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Question 1

1.(a) K-map of F_1

AB \ CD	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

$$= C' + D'AB'$$

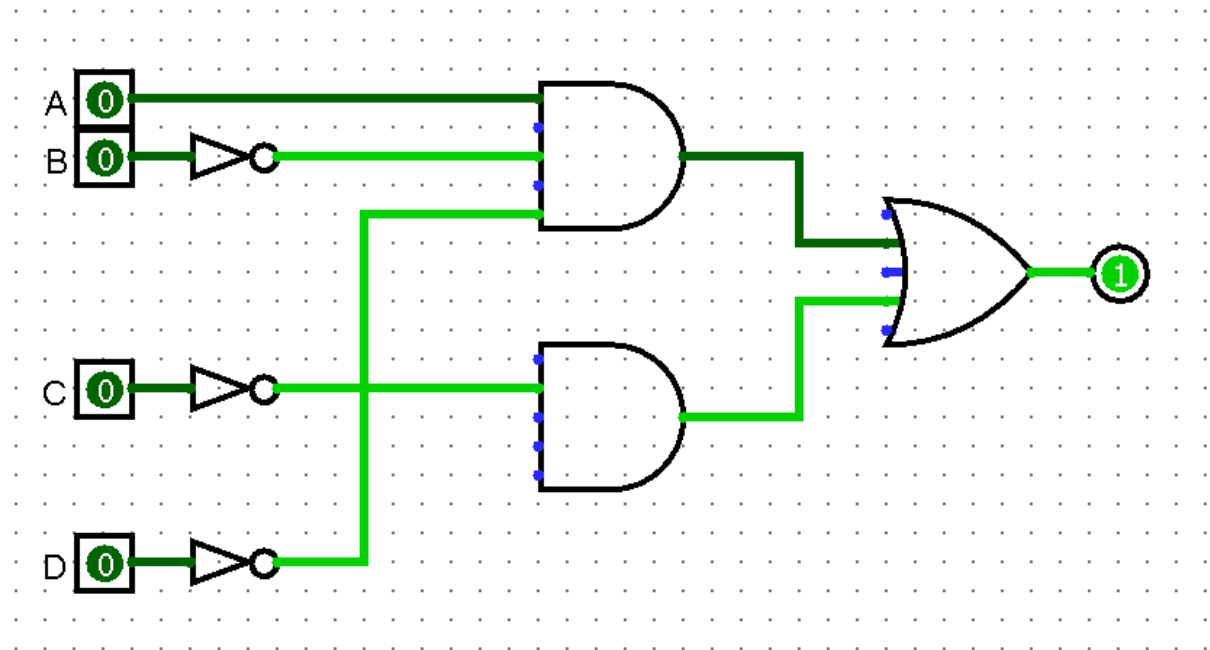
(b) K-map of F_2

AB \ CD	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

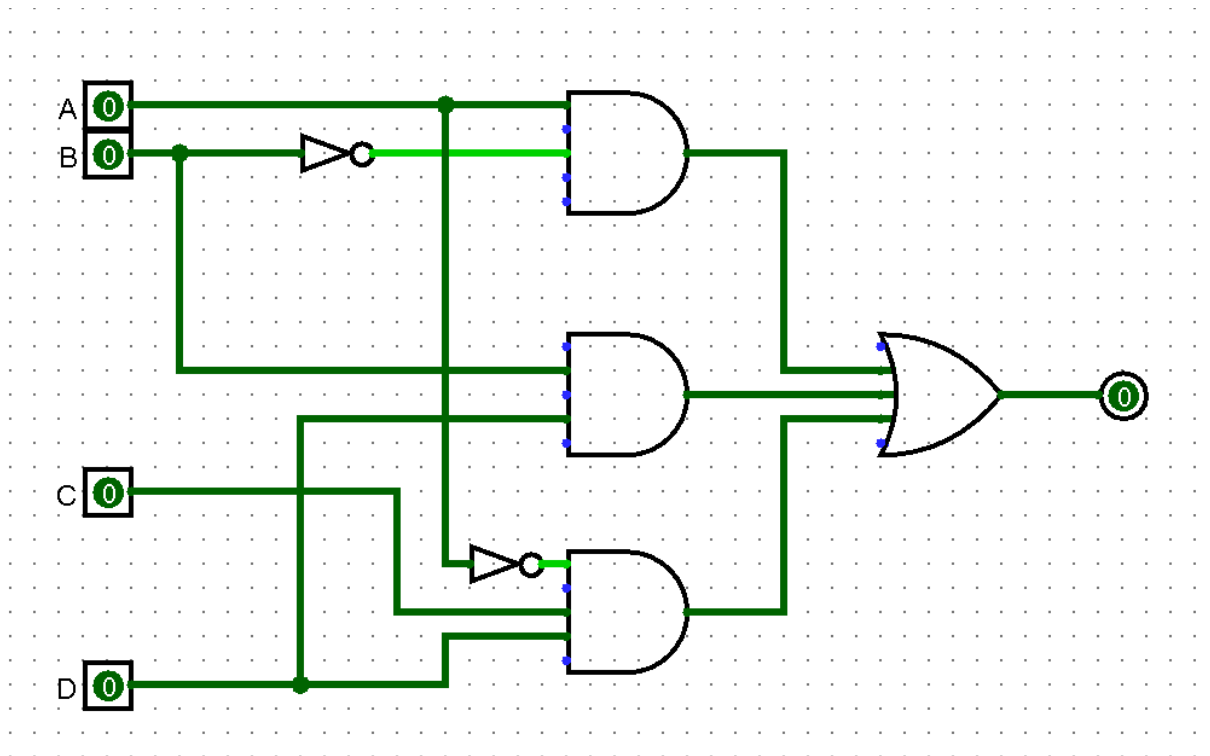
$$= AB' + BD + A'CD$$

2.

Logic circuit of F_1

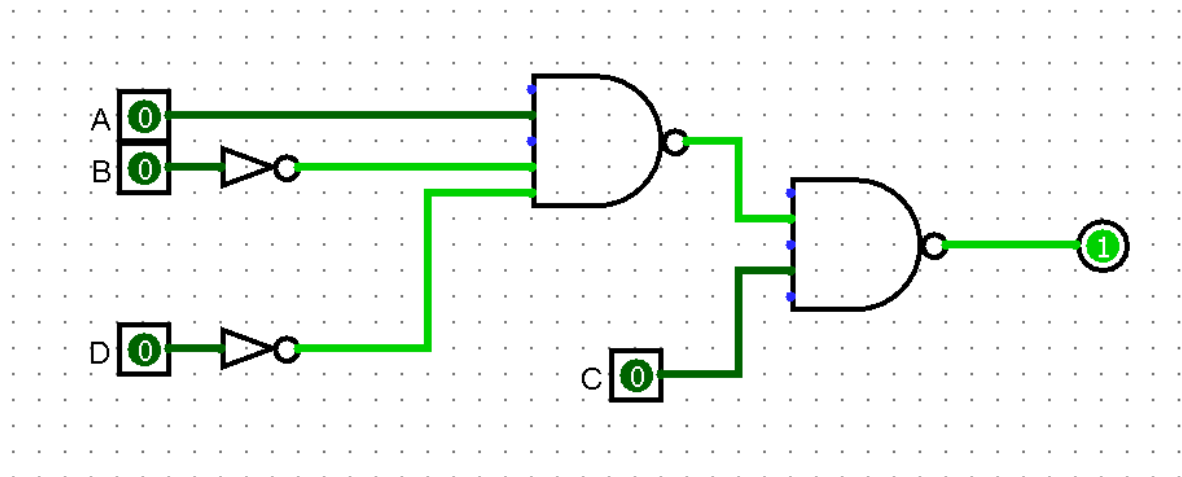


Logic circuit of F_2

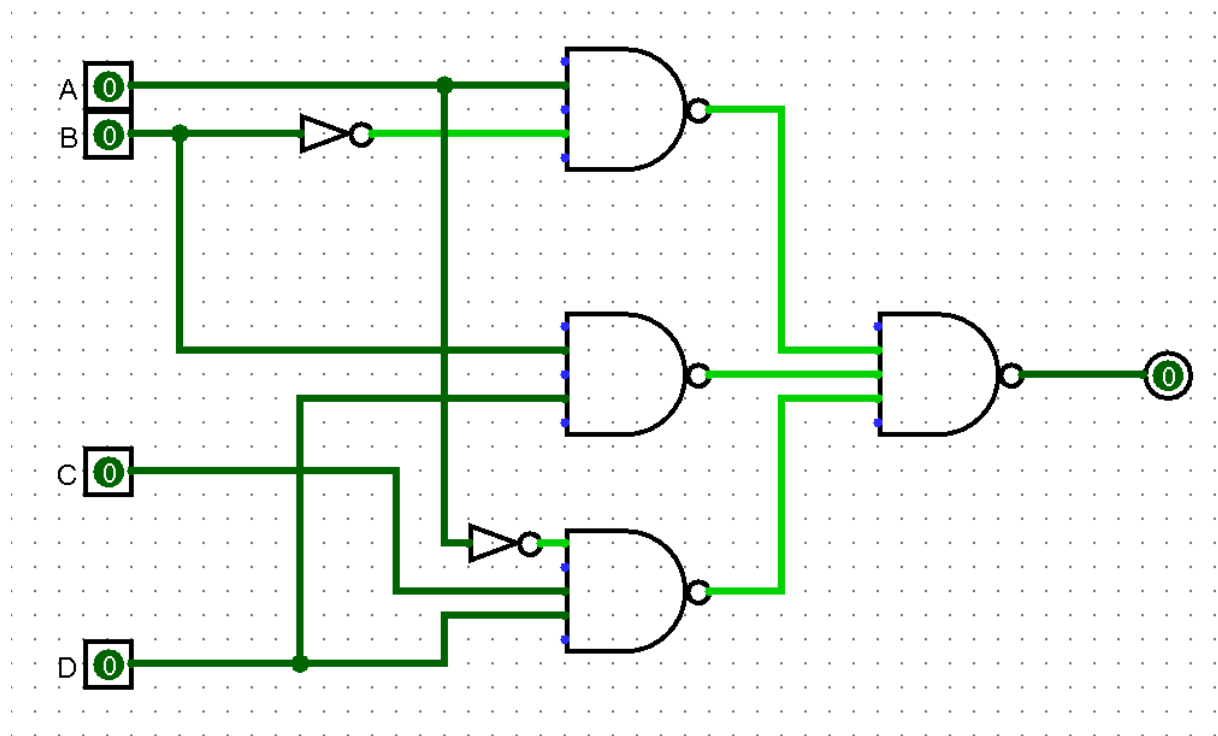


3.

Logic circuit of F_1 with NAND gates



Logic circuit of F_2 with NAND gates



Question 2

1.

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

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. K-maps for F and F'

F:

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

$$= B'D' + BC + AD$$

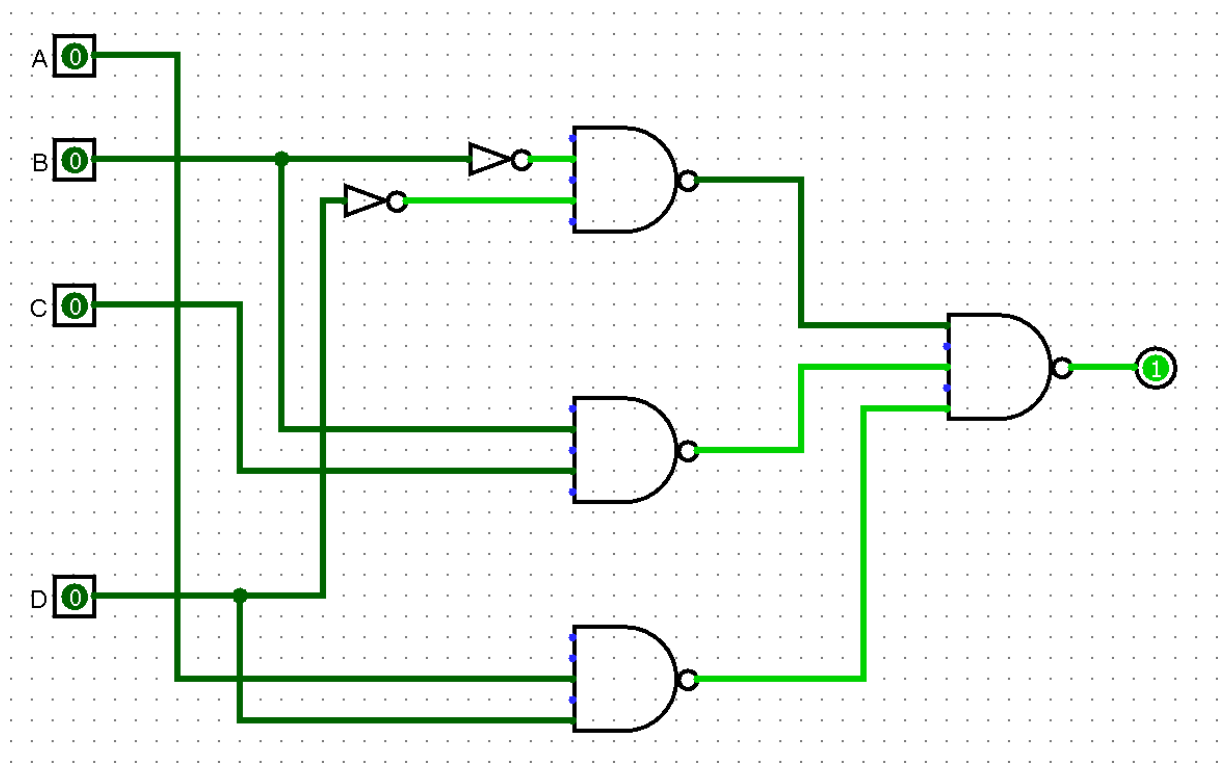
F':

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

$$F' = BC'D' + A'BC' + A'B'D + A'B'D$$

Circuits of F and F' with NAND gates

F:



F':

