Title: **Multi Security System**

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Objectives

1. To be able to implement a door-like security system with multiple ways to access it using buttons
2. To be able to demonstrate how the measured parameters (sound, luminance, and humidity) of various sensors (sound sensor, photoresistor and humidity sensor) will be compared to the threshold values in opening or accessing the gate.
3. To be able to demonstrate how the servo motor and stepper motor will open the gate as a response to each of the sensor
4. To be able to demonstrate how the LCD display will simultaneously print the parameter being measured

Discussion

Most security systems nowadays tend to rely on user-input string characters such as password and pin code. These can be seen in online accounts, safe boxes, and even houses for gate or door-lock. The student has realized that sensors can also be applied in implementing such security system on doors or gates. Moreover, multiple ways of accessing the door can also be added as feature to the security system by using buttons to direct which sensor to be used and which parameter to be compared with threshold values. The security system would utilize three buttons, each representing a way to access the gate.

The first button would be for the operation in the sound module. Once pressed, the measured parameter of the sound module will be compared to the set threshold value. If the measured sound reaches or exceeds the threshold value, the security system would accept it as a valid entry and then opens the gate and closes it after a few seconds. Hence, the user would be required to generate a sound to try accessing the gate.

On the other hand, the second button would be for the operation in the photoresistor. Once pressed, the measured parameter of the photoresistor will be compared to the set threshold value. If the measured light reaches or exceeds the threshold value, the security system would treat it as a valid entry and starts opening the gate and closes it after a few seconds. When this option is chosen, the user would be required to light above the system to access the gate.

The third button would be used for the operation in the humidity sensor. Once pressed, the measured parameter of the humidity sensor will be compared to the set threshold value. If the measured humidity reaches or exceeds the threshold value, the security system would treat it as a valid entry and then opens the gate and closes it after a few seconds. The user would be required to increase the humidity measured by either sticking a moist object around the sensor or by sticking their own finger around it.

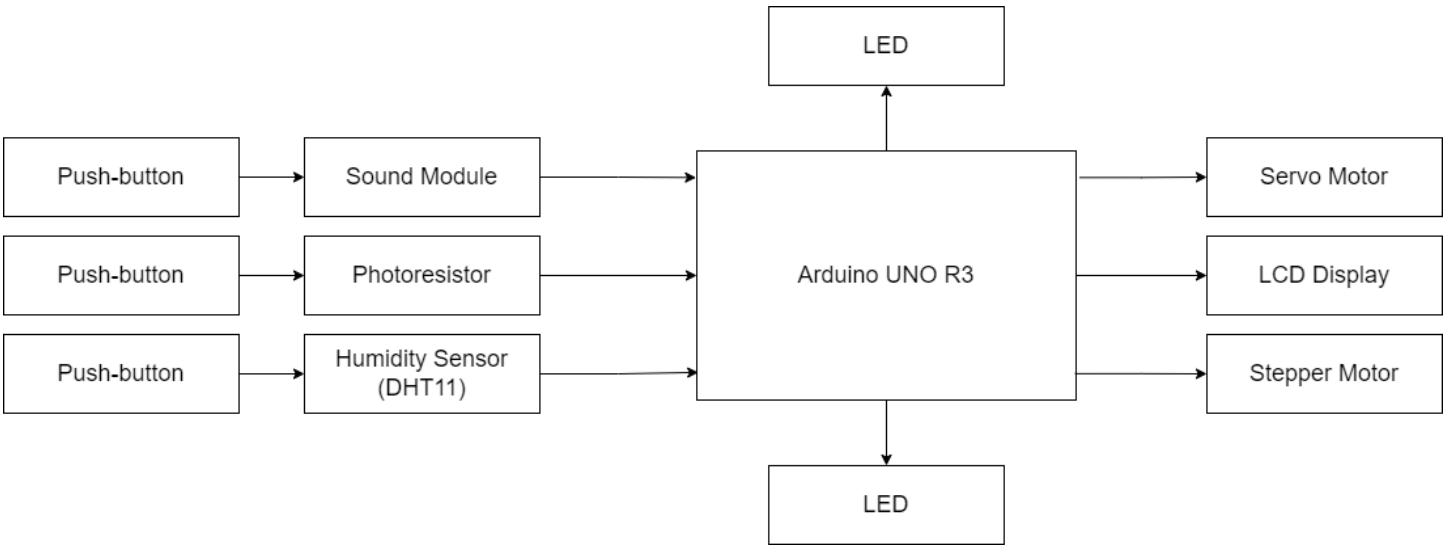
Other than the said components, two LEDs would be included to signify if the system is ready to accept data or is operating. This will be operated as the system's initial state when high signals from any of the buttons are not sent yet. Moreover, the student would create functions for operations per sensor to minimize the code. The operation of motors to open or close the gate would be placed as well in the functions of sensors. A series of if-else statements can be utilized as the structure of the main code to traverse each operation depending on the pressed button. To simplify what the multi security system is, it is a security system that has sound security, luminance security, and humidity security systems in one system. In addition, the student would make sure to calibrate the set threshold values properly so that the system would only respond to an intended stimuli or signal.

The system would have a simple system casing such as using a cardboard or box for the prototype. The prototype would be simulated while it is connected to the device as its power source.

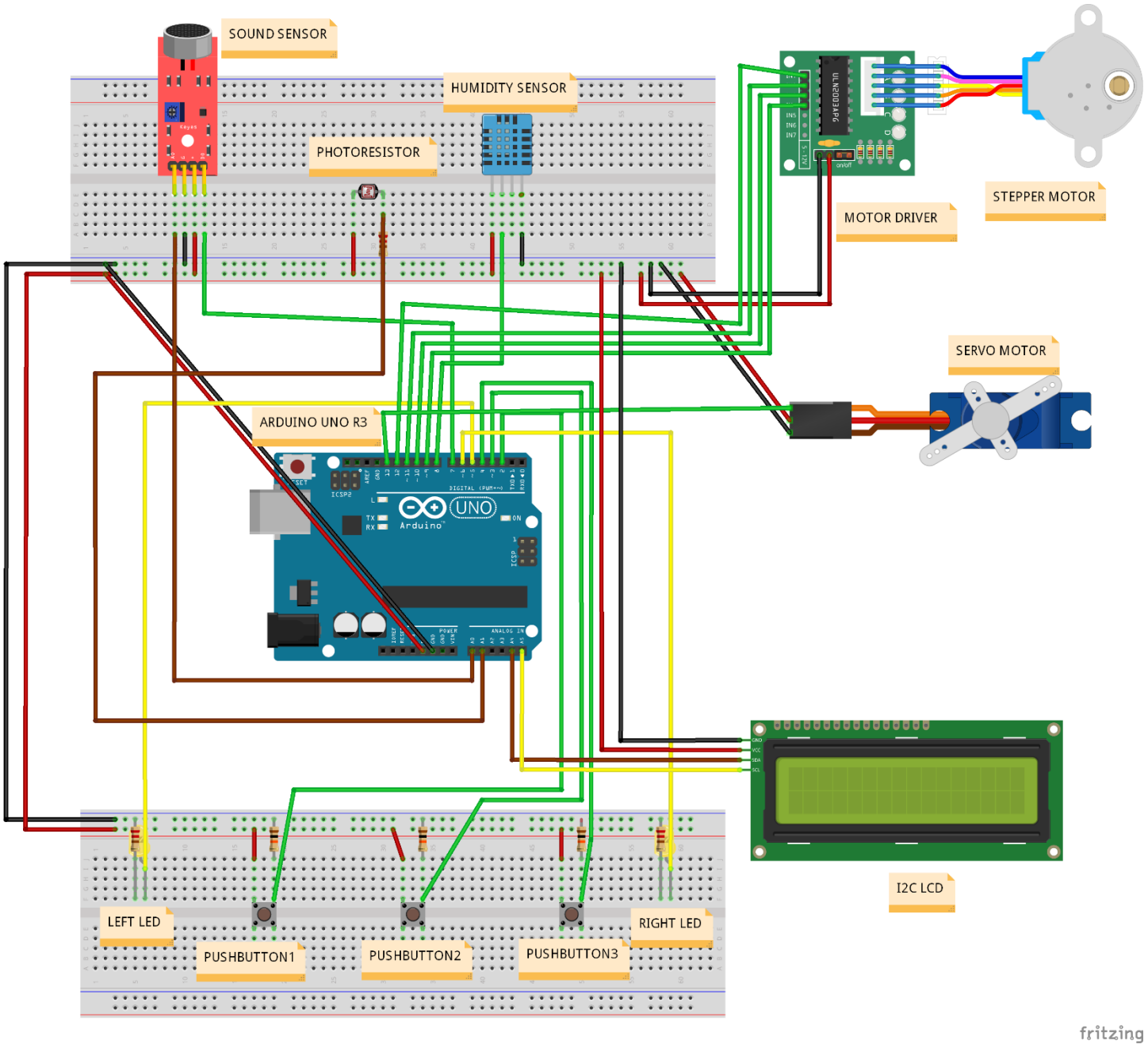
List of materials:

- 1 pc Arduino UNO R3 Microcontroller
- 1 pc Breadboard
- 1 pc LED Display
- 2 pcs LED
- 1 pc Servo Motor (SG90)
- 1 pc Stepper Motor
- 1 pc Stepper Motor Driver
- 3 pcs Push-button
- 1 pc Sound Module
- 1 pc Photoresistor
- 1 pc Humidity Sensor (DHT11)
- Jumper Wires

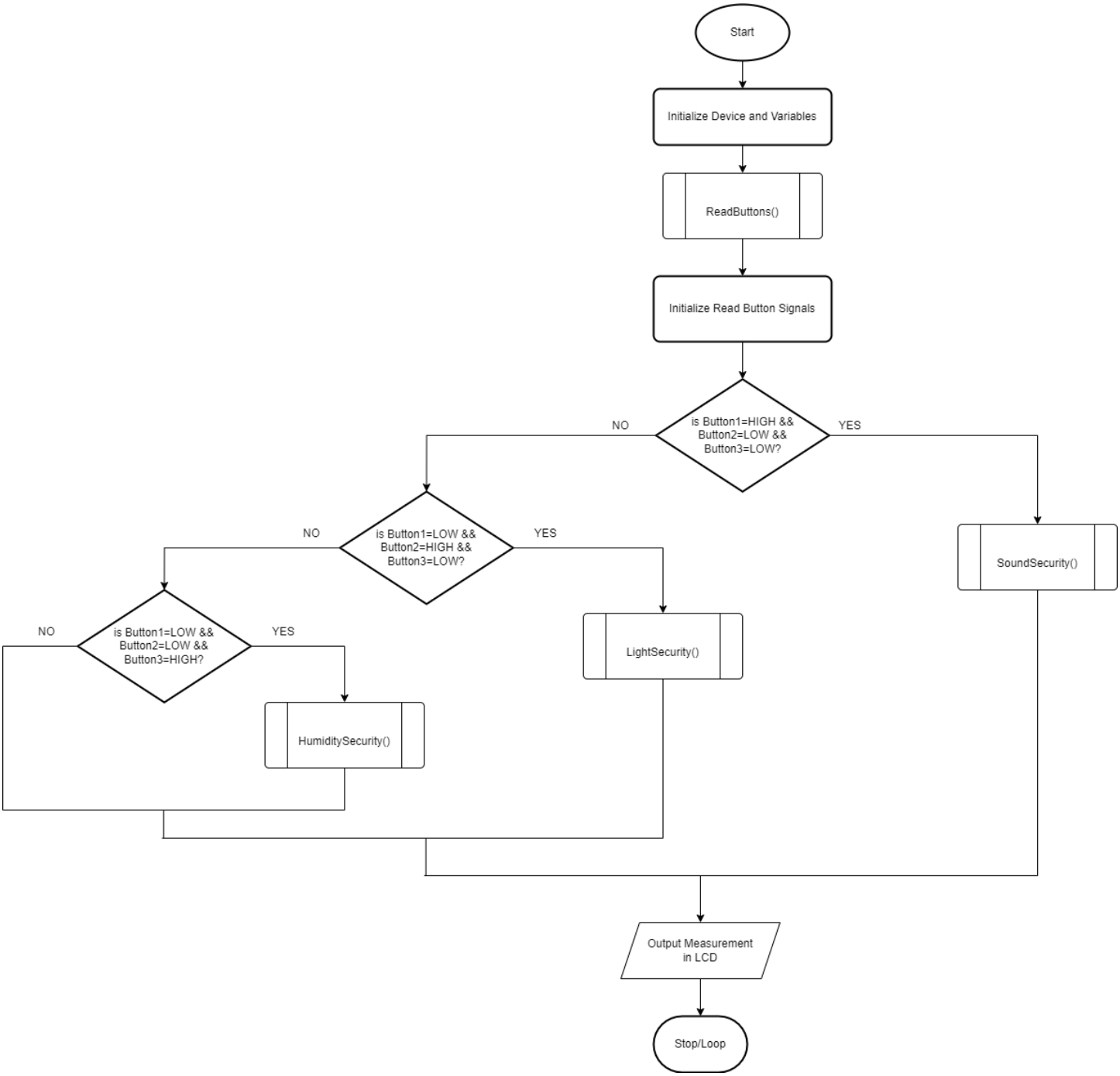
Block Diagram:



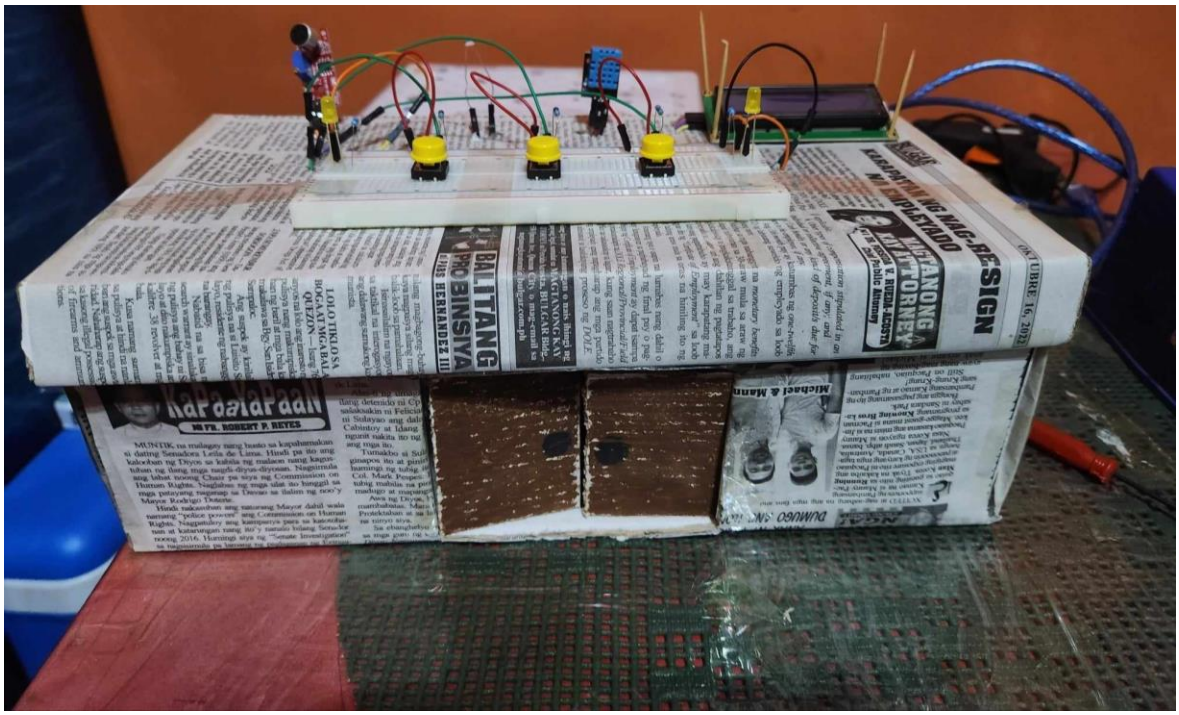
Circuit Diagram:



Flowchart (process/how the system will work):



Prototype Setup: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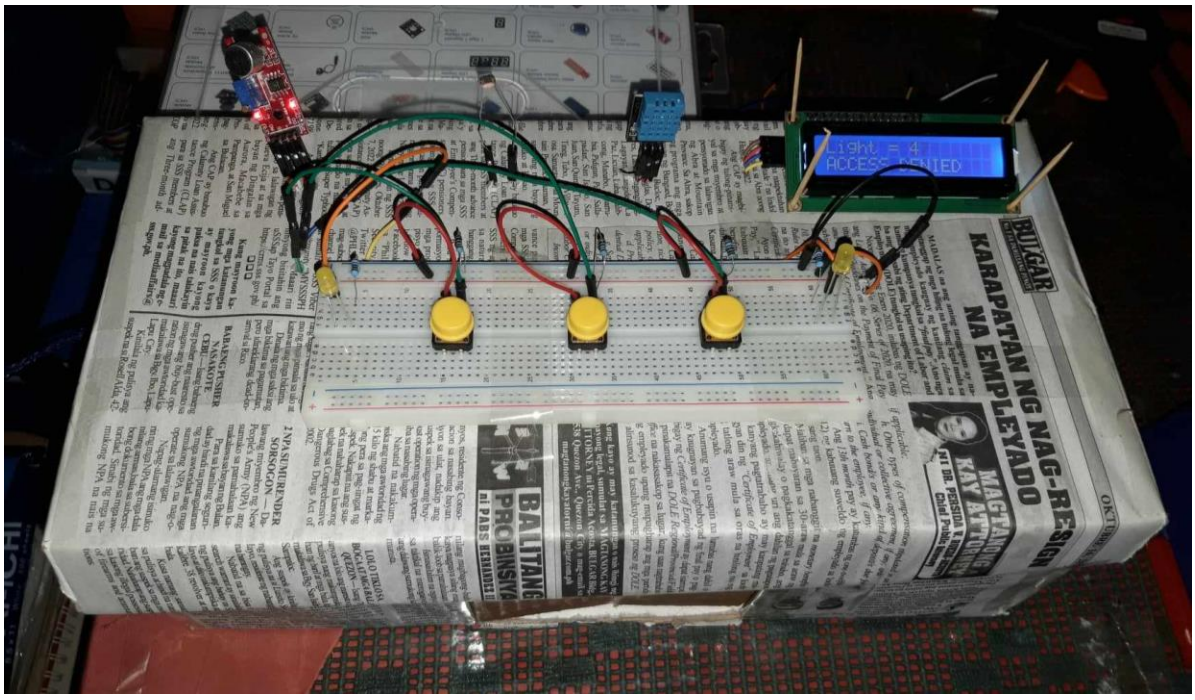
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