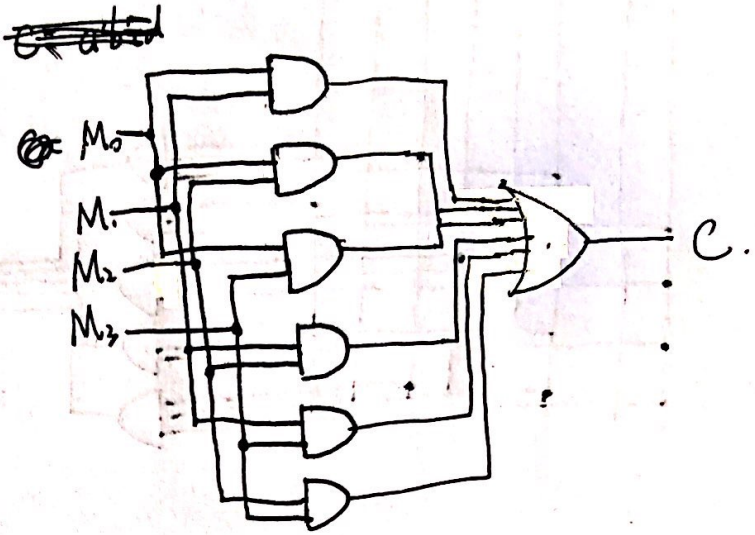
VE270 HW3 夏陶悦 5183709100871.

1.

M_0	M_1	M_2	M_3	C
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1



Using K-map to analyze.

C

M_0M_1 \ M_2M_3	00	01	11	10
00	0	0	1	0
01	0	1	1	1
11	1	1	1	1
10	0	1	1	1

~~$C = M_0M_1 + M_2M_3 + M_1M_3 + M_1M_2 + M_0M_2M_0M_3$~~

$C = M_0M_1 + M_2M_3 + M_1M_3 + M_1M_2 + M_0M_2 + M_0M_3$.

2.

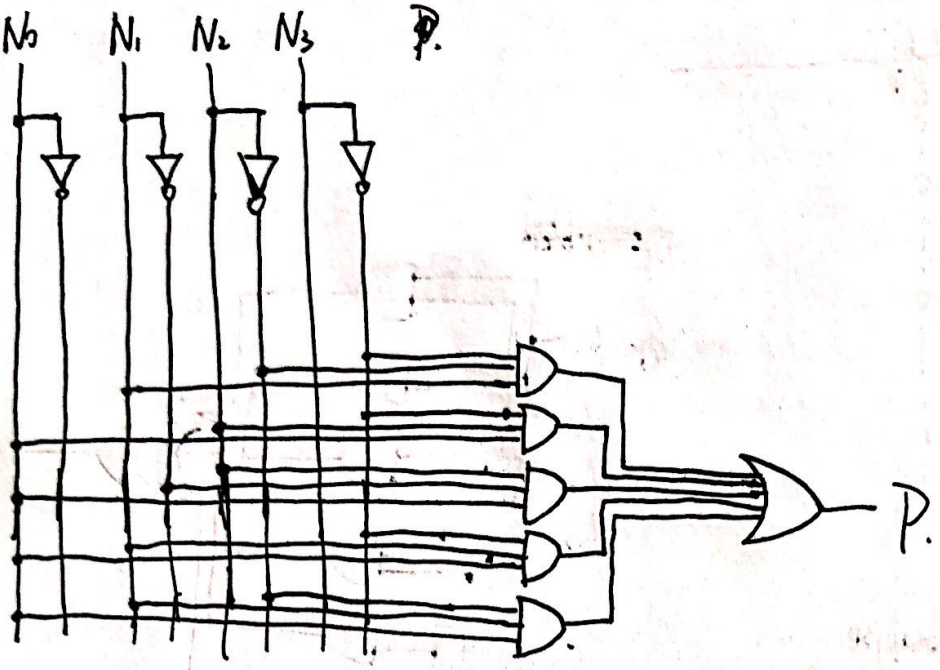
N_3	N_2	N_1	N_0	P.
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

P

N_2N_3 \ N_0N_1	00	01	11	10
00	0	0	1	1
01	0	1	1	0
11	0	1	0	0
10	0	0	1	0

$P = N_1N_2'N_3' + N_3N_1N_3' + N_0N_1N_2' + N_0N_2N_3' + N_0N_1'N_2$

2. (continue)

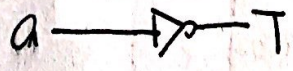


3. If the most significant bit of the 5-bit binary number is 0, then it can never exceed 16.

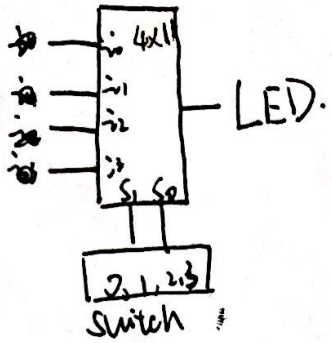
So the if it's 1, then T = 0.

sets the 5-bit binary number to be abcde, a is the most significant.

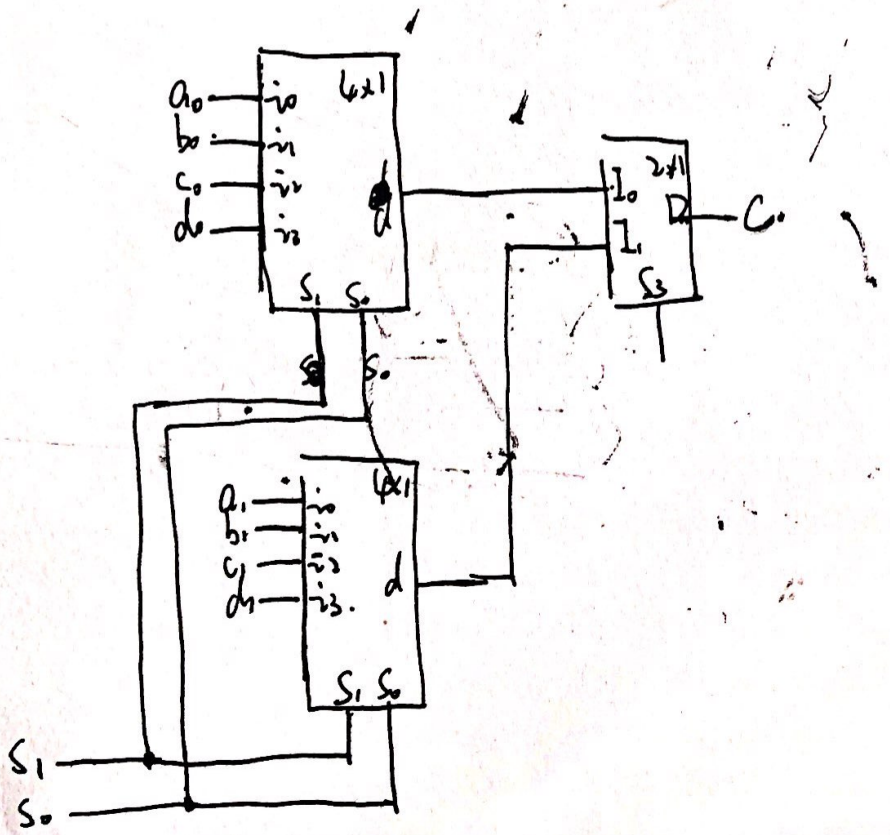
So $T = a'$.



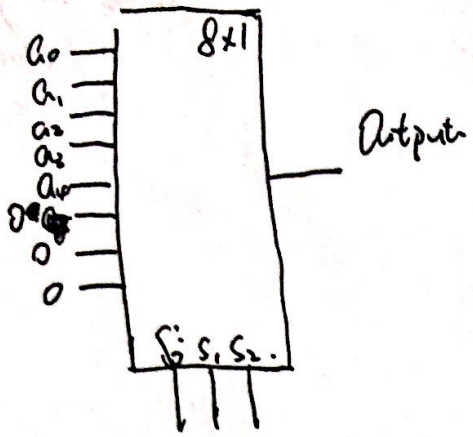
4. let the four sensors be i_0, i_1, i_2, i_3, the two-bit switch be S_1, S_0.
S_1 is the most significant



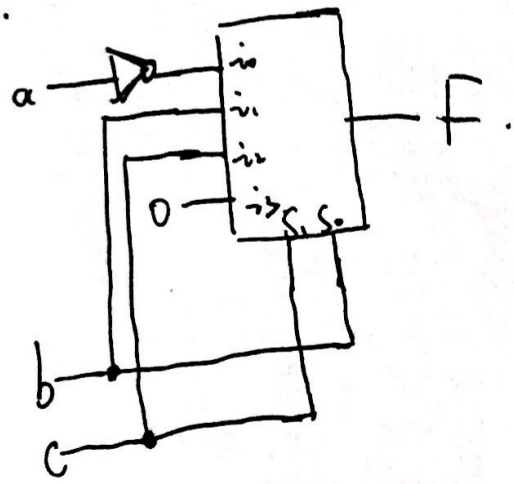
5.



6.


8×1
a_0
a_1
a_2
a_3
a_4
a_5
a_6
a_7
S_0 S_1 S_2
Output

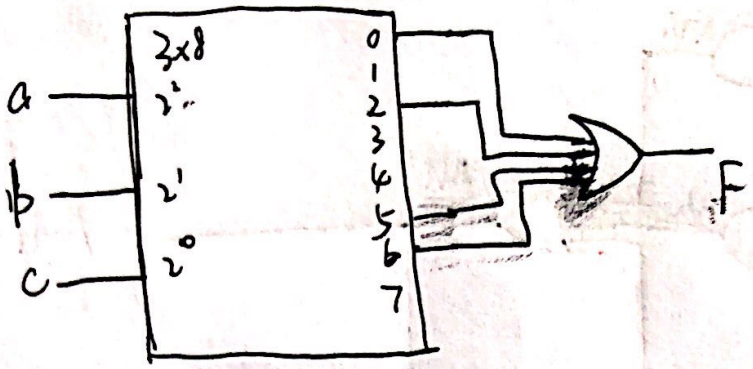
7.


a
b
c
0
i_{00}
i_{01}
i_{10}
i_{11}
S_1 S_0
f

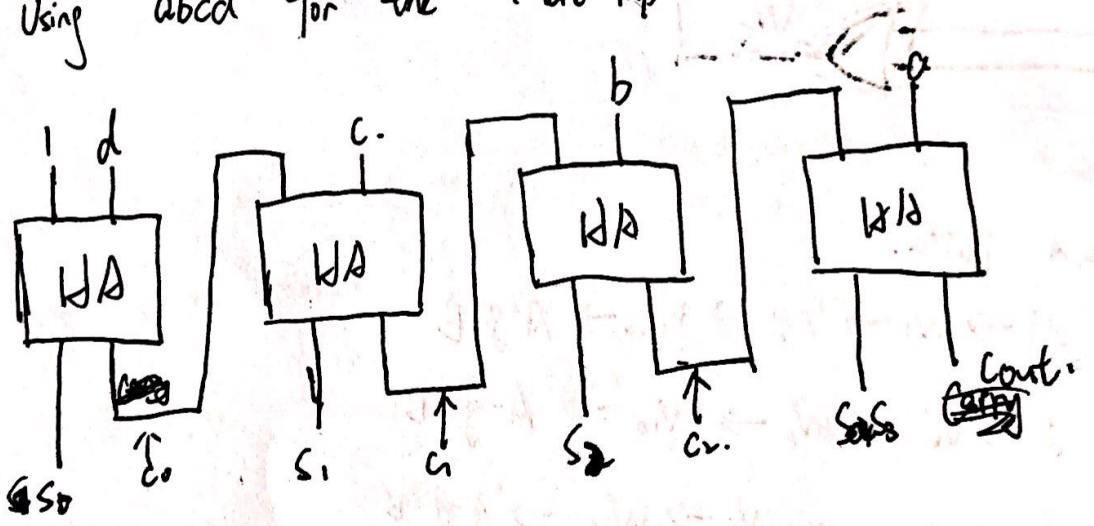
8.

F = a'b'c' + a'bc' + ab'c + abc'

= Σm(0, 2, 5, 6)

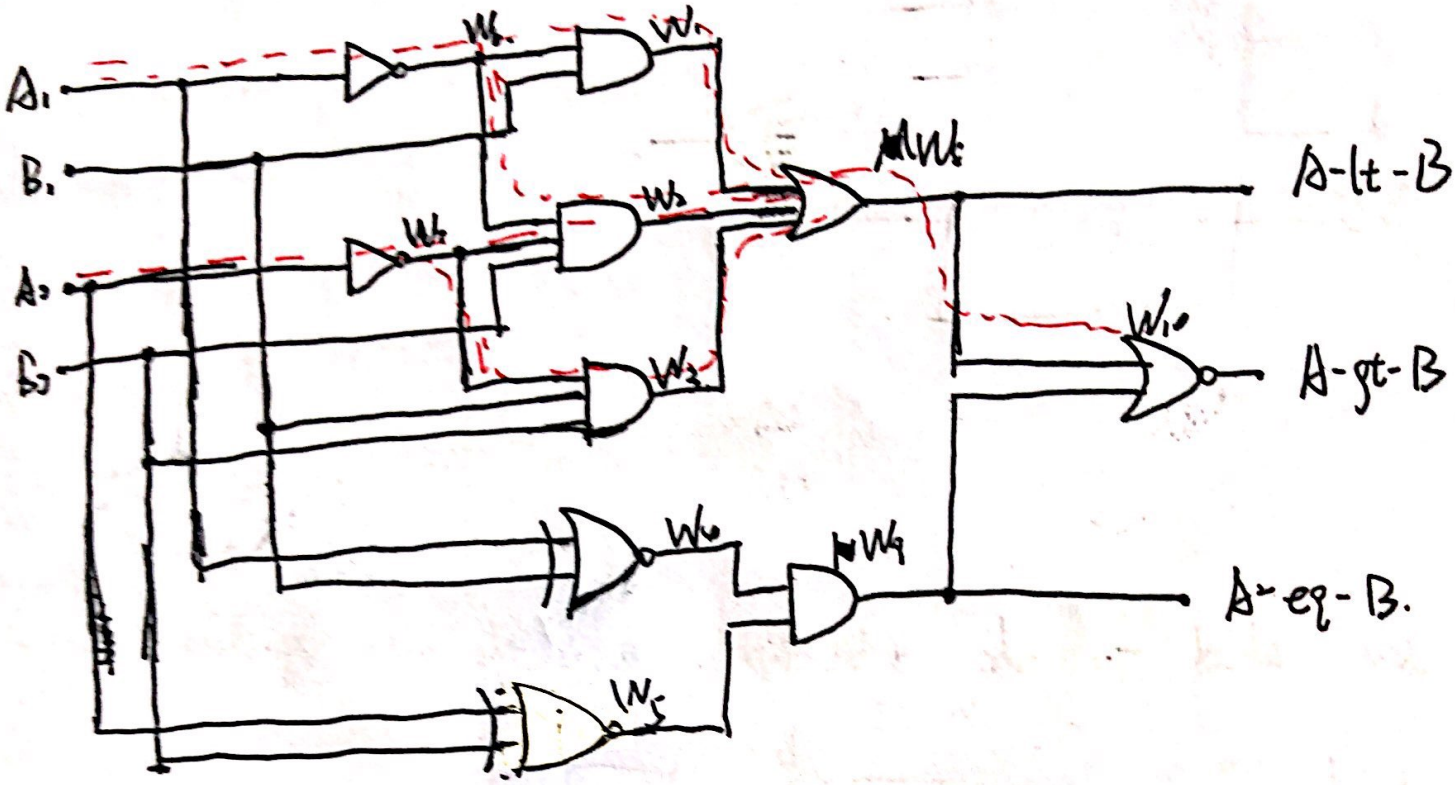


9. Using abcd for the 4-bit input, a is the most significant.



then the output is Cout $S_3 S_2 S_1 S_0$.

10.



4 critical paths.

① $A_1 \to W_6 \to W_1 \to W_8 \to W_{10} \to A\text{-}gt\text{-}B$

② $A_1 \to W_6 \to W_2 \to W_8 \to W_{10} \to A\text{-}gt\text{-}B$

③ $A_0 \to W_5 \to W_2 \to W_8 \to W_{10} \to A\text{-}gt\text{-}B$

④ $A_0 \to W_7 \to W_3 \to W_8 \to W_{10} \to A\text{-}gt\text{-}B.$