时序电路作业

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library ieee;
use ieee.std_logic_1164.all;
use ieee.std_logic_unsigned.all;
use ieee.std_logic_arith.all;

entity lock is
port(key1,key2,key3,key4,key5 : in std_logic; clk : in std_logic;
reset : in std_logic;
dig : out std_logic_vector(3 downto 0); seg : out std_logic_vector(7 downto 0)
);
end entity lock; architecture main of lock is
signal scan    :    STD_LOGIC_VECTOR(1 DOWNTO 0);
signal jinwei,jishuclk,clear,rst,divclk    :    STD_LOGIC;
signal num1out,num2out,num4out,num,num1,num2,num4,num5 : integer range 0 to 19;
signal num3out,num3 : integer range 10 to 19;
signal state : integer range 0 to 3;
signal oneseg :    std_logic_vector(7 downto 0); signal moshi : std_LOGIC_VECTOR(1 DOWNTO 0);
signal state1,state2,state3,state4,state5,key1filt,key2filt,key3filt,key4filt,key5filt : std_logic;
signal key1cnt,key2cnt,key3cnt,key4cnt,key5cnt : integer range 0 to 50000000; -- 用于对 key1 按键输入有效时间进行计数

begin process(clk)
constant clkfrq :integer := 50000000;
constant jishuclkfrq :integer := 500000000;
constant scanfrq :integer := 50;
constant jishufrq :integer := 50;
variable count:integer range 0 to 50000000;
variable jishucount:integer range 0 to 50000000;
begin
if clk'event and clk = '1' then
if count = clkfrq /(scanfrq*4)-1 then count := 0;
divclk <= '1';
else
count := count + 1; divclk <= '0';
end if;
if jishucount = jishuclkfrq /(jishufrq*4)-1 then jishucount := 0;
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jishuclk <= '1';
else

jishucount := jishucount + 1;
jishuclk <= '0';
end if;
end if;
end process;

process(divclk,rst)
begin
if rst = '0' then
scan <= "00";
elsif divclk'event and divclk = '1' then scan <= scan + '1';
end if;
end process;

process(moshi)
begin
case moshi is
when "00" => state <= 0;
when "01" => state <= 1;
when "10" => state <= 2;
when "11" => state <= 3;
end case;
end process;

process(num)
begin
case num is
when 0 => seg <= "11000000"; -- 0
when 1 => seg <= "11111001"; -- 1
when 2 => seg <= "10100100"; -- 2
when 3 => seg <= "10110000"; -- 3
when 4 => seg <= "10011001"; -- 4
when 5 => seg <= "10010010"; -- 5
when 6 => seg <= "10000010"; -- 6
when 7 => seg <= "11111000"; -- 7
when 8 => seg <= "10000000"; -- 8
when 9 => seg <= "10010000"; -- 9
when 10 => seg <= "01000000"; -- 0.
when 11 => seg <= "01111001"; -- 1.
when 12 => seg <= "00100100"; -- 2.
when 13 => seg <= "00110000"; -- 3.
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when 14 => seg <= "00011001"; -- 4.
when 15 => seg <= "00010010"; -- 5.
when 16 => seg <= "00000010"; -- 6.
when 17 => seg <= "01111000"; -- 7.
when 18 => seg <= "00000000"; -- 8.

when 19 => seg <= "00010000"; -- 9.
when others =>NULL;
end case;
end process;

process(scan)
begin
case scan is
when "00" => dig <= "1110";--选通第一个数码管

num <= num1;--同时把第一个数码管显示的数据送给总线
when "01" => dig <= "1101";     --选通第二个数码管

num <= num2; --同时把第二个数码管显示的数据送给总线
when "10" => dig <= "1011";     --选通第三个数码管
num <= num3 ; --同时把第三个数码管显示的数据送给总线
when "11" => dig <= "0111";     --选通第四个数码管
num <= num4; --同时把第四个数码管显示的数据送给总线
end case;
end process;

process(clk)
begin
if(clk'event and clk ='1')then
if(key2filt='1')then
moshi<="00"; end if;
  if(key3filt='1')then
moshi<="01"; end if;
  if(key4filt='1')then
moshi<="10"; end if;
end if;
  end process;

process(jishuclk)
begin
if(state = 0)then
if jishuclk = '1' then num1 <= num1out;
if num1out = 9 then
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num1out <= 0;
else
num1out <= num1out + 1;
end if;

if num1out = 0 then num2 <= num2out;
if num2out = 9 then
num2out <= 0;
else
num2out <= num2out + 1;
end if;
end if;
if num2out = 0 and num1out = 0 then
num3 <= num3out;
if num3out = 19 then
num3out <= 10;
else
num3out <= num3out + 1;
end if; end if;
if num3out= 10 and num2out = 0 and num1out = 0 then
  num4 <= num4out;
if num4out = 9 then num4out <= 0;
else
num4out <= num4out + 1;
end if;
end if;
end if;
end if;
if(state = 2)then
num1out <= 0;
num2out <= 0;
num3out <= 10;
num4out <= 0;
num1 <= num1out;
num2 <= num2out;
num3 <= num3out;
num4 <= num4out;
end if;
end process;

xiao_dou2:process (key2)
constant N :integer := 5000000;  --消抖时间，对于 50Mhz 的基准时钟，这相当于 0.1S
begin
if clk'event and clk = '1' then
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if key2 = '0' then  --当 key2 输入低电平，即按键按下
if key2cnt /= N then --一直计数到 N
key2cnt <= key2cnt + 1;

end if;
if key2cnt = N-1 then --最后一个计数时输出 key1filt 脉冲
key2filt <= '1';
else
key2filt <= '0';
end if;
else --若 key2 输入高电平，表明按键被释放
key2cnt <= 0; end if;
end if; end process;
xiao_dou3:process (key3)
constant N :integer := 5000000; --消抖时间，对于 50Mhz 的基准时钟，这相当于 0.1S
begin
if clk'event and clk = '1' then
if key3 = '0' then  --当 key3 输入低电平，即按键按下
if key3cnt /= N then --一直计数到 N
key3cnt <= key3cnt + 1;
end if;
if key3cnt = N-1 then --最后一个计数时输出 key3filt 脉冲
key3filt <= '1';
else
key3filt <= '0';
end if;
else --若 key3 输入高电平，表明按键被释放
key3cnt <= 0; end if;
end if; end process;
xiao_dou4:process (key4)
constant N :integer := 5000000; --消抖时间，对于 50Mhz 的基准时钟，这相当于 0.1S
begin
if clk'event and clk = '1' then
if key4 = '0' then  --当 key4 输入低电平，即按键按下
if key4cnt /= N then --一直计数到 N
key4cnt <= key4cnt + 1;
end if;
if key4cnt = N-1 then --最后一个计数时输出 key1filt 脉冲
key4filt <= '1';
else
key4filt <= '0';
end if;
else --若 key4 输入高电平，表明按键被释放
key4cnt <= 0;
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end if;
end if;
end process;
end architecture main;
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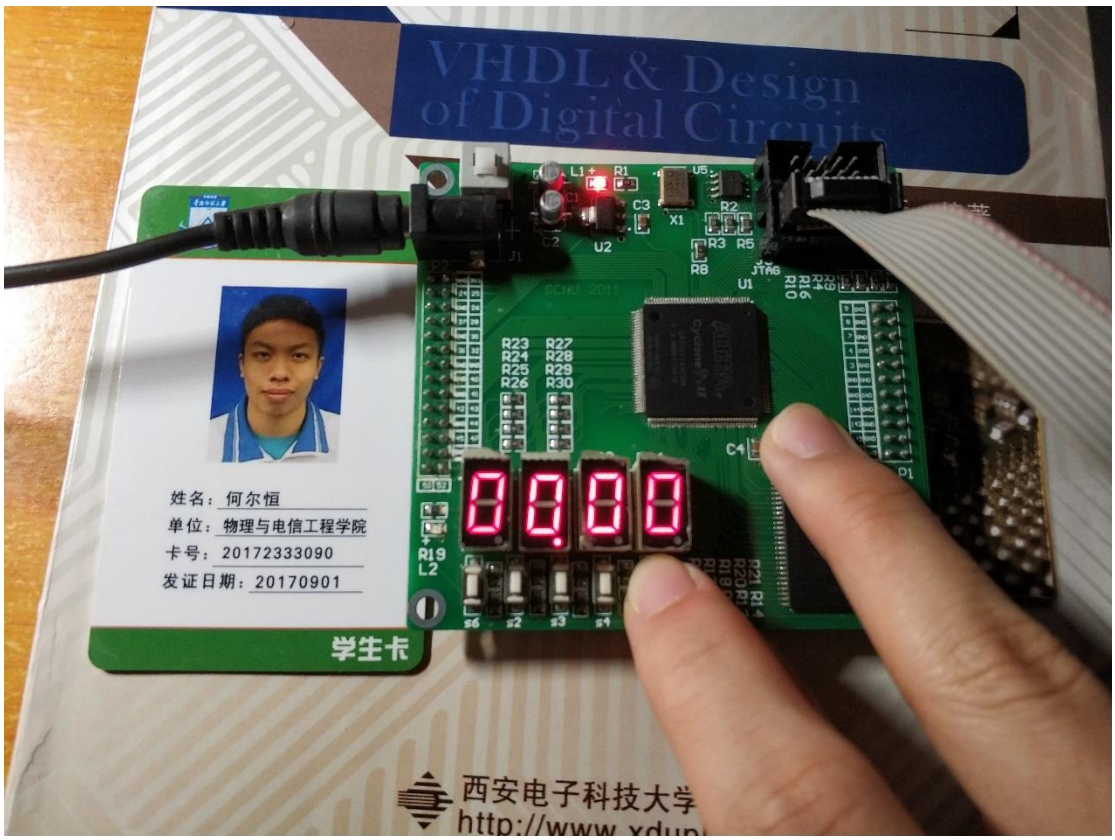

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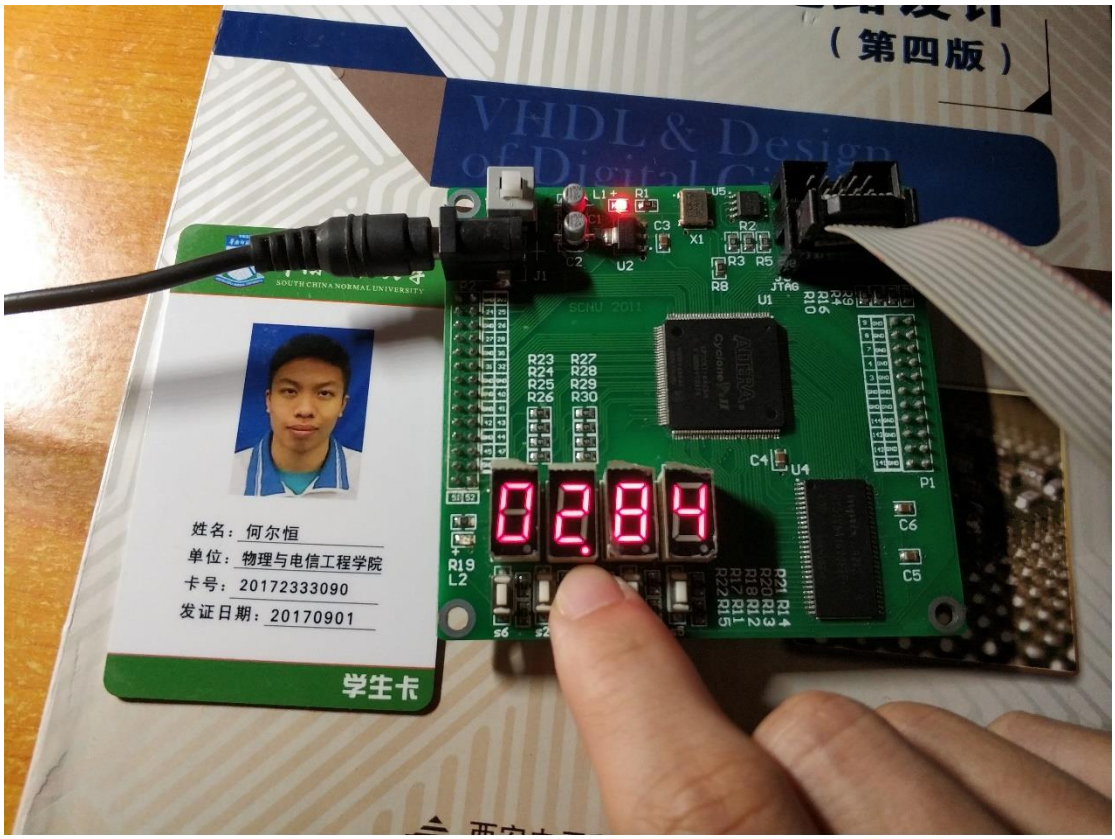
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