Switching Circuit & Logic Design

Lecture 9 : Karnaugh Map

Min terms

A	B	f
0	0	1
0	1	0
1	0	1
1	1	1

Min terms

Minterm	A	B	f
0	0	0	1
1	0	1	0
2	1	0	1
3	1	1	1

Min terms

Minterm	A	B	f
m_0 = A'B'	0	0	1
m_1 = A'B	0	1	0
m_2 = AB'	1	0	1
m_3 = AB	1	1	1

Max terms

Maxterm	A	B	f
$M_0 = A+B$	0	0	1
$M_0 = A+B'$	0	1	0
$M_0 = A'+B$	1	0	1
$M_0 = A'+B'$	1	1	1

Relation in between m_i & M_i

AB		
00	$m_0 = A' . B'$	$M_0 = A + B$
01	$m_0 = A' . B$	$M_0 = A + B'$
10	$m_0 = A . B'$	$M_0 = A' + B$
11	$m_0 = A . B$	$M_0 = A' + B'$

SoP and PoS

Maxterm	Minterm	A	B	f
$M_0 = A+B$	$m_0 = A'B'$	0	0	1
$M_0 = A+B'$	$m_1 = A'B$	0	1	0
$M_0 = A'+B$	$m_2 = AB'$	1	0	1
$M_0 = A'+B'$	$m_3 = AB$	1	1	0

$f = A'B' + AB'$

$f = (A+B')(A'+B')$

Karnaugh Map For Two Variables

Maxterm	Minterm	A	B	f
$M_0 = A+B$	$m_0 = A'B'$	0	0	1
$M_1 = A+B'$	$m_1 = A'B$	0	1	0
$M_2 = A'+B$	$m_2 = AB'$	1	0	1
$M_3 = A'+B'$	$m_3 = AB$	1	1	0

A\B	0	1
0	m_0	m_1
1	m_2	m_3

Karnaugh Map For Two Variables

A\B	0	1
0	m_0	m_1
1	m_2	m_3

Express function in K-Map

F = AB + A’B’

A\B	0	1
0		
1		

Express TT in K-Map

A	B	C
0	0	
0	1	
1	0	
1	1	

A\B	0	1
0		
1		

Reduce through K-Map

A\B	0	1
0		
1		