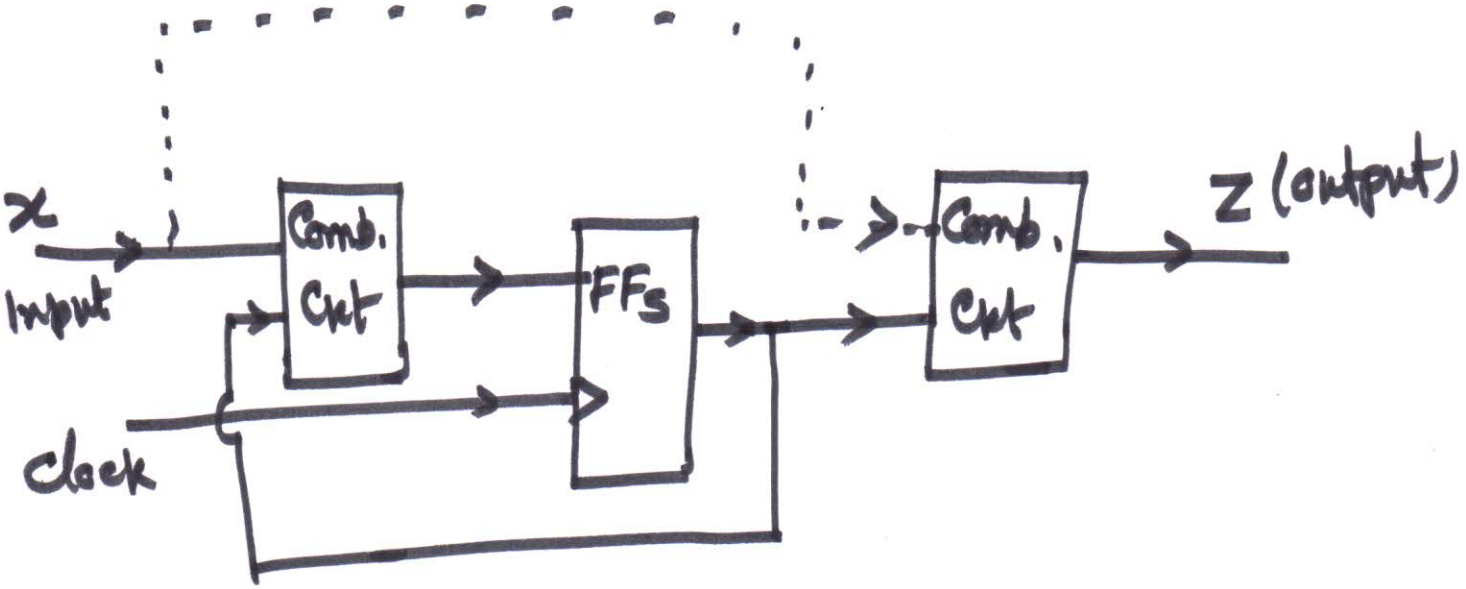
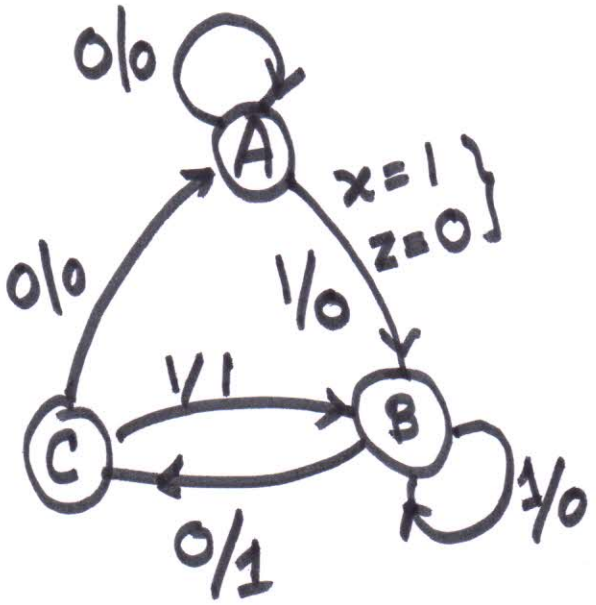
Finite State Machine (FSM)

- FSM contains finite number of states where a state specifies a unique internal condition of a system.
- Change of states: function of present states & present inputs.
- Output:
  1. For Mealy Machine- Output is a function of both present inputs & present states.
  2. For Moore Machine- Out is function of present states only.



Example of Mealy Machine:



State Diagram

State Transition Table

Present States	Next States x=0	Next States x=1	output (z) x=0	output (z) x=1
A	A	B	0	0
B	C	B	1	0
C	A	B	0	1

State Mapping

$q_1\ q_0$

A → 0 0

B → 0 1

C → 1 1

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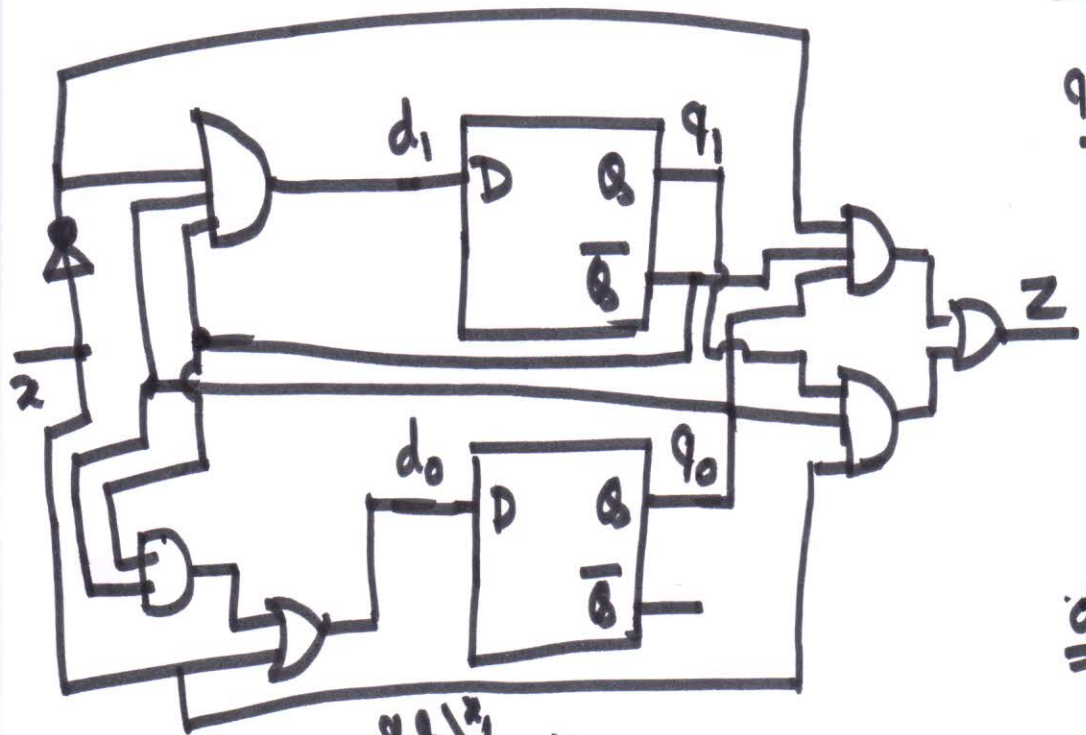
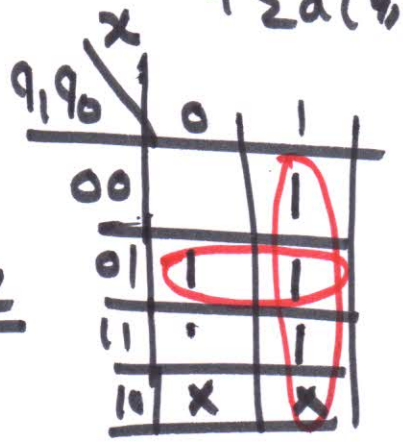
Present States q_1	q_0	I/p x	Next states q_1^+	q_0^+	I/p of the FFs d_1	d_0	output (z)
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	1	1	1	1	1
0	1	1	0	1	0	1	0
1	1	0	0	0	0	0	0
1	1	1	0	1	0	1	1
1	0	0	x	x	x	x	0
1	0	1	x	x	x	x	0

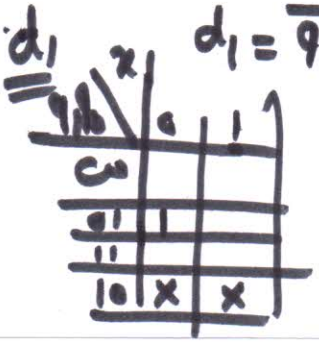
$d_0 = \sum m(1,2,3,7) + \sum d(4,5)$



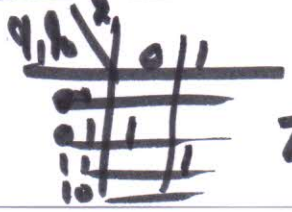


$d_0 = x + \overline{q_1}\, q_0$

$d_1 = \overline{q_1}\, q_0 \overline{x}$

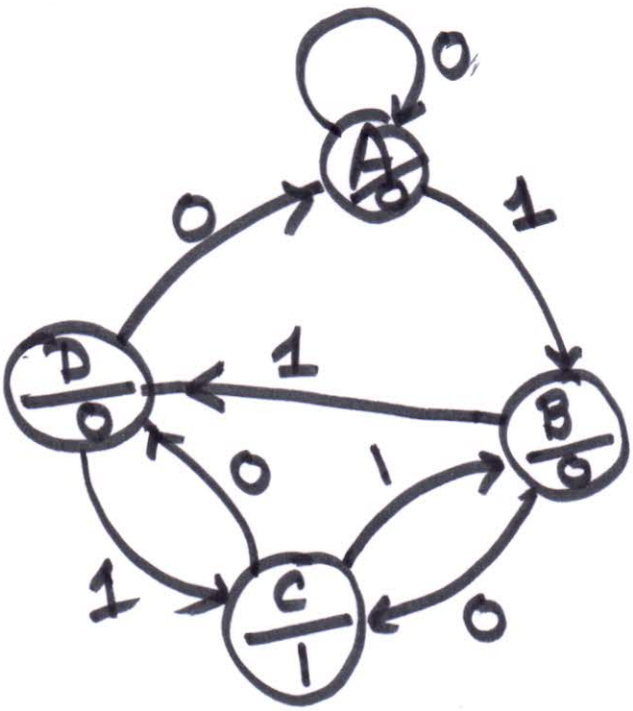


z



$z = \overline{q_1} q_0 \overline{x} + q_1 q_0 x$

Example of Moore Machine:



State Transition table

Present State	Next State x=0	Next State x=1	output
A	A	B	0
B	C	D	0
C	D	B	1
D	A	C	0