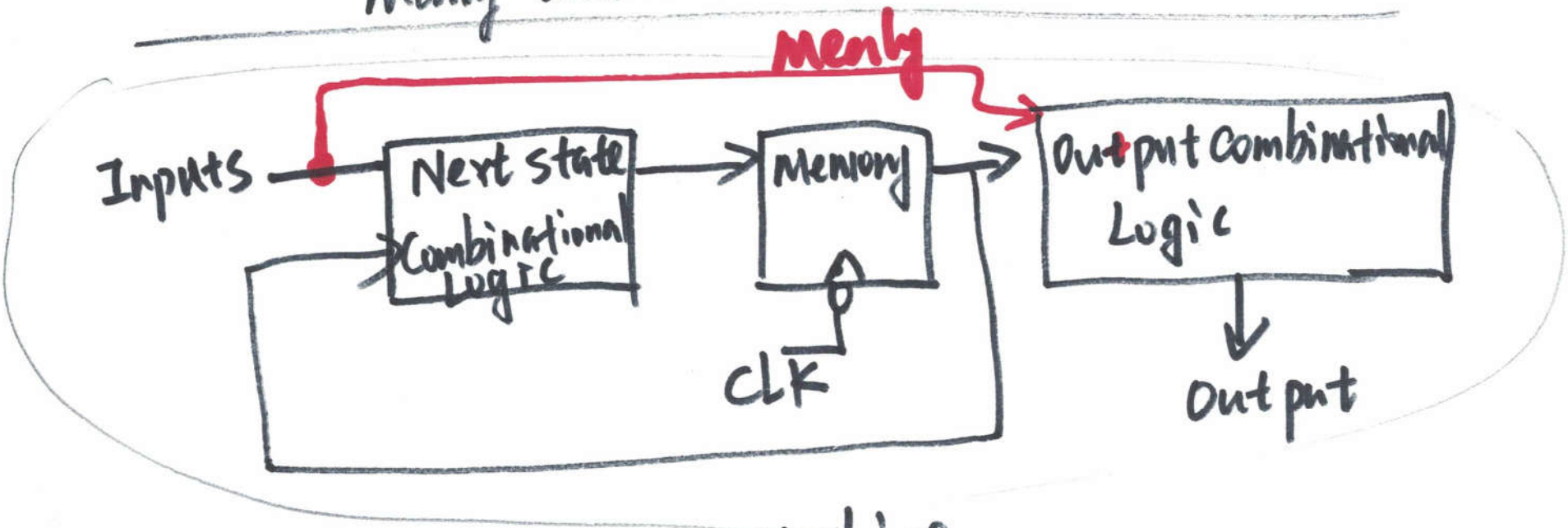
Mealy and Moore State Machines



Moore State Machine

△ Mealy State Machine: The output is the fuction of present State as well as the input.

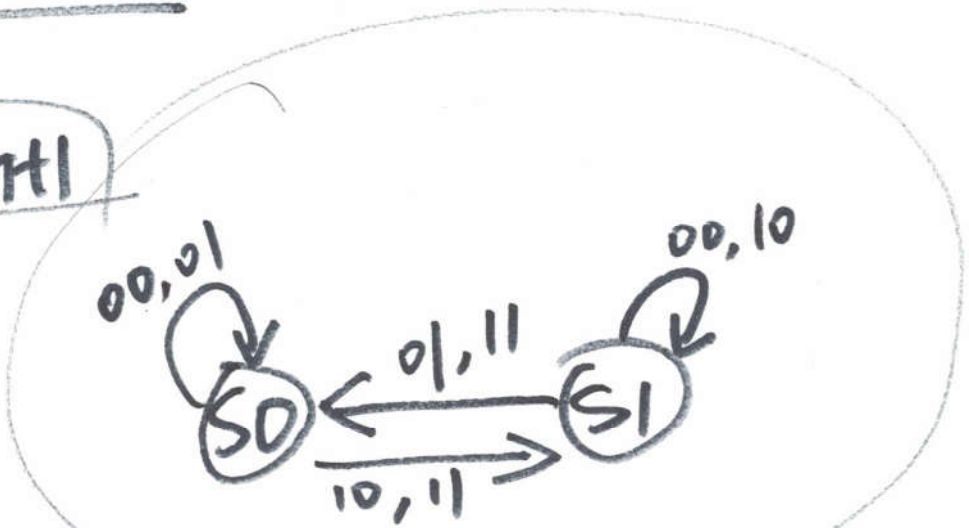
△ Moore State Machine: The output is the function of the present state only.

A very Simple Example:

JKFF

$Q^+ : Q_{n+1}$

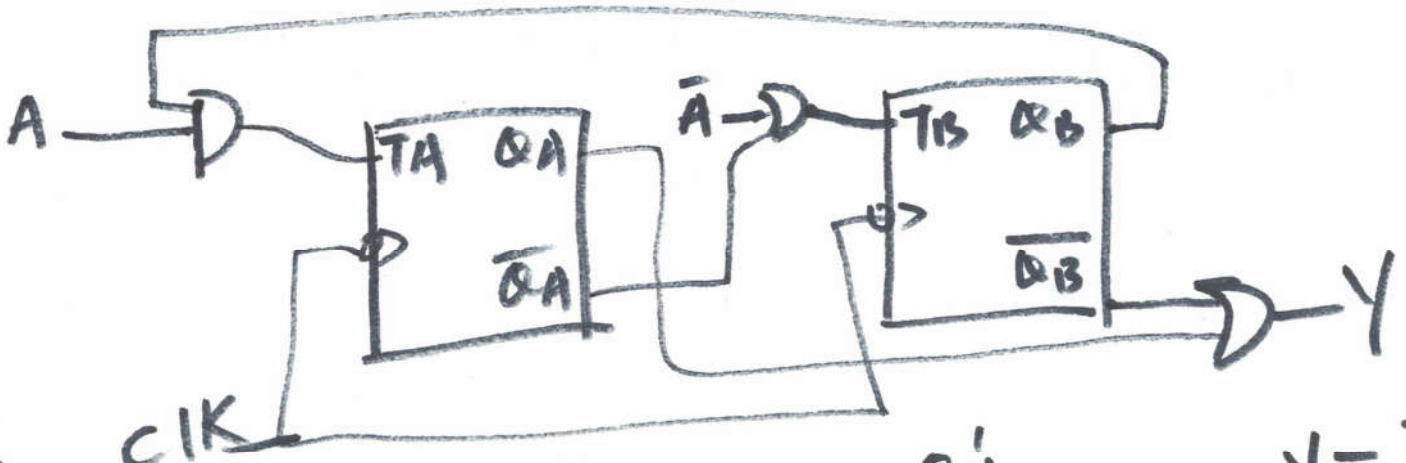
J	K	Q	Q^+	
0	0	0	0	(mem)
0	0	1	1	(mem)
0	1	0	0	
0	1	1	0	
1	0	0	1	
1	0	1	1	
1	1	0	1	(Toggle)
1	1	1	0	



State Diagram of the TK FF.

Examples: Moore machines

△ Circuit → Diagram



Step 1:

A	Q_A	Q_B	Q'_A	Q'_B	T_A	T_B	Y	Y'
0	0	0	0	1	0	1	1	0
0	0	1	0	0	0	1	0	1
0	1	0	1	1	0	1	1	1
0	1	1	1	0	0	1	1	1
1	0	0	0	1	0	1	1	0
1	0	1	1	0	1	1	0	1
1	1	0	1	0	0	0	1	1
1	1	1	0	1	1	0	1	0

Q'_A:

T_A	Q'_A
0	Q_A
1	$\bar{Q}_A$

Q'_B:

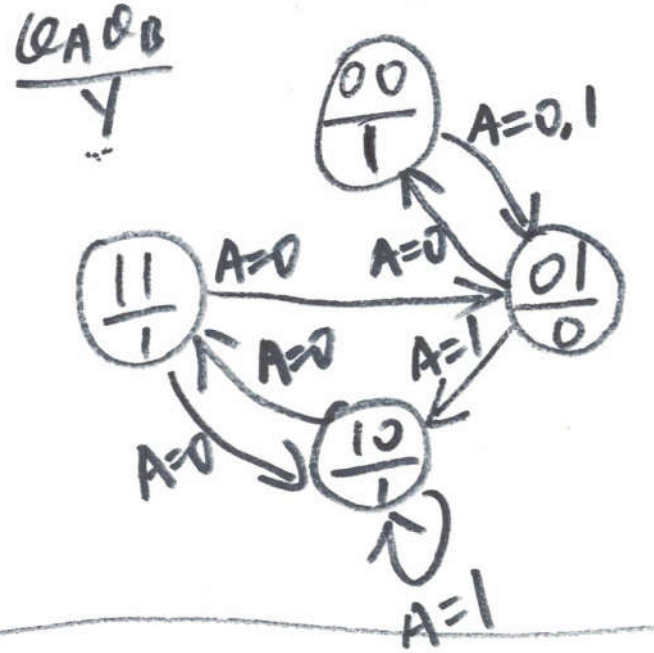
T_B	Q'_B
0	Q_B
1	$\bar{Q}_B$

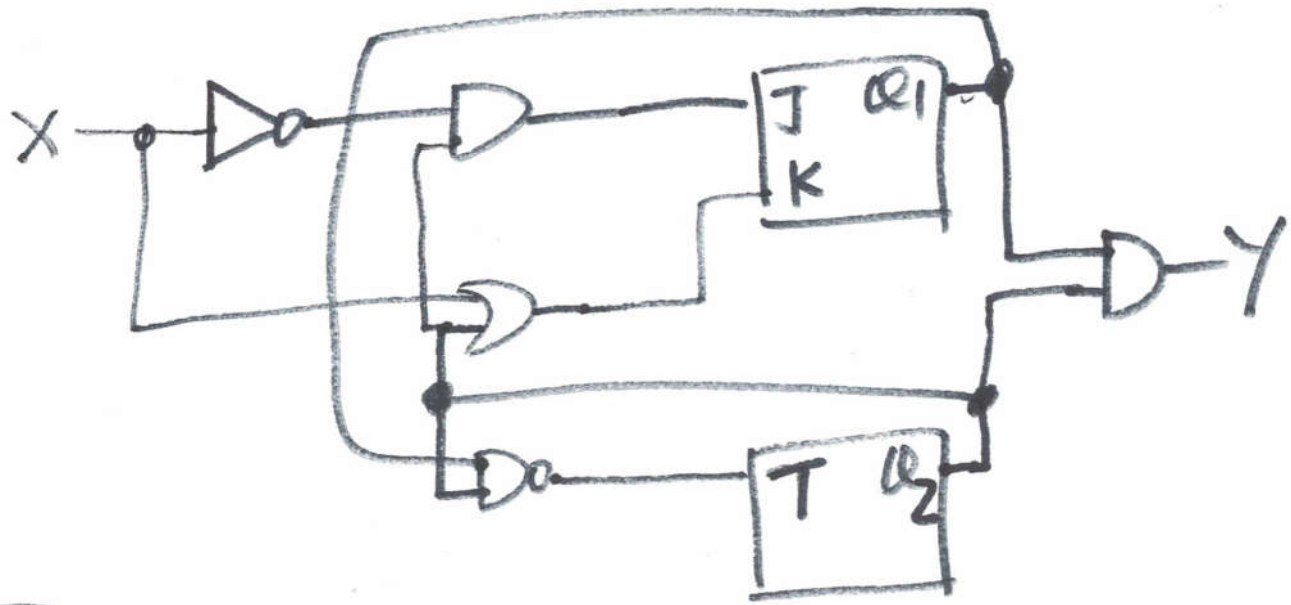
$Y = \bar{Q}_B + Q_A$

$Y' = \bar{Q}_B' + Q'_A$

$T_A = A \cdot Q_B$

$T_B = \bar{A} + \bar{Q}_A$


$Q_A Q_B$
Y
00
1
A=0,1
11
1
A=0
A=0
01
0
A=0
A=1
A=0
10
1
A=1



Step 1:

X	Q_1	Q_2	Q_1'	Q_2'	J	K	T	Y	Y'
0	0	0	0	1	0	0	1	0	0
0	0	1	1	0	0	1	1	0	0
0	1	0	1	1	0	0	1	0	1
0	1	1	0	1	0	1	1	0	0
1	0	0	0	1	1	0	1	0	0
1	0	1	0	0	1	1	1	0	0
1	1	0	0	1	1	0	1	0	0
1	1	1	0	1	1	0	1	0	0

$J = \bar{X} \cdot Q_2$

$K = X + Q_2$

$T = \overline{Q_1 \cdot Q_2}$

$Y = Q_1 \cdot Q_2$

$Y' = Q_1' \cdot Q_2'$

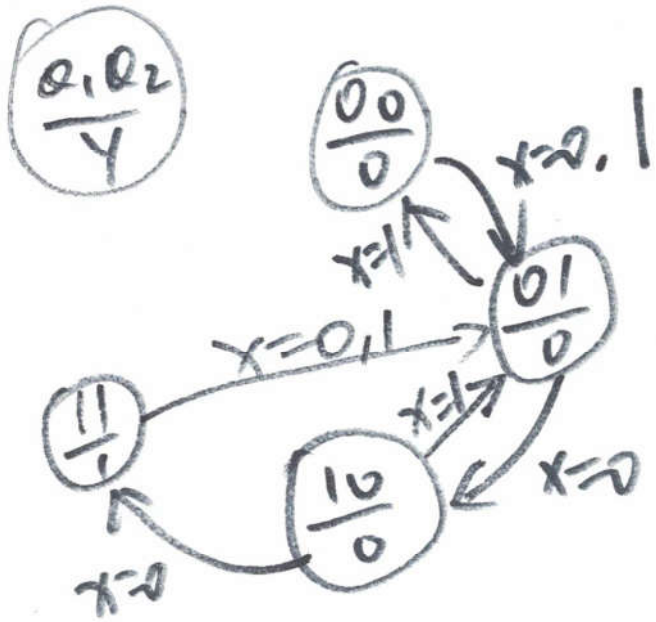
Q_1':

J	K	Q_1'
0	0	Q_1
0	1	0
1	0	1
1	1	$\bar{Q}_1$

Q_2':

J	K	Q_2'
0	0	Q_2
0	1	0
1	0	1
1	1	$\bar{Q}_2$

T	Q_2'
0	Q_2
1	$\bar{Q}_2$


Q1Q2
Y
00
0
01
0
11
1
10
0
x=0,1
x=1
x=1
x=0
x=0