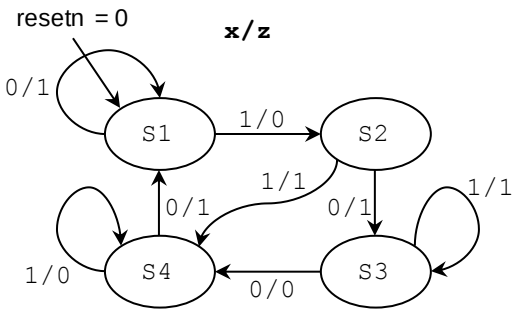
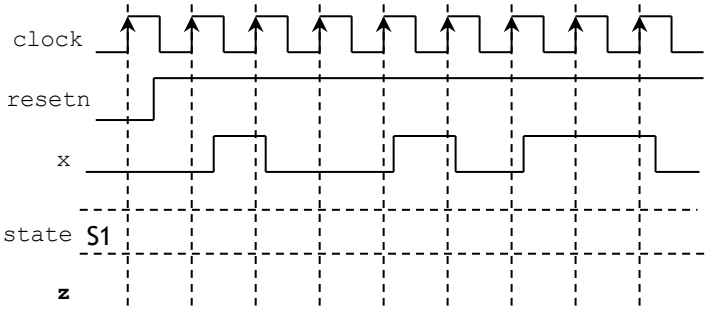
Quiz 3

(October 31st @ 9:30 am)

PROBLEM 1 (20 PTS)

- Complete the timing diagram of the following state machine:



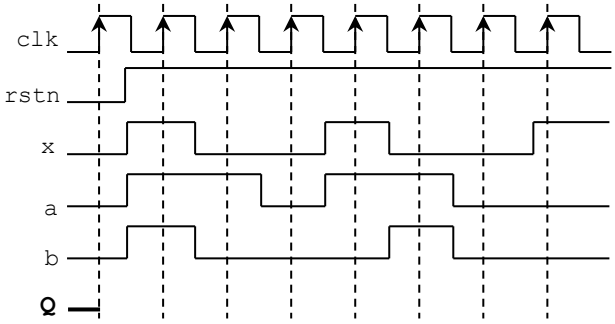


PROBLEM 2 (25 PTS)

- Complete the timing diagram of the circuit whose VHDL description is shown below:

```
library ieee;
use ieee.std_logic_1164.all;

entity circ is
   port ( rstn, a,b, x, clk: in std_logic;
          q: out std_logic);
end circ;
```




```
architecture hallows of circ is
   signal qt: std_logic;

begin

   process (rstn, clk, a, b, x)
   begin
     if rstn = '0' then
         qt <= '0';
     elsif (clk'event and clk = '1') then
         if x = '1' then
             qt <= not(qt);
         else
             qt <= a and b;
         end if;
      end if;
   end process;
   q <= qt;

end hallows;
```

PROBLEM 3 (25 PTS)

- Sequence detector (with overlap): Draw the state diagram of a circuit that detects the following sequence: `010011`. The detector must assert an output '`z=1`' when the sequence is detected.

PROBLEM 4 (30 PTS)

- Complete the timing diagram of the following circuit. $Q = Q_3Q_2Q_1Q_0$