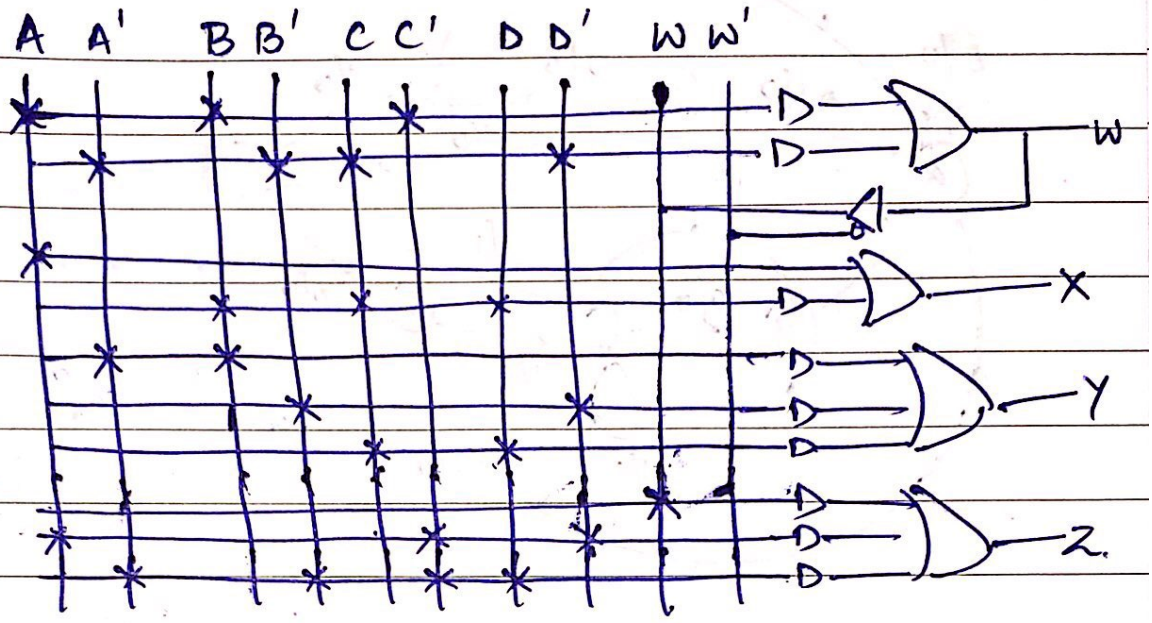
Date : / / /



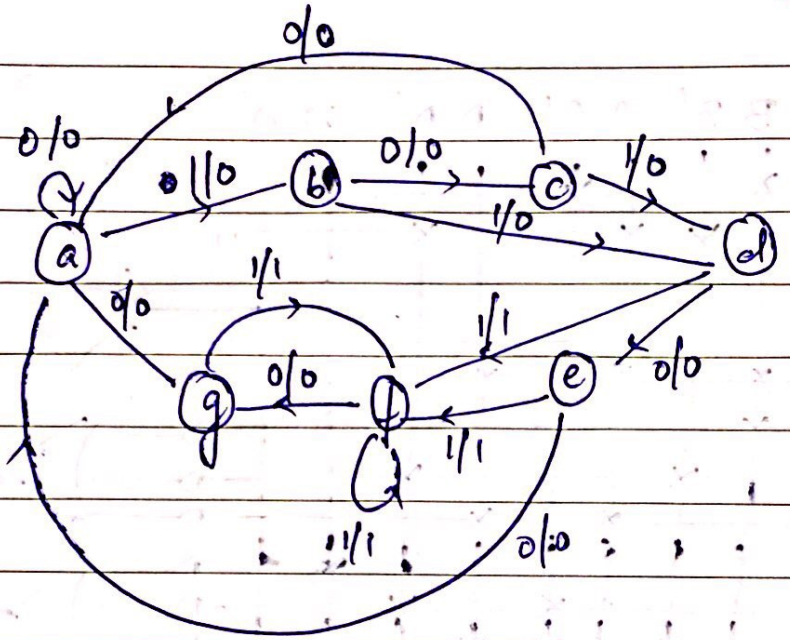
4/9/18 STATE REDUCTION

Q Draw State diagram.

Present state	Next state $x=0$	Next state $x=1$	Output $x=0$	Output $x=1$
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f	0	1

MATRIKAS

Date: / / /



Reduce No. of states.

e & g can be reduced (remove g) & replace g by e.

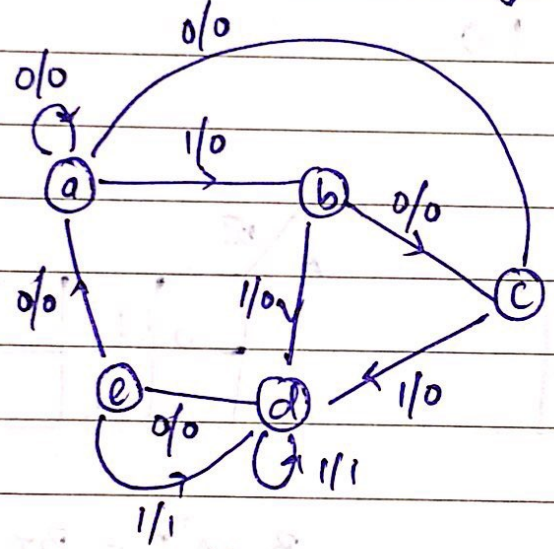
Present state	Next state $x=0$	Next state $x=1$	Output $x=0$	Output $x=1$
a	a	b	0	0
b	e	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	e	f	0	1

d & f can be reduced remove f & replace f by d.

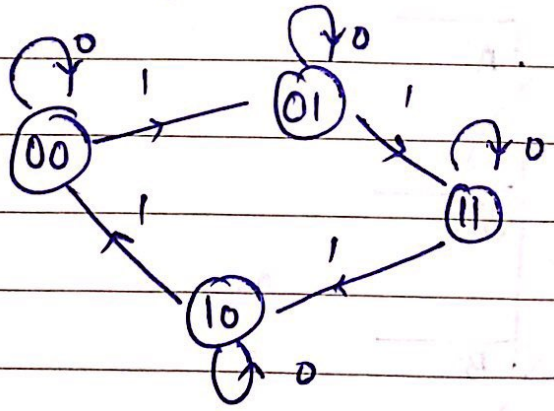
MATRIKAS

Date: / / /

Present state	Next state		Output	
	x=0	x=1	x=0	x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	d	0	1
e	a	d	0	1



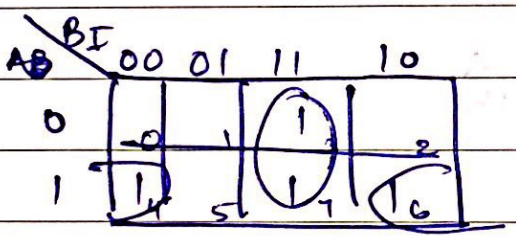
Q Give state diagram for when x=0 state of circuit remains same. when x=1 the circuit goes through the transition from 00 → 01 → 11 → 10 → 00 and repeats

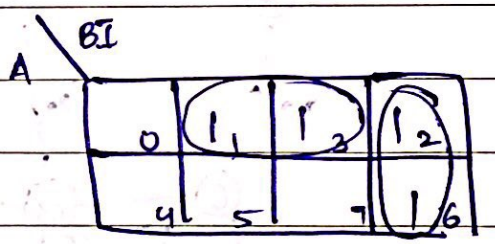


Design a sequential circuit using 2-D flipflops. MATRIKAS

Date: / / /

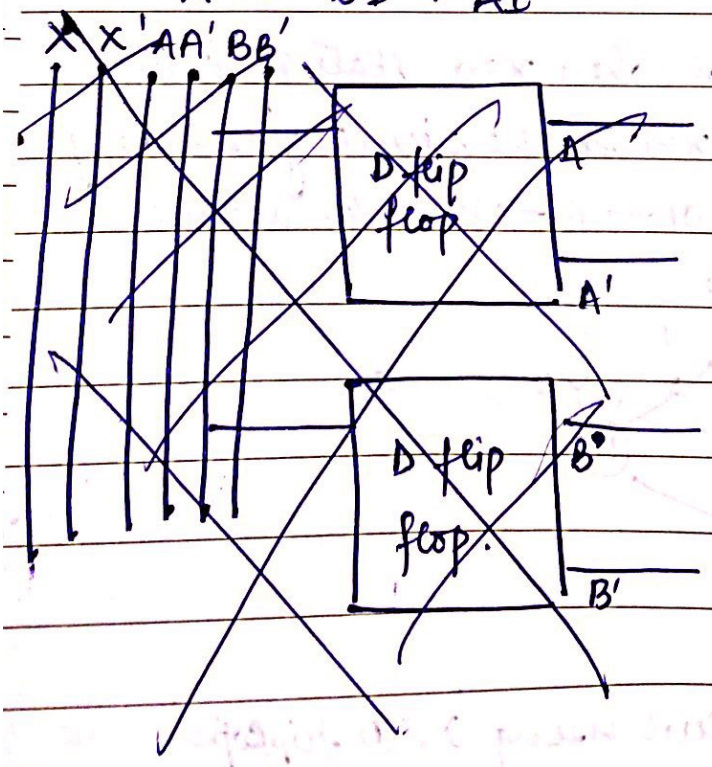
	State	Input	Next State/Output
0	00	0	00
1	00	1	01
2	01	0	01
3	01	1	11
4	10	0	10
5	10	1	00
6	11	0	11
7	11	1	10





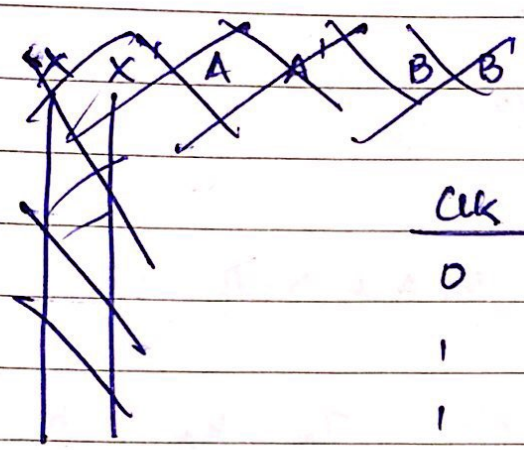
$A = BI + A\bar{I}'$

$B = A'I + BI'$

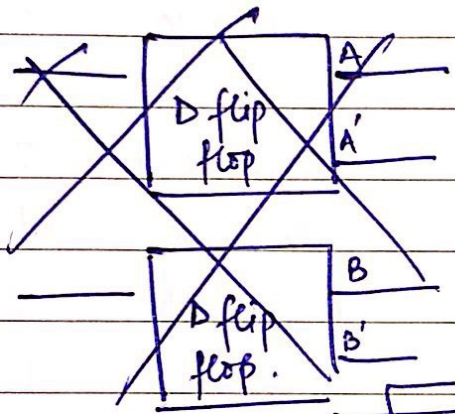


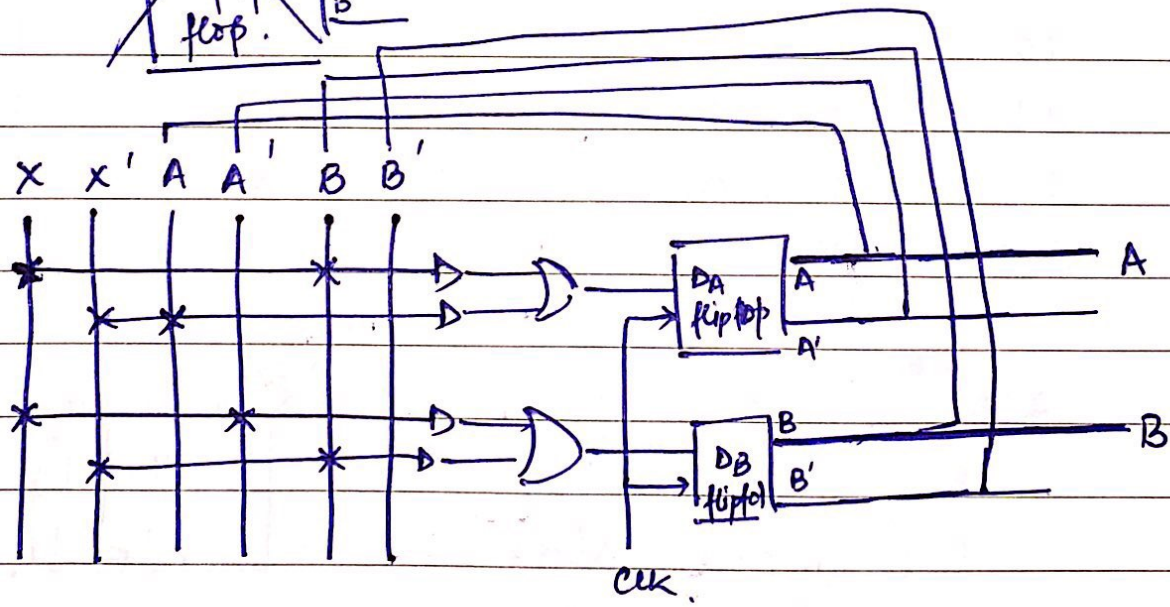
MATRIKAS

Date : / / /



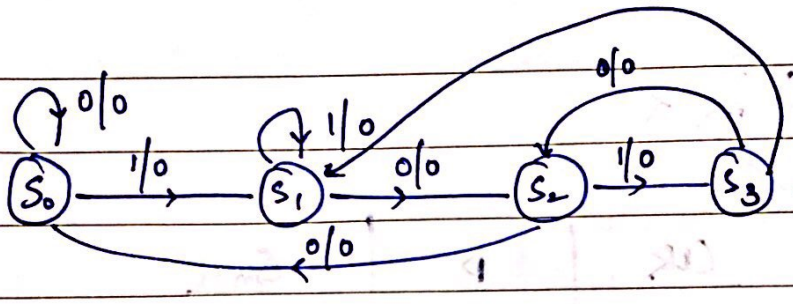
Clk	D	Q_{n+1}
0	X	Q_n
1	0	0
1	1	1





MATRIKAS

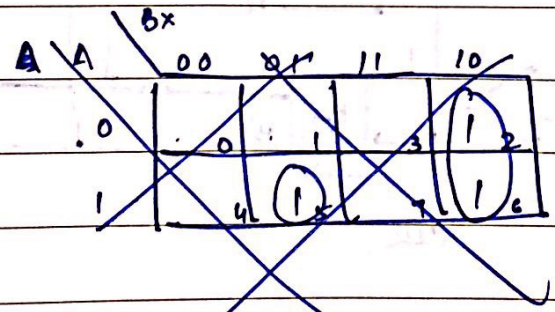
Date: 7/9/18



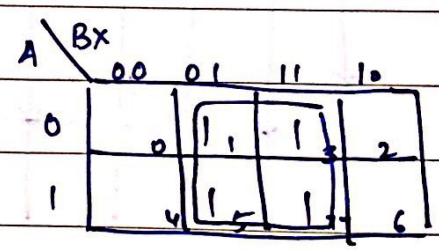
Generate the h/w using JK-ff. for A & D-ff. for B.

Present State	I/p	Next State	o/p	J_A	K_A	D_B
00	0	00	0	0	X	0
00	1	01	0	0	X	1
01	0	10	0	1	X	0
01	1	01	0	0	X	1
10	0	00	0	X	1	0
10	1	11	0	X	0	1
11	0	10	0	X	0	0
11	1	01	1	X	1	1

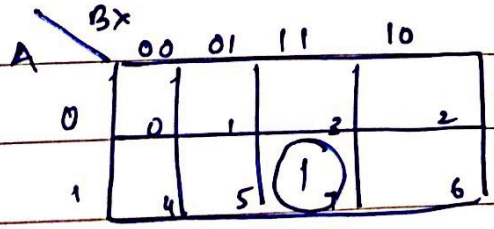
(A)(B) (X)



$A = A\bar{B}X + B\bar{X}$



$D_B = B = X$



o/p = $A \oplus B \oplus X$

MATRIKAS

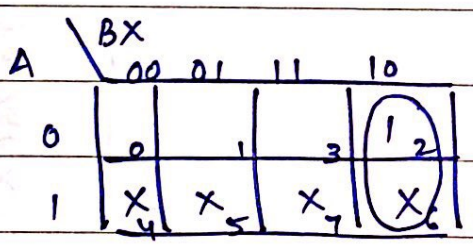
Date : / / /

Excitation Table of D - FF.

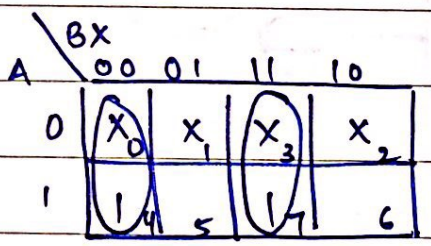
Clk	D	Q_{n+1}
0	x	Q_n
1	0	0
1	1	1

Excitation Table for JK-FF.

Q(t)	Q(t+1)	J	K
0	0	0	x
0	1	1	x
1	0	x	1
1	1	x	0



$J_A = B\bar{X}$

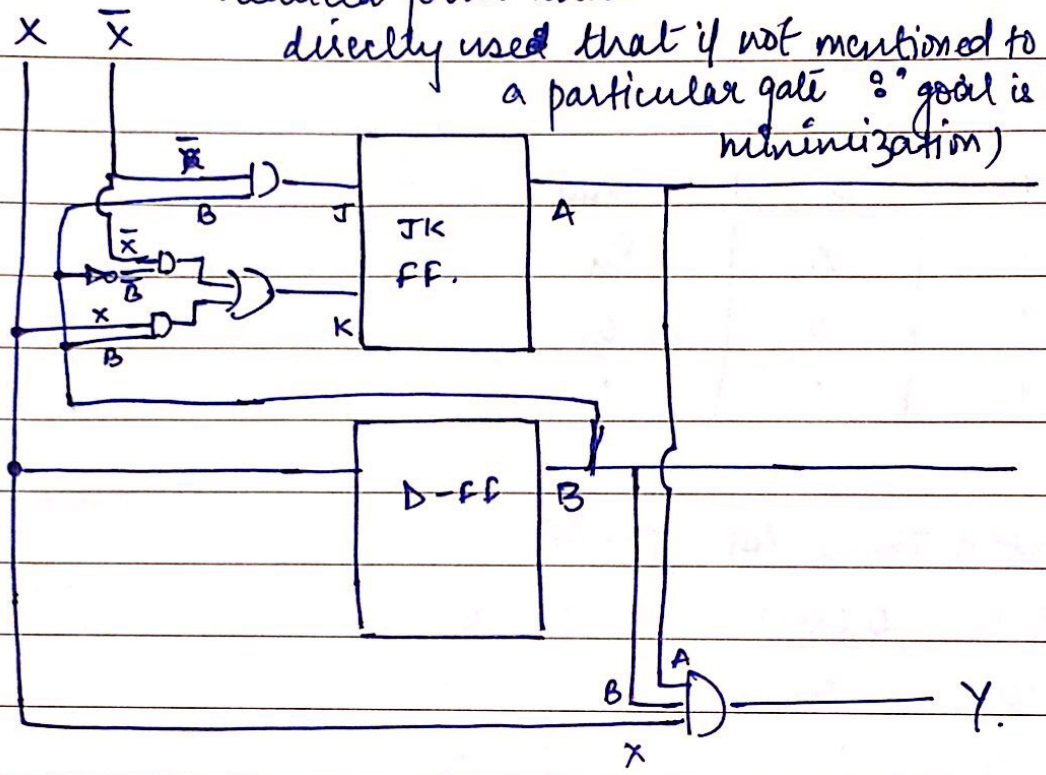


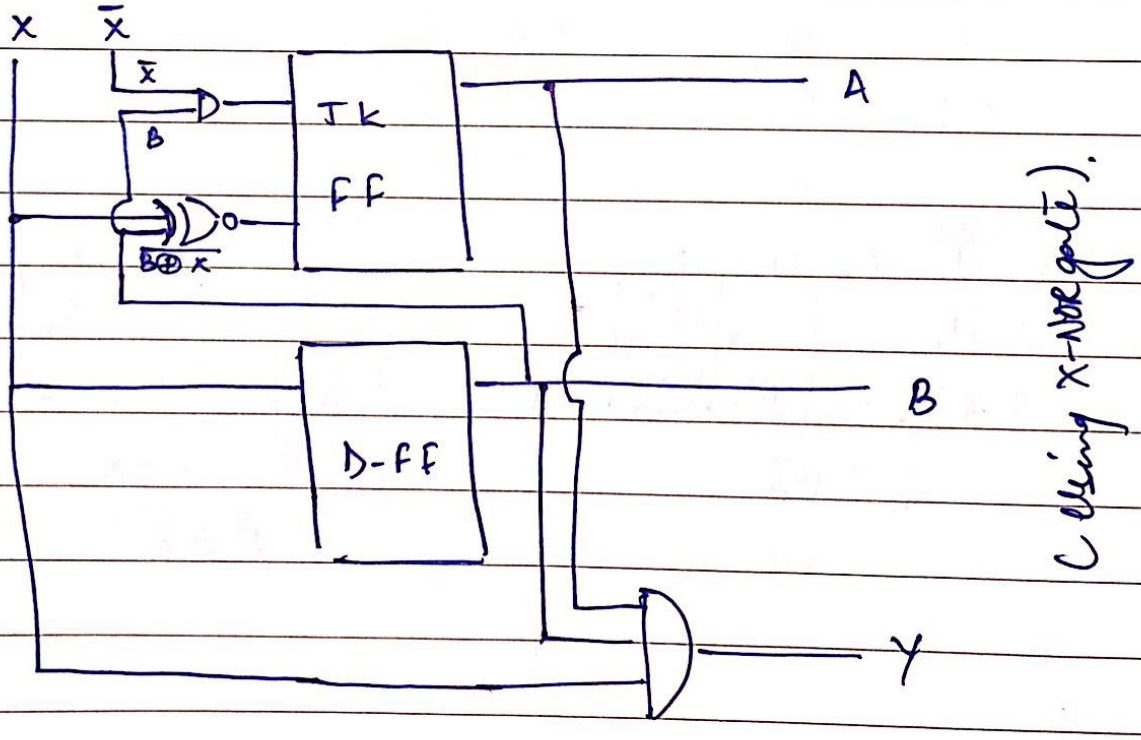
$K_A = \bar{B}\bar{X} + BX$

$= \overline{(B \oplus X)}$

(In Exam if gate available of a reduced form then directly used that if not mentioned to do from a particular gate ∵ goal is h/w minimization)

Date: / / /





MATRIKAS

Date: / / /

Q Generate state diagram from h/w.

$Y = ABX$

$J_A = B\bar{x}$

$K_B = Bx + B'x' = \overline{B \oplus x}$

$D_B = x$

Present State	I/p	Next State		Y.	J_A	K_B
0 0	0	0	0	0	0	1
0 0	1	0	1	0	0	0
0 1	0	1	0	0	1	1
0 1	1	0	1	0	0	1
1 0	0	0	0	0	0	1
1 0	1	0	1	0	0	0
1 1	0	0	1	0	1	0
1 1	1	1	0	1	0	1

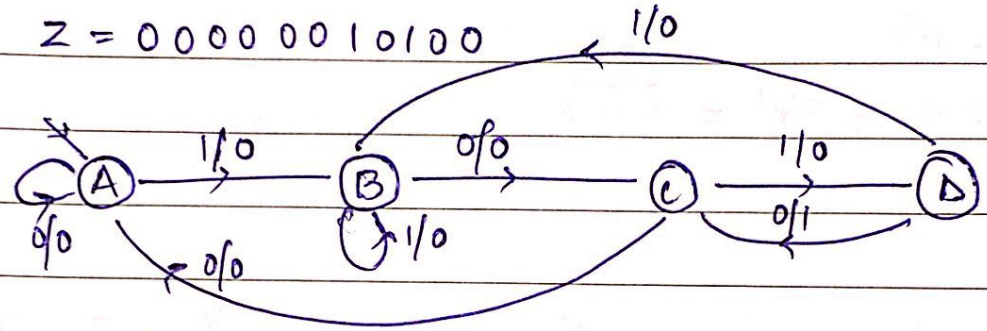
MATRIKAS

Date: 28/9/18

* SEQUENCE RECOGNIZER. (1010)

X = 0011010101000

Z = 0000001010 0

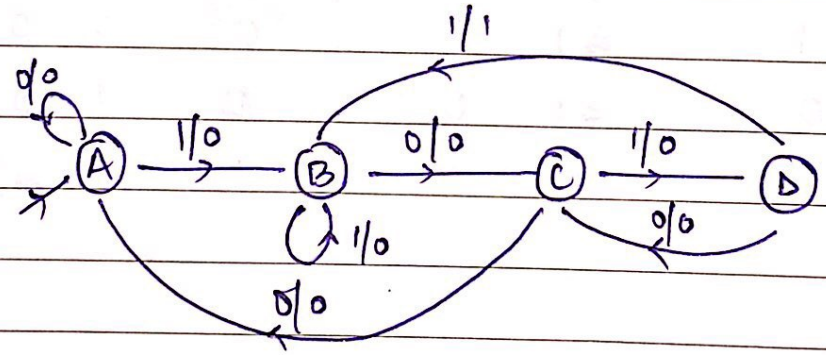


(1011)

X = 1110010010011011010111011111

Z = 0000000000000000100001001000

A → Reset
B → '1' seen
C → '10' seen
D → '101' seen.



A → Reset
B → '1' seen
C → '10' seen
D → '101' seen.

Implement (1010) H/W with JK for A, D for B.

A B

A state ⇒ 0 0

B state ⇒ 0 1

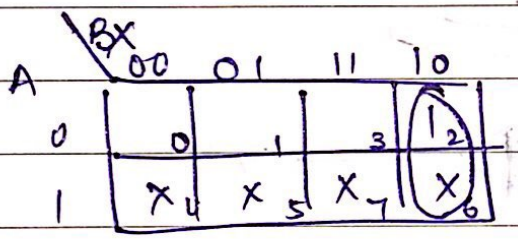
C state ⇒ 1 0

D state ⇒ 1 1

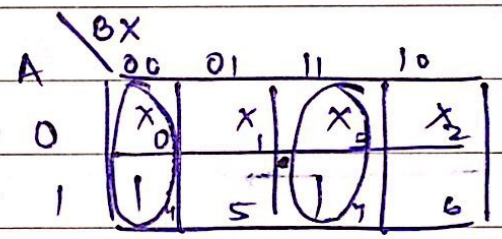
MATRIKAS

Date: / / /

Present State		I/p	Next State		O/p	FF	
A	B	X	A	B	Y	J_A	K_A
0	0	0	0	0	0	0	X
0	0	1	0	1	0	0	X
0	0	0	0	1	0	1	X
0	1	1	0	1	0	0	X
1	0	0	0	0	0	X	1
1	0	1	1	1	0	X	0
1	1	0	1	0	0	X	0
1	1	1	0	1	0	X	1

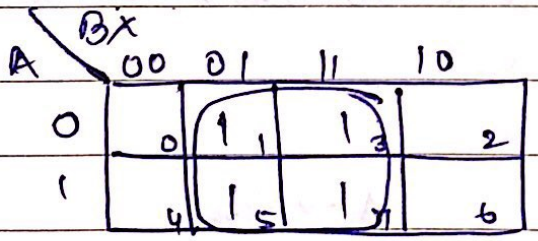


$J_A = B\bar{X}$

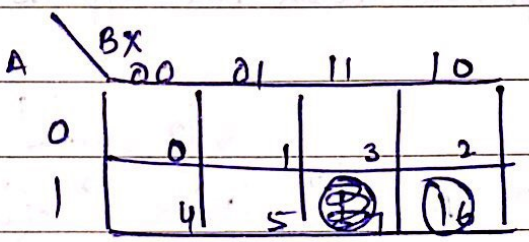


$K_A = \bar{B}\bar{X} + BX$

$= B \odot X$



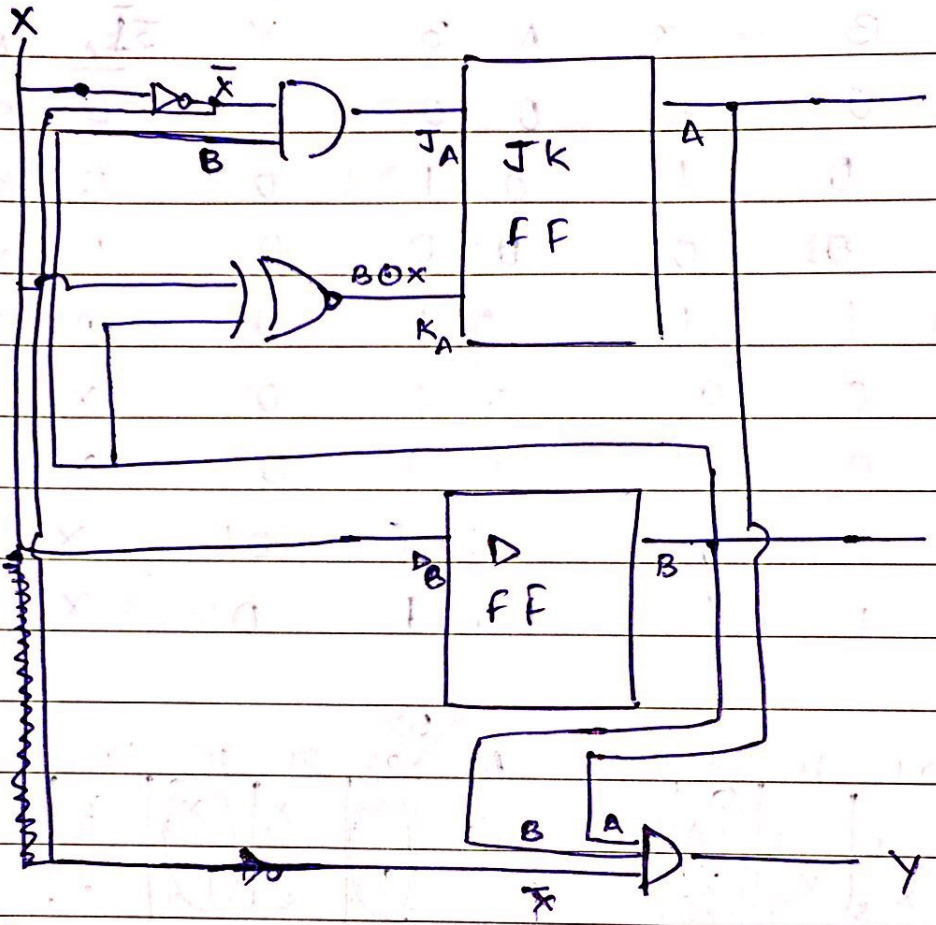
$D_B = X$



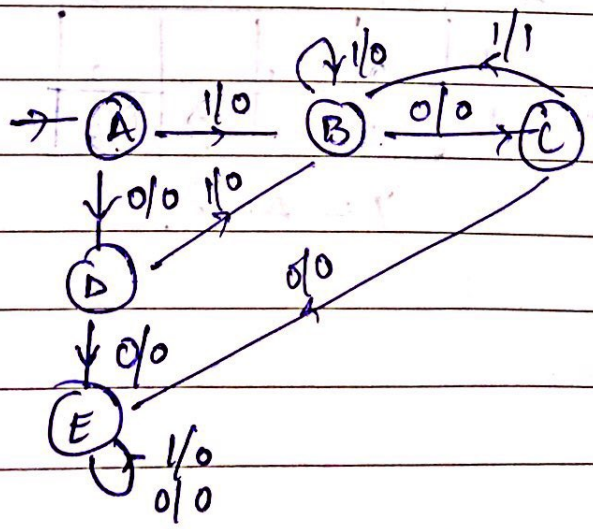
$Y = AB\bar{X}$

MATRIKAS

Date : / / /



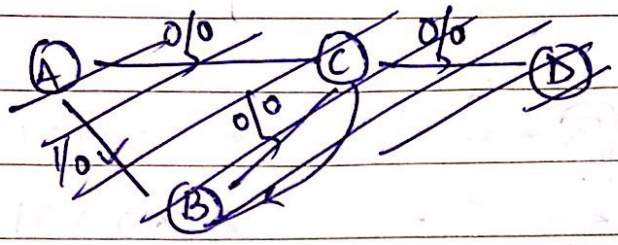
Q A sequential circuit has 1 i/p X. An ~~and~~ output $z_1 = 1$ whenever the i/p sequence x = 101 occurs, provided that the i/p sequence x = 00 has never occurred.



A → Reset
B → '1' seen.
C → '10' seen.
D → '0' seen.
E → '00' seen.

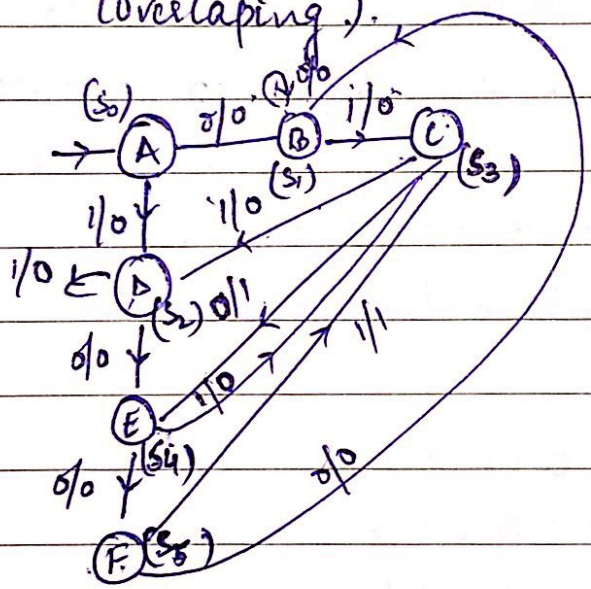
MATRIKAS

Date : / / /



1/10/18 Missed Class.

5/10/18 Q 010 or 1001 using Mealy M/c model. (Overlaping).



x = 011000100101011100

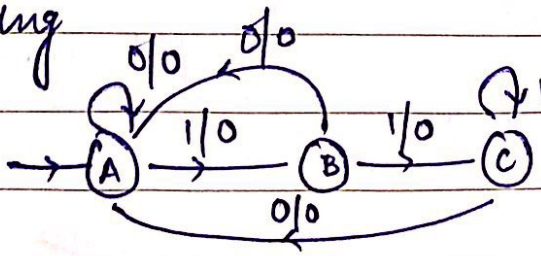
z = 000000010110000000

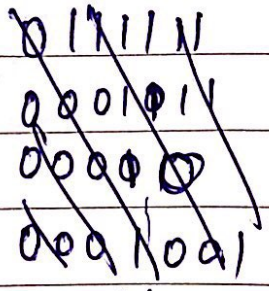
010010

00010

Q 3 or more consecutive 1's in a string.
(Overlapping & Non overlapping).

- Overlapping



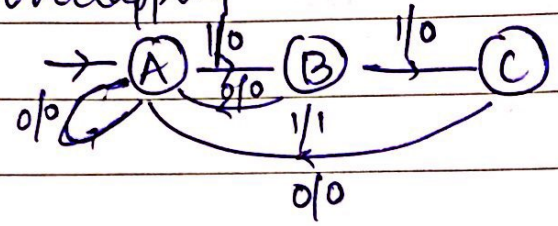


~~Non-Overlapping for this is same as after every 1 of a 0 comes it goes to reset state.~~

MATRIKAS

Date: / / /

Non-Overlapping



x = 00111111

z = 00000100

16/10/18

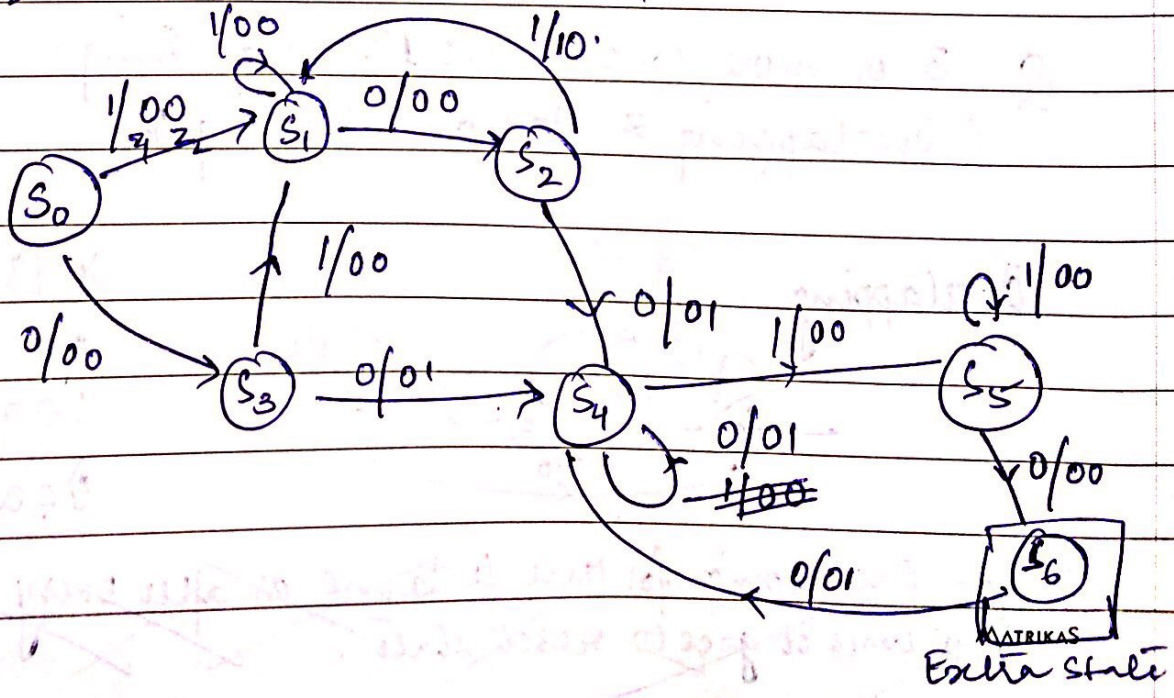
Q A sequential circuit has one i/p - x and two o/ps z_1 & z_2. An o/p $z_1 = 1$ occurs whenever the i/p sequence x = 101 occurs provided the i/p sequence x = 00 has never occured. An o/p $z_2 = 1$ occurs whenever the i/p sequence x = 00 occurs.

Give a mealy state graph and state table (Overlapping).

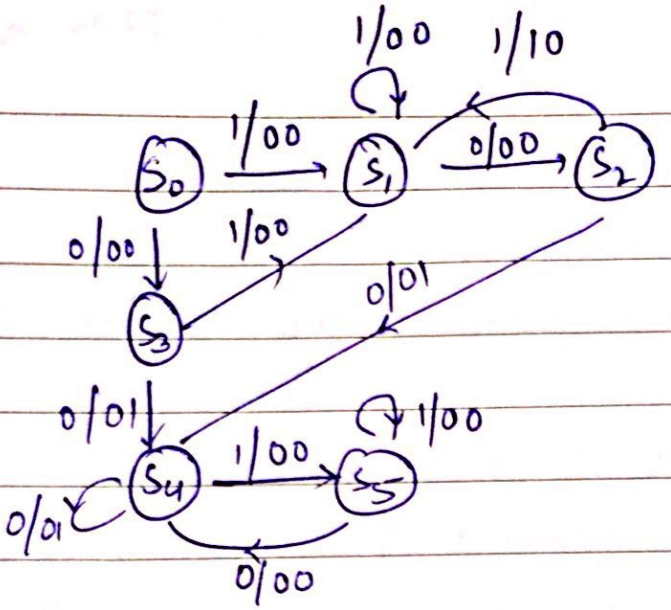
x = 0110101001010000

z_1 = 0000101000000000

z_2 = 0000000010000011



Date: / / /



Minimised

How many k-maps & what is the size?

4x4 → Kmaps

2 k-maps. (Z_1 & Z_2)

S_0
S_1
S_2
S_3
S_4
S_5

→ 6 states → 3 variable representation. → 4x4 k-map.

1 i/p ⇒ 1 variable

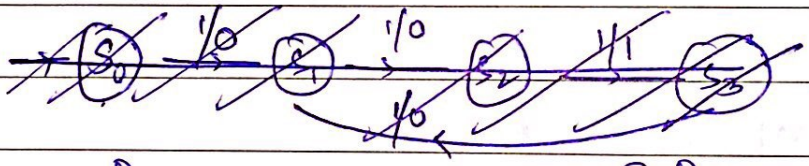
1 k-map	4x4	Z_1 o/p	→ Mealy m/c
1 k-map	4x4	Z_2 o/p	→ o/p dependent
3 k-map	4x4	~~i/p~~	Next State Calculation

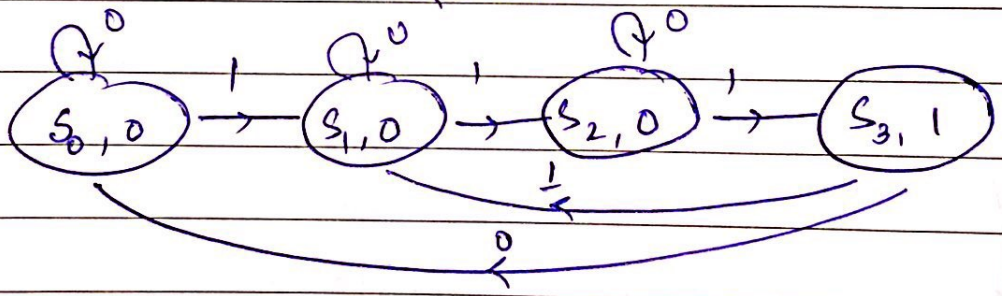
MATRIKAS

Date: 22/10/18

Q Coffee Machine operates only after you have inserted 75 cents. The machine has a single slot that accepts only quarters (only 1 coin at a time) a sensor indicates to control the value of the coin inserted. If the total amount is equal to 75 cents, the machine dispenses a single cup of coffee. Draw the state diagram & implement with JK flip flop. Make a moore m/c.

1 ⇒ 1 quarter accepted.



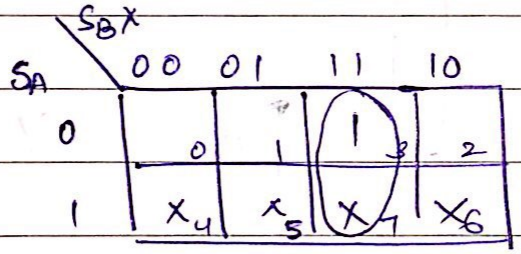


	0	1	o/p.
S_0	S_0	S_1	0
S_1	S_1	S_2	0
S_2	S_2	S_3	0
S_3	S_0	S_1	1

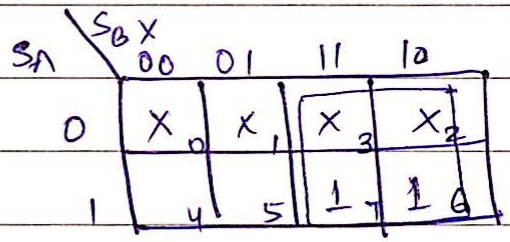
MATRIKAS

Date: / / /

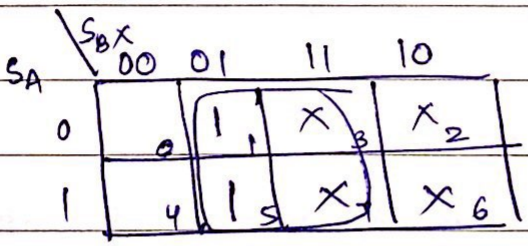
	Present state			Next state						
	S_A	S_B	X	S_A	S_B	J_A	K_A	Y	J_B	K_B
S_0	0	0	0	0	0	0	x	0	0	x
	0	0	1	0	1	0	x	0	1	x
S_1	0	1	0	0	1	0	x	0	x	0
	0	1	1	1	0	1	x	0	x	1
S_2	1	0	0	1	0	x	0	0	0	x
	1	0	1	1	1	x	0	0	1	x
S_3	1	1	0	0	0	x	1	0	x	1
	1	1	1	0	1	x	1	0	x	0



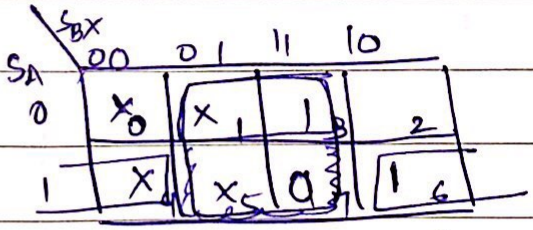
$J_A = S_B X$



$K_A = S_B$



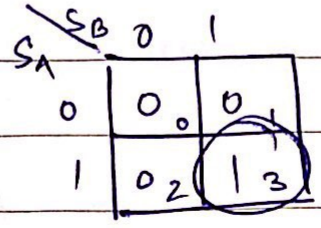
$J_B = X$



$K_B = S_A\bar{X} + \bar{S}_A X$

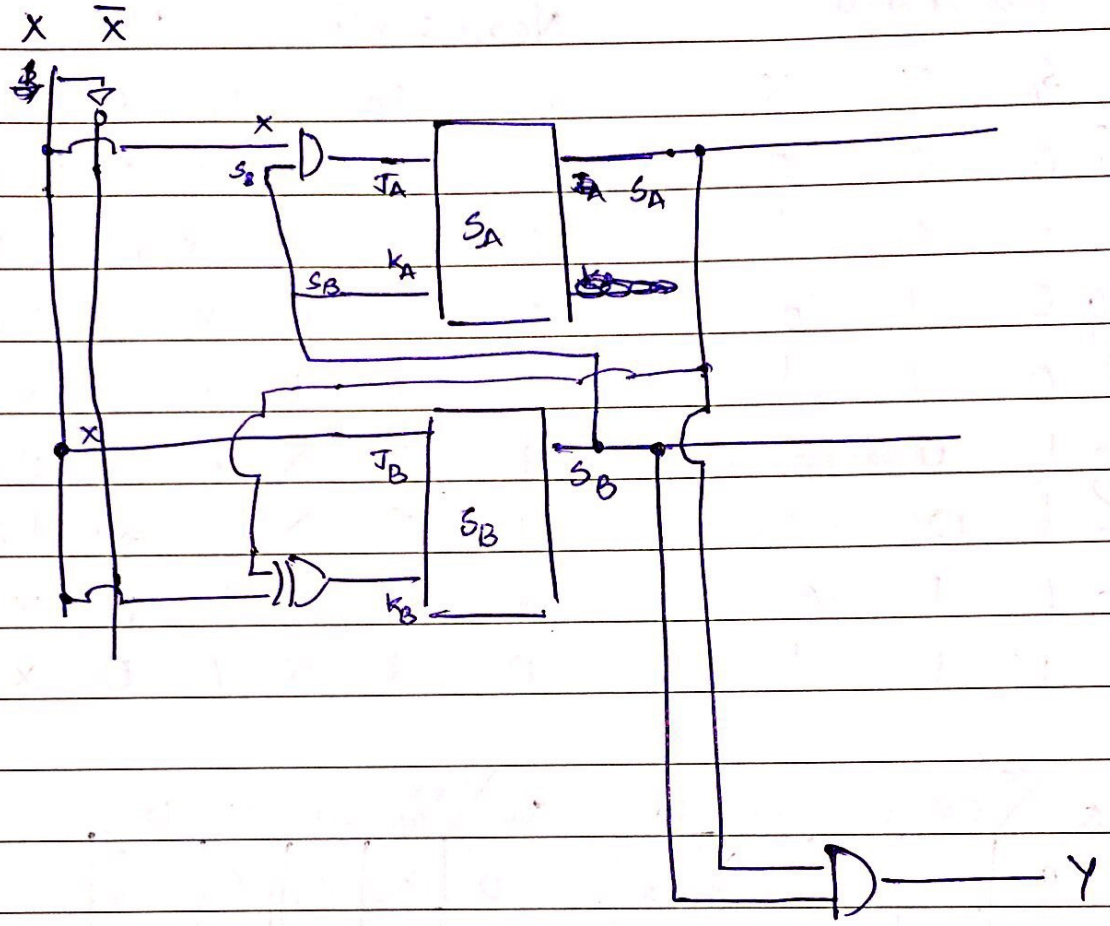
$= S_A \oplus X$

$S_P = S_A S_B$



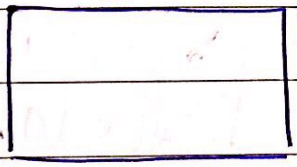
MATRIKAS

Date: / / /



29/10/18

* ALGORITHMIC STATE M/c CHART (ASM Chart).

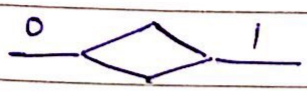


State box.

(At each clock cycle, the state of a circuit remains in a particular state & in the next clock cycle, the state of a circuit remains in the same state or moves to a next state).

MATRIKAS

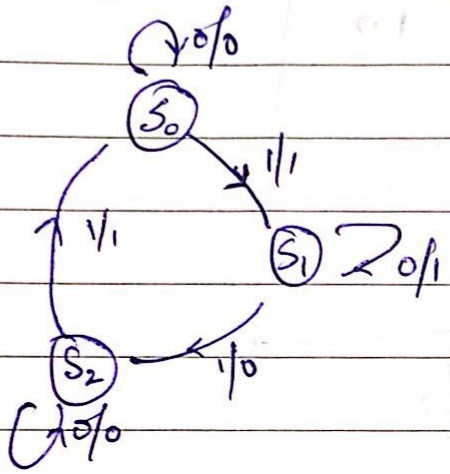
Date: / / /

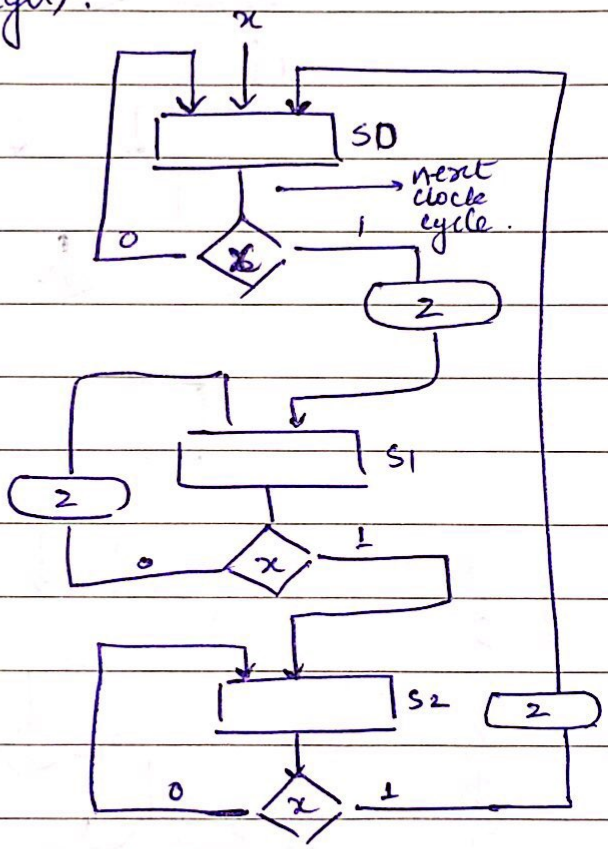


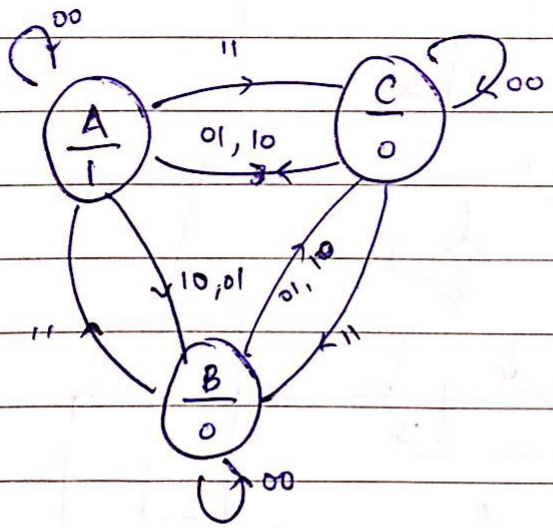
Decision box.

Condition box.

(Used only in Mealy m/c if the o/p is higher).







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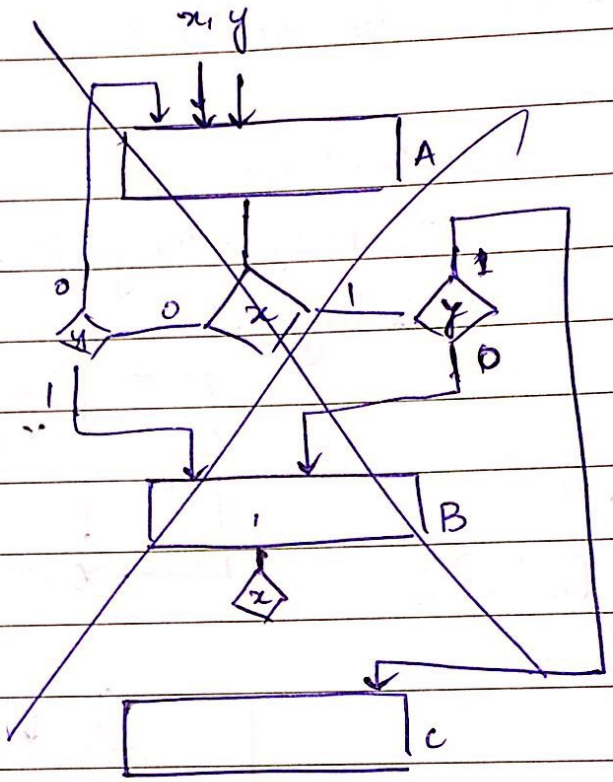

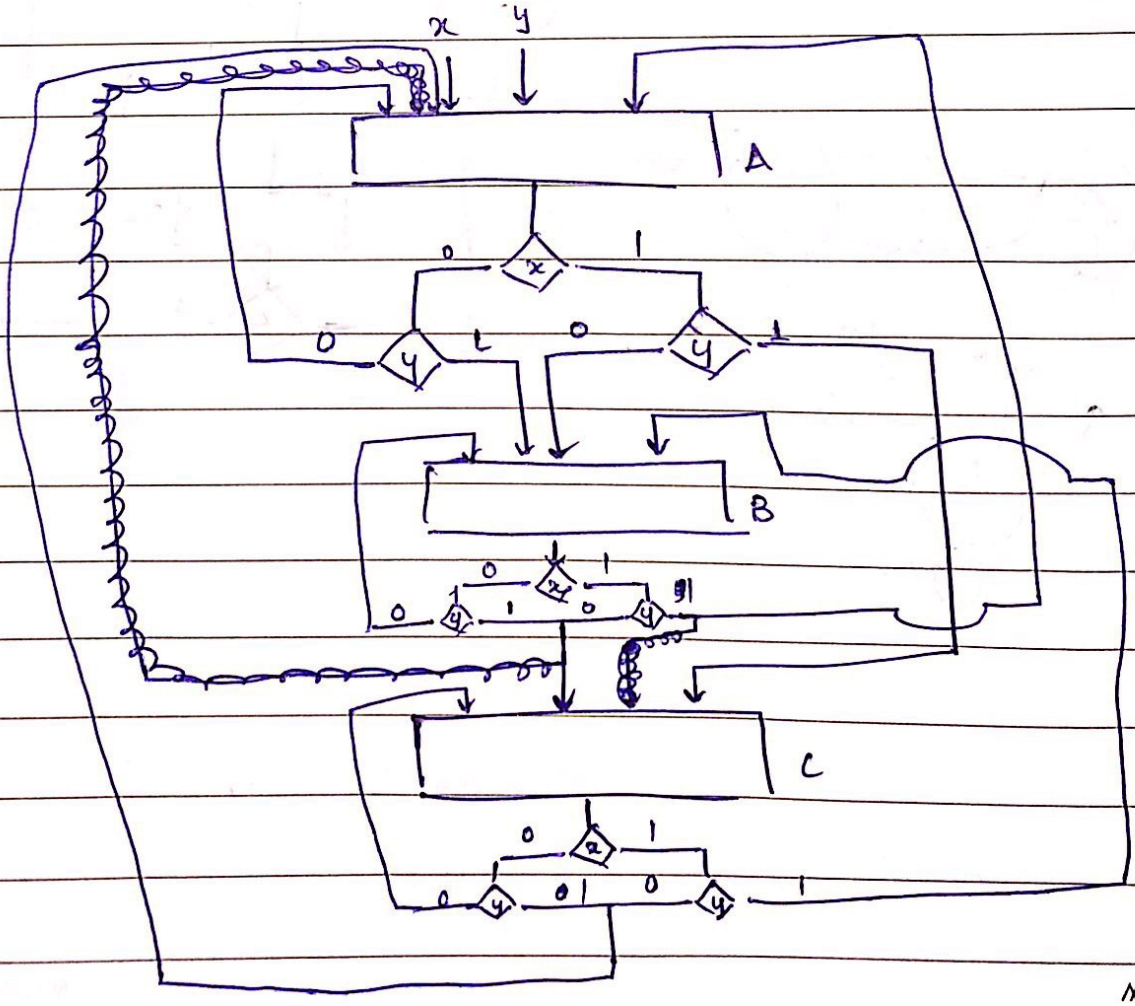

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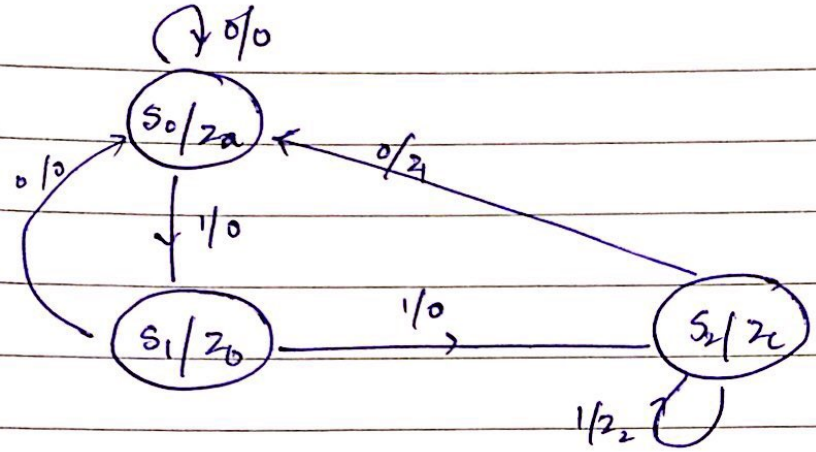
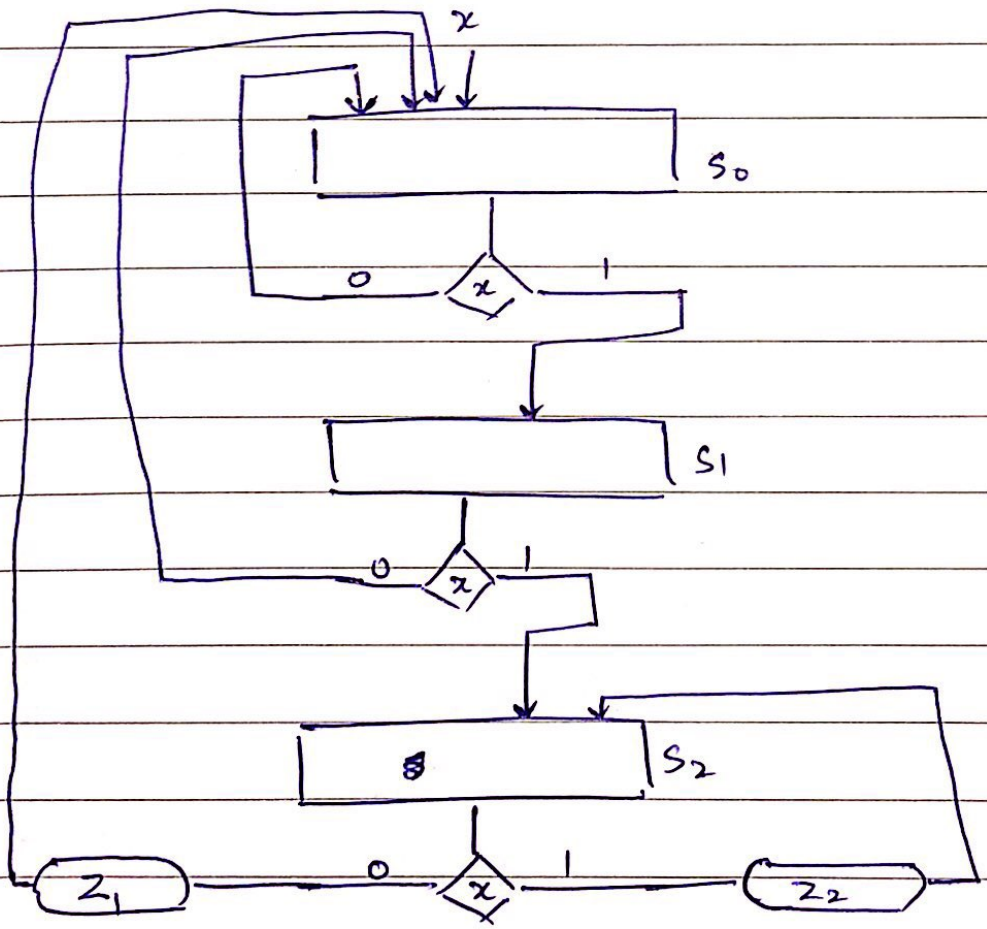


x is an i/p

z_a, z_b & z_c are moore o/p s

z_1 & z_2 are Mealy o/ps.



MATRIKAS