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--
-- Company:
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--
-- Create Date:    14:18:45 11/30/2015
-- Design Name:
-- Module Name:    BikeLock - Behavioral
-- Project Name:
-- Target Devices:
-- Tool versions:
-- Description:
--
-- Dependencies:
--
-- Revision:
-- Revision 0.01 - File Created
-- Additional Comments:
--
----------------------------------------------------------------------------------
--
library IEEE;
use IEEE.STD_LOGIC_1164.ALL;

-- Uncomment the following library declaration if using
-- arithmetic functions with Signed or Unsigned values
--use IEEE.NUMERIC_STD.ALL;

-- Uncomment the following library declaration if instantiating
-- any Xilinx primitives in this code.
--library UNISIM;
--use UNISIM.VComponents.all;

entity BikeLock is
    Port ( clk, Reset, H : in  STD_LOGIC;
           X : in  STD_LOGIC_VECTOR(4 downto 0);
           Locked : out  STD_LOGIC;
           Unlocked : out  STD_LOGIC;
           Alarm, Alarm_State, Locked_State, Reset_State : out  STD_LOGIC);
end BikeLock;

architecture Behavioral of BikeLock is

type state is (S0, S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14,
S15, S16, S17, S18, S19, S20, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30,
S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S45, S46, S47,
S48, S49, S50, S51, S52, S53, S54, S55, S56, S57, S58, S59, S60, S61, S62);
signal c_s, n_s: state;

begin
process (clk, Reset)
      begin
            if (Reset = '0') then
                  c_s <= S0;
            elsif (clk' event and clk = '1') then
                  c_s <= n_s;
            end if;
end process;

process (X, c_s, H)
      begin
      Case H is
            when '0' =>
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            Case c_s is
-- unlock to lock
                  when S0 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00000" => n_s <= S0;
                              when "00100" => n_s <= S1;
                              when others => n_s <= S13;
                        end case;
                  when S1 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00100" => n_s <= S1;
                              when "00000" => n_s <= S2;
                              when others => n_s <= S3;
                        end case;
                  when S2 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00000" => n_s <= S2;
                              when "00001" => n_s <= S3;
                              when others => n_s <= S13;
                        end case;
                  when S3 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00001" => n_s <= S3;
                              when "00000" => n_s <= S4;
                              when others => n_s <= S3;
                        end case;
                  when S4 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00000" => n_s <= S4;
                              when "01000" => n_s <= S5;
                              when others => n_s <= S13;
                        end case;
                  when S5 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "01000" => n_s <= S5;
                              when "00000" => n_s <= S6;
                              when others => n_s <= S5;
                        end case;
                  when S6 =>
                        Alarm <= '0';
                        Locked <= '0';
                        Unlocked <= '1';
                        Case X is
                              when "00000" => n_s <= S6;
                              when "01000" => n_s <= S7;
                              when others => n_s <= S13;
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```
      end case;
when S7 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "01000" => n_s <= S7;
            when "00000" => n_s <= S8;
            when others => n_s <= S7;
      end case;
when S8 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "00000" => n_s <= S8;
            when "00010" => n_s <= S9;
            when others => n_s <= S13;
      end case;
when S9 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "00010" => n_s <= S9;
            when "00000" => n_s <= S10;
            when others => n_s <= S9;
      end case;
when S10 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "00000" => n_s <= S10;
            when "10000" => n_s <= S11;
            when others => n_s <= S13;
      end case;
when S11 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "10000" => n_s <= S11;
            when "00000" => n_s <= S12;
            when others => n_s <= S11;
      end case;
when S12 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S12;
            when "10000" => n_s <= S12;
            when "00100" => n_s <= S15;
            when others => n_s <= S26;
            --when harness = 0
      end case;
when S13 =>
      Alarm <= '0';
      Locked <= '0';
      Unlocked <= '1';
      Case X is
            when "00000" => n_s <= S0;
            when others => n_s <= S13;
```

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                        end case;
--locked to unlocked
                  when S14 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00100" => n_s <= S14;
                              when "00000" => n_s <= S12;
                              when others => n_s <= S14;
                        end case;
                  when S15 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00100" => n_s <= S15;
                              when "00000" => n_s <= S16;
                              when others => n_s <= S15;
                        end case;
                  when S16 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S16;
                              when "00001" => n_s <= S17;
                              when "00100" => n_s <= S14;
                              when "10000" => n_s <= S12;
                              when others => n_s <= S37;
                        end case;
                  when S17 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00001" => n_s <= S17;
                              when "00000" => n_s <= S18;
                              when others => n_s <= S17;
                        end case;
                  when S18 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S18;
                              when "01000" => n_s <= S19;
                              when "00100" => n_s <= S30;
                              when "10000" => n_s <= S12;
                              when others => n_s <= S39;
                        end case;
                  when S19 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "01000" => n_s <= S19;
                              when "00000" => n_s <= S20;
                              when others => n_s <= S19;
                        end case;
                  when S20 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
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```
      Case X is
            when "00000" => n_s <= S20;
            when "01000" => n_s <= S21;
            when "00100" => n_s <= S33;
            when "10000" => n_s <= S12;
            when others => n_s <= S41;
      end case;
when S21 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "01000" => n_s <= S21;
            when "00000" => n_s <= S22;
            when others => n_s <= S21;
      end case;
when S22 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S22;
            when "00010" => n_s <= S23;
            when "00100" => n_s <= S60;
            when "10000" => n_s <= S12;
            when others => n_s <= S43;
      end case;
when S23 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00010" => n_s <= S23;
            when "00000" => n_s <= S24;
            when others => n_s <= S23;
      end case;
when S24 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S24;
            when "10000" => n_s <= S25;
            when others => n_s <= S29;
      end case;
when S25 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "10000" => n_s <= S25;
            when "00000" => n_s <= S0;
            when others => n_s <= S25;
      end case;
when S26 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00001" => n_s <= S26;
            when "00010" => n_s <= S26;
            when "01000" => n_s <= S26;
            when "10000" => n_s <= S27;
            when "00000" => n_s <= S36;
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            when others => n_s <= S26;
      end case;
when S27 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S12;
            when "10000" => n_s <= S27;
            when others => n_s <= S27;
      end case;
when S28 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S28;
            when "00100" => n_s <= S45;
            when others => n_s <= S29;
      end case;
when S29 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S48;
            when others => n_s <= S29;
      end case;
when S30 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S31;
            when "00100" => n_s <= S30;
            when others => n_s <= S30;
      end case;
when S31 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S31;
            when "00100" => n_s <= S32;
            when others => n_s <= S41;
      end case;
when S32 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S12;
            when "00100" => n_s <= S32;
            when others => n_s <= S32;
      end case;
when S33 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S34;
            when "00100" => n_s <= S33;
            when others => n_s <= S33;
      end case;
```

```
when S34 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S34;
            when "00100" => n_s <= S35;
            when others => n_s <= S43;
      end case;
when S35 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S12;
            when "00100" => n_s <= S35;
            when others => n_s <= S35;
      end case;
when S36 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S36;
            when "10000" => n_s <= S12;
            when "00100" => n_s <= S45;
            when others => n_s <= S37;
      end case;
when S37 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S38;
            when others => n_s <= S37;
      end case;
when S38 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S38;
            when "10000" => n_s <= S12;
            when "00100" => n_s <= S30;
            when others => n_s <= S39;
      end case;
when S39 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S40;
            when others => n_s <= S39;
      end case;
when S40 =>
      Alarm <= '0';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S40;
            when "10000" => n_s <= S12;
            when "00100" => n_s <= S33;
            when others => n_s <= S41;
      end case;
```

```
                  when S41 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S42;
                              when others => n_s <= S41;
                        end case;
                  when S42 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S42;
                              when "10000" => n_s <= S12;
                              when "00100" => n_s <= S60;
                              when others => n_s <= S43;
                        end case;
                  when S43 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S28;
                              when others => n_s <= S43;
                        end case;
                  when S45 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S46;
                              when "00100" => n_s <= S45;
                              when others => n_s <= S45;
                        end case;
                  when S46 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S46;
                              when "00100" => n_s <= S47;
                              when others => n_s <= S38;
                        end case;
                  when S47 =>
                        Alarm <= '0';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00000" => n_s <= S12;
                              when "00100" => n_s <= S47;
                              when others => n_s <= S47;
                        end case;
--alarm to reset
                  when S48 =>
                        Alarm <= '1';
                        Locked <= '1';
                        Unlocked <= '0';
                        Case X is
                              when "00100" => n_s <= S49;
                              when others => n_s <= S48;
                        end case;
                  when S49 =>
                        Alarm <= '1';
```

```
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S50;
            when "00100" => n_s <= S49;
            when others => n_s <= S49;
      end case;
when S50 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00001" => n_s <= S51;
            when "00000" => n_s <= S50;
            when others => n_s <= S29;
      end case;
when S51 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S52;
            when "00001" => n_s <= S51;
            when others => n_s <= S51;
      end case;
when S52 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "01000" => n_s <= S53;
            when "00000" => n_s <= S52;
            when others => n_s <= S29;
      end case;
when S53 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S54;
            when "01000" => n_s <= S53;
            when others => n_s <= S53;
      end case;
when S54 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "01000" => n_s <= S55;
            when "00000" => n_s <= S54;
            when others => n_s <= S29;
      end case;
when S55 =>
      Alarm <= '1';
      Locked <= '1';
      Unlocked <= '0';
      Case X is
            when "00000" => n_s <= S56;
            when "01000" => n_s <= S55;
            when others => n_s <= S55;
      end case;
when S56 =>
      Alarm <= '1';
      Locked <= '1';
```

```
                Unlocked <= '0';
                Case X is
                        when "00100" => n_s <= S29;
                        when "00010" => n_s <= S57;
                        when "00000" => n_s <= S56;
                        when others => n_s <= S29;
                end case;
        when S57 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "00000" => n_s <= S58;
                        when "00010" => n_s <= S57;
                        when others => n_s <= S57;
                end case;
        when S58 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "10000" => n_s <= S59;
                        when "00000" => n_s <= S58;
                        when others => n_s <= S29;
                end case;
        when S59 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "00000" => n_s <= S0;
                        when "10000" => n_s <= S59;
                        when others => n_s <= S59;
                end case;
        when S60 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "00000" => n_s <= S61;
                        when "00100" => n_s <= S60;
                        when others => n_s <= S60;
                end case;
        when S61 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "00000" => n_s <= S61;
                        when "00100" => n_s <= S62;
                        when others => n_s <= S29;
                end case;
        when S62 =>
                Alarm <= '1';
                Locked <= '1';
                Unlocked <= '0';
                Case X is
                        when "00000" => n_s <= S12;
                        when "00100" => n_s <= S62;
                        when others => n_s <= S62;
                end case;
        end case;
when '1' =>
    Case c_s is
```

```
                when S0 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked <=
'1';
                   when S1 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S2 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S3 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S4 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S5 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S6 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S7 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S8 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S9 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S10 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S11 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S12 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S13 => n_s <= S0; Alarm <= '0'; Locked <= '0'; Unlocked
<= '1';
                   when S14 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S15 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S16 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S17 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S18 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S19 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S20 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S21 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S22 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S23 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S24 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S25 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S26 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S27 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S28 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S29 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S30 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                   when S31 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
```

```
                    when S32 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S33 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S34 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S35 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S36 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S37 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S38 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S39 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S40 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S41 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S42 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S43 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S45 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S46 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S47 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    when S48 =>
                                        Alarm <= '1';
                                        Locked <= '1';
                                        Unlocked <= '0';
                                        Case X is
                                              when "00100" => n_s <= S49;
                                              when others => n_s <= S48;
                                              end case;
                    when S49 =>
                           Alarm <= '1';
                                        Locked <= '1';
                                        Unlocked <= '0';
                                        Case X is
                                           when "00100" => n_s <= S49;
                                              when "00000" => n_s <= S50;
                                              when others => n_s <= S50;
                                        end case;
                    when S50 =>
                                Alarm <= '1';
                                        Locked <= '1';
                                        Unlocked <= '0';
                                        Case X is
                                              when "00000" => n_s <= S50;
                                              when "00001" => n_s <= S51;
                                              when others => n_s <= S29;
                                        end case;
                    when S51 =>
                                Alarm <= '1';
                                        Locked <= '1';
                                        Unlocked <= '0';
                                        Case X is
                                              when "00000" => n_s <= S52;
                                              when "00001" => n_s <= S51;
                                              when others => n_s <= S51;
```

```
                              end case;
when S52 =>
                              Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                 when "00000" => n_s <= S52;
                                    when "01000" => n_s <= S53;
                                    when others => n_s <= S29;
                              end case;
when S53 =>
                           Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                    when "00000" => n_s <= S54;
                                    when "01000" => n_s <= S53;
                                    when others => n_s <= S53;
                              end case;
when S54 =>
                  Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                 when "00000" => n_s <= S54;
                                    when "01000" => n_s <= S55;
                                    when others => n_s <= S29;
                              end case;
when S55 =>
                              Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                    when "00000" => n_s <= S56;
                                    when "01000" => n_s <= S55;
                                    when others => n_s <= S55;
                              end case;
when S56 =>
                              Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                 when "00000" => n_s <= S56;
                                    when "00010" => n_s <= S57;
                                    when others => n_s <= S29;
                              end case;
when S57 =>
               Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                    when "00000" => n_s <= S58;
                                    when "00010" => n_s <= S57;
                                    when others => n_s <= S57;
                              end case;
when S58 =>
               Alarm <= '1';
                              Locked <= '1';
                              Unlocked <= '0';
                              Case X is
                                    when "00000" => n_s <= S58;

                                    when "10000" => n_s <= S59;
                                    when others => n_s <= S29;
```

```
                                          end case;
                    when S59 =>
                                Alarm <= '1';
                                          Locked <= '1';
                                          Unlocked <= '0';
                                          Case X is
                                                when "00000" => n_s <= S0;
                                                when "10000" => n_s <= S59;
                                                when others => n_s <= S59 ;
                                          end case;
                        when S60 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                        when S61 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                        when S62 => n_s <= S48; Alarm <= '1'; Locked <= '1';
Unlocked <= '0';
                    end case;
      when others =>
      end case;
end process;
process (c_s)
begin
if (c_s = S0) then
      Reset_State <= '1';
      Alarm_State <= '0';
      Locked_State <= '0';
elsif (c_s = S12) then
      Reset_State <= '0';
      Alarm_State <= '0';
      Locked_State <= '1';
elsif (c_s = S48) then
      Reset_State <= '0';
      Alarm_State <= '1';
      Locked_State <= '0';
else
      Reset_State <= '0';
      Alarm_State <= '0';
      Locked_State <= '0';
end if;
end process;

end Behavioral;
```