```vhdl
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-- Final Project CPE 133/01-02
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-- Prof: Hummel
-- Proj: Count to 15 Binary Game using Basys Board Switches with Live Timer
-- Version 2: Count to 31
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library IEEE;
use IEEE.STD_LOGIC_1164.ALL;
use IEEE.NUMERIC_STD.ALL;

entity GameV2 is
    Port ( Clock : in STD_LOGIC;
        Switch : in STD_LOGIC_VECTOR (4 downto 0);
        Ein : in STD_LOGIC;
        Rst : in STD_LOGIC;
        LED : out STD_LOGIC_Vector (15 downto 0);
        Anode : out STD_LOGIC_VECTOR (3 downto 0);
        Cathode : out STD_LOGIC_VECTOR (7 downto 0));
end GameV2;

architecture Behavioral of GameV2 is

signal PS : Std_logic_vector (5 downto 0) := "000000"; -- signal for our FSM Present State
signal NS : Std_logic_vector (5 downto 0) := "000000"; -- signal for our FSM Next State
signal Play : std_logic := '0'; -- signal for our enable for the stopwatch logic
signal digit1 : integer := 0; -- signal for Digit 1 (Right Most)
signal digit2 : integer := 0; -- signal for Digit 2 (Second to Right)
signal digit3 : integer := 0; -- signal for Digit 3 (Second to Left)
signal digit4 : integer := 0; -- signal for Digit 4 (Left Most)
signal Fail : std_logic := '0'; -- signal for our Fail condition, once toggled high, the fail sequence
will initiate

begin

    State_Decider: process (Clock, Rst, Fail) -- Controls the States
    begin
        If Rst = '1' then -- Reset takes precedence, over anything else
            PS <= "000000";
        elsif Fail = '1' then -- Fail only goes live if the timer reaches 100 seconds
            PS <= "111011";
        elsif (Rising_edge(Clock)) then -- the Basys board has a 100MHz Clock, which on every
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```vhdl
-- rising edge of the square wave pulse, we assign our stages
            PS <= NS;
      end if;
   end process;


   Switch_Logic: process (PS, Switch, Ein) -- Logic controlling the switches, which is dependant
-- on the stages. LED will light up, telling you what number to count to next
   begin
      NS <= PS; --fixes a PS and NS latch
      Case (PS) is
         When "000000" => --Pre-set Stage
            LED <= "0000000000000000";
            Play <= '0'; -- Play must be defined in every case here, or else creates a latch
            if Switch = "00000" and Ein = '1' then
               NS <= "000001";
            end if;
         when "000001" => -- Set Stage
            LED <= "0000000000000001";
            Play <= '0';
            if Switch = "00001" then
               NS <= "000010";
            end if;
         when "000010" => --1
            LED <= "0000000000000011";
            Play <= '1';
            if Switch = "00010" then
               NS <= "000011";
            end if;
         when "000011" => --2
            LED <= "0000000000000111";
            Play <= '1';
            if Switch = "00011" then
               NS <= "000100";
            end if;
         when "000100" => --3
            LED <= "0000000000001111";
            Play <= '1';
            if Switch = "00100" then
               NS <= "000101";
            end if;
         when "000101" => --4
            LED <= "0000000000011111";
            Play <= '1';
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```vhdl
      if Switch = "00101" then
         NS <= "000110";
      end if;
   when "000110" => --5
      LED <= "0000000000111111";
      Play <= '1';
      if Switch = "00110" then
         NS <= "000111";
      end if;
   when "000111" => --6
      LED <= "0000000001111111";
      Play <= '1';
      if Switch = "00111" then
         NS <= "001000";
      end if;
   when "001000" => --7
      LED <= "0000000011111111";
      Play <= '1';
      if Switch = "01000" then
         NS <= "001001";
      end if;
   when "001001" => --8
      LED <= "0000000111111111";
      Play <= '1';
      if Switch = "01001" then
         NS <= "001010";
      end if;
   when "001010" => --9
      LED <= "0000001111111111";
      Play <= '1';
      if Switch = "01010" then
         NS <= "001011";
      end if;
   when "001011" => --10
      LED <= "0000011111111111";
      Play <= '1';
      if Switch = "01011" then
         NS <= "001100";
      end if;
   when "001100" => --11
      LED <= "0000111111111111";
      Play <= '1';
      if Switch = "01100" then
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```vhdl
      NS <= "001101";
    end if;
when "001101" => --12
  LED <= "0001111111111111";
  Play <= '1';
  if Switch = "01101" then
    NS <= "001110";
  end if;
when "001110" => --13
  LED <= "0011111111111111";
  Play <= '1';
  if Switch = "01110" then
    NS <= "001111";
  end if;
when "001111" => --14
  LED <= "0111111111111111";
  Play <= '1';
  if Switch = "01111" then
    NS <= "010000";
  end if;
when "010000" => --15
  LED <= "1111111111111111";
  Play <= '1';
  if Switch = "10000" then
    NS <= "010001";
  end if;
when "010001" => --16
  LED <= "1000000000000001";
  Play <= '1';
  if Switch = "10001" then
    NS <= "010010";
  end if;
when "010010" => --17
  LED <= "1000000000000011";
  Play <= '1';
  if Switch = "10010" then
    NS <= "010011";
  end if;
when "010011" => --18
  LED <= "1000000000000111";
  Play <= '1';
  if Switch = "10011" then
    NS <= "010100";
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```vhdl
         end if;
      when "010100" => --19
         LED <= "1000000000001111";
         Play <= '1';
         if Switch = "10100" then
            NS <= "010101";
         end if;
      when "010101" => --20
         LED <= "1000000000011111";
         Play <= '1';
         if Switch = "10101" then
            NS <= "010110";
         end if;
      when "010110" => --21
         LED <= "1000000000111111";
         Play <= '1';
         if Switch = "10110" then
            NS <= "010111";
         end if;
      when "010111" => --22
         LED <= "1000000001111111";
         Play <= '1';
         if Switch = "10111" then
            NS <= "011000";
         end if;
      when "011000" => --23
         LED <= "1000000011111111";
         Play <= '1';
         if Switch = "11000" then
            NS <= "011001";
         end if;
      when "011001" => --24
         LED <= "1000000111111111";
         Play <= '1';
         if Switch = "11001" then
            NS <= "011010";
         end if;
      when "011010" => --25
         LED <= "1000001111111111";
         Play <= '1';
         if Switch = "11010" then
            NS <= "011011";
         end if;
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```vhdl
        when "011011" => --26
           LED <= "1000011111111111";
           Play <= '1';
           if Switch = "11011" then
              NS <= "011100";
           end if;
        when "011100" => --27
           LED <= "1000111111111111";
           Play <= '1';
           if Switch = "11100" then
              NS <= "011101";
           end if;
        when "011101" => --28
           LED <= "1001111111111111";
           Play <= '1';
           if Switch = "11101" then
              NS <= "011110";
           end if;
        when "011110" => --29
           LED <= "1011111111111111";
           Play <= '1';
           if Switch = "11110" then
              NS <= "011111";
           end if;
        when "011111" => --30
           LED <= "1111111111111111";
           Play <= '1';
           if Switch = "11111" then
              NS <= "100000";
           end if;
        when "100000" => --31
           LED <= "1111111111111111";
           Play <= '0';
        when "111011" => -- Failed Stage, only occurs when timer reaches 10 seconds
           LED <= "1010101010101010";
           Play <= '0';
        when others => -- Failsafe
           LED <= "0000000000000000";
           Play <= '0';
     end case;
   end process;
end Behavioral;
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