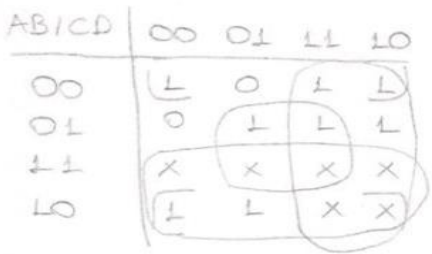
CSE232 HW2 2022

1)

Truth Table

Numbers	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	1	1	1	1	1	1	0
1	0	0	0	1	0	1	1	0	0	0	0
2	0	0	1	0	1	1	0	1	1	0	1
3	0	0	1	1	1	1	1	1	0	0	1
4	0	1	0	0	0	1	1	0	0	1	1
5	0	1	0	1	1	0	1	1	0	1	1
6	0	1	1	0	1	0	1	1	1	1	1
7	0	1	1	1	1	1	1	0	0	0	0
8	1	0	0	0	1	1	1	1	1	1	1
9	1	0	0	1	1	1	1	1	0	1	1

K-MAP FOR a

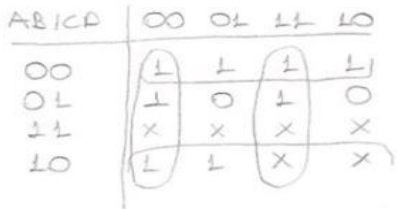


$a = C + BD + A + B'D'$

$a = \sum m(0,2,3,5,6,7,8,9) + \sum d(10,11,12,13,14,15)$

↳ don't care conditions

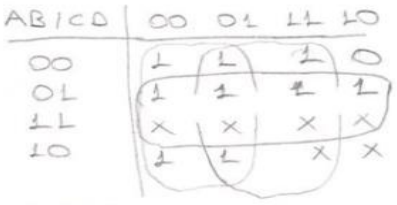
K-MAP FOR b



$b = C'D' + CD + B'$

$b = \sum m(0,1,2,3,4,7,8,9) + \sum d(10,11,12,13,14,15)$

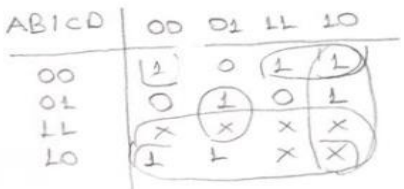
K-MAP FOR c



$c = C' + D + B$

$c = \sum m(0,1,3,4,5,6,7,8,9) + \sum d(10,11,12,13,14,15)$

K-MAP FOR d



$d = A + CD' + A'B'C + BC'D + B'D'$

$d = \sum m(0,2,3,5,6,8,9) + \sum d(10,11,12,13,14,15)$

K-MAP FOR e

AB\CD	00	01	11	10
00	1	0	0	1
01	0	0	0	1
11	X	X	X	X
10	1	0	X	X

$e = CD' + B'D'$

$e = \Sigma m(0,2,6,8) + \Sigma d(10,11,12,13,14,15)$

K-MAP FOR F

AB\CD	00	01	11	10
00	1	0	0	0
01	1	1	0	1
11	X	X	X	X
10	1	1	X	X

$F = C'D' + A + BC' + BD'$

$F = \Sigma m(0,4,5,6,8,9) + \Sigma d(10,11,12,13,14,15)$

K-MAP FOR g

AB\CD	00	01	11	10
00	0	0	1	1
01	1	1	0	1
11	X	X	X	X
10	1	1	X	X

$g = BC' + A + CD' + B'C$

$g = \Sigma m(2,3,4,5,6,8,9) + \Sigma d(10,11,12,13,14,15)$

2)

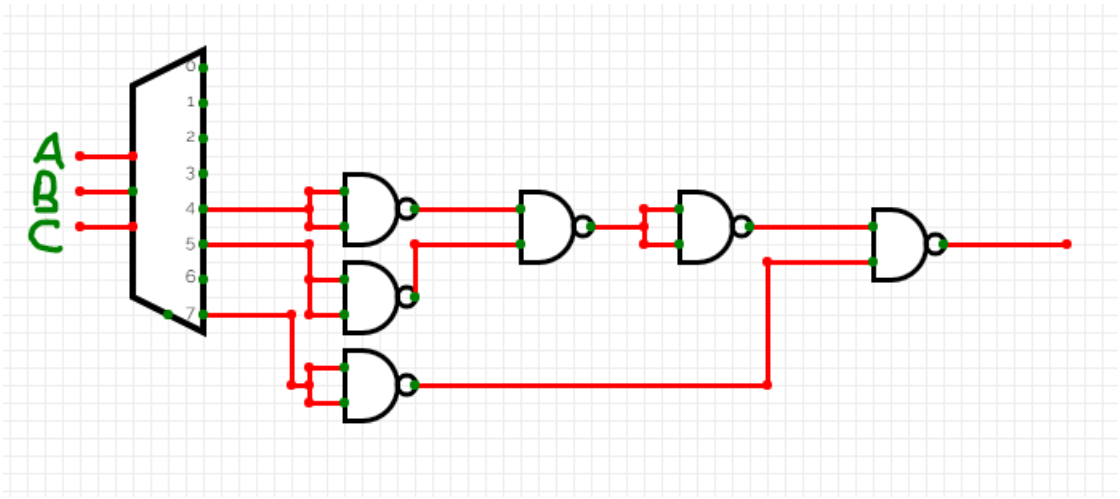
a)

$F(A,B,C) = AB'C + AB' + AC$

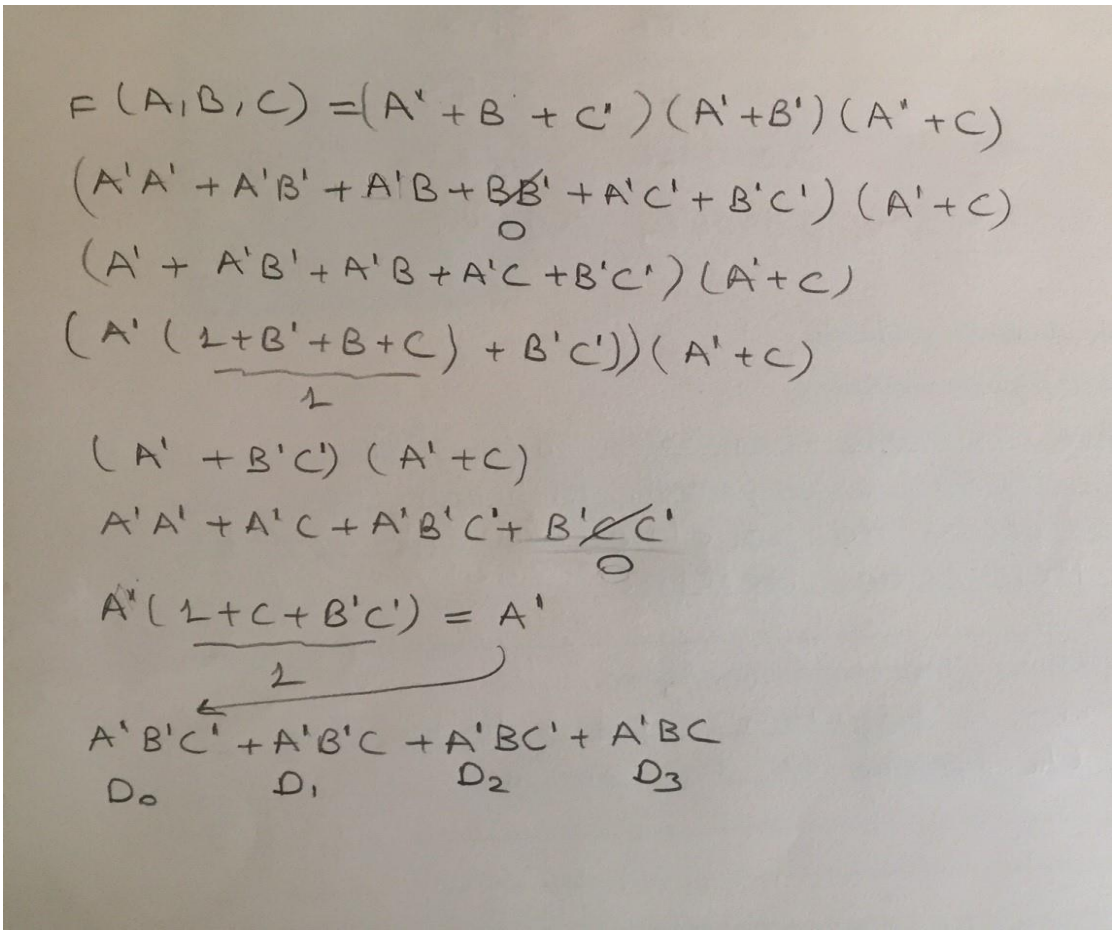
$AB'C + AB'C + AB'C' + ABC + AB'C$

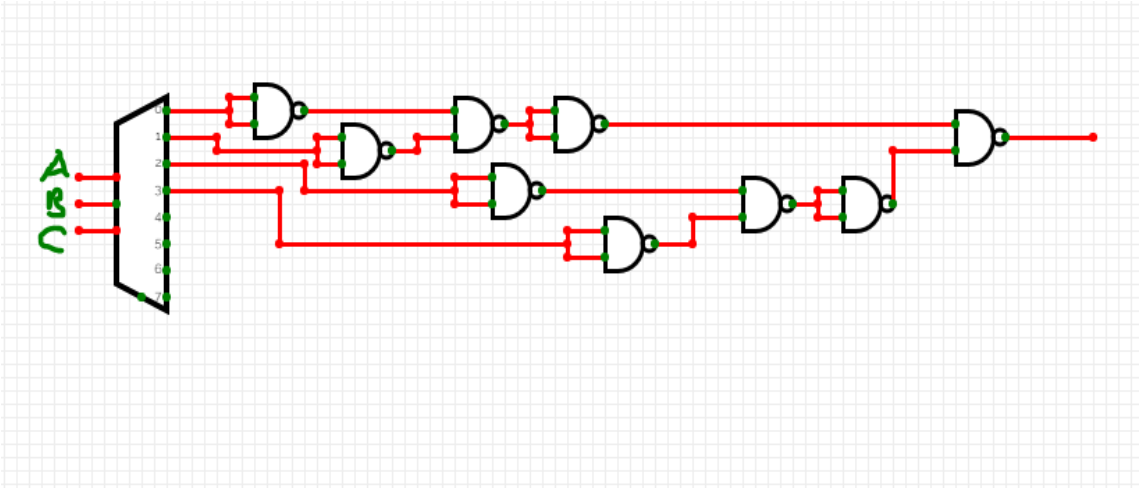
$\boxed{AB'C + AB'C' + ABC}$

$D_5 + D_4 + D_7$


A
B
C
0
1
2
3
4
5
6
7

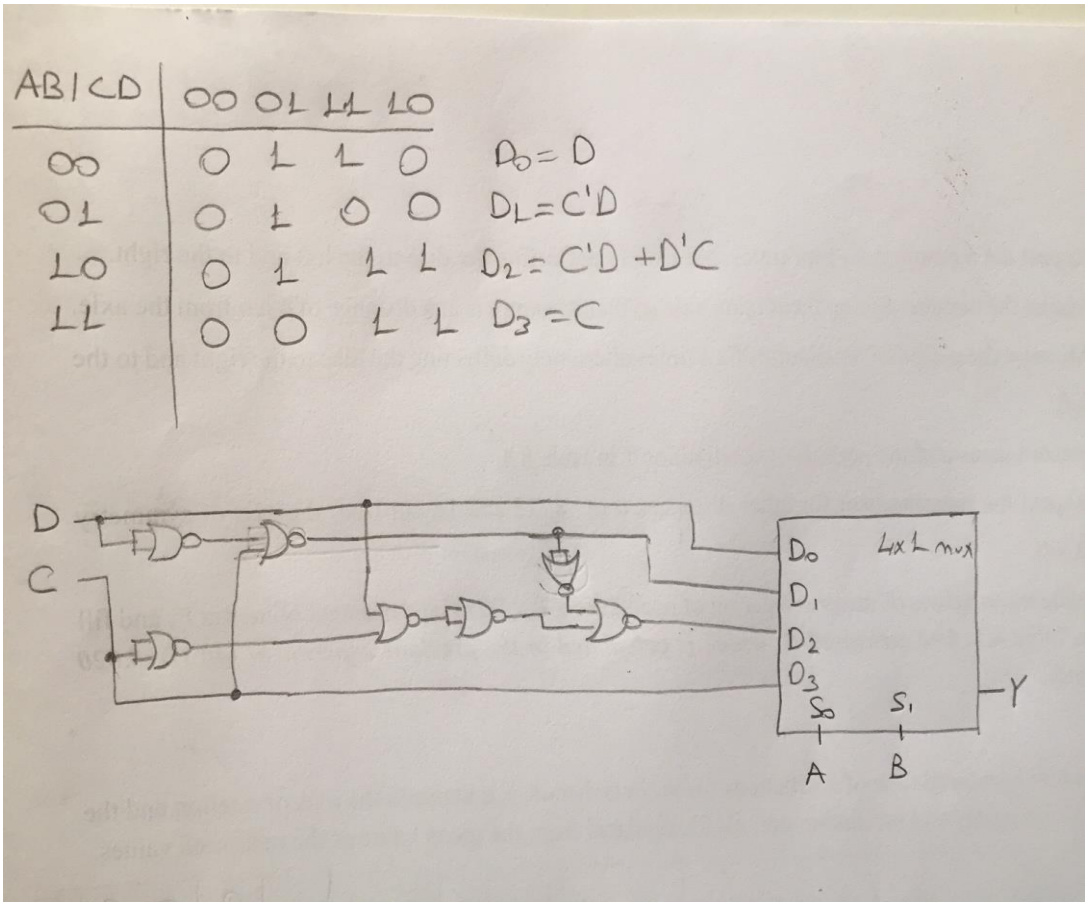
b)


F(A,B,C) = (A' + B + C')(A' + B')(A' + C)
(A'A' + A'B' + A'B + BB' + A'C' + B'C')(A' + C)
0
(A' + A'B' + A'B + A'C + B'C')(A' + C)
(A' (1 + B' + B + C) + B'C'))(A' + C)
1
(A' + B'C')(A' + C)
A'A' + A'C + A'B'C' + B'CC'
0
A'(1 + C + B'C') = A'
1
A'B'C' + A'B'C + A'BC' + A'BC
D0 D1 D2 D3

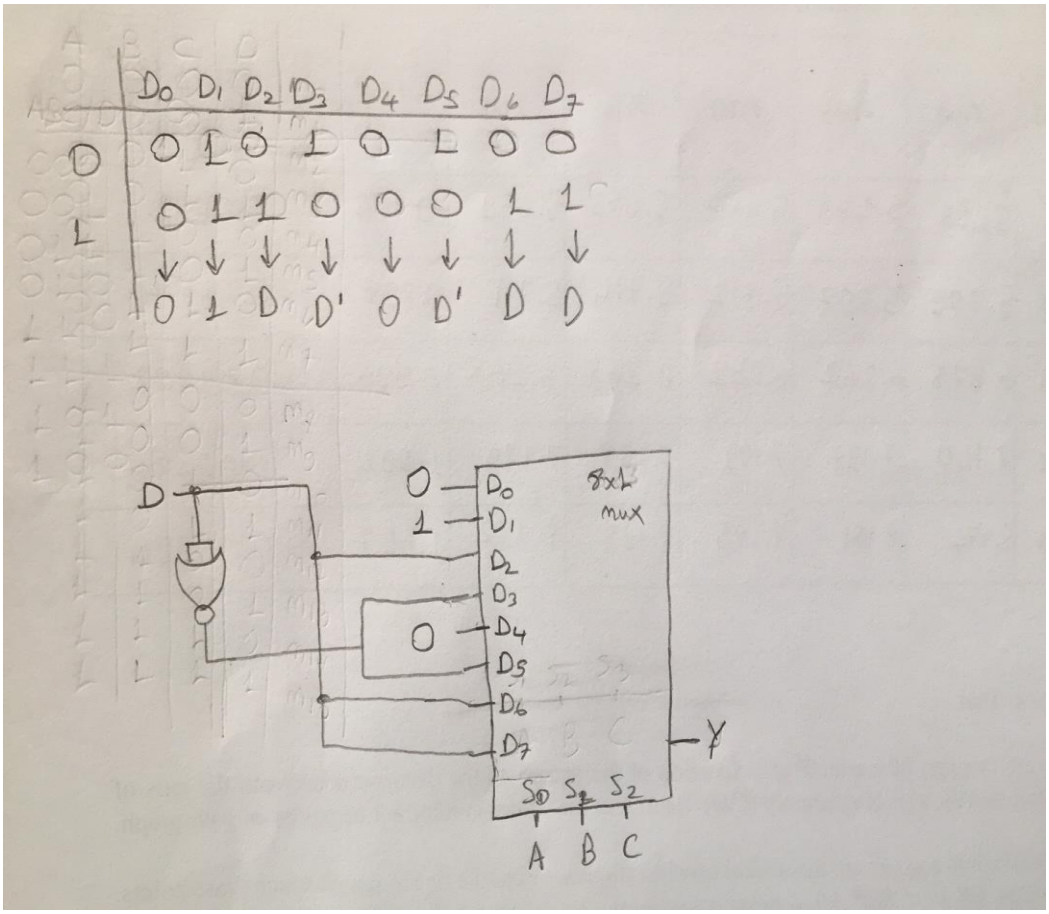

A
B
C

3)

a)


AB\CD
00 01 11 10
00 0 1 1 0
01 0 1 0 0
10 0 1 1 1
11 0 0 1 1
D0 = D
D1 = C'D
D2 = C'D + D'C
D3 = C
D
C
D0
D1
D2
D3
S0
S1
A
B
Y
4x1 mux

b)


D0 D1 D2 D3 D4 D5 D6 D7
0 1 0 1 0 1 0 0
0 1 1 0 0 0 1 1
0 1 D D' 0 D' D D
D
0
1
0
8x1
mux
D0
D1
D2
D3
D4
D5
D6
D7
Y
S0 S1 S2
A B C