



الجامعة المستنصرية



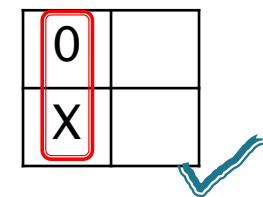
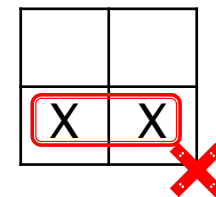
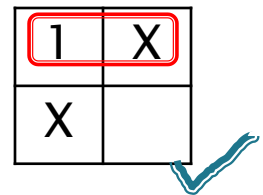
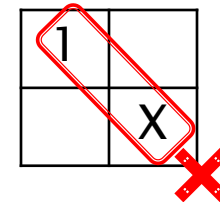
كلية العلوم

قسم علوم الحاسوب

نظري	التصميم المنطقي	المادة	3	رقم المحاضرة	مساقي	1	المرحلة
Karnaugh Map-Don't Care		عنوان المحاضرة					
د. بسام باسم جميل		التدريسي					

Don't Care

- ▶ The “**Don't Care**” conditions allow us to replace the empty cell of a **K-Map** to form a grouping of the variables.
- ▶ Important to consider in minimizing logic circuit design.
- ▶ It is considered either 1 or 0
- ▶ Given in question
- ▶ Write as (x) symbol in K-Map.



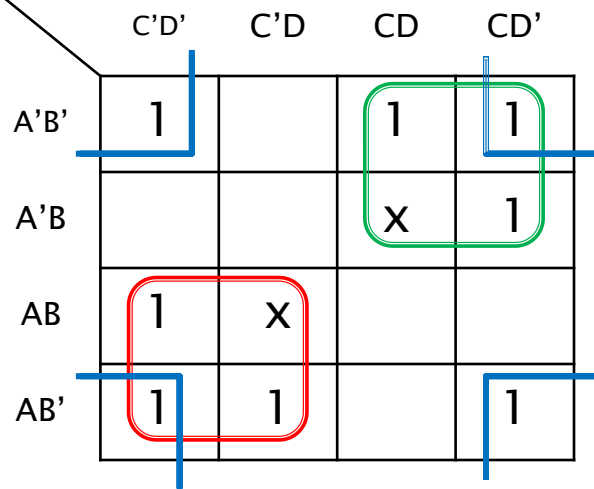
Don't Care-example

- ▶ Simplify the following expression using K-Map?

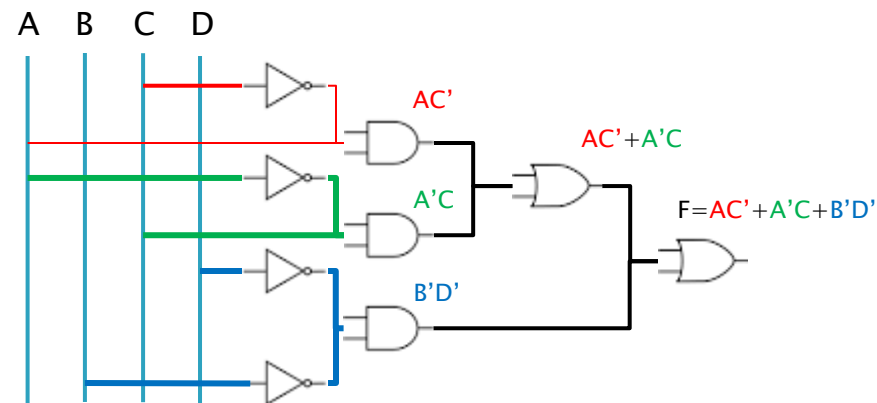
$$F(A,B,C,D) = \Sigma(0, 2, 3, 6, 8, 9, 10, 12)$$

$$\text{Don't care}(D) = \Sigma(7, 13)$$

Sol.



$$F = AC' + A'C + B'D'$$



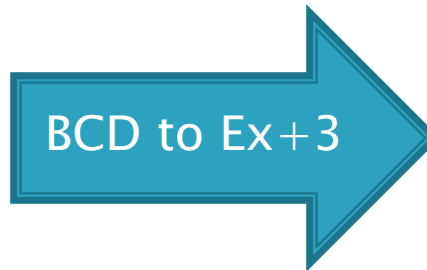
Don't care-example

- ▶ Convert the Binary to Excess+3 using K-Map?

Sol.

BCD

No	w	x	y	z
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



No	w	x	Y	Z
0	0	0	1	1
1	0	1	0	0
2	0	1	0	1
3	0	1	1	0
4	0	1	1	1
5	1	0	0	0
6	1	0	0	1
7	1	0	1	0
8	1	0	1	1
9	1	1	0	0
10	X	X	X	X
11	X	X	X	X
12	X	X	X	X
13	X	X	X	X
14	X	X	X	X
15	X	X	X	X

Ex+3

Don't care

Don't care-example

$Z = \Sigma(0, 2, 4, 6, 8),$
 $D = \Sigma(10, 11, 12, 13, 14, 15)$

		Y'Z'	Y'Z	YZ	YZ'
Z	W'X'	1			1
	W'X	1			1
	WX	X	X	X	X
	WX'	1		X	X

Without don't care $\rightarrow Z = W'Z' + X'Y'Z'$, with $\rightarrow Z = Z'$

$Y = \Sigma(0, 3, 4, 7, 8),$
 $D = \Sigma(10, 11, 12, 13, 14, 15)$

		Y'Z'	Y'Z	YZ	YZ'
Y	W'X'	1		1	
	W'X			1	
	WX	X	X	X	X
	WX'	1		X	X

$Y = YZ' + X'Y'Z'$

$X = \Sigma(1, 2, 3, 4, 9),$
 $D = \Sigma(10, 11, 12, 13, 14, 15)$

		Y'Z'	Y'Z	YZ	YZ'
X	W'X'		1	1	1
	W'X	1			
	WX	X	X	X	X
	WX'		1	X	X

$X = XY'Z' + X'Z + X'Y$

$W = \Sigma(5, 6, 7, 8, 9),$
 $D = \Sigma(10, 11, 12, 13, 14, 15)$

		Y'Z'	Y'Z	YZ	YZ'
W	W'X'				
	W'X		1	1	1
	WX	X	X	X	X
	WX'	1	1	X	X

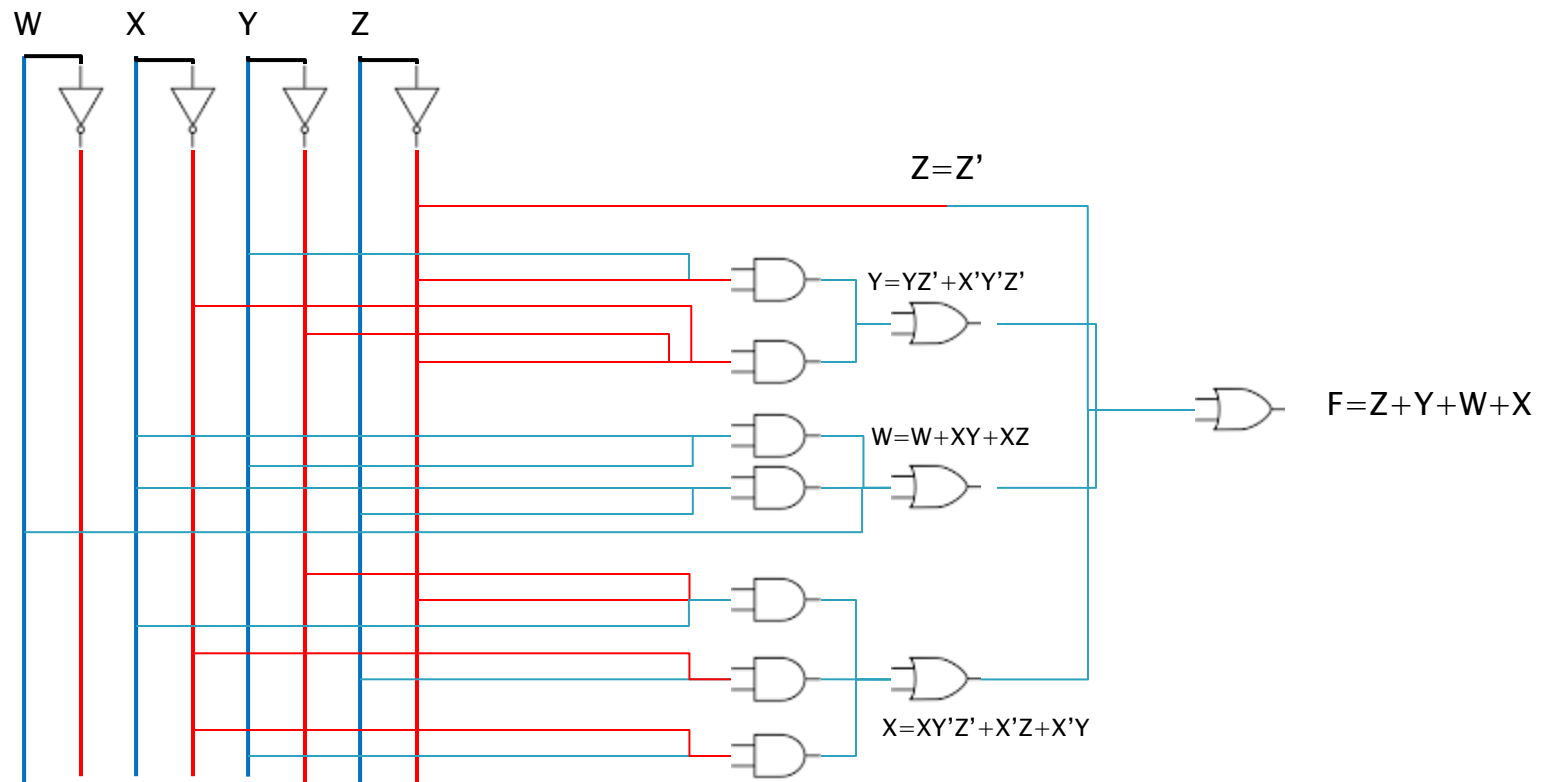
$W = W + XZ + XY$

Ex+3

		↓	↓	↓	↓
No	w	x	Y	Z	
0	0	0	1	1	
1	0	1	0	0	
2	0	1	0	1	
3	0	1	1	0	
4	0	1	1	1	
5	1	0	0	0	
6	1	0	0	1	
7	1	0	1	0	
8	1	0	1	1	
9	1	1	0	0	
10	X	X	X	X	
11	X	X	X	X	
12	X	X	X	X	
13	X	X	X	X	
14	X	X	X	X	
15	X	X	X	X	

Don't care example

- ▶ Draw logic circuit



End of this Lecture!

Any Questions?

Join our Logic Design google classroom at
<https://classroom.google.com/u/0/c/NjE2Mzg0MTc1OTNa>
class join code: upoi4fe

