

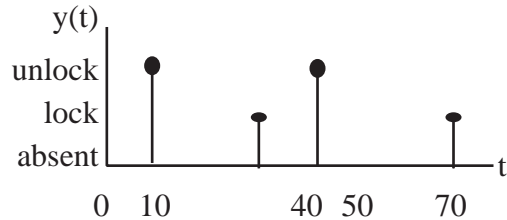
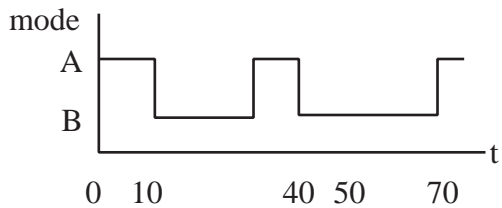
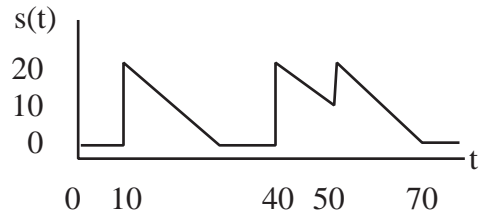
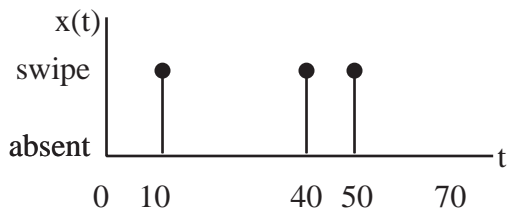
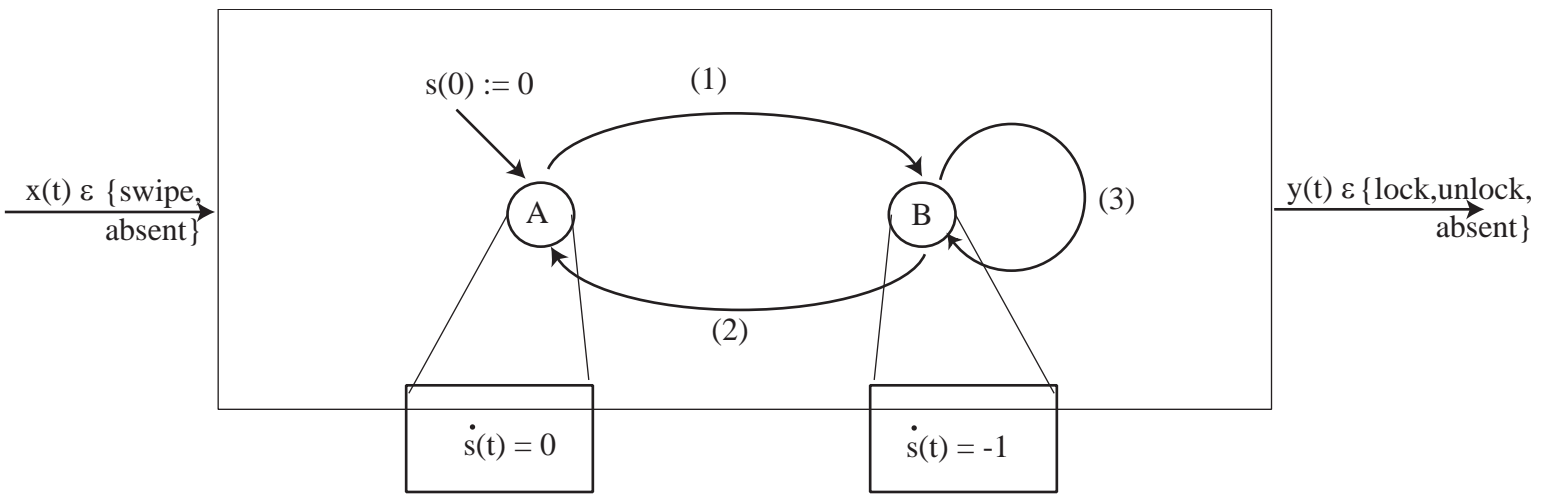
# EECS20n, Quiz 5 Solution, 10/21/04

1. **10 points** An electronic door lock works as follows. If a card is swiped across the card reader, the door will be unlocked for 20 seconds. The door is locked if a card has not been swiped during the previous 20 seconds.

i. **5 points** Give the transitions of the hybrid system so that it meets the specification above. Each transition must be in the form guard/output; action:

$$\{\text{guard on}(x(t), s(t))\}/y(t); s(t) := s'$$

ii. **5 points** If as indicated a card is swiped at 10, 40, 50 seconds, plot the mode, trajectory  $s$ , and output  $y$ .



(1)  $\{(x(t),s(t)) \mid x(t) = \text{swipe}\}/\text{unlock}; s(t) := 20$

(2)  $\{(x(t),s(t)) \mid x(t) \neq \text{swipe}, s(t) = 0\}/\text{lock}; s(t) := 0$

(3)  $\{(x(t),s(t)) \mid x(t) = \text{swipe}\}/\text{absent}; s(t) := 20$