

Case of four variables

(28)

Let 'f' be a fun. of 4 variables

x, y, z, w i.e. we have f(x, y, z, w).

Then K-map will have  $2^4 = 16$  squares as follows—

	xy	xy'	xy''	xy'''
zw				
zw'				
zw''				
zw'''				

Ex → Use K-map to find a minimal form for

$$f(x, y, z, w) = x'yzw + x'yzw' + x'yz'w + x'yz'w' + x'yz''w + x'yz''w' + x'yz'''w + x'yz'''w'$$

Soln we formulate K-map as—

	xy	xy'	xy''	xy'''
zw	0	0	0	1
zw'	0	1	1	0
zw''	1	1	0	0
zw'''	0	0	0	0

$$f(x, y, z, w) = x'yzw + x'yz'w + x'yz''w$$

Ex.  $f = xz + x'z + xz' + x'z'$

K-map

we can write '1' in each cell of the map corresponding to the minterms of the function.

	$xz$	$x'z$	$xz'$	$x'z'$
$x$	1	1	0	0
$x'$	1	1	0	0
$xz$	0	1	1	0
$x'z$	0	1	1	0

$f = xz + x'z + xz' + x'z'$

Ex.  $f = xz + x'z + xz' + x'z'$

	$xz$	$x'z$	$xz'$	$x'z'$
$x$	0	1	1	0
$x'$	0	1	1	0
$xz$	1	0	0	1
$x'z$	1	0	0	1

$f = xz + x'z + xz' + x'z'$

Ex- To find complement of  $\rightarrow$

$$f = abc + abc' + ab'c + a'b'c'$$

$\rightarrow$  DNF

we write complete DNF as -

$$abc + \underline{abc'} + ab'c + \underline{a'b'c} + a'b'c' + \underline{a'b'c} + ab'c' + \underline{abc'}$$

$\therefore$  complement of  $f$

$$= abc + ab'c + a'b'c' + abc'$$

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