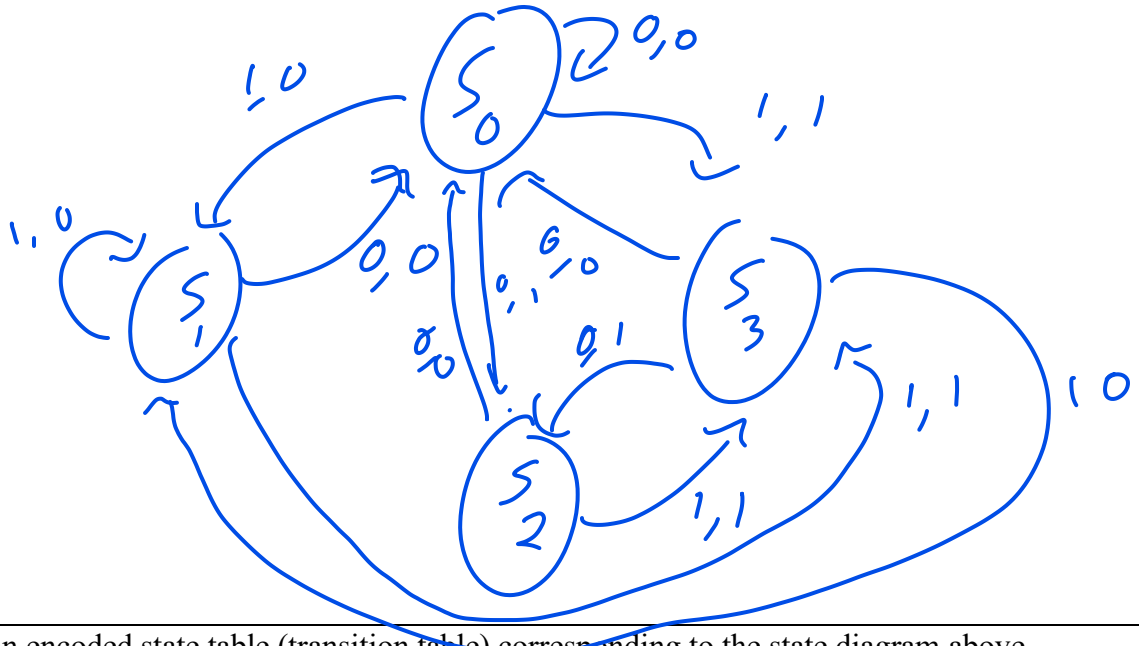
Pre-Lab Worksheet #6 NAME: Derek Wang LAB Section: B0__

1 a) Draw the state diagram for a FSM to represent the given specifications.



1 b) Write an encoded state table (transition table) corresponding to the state diagram above.

Present State		Next State		F+ S+	
F	**S**	**DT = 00**	**DT = 01**	**DT = 10**	**DT = 11**
0	0	00	10	01	11
0	1	00	XX	01	11
1	0	00	10	XX	11
1	1	00	10	01	11

1 c) Fill in the Karnaugh maps for F+ and S+ and write minimal sum-of-products equations for F+, S+ (show your work).

F+

FS\DT	00	01	11	10
00	0	1	1	0
01	0	X	1	0
11	0	1	1	0
10	0	1	1	X

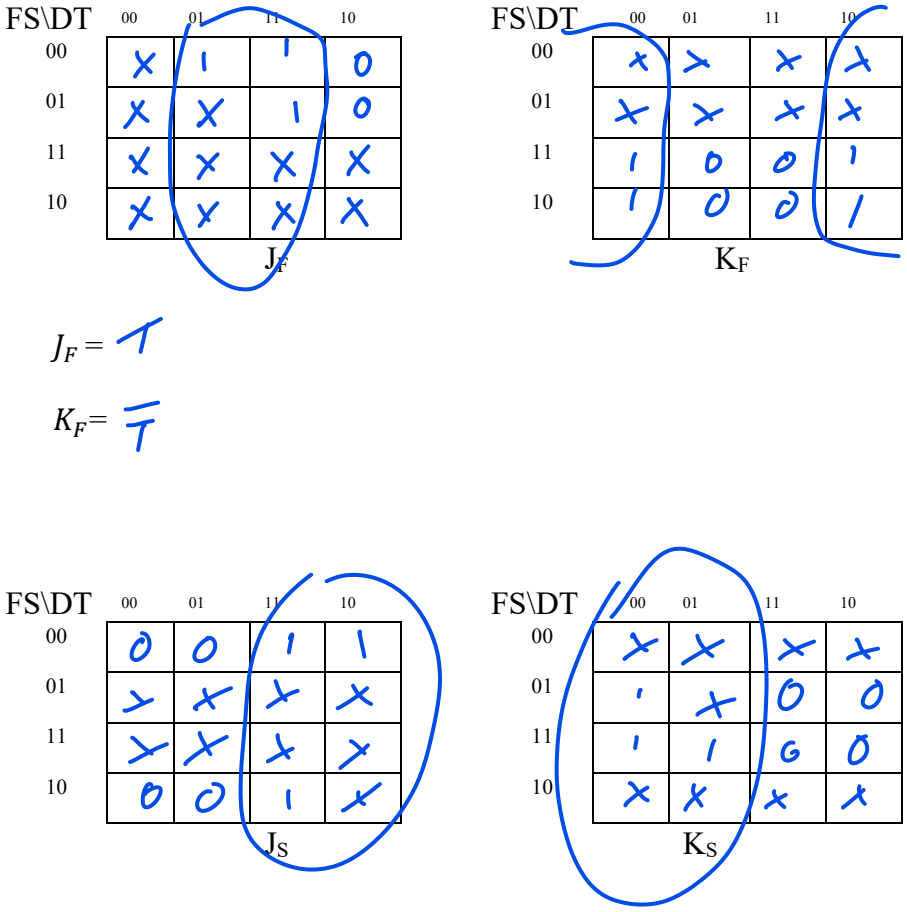
1

S+

FS\DT	00	01	11	10
00	0	0	1	1
01	0	X	1	1
11	0	0	1	1
10	0	0	1	X

0

1 d) Create the Karnaugh maps for J_F and K_F , J_S *and* K_S write minimal sum-of-products equations for each



$J_F =$ 1

$K_F =$ $\overline{1}$

$J_S =$ 0

$K_S =$ $\overline{0}$

2 a) Complete a state table corresponding to the state diagram.

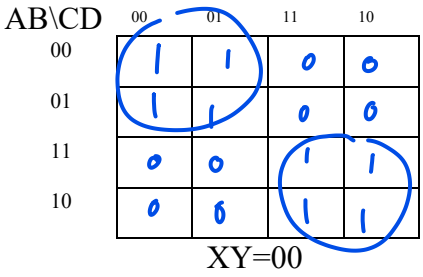
present state	condition				next state
	A	B	C	D	
S_1	1	x	x	x	S_2
S_1	x	1	x	x	S_2
S_1	0	0	x	x	S_1
S_2	x	0	0	x	S_3
S_2	x	1	1	x	S_2
S_2	x	0	1	x	S_4

S_2	X	1	0	X	S_4
S_3	0	X	1	X	S_3
S_3	0	X	0	X	S_2
S_3	1	X	1	X	S_2
S_3	1	X	1	X	S_4
S_4	X	X	0	0	S_3
S_4	X	X	1	X	S_1
S_4	X	X	X	1	S_1

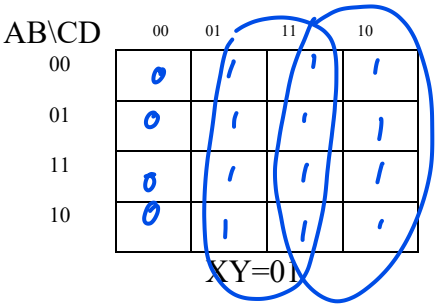
2 b) Complete the encoded state table (transition table).

present state	condition				next state
XY	A	B	C	D	X^+Y^+
10	1	x	x	x	1 1
10	x	1	x	x	1 1
10	0	0	x	x	1 0
11	x	0	0	x	0 0
11	X	1	1	X	1 1
11	X	0	1	X	0 1
11	X	1	0	X	0 1
00	0	X	1	X	0 0
00	0	X	0	X	1 1
00	1	X	1	X	1 1
00	1	X	0	X	0 1
01	X	X	0	0	0 0
01	X	X	1	X	1 0
01	X	X	X	1	1 0

2 c) Fill in the Karnaugh maps for the next states X^+, Y^+.

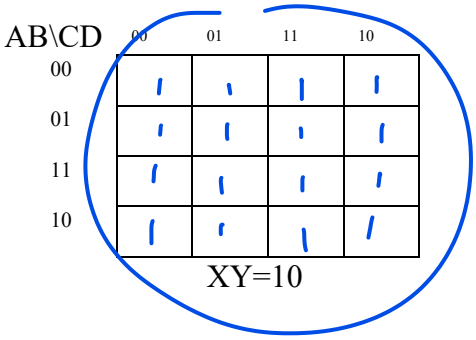


XY=00

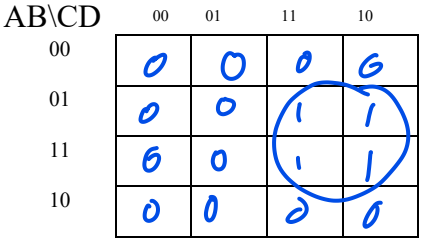


XY=01

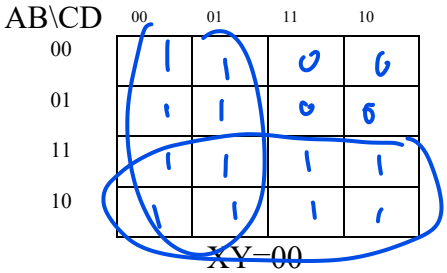
Maps for X+



XY=10

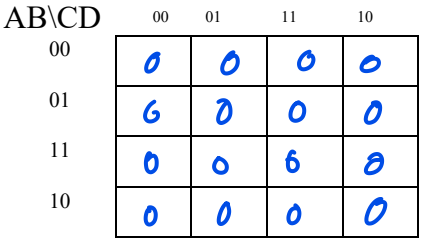


XY=11



XY=00

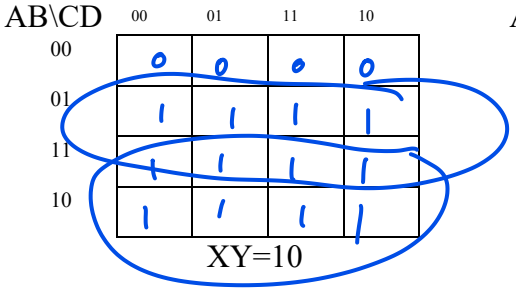
$\bar{C} + A$



XY=01

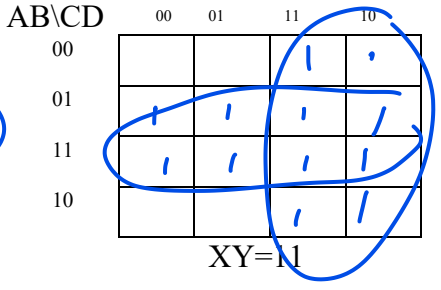
0

Maps for Y+



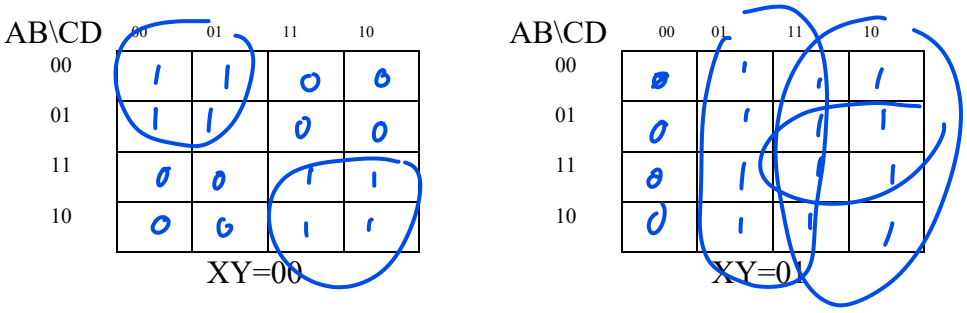
XY=10

$0 + A$

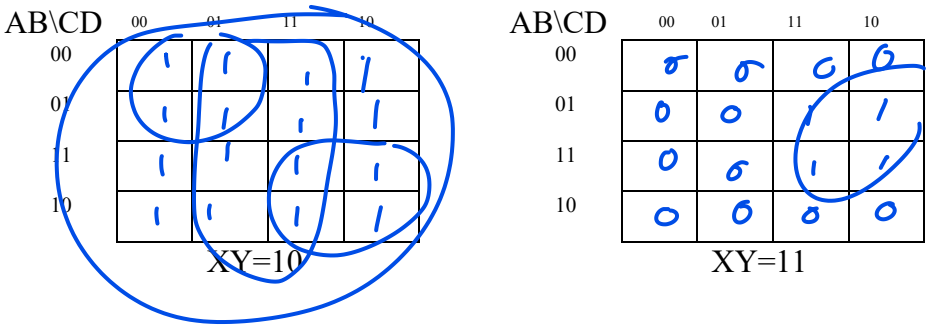


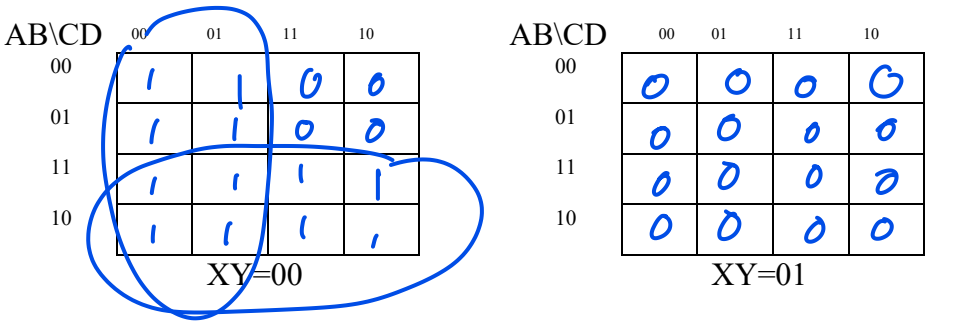
XY=11

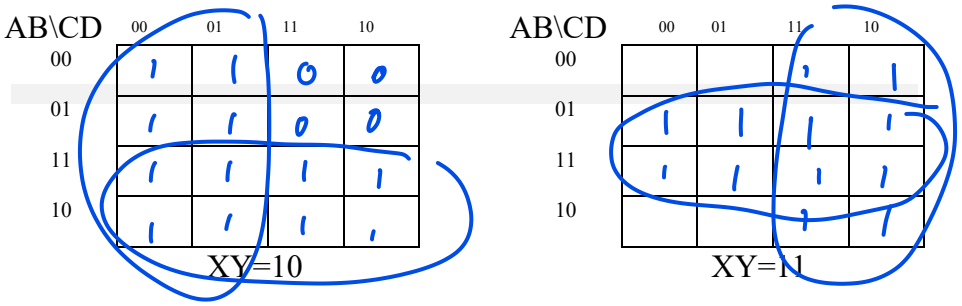
2 d) ***If you need***, fill in the maps for each of D_X and D_Y.



Map for D_X







Map for D_Y

2 e) Determine the minimal sum-of-products equations for each of D_X and D_Y.

$D_X = x\bar{y} + yBC + \bar{x}yd + \bar{x}yC + \bar{y}\bar{A}\bar{C} + \bar{y}AC$

$D_Y = \bar{x}\bar{y}\bar{C} + \bar{y}A + xD + xyC$

2 f) Draw the circuit