

# Lab 1 & 2 Report

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CSE 369: intro to Digital Design

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## Task 1 – SystemVerilog Design and Simulation

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### Question:

Figure out what the mux4\_1 module actually does.

Answer:

The mux4\_1 module simulates a device with 4 data inputs (i00, i01, i10, i11) and 2 select inputs (sel0, sel1). The data inputs i00 and i01 are run through an mux2\_1 module with sel0 as the select input. The data input i10 and i11 are run through another mux2\_1 module, with sel0 also used as the select input. The outputs of these two modules are run through one final mux2\_1 module, with sel1 used as the select input, and outputs this value.

v0 is equal to i00 when sel0==0 and is equal to i01 when sel0==1.

v1 is equal to i10 when sel0==0 and is equal to i11 when sel0==1.

The output of the module is equal to v0 when sel1==0 and is equal to v1 when sel1==1.

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## Task 2 – Logic Investigation

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### Question:

Which logical value (0 = FALSE = GND, 1 = TRUE = VDD) turns the red LEDs on?

Answer:

The value 1 = TRUE = VDD, turns the LED's on. In the file, LED 1 is set to 1 = TRUE = VDD and is lit up, while LED 0, which is set to 0 = FALSE = GND, is off.

### Question:

Which position (up or down) of the slider switch outputs a TRUE?

Answer:

The position up on the slider outputs a TRUE. LED 2 is connected to switch 2. When the switch is down the LED is turned off, which as indicated by the first question means the output is FALSE. When the switch is up, the opposite occurs, as the LED turns on, indicating an output of TRUE.

### Question:

Which position of the push button (pressed or unpressed) outputs a TRUE?

Answer:

The position unpressed on the button outputs a TRUE. LED 3 is connected to button 3. When the button is pressed the LED is turned off, which as indicated by the first question means the output is FALSE. When the button is unpressed, the opposite occurs, as the LED turns on, indicating an output of TRUE.

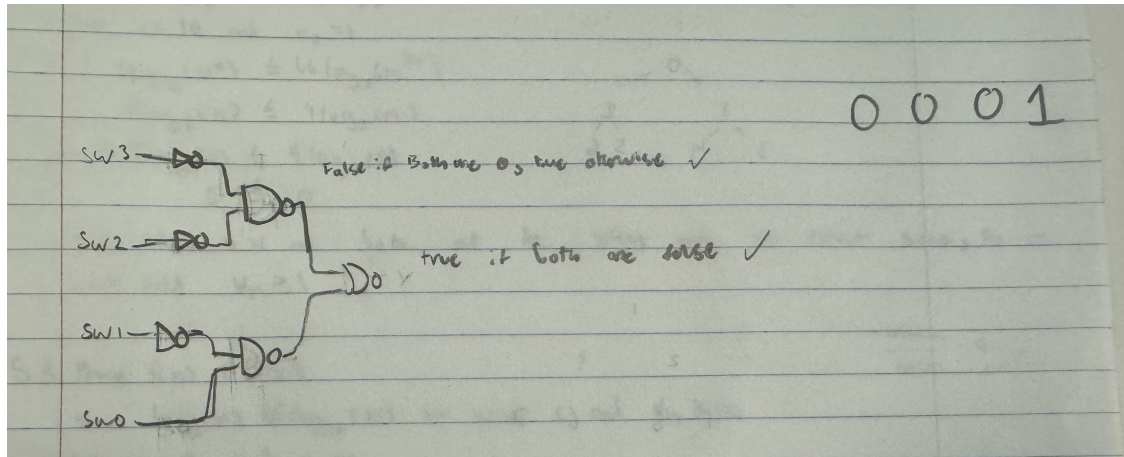
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## Task 4 – Digit Recognizer (Design)

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### Question:

A circuit diagram of your 1-digit recognizer circuit (For the digit 1, or 0001).



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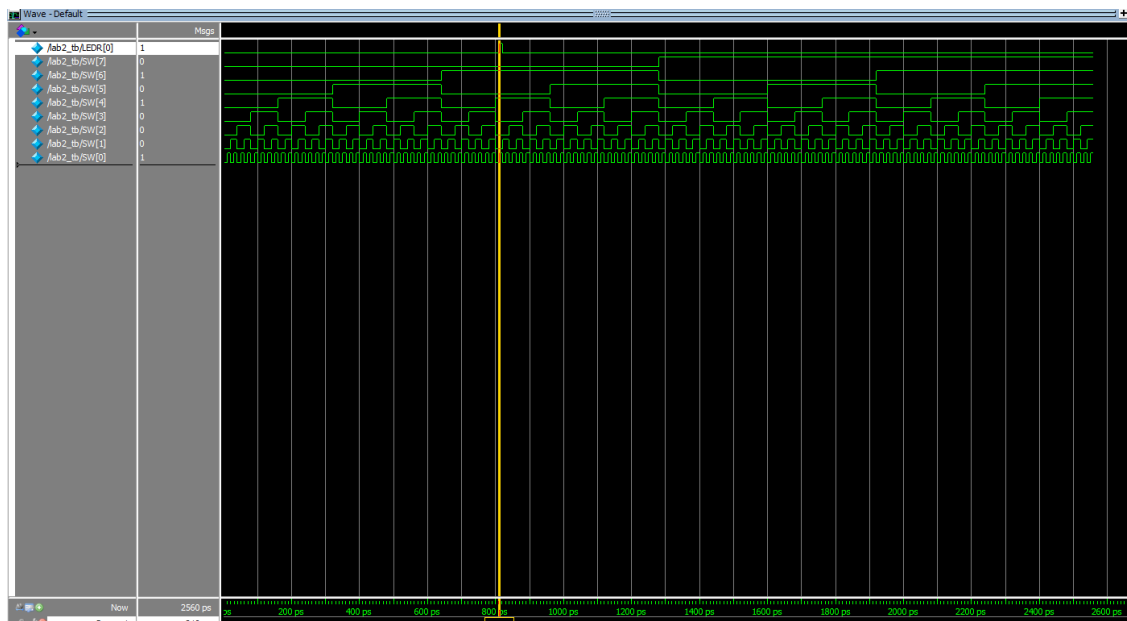
## Task 5 – Multi-Digit Recognizer (Implementation)

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### Question:

Screenshot of the 2-Digit Recognizer Simulation

As demonstrated in the model below, the module only outputs true and lights up the LED0 when the switches correspond to 0101 and 0001 for SW7-SW4 and SW3-SW0. This is to correspond with the last 2 digits of my student id, 5 and 1.



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**Reflection**

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**Question:**

How long did it take you?

Completing all of the lab took me around 3-3.5 hours