Assignment 4

Example: -
$$\mathbf{E} = \overline{x}y\overline{z} + x\overline{y}\overline{z}$$

$$\overline{F} = (xy+\overline{y}+z)(\overline{x}+y+z)$$

* Minterms and Maxterims for 2 variables?

		1		-
x	9	Index	Minterm	Manterm
0	0	0	mo = 75	Mo=x+y
0	2	011	$m_1 = \pi y$	M, = 2+9
1	8.	20199	m2 = 2 x y	M2 = x+y
	lome	100 20	m3 = 249	M3 = 7 + 9

- · Mintemen evaluates with I for each combination of of and y.
- · mantern evaluates with O.
- Maxterm is the complement of the minterm. $M_i = \overline{m_i}$ and $m_i = \overline{M_i}$

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*Mintorins and Marterins for 3 variables: -

x	y	Z	Index	menterm	maxtorm
0	0	0	0	m= 71 7 2	Mo=n+y+z
0	0	1	1	m1= xgz	M1 = 2+9+2
0	1	0	2	m2 = xy 2	M2 = 2+3+Z
0	1	1	3	m3 = Tyz	M3 = 2+9+2
	0	0	4	my = 25 Z	My = x+y+Z
7	0	1	5	m5 = 2752	M5 = 7+9+Z
7	1	0	6-80	me = nyZ	M6= 7+ 9+2
1	1	10	7	m7 = nyz	M7 = 7+9+Z
			2011	LAND MAN	OW XOBOL

*For minterins, I' means the variable is "Not complemented" and 'o' means the variable is "complemented"

* For Maxterims, "0' means variable is not complemented", and '1' means the variable is complemented.

* Sum- Of - Minterm (SOM) 0-

- Sum-of-Minterm (50 m) canonical tours:
Sum of minterms of enthres that evaluate
to '1'.

				1	
-	x	9	® Z	Finnenteron (1)	
Constitution of the last	0	0	0	Omney temporalists to the transfer of the state of the st	
on other sections are the	0	0	1		
-	4.0	10	0	was all the to end on to end on the must deal at	
Section (section)	0	1	1	Sign below to content to	
	1	0	0	0	
	1	0	1	on the major and the to	
-	1	T	(00	m6= nyz	
and the second	Ī	1	m + 1"	$m_7 = xyz$	
		9	1		

m_1+m_6+m_7 = \(\frac{1}{6},6,7\) = \(\frac{7}{2}\) = \(\frac{7}{2}\) + \(\chi\) * Product-of-Maxterra (POM) ?-POM of entines that evaluate to '0'.

y	Z	F	an:	Maxterm
0	0	1		1000
0	tha m	11	14	03 DAT W. ALGOR
1	0	0		M2 = (x+g+z)
1	7	1		
0	0	0		My = (7+19+2)
0	1	1		
1	0	0		$M_6 = (\overline{n} + \overline{g} + z)$
1	1	1		
	0 0 0	0 0 1 0 0 1 1 1 0 0 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0	0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 1 0 0 1 1 1 1 0 1	0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1

to for gottons

* converting to Sum-of-Minterons Form:

A Function that is not in the SOM form can be converted to that form by means of a truth table.

· Consider F= y+xz

n	9	Z	F	menterm	E = 4(0)
0	0	0	1	mo = xyz	F= 2(0,1,2,4,5)
0	0	1	1	m1= 2 2	= motmitmitmy + my + m5
0	1	0	1	m2= 2 yz	
0	1	1	0		コカダマナカダマナカダマナカダマナカダマ
t	0	0	1	my=24 =	F= (1,0,1) = = (1,6,7) =
1	0	1	1	m5 = x 9 2	
A CONTRACTOR OF THE PARTY OF TH		0		1.0 (N	* Product of Marteum (PO)
1	1	1	0		toulous trub southers to MOT

$$F = 2(0,1,2,4,5)$$
 = $\frac{1}{2}$ = $\frac{1}$ = $\frac{1}{2}$ = $\frac{1}{2}$ = $\frac{1}{2}$ = $\frac{1}{2}$ = $\frac{1}{2}$ =

1 10 0 0 1

* Converting to Product-of-Maxterms Form:

A function that is not in the POM form can't be convented to that form by means of a truth table.

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· Consider F= y+nz

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X	4	Z	F	Maxterm - 10- have of motors most standy that
0	0	0	1	Pl pletoshas of Jangs could the briggs .
	1			F= 17 (3,6,7) = M3.M6.M7
0	1	0	1	3 16 101
0	1	1	0	$M_3 = (n+\overline{y}+\overline{z})$ = $(n+\overline{y}+\overline{z})(\overline{n}+\overline{y}+\overline{z})(\overline{n}+\overline{y}+\overline{z})$
1	0	0	1	THE HOLD THE PUT THE PER CONTRACTOR OF THE P
1	0	1	1	Ex+ Dx + Cx = 3
1	1	0	0	M625 (7+9+2) m+m+Em +
t	1	1	0	$M_7 = (\bar{n} + \bar{y} + \bar{z})$

$$F = \Pi(3,6,7) = M_3 \cdot M_6 \cdot M_7$$

$$= (n+y+z)(n+y+z)(n+y+z)$$

$$= (n+y+z)(n+y+z)$$

o Frample 2 & B = a+6C

* conversion Between canonical forms:

n	9	7	For	Minterin	Maxterm
0	0	0	0	- 0 k C + 0 k d	Mo=(n+y+z)
0	0	01	1	mj= xyz	3.2
0	1	0	1 13	m2 = x42	1 thus from = P
0	1	1	1	m3= 272	
1	0	0	0	1 -10 - 20pt	My=(7+4+2)
1	0	1	4.91	m5 = 292	San Samet 1
1	1	0	0	La Carlo Com	M62(1+9+2)
1	1	1	1	m7 = 2472	
		1 8 8	1	10 60	

$$F^{2}$$
 $m_{1}+m_{2}+m_{3}+m_{5}+m_{7}^{2} \leq (1,2,3,5,87) =$
 $\pi yz + \pi yz + \pi yz + \pi yz + \pi yz$

F= 18 Mo. My. M62 17(0,4,6) = (184447) (n+y+z) (n+y+z) (n+y+z)

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* Algebraic conversion to sum- Of- monterons:
· Expand all terms thust to explicitly list all mintering
 · And any term missing a variable v with (V+V)
 · Example 1 ° = x+ ny (B2 variables)
          f= x (y+g) + xy
           f= xy+ny+ny
           f 2 m3+m2+m = 2 2 ($20,2,3)
                                       0 6 1 1
  · Example 2 : 9 = a+bc (3 variables)
            9= a(b+5) (c+ē) + (a+ā) 5c
                                       to consumon of
           82 abetabetabetabetabetabe
           8 = abc+abc+abc+abc+abc
           8 = m1 + m4 + m5 + m6 + m87 = 2 (14,5,6,87)
*Algebracie Conversion to Product of Maxterins :-
  · Expand all terms first to explicitly list all maxterims.
  o On any term missing a variable v with v.v.
  · Example 1: f= n+ ng (2 vaniables)
   Apply 2nd distributive law:
   f = (n+x) (n+y) = 1. (n+y) = (n+y) = M1
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L= 100 (10 1 10) = (10 10) = (10 10) (10 10 10) (10 10 10)

Example 2%- $g = a\bar{c} + bc + \bar{a}\bar{b}$ (3 vaniables) $g = (a\bar{c} + bc + \bar{a}) (a\bar{c} + bc + \bar{b})$ [destibutive] $g = (\bar{c} + bc + \bar{a}) (a\bar{c} + c + b)$ [$n + \bar{n} y = n + g$] $g = (\bar{c} + b + \bar{a}) (a + c + \bar{b})$ [$n + \bar{n} y = n + g$] $g = (\bar{c} + b + \bar{a}) (a + c + \bar{b})$ [$n + \bar{n} y = n + g$] $g = (\bar{a} + b + \bar{c}) (a + \bar{b} + c) = M_5 \cdot M_2 = \Pi(2,5)$

* Standard Sum-of-Products (SOP)

· A Simplification Example:-F(A,B,C)= & (1,4,5,6,7)

Mintern Expression 8-

F= ABC+ABC+ABC+ABC+ABC

59mpli fying: -

F = ABC + A (BC+BC+BC)

F= ABC+A(B(C+c)+B(E+c))

F = ABC+ A (B+B)

F = ABC +A

F = BC+A

Simplified F contains 83 literals compared to 15.