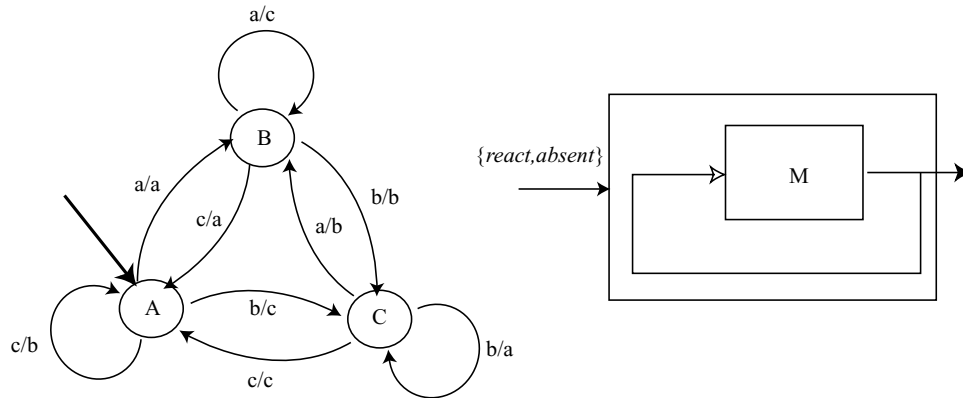


EECS20n, Quiz 2 Solution, 9/29/00

The figure on the left gives a state transition diagram for a machine M with 3 states and $Inputs = Outputs = \{a, b, c\}$. A is the initial state.



1. What is the state trajectory and the output sequence when the input sequence is $a, a, b, b, c, c, a, a, b, b, c, c, \dots$ where ellipsis means repeated forever?

We can trace the state trajectory and the output signal corresponding to the given input sequence a, a, b, b, c, c, \dots in the state transition diagram:

Input signal	$a, a, b, b, c, c, a, a, b, b, c, c, \dots$
State trajectory	$A, B, B, C, C, A, A, B, B, C, C, \dots$
Output signal	$a, c, b, a, c, b, a, c, b, a, c, \dots$

2. Suppose M is placed in feedback form as shown on the right. Is the resulting machine well-formed? What is its output sequence corresponding to the input sequence $react, react, \dots$?

Yes, it is well-formed since in each state s there is a unique input (output) x such that $output_M(s, x) = x$. The state trajectory and output sequence corresponding to $react, react, \dots$ are:

State trajectory	A, B, C, A, B, C, \dots
Output signal	a, b, c, a, b, c, \dots