

EECS20n, Quiz 2

The quiz will take 15 minutes. Write your response on the sheet. For true/false questions, you will receive 0 points for a wrong answer, 1 point for no answer, and 2 points for a correct answer. Please print your name and lab time here:

Solution

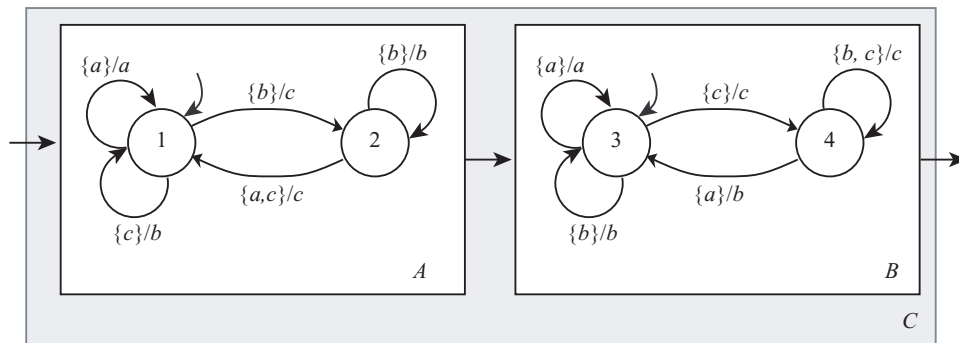
1. True or false: If A is an arbitrary set and B is a set with exactly one element, then $[A \rightarrow B]$ is a set with exactly one element.

TRUE

2. True or false: For all sets A , $|P(A)| \geq 2$, where $P(A)$ is the powerset of A and $|P(A)|$ is the number of elements in the powerset.

FALSE (Consider $A = \emptyset$).

The remaining questions concern the following cascade of two state machines:



The alphabets are $Inputs = Outputs = \{a, b, c, absent\}$, and the initial states are indicated with arrows with no originating state.

3. (One point): How many states are there in the composite machine C ?

4

4. (Two points): How many reachable states are there in the composite machine C ?

3 (The state $(2, 3)$ is not reachable.)

5. (Three points): If you feed back the output of machine B to the input of machine A , is the feedback composition well-formed? If you have doubts about your answer, explain your reasoning for possible partial credit.

Yes, it is well formed. Neither machine has state determined output, so in this case we have to use exhaustive search to find the fixed points. There is only one reachable state in the feedback composition.