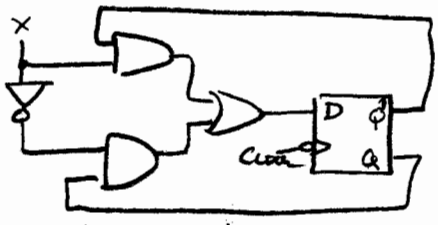
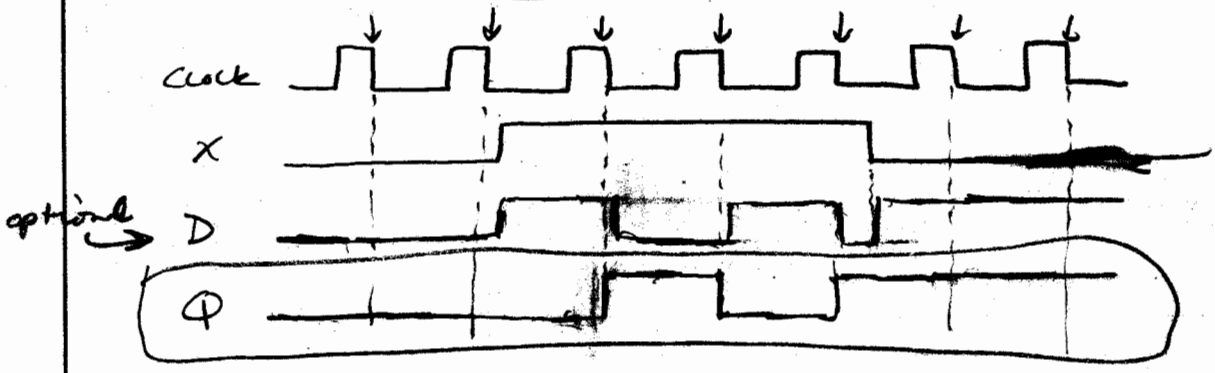
Ch6: 4a, 6ab

Ch 7: 2b, 12 (but base-5 counter), 16o

4a)

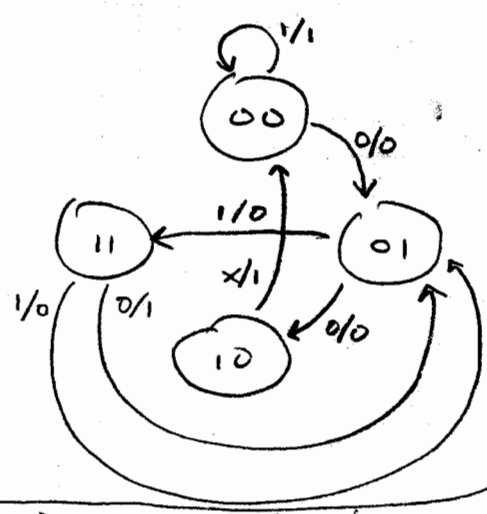


$D = Q'x + Qx'$

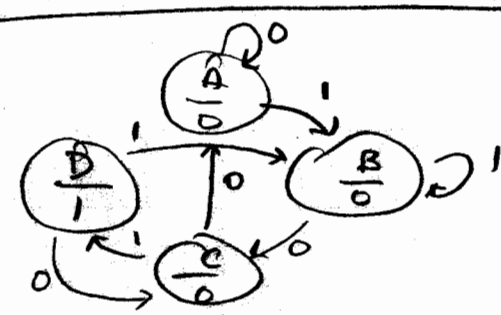


6a)

$q_1 q_2$	$q_1^+ q_2^+$ $x=0$	$x=1$	z $x=0$	$x=1$
0 0	0 1	0 0	0	1
0 1	1 0	1 1	0	0
1 0	0 0	0 0	1	1
1 1	0 1	0 1	1	0



x	1	0	1	1	0	0	0	1				
q_1	0	0	0	1	0	1	0	0	1	0	1	0 ?
q_2	0	0	1	1	1	0	0	1	1	1	?	? ?
z	1	0	0	0	0	1	0	0	?	0	?	? ?



6b)

q	q^+ $x=0$	$x=1$	z
A	A	B	0
B	C	B	0
C	A	D	0
D	C	B	1

x	1	1	0	1	0	1	0	1	0	0	1	0	1 1
q	A	B	B	C	D	C	D	C	D	C	A	B	C D B ?
z	0	0	0	0	1	0	1	0	1	0	0	0	1 0 0

Ch. 7, 2b

q	q^+ $x=0$	q^+ $x=1$	z $x=0$	z $x=1$
A	C	B	1	1
B	A	A	1	0
C	C	A	1	0

A	00
B	11
C	01

x	q_1	q_0	q_1^+	q_0^+	J_1	K_1	J_0	K_0	z
0	0	0	0	1	0	X	1	X	1
0	0	1	0	1	0	X	X	0	1
0	1	0	X	X	X	X	X	X	X
0	1	1	0	0	X	1	X	1	1
1	0	0	1	1	1	X	1	X	1
1	0	1	0	0	0	X	X	1	0
1	1	0	X	X	X	X	X	X	X
1	1	1	0	0	X	1	X	1	0

$q \to q^+$		JK	
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

i) D FF

D_1:

q_1q_0 \ x	0	1
00	0	1
01	0	0
11	0	0
10	X	X

D_0:

q_1q_0 \ x	0	1
00	1	1
01	1	0
11	0	0
10	X	X

Z:

q_1q_0 \ x	0	1
00	1	1
01	1	0
11	1	0
10	X	X

$\boxed{D_1 = x q_0'}$ $\boxed{D_0 = q_0' + x' q_1'}$ $\boxed{Z = x' + q_0'}$

ii) JKFF

$Z = x' + q_0'$ STILL

J_1:

q_1q_0 \ x	0	1
00	0	1
01	0	0
11	X	X
10	X	X

K_1:

q_1q_0 \ x	0	1
00	X	X
01	X	X
11	1	1
10	X	X

J_0:

q_1q_0 \ x	0	1
00	1	1
01	X	X
11	X	X
10	X	X

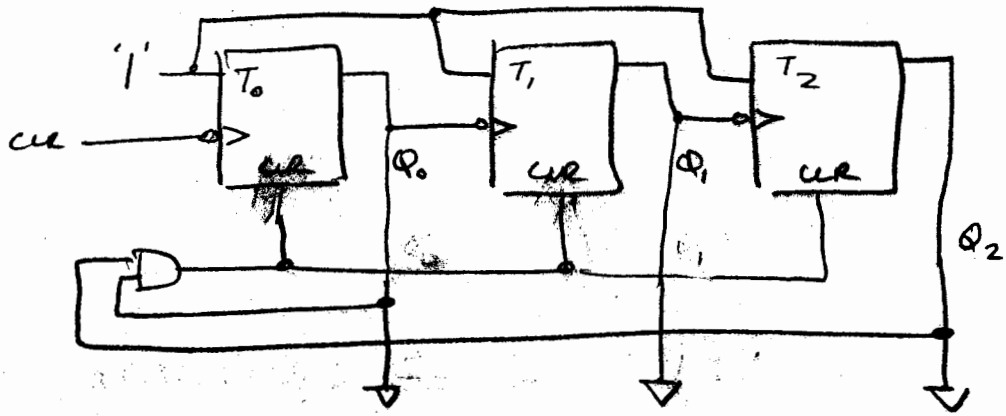
K_0:

q_1q_0 \ x	0	1
00	X	X
01	0	1
11	1	1
10	X	X

$\boxed{J_1 = x q_0' \quad K_1 = 1 \quad J_0 = 1 \quad K_0 = q_0 + x}$

(12) BUT BASE-5 COUNTER

$2^2 < 5 < 2^3$ so you need 3 FFs



CLEAR WHEN $Q_2 Q_1 Q_0 = 101$

SUFFICIENT TO SET

$CLR = Q_2 Q_0$

Q_2	Q_1	Q_0	CLR
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	X
1	1	1	X

cd.

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A → INITIAL STATE

B_0 → LAST # RECEIVED WAS Ø NO ≥ ACCUMULATION

B_1 → " " 1 " "

B_2 → " " 2 " "

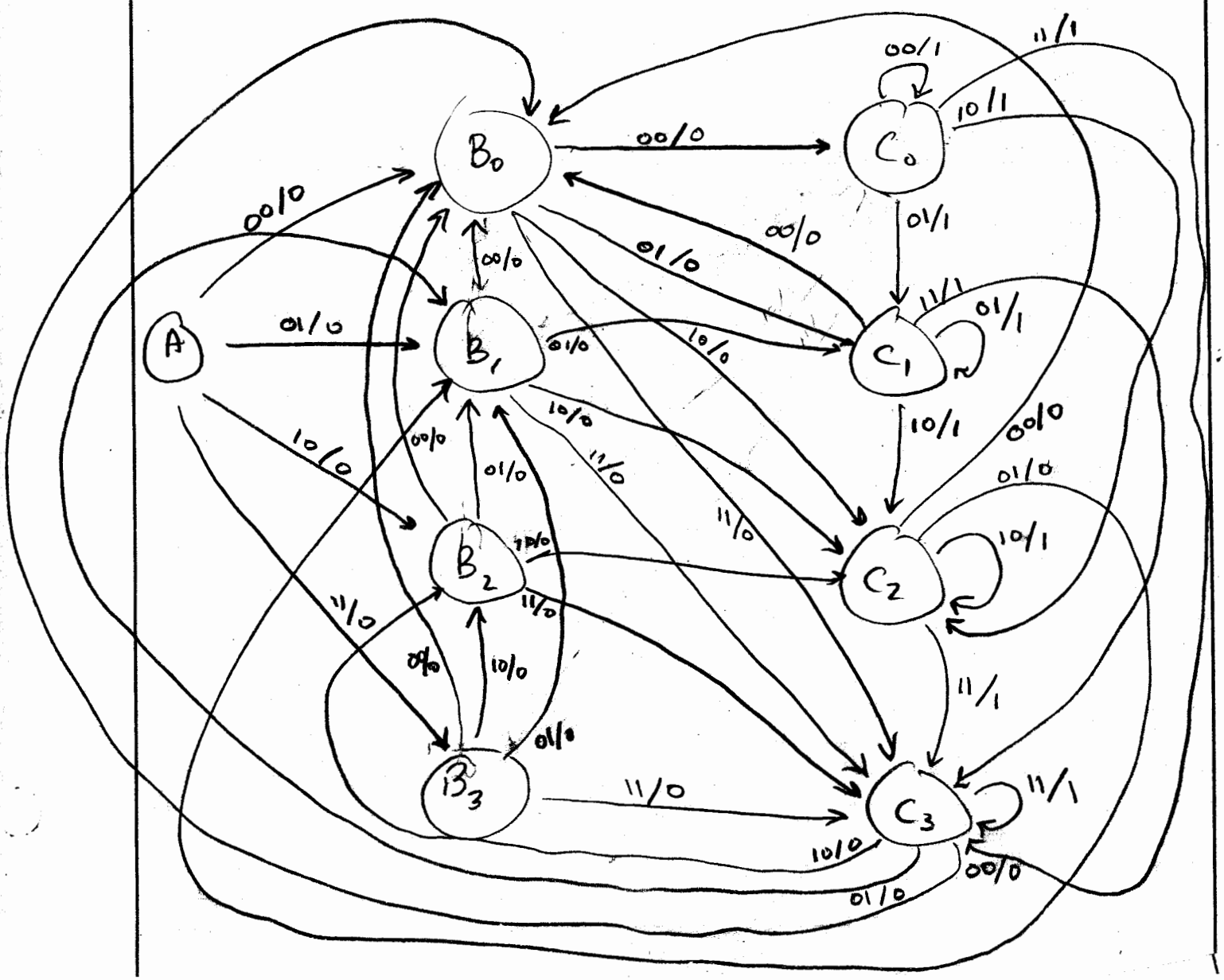
B_3 → " " 3 " "

C_0 → LAST # RECEIVED WAS Ø, AT LEAST 1 ≥ ACCUMULATION

C_1 → " " " 1 "

C_2 → " " " 2 "

C_3 → " " " 3 "



IN STATE TABLE FORM:

Q	Q^*				Z			
	00	01	10	11	00	01	10	11
A	B_0	B_1	B_2	B_3	0	0	0	0
B_0	C_0	C_1	C_2	C_3	0	0	0	0
B_1	B_0	C_1	C_2	C_3	0	0	0	0
B_2	B_0	B_1	C_2	C_3	0	0	0	0
B_3	B_0	B_1	B_2	C_3	0	0	0	0
C_0	C_0	C_1	C_2	C_3	1	1	1	1
C_1	B_0	C_1	C_2	C_3	0	1	1	1
C_2	B_0	B_1	C_2	C_3	0	0	1	1
C_3	B_0	B_1	B_2	C_3	0	0	0	1