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Session: 1

CMPE 240 2020 Experiment 5 Preliminary Work

1. **State Register Inputs:**

   n1 = (x.s0'.s1') + (s0.s1)
   n0 = (x'.s1) + (x.s0)
   rst, clk

2. **State Register Outputs:**

   s1,s0

3. **Combinational Block Inputs:**

   x, s1,s0

4. **Combinational Block Output:**

   y1 = s1.x'
   y0 = (x'.s0'.s1') + (x.s0.s1')
   n1 = (x.s0'.s1') + (s0.s1)
   n0 = (x'.s1) + (x.s0)

5. **Fill the following truth table:**

#	s1	s0	x	n1	n0	y1	y0
0	0	0	0	**0**	**0**	**0**	**1**
1	0	0	1	**1**	**0**	**0**	**0**
2	0	1	0	**0**	**0**	**0**	**0**
3	0	1	1	**0**	**1**	**0**	**1**
4	1	0	0	**0**	**1**	**1**	**0**
5	1	0	1	**0**	**0**	**0**	**0**
6	1	1	0	**1**	**1**	**1**	**0**
7	1	1	1	**1**	**1**	**0**	**0**

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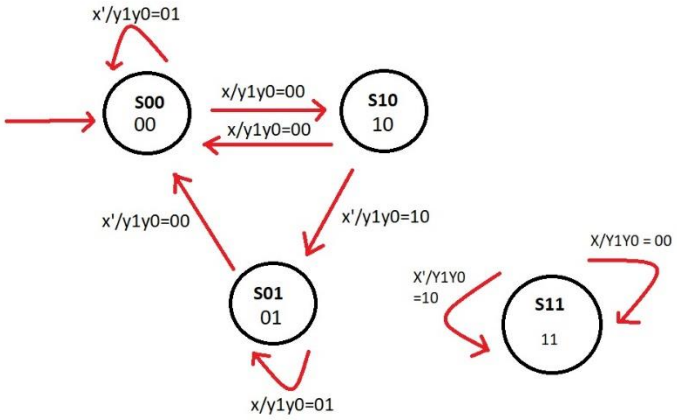
6. **Is this a Moore or Mealy Machine? (No explanation, only short answer)**

Mealy Machine.

7. **Draw the FSM:**

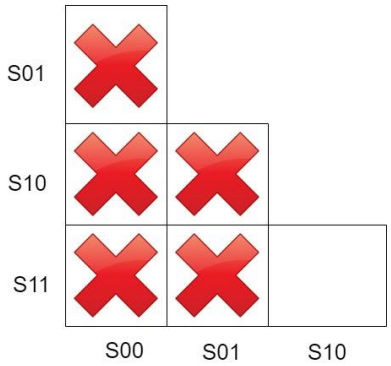


8. **How many unreachable states does the finite state machine contain?**

One state. (s11)

9. **Minimize the state machine. Show your steps. Is it minimized or not?**

STEP1:



State pairs having different outputs are different, mark them. Only s10 and s11 states gives same outputs respect to same inputs.

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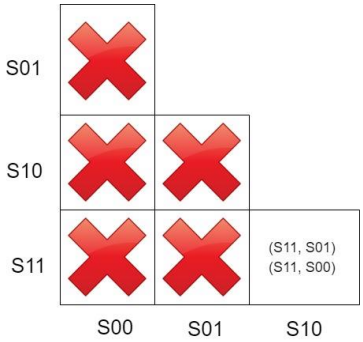
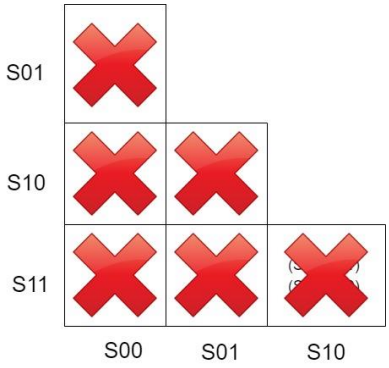
STEP2:



For unmarked state write next state pairs for same input values.

STEP3:



For unmark state pairs, mark having nonequivalent next state pairs. Since (S11, S01) pair and (S11, S00) pairs are already marked as nonequivalent, mark (s11, s10) pair.

STEP4: There is no remaining states, so this FSM is **not minimized**.