7 SEGMENT DISPLAY K-MAP

Decimal Digit	Input lines				Output lines							Display pattern
	A	B	C	D	a	b	c	d	e	f	g	
0	0	0	0	0	1	1	1	1	1	1	0	
1	0	0	0	1	0	1	1	0	0	0	0	
2	0	0	1	0	1	1	0	1	1	0	1	
3	0	0	1	1	1	1	1	1	0	0	1	
4	0	1	0	0	0	1	1	0	0	1	1	
5	0	1	0	1	1	0	1	1	0	1	1	
6	0	1	1	0	1	0	1	1	1	1	1	
7	0	1	1	1	1	1	1	0	0	0	0	
8	1	0	0	0	1	1	1	1	1	1	1	
9	1	0	0	1	1	1	1	1	0	1	1	

(a.)

wx \ yz	$\bar{y}\bar{z}$	$\bar{y}z$	yz	$y\bar{z}$
$\bar{w}\bar{x}$	1	0	1	1
$\bar{w}x$	0	1	1	1
wx	0	0	0	0
$w\bar{x}$	1	1	0	0

$a(w,x,y,z) = \Sigma m(0,2,3,5,6,7,8,9)$

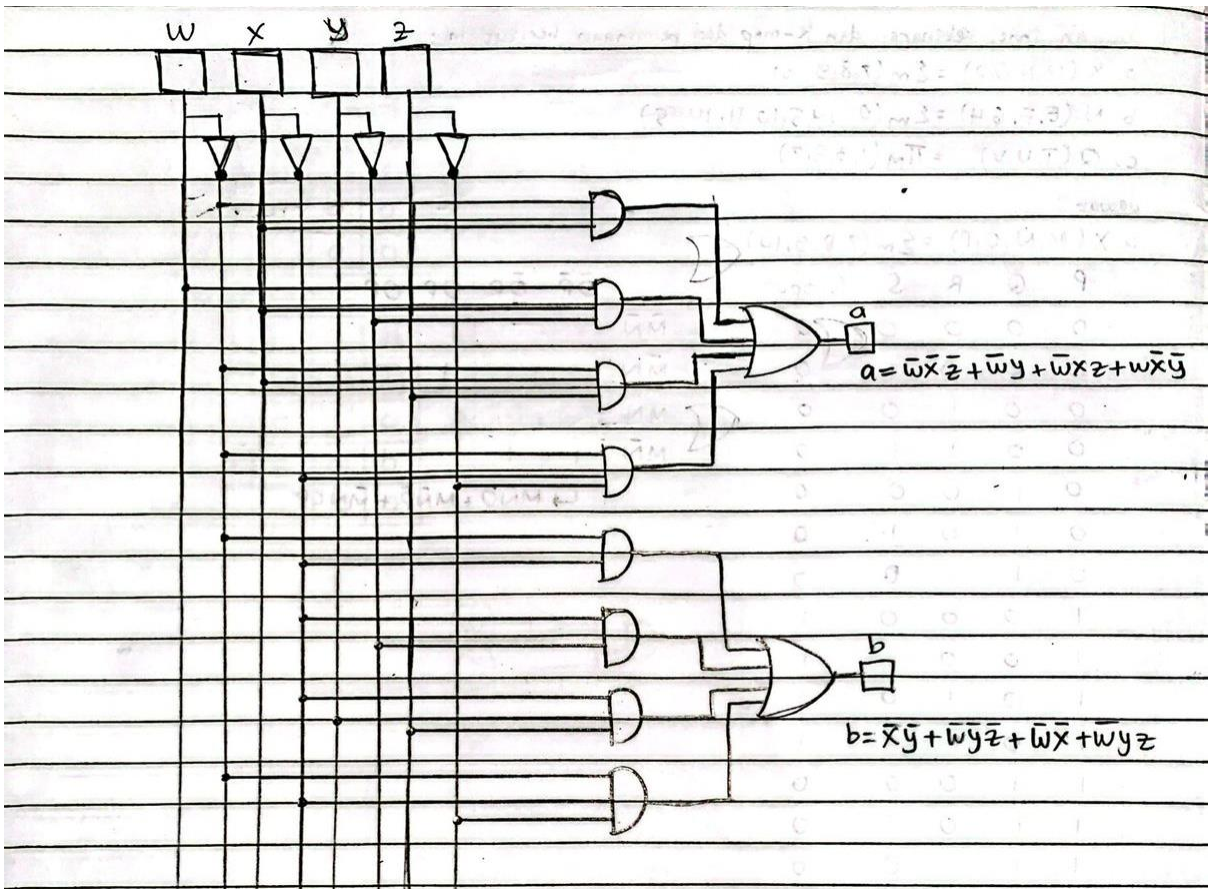
$\Rightarrow \bar{w}\bar{x}\bar{z} + \bar{w}y + \bar{w}xz + w\bar{x}\bar{y}$

(b.)

wx \ yz	$\bar{y}\bar{z}$	$\bar{y}z$	yz	$y\bar{z}$
$\bar{w}\bar{x}$	1	1	1	1
$\bar{w}x$	1	0	1	0
wx	0	0	0	0
$w\bar{x}$	1	1	0	0

$b(w,x,y,z) = \Sigma m(0,1,2,3,4,7,8,9)$

$\Rightarrow \bar{x}\bar{y} + \bar{w}\bar{y}\bar{z} + \bar{w}\bar{x} + \bar{w}yz$



$C(w,x,y,z) = \Sigma m(0,1,2,4,5,6,7,8,9)$

C =

	$\bar{y}\bar{z}$	$\bar{y}z$	yz	$y\bar{z}$
$\bar{w}\bar{x}$	1	1	1	0
$\bar{w}x$	1	1	1	1
wx	0	0	0	0
$w\bar{x}$	1	1	0	0

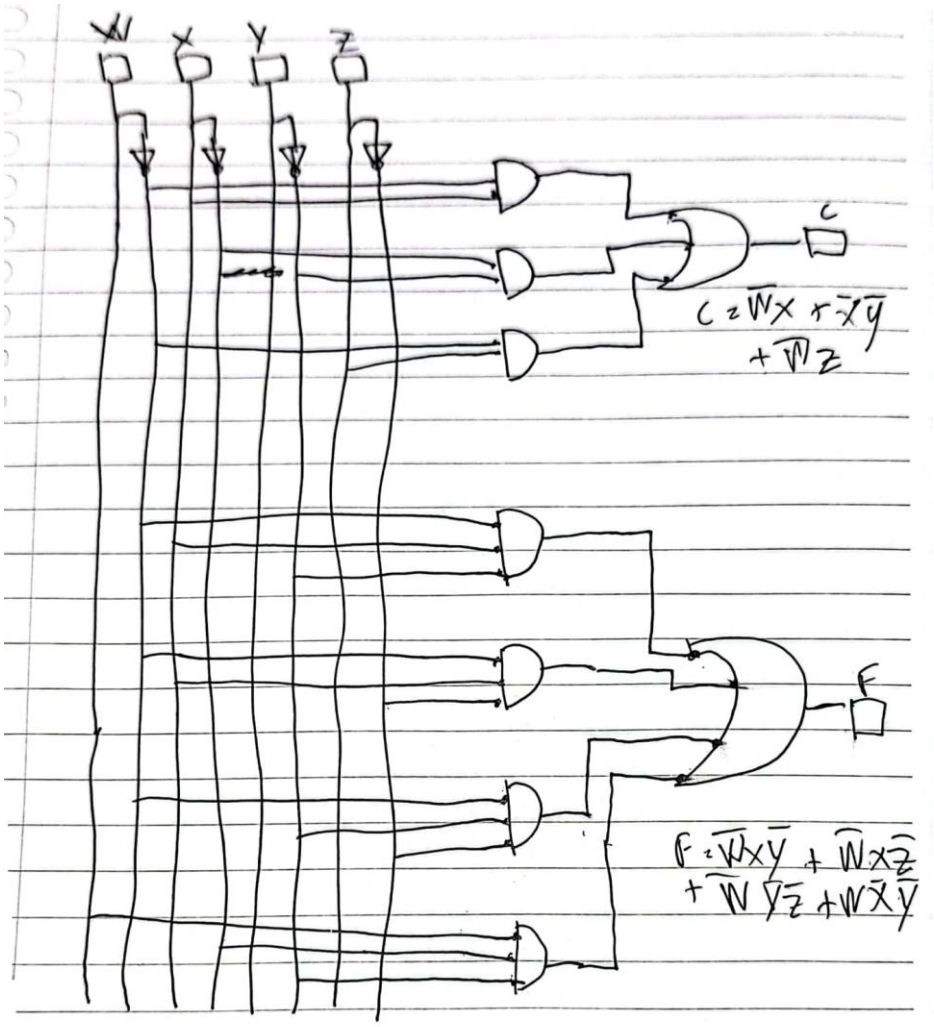
$= \bar{w}x + \bar{x}\bar{y} + \bar{w}z$

$F(w,x,y,z) = \Sigma m(0,4,5,6,8,9)$

F =

	$\bar{y}\bar{z}$	$\bar{y}z$	yz	$y\bar{z}$
$\bar{w}\bar{x}$	1	0	0	0
$\bar{w}x$	1	1	0	1
wx	0	0	0	0
$w\bar{x}$	1	1	0	0

$= \bar{w}x\bar{y} + \bar{w}\bar{x}z + \bar{w}\bar{y}\bar{z} + w\bar{x}\bar{y}$



e.

WX \ YZ	$\bar{Y}\bar{Z}$	$\bar{Y}Z$	YZ	$Y\bar{Z}$
$\bar{W}\bar{X}$	1 (0)	0 (1)	0 (3)	1 (2)
$\bar{W}X$	0 (4)	0 (5)	0 (7)	1 (6)
WX	0 (12)	0 (13)	0 (14)	0 (15)
$W\bar{X}$	1 (8)	0 (9)	0 (11)	0 (10)

$e(W,X,Y,Z) = \bar{Z}m(0,2,6,8)$

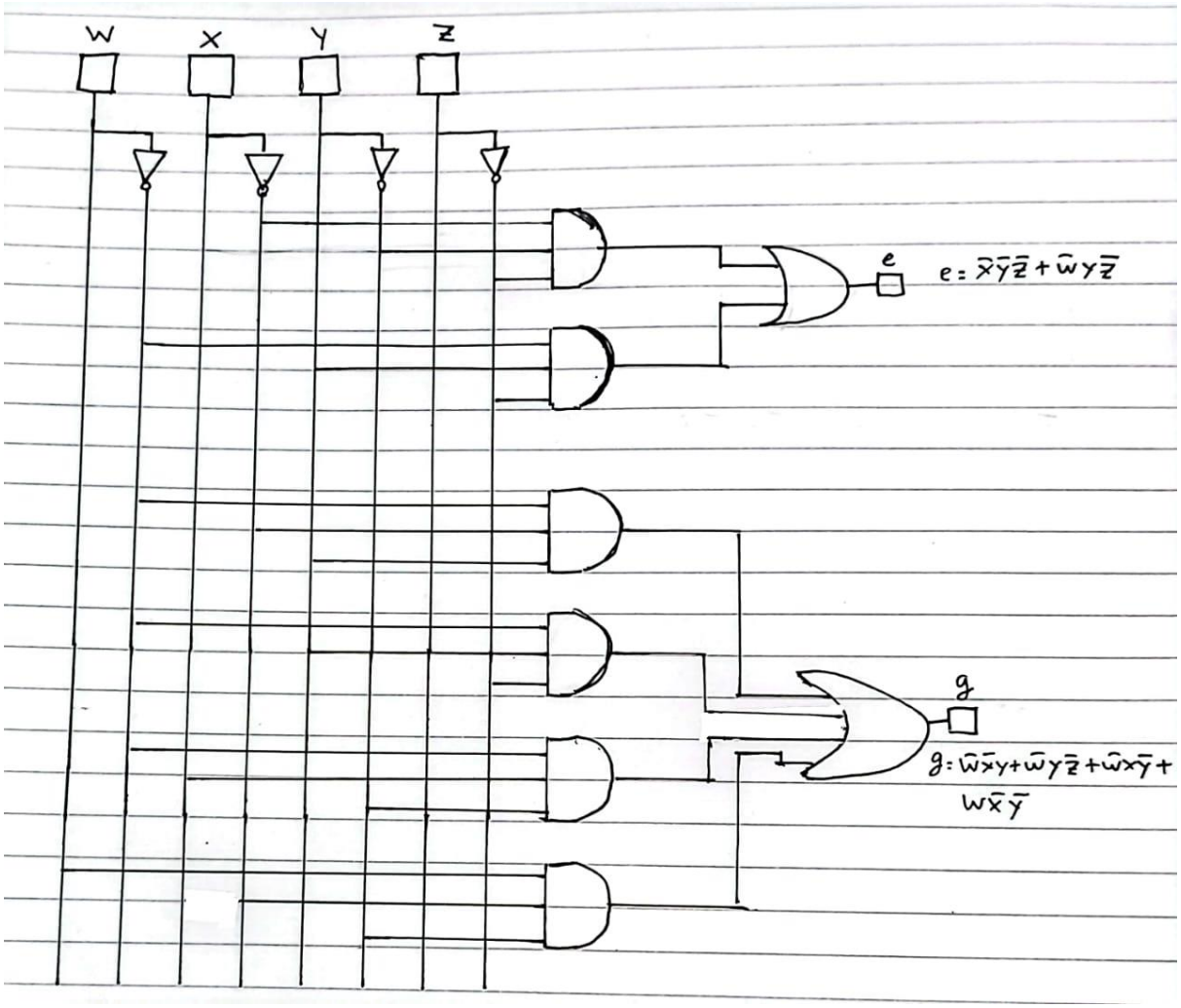
$e = \bar{X}\bar{Y}\bar{Z} + \bar{W}\bar{Y}\bar{Z}$

g.

WX \ YZ	$\bar{Y}\bar{Z}$	$\bar{Y}Z$	YZ	$Y\bar{Z}$
$\bar{W}\bar{X}$	0	0	1	1
$\bar{W}X$	1	1	0	1
WX	0	0	0	0
$W\bar{X}$	1	1	0	0

$g(W,X,Y,Z) = \bar{Z}m(2,3,4,5,6,8,9)$

$g = \bar{W}\bar{X}Y + \bar{W}Y\bar{Z} + \bar{W}X\bar{Y} + W\bar{X}\bar{Y}$


W
X
Y
Z
e
e: $\bar{x}\bar{y}\bar{z} + \bar{w}y\bar{z}$
g
g: $\bar{w}\bar{x}y + \bar{w}y\bar{z} + \bar{w}x\bar{y} +$
$w\bar{x}\bar{y}$