Remi de Ferrieres
X664611
CS 120A Section 021
Lab 6 – Timer Design – Laser surgery system
Yann Abou Jaoude
X663581

OVERVIEW

In this lab we worked on system of laser surgery. Especially around the timer. For testing the system, we had to change the timer in order to make it tick every 10s.

ANALYSIS

Source code:

```
module VerilogLab6 #(
 parameter NBITS = 32
)
(
input wire b ,
input wire clk ,
output reg light
);
reg reset;
wire timer;
reg [1:0] current_state ;
reg [1:0] next_state ;
wire [NBITS-1:0] cnt_ini ;
wire [NBITS-1:0] cnt_rst ;
// -------------------------------------
// Sequential logic
// -------------------------------------
always @(posedge clk) begin
current_state = next_state ;
end
// -------------------------------------
// Comb. Logic
// -------------------------------------
assign cnt_ini = 32'h0000 ;
assign cnt_rst = 32'hEE6B280; // 10 secs ( 25 MHZ internal clock )
// -------------------------------------
// Comb. Logic - FSM
// -------------------------------------
localparam OFF = 2'b00 ;
localparam START = 2'b01 ;
localparam ON = 2'b10 ;
always @( current_state ) begin
case (current_state)

 OFF : begin
 light = 1'b0 ;
 reset = 1'b1 ;
 if( b == 1)
    begin
      next_state = START;
    end
    else begin
      next_state = OFF;
    end
 end

 START : begin
 next_state = ON;
 light = 1'b0 ;
 reset = 1'b0 ;
 end

 ON : begin
    light = 1'b1 ;
    reset = 1'b0 ;
    if(timer == 1)
       begin
      next_state = OFF;
       end
    else begin
      next_state = ON;
    end
 end
 default: begin
 light = 1'b0 ;
reset = 1'b0 ;
next_state = OFF ;
 end
endcase
end
// -------------------------------------
// Timer instantiation
// -------------------------------------
timer_st #( .NBITS(NBITS) ) timerst (
.timer(timer),
.clk(clk),
.reset(reset) ,
.cnt_ini(cnt_ini) ,
.cnt_rst(cnt_rst)
);
endmodule
```

The rest of the source code was given in the lab pdf.

Constraint file:

```
# clock pin for Basys Board
// Inputs
NET "clk" LOC = "B8" ;
//NET "reset" LOC = "A7";
NET "b" LOC = "M4" ;
// Outputs
NET "light" LOC = "G1" ;
```

DISCUSSION

Our Laser Surgery System worked just as specified in the lab manual. The light turned on during ten seconds and then turned off.
We had some trouble with the timer design. We thought we had to do it without help and we got lost when creating the module We have been unlocked on this part thanks to the next part.

CONCLUSION

The purpose of this lab is to develop a structural verilog implementation of a system. Firstly, we programed a timer, witch is may be useful in almost every project. But through this example, we especially improved our ability to handle program pieces and verilog modules.

QUESTIONS

There is no question in this Lab manual