CSE 232 – HW2

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Question 1

a.1) F1 Function and Its Karnough Map

F1(A, B, C, D) = ∑m(0, 1, 4, 5, 8, 9, 10, 12, 13)

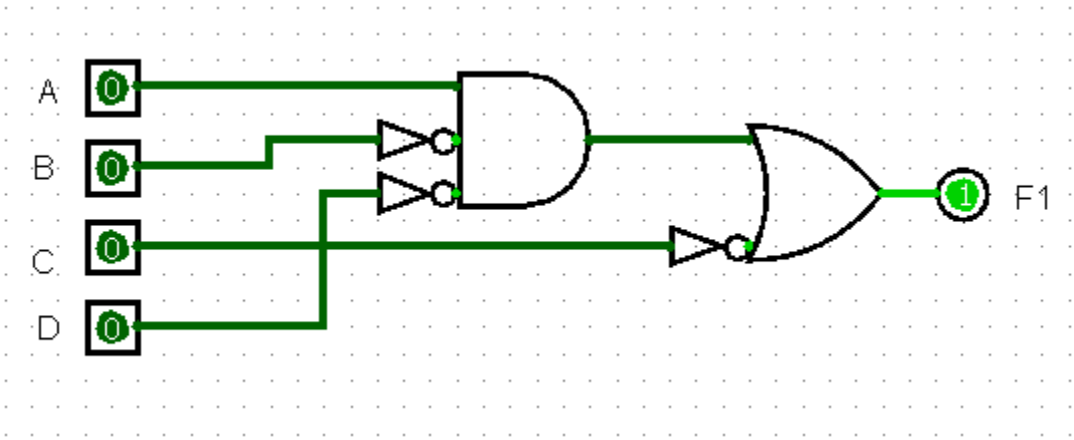
F1 = A'B'C'D' + A'B'C'D + A'BC'D' + A'BC'D + AB'C'D' + AB'C'D + AB'CD' + ABC'D' + ABC'D

Karnaugh Map for F1:

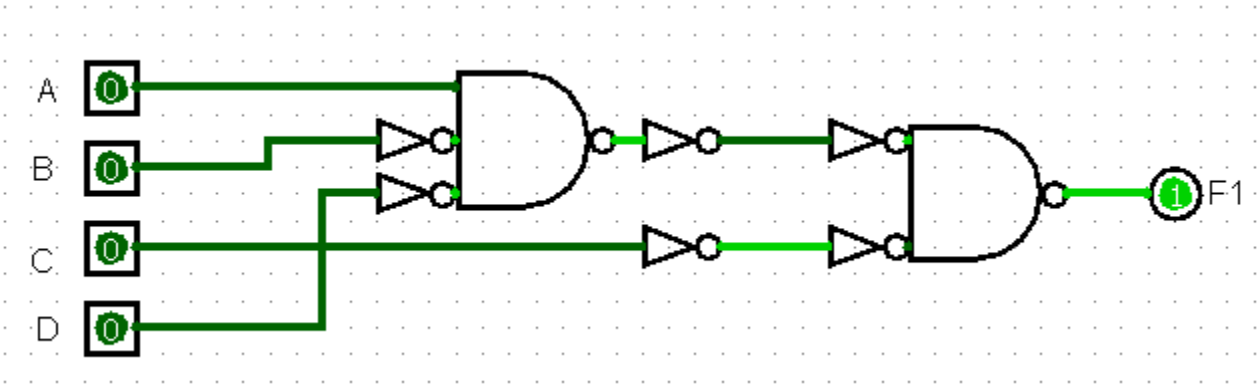
CD / AB	00	01	11	10
00	1	1	0	0
01	1	1	0	0
11	1	1	0	0
10	1	1	0	1

➔ F1 = C' + AB'D'

a.2) Logic Circuit of F1



a.3) Logic Circuit of F1 Using Only NAND Gates



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b.1) F2 Function and Its Karnough Map

F2(A, B, C, D) = ∑m(3, 5, 7, 8, 9, 10, 11, 13, 15)

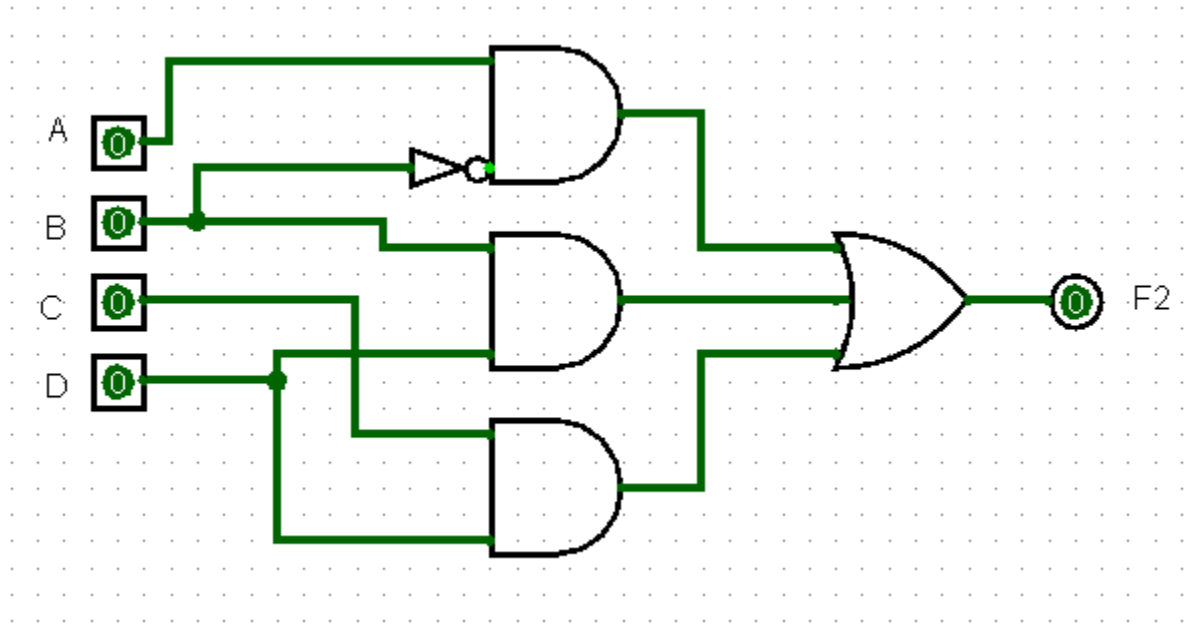
F2 = A'B'CD + A'BC'D + A'BCD + AB'C'D' + AB'C'D + AB'CD' + AB'CD + ABC'D + ABCD

Karnaugh Map for F2:

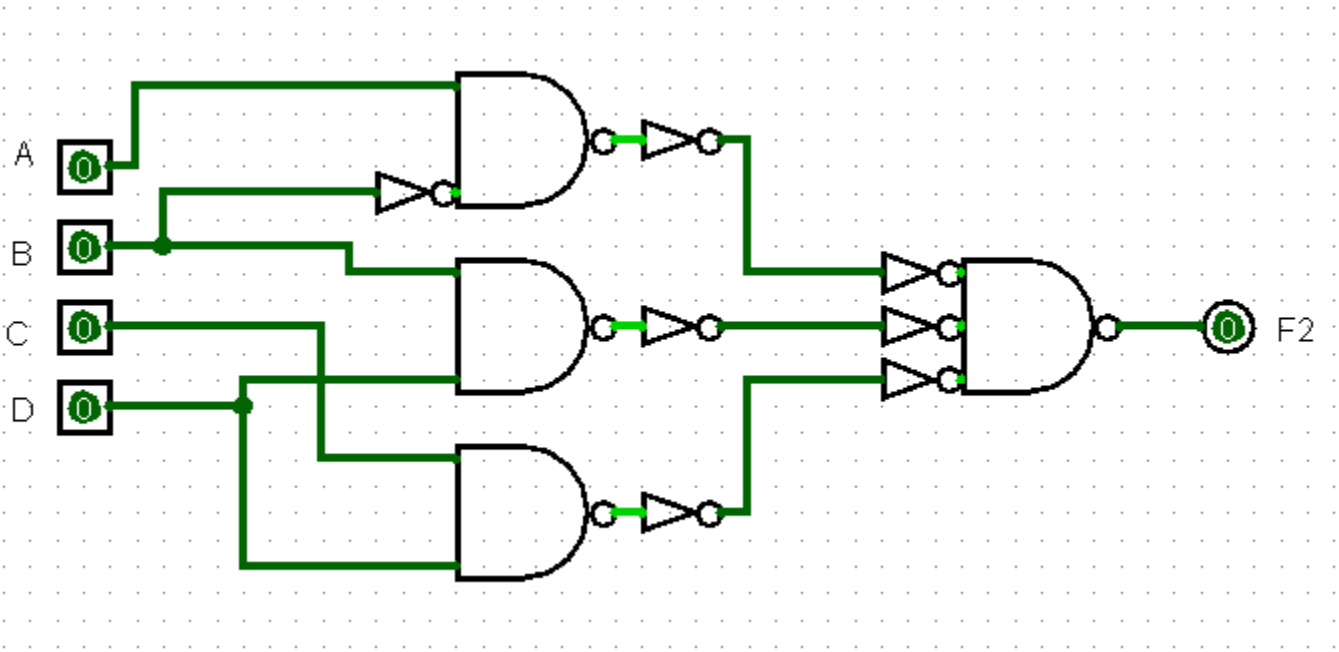
CD / AB	00	01	11	10
00	0	0	1	0
01	0	1	1	0
11	0	1	1	0
10	1	1	1	1

➔ F2 = AB' + BD + CD

b.2) Logic Circuit of F2



b.3) Logic Circuit of F2 Using Only NAND Gates



Question 2

1.) F Function and Its Truth Table

F = AB’ + AD + BC + CD’+ A’B’C’D’

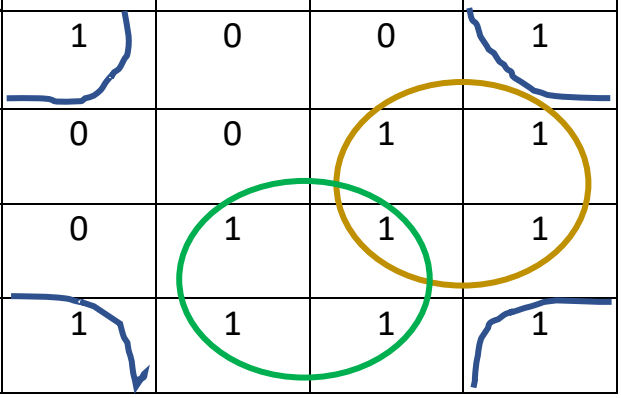
A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

2.) Karnaugh Map of F Function

CD / AB	**00**	**01**	**11**	**10**
00	1	0	0	1
01	0	0	1	1
11	0	1	1	1
10	1	1	1	1

3.) Karnaugh Map Simplification of F Function

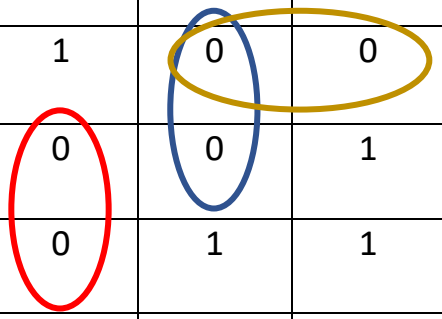
CD / AB	00	01	11	10
00	1	0	0	1
01	0	0	1	1
11	0	1	1	1
10	1	1	1	1



➔ F = AD + BC + B'D'

4.) Karnaugh Map Simplification of F' Function

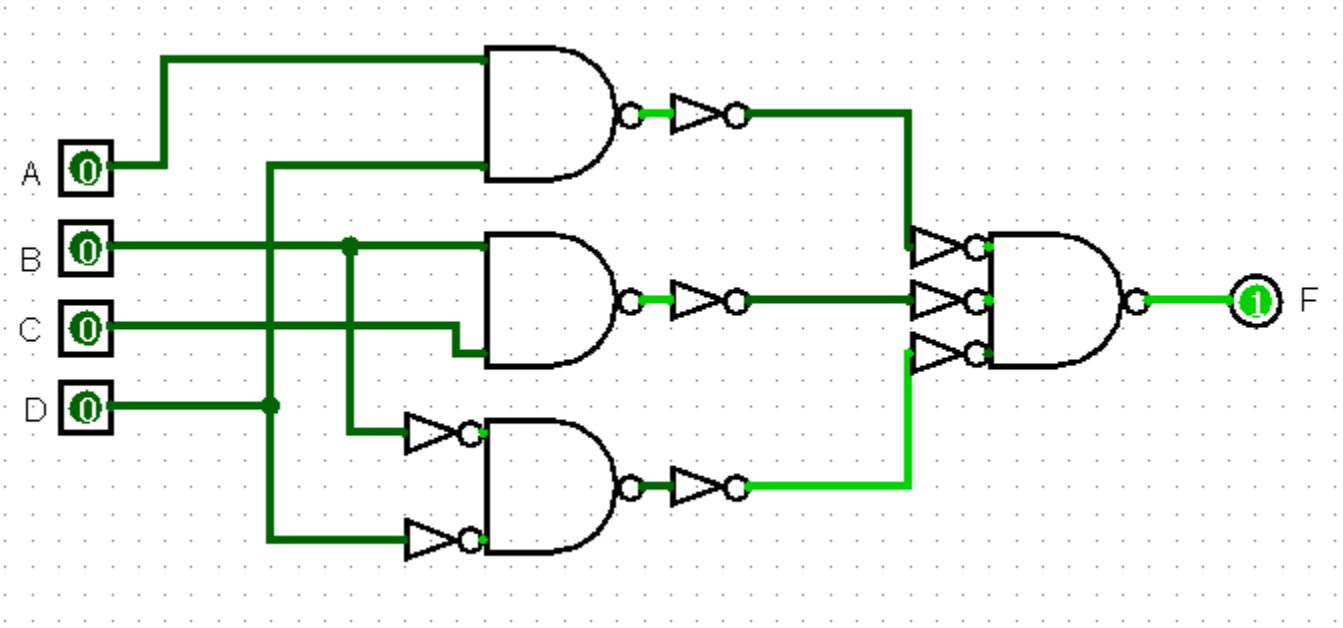
CD / AB	00	01	11	10
00	1	0	0	1
01	0	0	1	1
11	0	1	1	1
10	1	1	1	1



➔ F' = BC'D' + A'C'D + A'B'D

5.)

Logic Circuit of F Function With NAND Gates



Logic Circuit of F' Function With NAND Gates