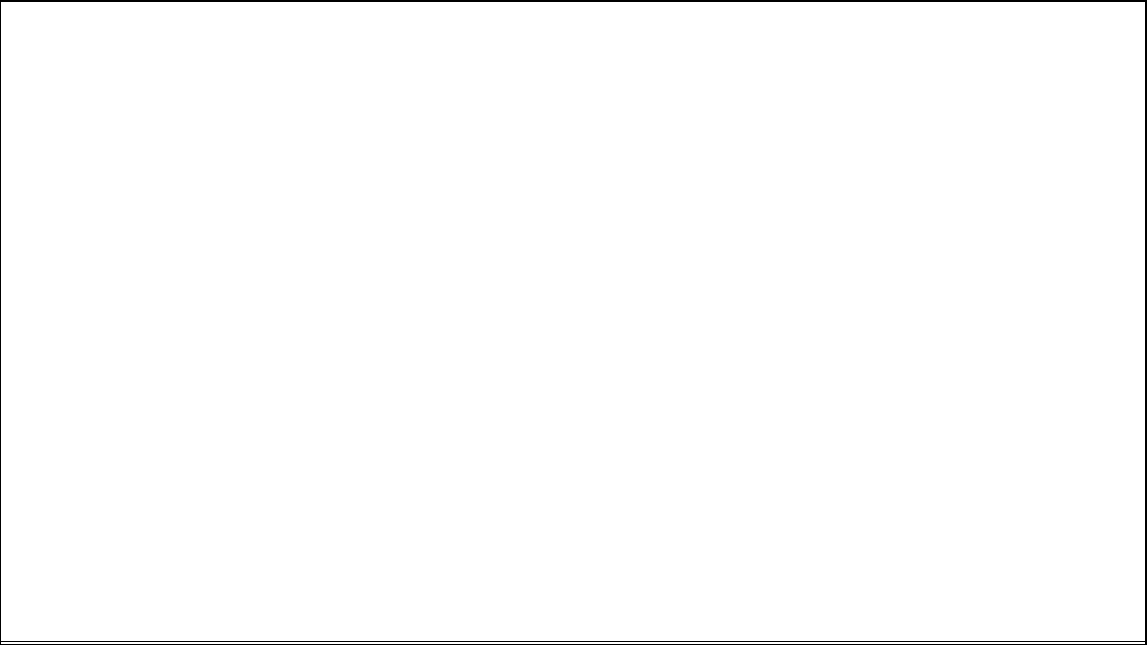


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PATTERN DETECTORS



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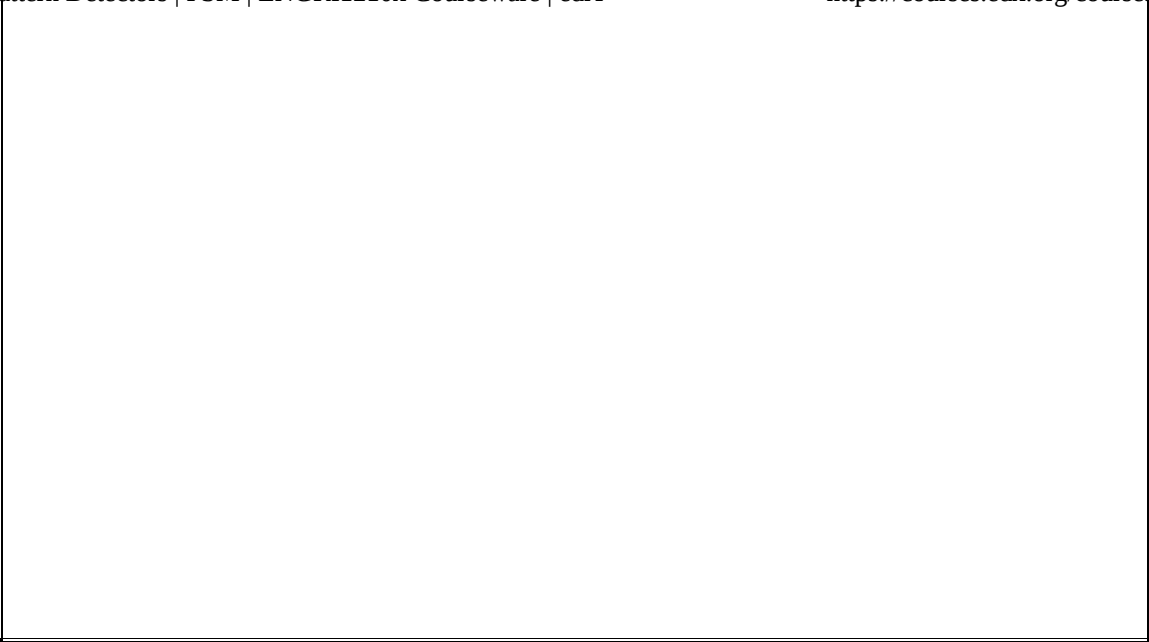
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OUTPUT TABLES

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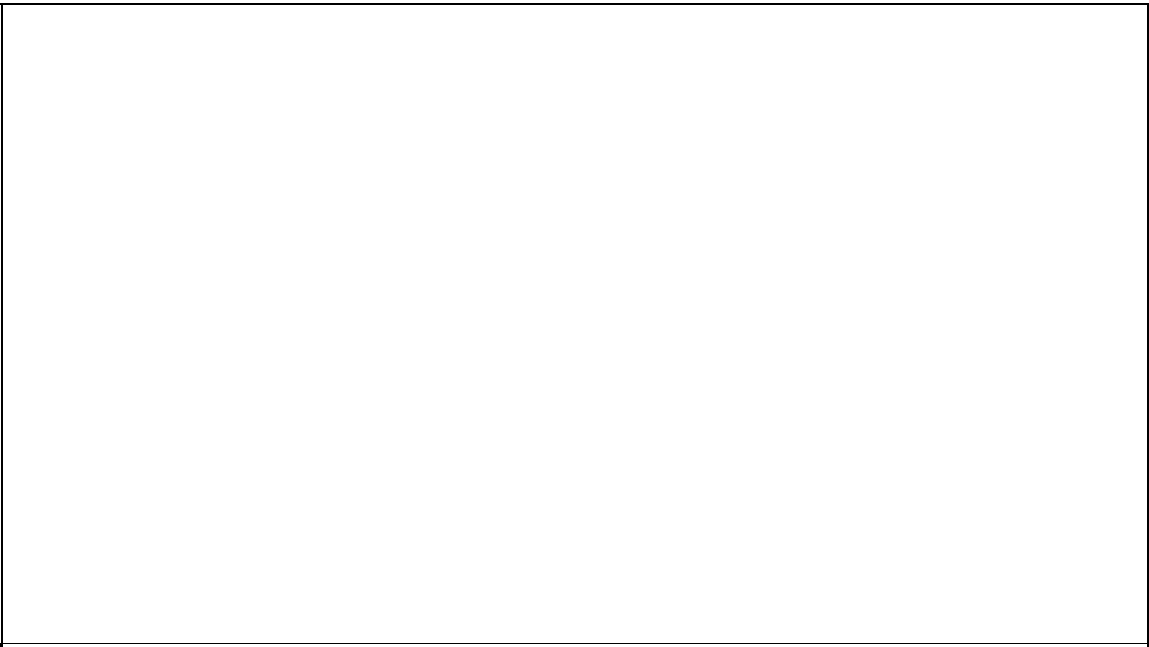
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TIMING



2 of 9	12:40 / 12:40	1.0x	04/16/2015 06:25 PM		
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## 1. Check Your Understanding

In addition to a Transition/Output table, a Finite State Machine may be represented by a truth table, such as the one shown below. The FSM in this example has one input, En, and one output, Max. S1 and S0 represent the current state and S1' and S0' the next state. Therefore, the truth table inputs are S1, S0, and En, and the outputs are S1', S0', and Max.

S1	S0	En	S1'	S0'	Max
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	1	0
0	1	1	1	0	0
1	0	0	1	0	0
1	0	1	1	1	0
1	1	0	1	1	1
1	1	1	0	0	1

## 1 A. CHECK YOUR UNDERSTANDING (1 point possible)

Could the FSM depicted by this truth table be implemented as a Moore machine? (**You have ONE submission**)

☐ Yes   
☒ No 

**EXPLANATION**

The output Max is 1 when S1 and S0 are both 1, irrespective of the value of the input En. Thus, Max solely depends on the current state, and therefore, the FSM could be implemented as a Moore machine.

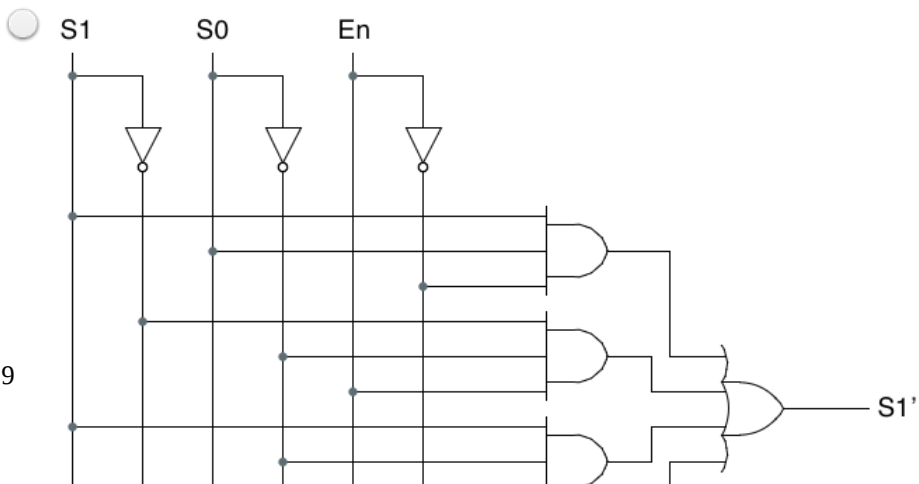
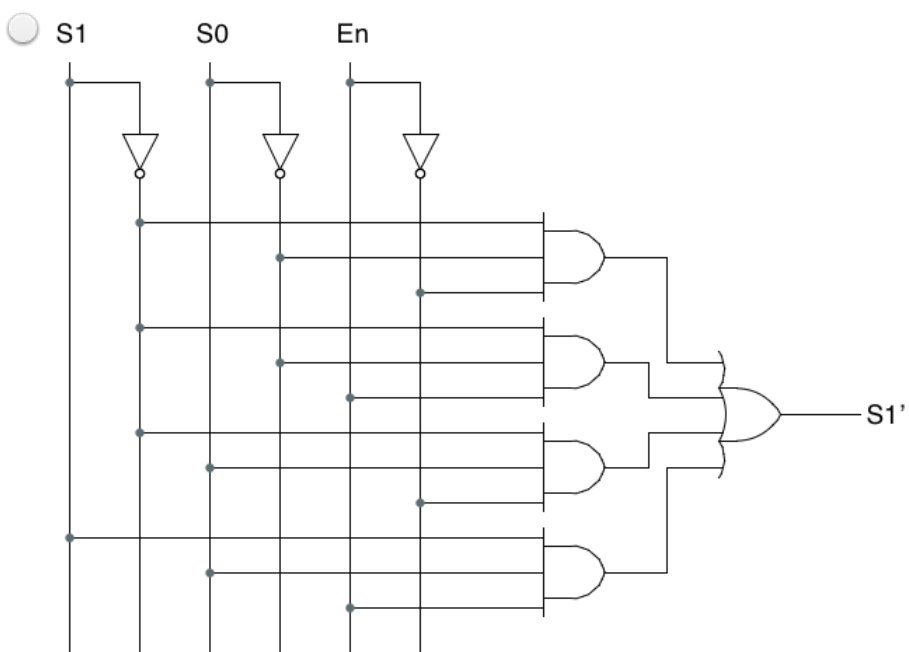
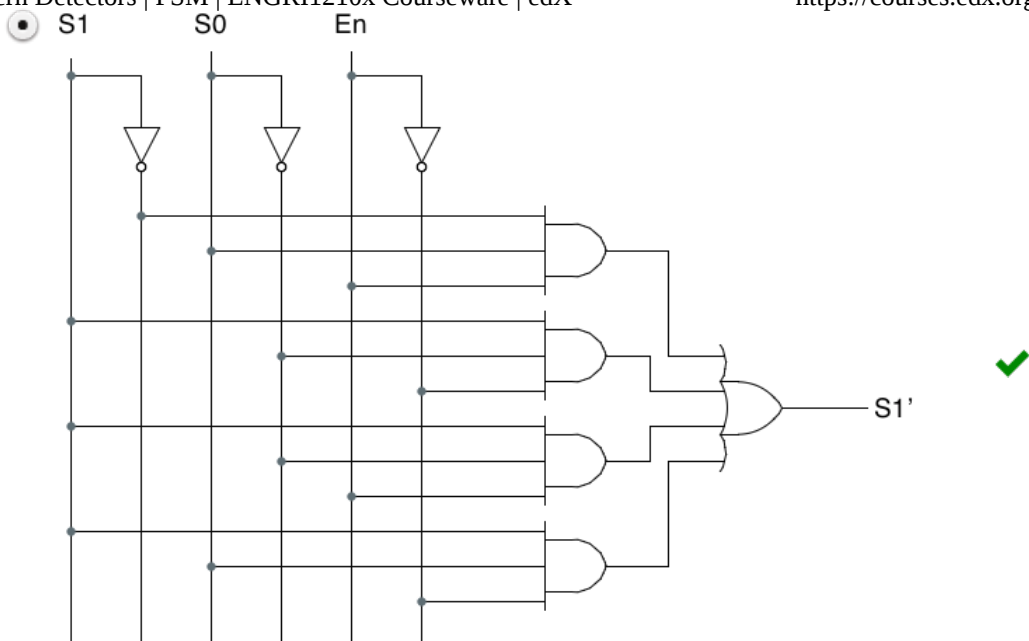
Hide Answer

You have used 1 of 1 submissions

## 1 B. CHECK YOUR UNDERSTANDING (1/1 point)

Which of the following shows the combinational logic circuit for S1'?

Help



**EXPLANATION**

Following the procedure from Muxes and Decoders, Logical Completeness, we first need both true and complemented (inverted) values of the three truth table inputs. We then create four three-input AND gates, one for each row in which  $S1' = 1$ , and connect the appropriate true or complemented values of the inputs. For example, for the first row in which  $S1' = 1$ , we need the complemented value of  $S1$  and the true values of  $S0$  and  $En$ . Finally, we connect the outputs of the four AND gates to the inputs of a four-input OR gate.

Final Check

**Save**

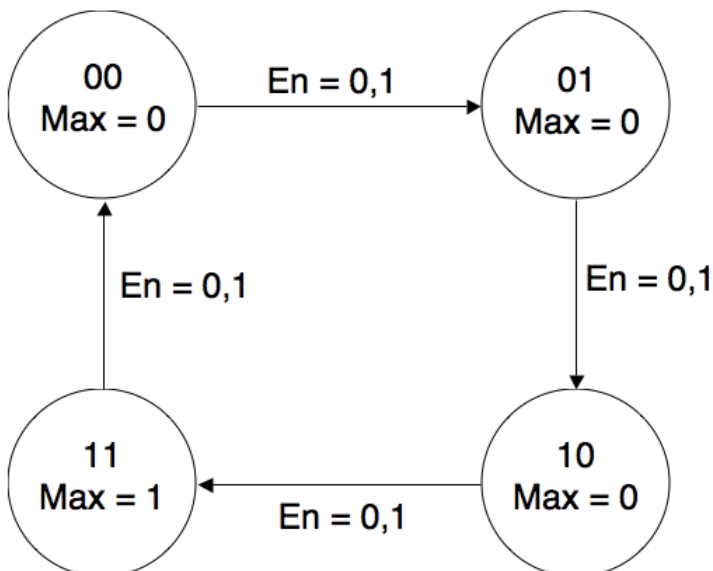
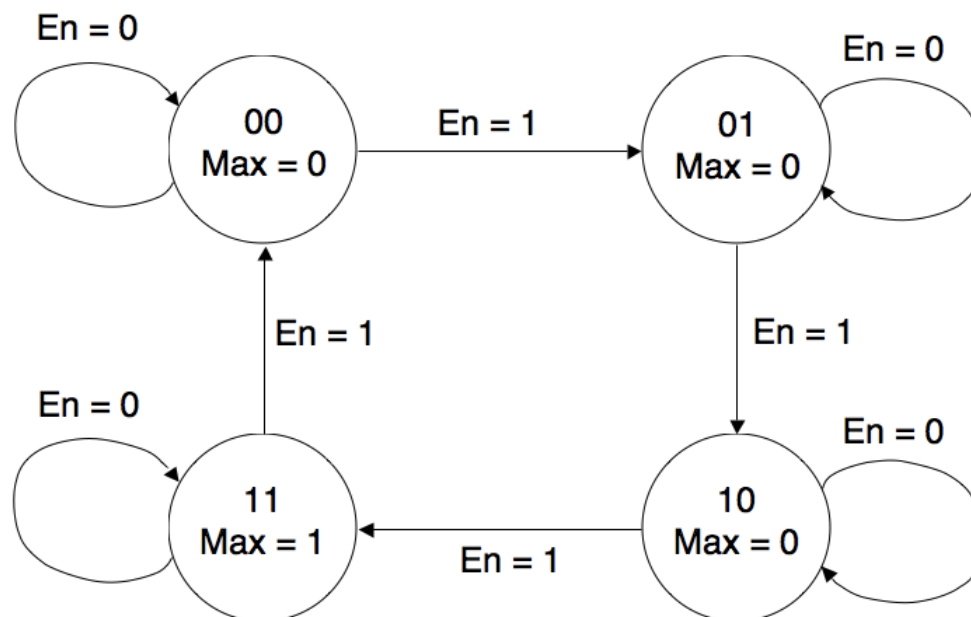
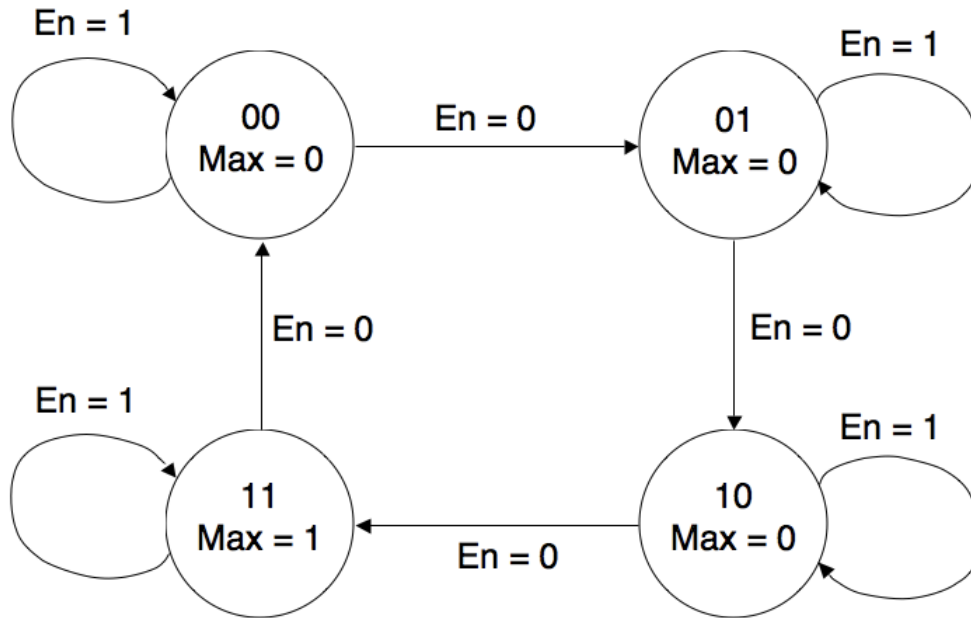
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 New Post**1 C. CHECK YOUR UNDERSTANDING** (1/1 point)

Which of the following shows the state diagram for the FSM as a Moore machine?



**EXPLANATION**

We have four states: 00, 01, 10, and 11. Once we draw the bubbles for those states, we can first fill in the values for Max. From the table, we observe that  $\text{Max} = 1$  in state 11 and otherwise  $\text{Max} = 0$ .

We then progress row by row in order to draw the state transitions:

Row 1:  $E_n = 0$ , transition from 00 to 00.

Row 2:  $E_n = 1$ , transition from 00 to 01.

Row 3:  $E_n = 0$ , transition from 01 to 01.

Row 4:  $E_n = 1$ , transition from 01 to 10.

Row 5:  $E_n = 0$ , transition from 10 to 10.

Row 6:  $E_n = 1$ , transition from 10 to 11.

Row 7:  $E_n = 0$ , transition from 11 to 11.

Row 8:  $E_n = 1$ , transition from 11 to 00.

After this procedure, the second state diagram is revealed to be the correct one.

Final Check

**Save**

Hide Answer

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