

MODELS IN SEQUENTIAL CIRCUITS

There are 2 models in Sequential Circuits.

- 1) Mealy Model.
- 2) Moore Model.

Mealy Model.

The output is a function of both the Present State and input.

Moore Model.

The output is a function of Present State only.

Mealy Model

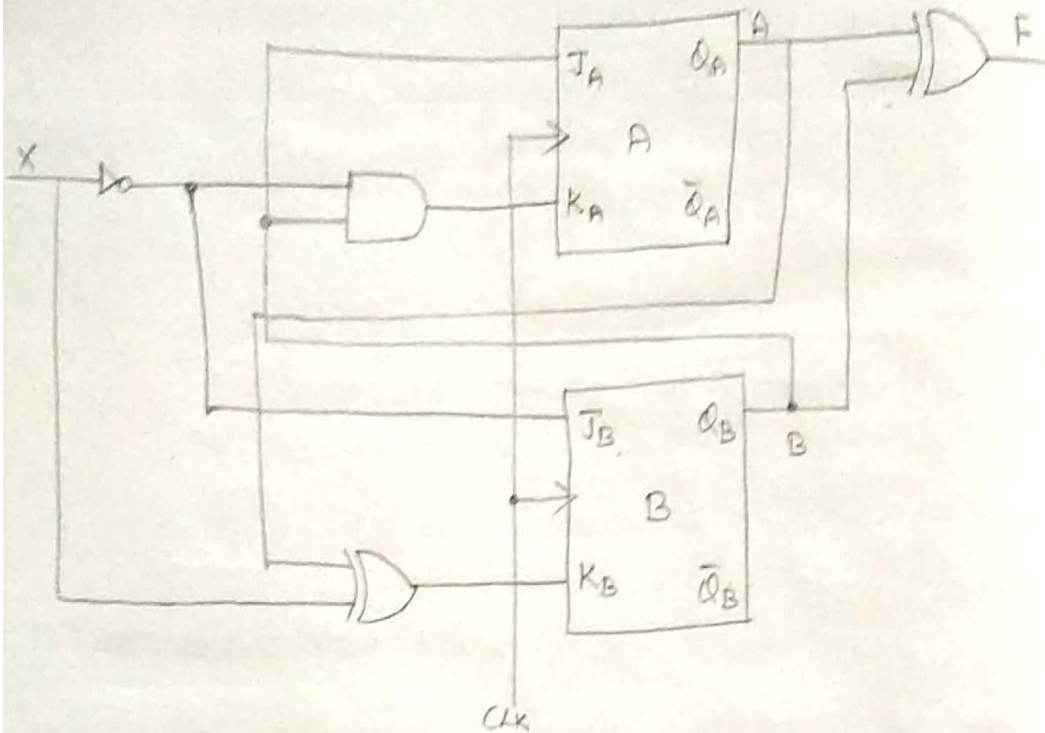
- 1) Its output is a function of PS and Present input.
- 2) Input changes may affect the output
- 3) It requires less number of states for implementing the same function.

Moore Model.

1. Its output depends on Present State only.
2. Input change does not affect the output
3. It requires more number of states for implementing the same function.

PROBLEM

- 1) Construct the transition table, state table and state diagram for the Moore model sequential circuit.



Solu:

A & B are Present States.

A⁺ & B⁺ are Next States.

X is the input

F is the output.

Step 1:

$$J_A = B$$

$$K_A = B\bar{x}$$

$$J_B = \bar{x}$$

$$K_B = x \oplus A$$

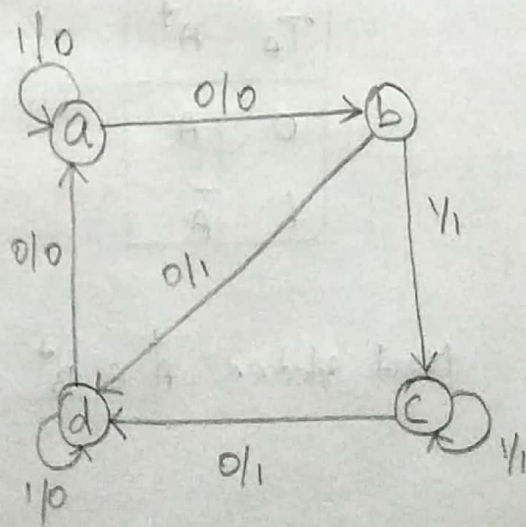
$$\text{Output } F = A \oplus B$$

J_A	K_A	A^+
0	0	A
0	1	0
1	0	1
1	1	\bar{A}

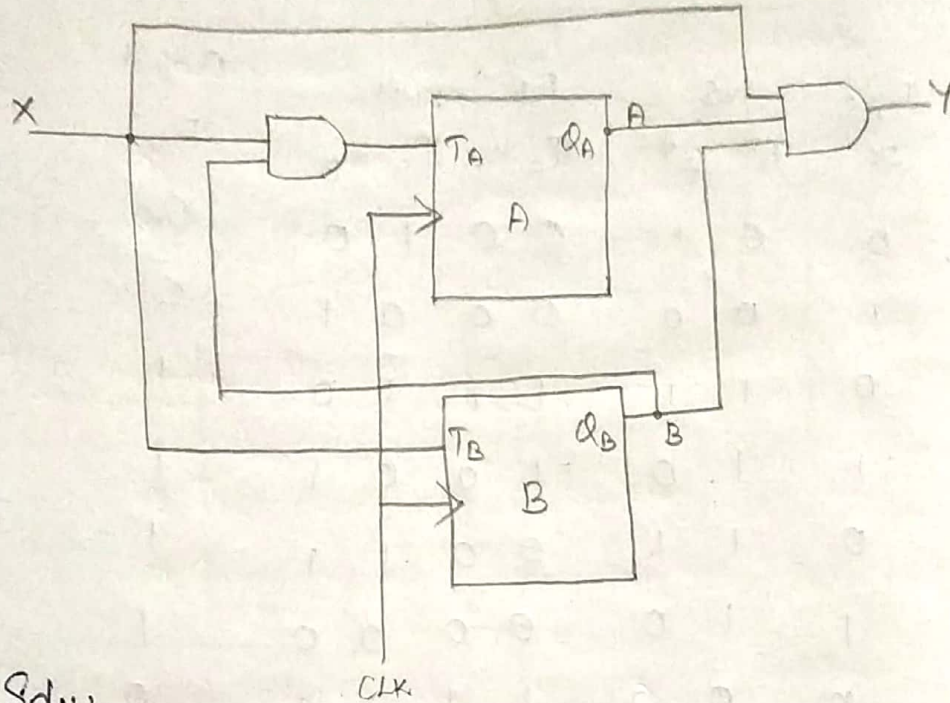
PS		Input		NS		FF Inputs				Output
A	B	x		A^+	B^+	J_A	K_A	J_B	K_B	F
0	0	0		0	1	0	0	1	0	0
0	0	1		0	0	0	0	0	1	0
0	1	0		1	1	1	1	1	0	1
0	1	1		1	0	1	0	0	1	1
1	0	0		1	1	0	0	1	1	1
1	0	1		1	0	0	0	0	0	1
1	1	0		0	0	1	1	1	1	0
1	1	1		1	1	1	0	0	0	0

Assume State $a=00$ $b=01$ $c=10$ $d=11$

PS	NS		O/P F	
	$x=0$	$x=1$	$x=0$	$x=1$
a	b	a	0	0
b	d	c	1	1
c	d	c	1	1
d	a	d	0	0



2) Construct the transition table, State table, and State diagram. For the Mealy model Sequential Circuit shown in fig.



Solu:

$$T_A = Bx \quad T_B = x$$

$$\text{O/p } Y = ABx$$

T_A	A^+
0	A
1	\bar{A}

Next states A^+ & B^+

PS		Input x	NS		FIF Inputs		Output Y
A	B		A^+	B^+	T_A	T_B	
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	0	1	0	0	0
0	1	1	1	0	1	1	0
1	0	0	1	0	0	0	0
1	0	1	1	1	0	1	0
1	1	0	1	1	0	0	0
1	1	1	0	0	1	1	1

PS	NS		o/p F	
	$x=0$	$x=1$	$x=0$	$x=1$
a	a	b	0	0
b	b	c	0	0
c	c	d	0	0
d	d	a	0	1

