ENTITY Timer IS
  PORT (b: IN std_logic;
        x: OUT std_logic;
        Clk, Rst: IN std_logic);
END Timer;

ARCHITECTURE Timer_Beh OF Timer IS
  TYPE Statetype IS
    (S_Off, S_On1, S_On2, S_On3);
  SIGNAL Currstate, Nextstate: Statetype;

BEGIN
  StateReg: PROCESS (Clk)
  BEGIN
    IF (Clk = '1' AND Clk'EVENT) THEN
      IF (Rst = '1') THEN
        Currstate <= S_Off;
      ELSE
        Currstate <= Nextstate;
      END IF;
    END IF;
  END PROCESS;

  CombLogic: PROCESS (Currstate, b)
  BEGIN
    ---
  END PROCESS;

END Timer_Beh;
ENTITY Timer IS
  PORT (b: IN std_logic;
        x: OUT std_logic;
        Clk, Rst: IN std_logic);
END Timer;

ARCHITECTURE Timer_Beh OF Timer IS
  TYPE Statetype IS
    (S_Off, S_On1, S_On2, S_On3);
  SIGNAL Currstate, Nextstate: Statetype;
  BEGIN
    StateReg: PROCESS (Clk)
      ---Combinational logic
      BEGIN
        CASE Currstate IS
          WHEN S_Off =>
            x <= '0';
            IF (b = '0') THEN
              Nextstate <= S_Off;
            ELSE
              Nextstate <= S_On1;
            END IF;
          WHEN S_On1 =>
            x <= '1';
            Nextstate <= S_On2;
          WHEN S_On2 =>
            x <= '1';
            Nextstate <= S_On3;
          WHEN S_On3 =>
            x <= '1';
            Nextstate <= S_Off;
          END CASE;
      END PROCESS;
      END BEGIN;
END Timer_Beh;
FSM Testbench

ClkProcess: PROCESS
BEGIN
  Clk_s <= '0';
  WAIT FOR 10 NS;
  Clk_s <= '1';
  WAIT FOR 10 NS;
END PROCESS ClkProcess;

VectorProcess: PROCESS
BEGIN
  Rst_s <= '1';
  b_s <= '0';
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  ASSERT x_s = '0' REPORT "Reset failed";
  Rst_s <= '0';
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  b_s <= '1';
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  ASSERT x_s = '1' REPORT "First x=1 failed";
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  b_s <= '0';
  ASSERT x_s = '1' REPORT "Second x=1 failed";
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  ASSERT x_s = '1' REPORT "Third x=1 failed";
  WAIT UNTIL Clk_s='1' AND Clk_s'EVENT;
  WAIT FOR 5 NS;
  ASSERT x_s = '0' REPORT "Final x=0 failed";
  WAIT;
END PROCESS VectorProcess;