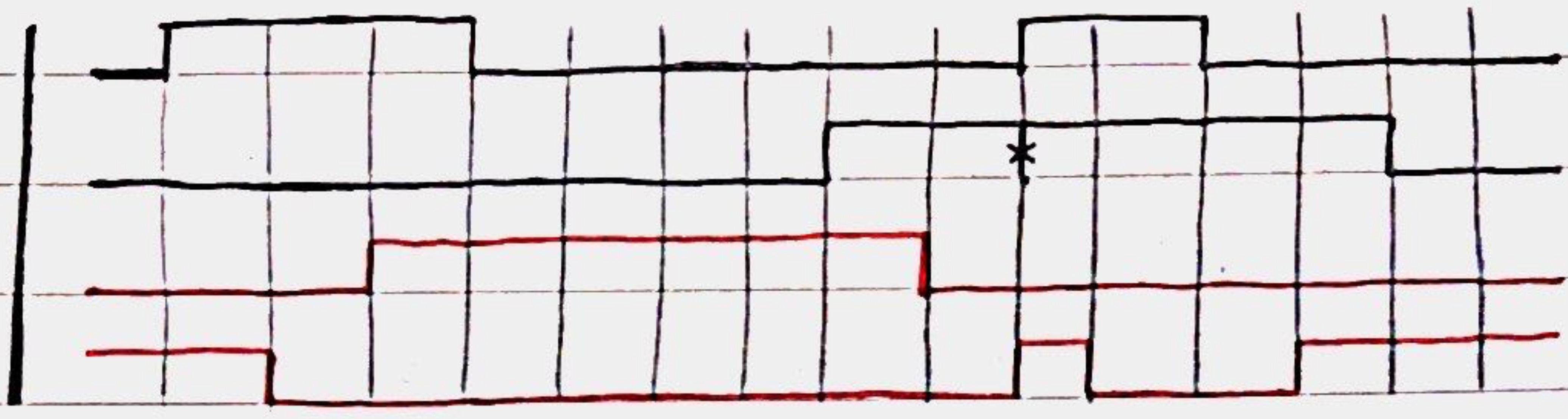
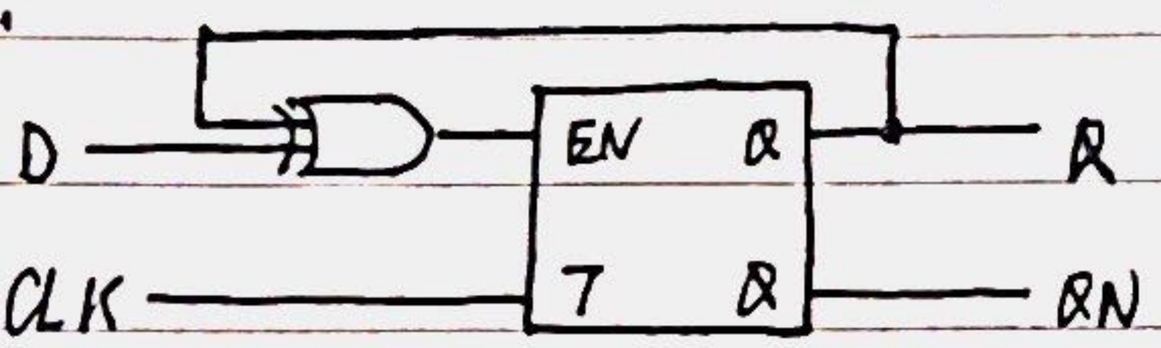
第7章习题：

7.4.



7.6.



7.8. 74X74正边沿触发式D触发器的输出值受CLK信号影响（只在CLK信号上升沿被触发）

S-R锁存器的控制信号应该为恒定值1，不能不用其他元件实现题目要求的构造.

7.12. 激励方程：$D_1 = Q_1' + Q_2$，$D_2 = Q_2' \cdot X$

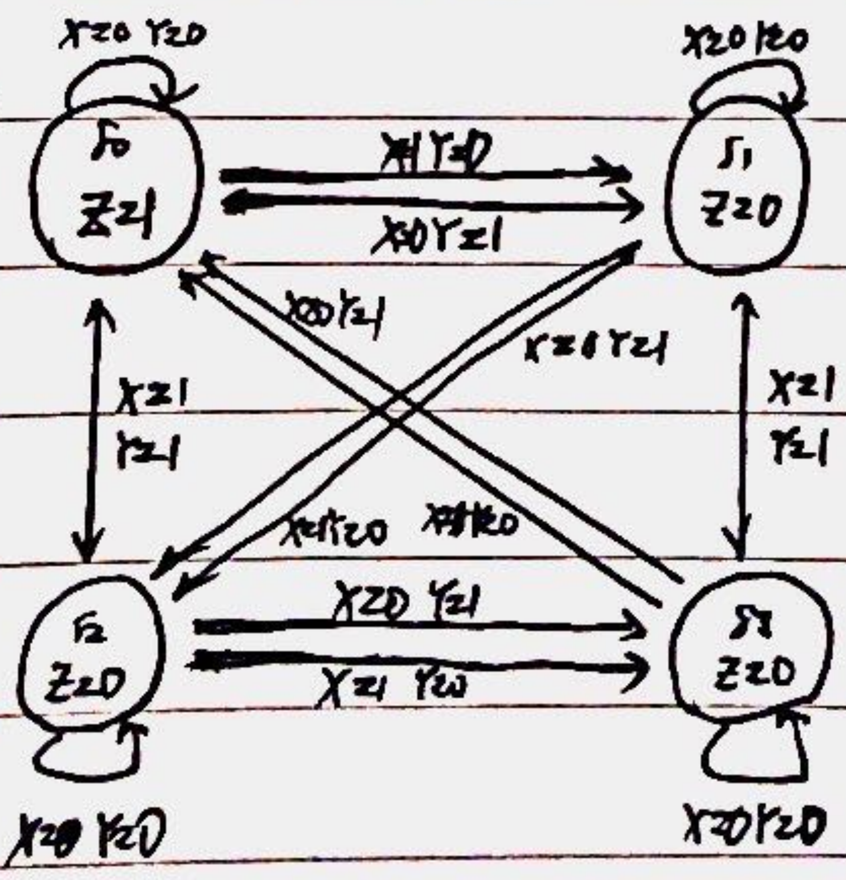
激励/转移表：$Q_1^* = D_1$，$Q_2^* = D_2$，$Z = Q_1 + Q_2'$，则：

X	Q_1	Q_2	Q_1^*	Q_2^*	Z
0	0	0	1	0	1
0	0	1	1	0	0
0	1	0	0	0	1
0	1	1	1	0	1
1	0	0	1	1	1
1	0	1	1	0	0
1	1	0	0	1	1
1	1	1	1	0	1

状态/输出表：

S	S^* X=0	S^* X=1	Z
A	C	D	1
B	C	C	0
C	A	B	1
D	C	C	1

7.15.



7.18. 激励方程：

$D_0 = Q_1$

$D_1 = Q_2$

$D_2 = (Q_1 \oplus Q_0) \oplus (Q_2 + Q_1)'$.

又 $Q_0^* = Q_1$, $Q_1^* = Q_2$, $Q_2^* = (Q_0 \oplus Q_1) \oplus (Q_1 + Q_2)'$,

激励/转换表:　　　　状态/输出表:

Q_0	Q_1	Q_2	Q_0^*	Q_1^*	Q_2^*	S	S*
0	0	0	1	0	0	A	E
0	0	1	0	0	0	B	A
0	1	0	1	0	1	C	F
0	1	1	0	0	1	D	B
1	0	0	0	1	0	E	C
1	0	1	1	1	0	F	G
1	1	0	1	1	1	G	H
1	1	1	0	1	1	H	D

7.19 激励方程: $D_1 = X$, $D_2 = (Q_1 + Y)\cdot Q_3'$, $D_3 = Q_1' + Q_2' \cdot Y$,

Q_1 Q_2 Q_3	$Q_1^* Q_2^* Q_3^*$ XY=00	XY=01	XY=10	XY=11
0 0 0	001	011	111	101
0 0 1	001	001	101	101
0 1 0	001	011	110	101
0 1 1	001	001	101	101
1 0 0	010	011	111	110
1 0 1	000	001	101	101
1 1 0	010	010	110	110
1 1 1	000	000	100	101

S	S* XY=00	XY=01	XY=10	XY=11
A	B	D	H	F
B	B	B	F	F
C	B	D	G	F
D	B	B	F	F
E	C	D	H	G
F	A	B	F	F
G	C	D	G	G
H	A	A	E	F

7.20 激励方程: $D_1 = Y$, $D_2 = X'YQ_1$,

Q_1Q_2	$Q_1^* Q_2^* Z$ XY=00	XY=01	XY=10	XY=11
00	001	101	000	100
01	010	110	010	110
10	101	011	100	000
11	110	000	110	010

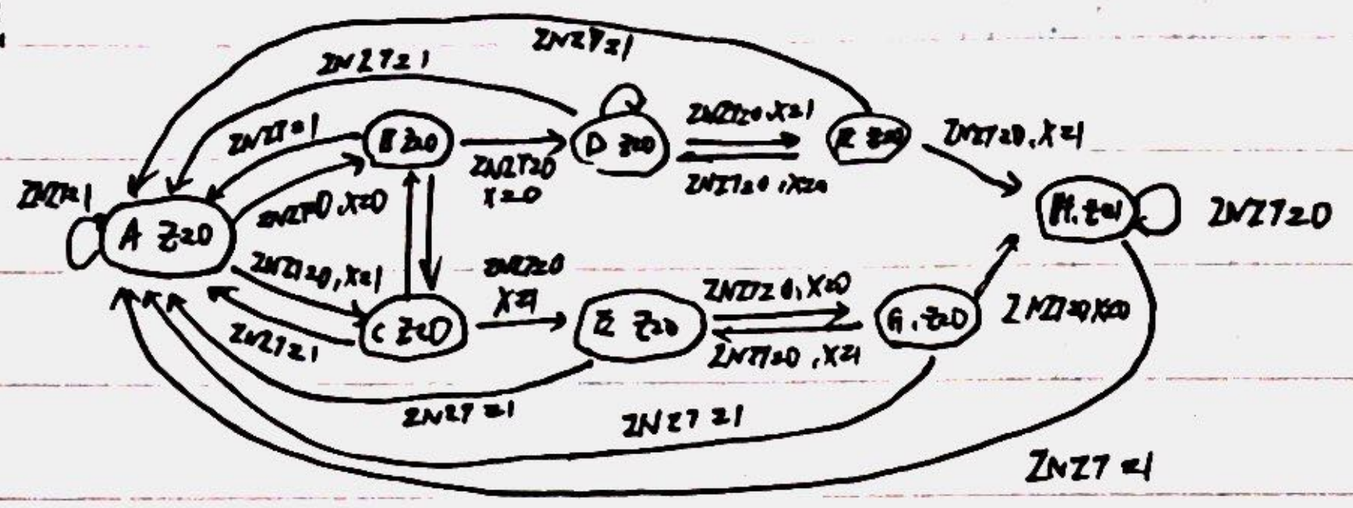
S	S*, Z XY=00	XY=01	XY=10	XY=11
A	A1	C1	A0	C0
B	B0	D0	B0	D0
C	C1	B1	C0	A0
D	D0	A0	D0	B0

No.

Date

7.43, $t_H > t_{setup}$, $t_H < t_{CLmin} + t_{PHmin} - t_{hold}$, $t_H + t_L > t_{Pmax} + \max(t_{CLmax}, t_{CHmax})$

7.44.



7.46

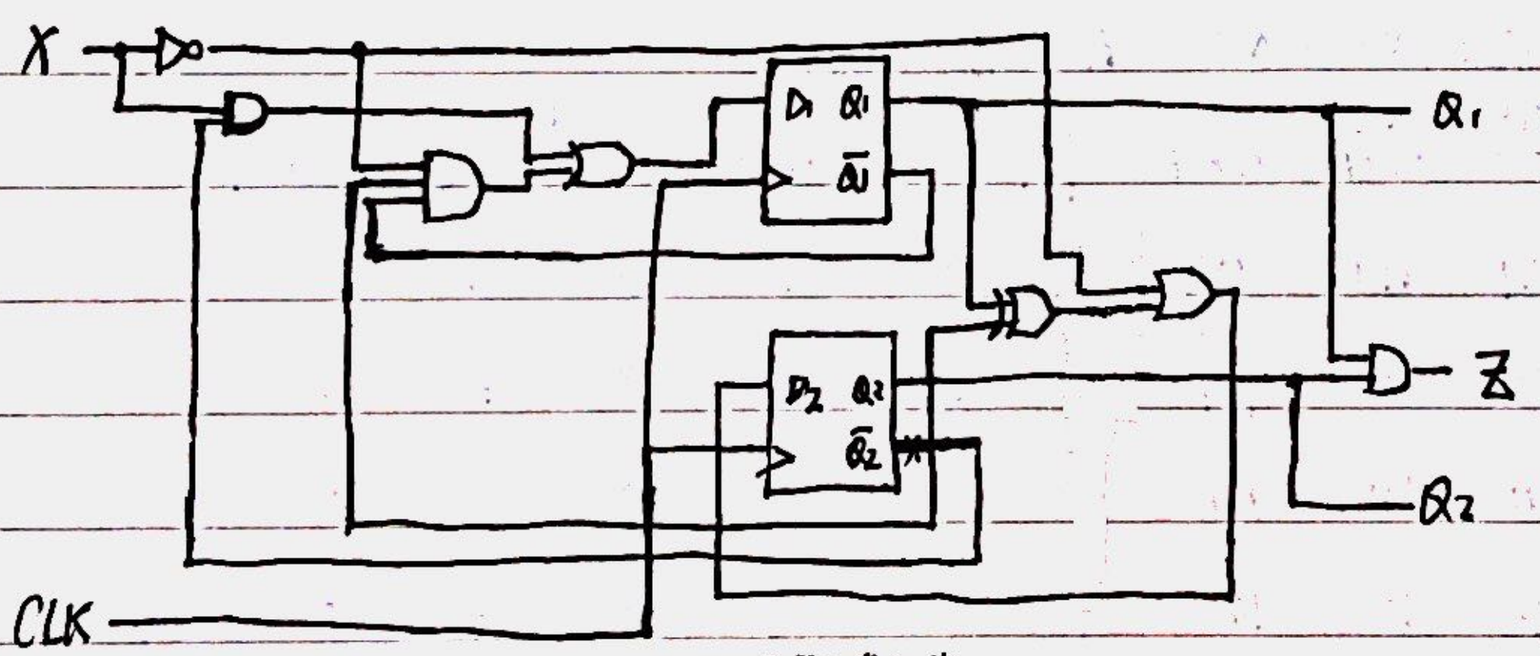
Q_1	Q_2	Q_1^* $_{X=0}$	Q_2^* $_{X=1}$	Z
0	0	0 1	0	1 0 0
0	1	1 1	0	0 1 0
1	0	0 1	1	0 0 1
1	1	0 1	0	1 1 0

$Q_1^* = Q_1'Q_2'X + Q_1Q_2'X' + Q_1Q_2'X = Q_1Q_2X' + Q_2'X$

$Q_2^* = X' + Q_1'Q_2X + Q_1Q_2'X = X' + (Q_1 \oplus Q_2)$

$Q^* = D$, $D_1 = Q_1^*$, $D_2 = Q_2^*$ 即

$Z = Q_1Q_2X' + Q_1Q_2X = Q_1Q_2$.



$Q_1^*Q_2^*Q_3^*$

7.47

$Q_1Q_2Q_3$	AB=00	AB=01	AB=10	AB=11	Z
INZ7	0 0 0	0 0 1	0 0 1	0 1 0	0 1 0	0
A0	0 0 1	0 1 1	0 1 1	0 1 0	0 1 0	0
A1	0 1 0	0 0 1	0 0 1	1 0 0	1 0 0	0
0K0	0 1 1	0 1 1	0 1 1	0 1 0	1 0 0	1
0K1	1 0 0	0 0 1	0 1 1	1 0 0	1 0 0	1

~~$D_0 = Q_0^* = Q_1'Q_0'X + Q_1X'$, $D_1 = Q_1^* = Q_1'Q_0X + Q_1'Q_0'X + Q_1Q_0'X = XQ_1 + Q_0'Q_1$.~~

~~$D_2 = Q_2^* = Q_2'Q_0'X + Q_2Q_0X + Q_2Q_0'X = Q_2X + Q_0'Q_2$~~ ~~$D_2 = N_2^* = X'$~~

$D_1 = Q_1^* = AB(Q_1+Q_2) + AB'(Q_1 + Q_1'Q_2Q_3') = AQ_1Q_3' + AQ_2Q_3' + ABQ_2Q_3$

Campus

$D_2=Q_2^*=Q_2'Q_3+Q_1A'+Q_3'B+Q_1'Q_2'A+Q_1Q_3'A'B$

$D_3=Q_3^*=A'$，$Z=Q_1'Q_2Q_3+Q_1Q_2'Q_3'$

共需要3个2输入与门，5个3输入与门，2个4输入与门，

1个2输入或门，1个3输入或门，1个5输入或门，

7.44方框中 $A=1$，$D_2=Q_1Q_3'A'+Q_3\cdot A+Q_2\cdot B$，$D_3=A$，

共需要2个2输入与门，1个3输入与门，1个3输入或门，成本极大地增加了。

7.48

	$Q_1Q_2Q_3Q_4$	00 ($Q_1^*Q_2^*Q_3^*Q_4^*$)	01	10	11	Z
INIT	0000	0001	0001	0010	0010	0
A0	0001	0100	0100	0010	0010	0
A1	0010	0001	0001	1000	1000	0
OK0	0100	0100	0100	0010	1000	1
OK1	1000	0001	0100	1010	100	1

$D_1=Q_1^*=(Q_1+Q_3)AB'+(Q_1+Q_2+Q_3)AB=Q_1A+Q_3A+Q_2AB$

$D_2=Q_2^*=(Q_2+Q_4)A'B'+(Q_1+Q_2+Q_4)A'B=Q_2A'+Q_4A'+Q_1A'B$

$D_3=Q_3^*=Q_1'Q_2'Q_3'A'+Q_2AB'$

$D_4=Q_4^*=Q_1'Q_2'Q_4'A'+Q_1AB'$，$Z=Q_1+Q_2=Q_1'Q_2Q_3'Q_4'+Q_1Q_2'Q_3'Q_4'$

共需要4个2输入与门，4个3输入与门，4个4输入与门，

2个2输入或门，3个2输入或门，

7.54

$Q_1Q_2Q_3$	$Q_1Q_2Q_3$ UNLK HINT (X=0)	$Q_1Q_2Q_3$ UNLK HINT (X=1)
000	00[illegible].01	000.00
001	001.00	011.01
011	001.00	010.01
010	110.01	000.00
110	001.00	111.01
111	001.00	101.01
101	110.00	100.01
100	001.11	000.00

$D_1=Q_1^*=Q_1Q_2X+Q_1Q_2'Q_3+Q_1'Q_2Q_3'X'$

$D_2=Q_2^*=Q_1'Q_3X+Q_1'Q_2Q_3'X$
$+Q_1Q_2Q_3'X+Q_1Q_2'Q_3X'$

$D_3=Q_3^*=Q_1Q_2+Q_1'Q_2'Q_3+Q_2'Q_3'X'+Q_1'Q_3X'$

共需要1个2输入与门，6个3输入与门，4个4输入与门，

1个3输入或门，2个4输入或门，

VST-11组合数：1个2输入与门，8个3输入与门，1个4输入与门，

1个2输入或门，1个3输入或门，1个5输入或门，

综上所述，改为方程组的成本相近。