

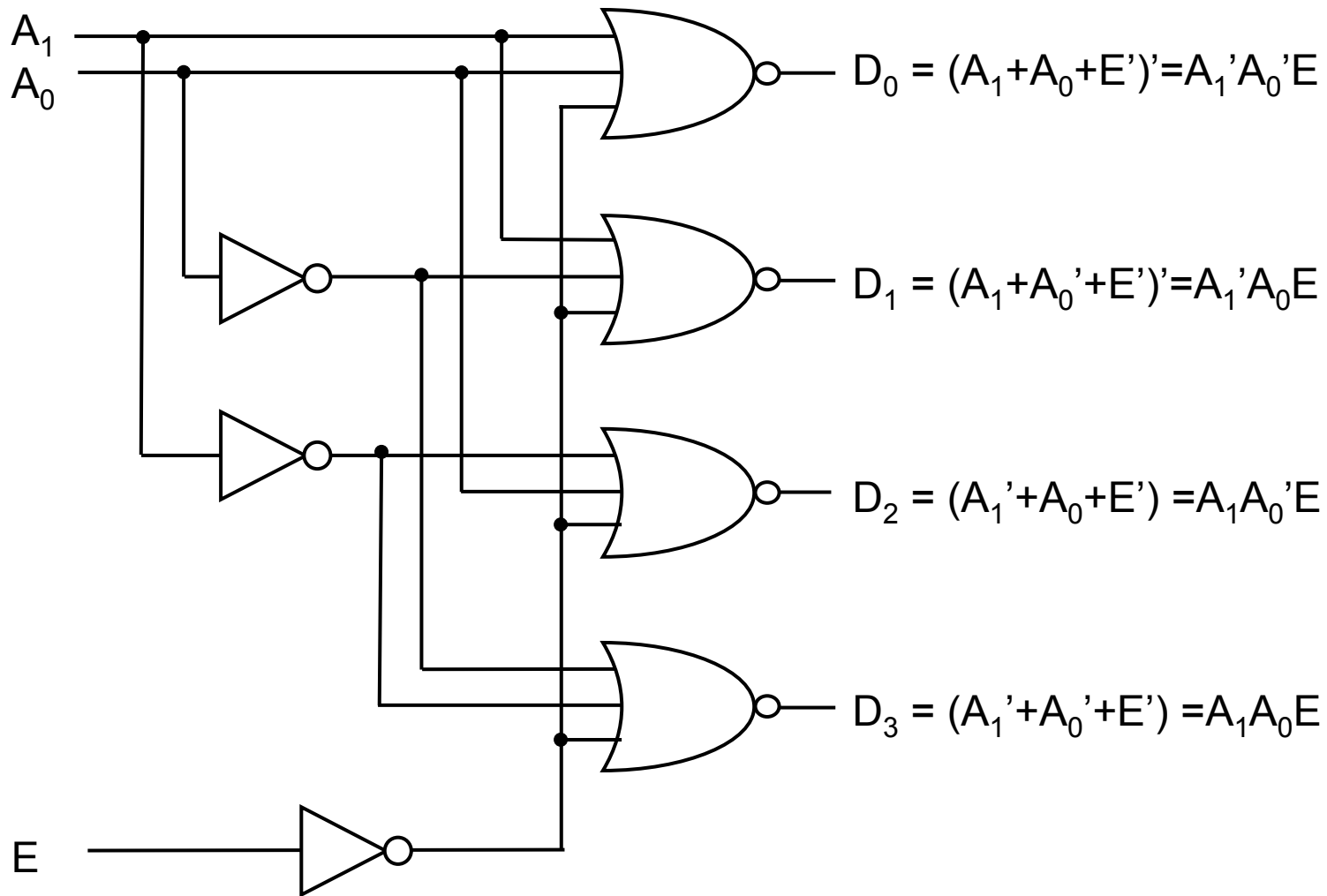
Solution to Problems

Chapter 4 & 5 “Digital Design” by M. Morris Mano

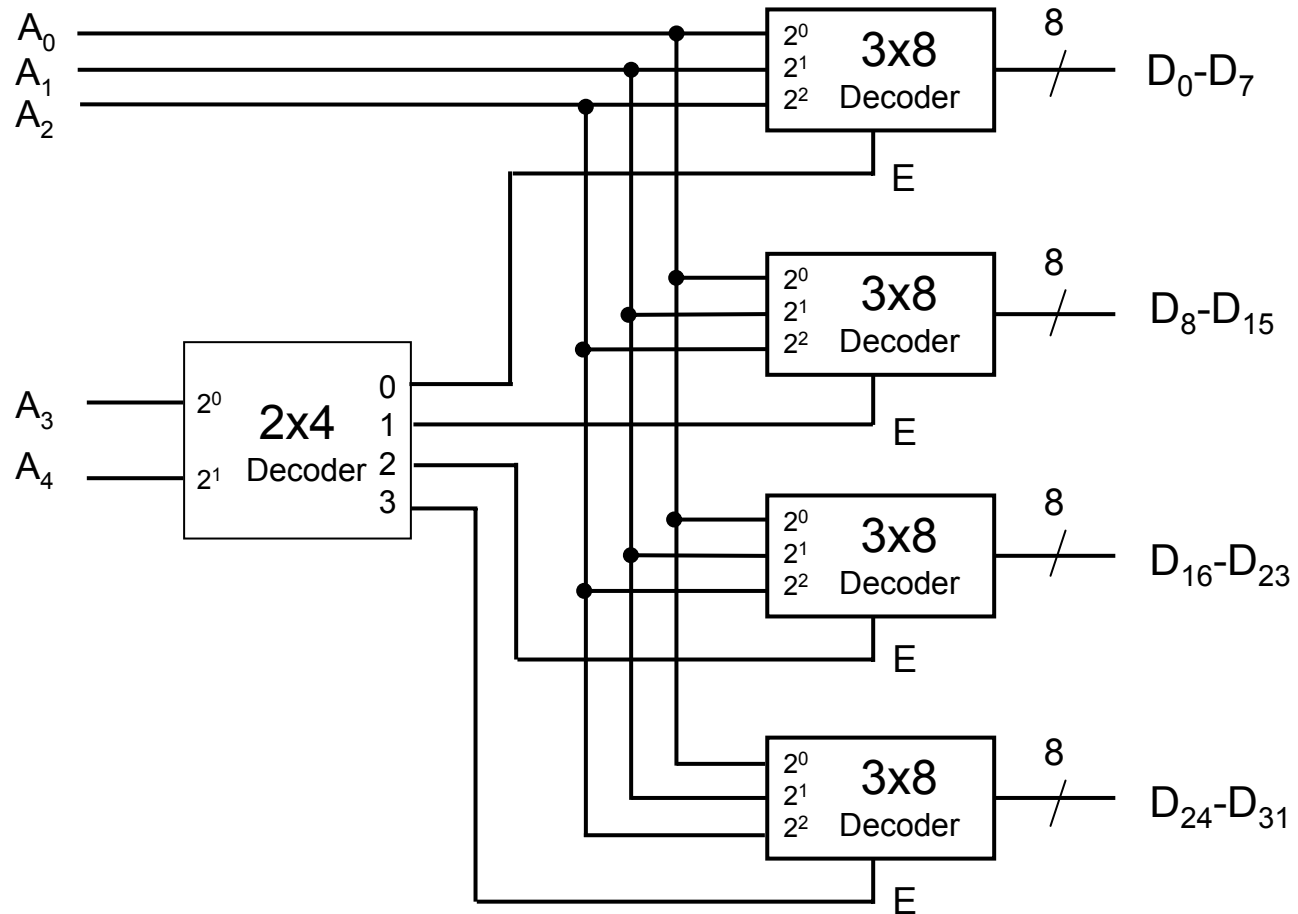
ECE 223
Fall 2005

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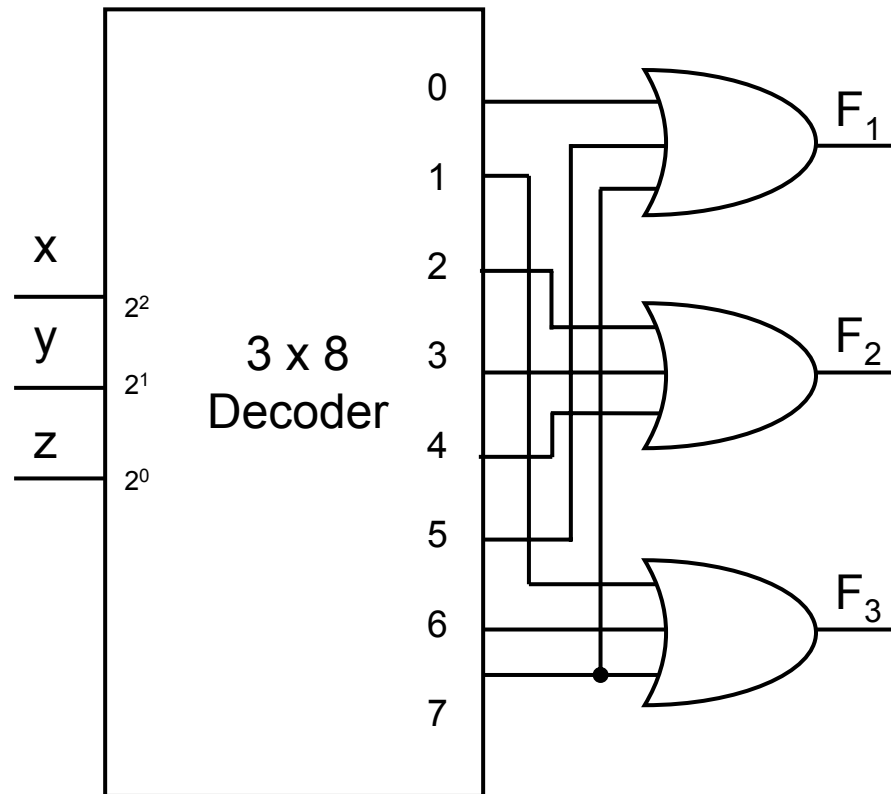
4-25



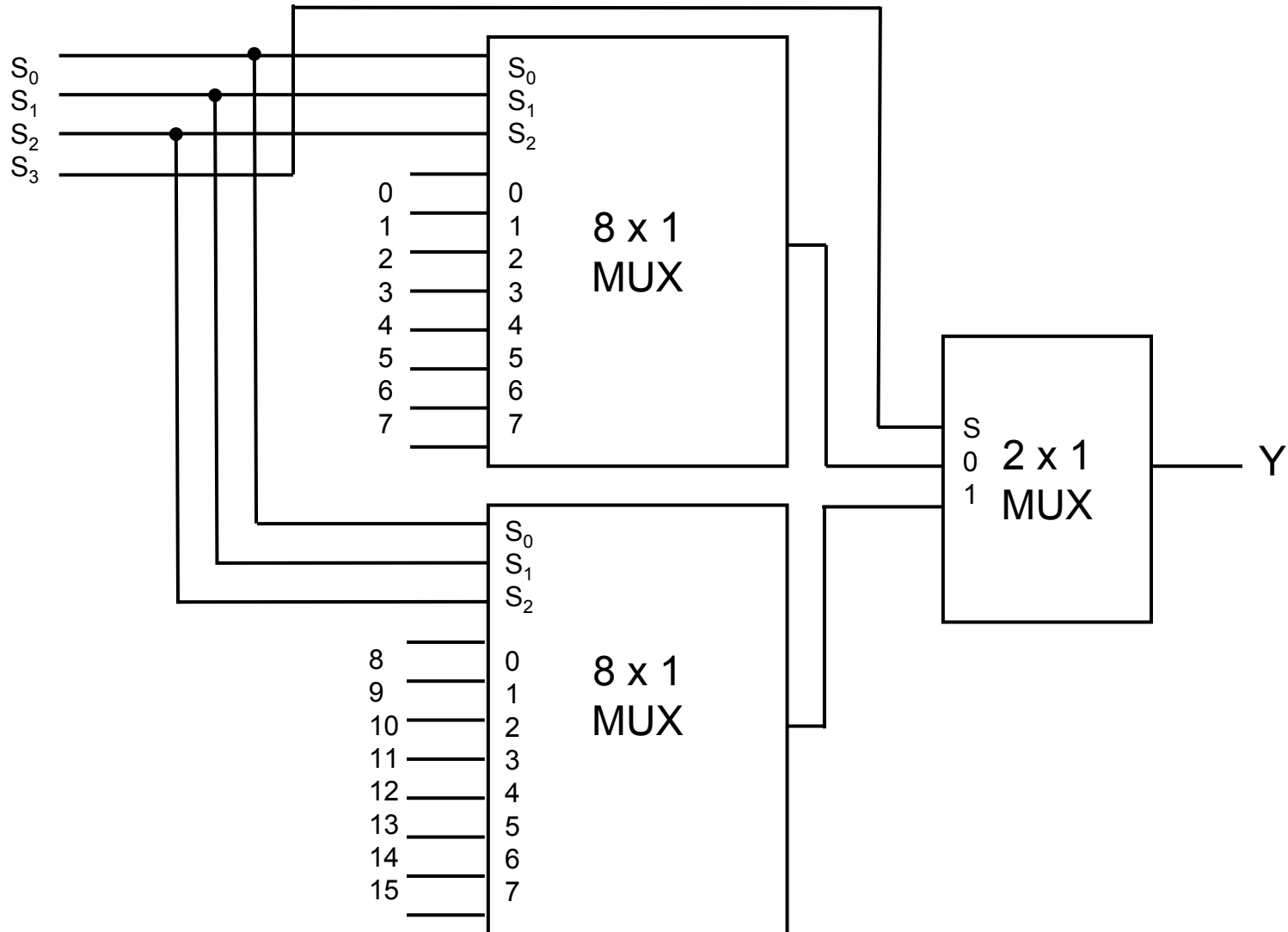
$$F_1 = x(y + y')z + x'y'z' = \Sigma(0, 5, 7)$$

$$F_2 = x y' z' + x' y (z + z') = \Sigma(2, 3, 4)$$

$$F_3 = x'y'z + x y (z + z') = \Sigma(1, 6, 7)$$

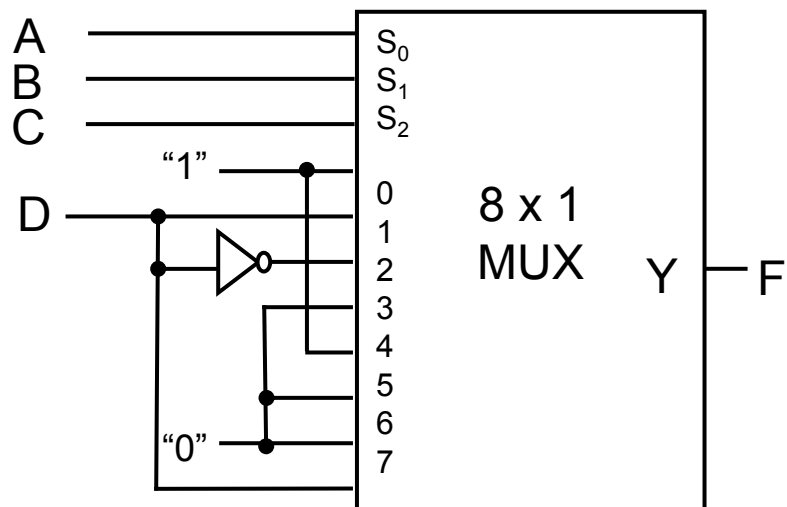


4-31



4-32

A	B	C	D	F	
0	0	0	0	1	} F=1
0	0	0	1	1	
0	0	1	0	0	} F=D
0	0	1	1	1	
0	1	0	0	1	} F=D'
0	1	0	1	0	
0	1	1	0	0	} F=D
0	1	1	1	0	
1	0	0	0	1	} F=1
1	0	0	1	1	
1	0	1	0	0	} F=0
1	0	1	1	0	
1	1	0	0	0	} F=0
1	1	0	1	0	
1	1	1	0	0	} F=D
1	1	1	1	1	



4-35

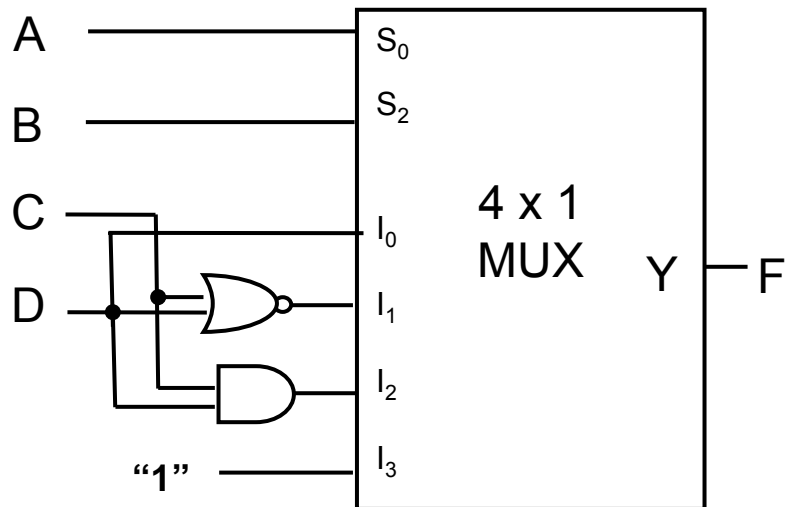
A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

AB=00
F=D

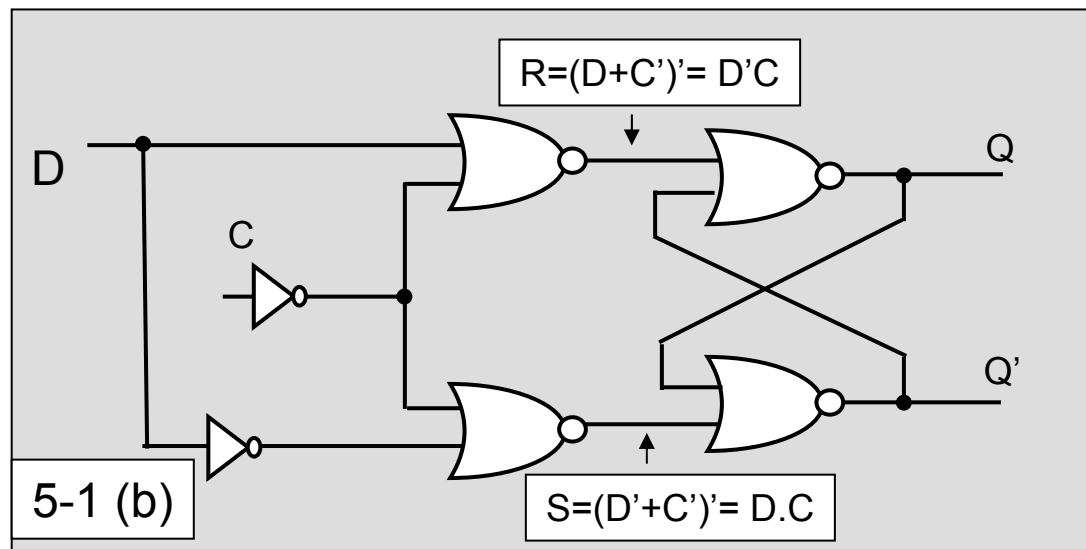
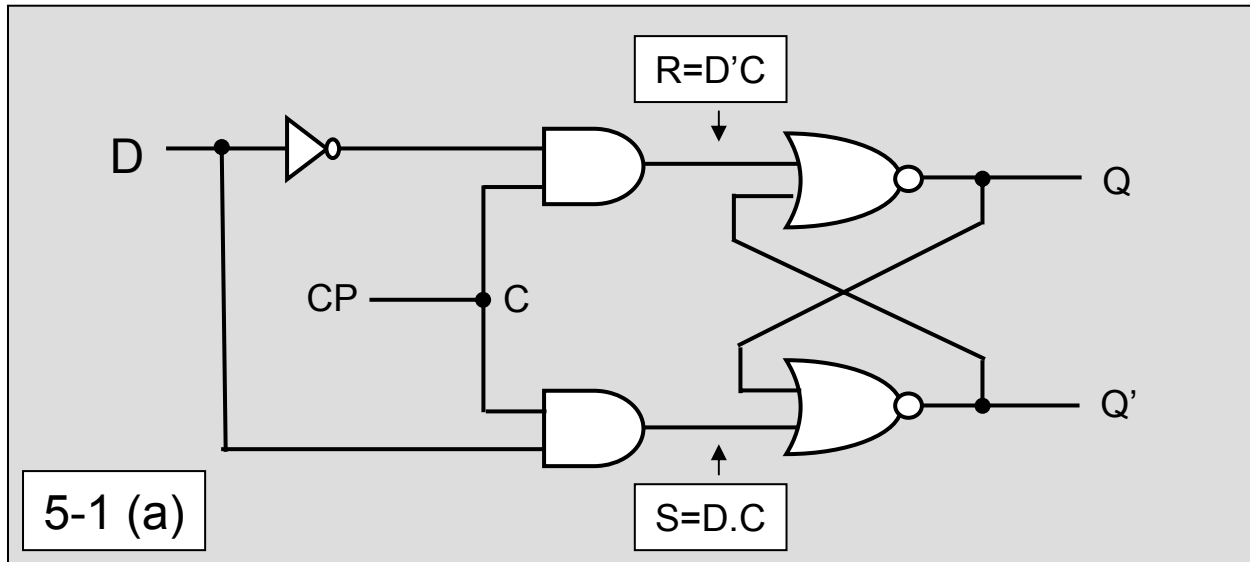
AB=01
F=C'D'=(C+D)'

AB=10
F=CD

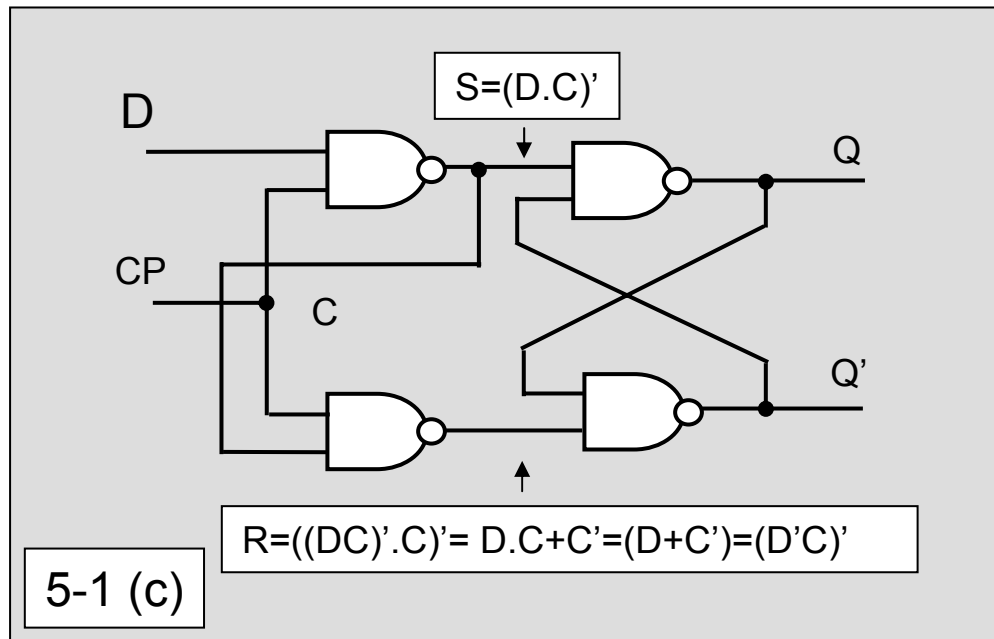
AB=11
F=1



5-1



5-1



5-4

P	N	Q(t+1)
0	0	0
0	1	Q(t)
1	0	Q'(t)
1	1	1

5-4(a)

P	N	Q(t)	Q(t+1)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

5-4(b)

Q(t)	Q(t+1)	P	N
0	0	0	X
0	1	1	X
1	0	X	0
1	1	X	1

5-4(c)

5-4(d)

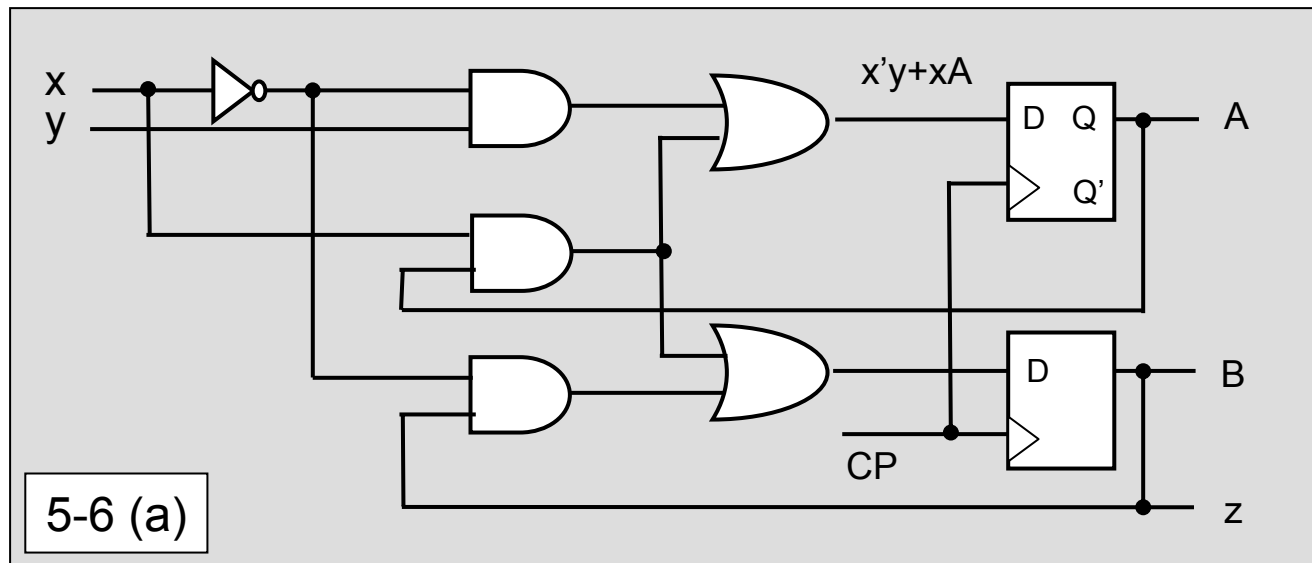
Connect P and N together

$$Q(t+1) = PQ' + NQ$$

		1	
1		1	1

Q(t)

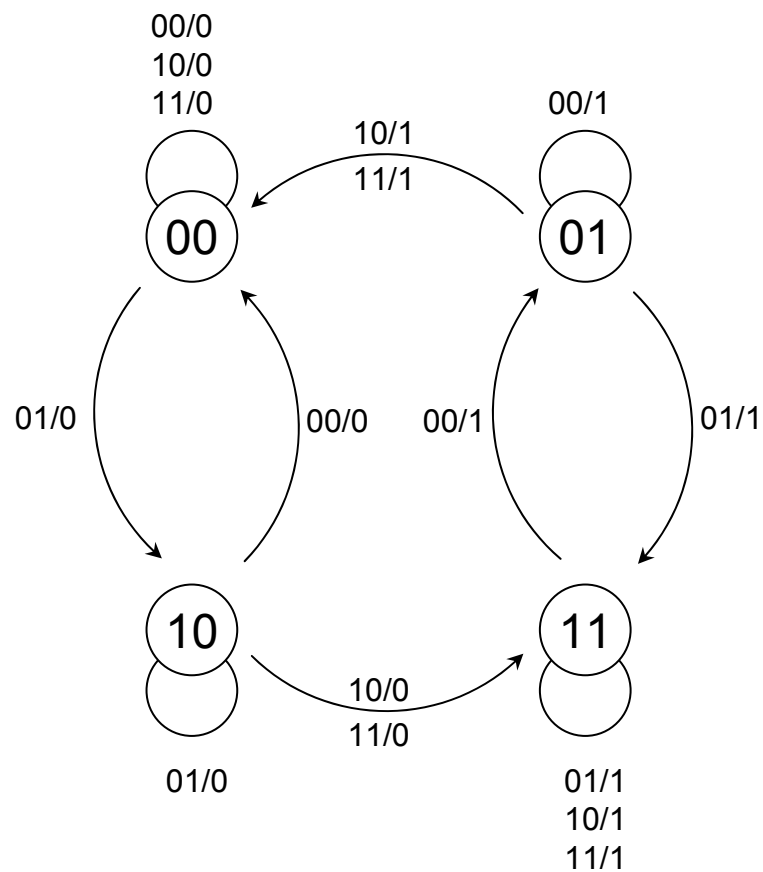
5-6



5-6

Present State	Inputs	Next State	Output
AB	xy	AB	z
00	00	00	0
00	01	10	0
00	10	00	0
00	11	00	0
01	00	01	1
01	01	11	1
01	10	00	1
01	11	00	1
10	00	00	0
10	01	10	0
10	10	11	0
10	11	11	0
11	00	01	1
11	01	11	1
11	10	11	1
11	11	11	1

5-6 (b)



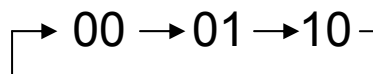
5-6 (c)

5-8

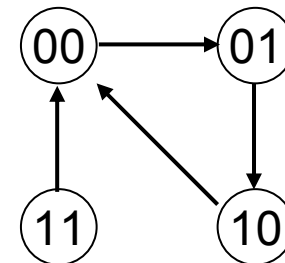
$$TA = A + B$$

$$TB = A' + B$$

Repeated Sequence



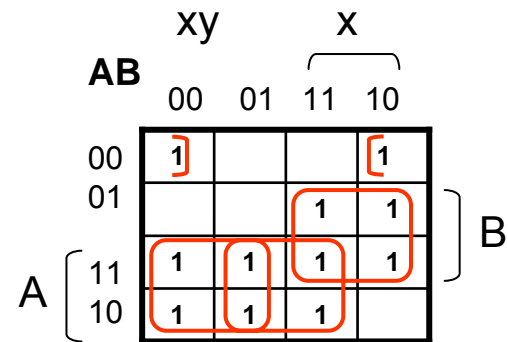
Present State	Next State	FF Inputs	
AB	AB	TA	TB
00	01	0	1
01	10	1	1
10	00	1	0
11	00	1	1



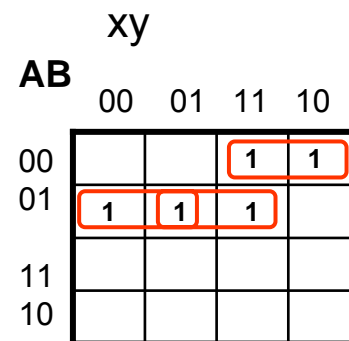
5-10

Present State	Inputs	Next State	Output	FF Inputs	
AB	xy	AB	z	$J_A K_A$	$J_B K_B$
00	00	10	0	10	00
00	01	00	0	00	00
00	10	11	0	11	11
00	11	01	0	00	10
01	00	01	1	00	00
01	01	01	0	00	00
01	10	10	0	10	11
01	11	11	0	10	10
10	00	10	0	10	01
10	01	10	0	00	01
10	10	00	0	11	01
10	11	10	1	00	01
11	00	10	1	00	01
11	01	10	0	00	01
11	10	10	0	10	01
11	11	10	1	10	01

5-10 (b)



$$A(t+1) = Ax' + Bx + Ay + A'B'y'$$



$$B(t+1) = A'B'x + A'B'(x' + y)$$

5-10 (c)