Switching Circuit & Logic Design

Lecture 11 : Five Variable Karnaugh Map

Don’t Care

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	x
1	0	0	1
1	0	1	0
1	1	0	x
1	1	1	x

Don’t Care

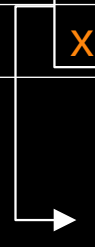
A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	x
1	0	0	1
1	0	1	0
1	1	0	x
1	1	1	x

A\BC	00	01	11	10
0	1		x	1
1	1		x	x

Don’t Care

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	x
1	0	0	1
1	0	1	0
1	1	0	x
1	1	1	x

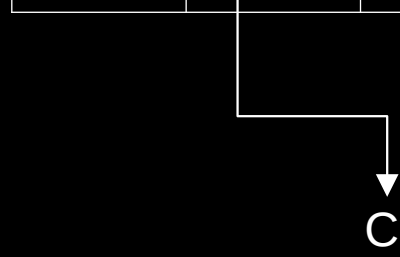
A\BC	00	01	11	10
0	1		x	1
1	1		x	x



Don’t Care

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	x
1	0	0	1
1	0	1	0
1	1	0	x
1	1	1	x

A\BC	00	01	11	10
0	1		x	1
1	1		x	x



F = B + C’

Don’t Care

$$F = \Sigma_m (1,5,6,12,13,14) + d(2,4)$$

Five variable K-Map

A=0

BC\DE	00	01	11	10
00	◯			◯
01	◯	◯	◯	◯
11		◯	◯	
10	◯	◯	◯	◯

A=1

BC\DE	00	01	11	10
00	◯			◯
01	◯	◯	◯	◯
11		◯	◯	
10	◯	◯	◯	◯

Five variable K-Map

A=0

BC\DE	00	01	11	10
00			◯	◯
01	◯	◯		
11	◯	◯		
10			◯	◯

A=1

BC\DE	00	01	11	10
00			◯	◯
01	◯	◯		
11	◯	◯		
10			◯	◯

2, 4, 8, 16, 32

Don’t Care

$$F = \sum_m (6,9,13,18,19,25,27,29,31) + d(2,3,11,15,17,24,28)$$

A=0

BC\DE	00	01	11	10
00			x	x
01				1
11		1	x	
10		1	x	

BE

A=1

BC\DE	00	01	11	10
00		x	1	1
01				
11	x	1	1	
10	x	1	1	

Don’t Care

$$F = \sum_m (6,9,13,18,19,25,27,29,31) + d(2,3,11,15,17,24,28)$$

A=0

BC\DE	00	01	11	10
00			x	x
01				1
11		1	x	
10		1	x	

A=1

BC\DE	00	01	11	10
00		x	1	1
01				
11	x	1	1	
10	x	1	1	

B’C’D

Don’t Care

$$F = \sum_m (6,9,13,18,19,25,27,29,31) + d(2,3,11,15,17,24,28)$$

A=0

BC\DE	00	01	11	10
00			x	x
01				1
11		1	x	
10		1	x	

A=1

BC\DE	00	01	11	10
00		x	1	1
01				
11	x	1	1	
10	x	1	1	

A’B’DE’

ABD

Five variable K-Map

A=0

BC\DE	00	01	11	10
00				
01				
11				
10				

A=1

BC\DE	00	01	11	10
00				
01				
11				
10				

$$F = \sum_m (0,1,2,4,7,8,12,14,15,16,17,18,20,24,28,30,31)$$

F = D’E’ + BCD + B’C’E’ + B’C’D’ + A’CDE