

$s \backslash x$	0	1	$z$
00	01	10	0
01	11	01	0
11	01	00	0
10	01	11	1

$\Rightarrow$

$Q_1, Q_0 \backslash x$	0	1
00	0	1
01	1	0
11	0	0
10	0	1

$D_1$   
 $Q_1$

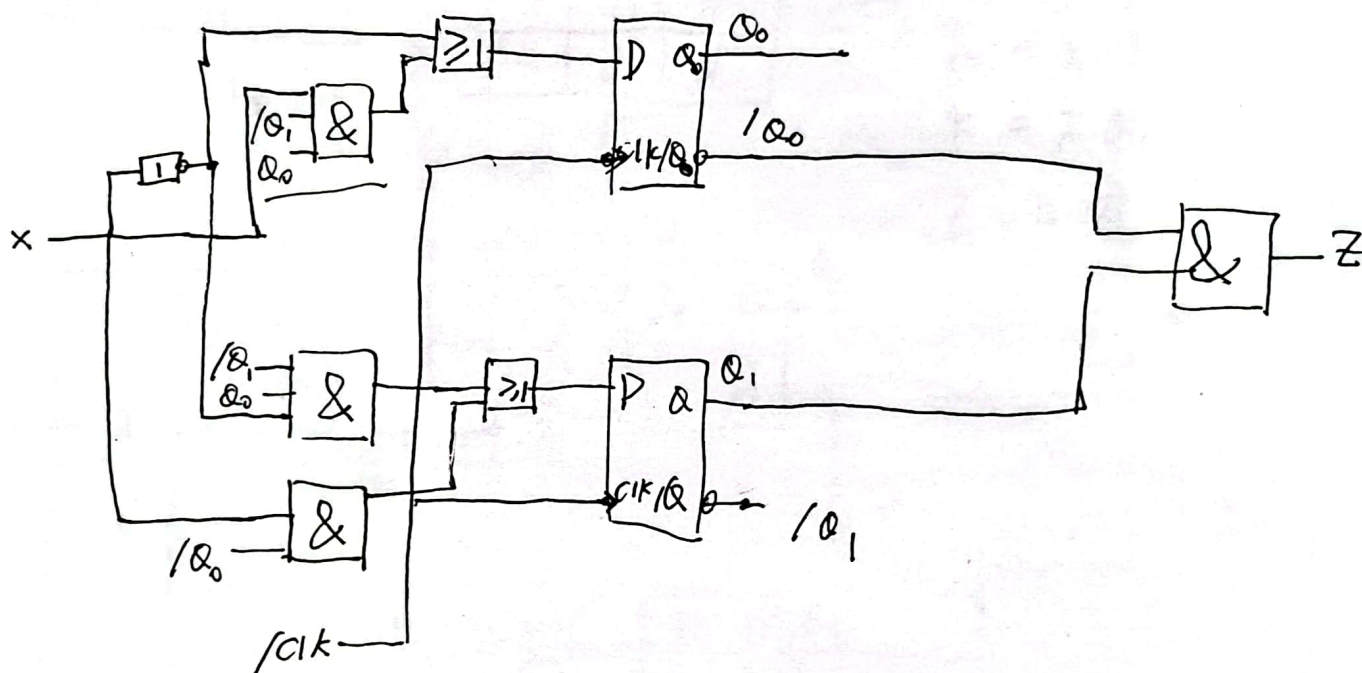
$Q_1, Q_0 \backslash x$	0	1
00	1	0
01	1	1
11	1	0
10	1	1

$D_0$

$$D_1 = \bar{x} \cdot \bar{Q}_1 \cdot Q_0 + x \cdot \bar{Q}_0$$

$$D_0 = \bar{x} + x(\bar{Q}_1 \cdot \bar{Q}_0 + Q_1 \cdot \bar{Q}_0)$$

$$Z = Q_1 \cdot \bar{Q}_0$$



$$Q^{n+1} = J \cdot \bar{Q} + \bar{K} \cdot Q$$

$Q$	$Q^{n+1}$	$J$	$K$
0	0	0	d
0	1	1	d
1	0	d	1
1	1	d	0

$Q, Q_0$	0	1
00	0	1
01	1	0
10	d	d
11	d	d

$Q, Q_1$	0	1
00	d	d
01	d	d
11	1	1
10	1	0

$K_1$

$Q, Q_0$	0	1
00	1	0
01	d	d
11	d	d
10	d	1

$J_0$

$Q, Q_1$	0	1
00	d	d
01	0	0
11	0	1
10	d	d

$K_1$

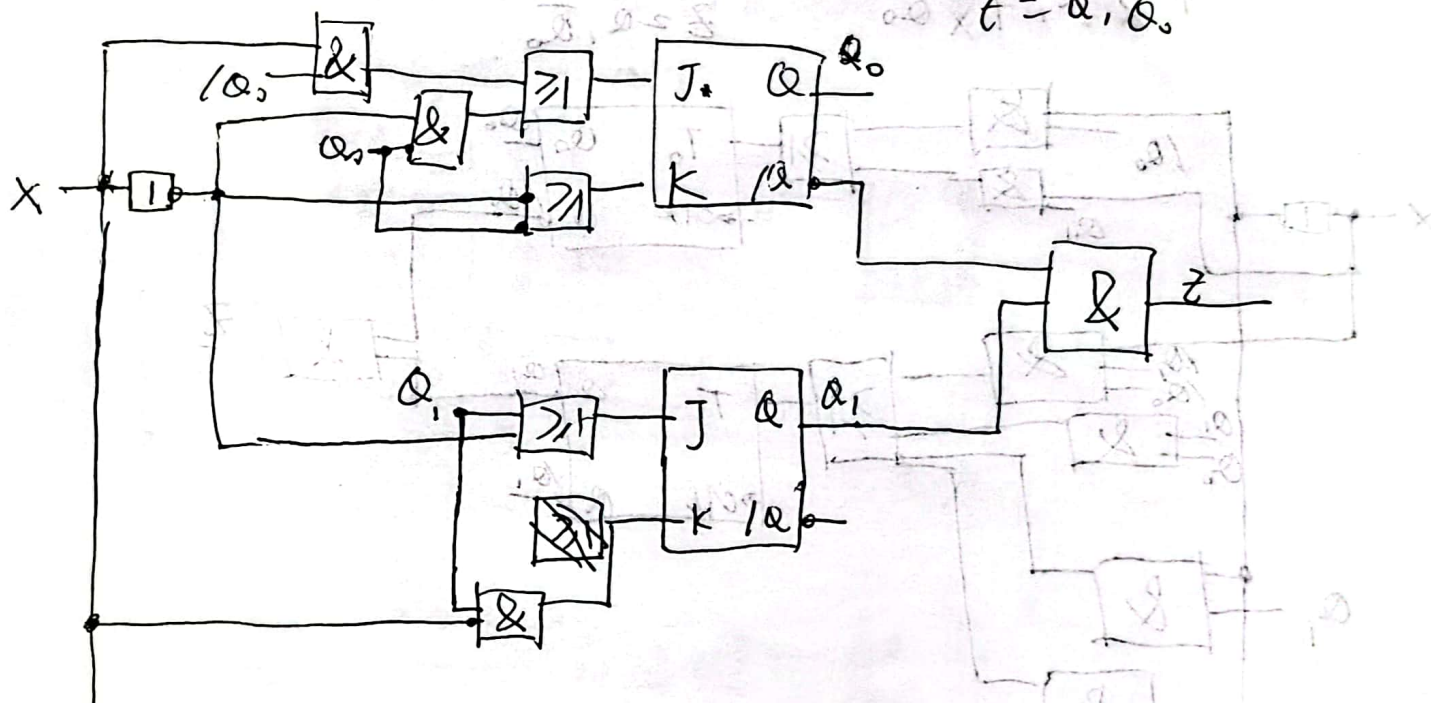
$$J_1 = X \bar{Q}_0 + \bar{X} Q_0$$

$$K_1 = \bar{X} + Q_0$$

$$J_0 = \bar{X} + Q_1$$

$$K_0 = X Q_1$$

$$Z = Q_1 \bar{Q}_0$$



$$Q^{n+1} = T \bar{Q} + \bar{T} Q$$

Q	Q <sup>n+1</sup>	T
0	0	0
0	1	1
1	0	1
1	1	0

Q <sub>1</sub> Q <sub>0</sub> \ X	0	1
00	0	1
01	1	0
11	1	1
10	1	0

T<sub>1</sub>

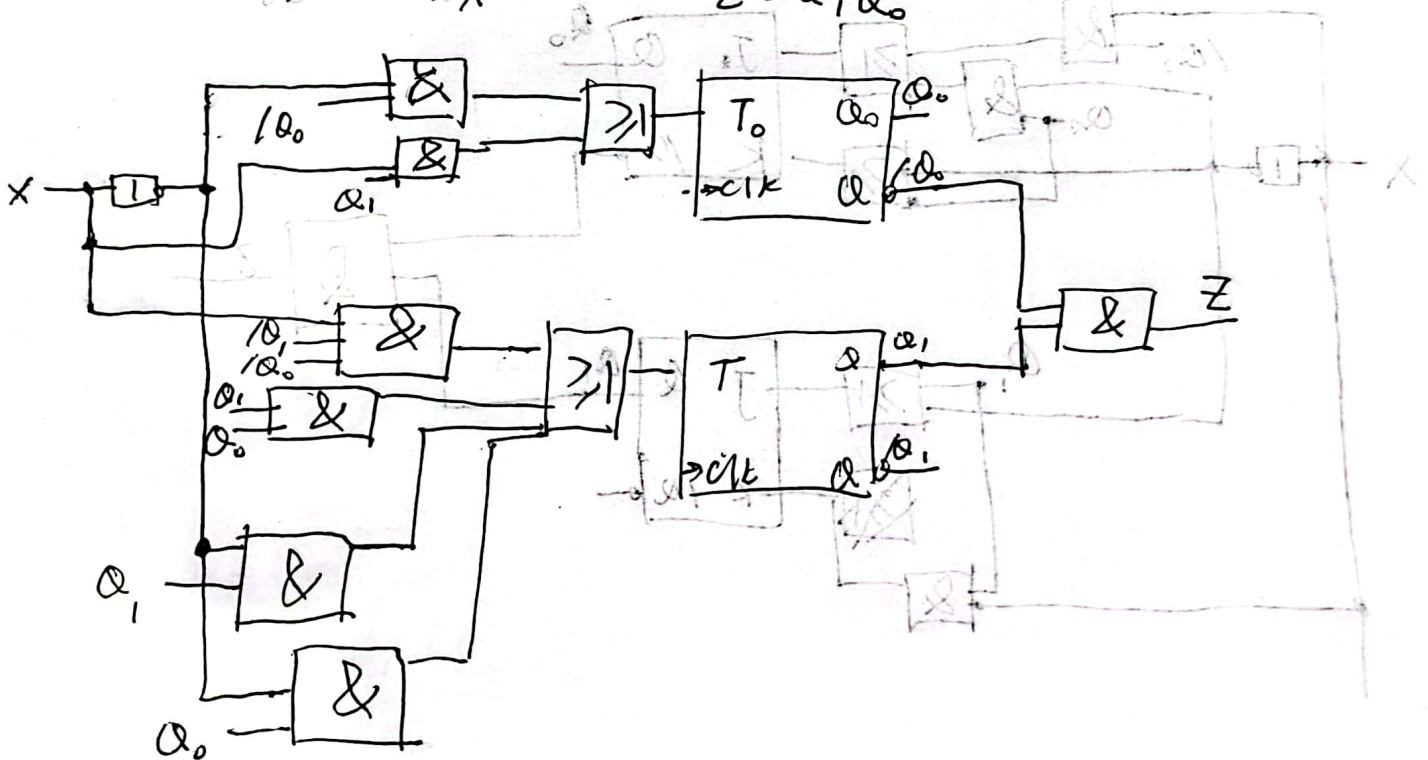
Q <sub>1</sub> Q <sub>0</sub> \ X	0	1
00	1	0
01	0	0
11	0	1
10	1	1

T<sub>0</sub>

$$T_1 = X(\bar{Q}_1 \bar{Q}_0 + Q_1 Q_0) + \bar{X} Q_1 + \bar{X} Q_0$$

$$T_0 = \bar{X} \bar{Q}_0 + X Q_1$$

$$Z = Q_1 \bar{Q}_0$$





3.19

$Q_2 Q_1 Q_0$	$X$	0	1
0 0 0		1 0 0	0 0 1
0 0 1		0 0 0	0 1 0
0 1 0		0 0 1	0 1 1
0 1 1		0 1 0	1 0 0
1 0 0		0 1 1	0 0 0

用 D 触发器

$Q$	$Q^m$	$D$
0	0	0
0	1	1
1	0	0
1	1	1

$Q_2 Q_1$	$Q_0 X$	00	01	11	10
00		1	0	0	0
01		0	0	1	0
11		d	d	d	d
10		0	0	d	d

$D_2$

$Q_2 Q_1$	$Q_0 X$	00	01	11	10
00		0	0	1	0
01		0	1	0	1
11		d	d	d	d
10		1	0	d	d

$D_1$

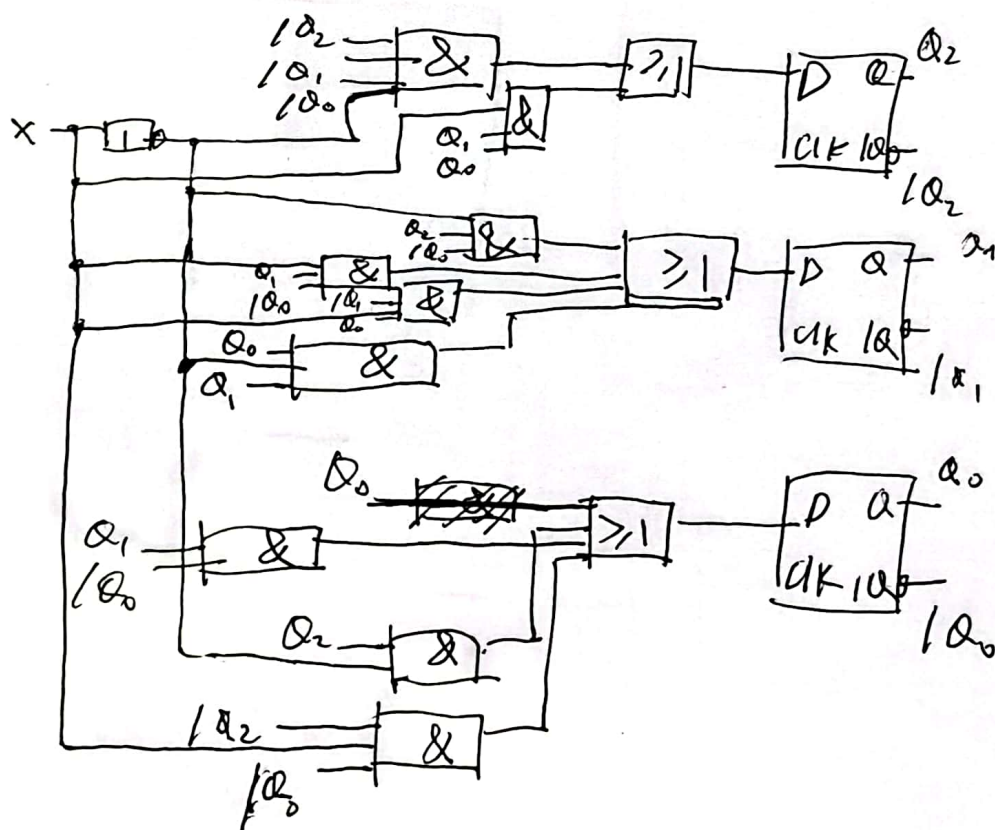
$Q_2 Q_1$	$Q_0 X$	00	01	11	10
00		0	1	1	1
01		1	1	0	0
11		d	d	d	d
10		1	0	d	d

$D_0$

$$D_2 = \bar{Q}_2 \bar{Q}_1 \bar{Q}_0 \bar{X} + Q_1 Q_0 X$$

$$D_1 = Q_2 \bar{Q}_0 \bar{X} + Q_1 \bar{Q}_0 X + \bar{Q}_1 Q_0 X + Q_1 Q_0 \bar{X}$$

$$D_0 = Q_0 + Q_1 \bar{Q}_0 + Q_2 \bar{X} + \bar{Q}_2 \bar{Q}_0 X$$



$$P_1 = \bar{Y}_1 = D_2$$

$$Y_1^{n+1} = D_1$$

$$Y_2^{n+1} = D_2$$

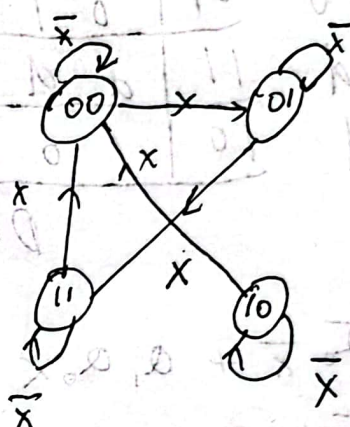
$$CLK_2 = X(Y_2 + \bar{Y}_1)$$

$$CLK_1 = X(Y_1 + Y_2)$$

$Y_1 Y_2$	$X$
00	1
01	1
10	1
11	1

$Y_1^{n+1}$	$Y_2^{n+1}$	$Z$
0	1	0
1	1	0
0	0	0
0	0	1

$X \backslash Y_1 Y_2$	0	1
00	00	00
01	01	11
11	11	00
10	10	00

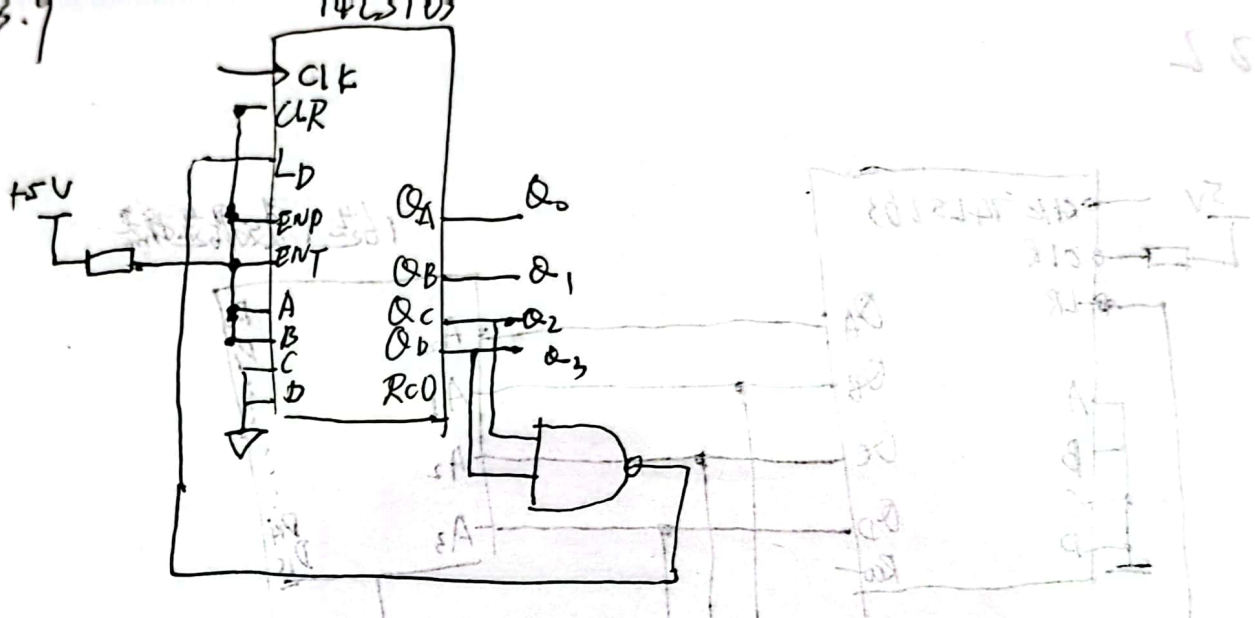


$$\bar{X} \cdot 0 \cdot 0 + X \cdot 0 \cdot 1 + X \cdot 1 \cdot 1 + \bar{X} \cdot 1 \cdot 0 = 0$$

$$X \cdot 0 \cdot 0 + \bar{X} \cdot 0 \cdot 1 + \bar{X} \cdot 1 \cdot 1 + 0 \cdot 1 \cdot 0 = 0$$



3.7



3.10.

0000 → 1000 → 1001 → 1010 → 1011 → 1100  
 → 1101 → 1110 → 1111 → 0111 → 0110  
 → 0101 → 0100 → 0011 → 0010  
 → 0001 → 0000 → ...

3.12.

