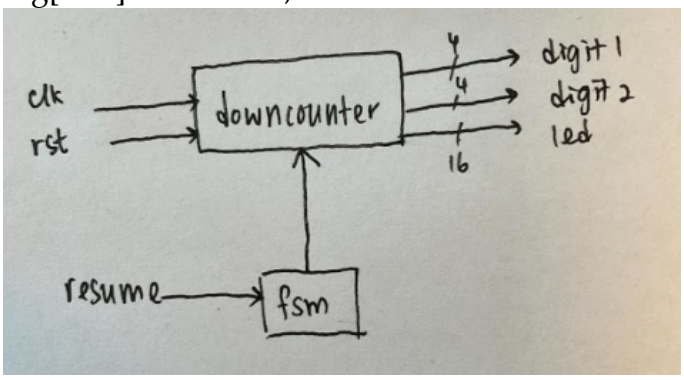
Prelab5 Report

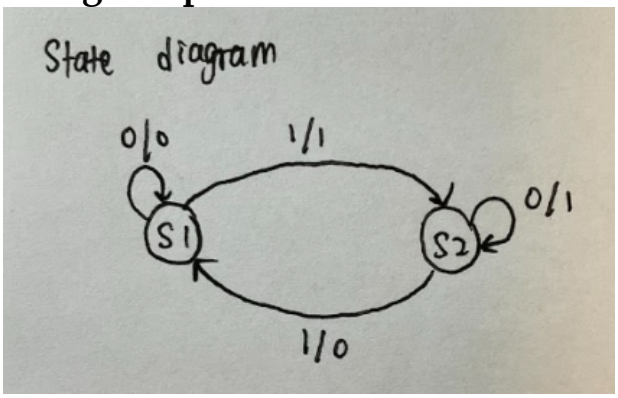
Design Specification

input clk;
input wire rst;
input wire resume；
output[3:0] digit1,
output[3:0] digit2,
output [15:0] led；

reg[3:0] digit1 = 4'd5;
reg[3:0] digit2 = 4'd2;
reg[15:0] led = 16'd0;



Design Implementation



state S1: not counting; state S2: counting
When at S1, resume(input) is 0, it will back to S1, since the program is not counting; while resume is 1, the state will change to S2, and start counting. When at S2, resume is 0, the program will continue counting, since the resume here become a pause signal for the state. When resume change to 1, the program will stop counting, and back to S1.
0/0: resume = 0; not counting
1/1: resume = 1; counting
0/1: resume = 0(this time means not pause); counting
1/0: resume = 1(this time means pause); not counting

The program is done by verifying whether the resume is push, when resume is push at the first time, the program will start counting, when resume is push for another time, the program will pause. After the resume push for third time, the program will continue to countdown again. The program will continue with these pushing of resume, unless the rst button is pushed, the program will be reset. This is also the reason why the rst is not included in the state diagram. Because once the rst is being pushed, the resume will be ignored, and the countdown will become 0, and start all over again.

Below attached with the waveform of the result:

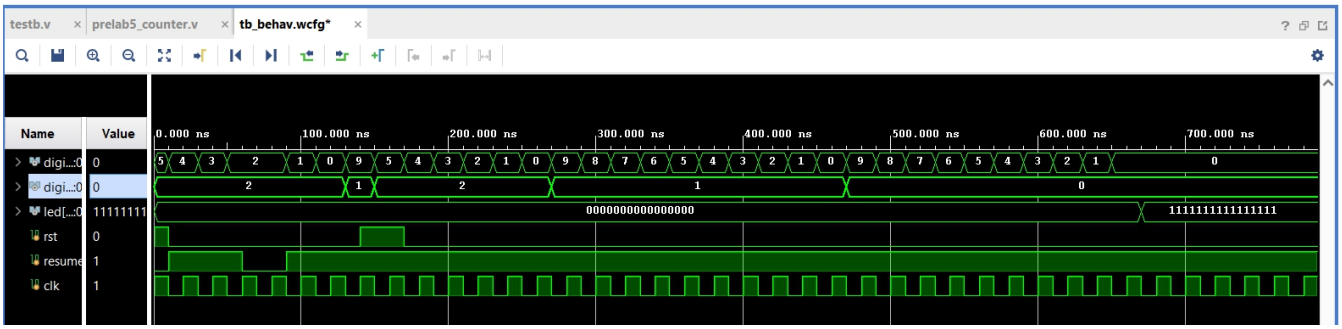


Figure 1: The simulation result of the program

Discussion

After done this prelab, I had a better understanding about the FSM.

Conclusion

The reset condition will always be the most powerful for this lab. And I had a better understanding about the FSM.