

Keith A. Kurtz
 CS 42
 Assig. 2

2-1) a) $\overline{XYZ} = \overline{X} + \overline{Y} + \overline{Z}$

X	Y	Z	XYZ	\overline{XYZ}	\overline{X}	\overline{Y}	\overline{Z}	$\overline{X+Y+Z}$
0	0	0	0	1	1	1	1	1
0	0	1	0	1	1	1	0	1
0	1	0	0	1	1	0	1	1
0	1	1	0	1	1	0	0	1
1	0	0	0	1	0	1	1	1
1	0	1	0	1	0	1	0	1
1	1	0	0	1	0	0	1	1
1	1	1	1	0	0	0	0	0

2-2)
 b)

$$\begin{aligned} \overline{A}B + \overline{B}C + A\overline{B} + \overline{B}C &= 1 \\ (A\overline{B} + \overline{A}B) + (\overline{B}C + B\overline{C}) &= 1 \\ B(A + \overline{A}) + \overline{B}(C + \overline{C}) &= 1 \\ B + \overline{B} &= 1 \\ 1 &= 1 \end{aligned}$$

c)

$$\begin{aligned} Y + \overline{X}Z + X\overline{Y} &= X + Y + Z \\ &= Y + X\overline{Y} + \overline{X}Z \quad (\text{Dist. Prop.}) \\ &= (Y + X)(Y + \overline{Y}) + \overline{X}Z \quad (A+BC = (A+B)(A+C)) \\ &= Y + X + \overline{X}Z \quad (\text{Dist. Prop.}) \\ &= Y + (X + \overline{X})(X + Z) \quad (A+BC = (A+0)(A+C)) \\ &= Y + X + Z \\ &= X + Y + Z \end{aligned}$$

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(2-10)

a) $(XY + Z)(Y + XZ) = F$

X	Y	Z	XY	XZ	XY + Z	XZ + Y	F
0	0	0	0	0	0	0	0
0	0	1	0	0	1	0	0
0	1	0	0	0	0	1	0
0	1	1	0	0	1	1	1
1	0	0	0	0	0	0	0
1	0	1	0	1	1	1	1
1	1	0	1	0	1	1	1
1	1	1	1	1	1	1	1

$$\sum m(3, 5, 6, 7) = \bar{X}Y\bar{Z} + X\bar{Y}Z + XY\bar{Z} + XYZ$$

$$\prod M(0, 1, 2, 4) = (X + Y + Z)(X + Y + \bar{Z})(X + \bar{Y} + Z)(\bar{X} + Y + \bar{Z})$$

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c) $WX\bar{Y} + WX\bar{Z} + WXZ + Y\bar{Z} = F$

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

$\Sigma m(2, 6, 10, 12, 13, 14, 15)$

$= \bar{W}\bar{X}Y\bar{Z} + \bar{W}XY\bar{Z} + W\bar{X}Y\bar{Z} + WX\bar{Y}\bar{Z}$
 $+ WX\bar{Y}Z + WX\bar{Y}Z + WX\bar{Y}Z$

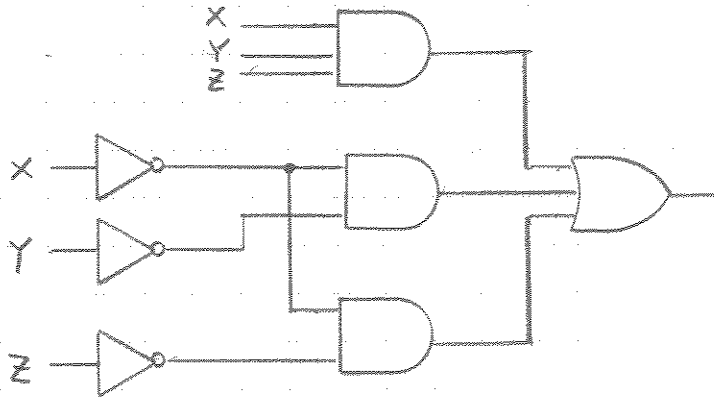
$\Pi M(0, 1, 3, 4, 5, 7, 8, 9, 11)$

$= (W+X+Y+Z)(W+X+Y+\bar{Z})(W+X+\bar{Y}+\bar{Z})$
 $(W+\bar{Y}+Y+Z)(W+\bar{X}+Y+\bar{Z})(W+\bar{X}+\bar{Y}+\bar{Z})$
 $(\bar{W}+X+Y+Z)(\bar{W}+X+Y+\bar{Z})(\bar{W}+X+\bar{Y}+\bar{Z})$

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2-13)

a) $XYZ + \bar{X}\bar{Y} + \bar{X}\bar{Z}$



b) $B(\bar{A}\bar{C} + AC) + \bar{D}(A + \bar{B}C)$

