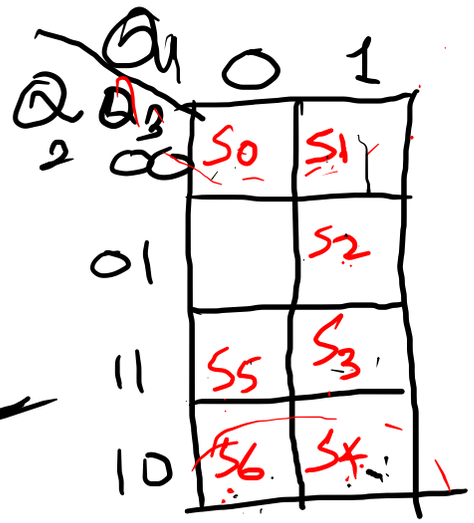
State Encoding:

→ States which have the same NS for a given I/P should be clubbed together. X=1 column.

→ States which are the NS of the same state should be clubbed together.

→ States which have the same O/P for a given I/P should be clubbed together.

$Q_1 Q_2 Q_3$



$Q_1 Q_2 Q_3$

S1, S2 → S4
S3, S4 → S5
S5, S6 → S0

(1,2) (3,4) (5,6)

(S0, S1, S4, S6)

(S2, S3, S5)

(1,2) (3,4) (5,6)

S_1, S_2 are NS of S0
S_3, S_4 are NS of S1
S_5, S_6 are NS of S4

S0 = 000 S5 = 011
S1 = 100 S6 = 010
S2 = 101
S3 = 111
S4 = 110

PS	$Q_1^+Q_2^+Q_3^+$ NS, x=0	$Q_1^+Q_2^+Q_3^+$ NS, x=1	Z, x=0	Z, x=1
S0 000	S1 100	S2 101	1	0
S1 100	S3 111	S4 110	1	0
S2 101	S4 110	S4 110	0	1
S3 111	S5 011	S5 011	0	1
S4 110	S5 011	S6 010	1	0
S5 011	S5 000	S0 000	0	1
S6 010	S0 000	—	1	—

O/P o/t

Q_2Q_3 \ XQ_1	00	01	11	10
00	1	1	0	0
01	X	0	1	X
11	0	0	1	1
10	1	1	0	X

$Z = Q_3X + Q_3'X'$

Q_2Q_3 \ XQ_1	00	01	11	10
00	1	1	1	1
01	X	1	1	X
11	0	0	0	0
10	0	0	0	X

$D_1 = Q_1^+ = Q_2'$

Q_2Q_3 \ XQ_1	00	01	11	10
00	0	1	1	0
01	X	1	1	X
11	0	1	1	0
10	0	1	1	X

$D_2 = Q_2^+ = Q_1$

Q_2Q_3 \ XQ_1	00	01	11	10
00	0	1	0	1
01	X	0	0	X
11	0	1	1	0
10	0	1	0	X

$D_3 = Q_3^+ = Q_2'XQ_1' + Q_2Q_3 + Q_3'X'Q_1$

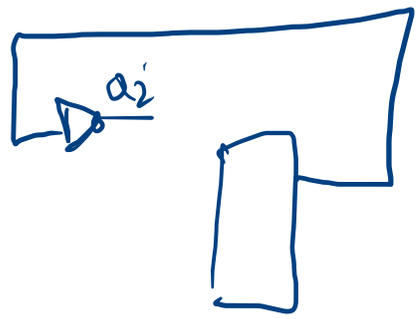
Check back for Mistr

$D_1 = Q_2'$

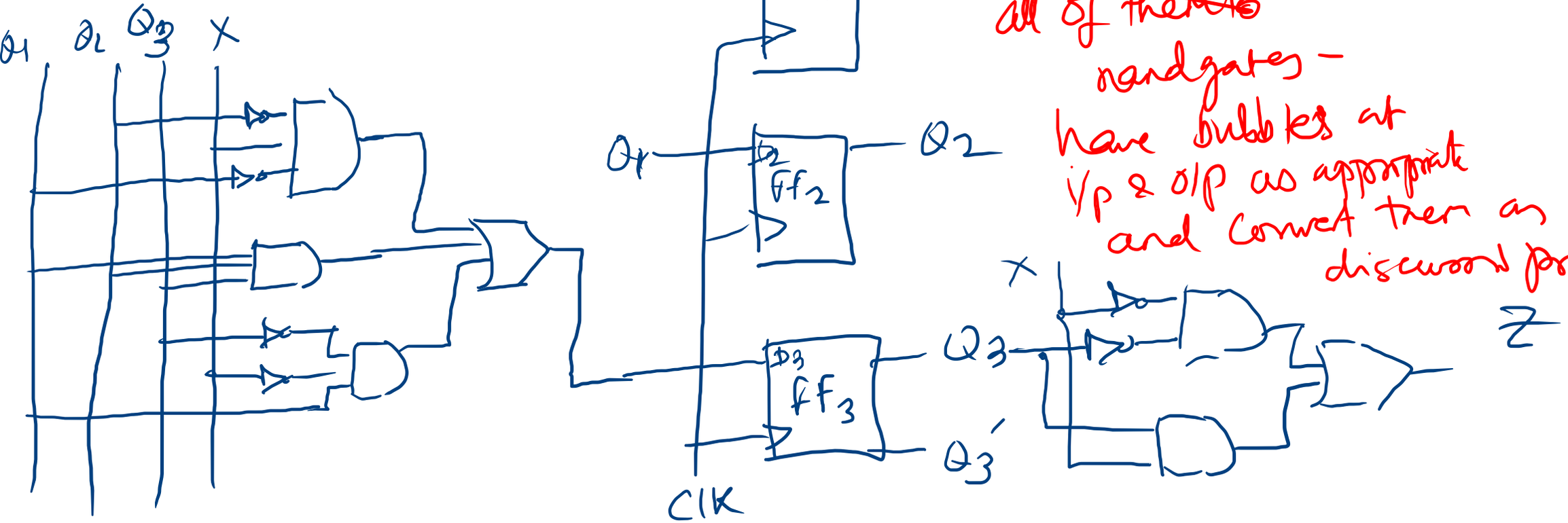
$D_2 = Q_1$

$D_3 = Q_2' x Q_1' + Q_2 Q_3 Q_1 + Q_3' x' Q_1$

$Z = Q_3' x' + Q_3 x$



Code Converter Circuit :-



Convert all of them to nandgates - have bubbles at i/p & o/p as appropriate and connect them as discussed previously.