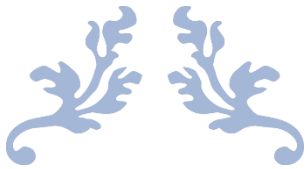

LOGIC CIRCUITS & DESIGN

Homework - 2

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Question 1

1.

Question 1

1. a) $F_1(ABCD) = \sum m(0, 1, 4, 5, 8, 9, 10, 12, 13)$

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

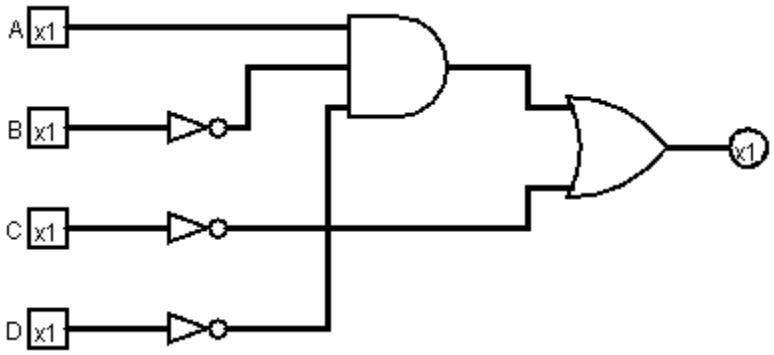
→ $F_1(ABCD) = C' + AB'D'$

b) $F_2(A,B,C,D) = \sum m(3, 5, 7, 8, 9, 10, 11, 13, 15)$

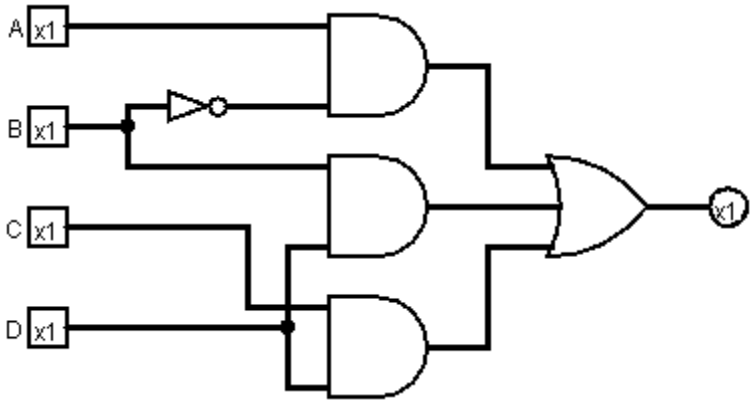
AB \ CD	00	01	11	10
00	0	0	1	0
01	0	1	1	0
11	0	1	1	0
10	1	1	1	1

→ $F_2(A,B,C,D) = AB' + BD + CD$

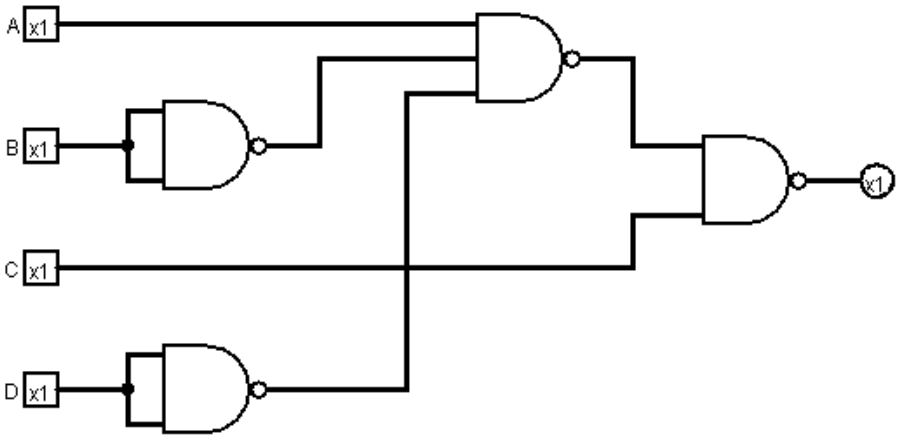
2. F1:



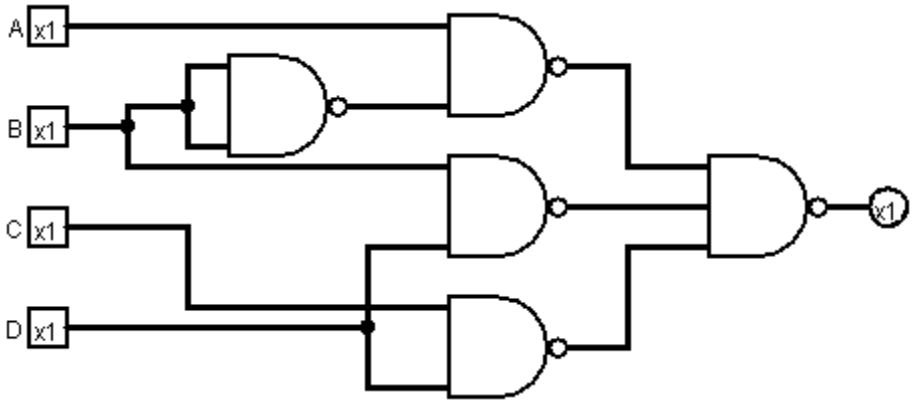
F2:



3. F1 by NAND gates:

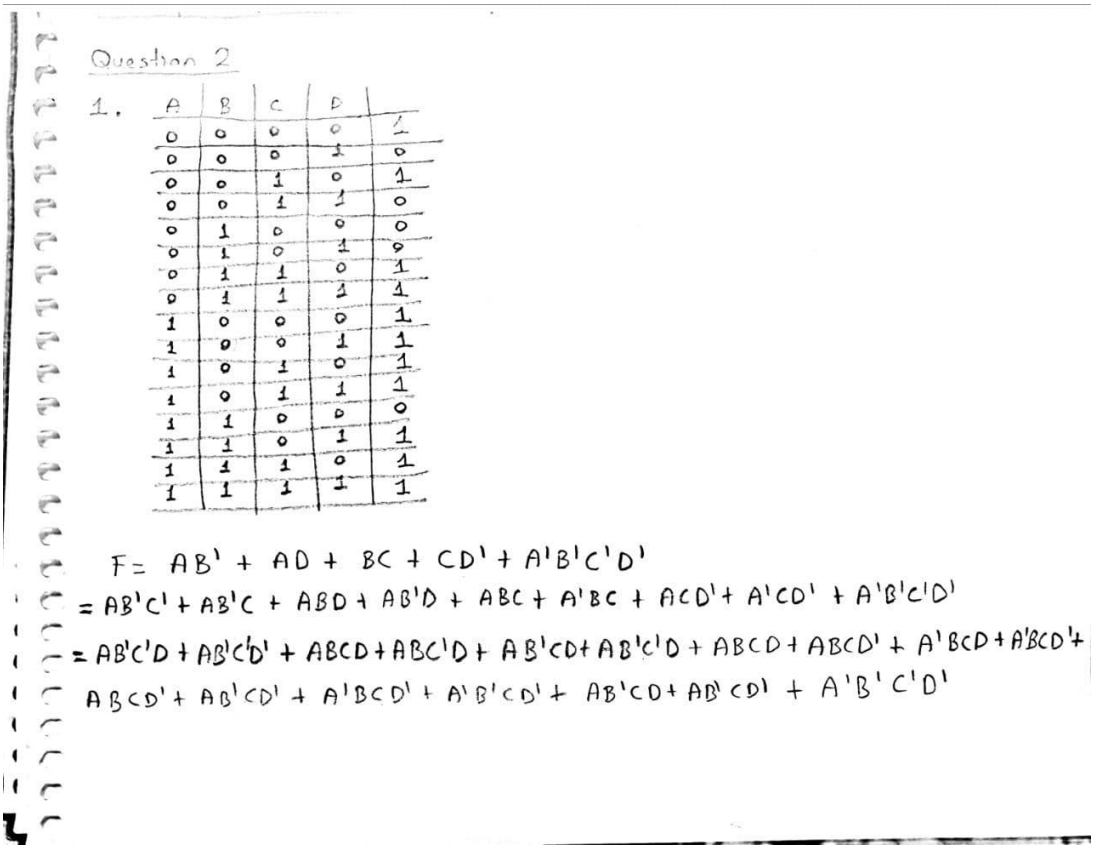


F2 by NAND gates:



Question 2

1 -)



Question 2

1.

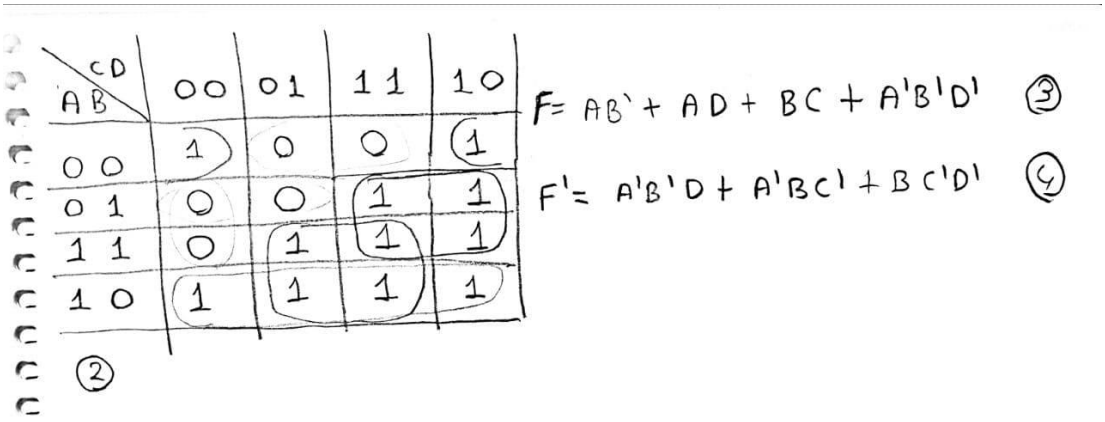
A	B	C	D	
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

$F = AB' + AD + BC + CD' + A'B'C'D'$

$= AB'C' + AB'C + ABD + AB'D + ABC + A'BC + ACD' + A'CD' + A'B'C'D'$

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

2, 3, 4 -)



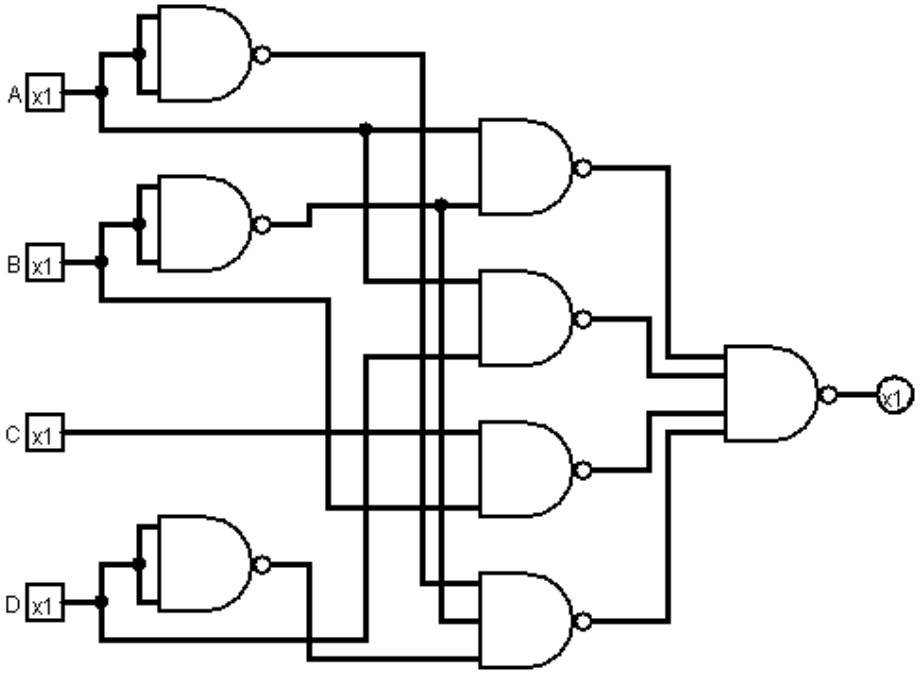
AB \ CD	00	01	11	10
00	1	0	0	1
01	0	0	1	1
11	0	1	1	1
10	1	1	1	1

②

$F = AB' + AD + BC + A'B'D'$ ③

$F' = A'B'D + A'BC' + BC'D'$ ④

5 -) F by NAND gates:



F’ by NAND gates: