**COEN 12 Lab 1 Report**

Introduction: In this lab, we explored what the bread board can do. We checked out the LEDs, the function generator, the actual breadboard, and the logic switches. In the prelab, we wrote down a circuit graph that involves an alarm-motion sensor-switch system. We reproduced that on the breadboard using wires, ICs, a Speaker, and a motion sensor.

Truth Table:

Motion Sensor (IN)	Switch (IN)	Light (OUT)	Alarm (OUT)
0	0	0	0
0	1	1	0
1	0	1	0
1	1	1	1

Circuit:
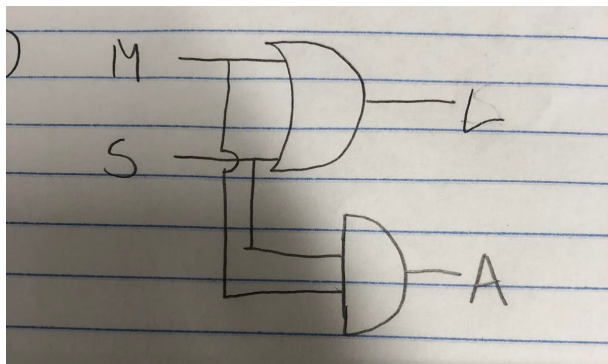
Part 1:

1.

(i)

When connected the red light of the corresponding LED turned on and the green turned off.

(ii)

When connected to the ground, the corresponding green light turned on while the red light turned off.

Observations:

The 5V caused one red LED to be on, while the ground caused one green LED to be on. The red LED must be connected internally to a ground source while the green LED must be connected internally to a 5V source.

2.

(i)

When the switch is up then the red LED is on, and when the switch is down then the green LED is on.

3.

(i)

The red and green light alternated being on. It alternated 17 times in 30 seconds.

(ii)

Frequency increases

(iii)

Looks like both are on at the same time. What is actually happening is that they are changing too quickly to see.

(iiii)

The adjacent LEDs light up as well. This could be explained by asking it to alternate so quickly that it generates more light than the previous case.

Motion Sensor Circuit:

We first tried to get the motion sensor to function correctly. Once we were confident that the motion sensor functioned, we then worked on adding in the switch. We combined the signals from the switch and the motion sensor into the OR IC. We took the output of that IC and directed it to an LED. From there, we took a signal from the switch and a signal from the motion detector and put them as inputs to an AND IC and then directed that output to the alarm so that when they are both on the alarm sounds, and when one or both of them is one then the LED turns on.

We learned that when "splitting" signals or sending the same signal to two different locations, we can't do it in the vicinity of an ICs. We need to do it in an isolated location. We didn't do this the first time so our circuit experienced some inconsistencies. Once we did follow this rule, our alarm system worked correctly. Also, need to make sure we have IC pins that are in good condition. We were stuck at one point because we didn't realize that our IC pin was damaged.

The circuit we ended up with was the same as the one we drew up in the prelab.

(Q) Suppose the alarm system is functioning in such a way that the alarm (A) is activated as soon as motion is detected. List the possible issues with this system and how could you determine if the system is acting incorrectly.

In this case, the problem with this setup is that the alarm activates without the input of the switch having an effect. You would be able to observe this issue because the alarm would go off even if the switch is off, which goes against how we really want the alarm system to operate.

(Q) Suppose the alarm system is operating in such a way that the alarm (A) goes on continuously regardless of the state of the other inputs. List the possible issues with this system and how you could fix this issue.

The issue with this situation is that you would be unable to tell if the alarm is real or not because it is always on. Make the speaker consider input from the switch and the motion sensor.