# EECS20n, Quiz 2, 9/21/04

The quiz will take 15 minutes. Write your reponse on the sheet.

Print your name and lab time here:

Last Name _____ First _____ Lab time _____

1. 4 points A parking lot has 3 spaces. At its entrance is a sensor that emits *enter* when a car enters the lot, and *leave* when a car departs. Design a state machine that takes as its input the sensor signal and outputs *full* when all 3 spaces are occupied, otherwise it outputs *absent*. Specify the state machine as a transition diagram inside the box in the figure below.
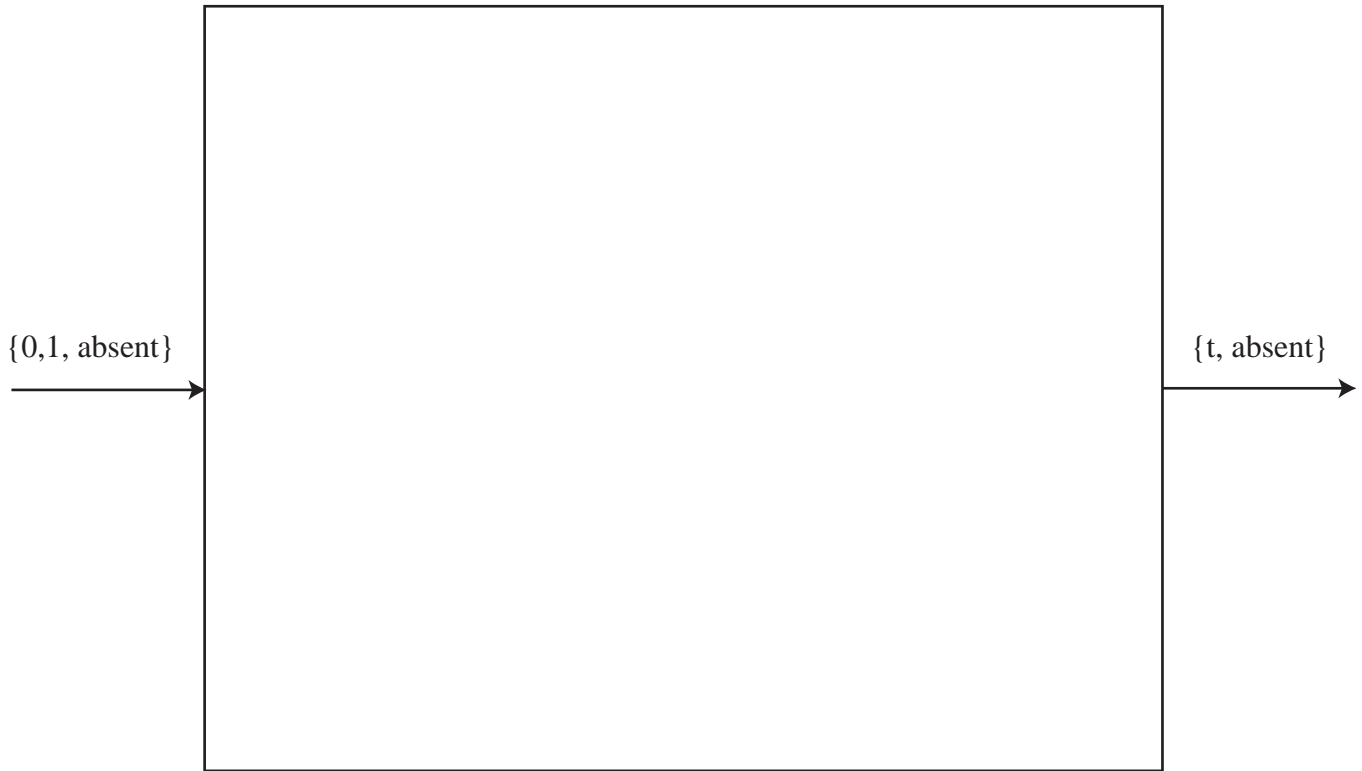
{enter, leave

absent}

{full, absent}
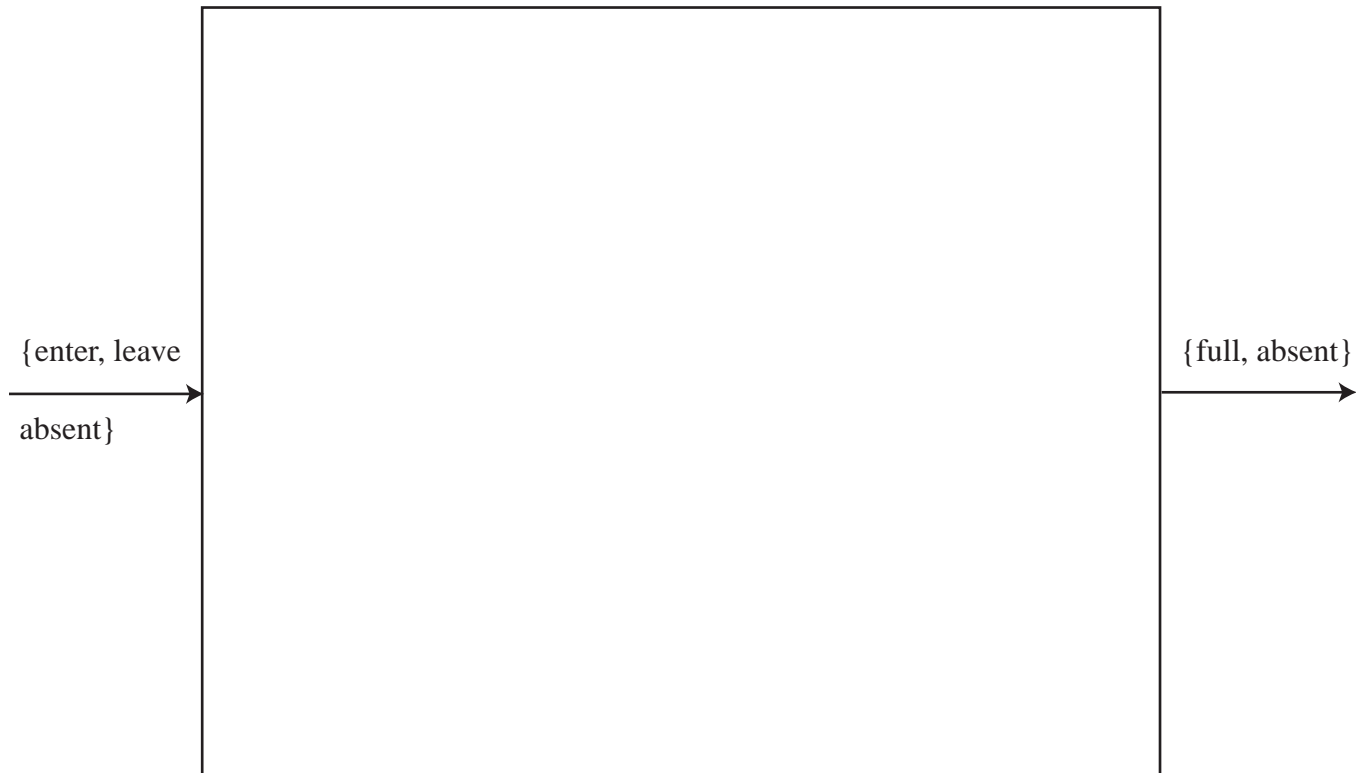
2. 6 points

Design a state machine S with *Inputs* $= \{0, 1, absent\}$, $Outputs = \{T, absent\}$, which recognizes the patters 010, 101, i.e.

$$\forall x, \forall n, \; S(x)(n) = \begin{cases} t, & \text{if } (x(n-2), x(n-1), x(n)) = 010 \text{ or } 101, \\ absent, & \text{else} \end{cases}$$

Specify your state machine as a transition diagram in the box below.

{0,1, absent} →

{t, absent} →

If the input sequence is $x = (0, 1, 0, 1, 0, 1, \cdots)$, what are the first six symbols in the output sequence $y = ($ $)$?