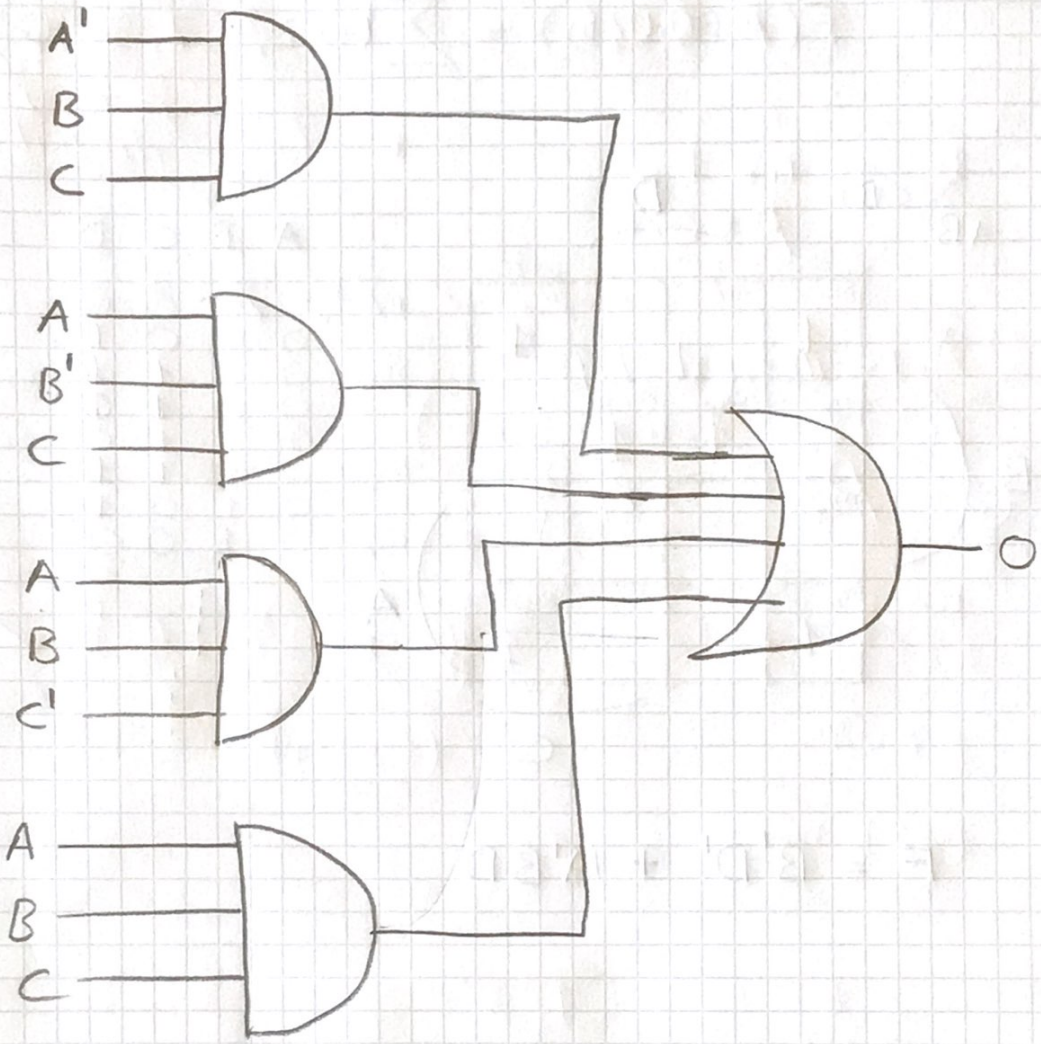
Q3



$$O = A'BC + AB'C + ABC' + ABC$$

① Add $ABC + ABC$ to the expression since it doesn't change the equation

$$O = A'BC + ABC + AB'C + ABC + ABC' + ABC$$

$$A'BC + ABC = BC(A + A') = BC$$
$$AB'C + ABC = AC(B + B') = AC$$
$$ABC' + ABC = AB(C + C') = AB$$

$$O = BC + AC + AB$$

Q1 ENCODER

I3	I2	I1	I0	O1	O0
0	0	0	1	0	0
0	0	1	0	0	1
0	1	0	0	1	0
1	0	0	0	1	1

$$O_1 = I_3' I_2 I_1' I_0' + I_3 I_2' I_1' I_0'$$

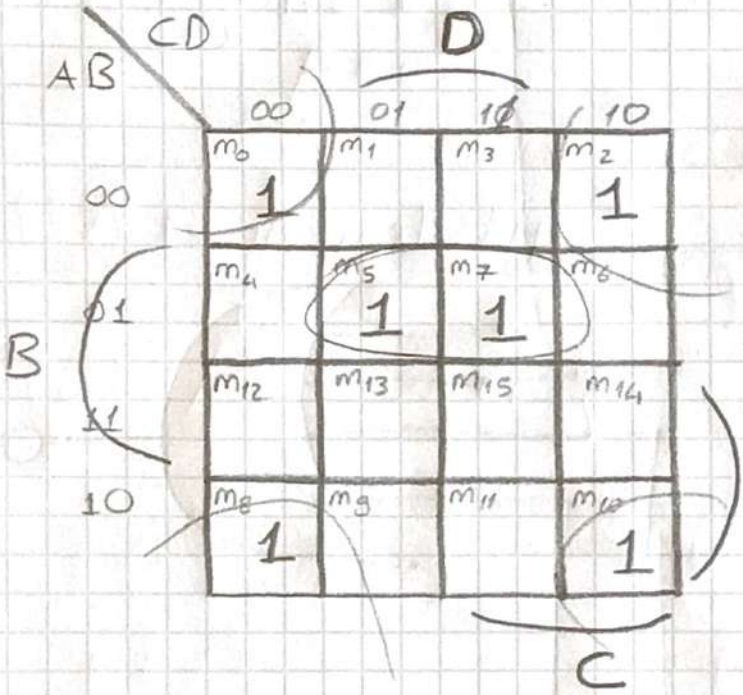
$$O_1 = I_1' I_0' \left(I_3' I_2 + I_3 I_2' \right)$$

$$O_0 = I_3' I_2' I_1 I_0' + I_3 I_2' I_1' I_0'$$

$$O_0 = I_0' I_2' \left(I_1 I_3' + I_1' I_3 \right)$$

Q2

$$F(A,B,C,D) = \sum(0,2,5,7,8,10)$$



	A	B	C	D	F
m_0 —	0	0	0	0	
	0	0	0	1	
m_2 —	0	0	1	1	
	0	0	1	0	
	0	1	1	0	
m_5 —	0	1	1	1	
	0	1	0	1	
m_7 —	0	1	0	0	

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