

1. $0 \rightarrow 15$. Input: I_1, I_2, I_3, I_4

Output: D ($D=1$ khi 1, 2, 3, 5, 7, 13, 14, 0 các)

Ta xây dựng bảng sự thật

	I_1	I_2	I_3	I_4	D		I_1	I_2	I_3	I_4	b
0	0	0	0	0	0	8	1	0	0	0	0
1	0	0	0	1	1	9	1	0	0	1	0
2	0	0	1	0	1	10	1	0	1	0	0
3	0	0	1	1	1	11	1	0	1	1	1
4	0	1	0	0	0	12	1	1	0	0	0
5	0	1	0	1	1	13	1	1	0	1	1
6	0	1	1	0	0	14	1	1	1	0	0
7	0	1	1	1	1	15	1	1	1	1	0

a)

D	$I_1 I_2$	$I_3 I_4$	00	01	11	10
00	0 ⁰		1 ¹	1 ³	1 ²	
01	0 ⁴		1 ⁵	1 ⁷	0 ⁶	
11	0 ¹²		1 ¹³	0 ¹⁵	0 ¹⁴	
10	0 ⁸		0 ⁹	1 ¹¹	0 ¹⁰	

$$\Rightarrow D = I_1' I_4 + I_2 I_3' I_4 + I_1' I_2' I_3 + I_2' I_3 I_4$$

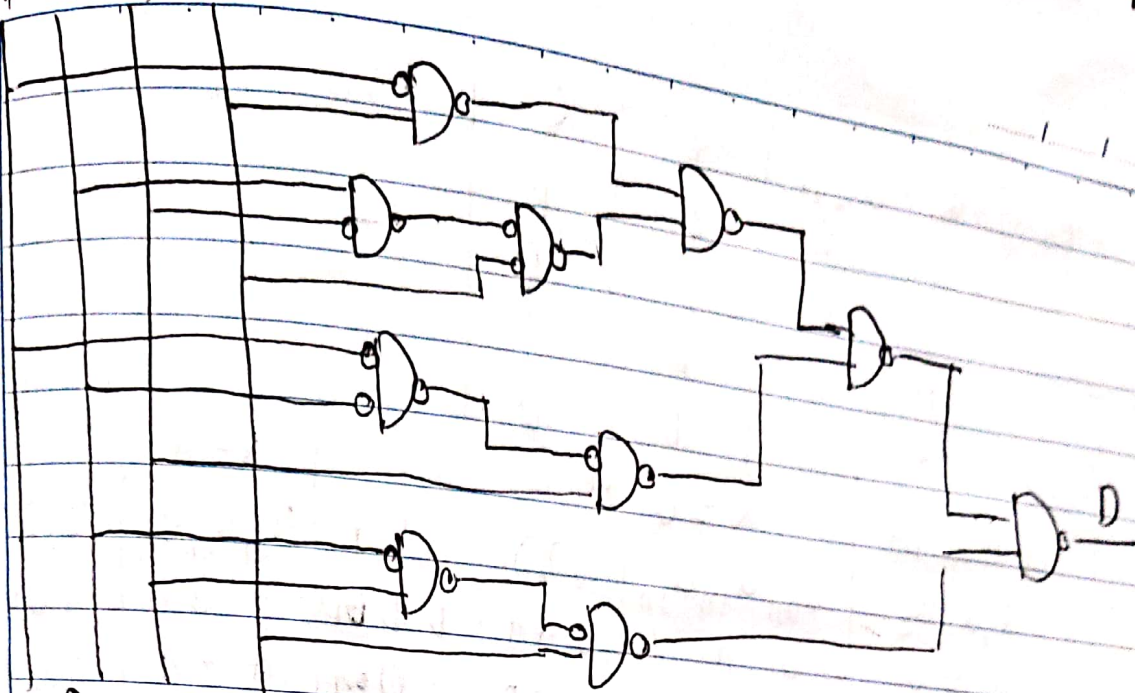
$$b) ((I_1' I_4)' (I_2 I_3' I_4)' (I_1' I_2' I_3)' (I_2' I_3 I_4)')'$$

$$= ((I_1' I_4)' \cdot (I_2 I_3' I_4)' (I_1' I_2' I_3))' \cdot (I_2' I_3 I_4)'$$



HAI TIEN

I_1, I_2, I_3, I_4



c) MUX 8-1 và cổng NOT

2. Trạng thái hiện tại

Trạng thái tiếp theo

Đầu ra 2

	$X=0$	$X=1$	$X=0$	$X=1$
A	D	E	0	1
B	A	F	1	1
C	D	B	0	1
D	D	F	0	0
E	C	F	1	1
F	D	G	1	1
G	A	F	1	1

Mạch ko rút gọn được

Trạng thái hiện tại

Trạng thái tiếp theo

Đầu ra 2

	$X=0$	$X=1$	$X=0$	$X=1$
A 000	011	100	0	1
B 001	000	101	1	1
C 010	011	001	0	1
D 011	011	101	0	0
E 100	010	101	1	1
F 101	011	110	1	1
G 110	000	101	1	1

C_0	Q	Q_{next}	J	K
0	0	0	0	0
0	1	1	1	0
1	0	0	0	1
1	1	1	0	0

Tag thời h	$x=0$						$x=1$								
$Q_0 Q_1 Q_2$	Q_0	Q_1	Q_2	J_0	J_1	J_2	Q_0	Q_1	Q_2	J_0	J_1	J_2	K_0	K_1	K_2
0 0 0	0	1	1	0	1	1	1	0	0	1	0	0	0	0	0
0 0 1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0
0 1 0	0	1	1	0	0	1	0	0	1	0	0	1	0	0	0
0 1 1	0	1	1	0	0	0	1	0	1	1	0	0	0	0	0
1 0 0	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0
1 0 1	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0
1 1 0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0

J_0	Q_0, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

$$J_0 = X$$

K_0	Q_1, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

$$K_0 = X'$$

J_1	Q_1, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

$$J_1 = X' Q_2' + Q_0 Q_2$$

K_1	Q_1, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

$$K_1 = X + Q_0$$

J_2	Q_1, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

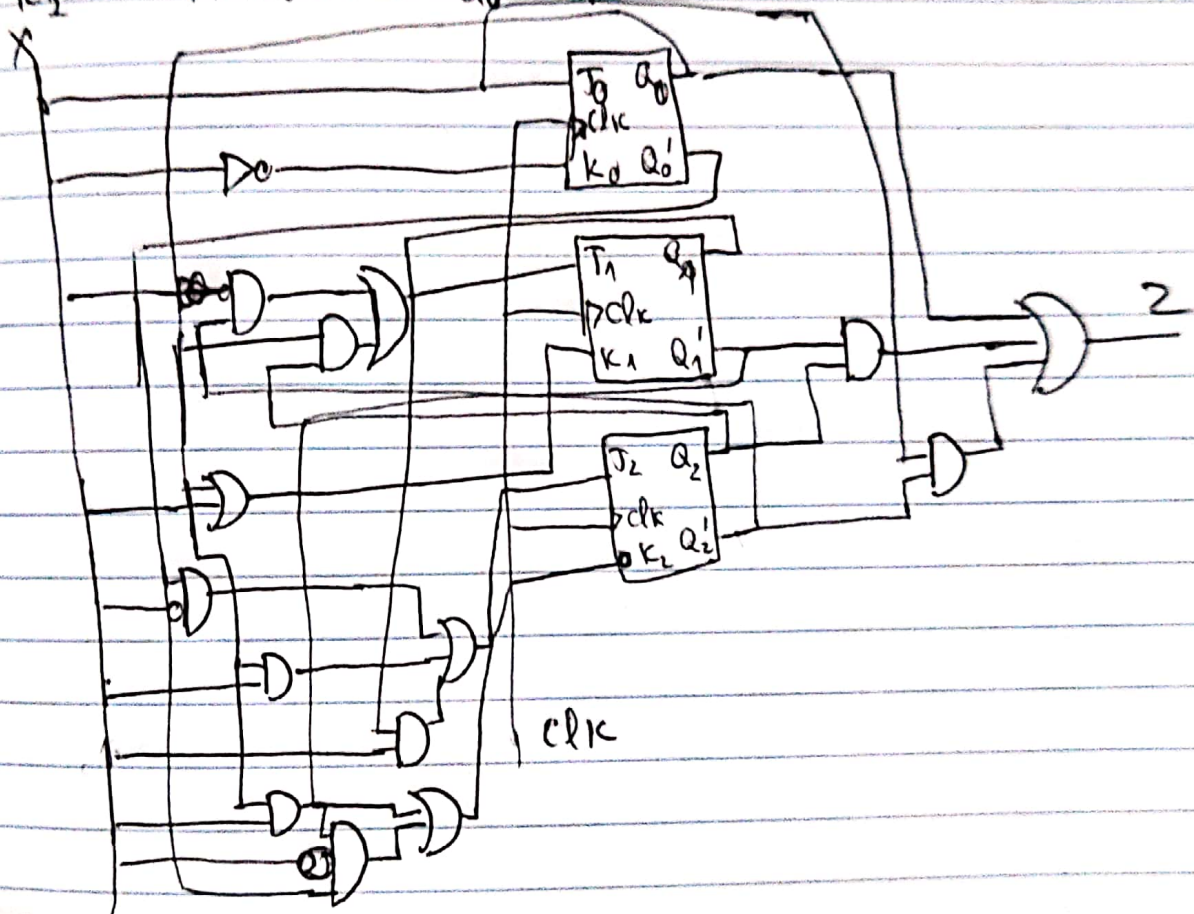
K_2	Q_1, Q_2	00	01	11	10
$x Q_0$	00	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

z	$Q_1 Q_2$	00	01	11	10
$x Q_0$		0	1	0	0
00		0	1	0	0
01		1	1	0	1
11		1	1	0	1
10		1	1	0	1

$$Z = Q_1' Q_2 + x Q_2' + Q_0$$

$$T_2 = x' Q_0' + x Q_0 + x Q_1$$

$$K_2 = x Q_0 + x' Q_0' Q_1'$$



3.

$$T_1 = S_1 S_0' + W \cdot S_0$$

$$K_1 = W$$

A = y_1 , B = y_2
MUX 8-1

1c)

$$D_2 = (S_2 + S_0) W' + y_2' W$$

T_1, T_2, T_3 để đ' chọn
 T_4 để đ' 8 đầu vào