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Laboratory 1

Pre-Lab

1. Supply voltage and Ground

1.1 Connect +5V to input 0 of logic monitor. Observe and record the status of LED D0 of logic monitor.

When we connected the +5V with input 0 by jump wire, the D0 LED lighted up.

1.2 Connect GND to input 1 of logic monitor. Observe and record the status of LED D1 of logic monitor.

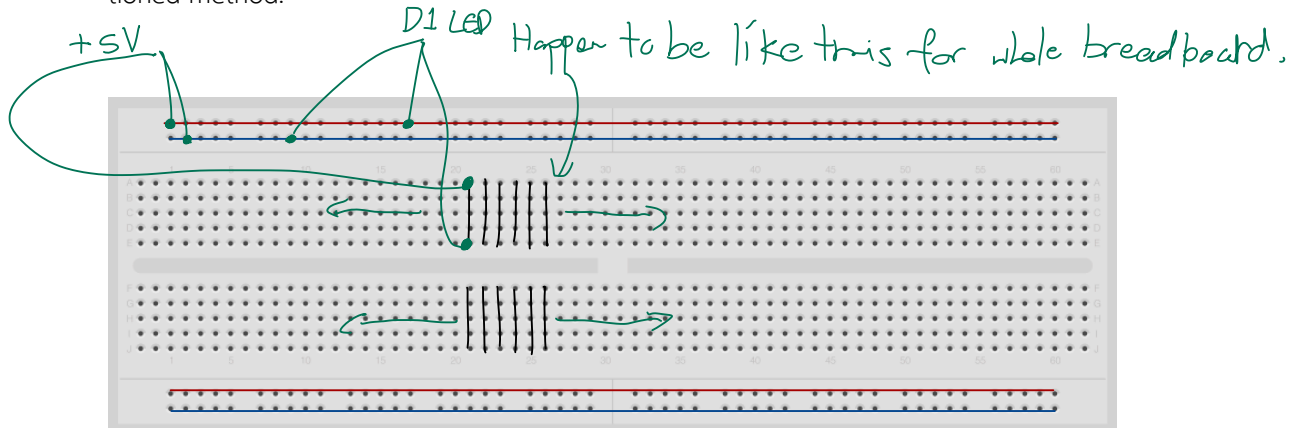
When we connected the GND with input 1 by jump wire, nothing happen.

Instructor's signature

Sugar

2. Circuit of Proto-board (breadboard)

- 2.1 Connect +5V to the upper leftmost hole of the board.
- 2.2 Connect a wire to input 0 of logic monitor
- 2.3 Use the wire to find out the circuit of the Proto-board. (Hint: If the holes are connected, LED0 will be lit up.)
- 2.4 Sketch the connection of each hole of proto-board as found by using the aforementioned method.



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3. Logic Switch

- 3.1 Connect logic switch D7 to input 7 of logic monitor.
- 3.2 Change the status of the logic switch D7. Observe and record the status of LED D7

If we switch the D7 switch from Logic-0 to Logic-1, the D7 LED will light up.

If we switch the D7 switch from Logic-1 to Logic-0, the D7 LED will turn off

Instructor's signature

4. Debounce Switch

4.1 Connect the falling edge output of the switch 2 (SW-2) to the input 0 of the logic monitor. Observe and record the status of LED D0.

As we connect the falling edge of SW-2 to D0 LED, the D0 LED light up

4.2 Press switch 2 (SW-2). Observe and record the status of LED D0.

If we press the SW-2, the D0 LED blink

4.3 Press and hold switch 2 (SW-2). Observe and record the status of LED D0.

If we press and hold SW-2, the D0 LED stay off until we release the SW-2

4.4 Connect the rising edge output of switch 2 (SW-2) to input 1 of logic monitor. Redo the experiment as in the falling edge case

→ As we connect the SW-2 (rising edge) to the D1 LED, nothing happens, the D1 LED is still off.

→ As we press the SW-2, the D1 LED blinks.

→ As we press and hold SW-2, the D1 LED stays light up until we release the SW-2.

Instructor's signature

Jaguar

5. Debounce Switch and Logic Probe

5.1 Connect the falling edge of switch 1 (SW-1) to the input terminal of logic probe. Observe and record the status of all three LEDs.

As we connect SW-1 (falling edge) to the input terminal of logic probe, the red LED (HI) lights up.

5.2 Press switch 1 (SW-1). Observe and record the status of all three LEDs of the logic probe.

As we press SW-1 (falling edge), the red LED (HI), green LED (LO) and yellow LED blink.
Then after that the green LED (LO) and yellow LED stay off while the red LED (HI) stays light up.

5.3 Press and hold switch 1 (SW-1). Observe and record the status of all three LEDs of the logic probe.


As we press the SW-1 and hold the green LED (LO) stay light up,
the yellow LED (PULSE) blink and the red LED (HI) stay turn off.
After we release the SW-1, the green LED (LO) stay turn off the yellow LED (PULSE)
blink and the red LED (HI) stay light up.

5.4 Remove the wire that connected to the falling edge output of switch 1 (SW-1).

5.5 Connect the rising edge output of switch 1 (SW-1) to the input of logic probe. Redo the experiment as in the falling edge case.

→ As we connect the input of logic probe to SW-1 (rising edge),
the green LED (LO) light up and stay light up.
→ As we press SW-1, the green LED (LO), yellow LED (PULSE) and the red LED (HI)
blink
As we press the SW-1 and hold the red LED (HI) stay light up,
the yellow LED (PULSE) blink and the green LED (LO) stay turn off.
After we release the SW-1, the red LED (HI) stay turn off the yellow LED (PULSE)
blink and the green LED (LO) stay light up.

Instructor's signature



6. Pulse Generator and Logic Probe

6.1 Connect the output terminal of pulse generator to the input of logic probe. Observe and record the status of all three LEDs of the logic probe.

The green LED (LO) will stay light up for half a second then switch to red LED (HI).
After changing, the red LED (HI) will stay light up for half a second then it switch back to green LED (LO) and the yellow LED (PULSE) will blink every time the red LED (HI) light up.

6.2 Change the frequency of the pulse generator by pressing the switch one time. Observe and record the status of all three LEDs of the logic probe.

All LED blink at the rapid rate.

6.3 Set the frequency of pulse generator to be 1 KHz. Observe and record the status of all three LEDs of the logic probe. Explain your observation result.

All LED stay on.

Instructor's signature



7. Adjustable Power Supply

7.1 Turn the knob to the leftmost position.

7.2 Connect the output of the adjustable power supply to the input terminal of the logic probe. Observe and record the status of all three LEDs of the logic probe.

The green LED (LO) stay light up.

7.3 Gradually turn the knob to the right. Observe and record the status of all three LEDs of the logic probe. What is the position of the knob such that the pulse LED (yellow LED) is on?

At first (at lowest), the green LED stay on until we start rotating.

The yellow LED (PULSE) light up when we rotate to the half of the full scale. But it will turn off when change scale to be higher or lower.

As we hit max the red LED stay light up.

Instructor's signature

Singar

8. Seven Segment Display

8.1 Connect the output of logic switch D0 to the input A of the left seven segment display.

8.2 Connect the output of logic switch D1 to the input B of the left seven segment display.

8.3 Connect the output of logic switch D2 to the input C of the left seven segment display.

8.4 Connect the output of logic switch D3 to the input D of the left seven segment display.

8.5 Connect the output of logic switch D4 to the input DP. Of the left seven segment display.

8.6 Find the status of logic switches D0-D4 that displays the following number.

- 0

D0 = 0
D1 = 0
D2 = 0
D3 = 0
D4 = 0

- 5

D0 = 0
D1 = 1
D2 = 0
D3 = 0
D4 = 1

- 8

D0 = 0
D1 = 0
D2 = 0
D3 = 1
D4 = 0

- A

D0 = 0
D1 = 1
D2 = 0
D3 = 1
D4 = 0

- F.

D0 = 1
D1 = 1
D2 = 1
D3 = 1
D4 = 1

Instructor's signature

Singer