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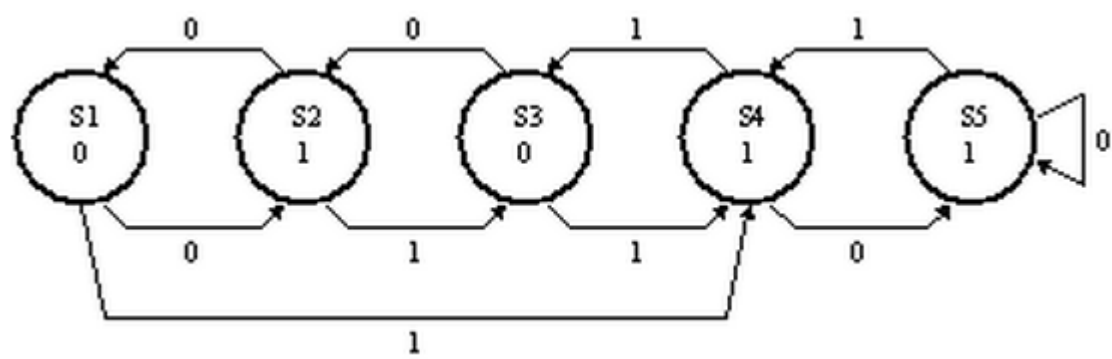
LE6.3

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LE6.3.1 Equivalent states

1/1 point (ungraded)

Consider the following state transition diagram for an FSM with a single input and a single output.



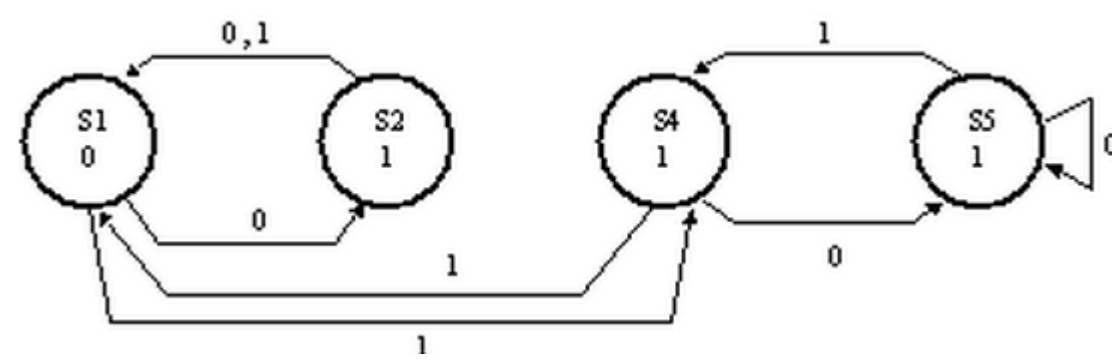
Recall that two states are equivalent if (1) they have identical outputs and (2) for each possible combination of inputs they transition to equivalent states. Please indicate which pairs of states, if any, are equivalent:

- ☐ No states are equivalent
- ☐ S1 and S2 are equivalent
- ☒ S1 and S3 are equivalent
- ☐ S1 and S4 are equivalent
- ☐ S1 and S5 are equivalent
- ☐ S2 and S3 are equivalent
- ☐ S2 and S4 are equivalent
- ☐ S2 and S5 are equivalent
- ☐ S3 and S4 are equivalent
- ☐ S3 and S5 are equivalent
- ☐ S4 and S5 are equivalent



Explanation

States S1 and S3 both output 0. On a "0" input they both transition to S2. On a "1" input they both transition to S4. Thus S1 and S3 satisfy are constraints for equivalent states. The following figure shows the state transition diagram for the reduced FSM:



Looking at this diagram one can establish that no combination of S2, S4, and S5 is equivalent:

- S2 with a 0 input transitions to a state that outputs 0. That's not true with states S4 and S5, so S2 is not equivalent to S4 and S5.
- S4 with a 1 input transitions to a state that outputs 0. That's not true with S5, so S4 is not equivalent to

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- LE6.3.1 Equivalent states

[STAFF] Please can you check :On a "0" input they both transition to S2, and let me know if this is correct.

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Calculator

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