Assignment–3

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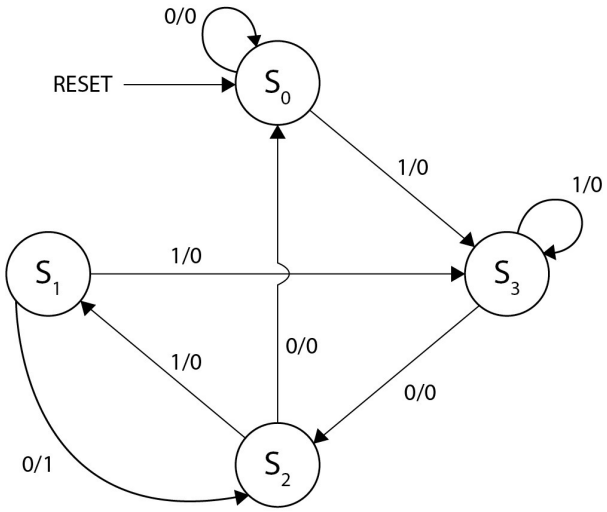
Question 1

a) States representation

$A_1 A_0$
$S_0 = 0 =$ 0 0
$S_1 = 1 =$ 0 1
$S_2 = 2 =$ 1 0
$S_3 = 3 =$ 1 1



State Diagram

Transition and output table

Current State	Next State		Output	
	X = 0	X = 1	X = 0	X = 1
$S_0 = 00$	S_0	S_1	0	0
$S_1 = 01$	S_2	S_1	0	0
$S_2 = 10$	S_1	S_3	0	0
$S_3 = 11$	S_2	S_1	1	0

Excitation table

Current State		Input	Next State		Output
A_1	A_0	X	A_1*	A_0*	Y
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	1	0	0
0	1	1	0	1	0
1	0	0	0	0	0
1	0	1	1	1	0
1	1	0	1	0	1
1	1	1	1	1	0

b)

A \ B X	00	01	11	10
0	0	0	0	1
1	0	1	1	1

$$A_1^* = D_1 = A\,X + B\,\overline{X}$$

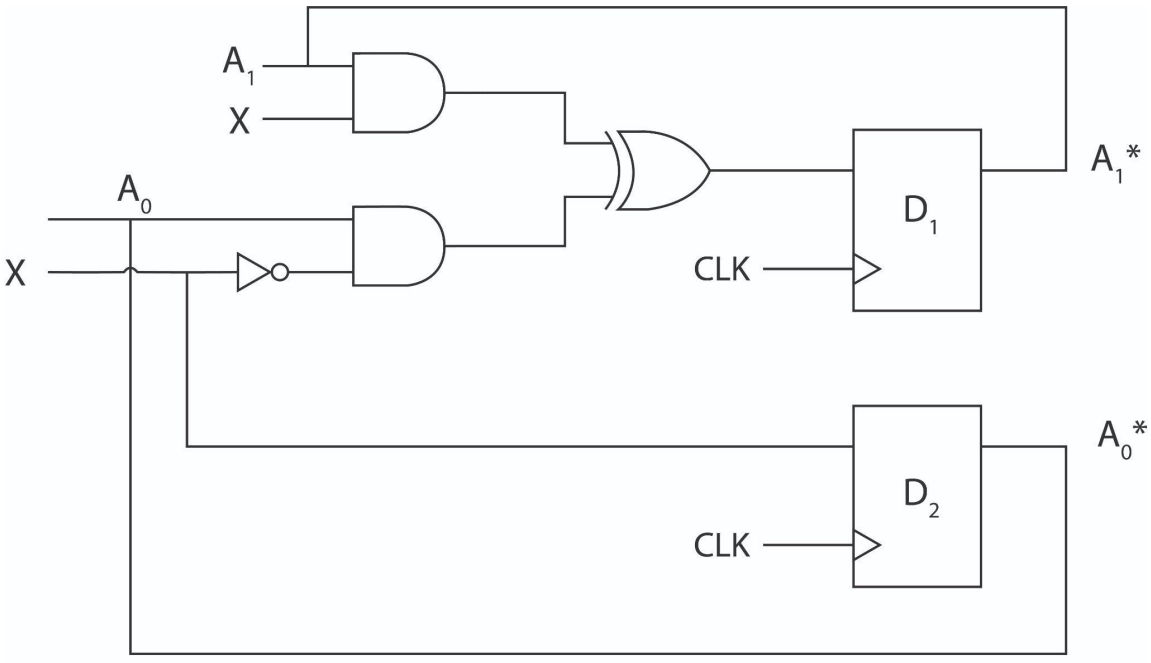
A \ B X	00	01	11	10
0	0	1	1	0
1	0	1	1	0

$$A_0^* = D_2 = X$$

A \ B X	00	01	11	10
0	0	0	0	0
1	0	0	0	1

$Y = A B \overline{X}$

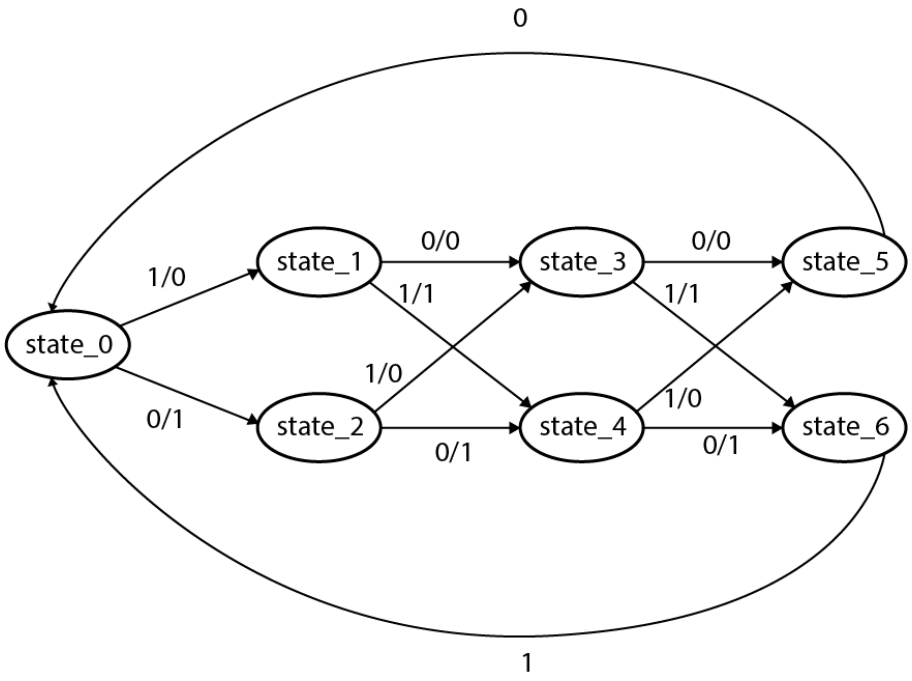
K-map



Logic Diagram

Question 2

a) State representation
   state_0 = 000
   state_1 = 001
   state_2 = 010
   state_3 = 011
   state_4 = 100
   state_5 = 101
   state_6 = 110



State Diagram

EXCITATION TABLE

Input

A	B	C	Contd
0	0	0	
1	0	0	
0	1	0	
0	0	1	
0	1	1	
1	0	1	
1	1	0	
1	1	1	

Ouput

A*	B*	C*	P
0	0	0	1
1	0	0	0
0	1	0	0
0	0	1	0
0	1	1	1
1	0	1	1
1	1	0	1
1	1	1	0

OUTPUT TABLE

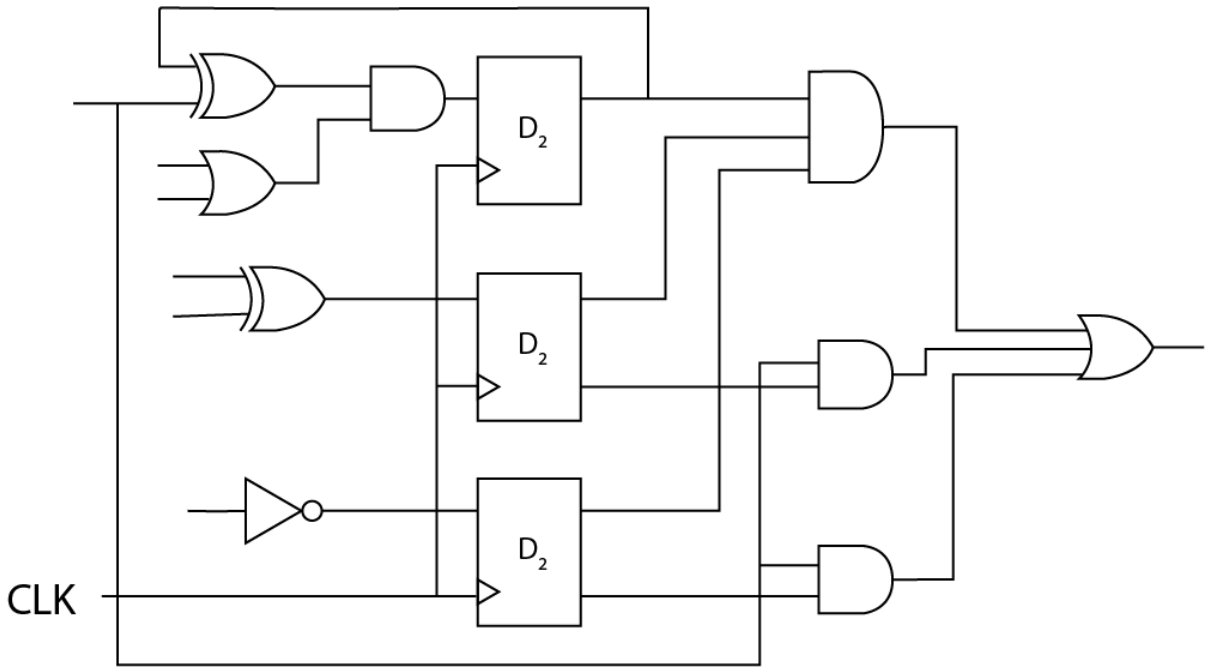
A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	0
1	0	0	0
0	1	1	1
1	0	1	1
1	1	0	1
1	1	1	0

b)

A \ BC	00	01	11	10
0	1	0	1	0
1	0	1	0	1

$$Y = \bar{A}\,\bar{B}\,\bar{C} + A\,\bar{B}\,C + \bar{A}\,B\,C + A\,B\,\bar{C}$$

K-map



Logic Diagram