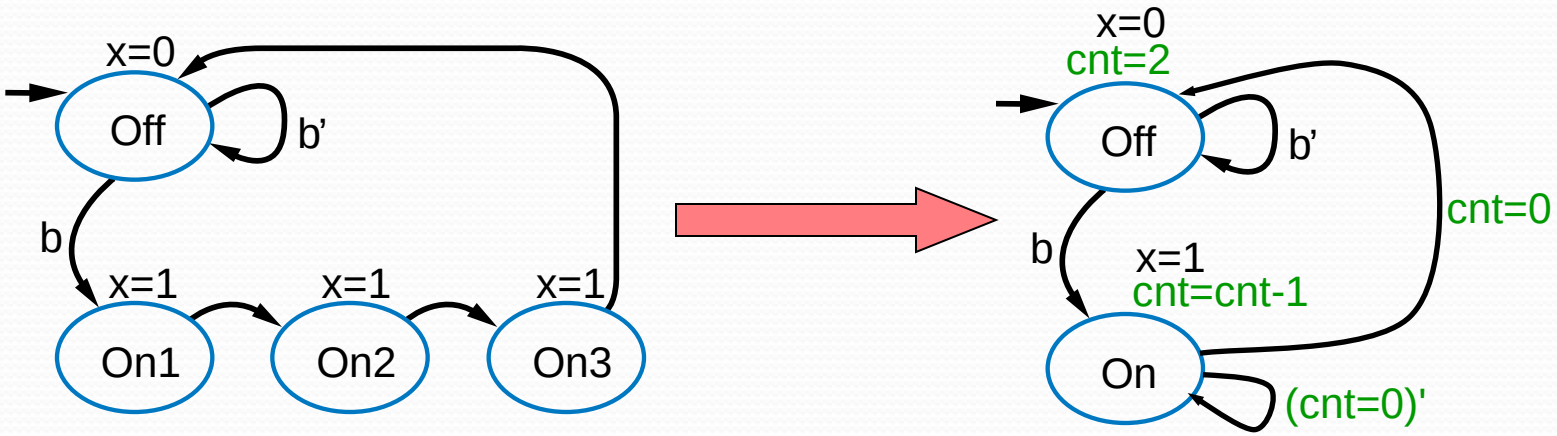
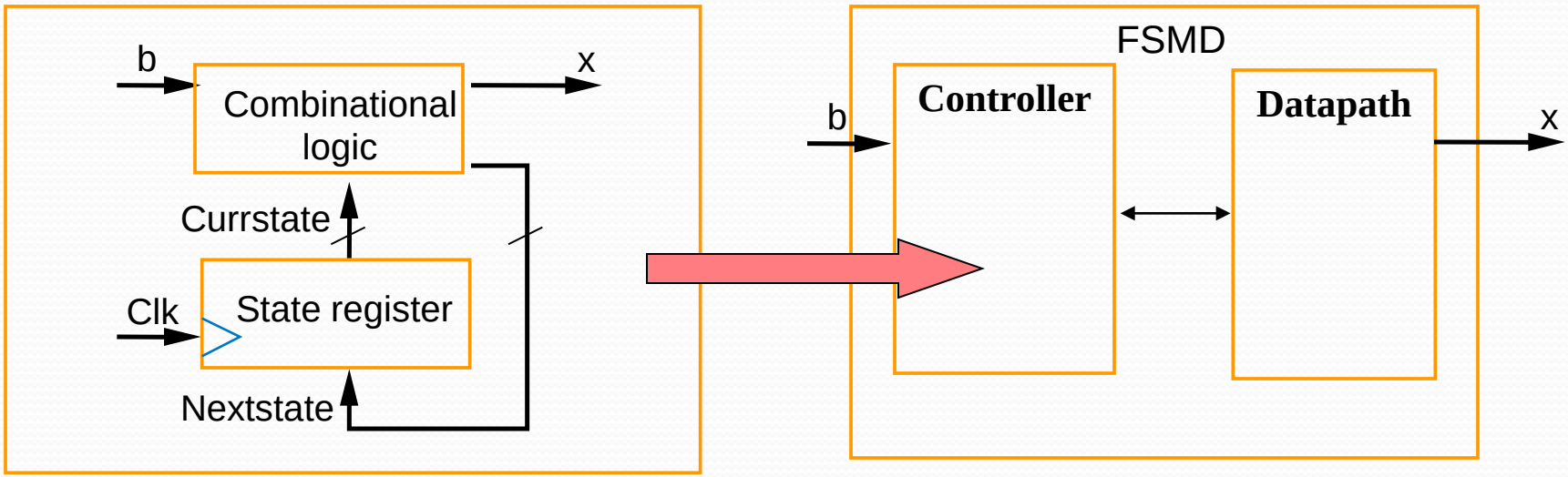
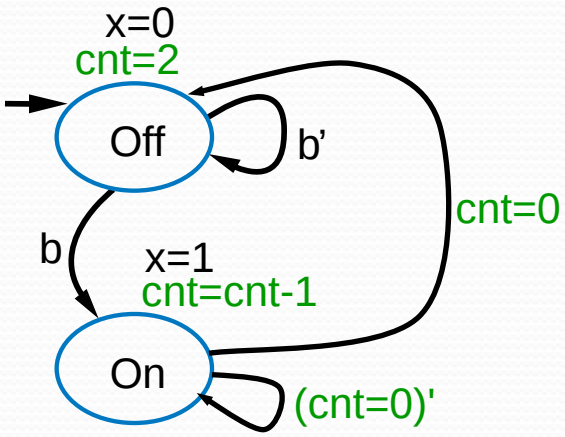
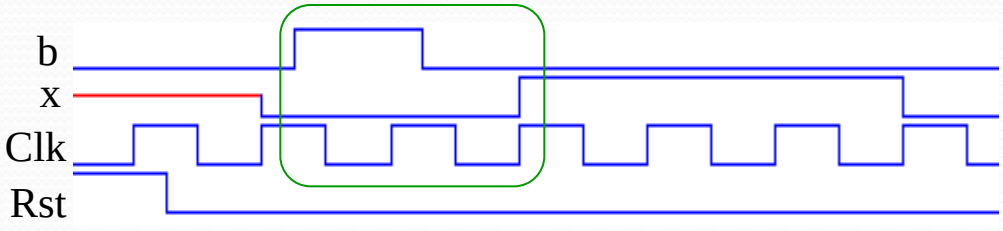
FSMD Design


x=0
Off
b'
b
x=1
On1
x=1
On2
x=1
On3
x=0
cnt=2
Off
b'
cnt=0
b
x=1
cnt=cnt-1
On
(cnt=0)'


b
Combinational logic
x
Currstate
Clk
State register
Nextstate
FSMD
b
Controller
Datapath
x

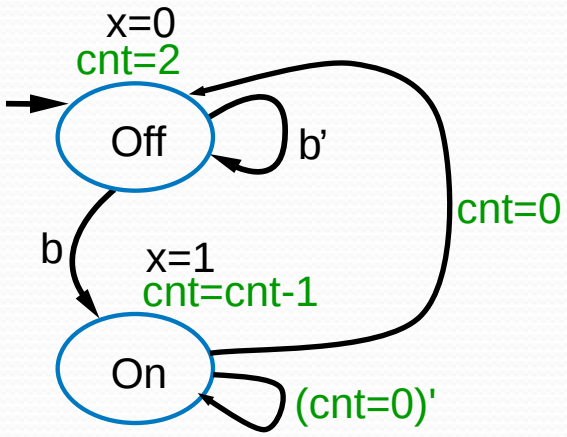
FSMD Behavior

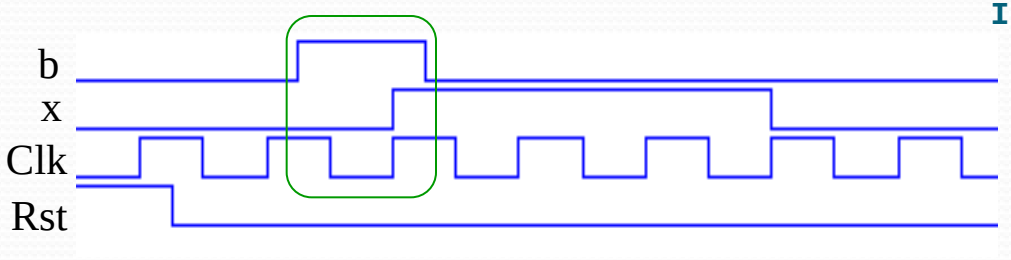





```
...
ARCHITECTURE Timer_Beh OF Timer IS
   TYPE Statetype IS (S_Off, S_On);
   SIGNAL State: Statetype;
   SIGNAL Cnt: std_logic_vector(1 DOWNTO 0);
BEGIN
   PROCESS (Clk)
   BEGIN
      IF (Clk = '1' AND Clk'EVENT) THEN
         IF (Rst = '1') THEN
            State <= S_Off;
            Cnt <= "00";
         ELSE
            CASE State IS
               WHEN S_Off =>
                  x <= '0';
                  Cnt <= "10";
                  IF (b = '0') THEN
                     State <= S_Off;
                  ELSE
                     State <= S_On;
                  END IF;
               WHEN S_On =>
                  x <= '1';
                  Cnt <= Cnt - "01";
                  IF (Cnt = "00") THEN
                     State <= S_Off;
                  ELSE
                     State <= S_On;
                  END IF;
            END CASE;
         END IF;
      END IF;
   END PROCESS;
END Timer_Beh;
```

FSMD Behavior






```
ARCHITECTURE Timer_Beh2 OF Timer IS
   TYPE Statetype IS (S_Off, S_On);
   SIGNAL Currstate, Nextstate: Statetype;
   SIGNAL Cnt,Cnt_Next:std_logic_vector(1 DOWNTO 0);
BEGIN
   PROCESS (Clk, Currstate, b)
   BEGIN
      CASE Currstate IS
         WHEN S_Off =>
            x <= '0';
            Cnt_Next <= "10";
            IF (b = '0') THEN
               Nextstate <= S_Off;
            ELSE
               Nextstate <= S_On;
            END IF;
         WHEN S_On =>
            x <= '1';
            Cnt_Next <= Cnt - "01";
            IF (Cnt = "00") THEN
               Nextstate <= S_Off;
            ELSE
               Nextstate <= S_On;
            END IF;
      END CASE;

      IF (Clk = '1' AND Clk'EVENT) THEN
         IF (Rst = '1') THEN
            Currstate <= S_Off;
            Cnt <= "00";
         ELSE
            Currstate <= Nextstate;
            Cnt <= Cnt_Next;
         END IF;
      END IF;
   END PROCESS;
END Timer_Beh2;
```