

# 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

→ B

# 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

↓

C'

$$F = B + C'$$

# Don't Care

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

# 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
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	
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	

$A'B'DE'$

A=1

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

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				

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

$$F = D'E' + BCD + B'C'E' + B'C'D' + A'CDE$$