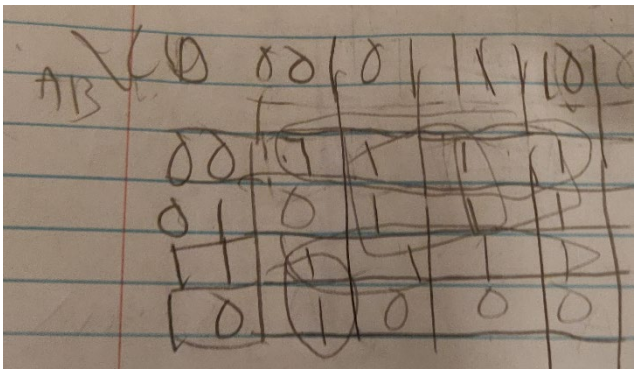
HOMEWORK 6

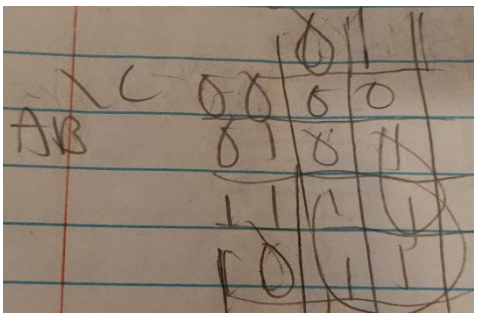
1) For the following functions simplify using K-Map

$$f(A, B, C, D) = (A + B' + C + D)(A' + B + C')(A' + B + C + D')$$



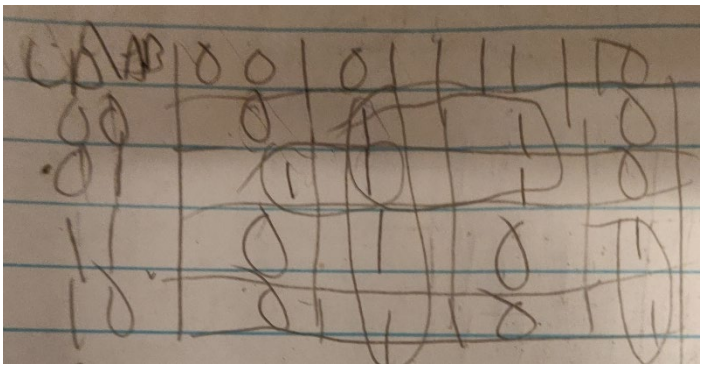
AC'D'

$$f = (A + B + C)(A + B + C')(A + B' + C)$$



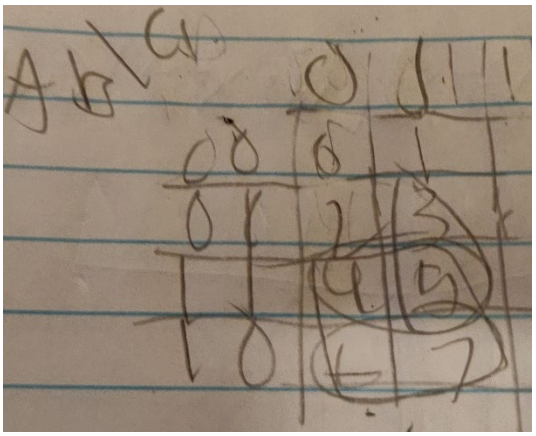
BC+A

$$F(a, b, c, d) = (a + b + \bar{d})\,(a' + c)\,(a' + b' + c')\,(a + b + c' + d')$$



B+BC'

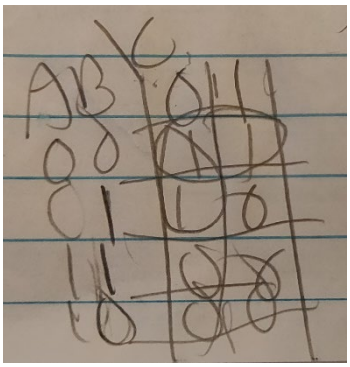
$$f' = \Pi\, M(3, 4, 5, 6, 7) = \; M_3 M_4 M_5 M_6 M_7$$



C

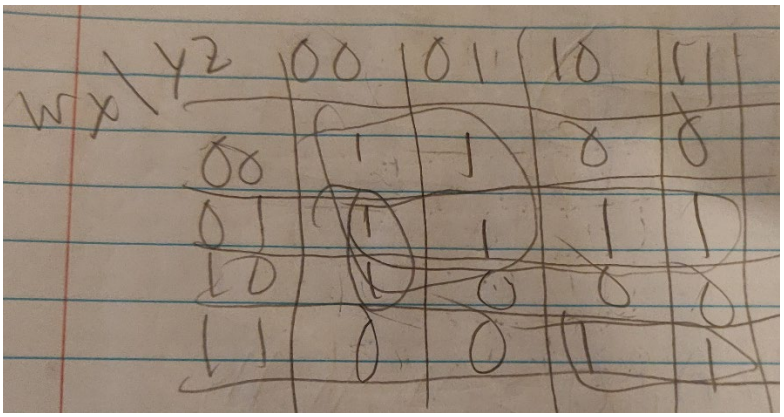
$$f(A, B, C) = M_0 M_1 M_2$$

$$f = (A + B)(A + B' + C)$$



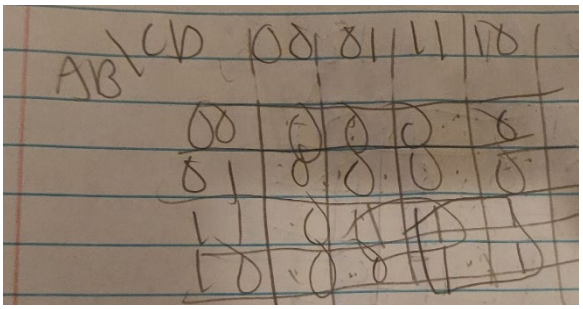
A+C

$$F_1 = (x + y' + z)(w' + x' + y)(w + x + y')(w' + y + z')$$



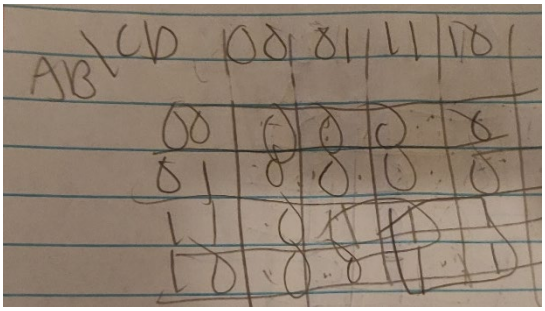
WX+Y

$$f(A, B, C) = m_3 + m_4 + m_5 + m_6 + m_7$$

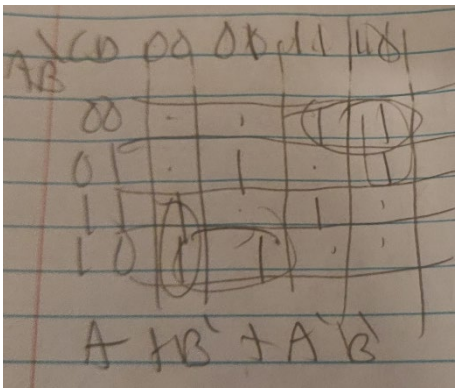


AB+C

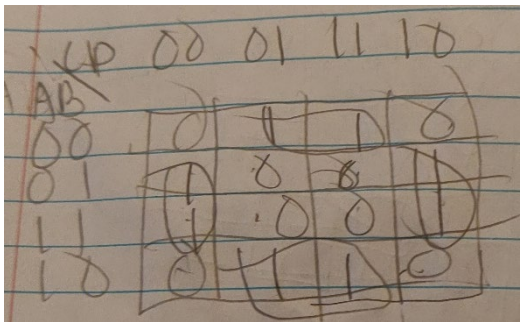
$$X(A, B, C, D) = \Sigma\, m(7, 10, 11, 13, 14, 15)$$
$$Y(A, B, C, D) = \Sigma\, m(2, 3, 5, 6, 8, 9, 12, 15)$$
$$Z(A, B, C, D) = \Sigma\, m(1, 3, 4, 6, 9, 11, 12, 14)$$



X=AC+B



Y=A+B'+A'B'

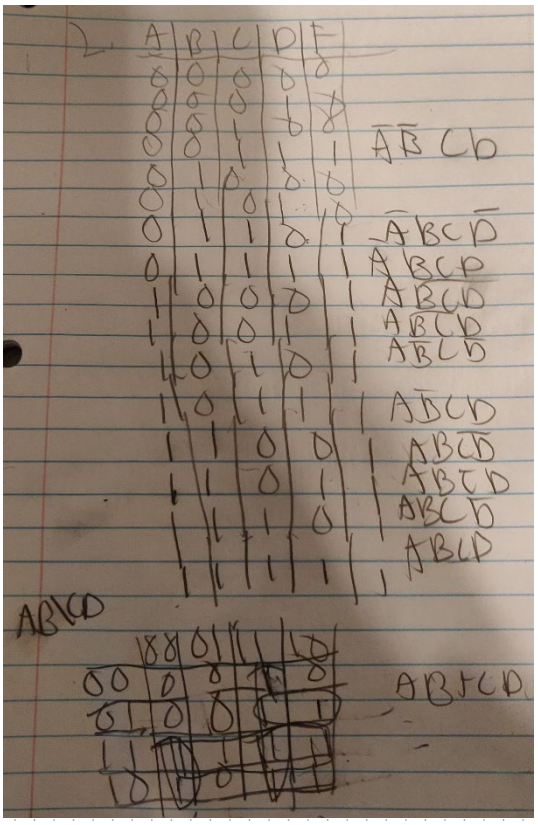


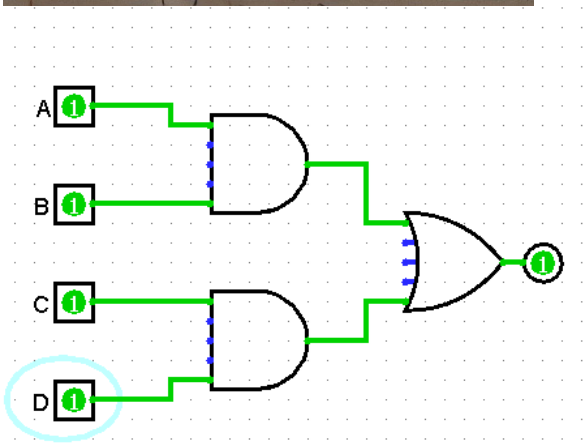
Z=A+C

2) Derive the Boolean function in a POS form from the following truth table

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

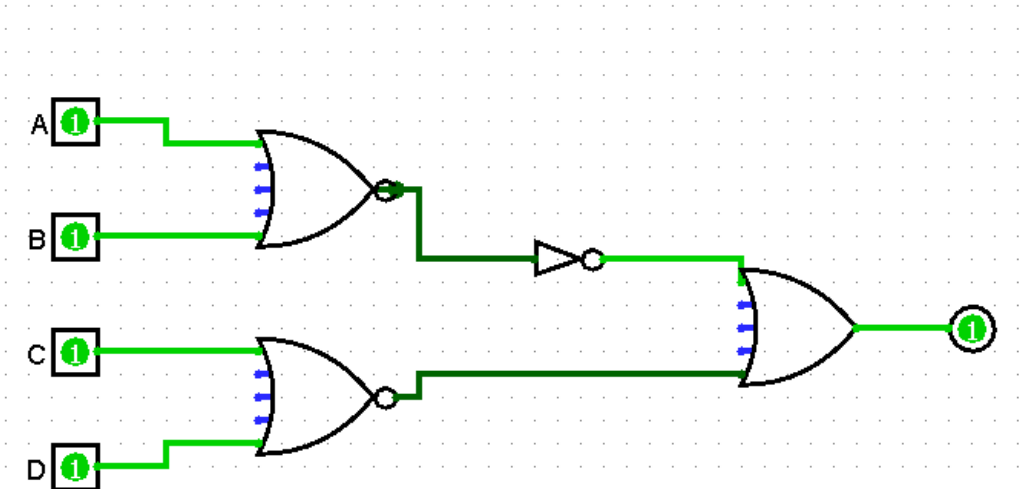
Draw the circuit in Logisim and test the truth table
Simplify the function using KMap.





AB+D+A

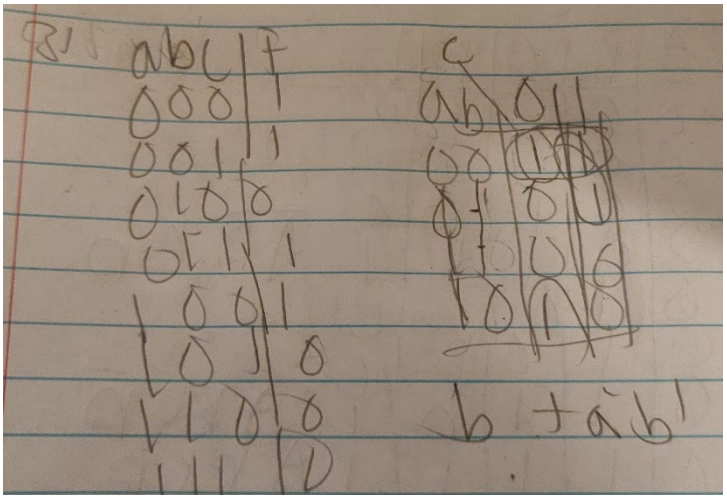
Design an equivalent circuit only using NOR gates and test the truth table using Logisim.

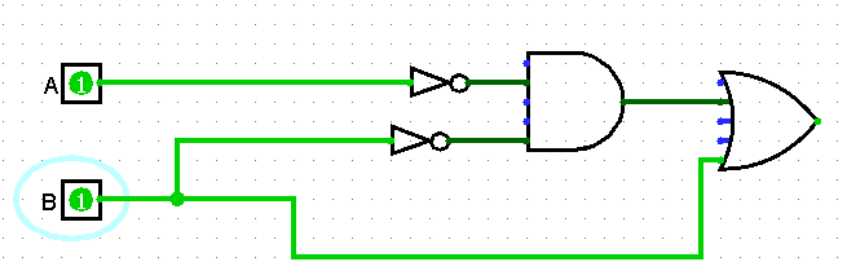


3) From the following truth table derive the Boolean Expression in a POS from, simplify using K-Map and draw the Logic Diagram that represent the simplified circuit.

a b c	*F*
0 0 0	1
0 0 1	1
0 1 0	0
0 1 1	1
1 0 0	1
1 0 1	0
1 1 0	0
1 1 1	0

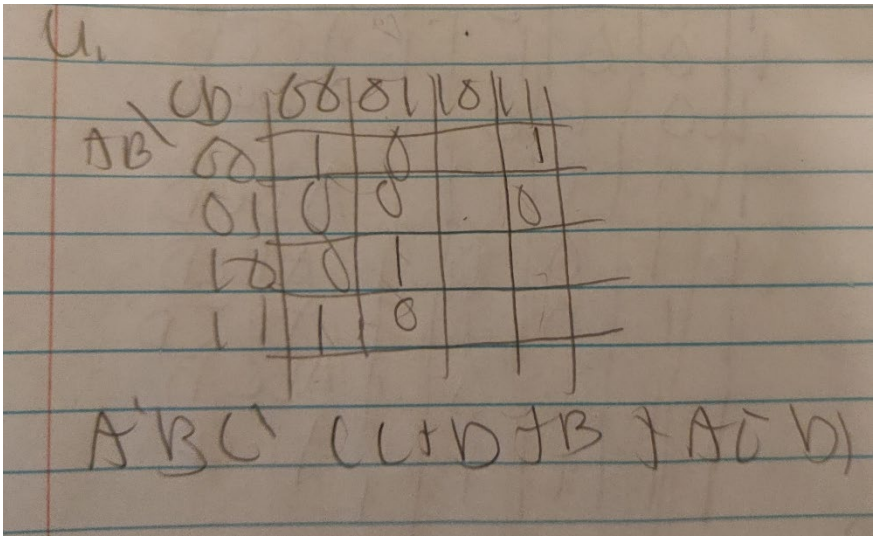
B+A'B'

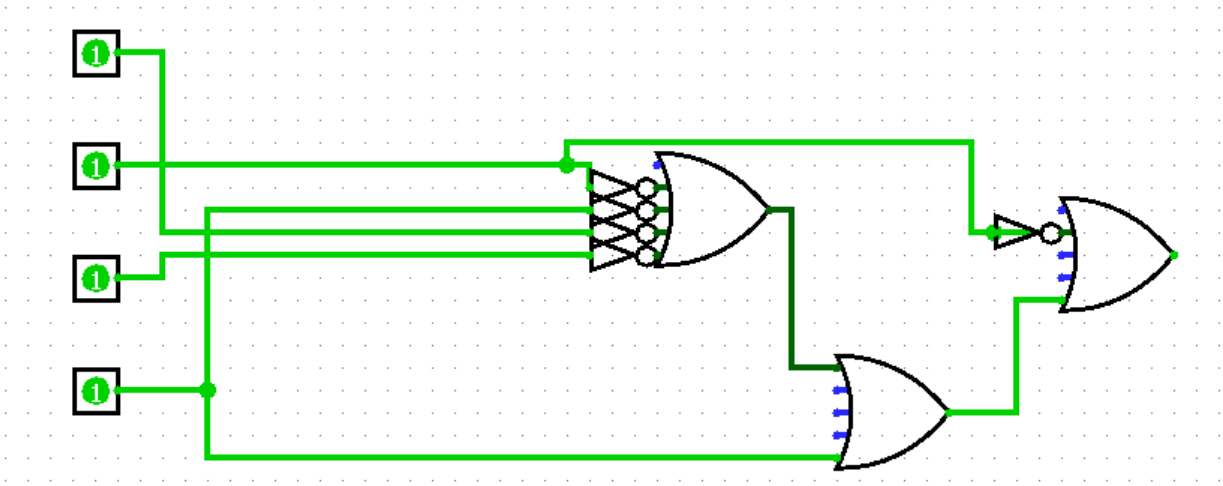




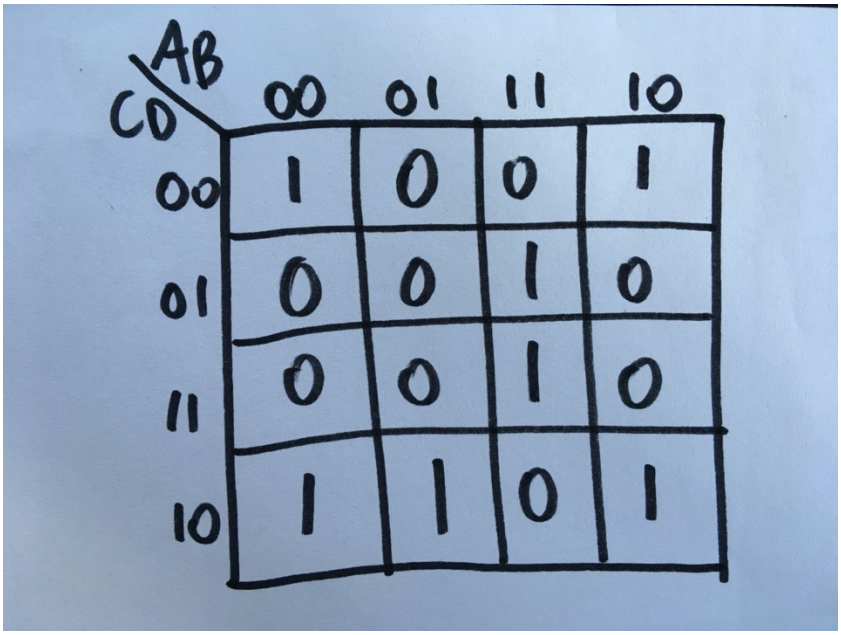
4) From the following truth table derive the Boolean Expression in a POS from, simplify using K-Map and draw the Logic Diagram that represent the simplified circuit.

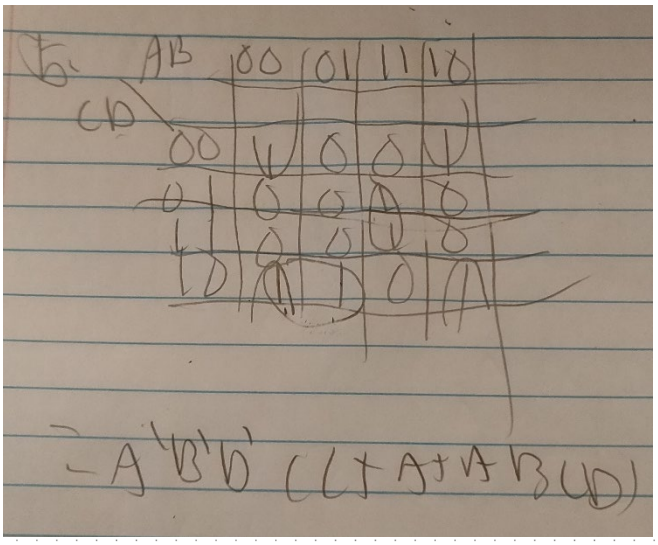
A	B	C	D	Z
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	X
1	0	1	1	X
1	1	0	0	X
1	1	0	1	X
1	1	1	0	X
1	1	1	1	X

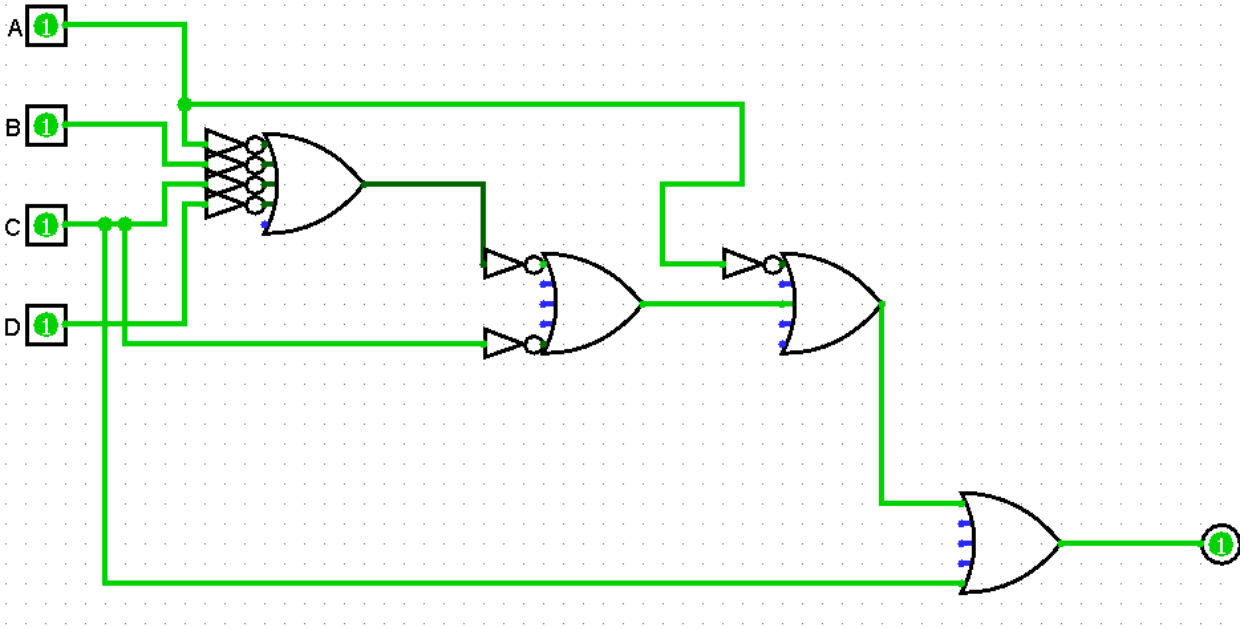




5) From the following K-Map derive the simplified Boolean Expression in a SOP and in a POS form. Draw both Logic Diagram that represent the circuits.




AB
00
01
11
10
CD
$\bar{A}\bar{B}\bar{D}(C+A+AB\bar{C}D)$


A
B
C
D
1