

# Solutions PDF Generated from: solutions-openai-generated/lab-practical-exam/lab- practical-exam-solutions-set-02.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.

```
'module displayCounter (
    //Inputs
    input clk, rst,
    input enable, countUp, countDown, pause,
    //Outputs
    output [6:0] sevenSeg
);

    //Registers
    reg [3:0] counter;
index
    //Clock Divider
    reg [15:0] clkDiv;
    always @ (posedge clk or posedge rst)
    begin
        if (rst)
            clkDiv <= 16'd0;
        else
            clkDiv <= clkDiv + 1;
    end

    //Counter
    always @ (posedge rst or posedge clkDiv[15])
    begin
if (rst)
        counter <= 0;
        //Enabled Counter
        else if (enable == 1'b1)
        begin
            //Up
            if (countUp)
                counter <= counter +1;
            //Down
            else if (countDown)
```

```

        counter <= counter -1;
    //Pause
    else if (pause)
        //Do Nothing
    end
else
    //Do Nothing
end

//Display Decoder
assign sevenSeg = (counter == 0) ? 7'b1000000 :
(counter == 1) ? 7'b1111001 :
(counter == 2) ? 7'b0100100 :
(counter == 3) ? 7'b0110000 :
(counter == 4) ? 7'b0011001 :
(counter == 5) ? 7'b0010010 :
(counter == 6) ? 7'b0000010 :
(counter == 7) ? 7'b1111000 :
(counter == 8) ? 7'b0000000 :
(counter == 9) ? 7'b0011000 :
7'b0001000;

endmodule

```

## Execution Time

0:00:13.076260

## OpenAI Parameters

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