K-Map Analysis

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- Three-Variable K-Map
  - The following truth table:

a	b	c	f(a,b,c)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

  - Would be converted to the following K-Map:

a \bc	(0,0)	(0,1)	(1,1)	(1,0)
0	0	1	1	0
1	0	1	1	0

  - By grouping 2^n adjacent ones, the boolean expression becomes: f(a,b,c)= c
- Converting to K-Maps from boolean expressions
  - f(a,b,c) = a'b'c' + ab'c' + abc' + ab'

a \bc	(0,0)	(0,1)	(1,1)	(1,0)
0	1	0	0	0
1	1	1	0	1

  - f(a,b,c) = a'b' + a'c'+ bc' + ab + b'c

a \bc	(0,0)	(0,1)	(1,1)	(1,0)
0	1	1	0	1
1	0	0	1	1

- K-Maps with Don't Cares ("x")
  - The following is an example K-Map with don't cares

AB \CD	00	01	11	10
00	1	0	x	1
01	0	x	x	1
11	1	1	x	x
10	1	1	1	1

- Don't cares can be assigned either a 0 or 1
- It is necessary to create groups as big as possible
- The above K-Map becomes the expression f(a,b,c) = A + $\bar{B}\bar{D}$ + C