

Lab 2

● $F = x y' z + x' y' z + w' x y + w x' y + w x y$

$$\begin{aligned} F &= x y' z + x' y' z + w' x y + w x' y + w x y \\ &= (x + x') y' z + (w' + w) x y + w x' y \\ &= y' z + x y + w x y \\ &= y' z + y(x + x' w) \\ &= y' z + y(x + w) \end{aligned}$$

$$F = y' z + x y + y w$$

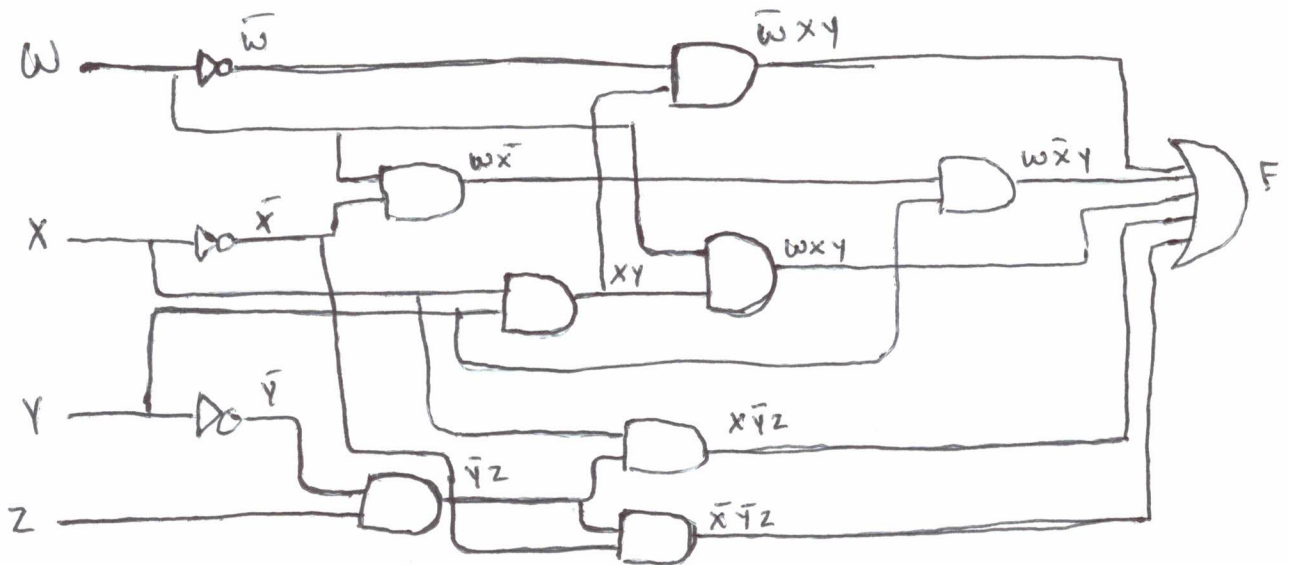
1)

Truth Table:

w	x	y	z	$x \bar{y} z$	$\bar{x} \bar{y} z$	$\bar{w} x y$	$w \bar{x} y$	$w x y$	F
0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	1	0	0	0	1
0	0	1	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	1	0	1	1	0	0	0	0	1
0	1	1	0	0	0	1	0	0	1
0	1	1	1	0	0	1	0	0	1
1	0	0	0	0	0	0	0	0	0
1	0	0	1	0	1	0	0	0	1
1	0	1	0	0	0	0	1	0	1
1	0	1	1	0	0	0	1	0	1
1	1	0	0	0	0	0	0	0	0

1	1	0	1	1	0	0	0	0	1
1	1	1	0	0	0	0	0	1	1
1	1	1	1	0	0	0	0	1	1

2)

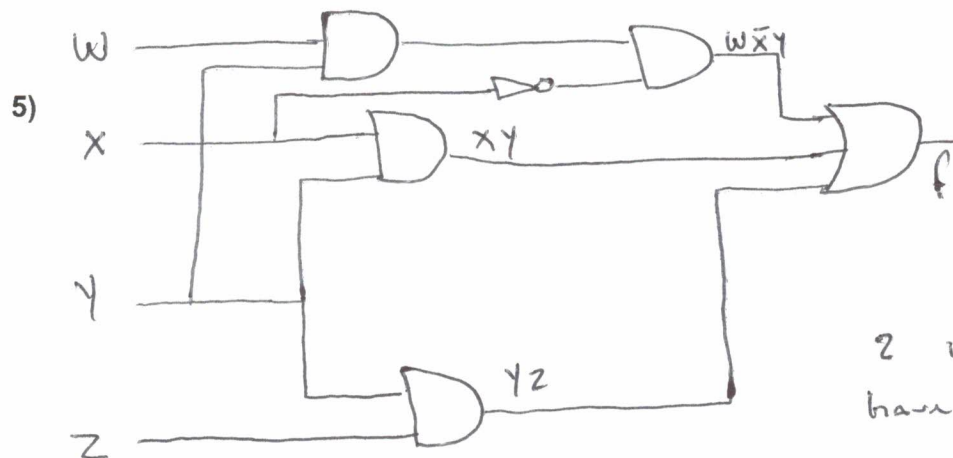


3)

$$\begin{aligned}
 F &= x\bar{y}z + \bar{x}\bar{y}z + \bar{w}xy + w\bar{x}y + wxy \\
 &= \bar{y}z(x + \bar{x}) + xy(\bar{w} + w) + w\bar{x}y \\
 &= yz + xy + w\bar{x}y
 \end{aligned}$$

4)

w	x	y	z	yz	xy	wxy	f
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	0
0	0	1	1	1	0	0	1
0	1	0	0	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	0	0	1	0	1
0	1	1	1	1	1	0	1
1	0	0	0	0	0	0	0
1	0	0	1	0	0	0	0
1	0	1	0	0	0	1	1
1	0	1	1	1	0	1	1
1	1	0	0	0	0	0	0
1	1	0	1	0	0	0	0
1	1	1	0	0	1	0	1
1	1	1	1	1	1	0	1



Number of not
gates reduced
from 3 to 1

2 input AND gates
have been used

2 input

Number of and gate reduced 2 to 4