

Homework 5

Ex 1, 2, 3 are located in HW5.CRC

(4)

$$\begin{aligned} F &= \Sigma(x + \bar{y}) + (\bar{x}y\bar{z}) \\ &= zx + z\bar{y} + \bar{x}y\bar{z} \\ G &= (x + \bar{y} + \bar{z})(\bar{x} + z)(y + z) \\ &= (x\bar{x} + \bar{x}\bar{y} + \bar{x}\bar{z} + xz + \bar{y}z + \bar{z}z)(y + z) \\ &= (\bar{x}\bar{y} + \bar{x}\bar{z} + xz + \bar{y}z)(y + z) \\ &= (\bar{x}\bar{y}y + \bar{x}y\bar{z} + xy\bar{z} + y\bar{y}z + \bar{x}\bar{y}z + \bar{x}\bar{z}z + xz\bar{z} + yz\bar{z}) \\ &= 0 + \bar{x}y\bar{z} + xyz + 0 + \bar{x}\bar{y}z + 0 + xz + \bar{y}z \\ &= \bar{x}y\bar{z} + \bar{x}yz + \bar{x}\bar{y}z + \bar{x}z + \bar{y}z \\ &= \bar{x}y\bar{z} + xz(y+1) + \bar{y}z(\bar{x}+1) \\ &= \bar{x}y\bar{z} + xz + \bar{y}z \end{aligned}$$

F and G are both
equal

ex 5 located in HW5.CRC

(6)

$$1. A(A+\bar{A})+B = AA+A\bar{A}+B$$

$$A(1)+B = A+0+B$$

$$A+B = A+B$$

$$2. (A+B)(\bar{A}+B) \bar{B} = (A+B)(\bar{A}\bar{B}+B\bar{B})$$

$$(A+B)(\bar{A}\bar{B}+B\bar{B}) = (A+B)\bar{A}\bar{B}$$

$$(A+B)\bar{A}\bar{B} = A\bar{A}\bar{B} + \bar{A}B\bar{B}$$

$$0 = 0$$

$$3. (\overline{\bar{A}B+\bar{B}}) 0 (\bar{B}+\bar{A}\bar{B}) = 0$$

$$4. \overline{\bar{A}+\bar{B}} = \overline{\bar{A}\bar{B}} = AB$$

Note: I messed up my SOP and POS 😞

$$7. F_{SOP} = \bar{A}\bar{B}CD + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + A\bar{B}\bar{C}\bar{D} \\ + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + A\bar{B}\bar{C}D + A\bar{B}\bar{C}\bar{D} \\ + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + ABCD$$

$$F_{POS} = (\bar{A}\bar{B}\bar{C}\bar{D})^+ (\bar{A}\bar{B}CD)^+ (\bar{A}\bar{B}C\bar{D})^+ (\bar{A}B\bar{C}\bar{D})^+ (\bar{A}B\bar{C}D)^+$$

min' k map

maxterms

$\bar{A}\bar{B}$ $\bar{A}B$ AB $A\bar{B}$

$\bar{C}\bar{D}$	0	0	1	1	$\bar{A}+\bar{B}+\bar{C}+\bar{D}$
$\bar{C}D$	0	0	1	1	$\bar{A}+\bar{B}+\bar{C}+D$
$C\bar{D}$	0	1	1	1	$\bar{A}+\bar{B}+\bar{C}+\bar{D}$
CD	1	1	1	1	$\bar{A}+\bar{B}+\bar{C}+D$

$$F_{SOP} = (\bar{A}+\bar{C})^+ (\bar{A}+\bar{B}+\bar{C}+\bar{D})$$

sum

midterm

$$F_{\text{Sop}} = A + CD + BC$$

sim

8

$\times \times z$ open = 0 close = 1
width off = 0 on = 1

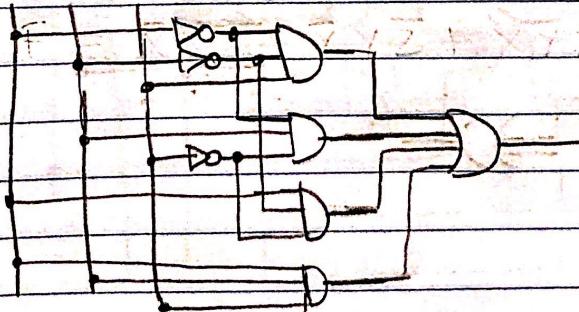
x	y	z	length	
0	0	0	0	
0	0	1	1	$\bar{x}\bar{y}z$
0	1	0	1	$\bar{x}yz$
0	1	1	0	
1	0	0	1	$x\bar{y}\bar{z}$
1	0	1	0	
1	1	0	0	
1	1	1	1	xyz

$$\overline{x}\overline{y} \quad \overline{x}y \quad xy \quad x\overline{y}$$

\bar{z}	0	1	0	1
z	1	0	1	0

$$E = \bar{x}\bar{y}z + \bar{x}yz + xy\bar{z} + xyz$$

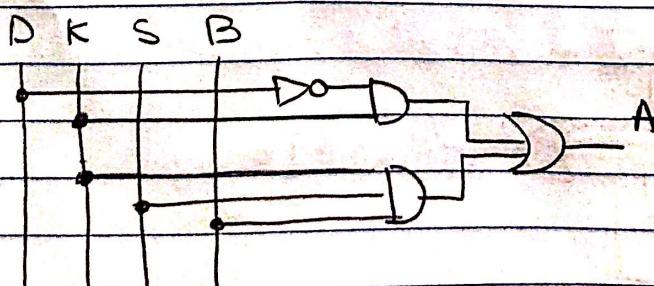
x y z



a) D not = 0 close = 1
 K out = 0 in = 1
 S no = 1 pres. = 1
 B open = 0 close = 1
 A no sound = 0 sound = 1

D	K	S	B	A	A = 1 when				
0	0	0	0	0	$\bar{K} = 1$	$D = 0$	$S = 1$	$B = 0$	or
0	0	0	1	0	$K = 1$	$D = 1$	$S = 1$	$B = 0$	
0	0	1	0	0					
0	0	1	1	0					
0	1	0	0	1	$\bar{D}K\bar{S}\bar{B}$				
0	1	0	1	1	$\bar{D}K\bar{S}B$				
0	1	1	0	1	$\bar{D}KS\bar{B}$				
0	1	1	1	1	$\bar{D}KS B$				
1	0	0	0	0					
1	0	0	1	0	$\bar{S}B$	$\bar{D}\bar{K}$	$\bar{D}K$	$D\bar{K}$	$D\bar{K}$
1	0	1	0	0	$\bar{S}B$		1		
1	0	1	1	0	$\bar{S}B$		1		
1	1	0	0	0	$\bar{S}B$		1	1	
1	1	0	1	0	$\bar{S}B$		1		
1	1	1	0	1	$D\bar{K}S\bar{B}$				
1	1	1	1	0		$\bar{D}K$	$\bar{D}KS B$	$D\bar{K} SB$	KSB

$A = \bar{D}K + KSB$



ex 10

E switch off = 0 on = 1

$S_1 \quad S_2 \quad S_3$ off = 0 on = 1

System off = 0 on = 1

S_2

$E \quad S_1 \quad S_2 \quad S_3$ System $\equiv 1$ when 1000

0 0 0 0 0 0110

0 0 0 1 0 0011

0 0 1 0 0 0111

0 0 1 1 1

0 1 0 0 0

0 1 0 1 0 $\bar{E} \bar{S}_1 \quad \bar{E} S_1 \quad E S_1 \quad E \bar{S}_1$

0 1 1 0 1 $\bar{S}_2 \bar{S}_3 \quad 0 \quad 0 \quad 1 \quad 1$

0 1 1 1 1 $\bar{S}_2 S_3 \quad 0 \quad 0 \quad 1 \quad 1$

0 1 1 1 1 $S_2 S_3 \quad 1 \quad 1 \quad 1 \quad 1 \quad \} S_2 S_3$

1 0 0 0 1 $S_2 \bar{S}_3 \quad 0 \quad 1 \quad 1 \quad 1$

1 0 0 1 1 $\bar{S}_2 \quad 1$

1 0 1 0 1 $S_1 S_2 \quad 1$

1 0 1 1 1

1 1 0 0 1 $F = E + S_1 S_2 + S_2 S_3$

1 1 0 1 1 $F = 1$

1 1 1 0 1

1 1 1 1 1

$\bar{E} \quad S_1 \quad S_2 \quad S_3$

