

Solutions PDF Generated from: solutions-openai-generated/lab-practical-exam/lab- practical-exam-solutions-set-03.json

Question A

Implement Verilog code for a counter that can count up or down or pause, based on button inputs from the users. The counter can also be enabled or disabled. The current value of the counter will be displayed on four 7- segment displays at the same time. One switch will determine if the counter is enabled or disabled. If the counter is disabled by the switch, the counter will be reset to zero. If the counter is enabled by the switch, 3 buttons, pressed individually, will determine if the counter counts up, counts down, or pauses. 7-segment display code is provided, also code for a clock divider is provided. All you have to do is to write Verilog code to monitor input buttons and a switch, manage the counter.

```
// 8-bit counter
module withCounter (
// input
    Clock, Reset, Switch, Up, Down,
// output
    LED
// ports
);
    input Clock, Reset, Switch, Up, Down;
    output LED [7:0];

// regs
reg [7:0] count;

// logic

// logic
always @(posedge Clk or posedge Reset) begin
    if (Rst == 1)
        count <= 0;
    else
        if (Switch == 0)
            count <= 0; // counter is disabled
        else if (Up == 1)
            count <= count + 1; // increment counter
        else if (Down == 1)
            count <= count - 1; //decrement counter
end

// seven segment display of the counter
reg [6:0] seg;

assign LED[7:0] = (Switch?seg[6:0]:8'b0000_0000);
```

```
always @ (count)
begin
    case (count)
        0: seg[6:0] = 7'b1000000;
        1: seg[6:0] = 7'b1111001;
        2: seg[6:0] = 7'b0100100;
        3: seg[6:0] = 7'b0110000;
        4: seg[6:0] = 7'b0011001;
        5: seg[6:0] = 7'b0010010;
        6: seg[6:0] = 7'b0000010;
        7: seg[6:0] = 7'b1111000;
        8: seg[6:0] = 7'b0000000;
        9: seg[6:0] = 7'b0010000;
        10: seg[6:0] = 7'b0001000;
        default: seg[6:0] = 7'b1111111;
    endcase
end

endmodule
```

Execution Time

0:00:23.998073

OpenAI Parameters

Model: text-davinci-003, Max. Tokens: 1024, Temperature: 1, N: 1