1a) $T_2 = (A' D)'$

$T_1 = (T_2 A')'$

$T_3 = A' + BC$

$F = T_1 T_3$

$G_1 = (T_2 T_3)'$

b) $T_2 = A + D'$

$T_1 = ((A+D')A')'$

$= (A'D')' = A+D$

$T_3 = A' + BC$

$F = T_1 T_3 = (A+D)(A' + BC)$

$= ABC + A'D + BCD$

$= ABCD + ABCD' + A'BCD + A'B'CD + A'BC'D + AB'C'D + ABCD + A'BCD$

$= ABC + A'D$

$G_1 = (T_2 T_3)' = T_2' + T_3'$

$= A'D + A(BC)'$

$= A'D + AB' + AC'$

$\therefore F = ABC + A'D$

$G_1 = A'D + AB' + AC'$

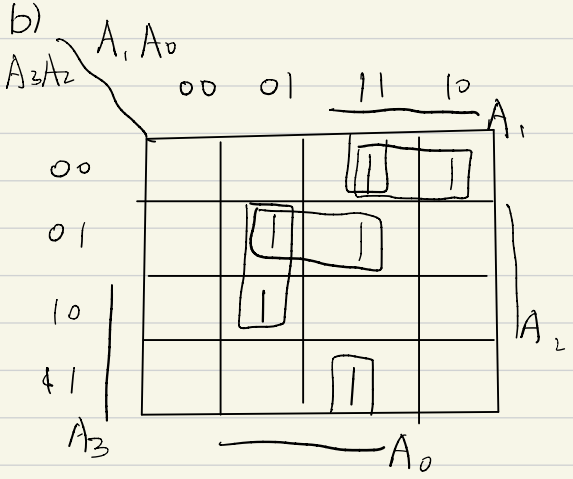
c).

A	B	C	D	T_1	T_2	T_3	F	G
0	0	0	0	0	1	1	0	0
0	0	0	1	1	0	1	1	1
0	0	1	0	0	1	1	0	0
0	0	1	1	1	0	1	1	1
0	1	0	0	0	1	1	0	0
0	1	0	1	1	0	1	1	1
0	1	1	0	0	1	1	0	0
0	1	1	1	1	0	1	1	1
1	0	0	0	1	1	0	0	1
1	0	0	1	1	1	0	0	1
1	0	1	0	1	1	0	0	1
1	0	1	1	1	1	0	0	1
1	1	0	0	1	1	0	0	1
1	1	0	1	1	1	0	0	1
1	1	1	0	1	1	1	1	0
1	1	1	1	1	1	1	1	0

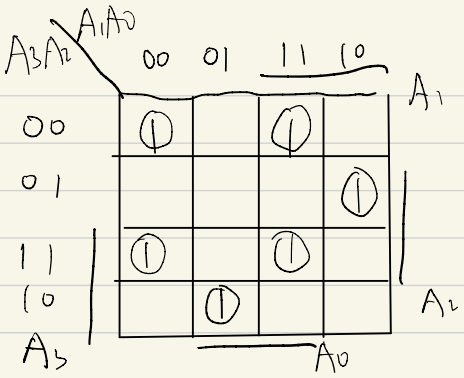
2a)

A_3	A_2	A_1	A_0	P	D
0	0	0	0	0	1
0	0	0	1	0	0
0	0	1	0	1	0
0	0	1	1	1	1
0	1	0	0	0	0
0	1	0	1	1	0
0	1	1	0	0	1
0	1	1	1	1	0
1	0	0	0	0	0
1	0	0	1	0	1
1	0	1	0	0	0
1	0	1	1	1	0
1	1	0	0	0	1
1	1	0	1	1	0
1	1	1	0	0	0
1	1	1	1	0	1

b)



$$P = A_0A_1A_2' + A_1A_2'A_3' + A_0A_2A_3' + A_0A_1'A_2$$



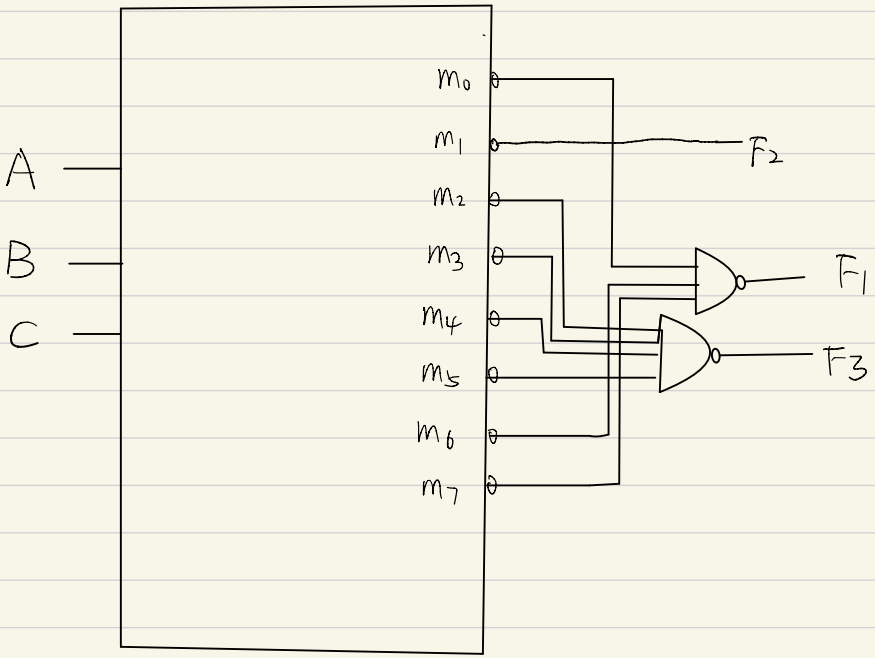
$$D = A_3'A_2'A_1'A_0' + A_3'A_2'A_1A_0 + A_3'A_2A_1A_0' + A_3A_2A_1'A_0 + A_3A_2A_1A_0 + A_3A_2'A_1'A_0.$$

3. $F_1 = AB + A'B'C' = ABC + ABC' + A'B'C' = m_7 + m_6 + m_0$

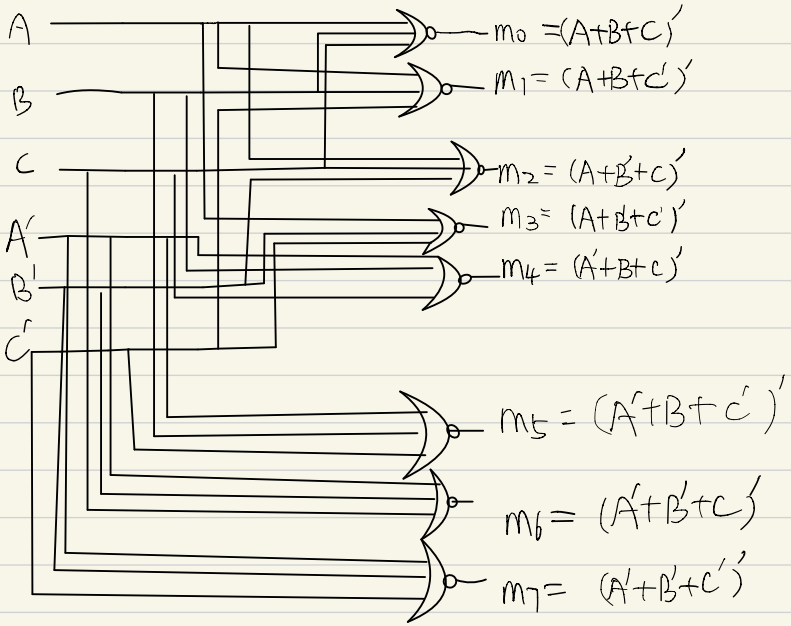
$F_2 = A + B + C' = (A'B'C)' = m_1'$

$F_3 = A'B + AB' = A'BC + A'BC' + AB'C + AB'C'$

$= m_3 + m_2 + m_5 + m_4$



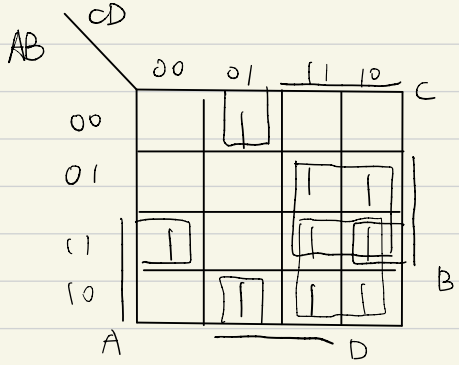
4. A B C



5. a)

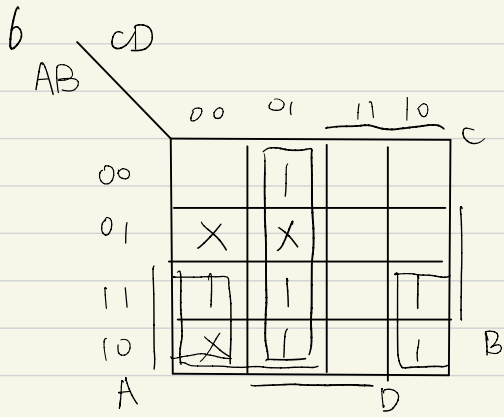
A	B	C	F
0	0	0	D
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	D
1	0	1	1
1	1	0	D′
1	1	1	1

b) $F = A'B'C'D + A'BC + AB'C'D + AB'C + ABC'D' + ABC$



$F = BC + AC + AB'D + B'C'D$

b

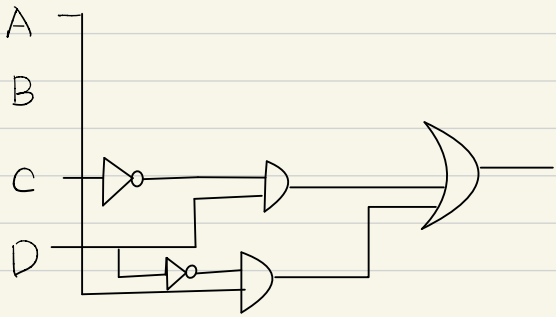


$F = C'D + AD'$

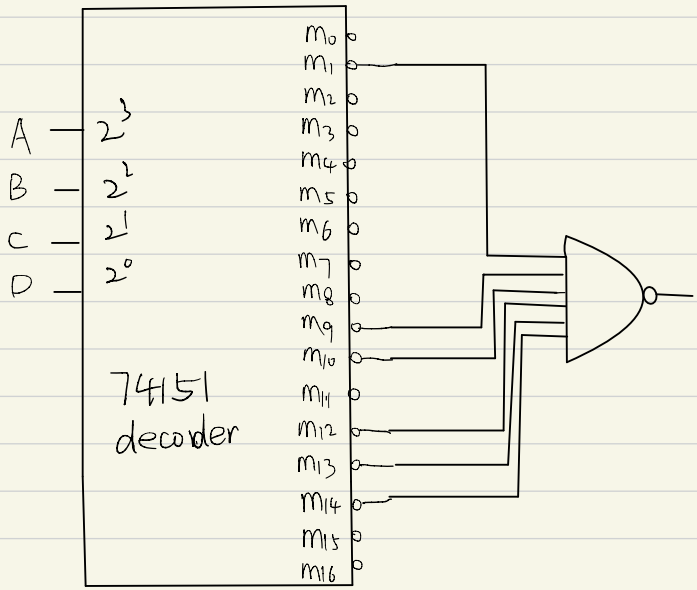
$= \Sigma(1,5,8,9,10,12,13,14)$

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

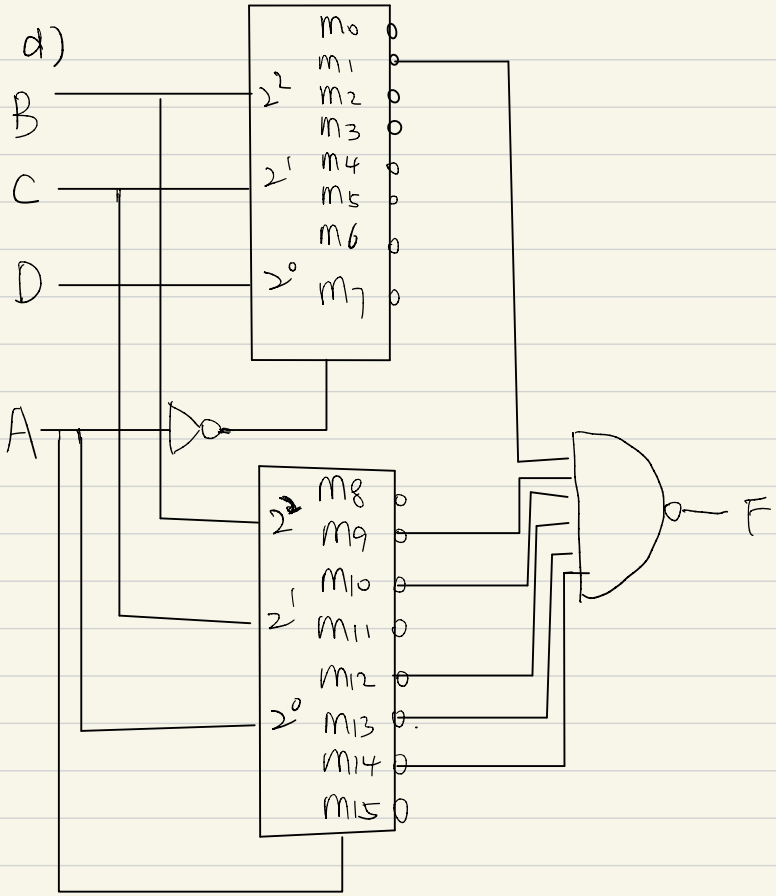
b) $F = C'D + AD'$


A
B
C
D

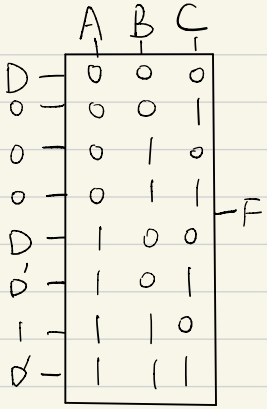
c)


A
B
C
D
2^3
2^2
2^1
2^0
74151
decoder
m_0
m_1
m_2
m_3
m_4
m_5
m_6
m_7
m_8
m_9
m_{10}
m_{11}
m_{12}
m_{13}
m_{14}
m_{15}
m_{16}

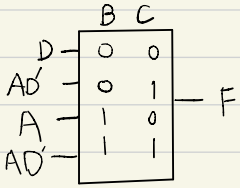
d)



e)



f)



B=0 C=0 F=D'

B=0 C=1 F=AD'

B=1 C=0 F=A

B=1 C=1 F=AD'