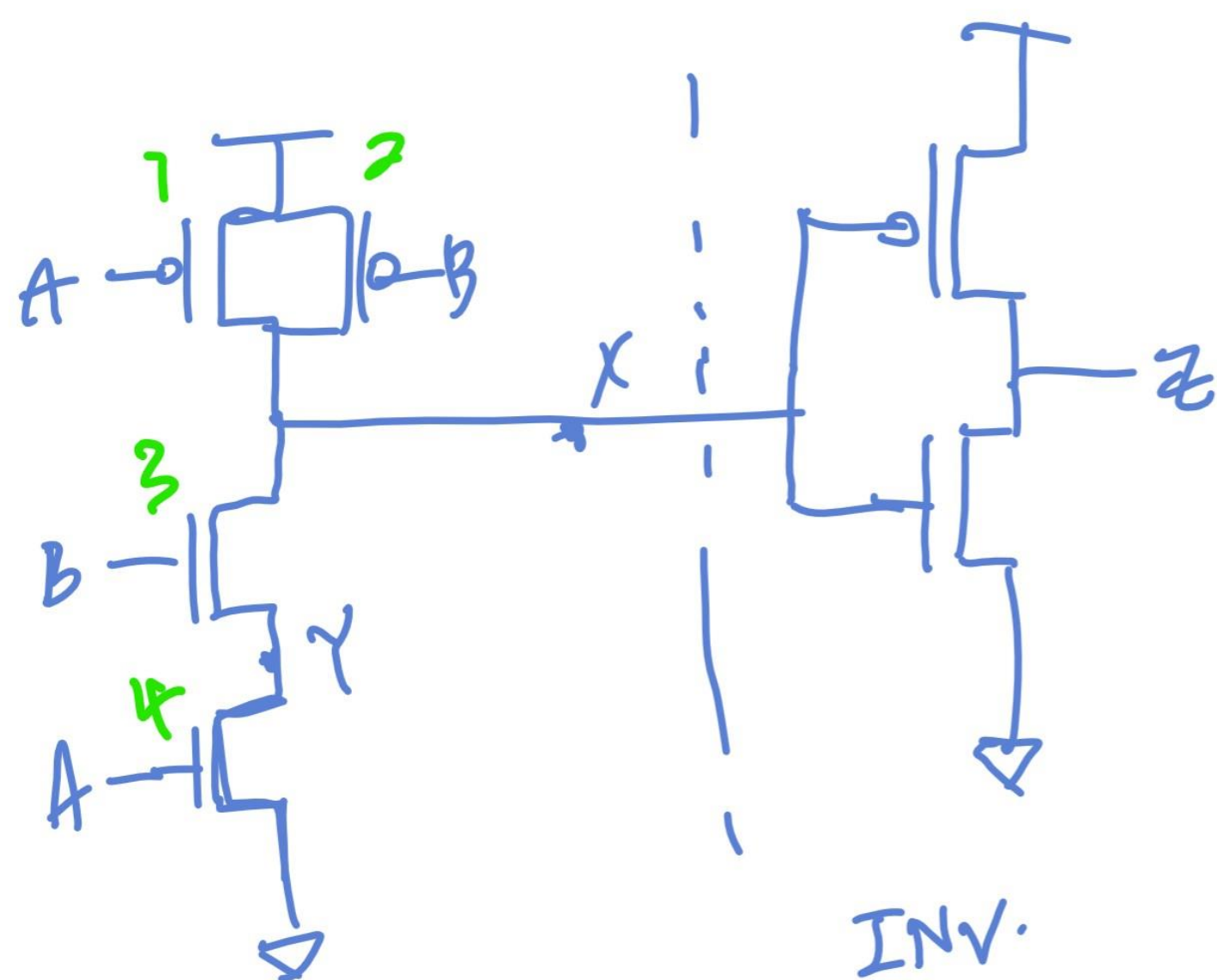


6. AN2. input: A-B output=z.

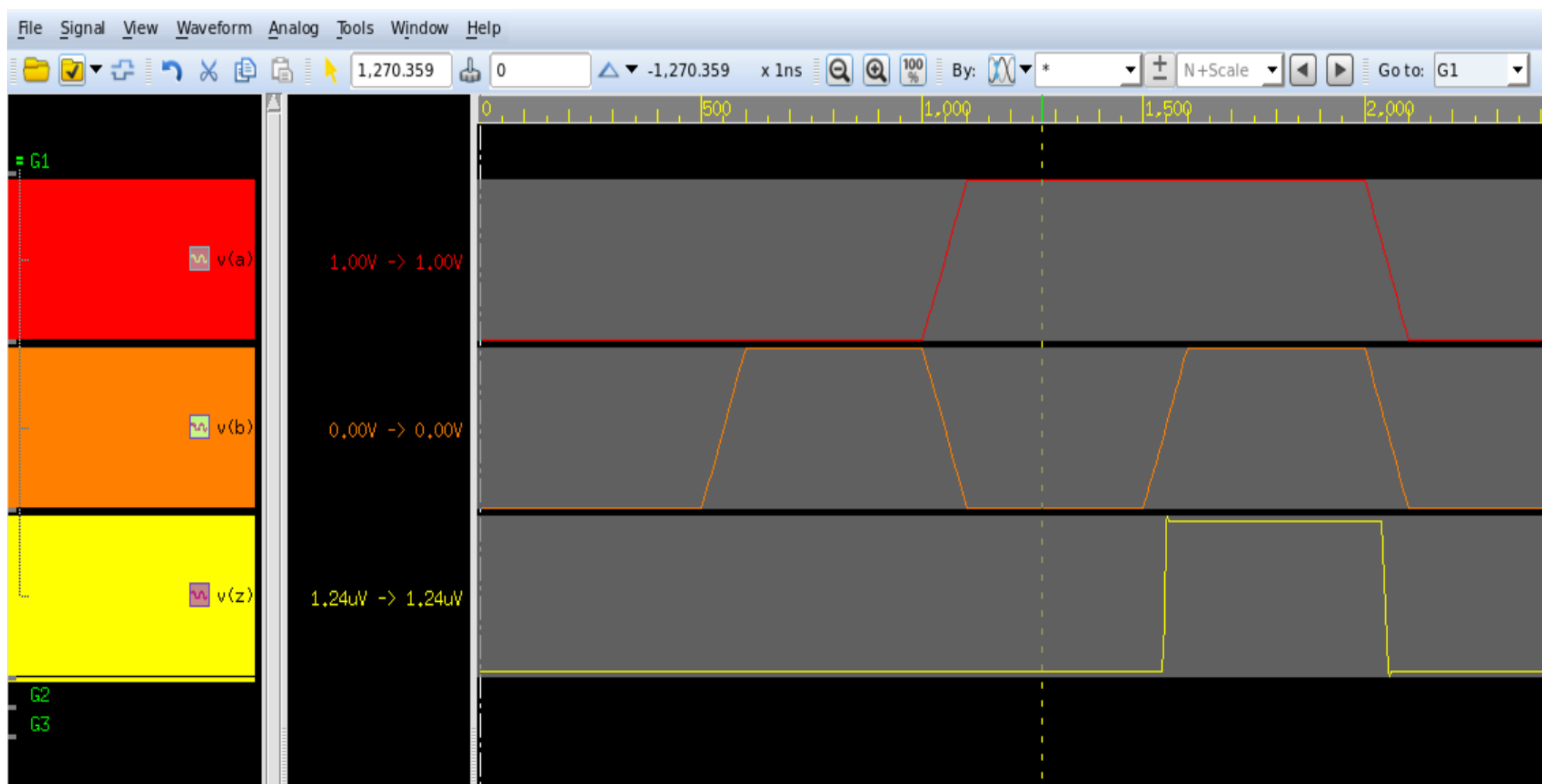


truth fable

A	B	z.
0	0	0
0	1	0
1	0	0
1	1	1

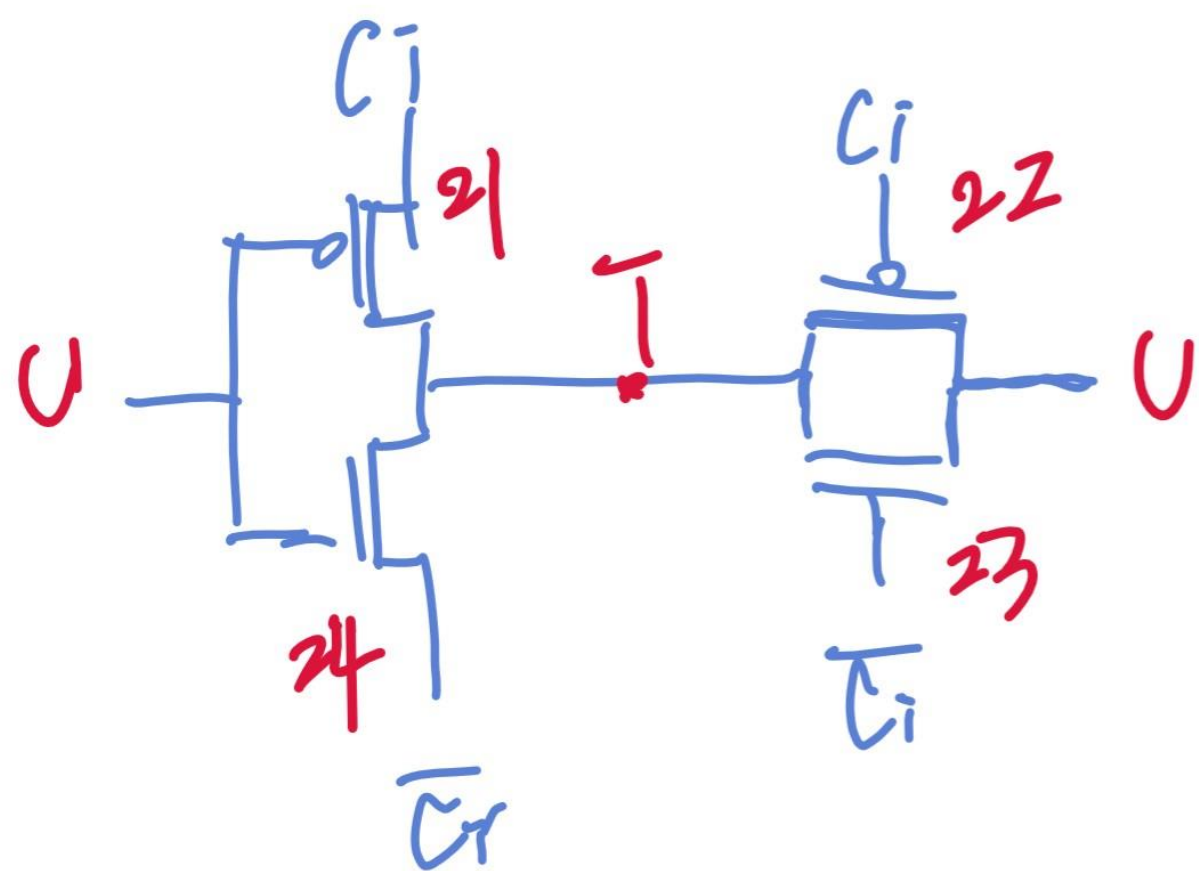
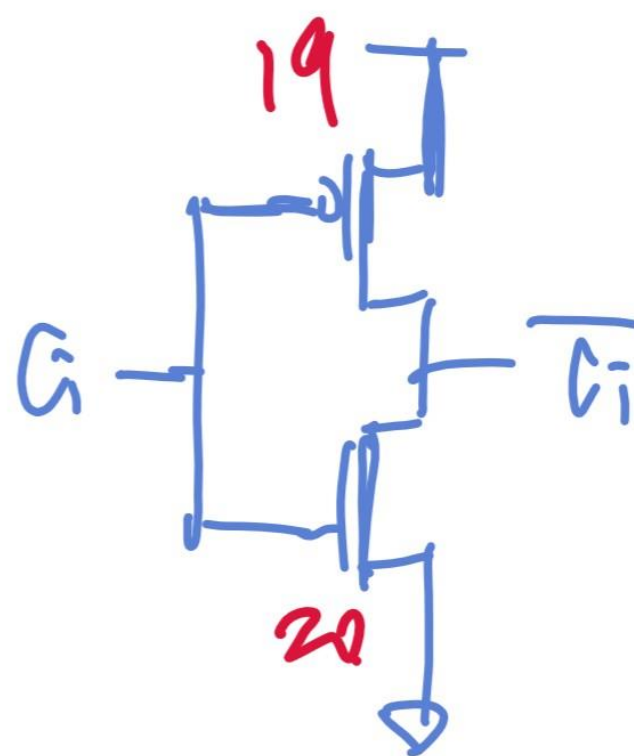
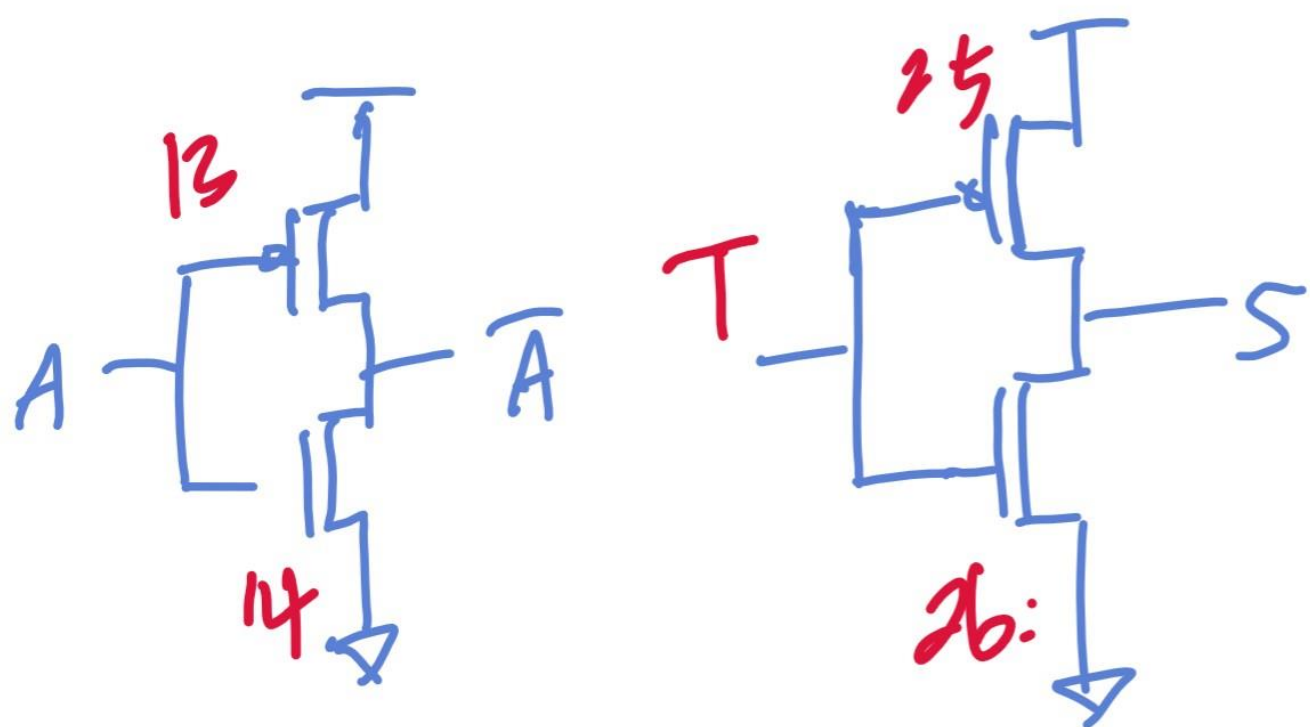
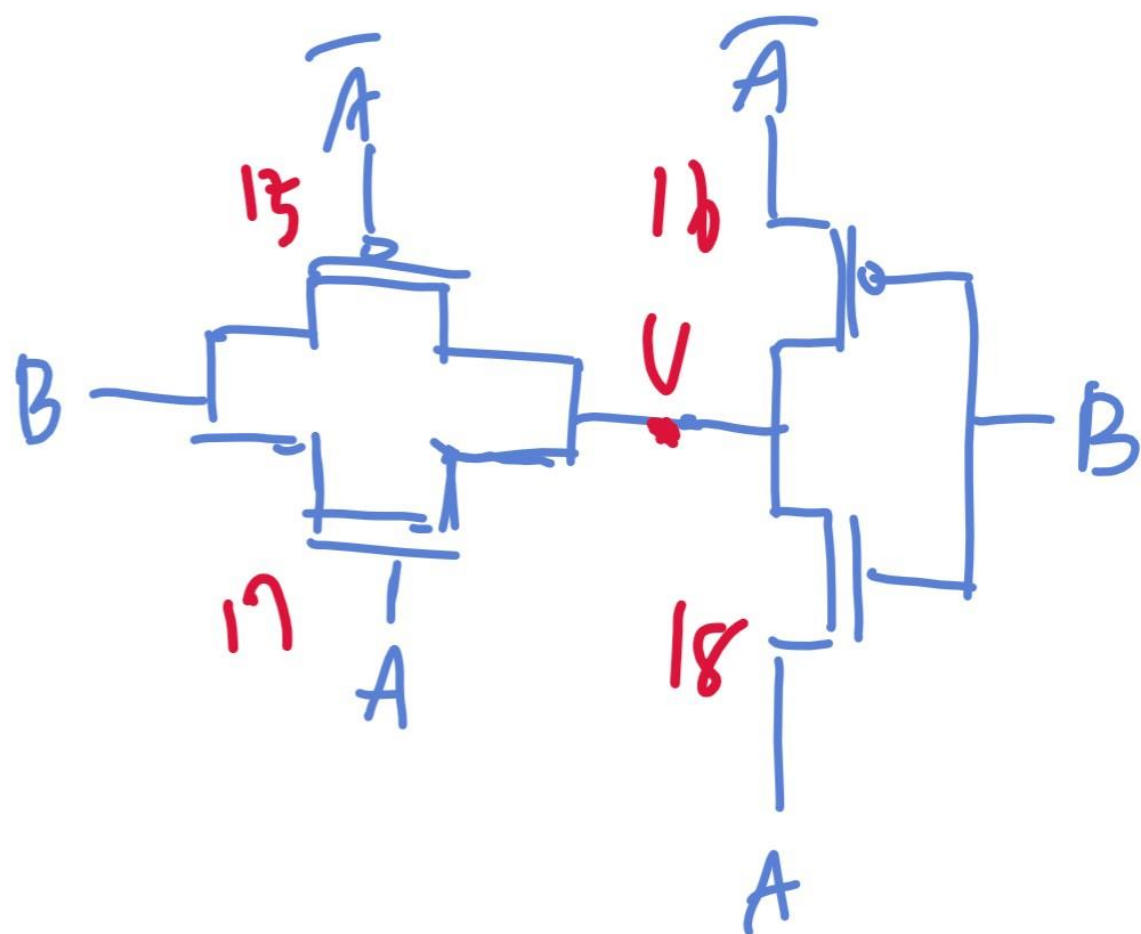
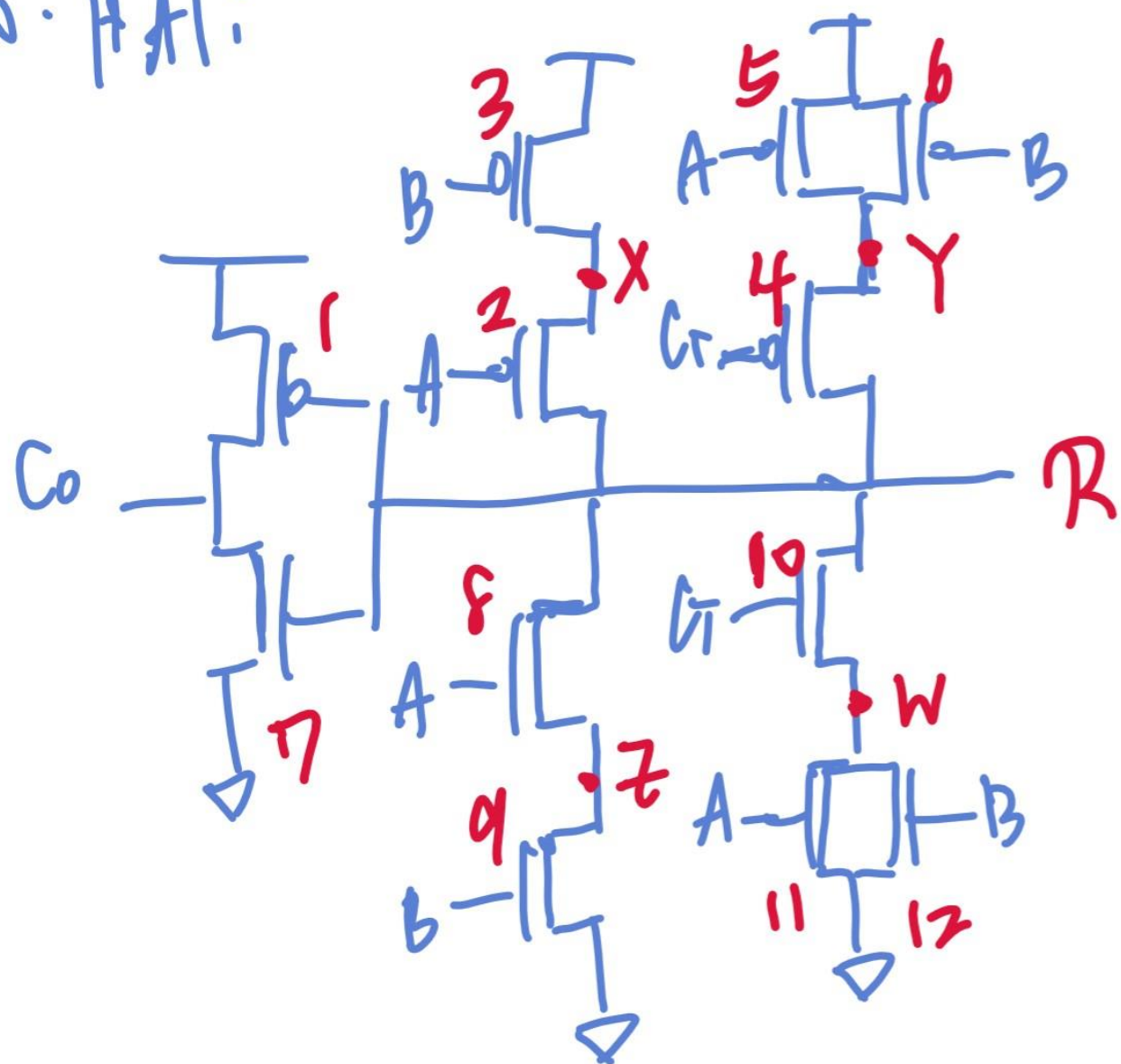
$$\Rightarrow z = AB$$

Ckt-NAND



觀察: rising time and falling time is very small, and the function is correct.

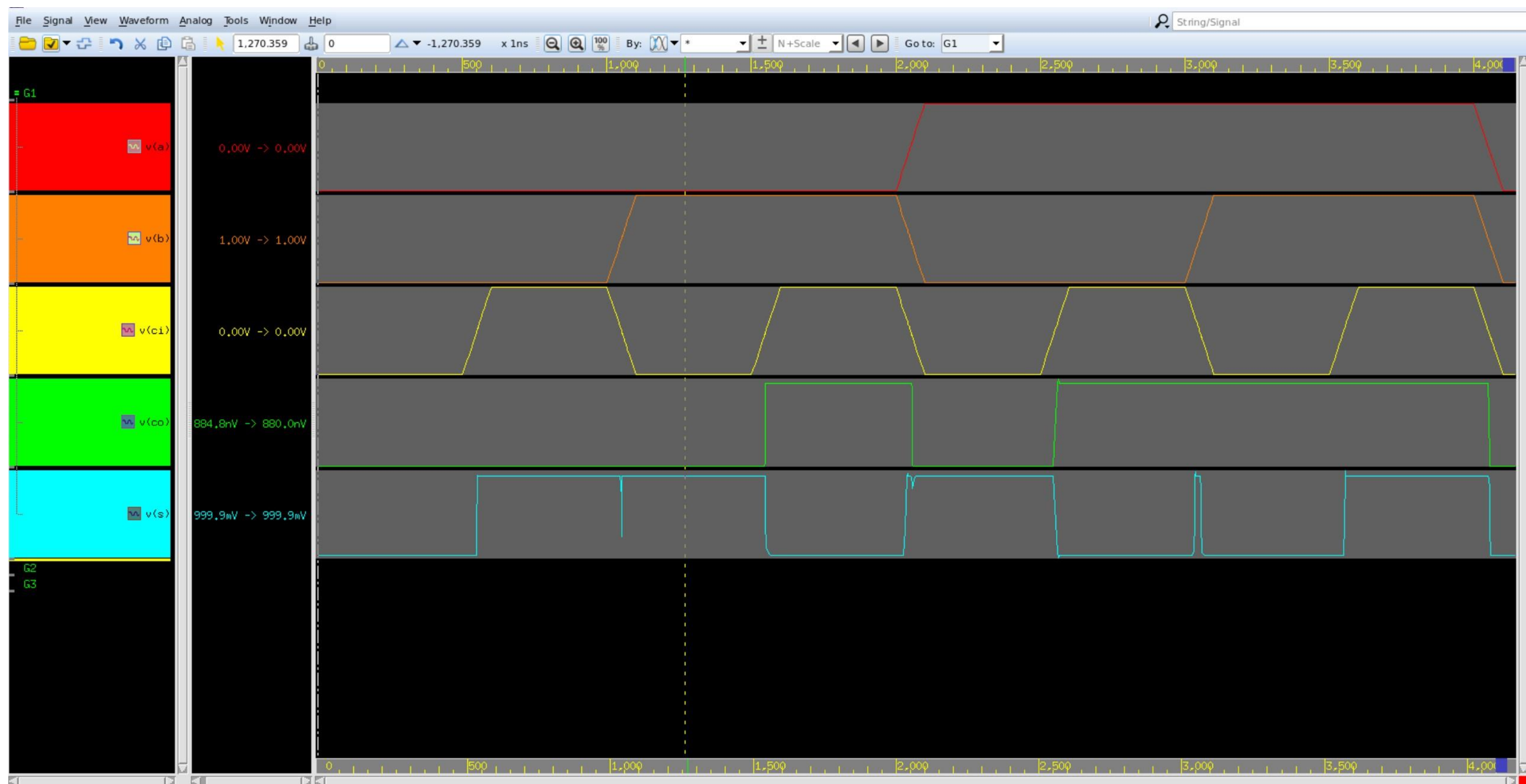
10. FAI:



truth table.

A	B	Ci	Co	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

input: A-B. Ci output: S. Co

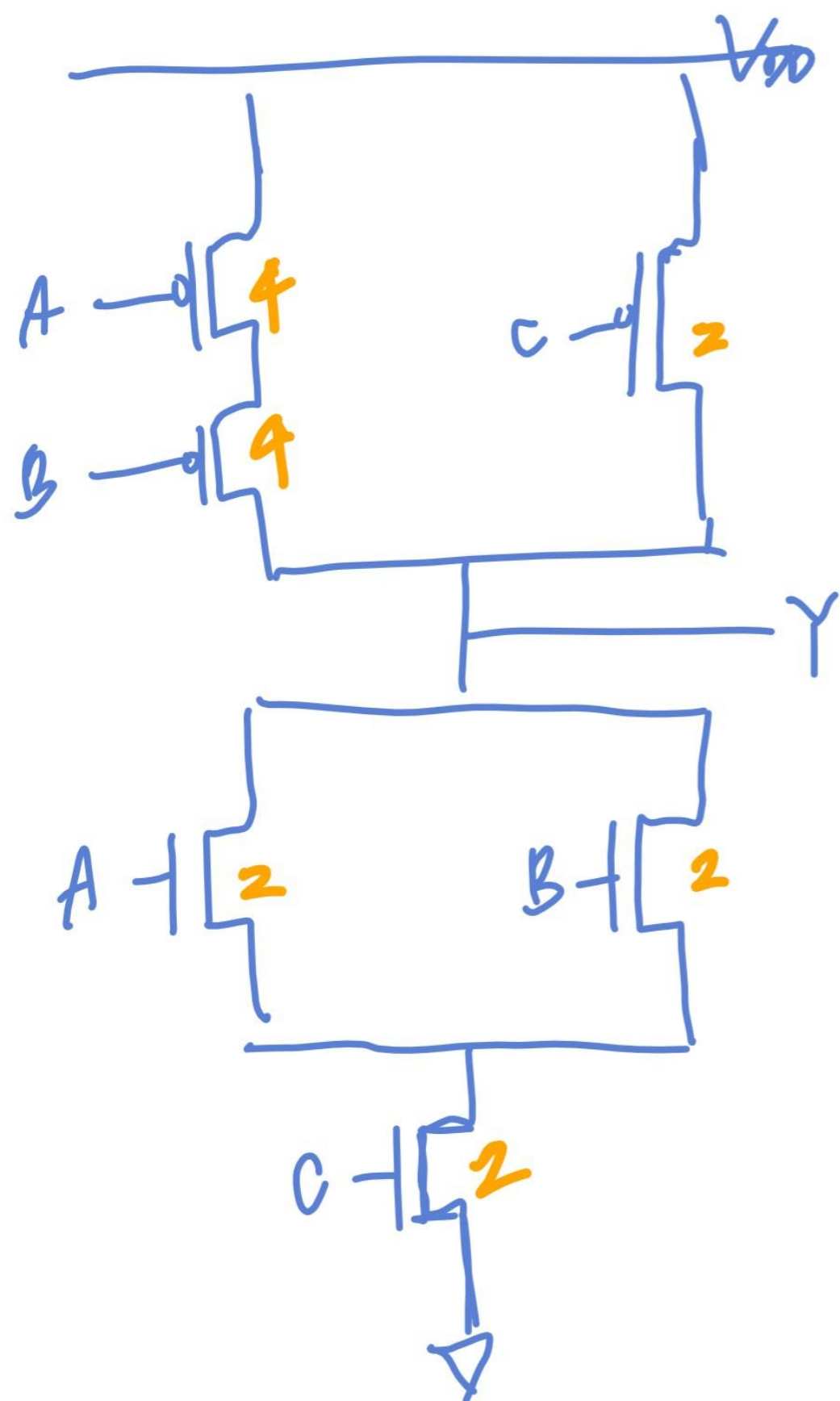


觀察: some interval time have some ripple, but the function result is correct.

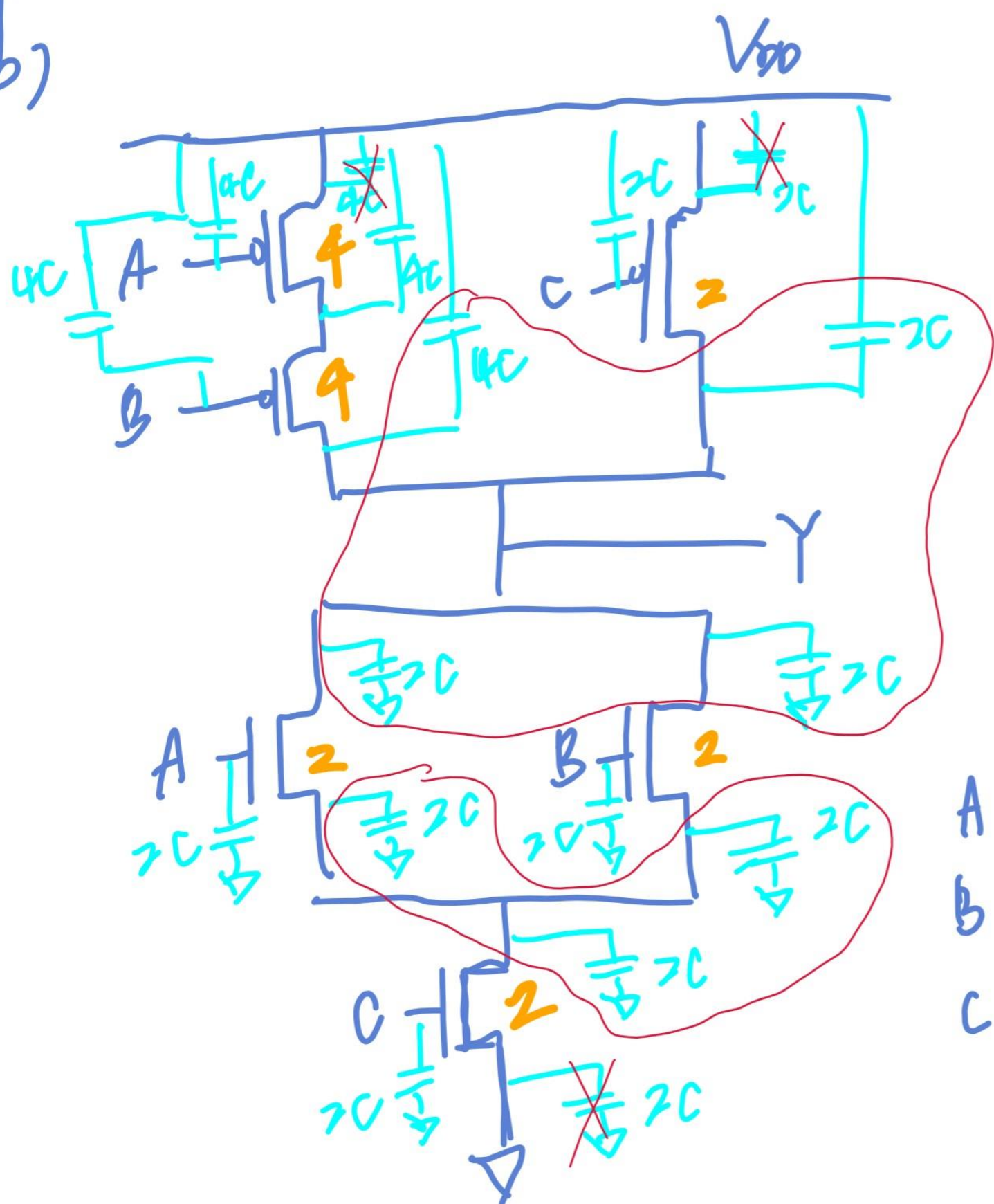
這是我第一次觀察一個基本電路的layout，讓我花了很多時間理解與熟悉，其中最難的部分是判斷哪些等電位以及哪些部分沒有連接等，之後把整個cell分成很多區塊個別擊破，並且在Hspice裡接在一起就能模擬出基本電路了。

2 -

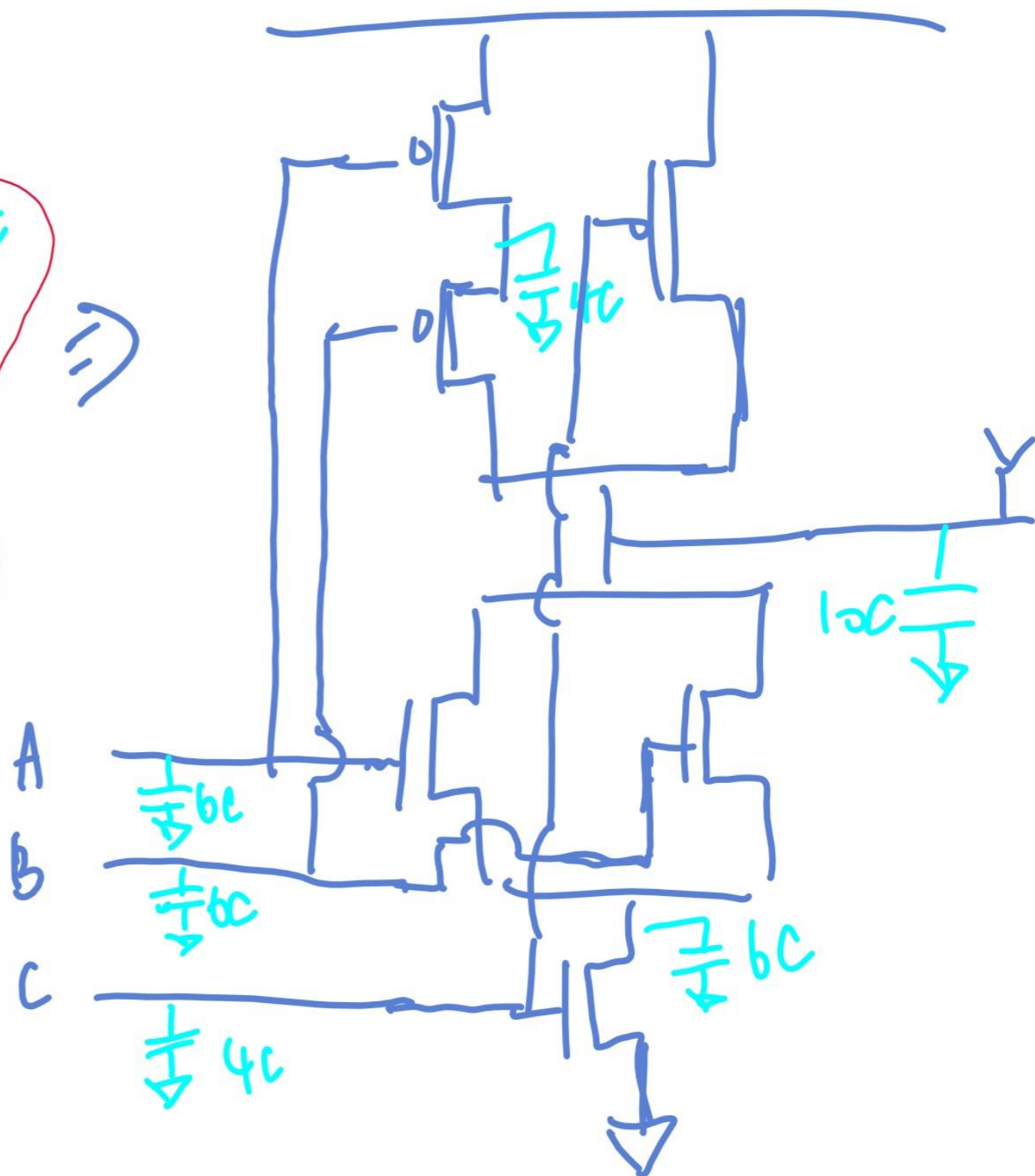
(a)



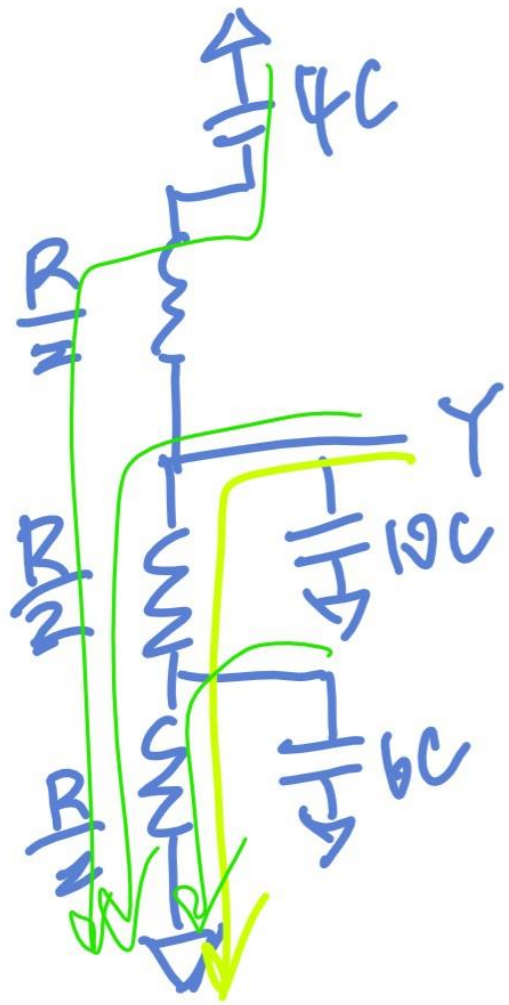
(b)



\Rightarrow



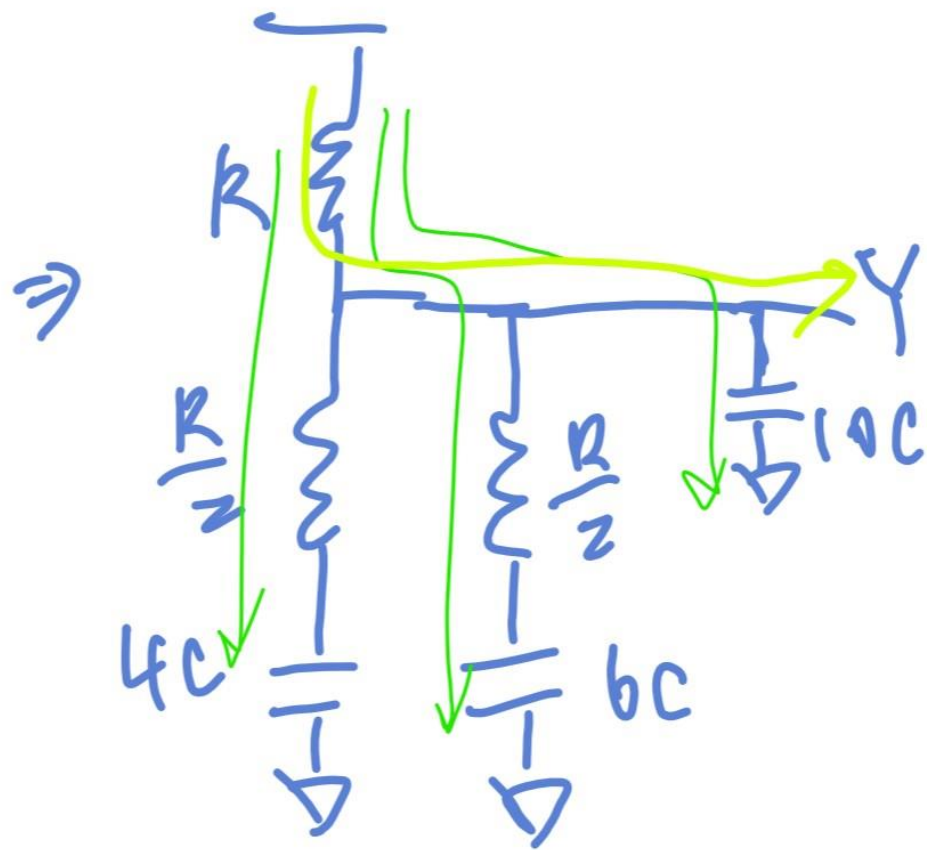
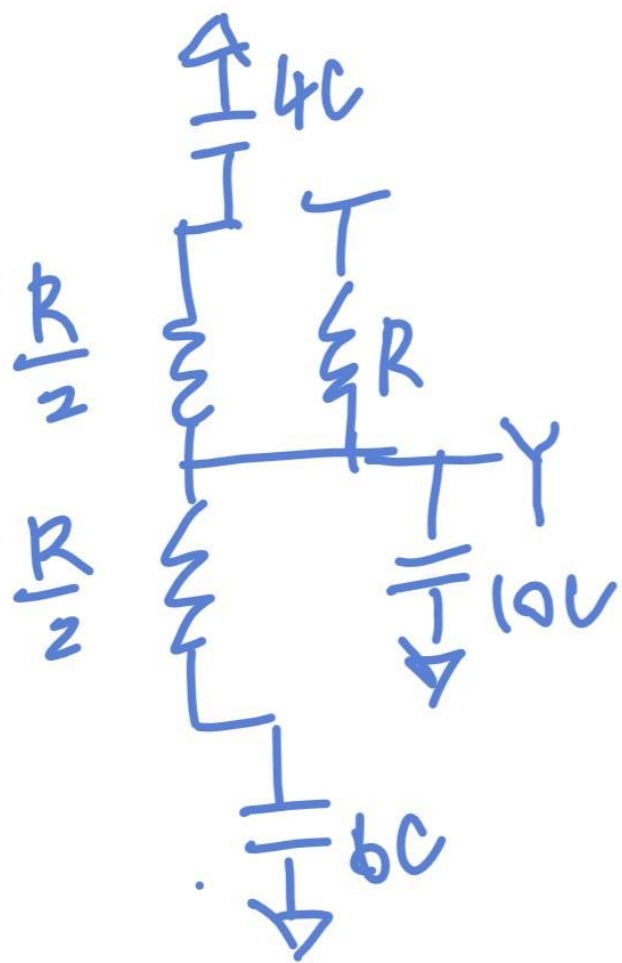
falling: for worst case. $A=1$. $B=0$. $C=1$ (cover the most capacitor)



$$\text{delay} = \frac{R}{2} \times 6C + \left(\frac{R}{2} + \frac{R}{2} \right) \times 10C + \left(\frac{R}{2} + \frac{R}{2} \right) \times 4C$$

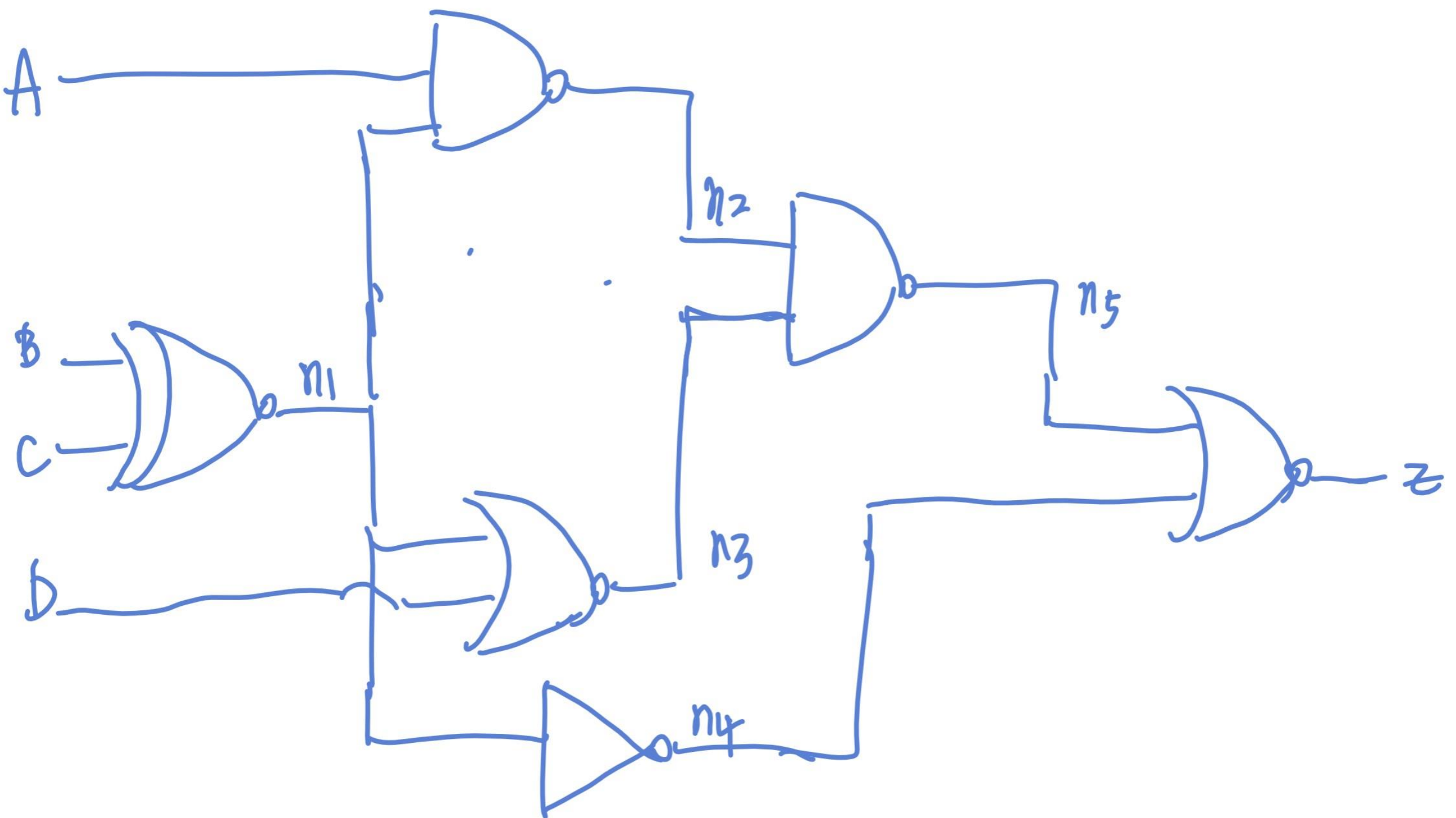
$$= 3RC + 10RC + 4RC = 17RC$$

rising: for worst case. $A=1$. $B=0$. $C=0$
(cover the most capacitor)



$$\Rightarrow \text{delay} = R \times 4C + R \times 6C + R \times 10C = 20RC$$

3.



$$n_1: p = 1 - P_A \bar{P}_B - \bar{P}_A P_B = 1 - \frac{1}{2} \times \frac{1}{2} - \frac{1}{2} \times \frac{1}{2} = \frac{1}{2}$$

$$\alpha = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$n_2: p = 1 - \frac{1}{2} \times \frac{1}{2} = \frac{3}{4} \Rightarrow \alpha = \frac{3}{4} \times \frac{1}{4} = \frac{3}{16}$$

$$n_3: p = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \Rightarrow \alpha = \frac{1}{4} \times \frac{3}{4} = \frac{3}{16}$$

$$n_4: p = \frac{1}{2} \Rightarrow \alpha = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$n_5: 1 - \frac{1}{4} \times \frac{3}{4} = \frac{13}{16} \Rightarrow \alpha = \frac{13}{16} \times \frac{3}{16} = \frac{39}{256}$$

$$z: \frac{3}{16} \times \frac{1}{2} = \frac{3}{32} \Rightarrow \alpha = \frac{24}{32} \times \frac{3}{32} = \frac{87}{1024}$$