2018-09-04 Lp

Design compound gates for these logic functions

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

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

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

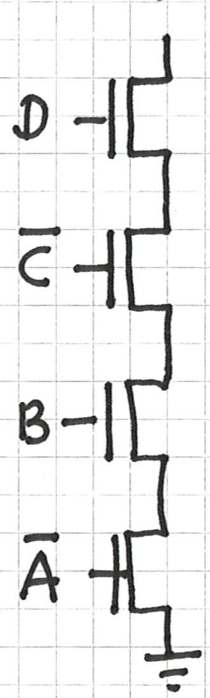
Solution 2018-09-05

1st problem

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

Circle zeros to find n-net

$\overline{A} \cdot B \cdot \overline{C} \cdot D$



Circle ones
or use
de Morgan's theorem
or
invert circuit
to find p-net

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

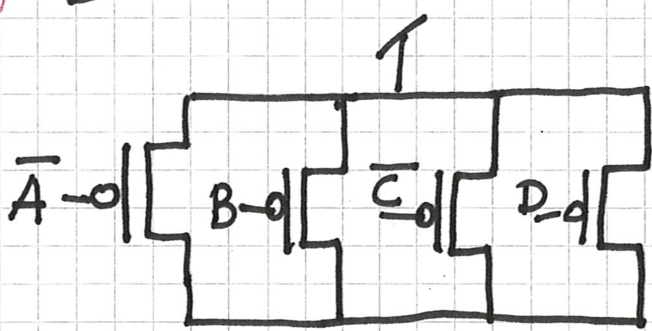
$\overline{B}$ ← D, $\overline{D}$, A

gives expression

$A + \overline{B} + C + D$

Remember bubbles!

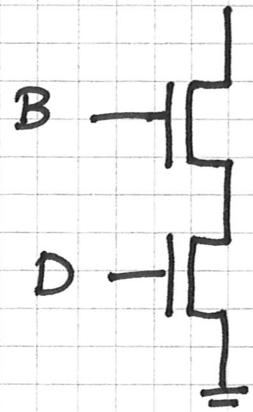
p-net is then



2nd problem

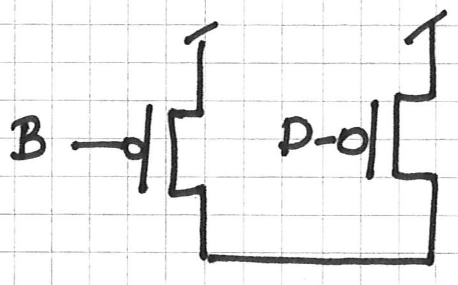
CD \ AB	00	01	11	10
00	1	1	1	1
01	1	0	0	1
11	1	0	0	1
10	1	1	1	1

n-net $B \cdot D$:



A & C do not matter at all!

So p-net becomes:

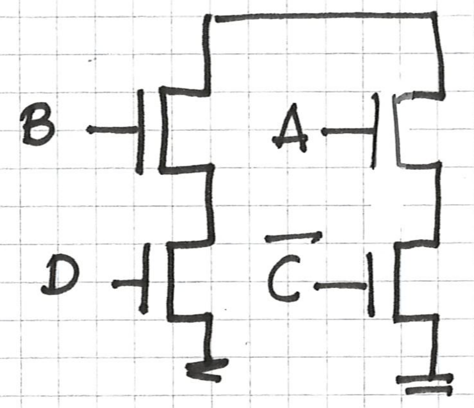


3rd problem

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

$$(B\cdot D)+(A\cdot\overline{C})$$

$$\Downarrow$$



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

From the ones in the Karnaugh map we get

$$(\overline{A}\cdot\overline{B})+(\overline{A}\cdot\overline{D})+(C\cdot\overline{D})+(C\cdot\overline{B})$$

$$=\overline{A}\cdot(\overline{B}+\overline{D})+C(\overline{B}+\overline{D})=(\overline{A}+C)\cdot(\overline{B}+\overline{D})$$

The same result we could get from inverting the circuit

p-net:

Remember bubbles!