z$$

$$F(W, X, Y, Z) = X \oplus Z$$



OR

